FLORISTIC STUDY OF WAYANAD DISTRICT WITH SPECIAL EMPHASIS ON CONSERVATION OF RARE AND THREATENED FLOWERING PLANTS

THESIS

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in

BOTANY

by

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Supervising Teacher

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DEPARTMENT OF BOTANY

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Dedicated

to

My late father-in-law

...without his inspiration and love, this humble endeavour would not have been a reality...

And to

My beloved Parents & Mother-in-law

for giving me all the love and education...

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10th September 2009

CERTIFICATE

This is to certify that the thesis entitled, **Floristic Study of Wayanad District with Special Emphasis on Conservation of Rare and Threatened Flowering Plants** submitted by Mr. M. K. Ratheesh Narayanan for the degree of Doctor of Philosophy in Botany of the University of Calicut is a record of *bonafide* research work carried out by him during the period of his study under my supervision and that the thesis has not previously formed the basis for award of any degree, diploma, associateship, fellowship or other similar titles or recognition.

Mr. M. K. Ratheesh Narayanan has successfully completed the qualifying examination prescribed by the University of Calicut as part of the Ph. D. programme.

M. Sivadasan
Supervising Teacher

DECLARATION

I hereby declare that the thesis entitled, **Floristic Study of Wayanad District with Special Emphasis on Conservation of Rare and Threatened Flowering Plants**, is a record of my *bonafide* work submitted by me in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Botany of the University of Calicut and has not been submitted to any other Universities for the award of any other degree, diploma, or similar titles of recognition.

Calicut University **M. K. Ratheesh Narayanan**

10.09. 2009

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INTRODUCTION

Floristic explorations and taxonomic studies can provide efficient and convenient information about the nomenclature, distribution, ecology, utility of various plant species, and thus about an ecosystem. Taxonomy is an integrated and, perhaps, intuitive science of identifying, naming and classifying plants. This may be considered as the oldest of sciences in the world, as the primitive man had to distinguish the plants that he can eat safely, from those which are poisonous and inedible. But, often this branch of botany is considered as old-fashioned and out-dated and the appearance of many subjects making use of modern technologies and sophisticated instruments, only added contempt to the neglect (Subramanyam & Nayar, 1974a; Henry & Daniel, 1988). Now there is great revival for this subject in view of the alarming erosion of species and ecosystems. The realisation of the economic potential of the biodiversity and the necessity for its preservation for the future welfare of mankind has suddenly boosted the stock of the subject of Taxonomy (Manilal, 1997). But unfortunately the number of systematic botanists is shrinking, with the result that the extent of ignorance of the number of species of organisms on earth is becoming vast (Swaminathan, 1992). Our knowledge about the diversity and distribution of plant species is very poor and inadequate that we still do not know exactly how many species exist on our earth. Wilson (1988) calculated that the total number of named species is about 1.4 million. It was estimated that around 7500 species of organisms are becoming extinct every year (Chatterjee, 1995) and many of them disappear even before known to the scientific world (Myers *et al.*, 2000; Pimm & Raven, 2000). Current extinction rate is 100-1000 times of what they would be in nature (Reid *et al.,* 1989). The gravity of the situation is so severe in the tropics due to variety of reasons, the foremost being habitat destruction at an alarming rate leading to loss of biodiversity essential for the sustenance of life on earth. Thus, conservation of biodiversity has gained prime consideration all over the world since the Earth Summit at Rio de Janeiro in 1992. It is estimated that tropical forest harbour about 70% of living organisms of the whole world, of which roughly 20% of the total are confined

as exclusive endemics in 18 areas through out the tropical forests (Myers, 1988). By the destruction of tropical forests alone we may lose about 25% of the total species by the year 2015 (Raven, 1988).

India is one among the 12 mega-biodiversity centres identified in the world having rich biodiversity indices, vast flora and fauna coupled with different topographical, ecological, climatic factors and about 18,664 taxa of vascular plants with 5725 endemics (Nayar, 1996). Presently the flora of India is a relict of only what was dominating before the dawn of civilizations in India (Mani, 1974). Warner (1982) estimated that 80% of the geographical areas of India were under forest cover in 3000 BC, which is now left with 19.1% of the total land area. Among the 34 Biodiversity Hotspots (Myers *et al.*, 2000; CIF, 2004) identified, two are in India. The most important topographic feature of Peninsular India is the 1400 km long Western Ghats along its western margin traversing the states of Tamil Nadu, Kerala, Karnataka, Goa, Maharashtra and Gujarat. Western Ghats is the second largest endemic centre in India with 1550 endemics out of the estimated 4250 species of vascular plants (Nayar, 1997). Recent studies (Sasidharan, 2007; Easa, 2003) showed that more than 5000 species of vascular plants with 1700 endemics were reported from Kerala part of Western Ghats itself. Since many hills of Peninsular India were formed during Archaean and Precambrian periods, the Western Ghats is more senile than the Himalayas (Mani, 1974) and hence the genetic stock of the biodiversity of the Western Ghats is the most attractive for both evolutionists and ecologists. Known locally as the *Sahyadri* Hills, the Western Ghats cover an area of 125,548 km^2 in a stretch of 1,600 km that is interrupted only by the 30 km wide Palghat Gap. The Western Ghats being the separating barrier of the two geographical regions of Peninsular India namely, the Malabar Coast and the Deccan (Hooker, 1904; Chaterjee, 1940), has both the Deccan flora along the leeward side and Malabar Coast flora along the windward side. The most outstanding feature of the Western Ghats is the formation of tropical rainforests along the windward sides facing the Arabian Sea. The heavy annual input (250-500 cm) of southwest Monsoon and northeast Monsoon along the windward side favours a typical rain forest and known for many species which are apparently endemic to the region.

As early as in 1904, Hooker had drawn attention to the distinct flora of Western Ghats, which he called the 'Malabar' floristic region. The presence of Bamboos, Dipterocarps, Clusiales, Myristicas and Palms has much contributed to its distinction. The major vegetation types identified are tropical evergreen forests, moist deciduous forests, dry deciduous forests, scrub jungles, sholas, and savannas including high rainfall savannas, peat bogs and Myristica swamps. The salient features of the vegetation of the Western Ghats have been discussed by Nair and Daniel (1986) and Subramanyam and Nayar (1974b). In southern Western Ghats, Nilgiri-Silent Valley and Wayanad-Kodagu localities constitute about 150 endemic species (Nayar, 1996). Although the exact number keeps varying with the author and time, what is of interest is that nearly 38% of all species of flowering plants in the Western Ghats are endemic. Sixty three percent of India's evergreen woody plants are endemic to the Western Ghats (Nayar, 1997).

Recent studies reveal that Kerala part of the Western Ghats itself harbors 4679 taxa of angiosperms with 1637 endemics (Sasidharan, 2004). Many of the endemic flowering plants in this region are very restricted in distribution with small population and it is estimated that about 10% of endemic flowering plants are presumably in danger of extinction. The floristic studies in Kerala, during the last three decades could come up with more than 300 taxa of vascular plants new to science (Manilal & Raveendrakumar, 1998). The loss of habitat and speciation essentially make the periodic plant inventories, especially of biological hotspots, indispensable for futuristic studies. The detailed biological studies in such hotspot areas provide ample scope for formulating effective management practices. Tracing out our cryptic biodiversity and linking it with other inter disciplinary aspects of bioscience provides a platform for all biological research leading to economic benefits and agricultural prosperity. This has also become important in the wake of importance on intellectual property rights on biodiversity, which is being exploited by developed countries.

The scenario

The Nilgiris or the Blue Mountains are a compact plateau of about 2,590 sq. km. It is the meeting place of three mountain systems of Peninsular India, the

Sahyadri, joining it opposite to Mukkurthi peak, the southern Ghats across the Palghat Gap in the south, and the Eastern Ghats in the northeastern corner (Chaterjee, 1995). The present study area, Wayanad district lies along the northwest corner of Nilgiri Mountains. The biodiversity of Wayanad district is diverse, but highly threatened and under explored. Available records show that a few sporadic collections have been made from Wayanad during the last century by botanists like Beddome and Lawson. Most of the collections are housed in MH, CAL and K and have been included by Gamble and Fischer in their *Flora of the Presidency of Madras* (Gamble & Fischer, 1915-1936). Based on those materials, they have published a few new taxa in different issues of *Kew Bulletin*. After the reorganization of the Botanical Survey of India Ellis and Chandrabose explored 'Chanthanathodu' (part of Periya R.F.) and Chedeleth forest ranges intensively during 1965-67. In 1977, a few students made some sporadic collections around Thirunelli, Periya and Begur and these specimens are deposited in the Herbarium of the Presidency College, Madras (PCM). Ramachandran and V.J. Nair (1988) who have studied the flora of Cannanore district covered some floristic regions of northern part of Wayanad district. Among the other works of significance on the Botany of this area is one by Ellis *et al.,* (1968). However, there were no serious attempts made to analyse the floristic composition of this region and there is no comprehensive published account on the flora of Wayanad district. In this context, the present study is an attempt to quantify the diversity of flowering plants of Wayanad district, a biodiversity rich area, with special emphasis on rare, endemic and threatened plants.

STUDY AREA

Wayanad district (Figure 1) is with a hilly terrain on the southern Western Ghats and located in the northeast part of Kerala at a distance of about 76 km from the seashores of Kozhikode. The area lies between North latitude 11^0 26' to 12^0 00' and East longitude 75^0 75' to 76^0 56'. The altitude varies from 700-2100 metres above MSL. It is bounded on the east by Nilgiris and Mysore district of Tamil Nadu and Karnataka respectively, on the north by Coorg district of Karnataka, on the south by Malappuram district and on the west by Kozhikode and Kannur districts of Kerala. To the west and south are the low lands of Malabar, to the east rise the Nilgiri hills, to the northeast lies the Mysore plateau, while to the northwest the chain of Ghats stretches away in to the Coorg. Wayanad along with other part of north Malabar remained with the Presidency of Madras even after independence. When the state Kerala was formed in 1956, Wayanad was a part of Cannanore district and the southern part of Wayanad was later added to Calicut district. Wayanad got the status of district in November 1, 1980 and the total geographic area is about 2136 sq. km. The forest records of 1887 show that Wayanad had about 75801 acres of reserve forest and 111897 acres of reserve land. According to the forest department, the present forest cover is about 787 sq. km.

The name Wayanad is said to be derived from different names like 'Waynad' (upper land- as its name denotes, an elevated plateau), 'Vayalnadu' (land of paddy fields) and 'Vananad' (land of forests) (Gopalan Nair, 1911). This district contributes significantly to the foreign exchange earnings of the state through its cash crops like pepper, cardamom, coffee, tea and other condiments like ginger and turmeric. The district is unique for its rich wealth of flora (earning it the sobriquet 'green paradise') and for the diverse ethnic cultures that inhabit the land.

A brief history

Historians are of the view that organized human life existed in Wayanad at least ten centuries before Christ (Johny, 2001). The earliest record of a ruling family in Kerala exists in Wayanad in the shape of a rock-inscription in the

Edakkal Caves. One of the inscriptions was suggested by Dr. Hultzch to be 'the writing of the glorious Vishnu Varma, the propagator of the 'Kudumbiyil family' (Gopalan Nair, 1911; Johny, 2001). Recorded history of this district is available from the beginning of 18th century with the rule by the Rajas of the Veda tribe. Wayanad stands unique in its political history and this was the only taluk in Malabar, which never bowed its neck to the Mysore Yoke and defied the British power until its ruler fell, fighting against the troops of the East India Company. This ruler was Kerala Varma Raja of Pazhassi Kovilakam of Kottayam dynasty. His history is practically the political history of Wayanad from 1786 to 30th November 1805. When Hyder Ali became the ruler of Mysore, he invaded Wayanad and brought it under his sway. Though in the days of his successor Tipu Sultan, Wayanad was restored to the Kottayam royal dynasty, the Sreerangapattanam truce that Tippu made with the British lead to British hegemony over the entire Malabar region, though only after facing fierce encounters from Pazhassi Raja (Gopalan Nair, 1911). The British domination changed Wayanad's historical trajectory particularly after it opened up the plateau for cultivation of tea and other cash crops. Roads were laid across the dangerous slopes of Wayanad, from Kozhikode and Thalassery. These roads were extended to the cities of Mysore and Ooty through Gudalur. Through the roads poured in settlers from all parts of Kerala and the virgin forestlands proved a veritable goldmine with incredible yields of cash crops (Johny, 2001)

Topography

Wayanad is a mid level plateau, lies in the northwest corner of the Nilgiris. Placed on the southern tip of the Deccan plateau, Wayanad's prime glory is the majestic Western Ghats ranging an altitude from 600 to 2100 m above sea level. It is an east-sloping, gently undulating, medium elevation plateau abruptly descending in the west to Kerala plains but merging imperceptibly with the Mysore plateau to the east. Topographically the district can be divided in two parts, the southwestern part and the northeastern part. Along the southwestern corner of Wayanad, there is a knot of isolated high ridges. This is the Chembra-Vellarimala mountain range closely similar to the Nilgiris

in ecological conditions. The northeastern corner of Wayanad rises up to a hill range called the Brahmagiris. This forms the western and southwestern border of the Coorg plateau. Wayanad descends extremely steeply to the plains of Kerala to the west with individual mountain peaks like Sughandhagiri, Kurichiarmala and Banasuramala. In the center of the district, the undulating terrain does not acquire much altitude, except in two places like Kurumbalakota (1100 m) and Manikkunnumala (1450 m). From the highest altitude of the Western Ghats on the southwest and western border of the district, the plateau of Wayanad gradually slopes down towards northeast and eastward. The northeastern sides are flat and open (Wayanad wildlife Sanctuary). Topography of this Sanctuary is gently undulating with occasional hillocks and the highest peak is Karottimala (1158 m).

Climate and soil

Wayanad has a salubrious climate. The mean average rainfall in this district is 2608 mm. Lakkidi, Vythiri and Meppadi are the high rainfall areas in Wayanad. Annual rain fall in these high rainfall areas ranges from 3000 to 4000 mm. High velocity winds are common during the southwest monsoon and dry winds blow during March-April. High altitude regions experience severe cold. In Wayanad the mean maximum and minimum temperature for the last five years were 29°C and 18°C respectively. This place experiences a high relative humidity, which goes even up to 95 per cent during the southwest monsoon period. The dale, 'Lakkidi', nestled among the hills of Vythiri taluk has the highest average rainfall in Kerala. There is a decreasing trend in rainfall in this area and the average rainfall data show that the lowest rainfall received from northeast monsoon is in Wayanad district. The soil resources vary by region and consequently the crops, forest types and natural vegetation also varied. These variations bestow the land with a rich natural endowment of biodiversity. On the plateau, the topsoil is rich clayey loam, generally 0.75 to 2.5 m deep with a red gravelly or yellowish clayey sub-soil layer of considerable depth. It promotes a luxuriant growth of vegetation, which makes Wayanad clothed in uniform greenery.

Rivers

Due to the peculiar terrain, there are east-flowing and west-flowing streams in Wayanad. Among the 44 major rivers of Kerala, the east-flowing Kabani and its tributaries water almost the entire area of Wayanad district. With a total catchment area of 1934.50 sq. km, the river Kabani has a basin length of 56 km in Wayanad. The river has three major tributaries viz. Panamaram Puzha, Mnanthavady Puzha and Bavali Puzha, and 7 minor tributaries (Vinayachandran *et al.*, 2007).

Panamaram Puzha is a major tributary that flows the longest distance through human settlement areas and is contributed by a large number of rivulets originating from the southwestern and the southeastern parts of Wayanad. The streamlet Vythirippuzha originates from Vythiri and flows northwards and on reaching Pozhuthana Panchayat, it narrows down for a short distance and later broadens again to form the stream Pozhuthana Puzha. Moving ahead through Kottathara, the stream reaches Venniyodu and becomes Venniyottu Puzha. Further ahead, the streamlet Venniyottu Cherupuzha also joins the river. It flows further north through several meanders and meets the Karamanthodu, which originates from the valleys of Kurichiyarmala and Ladysmith Reserve Forest and flows through Kuppadithara to form the Panamaram Puzha. The river now turns further northeast and on reaching Panamaram, it further broadens by receiving water from the streamlet Panamaram Cherupuzha**.** The rivulet Karappuzha and another one originating from the eastern slopes of Manikkunnumala bring water to Panamaram Cherupuzha. The rivulet Pathirippuzha originating from Kuppamudi, Ambukotti areas of Nenmeni Panchayath later becomes Chundalpuzha that flows into Panamaram Cherupuzha. Narasippuzha originating from Kuppady area of Sultan Bathery panchayath and flowing through Kattayadu, Onivayal, Chirattayampam, Neykkuppa, Pathiriyampam areas, is another important stream that meets the Panmaram Puzha at Neervaram.

Mananthavady Puzha takes its origin from the northwest region of Wayanad and has 2 major tributaries, viz. Niravil Puzha and Periya Puzha. The small

but several rivulets and streamlets originating from the northwestern slopes of Thondarmudimala, Manappadmala, Vallarkkotttamala, Ottupara, southern part of Periya Reserve Forest and the other adjacent forest areas join together at different places to form the Niravil Puzha. It flows northwards and gets strengthened by streamlets coming from Arimala and Kunjome forest areas. On its course, near Chetokuppi, the river takes an eastward turn and later changes towards north. Meanwhile, another stream formed by the rivulets coming from the northeastern part of Thondarmudi Mala, the western part of Purni Mudi and the adjacent forest areas, and flowing through Makkiad, Koroth and Paleri joins with Niravil Puzha. Then, the river turns another eastward turn at Kuttamputtur and flows northward through dense scrub jungle and reaches Valatt where it joins with Periya Puzha. From the confluence onwards, the river is known as Mananthavady Puzha. The rivulets contributing to the Periya Puzha originates from the north and the northeastern parts of Periya Reserve Forest, Bangalamala, Chapamala, Varayal and other adjacent forest areas.

On its course the river gets further strengthened by the subsequent inflow of the rivulets coming from Madiyur and Thavinjal forest areas and each of the two streams coming from Kambamala and Vemom regions. From Pandikkadavu the river takes a meandering path towards east though Changada Kadavu, Bungalow Kunnu, Kunnivayal, Thanikkal, Pudiyadam, Kovileri, Pepperkunnu and Mottanka. At Koodalkkadavu, Mananthavady Puzha and Panmaram Puzha merge together and flow northeast as the river Kabani. The river then bifurcates to form two tributaries running parallel to each other which further split up in to narrow streams that rejoin at several points forming a group of islands at Kuruva.

Bavali Puzha that drains water from the northern hill slopes of Wayanad is the third major tributary of the river Kabani. The small rivulets originating from the mountain ranges, *viz*. Kambamala, Narinirangimala and Brahmagiri that border the northern part of the district supply water to Bavali Puzha. The two streamlets from Karimala join together at 2 km north of Malampady and flows eastward by the name of Thirunelly Puzha. A small river, the Holy

Papanasini originating from the Brahmagiri hills merge with the Thirunelly Puzha at Nittra and then onwards it flows by the name Kalindi for a long distance through the Begur Reserve Forest via Aravanazhy, Chakkodu and Panavally. After reaching Bavali it becomes Bavali Puzha and joins with the river Kabani.

The small stream, Chedeleth Puzha originating from the Kurichiyat Reserve Forest, northeast of the district, flows west and then turns north. The stream becomes Kannarampuzha from Chettipambra where it meets the streamlet the Chettipambra Thodu (Oda Pallam) formed by two small rivulets the Mathamangalam Thodu and the Cheeyambum Thodu. After flowing through Amarakkuni and Vandikkadavu, the Kannarampuzha takes up the name Mavilanthodu and flows along the Kerala-Karnataka border for about 6 km and at Kolavalli it enters into the river Kabani. The Muddoli Thodu originating from Yogimoola in Pulpally Panchayat flows through the Alathoor Church premises and joins Kabani at Pachikkaramukku. The Kadamanthodu arising from the slopes of Kalloni hill in Poothady Grama Panchayat, runs through Kalluvayal and Pulpally areas and reaches Perikkalloor where it meets the river Kabani.

The Manikkadupuzha, also known as the Kurichipatta Thodu, arise from Moozhimala, Kappikkunnu areas of Pulpally Grama Panchayat. Watering the areas, viz. Veliyampam, Kurichippatta and Punchakkolli Vayal, it meets Kabani at Pannikkal.

There are six west-flowing rivers of Kerala that also get originated from the Wayanad district. The southeast and the southwest hill slopes of Wayanad plateau are part of the Chaliyaar watershed. Korappuzha flowing through Kozhikkode district originates from the southwestern slopes at the interjection of the Camel Hump Mountains with the Wayanad plateau. The western slopes located north to the Korappuzha watershed, supply water to Kuttiyadippuzha. North to Kuttiyadi watershed is the catchment areas of Mahi River that flows through the Kannur district. Another major river of the Kannur district, the Ancharakkandippuzha originates from the west-leaning hill slopes located north to the Mahi watershed.

The Meenakshippuzha originating from the north-eastern slopes of Elamkaleri hills and the Nellimundappuzha from the northern parts of Chembra valley merge together and flows eastwards through Kanthanpara and Meenmutti water falls. Then onwards the name changes to Meenmuttippuzha which receives water from Sentinental rock water-falls through the rivulet called Kalladippuzha coming from the southeastern slopes of Elambaleri hills and serves as a major tributary of the Chaliyar. Another rivulet originating in the Ayyankolli areas of Tamil Nadu flows through Wayanad for a short distance and joins the Chaliyar. With a catchment area of 50 sq. km in the district, the Chaliyar runs for 12 km through Wayanad.

Population, health, and social profile

Wayanad's population is 7,80,619 (3,91,273 males and 3,89,346 females) with an average of 316 persons per sq. km, and the tribal population contributes 17%, which is the largest in the state of Kerala (Census, 2001). The female-male sex ratio is 967 per 1000 males. The literacy rate in the region is 85.64%. There are 291 schools in Wayanad including a residential upper primary school at Muthanga and a residential high school at Nallurnadu for Scheduled Tribes.

For the purpose of revenue administration, the district is divided into three taluks, namely Sulthan Bathery, Vythiri and Mananthavady. There are 49 villages under these taluks. There is one revenue division and that is Mananthavady.

The district has an area of 1,13,000 ha. of agricultural land, of which 1853 ha. are uncultivable; horticultural crops are in about 16756 ha., and cash crops like coffee, tea and pepper in 65469 ha. More than 50% of the total cultivable land is used for raising cash crops like coffee, tea, rubber, ginger, cardamom, and arecanut (Table 1). A variety of crops including annuals and perennials are grown in small holdings.

Table 1. Major Agricultural crops

Crops	Area (ha)	Production (Tonnes)	Productivity (kg/ha)
Rice	12,343	28,421	2,303
Coconut	11098	47 (nuts in million)	4,235
Pepper	42,287	12,173	288
Tea	6492	7,334	1,130
Coffee	67,429	63,850	754
Banana	11,819	80,162	6,782

Irrigation

With a view to irrigate more area under paddy cultivation to overcome the deficiency in food grain production, the possibilities of implementing a few major irrigation projects had been investigated in Wayanad area, out of which the Karapuzha project was found to be the first and most feasible one and was taken up for execution during the 5th five-year plan. The project is to construct an Earth Dam at Vazhavatta in Vythiri Taluk. The partial commissioning of the project was to take place in 1984-85. This was not materialized in view of insufficient funds from 1980-1981 onwards. In addition to the originally envisaged scope of the Project, new proposal for 0.5 to 0.75 MW of power generation and drinking water supply for adjoining towns like Kalpetta and for tourism are under consideration of the concerned departments, for which preliminary investigation has already been conducted.

Tourism and industry

As a remote region of the virgin rainforests and mist-clad mountain ranges, Wayanad attracts over 4.6 lakhs of tourists a year (2003) including domestic and foreign travelers. The important spots of attraction include places of historical importance (Edakkal caves, Pazhassi tomb), nature's trails (Wayanad Wildlife Sanctuary, Chembra peak, Lakkidi, Pookkode lake, Karlad lake), places of religious importance (Thirunelly temple, Valliyoorkavu temple, Pallikkunnu church), water falls (Kanthan para, Meenmutty, Soochippara), and dam sites (Banasurasagar, Karapuzha) etc.

In Wayanad district so far 4370 small-scale industrial units have been registered. Of these, 1829 are in Sulthan Bathery Block, 1332 in Kalpetta Block and the remaining 1219 are in Mananthavady Block. There are 803 agro-based industries, 276 timber-based industries, 1649 garment making units, 757 engineering units, and 144 building material units in the district. In addition to the above, about 1017 small-scale industries in various sectors are also registered. Most of the industries are located in Kalpetta Municipality and Sulthan Bathery, Meenangadi and Mananthavady Grama Panchayaths.

Community profile

No one religion is predominant in the district; the major religious groups of the state are all more or less equally represented**.** The ethnic diversity of the district is very impressive as evidenced by ten different tribal groups. Among them, five dominant tribal groups are 'Kurichya', 'Mullu Kuruma', 'Paniya', 'Adiya' and 'Kattunaikka'. Others are 'Thachinadan mooppan', 'Karimbalar', 'Urali Kuruma', 'Pathiyar' and 'Wayanadan Kadar'. These are the communities which still hold knowledge on biodiversity.

Kurichya: The 'Kurichyas' are the first tribe from the plains of Malabar who colonized Wayanad for Agriculture. They form the second largest tribal community of Wayanad with 16.8 per cent of total tribal population. They are excellent bowmen and played an important role in the armed rebellion against the British in 1805 under Pazhassy Raja (Thurston, 1909). They are matrilineal settled agriculturists and land is collectively owned and hence land-holdings are relatively larger. The Kurichyas cultivate several traditional varieties and are rooted in cultural wisdom to the extent that they do not change the land use for the cultivation of cash crops (Vedavalli *et al.*, 1998).

Mullu Kuruma: 'Mullu Kuruma', often referred to as 'Kuruma' is found in Wayanad and the adjoining areas of the Gudalur Taluk and Nilgiri district of Tamil Nadu. They are distributed within a radius of about 30 kilometers, including the eastern part of Wayanad and the western part of Gudalur Taluk (Janah, 1994). Their language is basically Malayalam with a spattering of

Kannada and Tamil words. Agriculture is the main occupation of this settled land-owning community. The main crop is paddy, which is cultivated in the fallows and flat lands as well as on moderate slopes. Generally, each Kuruma settlement has three categories of lands, determined by the topography. The first is Vayal (wet lands), which are essentially paddy fields. The traditional rice varieties of Wayanad are cultivated by the community, among which are the famous scented varieties like Jeerakasala and Gandhakasala, along with other traditional varieties like Chennellu, Thondy, etc. The higher level lands next to the vayal are called Thottam, which support coffee, banana, jack trees, pepper, vegetables, etc. The drier lands with shallow soil are termed as Uzhavuparambu where tapioca, chillies and drought-resistant varieties of paddy are grown. In the past (about 20 to 25 years back), hunting and fishing were as important a means to garner food as agriculture; several of their religious rites and life cycle rituals prescribe the offering or use of the meat of animals killed in the hunt (Janah, 1994).

Paniya: The Paniya constitutes the single largest Scheduled Tribe in Kerala and is mainly found in the Wayanad district and the neighboring areas of Karnataka. They have a distinct language of their own, closely related to Malayalam. There is a theory that the Paniyas were brought to Wayanad by the Gounders who trained them to be agricultural laborers in their fields (Thurston, 1909). The community, almost entirely, depend on wage-labour in the paddy fields and farms of the land owning classes for their livelihood. The huts were generally single-roomed. The walls were of bamboo wattle plastered with mud, while the roofs were of bamboo, thatched with paddy straw or grass. They are non-vegetarian, but generally avoid beef (Singh, 1994).

Adiya: The Adiyas are known traditionally as 'Ravulayar' and are believed to be migrated from Coorg. They are one among the slave-tribal sects in Kerala. The Malayalam word 'Adiyar' literally means slaves. Up to 4 or 5 decades ago, like 'Paniya' tribes, these masses were also sold, purchased and exchanged by their landlords in front of Valliyoorkavu Bhagavathi temple during its annual festival. The 'Adiya' community is divided in to 20 classes called 'Mandu'. The

head of the 'Mandu' is called 'Chommikkaran' or 'Peruman'. Their immense contribution in the agricultural land makes the district still luxuriantly green (Gopalan Nair, 1911).

Kattunaikka: The Kattunaikkas are referred to variously as 'Jenu Kuruman', 'Tenu Kurumban' and 'Naickan'. The term 'Kattunaikkan' has been derived from the word 'Kadu', meaning forest, and 'Naikkan' meaning leader or headman (Thurston, 1909). The community is now predominantly distributed in the Wayanad district of Kerala. They speak the Kattunaikka dialect, which is close to the Dravidian language, Kannada. They are non-vegetarians and eat a diverse variety of meat. Rice and ragi are their staple cereals supplemented by roots and tubers. The Kattunaikka are divided into exogamous clans (Luiz, 1962). Food gathering, hunting, fishing and trapping of birds and animals are the traditional occupations of the Kattunaikka, which a few of them continue to pursue to the day. A few of them are land-owning cultivators. They worship trees, rocks, the sun, moon, local deities and the spirits of their ancestors.

Other socio-cultural groups*:* 'Others' represent all major socio-cultural groups such as Hindus, Jains, Christians and Muslims. Wayanadan Chettys are an agricultural community who came to Wayanad from Panthaloor area of Tamil Nadu. Over the years their dress and life styles have come to closely resemble the Nair community. A small representation by way of the Gounders who came from Karnataka constitutes the Jain community of Wayanad, many of whom are planters with sizeable land holdings. Muslims came to Wayanad from Malappuram, and Kozhikode districts, Christians from Travancore area of south Kerala and most of the Hindus from Kozhikode and Kannur districts.

Vegetation

Wayanad district converges different vegetation types along the windward and leeward side of the Western Ghats and dominated by Malabar floristic elements and the total area under forests in Wayanad is 787 sq. km. It is an east sloping mid-level plateau, lies in the northwest corner of the Nilgiris, gently undulating and abruptly descending in the west to Kerala plains but

merging imperceptibly with the Mysore plateau to the east. The Chembra-Vellarimala mountain ranges along the southwestern corner of Wayanad closely similar to the Nilgiris and the mountains are in tenuous connection with the Nilambur forests and again with the Wayanad western slope forests. Wayanad descends extremely steeply to the plains of Kerala to the west with individual mountain peaks like Sugandhagiri-Amba hills, Kurichiarmala and Banasuramala. These hill ranges although very attenuated and broken in four distinct locations, skirts around the entire west and north face of Wayanad. The northeastern corner of Wayanad rises up to a hill range called the Brahmagiris. This forms the western and southwestern border of the Coorg plateau. The Brahmagiri slope also extends towards southeast into the Wayanad plateau almost up to the Pulpally discontinuity. There are a few scattered very small pockets of forests on the northern and western parts of the plateau. Along the state border on the eastern edge of Wayanad, there is highly degraded belt of forests stretching along the part of the way.

The forest area in the district is administratively divided into Wayanad Wildlife Sanctuary (Sulthan Bathery, Muthanga, Kurichiad and Tholpetty Ranges 344.44 km^2) and other reserve forests. The reserve forest of the district is under two administrative divisions namely Wayanad north (214.29 km2) and Wayanad south divisions (325.339 km^2). North division constitutes Mananthavady, Periya and Begur ranges, which is dominated by evergreen and moist deciduous forests. South division forms Kalpetta, Meppady and Chedeleth ranges, which is also dominated by evergreen and moist deciduous forests. The northern part of the district is bordered by Aralam Wildlife Sanctuary and Kottiyoor forest range of Kannur district, and the southwest parts are continuous with the Kuttiyady and Vazhikadavu forest ranges of Kozhikkode and Malappuram districts respectively. Evergreen forest is the major forest type in the region. There is a stretch of moist deciduous forests along the state border to the east. These forests adjoining the southeastern side of Wayanad in the old Mysore State had become Wayanad Wildlife Sanctuary in 1941, and later became the part of Bandhipur National Park. The forests along the northeastern corner of Wayanad, across the Kabani in Karnataka, became the Nagarhola National Park in 1955. At the opposite end,

in the southeastern corner across the state border in Tamil Nadu, Mudumalai in the Gudalur-Wayanad region was declared as Wildlife Sanctuary in 1940 (Nair, 1991).

Established in 1973, the Wayanad Wildlife Sanctuary is contiguous to the protected area network of Nagarhola and Bandhipur of Karnataka on the northeast and Mudumalai of Tamil Nadu on the southeast. Dry deciduous forests are lying along this track of Protected Areas. Rich in biodiversity, the sanctuary is an integral part of the Nilgiri Biosphere Reserve, which has been established with the specific objective of conserving the biological heritage of the region. The total extent of the area is 344.44 km^2 and is divided into two discontinuous portions with revenue lands in between. The northwest portion of the sanctuary has only one range, viz. Tholpetty and has an area of 77.67 km^2. This range is contiguous to Rajiv Gandhi National Park in Nagarhola in the northeast, Kakkankotte Reserve Forest in the north and Brahmagiri Hills of north Wayanad division in Kerala in the east. The southern portion of the Sanctuary comprises an area of about 266.77 km^2. It is contiguous to Mudumalai Wildlife Sanctuary of Tamil Nadu in the east and Bandhipur Tiger Reserve (BTR) of Karnataka in the north and northeast. These areas are the moist deciduous forest gradually descends to the dry deciduous forests and joins with Deccan platau. There are, however, a few patches of West-coast semi-evergreen forests within this contiguous forest. About 110 sq. km of the sanctuary is under different plantations. *Teak* and *Eucalyptus* are the major plantation species in sanctuary and reserve forest areas. Small-scale plantations of *Bamboo, Grevillea* and *Pinus* are retained in some forest area.

The mid-level plateau of the district is the most densely populated area and it covers a major part of the land. Most of the natural vegetation of these areas has been replaced by Coffee, Tea, Eucalyptus, Banana and Rubber plantations. The natural flora of this area is that of the evergreen and moist deciduous forests consisting of a mixture of evergreen and deciduous elements. Some of the dominant trees of this region are *Artocarpus hirsutus, Albizia odoratissima, Pterocarpus marsupium, Gmelina arborea, Acrocarpus fraxinifolius, Mallotus tetracoccus* and *Terminalia crenulata.* Epiphytic orchids

common in these plantations are *Rhynchostylis retusa, Aerides ringens* and *Cleisostoma tenuifolium.*

By following Chandrasekharan (1962c) and Champion and Seth (1968) the natural vegetation of the study area can be broadly classified into the following types:

1. West-coast tropical evergreen forests (evergreen)
2. West-coast tropical semi-evergreen forests (semi-evergreen)
3. Southern moist-mixed deciduous forests (moist deciduous)
4. Southern dry-mixed deciduous forests (dry deciduous)
5. Southern montane wet-temperate forests (shola)
6. Southern wet-montane grasslands (grasslands)

Apart from the above mentioned vegetation types, certain edaphic types such as reed brakes, moist bamboo brakes, secondary evergreen forests, pseudosholas and marshy grasslands are also present in the district.

West-coast tropical evergreen forests

This forest type is the major vegetation in the Meppady, Kalpetta Periya and Manathavady forest ranges at an altitude ranging from 600m to 1300m and is continuous with the Nilgiri-Nilambur hill ranges towards south and south-west and Aralam-Coorg ranges towards north. These forests are common around the hills and valleys of Vythiri, Chembra, Chooralmala, Vaduvanchal, Thalimala, Mundakai, Manikkunnumala-Nalukettumchola, Sugandhagiri, Pozhuthana, Ladysmith, Thariodu, Banasuramala, Kurichiarmala, Niravilpuzha, Kunjome, Chanthanathodu, Periya, Palchuram, Narinirangimala, Makkimala, Kambamala and Thirunelli. These forests exhibit luxuriant growth, particularly of trees and woody climbers, and the canopy is closed. High humidity, shade and sheltered condition provide ideal habitat for epiphytic as well as terrestrial orchids, ferns, mosses and herbaceous flowering plants. Epiphytes and mosses tend to increase with altitude while woody climbers decrease. It has been observed that there is difference in the composition of species with altitude and latitude. The 'evergreen families' of Western Ghats namely, Clusiaceae, Dipterocarpaceae and Myristicaceae are

well represented in this forest. The major associations of trees in these areas are Mesua-Palaquium-Cullenia, Hopea-Dipterocarpus-Vateria and Polyalthia-Myristica-Calophyllum associations. The top canopy species are *Hopea parviflora, Dipterocarpus indicus, Polyalthia coffeoides, Palaquium ellipticum, Pterygota alata, Vateria indica, Calophyllum astroindicum, Antiaris toxicaria, Artocarpus hirsutus, Mesua thwaitesii, Holigarna grahamii, Lophopetalum wightianum, Mangifera indica, Myristica beddomei, Cynometra travancorica, Canarium strictum, Terminalia travancorensis, Kingiodendron pinnatum, Knema attenuata, Dysoxylum malabaricum, Elaeocarpus tuberculatus, Bischofia javanica, Cullenia exarillata,* etc. *Poeciloneuron indicum, Prunus zeylanica, Toona ciliata* and *Mesua ferrea* are also seen in the upper stratum at an altitude above 800 m.

The trees of the middle canopy comprises medium sized trees which are adapted themselves to the more shady conditions and are dominated by *Aglaia malabarica, Cinnamomum malabatrum, Dimocarpus longan, Drypetes oblongifolia, Diospyros paniculata, Epiprunus mallotiformis, Garcinia morella, Gordonia obtusa, Syzygium laetum, Hydnocarpus pentandra, Baccaurea courtallensis, Otonephalium stipulaceum, Meliosma simplicifolia, Humboldtia brunonis, Syzygium cumini, Vepris bilocularis, Syzygium munronii, Symplocos macrophylla* ssp. *rosea, Turpinia malabarica* etc. A few palms like *Arenga wightii, Caryota urens* and *Pinanga dicksonii* are also conspicuous. Reeds appear mainly as *Ochlandra* brakes along the streams.

The lower storey trees are *Antidesma montanum, Antidesma menasu, Olea dioica, Memyecylon heyneanum, Casearia ovata, Meiogyne ramarowii, Turraea villosa, Ixora elongata, Orophea erythrocarpa, Phaeanthus malabarica,* etc. The shrubby plants are mainly *Psychotria spp., Aporusa acuminata, Gomphandra coriacea, Ligustrum robustum, Glycosmis macrocarpa, Strobilanthes spp.*, etc. and the important herbs are *Begonia malabarica, Elatostema lineolatum, Girardinia diversifolia, Ophiorrhiza* spp., etc. Of the rhizomatous monocotyledons *Curcuma* spp., *Costus speciosus, Globba ophioglossa, Schumannianthus virgatus* and *Zingiber* spp. are important. Some of the lianas intertwining the trees are *Carissa inermis*, *Adenia hondala, Artabotrys*

zeylanica, Cissus spp.*, Derris brevipes, Entada rheedeii, Erythropalum populifolium, Caesalpinia spicata, Desmos lawii, Bauhinia phoenicea, Spatholobus purpureus, Ventilago bombaiensis, Salacia beddomei, Sarcostigma kleinii, Caesalpinia cucullata, Toddalia asiatica* and *Thunbergia mysorensis.*

West-coast semi-evergreen forests

This forest type is found below 900m and is intermediate vegetation between the moist-deciduous and wet-evergreen forests. It is a heterogeneous mixture of species that are common in evergreen and moist-deciduous forests. This forest type is seen mainly in slopes of Manikkunnumala, Chooralmala, Mundakai, Kurichairmala, Thariodu, Soojipara, Kanthanpara, Makkimala, Muttilmala, Thirunelli area, etc. The three-tier structure of the tree canopy is evident in this forest types also. The top canopy is composed of trees like *Bischofia javanica, Bombax cieba, Chukrasia tabularis, Mimusops elengi, Polyalthia fragrans, Pterospermum reticulatum, Terminalia bellirica, Artocarpus hirsutus, Elaeocarpus tuberculatus, Hopea parviflora, Lagerstroemea microcarpa, Mangifera indica, Sterculia guttata, Terminalia paniculata*, etc.

Predominate trees in the middle canopy are *Syzygium cumini, Litsea floribunda, Harpullia arborea, Mallotus tetracoccus, Mastixia arborea, Vitex altissima, Chionanthus mala-elengi, Croton malabaricus, Trewia nudiflora, Phoebe lanceolata, Flacourtia montana, Ficus callosa, Holigarna grahamii, Schleichera oleosa,* etc. The lower storey trees and shrubs are *Clausena indica, Antidesma montanum, Ixora brachiata, Leea asiatica, Mussaenda bellila, Psychotria dalzelli, Pavetta zeylanica, Cipadessa baccifera, Aporusa acuminata, Turraea villosa* and *Allophyllus cobbe*.

Some of the lower stratum species found in this forest type are *Acronychia pedunculata, Agrostistachys indica, Antidesma menasu, Callicarpa tomentosa, Mallotus philippensis* and *Hunteria zeylanica.* Major lianas are *Erycibe paniculata*, *Ancistrocladus heyneanus*, *Salacia oblonga*, *Derris brevipes, Toddalia asiatica, Hiptage bengalensis,* etc. The lower shrubby layer is composed of *Gomphandra tetrandra, Barleria courtallica, Dichapetalum gelonioides, Dracaena terniflora, Leea indica*, etc.

Southern moist-mixed deciduous forests

Moist deciduous forest is the dominant vegetation type in the Wayanad Wildlife Sanctuary (Muthanga, Begur, Tholpetty forest ranges) and Kurichiad, Naikkuppa, Pathiri and Kuruva forest areas of Chedeleth range (elevation of 700 m-900 m). During wet season, because of the thick foliage, the canopy looks similar to that of semi-evergreen forests. During January-April, the trees become more or less deciduous but the forests never become deciduous in toto. The leafless period varies from a few weeks to five months depending on the species.

Major upper canopy trees are *Pterocarpus marsupium, Tectona grandis, Terminalia paniculata, T. crenualata, Lagerstroemia microcarpa, Bombax ceiba, Tetrameles nudiflora, Dalbergia lanceolaria, Dalbergia sissoides, Grewia tiliifolia, Stereospermum colais, Diospyros montana, Semecarpus anacardium, Madhuca indica, Terminalia chebula, Shorea roxburghii, Syzygium cumini, Schleichera oleosa, Bauhenia malabarica, Haldina cordifolia, Mitragyne parviflora, Bridelia retusa, Radermachera xylocarpa,* etc. Middle canopy trees are *Olea dioica, Dillenia pentagyna, Gmelina arborea, Grewia tiliifolia, Litsea coriacea, Careya arborea, Dillenia pentagyna, Buchanania lanzan, Glochidion ellipticum, Phyllanthus emblica, Glochidion tomentosum. Butea monosperm*a, *Lannea coromandelica, Cassia fistula*, etc. The lower storey trees are *Wrightia tinctoria, Helicteres isora, Catunaregum spinosa, Casearia tomentosa, Cipadessa baccifera, Holarrhena pubescens, Naringi crenulata, Tamilnadia uliginosa,* etc. The shrubby layer is composed of *Maesa indica, Solanum torvum, Lantana camera, Pavetta tomentosa, Desmodium pulchellum, Flemingia strobilifera, Chromolaena odorota*, etc. Climbers like *Spatholobus purpurea, Dalbergia volubilis, Dioscorea* spp., *Hemidesmus indicus, Combretum ovalifolium, Calycopteris floribunda, Cissus repens, Ipomoea* spp., *Hiptage benghalensis,* etc. are also very common in these forests.

Southern dry mixed-deciduous forests

Eastern side of the Wayanad Wildlife Sanctuary continuous with the deciduous forests of Mudumalai ranges of Tamil Nadu and Bandhipur-Nagarhola National Park of Karnataka is dominated by this forest type.

Anogeissus latifolia, Schrebera swietenioides, Phyllanthus emblica, Phyllanthus indofischerii, Cleistanthus collinus, Premna tomentosa, Terminalia chebula, T. paniculata, Shorea roxburghii, Stereospermum suaveolens, Lagerstroemia parviflora, etc. are the dominant trees of this region. Parasites such as *Viscum orientale* and *Dendrophthoe falcata* are frequent. Ground flora is rich with medicinal plants. Epiphytes are few; however *Aerides ringens, Luisia zeylanica, Oberonia* spp. etc. are common. Herbaceous flora is very rich and thick during rainy season. This substratum supports high density of herbivores in these regions.

Southern montane wet-temperate forests

This forest type is seen in the district above 1500 m altitude (1500 m-2000 m), and is essentially a stunted evergreen forest. It is found in Chembra peak, Vellarimala, Kattimattam, Kurichiarmala, Banasuramala and Brahmagiri. Short-bole trees with low but dense branching and stout branchlets densely covered with mosses and other epiphytes are the features of this forest type. There is no stratification of trees, and leaves in general are small. Epiphytic species are more and climbers are few. New shoot of the different trees form scenic mosaic canopy during winter. Plants belonging to Lauraceae and Myrtaceae are common. The major tree components are *Syzygium spp., Cinnamomum wightii, Cinnamomum sulphuratum, Vernonia arborea, Actinodaphnae* spp., *Litsea wightiana*, *Atlantia wightii, Euonymus indicus, Eurya nitida, Elaeocarpus munronii, Glochidion ellipticum, Lasianthus jackianus, Ixora sivarajiana*, *Pittosporum neelgherrense*, *Symplocos* spp., *Casearia* spp., *Eugenia* spp., *Glyptopetalum grandiflorum*, *Euonymus serratifolius*, *Syzygium lanceolatum, Syzygium hemisphericum, Syzygium densiflorum, Neolitsea cassia, Neolitsea scrobiculata, Phoebe lanceolata, Litsea ghatica, Litsea beddomei, Litsea bourdillonii, Cryptocarya beddomei,* etc. Some of the species in shola margins are *Rauvolfia verticillata, Strobilanthes* spp., *Maesa indica, Elaegnus conferta, Leucas beddomei, Plectranthus malabaricus*, etc. A number of epiphytic orchids like *Trichoglotis tenera, Pteroceras leopardinum, Eria polystachya, Dendrobium jerdonianum, Dendrobium microbulbon, Bulbophyllum fusco-purpureum, Bulbophyllum acutiflorum,*

Coelogyne nervosa, etc. are also found specific to this forest. *Medinilla malabarica* and a number of *Imaptiens* species are peculiar to this forest type.

Southern wet-montane grasslands

This type of vegetation is confined to the hilltops where the altitude is above 1200m mainly at Chembra hills, Sugandhagiri-Amba, Manikkunnumala, Banasuramala, Kurichiarmala and Brahmagiri hills. The vegetation is dominated by grasses, herbs and sub-shrubs. Some of the important species of grasses found are *Arundinella setosa, Chrysopogon hackelli, Jansenella griffithiana, Ischaemum indicum* var. *indicum, Apluda mutica, Dimeria lawsonii, Themeda* spp., and *Cymbopogon flexuosus.* Some of the species that are commonly interspersed with grasses are *Curcuma neigherrensis, Euphorbia rothiana, Exacum bicolor, Swertia beddomei, Ceropegia* spp., *Satyrium nepalensis, Hypericum mysoresnse, Habenaria longicorniculata, Habenaria heyneana, Ipsea malabarica, Justicia nilgherrensis, Knoxia mollis, Leucas vestita, Murdannia lanuginosa, Pectilis gigantea, Peristylis spiralis* and *Swertia lawii.* Along the hilltops *Phoenix humilis* var. *pedunculata* grows in a scattered manner.

Bamboos and reeds

Gregarious growth of bamboos is found in moist deciduous forests of Wayanad Wildlife Sanctuary, Naikuppa, Kuruva and Pathiri. Reeds are growing in areas within the evergreen and semi-evergreen forests along the riverine areas. Important reeds in the district are *Ochlandra travancorica, O. beddomei* and *O. scriptoria.* Canes are sparsely distributed in the evergreen forests of Vythiri, Brahmagiri, Kurichiarmala and Chembra. Common rattans in the Wayanad district are *Calamus thwaitesii, C. pseudotenuis, C. gamblei, C. hookerianus,* and *C. travancoricus.*

Riparian vegetation

Kabani and its tributaries constitute a powerful river system in the landscape of Wayanad and are associated with a more or less defined riparian

flora. Along the banks of streams dense thickets of *Ochlandra* and *Pandanus* species are common. Trees like *Lophopetalum wightianum, Syzygium cumini, Syzygium heyneanum, Hydnocarpus pentandra, Neolamarckia cadamba, Madhuca nerifolia, Vepris bilocularis, Diospyros malabarica, Calophyllum apetalum, Diospyros paniculata, Ochrenauclea missionis, Hopea ponga, Pongamia pinnata, Salix tetrasperma, Vateria indica,* etc. are common along the banks of this river. *Rotula aquatica, Homonoia riparia,* etc. are the common shrubs in the area.

Forest plantations

Apart from the above mentioned types of vegetations, forest plantations occupy a major part of the district. Teak and Eucalyptus are the most extensively raised species in forest areas of Kalpetta and Meppady ranges and in many part of the Wildlife Sanctuary. Total area of the plantation in the Wayanad Wildlife Sanctuary area is about 73.27 km^2 which includes Pepper (2.1 km^2), Eucalypts (13.55 km^2), Teak (36.53 km^2) and mixed softwood species (21.09 km^2). Eucalyptus plantations do not have any other tree species except a few saplings of *Cassia fistula* and *Terminalia* spp.

REVIEW OF EARLIER WORK

Systematic floristic exploration in India started with the arrival of Europeans who came to the Malabar Coast for spice trade. *Coloquis dos Simples* (Garcia de Orta, 1565), a checklist of the medicinal plants of India, is the first published botanical work on the plants of Western Ghats. After a century van Rheede, the Dutch Governor of Malabar surpassed all the previous work by compiling his monumental and historic work in 12 volumes, the *Hortus Indicus Malabaricus* (1678-1703).

Britishers made major contributions to the floristic studies in India. Among those who contributed to the botany of Peninsular India, Wight's name is the most important. His contributions include 28 publications. Among them, *Illustrations of Indian Botany* (1840) and *Icones Plantarum Indiae Orientalis* (1838-1853) are the most important. Wight together with Arnott published *Prodromus Florae Peninsulae Indiae Orientalis* (1834) in which several new taxa were described. The other notable contributions during the 19th century were *The Flora Sylvatica for Southern India* (Beddome, 1869-1874), *Icones Plantarum Indiae Orientalis* (Beddome, 1868-1874) and *Flora Indica* (Roxburgh, 1820-1824).

The *Flora of British India* published by J. D. Hooker during 1872-1897 is still remaining as the most relevant reference on the phanerogams of India with phytogeographical information. Subsequently regional floras like *Flora of the Presidency of Bombay* (Cooke, 1901-1908) and *Flora of the Presidency of Madras* (Gamble & Fischer, 1915-1936) were published and the latter work is adjudged as the best among regional floras. *The Forest Trees of Travancore* by Bourdillon (1908) is the first comprehensive work on the tree flora of Travancore and it dealt with 582 indigenous trees. The important works on flora of southern Peninsular India are the *Flowering Plants of Travancore* (Rama Rao, 1914), *Flora of Anamalai Hills Coimbatore District, Madras Presidency* (Fischer, 1921) and *Flora of South Indian Hill Stations* (Fyson, 1932). Since then, the work on regional as well as local floras were undertaken with the view of preparing a complete and comprehensive flora of India and

major work was done by the Botanical Survey of India. *The Flora of Tamil Nadu, India* (Nair & Henry, 1983; Henry *et al.*, 1987 & 1989) and the *Flora of Karnataka* (Sharma, 1984) were published as part of the aforementioned project. The *Flora of Tamil Nadu-Carnatic* (1981a, 1983) by Matthew has immense value and very relevance with regard to the deciduous floristic elements. Few volumes of *Flora of India* have been published (Sharma *et al.*, 1993a, 1993b, 1993c; Hajra *et al.*, 1995) and others are in the process of completion.

The notable floristic publications of Kerala are *Flora of Calicut* (Manilal & Sivarajan, 1982), with 983 species of angiosperms in 566 genera and 132 families; *Flora of Cannanore* (Ramachandran & Nair, 1988) mentions 1132 species of flowering plants in 658 genera; *Flora of Silent valley* (Manilal, 1988), describes 966 flowering plants in 559 genera and 234 families; *Flora of Palghat* (Vajravelu, 1990), accounts for 1355 species belonging to 737 genera and 196 families; *Flora of Thiruvanathapuram District* (Mohanan & Henry, 1994), recorded 1336 species of vascular plants in 251 genera spread over 195 families; *Flowering plants of Thrissur Forests* (Sasidharan & Sivarajan, 1996), dealt with 1225 species of flowering plants belonging to 703 genera under 129 families; *Flora of Nilambur* (Sivarajan & Philip Mathew, 1997) describes 1132 species of flowering plants in 665 genera; *Flora of Agasthyamala* (Mohanan & Sivadasan, 2002) recorded 1117 flowering plants in 585 genera; *Flora of Pathanamthitta* (Anil Kumar *et al.*, 2005) shows 1249 species under 658 genera belonging to 148 families, and *Flora of Alappuzha District* (Sunil & Sivadasan, 2009) with 1111 angiosperms in 617 genera.

Floristic studies of some places that have been completed as Ph. D. programmes are *Studies on the flora of Kasaragod division, Cannanore District* (Ansari, 1985), *Flora of Malappuram District excluding Nilambur forest* (Babu, 1990), Flora *of Kottayam District* (Antony, 1989), and *Flora of Periyar Tiger Reserve* (Jomy Augustine, 2000). The flora of protected areas such as *Shenduruny Wildlife Sanctuary* (Sasidharan, 1997), *Chinnar Wildlife Sanctuary* (Sasidharan, 1999), *Parambikulam wildlife Sanctuary* (Sujanapal, 2005) have also been studied.

Besides the above general floristic studies, revisionary studies of several genera and families were also carried out. *Introduction to Orchids* by Abraham and Vatsala, (1981), *Rare and endemic species of Indian Commelinaceae* by Kammathy (1983), *Revision of the Indian species of Oberonia* by Ansari and Balakrishnan (1990), *Legumes of India* by Sanjappa (1991) are worth mentioning. The work on grasses (Sreekumar & Nair, 1991) revealed the presence of a total of 296 species belonging to 106 genera and 24 tribes. Interestingly, this study has also resulted in the discovery of 2 new genera, *viz*. *Chandrasekharania* and *Silentvalleya* and 26 new species in addition to several other records. *Taxonomy of Cyperaceae of Kerala* by Rejani (1991), *Taxonomic and Phylogenetic study of south Indian Zingiberaceae* by Sabu (1991), *The family Eriocaulaceae in India* revised by Ansari and Balakrishnan (1994), *Monograph on Indian Leucas* by Singh (2001), *The Indian Verbenaceae - a taxonomic revision* by Rajendran and Daniel (2002), *Taxonomic revision of Hedyotis in Indian sub-continent* by Ratna Dutta and D. B. Deb (2004), *Monograph on Indian Diospyros* by Singh (2005), *Strobilanthes in Peninsular India* (Venu, 2006), *A revision of Indian Amorphophallus* (Jaleel, 2001), *Taxonomic study of Araceae of south India* (Sivadasan, 1982), and *Epiphytes and Parasites of Kerala* (Shanavaskhan & Sivadasan, 2007) are some other important revisionary studies. *A comprehensive hand book on Zingiberaceae and Costaceae* by Sabu (2006) is the first detailed account of the family in south India. It covers a total of 10 genera, 65 species and 2 varieties of which 29 species are endemic to this region and six are exotic.

Manilal and Raveendrakumar (1998) have compiled a list 625 taxa of flowering plants as additions to the flora of Kerala after the publication of the Flora of the Presidency of Madras. Morphological observations on 599 collections of 21 taxa of *Curcuma* in India are synthesized and presented by Velayudhan *et al*. (1999) and highlighted the taxonomic importance of underground structures of the genus *Curcuma*. Muktesh Kumar (1998) reported the epiphytic flora in the tropical ecosystem of Western Ghats and Joseph (1991) conducted a study on the Aquatic angiosperms of Malabar. Sivadasan and Balakrishnan (1989) reported a new species of *Oberonia* and a new variety of *Amorphophallus* (Sivadasan & Jaleel, 2000) from Wayanad.

Sasidharan (2004) brought out a checklist of flowering plants of Kerala and an updated checklist in CD form (Sasidharan, 2007). Recently Botanical survey of India published first volume for the Angiosperm flora of Kerala (Nayar *et al.*, 2006).

The endemic species in the flora of a geographical region reveal the biogeography of the area, center of speciation and adaptive evolution (Nayar, 1996 & 1997). The degree of endemism increases with the increase in size of a homogenous biogeographical area having the same floristic history and ecological conditions. The catalogues by Henry *et al.* (1979), and Jain and Sastry (1984) revealed that a large number of threatened plants are recorded from southern Western Ghats in Peninsular India. The three volumes of *Red Data Book on Indian Plants* by Nayar and Sastry (1987, 1988, 1990) present information on 614 taxa of vascular plants for whole of India. Out of these, 185 taxa of flowering plants are reported from southern Western Ghats alone, under various categories of threatened plants. The various publication brought out on these lines indicate that among the 600 taxa considered to be rare or threatened in the flora of the Peninsular India, about 90% are in the Western Ghats (Ahmedullah & Nayar, 1986). Abraham and Mehrotra (1982), and Stephan and Vajravelu (1991) analysed the endemic and rare plants of the Montane flora of the Nilgiris. Manilal and Pandey (1996), and Mohanan and Sivadasan (1996) studied the taxonomy and conservation need of rare and endemic plants of Agasthyamala. Sivadasan (1999a) reported some rare and endemic species of Araceae from Silent valley and neighborhood.

Besides many individual publications on rediscoveries and conservation status of rare and threatened species of Western Ghats, IUCN (2006) published a checklist of rare and threatened plants of Indian region. Sasidharan (2004) documented 4679 species of flowering plants from Kerala of which 1637 are listed under endemic category.

MATERIALS AND METHODS

Intensive seasonal floristic collections were carried out from different habitats of the district during 2000-2005. During first three years intensive field trips and camping were conducted in each month. Field trips were conducted based on the exploration coefficient (coefficient is the cumulative of diversity within the habitat, season, number of previous collections, phytogeographical importance and richness of the flora). Frequent field trips were conducted to Chembra hills, Manikkunnumala, Vythiri hills, Sughandhagiri, Kurichairmala, Periya hills, Bramhagiri, Tholpetty and Muthanga, where maximum diversity was observed. Few remote areas were left with one or two visits due to the difficulties in access to the area. Specimens with 3800 field numbers were collected. Repeated collections were made of certain tree specimens to get all essential parts of the plant. Usually four specimens of each species were collected from different locations to study the range of variations. Field data including height, colour and nature of bark (inside and outside), colour of latex and other exudates, presence of buttress, odour and colour of vegetative and floral parts were recorded. Separate collections were made for dioecious plants. For parasites and epiphytes details of the host plants were also recorded. In some cases as in orchids, live specimens were collected and have grown in the garden of Community Agrobiodiversity Centre of M.S Swaminathan Research Foundation (CAbC, MSSRF), for further observations and identification. The collected specimens were preserved or pressed immediately. For preservation of specimens, the wet method (Fosberg & Sachet, 1965) using 70% methylated alcohol and 5% solution of formaldehyde was employed. The herbarium specimens were prepared as per the standard specifications (Fosberg & Sachet, 1965; Bridson & Forman, 1991). Processed herbarium specimens are deposited in the herbaria of the MSSRF (MSSH) and Calicut University (CALI).

The specimens were provisionally identified by using pertinent literatures and comparing with authentic specimens available in the herbaria of the Kerala Forest Research Institute (KFRI), Calicut University (CALI) and southern circle of the Botanical Survey of India (MH). Literature on

phytogeography and endemism were referred to assess the distribution and endemism of each species. Available revisions and monographs were also consulted. For confirming identity of doubtful specimens they were referred to concerned experts in Kew (K), Rijksherbarium (L) and Kerala Forest Research Institute (KFRI).

Plan of presentation of data

For general format of Flora, the format proposed by Radford *et al.* (1974) was followed. The families were arranged according to the classification of Bentham and Hooker (1862-1883) with necessary alterations, based on split up of various families as proposed by Hutchinson (1926, 1934, 1956 & 1973) and Brummit & Powell (1992). An artificial diagnostic key is provided for the identification of families. Dichotomous parallel keys are provided for the identification. Keys for identification of genera under each family and that for the species under each genus are given in respective places. The genera under each family are arranged in alphabetic sequence. Full name of the authors and citation of the original publication of the generic name is given (Farr *et al.,* 1979; IPNI, 2004-2009). Generic descriptions of all the genera with more than one species are provided and the descriptions include the entire salient vegetative as well as reproductive features of the included species. The keys for identification of intraspecific taxa are given after the description of the respective species. Illustrations and photographs are provided for some of the rare and endemic species.

The species under each genus are also arranged in alphabetic order. The correct name of the species is written in bold Roman letters followed by the author citation and full reference of the original publication. Basionym (if any), important synonyms and citation of the names included in important Indian Floras including regional Floras are also given. The Indian Floras cited are: *Flora of British India* (J.D. Hooker, 1872-1897), *Flora of the Presidency of Madras* (Gamble & Fischer, 1915-1936), *Flora of India* (Sharma *et al.,* 1993), *Flora of Calicut* (Manilal & Sivarajan, 1982), *Flora of Silent Valley* (Manilal, 1988), *Flora of Canannore* (Ramachandran & Nair, 1988), *Flora of Palghat*

District (Vajravelu, 1990), *Flowering Plants of Thrissur Forests* (Sasidharan & Sivarajan, 1996), *Flora of Nilambur* (Sivarajan & Philip Mathew, 1997), *Flora of Agasthyamala* (Mohanan & Sivadasan, 2002), *Flora of Pathanamthitta* (Anil Kumar *et al.,* 2005) and *Flora of Alapuzha District* (Sunil & Sivadasan, 2009). Citations of Icons of Wight (1838-1853) and Beddome (1868-1874) are also given. Abbreviations of the periodicals are mainly according to those given in *Botanico Periodicum Huntianum* (B-P-H) (Lawrence *et al.*, 1968). Synonyms relevant to Indian Flora only are given and are written in italics. All the relevant monographs and revision works are also cited. The detailed description of each species is given after the nomenclature citations. The description of the species is in the following sequence: habit, branchlets, leaves, inflorescence, flower, calyx, corolla, stamens, ovary, fruit and seed. The flowering and fruiting periods are given after species description. The geographical distribution, the status of the species in relation to the conservation point of view, the abundance in the study area indicating the type of vegetation and the name of the collector followed by collection number and name of the locality are given. Cultivated or other ornamental plants seen in the district were named at the end of respective families.

Abbreviations used in the thesis

ca.	-	about
CALI	-	Calicut University Herbarium
cm	-	centimeter/s
diam.	-	diameter
KFRI	-	Kerala Forest Research Institute
m	-	meter
MH	-	Madras Herbarium
mm	-	millimeter/s
MSSRF	-	M. S. Swaminathan Research Foundation
MSSH	-	M. S. Swaminathan Herbarium
RNMK	-	Ratheesh Narayanan M.K.

FLORISTIC ANALYSIS

Since the Peninsular India being the part of the Gondwanaland in the remote past, the flora have many similarities with that of S. America, Africa, Malesian Islands, Madagascar, Australia and Antartica, which were parted off from the Gondwanaland around 100 million years ago. Many species of plants are found common with these countries especially South Africa, Sri Lanka and Malesia and many plants seen in Peninsular India are true poly topic species (Wood, 1974). Nayar (1980) had brought out several examples to substantiate this view and the origin of Indian flora, and he was of the view that characteristic flora of India is that of Peninsular India. The flora of Western Ghats stands significant in Indian Flora because of high species diversity even in small areas. Of the total number of 17,000 species of Angiosperms in India, Western Ghats possesses more than 4000 species including many paleo-endemics (Nayar, 1982).

The present floristic study in Wayanad resulted in the collection, identification and description of 2034 taxa of flowering plants in a total area of 2136 sq. km. The magnitude of the species diversity is clear when it is compared with that of other regional and district Floras of Kerala (Table 2). The total number of 2034 species belonging to 903 genera and 171 families recorded from the area of present study form nearly half of the flora of the Kerala state (4679 taxa) and more than 10 % of the flora of India. Among the 3 indigenous gymnosperms reported from Kerala, 2 were collected from the district. They belong to the order Cycadales and Gnetales. Of the 2034 taxa, Dicotyledons are represented by 1521 species belonging to 676 genera under 140 families, and Monocotyledons by 511 species belonging to 225 genera under 29 families (Table 3, Figure 2). All the top ten families of Western Ghats are well represented in Wayanad also, except few families like Asclepiadaceae (Table 4, Figure 3). Fabaceae with 185 species in 68 genera is the largest family followed by Orchidaceae with 165 species in 68 genera. Poaceae is the third largest family represented in the district with 163 species in 65 genera. Among the rest of the families Rubiaceae has 98 species in 36 genera, Euphorbiaceae with 87 species in 36 genera, Asteraceae with 71 species in 41 genera, Acanthaceae with 67 species in 21 genera, Lamiaceae with 44 species in 14 genera, Cyperaceae with 38 species in 12 genera and Myrtaceae with 33

species in 6 genera. Among the 169 families, 35 dicot and 8 monocot families are represented by single species each.

Table 2. Comparison of the Flora of Wayanad with other regional floras of Kerala

Sl. No.	Name of the Flora	Number of species	Number of genera	Area (km^2)
1	Flora of Calicut District	983	566	600
2.	Flora of Cannanore	1132	658	3,670
3.	Flora of Palghat District	1355	732	4,400
4.	Flora of Pathanamthitta	1249	658	2,697
5.	Flowering plants of Thrissur forest	1225	703	1,041
6.	Flora of Silent Valley	966	559	90
7.	Flora of Malappuram District	813	511	3,548
8.	Flora of Nilambur	1132	665	150
9.	Flora of Alappuzha District	1111	617	1414
10.	Flora of Thiruvananthapuram	1270	710	2,191
11.	Flora of Periyar Tiger Reserve	1978	828	777
12.	Flora of Agasthyamala Biological Park	1117	585	200
13	Flora of Parambikulam WLS	1432	801	274
14.	**Flora of Wayanad District**	**2034**	**903**	**2,136**

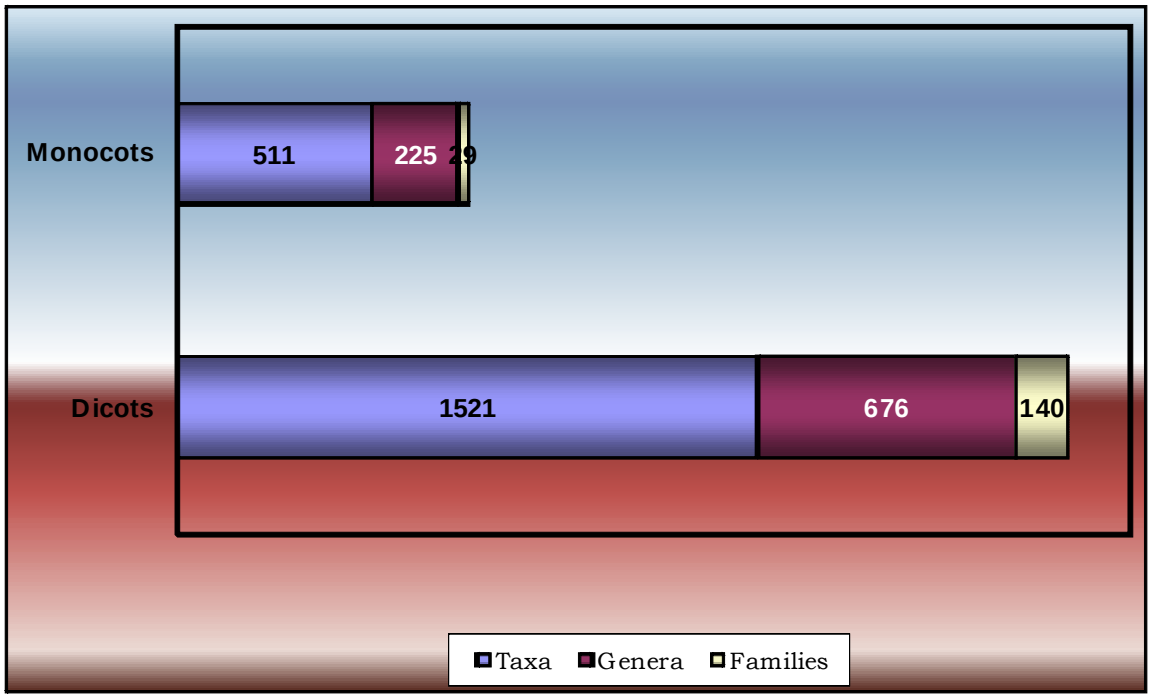
Table 3. Flowering plants c in Wayanad district

Sub-group	Families	Genera	Taxa
Dicot	140	676	1521
Monocot	29	225	511
Gymnosperms	2	2	2
Total	**171**	**903**	**2034**

Table 4. Relative abundance of the top ten families in Wayanad district and Kerala

Sl. No	Family	Wayanad		Kerala	
		Genera	Species	Genera	Species
1.	Fabaceae	68	185	93	381
2.	Orchidaceae	68	165	79	269
3.	Poaceae	65	163	118	409
4.	Rubiaceae	36	98	55	243
5.	Euphorbiaceae	36	87	46	181
6.	Asteraceae	41	71	64	182
7.	Acanthaceae	21	67	34	181
8.	Lamiaceae	14	44	23	116
9.	Cyperaceae	12	38	19	219
10	Myrtaceae	6	33	10	57

Figure 2. Composition of Angiosperms in Wayanad district.

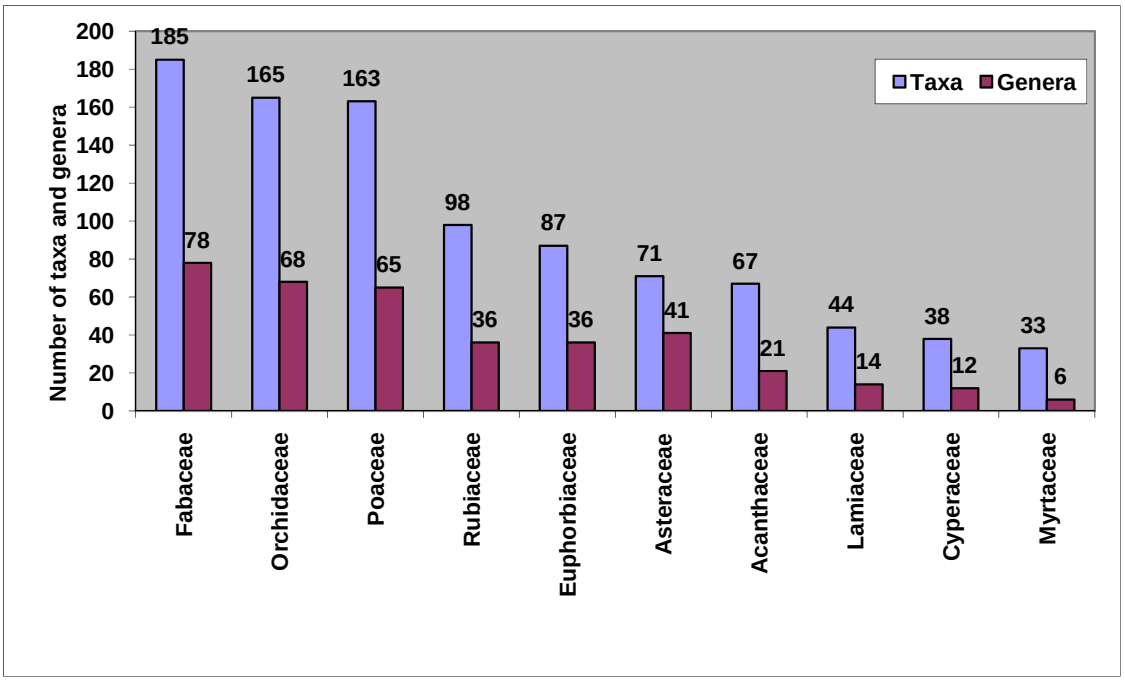


Except the Poaceae, Cyperaceae and Orchidaceae the monocots in general are poorly represented. Out of the 511 monocot species, 366 species belong to the above three families (72%). Similarly among the dicots, the Fabaceae, Rubiaceae, Euphorbiaceae, Asteraceae, Lamiaceae, Myrtaceae and Acanthaceae constitute about 39 % of the total number of species.

A comparison of the 10 largest families in order of their species richness and order of dominance with that of India (Hooker, 1904), Madras Presidency (Gamble & Fischer, 1915-1936), the Western Ghats (Subramanyam & Nayar, 1974b.) and the Kerala (Sasidharan, 2004) shows that many of these families are well represented in the study area, but the ranks are slightly altered. Fabaceae, which forms the largest family in the Madras Presidency, take the first position in the district, and in the Western Ghats and Kerala this is the second largest family. Orchidaceae, which form the largest family in India take the second position in the order of dominance in Wayanad district, where as in Kerala and Western Ghats their position is third and fourth respectively. Poaceae is the third largest family in the district, but in the Western Ghats

and Kerala Poaceae take the first position and in the Madras Presidency this is the second largest family. Rubiaceae, fourth in the Indian and Kerala flora and third in the Madras Presidency have come to the fourth position compared to their seventh position in the Western Ghats flora. Euphorbiaceae, the fifth largest family in the Indian flora and Madras Presidency, remain in the fifth position in Wayanad district also. In Kerala this is the seventh largest family. Asteraceae, one of the largest Angiosperm families in the world has come in the sixth position in Wayanad compared to their eighth position in Kerala. Acanthaceae is the seventh largest family in the district. In India and Kerala Acanthaceae attain the sixth position and fourth in Western Ghats. Lamiaceae, the nineth largest family in Kerala comes in the eighth position in the district. The Cyperaceae, the fifth largest family in Kerala comes only in the ninth position in Wayanad District and Myrtaceae is in the tenth position.

Figure 3. Relative abundance of the top ten families in Wayanad



Top three families, Fabaceae, Orchidaceae and Poaceae, were critically analysed with respect to their species diversity, endemism and rarity.

Fabaceae

Fabaceae, a predominantly tropical family with diverse group of plants is well represented in Western Ghats with more than 95 genera and 400 species. In the present study Fabaceae rank first in the order of dominance with 68 genera and 185 species under 3 subfamilies. Of this, Faboideae contains 122 species under 43 genera, subfamily Caesalpinioideae contains 38 species under 13 genera, and subfamily Mimosoideae contains 25 species under 13 genera (Table 5). It was observed that the members of this family are comparatively less in higher elevations and the diversity is more in moist deciduous forest patches and open areas in the district. This family is represented with a high degree of diversity in habit and habitat and includes trees, sub-shrubs, herbs and climbers. There are 29 trees and 42 climbers and some of the top canopy trees are *Pterocarpus marsupium, Kingiodendron pinnatum, Albizia lebbeck, Xylia xylocarpa, Dalbergia sissoides, D. latifolia*, etc. Some of the notable climbers/lianas are *Derris brevipes, Derris canarensis, Spatholobus parviflorus, Kunsteleria keralensis, Dalbergia volubilis, Dalbergia malabarica, Entada rheedei, Mucuna monosperma* and *Peuraria tuberosa*. The largest genus is *Crotalaria* with 16 species, followed by *Desmodium* with 13 species. Other genus with 5 or more species are *Cajanus* (6), *Dalbergia* (6), *Flemingia* (5), *Indigofera* (7), *Smithia* (6), *Tephrosia* (6), *Vigna* (5), *Chamaecrista* (5), *Senna* (6), *Acasia* (6) and *Albizia* (5).

Out of the 185 species collected, 25 are endemic to Western Ghats and 18 species are restricted to southern Western Ghats. In the subfamily Faboideae 17 are Peninsular Indian endemic species including 11 southern Western Ghat endemics. There are 6 species already been listed as rare and threatened (Ahmedullah & Nayar, 1987; Nayar, 1997). These are *Crotalaria bidie, Crotalaria clarkei, Dalbergia malabarica, Derris benthamii, Indigofera constricta* and *Kunstleria keralensis*. *Crotalaria bidie* is a Western Ghat endemic rare herb and in Kerala it was reported only from Wayanad district. *Dalbergia malabarica* is a rare climbing shrub found in moist deciduous forest of the district, and in Kerala it was earlier reported only from Thiruvananthapuram district. *Derris benthamii* is an endangered climber with very restricted population. Twelve species of this subfamily are common to Peninsular India

and Sri Lanka, and these species are *Cajanus albicans, Dalbergia volubilis, Derris benthamii, Indigofera constricta, Ormocarpum cochinchinense, Pterocarpus marsupium, Rhynchosia cana, Pseudarthria viscida, Tephrosia pulcherima, Tephrosia tinctoria* and *Vigna grahamiana*. Seventeen species are Indo-Malesian in distribution and some of these species are *Crotalaria nana, Derris scandens, Flemingia strobilifera, Tephrosia purpurea* and *Vigna trilobata*. Almost all other species have distribution in Tropical Africa, Java, southern China, South America and Australia.

Among the 27 species of the subfamily Caesalpinioideae, 7 are endemic to Western Ghats. These are *Bauhinia phoenicea, Caesalpinia spicata, Cynometra beddomei, Cynometra travancorica, Humboldtia brunonis, Kingiodendron pinnatum,* and *Senna intermedia.* Endangered tree species collected with restricted population are *Cynometra beddomei, Cynometra travancorica, Saraca asoca* and *Kingiodendron pinnatum* (Hilton Taylor, 2000). Two species of this subfamily, *Bauhinia racemosa* and *Chamaecrista kleinii* are common in Peninsular India and Sri Lanka. Indo-Malesian species found in the district are *Cassia fistula, Bauhinia malabarica, Caesalpinia cucullata* and *Caesalpinia mimosoides*. Except *Archiodendron monadelphum* var. *gracile*, all other species of the subfamily Mimosoideae are pantropical in distribution.

Table 5. Details of the family Fabaceae represented in Wayanad district

Number of Genera	68
Number of Species	185
Number of species in Faboideae	122
Number of species in Caesalpinioideae	38
Number of species in Mimosoideae	25
Genera with more than 5 species	13
Species endemic to Western Ghats	25
Species endemic to southern Western Ghats	18
Number of tree species	29
Indo-Sri Lankan species	14
Indo-Malesian species	24
Rare and threatened species	14
Number of species endemic to Kerala	4

Orchidaceae

The present study on the flora of Wayanad district revealed the richness and diversity of orchids of this area and in the order of dominance the family Orchidaceae ranks second in the district. Ramachandran and Nair (1988) who have studied the flora of Cannanore district covered some floristic regions of northern part of Wayanad district and recorded 35 orchids from Chanthanathodu and Thirunelli. Abraham and Vatsala (1981) had also mentioned Wayanad as one of their orchid collection sites. In the area of present study, the family is represented by 165 species belonging to 68 genera (Table 6). Of these, 59 species belonging to 29 genera are terrestrial in habit, while 106 species in 39 genera are epiphytic. The present record of 165 species of orchids from the district became the highest number recorded from a district or Sanctuary in Kerala state (Table 8). Oberonia with 17 species is the largest genus followed by Dendrobium with 14 species. *Habenaria* and *Bulbophyllum* are represented with 12 species each. Other genera with 5 or more species are *Eria*, *Liparis,* and *Peristylus*.

Among the 165 species collected, 15 species have been categorized as rare and threatened (Joseph, 1977; Henry *et al.,* 1984; Jain & Sastry, 1984; Ahmedullah & Nayar, 1986; Nayar, 1997) including 8 Indian Red Data Book listed species. They are *Bulbophyllum aureum, Bulbophyllum acutiflorum, Bulbophyllum elagantulum, Bulbophyllum mysorense*, *Bulbophyllum fuscopurpureum, Cirrhopetalum neilgherrense, Coelogyne mossiae, Corymborkis veratrifolia, Eria albiflora, Habenaria barnesii, Ipsea malabarica, Dendrobium jerdonianum*, *Dendrobium microbulbon*, *Habenaria richardiana* and *Oberonia brachyphylla*.

Table 6. Details of the family Orchidaceae represented in Wayanad

Genera	68
Species	165
Epiphytes	106
Terrestrials	59
Endemic to southern Western Ghats	54
Endemic to Peninsular India	76
Endemic to Kerala	5
Species common to South India and Sri Lanka	37
Indo-Malesian	20

Among the 142 endemic orchids of Peninsular India (Sathish Kumar & Manilal, 1994), 76 species are found in the district, which includes 57 epiphytes and 19 terrestrial species. Among these 54 species are endemic to southern Western Ghats and *Bulbophyllum silentvalliensis, Eria tiagii, Ipsea malabarica, Kingidium niveum* and *Oberonia wynadensis* are endemic to Kerala part of southern Western Ghats. Genus with 5 or more species were analyzed for their endemism (Table 7). Among those, *Bulbophyllum* and *Eria* showed maximum representation of endemic taxa with 100% endemism, followed by *Habenaria* with 79% and *Oberonia* with 61%.

Table 7. Genera with 5 or more species and percentage of endemism

Sl. No.	Genus	No. of species	Endemics	% of endemism
1	Bulbophyllum	12	12	100 %
2.	Eria	6	6	100 %
3.	Habenaria	12	11	79 %
4.	Oberonia	17	11	61 %
5.	Dendrobium	14	8	53 %
6.	Liparis	8	0	0 %
7.	Peristylus	6	2	20 %

All the 12 species of the genus *Bulbophyllum* occurring in Wayanad are endemic to southern Western Ghats. These are *Bulbophyllum aureum* (listed in Indian Red Data Book, narrow endemic to Wayanad region of the Western Ghats), *Bulbophyllum silentvalliensis* (recently discovered species from Silent Valley area of southern Western Ghats), *Bulbophyllum tremulum*, *Bulbophyllum elegantulum* (an endangered epiphytic herb listed in Indian Red Data Book, endemic to Wayanad part of the southern Western Ghats), *Bulbophyllum fimbriatum*, *Bulbophyllum acutiflorum* (narrow endemic epiphytic herb listed in the Indian Red Data Book), *Bulbophyllum fuscopurpureum* (an endangered epiphytic herb endemic to the southern Western Ghats), *Bulbophyllum mysorensis (a*n endangered epiphytic herb endemic to the southern Western Ghats), *Bulbophyllum rheedei* (reported only from Kerala), and *Bulbophyllum sterile*.

Table 8. Comparison of Orchid diversity of Wayanad with that of other regional floras of Kerala

Name of the area	No. of species	No. of genera	Reference
Kerala State	216	70	Manilal, K. S. & C. Sathish Kumar, 1993.
Wayanad District	**165**	**68**	**Present study**
Periyar Tiger Reserve	148	62	Augustine, J., 2000.
Silent Valley National Park	108	49	Manilal, K. S., 1988.
Parambikulam Wildlife Sanctuary	77	44	Sujanapal, P., 2005.
Thiruvanthapuram District	74	43	Mohanan, N. & A.N. Henry, 1994.
Agasthymala Forests	74	41	Mohanan, N. & M. Sivadasan, 2002.
Palghat District	73	42	Vajravelu, E., 1990.
Shenduruny Wildlife Sanctuary	70	44	Sasidharan, N., 1997.
Thrissur Forests	69	39	Sasidharan, N. & V. V. Sivarajan, 1996.
Pathanmthitta District	50	30	Anil Kumar, N., *et al.,* 2005.
Cannanore District	47	35	Ramachandran, V. S. & V. J. Nair, 1988.
Nilambur Forests	39	28	Sivarajan, V. V. & P. Mathew, 1996.
Thenmala Forest Division	25	18	Subramanian, K. N., 1995
Calicut District	10	9	Manilal, K. S. & V. V. Sivarajan, 1982.
Alappuzha District	10	9	Sunil, C. N. & M. Sivadasan, 2009.

Among the 14 species of the genus *Dendrobium* found in different forest types of Wayanad, 6 are endemic to Peninsular India and 2 are restricted to southern Western Ghats. These are *Dendrobium aqueum*, *Dendrobium barbatulum*, *Dendrobium herbaceum*, *Dendrobium heyneanum*, *Dendrobium jerdonianum*, *Dendrobium microbulbon* (endangered epiphyte listed in Indian Red Data Book), *Dendrobium nanum* and *Dendrobium ovatum*. All the 6 species

of the genus *Eria* collected from Wayanad are endemic to Peninsular India and these are *Eria albiflora* (endangered epiphytic herb listed in Indian Red Data Book), *Eria exilis*, *Eria mysorensis, Eria pauciflora*, *Eria polystachya* and *Eria tiagii* (endemic to Kerala part of the southern Western Ghats, earlier reported only from Silent Valley).

Habenaria Willd. is one of the largest pantropical genera of terrestrial orchids. Among the 28 species recorded from Kerala, 12 are found in Wayanad. Eleven species are endemic to Western Ghats and these are *Habenaria barnesii* (red Data Book-listed endangered plant endemic to the southern Western Ghats), *Habenaria crassifolia, Habenaria heyneana*, *Habenaria grandifloriformis*, *Habenaria longicorniculata*, *Habenaria longicornu*, *Habenaria multicaudata, Habenaria perrottetiana*, *Habenaria rarifolia*, *Habenaria richardiana* and *Habenaria roxburghii*. *Oberonia* Lindl. is an Old World genus of epiphytic orchids. Twenty five species are reported from Kerala, of which 17 are found in Wayanad. Among the 11 Peninsular Indian endemic species collected, 10 are restricted to the southern Western Ghats. These are *Oberonia anamalayana*, *Oberonia brachyphylla (*endangered orchid listed in Indian Red Data Book, endemic to the southern Western Ghats), *Oberonia brunoniana*, *Oberonia chandrasekharanii*, *Oberonia josephii*, *Oberonia platycaulon*, *Oberonia proudlockii*, *Oberonia santapaui*, *Oberonia sebastiana*, *Oberonia wynadensis* (endemic to Wayanad part of southern Western Ghats) and *Oberonia swaminathanii* (new species collected during the study). Endemic species of the genus *Kingidium* found in Wayanad are *Kingidium mysorensis* and *Kingidium niveum*. Endemic species of the genus *Luisia* found in Wayanad are *Luisia evangelinae* and *Luisia macrantha*. Two endemic species of the genus *Coelogyne* collected are *Coelogyne mossiae* (endangered epiphytic herb listed in the Indian Red Data Book, which is endemic to southern Western Ghats), and *Coelogyne nervosa*. Two Western Ghats endemic species of the genus *Propax* are reported from Kerala, which are found in Wayanad also. These are *Propax jerdoniana* and *Propax reticulata*. Among the 5 species of the genus *Seidenfia* collected from Wayanad, *Seidenfia crenulata* and *Seidenfia intermedia* are endemic to southern Western Ghats.

Other endemic orchids collected from Wayanad are *Robiquetia josephiana*, *Ipsea malabarica* (an endangered orchid listed in Indian Red Data Book, earlier reported only from Silent Valley), *Seidenfadeniella rosea*, *Smithsonia straminea, Trias stocksii*, *Aerides crispa*, *Anoectochilus elatus*, *Brachycorythis splendida*, *Cirrhopetalum neilgherrense* (an endangered epiphytic herb listed in Indian Red Data Book, endemic to southern Western Ghats), *Diplocentrum congestum*, *Disperis neilgherrensis*, *Peristylus lawii*, *Flickingeria nodosa*, and *Gastrochilus flabelliformis*. *Xenikophyton* is a monotypic endemic genus of epiphytic orchids represented by one species, *Xenikophyton smeeanum,* which is found in evergreen forests of the district.

Poaceae

Poaceae stands third in the order of dominance and is well represented by 163 species belonging to 65 genera (Table 9). Among the 67 genera, *Dimeria* has the highest representation with 10 species and the genus *Ischaemum* stands second with 9 species. Genera *Eragrostis* and *Panicum* have 8 species each and *Arundinella* has 7 species. Genera represented with 5 or more species are *Brachiaria, Cyrtococcum, Digitaria, Garnotia, Setaria* and *Paspalum*. Thirty five genera are represented by 1 species each. Tree grass, *Bambusa bambos* is the dominant species, especially in the moist deciduous forests of Wayanad Wildlife Sanctuary.

Among the 163 species collected during the study, 40 species are endemic to Peninsular India (25 % endemism), of which 26 are restricted to southern Western Ghats. Species like *Zenkeria jainii, Dimeria copiana, Dimeria idukkiensis, Isachne henryi, Ischaemum malabaricum, Ischaemum pushpangadanii, Ischaemum wayanadensis, Ochlandra scriptoria, Ochlandra beddomei* and *Tripogon narayanii* are endemic to Kerala. Among these species *Isachne henryi* and *Ischaemum wayanadense* are restricted to the present study area and *Zenkeria jainii, Dimeria copiana* and *Dimeria idukkiensis* are earlier reported only from their type localities. Species like *Garnotia puchiparensis, Ochlandra setigera, Isachne setosa* and *Ochlandra beddomei* are considered rare and threatened.

Table 9. Relative abundance of grasses occurring in the study area, Kerala state and Sri Lanka

Area	No. of genera	No. of species
Wayanad	65	163
Kerala	103	296
Sri Lanka	136	340

Genera with ten or more species in Wayanad district

Of the 901 genera there are 25 genera with 10 or more than 10 species in each (Table 10). They are *Crotalaria* (16), *Impatiens* (19), *Oberonia* (17), *Stobilanthes* (17), *Ixora* (10), *Leucas* (12), *Pogostemon* (10), *Cyperus (*12), *Desmodium* (13), *Dimeria* (10), *Dioscorea* (11), *Ficus* (15), *Habenaria* (13), *Syzygium* (18), *Diospyros* (10), *Eriocaulon* (10), *Ipomoea* (15), *Phyllanthus* (11), *Litsea* (10), *Solanum* (10), *Blumea* (10), *Bulbophyllum* (11), *Dendrobium* (13), *Lindernia* (10) and *Ischaemum* (11). There are 88 genera with 5 or more species and 479 genera represented by single species each.

In the Western Ghats, *Impatiens* with 86 species is the largest genus and in the present study area also it is the genus with maximum number of species. Of the 86 species reported from the Western Ghats, 76 are endemics. Except 5 species, which are seen throughout the Western Ghats, the rest are confined to well marked endemic centres, viz. the Nilgiri-Wayanad, Anamalai-Pulney Hills, Anamudi High Ranges and Thirunelveli-Agasthyamala Hills. Of the 86 species recorded from Western Ghats, 67 are reported to occur in Kerala. The Wayanad district is one of the centers of Western Ghats with a high percentage of endemism and among the 20 species of *Impatiens* collected during the present study, 18 are endemic to Peninsular India. Among these, 11 species are endemic to southern Western Ghats. *Impatiens crenata, Impatiens acaulis*, *Impatiens dasysperma*, *Impatiens herbicola*, *Impatiens lucida* and *Impatiens neo-barnesii* are considered as rare and threatened (Nayar, 1997; Ahmedullah & Nayar, 1986). *Impatiens acaulis* and *Impatiens scapiflora* are scapigerous herbs and seen on wet rocks in evergreen forests and grasslands. *Impatiens lawsonii*, *Impatiens crenata*, *Impatiens jerdoniae* and *Impatiens parasitica* are epiphytic herbs on moss covered tree trunks in

high altitude shola forests (Chembra, Kurichiarmala, Brahmagiri). *Impatiens scabriuscula* Heyne ex Roxb. is seen only in marshy areas of moist deciduous forest (Muthanga).

Table 10. Genera with 10 or more than 10 species and number of endemic species

Sl. No.	Genus	Number of species	No. of endemic species
1.	*Impatiens*	20	18
2.	*Syzygium*	18	11
3.	*Oberonia*	17	11
4.	*Strobilanthes*	17	14
5.	*Crotalaria*	16	5
6.	*Ficus*	15	2
7.	*Ipomoea*	15	2
8.	*Habenaria*	13	10
9.	*Dendrobium*	13	7
10.	*Desmodium*	13	1
11.	*Cyperus*	12	-
12.	*Leucas*	12	4
13.	*Bulbophyllum*	11	11
14.	*Ischaemum*	11	3
15.	*Phyllanthus*	11	3
16.	*Dioscorea*	11	6
17.	*Eriocaulon*	10	5
18.	*Dimeria*	10	7
19.	*Pogostemon*	10	5
20.	*Lindernia*	10	1
21.	*Litsea*	10	9
22.	*Ixora*	10	6
23.	*Blumea*	10	1
24.	*Solanum*	10	-
25.	*Diospyros*	10	6

Syzygium is the second largest genus in the study area with 18 species. Among the 11 endemic species collected, 8 species are endemic to southern Western Ghats. *Syzygium stocksii* and *Syzygium travancoricum* are two critically endangered species collected during the present study (Hilton Taylor, 2000). *Oberonia*, an Old World genus of epiphytic orchids, is well represented

in the present study area and is the third largest genus, the details of which have already been given under the account on Orchidaceae. *Oberonia wynadensis* is endemic to Wayanad district and is found in evergreen forests of Brahmagiri and Makkimala. *Strobilanthes* with 46 species in Western Ghats is represented with 17 species in the study area. All the 17 species of this shrubby monocarpic genus are seen well flourished in the evergreen forests of Wayanad. Among the 14 endemic species 11, are endemic to southern Western Ghats.

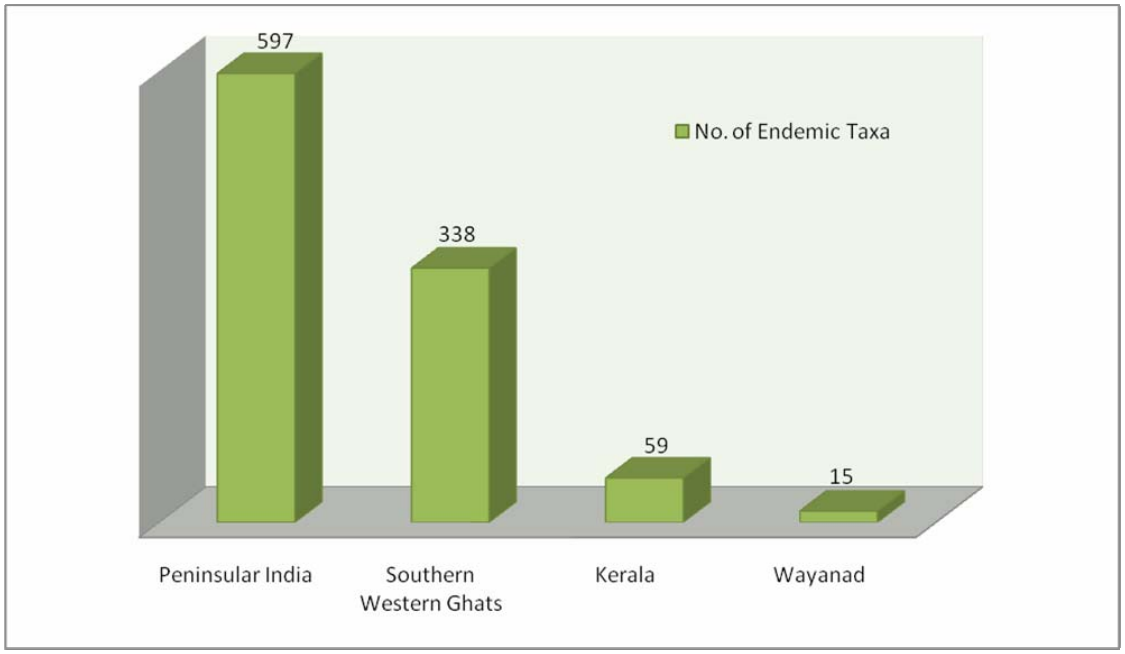
Rare, endemic and threatened plants

India being a tropical country is very rich in floristic diversity as well as endemism and constitutes 8% of the global biodiversity (Ahmedullah & Nayar, 1986). This is one among the 12 mega-biodiversity countries of the world. The country has about 17,000 species of flowering plants spread over in about 2,260 genera and over 304 families, comprising 6% of the known flowering plant species of the world (Subramanyam & Nayar, 1974b). Among the 34 Biodiversity hotspots (CIF, 2004) identified, two are in India. These two hottest hotspots having both species and ecosystem diversity in India are the southern Western Ghats and eastern Himalayas harboring around 1500 and 1808 endemic flowering plant species respectively. In the Western Ghats, southern Western Ghats consisting southern Karnataka, Kerala and part of Tamil Nadu is considered as the most species-rich region with respect to endemism. Even though Kerala represents a very small percentage of total area of southern Western Ghats, the State is very rich in biodiversity and possesses high rate of endemism. Nayar (1997) has reported that about 3800 species of flowering plants are occurring in Kerala of which 1272 are southern Western Ghat endemics. The recent compilation of flowering plants of Kerala (Sasidharan, 2004) revealed that there are 4679 species of flowering plants in Kerala and represents 1637 endemic species of which 263 are reported to occur only in Kerala.

Nayar (1997) recognized three hotspots of endemic centres in Kerala, viz. Agasthyamala, Anamalai High Ranges and Silent Valley–Wayanad. Among these hotspots of endemic centres, Wayanad comes under the “Silent Valley – Wayanad” centre of endemism. The study reports a total of 596 endemic taxa

in 97 families forming nearly 29% of the total species (Figure 5). Among these Indian endemics, 491 are endemic to Western Ghats. Three hundred and thirty eight taxa of flowering plants collected from the district are endemic to southern Western Ghats (18%), of which 59 are restricted to Kerala and 15 species exclusive to the study area (Figure 4). Orchidaceae (74) ranks first in having maximum number of endemic species followed by Rubiaceae (42), Poaceae (29), Acanthaceae (28), Fabaceae (27), Melastomataceae (22), Lauraceae (20), Euphorbiaceae (20), Balsaminaceae (18) and Lamiaceae (16). In India Rubiaceae ranks first in terms of number of endemic species, while in Kerala and in Wayanad it is Orchidaceae. Out of the total endemic species collected from the district 51% of the species are members of these ten families (Figure 6) Orchidaceae hold the highest percentage of endemic species, (13%) followed by Rubiaceae with 7% and Poaceae with 5%.

Figure 4. Number of Endemic taxa in Wayanad district



Among the 60 endemic genera reported from Western Ghats, 16 were collected from Wayanad during the present study. It includes 3 endemic tree genera, viz. *Meteoromyrtus*, *Otonephaliu*m and *Poeciloneuron,* of the 6 endemic tree genera of Western Ghats. Some other important endemic genera distributed in the study area are *Ochreinauclea, Jerdonia, Diplocentrum,*

Glyphochloa, Indobanalia and *Anaphyllum. Jerdonia* and *Meteromyrtus* are exclusive endemic genera to the study area. *Proteroceras*, earlier considered as a monotypic genus of southern Western Ghats is now treated as congeneric with *Pteroceras*. *Phlebophyllum, Nilgirianthus, Taeniandra* and *Xenacanthus* the splinter genera of *Strobilanthes* are now merged under it following the wider concept of the genus. The genus *Impatiens* has maximum number of endemic species (18), followed by *Strobilanthes* (14). Genera such as *Syzygium*, *Oberonia*, *Habenaria* and *Bulbophyllum* are represented with 10 or more endemic species (Table 11). Among these, *Bulbophyllum* is the genus in which all the species are endemic, i.e. the genus showed 100 % of endemism. Out of the 59 Kerala endemic species collected, 18 species are exclusively endemic to Wayanad region of Western Ghats. *Hedyotis wynaadensis, Oberonia wynadensis*, *Sonerila wynaadensis*, *Ischaemum wayanadense*, *Nothopegia beddomie* var. *wynaadica, Meteoromyrtus wynaadensis, Isachne henryi, Thottea sivarajanii, Pogostemon peethapushpum, Jerdonia indica, Ixora sivarajiana, Syzygium stocksii, Eugenia argentia, Leucas beddomei, Orophaea sivarajanii* and the recently described new species like *Miliusa wynaadica. Miliusa gokhalae* and *Oberonia swaminathanii* are the exclusive endemic species of the study area.

Figure 5. Relative abundance of endemic and non-endemic species in Wayanad district

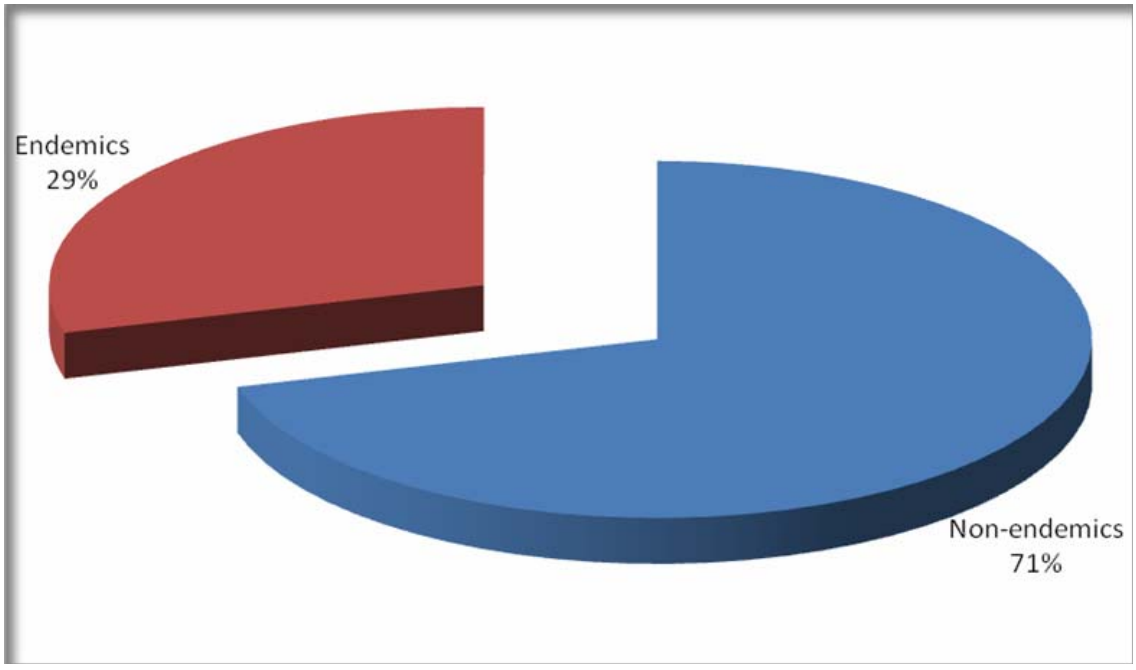
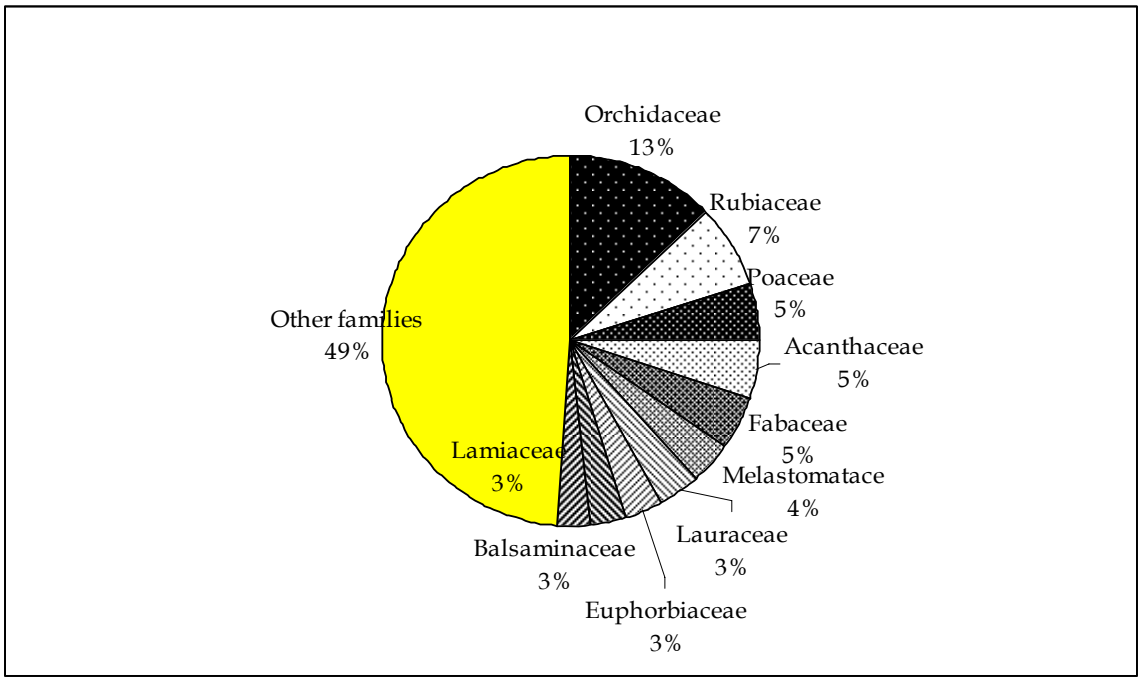


Table 11. Top ten genera in Wayanad with high percentage of endemism

Sl. No.	Genus	Number of species	No. of endemic species	% of Endemism
1.	*Impatiens*	20	18	90 %
2.	*Syzygium*	18	11	61 %
3.	*Oberonia*	17	11	65 %
4.	*Strobilanthes*	17	14	83 %
5	*Habenaria*	13	10	78 %
6.	*Bulbophyllum*	11	11	100 %
7.	*Dimeria*	10	7	70 %
8.	*Litsea*	10	9	90 %
9.	*Ixora*	10	6	60 %
10.	*Diospyros*	10	6	60 %

Figure 6. Relative abundance of endemic species in the top ten families of Wayanad district

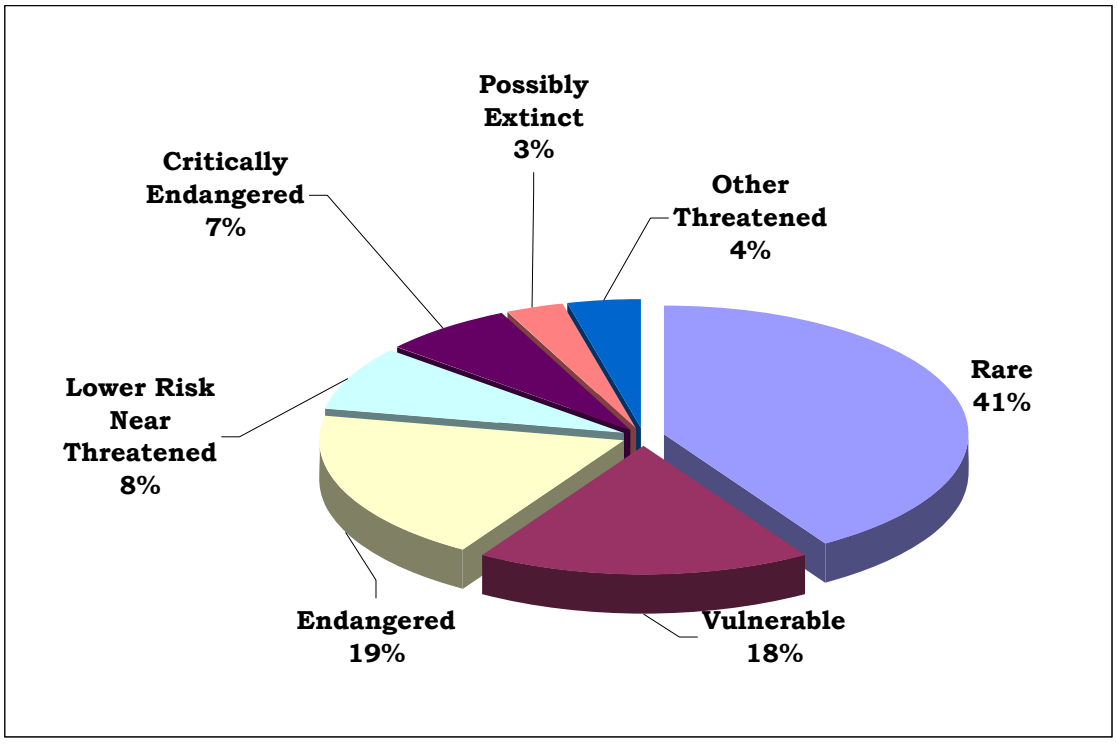


There are 620 threatened species listed in the *Red Data Book of Indian Plants* (Nayar & Sastry, 1987, 1988, 1990) out of which 550 species are endemics. Major work on endemism and conservation status of the flora of India were done by Subramanyam and Nayar (1974b), Joseph (1977), Henry *et al.* (1979),

Jain and Sastry (1984), Ahmedullah and Nayar (1986), Nayar and Sastry (1987), Nayar (1996 & 1997), *et al.* IUCN (2003) published a detailed list of plants of the world under various threat categories, including that of Indian species. Nayar (1997) studied the endemism and threatened status of Kerala plants and categorized them into different threatened groups such as Extinct, Possibly Extinct, Rare & Threatened, Endangered, Vulnerable, Conservation Dependent, and Indeterminate. Nayar has placed 483 species out of the 1272 endemic species reported from Kerala, under different threat categories.

In the present study, when the species were subjected to analysis of their rarity and threats based on the available data (Nayar, 1997; IUCN, 2003), out of the total 2034 taxa collected from the district, 138 are coming under different threat categories (Figure 7). Among these species, 41% represented the Rare (R) category, 18% Vulnerable (VU), 19% Endangered (EN), 8% Lower Risk Near Threatened (LRNT), 7% Critically Endangered (CR), 3% Possibly Extinct (PE), and 4% represented the Other Threatened (OT) category, which are locally threatened (Annexure 1).

Figure 7. Rare and threatened species in Wayanad district and categories as per IUCN



Of the total 137 threatened species of the study area, 125 are Western Ghats endemics, which mean that 91% of the total threatened species in the district are endemics. Again, 24.5 % of the total endemic species in the district are threatened. S*araca asoca, Glycosmis macrocarpa, Impatiens acaulis,* etc. are some of the threatened species, which are not endemic to Western Ghats.

The evergreen forests and grasslands of Chembra-Vellarimala hill ranges, Vythiri-Sughandhagiri forests, Kurichiarmala and Chanthanathodu harbor more than 80% species of rare and threatened categories. Diversity of Rare, Endemic, Endangered and Threatened plants is comparatively low in Wayanad Wildlife Sanctuary forests. Possibly Extinct category species like *Hedyotis wynaadensis* could seen only in Chembra peak-Vellarimala shola forests. Narrow endemic and critically endangered species like *Eugenia argentia,* and *Meteoromyrtus wynaadensis* were seen in three to four localities of Kurichiarmala-Kunchome-Chanthanathodu evergreen forest patches of Kalpetta and Periya forest ranges. Other critically endangered species like *Hopea erosa, Aglaia malabarica* and *Syzygium travancoricum* were collected only from evergreen forests of Vythiri. Endangered trees like *Cynometra beddomei*, *Cynometra travancorica* and *Kingiodendron pinnatum* were also collected from this area. Endangered and grassland species like *Ipsea malabarica*, *Garnotia puchiparensis* and *Habenaria barnesii* were located only in the grasslands of Chembra peak.

Plant taxa with "wynaadensis"/"wynaadica" etc. as specific epithet

It was noticed that Wayanad has a peculiarity in having twelve species, and one variety named after the district's name as 'wynadensis'/'wynaadica' etc. The interesting fact is that the species like *Hedyotis wynaadensis, Oberonia wynadensis*, *Sonerila wynaadensis*, *Ischaemum wayanadense*, *Nothopegia beddomie* var. *wynaadica, Meteoromyrtus wynaadensis,* and finally the recently described new taxa *Miliusa wayanadica* are reported to be occurring only in Wayanad. The other species like *Goniothalamus wynaadensis, Symplocos wynadense, Osbeckia wynaadensis, Justicia wynaadensis, Casearia wynadensis,* and *Tephrosia wynaadensis* are having very limited distribution outside Wayanad.

Rediscoveries and new distributional records

During the study, few species could be recollected after the type collections. *Eugenia argentea* was thought to be extinct and was assigned the status, "Possibly Extinct" (Nayar, 1997). It is a narrow endemic species of Wayanad and not seen after the type collection made by Beddome in 1870s. During the present study it could be recollected from its type locality after a lapse of 130 years and described. The grassland species *Hedyotis wynaadensis,* a high altitude endemic shrub of Wayanad (Possibly Extinct- Nayar, 1997), could be collected from the Chembra peak shola forests of the study area, which confirmed its existence in the type locality after a lapse of more than 100 years. The Endangered shrub, *Euonymus serratifolius* was earlier known only from its type locality, Idukki district, and the present study reported its presence in Wayanad also. *Ipsea malabarica,* the endangered orchid that was reportedly restricted to its type locality, Silent Valley, could be collected from Chembra peak of Wayanad District. *Eria tiagii, Memycylon sisparense, Aponogeton appendiculatus, Bulbophyllum silentvalliensis, Orophea malabarica* are some other species, which were also known only from their type localities, that could be collected from the study area. Species such as *Zenkeria jainii, Dimeria copiana, Dimeria idukkiensis, Pavetta travancorica,* and *Biophytum congestiflorum* were considered to be restricted to the Agasthyamala and Anamala high ranges. Collection of these species from Wayanad district during the present study shows their extended range of distribution.

New taxa described from Wayanad

Pristine forests in Wayanad are the treasure house of unique flora. Exploration in this enigmatic biodiversity region resulted in the discovery of three new taxa viz. *Miliusa wayanadica. Miliusa gokhalae and Oberonia swaminathanii.* The genus *Miliusa* Lesch. ex A. DC. is currently recognized with 40 species mostly of Austral-Asiatic with distribution ranging from India, Sri Lanka and Bhutan to Australia through the Malayan islands (Mols & Kessler, 2003). Ten species are reported from the Austro-Malesian area (Mols & Kessler, 2003) and three species from Sri Lanka (Huber, 1985). In India the

genus is represented by 15 species distributed mainly in western and north-eastern regions and Andaman & Nicobar Islands (Mitra, 1993). Six species of *Miliusa* are reported from Kerala (Sasidharan, 2007). Among the 15 species in India, four species are endemic to Western Ghats (Mitra, 1993; Murugan *et al.*, 2004). By following Finet & Gagnepain (1906) *Miliusa wayanadica* belonging to the section *Miliusa* due to one or two ovuled carpels and allied to *Miliusa indica*. Small populations of this tree species were observed in Kurichiarmala of Kalpetta Forest Range and Kalladi forest areas in Meppadi Forest Range. *Miliusa gokhalae* allied to *Miliusa eriocarpa* and distributed towards the windward side of Vythiri Ghats of Kalpetta Forest Range. The genus *Oberonia* comprises about 300 species of epiphytic orchids all over the world. Major work on the genus *Oberonia* was done by Gunnar Seidenfaden as he revised all the 85 species known in Mainland Asia in 1968. *Oberonia swaminathanii* is allied to *Oberonia balakrishnanii* and *Oberonia seidenfadeniana.* Small populations of this species were observed in Kurichiarmala of Kalpetta Forest Range.

Wild relatives of crop plants

Wayanad is well known in the world history as a main centre of spices and their trade. With its unique location, climatic features and diverse habitats, Wayanad harbours a very rich diversity of wild genetic resources of crop plants. These species are categorized into cereals, pulses, fruit crops, vegetable oilseeds, fiber crops, spices and condiments. Many species belonging to Cucurbitaceae, Amaranthaceae, Solanaceae and Dioscoreaceae are wild relatives of existing cultivars. *Momordica dioica* and *Momordica subangulata* are close relatives of bittergourd. *Trichosanthes cucumerina* and *Trichosanthes nervifolia* are closely related to the cultivated snakegourd. *Luffa cylindrica* is the wild relative of smoothgourd. Some other plants related to cultivated fruits and vegetables are *Abelmoschus moschatus, Amaranthus viridis, Amaranthus spinosus, Cajanus lineatus, Amorphophallus paeoniifolius* var. *paeoniifolius, Colocasia esculenta, Dioscorea bulbifera, Artocarpus hirsutus, Artocarpus gomezianus, Carissa inermis, Cucumis prophetarum, Solanum spp., Hibiscus hispidissimus, Flacourtia montana, Garcinia cowa, Garcinia gummi-gutta, Vigna vexillata,* and *Vigna radiata.* Wild relatives of spices collected from the study

area are species of *Piper, Amomum, Alpinia, Cinnamomum, Curcuma, Heracleum, Myristica,* and *Zingiber.* Seven species of *Piper* could be collected during the present study. *Piper trichostachyon* and *P. hymenophyllum* with longer spikes and bigger fruits are promising species for pepper breeding experiments. All the species of the family Zingiberaceae are either medicinal or relatives of cultivated plants. *Myristica malabarica*, a close relative of nutmeg (*Myristica fragrans*) is a common endemic tree in the study area with large fruits and brightly coloured aril. *Eleusine indica, Oryza meyeriana* and *Oryza rufipogon* are some of the wild relatives of cereals collected from the district. Species of orchid genera such as *Vanda, Aerides, Rhynchostylis, Calanthe, Cymbidium* and *Dendrobium* are with great horticultural value because of their showy flowers. Fibre yielding plants and their relatives of the families Sterculiaceae, Tiliaceae, Malvaceae, and Fabaceae also occur in the district. Fibre from *Sterculia spp.,* and *Helicteres isora* are traditionally used by the tribal people.

Non-endemics and exotics

The flora of India as a whole has been enriched by the intrusive elements from other parts of Asia, Europe, Tropical Africa, Tropical America and Australia (Mani, 1974). The indigenous non-endemic plants in the study area constitute about 65% of the total species. A total of 91 taxa are introduced or exotics. Majority of these species have very low density as they are planted in office premises, along roadsides or in homestead gardens. The tropical Asiatic elements of our flora have largely Indo-Chinese and Malayan affinities. Some of the common examples are species of *Goniothalamus, Gymnopetalum, Haldinia, Knoxia, Lasianthus, Myristica, Hedyotis, Saraca* and *Uvaria*. Some of the Tropical African and Madagascarean elements found in this area are *Geissaspis cristata, Albizia lebbeck, A. amara, Canavalia mollis, Combretum ovalifolium, Kalanchoe pinnata, Pseudarthria viscida* and *Ricinus communis*. American elements seen in the study area are *Anacardium occidentale,* cultivated species of *Annona, Capsicum, Hevea, Manihot, Ageratum conyzoides, Alternanthera pungens, Crassocephalum crepidioides, Synedrella nodiflora, Cassia occidentalis, Mimosa pudica, Passiflora foetida, Tridax procumbens,*

Datura metal, Lantana camara, Hyptis suaveolens, Gomphrena decumbens, and *Peperomia pellucida.* Most of these species are in fact, fast spreading weeds. Australian elements found in the study area are species of *Lindernia* and *Scleria, Apluda mutica,* etc. South American elements are *Ipomoea hederifolia, Ipomoea nil, Nicandra physalodes, Physalis peruviana, Mecardonia procumbens, Scoparia dulcis*, etc.

The flora of this region shows marked affinity with the flora of the Sri Lanka in having a number of species common to both. Some of these are *Myristica dactyloides, Neurocalyx calycinus, Cayratia pedata, Filicium decipiens, Gordonia obtusa, Gouania microcarpa, Harpullia arborea, Kydia calycina, Meliosma simplicifolia, Pterocarpus marsupium, Sarcandra chloranthoides, Tarenna asiatica, Thottea siliquosa* and *Vanda thwaitesii.*

Some of the fast spreading aggressive weeds observed in the study area, especially in the wildlife Sanctuary area are *Parthenium hysterophorus, Lantana camara, Ageratina adenophora, Mikania cordata, Mimosa diplotricha, Chromolaena odorata* and *Bidens biternata.*

THREAT TO THE FLORA

The flowering plant diversity of Wayanad district is under severe threat due to various man-made reasons like forest fragmentation, grassland conversion, construction of dams, over grazing, over exploitation of forest resources, habitation and cultivation inside the Wildlife Sanctuary, forest plantation, conversion of paddy fields, unscientific application of chemicals, invasion of alien species and forest encroachments. The western slope evergreen forests and moist deciduous tracks along the state border on the eastern edge of Wayanad are highly fragmented due to massive destruction of habitat. Due to the yield of valuable timber, these forest had been extensively exploited and consequently greatly disturbed. Most of the areas are now in secondary succession. Major part of the high altitude grasslands in Kurichiarmala and Banasuramala were converted in to Eucalyptus and Grewelia plantations by the forest department. Construction of dams for irrigation and electricity has also caused considerable damage to the vegetation. There are 2 dams in Wayanad, viz. Karapuzha and Banasurasagar. Construction of dams, especially Banasurasagar dam considerably damaged and submerged a vast stretch of the evergreen forests. It was observed that grazing in the buffer zones is a serious threat to the vegetation of Wayanad Wildlife Sanctuary. Over-exploitation of forest resources, especially from the Wayanad Wildlife Sanctuary is also causing severe damage due to the destructive collection methods. Barks of several taxa of spices and medicinal value are extracted quite often by cutting the trees. It was observed that collection of gooseberry and other fruits are made by lopping the branches. Several trees of *Cinnamomum malabatrum*, *Persea macrantha*, *Canarium strictum*, and *Symplocos microcarpa* were found damaged due to the removal of bark. Unsustainable and illegal collection of valuable medicinal plants like *Coscinium fenestratum, Pterospermum rubiginosum* is also causing depletion of species populations.

The most interesting feature of Wayanad Wildlife Sanctuary is the large number of settlements where cultivation is practiced. Southern Ranges have 80 settlements and 9 in Tholpetty Range. The main occupation of the people is

agriculture and they cultivate cash crops such as coffee, pepper and coconut followed by primary crops, *viz.* paddy, ginger, tapioca and plantains. These people living in the vicinity of forests are depending on the forests for meeting their requirements of firewood, small timber needs for house construction, agricultural implements, and poles for supporting banana plants. Teak and Ecucalyptus are most extensively raised as forest plantations in the district. Saplings of *Bambusa bambos* are often planted along with teak. Bamboos have been widely extracted from these forests since very long. Now sporadic flowering occurs almost every year. The undergrowth of these forest plantations in moist deciduous forests are predominantly exotic weeds like *Chromolaena odorata*, and *Lantana camara*.

Paddy fields of Wayanad have been a veritable treasure-trove of a variety of medicinal and wild edible greens, regularly accessed by the tribal communities. Apart from greens, a number of taxa of high food and health value such as fish, crustaceans like crab and snails were associated with this agro-eco system. From an ecological view point, the paddy fields situated in the low-lying areas of the undulating Wayanad terrain act as a trough collecting and retaining a large quantity of water that is used by the flora and fauna. Conversion of this land for cultivation of perennial crops or, as is the recent common practice, for banana considerably damaged the floristic wealth.

Studies have shown that the unscientific application of chemical pesticides, weedicides, fertilizers, etc. in the coffee, tea, cardamom and banana plantations, have considerably reduced the herbaceous flora.

A variety of alien species are getting naturalized rapidly in Wayanad district. The climate of the district is highly suitable for the fast growth of many of these exotic species. Some of these have replaced the herbaceous flora, especially edible greens; for example species such as *Cassia tora*, *Alternanthera sessilis*, *Amaranthus viridis, Amaranthus spinosus, Colocasia esculenta* (*Karathalu*) etc. are edged out by exotics like *Lantana camara, Parthenium hysterophorus* or *Drymaria cordata* etc. Sizeable areas of Muthanga sanctuary are now infested with *Lantana camara* and *Chromolaena odorata* - two noxious exotics. They now thrive in the area, which has been

clear-felled of Eucalyptus plantations. Interestingly, the Eucalyptus plantations itself came in to being after pristine natural forests were cleared to plant them as part of the social forestry scheme! *Mikania cordata* is another troublesome weed now found in almost all the forest fringes in the district. *Mucuna pruriens*, *Parthenium hysterophorus, Bidens biternata*, and several species of *Blumea* are some of the quick growing alien species, which have proliferated in different habitats in the study area.

SUMMARY AND CONCLUSION

The floristic study of Wayanad district envisaged exploration and documentation of the flowering plant diversity of Wayanad district. The thesis is organised into introductory part and systematic part. In the introductory part features of the study area, review of earlier work, methodology, salient findings, floristic analysis and ethnobotany were given. The systematic part taxonomically enumerates the taxa encountered from the study area.

Wayanad is a mid-level plateau, lies in the northwest corner of the Nilgiris. Topographically the district can be divided in two parts, the Southwestern part and the Northeastern part. From the highest altitude of the Western Ghats on the southwest and western border of the district, the plateau of Wayanad gradually slopes down towards northeast and eastward and merging imperceptibly with the Mysore plateau. The forest area in the district is divided into Wayanad Wildlife Sanctuary and Reserve Forests and is endowed with six vegetation types, which support luxuriant growth of diverse plant groups. The ethnic diversity of the district is also very impressive as evidenced by five dominant tribal groups, and these are the communities who still hold knowledge on biodiversity. The mid-level plateau of the district is the most densely populated area and it covers a major part of the land. Most of the natural vegetation of these areas has been replaced by coffee, tea, eucalyptus, banana and rubber plantations.

The thesis is the result of the intensive exploratory studies carried out during the period 2000-2005. Altogether, specimens with 4321 field numbers were collected. The total number of 2034 species belonging to 903 genera and 171 families recorded from an area of 2031 square kilometer form nearly 49% of the flora of the Kerala state (4679 taxa) and more than 10% of the flora of India. Of the 2034 taxa, Dicotyledons are represented by 1521 species belonging to 676 genera under 140 families, and Monocotyledons by 511 species belonging to 225 genera under 29 families. Gymnosperms are represented by 2 taxa. The plants were classified according to Bentham and Hooker's system with necessary alterations. Keys have been provided for

families, genera, species and intraspecific taxa. Illustrations and photographs of selected rare and endemic taxa have been provided. The family Fabaceae with 185 species in 68 genera is the largest family followed by Orchidaceae with 165 species in 68 genera. Poaceae are the third largest family represented in the district with 163 species in 65 genera. Among the 169 families, 43 families are represented by single species each. Of the 901 genera, there are 25 genera with 10 or more than 10 species in each.

Pristine forests in Wayanad are the treasure-house of unique flora and the present floristic exploration in this enigmatic biodiversity region resulted in the discovery of three new taxa, viz. *Miliusa wayanadica, Miliusa gokhalae* and *Oberonia swaminathanii.* Two rare and endangered species, considered as 'possibly extinct', viz. *Eugenia argentea* and *Hedyotis wynaadensis* could be recollected from their type localities after a lapse of 130 years. The study reports a total of 596 endemic taxa in 97 families forming nearly 29% of the total species. Among these Indian endemics, 491 are endemic to Western Ghats. Three hundred and thirty eight taxa of flowering plants collected from the district are endemic to southern Western Ghats (18 %), of which 59 are restricted to Kerala and 15 species exclusive to the study area. Among the 60 endemic genera reported from Western Ghats, 16 were collected from Wayanad during the present study. It includes 3 endemic tree genera, viz. *Meteoromyrtus*, *Otonephelium* and *Poeciloneuron,* out of 6 endemic tree genera of Western Ghats. *Jerdonia* and *Meteoromyrtus* are exclusive endemic genera to the study area. It was revealed that 138 taxa are coming under different threat categories and most of them are narrow endemics. It was observed that Wayanad has a peculiarity in having eleven species, and one variety named after the district's name as wynadensis'/wynaadica' etc. The interesting fact is that the species like *Hedyotis wynaadensis, Oberonia wynadensis*, *Sonerila wynaadensis*, *Ischaemum wayanadense*, *Nothopegia beddomie* var. *wynadica, Meteoromyrtus wayanaadensis,* and finally the recently described new taxon *Miliusa wynaadica* are reported to be occurring only in Wayanad.

With its unique location, climatic features and diverse habitats, Wayanad harbors a very rich diversity of wild genetic resources of crop plants. There are

434 flowering plants used by the tribal people of Wayanad and the indigenous non-endemic plants in the study area constitute about 65% of the total species.

The present study indicated that Wayanad is not only rich in its habitats and habit-forms but also for the diverse life forms. The life forms include peculiar plants such as saprophytes, insectivorous, parasites and semi-parasites. The diverse habitat of the district supports a rich flora and fauna. The evergreen forests and grasslands of Chembra-Vellarimala hill ranges, Vythiri-Sughandhagiri forests, Kurichiarmala and Chanthanathodu harbor more than 80% species of rare and threatened category. Diversity of Rare, Endemic, Endangered and Threatened plants is comparatively low in Wayanad wildlife Sanctuary forests. These areas are under severe threat due various man-made reasons like forest fragmentation, grassland conversion, construction of dams, over-grazing, over-exploitation of forest resources, habitation and cultivation inside the wildlife Sanctuary, forest plantations, conversion of paddy fields, unscientific application of chemicals, invasion of alien species, and forest encroachment. All these facts indicate the immediate need of implementing conservation measures to maintain the species diversity which is our national heritage, and to save the valuable genetic resources for judicious and sustainable utilization for the future generation.

SYSTEMATIC TREATMENT

Diagnostic key to the families

1. Seeds enclosed in fruit wall; stigma present 2
1. Seeds not enclosed in fruit wall; stigma absent 209
2. Plants with tap root system; cotyledons two 3
2. Plants with fibrous root system; cotyledons one 182
3. Flowers with two or more whorls of perianth 4
3. Flowers without or with one whorl of perianth 143
4. Inner whorl of perianth free; stamens free from petals 5
4. Inner whorl of perianth united or connate below; stamens epipetalous 98
5. Perianth lobes indistinguishable ..... **Magnoliaceae**
5. Perianth lobes distinguishable into sepals and petals 6
6. Carpels sunk in the pits of flat top of turbinate torus ..... **Nelumbonaceae**
6. Carpels otherwise 7
7. Fruit spongy, ripening below the surface ..... **Nymphaeaceae**
7. Fruit otherwise, ripening above the surface 8
8. Capsule opening at the top by valves ..... **Papaveraceae**
8. Capsule opening otherwise 9
9. Anther cells opening by recurved valves ..... **Berberidaceae**
9. Anther cells opening not by recurved valves 10
10. Ovary superior; flowers hypogynous or perigynous 11
10. Ovary inferior; flowers epigynous 84
11. Carpels free 12
11. Carpels united 16
12. Stems prickled, straggler ..... **Rosaceae** (p.p.)
12. Stem not prickled 13
13. Flowers unisexual ..... **Menispermaceae** (p.p.)
13. Flowers bisexual 14
14. Flowers trimerous ..... **Annonaceae**
14. Flowers 4 or 5-merous 15
15. Ovules solitary in each carpel ..... **Ranunculaceae** (p.p.)
15. Ovules 2-many in each carpel ..... **Dilleniaceae**
16. Stamens 15 or less 17
16. Stamens more than 15 68
17. Flowers zygomorphic 18
17. Flowers actinomorphic 24
18. Ovary 1-locular 19
18. Ovary 2-many-locular 20

19. Stamens 8; fruit a drupe ..... **Xanthophyllaceae**
19. Stamens 9 or 10, fruit a legume or pod ..... **Fabaceae** (p.p.)
20. Placentation parietal ..... **Violaceae**
20. Placentation axile 21
21. Fruit elastically opening; stamens confluent above ..... **Balsaminaceae**
21. Fruit and stamens otherwise 22
22. Leave pinnate; parts of inflorescence produced into tendril..... **Sapindaceae** (p.p)
22. Leaves simple; parts of inflorescence not as above 23
23. Ovary 5-celled; capsule twisting; seeds not carunculate ..... **Sterculiaceae** (p.p.)
23. Ovary 2-celled; capsule not twisting; seeds carunculate ..... **Polygalaceae**
24. Placentation parietal 25
24. Placentation otherwise 32
25. Stamens tetradynamous ..... **Brassicaceae**
25. Stamens equal 26
26. Gynandrophore present..... 27
26. Gynandrophore absent..... 28
27. Tendrillate climbers; flower with 3-5 whorls of corolline corona..... ..... **Passifloraceae** (p.p.)
27. Erect shrubs or non tendrillate climbers; corolline corona absent .... **Capparaceae** (p.p.)
28. Insectivorous plants; leaves covered with sticky hairs ..... **Droseraceae**
28. Non insectivorous plants; leaves otherwise 29
29. Flowers unisexual ..... **Flacourtiaceae** (p.p.)
29. Flowers bisexual 30
30. Stamens antipetalous..... **Flacourtiaceae** (p.p.)
30. Stamens alternipetalous..... 31
31. Fruit a globose capsule; trees or shrubs ..... **Pittosporaceae**
31. Fruit a linear capsule; herbs ..... **Capparaceae** (p.p.)
32. Ovary 1-celled 33
32. Ovary 2-many celled..... 39
33. Ovules free-central 34
33. Ovules not free-central 35
34. Sepals 2; fruit a circumscissile capsule ..... **Portulacaceae**
34. Sepals 5; fruit not as above ..... **Caryophyllaceae**
35. Disc present below the ovary 36
35. Disc absent 39
36. Flowers polygamous; disc intra-staminal..... **Anacardiaceae** (p.p.)
36. Flowers all bisexual; disc extra staminal 37
37. Stamens alternipetalous..... **Icacinaceae**
37. Stamens antipetalous..... 43

38. Tendril climbers.....**Erythropalaceae**
38. Plants otherwise .....**Olacaceae**
39. Calyx lobes persistent on the wings of the fruit; branches with hooks .....
.....**Ancistrocladaceae**
39. Calyx not as above; branches without hooks 40
40. Flowers with few sterile carpels and one fertile carpel..... **Connaraceae**
40. Flowers with fertile carpels only..... 41
41. Fruit a pod or legume..... **Fabaceae** (Mimosoideae)
41. Fruit a capsule or drupe..... 42
42. Herbs; flowers unisexual .....**Haloragaceae** (p.p.)
42. Trees; flowers bisexual ..... **Rosaceae** (p.p.)
43. Flowers perigynous, *i.e.*, perianth tube present 44
43. Flowers hypogynous; perianth tube absent..... 45
44. Leaves strongly ribbed from base; anthers attenuate to the apex.....
..... **Melastomataceae** (p.p.)
44. Leaves not or slightly 3-ribbed from base; anthers orbicular to ovoid.....
..... **Lythraceae** (p.p.)
45. Staminal filaments united into a staminal tube 46
45. Staminal filaments free or united only at base..... 49
46. Leaves simple; disc below the ovary absent 47
46. Leaves usually pinnate; disc present 48
47. Plants not mucilaginous; fruit 1-seeded drupe .....**Erythroxylaceae**
47. Plants mucilaginous; fruit many-seeded..... **Sterculiaceae** (p.p.)
48. Anthers 5; base of the petiole sheathing; lateral nerves of leaf blade always opposite .....**Leeaceae**
48. Anthers 4-12; base of the petiole not sheathing; lateral nerves of leaf blade not opposite ..... **Meliaceae**
49. Flowers strictly unisexual; ovary 3-celled ..... **Euphorbiaceae** (p.p.)
49. Flowers bisexual or rarely polygamous; ovary 1-5-celled..... 50
50. Fruit 5-angled with divaricate woody spines..... **Zygophyllaceae**
50. Fruit otherwise..... 51
51. Capsule septicidal, valves separating from the axis and septa..... **Elatinaceae**
51. Capsule otherwise 52
52. Disc below the ovary intra-staminal or absent..... 53
52. Disc below the ovary extra-staminal..... 66
53. Stamens opposite to petals..... 54
53. Stamens alternate to petals..... 58
54. Plants tendrillate climbers..... 55
54. Plants without tendrils 56
55. Fruits 3-winged, capsule .....**Rhamnaceae** (*Gouania*)
55. Fruit a wingless berry or drupe ..... **Vitaceae**

56. Sepals valvate ..... **Rhamnaceae** (p.p.)
56. Sepals imbricate 57
57. Petals 3; disc annular ..... **Sabiaceae**
57. Petals 5; disc 5-glandular ..... **Dichapetalaceae**
58. Stamens 3 only, filaments curved out ..... **Hippocrateaceae**
58. Stamens 5-10; filaments erect 59
59. Leaves gland-dotted ..... **Rutaceae**
59. Leaves not gland-dotted 60
60. Leaves pinnate or palmate 61
60. Leaves simple 63
61. Stamens 10; flowers umbellate ..... **Oxalidaceae**
61. Stamens 5 or 6; flowers in panicles 62
62. Petals 3; stamens 6 ..... **Burseraceae**
62. Petals 5; stamens 5 ..... **Staphyleaceae**
63. Stamens equal to the number of sepals 64
63. Stamens double the number of sepals ..... **Malpighiaceae**
64. Disc very prominent; stamens seen standing on the disc ..... **Celastraceae**
64. Disc not prominent; stamens free from disc 65
65. Flowers unisexual ..... **Aquifoliaceae**
65. Flowers bisexual ..... **Linaceae**
66. Sepals free ..... **Sapindaceae**(p.p.)
66. Sepals more or less united at the base 67
67. Carpels only one fertile ..... **Anacardiaceae** (p.p.)
67. Carpels all fertile ..... **Simaroubaceae**
68. Flowers strictly unisexual 69
68. Flowers bisexual or polygamous 70
69. Ovary 3-celled; styles 3, linear ..... **Euphorbiaceae** (p.p.)
69. Ovary 4-10-celled; styles short or absent ..... **Clusiaceae** (Garcinia)
70. Leaves opposite 71
70. Leaves alternate 73
71. Petals twisted; leaves decussate; small shrubs or herbs ..... **Hypericaceae**
71. Petals imbricate; leaves bifarious; large trees 72
72. Style one; leaves not areolate ..... **Clusiaceae**
72. Styles one; leaves areolate ..... **Bonnetiaceae**
73. Placentation parietal 74
73. Placentation axile or basal 76
74. Gynandrophore present ..... **Capparaceae** (p.p.)
74. Gynandrophore absent 75
75. Fruit a berry or indehiscent ..... **Flacourtiaceae** (p.p.)
75. Fruit a capsule ..... **Bixaceae**

76. Petals slightly united at base ..... **Theaceae** (**Ternstroemiaceae)**
76. Petals not as above 77
77. Hypanthium cup present 78
77. Hypanthium cup absent 79
78. Flowers regular ..... **Rosaceae**
78. Flowers irregular ..... **Chrysobalanaceae**
79. Two sepals larger and persistent ..... **Dipterocarpaceae** (p.p.)
79. Sepals equal 80
80. Staminal filaments produced into a long staminal tube 81
80. Stamens free or if united not produced into a staminal tube 82
81. Sepals free; anther cells with 2-chambers ..... **Sterculiaceae** (p.p.)
81. Sepals united; anther cells with one chamber ..... **Malvaceae**
82. Sepals united; stamens combined at base ..... **Bombacaceae**
82. Sepals and stamens free 83
83. Petals fimbriate above ..... **Elaeocarpaceae**
83. Petals entire ..... **Tiliaceae**
84. Stamens numerous, more than twice the number of sepals 85
84. Stamens equal to pr twice the number of sepals 88
85. Leaves opposite, gland dotted ..... **Myrtaceae**
85. Leaves alternate, not gland-dotted 86
86. Succulents; leaves reduced ..... **Cactaceae**
86. Non-succulents; leaves normal 87
87. Flowers unisexual; sepals unequal ..... **Begoniaceae**
87. Flowers bisexual; sepals equal ..... **Lecythidaceae**
88. Leaves sheathing at base 89
88. Leaves not sheathing at base 90
89. Shrubs or trees; fruit a drupe ..... **Araliaceae**
89. Herbs or small shrubs; fruit a cremocarp with longitudinal ridges ..... **Apiaceae**
90. Tendrillate climbers; placentation parietal ..... **Cucurbitaceae** (p.p.)
90. Non tendrillate plants; placentation not parietal 91
91. Parasitic epiphytes with haustoria; calyx a truncate rim ..... **Loranthaceae** (p.p.)
91. Non parasitic; haustoria absent; calyx not as above 92
92. Flowers polygamous ..... **Combretaceae** (p.p.)
92. Flowers all bisexual 93
93. Aquatic floating herbs; leaves dimorphic, submerged leaves root like ..... **Trapaceae**
93. Terrestrials; leaves not dimorphic 94
94. Leaves opposite 95
94. Leaves alternate 96
95. Petals smaller than sepals ..... **Rhizophoraceae**
95. Petals larger than sepals ..... **Melastomataceae** (p.p.)

96. Ovules many in each cell; petals caducus; flowers axillary, solitary ....**Onagraceae**
96. Ovules few; petals not as above; flowers in clusters 97
97. Stamens twice the number of sepals; flowers axillary fascicles ..... **Alangiaceae**
97. Stamens equal to the number of sepals; flowers in terminal or axillary panicles .... **Cornaceae**
98. Flowers epigynous.....99
98. Flowers hypogynous.....105
99. Parasitic epiphytes with haustoria; calyx rim like, truncate.... **Loranthaceae** (p.p.)
99. Non-parasitic; haustoria absent; calyx not as above 100
100. Ovules parietal ..... **Cucurbitaceae** (p.p.)
100. Ovules basal or axile 101
101. Stamens 10 or more ..... **Symplocaceae**
101. Stamens 5 or equal to the calyx lobes.....102
102. Ovary 1-celled; sepals modified into small spines or long cottony bristles (pappus) .....**Asteraceae**
102. Ovary 2-many-celled; sepals not modified as above 102
103. Leaves alternate; flowers zygomorphic .....**Campanulaceae**
103. Leaves opposite; flowers actinomorphic 104
104. Interpetiolar stipule absent or very inconspicuous.....**Valerianaceae**
104. Interpetiolar stipule conspicuous.....**Rubiaceae**
105. Flowers zygomorphic 106
105. Flowers actinomorphic 118
106. Scapigerous plants with insect catching bladders; sepals 2 ..... **Lentibulariaceae**
106. Non scapigerous plants; insect catching bladders absent; sepals 4 or 5.....107
107. Leaves alternate or rosetted 108
107. Leaves opposite or absent.....110
108. Placentation parietal.....**Gesneriaceae** (p.p.)
108. Placenta axile 109
109. Base of the petiole with 2 sessile glands ..... **Pedaliaceae**
109. Base of the petiole eglandular.....**Scrophulariaceae** (p.p.)
110. Leaves pinnately compound .....**Bignoniaceae**
110. Leaves simple, rarely palmately 3-5-foliolate (*Vitex*) or absent.....111
111. Leafless root parasites .....**Orobanchaceae**
111. Leafy, non-parasites or semi-parasites 112
112. Ovules solitary in each cell of the ovary 113
112. Ovules 2-many in each cell of the ovary.....115
113. Clusters of flowers surrounded by radiate involucral bracts .... **Verbenaceae** (p.p.)
113. Clusters of flowers not surrounded by involucral bracts 114
114. Style gynobasic; fruits of 4 nutlets ..... **Lamiaceae**
114. Style not gynobasic; fruit not of 4 nutlets ..... **Verbenaceae** (p.p.)

115. Placentation parietal..... 116
115. Placentation not parietal..... 117
116. Anthers united in pairs..... **Gesneriaceae** (p.p.)
116. Anthers not united in pairs ..... **Gentianaceae** (p.p.)
117. Placenta thick; anthers usually joined in pairs ..... **Scrophulariaceae**
117. Placenta thin; anthers free .....**Acanthaceae**
118. Carpels free 119
118. Carpels united..... 122
119 Carpels 4 or 5; latex absent..... **Crassulaceae**
119. Carpels 2; latex present..... 120
120. Styles 2; staminal corona present..... 121
120. Styles 1; staminal corona absent ..... **Apocynaceae**
121. Pollen tetrads contained loosely on a spatulate translator with basal corpusculum; filaments free ..... **Periplocaceae**
121. Pollen granular, united into pollinia attached to a retinaculum through a caudicle; filaments connate into a gynostegium .....**Asclepiadaceae**
122. Leaves alternate 123
122. Leaves opposite 135
123. Styles two, distinct .....**Hydrophyllaceae**
123. Style one 124
124. Ovules parietal 125
124. Ovules not parietal 127
125. Aquatic herbs .....**Menyanthaceae**
125. Terrestrials..... 126
126. Scapigerous herbs ..... **Parnassiaceae**
126. Tendrillate climbers.....**Passifloraceae** (*Adenia*)
127. Flowers strictly unisexual..... **Ebenaceae**
127. Flowers bisexual, rarely polygamous 128
128. Ovary 1-celled 129
128. Ovary 2-5-celled 132
129. Ovule solitary 130
129. Ovules few-many 131
130. Four-lobed disc present below the ovary..... **Opiliaceae**
130. Disc absent ..... **Plumbaginaceae**
131. Stamens alternate to petals; leaves rosetted .....**Plantaginaceae**
131. Stamens opposite to petals; leaves not rosetted .....**Myrsinaceae**
132. Stamens double the number of sepals or more .....**Sapotaceae**
132. Stamens equal to the number of calyx..... 133
133. Ovules solitary in each cell of the ovary 134
133. Ovules many in each cell of the ovary..... **Solanaceae**

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134. Style terminal; stamens unequal ..... **Convolvulaceae**
135. Stamens 2 ..... **Oleaceae**
135. Stamens 4 or 5 136
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138. Corolla imbricate ..... **Verbenaceae**
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199. One stamen larger than others; marshy or aquatic herbs ..... **Pontederiaceae**
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209. Leaves pinnate, collected at apex of the caudex ..... **Cycadaceae**
209. Leaves simple, not collected at apex of the caudex ..... **Gnetaceae**

RANUNCULACEAE Juss.

Gen.Pl. 231. 1789.

1. Terminal leaflet modified into tendril; petals present ..... **Naravelia**
1. Terminal leaflet normal; petals absent..... **Clematis**

CLEMATIS Linnaeus

Sp. Pl. 543. 1753.

Clematis gouriana Roxb. ex DC., Syst. Nat. 1: 138. 1817; Wight, Ic. t.933 & 934, 1845 ; Hook. f. & Thoms. in Hook.f., Fl. Brit. India 1:4.1872; Dunn in Gamble, Fl. Pres. Madras 3(2).1915; Manilal, Fl. Silent Valley 1. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 35. 1988; Vajr., Fl. Palghat Dist. 43. 1990; M. A. Rau in B. D. Sharma *et al.*, Fl. India 1:64.1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 24. 1996; Sivar. & P. Mathew, Fl. Nilambur 33. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 35. 2005.

Climbing herbs; young branches pubescent. Leaflets 3-7, 4-6 x 1.5-3 cm, ovate, acute at apex, rounded at base, nerves tomentose below. Panicles drooping, terminal and axillary, tomentose. Flowers white, 0.8-1 cm across; sepals ca. 7 x 4 mm, oblong, obtuse, pubescent; stamens many, filaments 7-8 mm long, glabrous; carpels 10-15, pubescent. Achenes 2-3 x 1-1.2 mm, ovoid, hairy; achenal style 3-4 cm long.

Flowering & Fruiting: November-March.

Distribution: Indo-Malesia and China. Occasional; in semi-evergreen and moist deciduous forests. *RNMK 2225* Kallady; *RNMK* 4135, Muthanga.

NARAVELIA Adanson

Fam. Pl. 2: 460, 581. 1763 (*nom.cons.*).

Naravelia zeylanica (L.) DC., Syst. Nat. 1: 167. 1817; Hook.f. & Thoms. in Hook. f., Fl. Brit. India 1: 7. 1872; Dunn in Gamble, Fl. Pres. Madras 3(3). 1915; Manilal & Sivar., Fl. Calicut 25. 1982; Ansari, Fl. Kasaragod Div. 52. 1985; Manilal, Fl. Silent Valley 1. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 35. 1988; Vajr., Fl. Palghat Dist. 44. 1990; M. A. Rau in B. D. Sharma *et al.*, Fl. India 1: 106. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 24. 1996; Sivar. & P. Mathew, Fl. Nilambur 33. 1997; Mohanan & Sivad., Fl. Agasthyamala 48. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 35. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 69. 2009. *Atragene zeylanica* L., Sp. Pl. 542. 1753.

Climbing tomentose shrubs. Leaves opposite, trifoliolate; leaflets 9-10 x 8-9 cm, broadly ovate, rounded at base, acute at apex, entire or serrate, 5-ribbed from base, terminal leaflets modified into a trifid tendril; petiole 5-10 cm long; petiolule 2-2.5 cm long. Inflorescence a terminal or axillary panicles, 5-15 cm across. Flowers many, greenish- white, pedicels ca. 2.5 cm long; sepals 4-5, ca. 6 x 6 mm, ovate, pubescent outside; petals 4-10, ca. 7 mm long, clavate, green; stamens many, filaments flat, connective produced beyond the anthers;

carpels many, densely hairy, 1- locular; ovule 1, pendulous. Achenes linear, stalked, spirally twisted with long feathery stigma, to 5 cm long.
Flowering & Fruiting: October-April.
Distribution: South East Asia. Common; in moist deciduous forests, also in open disturbed areas. *RNMK* 2256, Manikkunnumala; *RNMK* 1841, Puthoorvayal; *RNMK* 1249, Muthanga.

DILLENIACEAE Salisb.

Parad. Lond. 2: t. 73. 1807.

DILLENIA Linnaeus

Sp. Pl. 535. 1753.

Trees. Leaves large, smetimes stipulate; petioles channelled above. Flowerss showy, solitary or in terminal racemes, sometimes fasciculate on short shoots; sepals 5, persistent, tightly packed; petals 5, yellow or white, larger than sepals, caducous; stamens numerous, free; filaments equal or unequal in length; anthers linear with parallel loculi opening by apical pores or longiudinal slits; the inner ones erect and introse; the outer ones recurved and extrorse. Carpels 5-20, born on a conical receptacle; style radiating; ovules 4-80. Berry enclosed by enlarged thickened sepals; seed exarillate.

1. Flowers 3-6 cm across, in racemes; sepals silky .....**D. bracteata**
1. Flowers less than 3 cm or more than 6 cm across; sepals glabrous 2
2. Flowers solitary, terminal, white.....**D. indica**
2. Flowers fascicled on old branches, yellow .....**D. pentagyna**

Dillenia bracteata Wight, Ic. t. 358. 1840-43; Hook.f. & Thoms in Hook. f., Fl. Brit. India 1: 37. 1872; Dunn in Gamble, Fl. Pres. Madras 7 (5). 1915; V. S. Ramach. & V.J. Nair, Fl. Cannanore 36. 1988; N. C. Majumdar in B. D. Sharma *et al.*, Fl. India 1: 154. 1993.

Trees, to 20 m high, bark greyish-brown; young shoots tomentose; leaf scars claps the branches half the circumference. Leaves simple, alternate, spiral; stipules lateral, deciduous; petiole 1-5 cm long, stout, pubescent, grooved above; lamina 15-45 x 5-20 cm, obovate to elliptic-obovate, base cuneate, acute or obtuse, apex acute, acuminate or obtuse, margin serrate or rarely entire, coriaceous, glabrescent at maturity; lateral nerves 12-20 pairs, parallel, prominent; intercostae subscalariform, faint. Flowers bisexual, yellow, 2.5-3 cm across, in racemes or in 2-7 - flowered clusters on old branches; pedicels 4-9 mm long; bracts lanceolate or spathulate, hirsute, early cauducous; sepals 5, 8-12 x 5-9 mm, ovate, coriaceous, reddish, silky pubescent; petals 5, 15-20 x 5-10 mm, obovate, white turning to yellow; stamens numerous, cohering slightly at base, in 2 series, purple blue; anthers linear, opening by small slits; carpels 5, cohering at the axis,ovules many; styles 5, free, 9-11 mm long. Berry orange, subglobose, enclosed within sepals,

2.5-3 cm across, 1-2 - seed, each seed 5-7 x 4-6 mm, ovoid, dark reddish-brown to black, arillate, glabrous.
Flowering & Fruiting: December-June.
Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 2046* Kurichiarmala; *RNMK* 0261, Chembra hills; *RNMK* 2834, Brahmagiri.

Dillenia indica L., Sp. Pl. 535. 1753; Hook.f. & Thoms. in Hook. f., Fl. Brit. India 1: 36. 1872; Dunn in Gamble, Fl. Pres. Madras 7(5). 1915; V. S. Ramach. & V.J. Nair, Fl. Cannanore 36. 1988; N. C. Majumdar in B. D. Sharma *et al.*, Fl. India 1: 155. 1993. *Dillenia speciosa* Thunb., Trans. Linn. Soc. Bot. London 1: 200. 1791. Wight, Ic. t. 823. 1844-45.

Evergreen trees, to 25 m high, bole straight; branches spreading; bark smooth, pealing off in small thin hard scales; branchlets appressed silky hairy. Leaves simple, alternate, exstipulate; petiole 1.5-7.5 cm long, stout, sheathing, winged, tomentose, grooved above; lamina 18.5-30 × 5-10 cm, elliptic-oblanceolate or oblong-lanceolate, base cuneate, acute or attenuate, apex acute or acuminate, margin serrate to dentate, glabrous above, strigose or pubescent beneath; lateral nerves many, parallel, prominent, intercostae scalariform, faint. Flowers bisexual, 12-15 cm across, solitary, white, terminal; pedicels 4-8 cm long, silky hairy; bracts to 5 mm long, solitary, lanceolate; sepals 5, 4-6 × 3-5 cm, orbicular or elliptic, thick, fleshy; petals 5, 7-9 × 5-6 cm, obovate or oblong, white, veins green; stamens many, cohering slightly at base, in 2 series, outer 1.3-1.5 cm long, inner ones 2-2.2 cm long, inner ones arching over the short outer ones; carpels 14-20, cohering at the axis, ovules many; styles free, 1.8-2.5 cm long, flattened. Berry yellowish-green, globular with enclosed sepals, 2.5-3 cm across; seeds reniform, compressed, reddish, echinate with hairy margins.
Flowering & Fruiting: May-February.
Distribution: Indo-Malesia. Rare; in evergreen forests. *RNMK* 1556, Chanthanathodu.

Dillenia pentagyna Roxb., Pl. Corom. t. 20. 1795; Hook.f. & Thoms. in Hook. f., Fl. Brit. India 1: 38. 1872; Dunn in Gamble, Fl. Pres. Madras 8(6). 1915; Manilal & Sivar., Fl. Calicut 25. 1982; Ansari, Fl. Kasaragod Div. 52. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 36. 1988; Manilal, Fl. Silent Valley 2. 1988; Vajr., Fl. Palghat Dist. 44. 1990; N. C. Majumdar in B. D. Sharma *et al.*, Fl. India 1: 156. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 25. 1996; Sivar. & P. Mathew, Fl. Nilambur 34. 1997; Mohanan & Sivad., Fl. Agasthyamala 49. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 36. 2005.

Medium deciduous trees, bark greyish, smooth, dull-red inside; branchlets with prominent V-shaped leaf-scars. Leaves simple, alternate, 25-50 x 10-25 cm, obovate, apex obtuse, base attenuate, serrulate, nerves 40-60 pairs, regular, parallel; petiole 2-5 cm long, sheathing at base. Flowers fascicled on old branches; pedicel to 4 cm long; sepals 5, obovate, glabrous; petals yellow,

1-1.5 x 0.7-1.2 cm, obovate, obtuse; stamens many, filaments unequal, to 9 mm long, yellow; carpels 6-10, united; ovules many. Berry ca. 1.5 cm across, fleshy, globose, yellow, subtended by persistent sepals; seeds many, angular.
Flowering & Fruiting: February-June.
Distribution: Indo-Malesia. Common; in deciduous forests. *RNMK 1237,* Muthanga

MAGNOLIACEAE Juss.

Gen. Pl. 280. 1789.

MAGNOLIA Linnaeus

Sp. Pl. 535. 1753.

Shrubs or trees. Leaves coriaceous, entire; petiole without oblong adaxial scar. Flower solitary, terminal, showy; perianth lobes 9 or 12. Receptacle conical; stamens many; carpels many, sessile, oblong, 1-celled, strongly coherent on the receptacle, woolly or glabrous; ovules 2 or more. Follicles compact, cone like, woody, erect.

1. Leaves to 25 cm long, glabrous or midrib hairy beneath ..... **M. champaca**
1. Leaves to 13 cm long, velutinous tomentose beneath..... **M. nilagirica**

Magnolia champaca (L.) Baill. ex Pierre, Fl. Forest. Cochinch. t. 3. 1880. *Michelia champaca* L., Sp. Pl. 536. 1753; Roxb., Fl. Ind. 2: 656. 1832; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 42. 1872; Dunn in Gamble, Fl. Pres. Madras 9 (6). 1915; Manilal & Sivar., Fl. Calicut 26. 1982; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 169. 1988; Vajr., Fl. Palghat Dist. 45. 1990; D. C. S. Raju in B. D. Sharma *et al.*, Fl. India 1: 175. 1993; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 39. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 70. 2009. *Michelia rheedei* Wight, Illustr. 1: 14. 1840. *Champacam* Rheede, Hort. Malab. 1:31-32, t. 19. 1678.

Evergreen trees, to 30 m high, bole straight; bark grey with numerous pits, blaze yellow; branchlets lenticellate, scarious. Leaves simple, alternate; stipules 1-2.5 cm long, lateral, adnate to the petiole, ovate, subglabrous, enclosing leaf buds, deciduous leaving annular scar; petiole 1-3 cm long, slender, pubescent, grooved above; lamina 8-25 x 4-10 cm, ovate-lanceolate, elliptic-lanceolate or elliptic-oblong, base acute, apex acuminate, margin entire, wavy, glabrous above, puberulent beneath; lateral nerves 8-18 pairs, pinnate, prominent; intercostae reticulate, prominent. Flowers bisexual, yellow or white, fragrant, 4-5 cm across, axillary or terminal, solitary; flower bud enclosed by a greenish-yellow, spathaceous, pubescent, coriaceous, deciduous bracts; pedicels 1-1.6 cm long, stout, perianth parts 9-12, 4.5-8 cm long, oblanceolate, fleshy; stamens numerous, subclavate; filaments short, flat; carpels many, superior, ovoid-oblong, densely hairy. Fruit an aggregate of capsules, 1-1.5 x 1-2 cm, laxly arranged, ovoid to ellipsoid; seeds 3-4, enclosed by fleshy red aril.

Flowering & Fruiting: March-July.
Distribution: Indo-Malesia and China. Occasional; in evergreen forests and plantations. *RNMK 3079,* Kalpetta; *RNMK* 1248, Vythiri.

Magnolia nilagirica (Zenk.) Figlar, Proc. Int. Symp. Magnoliac. 23. 2000. *Michelia nilagirica* Zenk., Pl. Ind. 21, t.20. 1835; Hook.f. & Thoms. in Hook. f., Fl. Brit. India 1: 44. 1872; Dunn in Gamble, Fl. Pres. Madras 9 (6). 1915; Vajr., Fl. Palghat Dist. 45. 1990; D. C. S. Raju in B. D. Sharma *et al.*, Fl. India 1: 175. 1993.

Trees, up to 20 m high, blaze yellow; branchlets tomentose, lenticellate. Leaves simple, alternate, spiral; stipules 1-1.5 cm long, oblong, coriaceous, woolly, enclosing buds, deciduous leaving an annular scar; petiole 1.5-2 cm long, slender, tomentose, grooved above; lamina 5-13 x 3-5.5 cm, obovate to elliptic-obovate, base cuneate or acute, apex acuminate or caudate acuminate, margin entire, glabrous above, villous beneath, coriaceous; lateral nerves 13-18 pairs, pinnate, slender, prominent, intercostae reticulate, prominent. Flowers bisexual, white, 7-10 cm across, axillary or terminal, solitary, enclosed by densely pubescent, spathaceous bracts; pedicel ca. 8 mm long, stout; perianth lobes 9-12, 3-5 x 1.2-1.5 cm, obovate, inner smaller; stamens numerous, crowded at the base of gynophore; filaments short, flat; anthers up to 8 mm long; carpels many, pubescent. Fruit an aggregate of capsules, globose.
Flowering & Fruiting: March-August.
Distribution: Endemic to Western Ghats. Rare; in evergreen forests. *RNMK 1717,* Aranamala.

ANNONACEAE Juss.

Gen. Pl. 283. 1789.

1. Carpel one; sepals united into a cup..... **Cyathocalyx**
1. Carpels 3 or more; sepals free 2
2. Inner petals clawed .....**Orophea**
2. Inner petals not clawed 3
3. Carpels 3-5 ..... **Sageraea**
3. Carpels 10 or more.....4
4. Inner petals much longer than the outer petals 5
4. Inner petals as long as the outer petals 6
5. Connective prolonged widened above the anther..... **Phaeanthus**
5. Connective hardly prolonged, not widened abve the anther .....**Miliusa**
6. Flowers on hooked peduncles; inner petals constricted at base ..... **Artabotrys**
6. Flowers not on hooked peduncles; inner petals not constricted at base 7
7. Flowers subsessile; pedicels under 3 mm long.....**Meiogyne**
7. Flowers pedicelled; pedicels more than 1 cm long.....8
8. Trees; ovules 1 or 2 ..... **Polyalthia**
8. Climbers; ovules 2 or more.....9
9. Petals ovate-orbicular; less than 2 cm long..... **Uvaria**
9. Petals linear; more than 4 cm long ..... **Desmos**

ARTABOTRYS R. Brown
Bot. Reg. 5: 423. 1820.

Artabotrys zeylanicus Hook. f. & Thoms., Fl. Ind. 128. 1855 & in Hook. f., Fl. Brit. India 1: 54. 1872; Dunn in Gamble, Fl. Pres. Madras 14(10). 1915; Manilal & Sivar., Fl. Calicut 26. 1982; Ansari, Fl. Kasaragod Div. 53. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 37. 1988; Manilal, Fl. Silent Valley 2. 1988; Vajr., Fl. Palghat Dist. 46. 1990; Debika Mitra in B. D. Sharma *et al.*, Fl. India 1: 253. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 26. 1996; Sivar. & P. Mathew, Fl. Nilambur 36. 1997; Mohanan & Sivad., Fl. Agasthyamala 51. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 40. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 74. 2009. **Plate 9a.**

Woody climbers; stems glabrous. Leaves 16-18 x 6-7 cm, oblong, acute at both ends, nerves 10-12 pairs; petiole striate. Flowers 1-few, on hooked axillary peduncles; fragrant, pedicels 1-2 cm long, stout with 4 bracts at base; sepals 3, 8 x 6 mm, broadly ovate, pubescent; petals 6, similar, 2.5-3 x 0.8-1 cm, oblong-lanceolate, concave at base inside, pubescent yellow; stamens many, anthers oblong, concealed by flat and broad connectives; carpels few, tomentose, ovules paired in each cell. Fruitlets sessile, globose, 15-22 cm across, obovoid obtusely ridged, densely packed, tomentose.

Flowering & Fruiting: August-November.

Distribution: Peninsular India and Sri Lanka. Fairly common; in evergreen and semi-evergreen forests. *RNMK 1438,* Chanthanathodu*; RNMK 2261,* Karuvanthodu.

CYATHOCALYX Champ. ex J.D. Hooker et T. Thomson
Fl. Ind. 126. 1855.

Cyathocalyx zeylanica Champ. ex Hook. f. & Thoms., Fl. Ind. 127. 1855 & in Hook. f., Fl. Brit. India 1: 53. 1872; Bedd., Ic.t.47.1868-1874; Dunn in Gamble, Fl. Pres. Madras 13(9). 1915; Vajr., Fl. Palghat Dist. 46. 1990; Debika Mitra in B. D. Sharma *et al.,* Fl. India 1: 256. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 26. 1996; Mohanan & Sivad., Fl. Agasthyamala 52. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 40. 2005. **Plate 9b.**

Medium-sized tree; bark greyish-brown, smooth, dull yellow inside; young shoots brown tomentose; branches horizontal, confined to the top of the trunk. Leaves elliptic-oblong, apex acuminate, base acute or obtuse, glabrous, 18-20 x 5-6 cm; lateral nerves 8-10 pairs; petiole to 1 cm long. Flowers solitary or in pairs; bracts and pedicels tawny tomentose; sepals 3, united to form a cup-like calyx; petals ovate-lanceolate, outer 2-2.5 x 0.5-0.8 cm; stamens numerous; ovary pubescent; stigma disc-shaped. Berry ovoid, 6- 7 x 4-5 cm; seeds compressed.

Flowering & Fruiting: April-August.

Distribution: South India and Sri Lanka. Rare; in evergreen forests. *RNMK 4006,* Vythiri Ghat.

DESMOS Loureiro

Fl. Cochinch. 1: 352. 1790, 'Desmis'

Desmos lawii (Hook. f. & Thoms.) Safford, Bull. Torrey Bot. Club 39: 506. 1912; Debika Mitra in B. D. Sharma *et al.*, Fl. India 1: 261. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 27. 1996; V. S. Ramach. & V. J. Nair, Fl. Cannanore 38. 1988; Sivar. & P. Mathew, Fl. Nilambur 37. 1997; Mohanan & Sivad., Fl. Agasthyamala 53. 2002. *Unona lawii* Hook. f. & Thoms., Fl. Ind. 132. 1855 & in Hook. f., Fl. Brit. India 1: 59. 1872; Dunn in Gamble, Fl. Pres. Madras 15(10). 1915. **Fig. 9, Plate 9c.**

Large woody climber; young shoots grey-pubescent. Leaves oblong-lanceolate, apex acuminate, base rounded or subcordate, glabrous above and glaucous below, 7-12 x 2.5-4 cm; lateral nerves 7-10 pairs, faint; petiole to 0.5 cm long. Flowers solitary, axillary or extra axillary; pedicels slender, to 3.5 cm long; sepals ovate-acute, 1-2 cm long; petals greenish-yellow, 6-8 x 0.4-0.6 cm, linear-oblong; stamens many, stigma globose, red; carpels glabrous.

Flowering & Fruiting: March-September.

Distribution: South India and Sri Lanka. Occasional; in evergreen forests. *RNMK 4488,* Vythiri Ghat; *RNMK 4016,* Chanthanathodu*; RNMK 3040,* Chooralmala.

GONIOTHALAMUS J. D. Hooker & Thomson

Fl. Ind. 105. 1855.

Shrubs or small trees. Leaves with intra-marginal loops. Flowers solitary or few in fascicles, axillary or extra-axillary or sometimes cauliflorus; sepals 3, valvate, often persistent in fruit; petals 6 (3 + 3), valvate, coriaceous; outer petals erect, flat, inner ones smaller, shortly and broadly-clawed at base, with upper part broadened and cohering in a narrow conical vaulted cap over the stamens and carpels; stamens many, connectives produced into oblong or truncate processes; carpels many; style linear; stigma simple or bifid; ovule solitary or 2. Berries globose or oblong; seed 1, sometimes 2-4.

1. Outer petals oblong, clawed, hooded.....**G. cardiopetalus**
1. Outer petals ovate, not clawed and hooded ..... **G. wynaadensis**

Goniothalamus cardiopetalus (Dalz.) Hook. f. & Thoms., Fl. Ind. 107. 1855 & in Hook. f., Fl. Brit. India 1:75.1872; Dunn in Gamble, Fl. Pres. Madras 18 (13). 1915; Ansari, Fl. Kasaragod Div. 54. 1985; Debika Mitra in B. D. Sharma *et al.*, Fl. India 1: 232. 1993; V. S. Ramach. & V. J. Nair, Fl. Cannanore 38. 1988; Sivar. & P. Mathew, Fl. Nilambur 37. 1997. *Polyalthia cardiopetala* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 2:39.1850. **Fig. 10, Plate 9d.**

Small trees, young branches puberulous. Leaves oblong-laceolate or oblanceolate, cuneate at base, 9-20 x 2-7.5 cm, coriaceous, glabrous; lateral nerves 8-15 pairs; petiole 5-10 mm long. Flowers solitary or superposed, axillary; pedicels 5-10 mm long; bracts minute at the base of pedicels; sepals

3, almost orbicular; petals 6; outer petals cucullate, oblong, clawed at base, hooded, acute at apex; stamens many, 2 mm long, connectives capitate at top; carpels many, linear-oblong, 3 mm long, brown-pubescent, 1-ovuled; style bifid, elongate, curved; stigma bilobed. Ripe carpels ellipsoid, 1-seeded.
Flowering & Fruiting: January-August.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3584,* Manikkunnumala

Goniothalamus wynaadensis (Bedd.) Bedd., Ic. t. 61. 1868-1874; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 74. 1872; Dunn in Gamble, Fl. Pres. Madras 19(13). 1915; V. S. Ramach. & V. J. Nair, Fl. Cannanore 39. 1988; Debika Mitra in B. D. Sharma *et al.*, Fl. India 1: 240. 1993; Sivar. & P. Mathew, Fl. Nilambur 39. 1997. *Atrutegia wynaadensis* Bedd., Madras J. Lit. Sci. ser. 3, 1: 37. f. 1. 1864. **Plate 9e.**

Small tree; young parts minutely fusco-pubescent. Leaves oblong to oblong-lanceolate, attenuate at base, 10-24 x 3-5 cm; petiole 6-8 mm long. Flowers yellowish green, ca. 1.5 cm long, solitary, axillary or from small tubercles on old wood; pedicels ca. 5 mm long, with 2-3 minute basal bracts; sepals 3, almost orbicular, obtuse or sometimes acute, 4-5 mm across; petals 6; outer petals broadly ovate, subacute, 1.5-2 x 0.5-0.7 cm long; inner one ca. 7 x 3 mm, closely connivent; stamens many; connectives prolonged beyond the anthers into blunt tips. Carpels many, oblong, ca. 4 mm long, hairy; ovule solitary from ventral suture above the base; style linear-elongate; stigma bifid. Ripe carpels many, elliptic to oblong, apiculate, shortly-stalked, 1-seeded.
Flowering & Fruiting: March-September
Distribution: Endemic to *s*outhern Western Ghats. Rare; in evergreen forests. *RNMK 2896,* Vythiri Ghat; *RNMK* 4211, Kanthanpara; *RNMK* 3972, Aranapuzha*; RNMK 4373,* Periya Ghat.

MEIOGYNE Miquel

Ann. Mus. Bot. Lugduno-Batavi 2: 12. 1865

Small trees, branches radiating. Leaves alternate, prominently-veined beneath. Flowers solitary, axillary or leaf-opposed; sepals 3, free; petals 6, biseriate, similar; stamens many, anthers linear, concealed by the broad connectives; ovaries many, ovules 2-8; style oblong, recurved. Fruit of many carpels arranged in a ring, ovoid, oblong or constricted, few-many seeded.

1. Fruitlets globose, tomentose ..... **M. pannosa**
1. Fruitlets oblong, subglabrous ..... **M. ramarowii**

Meiogyne pannosa (Dalz.) Sinclair, Sarawak Mus. J. 5: 604. 1951; Debika Mitra in B. D. Sharma *et al.*, Fl. India 1: 266. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 27. 1996; V. S. Ramach. & V. J. Nair, Fl. Cannanore 39. 1988; Sivar. & P. Mathew, Fl. Nilambur 39. 1997; Mohanan & Sivad., Fl.

Agasthyamala 56. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 43. 2005.*Unona pannosa* Dalz. in Hooker's J. Bot. Kew. Gard. Misc. 3: 207. 1851; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 58. 1872; Dunn in Gamble, Fl. Pres. Madras 14(10). 1915.*Desmos pannosus* (Dalz.) Safford, Bull. Torrey Bot. Club 39: 506. 1912.

Trees, to 8 m high; branchlets hirtus. Leaves ovate, apex acuminate, base rounded, nerves 6 or 7 pairs, hirtus below; glabrous above; petioles ca. 5 mm long. Flowers axillary, sessile, dull yellow; sepals ca. 6 x 4 mm, ovate, acute, fulvous tomentose; outer petals spreading; inner erect, ovate-lanceolate, fulvous- tomentose; carpels densely hairy. Fruitlets ca. 12 x 8 mm, globose, fulvous- tomentose; seeds 2-few, globose.

Flowering & Fruiting: July-December.

Distribution: Endemic to Western Ghats. Rare; in evergreen forests. *RNMK 4450,* Aranapuzha.

Meiogyne ramarowii (Dunn) Gandhi in Sald., & Nicols., Fl. Hassan Dist. 38. 1976; Ansari, Fl. Kasaragod Div. 54. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 39. 1988; Vajr., Fl. Palghat Dist. 46. 1990; Debika Mitra in B. D. Sharma *et al.*, Fl. India 1: 266. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 27. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 45. 2005. *Unona ramarowii* Dunn, Kew Bull. 1914: 183. 1914; Dunn in Gamble, Fl. Pres. Madras 15(10). 1915. *Desmos ramarowii* (Dunn) Das, Bull. Bot. Surv. India 5: 42. 1963.

Branchlets, hirtus. Leaves oblong, acuminate at apex, hirtus below, nerves to 9 pairs, nervules parallel; petiole ca. 8 mm long. Flowers dull white, sessile; sepals ca. 12 x 6 mm, ovate, acute, hispid; petals lanceolate, saccate at base, densely hispid; ovaries densely villous. Fruitlets 1-2.5 x 0.8-1 cm, oblong, shortly-stalked, subglabrous, depressed between seeds; seeds 1-3, globose.

Flowering & Fruiting: December-March.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 4369,* Peria Ghat.

MILIUSA Leschenault ex A. P. de Candolle
Mem. Soc. Phys. Geneve 5: 213. 1832.

Shrubs or small trees. Leaves thick, bifarious. Flowers solitary or fascicled, axillary or lateral, pedicelled; sepals 3; petals 3 + 3, unequal, outer smaller, inner ovate to lanceolate, cohering by margins; stamens many, filaments short, thick, connectives not produced above the anthers; ovaries many, ovules 2-8, Fruitlets stipitate, arranged in a ring.

1. Carpels 4-6-ovuled ..... **M. tomentosa**
1. Carpels less than 4-ovuled 2
2. Stamens many 3
2. Stamens 6-12.....4

3. Carpels 10-15, glabrous ..... **M. gokhalae**
3. Carpels many, densely pilose..... **M. indica**
4. Stamens 9, biseriate; staminodes 3 ..... **M. wayanadica**
4. Stamens 8-12, uniseriate; staminodes absent ..... **M. nilagirica**

Miliusa gokhalae Ratheesh, Sujanapal, Anil Kumar & Sivad. s*p. nov.* (in ed.). **Fig. 11, Plate 9f.**

Small trees, to 7 m high, sometimes scandent; bark black, branches terete, drooping, young parts densely hairy. Leaves simple, alternate, 6--12 x 2.5--4 cm, oblong, elliptic-oblong or obovate, glabrous, midrib pubescent below, slightly unequally rounded at base, apex caudate acuminate, subsessile or petiole to 3 mm, membranous, lateral nerves 10--14 pairs, intramarginal nerves sub-marginal, looping, margins entire, slightly curved, thickened. Flowers solitary, pseudo-terminal (slightly above and opposite to the terminal leaf) greenish-yellow, pedicel 2-4 mm long, glabrous; bracts two, very small, woody, bracteoles two at the base, unequal, ovate-triangular, acute, ca. 1.5 mm, hairy outside; sepals 3, *ca.* 1.5 x 2 mm, broadly ovate, woody, acute, glabrous; outer petals 3, broadly ovate, woody, acute, hairy on margins, slightly hooded, *ca.* 2 x 1.5 mm long; inner petals 3, broadly ovate-lanceolate, 2-2.4 x 0.8-1.3 cm, thick, fleshy, glabrous, thickly hooded on the lower half, cohering when young along the margins, brown streaks inside; torus ovoid, long hairy, stamens many, 40-50, anthers in pairs, ca. 1 mm., connective included, staminodes absent, anthers extrorse; carpels 10-15, linear-oblong, curved, ca. 2 mm long, glabrous, stigma ovoid-acute, about half of the length of the ovary, with viscous exudation, ovules 1 or 2. Monocarps usually 8-12, ovoid, mammate, glabrous, glandular, deep pink, 10-12 mm across; stipe terete, 8-11 mm long; stalk of monocarps *ca*. 5 mm; seeds 1 or 2.

Flowering & Fruiting: Flowering starts from January and peak time is March.

Distribution: Hitherto known only from Wayanad. Small populations of this species were observed in Vythiri forest.

Etymology: The specific epithet is in honour of Padmashree A.M. Gokhale, former executive director of M. S. Swaminathan Research Foundation.

Type: INDIA, Kerala, Wayanad district, Vythiri; ±600 m. *Ratheesh Narayanan* & *Sujanapal 2682* (*holotype*: MH; Isotypes; CALI, KFRI, MSSH).

Miliusa indica Lesch. ex A. DC., Mem. Soc. Phys., Geneve 5: 213, t. 3. 1832; Sasidh. & Sivar., Fl. Pl. Thrissur For. 28. 1996. *Miliusa montana* Gard. ex Hook. f. & Thoms., Fl. Ind. 148. 1855; Bedd., Ic. t. 84. 1868-1874; Dunn in Gamble, Fl. Pres. Madras 16(15). 1915; Manilal, Fl. Silent Valley 3. 1988; Ansari, Fl. Kasaragod Div. 55. 1985; Debika Mitra in B. D. Sharma *et al.*, Fl. India 1: 217. 1993. *Miliusa indica* var. *montana* (Gard. ex Hook. f. & Thoms.) Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 86. 1872.

Shrubs; branchlets radiating, pubescent. Leaves ovate, acute at apex, rounded to subcordate at base, 7-9 x 3-4 cm, pubescent; nerves 8-10 pairs. Flowers solitary or paired; pedicel ca. 7 mm long, slender; sepals ca. 2 x 1.5 mm, ovate, ciliate; outer petals ca. 2.5 x 1.5 mm, ovate, acute, glabrous; inner petals ovate, acute, saccate at base, dotted with red glands; torus hairy; anthers curved, filaments pubescent, glandular; ovaries curved, pubescent, 1-celled; ovules 2; style absent; stigma ovoid.
Flowering & Fruiting: April- June.
Distribution: India and Sri Lanka. Occasional; in evergreen shola forests. *RNMK 1800,* Kurichiarmala.

Miliusa nilagirica Bedd., Ic. t. 88. 1868-1874; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 87. 1872; Dunn in Gamble, Fl. Pres. Madras 22(15). 1915; V. S. Ramach. & V. J. Nair, Fl. Cannanore 40. 1988; Debika Mitra in B. D. Sharma *et al.,* Fl. India 1: 220. 1993. **Fig. 12, Plate 9g.**

Large shrubs; young branches rugose. Leaves ovate, lanceolate or elliptic-lanceolate, subcuneate at base, shortly acuminate at apex, 5-10 x 2-4 cm, glabrous; petioles 3-7 mm long. Flowers purplish brown, bisexual, solitary, axillary or extra-axillary; pedicels 5-10 mm long, glabrous; bracts 2-3, basal, minute, glabrous; sepals 3, minute, ovate, ciliate along margins towards apex; petals 6; outer petals like the sepals; inner ones oblong, acute, ca. 10 x 2 mm, thick; stamens 8-12, uniseriate, connectives blunt at top; ovules 1-2, on ventral sutures; style very short; stigma sessile, oblong or globose. Ripe carpels many, globose or subglobose, apiculate, red, glabrous; stalks 5-7 mm long.
Flowering & Fruiting: March-December.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2665,* Chembra hills*; RNMK 4063,* Kallady.

Miliusa tomentosa (Roxb.) Sinclair, Gard. Bull. Singapore 14. 378. 1955; Vajr., Fl. Palghat Dist. 47. 1990; Debika Mitra in B. D. Sharma *et al.*, Fl. India 1: 221. 1993; Sivar. & P. Mathew, Fl. Nilambur 40. 1997. *Uvaria tomentosa* Roxb., Pl. Corom. t. 35. 1795. *Saccopetalum tomentosum* (Roxb.) Hook. f. & Thoms., Fl. Ind. 152. 1855 & in Hook. f., Fl. Brit. India 1: 88. 1872; Dunn in Gamble, Fl. Pres. Madras 22(16). 1915; Ansari, Fl. Kasaragod Div. 56. 1985.

Trees to 20 m high; twigs tomentose. Leaves ca. 14 x 6 cm, ovate, apex acute, base rounded, nerves 8-10 pairs; petiole ca. 5 mm long, hispid. Flowers in axillary fascicles; pedicels ca. 6 mm long; sepals 3, ca. 5 x 1.5 mm, lanceolate, hispid; outer petals ca. 8 x 1.5 mm, linear-oblong, tomentose; inner petals ovate, acute, hispid; torus densely hispid; ovary curved, hispid, ovules 4-6; style absent; stigma oblong. Fruitlets 2.5-2.7 cm across, globose, glabrous, purple; seeds 3 or 4.
Flowering & Fruiting: December-May.
Distribution: India, Nepal and Sri Lanka. Common; in moist deciduous forests. *RNMK 3530,* Muthanga; *RNMK* 2897, Kurichiyad.

Miliusa wayanadica Ratheesh, Sujanapal, Sasidh., Anil Kumar & Sivad. s*p. nov.* (in ed.). **Fig.13, Plate 9h & f.**

Shrubs to small trees, to 7 m height; bark black, branches terete, branching horizontal, young parts densely pubescent. Leaves simple, alternate, 6-9 x 2-3 cm, lanceolate or elliptic-lanceolate, base rounded, slightly oblique, apex caudate acuminate, petiole to 3 mm or subsessile, coriaceous, lateral nerves 5-8 pairs, intramarginal nerves sub-marginal, tomentose on both sides, margins entire. Flowers yellow or yellowish-green, solitary, axillary or slightly above the axil, pedicel 4-7mm long, glabrous, bracteoles two at the base, unequal, triangular, very small; sepals 3, *ca.* 4 x 3 mm, broadly ovate; outer petals 3, triangular, *ca.* 3 mm long, slightly curved on mature flower, prominently hairy on margins; inner petals 3, broadly ovate, 7-9 x 2-4 mm, upper half out-curved at 90^0, hairy on the mouth; torus triangular, long hairy, stamens 6+3, anthers in pairs, staminodes 3, arranged alternate with two stamens, one pair slightly above the staminode, connective slightly prolonged above the anther, connective truncate, anthers extrorse; carpels 7-12, flask shaped, 2 mm long, glabrous, stigma club-shaped, with viscous exudation on the torus in mature flower, ovules 1 or 2. Monocarps 6-8, subglobose, glabrous, brownish or blakish when dry, apiculate; stipe terete, 10-13 mm long, stalk of monocarps *ca.* 5 mm, monocarp 8-10 mm across; seeds 1 or 2.

Flowering and fruiting: Flowering starts from December and peak time is March. More flowers were observed on the exposed lower branches. Occasional flowering was observed outside this season, especially in rainy season.

Distribution:: Hitherto known only from Wayanad. Small populations of this species were observed in two locations in Wayanad. At Kurichiarmala of Kalpetta Forest Range few individuals were observed and at Kalladi forest areas in Meppadi Forest Range the population is comparatively large with small tree sized individuals.

Etymology: The specific epithet denotes the locality, a unique area with diverse topographical peculiarities and Hot Spot of Biodiversity in Western Ghats.

Type: INDIA, Kerala, Wayanad district, Kurichiarmala; N 11^0 35.769' E 75^0 58.787' ±1092 m. *N. Sasidharan* & *M. K. Ratheesh Narayanan 2642* (*holotype*: MH; *Isotypes*; CALI, KFRI, MSSH).

Miliusa wayanadica belonging to the section *Miliusa* is similar to *M. indica* in the axillary, solitary flower, one or two ovuled, flask shaped carpel and sub sessile, hairy nerved, elliptic-lanceolate or lanceolate leaves. But differs in the oblique leaf base, broadly ovate sepal, recurved inner petal with hairs on the abaxial side, fewer stamens and glabrous carpel.

OROPHEA Blume

Bijdr. 18. 1825.

Shrubs to small trees. Leaves alternate, petiolate. Flowers axillary, solitary, fascicled or cymose; sepals 3, orbicular, valvate; petals 6, biseriate; outer petals orbicular , inner petals clawed, cohering by the margins above, acute; stamens 6-12, ovoid, connectives acute, not concealing the anthers; ovaries 3-15; ovules 2-4 in each ovary; style absent; stigma oblong. Fruit a ring of capsules, globular or oblong, 1-4-seeded.

1. Carpels 3; stamens 6..... **O. malabarica**
1. Carpels 5-6; stamens 10-12 2
2. Outer 6 stamens sterile; carpels densely strigose..... **O. erythrocarpa**
2. All stamens perfect; carpels glabrous 3
3. Pedicel 8-12 mm long, glabrous ..... **O. sivarajanii**
3. Pedicels 3-5 mm long, tomentose ..... **O. uniflora**

Orophea erythrocarpa Bedd., Trans. Linn. Soc. London 20: 5. 1846 & Madras J. Lit. Sci. (n.s.) 6: 71. 1861 & Ic. t. 68. 1868-1874; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 91. 1872; Bedd., Ic. t. 67. 1868-1874; Dunn in Gamble, Fl. Pres. Madras 24(17). 1915; V. S. Ramach. & V. J. Nair, Fl. Cannanore 40. 1988; Debika Mitra in B. D. Sharma *et al.*, Fl. India 1: 224. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 29. 1996; Mohanan & Sivad., Fl. Agasthyamala 59. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 45. 2005. **Plate 9j.**

Leaves ca. 10 x 4 cm, ovate, acute at both ends, scarcely pubescent, nerves 8 pairs, nervules parallel. Flowers ca. 7 mm across, 3-7 together, in peduncled cymes; peduncles to 10 mm long, hispid; sepals broadly orbicular, ciliate; outer petals ciliate, inner petals rhomboid, curved inward, pubescent at tips, nectarines horizontal, free, oblong; stamens 12, outer 6 sterile; connective produced into short point; ovaries 6, densely strigose. Fruitlets oblong, reddish, tomentose.

Flowering & Fruiting: February-August. *Distribution*: Western Ghats and Sri Lanka. Rare in evergreen forests. *RNMK 3996* Vythiri Ghat.

Orophea malabarica Sasidh. & Sivar., Blumea 35: 269. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 29. 1996.

Shrubs, young shoots pilose. Leaves 5.5-10 x 2-3.4 cm, oblong or elliptic-oblong, acuminate at apex, base obtuse or cuneate; lateral veins 4 or 5 pairs glabrous, petiole 2 mm long. Flowers white, often with pinkish tinge, in 2-3-fowered axillary or extra-axillary, pilose peduncles; bracts ovate-acuminate, densely pilose outside; pedicles slender, up to 1.5 cm long, densely pilose; sepals ovate rounded, minutely tomentose outside; outer petals ovate-orbicular, tomentose along margin, 3 mm across, inner glabrous, up to 4 mm long, nectarines narrowly oblong, vertical; stamens 6, uniseriate, all fertile;

carpels 3, glabrous; ovules 2; style hairy. Fruitlets sessile, 1-3, globose, 8-10 mm across, creamy with pink shades.
Flowering & Fruiting: March-April.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3064,* Palchuram.

Orophea sivarajanii Sasidh., Nordic J. Bot. 19: 301. 1999. **Plate 9k.**

Shrubs, 2-3 m tall, young shoots glabrous. Leaves to 7-15 x 3-6 cm., oblong or elliptic-oblong, acuminate at apex, obtuse or rounded at base, glabrous, lateral nerves 7-11 pairs, prominent below and faint above, intercostae widely reticulate; petiole 2-3 mm long, glabrous. Flowers in 2 or 3-flowered, peduncled cymes, axillary; pedicel 8-12 mm long, glabrous; bract ca. 0.5 mm long, ovate-acute, towards the upper half of the pedicel; sepals ca. 2 x 2.5 mm, jointed at base, ovate-deltoid, acute, ciliolate along the margins, otherwise glabrous; outer petals ca. 4 mm across, ovate-orbicular, greenish towards the upper half and white in the lower half, tomentose along the margins; inner petals ca. 7 mm long (with claw), tomentose along the margins; nectaries 2, distinct, horizontal with thick undulating margins and shortly downwardly hooked apex; stamens 12 in 2 rows of 6 each; ovaries 6, glabrous; ovules 2; style hairy. Fruitlets globose.
Flowering & Fruiting: November-January.
Distribution: Endemic to *s*outhern Western Ghats (Kerala). Rare; in evergreen forests. *RNMK 3988,* Vythiri Ghat.

Orophea uniflora Hook. f. & Thoms., Fl. Ind. 111. 1855 & in Hook. f., Fl. Brit. India 1: 90. 1872; Dunn in Gamble, Fl. Pres. Madras 24(17). 1915; V. S. Ramach. & V. J. Nair, Fl. Cannanore 40. 1988; Vajr., Fl. Palghat Dist. 47. 1990; Debika Mitra in B. D. Sharma *et al.*, Fl. India 1: 229. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 32. 1996.

Large shrubs to small trees; bark black. Leaves ca. 9 x 3 cm, ovate, acuminate at apex, glabrous, pale below, nerves 7-10 pairs, faint; petiole ca. 4 mm long, tomentose. Flowers 8-10 mm across, in axillary fascicles; pedicels 3-5 mm long, tomentose; sepals ca. 1.5 mm across, orbicular, ciliate; outer petals ca. 5 mm across, orbicular, ciliate; inner petals ca. 9 x 4 mm, rhomboid, glabrous; stamens 9-12, glabrous; ovaries 6, glabrous. Fruitlets ca. 8 mm across, globose, glabrous; seed one.
Flowering & Fruiting: February-May.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3631,* Chanthanathodu.

PHAEANTHUS J. D. Hooker & T. Thomson
Fl. Ind. 146. 1855.

Phaeanthus malabaricus Bedd., Ic. t. 76. 1868-1874; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 72. 1872; King, Ann. Roy. Bot. Gard. (Calcutta) 4:

154, t. 201B. 1893; Dunn in Gamble, Fl. Pres. Madras 17(12). 1915; V. S. Ramach. & V. J. Nair, Fl. Cannanore 41. 1988; Debika Mitra in B. D. Sharma *et al.*, Fl. India 1: 230. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 32. 1996; Mohanan & Sivad., Fl. Agasthyamala 59. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 45. 2005. **Fig.14, Plate 9 l.**

Small trees, branchlets sparsely tomentose. Leaves 13-16 x 4-4.5 cm, oblong, shortly acuminate at apex, rounded to subcordate at base, glabrous; nerves 6-10 pairs, puberulous on beneath, looping below the margin, reticulate. Flowers axillary, solitary or in fascicles; pedicels ca.1.5 cm long, hispid.; sepals ca. 3 x 3 mm, ovate, acute, hispid; petals unequal; outer petals 6, 3+3, ca. 9 x 5 mm, elliptic, acute, hirtus; inner ca. 12 x 8 mm, ovate, acute, concave, thick, hirtus, spreading; stamens many; anthers oblong; connective hooded; ovaries 20, oblong, villous; ovules 1 or 2; stigma globose. Fruitlets red.

Flowering & Fruiting: Throughout the year.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 4000,* Vythiri Ghat; *RNMK* 3566, Periya Ghat.

POLYALTHIA Blume

Fl. Javae. Anonac. 68. 1830.

Trees. Leaves alternate with many parallel lateral nerves. Flowers solitary or in cymes, axillary, terminal or on old wood, pedicelled; sepals 3, suborbicular, valvate; petals 6, biseriate, similar, oblong to lanceolate; stamens many, cuneate; anthers linear, concealed by connective; ovaries many, ovules 1 or 2; style oblong. Fruit of few 1-seeded berries arranged in a ring, usually stalked.

Flowers yellowish; lateral nerves of leaves 10-14 pairs .....**P. coffeoides**
Flowers greenish; lateral nerves of leaves 15-23 pairs.....**P. fragrans**

Polyalthia coffeoides (Thw. ex Hook. f. & Thoms.) Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 62. 1872; Dunn in Gamble, Fl. Pres. Madras 16(11). 1915; V. S. Ramach. & V. J. Nair, Fl. Cannanore 41. 1988; Manilal, Fl. Silent Valley 3. 1988; Vajr., Fl. Palghat Dist. 48. 1990; Debika Mitra in B. D. Sharma *et al.*, Fl. India 1: 270. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 33. 1996; Sivar. & P. Mathew, Fl. Nilambur 41. 1997; Mohanan & Sivad., Fl. Agasthyamala 60. 2002. *Guatteria coffeoides* Thw. ex Hook. f. & Thoms., Fl. Ind. 141. 1855. **Plate 10a.**

Trees to 15 tall; branches horizontal; bark black; young parts glabrous. Leaves 18-20 x 6-7 cm, ovate-oblong, apex acuminate, base acute, nerves 10-14 pairs, regular, nervules parallel; petiole 1-1.5 cm long, stout. Flowers solitary or few together; pedicels ca. 3 cm long, stout; sepals ca. 2 x 5 mm, suborbicular, glabrous; petals ca. 5 x 1 cm, oblong, acuminate, hispid, greenish-yellow; stamens ca. 1 mm long. Berry 2-2.5 x 1-1.5 cm, obovoid, puberulus, smooth.

Flowering & Fruiting: December-May.
Distribution: South India and Sri Lanka. Common; in evergreen and semi-evergreen forests. *RNMK 4350,* Kallady*; RNMK* 3371, Theethundamala.

Polyalthia fragrans (Dalz.) Bedd., Fl. Sylv. t. 74. 1871; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 63. 1872; Dunn in Gamble, Fl. Pres. Madras 16(11). 1915; Vajr., Fl. Palghat Dist. 48. 1990; Debika Mitra in B. D. Sharma *et al.*, Fl. India 1: 271. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 33. 1996; Sivar. & P. Mathew, Fl. Nilambur 41. 1997; Mohanan & Sivad., Fl. Agasthyamala 61. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 48. 2005. *Guatteria fragrans* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 200. 1851.

Tall trees; bark grey; branches to all sides; young parts pubescent. Leaves 20-24 x 7-9 cm, elliptic, apex acute, base rounded, nerves 17 pairs. Flowers in many-flowered cymes; pedicels stout, bracteate above the middle; sepals 3, each ca. 4 x 5 mm, orbicular, pubescent; petals 6, 4-5.5 x 0.5-0.8 cm, linear-oblong, with a broad, curved base, acuminate, greenish-yellow; stamens many, connective forms a truncate hood; ovaries hairy. Berry c.2.5x1.5 cm across, globose, long-stalked; seeds ca. 2 cm, ovoid.
Flowering & Fruiting: January-May.
Distribution: Endemic to southern Western Ghats. Fairly common; in evergreen forests. *RNMK 4249,* Kanthanpara; *RNMK* 3990, Vythiri Ghat.

UVARIA Linnaeus
Sp. Pl. 503. 1753.

Uvaria narum (Dunal) Wall. ex Wight & Arn., Prodr. 9. 1834; Hook.f. & Thoms. in Hook. f., Fl. Brit. India 1:50.1872; Dunn in Gamble, Fl. Pres. Madras 13(9). 1915; Manilal & Sivar., Fl. Calicut 26. 1982; Ansari, Fl. Kasaragod Div. 56. 1985; Vajr., Fl. Palghat Dist. 49. 1990; Debika Mitra in B. D. Sharma *et al.*, Fl. India 1: 292. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 34. 1996; V. S. Ramach. & V. J. Nair, Fl. Cannanore 41. 1988; Sivar. & P. Mathew, Fl. Nilambur 42. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 49. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 78. 2009. U*nona narum* Dunal, Monogr. Anonac. 99. 1817.

Climbers; branchlets glabrous. Leaves 15-16 x 4.5-5 cm, oblong, acute to acuminate at both ends; nerves 14-16 pairs, regular; petiole ca. 1 cm long, rugose. Flowers solitary, terminal, 2.2-2.8 cm across; pedicels 5-8 mm long, stellate hairy; sepals 3, ca. 5 x 5 mm, orbicular, acute, hairy; outer petals ca. 12 x 12 mm, orbicular, incurved at apex, hispid; inner petals 16 x 12 mm, orbicular, incurved at apex, hispid; stamens many, anthers linear, connectives pointed; ovary many, oblong; stigma bifid. Fruitlets obovoid, greenish-yellow, 10-20-together, sessile, 1-seeded, densely packed.
Flowering & Fruiting: March-April.
Distribution: South India and Sri Lanka. Occasional; in sacred groves. *RNMK 3510,* Pozhuthana.

Polyalthia longifolia (Sonn.) Thw., and **Cananga odorata** (Lam.) Hook.f. & Thoms., are grown as ornamental trees. **Annona reticulata** L., **Annona muricata** L., and **Annona squamosa** L., are commonly cultivated in the district.

MENISPERMACEAE Juss.

Gen. Pl. 284. 1789.

1. Leaves greyish-white pubescent below; stem deep yellow inside..... **Coscinium**
1. Leaves glabrous or tomentose below; stem otherwise.....2
2. Leaves with hairy domatia in the nerve-axils ..... **Anamirta**
2. Leaves without domatia in the nerve-axils 3
3. Inflorescence from old wood ..... **Diploclisia**
3. Inflorescence axillary or from leaf scars 4
4. Male flowers in racemes 5
4. Male flowers in axillary panicles or in umbels.....6
5. Carpels 3-12; endocarp thin..... **Tiliacora**
5. Capels 3; endocarp rugose, dorsally keeled..... **Tinospora**
6. Male flowers in umbels ..... **Stephania**
6. Male flowers in panicles 7
7. Female flowers 3-6 together in the axils of large orbicular bracts..... **Cissampelos**
7. Female flowers in panicles; not in the axils of bracts .....**Cyclea**

ANAMIRTA Colebrooke

Trans. Linn. Soc. London 13: 52, 66. 1821.

Anamirta cocculus (L.) Wight & Arn., Prodr. 446. 1834; Hook.f. & Thoms. in Hook. f., Fl. Brit. India 1: 93. 1872; Dunn in Gamble, Fl. Pres. Madras 28(19). 1915; Manilal & Sivar., Fl. Calicut 29. 1982; Ansari, Fl. Kasaragod Div. 57. 1985; Vajr., Fl. Palghat Dist. 50. 1990; A. Pramanik in B. D. Sharma *et al.*, Fl. India 1: 311. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 35. 1996; Sivar. & P. Mathew, Fl. Nilambur 46. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 50. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 80. 2009. *Menispermum cocculus* L., Sp. Pl. 340. 1753. *Anamirta paniculata* Colebr., Trans. Linn. Soc. London 13: 66. 1822.

Woody climbers. Leaves alternate, 20-25 x 15-19 cm, broadly ovate, apex acute, base truncate, 5-ribbed, coriaceous; petiole 8-13 cm long. Flowers unisexual, many, in large drooping panicles on old branches; sepals 6 in 2 rows, each ca. 3 x 2 mm, ovate, yellow; petals absent; stamens 9, combined into a globose staminal column, anthers sessile; staminodes 9 in female flowers, obovate, scaly; carpels 3, free; style absent; stigma recurved. Fruit of 1-3 drupes, 0.8-1 cm across, obliquely ovoid, gibbous, black, smooth; seeds 1, black, glabrous.

Flowering & Fruiting: August-December.

Distribution: Indo-Malesia. Common; in evergreen forests & moist deciduous forests. *RNMK 2812,* Vythiri Ghats; *RNMK* 1058, Kuruva.

CISSAMPELOS Linnaeus

Sp. Pl. 1031. 1753.

Cissampelos pareira L. var. **hirsuta** (Ham. ex DC.) Forman, Kew Bull. 22: 356. 1968; Manilal, Fl. Silent Valley 4. 1988; Vajr., Fl. Palghat Dist. 50. 1990; Gangop. in B. D. Sharma *et al.*, Fl. India 1: 317. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 35. 1996; Mohanan & Sivad., Fl. Agasthyamala 64. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 50. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 74. 2009. *Cissampelos hirsuta* Ham. ex DC., Syst. Nat. 1: 535. 1817. *Cissampelos pareira* L., Sp. Pl. 1031. 1753, p.p.; Hook.f. & Thoms. in Hook. f., Fl. Brit. India 1: 103. 1872; Dunn in Gamble, Fl. Pres. Madras 30(21). 1915.

Slender climbers, stem pubescent. Leaves 4-5 x 6-7 cm, broadly ovate, apex apiculate, base cordate; petiole 3-5 cm long. Male flowers in axillary cymes, sessile, 3-4 mm across; sepals 4, orbicular, hairy inside; petals 4, connate into a truncate cup, glabrous; stamens 4, connate in a peltate head. Female flowers in bracteate racemes, 3-8 together; bracts to 1 x 1 cm, orbicular, pubescent; sepals 2; petals absent; ovary densely hairy; styles 3. Drupe globose, glabrous; seeds 1, black, curved.

Flowering & Fruiting: August-October.

Distribution: Indo-Malesia. Common; in moist deciduous forests and forest plantations. *RNMK 1065,* Muthanga; *RNMK* 3197, Chooralmala.

COSCINIUM Colebrooke

Trans. Linn. Soc. 13: 51. 1822.

Coscinium fenestratum (Gaertn.) Colebr., Trans. Linn. Soc. London 13: 65. 1822; Hook.f. & Thoms. in Hook. f., Fl. Brit. India 1: 99. 1872; Dunn in Gamble, Fl. Pres. Madras 27(19). 1915; A. Pramanik in B. D. Sharma *et al.*, Fl. India 1: 313. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 36. 1996; Mohanan & Sivad., Fl. Agasthyamala 65. 2002. *Menispermum fenestratum* Gaertn., Fruct. 1: 219, t. 45, f.5. 1788.

Woody climbers, wood yellow. Leaves 15-18 x 13-15 cm, ovate, apex acuminate, base truncate, 5-7-ribbed, deltoid; petiole 10-12 cm long. Inflorescence supra-axillary or cauliflorous. Female flowers mostly from old wood; sepals 6, sericeous; petals 3; ovary densely pilose, staminodes 6. Fruit of 1 or 2 drupes, ca. 2 cm across, globose, brown villous; seed 1, black, glabrous.

Flowering & Fruiting: August-October.

Distribution: Indo-Malesia. Rare; in grasslands and evergreen forests. *RNMK 1058,* Palchuram.

CYCLEA Arnott ex R. Wight

Ill. Ind. Bot. 1: 22. 1840.

Twining herbs, root tuberous. Leaves peltate, entire. Flowers unisexual, dioecious, numerous, in axillary drooping panicles; sepals 4, connate into a tube; petals 4, connate into a 4-toothed tube; stamens 4-6, combined into a peltate disc; anthers along the rim of the disc, dehiscence transverse; ovary 1 in female flowers, densely hairy, ovule solitary; styles 3, glabrous; stigmas pointed. Drupe globose or obovoid; seeds tubercled along concentric lines.

1. Leaves and panicles glabrous .....**C. fissicalyx**
1. Leaves pubescent below; panicles densely hairy .....**C. peltata**

Cyclea fissicalyx Dunn in Gamble, Fl. Pres. Madras 31(22). 1915 & Bull. Misc. Inform. Kew 1916: 60. 1916; Manilal, Fl. Silent Valley 5. 1988; Gangop. in B. D. Sharma *et al.*, Fl. India 1: 324. 1993. *Cyclea peltata* Miers, Contr. Bot. 3: 236. 1874, non (Lamk.) Hook. f. & Thoms. 1855, nec. Miq., 1858.

Glabrous climbing shrubs. Leaves 8-10 x 4-5 cm, ovate, apex sharply acuminate, base truncate, 5-ribbed, reticulate, glabrous; petiole 1.5-2.5 cm long. Panicle to 15 x 5 cm; flowers ca. 2 mm across, glabrous, shortly-pedicelled; peduncles slender; bracts foliar; calyx campanulate, glabrous; petals connate; anthers in male flowers connate into a ring at the top of staminal column; pistil in female flowers hairy; style trifid.
Flowering & Fruiting: January-April.
Distribution: Endemic to southern Western Ghats (Kerala). Rare; in evergreen forests. *RNMK* 2812, Kurichiarmala.

Cyclea peltata (Lamk.) Hook. f. & Thoms., Fl. Ind. 201. 1855 & in Hook. f., Fl. Brit. India 1: 104. 1872, p.p; Dunn in Gamble, Fl. Pres. Madras 31(22). 1915; Manilal & Sivar., Fl. Calicut 29. 1982; Ansari, Fl. Kasaragod Div. 58. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 42. 1988; Manilal, Fl. Silent Valley 5. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 179. 1988; Vajr., Fl. Palghat Dist. 51. 1990; Gangop. in B. D. Sharma *et al.*, Fl. India 1: 325. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 36. 1996; Sivar. & P. Mathew, Fl. Nilambur 46. 1997; Mohanan & Sivad., Fl. Agasthyamala 66. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 51. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 81. 2009. *Menispermum peltatum* Lam., Encycl. 4: 96. 1797. *Cyclea burmannii* (DC.) Hook. f. & Thoms., Fl. Ind. 201. 1855 & Hook. f., Fl. Brit. India 1: 104. 1872. *Clypea burmannii* Wight & Arn., Prodr. 1: 14. 1834. *Cyclea arnottii* Miers, Ann. Mag. Nat. Hist. ser. 3, 18:19.1866; Dunn in Gamble, Fl. Pres. Madras 31(22).1915; V. S. Ramach. & V.J. Nair, Fl. Cannanore 42. 1988. *Cocculus burmannii* DC., Syst. Nat. 1: 517. 1817. *Pada-kelengu, pada-valli* Rheede, Hort. Malab. 7: 93, t.49.1688.

Leaves 8-10 x 6-7 cm, ovate, apex acute or acuminate, base cordate, 4-8-ribbed, pubescent below. Panicles 15-20 x 5-7 cm, rachis pubescent. Flowers densely packed towards the branch tips, sessile, densely hairy; male flowers 1-1.5 mm across; sepals hairy outside; petals glabrous; female flowers smaller; sepal 1, hairy; petal 1, hairy; ovary 1, densely hairy. Drupe 3-4 mm across, subglobose, white, pilose; seeds curved.
Flowering & Fruiting: August-March.
Distribution: India and Sri Lanka. Common; in open areas, semi evergreen and moist deciduous forests. *RNMK* 1175, Manikkunnumala; *RNMK* 1089, Pozhuthana; *RNMK* 2055 Poothady.

DIPLOCLISIA Miers

Ann. Mag. Nat. Hist (Ser. 2) 7: 37, 42. 1851.

Diploclisia glaucescens (Bl.) Diels in Engl., Pflanzenr.46: 225. 1910; Dunn in Gamble, Fl. Pres. Madras 28(20). 1915; Manilal & Sivar., Fl. Calicut 28. 1982; Ansari, Fl. Kasaragod Div. 58. 1985; Manilal, Fl. Silent Valley 6. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 179. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 43. 1988; A. Pramanik in B. D. Sharma *et al.*, Fl. India 1: 327. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 36. 1996; Sivar. & P. Mathew, Fl. Nilambur 48. 1997; Mohanan & Sivad., Fl. Agasthyamala 66. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 51. 2005. *Cocculus glaucescens* Bl., Bijdr. 25. 1825. *Cocculus macrocarpus* Wight & Arn., Prodr. 13. 1834; Hook.f. & Thoms. in Hook. f., Fl. Brit. India 1: 101. 1872. *Nstsjatam, Batta-valli* Rheede, Hort. Malab. 7:1-2, t.1, 1688.

Woody climbers; stem glabrous. Leaves 6-9 x 5-11 cm, suborbicular, apex obtuse, base truncate, glaucous below, membranous; petiole 1.5-3 cm long. Flowers unisexual, in large drooping panicles from old wood, bright yellow; sepals 6 in two whorls, ca. 3 mm long, obovate; petals 6, smaller than sepals, concave with incurved margins, ca. 2 mm long, obovate, emarginate; stamens 6 in male flowers, staminodes absent; carpels 3 in female flowers, free; style cylindric. Drupe compressed, curved, tubercled.

Flowering & Fruiting: March-August.

Distribution: Indo-Malesia and China. Occasional; in evergreen forests. *RNMK 2294,* Vythiri Ghat.

STEPHANIA Loureiro

Fl. Cochinch. 598, 608. 1790.

Slender twining or creeping herbs. Leaves peltate, broadly ovate to orbicular, 7-9-nerved. Flowers unisexual, sessile on axillary peduncled umbels, dioecious. Male flowers: sepals 6, free; petals 3-5, free, smaller than sepals; stamens 6-10, connate into a column with peltate disc; anthers sessile along the rim of the disc. Sepals and petals of female flower similar to male flowers; carpel 1, 1-ovuled; style 3-fid, stigmas 3, pointed. Drupe obovoid, compressed, ridged along the margins.

1. Leaves shallowly 3-7-lobed; flowering heads solitary..... **S. wightii**
1. Leaves entire; flowering heads umbelled ..... **S. japonica**

Stephania japonica (Thunb.) Miers, Ann. Mag. Nat. Hist. ser.3, 18: 14. 1866; Dunn in Gamble, Fl. Pres. Madras 29(21). 1915; Manilal, Fl. Silent Valley 6. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 43. 1988; Gangop. in B. D. Sharma *et al.*, Fl. India 1: 335. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 37. 1996; Sivar. & P. Mathew, Fl. Nilambur 49. 1997; Mohanan & Sivad., Fl. Agasthyamala 67. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 52. 2005. *Menispermum japonicum* Thunb., Fl. Jap. 193. 1784. *Cissampelos hernandifolia* Willd., Sp. Pl. 4: 861. 1806. *Stephania hernandifolia* (Willd.)

Walp., Rep. 1: 96.1842; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1:103. 1872. *Clypea hernandifolia* Wight & Arn., Prodr. 14. 1834. Wight, Ic. t. 939. 1845.

Twining herbs. Leaves 8-10 x 6-7 cm, apex acute, base truncate to cordate, 9-ribbed; petiole to 9 cm long. Umbel peduncled, axillary; peduncle 3-5 cm long, erect, slender. Flowers many, ca. 2 mm across, sessile; sepals 5, free, glabrous; petals 5, oblong, glabrous, greenish-yellow. Drupe to 5 x 4 mm, curved, oblong to obovoid, shortly stalked, glabrous; seeds horse-shoe shaped.
Flowering & Fruiting: October-December.
Distribution: Indo-Malesia and East Asia. Occasional; in evergreen and moist deciduous forests. *RNMK 1046,* Talimala; *RNMK 2602,* Muthanga.

Stephania wightii (Arn.) Dunn in Gamble, Fl. Pres. Madras 74(21). 1915; Manilal, Fl. Silent Valley 7. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 44. 1988; Vajr., Fl. Palghat Dist. 51. 1990; Gangop. in B. D. Sharma *et al.*, Fl. India 1: 338. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 37. 1996; Sivar. & P. Mathew, Fl. Nilambur 49. 1997; Mohanan & Sivad., Fl. Agasthyamala 68. 2002. *Clypea wightii* Arn. in Wight, Illustr. 1: 22. 1840. *Stephania rotundus* sensu Hook. f. & Thoms., Fl. Ind. 197. 1855 & in Hook. f., Fl. Brit. India 1: 103. 1872, p. p., non Lour., 1790.

Creeping herbs. Leaves 8 cm across, orbicular, glaucous, margins wavy or coarsely dentate; petiole ca. 8 cm long, slender. Peduncle to 2 cm long, erect; pedicel ca. 3 mm long; Male flowers densely packed in heads. Female flowers 2-3 mm across, in pedunculate cymes; sepals 5, ovate-acute, glabrous; petals ovate, greenish yellow. Drupe 7-8 x 5-6 mm, oblique, stalked, with 4 rows of tubercles along the margins.
Flowering & Fruiting: April-June.
Distribution: Indo-Malesia. Common; in evergreen forests. *RNMK 3074,* Talimala

TILIACORA Colebrooke

Trans. Linn. Soc. London 13: 53, 67. 1821.

Tiliacora acuminata (Poir.) Miers ex Hook.f. & Thoms., Fl. Ind. 187.1855; Dunn in Gamble, Fl. Pres. Madras 28(20).1915; Manilal & Sivar., Fl. Calicut 30. 1982; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 180. 1988; Vajr., Fl. Palghat Dist. 52. 1990; A. Pramanik in B. D. Sharma *et al.,* Fl. India 1: 343. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 37. 1996; Sivar. & P. Mathew, Fl. Nilambur 50. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 52. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 82. 2009. *Menispermum acuminatum* Poir. in Lam., Encycl. 4: 101. 1797. *Tiliacora racemosa* Colebr., Trans. Linn. Soc. London 13: 67. 1821; Hook.f. & Thoms. in Hook. f., Fl. Brit. India 1: 99. 1872. *Valli-caniram* Rheede, Hort. Malab. 7: 5-6, t.3.1688.

Climbers. Leaves 6-13 x 3-6 cm, ovate-lanceolate, base truncate to rounded, apex acuminate-apiculate, basally 3-5-nerved, coriaceous. Flowers in axillary racemes; sepals 3 + 3, free; petals 6, bright yellow; stamens 6, free; carpels 6; staminodes 0. Drupes obovoid, ca. 1.5 cm long, orange red; seeds horse-shoe shaped.

Flowering & Fruiting: April-December.
Distribution: India, Sri Lanka and south east Asia. Rare; in moist deciduous forests. *RNMK 1049,* Tholpetty.

TINOSPORA Miers

Ann. Mag. Nat. Hist. (ser. 2)7: 35, 38. 1851.

Climbing shrubs. Flowers in racemes or panicles, axillary or from the old stem; sepals 6 in 2 series; petals 6, smaller than sepals; stamens 6, free, anthers dehiscing longitudinally; carpels 3; stigma bilobed; staminodes 6, clavate. Endocarp rugose, dorsally keeled and ventrally concave.

1. Branchlets and leaves glabrous.....**T. cordifolia**
1. Branchlets and leaves tomentose .....**T. sinensis**

Tinospora cordifolia (Willd.) Miers, Ann. Mag. Nat. Hist. 2, 7: 38. 1855; Hook.f. & Thoms. in Hook. f., Fl. Brit. India 1: 97. 1872; Dunn in Gamble, Fl. Pres. Madras 26(19). 1915; Manilal & Sivar., Fl. Calicut 29. 1982; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 180. 1988; Vajr., Fl. Palghat Dist. 52. 1990; A. Pramanik in B. D. Sharma *et al.*, Fl. India 1: 347. 1993; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 52. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 83. 2009. *Menispermum cordifolium* Willd., Sp. Pl. 4: 826. 1806. *Cocculus cordifolius* (Willd.) DC., Syst. Nat. 1: 517. 1817. *Citamerdu* Rheede, Hort. Malab. 7: 39, t.21.1688.

Stout climbers. Leaves 8-11 x 7-9 cm, broadly ovate, apex acuminate, base cordate, 5-ribbed; petiole 4-6 cm long. Male flowers in racemes; outer sepals smaller; petals shorter than the inner sepals; stamens 6, free, opposite to petals; female flowers: staminodes 6, carpels 3; stigma forked. Drupes sessile, globose; seeds grooved vertically.
Flowering & Fruiting: January-February.
Distribution: South Asia. Occasional; in moist deciduous forests. *RNMK* 1202, Baveli.

Tinospora sinensis (Lour.) Merr., Sunyatsenia 1: 193. 1934 & Trans. Am. Phil. Soc. Philad. 24. 158. 1935; Manilal & Sivar., Fl. Calicut 30. 1982; Ansari, Fl. Kasaragod Div. 59. 1985; Vajr., Fl. Palghat Dist. 52. 1990; A. Pramanik in B. D. Sharma *et al.*, Fl. India 1: 349. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 39. 1996; Sivar. & P. Mathew, Fl. Nilambur 51. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 83. 2009. *Campylus sinensis* Lour., Fl. Cochinch. 113. 1790. *Tinospora malabarica* (Lamk.) Hook. f. & Thoms., Fl. Ind. 183. 1855 & in Hook. f., Fl. Brit. India 1: 96. 1872. *Tinospora tomentosa* (Coleb.) Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 96. 1872.

Deciduous climbers; mature stem with smooth shining papery bark; young part tomentose. Leaves 11-14 x 9-11 cm, broadly ovate, apex acuminate, base cordate, 5-7 ribbed, scabrous above, densely white tomentose below. Male flowers 3-5 together, pedicelled; sepals 6 in 2 whorls, outer smaller, inner 2-3

x 1.5-3 mm, obovate; petals 6, smaller; stamens 6, free, anthers orbicular. Sepals and petals in female flowers similar to male flowers; carpels 3, stigma bilobed, staminodes 6, clavate. Drupe ca. 8 mm long, 1 or 2 together, ovoid, red, glabrous.
Flowering & Fruiting: February-April.
Distribution: India, Sri Lanka, China to Cambodia. Rare; in evergreen forests. *RNMK 0109,* Vaduvanchal.

BERBERIDACEAE Juss.

Gen. Pl. 294. 1789.

BERBERIS Linnaeus

Sp. Pl. 330. 1753.

Berberis tinctoria Lesch., Mem. Paris 9: 306. 1822; Dunn in Gamble, Fl. Pres. Madras 32(23). 1915; R.R. Rao & B.D. Naithani in B. D. Sharma *et al.*, Fl. India 1: 386. 1993.

Shrubs, 3-6 m tall; stem glabrous, very sulcate, yellow. Leaves 1.5-3 x 0.6-1.4 cm, obovate, obtuse, mucronate, entire, rarely with 1-2 spinules; venation branched, reticulate; petiole 3-4 mm long. Inflorescens 10-20 flowered, racemose, drooping, sometimes branched, 3.5-5 cm long; pedicels slender, 0.5-1 cm long; sepals 6 in 2 whorls; outer sepals ovate, acute, ca. 2.5 x 1 mm; petals 6, ca. 6 x 4.5 mm, obovate, clawed; glands at the base of the claw; stamens 6, free; anther cells opening by recurved valves; ovules 2, stipitate. Berries oblong, 0.9-1 x 0-4-0.5 cm.
Flowering & Fruiting: February-June.
Distribution: India, Afghanistan and Bhutan. Rare; in evergreen forests. *RNMK 2752,* Vaduvanchal.

NYMPHAEACEAE Salisb.

Ann. Bot. (Koenig & Sims) 2: 70. 1805.

NYMPHAEA Linnaeus

Sp. Pl. 510. 1753.

Perennial herbs. Rhizomes usually stoloniferous, erect or creeping, sometimes branched. Leaves polymorphic, long-petiolate; juvenile leaves membranous, at first subulate, hastate, sagitate, deltoid or cordate-ovate and submerged, afterwards elliptic and cleft up to petiole base and floating. Flowers on long peduncles, floating or emersed, showy; sepals 4, free, hypogynous; petals numerous, hypogynous to perigynous, outermost ones sometimes sepaloid; stamens numerous, infloexed, perigynous. Carpels 5-35, partially coherent, fused peripherally, arranged radially around and adnate below to central core of receptaculate tissue to about half their length; ovules numerous, arising all over septa. Berry globose, often crowned with persistent green filaments; seeds enclosed in bell shaped aril, indurate.

1. Leaves glabrous on both sides ..... **N. nauchali**
1. Leaves glabrous above, densely pubescent beneath ..... **N. pubescens**

Nymphaea nouchali Burm.f., Fl. Ind. 120. 1768; Maheshwari in Manilal, Bot. Hist. Hort. Malab. 29. 1980; Manilal & Sivar., Fl. Calicut 31. 1982; Ansari, Fl. Kasaragod Div. 59. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 198. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 44. 1988; Vajr., Fl. Palghat Dist. 53. 1990; Joseph, Aquatic Angiosp. Malabar 155. 1991; R.L. Mitra in B. D. Sharma *et al.*, Fl. India 1: 426. 1993; Mohanan & Sivad., Fl. Agasthyamala 69. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 54. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 87. 2009. *Nymphaea stellata* Willd., Sp. Pl. 2: 1153. 1799; Wight, Ic. t. 178. 1839; Hook.f. & Thoms. in Hook. f., Fl. Brit. India 1: 114. 1872; Dunn in Gamble, Fl. Pres. Madras 33(24). 1915. *Cit-ambel* Rheede, Hort. Malab. 11:53, t.27.1692.

Aquatic, perennial stoloniferous herbs. Leaves floating, 10-25 x 8-20 cm, orbicular, margin sharply to obscurely dentate or entire, base cordate with a deep sinus up to the attachment of petiols; nerves radiating and dichotomously branching towards the periphery. Flowers white, on long, axillary scapes; sepals 4, triangular ovate; petals many arising from below receptacle; stamens many; filaments petaloid, attached towards the upper edges of receptacles. Carpels many, connate, sunk in the receptacle forming a many celled ovary; ovules many; stigma sessile, radiating over the ovary. Fruit a fleshy berry, globose; seeds many.

Flowering & Fruiting: Throughout the year.

Distribution: Indo-Malesia and Tropical Africa. Occasional; in fallow fields & lakes. *RNMK 2031,* Panamaram; *RNMK 1329,* Pookodu.

Nymphaea pubescens Willd., Sp. Pl. 2: 1154. 1799; Dunn in Gamble, Fl. Pres. Madras 34(24). 1915; V. S. Ramach. & V.J. Nair, Fl. Cannanore 44. 1988; Vajr., Fl. Palghat Dist. 53. 1990; Joseph, Aquatic Angiosp. Malabar 156. 1991; R.L. Mitra in B. D. Sharma *et al.*, Fl. India 1: 431. 1993; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 87. 2009. *Nymphaea lotus* L. var. *pubescens* (Willd.) Hook.f. & Thoms. in Hook.f., Fl. Brit. India 1: 114. 1872.

Aquatic perennial herbs. Leaves 15-50 x 20-45 cm, broadly ovate-elliptic, dark green, glabrous and often postulate above, green or dull purplish-green and velutinous pubescent beneath. Flowers 4-15 cm across, slightly fragrant sepals ovate-lanceolate, subacute at apex, puberulous and green with 5-9 prominent white veins outside petals 10-25, outer ones 2-7 x 1-3 cm, linear-oblanceolate, obtuse or subacute at apex; stamens 20-70, outer ones 1.5-3.5 cm long, yellow; ovary 13-22 loculate; stigmatic appendages 0.5-1 cm long, oblong, inflexed, yellow. Berry 2.5-4 cm across; seeds ellipsoid.

Flowering & Fruiting: November-December.

Distribution: Indo-Malesia. Rare; in in fallow fields & lakes. *RNMK 1329,* Panamaram.

NELUMBONACEAE (DC.) Dumort

Anal. Fam. Pl. 53. 1829.

NELUMBO Adanson

Fam. 2: 76. 582.1763.

Nelumbo nucifera Gaertn., Fruct. Sem. Pl. 1: 73. t.19. f.2. 1788; Maheshwari in Manilal, Bot. Hist. Hort. Malab. 123. 1980; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 197. 1988; Vajr., Fl. Palghat Dist. 53. 1990; Joseph, Aquatic Angiosp. Malabar 152. 1991; R.L. Mitra in B. D. Sharma *et al.*, Fl. India 1: 441. 1993; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 54. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 84. 2009. *Nymphaea nelumbo* L., Sp. Pl. 511. 1753. *Nelumbium speciosum* Willd., Sp. Pl. 2: 1258. 1799; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 116. 1872; Dunn in Gamble, Fl. Pres. Madras 34(24). 1915. *Tamara* Rheede, Hort. Malab. 11: 59-60, t. 30. 1692.

Aquatic herbs; stem rhizomatous, creeping. Leaves raised above the water, peltate, orbicular, 30-90 cm wide, upturned; veins prominent below; petiole to 2 m long. Flowers up to 20 cm across; sepals 4-5, caducous; petals many, pinkish-red or white, caducous; stamens many, anthers linear; carpels many, free, embedded in the broad truncate torus; stigma terminal, peltate.

Flowering & Fruiting: September-December.

Distribution: South and east Asia to far eastern Russia and to Australia. Rare; in ponds. *RNMK 2544,* Ponkuzhy.

PAPAVERACEAE Juss.

Gen. Pl. 296. 1789.

ARGEMONE Linnaeus

Sp. Pl. 508. 1753.

Argemone mexicana L., Sp. Pl. 508. 1753; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 117. 1872; Dunn in Gamble, Fl. Pres. Madras 35(25). 1915; Vajr., Fl. Palghat Dist. 54. 1990; Debnath & M.P. Nayar in B.D. Sharma & N.P. Balakr., Fl. India 2: 2. 1993; Sivar. & P. Mathew, Fl. Nilambur. 51. 1997.

Erect herbs, to 70 cm, spiny, sap yellow. Leaves alternate, 12-30 x 4-10 cm, dissected, semi-amplexicaule, membranous, margins spiny, midrib thick. Flowers terminal, solitary, ca. 4.5 cm across, yellow; sepals 2-3; petals 4-6; stamens many; ovary 1 celled, ovules many, stigma 5- lobed. Capsule ca. 4 x 2 cm, oblong, spiny, dehiscing apically downwards; seeds rugose.

Flowering & Fruiting: Throughout the year.

Distribution: Originally from West Indies; now naturalised in the tropics. Weed of fallow lands. *RNMK 1089,* Ambalavayal.

BRASSICACEAE Burnett

Outl. Bot. 854, 1123. 1835.

1. Flowers in terminal or leaf-opposed short racemes .....**Cardamine**
1. Flowers in terminal and axillary panicled racemes.....**Rorippa**

CARDAMINE Linnaeus

Sp. Pl. 654. 1753.

Weak herbs. Leaves alternate, lobed or pinnate, petiolate. Flowers in terminal or leaf-opposed short racemes; sepals 4, free, ovate, not pouched at base; petals 4, free, clawed or absent, usually white; stamens 4, free, anthers ovoid; ovary oblong, many-ovuled, parietal; stigma sessile. Pod narrowly linear, compressed; seeds many, flattened.

1. Leaves 3-foliolate; petals present .....**C. africana**
1. Leaves 5-7-foliolate; petals absent ..... **C. hirsuta**

Cardamine africana L., Sp. Pl. 655. 1753; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 137. 1872; Dunn in Gamble, Fl. Pres. Madras 38(27). 1915; Hajra & H.J. Chowdhery in B.D. Sharma & N.P. Balakr., Fl. India 2: 109. 1993. *Cardamine borbonica* Pers., Syn. 2: 195. 1806.

Weak herbs to 15 cm high, branches scarce. Leaflets ca. 4 x 2 cm, glabrous above, sparsely hairy below; petiole ca. 5 cm long, slender. Raceme terminal, few-flowered. Flowers ca. 8 mm across, pedicellate; sepals linear; petals ca. 5 mm long, clawed; stamens 6, tetradynamous, filaments glabrous. Pod ca. 4 cm long; seeds narrowly oblong, smooth.

Flowering & Fruiting: Throughout the year.

Distribution: Africa, India, Sri Lanka and Indonesia. Rare; in forest plantations. *RNMK 0206,* Pachakad.

Cardamine hirsuta L., Sp. Pl. 655. 1753; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 158. 1872; Dunn in Gamble, Fl. Pres. Madras 38(27). 1915; V. S. Ramach. & V.J. Nair, Fl. Cannanore 45. 1988; Hajra & H.J. Chowdhery in B.D. Sharma & N.P. Balakr., Fl. India 2:112.1993.

Annual herbs, up to 50 cm high; stem simple. Leaves 5-7 x 4.5 cm; leaflets 5-13, orbicular or ovate, 0.5-1.5 cm across. Cauline leaves peltoid or subsessile; leaflets lanceolate, narrowly oblong or obovate, toothed or irregulary lobed, obtusely rounded at apex. Inflorescens racemose or subcorymbose, 10-20 flowered, up to 20 cm long. Flowers 3-5 mm across, white; sepals oblong, obtuse at apex, ca. 2 mm long; petals obovate-cuneate, rounded at apex, 2.5-5 mm long; stamens 4 or rarely 6; ovary many ovuled. Fruit cylindric, somewhat compressed, 1.5-2.5 cm long, seed 6-12 on either side of septum.

Flowering & Fruiting: November-December.

Distribution: Cosmopolitan. Occasional; in moist deciduous forests. *RNMK 1398,* Tholpetty.

RORIPPA Scopoli

Fl. Carniol. 520. 1760.

Rorippa indica (L.) Hiern, Cat. Afr. Pl. Welw. 26. 1896; Manilal & Sivar., Fl. Calicut 31. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 45. 1988; Debnath in B.D. Sharma & N.P. Balakr., Fl. India 2: 129. 1993; Vajr., Fl. Palghat Dist. 54. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 39. 1996; Sivar. & P. Mathew, Fl. Nilambur 52. 1997. *Sisymbrium indicum* L., Mant. Pl. 1: 93. 1767. *Nasturtium indicum* (L.) DC., Prodr. 1: 139. 1824; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1:134. 1872, p.p.; Dunn in Gamble, Fl. Pres. Madras 37(27). 1915. *Nasturtium madagascariense* sensu Wight & Arn., Prodr. 19. 1834; Wight, ill. t. 13. 1840, non DC. 1821.

Annual erect herbs, simple or branched, up to 60 cm high. Leaves 6-10 x 2.5 cm, irregularly lobed; upper ones sessile, ovate-lanceolate to lanceolate-oblong, base decurrent on the petiole, upper leaves much smaller. Racemes terminal, 7-30 cm long, many-flowered. Flowers yellow, ca. 2.5 mm across; pedicles 5-7 mm long in fruit; sepals 2-3 mm long, oblong; petals 3-4 mm long, yellow; stames ca. 2 mm long; stigma subsessile. Capsule ca. 1.5 cm long; seeds minute, rugose, spherical.

Flowering & Fruiting: March-April.

Distribution: Indo-Malesia, China and Africa. Rare; in moist deciduous forests. *RNMK 1837,* Mananthavady; *RNMK 1295,* Begur.

CAPPARACEAE Juss.

Gen. Pl. 242. 1789.

1. Slender annuals; fruit a capsule.....2
1. Perennial shrubs or trees; fruit a berry.....3
2. Leaves 1-3 foliolate; stamens 12 or more; ovary sessile..... **Cleome**
2. Leaves 5-foliolate; stamens 6; ovary long stalked..... **Gynandropsis**
3. Leaves simple; stipules spinescent ..... **Capparis**
3. Leaves 3-foliolate; stipules absent ..... **Crateva**

CAPPARIS Linnaeus

Sp. Pl. 503. 1753.

Erect or scandent shrub. Leaves alternate, entire, penninerved; stipules usually modified into spines. Flowers axillary or in terminal cymes or umbels, pedicellate; sepals 4, orbicular, imbricate; petals 4, imbricate, spreading; stamens numerous, free, filaments very long; anthers small; ovary stalked, 1-4 celled; ovules many on 2-6 parietal placentae; style 1, slender; stigma terminal, pointed. Fruit a berry, usually globose; seeds numerous, embedded in pulp.

1. Gynophore at anthesis 1.5-2 cm long; stamens less than 20 ..... **C. tenera**
1. Gynophore at anthesis 2.5 cm or more long; stamens 30 or more.....2
2. Young shoots, calyx and ovary glabrous ..... **C. moonii**
2. Young shoots, calyx and ovary tomentose.....3

3. Scandent shrubs; stamens pink or scarlet.....**C. cleghornii**
3. Erect shrubs or small trees; stamens white 4
4. Flowers 6-8 cm across; young shoots with brown tomentum .....**C. rheedei**
4. Flowers 4-5 cm across; young shoots without tomentum.....**C. brevispina**

Capparis brevispina DC., Prodr. 1: 246. 1824; Wight, Ic. t. 126. 1837; Dunn in Gamble, Fl. Pres. Madras 45(32). 1915; Sundararagh. in B.D. Sharma & N.P. Balakr., Fl. India 2: 260. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 40. 1996. *Capparis zeylanica* sensu Hook.f. & Thoms. in Hook.f., Fl. Brit. India 1: 174. 1872, non L. 1753.

Shrubs, 2-4 m, branchlets hairy; branchlets adpressed tomentose. Leaves 5-7 x 2-4 cm, elliptic or oblong, acute, coriaceous, stipular spines very small. Flowers axillary, solitary, 4-5 cm across; pedicels ca. 4 cm long; sepals 4 in two whorls; petals 4, oblong, obovate, white with brown patches; stamens numerous, exserted, gynandrophore as long as or longer than the filaments, anthers dorsifixed; ovary ca. 6 mm, ellipsoid, ovules few to many.
Flowering & Fruiting: January-October.
Distribution: Peninsular India and Sri Lanka. Rare; in moist deciduous forests. *RNMK 1244*, Muthanga.

Capparis cleghornii Dunn ex Gamble, Fl. Pres. Madras 46(33). 1915; V. S. Ramach. & V.J. Nair, Fl. Cannanore 46. 1988; Vajr., Fl. Palghat Dist. 55. 1990; Sundararagh. in B.D. Sharma & N.P. Balakr., Fl. India 2: 263. 1993.

Scandent shrubs; twigs purplish, fulvous pubescent, densely armed with sharp recurved stipular thorns. Leaves 3.5-10 x 2-4.5 cm, elliptic or obovate, acute at base; lateral nerves 4-6 pairs with the obscure reticulations; petioles 6-9 mm long. Flowers showy, white, purple on ageing, 3.5-4.5 cm across, in terminal 6-10 flowered corymbs or rarely solitary, axillary or conferted in subterminal shoots; pedicels 2.5-4 cm long, pubescent; sepals subequal, concave, pubescent outside, glabrous inside; petals obovate oblong, unequal; stamens 65-80, white turning to pink or scarlet; filaments 2.5-3 cm long. Fruit on slender stalks, ovoid or subglobose, 6-8.5 cm long, dark purplish to violet; seeds 1-4, dorsally compressed, obovoid.
Flowering & Fruiting: February-October.
Distribution: Endemic to south India. Rare; in semi-evergreen forests. *RNMK 1061,* Thirunelli.

Capparis moonii Wight, Ill. 1: 35. 1840; Hook.f. & Thoms. in Hook. f., Fl. Brit. India 1:175. 1872; Dunn in Gamble, Fl. Pres. Madras 45(33). 1915; Vajr., Fl. Palghat Dist. 56. 1990; Sundararagh. in B.D. Sharma & N.P. Balakr., Fl. India 2:277. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 40. 1996; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 90. 2009. **Plate 10b.**

Scandent shrubs; stem glabrous, spines, conical, slightly recurved, with white decurrent base on either side of petiole. Leaves 8-12 x 3.5-4 cm, elliptic-

oblong, acute at both ends, glabrous, shining above; petiole ca. 1.5 cm long, slender. Flowers 8-10 cm across, solitary or 3-5 together, terminal or in axils of upper leaves, spreading; sepals ca. 1.8 cm across, orbicular; petals ca. 5 x 3 cm, obovate, white, cottony hairy; filaments ca. 7.5 cm long, glabrous. Berry 6-8 cm across, globose, glabrous; gynandrophore 4-10 cm long, stout.
Flowering & Fruiting: January-May.
Distribution: South west India and Sri Lanka. Occasional; in evergreen forests. *RNMK 1211,* Vythiri Ghat.

Capparis rheedei DC., Prodr. 1: 246. 1824; Nayar & Sasty, Red Data Book Indian Pl. 1:107. 1987; Sundara Raghavan in Sharma & Balakr., Fl. Ind. 2: 285. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 40. 1996. *Capparis heyneana* Wall. *ex* Wight & Arn., Prodr. 25. 1834; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 174. 1872; Dunn in Gamble, Fl. Pres. Madras 45(32). 1915. *Capparis baducca* sensu Jacobs, Blumea 12: 435. 1965, non L. 1753; Vajravelu, Fl. Palghat Dist. 55.1990. **Plate 10c.**

Scandent shrubs; stem glabrous, spines, conical, slightly recurved, with white decurrent base on either side of petiole. Leaves 12-14 x 4-6 cm, elliptic-oblong, acute at both ends, glabrous, shining above; petiole ca. 1.5 cm long, slender. Flowers 8-10 cm across, solitary or 3-5 together, terminal or in axils of upper leaves, spreading; sepals ca. 1.8 cm across, orbicular, puberulus; petals pale blue changing to white, yellow blotches at the base of upper pair, obovate, cottony hairy; stamens 80-100, filaments ca. 7.5 cm long, glabrous. Berry 6-8 cm across, globose, glabrous.
Flowering & Fruiting: February-June.
Distribution: Endemic to Western Ghats. Rare; in semi-evergreen forests. *RNMK 1417,* Manikkunnumala.

Capparis tenera Dalz., Hook.'s J. Bot. Kew Gard. Misc. 2: 41. 1850; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 179. 1872; Dunn in Gamble, Fl. Pres. Madras 46(34). 1915; Ansari, Fl. Kasaragod Div. 61. 1985; Sundararagh. in B.D. Sharma & N.P. Balakr., Fl. India 2: 297. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 40. 1996. *Capparis tenera* Dalz. var. *zeylanica* Hook.f. & Thoms. in Hook.f., Fl. Brit. India 1: 179. 1872.

Scandent shrubs; young shoots and leaves glabrous. Leaves ovate, oblong or lanceolate, acuminate, base acute, 4-5 x 2.6-3 cm; lateral nerves 4 or 5 pairs, reticulation obscure; petiole ca. 0.5 cm long. Flowers ca. 1.5 cm across, solitary, axillary, pedicels slender; petals white, upper pair with darker blotches at base; stamens 8-18, white. Fruit pisciform or subglobular, sometimes pointed, 0.8-1.2 cm across; seeds 3-4.
Flowering & Fruiting: February-June.
Distribution: India, Sri Lanka, Myanmar, Thailand and extending to Tropical Africa. Rare; in evergreen forests. *RNMK 1457,* Palchuram.

CLEOME Linnaeus

Sp. Pl. 671. 1753.

Slender herbs. Leaves alternate, digitately 1-5 foliolate. Flowers solitary, axillary or in terminal racemes, pedicellate; sepals 4, free, spreading; petals 4, erect, imbricate, similar or dissimilar; stamens 6-20, filaments long, free; ovary 1-celled, oblong, sessile; ovules many, on 2-parietal placenta; style short; stigma globose. Capsule linear-oblong, terete, 2-valved; seeds many, reniform.

1. Leaves simple ..... **C. monophylla**
1. Leaves 3-5- foliolate ..... **C. viscosa**

Cleome monophylla L., Sp. Pl. 672. 1753; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 168. 1872; Dunn in Gamble, Fl. Pres. Madras 41(29). 1915; Manilal & Sivar., Fl. Calicut 34. 1982; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 78. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 46. 1988; Vajr., Fl. Palghat Dist. 57. 1990; Sundararagh. in B.D. Sharma & N.P. Balakr., Fl. India 2: 312. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 42. 1996; Sivar. & P. Mathew, Fl. Nilambur 53. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 55. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 92. 2009. *Tsjeru-vela* Rheede, Hort. Malab. 9: 63, t. 34. 1689.

Erect herbs to 50 cm high; densely glandular hairy. Leaves 2-4.5 x 1-1.5 cm, oblong-lanceolate, acute at apex, rounded or cordate at base, pubescent; petiole ca. 8 mm long. Raceme terminal; bracts ovate-triangular, cordate at base; pedicel ca. 1 cm long. Flowers many; sepals ca. 6 mm long, oblong, acuminate; petals ca. 4 mm long, obovate; stamens 6, filaments glabrous. Capsule 8-11 cm long, pubescent; seeds strongly reniform, rugose along transverse ridges.

Flowering & Fruiting: Ferbruary-August.

Distribution: Tropical Asia. Common; in exposed plantations. *RNMK* 3189, Meppady.

Cleome viscosa L., Sp. Pl. 672. 1753; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 170. 1872; Dunn in Gamble, Fl. Pres. Madras 41(29). 1915; Manilal & Sivar., Fl. Calicut 34. 1982; Ansari, Fl. Kasaragod Div. 62. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 78. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 47. 1988; Vajr., Fl. Palghat Dist. 57. 1990; Sundararagh. in B.D. Sharma & N.P. Balakr., Fl. India 2: 317. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 42. 1996; Sivar. & P. Mathew, Fl. Nilambur 53. 1997; Mohanan & Sivad., Fl. Agasthyamala 69. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 55. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 93. 2009. *Aria-vela* Rheede, Hort. Malab. 9: 41, t.23. 1689.

Herbs to 50 cm high. Leaves 3-5-foliolate; leaflets 2-2.5 x 1-1.5 cm, obovate, acute at apex and base, glandular hairy; petiole ca. 3 cm long. Flowers axillary, solitary; pedicels ca. 1.5 cm long; sepals ca. 4 mm long, oblong,

glandular hairy; petals yellow, ca. 7 mm long, obovate; stamens 12-18, filaments straight. Capsule 6-8 cm long terete; seeds reniform, ridged along the margins.
Flowering & Fruiting: March-July.
Distribution: Pantropical. Common; in open areas. *RNMK 1296,* Muttil.

CRATAEVA Linnaeus
Sp. Pl. 444. 1753.

Crataeva magna (Lour.) DC., Prodr. 1: 243. 1824; Ansari, Fl. Kasaragod Div. 63. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 47. 1988; Vajr., Fl. Palghat Dist. 58. 1990; Sundararagh. in B.D. Sharma & N.P. Balakr., Fl. India 2: 324. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 42. 1996; Sivar. & P. Mathew, Fl. Nilambur 54. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 94. 2009. *Capparis magna* Lour., Fl. Cochinch. 330. 1790. *Crataeva nurvala* Buch.-Ham., Trans. Linn. Soc. London 15: 121. 1827; Manilal & Sivar., Fl. Calicut 32. 1982; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 78. 1988; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 56. 2005. *Crataeva religiosa* auct., non Foster f., 1786, sensu Bedd., Fl. Sylv. t. 116. 1871; Dunn in Gamble, Fl. Madras 47. 1915. *Nirvala* Rheede, Hort. Malab. 3: 49-50, t. 42. 1682.

Small trees; bark white. Leaves alternate, digitately 3-foliolate, leaflets 10-11 x 4-5 cm, ovate, acute at apex, acute or rounded at base, glabrous. Flowers in terminal corymbs; pedicel to 5 cm long; sepals 4, free, ca. 3 mm long, oblong, adnate to the disc; petals long-clawed, limb ca. 2 x 1.8 cm, orbicular, white, claw ca. 1 cm long, slender; stamens many, filaments 3-3.5 cm long, free; gynophore 4-4.5 cm long, slender; ovary 1-2-celled; stigma sessile, capitate. Fruit a globular drupe, 2-2.5 cm across, rough, puberulus.
Flowering & Fruiting: February-May.
Distribution: Indo-Malesia and China. Occasional in riverbanks in moist deciduous and semi-evergreen forests. *RNMK 1158,* Kuruva; *RNMK 2526,* Chooralmala; *RNMK 1930,* Kotavayal.

GYNANDROPSIS A.P. de Candolle
Prodr. 1 : 237. 1824, *nom. cons.*

Gynandropsis gynandra (L.) Briq., Annuaire Conserv. Jard. Bot. Geneve 17: 382. 1914. *Cleome gynandra* L., Sp. Pl. 671. 1753; Manilal & Sivar., Fl. Calicut 33. 1982; Sundararagh. in B.D. Sharma & N.P. Balakr., Fl. India 2: 309. 1993; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 92. 2009. *Gynandropsis pentaphylla* (L.) DC., Prodr. 1: 238. 1824; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 171. 1872; Dunn in Gamble, Fl. Pres. Madras 40(29). 1915. *Cleome pentaphylla* L., Sp. Pl. (ed. 2) 983. 1763.

Glandular erect herbs. Leaves digitately 5-7 foliate, 6-7 x 5-6 cm, leaflets 3-4 x 2-2.5 cm, obovate. Flowers in bracteate racemes, ca. 1.5 cm across, white; calyx lobes unequal, glandular, pubescent; petals long clawed, spreading;

stamens 6, attached to the long gynandrophore; ovary glandular. Capsule 3-4 cm long terete, glandular, tip discoid.
Flowering & Fruiting: March-April.
Distribution: Pantropical. Occasional; in plantations. *RNMK* 1930, Puthoorvayal.

VIOLACEAE Batsch

Tab. Affin. Regni Veg.: 57. 1802.

1. Annual herbs .....**Hybanthus**
2. Small trees .....**Rinorea**

HYBANTHUS N. J. Jacquin

Enum. Pl. Carib. 2: 17. 1760, *nom. cons.*

Hybanthus enneaspermus (L.) F.V. Muell., Fragm. Phyt. Austr. 10: 81. 1876; Manilal & Sivar., Fl. Calicut 34. 1982; S.P. Banerjee & B.B. Pramanik, Fasc. Fl. Ind. 12: 2. 1983 & in B.D. Sharma & N.P. Balakr., Fl. India 2: 343. 1993; Ansari, Fl. Kasaragod Div. 63. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 267. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 47. 1988; Sivar. & P. Mathew, Fl. Nilambur 55. 1997; Mohanan & Sivad., Fl. Agasthyamala 70. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 56. 2005 ; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 95. 2009. *Viola enneasperma* L., Sp. Pl. 937. 1753. *Viola suffruticosa* L., Sp. Pl. 937. 1753. *Ionidium suffruticosum* (L.) Ging. in DC., Prodr. 1: 311. 1824; Wight, Ic. t. 308. 1840; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 185. 1872; Dunn in Gamble, Fl. Pres. Madras 49(35). 1915. *Nelamparenda* Rheede, Hort. Malab. 9: 117, t.60.1689.

Annual herbs; stems slender, glabrous. Leaves simple, alternate, 2-4 x 0.1-0.6 cm, linear elliptic, to linear lanceolate, serrate along the margins; base and apex acute, shortly cuspidate at apex; nerves 2-3 pairs very oblique, narrow. Flowers solitary, axillary; pedicels 1-1.5 cm long, slender, smooth; sepals 5, subequal, ca. 3 mm long; petals 5, pale pink, unequal, lower petal long clawed, ca. 3 mm long, saccate at base, upper petals ca. 5 mm long; stamens 5, filaments dialated at base; anthers connate; ovary 1-celled, globose, ovules many, parietal. Fruit a 3-valved capsule, ca. 5 mm across; seeds many.
Flowering & Fruiting: July-November.
Distribution: Sri Lanka, India, China, Madagascar, Africa and Tropical Australia. Common; in moist deciduous forests. *RNMK 1112*, Tholpetty

RINOREA Aublet

Hist. Pl. Gue. 1: 235, t. 93. 1775.

Rinorea bengalensis (Wall.) O. Kuntze., Rev. Gen. Pl. 1: 42. 1891; S.P. Banerjee & B.B. Pramanik, Fasc. Fl. Ind. 12: 5. 1983 & in B.D. Sharma & N.P. Balakr., Fl. India 2: 348. 1993. *Alsodeia bengalensis* Wall., Trans. Med. Soc. Calcutta 7: 224. 1835. *Rinorea zeylanica* (Arn.) O.Kuntze., Rev. Gen. Pl. 1: 42.

1891. *Pentaloba zeylanica* Arn., Mag. Zool. Bot. 2: 543. 1837. *Alsodeia zeylanica* (Arn.) Thw., Enum. Pl. Zeyl. 21.1858; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1:187.1872; Dunn in Gamble, Fl. Pres. Madras 49(35).1915.

Trees, up to 15 m tall; branchlets glabrous or puberulous. Leaves 6-18 x 2-9 cm, elliptic-lanceolate or ovate, acute at base, obtuse at apex, crenate along margins; laternal nerves 10-12 pairs; petiols up to 1 cm long. Flowers ca. 4 mm across, white; sepals subequal, broadly ovate; petals subequal, oblong-ovate; stamens on a thick 5-lobed disc, glabrous; ovary oblong, 3-ovuled; style short, straight, glabrous. Capsule globose, up to 1 cm in long, 3 valved; seeds 3-4, globose, glabrous.

Flowering & Fruiting: March-May.

Distribution: Indo-Malesia, Australia and Pacific Islands. Occasional; in river banks in semi evergreen forests. *RNMK 1890,* Chooralmala.

BIXACEAE Link.

Handbuch 2: 371. 1831.

BIXA Linnaeus

Sp. Pl. 512. 1753.

Bixa orellana L., Sp. Pl. 512. 1753; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 252. 1827; Dunn in Gamble, Fl. Pres. Madras 51(36). 1915; Manilal & Sivar., Fl. Calicut 35. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 48. 1988; N.P. Balakr. in B.D. Sharma & N.P. Balakr., Fl. India 2: 381. 1993; Sivar. & P. Mathew, Fl. Nilambur 56. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 96. 2009.

Shrubs to small trees, 2-7 m tall, young branches densely dark scaly. Leaves 7-25 x 4-15 cm, ovate, truncate at base, long acuminate at apex; lateral nerves 4-5 pairs; petioles slender, 4-10 cm long; stipules 5-6 mm long. Corymbs or panicles 8-50 flowered, scaly; pedicels 0.7-1 cm long; flowers 4-5 cm in diam.; sepals concave, broadly ovate to suborbicular, purple, scaly; petals 5-7, unequal, obovate, rounded at apex; filaments slender, yellow at base, red at apex; anthers purple. Capsule globose or broadly ovoid, nearly truncate at base; seeds orange-red.

Flowering & Fruiting: June-November.

Distribution: Originally from Tropical America; now widespread in the tropics. Occasional; in open plantations. *RNMK 1324,* Muttil.

FLACOURTIACEAE Rich. ex DC.

Prodr. 1: 255. 1824.

1. Trunk armed with branched or unbranched thorns.....2
1. Trunk unarmed.....4
2. Flowers bisexual; petals present.....**Scolopia**
2. Flowers unisexual; petals absent.....3

3. Fruits 3-8 seeded ..... **Xylosma**
3. Fruits 1 seeded..... **Flacourtia**
4. Fruit a capsule, thin rinded..... **Casearia**
4. Fruit a berry, hard rinded..... **Hydnocarpus**

CASEARIA N. J. Jacquin
Enum. Pl. Carib. 4: 21. 1760.

Trees. Leaves alternate, entire, covered with pellucid transparent glands. Flowers in axillary fascicles; pedicels jointed; sepals 5, free, imbricate, obtuse; petals absent; stamens 8 or 10, filaments connate below; staminodes 8-10, densely tufted hairy at apex; ovary 1-celled, ovules many on 3 parietal placentas; style simple; stigma capitate. Fruit a ribbed or smooth capsule, 3-valved; rind thick , fleshy; seeds few, angular, surrounded by coloured aril.

1. Leaves hairy; margin crenate-serrate 2
1. Leaves glabrous; margin entire or sub entire 3
2. Leaves coriaceaous; petiole reddish; capsule yellow ..... **C. tomentosa**
2. Leaves membranous; petiole greenish; capsule orange ..... **C. wynadensis**
3. Leaves thickly coriaceous; sepals glabrous, not ciliate ..... **C. ovata**
3. Leaves membranous; sepals tomentose, ciliate 4
4. Stamens 10, filaments sparsely hairy ..... **C. rubescens**
4. Stamens 8, filaments pubescent ..... **C. thwaitesii**

Casearia ovata (Lamk.) Willd., Sp. Pl. 2: 629. 1799; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 146. 1988; R.L. Mitra in B.D. Sharma & N.P. Balakr., Fl. India 2: 399. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 44. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 57. 2005. *Anavinga ovata* Lamk., Encycl. 1: 148. 1789. *Casearia esculenta* Roxb., Fl. Ind. 2: 422. 1832; Clarke in Hook. f., Fl. Brit. India 2:592. 1874; Gamble, Fl. Pres. Madras 521. 1919; Manilal, Fl. Silent Valley 9. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 49. 1988; Vajr., Fl. Palghat Dist. 59. 1990; Mohanan & Sivad., Fl. Agasthyamala 73. 2002. *Ana-vinga* Rheede, Hort. Malab. 4: 101-102, t. 49. 1683.

Small trees, young shoots glabrous. Leaves 10-13 x 4-6 cm, ovate or elliptic, apex acuminate, acumen twisted and folded, base acute or rounded; lateral veins 6-8 pairs, reticulation faint, glabrous and shining; petiole ca. 0.5 cm long. Sepals glabrous, greenish; stamens basally connate with alternating staminodes. Capsule to 1.5 cm long, orange yellow, sacculent; seeds arillate.
Flowering & Fruiting: January-May.
Distribution: India and Sri Lanka. Rare; in evergreen forests. *RNMK 3136,* Vythiri Ghat.

Casearia rubescens Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 4: 108. 1852; Clarke in Hook.f., Fl. Brit. India 2:594. 1879; Gamble, Fl. Pres. Madras 520. 1919; R.L. Mitra in B.D. Sharma & N.P. Balakr., Fl. India 2: 396. 1993;

Sasidh. & Sivar., Fl. Pl. Thrissur For. 44. 1996; Mohanan & Sivad., Fl. Agasthyamala 73. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 96. 2009. *Casearia rubescens* Dalz. var. *gamblei* N. Mukh., J. Bombay Nat. Hist. Soc. 69: 390. 1972. **Plate 10d.**

Medium sized trees, branchlets lenticellate. Leaves 14-17 x 6-8 cm, oblong, rounded at base, acute or obtuse at apex, glabrous, nerves 12-15 pairs; nerves and petiole reddish, petiole ca. 1.5 cm long. Flowers 2-6 together, ca. 5 mm across; pedicel ca. 3.5 mm long, tomentose; sepals ovate obtuse, tomentose outside, ciliate; stamens 10, filaments sparsely hairy; staminodes triangular, sparsely hairy at base; ovary globular, ovules 9; stigma hardly wider than style. Capsule ca. 1.5 x 0.8 cm, ellipsoid, smooth, narrowly 3-furrowed, not prominently ridged, glabrous.

Flowering & Fruiting: Ferbuary-April.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 1614,* Talimala.

Casearia tomentosa Roxb., Fl. Ind. 2: 421. 1832; Clarke in Hook. f., Fl. Brit. India 2: 593. 1879; Gamble, Fl. Pres. Madras 521. 1919; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 146. 1988; Vajr., Fl. Palghat Dist. 59. 1990; R.L. Mitra in B.D. Sharma & N.P. Balakr., Fl. India 2: 397. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 44. 1996; Sivar. & P. Mathew, Fl. Nilambur 57. 1997. *Casearia elliptica* Willd., Sp. Pl. 2: 628. 1799, Wight, Ic. t. 1849. 1852; Manilal & Sivar., Fl. Calicut 36. 1982. **Plate 10e.**

Small trees, young shoots tomentose. Leaves 9-12 x 3.5 cm, elliptic-lanceolate, apex acuminate, base acute, serrate, pubescent below, lateral nerves 7 or 8 pairs, reticulation faint; petiole to 1 cm long, pubescent. Sepals and pedicels tomentose. Capsule ca. 2 x 1.2 cm, oblong, ribbed.

Flowering & Fruiting: October-April.

Distribution: Indo-Malesia to Australia. Common; in semi-evergreen forests. *RNMK 4135,* Meppady; *RNMK 3068,* Manikkunnumala.

Casearia wynadensis Bedd., Ic. t. 160. 1868-1874; Clarke in Hook. f., Fl. Brit. India 2: 594. 1879; Gamble, Fl. Pres. Madras 521(368). 1919; V. S. Ramach. & V.J. Nair, Fl. Cannanore 49. 1988; Manilal, Fl. Silent Valley 9. 1988; Vajr., Fl. Palghat Dist. 60. 1990; R.L. Mitra in B.D. Sharma & N.P. Balakr., Fl. India 2: 399. 1993. **Fig.15, Plate 10f.**

Small trees, branchlets pubescent. Leaves 15-18 x 4-5.5 cm, apex acuminate, base acute, serrate, rufous below, glabrous above; petiole ca. 1 cm. Flowers 6-8, fascicled on axils of older leaves; peduncle ca. 4 mm, pubescent; calyx 5-lobed, ca. 3 mm, ovate, glabrous within; stamens 8, staminodes hairy; ovary oblong, style hairy, stigma 4-lobed. Capsule ca. 2 x 1 cm, oblong.

Flowering & Fruiting: November-April.

Distribution: Endemic to Western Ghats. Rare; in evergreen and moist deciduous forests. *RNMK 1229,* Muthanga; *RNMK 2139,* Kurichiarmala.

Casearia thwaitesii Briq., Ann. Cons. Jard. Bot. Geneve 62. 1898; R.L. Mitra in B.D. Sharma & N.P. Balakr., Fl. India 2: 397. 1993. *Casearia coriacea* Thw., Enum. Pl. Zeyl. 20. 1858; Gamble, Fl. Pres. Madras 521(368). 1919; Mohanan & Sivad., Fl. Agasthyamala 72. 2002, non Vent. 1803.

Small trees, branches lenticellate. Leaves 8-9 x 4-4.5 cm, obovate, obtusely acute at apex or obtuse, cuneate at base; nerves 5 pairs, prominent below. Flowers ca. 5 mm across, 3-6 together; pedicel ca. 5 mm long; sepals obovate, obtuse, ciliate; stamens 8, filaments pubescent; ovary terete; ovules 4, on 2 parietal placentas. Capsule ca. 1.7 x 1.2 cm, ovoid, smooth, greenish yellow.
Flowering & Fruiting: March-May. *Distribution.*
Distribution: South India and Sri Lanka. Rare; in shola forests. *RNMK 3480,* Chembra peak.

FLACOURTIA Commerson ex L' Heritier de Brutelle
Stirp. Nov. 59. 1786.

1. Leaves densely fascicled at apex; flowers mostly on thorns ..... **F. indica**
1. Leaves distinctly alternate; flowers not on thorns ..... **F. montana**

Flacourtia indica (Burm. f.) Merr., Interpr. Rumph. Herb. Amboin. 377. 1917; Manilal & Sivar., Fl. Calicut 35. 1982; Ansari, Fl. Kasaragod Div. 64. 1985; Manilal, Fl. Silent Valley 9. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 147. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 49. 1988; Vajr., Fl. Palghat Dist. 60. 1990; R.L. Mitra in B.D. Sharma & N.P. Balakr., Fl. India 2: 402. 1993; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 58. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 97. 2009. *Gmelina indica* Burm. f., Fl. Ind. 132. 1768. *Flacourtia ramontchi* L'Herit., Stirp. Nov. 3: 59. 1786; Wight, Ic. t. 85. 1838; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 193. 1872; Dunn in Gamble, Fl. Pres. Madras 54(39). 1915; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 58. 2005. *Flacourtia sepiaria* Roxb., Pl. Corom. t. 68. 1795; Hook.f. & Thoms. in Hook. f., Fl. Brit. India 1: 194. 1872; Dunn in Gamble, Fl. Pres. Madras 54(39). 1915. *Couro-moelli* Rheede, Hort. Malab. 5: 77, t. 39. 1865.

Shrubs, sparsely spiny. Leaves 3-4.5 x 2.5 cm, obovate, apex obtuse, base attenuate, crenulate towards the apex; petiole less than 5 mm. Flowers axillary, greenish; sepals 4, imbricate, broadly ovate, ciliate; petals absent; disc lobed; stamens more than 20, filaments up to 3 mm; anthers versatile. Drupe globose; seeds obovoid.
Flowering & Fruiting: July-September.
Distribution: Indo-Malesia and Africa. Common; in moist deciduous forests. *RNMK 3027,* Kuruva; *RNMK 2449,* Muthanga.

Flacourtia montana Grah., Cat. Pl. Bombay 10. 1839; Hook. f. & Thoms. in Hook.f., Fl. Brit. India 1: 192. 1872; Dunn in Gamble, Fl. Pres. Madras 54(39). 1915; Ansari, Fl. Kasaragod Div. 65. 1985; Manilal, Fl. Silent Valley 10. 1988;

R.L. Mitra in B.D. Sharma & N.P. Balakr., Fl. India 2: 406. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 44. 1996; Sivar. & P. Mathew, Fl. Nilambur 58. 1997; Mohanan & Sivad., Fl. Agasthyamala 74. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 58. 2005.

Medium trees, trunk armed with unbranched thorns. Leaves 12-15 x 4-6 cm, elliptic, acuminate at both ends, crenate-serrate, nerves 4-6 pairs, reticulate. Flowers unisexual, dioecious, densely packed in axillary congested cymes; sepals 4 or 5, ca. 1.5 mm long, ovate, pubescent; stamens many, pistillode absent; ovary 1-celled, ovules few, parietal, styles 5, stigma bifid at apex. Berry to 1.5 cm across, bright red; seeds few, reddish.

Flowering & Fruiting: March-May.

Distribution: Endemic to Western Ghats. Common; in evergreen and semi evergreen forests. *RNMK 2034,* Kurichiarmala; *RNMK 1165,* Manikkunnumala.

HYDNOCARPUS Gaertner

Fruct. 1: 288, t. 60, 1788.

Trees. Leaves alternate, entire or serrate. Flowers in axillary fascicles, solitary or in peduncled cymes; sepals 5, free, unequal; petals 5, free, with a large scale on inside; stamens 5-15 in male flowers, free, pistillode absent; staminodes in female flowers similar to stamens but without pollen; ovary 1-celled; ovules many; style absent; stigmas sessile, 3-6 lobed. Berry globose, many-seeded.

1. Scale of petals lobed; stamens many ..... **H. macrocarpa**
1. Scale of petals not lobed; stamens 5-8 2
2. Leaf margin entire; berry leathery tomentose ..... **H. alpina**
2. Leaf margins serrate or crenate; berry glabrous ..... **H. pentandra**

Hydnocarpus alpina Wight, Ic. t. 942. 1845; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 197. 1872; Dunn in Gamble, Fl. Pres. Madras 52(37). 1915; Manilal & Sivar., Fl. Calicut 36. 1982; Manilal, Fl. Silent Valley 11. 1988; Vajr., Fl. Palghat Dist. 61. 1990; R.L. Mitra in B.D. Sharma & N.P. Balakr., Fl. India 2:418. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 45. 1996; Mohanan & Sivad., Fl. Agasthyamala 75. 2002. *Hydnocarpus pendula* Manilal *et al.*, Trop. Plant. Sci. Res. 1: 35. 1983; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 59. 2005.

Medium trees; bark black; branchlets puberulus. Leaves 15-20 x 6-7 cm, ovate, acute at apex, acute or round at base, nerves 7-10 pairs; young sprouts reddish. Flowers ca. 1.5 cm across in axillary peduncled cymes; pedicel 1.5-2 cm long, deflexed, pubescent; sepals ca. 8 mm long, oblong, pubescent; petals ca. 1 cm long, narrow, glabrous; scale linear, as long as petal, sparsely hairy; filaments glabrous; ovary in female flowers globular, tomentose, stigma 5, free, radiating, recurved. Berry ca. 7 cm across, densely tomentose, dark brown.

Flowering & Fruiting: January-May.

Distribution: South India and Sri Lanka. Occasional; in semi-evergreen forests. *RNMK 3197,* Manikkunnumala.

Hydnocarpus macrocarpa (Bedd.) Warb. in Engl. & Prantl, Naturl. Pflanzenfam. 3(6a): 21. 1893; R.L. Mitra in B.D. Sharma & N.P. Balakr., Fl. India 2: 421. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 45. 1996; Sivar. & P. Mathew, Fl. Nilambur 59. 1997. *Asteriastigma macrocarpa* Bedd., For. Man. Bot. t. 266. 1873 & Ic. t. 242. 1874; Dunn in Gamble, Fl. Pres. Madras 52(38). 1915. *Taraktogenos macrocarpa* (Bedd.) Balakr., J. Bombay Nat. Hist. Soc. 67: 57. 1970. **Plate 10g.**

Medium sized trees. Leaves oblong, obtusely acuminate, base rounded, unequal sided, margin entire, glabrous on both sides, ca. 30 x 9 cm; lateral nerves 7 pairs; petiole 2-2.5 cm long. Flowers from the basal leafless parts of branches; sepals 4; petals greenish-yellow, scales half the length of petals, 3-lobed; stigma 6, bilobed. Berry globose, to 15 cm across.

Flowering & Fruiting: March-May.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 1064,* Kallady.

Hydnocarpus pentandra (Buch.-Ham.) Oken, Allg. Natur. 3: 1381. 1841; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 147. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 50. 1988; Ansari, Fl. Kasaragod Div. 65. 1985; Vajr., Fl. Palghat Dist. 61. 1990; R.L. Mitra in B.D. Sharma & N.P. Balakr., Fl. India 2: 422. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 46. 1996; Sivar. & P. Mathew, Fl. Nilambur 59. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 59. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 97. 2009.. *Chilmoria pentandra* Buch.-Ham., Trans. Linn. Soc. London 13. 501. 1822. *Hydnocarpus laurifolia* (Dennst.) Sleum. in Engl., Bot. Jahrb. Syst. 69: 33. 1938. *Hydnocarpus wightiana* Bl., Rumph. 4: 22. 1848; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 196. 1872; Dunn in Gamble, Fl. Pres. Madras 52(37). 1915. *Marotti* Rheede, Hort. Malab. 1:65-66, t. 36.1678. **Plate 10h.**

Medium sized trees; bark white; branchlets puberulus. Leaves 17-20 x 7-8 cm, elliptic, acuminate at apex, acute or obtuse at base, nerves 8 pairs, prominent. Flowers ca. 1 cm across, in peduncled axillary cymes; sepals broadly ovate, pubescent; petals broadly ovate, greenish yellow, obtuse, ciliate; scale half as long as petals, densely hairy; stamens free, filaments hairy; ovary in female flowers globose tomentose; stigma 3-5, sessile; staminodes 5. Berry 5-7 cm across, globose, rind thick, rough with uneven surface.

Flowering & Fruiting: December-May.

Distribution: Endemic to Western Ghats. Common; in moist deciduous forests. *RNMK 1554,* Muthanga; *RNMK 1244*, Chedeleth; *RNMK 1950*, Tholpetty.

SCOLOPIA Schreber

Gen. 335. 1789.

Scolopia crenata (Wight & Arn.) Clos, Ann. Sci. Nat. Bot. ser. 4, 8: 250. 1857; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 191. 1872; Dunn in Gamble, Fl. Pres. Madras 52(38). 1915; Sleumer, Blumea 20: 39. 1972; V. S. Ramach. & V.J. Nair, Fl. Cannanore 50. 1988; Manilal, Fl. Silent Valley 12. 1988; Vajr.,

Fl. Palghat Dist. 62. 1990; R.L. Mitra in B.D. Sharma & N.P. Balakr., Fl. India 2: 430. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 46. 1996; Sivar. & P. Mathew, Fl. Nilambur 61. 1997; Mohanan & Sivad., Fl. Agasthyamala 75. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 59. 2005. *Phoberos crenatus* Wight & Arn., Prodr. 29. 1834.

Small to medium sized trees; trunk armed with branched thornes; branchlets with transverse lenticels. Leaves 5-9 x 3-5.5 cm, obovate, crenulate, abruptly acuminate, nerves erose, 4-7 pairs. Racemes upper axillary, 5-7 cm long; rachis ferrugineous tomentose. Flowers pedicellate; pedicel ca. 6 mm long, puberulus; sepals 6, obovate; petals 6, orbicular, white; stamens numerous, free, anthers oblong, connective produced into a reddish hood; ovary 1-celled, few ovuled; style ca. 4 mm long, thick; stigma 3-fid. Capsule ca. 1 cm across, globose, with persistent style.

Flowering & Fruiting: October-April.

Distribution: Indo-Malesia. Common; in shola margins and moist decidous forests. *RNMK* 2418, Kurichiarmala; *RNMK 1985*, Begur.

XYLOSMA G. Forst.

Fl. Ins. Austr. 72. 1786.

Xylosma longifolia Clos in Ann. Sci. Nat. 4, 8: 231. 1857; R.L. Mitra in B.D. Sharma & N.P. Balakr., Fl. India 2: 436. 1993. *Xylosma latifolium* Hook.f. & Thoms. in Hook.f., Fl. Brit. India 194. 1872; Dunn in Gamble, Fl. Pres. Madras 53(38). 1915; V. S. Ramach. & V.J. Nair, Fl. Cannanore 50. 1988; Vajr., Fl. Palghat Dist. 62. 1990; Sivar. & P. Mathew, Fl. Nilambur 61. 1997.

Trees, 5-15 m tall. Leaves 5-7 x 1.5-5 cm, ovate-lanceolate, obtuse at apex, cuneate at base, glandular, crenate-serrate. Flowers ca. 5 mm across, greenish yellow, in axillary pubescent breacteate racemes, 1.5-2.5 cm long; bracts ovate, acuminate; pedicles 3-6 mm long, articulate near base, pubescent; sepals 4 or 5, ovate or orbicular, subequal; stamens 15-20, filaments filiform; ovary globular, glabrous; disc lobulate; style short or abscent; stigma 2-3. Berry globose, 4-7 mm across, on 4-6 mm long pedicels, red when ripe; seeds 3-8, angled.

Flowering & Fruiting: June-July.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 1721,* Chanthanathodu.

Flacourtia jangomas (Lour.) Raeusch. commonly grown in homesteds

PITTOSPORACEAE R. Br.

Voy. Terra Austr. 2: 542. 1814.

PITTOSPORUM Banks ex Solander

in Geartner, Fruct. 1: 286, t. 59. 1788.

Trees or large shrubs. Leaves alternate, usually clustered towards the tip of branchlets, entire, petiolate. Flowers in terminal panicle, umbel or racemes;

sepals 5, free, imbricate; petals 5, free, erect, imbricate, recurved above; stamens 5, free, anthers versatile; ovary 2-3-celled, septa incomplete; ovules 2-10, on intruded parietal placentas; style -1, slender; stigma 2-5-lobed. Fruit a dehiscent capsule, 1-celled; seeds 2-9, in oily resinous pulp.

1. Inflorescence tomentose ..... **P. tetraspermum**
2. Inflorescence glabrous ..... **P. neelgherrense**

Pittosporum neelgherrense Wight & Arn., Prodr. 154. 1834; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 198. 1872; Dunn in Gamble, Fl. Pres. Madras 55(40). 1915; Manilal, Fl. Silent Valley 12. 1988; M.P. Nayar & G.S. Giri in B.D. Sharma & N.P. Balakr., Fl. India 2: 446. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 47. 1996; Mohanan & Sivad., Fl. Agasthyamala 76. 2002.

Shrubs to 1.5 m high. Leaves 8-12 x 3-4 cm, elliptic, acuminate at apex, acute at base, nerves indistinct; petiole ca. 2 cm long. Racemes 2-5-together, terminal, stout; pedicel ca. 5 mm long, glabrous; sepals subulate; petals yellow. Capsule globose, yellow, ca. 1 cm across; seeds 7-10, orange red, shining.
Flowering & Fruiting: July-December.
Distribution: Endemic to south India. Rare; in evergreen forests. *RNMK 1027,* Kallady.

Pittosporum tetraspermum Wight & Arn., Prodr. 154. 1834; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 198. 1872; Dunn in Gamble, Fl. Pres. Madras 55(40). 1915; Manilal, Fl. Silent Valley 14. 1988; Vajr., Fl. Palghat Dist. 63. 1990; M.P. Nayar & G.S. Giri in B.D. Sharma & N.P. Balakr., Fl. India 2: 447. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 47. 1996; Sivar. & P. Mathew, Fl. Nilambur 62. 1997.

Large shrubs, to 2 m tall; bark rough, grey outside, pungent smelling when cut, granular. Leaves pseudoverticillate towards the branch tips, 6-9 x 2-4 cm, elliptic, acute at either ends, 10-12-nerved; midrib tomentose above and below; petiole ca. 1 cm long. Flowers in terminal sessile umbels, pedicels ca. 5 mm long; sepals ovate, obtuse, pubescent; petals creamy-white, ca. 1.2 x 0.3 cm, oblanceolate, clawed; filaments ca. 6 mm long; ovary densely hairy; style glabrous. Capsule ca. 8 mm across, globose, smooth, black.
Flowering & Fruiting: July-March.
Distribution: South India and Sri Lanka. Rare; in evergreen forests. *RNMK 2224,* Niravilpuzha.

POLYGALACEAE R. Br.

Voy. Terra Austr. 2: 542. 1814.

POLYGALA Linnaeus

Sp. Pl. 701. 1753.

Herbs or undershrubs. Leaves alternate, penninerved, entire. Flowers bisexual, irregular, in axillary or extra-axillary racemes.; calyx 5-lobed, lobes

unequal, outer 3 smaller, inner 2 larger, wing-like; petals 3, basely connate, adnate to the staminal tube, lower petal boat-shaped, crested with lobed appendages; stamens 8, monadelphous into a split sheath; anthers similar, ovate; ovary superior, 2-celled; ovules one in each cell; style short. Fruit a capsule, 2-celled, cells unequal; seeds oblong , carunculate; caruncle lobed.

1. Fowers yellow; racemes few flowered, less than 3 cm long 2
1. Flowers pink or blue; racemes many flowered, more than 3 cm long.....4
2. Capsule densely bulbous based hairy along margins ..... **P. bulbothrix**
2. Capsule ciliate along margins.....3
3. Seeds cylindric; caruncle equally 3-toothed .....**P. arvensis**
3. Seeds ovoid; caruncle with 2 appendages and a tooth .....**P. chinensis**
4. Diffuse herbs; leaves to 2 cm long ..... **P. telephioides**
4. Erect herbs; leaves 4-5 cm long.....**P. persicariifolia**

Polygala arvensis Willd., Sp. Pl. 3: 876. 1802; R.N. Banerjee in B.D. Sharma & N.P. Balakr., Fl. India 2: 460. 1993; Manilal, Fl. Silent Valley 14. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 210. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 47. 1996; Sivar. & P. Mathew, Fl. Nilambur 62. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 61. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 98. 2009. *Polygala chinensis* auct., non L. 1753; Benn. in Hook.f., Fl. Brit. India 1: 204. 1872,p.p. ; Dunn in Gamble, Fl. Pres. Madras 58(42). 1915. *Katu-vistna-clandi* Rheede, Hort. Malab. 9:119, t.61. 1689. *Kodatsjer*i Rheede, Hort. Malab. 9: 131, t.67. 1689.

Erect or procumbent herbs. Leaves very variable, 3-4 x 1.5-2 cm, glabrous or densely pubescent. Flowers solitary or in ca. 2 cm long lateral racemes, yellow; keel petal crested with shortly forked or notched appendages; style curved, hooked at apex. Capsule ciliate along the margins; seeds black, elliptic-obovate, pilose.

Flowering & Fruiting: July-December.

Distribution: Indo-Malesia to Australia. Common; in moist deciduous forests. *RNMK 2116,* Muthanga ; *RNMK 2260,* Kuruva.

Polygala bolbothrix Dunn, Kew Bull. 1916 :63. 1916 & in Gamble, Fl. Pres. Madras 58(42). 1915; Manilal & Sivar., Fl. Calicut 37. 1982; Manilal, Fl. Silent Valley 14. 1988; Vajr., Fl. Palghat Dist. 64. 1990; R.N. Banerjee in B.D. Sharma & N.P. Balakr., Fl. India 2: 462. 1993; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 61. 2005. *Polygala ciliata* sensu Wight & Arn., Prodr. 38. 1834, non L. 1753. *Polygala ramaswamiana* Mukerjee, var. *palniensis* Mukerjee, J. Bombay Nat. Hist. Soc. 53: 56. 1955 & Bull. Bot. Soc. Bengal 12: 38. 1958.

Diffuse herbs; whole plant with bulbous based hairs. Leaves 1.3-1.5 x 0.5-0.8 cm, obovate, obtuse; racemes ca. 2 cm long, 2-4-flowered; pedicels ca. 4 mm long. Flowers yellow; outer sepals ovate, acute, densely hairy; inner sepals ovate, acuminate; dorsal petal ca. 3 mm; crest ca. 2 mm long, dichotomous;

stamens 8; sheath cleft at apex. Capsule ca. 3.5 mm long, densely bulbous based hairy along the margins; seeds oblong, black hairy; caruncle 3 toothed.
Flowering & Fruiting: July-December.
Distribution: Endemic to Peninsular India. Rare; in grasslands. *RNMK 2078,* Banasuramala; *RNMK 2643*, Sugandhagiri.

Polygala chinensis L., Sp. Pl. 704. 1753; Dunn in Gamble, Fl. Pres. Madras 58(42). 1915; R.N. Banerjee in B.D. Sharma & N.P. Balakr., Fl. India 2: 464. 1993; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 61. 2005. *Polygala glomerata* Lour., Fl. Cochinch. 426. 1790; Benn. in Hook. f., Fl. Brit. India 1: 206. 1872.

Herbs, branchlets hirsute. Leaves 1-5 x 0.5-1.5 cm, obovate-oblanceolate, bracts hairy, persistent. Racemes axillary, pubescent, less than 2 cm; keel petal crenate with shortly notched appendages; style curved hooked at apex. Capsule slightly winged, ciliate along the margins; seeds pilose, caruncle cup shaped.
Flowering & Fruiting: April-December.
Distribution: Indo-Malaesia and China. Common; in moist deciduous forests. *RNMK 2114,* Muthanga.

Polygala persicariifolia DC., Prodr. 1: 326. 1824; Benn. In Hook. f., Fl. Brit. India 1: 202. 1872; Dunn in Gamble, Fl. Pres. Madras 58(42). 1915; Manilal, Fl. Silent Valley 15. 1988; Vajr., Fl. Palghat Dist. 65. 1990; R.N. Banerjee in B.D. Sharma & N.P. Balakr., Fl. India 2: 480. 1993. *Polygala wallichiana* Wight, Ill. t. 22A. 1840.

Erect herbs to 35 cm high. Leaves 4-5 x 0.6-0.8 cm, linear-lanceolate, acuminate, glabrous. Racemes to 5 cm long, slender, pubescent, many-flowered. Flowers pink; inner sepals ca. 6 x 6 mm, orbicular, white; outer sepals ca. 3 x 2 mm, ovate; wing petals ca. 2 mm long, cordate at base, hairy, dorsal petal ca. 6 x 4 mm, obovate, glabrous, crest fimbriate, 2-lobed. Capsule 3-4 mm long, glabrous; seeds pubescent, caruncle as long as the seed.
Flowering & Fruiting: July-December.
Distribution: Indo-Malesia, North Australia and Tropical East Africa. Occasional; in grasslands. *RNMK 2102,* Aranamala.

Polygala telephioides Willd., Sp. Pl. 3: 876. 1802; Roxb., Fl. Ind. 3:218. 1832. Wight & Arn., Prodr. 36.1834; Benn. Hook. f., Fl. Brit. India 1: 205. 1872; Dunn in Gamble, Fl. Pres. Madras 59(42). 1915; R.N. Banerjee in B.D. Sharma & N.P. Balakr., Fl. India 2: 485. 1993; Mohanan & Sivad., Fl. Agasthyamala 79. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 62. 2005. *Polygala brachystachya* DC., Prodr. 1: 326. 1824, non Bl. 1825.

Diffuse herbs. Leaves 1.5-2 x 0.3-0.5 cm, elliptic or lanceolate, apex obtusely acuminate, base cuneate, petiole 5-6 mm. Flowers ca. 3 mm across in axillary or leaf opposed racemes, blue; outer sepals linear-lanceolate, ciliate;

inner sepals long, elliptic, glabrescent; wing petals obovate; filaments variously connate, middle two free; ovary ciliate; style curved at the middle, apex broad; stigma knob like. Capsule 2-2.5 mm long, suborbicular, covered with wing sepals; seeds 2, villous, caruncle 3-lobed.
Flowering & Fruiting: August-December.
Distribution: Indo-Malesia. Rare; in moist deciduous forests. *RNMK 2755,* Muthanga-Maragadha.

XANTHOPHYLLACEAE (Chodat) Gagnep.

XANTHOPHYLLUM Roxburgh
Pl. Corom. 3: 81. 1820, *nom. cons.*

Xanthophyllum arnottianum Wight, Ill. 1: 50. t.23. 1840; Manilal, Fl. Silent Valley 16. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 210. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 48. 1996; Sivar. & P. Mathew, Fl. Nilambur 64. 1997; Mohanan & Sivad., Fl. Agasthyamala 80. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 64. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 99. 2009. *Xanthophyllum flavescens* Roxb., Pl. Corom. 3 :81, t. 284. 1820 ; Benn. in Hook.f., Fl. Brit. India 1: 209. 1874 ; Dunn in Gamble, Fl. Pres. Madras 59(42). 1915; V. S. Ramach. & V.J. Nair, Fl. Cannanore 51. 1988; Vajr., Fl. Palghat Dist. 66. 1990; R.N. Banerjee & N.P. Balakr. in B.D. Sharma & N.P. Balakr., Fl. India 2:497.1993; *Xanthophyllum angustifolium* Wight, Ill. 1:50. t. 23.1840. *Karin-kara* Rheede, Hort. Malab. 4:49-50, t.23. 1683.

Small trees; bark smooth; branchlets puberulus. Leaves alternate, simple, 12-15 x 6-7 cm, ovate, lanceolate, acuminate at apex, glabrous, drying to yellow; nerves 5-7 pairs; petiole ca. 0.5 cm long. Flowers in terminal or axillary panicled racemes; sepals 5, subequal, ovate, acute; petals yellow, unequal, lower one boat-shaped, pubescent; others ovate, ca. 9 x 4 mm; stamens 8, filaments free, adhered to the base of petals in pairs; ovary 1-celled; ovules 4-16, style curved; disc 5-lobed. Drupe ca. 2 cm across, globose, rugose, 1-seeded.
Flowering & Fruiting: December-June
Distribution: Endemic to southern Western Ghats. Common; in evergreen forests. *RNMMSRF 2502,* Talimala; *RNMK 2252*, Sugandhagiri; *RNMK 2093*, Thariodu.

CARYOPHYLLACEAE Juss.
Gen. Pl. 299. 1789.

1. Leaves 3-5 at each node, linear; petals entire ..... **Polycarpon**
1. Leaves opposite, orbicular; petals 2-5-fid..... **Drymaria**

DRYMARIA Willdenow ex J. A. Schultes
in J.J. Roemer & J. A. Schultes, Syst.
Veg. 5: 406. 1819-1820.

Drymaria cordata (L.) Willd. ex Roem. & Schult. ssp. **diandra** (Bl.) Duke, Ann. Miss. Bot. Gard. 48: 253. 1961; Majumdar, Bull. Bot. Surv. India 10:204. 1969; Manilal, Fl. Silent Valley 17. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 51. 1988; Vajr., Fl. Palghat Dist. 67. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 49. 1996; Sivar. & P. Mathew, Fl. Nilambur 64. 1997. *Drymaria diandra* Bl. Bijdr. 62. 1825. *Drymaria cordata* Edgew. & Hook.f. in Hook.f., Fl. Brit. India 1:244.1874p.p.; Dunn in Gamble, Fl. Pres. Madras 63(46). 1915; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 67. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 100. 2009. *Cerastium cordifolium* Roxb., Fl. Ind. 2: 458. 1832.

Prostrate glabrous herbs; stem slender. Leaves opposite, ca. 1 cm across, orbicular, cordate at base, obtuse, nerved from the base. Flowers ca. 5 mm across, in cymes axillary or terminal; sepals 5, ca. 3 mm long, lanceolate, spreading; petals ca. 2 mm long, 2-5-fid, chartaceous, white; stamens 5, free, anthers small. Ovary 1-celled, ovules few, basal; style 3-fid. Capsule ca. 4 x 1 mm, 3-valved; seeds orbicular, minutely muricate.

Flowering & Fruiting: Throughout the year.

Distribution: Paleotropics. Common; in open plantations. *RNMK 2541,* Puthoorvayal.

POLYCARPON Linnaeus
Syst. ed. 10.881, 1360. 1759.

Polycarpon prostratum (Forssk.) Asch. & Sehweinf., Oester. Bot. Z. 39: 128. 1889; Manilal & Sivar., Fl. Calicut 39. 1982; Ansari, Fl. Kasaragod Div. 68. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 52. 1988; Vajr., Fl. Palghat Dist. 67. 1990; N. C. Majumdar in B.D. Sharma & N.P. Balakr., Fl. India 2: 553. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 49. 1996; Sivar. & P. Mathew, Fl. Nilambur 65. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 67. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 101. 2009. *Alsine prostrata* Forssk., Fl. Aeg.-Arab. 207. 1775. *Polycarpon loeflingiae* (Wall. ex Wight & Arn.) Benth. ex Edgew. & Hook. f., Fl. Brit. India 1: 245. 1874; Dunn in Gamble, Fl. Pres. Madras 64(46). 1915. *Hapalosa loeflingiae* Wall. ex Wight & Arn., Prodr. 358. 1834.

Prostrate herbs with radiating branches; stems densely hairy. Leaves whorled, 1-2 x 0.4-0.6 cm, oblanceolate to spathulate, acute, sparsely hairy, thick; stipule chartaceous, lanceolate. Flowers in terminal panicled cymes, sessile and pedicelled; sepals 5, oblong, keeled, acute, margin white; petals entire, chartaceous; stamens 5, free; ovary 1-celled, style 3-fid, short. Capsule ca. 4 mm long, ovoid, acute; seeds few.

Flowering & Fruiting: January-May.

Distribution: Paleotropics. Rare; in moist places. *RNMK* 1379, Meppady.

PORTULACACEAE Juss.

Gen. Pl. 312. 1789.

1. Ovary 1 celled ..... **Portulaca**
1. Ovary 3 celled ..... **Talinum**

PORTULACA Linnaeus

Sp. Pl. 445. 1753.

Portulaca oleracea L., Sp. Pl. 445. 1753; Dyer in Hook. f., Fl. Brit. India 1: 246. 1874; Dunn in Gamble, Fl. Pres. Madras 66(47). 1915; Manilal & Sivar., Fl. Calicut 40. 1982; Ansari, Fl. Kasaragod Div. 68. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 212. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 52. 1988; Manilal, Fl. Silent Valley 17. 1988; Vajr., Fl. Palghat Dist. 68. 1990; M.K.V. Rao in B.D. Sharma & Sanjappa, Fl. India 3: 4. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 50. 1996; Sivar. & P. Mathew, Fl. Nilambur 66. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 68. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 102. 2009. *Kara-tsjira* Rheede, Hort. Malab. 10:71, t.36.1960.

Erect or prostrate herbs. Leaves alternate or whorled, 2-3 x 0.5-1 cm, obovate, obtuse, puberulus, alternate or pseudo-whorled. Flowers terminal and axillary, sessile, solitary or 2-3 together; sepals 2, ca. 5 x 5 mm, ovate, acute, glabrous; petals 5, ca. 6 x6 mm, obovate, obtuse, white or yellow; stamens 12, filaments hairy at base; ovary one celled, many ovuled, stigma globose. Capsule 7 -8 mm long, ovoid, glabrous; seeds many reniform, tubercled, black.

Flowering & Fruiting: Throughout the year.

Distribution: Throughout the Tropics. Common; in open wet areas. *RNMK 2502,* Panamaram.

TALINUM Adanson

Fam. 2: 245. 1763.

Talinum portulacifolium (Forssk.) Asch. ex Scheinf, Weinf., Bull. Herb. Boissier 4. App. 172. 1896; Manilal & Sivar., Fl. Calicut 40. 1982; Vajr., Fl. Palghat Dist. 68. 1990; M.K.V. Rao in B.D. Sharma & Sanjappa, Fl. India 3: 9. 1993; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 68. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 104. 2009. *Orygia portulacifolia* Forssk., Fl. Aeg.-Arab. 103. 1775. *Portulaca cuneifolia* Vahl, Symb. Bot. 1: 33. 1790. *Talinum cuneifolium* (Vahl) Willd., Sp. Pl. 2: 864.1799; Dyer in Hook. f., Fl. Brit. India 1: 247. 1874; Dunn in Gamble, Fl. Pres. Madras 66(48). 1915. *Talinum indicum* Wight & Arn., Prodr. 356. 1834.

Erect herbs. Leaves alternate, 8-10 x 3-3.5 cm, obovate, cuneate, membraneous, emarginate at apex; leaf base decurrent to the petiole; petiole to 1.5 cm. Panicle terminal, to 15 cm; flowers pink; bracts lanceolate, ca. 6 mm; pedicels to 1.5 cm; sepals 2, ca. 6 mm, lanceolate; petals 5, ca. 1 x 0.6 cm, obovate; stamens many, filaments unequal, connate at the base; ovary 3-

celled, globose, style ca. 6 mm, stigma 3 fid. Capsule ca. 6 mm across, globose.
Flowering & Fruiting: February-August.
Distribution: Pantropical. Occasional; in open wastelands. *RNMK 1780,* Kalpetta; *RNMK 2525,* Puthoorvayal.

HYPERICACEAE Juss.

Gen. Pl. 254. 1789.

HYPERICUM Linnaeus

Sp. Pl. 783. 1753.

Shrubs or small herbs, glabrous. Leaves sessile, entire, opposite, decussate. Flowers axillary, solitary or in terminal cymes, yellow tetra- or pentamerous; sepals free, ovate; petals obovate, twisted; stamens many, free or combined in 4 or 5 bundles; ovary 3 or 5-celled; ovules many in axile placentation; style 3 or 5, free. Fruit a dehiscent capsule; seeds many.

1. Stout shrubs; flowers 5 cm across; styles 5 ..... **H. mysurense**
1. Slender herbs; flowers to 1 cm across; styles 3 ..... **H. japonicum**

Hypericum japonicum Thunb. ex Murray in L., Syst. Veg. 702. 1784; Wight & Arn., Prodr.99. 1834; Dyer in Hook. f., Fl. Brit. India 1: 256. 1874; Dunn in Gamble, Fl. Pres. Madras 70(51). 1915; Manilal, Fl. Silent Valley 18. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 53. 1988; S.N. Biswas in B.D. Sharma & Sanjappa, Fl. India 3: 69. 1993; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 69. 2005.

Small herbs. Leaves 7-9 x 2-3 mm long, lanceolate, auricled at base, 3-ribbed, glabrous. Flowers in terminal cymes or solitary, axillary; pedicels ca. 5 mm long; sepals oblong, obtuse, many-ribbed; petals yellow, oblong; stamens many, free; ovary 1-celled, ellipsoid, styles 3. Capsule 3-valved, smooth, ovoid, septicidal; seeds many, oblong.
Flowering & Fruiting: November-January.
Distribution: Indo-Malesia to Australia and New Zealand and East Asia. Common; in paddy fields. *RNMK* 1985, Muttil; *RNMK 1109,* Kottathara.

Hypericum mysurense Heyne ex Wight & Arn., Prodr. 99. 1834; Dyer in Hook. f., Fl. Brit. India 1: 253. 1874; Dunn in Gamble, Fl. Pres. Madras 70(50). 1915; V. S. Ramach. & V.J. Nair, Fl. Cannanore 53. 1988; Manilal, Fl. Silent Valley 18. 1988; Vajr., Fl. Palghat Dist. 68. 1990; S.N. Biswas in B.D. Sharma & Sanjappa, Fl. India 3: 71. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 51. 1996; Sivar. & P. Mathew, Fl. Nilambur 66. 1997. *Norisca mysurensis* (Heyne ex Wight & Arn.) Wight, Ic. t. 56. 1838.

Shrubs; branchlets obscurely 4-lined. Leaves 2-2.5 x 0.7-1 cm, lanceolate, acute at both ends, closely placed, sessile; nerves 2 or 3 pairs, very oblique. Flowers 5-6 cm across, in terminal cymes, 2-3 together; sepals ca. 1 cm long,

sparsely black gland-dotted, lanceolate; petals ca. 2.5 x 1 cm, golden yellow, obovate, obtuse, glabrous; stamens arranged in 5 bundles; filaments ca. 1 cm long; ovary 5-celled; styles 5, 1-1.5 cm long. Capsule 1.2-1.5 cm long, 5-valved, glabrous; seeds numerous, oblong.
Flowering & Fruiting: Throughout the year.
Distribution: Tropical Asia. Rare; in open grasslands. *RNMK* 1475, Chembra.

CLUSIACEAE Lind.

Intr. Nat. Syst. Bot., ed. 2: 74. 1836.

1. Flowers unisexual ..... **Garcinia**
1. Flowers bisexual..... 2
2. Flowers solitary or 2-3 together, 3-8 cm across ..... **Mesua**
2. Flowers in racemes or panicles, less than 2.5 cm across ..... **Calophyllum**

CALOPHYLLUM Linnaeus

Sp. Pl. 513. 1753.

Small or large trees, with white exudate; bark with vertical fissures. Leaves opposite, entire with very close lateral nerves. Flowers in axillary panicles or racemes, 4-merous; sepals obovate, obtuse; petals 4, obovate to orbicular or absent; stamens many, polyadelphous or free; ovary ovoid, 1-celled, 1-ovuled; style slender; stigma capitate. Fruit a 1-seeded ellipsoidal or globose drupe.

1. Leaves acuminate; petiole 2-2.5 cm long; Inflorescence tomentose.... **C. polyanthum**
1. Leaves not acuminate; petiole less than 1 cm long; inflorescence glabrous 2
2. Leaves obovate, base cuneate, under 5 cm long..... **C. austroindicum**
2. Leaves oblong or elliptic-oblong, base obtuse or acute, to 12 cm long..... **C. calaba**

Calophyllum austroindicum Kosterm. ex Stevens, J. Arnold Arbor. 61: 250. 1980; Manilal, Fl. Silent Valley 18. 1988; Vajr., Fl. Palghat Dist. 69. 1990; N.P. Singh in B.D. Sharma & Sanjappa, Fl. India 3: 90. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 51. 1996. *Calophyllum trapezifolium* auct. non Thwaites, 1858, sensu Anders. in Hook.f., Fl. Brit. India 1: 275. 1874; Dunn in Gamble, Fl. Pres. Madras 76 (55). 1915; Mahes., Bull. Bot. Surv. India 2: 144. 1960. **Plate 10i.**

Large trees, bark rough, ca. 2 cm thick; branchlets slender, glabrous. Leaves obovate, acute, base cuneate, rigidly coriaceous, 3-5 x 2-3 cm. Flowers white, in short axillary and terminal panicles; sepals 4, inner 2, petaloid; petals ovate-oblong, ca. 8 mm long; ovary globose. Fruit 3-3.5 x 1.5-2.5 cm, ellipsoid, greenish purple, smooth.
Flowering & Fruiting: November-June.
Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK* 2683, Kurichiarmala.

Calophyllum calaba L., Sp. Pl. 514. 1753; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 81. 1988: Sasidh. & Sivar., Fl. Pl. Thrissur For. 51. 1996; Sivar. & P. Mathew, Fl. Nilambur 67. 1997; Mohanan & Sivad., Fl.

Agasthyamala 81. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 69. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 106. 2009. *Calophyllum apetalum* Willd., Ges. Naturf. Freunde Berlin Mag. Neuesten 5: 79. 1811; N.P. Singh in B.D. Sharma & Sanjappa, Fl. India 3:88.1993; Vajr., Fl. Palghat Dist. 69. 1990. *Calophyllum decipiens* Wight, Ic. t. 106. 1839; Dunn in Gamble, Fl. Pres. Madras 76(54). 1915. *Calophyllum wightianum* Wall. ex Planch. & Triana, Ann. Sci. Nat. Bot. Ser. 4. 15: 256. 1862; Anderson in Hook. f., Fl. Brit. India 1: 274. 1874. *Tsjerouponna* Rheede, Hort. Malab. 4: 81, t. 39. 1683. **Plate 10j.**

Trees, to 10 m high; bark with deep fissures, yellowish brown inside; branchlets quadrangular. Leaves 9-12 x 4-5 cm, obovate, acute, emarginate at tip, attenuate at base; petiole up to 0.5 cm long; lateral nerves ascending. Flowers in axillary panicles, pedicelled; sepals white, ca. 8 x 5 mm, obovate, obtuse; petals absent; filaments ca. 6 mm long, slender. Drupe ca. 1 cm long, obovoid, obtuse, glabrous.

Flowering & Fruiting: September-May.

Distribution: Endemic to southern Western Ghats. Common; along riverbanks. *RNMK 2080,* Kuruva.

Calophyllum polyanthum Wall. ex Choisy, Descr. Guttif. Ind. 43. 1849; Manilal, Fl. Silent Valley 19. 1988; Mahes., Bull. Bot. Surv. India 2: 144. 1960; N.P. Singh in B.D. Sharma & Sanjappa, Fl. India 3: 94. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 52. 1996; Sivar. & P. Mathew, Fl. Nilambur 68. 1997; Mohanan & Sivad., Fl. Agasthyamala 82. 2002. *Calophyllum elatum* Bedd., Fl. Sylv. t. 2. 1869; Dunn in Gamble, Fl. Pres. Madras 76(54). 1915. *Calophyllum tomentosum* auct. non Wight 1839, sensu Anders. in Hook. f., Fl. Brit. India 1: 274. 1874.

Tall trees, to 35 m high; trunk straight, round; bark white, reddish brown inside, deeply spirally fissured; branchlets minutely brown tomentose. Leaves 10-12 x 5-8 cm, elliptic, acute at either ends, petiole ca. 2 cm long. Flowers 1-1.2 cm across, in axillary racemes; peduncle puberulus; pedicel 1.3-1.5 cm long; sepals orbicular; petals ca. 5 mm across, orbicular, white; stamens polyadelphous. Drupe 2-2.5 cm long, ellipsoid, smooth, apiculate.

Flowering & Fruiting: June-September.

Distribution: Indo-Malesia and China. Common; in evergreen forests. *RNMK 2058,* Vythiri Ghat.

GARCINIA Linnaeus

Sp. Pl. 443. 1753.

Trees with yellow exudates when cut. Leaves opposite, entire, coriaceous. Flowers fascicled or umbellate, dioecious, terminal or axillary; sepals 4 or 5, imbricate, thick; petals 4 or 5, thinner than sepals; stamens many, free or variously combined, surrounding a pistillode; ovary in female flowers 2-12-celled; stigma peltate, sessile or shortly stalked; ovule solitary; staminodes

many, free or connate in groups. Berry terete or ridged; broadly ellipsoid or globose; seeds with pulpy aril.

1. Fruit ribbed or grooved.....2
1. Fruit not ribbed or grooved, smooth .....**G. morella**
2. Ovary 4-5-celled 3
2. Ovary 6-12-celled .....**G. gummi-gutta**
3. Leaves elliptic-oblong; lateral veins 15-21 pairs .....**G. cowa**
3. Leaves ovate; lateral veins 30-40 pairs .....**G. rubro-echinata**

Garcinia cowa Roxb. ex DC., Prodr. 1: 561. 1824; Anderson in Hook. f., Fl. Brit. India 1: 202. 1874; Dunn in Gamble, Fl. Pres. Madras 74(53). 1915; Vajr., Fl. Palghat Dist. 70. 1990; N.P. Singh in B.D. Sharma & Sanjappa, Fl. India 3: 108. 1993.

Small trees with oval crown; bark smooth, black; branchlets 4-angled, drooping. Leaves 8-14 x 2.5-5 cm, elliptic-oblong or oblanceolate, obtuse at apex, cuneate at base, nerves 15-21 pairs, arching and forms an intramarginal vein; petiole 0.8-1.3 cm long. Flowers 1-3 in terminal clusters; female flowers larger than male flowers; sepals 4-7 mm long, unequal, thick, greenish-yellow; petals larger, 0.8-1.3 cm long, ovate, obtuse, yellow to red; staminodes in female flowers in a ring around the ovary. Capsule 4-5 cm across, elliptic to globose, beaked, ridged.

Flowering & Fruiting: December-September.

Distribution: India to Indo-China. Rare; in evergreen forests. *RNMK 2625,* Kurichiarmala.

Garcinia gummi-gutta (L.) Robson., Brittonia 20: 103. 1968; Ansari, Fl. Kasaragod Div. 70. 1985; Manilal, Fl. Silent Valley 19. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 82. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 54. 1988; Vajr., Fl. Palghat Dist. 70. 1990; N.P. Singh in B.D. Sharma & Sanjappa, Fl. India 3:110.1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 52. 1996; Sivar. & P. Mathew, Fl. Nilambur 68. 1997; Mohanan & Sivad., Fl. Agasthyamala 84. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 70. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 109. 2009. *Cambogia gummi-gutta* L., Gen. Pl. (ed.5) 522. 1754. *Garcinia cambogia* (Gaertn.) Desr. in Lamk., Encycl. 3: 701. 1792; Anderson in Hook. f., Fl. Brit. India 1: 261. 1874; Dunn in Gamble, Fl. Pres. Madras 73(53). 1915. *Mangostana cambogia* Gaertn., Fruct. 2: 106. 1790. *Coddam-pulli* Rheede, Hort. Malab. 1:41-42, t. 24. 1678. **Plate 10K.**

Trees, to 20 m high; bark black, yellow inside; twigs glabrous. Leaves 10-13 x 5-8 cm, elliptic, acute at ends, nerves 10-12 pairs, oblique. Flowers in terminal, umbells; sepals obtuse, thick; petals larger, 7-9 mm long, ovate, obtuse; stamens in male flowers connate into a central column; female flowers solitary; ovary 6-12-celled, furrowed; staminodes many, in a ring around the ovary. Berry 4-8 cm across, glabrous, grooved, beaked.

Flowering & Fruiting: January-September.
Distribution: South India and Sri Lanka. Common; in evergreen and semi-evergreen forests. *RNMK 1295,* Kattimattam; *RNMK 2542*, Thariyodu; *RNMK 1109*, Kuruva.

Garcinia morella (Gaertn.) Desv. in Lamk., Encycl. 3: 701. 1792; Bedd., Fl. Sylv.t. 86. 1871; Anderson in Hook. f., Fl. Brit. India 1: 204. 1874; Dunn in Gamble, Fl. Pres. Madras 74(52). 1915; Manilal, Fl. Silent Valley 20. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 55. 1988; Vajr., Fl. Palghat Dist. 71. 1990; N.P. Singh in B.D. Sharma & Sanjappa, Fl. India 3: 119. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 52. 1996; Sivar. & P. Mathew, Fl. Nilambur 69. 1997; Mohanan & Sivad., Fl. Agasthyamala 85. 2002. *Mangostana morella* Gaertn., Fruct. 2: 106. 1790. *Garcinia pictoria* Roxb., Fl. Ind. 2:627. 1832; Wight, Ic. t. 102. 1839; *Garcinia gutta* Wight, Ic. t. 44. 1840. **Plate 10 l.**

Medium trees; branchlets quadrangular, glabrous. Leaves 10-12 x 8-10 cm, broadly ovate, acute at both ends; lateral nerves 10-12 pairs; petiole 0.8-1 cm long. Flowers axillary, solitary or 2-4 together, sessile; sepals orbicular, thick glabrous; petals orbicular; stamens in male flowers 10-12, combined into a central column; anthers transverse; staminodes 10-12, basely united; ovary in female flowers 4-celled; stigma radiating. Berry 2-2.5 cm long, ellipsoid, smooth, light pink.
Flowering & Fruiting: February-August.
Distribution: Indo-Malesia. Rare; in evergreen and moist deciduous forests. *RNMK 2502,* Thariyodu; *RNMK 2845*, Muthanga; *RNMK 3136*, Kuruva.

Garcinia rubro-echinata Kosterm., Ceylon J. Biol. Sci. 12: 128. 1977; N.P. Singh in B.D. Sharma & Sanjappa, Fl. India 3: 123. 1993. *Garcinia echinocarpa* auct. non Thw., 1854; Anderson in Hook. f., Fl. Brit. India 1: 274. 1874; Dunn in Gamble, Fl. Pres. Madras 73(52). 1915; Mohanan & Sivad., Fl. Agasthyamala 83. 2002. *Garcinia echinocarpa* var. *monticola* Mahes., Bull. Bot. Surv. India 6: 126. 1965.

Medium-sized trees with cylindrical, smooth, dark-brown bole; bark with numerous small lenticells. Leaves ovate, obtuse, coriaceous, 8-15 x 3-6 cm; petiole stout, 1-1.5 cm long; lateral veins 30-40 pairs, obliquely parallel. Flowers sessile, mostly at the apex of branchlets; sepals fleshy, ovate, concave 6-9 mm long, red; petals almost twice as long as sepals, green; ovary 4-celled. Fruits ovoid, tubercled, 3-5 x 2.5-4 cm, dark red; seeds up to 4 cm long, oblong, with scanty aril.
Flowering & Fruiting: February-July.
Distribution: Endemic to Western Ghats. Rare; in evergreen forests. *RNMK 1758,* Chanthanthodu.

MESUA Linnaeus
Sp. Pl. 515. 1753.

Trees with yellow resin. Leaves simple, opposite, entire; nerves many, closely parallel. Flowers solitary or in short sessile cymes, axillary or terminal.

Sepals 4, free, orbicular; petals 4, white, obovate; stamens numerous, many-seriate, free; anthers long; ovary 2-celled; ovules 2 in each cell, erect; style long; stigma peltate. Fruit a woody capsule, subtended by coriaceous sepals; seeds 2-4.

1. Leaves oblong, over 15 cm long ..... **M. thwaitesii**
1. Leaves elliptic, to 10 cm long..... **M. ferrea**

Mesua ferrea L., Sp. Pl. 515. 1753; Wight, Ic. t. 118. 1839; Anderson in Hook. f., Fl. Brit. India 1: 277. 1874; Dunn in Gamble, Fl. Pres. Madras 77(55). 1915; Ansari, Fl. Kasaragod Div. 71. 1985; N.P. Singh in B.D. Sharma & Sanjappa, Fl. India 3:136.1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 53. 1996; Sivar. & P. Mathew, Fl. Nilambur 70. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 110. 2009. *Mesua speciosa* Choisy in DC., Prodr. 1:562. 1824; Wight, Ic. t. 961. 1845. *Mesua pedunculata* Wight, Ic. t. 119. 1839. *Mesua coromandelica* Wight, Ic. t. 117. 1839. *Mesua nagassarium* (Burm. f.) Kosterm., Ceylon J. Sci. 12, 1: 71. 1976; V. S. Ramach. & V.J. Nair, Fl. Cannanore 55. 1988; Manilal, Fl. Silent Valley 21. 1988; Vajr., Fl. Palghat Dist. 72. 1990; Mohanan & Sivad., Fl. Agasthyamala 88.2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 72.2005.

Very large trees, bark reddish grey. Leaves 8-10 x 3-4 cm, elliptic, apex acuminate, base acute, nerves many, closely placed; petiole to 1 cm long. Flowers solitary, axillary; pedicels ca. 5 mm long, slender; sepals ca. 6 mm across, orbicular, obtuse, puberulus; petals to 2 cm long, white, obovate, obtuse; stamens polyadelphous. Capsule 2-4 cm across, ellipsoid, acute, glabrous; seeds plano-convex.

Flowering & Fruiting: April-July.

Distribution: Indo-Malesia. Common; in evergreen forests. *RNMK 2005,* Kurichiarmala; *RNMK 2035*, Banasuramala; *RNMK 1931*, Chanthanathodu; *RNMK 2848,* Chembra.

Mesua thwaitesii Planch. & Triana, Ann. Sci. Nat. Bot. ser. 4, 15: 305. 1861; Anderson in Hook. f., Fl. Brit. India 1: 278. 1874; N.P. Singh in B.D. Sharma & Sanjappa, Fl. India 3: 143. 1993. *Mesua ferrea* L. var. *thwaitesii* (Planch. & Triana) Vesque in DC., Monogr. Phan. 8: 634. 1893; Mahes., Bull. Bot. Surv. India 5:339. 1964; Manilal & Sivar., Fl. Calicut 41. 1982. **Plate 11a.**

Tall glabrous trees, to 30 m tall; bark light green. Leaves oblong, acuminate at apex, acute at base, thickly coriaceous, pale green above, glaucous, white beneath; petiole 1 cm long. Flowers in terminal cymes, sessile; sepals ca. 1.5 cm across, orbicular, glabrous; petals 3-4 x 2-3 cm, obovate; stamens polyadelphous. Capsule 3-5 cm across, depressed globose, acute, greenish yellow, surrounded by enlarged sepals and bracts; seeds 2 or 3, plano-convex or trigonous, brown.

Flowering & Fruiting: February-December.

Distribution: South India and Sri Lanka. Occasional; in evergreen forests *RNMK 2638,* Chanthanathodu; *RNMK 1409,* Banasuramala.

Garcinia indica (Thouars) Choisy and **Garcinia mangostana** L., are often grown in homesteds for their edible fruit in many parts of the district.

BONNETIACEAE Beauvis.

POECILONEURON Beddome

J. Linn. Soc. 8: 267. 1865.

Poeciloneuron indicum Bedd., J. Linn. Soc. Bot. 8: 267,t.17. 1865 & Fl. Sylv. t.3. 1869; Dyer in Hook. f., Fl. Brit. India 1: 278. 1874; Dunn in Gamble, Fl. Pres. Madras 77(56). 1915; Manilal, Fl. Silent Valley 22. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 55. 1988; Vajr., Fl. Palghat Dist. 72. 1990; N.P. Singh in B.D. Sharma & Sanjappa, Fl. India 3: 146. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 54. 1996; Mohanan & Sivad., Fl. Agasthyamala 89. 2002. **Plate 11b.**

Tall trees, branchlets terete. Leaves 18-19 x 6.5-7 cm, oblong, abruptly acuminate, acute at base, nerves many, close, parallel, nervules minutely reticulate into polygonal units; petiole ca. 1.5 cm long. Flowers in terminal panicles, many, bisexual; pedicels 5-7 mm long; sepals 5, ca. 2 mm long, ovate, acute, glabrous; petals 5, ca. 6 mm long, obovate, white, glabrous; stamens 14, free, anthers linear; ovary 2-celled, glabrous; ovules 2 in each cell; styles 2. Fruit a 1-seeded capsule, beaked, 2.2-2.5 cm across.

Flowering & Fruiting: December-June.

Distribution: Endemic to Western Ghats. Rare; in evergreen forests. *RNMK 1213,* Chanthanathodu.

THEACEAE D. Don

Prodr. Fl. Nepal. 224. 1825.

1. Flowers 5 cm across; fruit a capsule ..... **Gordonia**
1. Flowers to 1 cm across; fruit a berry 2
2. Leaf tip acute, margin serrate; stamens to 10 ..... **Eurya**
2. Leaf tip obtuse, margin entire; stamens numerous ..... **Ternstroemia**

EURYA Thunberg

Nova Gen. Pl. 67. 1783.

Eurya nitida Korth. in Temminck, Verh. Nat. Gesch. Bot. 3: 115. t.17. 1840; V. S. Ramach. & V.J. Nair, Fl. Cannanore 56. 1988; Manilal, Fl. Silent Valley 22. 1988; A.S. Chauhan & T.K. Paul in B.D. Sharma & Sanjappa, Fl. India 3: 184. 1993; Sivar. & P. Mathew, Fl. Nilambur 72. 1997; Mohanan & Sivad., Fl. Agasthyamala 91. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 73. 2005. *Eurya japonica* auct., non Thunb., 1784: Bedd., Fl. Sylv. t. 92. 1871; Dyer in Hook. f., Fl. Brit. India 1: 284. 1874.

Large shrubs or small trees. Leaves alternate, 3-7 x 1.5-3 cm, elliptic, acute at both ends, serrate, coriaceous; lateral nerves many, looping. Flowers in axillary fascicles, pedicels ca. 1.5 mm long; sepals 5, outer smaller, ca. 1.5

mm across, orbicular; petals 5, ca. 2 mm long, orbicular, greenish white, basally connate, white; stamens 5-15, free, filaments attached at the base of the petals; ovary 3-celled, globose, glabrous, ovule one in each cell; styles 3, united basally. Berry, 3-5 mm across, globose, black, apiculate; seeds many, tuberculate.

Flowering & Fruiting: July-December.

Distribution: Indo-Malesia and China. Common; in shola margins. *RNMK 1632,* Chembra; *RNMK 2076*, Kurichiarmala.

GORDONIA J. Ellis

Phil. Trans. 60: 520. 1771, *nom. cons.*

Gordonia obtusa Wall.ex Wight & Arn., Prodr. 87. 1834; Dyer in Hook. f., Fl. Brit. India 1: 291. 1874; Dunn in Gamble, Fl. Pres. Madras 79(57). 1915; V. S. Ramach. & V.J. Nair, Fl. Cannanore 56. 1988; Manilal, Fl. Silent Valley 22. 1988; Vajr., Fl. Palghat Dist. 73. 1990; A.S. Chauhan & T.K. Paul in B.D. Sharma & Sanjappa, Fl. India 3: 162. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 54. 1996; Mohanan & Sivad., Fl. Agasthyamala 91. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 73. 2005. *Gordonia obtusifolia* Wight, Ill. 1: 99. 1838. *Gordonia parvifolia* Wight, Ill. 1: 99. 1838.

Medium-sized trees; bark white; branchlets tomentose. Leaves 10-14 x 2-4 cm, elliptic, acute at either ends, crenate; petiole ca. 7 mm long. Flowers terminal or upper axillary, solitary; sepals 7-8 mm long, orbicular; petals 2.3-2.5 x 2.2-2.5 cm, obovate, emarginate, white, basally connate; stamens many, free, filaments attached to the base of petals; ovary 5-celled, densely hairy; ovules 4-8 in each cell; style 1, stout. Capsule 3-4 cm long, ellipsoid, 4-5-grooved, valved; seeds winged.

Flowering & Fruiting: October-May.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 3199,* Kurichiarmala; *RNMK 1052*, Chembra.

TERNSTROEMIA Mutis ex Linnaeus

Suppl. 39, 264. 1782, *nom. cons.*

Ternstroemia gymnanthera (Wight & Arn.) Bedd., Fl. Sylv. 91, t. 91. 1871; A.S. Chauhan & T.K. Paul in B.D. Sharma & Sanjappa, Fl. India 3: 190. 1993; Mohanan & Sivad., Fl. Agasthyamala 92. 2002. *Cleyera gymnanthera* Wight & Arn., Prodr. 87. 1834. *Ternstroemia japonica* sensu Dyer in Hook. f., Fl. Brit. India 1: 280. 1874; Dunn in Gamble, Fl. Pres. Madras 78(56). 1915; Manilal, Fl. Silent Valley 23. 1988.

Trees to 15 m high; branchlets reddish, glabrous. Leaves alternate, 6-7 x 2-2.5 cm, obovate, obtuse at apex, cuneate at base; petiole reddish. Flowers solitary, axillary; pedicel 8-10 mm long, stout; sepals 5, ca. 6 mm long, orbicular, outer most one much smaller, green; petals 5, ca. 6 mm across, obovate, yellow, basally connate; stamens more than 50 in male flowers, free, filaments adnate to the base of petals, anthers oblong; pistillode clavate; ovary

in female flowers 2 or 3-celled; ovules 2 in each cell; stigmas 3, sessile. Berry 0.8-1 cm across, globose.
Flowering & Fruiting: April-July.
Distribution: Southeast Asia and China. Rare; in evergreen forests. *RNMK* 2222, Banasuramala.

Camellia sinensis (L.) O. Kuntze., the tea plant is commonly cultivated in the hills of the district.

DIPTEROCARPACEAE Blume

Bijdr. Fl. Ned. Ind. 222. 1825.

1. Stipules encircling the stem; sepals connate, tubular ..... **Dipterocarpus**
1. Stipules not encircling the stem; sepals free 2
2. Leaves with domatia in the nerve-axils ..... **Hopea**
2. Leaves without domatia in the nerve-axils 3
3. Calyx accrescent and enclosing the fruit; fruit winged ..... **Shorea**
3. Calyx not accrescent; fruit not winged ..... **Vateria**

DIPTEROCARPUS C. F. Gaertner

De Fructibus 3: 50. 1805.

Dipterocarpus indicus Bedd., Fl. Sylv. t. 94. 1871; Dunn in Gamble, Fl. Pres. Madras 81(58). 1915; Vajr., Fl. Palghat Dist. 74. 1990; K.P. Janardh. in B.D. Sharma & Sanjappa, Fl. India 3: 214. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 55. 1996; Mohanan & Sivad., Fl. Agasthyamala 93. 2002. *Dipterocarpus turbinatus* sensu Dyer in Hook. f., Fl. Brit. India 1: 295. 1874 p.p. non Gaertn.f.

Very large evergreen trees, to 40 m high; bark smooth, grey inside. Leaves 12-15 x 7-8 cm, ovate, acute; lateral nerves 10-15 pairs; stipules 1.7-2 x 0.8-1 cm, ovate, glabrous. Flowers white with pink tinge, 4.5-5 cm across, in axillary racemes, pedicellate; pedicels 2.5-3 cm long; larger sepalsca. 0.8 x 0.3 cm, oblong, to 11-12 x 2-2.5 cm in fruit, cordate at base, reticulate; petals 2.5-3 cm long, brown; anthers ca. 5 mm long. Nut 1.5-2 cm long, ellipsoid; fruit wings oblong, reddish brown.
Flowering & Fruiting: February-April.
Distribution Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK* 2281, Vythiri Ghat.

HOPEA Roxburgh

Pl. Corom. 3: 7. 1811, *nom. cons.*

Trees. Leaves alternate, entire, penninerved; nervules parallel. Flowers in axillary or terminal panicles. Sepals 5, free, unequal, two longer than the others, wing-like; petals 5, equal, twisted, free; stamens 10 or 15, anthers ovate, connective produced into a subulate appendage, longer than the

anthers; ovary 3-celled with 2 ovules in each; style stout; stigma terminal, pointed. Fruit a nut with persistent calyx with wing-like larger calyx lobes.

1. Leaves to 8 cm long; inflorescence pubescent ..... **H. parviflora**
1. Leaves to 20 cm long; inflorescence glabrous.....2
2. Leaf-base unequally cordate; lateral nerves 12-14 pairs ..... **H. erosa**
2. Leaf-base rounded; lateral nerves 6-8 pairs ..... **H. ponga**

Hopea erosa (Bedd.) van Sloot., Reinwardtia 3: 318. 1956; K.P. Janardh. in B.D. Sharma & Sanjappa, Fl. India 3: 222. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 55. 1996. *Balanocarpus erosa* Bedd., For. Man. Bot. 237. 1873; Dunn in Gamble, Fl. Pres. Madras 84(60). 1915.

Large trees, bark pale brown, smooth, yellow with pink tinge inside. Leaves oblong, acute, base unequally cordate, 20 x 5 cm; lateral nerves 12-14 pairs, intercoaste scalariform-reticulate; petioles ca. 1 cm long. Flowers ca. 1 cm across, subsessile, in unilateral racemed axillary panicles; sepals suborbicular, ciliate along the margins; petals pilose outside, white with pink shades; ovary glabrous. Fruit 2.3-2.5 x 1.2-1.5 cm, ovoid or oblong, pointed.
Flowering & Fruiting: October-January.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1178,* Vythiri Ghat.

Hopea parviflora Bedd., Fl. Sylv. t. 7. 1869; Dyer in Hook. f., Fl. Brit. India 1308. 1874; Dunn in Gamble, Fl. Pres. Madras 82(59). 1915; Ansari, Fl. Kasaragod Div. 72. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 57. 1988; Vajr., Fl. Palghat Dist. 74. 1990; K.P. Janardh. in B.D. Sharma & Sanjappa, Fl. India 3: 228. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 56. 1996; Sivar. & P. Mathew, Fl. Nilambur 73. 1997; Mohanan & Sivad., Fl. Agasthyamala 93. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 74. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 111. 2009.

Very large trees; bark splitting into elongated pieces. Leaves 6-8 x 4-5 cm, ovate, obtuse, rounded to truncate at base; nerves 8-10 pairs, domatia present in the axils; petiole ca. 1 cm long. Panicles 12-15 cm across, terminal and upper axillary. Flowers pedicelled; sepals ca. 3 mm long, hairy outside; petals ca. 6 mm long, oblong, glabrous, fimbriate at apex, creamy yellow; anthers orbicular, appendage ca. 1 mm long. Nuts ca. 0.8 cm across, terete, glabrous; wings 5-6 x 1.8-2 cm, oblong, 8-10-nerved, glabrous.
Flowering & Fruiting: January-June.
Distribution: Endemic to *s*outhern Western Ghats. Common; in evergreen forests. *RNMK* 1930, Talimala; *RNMK 2194*, Chanthanathodu.

Hopea ponga (Dennst.) Mabb., Taxon 28: 587. 1979; Manilal & Sivar., Fl. Calicut 42. 1982; Ansari, Fl. Kasaragod Div. 72. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 101. 1988; V. S. Ramach. & V.J. Nair, Fl.

Cannanore 58. 1988; Vajr., Fl. Palghat Dist. 74. 1990; K.P. Janardh. in B.D. Sharma & Sanjappa, Fl. India 3: 230. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 56. 1996; Sivar. & P. Mathew, Fl. Nilambur 73. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 75. 2005. *Artocarpus ponga* Dennst., Schluessel. Hort. Malab. 15,18,30. 1818. *Hopea wightiana* Wall.ex Wight & Arn., Prodr. 85.1834; Dyer in Hook. f., Fl. Brit. India 1: 309.1874; Dunn in Gamble, Fl. Pres. Madras 82(59). 1915. *Ponga, Pongu* Rheede, Hort. Malab. 4: 33-34, t. 15. 1683. **Fig.16, Plate 11c.**

Medium sized trees; twigs glabrous. Leaves 14-18 x 4-6 cm, ovate-lanceolate, acute at apex, rounded at base; lateral nerves 6-8 pairs. Flowers in axillary drooping panicles; larger sepals 5-7 mm long, oblong; petals ca. 8 mm long, oblong, pubescent, yellowish with red tinge; style stout, pubescent. Nuts ca. 8 x 6 mm, ovoid, acute; wings of fruiting calyx 5-10 x 1-1.5 cm, oblong, obtuse, glabrous, 8-nerved, red.

Flowering & Fruiting: October-May. *Distribution:*
Endemic to southern Western Ghats. Common; in moist deciduous forests along banks of streams. *RNMK 1093,* Muthanga.

SHOREA Roxburgh ex C. F. Gaertner
Fruct. 3: 47. 1805.

Shorea roxburghii G. Don, Gen. Hist. 1: 813. 1831; Tewary & Sarkar, J. Econ. Tax. Bot. 11: 104. 1987; K.P. Janardh. in B.D. Sharma & Sanjappa, Fl. India 3: 239. 1993. *Shorea talura* Roxb., Fl. Ind. 2: 618. 1832; Dyer in Hook. f., Fl. Brit. India 1: 304. 1874; Dunn in Gamble, Fl. Pres. Madras 83(60). 1915. *Vatica laccifera* Wight & Arn., Prodr. 84.1834. *Shorea laccifera* (Wight & Arn.) Heyne ex Bedd., Fl. Sylv. t. 6. 1869.

Medium trees, bark rough, brown inside. Leaves 14-18 x 7-9 cm, elliptic-oblong, apex obtuse or emarginate, base slightly cordate or truncate, glossy above, coriaceous, nerves 15-20 pairs, parallel; petiole to 1.5 cm. Panicles axillary and terminal, to 25 cm, glabrous; pedicels to 1 cm long, jointed; outer sepals ca. 5 mm long, oblong, inner 2, ca. 4 mm long, ovate; petals 1.7-2 cm long, ovate, villous; stamens 15; ovary 2, globose, style ca. 5 mm long, stigma 3 fid. Nut 1-2 cm, enclosed in accrescent calyx, lobes oblong, 3 longer, to 7 x 1 cm; inner 2 smaller, 3.5-4 x 0.8-1 cm.

Flowering & Fruiting: February-June.
Distribution: Indo-Malesia. Occasional; in moist deciduous forests. *RNMK 2293,* Muthanga.

VATERIA Linnaeus
Sp. Pl. 515. 1753.

Vateria indica L., Sp. Pl. 513. 1753; Dyer in Hook. f., Fl. Brit. India 1: 313. 1874; Dunn in Gamble, Fl. Pres. Madras 85(61). 1915; Manilal & Sivar., Fl. Calicut 42. 1982; Ansari, Fl. Kasaragod Div. 73. 1985; Manilal, Fl. Silent Valley 24. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 102.

1988: V. S. Ramach. & V.J. Nair, Fl. Cannanore 58. 1988; K.P. Janardh. in B.D. Sharma & Sanjappa, Fl. India 3: 245. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 56. 1996; Mohanan & Sivad., Fl. Agasthyamala 94. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 75. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 112. 2009. *Vateria malabarica* Bl. Mus. Bot. 2: 29. 1852; Bedd., Fl. Sylv. t. 84. 1871. *Penone* Rheede, Hort. Malab. 4: 33-34, t.15. 1683. **Plate 11d.**

Tall trees with resinous exudation; bark smooth, grey; branchlets puberulus. Leaves 18-20 x 10-12 cm, oblong, rounded or cordate at base, acuminate at apex, nerves 15-18 pairs, parallel, prominent below, nervules parallel, close; petiole 2.5-3.5 cm long. Panicles terminal, to 30 cm across, densely puberulus. Flowers 2.5-3 cm across, pedicellate; sepals 5, free, ca. 1 cm long, lanceolate, covered with stellate hairs; petals white, ca. 1.5 x 0.7 cm, obovate, spreading, shortly united at base; stamens many, free, connective produced into a filiform appendage, filaments hairy; ovary densely hairy, 3-celled, 2-3 ovules in each cell; style filiform. Drupe ca. 3 x 1.5 cm, oblong, obtuse, coarsely puberulus brown.

Flowering & Fruiting: March-July.

Distribution: Endemic to southern Western Ghats. Common; in evergreen forests. *RNMK 1930,* Chanthanathodu; *RNMK 1411*, Vythiri Ghat.

ANCISTROCLADACEAE Planch. ex. Walp.

Ann. Bot. Syst. 2: 175. 1851.

ANCISTROCLADUS Wallich

Num. List 1052. 1929, *nom. cons.*

Ancistrocladus heyneanus Wall. ex Graham, Cat. Pl. Bombay 28. 1839; Wight, Ic. t.1987. 1853; Dyer in Hook. f., Fl. Brit. India 1: 299. 1874; Dunn in Gamble, Fl. Pres. Madras 86(62). 1915; Manilal, Fl. Silent Valley 24. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 49. 1988; Vajr., Fl. Palghat Dist. 76. 1990; Silpi Das in B.D. Sharma & Sanjappa, Fl. India 3: 254. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 57. 1996; Sivar. & P. Mathew, Fl. Nilambur 75. 1997; Mohanan & Sivad., Fl. Agasthyamala 95. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 75. 2005. *Modira-valli* Rheede, Hort. Malab. 7:87, t. 46. 1688. **Plate 11e.**

Climbing shrubs with hooked branches; twigs glabrous. Leaves crowded at the apex of branchlets, 13-20 x 4-6 cm, oblanceolate, attenuate at base, sessile. Flowers ca. 1 cm across, bisexual, sessile on terminal lax panicles; sepals 5, unequal, connate into a tube and adnate to the ovary, lobes ca. 3 mm long; petals 5, subequal, to 6 mm long, oblong, obtuse, slightly connate at base, greenish yellow; stamens 10, filaments connate at base, anthers orbicular; ovary 1-celled; ovules solitary; styles 3, free. Fruit a nut covered with large wing like sepals; wings unequal, 4-5 x 1.7-2 cm, obovate, obtuse, reticulate, glabrous

Flowering & Fruiting: March-May.
Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 3480,* Vythiri Ghat; *RNMK 1049,* Makkimala.

MALVACEAE Juss.

Gen. Pl. 271. 1789.

1. Number of stylar branches equal or less than the number of carpels 2
1. Nubmber of stylar branches twice as many as the carpels ..... **Urena**
2. Staminal column antheriferous at the apex only; fruit a schizocarp 3
2. Staminal column anthriferous through out; fruit a capsule 5
3. Seed 1 per mericarp 4
3. Seeds 2 or more per mericarp ..... **Abutilon**
4. Epicalyx segments 0 ..... **Sida**
4. Epicalyx segments 3 ..... **Malvastrum**
5. Involucellar bracts 10 ..... **Decaschistia**
5. Involucellar bracts 6-9 6
6. Flowers in dense large panicles; involucellar bracts large, persistent 7
6. Flower(s) solitary or few in short panicles; involucellar bracts not so 8
7. Corolla yellow with a reddish centre; fruit indehiscent ..... **Julostylis**
7. Corolla white without a reddish centre; fruit loculicidally dehiscent ..... **Kydia**
8. Calyx spathaceous, splitting on one side, deciduous ..... **Abelmoschus**
8. Calyx companulate, not splitting on one side, persistent 9
9. Style branched; stigma splitting on one side, spreading 10
9. Style unbranched; stigma coherent ..... **Thespesia**
10. Capsule winged ..... **Fioria**
10. Capsule not winged ..... **Hibiscus**

ABELMOSCHUS Medikus

Malvenfam. 45. 1787.

Annual or perennial subshrubs; stems hispid. Leaves alternate, palmately-lobed, with long-petiole. Flowers in terminal racemes or solitary in leaf axils; involucral bracts 5, ovate or lanceolate; calyx spathaceous, split along one side; corolla campanulate, yellow with purple-brown centre; staminal tube erect, included, stamens throughout the tube; ovary 5-celled, ovules many, axile; style slender, 5-lobed at apex; stigma globose. Capsule 5-angled, coarsely pubescent, 5-valved; seeds many, reniform, striate-pubescent.

1. Involucral bracts 10-16, linear to lanceolate ..... **A. moschatus**
1. Involucral bracts 4-6, broadly ovate ..... **A. angulosus**

Key to the varieties of **A. angulosus**

1. Plants robust, densely rigid bristly all over ..... **A. angulosus** var. **angulosus**
1. Plants slender, not bristly all over ..... **A. angulosus** var. **grandiflorus**

Abelmoschus angulosus Wall. ex Wight & Arn., Prodr. 53. 1834, var. **angulosus** Sivar., & Manilal, Rheedea, 4: 4. 1994; Manilal, Fl. Silent Valley 25. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 59. 1988; Vajr., Fl. Palghat Dist. 77. 1990; Paul in B.D. Sharma & Sanjappa, Fl. India 3: 301. 1993; Sivar. & Pradeep, Malv. South. Penins. India 52. 1996; Sivar. & P. Mathew, Fl. Nilambur 76. 1997. *Hibiscus angulosus* (Wight & Arn.) Steud., Nom. Bot. (ed.2) 1: 758. 1840; Mast in Hook. f., Fl. Brit. India 1: 341. 1874; Dunn in Gamble, Fl. Pres. Madras 97(70). 1915.

Sub-shrubs, to 2 m tall; stem covered with stiff hairs. Leaves 5-10 x 8-12 cm, 3-5-lobed, cordate, lobes ovate, acute, serrate, scarcely pubescent; petiole 14-18 cm long. Flowers axillary, solitary; involucral bracts 2-5 x 0.5 -1 cm, ovate, acute, pubescent; corolla 6-7 cm across, white with purple centre. Capsule densely hispid with yellow hairs; seeds 2-3 mm across, muriculate.
Flowering & Fruiting: October-January.
Distribution: Indo-Malesia to Australia. Rare; in semi evergreen forests. *RNMK 4137,* Sugandhagiri; *RNMK 2015*, Vaduvanchal.

Abelmoschus angulosus Wall. ex Wight & Arn. var. **grandiflorus** Thw., Enum. Pl. Zeyl. 26. 1858; Sivar., & Manilal Rheedea 4: 6. 1994; Sivar. & Pradeep, Malva. South. Penins. India 55. 1996. *Hibiscus angulosus* var. *grandiflorus* (Thw.) Mast. in Hook.f., Fl. Brit. India 1: 341. 1874. *Hibiscus primulinus* Alston, Handb. Fl. Ceylon 6. Suppl. 29. 1931. *Abelmoschus angulosus* sensu Borss., Blumea 14: 104. 1966; Manilal & Sivar., Fl. Calicut 49. 1982; Manilal, Fl. Silent Valley 25. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 59. 1988; Vajr., Fl. Palghat Dist. 77. 1990. **Plate 11f.**

Erect sub-shrubs; stem terete, green, often tinged with purple at nodes. Leaves 5-20 cm across, orbicular, membranous, shallow cordate or hastate at base, 5-7 nerved from base, acuminate at apex, sinuses rounded, margins coarsely crenate to serrate. Flowers pendant, initially solitary in upper axils; involucellar bracts 4, triangular, thin and papery; corolla 6-8 cm long, bright yellow with dark purple centre. Capsule 3-4 x 1.5-2.0 cm, fusiform to ovoid; seeds 2-3 mm in diam., globose with dense concentric rings of white hairs.
Flowering & Fruiting: August-December.
Distribution: South India and Sri Lanka. Occasional; in evergreen and moist deciduous forests. *RNMK 2053,* Sugandhagiri; *RNMK 1915*, Muthanga.

Abelmoschus moschatus Medik., Malv. 46. 1787; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 170. 1988; Vajr., Fl. Palghat Dist. 77. 1990; Paul in B.D. Sharma & Sanjappa, Fl. India 3: 308. 1993; Sivar. & Pradeep, Malva. South. Penins. India 70. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 58. 1996; Sivar. & P. Mathew, Fl. Nilambur 77. 1997; Mohanan & Sivad., Fl. Agasthyamala 96. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 78. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 114. 2009. *Hibiscus abelmoschus* L., Sp. Pl. 696. 1753; Mast. in Hook. f., Fl. Brit. India 1: 342.

1874; Dunn in Gamble, Fl. Pres. Madras 87(69). 1915. *Cattu-gasturi* Rheede, Hort. Malab. 2:71-72, t.38. 1679.

Sub-shrubs, 1.5 m tall; stem densely retrorsely hairy. Leaves 10-23 x 12-25 cm, deeply 3-7-lobed, cordate, lobes acuminate, crenate, hairy; petiole 10-15 cm long; stipule 7-8 mm long, ovate. Flowers axillary, solitary, pedicel 6-7 cm long; involucral bracts ca. 1.5 x 0.2 cm, free, hispid; calyx 2-3 cm long, minutely stellate hairy; corolla 8-9 cm across, yellow with purple centre. Capsule 7-8 cm long, hairy.

Flowering & Fruiting: October- January.

Distribution: India, Malaya and Indonesia. Rare; in semi evergreen forests. *RNMK 2077,* Sugandhagiri; *RNMK 2552,* Manikkunnumala.

ABUTILON P. Miller

Gard. Dict. Abr. (ed. 4) 23. 1754.

Annual or perennial herbs or shrubs. Leaves simple or lobed, cordate at base. Flowers axillary, solitary, sometimes in racemes or panicles due to reduction of upper leaves; pedicels jointed in the upper half; calyx campanulate, lobes 5, persistent; petals free, usually rotate; staminal column shorter than the petals; ovary 5 to many locular; cells 2-many ovuled; styles as many as carpels, stigma capitate. Schizocarp globular, campanulate, mericarps as many as locules; seeds 2-8 per mericarps.

1. Calyx 1.5-5 cm long; mericarp 4-6 seeded 2
1. Calyx 0.5-1.2 cm long; mericarp 2-3 seeded .....**A. indicum**
2. Flowers pendent, brick red; staminal filaments shorter than the column ....**A. striatum**
2. Flowers erect, bright yellow; staminal filaments longer than the column ....**A. persicum**

Abutilon indicum (L.) Sweet, Hort. Brit. 54. 1826; Wight, Ic. t. 12. 1838; Mast. in Hook. f., Fl. Brit. India 1: 326. 1874; Dunn in Gamble, Fl. Pres. Madras 91(65). 1915; Manilal & Sivar., Fl. Calicut 45. 1982; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 170. 1988; Vajr., Fl. Palghat Dist. 78. 1990; Paul in B.D. Sharma & Sanjappa, Fl. India 3: 266. 1993; Sivar. & Pradeep, Malva. South. Penins. India 192. 1996; Sivar. & P. Mathew, Fl. Nilambur 79. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 78. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 115. 2009. *Sida indica* L., Cent. Pl. 2: 26. 1756.

Shrubs, adpressed pubescent. Leaves 6-8 x 6-6.5 cm, broadly ovate, apex acute-acuminate, cordate, margin crenate, chartaceous, glaucous below, 7-9 nerved; petiole 7-8 cm. Flower solitary, yellow; pedicels 4-5 cm; calyx lobes ovate; petals ca. 1 x 1 cm, obovate; staminal column 5.5-6 mm, glabrous above. Schizocarps 0.5-1 x 1.5- 2 cm, globose; mericarps 15-20, densely stellate hairy; seeds 2-3 per mericarp.

Flowering & Fruiting: November-March.

Distribution: Widely distributed throughout the tropics and sub tropics. Occasional; in moist places. *RNMK 3016*, Panamaram.

Abutilon persicum (Burm.f.) Merr., Philip. J. Sci. 19: 364. 1921; Borss., Blumea 14: 163. 1966; Ansari, Fl. Kasaragod Div. 74. 1985; Manilal, Fl. Silent Valley 25. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 60. 1988; Vajr., Fl. Palghat Dist. 78. 1990; Paul in B.D. Sharma & Sanjappa, Fl. India 3: 269. 1993; Sivar. & Pradeep, Malva. South. Penins. India 201. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 58. 1996; Sivar. & P. Mathew, Fl. Nilambur 80. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 80. 2005. *Sida persica* Burm.f., Fl. Ind. 148. 1768. *Sida polyandra* Roxb., Fl. Ind. 3: 173. 1832. *Abutilon polyandrum* (Roxb.) Wight & Arn. ex Wight, Cat. 12. 1833, non G. Don 1831; Mast. In Hook. f., Fl. Brit. India 1: 325. 1874; Dunn in Gamble, Fl. Pres. Madras91(65). 1915.

Sub-shrubs, pubescent. Leaves 12-15 x 10-12 cm, lower broadly ovate, upper ovate-lanceolate, smaller, apex acuminate, base deeply cordate, 6-9 nerved, crenate-dentate, velutinous below and glabrescent above; petiole 6-10 cm, upper shorter. Flowers 3-4.5 cm across; calyx lobes ovate-lanceolate, tomentose on both sides; petals yellow, obovate; upper part of staminal column stellate-hairy. Mericarps 5, puberulus with an erect, minutely stellate hairy, pointed apex; seeds 4-6 per mericarp.

Flowering & Fruiting: November-April.

Distribution: Indo-Malesia and China. Occasional; in moist deciduous forests. *RNMK 1994,* Muthanga.

Abutilon striatum Dickson ex Lindl., Edward's Bot. Reg. App. 39. 1839; Paul in B.D. Sharma & Sanjappa, Fl. India 3: 273. 1993; Sivar. & Pradeep, Malva. South. Penins. India 204. 1996. *Sida striata* (Dickson ex Lindl.) D. Dietr., Syn. Pl. 4: 852. 1847.

Erect branched shrubs; branchlets 10-14 cm long, petioles and pedicels minutely stellate-hairy, rarely glabrous. Leaves orbicular to broadly ovate, cordate, 5-6 nerved at base, 3-5 lobed; lobes deltoid, ovate or oblong, acute or acuminate at apex; petiole 1-6 cm long; stipule 3-6 cm, linear. Flowers pendent, solitary, pedicels 3-10 cm long; calyx campanulate, slightly inflated at base; lobes 5-9 x 4-8 mm, deltoid, acute or slightly acuminate; petals orange or pink with purple veins, 2.5-4 x 2-3 cm, obovate. Schizocaps 1.5-2 cm across, globular; mericarps reniform, rounded at apex, 7-9 seeded.

Flowering & Fruiting: January-April.

Distribution: Native of Central America. Occasional; in open places. *RNMK 1424,* Maniyankodu.

DECASCHISTIA Wight & Arn.
Prodr. 52. 1834.

Decaschistia crotonifolia Wight & Arn., Prodr. 52. 1834; Mast. in Hook. f., Fl. Brit. India 1: 332. 1874; Dunn in Gamble, Fl. Pres. Madras 94 (68). 1915; Paul in B.D. Sharma & Sanjappa, Fl. India 3: 296. 1993; Sivar. & Pradeep, Malva. South. Penins. India 18. 1996. **Plate 11g**

Shrubs; stems and branches densely whitish stellate-tomentose. Leaves 3-5 x 1.5-9 cm, ovate-lanceolate, cordate at base, acute at apex, coarsely serrate; petiole 1-4 cm long, stipules 0.5-1 cm long, linear-subulate. Flowers solitary, axillary or 2-5 in terminal clusters by reduction of upper leaves; pedicels 0.3-1.5 cm long; calyx campanulate, divided to the middle, lobes 1-1.5 cm long, deltoid-auminate, persistent; corolla with dark maroon centre, 5-6 cm across; petals 3-4 x 2-2.5 cm, obovate; ovary ovoid with 10 carpels attached by the base to a short conical 10-angled central colum. Capsules 1.5-2 cm long; seeds reniform, glabrous, brownish black.

Flowering & Fruiting: March-November.

Distribution: Endemic to Peninsular India. Rare in moist deciduous forests. *RNMK 2520,* Muthanga.

FIORIA Mattei

Boll. R. Orto Bot. Palermo 2: 71. 1917

Fioria vitifolia (L.) Mattei, Boll. R. Orto. Bot. Palermo 2: 71. 1917; Paul & M.P. Nayar, Fasc. Fl. India 19:109. 1988; Paul in B.D. Sharma & Sanjappa, Fl. India 3:310. 1993; Sivar. & Pradeep, Malva. South. Penins. India 74. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 80. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 116. 2009. *Hibiscus vitifolius* L., Sp. Pl. 696. 1753; Mast. in Hook. f., Fl. Brit. India 1: 338. 1874; Dunn in Gamble, Fl. Pres. Madras 98(70). 1915; Manilal & Sivar., Fl. Calicut 47. 1982; Ansari, Fl. Kasaragod Div. 76. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 172. 1988; Vajr., Fl. Palghat Dist. 80. 1990; Sivar. & P. Mathew, Fl. Nilambur 86. 1997. *Katu-beloeren* Rheede, Hort. Malab. 6:79, t.46. 1686.

Sub-shrubs; branchlets terete, green, densely clothed with simple glandular stellate hairs. Leaves 7-9 cm across, 5-7 ribbed, shallowly 3-5 lobed, lobes triangular, apex acute, stellate pubescent; petiole 8-12 cm, stipules 1-2 mm, subulate. Flowers axillary, solitary; epicalyx slender, linear, 0.5-1 cm; calyx lobes 0.5-1 cm, lanceolate, pubescent; petals 4-5 cm across, yellow, base purplish inside; staminal column 1-2 cm; ovary 5-celled, style branches 5. Capsule 5 celled, winged; seeds glabrous.

Flowering & Fruiting: April-December.

Distribution: Paleotropics. Rare; in moist deciduous forests. *RNMK 1984,* Muthanga.

HIBISCUS Linnaeus

Sp. Pl. 693. 1753 (*nom. cons.).*

Herbs, shrubs or trees. Leaves simple or 3-7-lobed, lobes serrate. Flowers solitary, axillary or in terminal raceme; involucral bracts 8-10, free, linear; calyx gamosepalous, equally 5-lobed, tubular below; corolla campanulate, variously coloured; staminal tube long, stamens above the middle of the tube; ovary 5-celled, ovules many, axile; style slender, 5-fid towards the apex; stigmas capitate. Capsule 5-valved, loculicidal; seeds many, sub-reniform.

1. Rambling or trailing shrubs or undershrubs with prickles.....2
1. Erect shrubs or subshrubs with stellate hairs 3
2. Stipules foliaceous, ear shaped.....**H. surattensis**
2. Stipules lanceolate, not ear shaped ..... **H. hispidissimus**
3. Annual herbs; seeds trigonous hispid.....**H. lobatus**
3. Shrubs; seeds rugose .....**H. lunariifolius**

Hibiscus hispidissimus Griff., Not. Pl. Asiat. 4: 521. 1854; Sivar. & Pradeep, Malva. South. Penins. India 106. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 59. 1996; Sivar. & P. Mathew, Fl. Nilambur 82. 1997; Mohanan & Sivad., Fl. Agasthyamala 96. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 81. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 118. 2009;. *Hibiscus aculeatus* Roxb., Fl. Ind. 3: 206. 1832; Ansari, Fl. Kasaragod Div. 75. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 60. 1988; Paul & M.P. Nayar, Fasc. Fl. India 19: 123. 1988; Manilal, Fl. Silent Valley 26. 1988; Vajr., Fl. Palghat Dist. 79. 1990; Paul in B.D. Sharma & Sanjappa, Fl. India 3:323.1993,non Walter 1778 *Hibiscus furcatus* Roxb. ex DC., Prodr. 1: 448,non wild 1809; 1824; Mast. in Hook. f., Fl. Brit. India 1: 335. 1874; Dunn in Gamble, Fl. Pres. Madras 97(70). 1915.

Scandent shrubs; stem reddish; prickles many, retrorse. Leaves 6-10 x 5-8 cm, 3-5 lobed, lobes acuminate, serrate, prickled along the ribs; petiole 5-8 cm long. Flowers axillary; pedicels 4-5 cm long, prickled; involucral bracts 10-12, bifurcate, hairy; calyx 2-2.3 cm long, 10-costate, 5-lobed at apex, lobes acuminate, bristled; corolla 7-8 cm across, yellow with brown centre. Capsule 3-4 x 1-2 cm, ovate, acute, hirsute.

Flowering & Fruiting: October-February.

Distribution: Tropical Africa Indo-china and Sri Lanka. Common; in streamsides. *RNMK 1424,* Vaduvanchal; *RNMK 1984*, Vythiri; *RNMK 1722,* Pozhuthana.

Hibiscus lobatus (Murr.) O. Kuntze., Rev. Gen. Pl. 2: 19. 1898; Paul & Nayar, Fl. India Fasc. 19:133. 1988; Manilal, Fl. Silent Valley 26. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 61. 1988; Vajr., Fl. Palghat Dist. 79. 1990; Paul in B.D. Sharma & Sanjappa, Fl. India 3: 336. 1993; Sivar. & Pradeep, Malva. South. Penins. India 125. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 59. 1996; Sivar. & P. Mathew, Fl. Nilambur 83. 1997. *Solandra lobata* Murr., Comm. Soc. Reg. Sc. Geott. 6: 20. t.1. 1785. *Hibiscus solandra* L' Herit., Strip. Nov. 1: 103. t.49. 1788; Mast in Hook. f., Fl. Brit. India 1: 336. 1874; Dunn in Gamble, Fl. Pres. Madras 98(70). 1915.

Annual herbs, to 1.5 m high; stem pubescent with simple hairs. Leaves 8-9 x 7-8 cm, upper smaller, entire or 3-lobed, lobes lanceolate, serrate, pubescent; petiole to 7 cm long; upper leaves linear-oblong. Flowers solitary, axillary, become racemose; pedicels 2-4 cm long; involucral bracts smaller; calyx 0.8-1 cm long, lobes deep, glabrous; petals white, 0.5-1 x 0.2-0.8 cm,

obovate, obtuse, glabrous. Capsule 1-1.2 cm long, ovoid, acute, hispid; seeds trigonous, hispid.
Flowering & Fruiting: August-January.
Distribution: India and Tropical Africa. Common; in semi evergreen and moist deciduous forests. *RNMK 2207,* Manikkunnumala; *RNMK 0171*, Puthoorvayal; *RNMK 1427*, Pathiri.

Hibiscus lunariifolius Willd., Sp. Pl. 3: 811. 1800; Mast. in Hook. f., Fl. Brit. India 1: 338. 1874; Dunn in Gamble, Fl. Pres. Madras 98(70). 1915; Paul & Nayar, Fl. India Fasc. 19:135.1988; Manilal, Fl. Silent Valley 27. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 61. 1988; Vajr., Fl. Palghat Dist. 79. 1990; Paul in B.D. Sharma & Sanjappa, Fl. India 3: 334. 1993; Sivar. & Pradeep, Malv. South. Penins. India 138. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 59. 1996; Sivar. & P. Mathew, Fl. Nilambur 83. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 81. 2005. *Hibiscus pruriens* Roxb. ex Hornem., Hort. Hafn. 1: 79. 1815.

Shrubs densely covered with soft spreading hairs. Leaves 7-16 x 6-18 cm, shallowly 3-5- lobed, cordate at base; lobes acute to acuminate, serrate, stellate-hairy; petiole to 25 cm long. Flowers axillary or terminal, racemose; bracts 1-2.5 cm long, linear-lanceolate; calyx 1-1.5 cm long, campanulate, lobes acuminate; corolla 7-10 cm across, yellow with brown eye. Capsule 1-2 x 1-1.5 cm, ovoid, obtuse, cuspidate, stellate-hairy; seeds rugose.
Flowering & Fruiting: October-January.
Distribution: India Malesia and Tropical Africa. Occasional; in moist decidous forest and open areas. *RNMK 1794,* Muthanga; *RNMK 2822*, Kotavayal.

Hibiscus surattensis L., Sp. Pl. 696. 1753; Mast. in Hook. f., Fl. Brit. India 1: 334. 1874; Dunn in Gamble, Fl. Pres. Madras 97(70). 1915; Paul & Nayar, Fl. India Fasc. 19: 153.1988; Manilal & Sivar., Fl. Calicut 47. 1982; V.S. Ramach. & V.J. Nair, Fl. Cannanore 61. 1988; Vajr., Fl. Palghat Dist. 80. 1990; Paul in B.D. Sharma & Sanjappa, Fl. India 3: 327. 1993; Sivar. & Pradeep, Malv. South. Penins. India 119. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 59. 1996; Sivar. & P. Mathew, Fl. Nilambur 85. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 84. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 121. 2009.

Scandent sub-shrubs; stem greenish, retrorsely prickled. Leaves 5-10 x 8-14 cm, 3-5-lobed, cordate at base, lobes elliptic, acuminate, serrate, pubescent; petiole 4-5 cm long, slender; stipules 1-1.5 cm long, foliaceous, auricled at base. Flowers axillary; pedicels 6-7 cm long, prickled; involucral bracts 2-2.5 cm long, bifurcate, pubescent, lobes unequal, ciliate; calyx 0.8-1 cm long, 10-costate, 5-lobed, long acuminate; corolla 5-6 cm across, yellow with brown centre.
Flowering & Fruiting: November-February.
Distribution: South India and Sri Lanka. Common; in evergreen forest margins. *RNMK 2532,* Vythiri.

JULOSTYLIS Thwaites

Enum. Pl. Zeyl. 30. 1858.

Julostylis angustifolia (Arn.) Thw., Enum. Pl. Zeyl. 30.1858; Mast. in Hook.f., Fl. Brit. India 1: 333. 1874; Pradeep, Bot. Bull. Acad. Sin. 34: 281. 1993; Paul in B.D. Sharma & Sanjappa, Fl. India 3:342.1993; Sivar. & Pradeep, Malv. South. Penins. India 150. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 60. 1996. *Kydia angustifolia* Arn., Nov. Act. Nat. Cur. 28: 322. 1836; Beddome, Ic. t. 280. 1874.

Small trees; bark yellowish-brown, smooth; branches drooping. Leaves 10-15 x 3.5-6 cm; oblong acuminate, base rounded, entire, minutely stellate-tomentose above and densely below, petiole 1-1.5 cm long. Flowers pedicellate in large terminal and axillary pendulous panicles; dull red, 1-2 cm across; calyx 5 lobed, accrescent, densely pubescent; corolla yellowish red, reddish centre; staminal tube 5-toothed at apex. Capsule globose, 7-8 mm across, stellately tomentose.

Flowering & Fruiting: October-January.

Distribution: South India and Sri Lanka. Occasional; in semi-evergreen forests. *RNMK* 2207, Manikkunnumala; *RNMK 2052,* Meppady.

KYDIA Roxburgh

Hort. Bengal. 50. 1814.

Kydia calycina Roxb., Pl. Corom. 3: 11. t. 215. 1811; Mast. in Hook. f., Fl. Brit. India 1: 348. 1874; Dunn in Gamble, Fl. Pres. Madras 93(67). 1915; V.S. Ramach. & V.J. Nair, Fl. Cannanore 62. 1988; Manilal, Fl. Silent Valley 27. 1988; Vajr., Fl. Palghat Dist. 81. 1990; Paul in B.D. Sharma & Sanjappa, Fl. India 3: 344. 1993; Sivar. & Pradeep, Malv. South. Penins. India 159. 1996; Sivar. & P. Mathew, Fl. Nilambur 86. 1997. *Kydia fraterna* Roxb., Pl. Corom. 3: 12. t.216. 1811. *Kydia roxburghiana* Wight, Ic. t. 881. 1844-45.

Trees, young stems and branches densely pubescent with minute grayish stellate hairs. Leaves 4-11 x 3-14 cm, ovate-rounded, rouded at base, acute or obtuse at apex; petiole 2-7 cm long, densely stellate-pubescent; stipules subulate. Flowers polygamous, in axillary or terminal panicles; pedicels 0.5-1.8 cm long; calyx cup-shaped, connate at base, lobes 4-5 x 3-4 mm, ovate acute, petals longer than calyx but shorter than epicalyx, obcordate; ovary ovoid, trilocular with 2-3 ovules in each locule. Capsule 4-5 mm across, subglobose, depressed; seeds more or less reniform-ellipsoid, glabrous, brown.

Flowering & Fruiting: October-December.

Distribution: India, Myanmar, Nepal, Pakistan, Bhutan and China. Semi-evergreen and moist deciduous forests. *RNMK 2207,* Meppady; *RNMK 3045,* Tholpetty.

MALVASTRUM A. Gray

Mem. Amer. Acad.n.s. 4: 21. 1849, *nom. cons.*

Malvastrum coromandelianum (L.) Garcke, Bonplandia 5: 295. 1857; Dunn in Gamble, Fl. Pres. Madras 88(64). 1915; V.S. Ramach. & V.J. Nair, Fl. Cannanore 62. 1988; Vajr., Fl. Palghat Dist. 81. 1990; Paul in B.D. Sharma &

Sanjappa, Fl. India 3: 277. 1993; Sivar. & Pradeep, Malv.. South. Penins. India 219. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 85. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 124. 2009. *Malva coromandeliana* L., Sp. Pl. 687. 1753. *Malva tricuspidata* R.Br. in Ait. Hort. Kew 4:210. 1812. *Malvastrum tricuspidatum* (R.Br.) Gray, Pl. Wright, 1; 16. 1852; Mast. in Hook. f., Fl. Brit. India 1: 321. 1874.

Woody prostrate or erect herbs; stem covered with 4-armed stellate-hairs. Leaf blades 2-5 x 1-3 cm, ovate, rounded at base, acute at apex, serrate, sparsely hairy; petiole 1-1.5 cm long. Flowers axillary, solitary or 2-3 together; involucral bracts 5, to 1 cm long, ovate, acuminate; calyx ca. 1 cm long, 5-lobed, lobes triangular, hispid; corolla 1.3-1.6 cm across, yellow; stamens many, anthers confined to the apex of staminal tube; ovary 10-12-celled, ovule solitary in each cell; styles 8-18, free. Schizocarps enclosed within the calyx; mericarps 10-12, trigonous; 3-awned, pubescent above.

Flowering & Fruiting: March-September.

Distribution: Pantropical. Common; in disturbed moist deciduous forests. *RNMK 2563,* Muthanga; *RNMK 1570*, Poothady.

SIDA Linnaeus

Sp. Pl. 683. 1753.

Perennial branched herbs or sub-shrubs. Leaves simple, crenate or serrate, not divided, petiolate to sub-sessile. Flowers axillary, solitary or clustered; involucral bracts absent; calyx campanulate, 5-lobed; petals orange-yellow, rotate, obovate, glabrous; staminal tube included, erect; anthers many, confined to the apex; ovary 5-14-celled, ovule solitary in each cell, style 5-14; stigmas capitate. Fruit schizocarp; mericarps 1-seeded.

1. Prostrate or decumbent herbs 2
1. Erect woody herbs or sub shrubs 3
2. Accrescent pedicel to 6 cm long; articulate far above the middle; mericarps awnless..... **S. beddomei**
2. Pedicel to 3 cm long; articulate at or near the middle; mericarp minutely awned or apiculate..... **S. cordata**
3. Mericarp 5..... **S. mysorensis**
3. Mericarp 6-12..... 4
4. Awns of mericarp retrorsely hairy..... **S. cordifolia**
4. Awns of mericarp atrorsely hairy or absent..... 5
5. Leaves and branching pattern distichous ..... **S. acuta**
5. Leaves and branching pattern not distichous 6
6. Mericarp indehiscent..... **S. rhomboidea**
6. Mericarp dehiscent at apex..... 7
7. Leaves with simple and 2-3 armed hairs; pedicels not jointed..... **S. scabrida**
7. Leaves with short, greyish many rayed stellate hairs; pedicels jointed 8
8. Mericarps mucronate at apex ..... **S. alnifolia**
8. Meicarps 2-awned or beaked at apex..... **S. rhombifolia**

Sida acuta Burm. f., Fl. Ind. 147. 1768: Dunn in Gamble, Fl. Pres. Madras 90(64). 1915; Manilal & Sivar., Fl. Calicut 45. 1982; Ansari, Fl. Kasaragod Div. 76. 1985; Manilal, Fl. Silent Valley 28. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 173. 1988; Paul & Nayar, Fl. India Fasc. 19: 201.1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 63. 1988; Sivar. & Pradeep, Malva. South. Penins. India 238. 1996; Vajr., Fl. Palghat Dist. 82. 1990; Paul in B.D. Sharma & Sanjappa, Fl. India 3:281.1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 61. 1996; Sivar. & P. Mathew, Fl. Nilambur 88. 1997; Mohanan & Sivad., Fl. Agasthyamala 99. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 86. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 126. 2009.. *Sida lanceolata* Retz., Obs. Bot. 4: 119. 1786. *Sida carpinifolia* sensu Mast. in Hook.f., Fl. Brit. India 1: 323. 1874 p.p., non L.f. 1781. *Tsjeru-parua* Rheede, Hort. Malab. 10:105, t.53. 1690.

Sub-shrubs. Leaves 5-8 x 2-4 cm, lanceolate, serrate, rounded at base, glabrate; petiole 4-5 mm long; stipule 0.5-1 x 0.1-0.8 cm, lanceolate. Flowers solitary or paired, axillary, on short lateral branchlets; pedicels 4-5 mm long; calyx 5-6 mm across, lobes subulate, ciliate; corolla 0.5-1 cm across, petals obovate, outside sparsely glandular without hairy. Schizocarps 4.5-5 mm long, glabrous; mericarps trigonous, reticulate.

Flowering & Fruiting: August-October.

Distribution: Pantropical. Common; in moist deciduous forests and also in the plains. *RNMK 3045,* Puthoorvayal.

Sida alnifolia L., Sp. Pl. 684. 1753; Wight, & Arn., Prodr. 1: 58. 1834; Sivar. & Pradeep, Sida. 16: 69. 1994; Sivar. & Pradeep, Malv. South. Penins. India 241. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 61. 1996; Sivar. & P. Mathew, Fl. Nilambur 89. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 127. 2009. *Sida retusa* L., Sp. Pl. (ed. 2) 961. 1763. *Sida rhombifolia* L. var. *retusa* (L.) Mast. in Hook. f., Fl. Brit. India 1: 324. 1874. *Sida rhombifolia* L. ssp. *retusa* (L.) Borss., Bl. 14: 198. 1966; Paul & Nayar, Fl. India Fasc. 19: 216.1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 64. 1988; Paul in B.D. Sharma & Sanjappa, Fl. India 3:289.1993; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 90. 2005.

Woody erect herbs; branches bluish, minutely stellate-hairy. Leaves 4-5 x 3-4 cm, obovate, obtuse or acute, emarginate, crenate on the upper half, densely tomentose below; petiole 4-5 mm long, stipules filiform. Flowers 1-1.2 cm across, yellow, axillary or in terminal racemes; pedicels ca. 6 mm long; calyx 7-8 mm across, lobes acute. Schizocarps 3-4 mm long; mericarps 7-10, trigonous, included in the calyx, with a pair of short mucro at apex; seeds black.

Flowering & Fruiting: September-December.

Distribution: Indo-Malesia. Occasional; in moist deciduous forests and also in the plains. *RNMK 2010,* Meppady; *RNMK 3045*, Tholpetty.

Sida beddomei Jacob, J. Bombay Nat. Hist. Soc. 47: 50. 1950; V.S. Ramach. & V.J. Nair, Fl. Cannanore 63. 1988; Sivar. & Pradeep, Malv. South. Penins. India 266. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 61. 1996; Sivar. & P. Mathew, Fl. Nilambur 90. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 87. 2005. *Sida cordata* sensu Paul & Nayar, Fl. India Fasc. 19: 206. 1988, non (Burm.f.) Borss., 1966; Paul in Sharma & Sanjappa, Fl. India 3: 283. 1993.

Prostrate herbs, rooting at nodes, branchlets sparsely hairy. Leaves 4-5 x 4 cm ovate, apex acute or acuminate, base cordate, 5-7ribbed, crenate-serrate, sparsely tomentose on both sides; petiole 4-4.5 cm long. Flowers solitary, axillary, pedicels 3-5 cm long; calyx lobes longer than the tube, devided below the middle; petals 1-1.3 cm long; broadly obovate. Schizocarp 4-5 mm long; mericarps awnless.

Flowering & Fruiting: January-March.

Distribution: Endemic to southern Western Ghats (Kerala). Rare in semi-evergreen and moist deciduous forests. *RNMK 2084*, Thirunelli; *RNMK 1176*, Pathiri.

Sida cordata (Burm. f.) Borss., Blumea 14: 182. 1966; Manilal & Sivar., Fl. Calicut 43. 1982; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 173. 1988; Vajr., Fl. Palghat Dist. 83. 1990; Sivar. & Pradeep, Malv. South. Penins. India 266. 1996; Sivar. & P. Mathew, Fl. Nilambur 90. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 87. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 128. 2009. *Melochia cordata* Burm. f., Fl. Ind. 143. 1768. *Sida veronicaefolia* Lamk., Encycl. 1: 5. 1783; Dunn in Gamble, Fl. Pres. Madras 89(64). 1915. *Sida humilis* Cav. var. *veronicaefolia* (Lamk.) Mast. in Hook. f., Fl. Brit. India 1: 322. 1874. *Nela-vaga* Rheede, Hort. Malab. 10: 137, t. 69. 1690.

Prostrate herbs; branches slender, pilose. Leaves 6-7 x 5-6 cm, orbicular, abruptly acuminate, cordate at base, serrate, pubescent; petiole 1-1.5 cm long, slender, stipule 2-3 mm long, deflexed. Flowers 0.5-1 cm across, solitary, axillary; pedicels 3-4 cm long; calyx 4-5 mm long, widely campanulate, lobes ovate, acute; petals 5-6 x 3-4 mm, obovate, ciliate at base. Schizocarp 1-2.5 mm long; mericarps smooth., completely enclosed in accrescent calyx, trigonous with rounded angles; seeds glabrous through out.

Flowering & Fruiting: January-April.

Distribution: Pantropical. Common; in moist deciduous forests. *RNMK 2059,* Nadavayal.

Sida cordifolia L., Sp. Pl. 684. 1753; Roxb., Fl. Ind. 3 : 177. 1832 ; Mast. In Hook. f., Fl. Brit. India 1: 324. 1874; Dunn in Gamble, Fl. Pres. Madras 89(64). 1915; Manilal & Sivar., Fl. Calicut 43. 1982; Ansari, Fl. Kasaragod Div. 76. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 173. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 63. 1988; Vajr., Fl. Palghat Dist. 83.

1990; Paul in B.D. Sharma & Sanjappa, Fl. India 3: 285. 1993; Sivar. & Pradeep, Malv. South. Penins. India 256. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 62. 1996; Sivar. & P. Mathew, Fl. Nilambur 91. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 87. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 129. 2009. *Katu-uren* Rheede, Hort. Malab. 10: 107, t. 54. 1690.

Erect woody herbs, densely velvet-tomentose. Leaves 3-4 x 2-3 cm, ovate, obtuse, cordate at base, acute or obtuse at apex, crenate; petiole 2.5-3 cm long. Flowers axillary, solitary or paired; pedicels 1-1.5 cm long, stout; calyx 7-8 mm long, densely hairy, lobes acute; petals 7.5-8 mm long, obovate, glabrous; style 10, free. Mericarps 10, coarsely and transversely rugose, awned; awn 3-4 mm long.

Flowering & Fruiting: Throughout the year.

Distribution: Pantropical. Occassional; along roadsides in forest plantations. *RNMK 1182,* Kottavayal; *RNMK 2015*, Meenangady.

Sida mysorensis Wight & Arn., Prodr. 59. 1834; Mast. in Hook. f., Fl. Brit. India 1: 322. 1874; Ansari, Fl. Kasaragod Div. 77. 1985; Paul & Nayar, Fasc. Fl. India 19: 209. 1988; Paul in B.D. Sharma & Sanjappa, Fl. India 3:286.1993; Sivar. & Pradeep, Malva. South. Penins. India 271. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 62. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 89. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 130. 2009. *Sida glutinosa* Roxb., Fl. Ind. 3: 172. 1832, non Cav. 1785; Dunn in Gamble, Fl. Pres. Madras 89(64). 1915; V.S. Ramach. & V.J. Nair, Fl. Cannanore 64. 1988; Vajr., Fl. Palghat Dist. 83. 1990; Mohanan & Sivad., Fl. Agasthyamala 100. 2002. *Sida urticifolia* Wight & Arn., Prodr. 59. 1834, non St. Hill. 1828.

Aromatic erect herbs. Leaves 6-7 x 4-5 cm, ovate, acute, crenate, membranous, tomentose; petiole 4-6 cm long. Flowers 0.5-1.2 cm across, solitary, axillary or in short racemes; pedicels 5-8 mm long, slender; calyx 5-7 mm long, ribbed, lobes shorter than tube, acute; petals yellow. Schizocarps 2-3 mm long; mericarps 5, trigonous with rounded angles, smooth; seeds brownish black..

Flowering & Fruiting: October-February.

Distribution: South and south-east Asia

Occasional; in semi-evergreen and moist deciduous forests. *RNMK 2011,* Kurumbalakota; *RNMK 2528,* Manikkunnumala.

Sida rhombifolia L., Sp. Pl. 684. 1753; Mast. in Hook. f., Fl. Brit. India 1: 323. 1874; Dunn in Gamble, Fl. Sivar. & Pradeep, Sida. 16: 71. 1994;Pres. Madras 90(65). 1915; Paul & Nayar, Fasc. Fl. India 19: 214. 1988; Manilal, Fl. Silent Valley 28. 1988; Vajr., Fl. Palghat Dist. 84. 1990; Paul in B.D. Sharma & Sanjappa, Fl. India 3:290.1993; Sivar. & P. Mathew, Fl. Nilambur 93. 1997; Sivar. & Pradeep, Malv. South. Penins. India 245. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 62. 1996; Mohanan & Sivad., Fl. Agasthyamala 100. 2002.

Sida rhombifolia L. ssp. *Rhombifolia* Borss., Blumea 14: 193. 1966; Manilal & Sivar., Fl. Calicut 44. 1982. *Sida rhombifolia* L. ssp. *rhombifolia* var. *rhombifolia*: Paul & Nayar, Fasc. Fl. India 19: 214. 1988.....

Sub-shrubs, branchlets tomentose. Leaves 6-8 x 3-5 cm, ovate-oblong or rhomboid or lanceolate, minutely stellate-hairy; petiole to 1.5 cm long. Flowers to 1.5 cm across; pedicels longer than the petiole, joined above the middle. Mericarps 8-10, transversely rugose, with a pair of sharp divergent awns at the tip.

Flowering & Fruiting: September-December.

Distribution: Pantropical. Common; in moist deciduous forests and along roadsides. *RNMK 4137,* Sulthan Bathery; *RNMK 1182,* Kalpetta; *RNMK 2488*, Muthanga.

Sida rhomboidea Roxb. ex Fleming, Asiat. Res. 11. 178. 1810; Dunn in Gamble, Fl. Pres. Madras 90(65). 1915; Sivar. & Pradeep, Sida Contr. Bot. 16: 73. 1944; Sivar. & Pradeep, Malv. South. Penins. India 246. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 62. 1996; Sivar. & P. Mathew, Fl. Nilambur 93. 1997; C. N. Sunil & Sivad., Fl. Pl. Div. Alappuzha Dist 131. 2009. *Sida rhombifolia* var. *rhomboidea* (Roxb. ex Flem.) Mast. in Hook. f., Fl. Brit. India 1: 324. 1874. *Sida rhombifolia* L. ssp. *rhombifolia* sensu Borss., Blumea 14: 193. 1966; Manilal, Fl. Silent Valley 28. 1988; Vajr., Fl. Palghat Dist. 84. 1990.

Erect woody herbs; stem thickly pubescent. Leaves rhomboid to oblong, acute or obtuse, densely stellate-hairy below, serrate, nerves 5 pairs; petiole 2-5 mm long; stipule 4-5 mm long, lanceolate. Flowers axillary, solitary; pedicels 7-8 mm long, slender; calyx 0.5-1 cm across, lobes ovate, acuminate; corolla 1.5-2 cm across, petals emarginate at apex; staminal tube stellate-pubescent. Mericarps ca. 2 mm long, trigonous, transversely ridged on distal faces, awned.

Flowering & Fruiting: July-September.

Distribution: Endemic to Peninsular India. Common; in open wastelands and moist deciduous forests. *RNMK 2059,* Kalpetta; *RNMK 2084,* Manathavady; *RNMK 1192,* Begur.

Sida scabrida Wight & Arn., Prodr. 57. 1834; Sivar. & Pradeep, Malv. South. Penins. India 250. 1996. *Sida rhombifolia* L. var. *scabrida* (Wight & Arn.) *Mast.* in Hook. f., Fl. Brit. India 1: 324. 1874; Paul &. Nayar, Fasc. Fl. India 19: 216. 1988; Paul in B.D. Sharma & Sanjappa, Fl. India 3:290.1993; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 90. 2005.

Subshrubs; stem purplish, stellate hairy. Leaves 6-8 x 4 cm, rhomboid, acuminate at apex, rounded at base, coarsely serrate on upper half; petiole 6-8 mm long; stipule 7-8 mm long, filiform. Flowers axillary; pedicels 7-8 mm long, slender; calyx 6-7 mm across, lobes triangular, acute; corolla 1.5-2 cm across. Mericarps 2.5-3 x 2-3 mm, awns 2, sharp, acuminate, divergent.

Flowering & Fruiting: September-January.

Distribution: Pantropical. Occasional; in semi-evergreen and moist deciduous forests. *RNMK* 2588, Pookodu; *RNMK 1192,* Muthanga.

THESPESIA Solander ex Correa

Ann. Mus. Natl. Hist. Nat. 9: 290. 1807, *nom. cons.*

Trees or shrubs; brachlets with an indumentum of scales or stellate hairs. Leaves simple, entire. Flowers solitary, axillary or in racemes by reduction of upper leaves; pedicels generally articulate, thickened at apex into a hypanthium; calyx cyathiform, nearly truncate; corolla large, showy; staminal column shorter than petals, cylindric. Capsules globose or pyriform; seeds 3-many in each locule, obovoid, glabrous, pubescent or tomentose.

1. Shrubs; branches glabrous; capsule ellipsoid .....**T. lampas**
1. Trees; branches densely covered with minute scales; capsule globose ... **T. populnea**

Thespesia lampas (Cav.) Dalz. & Gibs., Bombay Fl. 19. 1861; Mast. in Hook. f., Fl. Brit. India 1: 345. 1874; Manilal, Fl. Silent Valley 29. 1988; Paul & Nayar, Fl. India Fasc. 19:222. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 64. 1988; Vajr., Fl. Palghat Dist. 84. 1990; Paul in B.D. Sharma & Sanjappa, Fl. India 3: 350. 1993; Sivar. & Pradeep, Malv. South. Penins. India 40. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 63. 1996; Sivar. & P. Mathew, Fl. Nilambur 94. 1997; Mohanan & Sivad., Fl. Agasthyamala 101. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 92. 2005. *Hibiscus lampas* Cav., Diss. 3: 154. t.56. 1787; Wight, Ic. t. 5. 1838; Dunn in Gamble, Fl. Pres. Madras 98(71). 1915.

Shrubs, to 1.5 m tall; stems glabrous. Leaves 13-15 x 13-14 cm; 3-5-lobed or entire, ovate, cordate or truncate at base, lobes acute, densely stellate pubescent beneath; 5-7 nerved at base with linear nectary; petioles 3-8 cm long. Flowers axillary, solitary or in terminal racemes, 5-6 cm across; pedicels 2-6 cm long jointed above the middle; involucellar bracts 4-7, subulate, deciduous; calyx cupular, 0.8-1.2 cm across, stellate hairy; corolla 6-8 cm across, rose-yellow. Capsule 2-2.5 cm long, ellipsoid, glabrous, 5-valved; seeds many, trigonous, glabrous, brown.

Flowering & Fruiting: August-December.

Distribution: South and south-east Asia, Tropical east Africa. Occasional; in moist deciduous forests. *RNMK 2416,* Muthanga; *RNMK 1570*, Tholpetty.

Thespesia populnea (L.) Soland. ex Correa, Ann. Mus. Nat. Hist. 9:290.1807; Mast. in Hook. f., Fl. Brit. India 1:345.1874; Dunn in Gamble, Fl. Pres. Madras 101(72). 1915; Manilal & Sivar., Fl. Calicut 49. 1982; Ansari, Fl. Kasaragod Div. 78. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 65. 1988; Vajr., Fl. Palghat Dist. 84. 1990; Paul in B.D. Sharma & Sanjappa, Fl. India 3: 352. 1993; Sivar. & Pradeep, Malv. South. Penins. India 37. 1996; Sivar. & P. Mathew, Fl. Nilambur 95. 1997; C. N. Sunil & Sivad. Fl. Pl. Div. Alappuzha Dist. 131. 2009.*Hibiscus populneus* L., Sp. Pl. 694. 1753.

Trees; twigs densely covered with minute scales, glabrescent. Leaves 5-20 x 5-15 cm, orbicular, deltoid, ovate or oblong, deeply cordate at base, acute to acuminate at apex, entire, 7-nerved at base; petiole 5-15 cm long, scaly. Flowers solitary, axillary; pedicels 2-5 cm long; calyx cupular, coriaceous; corolla light yellow with dark purple centre; staminal column 1.5-2.5 cm long; ovary globose to ovoid. Capsule 2-3.5 cm across, globose, obtuse; seeds obovoid, angular.

Flowering & Fruiting: March-June.

Distribution: Pantropical. Occasional; in wastelands. *RNMK 2428,* Muttil.

URENA Linnaeus

Sp. Pl. 692. 1753.

Sub-shrubs. Leaves entire or 3-5-lobed, with 1-3 nectaries on ribs below. Flowers axillary, solitary, usually sessile; involucellar bracts 5, connate at base; calyx campanulate, 5-lobed; corolla pink, spreading or closed; anthers in the upper half of staminal tube; filaments short; ovary 5-celled; cells 1-ovuled; style 10-fid above; stigmas capitate. Schizocarp 5-lobed, indehiscent, densely glochidiate hairy; seeds trigonous.

1. Leaves entire or shallowly lobed.....**U. lobata** ssp**. lobata**
1. Leaves deeply sinuate; lobes narrowed to the center.....**U. lobata** ssp. **sinuata**

Urena lobata L., Sp. Pl. 692. 1753, ssp. **lobata** Borss., Blumea 14:140. 1966; Mast. in Hook. f., Fl. Brit. India 1: 329. 1874; Dunn in Gamble, Fl. Pres. Madras 92(66). 1915; Manilal, Fl. Silent Valley 29. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 65. 1988; Vajr., Fl. Palghat Dist. 85. 1990; Paul in B.D. Sharma & Sanjappa, Fl. India 3: 380. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 63. 1996; Sivar. & Pradeep, Malv. South. Penins. India 180. 1996; Sivar. & P. Mathew, Fl. Nilambur 95. 1997; Mohanan & Sivad., Fl. Agasthyamala 102. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta Dist. 92. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist.132. 2009.

Shrubs; stem greenish densely stellate pubescent. Leaves 3-8 x 3-9 cm, ovate, 3-5 angular or lobed, densely stellate hairy below; petiole 1-1.5 cm long. Flowers shortly pedicelled; bracts spathulate; calyx glabrous; corolla 1.5-2.5 cm across, petals obovate, stellate-tomentose. Schizocarp 1-1.2 cm across, black.

Flowering & Fruiting: August-December.

Distribution: Pantropical. Common; in roadsides and moist deciduous forests. *RNMK 1915,* Puthoorvayal; RNMK 1182, Muthanga.

Urena lobata L. Sp. Pl. 692. 1753, ssp. **sinuata** (L.) Borss., Blumea 14: 142. 1966; Mast. in Hook. f., Fl. Brit. India 1: 329. 1874; Manilal & Sivar., Fl. Calicut 46. 1982; Ansari, Fl. Kasaragod Div. 78. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 65. 1988; Paul & Nayar, Fasc. Fl. India 19: 230. 1988;

Vajr., Fl. Palghat Dist. 85. 1990; Paul in B.D. Sharma & Sanjappa, Fl. India 3:382.1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 63. 1996; Sivar. & P. Mathew, Fl. Nilambur 96. 1997; Mohanan & Sivad., Fl. Agasthyamala 103. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 92. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 133. 2009. *Urena sinuata* L., Sp. Pl. 692. 1753; Mast. in Hook. f., Fl. Brit. India 1: 329. 1874; Dunn in Gamble, Fl. Pres. Madras 92(66). 1915; Sivar. & Pradeep, Malvac. Southern Peninsular India 184. 1996.

Shrubs. Leaves 7-8 x 7-8 cm, palmately 5-lobed; lobes again lobed, narrow, obtuse at apex, serrulate, minutely stellate-hairy; petiole 5-6 mm long. Flowers shortly pedicelled; involucral bracts 2-3 mm long, spathulate; calyx 5-6 mm long, divided below the middle, lobes ovate, acute spreading; corolla 15-20 mm across. Schizocarp 10 mm across.

Flowering & Fruiting: August-December.

Distribution: Pantropical. Along roadsides and wastelands. *RNMK 1704,* Puthoorvayal.

BOMBACACEAE Kunth

Malvac. Buttner. Tiliac. 5. 1822.

1. Leaves simple; fruit globose, spiny..... **Cullenia**
1. Leaves digitately compound; fruit elliptic-oblong, not spiny 2
2. Flowers bright red .....**Bombax**
2. Flowers pale yellow.....**Cieba**

BOMBAX Linnaeus

Sp. Pl. 511.1753.

Large trees; trunk broadly buttressed, branchlets thick, prickled. Leaves digitate; leaflets 5-7, penninerved. Flowers large, appear before leaves, in clusters at branch tips; calyx cup-shaped, irregularly lobed; petals 5, oblong, basely united; stamens many, polyadelphous; ovary 5-celled, oblong, style 1, thick, 5-fid above. Fruit a dehiscent capsule, 5-valved, valves thick, leathery; seeds many, globose with long white woolly hairs.

1. Leaflets petiolulate; stamens about 80.....**B. ceiba**
1. Leaflets subsessile; stamens about 500 ..... **B. insigne**

Bombax ceiba L., Sp. Pl. 511. 1753; Nicols., Taxon 28: 370. 1979; Manilal & Sivar., Fl. Calicut 50. 1982; Ansari, Fl. Kasaragod Div. 79. 1985; Manilal, Fl. Silent Valley 30. 1988; Nicols., Suresh & Manilal, An interpr. Hort. Malab. 230. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 66. 1988; Vajr., Fl. Palghat Dist. 86. 1990; Nayar & Biswas in B.D. Sharma & Sanjappa, Fl. India 3: 398. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 64. 1996; Sivar. & P. Mathew, Fl. Nilambur 96. 1997; Mohanan & Sivad., Fl. Agasthyamala 104.

2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 93. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 134. 2009. *Bombax malabaricum* DC., Prodr. 1: 479. 1824; Mast. in Hook. f., Fl. Brit. India 1: 349. 1874; Dunn in Gamble, Fl. Pres. Madras 99(71). 1915. *Salmalia malabarica* (DC.) Schott & Endl., Melet. Bot. 35. 1832.*Moul-elavou* Rheede, Hort. Malab. 3: 61-62, t.52. 1682.

Large deciduous, buttressed trees, to 40 m high. Leaflets 16-18 x 4-5 cm, elliptic, caudate-acuminate at apex, attenuate at base; nerves 12-15 pairs; petiolule 2-3 cm long; petiole to 20 cm long. Flowers solitary or 2-5 together; sepals ca. 3 x 3 cm, campanulate, densely villous within, lobes obtuse; petals reddish, 8-10 x 3-3.5 cm, oblong, obtuse, stellate-hairy outside; filaments 5-5.5 cm long, minutely hairy. Capsule 12.5-12 x 2-3 cm, subcylindric, terete, downy tomentose; seeds black.

Flowering & Fruiting: January-April.

D*istribution*: Tropical Asia and New Guinea. Common in semi-evergreen forests. *RNMK* 2346, Manikkunnumala.

Bombax insigne Wall., Pl. Asiat. Rar. 1: 71. 1830; Mast. in Hook. f., Fl. Brit. India 1: 349. 1784; Dunn in Gamble, Fl. Pres. Madras 100(71). 1915; Vajr., Fl. Palghat Dist. 87. 1990; Nayar & Biswas in B.D. Sharma & Sanjappa, Fl. India 3: 398. 1993; Mohanan & Sivad., Fl. Agasthyamala 104. 2002; Sasidh. & Sivar., Fl. Pl. Thrissur For. 64. 1996. *Salmalia insignis* (Wall.) Schott & Endl., Melet. Bot. 35. 1832.

Medium sized deciduous trees, trunk and branches densely prickly. Leaflets 14-17 x 3-4 cm, oblong or obovate, apex caudate-acuminate, base attenuate; leaflets subsessile; petiole to 25 cm long. Flowers few together, appear before the leaves; calyx 2-lobed, campanulate, densely silky within; petals 8-12 x 2-2.5 cm oblong, acute, tomentose, creamy yellow to pale red. Capsule 5-angled, 16-18 x 4-4.5 cm long, tomentose.

Flowering & Fruiting: November-March.

Distribution: India and Myanmar. Occasional; in moist deciduous forests. *RNMK* 1873, Chedalayam.

CEIBA Miller. Emend Gaertn.
Gard. Dict. Abr. ed. 4. 1754.

Ceiba pentandra (L.) Gaertn., Fruct. 2: 244, t.133. 1791; Manilal & Sivar., Fl. Calicut 50. 1982; V.S. Ramach. & V.J. Nair, Fl. Cannanore 67. 1988; Vajr., Fl. Palghat Dist. 87. 1990; Nayar & Biswas in B.D. Sharma & Sanjappa, Fl. India 3: 400. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 65. 1996; Sivar. & P. Mathew, Fl. Nilambur 97. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 135. 2009; *Bombax pentandrum* L., Sp. Pl. 511. 1753. *Eriodendron anfractuosum* DC., Prodr. 1: 479. 1824; Mast. in Hook. f., Fl. Brit. India 1: 350. 1874. *Eriodendron pentandrum* (L.) Kurz, J. Asiat. Soc. Bengal, Pt. 2. Nat. Hist. 43: 113. 1874; Dunn in Gamble, Fl. Pres. Madras 100(72). 1915. *Ceiba pentandra* (L.) Gaertn. var. *indica* (DC.) Bakh. f., Bull. Jard. Bot. Buitenz. ser.3, 6: 195. 1924.

Trees, trunk straight, smooth or prickly when young. Leaves digitate, 5-9-foliolate; leaflets 10-12 x 3-4 cm, ovate-oblong to obovate-oblong, narrowed at base, acute to acuminate at apex, entire, glabrous; petioles 15-20 cm long. Flowers usually in clusters of 3-10; axillary or grouped towards ends of leafless branchlets, rarely solitary, axillary; staminal tube divided into 5 phalanges, each dividing again into usually 3 filiform branches bearing 2-3 anfractose; ovary globular or ovoid, glabrous, 5-locular; ovules many in each locule. Capsule 12-25 x 3.5 cm, up to 4 cm in diam., ellipsoid to fusiform, narrowed at both ends, coriaceous; seeds numerous, globose to subpyriform, black with copious white silky fibres.
Flowering & Fruiting: February-June.
Distribution: Throughout the tropics. Occasional; in moist deciduous forests. *RNMK* 1139, Pulpally.

CULLENIA R. Wight
Ic. Pl. Ind. Or. 5(1): 22, t. 1761 & 1762. 1851.

Cullenia exarillata Robyns, Bull. Jard. Bot. Nat. Belg. 40: 249. 1970; Manilal, Fl. Silent Valley 30. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 66. 1988; Vajr., Fl. Palghat Dist. 87. 1990; Nayar & Biswas in B.D. Sharma & Sanjappa, Fl. India 3: 402. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 64. 1996; Sivar. & P. Mathew, Fl. Nilambur 98. 1997; Mohanan & Sivad., Fl. Agasthyamala 105. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 94. 2005. *Cullenia excelsa* Wight, Ic. t. 1701, 1762.1851,p.p.; Mast. in Hook. f., Fl. Brit. India 1:350.1874; Dunn in Gamble, Fl. Pres. Madras 101(73).1915. **Plate 11h.**

Large trees, to 40 m tall; buttress prominent; older branches furnished with large tubercles; young branchlets and underside of leaves densely covered with peltate scales. Leaves alternate, 14-16 x 5-6 cm, oblong, acute, nerves not visible, shining above, brownish below. Flowers densely clustered on tubercles on old branches; pedicels 2-3 cm long, jointed; bracteoles tubular, 1-1.5 cm long, 4-5-toothed at apex; petals absent; staminal tube 2-3 cm long, 5-lobed at apex with many stamens; ovary 5-celled, echinate, ovules 2 in each cell; style woolly, elongate. Capsule globose, 15-20 cm across, dehiscent, densely echinate, globose, 5-valved.
Flowering & Fruiting: January-November.
Distribution: Endemic to southern Western Ghats. Common; in evergreen forests. *RNMK* 1867, Kallady; *RNMK 2341*, Chanthanathodu.

STERCULIACEAE (DC.) Bartl.
Ord. Nat. Pl. 225. 1830

1. Flowers unisexual; petals absent 2
1. Flowers bisexual; petals present 4
2. Calyx tubular, 5-toothed; follicle 2-seeded, compressed ..... **Firmiana**
2. Calyx widely campanulate, 5-lobed or 5-partite; follicle many-seeded 3

3. Branches glabrous; seeds winged .....**Pterygota**
3. Branches tomentose; seeds wingless .....**Sterculia**
4. Follicle spirally twisted; petals unequal .....**Helicteres**
4. Follicle not spirally twisted; petals equal..... 5
5. Ovary 1-celled; capsule 1-seeded .....**Waltheria**
5. Ovary 5-celled; capsule many-seeded 6
6. Seeds wingless 7
6. Seeds winged..... **Pterospermum**
7. Leaves entire; ovary 3-4 celled ..... **Leptonychia**
7. Leaves serrate; ovary 5-celled .....**Melochia**

FIRMIANA Marsili

Saggi. Sci. Lett. Acad. Padova 1: 114. 1786.

Firmiana colorata (Roxb.) R. Br. in Bennett & Brown, Pl. Jav. Rar. 235. 1844; Dunn in Gamble, Fl. Pres. Madras 107(76). 1915; Ansari, Fl. Kasaragod Div. 80. 1985; Manilal, Fl. Silent Valley 31. 1988; Vajr., Fl. Palghat Dist. 88. 1990; Malick in B.D. Sharma & Sanjappa, Fl. India 3: 420. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 65. 1996; Mohanan & Sivad., Fl. Agasthyamala 106. 2002. *Sterculia colorata* Roxb., Pl. Corom. t. 25. 1795; Mast. in Hook. f., Fl. Brit. India 1: 359. 1874. *Sterculia rubicunda* Wall. ex Mast. in Hook. f., Fl. Brit. India 1: 360. 1874.

Medium sized trees. Leaves 15-16 x 22-25 cm, 3-lobed, cordate at base, 7-9 ribbed, lobes acuminate; petiole to 20 cm long. Flowers unisexual, in terminal panicled racemes; calyx 1-2 cm long, tubular, reddish, tomentose outside; gynophore 1-2.5 cm long; stamens 16, filaments connate into a cup around the pistillode; carpels 5, free, flattened; style short, curved. Follicle 5-6 cm long, compressed; seeds 2-5, compressed.

Flowering & Fruiting: January-June.

Distribution: Indo-Malesia and China. Occasional; in evergreen forests. *RNMK* 2214, Vythiri.

HELICTERES Linnaeus

Sp. Pl. 963. 1753.

Helicteres isora L., Sp. Pl. 963. 1753; Wight, Ic. t. 180. 1839; Mast. in Hook. f., Fl. Brit. India 1: 365. 1874; Dunn in Gamble, Fl. Pres. Madras 107(77). 1915; Manilal & Sivar., Fl. Calicut 51. 1982; Ansari, Fl. Kasaragod Div. 80. 1985; Manilal, Fl. Silent Valley 31. 1988; Nicols., Suresh & Manilal, An interpr. Hort. Malab. 253. 1988: V.S. Ramach. & V.J. Nair, Fl. Cannanore 67. 1988; Vajr., Fl. Palghat Dist. 89. 1990; Malick in B.D. Sharma & Sanjappa, Fl. India 3: 426. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 66. 1996; Sivar. & P. Mathew, Fl. Nilambur 99. 1997; Mohanan & Sivad., Fl. Agasthyamala 107. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 94. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 137. 2009. *Isora-murri* Rheede, Hort. Malab. 6: 55-66, t.30. 1686.

Large shrubs. Leaves 12-15 cm, orbicular, cordate at base, obtuse at apex, serrate, 3-nerved from base, scabrous. Flowers axillary, fascicled or solitary; calyx 1.2-1.5 cm long, tubular, 5-toothed, yellowish; petals to 3.5 cm long, unequal, reddish; gynophore 3- 4 cm long, curved; stamens 5, filaments short, united at base; ovary 5-celled; ovules many; style 5. Fruit a spirally twisted follicle, 4-6 cm long; seeds many, tubercled.

Flowering & Fruiting: September-March.

Distribution: Indo-Malesia, China and Australia. Common; in semi-evergreen and moist deciduous forests. *RNMK 1871*, Manikkunnumala; *RNMK 1760*, Tholpetty.

LEPTONYCHIA Turczaninow

Bull. Soc. Nat. Mosc. 31. 222. 1858

Leptonychia caudata (Wall. ex G. Don) Burrett, Notizbl. Bot. Gart. Berlin. 9: 727. 1926; Rao, J. Bombay nat. Hist. Soc. 55:377. 1958; Veldk. & Flipphi, Blumea 32: 451. 1987; Duatta in B.D. Sharma & Sanjappa, Fl. India 3: 435. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 66. 1996; Sivar. & P. Mathew, Fl. Nilambur 100. 1997. *Grewia caudata* Wall. ex G. Don, Gen. Syst. 1: 547. 1831. *Grewia heteroclita* Roxb., Fl. Ind. 2:590.1832. *Leptonychia heteroclita* (Roxb.) Kurz, J. Asiat. Soc. Bengal 39: 67. 1870. *Leptonychia glabra* Turcz., Bull. Soc. Imp. Nat. Moscou 31: 233; Mast. in Hook. f., Fl. Brit. India 1: 379. 1874. *Grewia acuminata* Bedd., Madras J. Lit. Sci. ser. 3, 1: 38. 1864; Mast. in Hook. f., Fl. Brit. India 1: 379. 1874; *Leptonychia moacurroides* Bedd., Fl. Sylv. t. 114.1871; Mast. in Hook. f., Fl. Brit. India 1:379. 1874; Dunn in Gamble, Fl. Pres. Madras 112(80). 1915; Manilal, Fl. Silent Valley 32. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 68. 1988; Vajr., Fl. Palghat Dist. 89. 1990; Mohanan & Sivad., Fl. Agasthyamala 108. 2002. *Leptonychia acuminata* Mast. in Hook. f., Fl. Brit. India 1: 379. 1874, non Burrett 1926. *Paragrewia poilanii* Gagnep. ex Rao, J. Bombay Nat. Hist. Soc. 51: 671. f. 1-9. 1953.

Small trees. Leaves 9-12 x 3-5 cm, oblong or elliptic-oblong, apex caudate-acuminate, base rounded, subcoriaceous, nerves 5-7, archingly jointed along the margin, intercostae reticulate, domatia in the nerve axils; petiole to 1 cm long. Sepals 2-3 mm long, tomentose; petals 5-7 mm long, white, oblong, linear; inner staminodes subulate and outer ovate; ovary depressed globose, 3-4 celled, cells few ovuled. Capsule 1.5-2.5 x 1- 2 cm, depressed globose, 3-lobed, tomentose.

Flowering & Fruiting: June-September.

Distribution: Indo-Malesia. Common; in evergreen forests. *RNMK 2132*, Meenmutti; *RNMK 2877,* Kanthanpara.

MELOCHIA Linnaeus

Sp. Pl. 674. 1753.

Melochia corchorifolia L., Sp. Pl. 675. 1753; Mast. in Hook. f., Fl. Brit. India 1: 374. 1874; Dunn in Gamble, Fl. Pres. Madras 110(79). 1915; Manilal & Sivar., Fl. Calicut 51. 1982; Ansari, Fl. Kasaragod Div. 81. 1985; Nicols.,

Suresh & Manilal, An interpr. Hort. Malab. 254. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 68. 1988; Malick in B.D. Sharma & Sanjappa, Fl. India 3: 441. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 67. 1996; Sivar. & P. Mathew, Fl. Nilambur 100. 1997; Mohanan & Sivad., Fl. Agasthyamala 108. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 95. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 138. 2009. *Niruren* Rheede, Hort. Malab. 110: 109, t55. 1960.

Slender subglabrous herbs. Leaves 3-4 x 1.5-2 cm, ovate-lanceolate, rounded at base, serrate, scabrid. Flowers 2-6 together, in terminal sessile cymes; sepals campanulate, lobes subulate, petals pink, obovate, glabrous; stamens 5, united at base; ovary 5-celled, 2-ovules in each, densely hairy; styles 5, free. Capsule 5-valved, depressed globose, 4-5 mm across; seeds 1 or 2, angular.

Flowering & Fruiting: July-April.

Distribution: Pantropical. Common; in moist deciduous forests. *RNMK* 1984, Muthanga.

PTEROSPERMUM Schreber

Gen 2: 461. 1791, *nom. cons.*

Small trees. Leaves alternate, entire or dentate, usually white tomentose below. Flowers in axillary fascicles, pedicelled; bracteoles 3, entire or fimbriate; calyx 5-partite, lobes oblong; petals 5, linear-oblong to obovate; stamens 10-15, 5-adelphous; staminodes alternate with bundles of stamens; staminal tube adnate with the gynophore; ovary tomentose, 5-celled, cells many-ovuled; style 1, long. Fruit a woody capsule, loculicidally 5-valved; seeds few, winged.

1. Leaves to 3 cm broad; venation obscure ..... **P. rubiginosum**
1. Leaves 10-15 cm broad; venation conspicuous 2
2. Capsule terete or obtusely angled; calyx to 5 cm long ..... **P. reticulatum**
2. Capsule acutely angled; calyx to 10 cm long..... **P. diversifolium**

Pterospermum diversifolium Blume, Bijdr. 88. 1825; Mast. in Hook. f., Fl. Brit. India 1: 367. 1874; Dunn in Gamble, Fl. Pres. Madras 108(78). 1915; Nicols., Suresh & Manilal, An interpr. Hort. Malab. 254. 1988: V.S. Ramach. & V.J. Nair, Fl. Cannanore 68. 1988; Vajr., Fl. Palghat Dist. 90. 1990; Chandra in B.D. Sharma & Sanjappa, Fl. India 3: 449. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 67. 1996; Sivar. & P. Mathew, Fl. Nilambur 101. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 95. 2005. *Pterospermum glabrescens* Wight & Arn., Prodr. 69. 1834; Mast. in Hook. f., Fl. Brit. India 1: 369. 1874. *Solda* Rheede, Hort. Malab. 6:103, t.58. 1689.

Medium sized trees; bark greyish brown; branches horizontal. Leaves 15-26 x 10-15 cm, oblong, abruptly acuminate at apex, cordate at base; nerves 7-12 pairs, intercostae parallel, prominent; petiole 1-1.5 cm long. Flowers axillary, solitary; pedicel 1-1.5 cm long; sepals 9-10 cm long, oblong, pubescent

outside; petals 8-9 cm long, oblong, glabrous, white. Capsule to 18 cm long, 5-angled, woody, smooth; seeds 8-11 in each cell.
Flowering & Fruiting: December-April.
Distribution: Indo-Malesia. Common; in semi-evergreen forests. *RNMK* 2341, Manikkunnumala.

Pterospermum reticulatum Wight & Arn., Prodr. 69. 1834; Mast. in Hook. f., Fl. Brit. India 1: 368. 1874; Dunn in Gamble, Fl. Pres. Madras 108(77). 1915; Nair &. Mohanan, J. Econ. Tax. Bot. 2: 234. 1981; Chandra in B.D. Sharma & Sanjappa, Fl. India 3: 451. 1993; Pandura. & V.J. Nair, J. Econ. Tax. Bot. 17: 183. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 67. 1996; Sivar. & P. Mathew, Fl. Nilambur 102. 1997; Mohanan & Sivad., Fl. Agasthyamala 109. 2002. **Fig.17, Plate 11i.**

Medium sized tree. Leaves 14-15 x 7-8 cm, obovate; 3-7-toothed at apex; cordate at base, white-tomentose below; nerves 6-9 pairs, prominent. Flowers in terminal or axillary fascicles; bracts laciniate; sepals 4-4.5 cm long, oblong, densely stellate-tomentose; petals 3-4 cm, obovate, densely stellate-hairy within; stamens 15, staminodes 5. Capsule 6-7 cm long, oblong, acute, stalked, densely rugose, tomentose; seeds solitary, winged.
Flowering & Fruiting: January-November.
Distribution: Endemic to southern Western Ghats. Common; in evergreen forests. *RNMK* 3216, Sugandhagiri; *RNMK 2773,* Chanthanathodu.

Pterospermum rubiginosum Heyne ex Wight & Arn., Prodr. 68. 1834; Mast. in Hook. f., Fl. Brit. India 1: 368. 1874; Dunn in Gamble, Fl. Pres. Madras 109(78). 1915; Vajr., Fl. Palghat Dist. 90. 1990; Chandra in B.D. Sharma & Sanjappa, Fl. India 3: 451. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 69. 1996; Mohanan & Sivad., Fl. Agasthyamala 110. 2002. **Plate 11j.**

Large trees; bark grayish-brown, peels off in thin rectangualr strips; branchlets drooping. Leaves 9-10 x 2-3 cm, ovate-lanceolate, oblique at base, acuminate at apex, densely tomentose below; nerves 5 pairs. Flowers axillary, 2-3 together; pedicels 1-1.5 cm long; sepals 3-4 cm long, linear oblong, densely tomentose; petals ca. 3 cm long, linear-oblong, white; stamens 10, filaments 2-3 cm long, united at base into a tube; ovary tomentose; style 4-5 cm long. Capsule narrowly oblong, acuminate, 4-5 cm long, angular.
Flowering & Fruiting: November-April.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 4213*, Makkimala; *RNMK 1875*, Thirunelli; *RNMK 1439*, Vythiri Ghat.

PTERYGOTA Schott & Endlicher
Melet. Bot. 32. 1832.

Pterygota alata (Roxb.) R. Br. in Bennett & Brown, Pl. Jav. Rar. 234. 1844; Dunn in Gamble, Fl. Pres. Madras 104(75). 1915; Vajr., Fl. Palghat Dist. 91. 1990; Malick in B.D. Sharma & Sanjappa, Fl. India 3: 455. 1993; Sasidh. &

Sivar., Fl. Pl. Thrissur For. 69. 1996; Sivar. & P. Mathew, Fl. Nilambur 102. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 96. 2005. *Sterculia alata* Roxb., Pl. Corom. t. 287. 1820; Mast in Hook. f., Fl. Brit. India 1: 360. 1874. *Sterculia heynei* Bedd., Fl. Sylv. t. 230.1874.

Very large trees; trunk round, straight; bark smooth; branches glabrous. Leaves 15-30 x 13-18 cm, broadly ovate, entire, 7-ribbed, glabrous; rounded or cordate at base. Flowers in axillary panicles; unisexual; calyx 5-partite, lobes 0.5-1 cm long, curved out, tomentose outside; stamens 20, 5-adelphous; carpels 5, free, sessile, ovules many in each; staminodes in female flowers 5. Follicle 10-15 cm long, obovoid, oblique, 2-valved, tapering at base, pubescent; seeds 7-8 cm long, oblong, winged.

Flowering & Fruiting: April-May.

Distribution: South Asia and Myanmar. Common' in evergreen forests. *RNMK 1218*, Vythiri; *RNMK 2450,* Chanthanathodu.

STERCULIA Linnaeus

Sp. Pl. 1007. 1753.

Trees. Leaves alternate, entire or lobed, crowded towards the tip of branches. Flowers in axillary or terminal panicles, unisexual or polygamous; calyx widely campanulate, 4 or 5-lobed; stamens 10-30; filaments united into a long column; carpels 5, distinct; ovules few to many in each; styles 5. Fruit of 5 distinct follicles, 2-valved, stalked, curved; seeds few to many, ovoid to globose.

1. Leaves entire ..... **S. guttata**
1. Leaves 5-7-lobed 2
2. Follicles 5-6 cm long; oblong, tomentose..... **S. villosa**
2. Follicles to 12 cm long; boat shaped; glabrous..... **S. foetida**

Sterculia foetida L., Sp. Pl. 1008. 1753; Mast. in Hook. f., Fl. Brit. India 1: 354. 1874; Dunn in Gamble, Fl. Pres. Madras 105(75). 1915; Malick in B.D. Sharma & Sanjappa, Fl. India 3: 459. 1993; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 139. 2009

Deciduous trees. Leaves digitate; leaflets 7-9, 10-13 x 3-5 cm, elliptic, acuminate, glabrous. Racemes terminal or axillary; flowers unisexual, dioecious or polygamous. Follicle 10-12 cm, boat shaped, 5-lobed, glabrous, woody; seeds many, ellipsoid, smooth. .....

Flowering & Fruiting: February-August.

Distribution: Pantropical. Occasional; in semi-evergreen forests. *RNMK 2644,* Manikkunnumala; *RNMK 3257,* Sugandhagiri.

Sterculia guttata Roxb. ex DC., Prodr. 1: 482.1824; Wight, Ic. t. 487. 1841; Mast. in Hook. f., Fl. Brit. India 1:355.1874; Dunn in Gamble, Fl. Pres. Madras 106(76). 1915; Manilal & Sivar., Fl. Calicut 51. 1982; Manilal, Fl. Silent Valley 33. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 69. 1988; Vajr., Fl. Palghat Dist. 91. 1990; Malick in B.D. Sharma & Sanjappa, Fl. India

3: 462. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 70. 1996; Sivar. & P. Mathew, Fl. Nilambur 103. 1997; Mohanan & Sivad., Fl. Agasthyamala 111. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 96. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 140. 2009.

Large deciduous trees; bark brownish, branchlets tomentose. Leaves 22-30 x 13-15 cm, obovate, abruptly acuminate at apex, rounded at base, stellate-tomentose below, nerves 7-10 pairs. Panicles to 20 cm across, terminal. Flowers pedicelled, with foetid smell; calyx 1-1.5 cm across, campanulate, lobes acuminate, densely hairy, greenish outside and reddish inside; stamens 10, column hairy at apex. Follicle bright red, 6-7 cm across, curved-obovoid, tomentose; seeds few, black, smooth, shining.

Flowering & Fruiting: September-March.

Distribution: Indo-Malesia. Common; in evergreen forests. *RNMK 3077,* Vythiri; *RNMK 1861,* Sugandhagiri.

Sterculia villosa Roxb. ex Smith in Rees, Cyclop. 36: n.16. 1816; Mast. in Hook. f., Fl. Brit. India 1: 355. 1874; Dunn in Gamble, Fl. Pres. Madras106(76). 1915; Malick in B.D. Sharma & Sanjappa, Fl. India 3: 472. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 70. 1996; Mohanan & Sivad., Fl. Agasthyamala 112. 2002.

Medium sized trees; bark pale brown, fibrous. Leaves 20-25 cm across, cordate at base; lobes caudate-acuminate at apex, penninerved, downy pubescent below; petioles 15-20 cm long. Panicles to 20 cm across, terminal, densely hairy. Flowers 2-2.5 cm across, greenish brown; pedicels 4-5 mm long; calyx lobes oblong, tomentose outside, stamens 10, anthers along the rim of staminal column.; column hairy at apex; staminodes 10 in female flowers. Follicles 5-6 cm long, oblong, tomentose; seeds black, smooth.

Flowering & Fruiting: February-April.

Distribution: South Asia and Myanmar. Common; in moist deciduous forests. *RNMK 1857,* Chedalayam; *RNMK 1219,* Pathiri; *RNMK 3260,* Muthanga.

WALTHERIA Linnaeus

Sp. Pl. 673. 1753.

Waltheria indica L., Sp. Pl. 673. 1753; Wight & Arn., Prodr. 67. 1834; Mast. in Hook. f., Fl. Brit. India 1: 374. 1874; Dunn in Gamble, Fl. Pres. Madras 111(79). 1915; Manilal & Sivar., Fl. Calicut 52. 1982; Ansari, Fl. Kasaragod Div. 81. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 69. 1988; Vajr., Fl. Palghat Dist. 92. 1990; Malick in B.D. Sharma & Sanjappa, Fl. India 3: 473. 1993; Sivar. & P. Mathew, Fl. Nilambur 104. 1997; Mohanan & Sivad., Fl. Agasthyamala 112. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 97. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 141. 2009. *Waltheria americana* L., Sp. Pl. 673. 1753.

Herbs, to 70 cm high, densely tomentose. Leaves 4-5 x 2-3 cm, ovate, obtuse, crenate; petiole 1-1.5 cm long. Flowers 3-10-together, in axillary or

terminal heads, sessile; calyx tubular, lobes subulate; petals yellow, obovate, stamens 5, monadelphous; ovary 1-celled, 2-ovuled, pubescent; style lateral. Capsule 2-valved; 1-seeded, hairy at apex.
Flowering & Fruiting: October-January.
Distribution: Pantropical. Common; in open areas. *RNMK 3078*, Puthoorvayal.

Theobroma cacao L., is found occasionally cultivated by the planters in Chundale.

TILIACEAE Juss.

Gen. Pl. 289. 1789.

1. Shrubs or small trees; fruit a drupe..... **Grewia**
2. Herbs or subshrubs; fruit a capsule 2
2. Capsule prickly or bristly .....**Triumfetta**
2. Capsule unarmed.....**Corchorus**

CORCHORUS Linnaeus

Sp. Pl. 529. 1753.

Corchorus aestuans L., Syst. Nat. (ed. 10) 1079. 1759; Manilal & Sivar., Fl. Calicut 53. 1982; Ansari, Fl. Kasaragod Div. 82. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 69. 1988; Vajr., Fl. Palghat Dist. 92. 1990; Daniel & Chandra. in B.D. Sharma & Sanjappa, Fl. India 3: 485. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 71. 1996; Sivar. & P. Mathew, Fl. Nilambur 105. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 98. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 142. 2009. *Corchorus acutangulus* Lamk., Encycl. 2: 104. 1786 ; Mast. in Hook. f., Fl. Brit. India 1: 398. 1874; Dunn in Gamble, Fl. Pres. Madras 121(86). 1915.

Herbs. Leaves 3-4 x 2 cm, ovate, apex acute, base slightly cordate, 3-5 ribbed, minutely and closely crenate, basal teeth prolonged into long hairs, sparsely strigose above and below, membranous. Cymes axillary, 1-3 flowered. Flowers 6-7 mm across, 5-merous, yellow; bracts and bracteoles linear; stamens many. Capsule 1.5-2.5 cm long, oblong, 3 toothed at apex, glabrous; seeds many.
Flowering & Fruiting: August-February.
Distribution: Pantropical. Common; in disturbed moist deciduous forests. *RNMK 2520,* Maragatha.

GREWIA Linnaeus

Sp. Pl. 964. 1753.

Straggling shrubs or trees, stellately pubescent. Leaves entire or serrate, 3-7-ribbed, intercostae parallel. Flowers in axillary fascicles or cymes; sepals 5, oblong, distinct; petals 5, free, shorter than sepals, with a gland at base; stamens many, free, ovary 2-4-celled, cells 2-ovuled; style -1, stigma lobed or laciniate. Fruit entire or lobed drupe; seeds 2-4.

1. Leaves 5-ribbed from base.....**G. tilifolia**
1. Leaves 3-ribbed from base..... 2

2. Peduncle shorter or equal to the petiole ..... **G. barberi**
2. Peduncle longer than the petiole 3
3. Drupe divided into 2-4 distinct drupelets 4
3. Drupe obscurely lobed or unlobed 6
4. Peduncle many-flowered; drupelets 4 5
4. Peduncle 3-flowered; drupelets 2 ..... **G. serrulata**
5. Peduncle up to 2.5 cm long ..... **G. gamblei**
5. Peduncle 3-5 cm long ..... **G. umbellifera**
6. Small trees; leaves 5-15 cm long, sub-acute at base ..... **G. heterotricha**
6. Shrubs; leaves 5-7 cm long, rounded at base ..... **G. hirsuta**

Grewia barberi Drumm. ex Dunn in Gamble, Fl. Pres. Madras 118(84). 1915; V.S. Ramach. & V.J. Nair, Fl. Cannanore 70. 1988; Mohanan & Sivad., Fl. Agasthyamala 114. 2002.

Scandent shrubs; branches softly spreading-tomentose. Leaves 11-15 x 3-6 cm, ovate-lanceolate, sharply acuminate, tomentose along the nerves below, ribs prominent, midrib with 6 lateral nerves; petiole 6-8 mm long. Peduncle 0.8-1 cm long, stout, few-flowered; pedicels 7-8 cm long, enlarging in fruit; sepals oblong, densely tomentose outside; petals oblong, obtuse, white. Drupe ca. 2 cm across, depressed.

Flowering & Fruiting: November-December.

Distribution: Endemic to Western Ghats. Occasional; in moist deciduous forest. *RNMK 1440,* Tholpetty.

Grewia gamblei Drumm. ex Dunn in Gamble, Fl. Pres. Madras 117(84). 1915; Daniel &. Chandra. in B.D. Sharma & Sanjappa, Fl. India 3: 498. 1993. **Plate 11k.**

Scandent shrubs. Leaves 4-9 x 2-4 cm, ovate-elliptic or ovate-oblong, subacute at base, acute or shorly acuminate at apex, rounded or crenate-dentate, scabrid above, tomentose beneath, 3-nerved; petioles up to 9 mm long. Flowers in axillary or leaf opposed umbellate cymes; peduncles up to 2.5 cm long; pedicles up to 1.3 cm long; sepals 1-1.4 cm long, oblong-lanceolate, tomentose; petals oblong-lanceolate; glands ovoid; ovary subglobose, hirsute; stigma 4-lobed. Drupe 1-2 cm across, deeply 4-lobed, sparsely pubescent.

Flowering & Fruiting: April-November. *Distribution*: Endemic to southern Western Ghats. Rare in evergreen forests. *RNMK 1632,* Chembra; *RNMK 0256,* Sugandhagiri.

Grewia heterotricha Mast. in Hook.f., Fl. Brit. India 1: 385. 1874; Dunn in Gamble, Fl. Pres. Madras 117(84). 1915; Daniel & Chandra. in B.D. Sharma & Sanjappa, Fl. India 3: 500. 1993; Mohanan & Sivad., Fl. Agasthyamala 114. 2002. *Grewia ritchiei* Mast. in Hook.f., Fl. Brit. India 1: 389. 1874. *Grewia umbellata* Mast. in Hook.f., Fl. Brit. India 1: 385. 1874, p.p., non Roxb. 1832. *Grewia lawsoniana* Drumm. ex Dunn in Gamble, Fl. Pres. Madras 117(84).

1915; Manilal & Sivar., Fl. Calicut 53. 1982; V.S. Ramach. & V.J. Nair, Fl. Cannanore 71. 1988; Vajr., Fl. Palghat Dist. 94. 1990.

Small trees. Leaves 3-15 x 0.5-3.5 cm, oblong-lanceolate, rounded or subacute at base, acute at apex, irregularly serrate, hispid or glabrescent above, densely tomentose beneath, 3-nerved; petiole 3-6 mm long. Flowers in axillary, umbellate cymes; peduncles 0.5-1.7 cm long; pedicles up to 8 mm long; sepals oblong-lanceolate; petals white, oblong; stamens 16-20; ovary 1-1.5 mm across, globose, pilose. Drupe 0.8-2 cm across, obscurely 4-lobed, sometimes 2-lobed, brown.

Flowering & Fruiting: March-December.

Distribution: Endemic to Western Ghats. Rare; along the margins of evergreen forests. *RNMK 3527,* Sughandagiri; *RNMK 3458,* Brahmagiri.

Grewia hirsuta Vahl, Symb. Bot. 1: 34. 1790; Mast. in Hook. f., Fl. Brit. India 1: 391. 1874; Dunn in Gamble, Fl. Pres. Madras 119(85). 1915; Vajr., Fl. Palghat Dist. 94. 1990; Daniel & Chandra. in B.D. Sharma & Sanjappa, Fl. India 3: 501. 1993.

Shrubs, branches densely pilose. Leaves 5-7 x 2-3 cm, ovate, acute, rounded at base, serrate, hirsute-pubescent; petiole 3-5 mm long. Peduncle 0.5-1 cm long, hirsute; pedicels slender; sepals oblong, 3-ribbed; petals oblong, obtuse; gland orbicular, hairy; anthers below the level of ovary; ovary densely hairy; style 1-2 mm long; stigma globose. Drupe 0.5-1 cm across, obscurely 4-lobed, pilose.

Flowering & Fruiting: August-December.

Distribution: India, Bangladesh and Sri Lanka. Moist and dry deciduous forests. *RNMK 3106*, Muthanga; *RNMK 1844,* Tholpetty.

Grewia serrulata DC., Prodr. 1: 510. 1824; Ansari, Fl. Kasaragod Div. 83. 1985; Daniel & Chandra. in B.D. Sharma & Sanjappa, Fl. India 3: 509. 1993. *Grewia glabra* Blume, Bijdr. 115. 1825; Manilal, Fl. Silent Valley 33. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 70. 1988; Vajr., Fl. Palghat Dist. 94. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 72. 1996; Sivar. & P. Mathew, Fl. Nilambur 107. 1997. *Grewia disperma* sensu Dunn in Gamble, Fl. Pres. Madras 118(84). 1915 non Rottl. ex Spreng. 1825; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 99. 2005. *Grewia laevigata* sensu Mast. in Hook. f., Fl. Brit. India 1: 389. 1874, non Vahl 1790.

Erect shrubs, branchlets slender, glabrous. Leaves 12-13 x 3-4 cm, elliptic, sharply acuminate, serrate, petiole 5-6 mm long. Peduncle 2-2.5 cm long, slender, glabrous; pedicel 1-2 cm long, sparsely stellate hairy; sepals oblong, tomentose outside; petals ovate, white; gynandrophore densely hairy; stigma fimbriate. Drupelets 4-5 mm across, globose, glabrous.

Flowering & Fruiting: August-November.

Distribution: Indo-Malesia and Tropical Africa. Occasional; in semi-evergreen and moist deciduous forests. *RNMK 2664,* Pookodu; *RNMK 1500*, Tholpetty.

Grewia tiliifolia Vahl, Symb. Bot. 1: 35. 1790; Mast. inHook. f., Fl. Brit. India 1: 386. 1874, "tiliaefolia"; Dunn in Gamble, Fl. Pres. Madras 118(84). 1915; Ansari, Fl. Kasaragod Div. 84. 1985; Manilal, Fl. Silent Valley 34. 1988; Nicols., Suresh & Manilal, An interpr. Hort. Malab. 257. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 71. 1988; Vajr., Fl. Palghat Dist. 94. 1990; Daniel & Chandra. in B.D. Sharma & Sanjappa, Fl. India 3: 511. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 72. 1996; Sivar. & P. Mathew, Fl. Nilambur 108. 1997; Mohanan & Sivad., Fl. Agasthyamala 115. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 99. 2005. *Grewia leptopetala* Brandis, Indian Trees 100. 1906. *Grewia tiliifolia* Vahl var. *leptopetala* (Brandis) Cooke, Fl. Pres. Bombay 142. 1901. *Grewia tiliifolia* Vahl var. *argentea* Burrett, Notizbl. Bot. Gart. Berlin. 9: 659. 1926.*Pai-paroea, Couradi* Rheede, Hort. Malab. 5:91-92, t. 46. 1685.

Large trees; bark greyish-brown, rough. Branchlets stellate-tomentose. Leaves 14-18 x 9-12 cm, broadly ovate, acute at apex, crenate-serrate, hoary tomentose below; petiole 2-2.5 cm long. Peduncle axillary; sepals hairy at base inside; petals yellow, densely tomentose outside; stigma 2-3-lobed, recurved. Drupelets 1-4, to 5 mm across, globose, reddish.

Flowering & Fruiting: February-June.

Distribution: Tropical Africa, India to Indo-China. Common; in semi-evergreen and moist deciduous forests. *RNMK 1592*, Manikkunnumala; *RNMK 3297*, Muthanga; *RNMK 2546*, Tholpetty.

Grewia umbellifera Bedd., For. Man. Bot. 37. 1871; Mast. in Hook. f., Fl. Brit. India 1: 393. 1874; Dunn in Gamble, Fl. Pres. Madras 117(84). 1915; Manilal & Sivar., Fl. Calicut 53. 1982; Ansari, Fl. Kasaragod Div. 84. 1985; Manilal, Fl. Silent Valley 34. 1988; Daniel & Chandra. in B.D. Sharma & Sanjappa, Fl. India 3: 513. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 72. 1996; Sivar. & P. Mathew, Fl. Nilambur 110. 1997; Mohanan & Sivad., Fl. Agasthyamala 116. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 100. 2005.

Scandent shrubs. Leaves 10-12 x 5-6 cm, ovate-oblong, abruptly acuminate, shortly cordate at base, stellate hairy along nerves; petiole 7-8 mm long. Peduncle 3-4 cm long, many-flowered; pedicels slender; sepals 1-1.5 cm long, tomentose outside; petals obtuse; gynophore densely hairy, stigma 4-lobed. Drupelets 0.5-1 cm across, globose.

Flowering & Fruiting: March-May.

Distribution: Endemic to Western Ghats. Common in evergreen forests. *RNMK 2554*, Talimala.

TRIUMFETTA Linnaeus

Sp. Pl. 444. 1753.

Erect herbs or shrubs; branches stellate hairy. Leaves entire or lobed, serrate. Flowers yellow, axillary, cymose, conjested; sepals 5, free, oblong;

petals 5, oblanceolate to obovate; stamens 10 or indefinite, free; ovary globose, 5-celled, cell 2-ovuled; style 1, filiform, stigma 2-5- lobed. Capsule globose, densely glochidiate hairy; seeds angled.

1. Lower leaves 3- lobed .....**T. rhomboidea**
1. All leaves entire ..... **T. pilosa**

Triumfetta pilosa Roth, Nov. Pl. Sp. 223. 1821; Mast. in Hook. f., Fl. Brit. India 1: 394. 1874; Dunn in Gamble, Fl. Pres. Madras 120(86). 1915; Manilal, Fl. Silent Valley 34. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 72. 1988; Vajr., Fl. Palghat Dist. 95. 1990; Daniel &. Chandra. in B.D. Sharma & Sanjappa, Fl. India 3: 519. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 73. 1996; Sivar. & P. Mathew, Fl. Nilambur 110. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 101. 2005. *Triumfetta cana* Blume, Bijdr. 113. 1825; Mast. in Hook. f., Fl. Brit. India 1: 396. 1874.

Shrubs, to 2 m high; branches stellate-hairy. Leaves 13-16 x 8-10 cm, ovate, rounded at base, acuminate at apex, serrate, densely stellate-hairy below, 5-nerved from base. Flowers 3-10-together; sepals hairy outside; petals yellow, oblanceolate, hairy at base; stamens 10, filaments 6-7 mm long. Capsule densely glochidiate-bristled, 2.5 cm across.
Flowering & Fruiting: November-February.
Distribution: Tropical Africa, Central and east Asia. Common; in open plantations. *RNMK 1173*, Puthoorvayal.

Triumfetta rhomboidea Jacq., Enum. Syst. Pl. 22. 1760; Mast. in Hook. f., Fl. Brit. India 1: 395. 1874; Dunn in Gamble, Fl. Pres. Madras 120(86). 1915; Manilal & Sivar., Fl. Calicut 52. 1982; Ansari, Fl. Kasaragod Div. 85. 1985; Manilal, Fl. Silent Valley 35. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 72. 1988; Vajr., Fl. Palghat Dist. 95. 1990; Daniel & Chandra. in B.D. Sharma & Sanjappa, Fl. India 3: 520. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 73. 1996; Sivar. & P. Mathew, Fl. Nilambur 111. 1997; Mohanan & Sivad., Fl. Agasthyamala 118. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 101. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 144. 2009. *Triumfetta angulata* Lamk., Encycl. 3: 421. 1789. *Triumfetta trilocularis* Roxb., Fl. Ind. 2: 462. 1832. *Triumfetta tungarensis* Billore, J. Econ. Tax. Bot. 3: 621. 1982.

Shrubs or herbs. Leaves 6-7 x 4-6 cm, ovate to rhomboid, 3-lobed, cordate or rounded at base, acuminate at apex, densely stellate-tomentose below, 3-5-ribbed from base. Flowers 3-15 together; pedicels 4-5 mm long; sepals sparsely stellate-hairy; petals oblanceolate, with two tufts of hairs at base. Capsule with stiff bristles.
Flowering & Fruiting: August-January. *Distribution*: Pantropical. Common in open areas. *RNMK 3100,* Puthoorvayal.

ELAEOCARPACEAE Juss. ex DC.

Prodr. 1: 519. 1824.

ELAEOCARPUS Linnaeus

Sp. Pl. 515. 1753.

Trees. Leaves alternate, entire or serrate; petiolate. Flowers in axillary racemes; pedicelled, usually deflexed; sepals 4 or 5, free, valvate; petals 4 or 5, obovate, fimbriate; stamens many, free; anthers oblong, dehiscing apically; ovary 2-5 celled, ovules 2 in each cell, style -1, entire. Drupe globose to oblong, with a tuberculate stone divided into 2-5, 1-seeded cells.

1. Anthers awned with a long bristle 2
1. Anthers obtuse, bearded at apex 3
2. Leaves ca. 9 x 4 cm, crenate, glabrous; drupe oblong ..... **E. munronii**
2. Leaves ca. 22 x 15 cm, entire, ferrugineous tomentose beneath; drupe globose .... **E. tuberculatus**
3. Leaves glandular; sepals pubescent..... **E. glandulosus**
3. Leaves eglandular; sepals glabrous..... **E. serratus**

Elaeocarpus glandulosus Wall. ex Merr., J. Arnold Arbor. 32: 194. 1951; Manilal, Fl. Silent Valley 36. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 73. 1988; Murti in B.D. Sharma & Sanjappa, Fl. India 3: 539. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 74. 1996; Mohanan & Sivad., Fl. Agasthyamala 119. 2002. *Elaeocarpus oblongus* sensu Wight, Ic. t. 48. 1838; Mast. in Hook.f., Fl. Brit. India 1:403. 1874; Dunn in Gamble, Fl. Madras 124. 1915, non Gaertn., 1788.

Large trees with broad buttresses. Leaves 12-15 x 6-7 cm, elliptic-oblong, abruptly acuminate with emarginate tip, base rounded, distantly crenate, 6-8 nerved, punctuate, domatia glandular. Racemes to 8 cm long; pedicel glabrous; sepals minutely pubescent outside, glandular inside, reddish; petals white, 6-7 mm long, fimbriate, glandular; stamens many, anthers puberulus; ovary densely hairy. Drupe 2.5–3.5 cm long, oblong; pyrene tubercled.

Flowering & Fruiting: December-May.

Distribution: Indo-Malesia. Occasional; in evergreen forests. *RNMK 3481*, Chanthanathodu.

Elaeocarpus munronii (Wight) Mast. in Hook. f., Fl. Brit. India 1: 407. 1874; Dunn in Gamble, Fl. Pres. Madras 124(88). 1915; V.S. Ramach. & V.J. Nair, Fl. Cannanore 73. 1988; Manilal, Fl. Silent Valley 35. 1988; Vajr., Fl. Palghat Dist. 96. 1990; Murti in B.D. Sharma & Sanjappa, Fl. India 3: 546. 1993; Mohanan & Sivad., Fl. Agasthyamala 120. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta Dist. 102. 2005. *Monocera munroii* Wight, Ill. 1: 83. 1840 & Ic. t. 952. 1845. **Plate 12a.**

Large trees; branchlets slender. Leaves 4-9 x 3-4 cm, ovate-lanceolate, acuminate, rounded at base, crenate, 5-nerved, petiole 2-3 cm long, glabrous.

Racemes to 5 cm long, axillary, glabrous; pedicel 0.5-1 cm long, erect; sepals thinly tomentose; petals white with reddish lines at base, densely tomentose; anthers 2-3 mm long, bristle 0.5-1 mm long. Drupe 1.5-2 cm long, terete, glabrous, glaucous; seeds tubercled.
Flowering & Fruiting: September-April.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1426*, Kurichiarmala; *RNMK 2190,* Pookodu.

Elaeocarpus serratus L., Sp. Pl. 515. 1753; Mast. in Hook. f., Fl. Brit. India 1:401.1874; Dunn in Gamble, Fl. Pres. Madras 124(88). 1915; Ansari, Fl. Kasaragod Div. 86. 1985; Nicols., Suresh & Manilal, An interpr. Hort. Malab. 103. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 74. 1988; Vajr., Fl. Palghat Dist. 96. 1990; Murti in B.D. Sharma & Sanjappa, Fl. India 3: 553. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 74. 1996; Sivar. & P. Mathew, Fl. Nilambur 112. 1997; Mohanan & Sivad., Fl. Agasthyamala 121. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 102. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 144. 2009. *Elaeocarpus oblongus* Gaertn., Fruct. 1: 202. t. 43. 1788. *Perin-Kara* Rheede, Hort. Mab. 4:51-52, t. 24. 1683.

Large trees with aerial rots on the buttresses; twigs glabrous. Leaves 9-12 x 4-6 cm, obovate, acute, narrowed to the base, serrate, 4-7 nerved; domatia glandular; petiole ca. 1.5 cm long, glabrous. Raceme ca. 8 cm long; glabrous; pedicel ca. 5 mm long, slender. Flowers greenish white; sepals densely glandulose; petals ca. 7 mm long, glabrous; anthers puberulus, bristles 3 or 4; ovary densely tomentose, 3-celled. Drupe 2-2.5 cm across, ovoid to oblong; pyrene shortly tubercled.
Flowering & Fruiting: April-September.
Distribution: Indo-Malesia. Common; in evergreen forests. *RNMK 2876*, Chooralmala; *RNMK 1123*, Sughandhagiri.

Elaeocarpus tuberculatus Roxb., Fl. Ind. 2: 594.1832; Bedd., Fl. Sylv.t.113. 1871; Mast. in Hook. f., Fl. Brit. India 1:404.1874; Dunn in Gamble, Fl. Pres. Madras 124(88). 1915; Manilal, Fl. Silent Valley 37. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 74. 1988; Vajr., Fl. Palghat Dist. 97. 1990; Murti in B.D. Sharma & Sanjappa, Fl. India 3: 559. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 74. 1996; Sivar. & P. Mathew, Fl. Nilambur 112. 1997; Mohanan & Sivad., Fl. Agasthyamala 121. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 102. 2005. *Monocera tuberculata* (Roxb.) Wight & Arn., Prodr. 83. 1834. **Plate 11 l.**

Large trees, prominently buttressed; bark white; branching monopodial, branchlets stout. Leaves 22-24 x 12-15 cm, obovate, obtuse, entire, brown pubescent below, 14-16-nerved, glabrous above; petiole 1.5-2.5 cm long, stout. Raceme to 12 cm long, ferrugineous tomentose; pedicel 1-2 cm long deflexed. Flowers facing downwards, 1.5-2.5 cm across; sepals 1.5-2 cm, lanceolate; petals white, 1.5-1.8 cm long, fimbriate, fulvous tomentose,

anthers thinly tomentose, aristate; ovary densely hairy; style 0.5-1 cm long, tomentose. Drupe oblong or ellipsoid, 4-5 cm long, ferrugineous tomentose; pyrene laterally compressed, warty tubercled.
Flowering & Fruiting: December-August.
Distribution: Indo-Malesia. Common; in evergreen forests. *RNMK 2560*, Talimala; *RNMK 1790,* Amba; *RNMK 1905,* Thirunelli.

Muntingia calabura L., is found occasionally grown along way sides and Govt. office premises at Kalpetta.

ERYTHROXYLACEAE Kunth

Nov. Gen. Sp. 5. 4: 175. 1822.

ERYTHROXYLUM P. Browne

Civ. Nat. Hist. Jamaica 278. 1756.

Erythroxylum moonii Hochr., Bull. Inst. Bot. Buit. 22: 54. 1905; Vajr., Fl. Palghat Dist. 97. 1990; Chatterjee & B.D. Sharma in B.D. Sharma & Sanjappa, Fl. India 3: 593. 1993; Mohanan & Sivad., Fl. Agasthyamala 123. 2002. *Sethia acuminata* Arn., in Act. Acad. Nat. Cur. 18:324. 1836. *Erythroxylum acuminatum* (Arn.) Walp., Rep. Bot. Syst.1: 407. 1842, non Ruiz. & Pav. 1794; Gamble, Fl. Pres. Madras 127(91). 1915. *Erythroxylum lucidum* Moon ex Hook.f., Fl. Brit. India 1: 415. 1874, non Kunth 1822. **Plate 12b.**

Small trees. Leaves 6-15 x 1.5-4 cm, linear lanceolate, caudate acuminate at apex, attenuate at base, dark brown on drying. Flowers solitary or 1-2 fascicled at axils. Peduncles 0.4-0.6 cm, stout; calyx lobes 0.1-0.2 cm, triangular ovate; corolla white, lobes 0.1-0.2 cm long; ovary oblong, 3-celled; style as many as cells. Drupe oblong, 1.2-1.5 cm long, glabrous, furrowed.
Flowering & Fruiting: February-May.
Distribution: South India and Sri Lanka. Rare; in evergreen forests. *RNMK 1234,* Chanthanathodu; *RNMK 3542*, Thariodu.

MALPIGHIACEAE Juss.

Gen. Pl. 252. 1789.

1. Petals clawed; style 1, rarely 2 ..... **Hiptage**
1. Petals not clawed; styles 3 ..... **Aspidopterys**

ASPIDOPTERYS A. Jussieu

Ann. Sc. Nat. Ser. 2, 13: 266. 1840.

Aspidopterys canarensis Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3:351.1851; Hook. f., Fl. Brit. India 1: 420. 1874; Gamble, Fl. Pres. Madras129(92). 1915; Srivastava, J. Econ. Tax. Bot. 6: 62. 1985; Nayar & Sastry, Red Data Book Indian Pl. 1:194. 1987; V.S. Ramach. & V.J. Nair, Fl. Cannanore 75. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 75. 1996;

Srivastava in Hajra *et al.*, Fl. India 4: 3. 1997; Mohanan & Sivad., Fl. Agasthyamala 124. 2002. *Aspidopterys glomerata* Wight, Ic. t. 1986. 1853. **Plate 12c.**

Woody climbers; stems green. Leaves opposite, 7-9 x 4-4.5 cm, ovate, acute at apex, rounded at base, entire, basal nerves 3, rib-like. Flowers bisexual, in axillary fascicles, 5-25-together; pedicels 1-1.5 cm long; bracts rusty tomentose; sepals 5, free, oblong; petals 5, oblong, yellow, imbricate; stamens 10, free; ovary 3-celled, glabrous; styles 3, free; stigmas capitate. Fruit of 1-3-winged samaras.

Flowering & Fruiting: February-May.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. RNMK 2340, Chanthanathodu; *RNMK 1654*, Kutyadi Ghats.

HIPTAGE J. Gaertner

Fruct. 2: 169. 1790, *nom. cons.*

Hiptage benghalensis (L.) Kurz, J. Asiat. Soc. Bengal 43: 136. 1874; Manilal & Sivar., Fl. Calicut 55. 1982; Manilal, Fl. Silent Valley 38. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 75. 1988; Vajr., Fl. Palghat Dist. 97. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 75. 1996; Srivastava in Hajra *et al.*, Fl. India 4:14.1997; Mohanan & Sivad., Fl. Agasthyamala 125. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 104. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 147. 2009. *Banisteria benghalensis* L., Sp. Pl. 427. 1753. *Hiptage madablota* Gaertn., Fruct. 2: 169,t.116. 1791; Dunn in Gamble, Fl. Pres. Madras 128(91). 1915. *Gaertnera racemosa* Roxb., Pl. Corom. t. 18. 1795 & Fl. Ind. 2: 368. 1832.

Woody climbers. Leaves opposite, 13-16 x 5-7 cm, elliptic, acuminate at apex, rounded at base, nerves 7-8 pairs, intercostae reticulate, green when dried; petiole 0.5-1 cm long, hirtus. Racemes 5-10 cm long; pedicels 1.5-2 cm long, hispid; bracts lanceolate. Flowers white; calyx lobes ovate, obtuse, hispid, with a large red gland on one lobe outside; petals 5, 1-1.3 x 0.5-1 cm, obovate, obtuse, fimbriate; stamens 10, free; ovary densely hairy; style 1. Samara with a longer medium wing and 2- shorted lateral wings, elliptic to obovate; seeds solitary, compressed.

Flowering & Fruiting: January-November.

Distribution: Indo-Malesia and China. Common; in semi-evergreen and moist deciduous forests. *RNMK 2341*, Kuruva; *RNMK 3021*, Manikkunnumala.

ZYGOPHYLLACEAE R. Br.

TRIBULUS Linnaeus

Sp. Pl. 386. 1753.

Tribulus terrestris L., Sp. Pl. 387. 1753; Edgew. & Hook. f. in Hook. f., Fl. Brit. India 1: 423. 1874; Dun in Gamble, Fl. Pres. Madras 130(92). 1915; P. Singh & V. Singh in Hajra *et al.*, Fl. India 4: 55. 1997. *Tribulus lanuginosus* L., Sp. Pl. 387. 1753.

Prostrate herbs. Leaves opposite, imparipinnate; leaflets opposite, 1-1.5 x 0.6-0.7 cm, 4-5 pairs, oblong; petiole 6-7 mm long, stipules 2-3 in cluster, persistent. Flowers 1 or 2, axillary, golden yellow, to 2 cm across; pedicels to 3 cm; sepals 5, 4-5 mm long, linear; petals 5, 5-6 mm long; stamens 10, filaments dilated at base, disc 10-lobed; ovary 5-lobed, hirsute with bulbous hairs; stigmas 5. Fruit 0.5-1 cm across, globose, 5-angled, cocci 5, woody, each with a pair of divaricate spines.
Flowering & Fruiting: October-December.
Distribution: Tropical and warm temperate regions of the world. Common; in dry deciduous forests. *RNMK 1432,* Maragatha.

OXALIDACEAE R. Br.

in Tuckey, Narr. Exped. Zaire: 433. 1818.

1. Leaves pinnate ..... **Biophytum**
1. Leaves trifoliate ..... **Oxalis**

BIOPHYTUM A. P. de Candolle

Prodr. 1: 689. 1824.

Herbs. Leaves pinnate, clustered towards the apex; leaflets larger towards the apex of the leaf, opposite, inequilateral, entire, penninerved; petiole swollen at the base. Flowers in terminal umbels, bisexual; sepals 5, free; petals 5, free, usually yellow; stamens 10, filaments shortly connate at base; ovary 5-celled, 5-lobed, ovules few in each cell, style 1, notched at apex. Fruit a loculicidal capsule; seeds 2-4 in each cell, tubercled, arillate.

1. Stem unbranched.....2
1. Stem branched.....3
2. Sepals equal or bigger than capsule ..... **B. reinwardtii**
2. Sepals smaller than capsule..... **B. sensitivum**
3. Flowers 10-12 in a pseudo umbel..... **B. congestiflorum**
3. Flowers 4-8 in an umbel..... **B. intermedium**

Biophytum congestiflorum Govind., J. Econ. Tax. Bot.20: 311. f. 1. 1996; Manna in Hajra *et al.*, Fl. India 4: 231. 1997.

Perennial herbs; stems usually branched; branches 2-6 in pseudo-wholrs. Leaves 5-10 x 2-3 cm; stipules linear-lanceolate; leaflets 15-22 pairs, falcate, cuspidate, undulate, margins and midnerve above with a row of bulbous based hairs, dirty green above. Inflorescence shorter than leaves; peduncle 4-8 cm long; flowers 10-12 in a pseudo-umbel; pedicels shorter than bracts, 1.5-2 mm, glabrous; bracts closely whorled, linear-lanceolate; sepals 4-5 x 1-2 mm, ovate to lanceolate; petals 5-5.5 x 0.5-1 mm, obovate; ovary 5-lobed, glabrous. Fruits turbinate; seeds 2-4 per locule, broadly ovate, acute, reddish brown.
Flowering & Fruiting: Through out the year.
Distribution: Endemic to southern Western Ghats (Kerala). Rare; in Grasslands in rock crevice. *RNMK 1532,* Chembra.

Biophytum intermedium Wight, Ill. 1: 162. 1840; Edgew. & Hook. f. in Hook. f., Fl. Brit. India 1: 438. 1874; Gamble, Fl. Pres. Madras 133(95). 1918; Manna in Hajra *et al.*, Fl. India 4: 232. 1997; Mohanan & Sivad., Fl. Agasthyamala 126. 2002.

Perennial herbs; stem branched, slender, rooting at nodes, 50-60 cm long, trailing; nodes hairy. Leaves 3-10 cm long, rachis hirsute; leaflets 12-25 pairs, basal smaller, ovate, middle 6-7 x 2-2.5 mm, obovate-oblong, truncate at base, apiculate. Flowers yellow, 4-8-together in an umbel; peduncles 2-3 cm long; sepals linear, villous; petals obovate. Seeds ellipsoid, tubercled ridged.
Flowering & Fruiting: February-June.
Distribution: South India and Sri Lanka. Grasslands in rock crevices. *RNMK 1210*, Banasuramala.

Biophytum reinwardtii (Zucc.) Klotzsch in Peters Reise Mossamb. Bot. 1: 85. 1861; Edgew. & Hook. f. in Hook. f., Fl. Brit. India 1: 437. 1874; Gamble, Fl. Pres. Madras 133(95). 1915; Manilal & Sivar., Fl. Calicut 55. 1982; Ansari, Fl. Kasaragod Div. 87. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 76. 1988; Vajr., Fl. Palghat Dist. 98. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 76. 1996; Manna in Hajra *et al.*, Fl. India 4: 236. 1997; Mohanan & Sivad., Fl. Agasthyamala 126. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 104. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 150. 2009. *Oxalis reinwardtii* Zucc., Abh. Math.-Phys. Cl. Koenigl. Bayer. Akad. Wiss. 1: 274. 1829-1830.

Unbranched herbs; stem to 20 cm tall. Leaves 5-12 cm long, collected at apex into a caudex; leaflets 10-15 pairs, oblong, slightly oblique, base truncate, glabrous. Peduncle to 15 cm long, glandular-hispid. Flowers to 8 per umbel; pedicels slender, glandular; sepals ovate-lanceolate, acute, brown; petals yellow, oblanceolate, with a red line in the middle.
Flowering & Fruiting: July-December.
Distribution: Indo-Malesia and China. Common; in moist deciduous forests and forest plantations. *RNMK 1549,* Kuruva; *RNMK 2341*, Pulpally.

Biophytum sensitivum (L.) DC., Prodr. 1: 690. 1824; Edgew. & Hook. f. in Hook. f., Fl. Brit. India 1: 436. 1874; Gamble, Fl. Pres. Madras 133(95). 1915; Ansari, Fl. Kasaragod Div. 87. 1985; Nicols., Suresh & Manilal, An interpr. Hort. Malab. 155. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 76. 1988; Manna in Hajra *et al.*, Fl. India 4: 238. 1997. *Oxalis sensitiva* L., Sp. Pl. 434.1753. *Todda-vaddi* Rheede, Hort. Malab. 9:33-34, t.19.11689.

Stem simple, 15, 40 cm long. Leaves 7-10 cm long; rachis hirsute; leaflets 15-18 pairs, sparsely strigose hairy above, glaucous beneath, basal small, ovate, terminal obovate. Flowers yellow, in 10-18 cm long slender hirsute umbels; peduncles congested; bracts 1.2-1.8 x 0.1-0.5 mm, ovate, acute, villous; bracteoles ca. 2 x 0.2 mm, linear, villous; sepals linear, lanceolate, strigose. Seeds ovoid, tubercled.

Flowering & Fruiting: October-January.
Distribution: Indo-Malesia. Occasional; in moist shady places. *RNMK 3128,* Puthoorvayal.

OXALIS Linnaeus
Sp. Pl. 433.1753.

Herbs, stems creeping or very short. Leaves digitately 3-foliolate, long-petiolate; leaflets obovate, obtuse, sessile. Flowers umbellate, bisexual; sepals 5, free; petals 5, free, twisted; stamens 10, in two series, outer whorl with short stamens; filaments shortly united at the base; ovary conical, 5-celled, ovule many in each cell; styles 5, distinct. Fruit a capsule, oblong; seeds many.

1. Diffuse herbs; flowers yellow ..... **O. corniculata**
1. Erect herbs; flowers violet..... **O. corymbosa**

Oxalis corniculata L., Sp. Pl. 435. 1753; Wight, Ic. t. 18. 1838; Edgew. & Hook. f. in Hook. f., Fl. Brit. India 1: 436. 1874; Gamble, Fl. Pres. Madras 132(94). 1915; Manilal & Sivar., Fl. Calicut 55. 1982; Manilal, Fl. Silent Valley 38. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 77. 1988; Vajr., Fl. Palghat Dist. 98. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 76. 1996; Sivar. & P. Mathew, Fl. Nilambur 115. 1997; Manna in Hajra *et al.*, Fl. India 4: 242. 1997; Mohanan & Sivad., Fl. Agasthyamala 128. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 105. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 151. 2009. *Oxalis corniculata* L. var. *hispida* Blatt., J. Bombay Nat. Hist. Soc. 34: 898. 1931.

Diffuse perennial herbs, branches slender, procumbent, rooting at lower nodes, pubescent. Leaflets sessile, obcordate, emarginate, base cuneate, pilose, ca. 1.5 x 1.6 cm; petiole 2-4 cm long, slender. Flowers yellow, 5-6 mm across, 2-many-together, in peduncled umbels; peduncles 3-7 cm long; pedicels 2-3 cm long, slender; sepals lanceolate, obtuse at apex; petals 6-7 mm long, oblong. Capsule oblong, acuminate, to 1.5 cm long; seeds 5-10 per cell, flattened to ovoid, transversely ridged.
Flowering & Fruiting: March-December.
Distribution: Cosmopolitan. Common; in moist places. *RNMK 2896*, Puthoorvayal.

Oxalis corymbosa DC., Prodr. 1: 696. 1824; Calder in Rec. Bot. Surv. India 6: 337. 1919: Manna in Hajra *et al.,* Fl. India 4: 246. 1997. *Oxalis martiana* Zucc., Denkschr. Koenigl. Akad. Wiss. Muenchen 59: 144. 1823-1824.

Herbs, acaulescent; bulbs globose, acute at tip. Leaves 9-12, stipulate, trifoliolate; petiole very thin, 13-25 cm long, sparsely hairy; leaflets cuneate at base, 1.2-1.8 x 1.5-2 cm, equal, membranous, appressed hairy on both surfaces. Inflorescence a pseudo-umbel, 6-7 flowered. Flowers pedicellate, 1-1.5 cm long; sepals 5, distinct, elliptic, erect, acute, 5-6 mm long; petals 5,

cuneate, oblique, 1.5-2 cm long, violet; stamens 10 in two series, alternately long and short; anthers oblong, short, yellow; ovary obtusely 5-angled, oblong, glabrous; ovules 3-8 in each locule; style 5.
Flowering & Fruiting: September-January.
Distribution: India and Tropical South America. Moist places in plantations. *RNMK 1298,* Chembra estate ; *RNMK 2681*, Chooralmala.

BALSAMINACEAE A. Rich.

in Bory, Dict. Class. Hist. Nat. 2: 173. 1822.

IMPATIENS Linnaeus

Sp. Pl. 937. 1753.

Erect herbs or small shrubs. Stems delicate and usually fleshy. Leaves opposite, alternate, or whorled, linear to broadly ovate, usually petiolate. Flowers solitary, umbellate, fascicled or in racemes, axillary or terminal, irregular and showy; sepals 3, free, irregular, the lower one modified into a boat shaped lip with or without a basal extension into a long or short spur; other two sepals sepaloid, linear, lanceolate to orbicular; petals 3, irregular; posterior petal, the standard, oblong to orbicular, with or without a midrib; lateral petals, the wings, usually 2-3 lobed, lobes equal or unequal, sometimes with a dorsal projection near the base, the dorsal auricle; lobes usually obtuse; stamens 5, filaments free at base, confluent along with anthers towards the tip, all surrounding the ovary; ovary ellipsoid, 5 -celled; ovules few-many in each cell; style absent, stigma 5-lobed. Fruit a capsule, elastically opening; seeds many, round or flattened, glabrous or hairy.

1. Leaves radical; flowers in scape 2
1. Leaves cauline; flowers in leafy stem 6
2. Wings 2 lobed 3
2. Wings 3 lobed 4
3. Flowers white or cream coloured ..... **I. neo-barnesii**
3. Flowers deep-pink or mauve ..... **I. acaulis**
4. Dorsal auricle of wings produced into spur of lip ..... **I. lawsonii**
4. Dorsal auricle of wings not produced into spur of lip 5
5. Standard crenate ..... **I. crenata**
5. Standard not crenate ..... **I. scapiflora**
6. Plants epiphytic 7
6. Plants terrestrial 8
7. Lateral sepals elliptic; capsule ellipsoid ..... **I. jerdoniae**
7. Lateral sepals linear; capsule gibbous ..... **I. parasitica**
8. Flowers epedunculate 9
8. Flowers pedunculata 18
9. Spur of lip absent or extreamely minute 10
9. Spur of lip present and well developed 12

10. Leaves opposite 11
10. Leaves alternate .....**I. scabriuscula**
11. Leaves linear or narrowly linear-lanceolate .....**I. herbicola**
11. Leaves ovate or ovate-lanceolate ..... **I. inconspicua**
12. Aestivation either alternate or opposite.....13
12. Aestivation of different types on same plant.....17
13. Leaves all opposite 14
13. Leaves all alternate.....16
14. Leaves entire or sub-entire .....**I. diversifolia**
14. Leaves serrate or crenate.....15
15. Leaves linear or linear-elliptic.....**I. chinensis**
15. Leaves elliptic-lanceolate ..... **I. minor**
16. Wing-lobes subequal .....**I. dasysperma**
16. Wing-lobes unequal, basal lobes smaller than distal one .....**I. balsamina**
17. Lateral sepals ciliate along margins .....**I. gardneriana**
17. Lateral sepals not ciliate along margins ..... **I. lucida**
18. Dorsal auricle of wings filiform, extending into a spur ..... **I. viscose**
18. Dorsal auricle of wings not filiform or extending into spur.....19
19. Stem prostrate and rooting below; distal lobe of wings orbicular.....**I. cordata**
19. Stem erect; distal lobe of wings triangular .....**I. parvifolia**

Impatiens acaulis Arn., Comp. Bot. Mag. 1: 325. 1835; Hook. f., Fl. Brit. India 1: 443. 1874; Gamble, Fl. Pres. Madras 138(98). 1915; Manilal, Fl. Silent Valley 39. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 78. 1988; Vajr., Fl. Palghat Dist. 99. 1990; Pandura. & V.J. Nair, J. Econ. Tax. Bot. 20: 699. 1996; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 111. 1997.

Stemless herbs. Leaves 9-12 x 9-12 cm, orbicular, obtuse, cordate at base, glabrous, margins distantly crenate or entire; nerves 4 pairs. Scape 20-25 cm long, many-flowered. Flowers white, 2-3 cm across, confined to the apex of the scape; bracts 3-4 mm long, ovate; pedicels 2-2.5 cm long, solitary; lip 7-9 mm long, broadly ovate, concave, acute; spur 3-3.5 cm long, slender, glabrous; lateral sepals ovate, acute, green; standard pink, orbicular, emarginate, not cuspidate; wings equally lobed, lobes 2-2.5 cm long, oblong, obtuse. Capsule 6-9 mm long, ellipsoid, acute, glabrous.

Flowering & Fruiting: July-November.

Distribution: South India and Sri Lanka. Rare; in open dripping rocks in grasslands. *RNMK 0031,* Manikkunnumala.

Impatiens balsamina L., Sp. Pl. 938. 1753; Wight & Arn., Prodr. 135. 1834; Hook. f., Fl. Brit. India 1: 453. 1874; Gamble, Fl. Pres. Madras 142(101). 1915; Manilal & Sivar., Fl. Calicut 57. 1982; Sivar. & P. Mathew, Fl. Nilambur 116. 1997; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 123. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 106. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 152. 2000. *Impatiens dahlii* Warb. in K. Schum. & Lauterb, Nachtr. Fl. Deutsch. Sudsee 313. 1905.

Stem 30-40 cm high, glabrous. Leaves 7-8 x 0.7-0.8 cm, narrowly lanceolate, acute at either ends, serrate; petiole 1.3-1.5 cm long. Flowers solitary, axillary; pedicels 7-9 mm long; lip saccate, cuspidate, densely hairy; spur 8-9 mm long, curved, densely hairy; sepals minute; standard 5.5-6.5 x 7-8 mm, orbicular, emarginate and cuspidate, hairy, cusp 4-5 mm long; wings 1.2-1.5 cm long, 2-lobed, basal lobe rounded; terminal lobe notched at apex. Capsule ellipsoid, acute, tomentose; seeds few, rugulose, brown.
Flowering & Fruiting: March-October.
Distribution: Indo-Malesia; introduced into many countries. Common; in grasslands. *RNMK 2516,* Pookodu.

Impatiens chinensis L., Sp. Pl. 937. 1753; Hook. f., Fl. Brit. India 1: 444. 1874; Gamble, Fl. Pres. Madras 139(99). 1915; Manilal, Fl. Silent Valley 39. 1988; Nicols., Suresh & Manilal, An interpr. Hort. Malab. 70. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 78. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 77. 1996; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 131. 1997; Mohanan & Sivad., Fl. Agasthyamala 130. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta. 107. 2005. *Impatiens fasciculata* Lamk., Dict. 1: 359. 1873.

Unbranched herbs, stems 40 cm high, reddish. Leaves 8-10 x 1-1.5 cm, linear-oblong, cordate at base, distantly crenate, glabrous. Flowers binate, axillary, pedicelled; lip 7-8 mm long, acuminate and curved back at apex; spur 1.3-1.5 cm long, slender; standard orbicular, emarginate; terminal lobe of wing 1.2-1.4 cm long, ovate, obtuse, pink; basal lobe 4-5 mm long; dorsal auricle 4-4.5 mm long, slender. Capsule 0.5-1 cm, long, glabrous.
Flowering & Fruiting: October-May.
Distribution: India and China. Common; in exposed marshes in grasslands. *RNMK 0031,* Sugandhagiri.

Impatiens cordata Wight, Madras J. Lit. Sci. ser. 1. 5: 10. 1837; Hook. f., Fl. Brit. India 1: 462. 1874; Gamble, Fl. Pres. Madras 144(103). 1915; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 135. 1997; Mohanan & Sivad., Fl. Agasthyamala 131. 2002.

Procumbent herbs, 20-35 cm long. Leaves to 4-5 x 3-3.5 cm, ovate, cordate at base, acute at apex, crenate, glabrous; petioles 7-8 cm long. Flowers 2-2.5 cm across, light pink; pedicels 1.2-1.5 cm long; lip 7-8 x 7-8 mm, concave, obtuse; spur 3-3.5 cm long, curved; sepals 4-5 x 3.5-4 mm, ovate, cordate at base, mucronate; standard 8-9 x 6-7 mm, oblong, emarginate at apex, round at base; wings 1.5-1.7 x 1-1.3 cm, two-lobed, lower lobe orbicular, vaulting over the anthers, reddish. Capsule 1.2-1.5 cm long, curved-ellipsoid, glabrous; seeds ovoid, densely hairy along the margins, dark-brown.
Flowering & Fruiting: December-March.
Distribution: Endemic to southern Western Ghats. Rare; in moist shady places in upper hills. *RNMK 2516,* Banasuramala.

Impatiens crenata Bedd., Madras J. Lit. Sci. ser. 2, 20: 69. t.7. f.10. 1859; Hook. f., Fl. Brit. India 1: 442. 1874; Gamble, Fl. Pres. Madras 139(99).1915; V.S. Ramach. & V.J. Nair, Fl. Cannanore 78. 1988; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 136. 1997. *Impatiens stocksii* Hook.f. & Thoms., J. Linn. Soc. Bot. 4: 156. 1860; Hook. f., Fl. Brit. India 1: 442. 1874; Gamble, Fl. Pres. Madras 1879 (1294). 1936; Pandura. & V.J. Nair, J. Econ. Tax. Bot. 20: 701. 1996.

Herbs, root stock bulbous. Leaves radical, orbicular-reniform or cordate, rounded at base, glabrous. Scape slender, 2-3-flowered at apex, pedicels short; bracts ovate-oblong. Flowers white with a tuft of blue hairs; lateral sepals small, ovate; lip with a short obtuse spur; wings deeply 2-lobed; inner surface with a dense tuft of hairs; standard broader than long. Capsule tapering at both ends, glabrous.

Flowering & Fruiting: July-September.

Distribution: Endemic to southern Western Ghats. Rare; on moist tree trunks. *RNMK 0089*, Theethundamala.

Impatiens dasysperma Wight, Madras J. Lit. Sci. ser. 1, 5: 7, t. 2. 1837; Hook. f., Fl. Brit. India 457. 1874; Gamble, Fl. Pres. Madras 143(102). 1915; V.S. Ramach. & V.J. Nair, Fl. Cannanore 79. 1988; Vivek. et al. in Hajra *et al.*, Fl. India 4: 139. 1997.

Erect herbs, 25-30 cm high. Leaves 10-11 x 3-3.5 cm, elliptic, acuminate at apex, acute at base, crenate, hairy below; petiole 4-5 cm long. Flowers 1.8-2 cm across, solitary or binate, axillary; pedicels 3-4 cm long; lip 7-8 x 3-4 mm, acuminate, glabrous; spur 1.5-1.7 cm long, narrow, minutely hairy; sepals small, ovate, acute, hairy; standard obovate, emarginate at apex, sharply cuspidate, keeled, keel ciliate; wings 0.8-0.9 x 0.8-1 cm, equally 2-lobed, lobes obovate, obcordate. Capsule 1-1.2 cm long, glabrous; seeds ovoid, minutely hirtus.

Flowering & Fruiting: November-December.

Distribution: Endemic to southern Western Ghats. Rare; in moist situations. *RNMK 2269,* Chooralmala.

Impatiens diversifolia Wall. ex Wight & Arn., Prodr. 139. 1834; Hook. f., Fl. Brit. India 1: 446. 1874; Gamble, Fl. Pres. Madras 140(99). 1915; V.S. Ramach. & V.J. Nair, Fl. Cannanore 79. 1988; Vivek. *et al.* in Hajra *et al.,* Fl. India 4: 141. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 154. 2009.

Diffuse herbs; stems rooting at lower nodes. Leaves opposite, sessile or shortly petiolate, 2-9 x 0.8-1.3 cm; lower ones shortly petiolate, elliptic or oblong; upper linear-oblong or ligulate, cordate at base, sessile; stipules obscures, glandular. Flowers axillary, solitary or binate, 1-2 cm across; pedicels 1-2 cm long, pubescent, deflexed in fruits. Lateral sepals linear, acuminate; spur filiform, 1-1.5 cm long. Capsule ellipsoid, 7-8 mm long; seeds globoe, dark brownish, smooth, shining.

Flowering & Fruiting: June-November.

Distribution: Endemic to Western Ghats. Occasional in moist situations in ghats. *RNMK 1017,* Vaduvanchal.

Impatiens gardneriana Wight, Ic. t. 1050. 1846; Hook. f., Fl. Brit. India 1: 445. 1874; Gamble, Fl. Pres. Madras 141(101). 1915; V.S. Ramach. & V.J. Nair, Fl. Cannanore 79. 1988; Vajr., Fl. Palghat Dist. 99. 1990; Sivar. & P. Mathew, Fl. Nilambur 116. 1997; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 150. 1997. *Impatiens setosa* Hook.f. & Thoms., J. Linn. Soc. Bot. 4: 123. 1860; Hook. f., Fl. Brit. India 1: 445. 1874. **Plate 12d.**

Annual, large herbs; stems procumbent or creeping at base, simple or branched with cilia at upper nodes. Leaves 12-15 x 4-6 cm, opposite and whorled, upper sessile, ovate-oblong or elliptic-lanceolate, cuneate or rounded at base, acuminate at apex, serrate; petiole 1.2-2.5 cm long, sparsely pubescent. Flowers axillary, solitary, 2.5-3 cm across, bright red or pink; pedicels filiform, 2-3.5 cm long, glabrous; lateral sepals ovate, acuminate, apiculate; lip cymbiform; spur slender curved upwards, 1.5-1.8 cm long; wings 2-lobed, lobes obovate, subequal; distal lobed comparatively larger. Capsule 2-2.5 cm long, oblong, pointed, glabrous.

Flowering & Fruiting: July-November.

Distribution: Endemic to southern Western Ghats. Common; in evergreen forest margins. *RNMK 1031,* Soojippara; *RNMK 0033*, Kurichairmala.

Impatiens herbicola Hook. f., Bull. Misc. Inform. Kew 1911: 354. 1911; Gamble, Fl. Pres. Madras 141(100). 1915; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 156. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 107. 2005.

Branched glabrous herbs, 20-25 cm high, erect. Leaves opposite, ca. 4.5 x 0.5 cm, linear-oblong, nearly entire, young ones pubescent above. Flowers paired, axillary; pedicels 1.2-1.5 cm long, pubescent on one side along a line; lip 4-5 x 1.5-2 mm, boat-shaped, cuspidate, hairy; spur inconspicuous; sepals 4-4.5 mm long, linear, pubescent; standard obovate; keel ciliate, produced into a short cusp; wings 4-5 x 1.5-2 mm, 2-lobed, basal lobe shorter, dorsal auricle minute. Capsule 0.7-1 cm long, glabrous; seeds many, glabrous, dark-brown.

Flowering & Fruiting: November-Janaury.

Distribution: Endemic to southern Western Ghats. Rare; in open Grasslands. *RNMK 0080,* Kurichiarmala.

Impatiens inconspicua Benth. ex Wight & Arn., Prodr. 139. 1834; Hook. f., Fl. Brit. India 1: 447. 1874; Wight, Ic. t. 970. 1845; V.S. Ramach. & V.J. Nair, Fl. Cannanore 79. 1988; Vajr., Fl. Palghat Dist. 100. 1990; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 158. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 107. 2005. *Impatiens inconspicua* Benth. ex Wight & Arn. var. *filiformis* (Wight & Arn.) Hook. f., Fl. Brit. India 1: 448. 1874. *Impatiens inconspicua* Benth. ex Wight & Arn. var. *ramosissima* (Dalz.) Hook.f., Fl. Brit. India 1: 448. 1874. *Impatiens pusilla* var. *nematostachys* Hook.f., Bull. Misc. Inform. Kew 1910: 294. 1910. *Impatiens pusilla* Heyne ex Hook. f. & Thoms., J. Linn. Soc. Bot. 4: 122. 1859; Gamble, Fl. Pres. Madras 140(100). 1915.

Profusely branched herbs, 20-50 cm high. Leaves 4-5 x 1.5 cm, elliptic to linear-oblong, cordate at base, glabrous; petiole ca. 1 cm long; upper leaves

narrower with smaller petioles. Pedicel binate, 2-2.5 cm long, pubescent along one line; lip 3-4 x 2-2.5 mm, saccate near the base, spurless; sepals 3-4 x 0.3-0.5 mm, linear; standard 4-5 mm long, obtusely acute at apex; keel ciliate; wings 2-lobed, lobes unequal, lower lobe smaller, glabrous, yellowish-blue. Capsule 1-1.2 cm long, glabrous; seeds few, globose, black, shining.
Flowering & Fruiting: September-December.
Distribution: Endemic to Western Ghats. Common; in grasslands. *RNMK 1230,* Banasuramala; *RNMK 1109*, Theethundamala.

Impatiens jerdoniae Wight, Madras J. Lit. Sci. ser. 1, 5: 8. 1837; Hook. f., Fl. Brit. India 1: 460. 1874; Gamble, Fl. Pres. Madras 139(99). 1915; Manilal, Fl. Silent Valley 40. 1988; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 159. 1997; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 32. 2009.

Herbs; stem tumid, glabrous, green or purple. Leaves few, alternate, elliptic, acute, serrate, 5-8 cm long; nerves few with glandular cilia at base and on top of stout petiole. Flowers solitary or binate, 3-5 cm long; peduncles 2-8 cm long, green, stout; lateral sepals lanceolate, acuminate, green; lip rounded, overlapping, laterally compressed, scarlet, spur ventricose, wrinkled, saccate; wings 2-lobed; lobes rounded, overlapping, concealed under lip. Capsules ellipsoid.
Flowering & Fruiting: August-December.
Distribution: Endemic to Western Ghats. Rare; in evergreen forests. *RNMK* 2987, Kurichairmala; *RNMK 1392*, Chembra.

Impatiens lawsonii Hook. f., Rec. Bot. Surv. India 4: 45. 1906; Gamble, Fl. Pres. Madras 139(99). 1915; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 170. 1997.

Epiphytes, scapigerous, tuberous herbs. Leaves radical, ovate, cuneate, obtuse, sparsely hairy above; petiole to 2 cm long. Flowers white, 1-1.3 cm across; pedicels filiform, in fruit 1-2 mm long, glabrous; lateral sepals ovate, acuminate, 3-4-nerved; lip funnel shaped; spur conical; wings 3-lobed, 1.3-1.5 cm long; dorsal auricle short, pale pink with yellow tinge at centre, whitish outside. Capsule ovate, raised in centre, glabrous; seeds powdery, minute, hiary.
Flowering & Fruiting: August-September.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1092,* Chembra.

Impatiens lucida Heyne ex Hook. f., Fl. Brit. India 1: 451. 1874; Gamble, Fl. Pres. Madras 142(101). 1915; Manilal & Sivar., Fl. Calicut 56. 1982; Manilal, Fl. Silent Valley 41. 1988; Sivar. & P. Mathew, Fl. Nilambur 118. 1997; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 175. 1997.

Succulent herbs, 30-90 cm high, stem flaccid, glabrous. Leaves opposite and ternate, 5-12 x 2-4 cm, elliptic, acute at either ends, crenate with lower crenations produced into bristles. Flowers binate, axillary; pedicels 4-5 cm

long; lip 7-8 mm long, acuminate; spur 2-3 cm long, slender, straight, glabrous; sepals 7-8 mm long, broadly ovate, pubescent; standard 1-1.2 x 1.3-1.5 cm, obcordate, cuspidate, strongly keeled; wings 2-lobed; lobes equal, emarginate. Capsule 1.2-1.5 cm long, ellipsoid, glabrous; seeds obovoid, densely hairy, dull brown.
Flowering & Fruiting: April-November.
Distribution: Endemic to Peninsular India. Common; in moist areas. *RNMK 3211,* Pookodu.

Impatiens minor (DC.) Bennet, Indian J. For. 2: 283. 1979; Ansari, Fl. Kasaragod Div. 89. 1985; Nicols., Suresh & Manilal, An interpr. Hort. Malab. 71. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 80. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 78. 1996; Sivar. & P. Mathew, Fl. Nilambur 118. 1997; Vivek. *et al.* in Hajra *et al.,* Fl. India 4: 181. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 108. 2005. *Balsamina minor* DC., Prodr. 1: 686. 1824. *Impatiens kleinii* Wight & Arn., Prodr. 140.1834; Hook. f., Fl. Brit. India 1:445.1874; Gamble, Fl. Pres. Madras 140(100). 1915; Manilal, Fl. Silent Valley 40. 1988; Vajr., Fl. Palghat Dist. 100. 1990. *Man-onapu* Rheede, Hort. Malab. 9:99, t. 51. 1689.

Slender erect herbs; stem 10-30 cm high, glabrous. Leaves opposite, 3-8 x 1-1.5 cm, elliptic-oblong, sub-entire, acute at either ends; base with stalked glands. Flowers paired, axillary; pedicel 1.3-1.5 cm long, deflexed in fruit; lip 3-4 x 1-1.5 cm, acute; spur 1-1.3 cm long, straight, slender; sepals ovate; standard 4-5 x 3-4 mm, concave, acute; wings unlobed, obovate, stalked, white to pink. Capsule linear, glabrous; seeds few, biconvex, dark-brown.
Flowering & Fruiting: August-December.
Distribution: Endemic to Peninsular India. Common; in moist situations is moist deciduous forest. *RNMK 1617,* Tholpetty.

Impatiens parasitica Bedd., Madras J. Lit. Sci. ser. 2, 20: 66. t.7. f.2. 1859 & Ic. t. 140. 1868-1874; Gamble, Fl. Pres. Madras 139(99). 1915; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 191. 1997. *Impatiens jerdoniae* Wight var. *parasitica* (Bedd.) Hook. f., Fl. Brit. India 1: 460. 1874. **Plate 12e.**

Epiphytic herbs; stems succulent, unevenly thickened, reddish. Leaves 4-5 x 2-2.5 cm, elliptic, acute at either ends, serrate, collected towards the apex, glabrous; petiole ca. 1.5 cm long. Cymes 2-4-flowered, axillary; peduncle 2-2.5 cm long, glabrous. Flowers 2-2.5 cm long; pedicels 1-1.5 cm long; lip greenish at mouth, rest scarlet; spur 1-1.3 cm long, reddish, striate, broad, obtuse; sepals linear, green, acute; standard 1-1.2 x 1.2-1.4 cm, green with yellow margins, with a strong midrib; wings 2-lobed, lower lobe larger, flat, enter into the spur of the lip, red.
Flowering & Fruiting: July-November.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forest. *RNMK 1213,* Kurichiarmala.

Impatiens parvifolia Bedd., Madras J. Lit. Sci. ser. 2, 20: 66. t.7. f.1. 1859 & Ic. t. 29, t.142. 1868-74; Hook. f., Fl. Brit. India 1: 453. 1874; Gamble, Fl. Pres. Madras 144(103). 1915; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 191. 1997. *Impatiens omissa* Hook.f., Rec. Bot. Surv. India 4: 48. 1906; Gamble, Fl. Pres. Madras 144(103). 1915.

Herbs, 12-25 cm long; stems branched. Leaves 0.8-2 x 0.5-1.3 cm, ovate-elliptic, crenate-serrate; petioles up to 7 mm long. Flowers axillary, solitary or in racemes, white with crimson blotches; peduncle 4-5 cm long; lateral sepals falcate; lip cymbiform; spur green, short; standard sborbicular, keeled; wings 1-1.2 cm long, bilobed, distal lobes triangular. Capsule ellipsoid; seeds ovoid, villous.
Flowering & Fruiting: September-December.
Distribution: Endemic to southern Western Ghats. Occasional; in open grasslands. *RNMK 1345*, Banasuramala.

Impatiens scabriuscula Heyne ex Roxb., Fl. Ind. 2:464.1824; Hook. f., Fl. Brit. India 1: 454. 1874; Gamble, Fl. Pres. Madras 142(101). 1915; V.S. Ramach. & V.J. Nair, Fl. Cannanore 80. 1988; Vajr., Fl. Palghat Dist. 100. 1990; Vivek. *et al.* in Hajra *et a*l., Fl. India 4: 207. 1997.

Erect herbs; stems branching at base, hairy. Leaves alternate, elliptic-lanceolate, serrate along margins, 1.8-6 x 0.5-1.3 cm; petioles 2.5-3 mm long, sometimes glandular. Flowers in axillady fascicles, pink or rose; pedicels up to 6 mm long, scabrid; lateral sepals minute, linear-lanceolate, hairy. Capsule ellipsoid, mucronate, 7- 8 mm long, villous; seeds globose, brown, tubercled.
Flowering & Fruiting: August-January.
Distribution: Endemic to Western Ghats. Rare; in moist deciduous forest. *RNMK 1542*, Muthanga.

Impatiens scapiflora Heyne ex Roxb., Fl. Ind. 2: 464. 1824; Hook. f., Fl. Brit. India 1: 443. 1874; Gamble, Fl. Pres. Madras 138 (98). 1915; Ansari, Fl. Kasaragod Div. 89. 1985; Manilal, Fl. Silent Valley 41. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 80. 1988; Vajr., Fl. Palghat Dist. 101. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 79. 1996; Sivar. & P. Mathew, Fl. Nilambur 119. 1997; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 208. 1997; Mohanan & Sivad., Fl. Agasthyamala 133. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 108. 2005. *Impatiens rivalis* Wight, Ic. t. 751. 1844.

Acaulescent herbs. Leaves 8-13 x 5-8 cm, ovate, apex obtuse, base cordate, glabrous; petiole 14-20 cm long. Scape to 35 cm long. Flowers to 4 cm across, crowded towards the apex of the stem; bracts 5-8 mm long, ovate, acute; pedicels 4-5 cm long; lip ovate, obtuse, spur 4-5 cm long, glabrous; sepals 3.5-4 x 2.5-3 mm, ovate, acute; standard concave at base, obtuse at apex; lobes of wings subequal, oblong, obtuse. Capsule 1-1.2 cm long, ellipsoid, glabrous; seeds glandular-hairy.
Flowering & Fruiting: July-December.
Distribution: Endemic to Western Ghats. Open dripping rocks in grasslands. *RNMK 1789*, Soojipara; *RNMK 1236*, Chembra; *RNMK 1112*, Vythiri.

Impatiens viscosa Bedd., Madras J. Lit. Sci. ser. 2, 20: 66. t.7. f.7. 1859; Hook. f., Fl. Brit. India 1: 453. 1874. Gamble, Fl. Pres. Madras 144(103). 1915; Manilal, Fl. Silent Valley 41. 1988; Vajr., Fl. Palghat Dist. 101. 1990; Vivek. *et al*. in Hajra *et al.*, Fl. India 4: 228. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 110. 2005. *Impatiens ballardii* Bedd., Ic. 44, t. 192. 1868-1874; Hook. f., Fl. Brit. India 1: 482. 1874.

Erect annuals, 30-40 cm high. Leaves opposite, to 7 x 4 cm, acute at either ends, crenate, glabrous; petioles 0.8-2 cm long, eglandular. Peduncles 8-10 cm long, axillary. Flowers restricted to the terminal portion; pedicels 2-3 cm long, slender; lip 6-7 x 3-4 mm, ovate, acuminate; spur 1.3-1.5 cm long, ensiform, acute; sepals ovate, acute; standard 3.5-4 x 3.5-4 mm, rounded at apex; wings 2-lobed; lower lobe very small; dorsal auricle filiform, 1-1.3 cm long, produced into the spur. Capsule 1-1.3 cm long, glabrous; seeds many, densely hairy, dark-brown.

Flowering & Fruiting: August-December.

Distribution: Endemic to southern Western Ghats. Occasional; in moist grassy slopes. *RNMK 2765*, Sughandhagiri.

RUTACEAE Juss.

Gen. Pl. 296. 1789.

1. Leaves simple 2
1. Leaves 3-many-foliolate 4
2. Climbing shrubs; disc columnar ..... **Paramignya**
2. Erect shrubs or trees; disc annular 3
3. Flowers in short racemes, panicles or fascicles ..... **Atlantia**
3. Flowers in long-peduncled corymbs ..... **Acronychia**
4. Stamens equal to the number of sepals 5
4. Stamens twice the number of sepals or many 7
5. Leaves opposite; unarmed trees ..... **Melicope**
5. Leaves alternate; armed climbers, shrubs or trees 6
6. Styles 4, free; fruit a capsule ..... **Zanthoxylum**
6. Style 1; fruit a berry ..... **Toddalia**
7. Rachis winged 8
7. Rachis wingless 10
8. Fruit less than 1 cm across; seeds 1-3 ..... **Naringi**
8. Fruit more than 5 cm across; seeds many 9
9. Ovary 8-20 celled ..... **Aegle**
9. Ovary 5-6 celled ..... **Limonia**
10. Thorny climbers ..... **Luvunga**
10. Shrubs or trees, unarmed 11
11. Large dioecious trees ..... **Vepris**
11. Shrubs or small trees; flowers bisexual 12
12. Style persistent ..... **Glycosmis**
12. Style deciduous 13

13. Flowers 8 mm across; petals clawed ..... **Murraya**
13. Flowers 5 mm across; petals not clawed ..... **Clausena**

ACRONYCHIA J. R. Forster & G. Forster
Charact. Gen. 53. 1776, *nom. cons.*

Acronychia pedunculata (L.) Miq., Fl. Ind. Bat. Suppl. 532. 1861; Nicols., Suresh & Manilal, An interpr. Hort. Malab. 230. 1988: Manilal, Fl. Silent Valley 42. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 81. 1988; Vajr., Fl. Palghat Dist. 102. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 80. 1996; Nair & Nayar in Hajra *et al.*, Fl. India 4: 392.1997; Sivar. & P. Mathew, Fl. Nilambur 120. 1997; Mohanan & Sivad., Fl. Agasthyamala 137. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 110. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 155. 2009. *Jambolifera pedunculata* L., Sp. Pl. 349. 1753. *Acronychia laurifolia* Bl., Cat. Gew. Buitenz. 63. 1823; Hook. f., Fl. Brit. India 1: 498. 1875; Gamble, Fl. Pres. Madras 152(108). 1915. *Acronychia barberi* Gamble, Bull. Misc. Inform. Kew 1915: 345. . 1915 & Gamble, Fl. Pres. Madras 152(108). 1915. *Perin-panel* Rheede, Hort. Malab. 5: 29-30, t.15. 1685.

Small to medium sized trees; bark grayish-yellow; branchlets stout, terete, glabrous. Leaves 9-15 x 3-6 cm, obovate to oblong, obtusely acute at apex, acute at base; nerves 10-13 pairs, strongly reticulate. Panicle 5-8 cm across, axillary; peduncle 5-6 cm long; flowers bisexual, yellowish, many, pedicelled; sepals 4, ovate, obtuse, ciliolate along margin; petals 4, oblong, densely hairy within; stamens 8, 2-seriate; filaments unequal, densely reflexed-hairy; anthers oblong; disc 8- ribbed; ovary 4-celled, partially immersed in the disc; tomentose; style 1. Drupe ca. 1 cm across, globose, obtusely 3-angled.
Flowering & Fruiting: March-November.
Distribution: Indo-Malesia and China. Common; in semi-evergreen forests. *RNMK 1812,* Manikkunnumala.

AEGLE Dulac
Fl. Hautes-Pyr. 43. 1867.

Aegle marmelos (L.) Correa, Trans. Linn. Soc. London 5: 223. 1800; Hook. f., Fl. Brit. India 1: 516. 1875; Gamble, Fl. Pres. Madras 161(115). 1915; Manilal & Sivar., Fl. Calicut 58. 1982; Vajr., Fl. Palghat Dist. 102. 1990; Nair & Nayar in Hajra *et al.*, Fl. India 4: 264. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 114. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 156. 2009. *Crataeva marmelos* L., Sp. Pl. 444. 1753. *Aegle marmelos* (L.) Correa var. *mahurensis* Zate, Indian J. For. 5: 35. 1982.

Deciduous trees; bark yellowish-grey, corky; blaze creamy yellow. Leaves trifoliate, alternate, estipulate; rachis slender, slightly winged, swollen at base; lateral leaflets 1.7-6.5 cm long, terminal leaflets 2.3-10 cm long, elliptic, ovate, elliptic-lanceolate or elliptic-oblanceolate, base oblique, obtuse, acute or attenuate, apex obtusely acuminate or obtuse and retuse at tip, margin serrate, serrulate or crenate, glabrous, membranous, densely minutely

glandular-punctate. Flowers bisexual, greenish-white, fragrant, in axillary panicles; calyx small, obscurely 4-5 toothed, pubescent, deciduous; petals 4-5, free, oblong, imbricate, gland-dotted; stamens numerous, inserted around an inconspicuous disc; filaments subulate, anthers elongate, erect; ovary superior, ovoid, light green, glabrous, 8-20-celled, ovules many, 2-seriate in each cell; style short, stout, deciduous; stigma oblong-cylindric. Fruit a berry, 8-15-celled, the rind smooth, woody; seeds many, embedded in thick, orange coloured aromatic pulp, oblong, compressed, testa white.
Flowering & Fruiting: March-May.
Distribution: India and Sri Lanka; widely cultivated in south east Asia, Malesia, Tropical Africa and the United States. Occasional in moist deciduous and dry deciduous forests. *RNMK 1707,* Begur; *RNMK 3250*, Baveli.

ATALANTIA Correa

Ann. Mus. Natl. Hist. Nat. 6: 383. 1805, *nom. cons.*

Shrubs or small trees, sometimes armed with axillary spines. Leaves 1-foliolate, alternate. Flowers bisexual in axillary fascicles or racemes; sepals 3-5, free or united below; petals 3-5, free or sometimes connate; stamens 6-8, filaments free or connate in a tube, anthers oblong or cordate; ovary 2-4-celled, ovule one in each cell, style stout; stigma capitate. Fruit a berry; seeds 1-5, ovoid-oblong.

1. Inflorescence corymbose; calyx copular .....**A. monophylla**
1. Inflorescence racemose or fascicled; calyx not cupular 2
2. Fruit ellipsoid; filaments free .....**A. wightii**
2. Fruit globose; filaments united atleast in lower half.....**A. racemosa**

Atalantia monophylla (L.) DC., Prodr. 1: 535. 1824; Hook. f., Fl. Brit. India 1: 511. 1875; Gamble, Fl. Pres. Madras 159(113). 1915; Manilal, Fl. Silent Valley 42. 1988; Nair & Nayar in Hajra *et al.*, Fl. India 4: 266. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 156. 2009. *Limonia monophylla* L., Mant. Pl. 2: 237. 1775. *Malnaregam malabarica* Rafin., Sylv. Tellur. 143. 1838. *Atalantia floribunda* Wight, Ic. t. 1611. 1850. *Atalantia malabarica* (Rafin.) Tanaka in J. Indian Bot. Soc. 16: 233. 1937. **Plate 12g.**

Small trees; branchlets woody, spines straight, to 1.5 cm, axillary. Leaves 5-8 x 3-5 cm long, elliptic or lanceolate, apex emarginated; petiole to 8 mm. Corymbs axillary, pedicels to 1 cm long, pubescent. Flowers white; calyx 4-lobed; petals 4, ca. 9 x 4 mm; stamens 8 or 10, alternately short and long; ovary 4-celled. Berry ca. 3 cm across, globose.
Flowering & Fruiting: December-March.
Distribution: Indo-Malesia. Rare; in evergreen forests. *RNMK 3047,* Kurichairmala; *RNMK 2821*, Makkimala.

Atalantia racemosa Wight in Hook.'s J. Bot. Kew Gard. Misc. 1: 64, t. 122. 1834; Hook. f., Fl. Brit. India 1:512.1875; Gamble, Fl. Pres. Madras 159(114).

1915; Manilal, Fl. Silent Valley 43. 1988; Nair & Nayar in Hajra et al., Fl. India 4: 269. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 111. 2005. *Sclerostylis atalantioides* auct. non Wight & Arn. 1834 Wight, Ic. t. 71. 1838.*Sclerostylis racemosa* (Wight) Wight, Ill. 1: 109. 1840. **Plate 12h.**

Small trees, branchlets glabrous. Leaves 9-13 x 3-5 cm, elliptic-oblong, acute at either ends, retuse; nerves many, obtuse; petiole to 1 cm long. Raceme 1-3 cm long, axillary. Flowers 4-5 mm across; pedicels 1-2 mm long; sepals orbicular, ciliate; petals white, orbicular, ciliate at apex, glandular; stamens slightly longer than petals, anthers 0.5-1.5 mm long, cordate at base; ovary 2-celled; style short or absent; stigma clavate. Berries globose.

Flowering & Fruiting: October-January.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2771,* Kurichiarmala; *RNMK 0146*, Palchuram; *RNMK 2536,*Manikkunnumala

Atalantia wightii Tanaka, Bull. Soc. Bot. France 75: 714. 1928; Gamble, Fl. Pres. Madras 1895(114). 1936; Manilal, Fl. Silent Valley 43. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 81. 1988; Vajr., Fl. Palghat Dist. 103. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 80. 1996; Sivar. & P. Mathew, Fl. Nilambur 121. 1997; Nair & Nayar in Hajra *et al.*, Fl. India 4: 274.1997; Mohanan & Sivad., Fl. Agasthyamala 137. 2002. *Atalantia ceylanica* (Arn.) Oliver, J. Linn. Soc. Bot. 5. Suppl. 2: 25. 1861,p.p.; Hook. f., Fl. Brit. India 1: 512. 1875. **Plate 12 i**

Shrubs, to 2 m high; branchlets minutely hispid. Leaves 8-11 x 3-5 cm, ovate, acute, tip rounded or emarginate, acute at base; nerves 10-12 pairs, prominent below, glabrous. Raceme to 1 cm long, pedicels 4-5 mm long, hispid. Flowers 0.8-1.2 cm across; sepals ovate, acute, ciliate, petals white, 8-9 cm long, oblong, obtuse; stamens 8, inner filaments smaller; style 4-5 mm long. Berry ellipsoid, 1-1.4 cm across, smooth, glandular, yellowish when ripe; seeds 2-4, oblong-ellipsoid.

Flowering & Fruiting: March-June.

Distribution: Indo-Malesia. Rare; in evergreen forests. *RNMK 1218,* Kallady.

CLAUSENA N. L. Burman

Fl. Indica 87, t. 29, f. 2. 1768.

Shrubs or small trees. Leaves imparipinnate, alternate; leaflets alternate. Flowers in cymes or panicles, terminal or axillary, pedicellate; sepals 4 or 5, free or united at the base; petals 4 or 5, imbricate, gland dotted; stamens 8-10; filaments longer and shorter; dialated below the apex; anthers oblong; ovary 4 or 5-celled, ovule 2 in each cell; style stout; stigma terminal. Fruit a globose or oblong berry; seeds 1-4, biconvex.

1. Flowers in axillary compound racemes; tetramerous ..... **C. anisata**
1. Flowers in terminal corymbs or panicles; pentamerous 2
2. Young shoot puberulous; flowers in corymbs..... **C. indica**
2. Young shoot glabrous; flowers in the thyrsoid panicles.....**C. austroindica**

Clausena anisata (Willd.) Hook.f. ex Benth. in Hook., Niger Fl. 256. 1849; K.N. Nair & M.P. Nayar in Hajra *et al.*, Fl. India 4: 321.1997. *Amyris anisata* Willd., Sp. Pl. 2: 337. 1799. *Clausena dentata* (Willd.) Roem., Syn. Hesper. 1: 44. 1846; Manilal, Fl. Silent Valley 43. 1988; Mohanan & Sivad., Fl. Agasthyamala 139. 2002. *Clausena willdenowii* Wight & Arn., Prodr. 96. 1834; Hook. f., Fl. Brit. India 1:506. 1875; Gamble, Fl. Pres. Madras 155(110). 1915. *Clausena willdenowii* Wight & Arn. var. *nana* (Roxb.) Balakr., Bull. Bot. Surv. India 22: 173. 1982. *Clausena willdenowii* Wight & Arn. var. *pubescens* (Wight & Arn.) Hook.f., Fl. Brit. India 1: 506. 1875. *Clausena willdenowii* Wight & Arn. var. *dulcis* (Bedd.) Bedd., Fl. Sylv. S. India 45. 1871. *Clausena dentata* (Willd.) Roem. var. *dulcis* (Bedd.) Swingle, J. Wash. Acad. Sci. 28: 532. 1938. *Clausena dentata* (Willd.) Roem. var. *pubescens* (Wight & Arn.) Tanaka, J. Bot. 68:277.1930; Sasidh. & Sivar., Fl. Pl. Thrissur For. 81. 1996.

Shrubs to small trees; bark brown; twigs puberulus. Leaves 15-40 cm long; leaflets 7-9 pairs, sub-opposite, ca. 6 x 3 cm; ovate, acute, nerves 6-9 pairs, pubescent below. Panicles to 10 cm long, axillary. Flowers greenish-white, pedicelled, 8-9 mm across; sepals 4, oblong, obtuse; petals 4-5 mm long, obovate, concave; stamens 7-8, filaments unequal, glabrous; ovary 4- grooved. Berry ca. 8 mm across, globose, glandular, greenish-white before becoming ripe; seeds few, seated in yellow pulp.

Flowering & Fruiting: March-June.

Distribution: India, Nepal, Sri Lanka and Africa. Occasional; in semi-evergreen forests. *RNMK 2868,* Pookodu.

Clausena austroindica Stone & Nair, Nordic J. Bot. 14:491. 1994; Nair & Nayar in Hajra et al., Fl. India 4: 322.1997; Mohanan & Sivad., Fl. Agasthyamala 138. 2002. *Clausena heptaphylla* auct. non (Roxb.) Wight & Arn. ex Steud., 1840: Hook. f., Fl. Brit. India 1: 504. 1875; Gamble, Fl. Pres. Madras 155(110). 1915; Manilal, Fl. Silent Valley 44. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 82. 1988; Vajr., Fl. Palghat Dist. 103. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 81. 1996; Sivar. & P. Mathew, Fl. Nilambur 121. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 111. 2005.

Shrubs, to 1.5 m high, fragrant, young shoots glabrous. Leaf 20-40 cm long, 7-8 foliolate; leaflets 12-15 x 5-6 cm, elliptic, acute at apex, attenuate at base, glaucous below; lateral nerves 7-13 pairs, prominent below, gland dotted; petiolule 4-5 mm long. Panicle 20-25 cm, terminal. Flowers shortly pedicelled, 3-4 mm across; sepals 4 or 5, very small, ovate, acute; petals yellow, concave, glabrous, glandular; stamens 10, filaments shorter than anthers, thickened at base; ovary depressed globose; style constricted at base. Berry 0.5-1 cm across, ovoid; seeds 1, ovoid, rugulose.

Flowering & Fruiting: January-April.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 2796,* Makkimala; *RNMK 2821*, Chanthanathodu.

Clausena indica (Dalz.) Oliver, J. Linn. Soc. Bot. 5: 36. 1861; Hook. f., Fl. Brit. India 1: 505. 1875; Gamble, Fl. Pres. Madras 155(110). 1915; Manilal, Fl. Silent Valley 44. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 82. 1988; Vajr., Fl. Palghat Dist. 103. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 81. 1996; Sivar. & P. Mathew, Fl. Nilambur 122. 1997; Nair &. Nayar in Hajra *et al.,* Fl. India 4: 328. 1997. *Piptostylis indica* Dalz. in Hooker's J. Bot. Kew Gard. Misc. 3: 33. t.2. 1851.

Small trees; branchlets puberulus. Leaves 20-23 x 8-10 cm, 12-16-foliolate; leaflets alternate, 7-9 x 3-4 cm, ovate, oblique at base, acute or obtuse at apex; lateral nerves 5-8 pairs; petiolule 2-3 mm long. Panicle to 10 cm across, terminal or subterminal, branches puberulus. Flowers sessile, 2-3 mm across; sepals ovate, acute, ciliate; petals greenish-white, ovate, glabrous; stamens 10, filaments glabrous; ovary globose, gland dotted. Berry 8-1 cm across, globose, dark blue; seeds 1-4, biconvex, glabrous.

Flowering & Fruiting: February-June.

Distribution: Peninsular India and Sri Lanka. Occasional; in evergreen forests. *RNMK 3872,* Pookodu.

GLYCOSMIS Correa

Ann. Mus. Natl. Hist. Nat. 6: 384. 1805.

Shrubs. Leaves imparipinnate; leaflets alternate. Flowers in axillary or terminal panicles; sessile or subsessile; sepals 4 or 5, connate below, imbricate; petals 4 or 5, obovate, imbricate; stamens 8 or 10, free, filaments flat, anthers with glands at apex; ovary 2-5-celled; seated on the disk, glabrous; ovule 1 in each cell; style short; stigma capitate. Fruit a berry, 1-3-seeded; seeds globose.

1. Flowers in short axillary cymes; ovary seated on minute fleshy disc .... **G. cyanocarpa** var. **cymosa**
1. Flowers in axillary and terminal panicles; ovary seated on gynonphore 2
2. Sepals glabrous; berry more than 1.5 cm across ..... **G. macrocarpa**
2. Sepal ciliate; berry to 1 cm across 3
3. Ovary glabrous; gynophore distinct ..... **G. mauritiana**
3. Ovary puberulous; gynophore indistinct..... **G. pentaphylla**

Glycosmis cyanocarpa (Bl.) Spreng. var. **cymosa** Kurz, J. Bot. 14: 34. 1876; Nair & Nayar in Hajra *et al.,* Fl. Ind. 4: 336.1997. *Glycosmis oxyphylla* Wall. *ex* Voigt, Hort. Suburb. Calc. 129. 1845. *Glycosmis tetraphylla* Wall. *ex* Voigt, Hort. Subrub. Calc. 129. 1845. *Glycosmis cymosa* (Kurz) Narayana swamy, Rec. Bot. Surv. India 14: 26. 1941; Sasidh. & Sivar., Fl. Pl. Thrissur For. 82. 1996.

Small trees, branchlets glabrous. Leaves 5-foliolate; leaflets 8-12 x 3-4 cm lanceolate or elliptic-lanceolate, apex acuminate, base acute, entire, glabrous; petiolule 2-3 mm long. Flowers creamy white, buds globose; calyx lobes short, ciliolate along margins; petals 5, glandular; stamens 10; ovary ovoid or oblong, glabrous, 4 or 5 celled. Berry 0.5-1 cm long, pink-red.

Flowering & Fruiting: March-April.
Distribution: Indo-Malesia. Common in evergreen forests. *RNMK 2098,* Vythiri Ghat; *RNMK 1904,* Palchuram.

Glycosmis macrocarpa Wight, Ill. 1: 109. 1840; Subram. & Henry, Bull. Bot. Surv. India 12:3. 1972; V.S. Ramach. & V.J. Nair, Fl. Cannanore 83. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 82. 1996; Sivar. & P. Mathew, Fl. Nilambur 123. 1997; Nair & Nayar in Hajra *et al.*, Fl. India 4: 338. 1997; Mohanan & Sivad., Fl. Agasthyamala 142. 2002. *Glycosmis pentaphylla* Hook. f. var. *macrocarpa* (Wight) Hook. f., Fl. Brit. India 1:500. 1875.

Shrubs, to 2 m high; leaflets 3-7, 10-22 x 3-7 cm, elliptic, obtusely acuminate at apex, acute at base, pale beneath, nerves 8-12 pairs; petiolule 4-5 mm long. Panicle 3-4 x 2-3 cm, terminal, congested; peduncle to 3 cm long. Flowers 3-4 mm across, densely packed; sepals triangular, acute, spreading; petals ovate, obtuse; stamens 10, filaments equal to anthers in length; ovary 3-celled. Berry globose, greenish-red, 1.2-2 cm across.
Flowering & Fruiting: March-June.
Distribution: South india and Sri Lanka. Occasional; in evergreen forests: *RNMK 1679,* Manikkunnumala; *RNMK 1305*, Chanthanathodu; *RNMK 2901*, Vythiri.

Glycosmis mauritiana (Lam.) Tanaka, Bot. Not. 28:159. 1928; Manilal, Fl. Silent Valley 45. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 84. 1988; Vajr., Fl. Palghat Dist. 104. 1990; Nair & Nayar in Hajra *et al.*, Fl. India 4: 343. 1997; Mohanan & Sivad., Fl. Agasthyamala 143. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 112. 2005. *Limonia mauritiana* Lam., Encycl. 3: 517. 1792. *Limonia pentaphylla* Roxb., Pl. Corom. t. 84. 1798, non Retz. 1788.

Shrubs to 1.5 m high; stem reddish, glabrous or puberulus. Leaves 5-foliolate, leaflets 16-18 x 6-7 cm, obovate, obtuse at apex, acute at base, nerves 10-12 pairs, reticulate beneath. Panicle ferrugineous tomentose. Flowers 3-4 mm across, sessile; sepals triangular, ciliate, petals white, obovate, obtuse, glandular; stamens 10; filaments shorter than anthers. Berry pale pink, glabrous, subglobose.
Flowering & Fruiting: October-May. *Distribution*: Indo-Malesia. Occasional in semi-evergreen and moist deciduous forests. *RNMK 2011,* Manikkunnumala; *RNMK 1090,* Begur.

Glycosmis pentaphylla (Retz.) DC., Prodr. 1:538. 1824; Mitra & Subram., J. Arnold Arbor. 50:155. 1969; Hook. f., Fl. Brit. India 1:499.1875; Nicols., Suresh & Manilal, An interpr. Hort. Malab. 232. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 82. 1996; Sivar. & P. Mathew, Fl. Nilambur 123. 1997; Nair & Nayar in Hajra *et al.*, Fl. India 4:343.1997; Mohanan & Sivad., Fl. Agasthyamala 144. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta

112. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 157. 2009. *Limonia pentaphylla* Retz., Obs. Bot. 5: 24. 1788. *Limonia arborea* Roxb., Pl. Corom.t.85. 1798. *Glycosmis arborea* (Roxb.)DC.,Prodr. 1:538.1824; Manilal & Sivar., Fl. Calicut 60. 1982; Ansari, Fl. Kasaragod Div. 90. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 83. 1988; Vajr., Fl. Palghat Dist. 104. 1990. *Glycosmis cochinchinensis* sensu Gamble, Fl. Pres. Madras 153(109). 1915p.p. *Panel* Rheede, Hort. Malab. 2 :9-10, t. 1679.

Shrubs, branchlets puberulent. Leaves 3-7 foliolate, pinnate; leaflets 7-15 x 2.5-6 cm, elliptic or oblong, apex acute, base acuminate or obtuse, serrate or entire, glabrous. Panicle to 12 cm; flowers creamy white, peduncle brown tomentose; calyx lobes minute, ciliolate along the margins; stamens 10, filaments tapering towards apex. Berry white, turning to dull pink.

Flowering & Fruiting: September-April.

Distribution: Indo-Malesia. Common in moist deciduous forests and in forest plantation. *RNMK 2120,* Tholpetty; *RNMK 1469,* Muthanga; *RNMK 2786,* Thrikaippetta.

LIMONIA Gaertner

Fruct. Sem. Pl. i. 278, t. 58, f. 4. 1789.

Limonia acidissima L., Sp. Pl. (ed. 2) 554. 1762; Nair & Nayar in Hajra *et al.*, Fl. India 4: 294. 1997. *Feronia elephantum* Correa, Trans. Linn. Soc. London 5: 224. 1800; Hook. f., Fl. Brit. India 1: 516. 1875; Gamble, Fl. Pres. Madras 160(114). 1915.

Deciduous trees, bark dark-grey or black, deeply cracked longitudinally; thorns straight. Leaves imparipinnate, alternate, 1-3 in a cluster, exstipulate; rachis 6-8 cm long, stout, glabrous, often narrowly winged; leaflets 4-7, opposite, sessile, exstipellate; lamina 1.3-3.8 × 1-1.3 cm, obovate, base cuneate or acute, apex obtuse, margin entire, glabrous, pellucid-punctate, coriaceous; lateral nerves pinnate, obscure, intercostae obscure. Flowers polygamous, dull red, 1-1.3 cm across, in axillary cymes; calyx small, flat, 5-toothed, deciduous; petals 5, free, spreading; stamens 10-12, inserted round the disc; filaments dilated below, villous on face and margins; anthers linear-oblong; disc thick, annular, pubescent; pistillode short; ovary superior, oblong, 5-6-celled, at length 1-celled, ovules many; stigma oblong, fusiform. Fruit a berry, 5-7 cm across, globose, whitish-brown, rind hard and woody; seeds many.

Flowering & Fruiting: April-September.

Distribution: Indo-Malesia. Occasional; in dry deciduous forests. *RNMK 1011,* Baveli.

LUVUNGA Buchanan-Hamilton ex Wight & Arnott

Prodr. 90. 1834.

Luvunga eleutherandra Dalz. in Hooker's J. Bot. Kew Gard. Misc. 2: 258. 1850; Hook. f., Fl. Brit. India 1: 509. 1875; Gamble, Fl. Pres. Madras 157(112). 1915; V.S. Ramach. & V.J. Nair, Fl. Cannanore 84. 1988; Sasidh. &

Sivar., Fl. Pl. Thrissur For. 83. 1996; Nair & Nayar in Hajra *et al.*, Fl. India 4: 296.1997. *Luvunga sarmentosa* auct. non (Blume) Kurz, 1870: Manilal, Fl. Silent Valley 45. 1988; Mohanan & Sivad., Fl. Agasthyamala 144. 2002; Sivar. & P. Mathew, Fl. Nilambur 124. 1997. **Plate 12k.**

Large woody climbing shrubs, thorns axillary, 1-2 cm long, recurved. Leaves 3-foliolate; leaflet 7-12 x 3-4 cm, oblong, acute or obtuse at apex, acute at base, shining above; lateral nerves 8-10 pairs, obscure; petiole 5-6 cm long; petiolule 7-8 mm long, thick. Cymes axillary, 2-3 cm across, sessile or shortly pedunculate; flowers 0.3-1 cm across, shortly pedicelled; calyx cupular, shallowly 4-lobes; petals 4, oblong; stamens 8, filaments 3-4 mm long; anthers cleft at base, oblong; ovary 4-celled; ovules paired in each cell; style stout; stigma terminal, capitate. Fruit a berry, 1.5-2.5 x 1-2 cm, globose-oblong, smooth; seeds 1-4-oblong, covered with mucilaginous pulp.

Flowering & Fruiting: December-April.

Distribution: Endemic to Western Ghats. Rare; in evergreen forests. *RNMK 2109,* Makkimala; *RNMK 3175,* Kurichiarmala.

MELICOPE J. R. Forster & G. Forster
Charact. Gen. 55. 1776

Melicope lunu-ankenda (Gaertn.) Hartley in Sandakania 4: 61. 1994; Nair & Nayar in Hajra *et al.*, Fl. India 4: 369.1997. *Fagara lunu-ankenda* Gaertn., Fruct. Sem. Pl. 334, t. 68. f. 9. 1778. *Euodia lunu-ankenda* (Gaertn.) Merr., Philipp. J. Sci. 7:378.1912; Gamble, Fl. Pres. Madras 148(105). 1915; Ansari, Fl. Kasaragod Div. 90. 1985; Manilal, Fl. Silent Valley 44. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 83. 1988; Vajr., Fl. Palghat Dist. 104. 1990; Mohanan & Sivad., Fl. Agasthyamala 141. 2002; Sasidh. & Sivar., Fl. Pl. Thrissur For. 82. 1996; Sivar. & P. Mathew, Fl. Nilambur 122. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 111. 2005. *Zanthoxylum roxburghianum* Cham., Linnaea 5: 58. 1830. *Euodia roxburghiana* (Cham.) Benth., Fl. Hongk. 59. 1861; Hook. f., Fl. Brit. India 1: 487. 1875. *Euodia lunu-ankenda* (Gaertn.) Merr. var. *tirunelvelica* Henry & Chandrab., Bull. Bot. Surv. India 15: 144. 1973; Mohanan & Sivad., Fl. Agasthyamala 141. 2002; Mohanan *et al.*, J. Econ. Tax. Bot. 24(1): 75. 2000.

Medium size trees; bark brown, smooth; branchlets minutely pubescent. Leaves opposite, 3-foliolate; leaflets 18-20 x 8-10 cm, elliptic, abruptly acuminate at apex, acute at base; nerves 16-22 pairs, parallel; petiole 8-10 cm long. Panicle 14-15 x 4-5 cm, axillary, densely pubescent; flowers unisexual, polygamous, 2-3 mm across; sepals 4, ovate, acute, and tomentose; petals 4, ovate; stamens 4, free; ovary deeply 4-lobed, 4-celled; ovules 2 in each cell; stigma 4-lobed. Fruit 4, 1-seeded cocci, 2-3 mm diam; seeds globose, rugose.

Flowering & Fruiting: May-July.

Distribution: Indo-Malesia. Common in semi-evergreen forests. *RNMK 3864,* Manikkunnumala; *RNMK 2640,* Thirunelli.

MURRAYA J. G. Koenig ex Linnaeus
Mant. 2: 554, 563. 1771, *nom. cons.*

Murraya paniculata (L.) Jack., Malay. Misc. 1: 31. 1820; Manilal & Sivar., Fl. Calicut 60. 1982; Vajr., Fl. Palghat Dist. 105. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 83. 1996; Nair & Nayar in Hajra *et al.*, Fl. India 4: 352. 1997; Mohanan & Sivad., Fl. Agasthyamala 145. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 113. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 159. 2009. *Chalcas paniculata* L., Mant. Pl. 1: 68. 1767. *Murraya exotica* L., Mant. Pl. 2: 563. 1771; Wight, Ic.t.96.1838; Hook. f., Fl. Brit. India 1: 502. 1875; Gamble, Fl. Pres. Madras 155(111). 1915.

Shrubs; branchlets white, glabrous. Leaves pinnately 3-5 foliolate, leaflets 3-8 x 2-4 cm, ovate, obtusely acuminate, crenulate, terminal the largest. Flowers 3-7 together in axillary cymes; sepals 5, ovate, acute; petals white, 1.5-1.7 cm, oblanceolate, clawed, imbricate; stamens 10, 2-seriate, filaments7- 8 mm long, inner smaller; anthers ovate; ovary 2-celled; oblong, glabrous; style slender; stigma capitate. Berry 0.6-1.5 cm long, oblong, reddish; seeds planoconvex, densely white-woolly.

Flowering & Fruiting: March-September.

Distribution: Indo-Malesia and Australia. Occasional; in semi-evergreen forests. *RNMK 1125,* Thirunelli; *RNMK 1982*, Makkimala.

NARINGI Adanson
Fam. 2: 341. 1763.

Naringi crenulata (Roxb.) Nicols. in Saldanha & Nicols, Fl Hassan Dist. 387. 1976; Manilal & Sivar., Fl. Calicut 58. 1982; Ansari, Fl. Kasaragod Div. 92. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 84. 1988; Vajr., Fl. Palghat Dist. 106. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 84. 1996; Sivar. & P. Mathew, Fl. Nilambur 125. 1997; Nair & Nayar in Hajra *et al.*, Fl. India 4: 302. 1997. *Limonia crenulata* Roxb., Pl. Corom. t. 86. 1798; Gamble, Fl. Pres. Madras 157(112). 1915. *Hesperethusa crenulata* (Roxb.) Roem., Syn. Monogr. 1: 38. 1846. *Limonia acidissima* sensu Hook.f., Fl. Brit. India 1: 507. 1875, non L. 1762.

Large shrubs or small trees, armed with axillary erect spines; branchlets angled, white. Leaves 3-7-foliolate; leaflets opposite, 4-5 x 1.5-2 cm, elliptic-obovate, obtuse or obtusely acute, crenate; rachis winged. Flowers 6-8 mm across, 3-6 together in axillary cymes; pedicel 0.5-1 cm long; sepals 4, free or united at base; petals 4, oblong, white; stamens 8, filaments equal; anthers sagitate at base; ovary globose, 4-celled; style stout; stigma capitate. Berry 6-8 mm across, globose; seeds 1-3, ovoid, dull yellow, smooth.

Flowering & Fruiting: June-December.

Distribution: Indo-Malesia. Common; in semi-evergreen and moist deciduous forests. *RNMK 2081,* Makkimala; *RNMK 3736,* Tholpetty.

PARAMIGNYA Wight

Ill. Ind. Bot. 108. t. 42. 1838.

Woody climbers or scandent shrubs; armed with retrorse axillary spines. Leaves alternate, unifoliolate or simple; petiole pulvanoid, often articulated above with the leaflet blade. Flowers axillary, fascicled or solitary; calyx cupular with 4 or 5 distinct sepals, persistent; petals 4 or 5, imbricate, white; stamens 8 or 10; filaments linear. Berry subglobose, ellipsoid to pyriform or obovoid; seed embedded in a mucilaginous substance; pulp vesicles absent.

1. Flowers solitary; calyx 4-lobed ..... **P. beddomei**
1. Flowers 1-3; calyx 5-lobed ..... **P. monophylla**

Paramignya beddomei Tanaka, J. Bot. 68: 230. 1930; Gamble, Fl. Pres. Madras 1872(1295). 1936; Sivar. & P. Mathew, Fl. Nilambur 126. 1997; Nair & Nayar in Hajra *et al.*, Fl. India 4: 309. 1997; Mohanan & Sivad., Fl. Agasthyamala 146. 2002. *Paramignya armata* auct.non(Thw.)Oliver1861: Bedd., Ic. t. 275. 1868-1874; Hook. f., Fl. Brit. India 1: 511. 1875; Gamble, Fl. Pres. Madras 158(113). 1915, non (Thw.) Oliver 1861; V.S. Ramach. & V.J. Nair, Fl. Cannanore 85. 1988; Manilal, Fl. Silent Valley 46. 1988; Vajr., Fl. Palghat Dist. 106. 1990. **Plate 12 l.**

Woody climbing shrubs. Leaves simple, alternate, 5-7 x 2.5-4 cm, elliptic-ovate, slightly caudate acuminate at apex, round at base; glands very close; petioles 1.2-1.5 cm. Flowers solitary, axillary; pedicels slender, 1.3-1.6 cm long; calyx cupular, 4-lobed, minutely toothed; petals white, 1-1.3 cm long, linear-oblong; stamens 10, filaments densely villous; ovary globose, 4-5-celled, ovules 1 in each cell; stigma capitate. Berry globose, 1-1.2 cm diam.

Flowering & Fruiting: June-January.

Distribution: Western Ghats and Sri Lanka. Occasional; in evergreen forests. *RNMK 2342,* Kurichiarmala.

Paramignya monophylla Wight, Ill. 1:109, t.42. 1840; Hook. f., Fl. Brit. India 1:510.1875; Gamble, Fl. Pres. Madras 158(113). 1915; Ansari, Fl. Kasaragod Div. 92. 1985; Manilal, Fl. Silent Valley 46. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 84. 1996; Nair & Nayar in Hajra *et al.*, Fl. India 4:312.1997.

Climbing shrubs, branches with recurved axillary thorns. Leaves 5-7 x 3-5 cm, ovate-oblong or elliptic, apex obtuse or acute, mucronate, base rounded, coriaceous, glabrous, lateral nerves and reticulation not prominent. Flowers 1-3, axillary; calyx cupular, 5-lobed, pubescent; petals white, narrowly oblong, imbricate; stamens 10; ovary densely pubescent, style puberulent. Berry subglobose or obovoid, 2- 2.5 cm across, 3-5 grooved, orange coloured when ripe, downy- pubescent; seeds 3-5, flat.

Flowering & Fruiting: October-March.

Distribution: South Asia. Rare; in evergreen forests. *RNMK 1814,* Kurichairmala; *RNMK 2099,* Kattimattam.

TODDALIA A. L. Jussieu

Gen. 371. 1789, *nom. cons.*

Toddalia asiatica (L.) Lamk., Tabl. Encycl. 2: 116. 1797; Gamble, Fl. Pres. Madras 150(107). 1915; Manilal & Sivar., Fl. Calicut 59. 1982; Nair & Nayar in Hajra *et al.*, Fl. India 4: 403.1997. *Paullinia asiatica* L., Sp. Pl. 365. 1753. *Toddalia aculeata* (Smith) Pers., Syn. Pl. 1: 249. 1805; Hook. f., Fl. Brit. India 1: 497. 1875. *Toddalia floribunda* Wall., Pl. Asiat. Rar. 3: 17, t. 232. 1832. *Toddalia asiatica* (L.) Lamk. var. *floribunda* (Wall.) Kurz, J. Asiat. Soc. Bengal pt.2, Nat. Hist. 44: 130. 1875; Gamble, Fl. Pres. Madras 151(107). 1915; Manilal, Fl. Silent Valley 46. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 85. 1988; Vajr., Fl. Palghat Dist. 106. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 85. 1996; Sivar. & P. Mathew, Fl. Nilambur 126. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 113. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 159. 2009. *Toddalia asiatica* (L.) Lam., Ill. 2: 116. 1797, var. *obtusifolia* Gamble, Fl. Pres. Madras 151(107). 1915; Manilal, Fl. Silent Valley 47. 1988; Mohanan & Sivad., Fl. Agasthyamala 146. 2002; Sasidh. & Sivar., Fl. Pl. Thrissur For. 85. 1996. *Toddalia asiatica* (L.) Lam. var. *gracilis* Gamble, Fl. Pres. Madras 151(107). 1915.

Erect or climbing shrubs, usually armed with prickles. Leaves 3-foliolate; leaflets 7-9 x 3-4 cm, elliptic-obovate, obtuse or obtusely acute, entire or crenulate, nerves many, closely packed. Panicles axillary or terminal. Flowers pedicelled, unisexual; sepals 4 or 5, united below; petals 4 or 5, oblong, yellow; stamens in male flowers 5, filaments equal, spreading; anthers oblong, obtuse; ovary 4 or 5-celled, ovoid, glabrous, ovule in each cell; style absent; stigma capilate, sessile. Berry 0.5-0.7 x 1-2 cm, depressed-globose; seeds 1-4, ovoid, in fleshy pulp.

Flowering & Fruiting: September-July.

Distribution: Indo-Malesia and Africa. Common; in evergreen forests. *RNMK 2789,* Chembra; *RNMK 2671*, Kurichiarmala.

VEPRIS Commerson ex A. Jussieu

Mem. Mus. Hist. Nat. 12: 509. 1825.

Vepris bilocularis (Wight & Arn.) Engl. in Engl. & Prantl, Pflanzenfam. 3(4): 178. 1896; Gamble, Fl. Pres. Madras 151(108). 1915; Sasidh. & Sivar., Fl. Pl. Thrissur For. 85. 1996; Sivar. & P. Mathew, Fl. Nilambur 127. 1997; Nair & Nayar in Hajra *et al.*, Fl. India 4: 405. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 113. 2005. *Toddalia bilocularis* Wight & Arn., Prodr. 149. 1834; Bedd., Ic. t. 167. 1868-1874; Hook. f., Fl. Brit. India 1: 497. 1875. *Dipetalum bioculare* (Wight & Arn.) Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 2: 138. 1850.

Medium sized trees, bark grayish yellow with corky warts, dull yellow inside; branchlets glabrous. Leaves 3-foliolate; leaflets 17-19 x 6-7 cm, obovate-oblanceolate, abruptly acuminate, entire; nerves many, closely parallel, joining into an intramarginal vein; petiole 6-7 cm long. Panicles 5-6 x

4-5 cm, terminal; flowers 3-4 mm across, polygamous; pedicels 2-3 mm long; sepals 3, ovate, free; petals 3, orbicular; stamens 3, equal, filaments broad at base; anthers ovate, sagitate at base; ovary 2-celled and conical in male flowers, 4-celled and globose in female flowers. Fruit a berry, 14-15 x 12-13 mm, 2-4- celled; seeds planoconvex.
Flowering & Fruiting: February-May.
Distribution: Endemic to southern Western Ghats. Common; in semi-evergreen forests. *RNMK 1810,* Kuruva.

ZANTHOXYLUM Linnaeus
Sp. Pl. 270. 1753.

Zanthoxylum rhetsa (Roxb.) DC., Prodr. 1: 728. 1824; Hook. f., Fl. Brit. India 1: 495. 1875; Gamble, Fl. Pres. Madras 150(107). 1925; Manilal & Sivar., Fl. Calicut 59. 1982; Ansari, Fl. Kasaragod Div. 93. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 85. 1996; Sivar. & P. Mathew, Fl. Nilambur 127. 1997; Nair & Nayar in Hajra *et al.*, Fl. India 4: 387.1997. *Fagara rhetsa* Roxb., Fl. Ind. 1: 438. 1820. *Zanthoxylum limonella* (Dennst.) Alston in Trimen, Handb. Fl. Ceyl. 6: 37. 1931. *Fagara budrunga* Roxb., Fl. Ind. 1:437.1820. *Zanthoxylum budrunga* (Roxb.) DC., Prodr. 1:728.1824; Hook. f., Fl. Brit. India 495.1875; Gamble, Fl. Pres. Madras 150(107). 1915.

Medium sized deciduous trees, armed with stout prickles. Leaves imparipinnate, clustered at the apex of branchlets, 25-35 cm long; leaflets 13-21, opposite, elliptic-oblong or ovate-oblong, caudate-acuminate, base oblique, entire, glabrous, 10-12 x 4-5 cm; lateral nerves 10-12 pairs, slender. Flowers pedicelled, 2-3 mm across, greenish-yellow, in terminal cymose panicles. Fruit tubercled; seeds globose, smooth.
Flowering & Fruiting: March-November.
Distribution: Indo-Malesia. Occasional in evergreen forests. *RNMK 1785,* Vythiri Ghats.

Citrus limon (L.) Burm. f**.**, **Citrus maxima** (Burm. f.) Merr., **Citrus medica** L., **Murraya koenigii** (L.) Spreng., **Murraya paniculata** (L.) Jack., and **Ruta chalepensis** L., are often cultivated in homesteads by many planters in the district.

SIMAROUBACEAE DC.
in Ann. Mus. Natl. Hist. Nat. 17: 422. 1811.

1. Leaves simple .....**Quassia**
1. Leaves pinnate .....**Ailanthus**

AILANTHUS Desfontaines
Mem. Acad. Sci. Paris. 1786: 265. 1788, *nom. cons.*

Ailanthus triphysa (Dennst.) Alston in Trimen, Handb. Fl. Ceylon 6 (Suppl.) 41. 1931; Basak, Fl. India Fasc. 4, 5. 1980. Manilal & Sivar., Fl. Calicut 61.

1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 86. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 86. 1996; Sivar. & P. Mathew, Fl. Nilambur 128. 1997; Basak in Hajra *et al.,* Fl. India 4: 413. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 161. 2009. *Adenanthera triphysa* Dennst., Schluss. Hort. Malab. 15, 18, 32. 1818. *Ailanthus malabarica* DC., Prodr. 2: 89. 1825; Bennet in Hook. f., Fl. Brit. India 1: 158. 1875; Gamble, Fl. Pres. Madras 163(116). 1915.

Lofty deciduous trees, to 30 m high, bark grey, smooth, lenticellate; blaze pale yellow with reddish-brown sclerotic granules. Leaves imparipinnate, alternate, crowded towards the apex of branches, exstipulate; rachis 26.5-52.5 cm long, stout, slightly ridged above, glabrous, swollen at base; leaflets 11-23, opposite or subopposite; petiolule 0.5-1 cm, slender, glabrous, ridged above; lamina 8.5-17 x 2-6.5 cm, oblong-ovate, oblong-lanceolate or elliptic to lanceolate, base oblique, apex acute or acuminate, margin entire, revolute, glabrous, coriaceous; lateral nerves 8-16 pairs, pinnate, prominent, intercostae reticulate, prominent. Flowers polygamous, greenish-yellow, in axillary panicles; in male flowers sepal 5, ovate, acute, pubescent, imbricate; petals 5, erect, glabrous, valvate; disc 10-lobed; stamens 10, anthers ovate; pistillode rudimentary, cordate; in bisexual flowers sepals and petals as in male flowers; stamens 2 or 3; disc 10-lobed; ovary 5 partite, superior, ovule 1 in each cell; style connate; stigmas plumose. Fruit a samara, 1-5, oblong, 5-6 x 1.5-2.5 cm, prominently veined, not twisted, reddish-brown with rounded ends.
Flowering & Fruiting: January-May.
Distribution: Indo-Malesia and Australia. Occasional; in forest plantations and semi-evergreen forests. *RNMK 2081,* Chooralmala.

QUASSIA Linnaeus
Sp. Pl. 1: 553, 1762.

Quassia indica (Gaertn.) Nooteb. in Steenis, Fl. Males. ser.1. 6: 199. 1962; Manilal & Sivar., Fl. Calicut 61. 1982. *Samadera indica* Gaertn., Fruct. 2: 352, t.156. f.3. 1791; Bennett in Hook. f., Fl. Brit. India 1: 519. 1875; Gamble, Fl. Pres. Madras 163(117). 1915; V. S. Ramach. & V. J. Nair, Fl. Cannanore 86. 1988; Basak in Hajra *et al.*, Fl. India 4:420.1997; C.N. Sunil & Sivad., Fl. Pl. Div. Alappuzha Dist. 151. 2000. *Samadera lucida* (Wall.) Planch. in Hook.'s J. Bot. Kew Gard. Misc. 5: 562. 1846.

Glabrous trees, to 10 m high, bole fluted; bark grey to black, transversely cracked, bitter, smooth; branches horizontal. Leaves simple, alternate, estipulate; petiole 1-2 cm long, stout, glabrous; lamina 9-30 x 3.5-11 cm, oblong, elliptic-oblong or elliptic-lanceolate, base obtuse, subacute or round, apex acute or acuminate, margin entire, glabrous, coriaceous; lateral nerves 12-20 pairs, pinnate, slender, faint, intercostae reticulate. Flowers bisexual, yellow, in few or many flowered, pendulous axillary umbels; peduncles 7-30 cm long, flattened, thickened at apex; pedicles 1-1.5 cm long, longer in fruits, articulate in the lower half; calyx small, lobes 4, thick, ciliate, persistent; petals 4, free, 1.5-2 x 0.3-0.4 cm, oblong-oblanceolate, obtuse, dorsally

pubescent, white or pale yellow or purplish, imbricate; disc large, obconic; stamens 8, pubescent, anthers lanceolate-oblong; ovary of 4 distinct, free carpels, superior, ovule one in each cell, pendulous; styles free at base, more or less united above; stigma acute. Fruit a drupe, oval, smooth, red, compressed, with narrow wing.
Flowering & Fruiting: Throughout the year.
Distribution: India, Myanmar and Sri Lanka Common; in moist deciduous and evergreen forest. *RNMK 3309,* Mananthavady; *RNMK 2281*, Periya.

Ailanthus excelsa Roxb. is planted along roadsides and in plantations in Kalpetta

BURSERACEAE Kunth

Ann. Sci. Nat. (Paris) 2: 346. 1824.

1. Branchlets velvety tomentose; stamens connate into a tube .....**Canarium**
1. Branchlets glabrous; stamens free 2
2. Leaflets ovate or oblong; apex caudate; flowers 4-merous ..... **Commiphora**
2. Leaflets oblong-lanceolate, apex acuminate; flowers 5-merous.....**Garuga**

CANARIUM Linnaeus

Amoen. Acad. 4: 121. 1759.

Canarium strictum Roxb., Fl. Ind. 3: 138. 1832; Wight & Arn., Prodr. 175. 1834; Bennett in Hook. f., Fl. Brit. India 1: 534. 1875; Gamble, Fl. Pres. Madras 172(123). 1915; Manilal, Fl. Silent Valley 47. 1988; Vajr., Fl. Palghat Dist. 107. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 86. 1996; Sivar. & P. Mathew, Fl. Nilambur 129. 1997; Chithra &. Henry in Hajra *et al.*, Fl. India 4: 440. 1997; Mohanan & Sivad., Fl. Agasthyamala 147. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 115. 2005.

arge trees, bark white, peeling, exuding a resin; branchlets dark-fulvous-tomentose. Leaves alternate, imparipinnate, 30-60 cm long; leaflets 9-11 pairs, 14-16 x 6-7 cm, ovate, acuminate, serrulate, nerves parallel. Flowers in large terminal panicles, 3-6 together; calyx cupular, 5-lobed, densely tomentose; petals 3, white, 1-1.3 cm long, oblong, stamens 6, filaments connate at base; ovary 2 or 3-celled; ovules 2 in each cell; styles 1, stout; stigma capitate. Fruit a drupe, 3-3.5 cm long, ellipsoid, dark blue, 1-3-celled; seeds 1-3.
Flowering & Fruiting:January-December.
Distribution: India and Upper Myanmar. Common; in evergreen forests. *RNMK 0821,* Chanthanathodu; *RNMK 2088*, Periya; *RNMK 3099*, Vythiri.

COMMIPHORA N. J. Jacquin

Pl. Rar. Horti Schoenbr. 2: 66. 1797, *nom. cons.*

Commiphora caudata (Wight & Arn.) Engl. in A. & C. DC., Monogr. Phan. 4:27.1883; Gamble, Fl. Pres. 171(122).1915; Manilal & Sivar., Fl. Calicut 62. 1982; Chithra & Henry in Hajra *et al.*, Fl. India 4:443.1997. *Protium caudatum*

Wight & Arn., Prodr. 176. 1834; Bennett in Hook. f., Fl. Brit. India 1: 530. 1875. *Protium caudatum* Wight & Arn. var. *roxburghiana* (Wight & Arn.) Bennett in Hook.f., Fl. Brit. India 1: 530. 1875.

Small trees, bark green, peeling off thin scales. Leaves 3-7 foliolate, rachis to 14 cm; leaflets opposite, 4-6 x 3-4.5 cm, ovate or oblong, base acute; petiole 5-6 cm. Polygamous, flowers in axillary or terminal panicles; calyx cupular, lobes 4, ovate; petals 4, 3-4 mm, cream, reflexed; disc cupular, stamens 8, alternately short and long; ovary ovoid, 2-locular, locule 2 ovuled, stigma 2-lobed. Drupe 1-1.5 cm long, globose or ellipsoid.

Flowering & Fruiting: March-October.

Distribution: India and Sri Lanka. Rare; in moist deciduous forest. *RNMK 2198,* Muthanga.

GARUGA Roxburgh

Pl. Coromandel 3: 5. 1811. '1819'

Garuga pinnata Roxb., Pl. Corom. t. 208. 1811; Bennett in Hook. f., Fl. Brit. India 1: 528. 1875; Gamble, Fl. Pres. Madras 172(121). 1915; Manilal & Sivar., Fl. Calicut 63. 1982; Ansari, Fl. Kasaragod Div. 94. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 86. 1988; Vajr., Fl. Palghat Dist. 107. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 87. 1996; Chithra & Henry in Hajra *et al.*, Fl. India 4: 448. 1997; Mohanan & Sivad., Fl. Agasthyamala 148. 2002.

Deciduous trees, to 25 m high, bark grey or brown, shallowly longitudinally furrowed, exfoliating in large irregular flakes; blaze orange-red. Leaves imparipinnate, alternate, crowded at the tips of branchlets; stipules 3-5 mm, falcate; rachis 15-30 cm long, pubescent; leaflets 11-21, opposite, petiolule 1-2 mm, slender, pubescent; lamina 3-15 x 1.5-6 cm, oblong-lanceolate, oblong or ovate-lanceolate, base oblique, cuneate or subacute, margin crenate or serrate, pubescent, chartaceous; lateral nerves 12-18 pairs, parallel, prominent, intercostae reticulate, prominent; leaf galls copious. Flowers polygamous, yellow, 3-4 mm across, in axillary panicles to 15 cm; bracts linear; calyx campanulate, tomentose, deciduous; lobes 5, ovate; petals 5, oblong-lanceolate, tomentose, thickened and inflexed at apex; disc crenate, yellow; stamens 10, inserted on calyx tube; filaments pubescent; ovary superior, globose, pilose, 5-celled, ovules 2 in each cell; style pubescent; stigma 5-lobed. Fruit a drupe, greenish-yellow, oblong or irregularly globose, horned; seed one, with a membranous wing.

Flowering & Fruiting: January-August.

Distribution: Indo-Malesia. Occasional; in moist deciduous forest. *RNMK 1288,* Tholpetty.

MELIACEAE Juss.

Gen. Pl. 263. 1789.

1. Petiole winged ..... **Naregamia**
1. Petiole not winged 2

2. Seeds winged; cells many ovuled 3
2. Seeds not winged; cells one or two ovuled..... 4
3. Young shoots glabrous; filaments free ..... **Toona**
3. Young shoots tomentose; filaments united..... **Chukrasia**
4. Perennial herbs or subshrubs ..... **Munronia**
4. Trees or woody shrubs 5
5. Leaflets entire..... 6
5. Leaflets toothed 10
6. Leaves with domatia in the nerve axils..... **Reinwardtiodendron**
6. Leaves without domatia in the nerve axils 7
7. Peduncle to 25 cm long; staminal tube with bilobed appendages ..... **Trichilia**
7. Peduncle to 10 cm long; staminal tube without bilobed apeendages 8
8. Young parts covered with stellate hairs or fimbriate scales; disc obscure..... **Aglaia**
8. Young parts otherwise; disc prominent..... 9
9. Panicles longer than the leaves, drooping; petals 3 ..... **Aphanamixis**
9. Panicle shorter than the leaves, erect; petals 5 ..... **Dysoxylum**
10. Leaves simple ..... **Turraea**
10. Leaves trifoliolate or pinnate.....11
11. Leaves bipinnate..... **Melia**
11. Leaves simple pinnate ..... **Cipadessa**

AGLAIA Loureiro

Fl. Cochinch.173. 1790, *nom. cons.*

Shrubs or trees; twigs covered with stellate hairs or peltate scales. Leaves simple or pinnately compound; leaflets entire. Flowers polygamodioecious, globose; calyx 5-lobed; petals 5, free; staminal tube globose or urceolate, anthers 5 or 10, sessile, erect; disk minute or absent; ovary 1-2 or 3-celled; ovule 1 or 2 in each cells; style short; stigma simple or lobed. Fruit a berry, 1 or 2 celled; seeds 1 or 2, oblong or globose.

1. Leaves simple; shrubs ..... **A. simplicifolia**
1. Leaves 3-many-foliolate; trees..... 2
2. Young leaves golden brown; fruits longitudinally ridged ..... **A. malabarica**
2. Young leaves green; fruits smooth 3
3. Base of the leaflets unequal and oblique..... 4
3. Base of the leaflets equal and not oblique..... 5
4. Stamens 5-6 ..... **A. edulis**
4. Stamens 8-10 ..... **A. lawii**
5. Leaflets narrow, less than 2.5 cm broad ..... **A. barberi**
5. Leaflets broad, more than 3 cm broad ..... **A. elaeagnoidea**

Aglaia barberi Gamble, Bull. Misc. Inform. Kew 1915: 346. 1915 & Gamble, Fl. Pres. Madras 180(129). 1915; Sasidh. & Sivar., Fl. Pl. Thrissur For. 88. 1996; Jain & Bennett in Hajra *et al.*, Fl. India 4: 457.1997.

Small to medium sized trees; bark reddish brown, smooth. Leaves 20-25 cm long, 7-foliolate; leaflets 10-12 x 2.5-3 cm, elliptic-oblong, acuminate, glabrous, nerves to 15 pairs; petiolule 2-3 mm long. Panicles to 15 x 6 cm long, axillary, densely scaly; male flowers in panicles from the axils of upper leaves, 12-15 cm long; female flowers in 3-4 cm long few flowered racemes; calyx rim ciliate; petals 4, orbicular; anthers 5, ovate. Berry 1-2.5 cm across, globose, brownish puberulus.
Flowering & Fruiting: December-June.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forest. *RNMK 2766,* Banasuramala.

Aglaia edulis (Roxb.) Wall., Calc. Gard. Rep. 26. 1840; Bennett in Hook. f., Fl. Brit. India 1: 556. 1875; Pannell, Kew Bull. Addl. ser. 16, 229.1992; Jain & Bennett in Hajra *et al.*, Fl. India 4: 461.1997. *Milnea edulis* Roxb., Fl. Ind. 2: 430. 1824. *Nyalelia racemosa* Dennst., Schluss. Hort. Malab. 14,23,30. 1818; Hook. f., Fl. Brit. India 1: 554. 1875. *Beddomea indica* Hook.f. in Benth. & Hook.f., Gen. Pl. 1: 336. 1862; Hiern in Hook. f., Fl. Brit. India 1: 566. 1875; Gamble, Fl. Pres. Madras 184(132). 1915. *Aglaia khasiana* Hiern in Hook.f., Fl. Brit. India 1: 554. 1875. *Aglaia indica* (Hook.f.) Harms in Engl. & Prantl, Naturl. Pflanzenr. (ed.2.) 19b.I:146. 1940; Jain & Bennett in Hajra *et al.*, Fl. India 4: 468.1997; V. S. Ramach. & V. J. Nair, Fl. Cannanore 87. 1988; Sivar. & P. Mathew, Fl. Nilambur 130. 1997.

Trees, to 15 m high, bole buttressed; outer bark reddish-brown, yellowish-brown or greyish-green; inner bark pink or brown; exudation white; young parts covered with reddish-brown stellate hairs and scales. Leaves imparipinnate, alternate, estipulate, rachis 10-12.5 cm long, slender, swollen at base, covered with hairs or reddish-brown lepidote scales; leaflets 5-13, opposite or subopposite; petiolule 0.5-1.8 cm long, grooved above; lamina 4.5-23 x 2-8 cm, elliptic, elliptic-oblanceolate, base oblique, cuneate, acute or attenuate, apex acuminate or obtusely acuminate, margin entire, membranous to coriaceous, glabrous, papillate above; lateral nerves 7-16 pairs, slender, pinnate, prominent, intercostae scalariform, prominent. Flowers polygamodioecious, yellow or orange, in axillary inflorescence; male flowers inflorescence upto 38 cm long; covered with brown stellate hairs; calyx cup shaped; lobes 4-6, covered with scales; petals 4-6; staminal tube cup shaped, thick, crenulate at mouth, anthers 5-6; female inflorescence 5-6 cm long, peduncle 1-2.5 cm, calyx lobes 5, ovate, covered with hairs; petals 5; ovary superior, covered with scales, 3-celled, 1-2 ovules in each locule. Fruit a capsule, subglobose.
Flowering & Fruiting: May-June.
Distribution: Indo-Malesia. Occasional; in evergreen forests. *RNMK 2563,* Thirunelli.

Aglaia elaeagnoidea (A. Juss.) Benth., Fl. Australia 1: 383. 1863; Manilal & Sivar., Fl. Calicut 63. 1982; Ansari, Fl. Kasaragod Div. 95. 1985; Nicols., Suresh & Manilal, An interpr. Hort. Malab. 177. 1988; Pannell, Kew Bull. Add. ser. 16, 143.1992; Jain & Bennett in Hajra *et al.*, Fl. India 4: 461.1997; Mohanan & Sivad., Fl. Agasthyamala 149. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 116. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 164. 2009. *Nemedra elaeagnoidea* Juss., Mem. Mus. Hist. Nat. Paris 19: 259, t. 14. 1830. *Aglaia roxburghiana* (Wight & Arn.) Miq., Ann. Mus. Ludg.-Bat. 4: 41. 1868; Gamble, Fl. Pres. Madras 180(128). 1915. *Aglaia wallichii* Hiern in Hook. f., Fl. Brit. India 1: 555. 1875. *Aglaia roxburghiana* (Wight & Arn.) Miq. var. *obtusa* DC. in A. & C. DC., Monogr. Phan. 1: 605. 1878. *Aglaia roxburghiana* (Wight & Arn.) Miq. var. *beddomei* Gamble, Fl. Pres. .Madras 180(129). 1915. *Aglaia roxburghiana* (Wight & Arn.) Miq. var. *courtallensis* Gamble, Fl. Pres. Madras 180(129). 1915. *Aglaia elaeagnoidea* (Juss.) Benth. var. *beddomei* (Gamble) K.K.N. Nair, J. Bombay Nat. Hist. Soc. 78: 426. 1981; Vajr., Fl. Palghat Dist. 109. 1990; Jain &. Bennett in Hajra *et al.,* Fl. India 4: 462.1997. *Aglaia elaeagnoidea* (Juss.) Benth. var. *courtallensis* (Gamble) K.K.N. Nair, J. Bombay Nat. Hist. Soc. 76: 476. 1981; Jain & Bennett in Hajra *et al.*, Fl. India 4: 465.1997; Mohanan & Sivad., Fl. Agasthyamala 149. 2002. *Nyalel, Nialel* Rheede, Hort. Malab. 4:37-38, t. 16. 1683.

Medium trees, bark red, branchlets covered with brownish scales. Leaves 10-foliolate, leaflets opposite, 8-12 x 3-4 cm, elliptic-obovate, apex acuminate, base cuneate, scaly on both surface, densely below, drying brownish. Panicles to 11 cm, axillary; flowers polygamo-dioecious, yellow; calyx campanulate, scaly; petals 5, pale yellow; staminal tube entire at apex; anthers included. Berry subglobose.

Flowering & Fruiting: November-August.

Distribution: Indo-Malesia to Pacific Islands. Occasional; in evergreen forests. *RNMK 2688,* Thariodu.

Aglaia lawii (Wight) Sald. in Sald. & Nicols., Fl. Hassan Dist. 392. 1976; Vajr., Fl. Palghat Dist. 109. 1990; Pannell, Kew Bull. Add. ser. 16, 97.1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 88. 1996; Jain & Bennett in Hajra *et al.*, Fl. India 4: 471.1997. *Nimmonia lawii* Wight, Calcutta J. Nat. Hist. 7: 13. 1847. *Amoora lawii* (Wight) Bedd., Fl. Sylv. t. 133. 1871; Hiern in Hook. f., Fl. Brit. India 1: 561. 1875; Gamble, Fl. Pres. Madras 181(130). 1915. *Aglaia andamanica* Hiern in Hook.f., Fl. Brit. India 1: 555. 1875. *Amoora canarana* (Turcz.) Hiern in Hook.f., Fl. Brit. India 1: 560.1875; Gamble, Fl. Pres. Madras 182(130). 1915;. *Aglaia jainii* Viswan. & Ramach., Bull. Bot. Surv. India 24: 212. 1982(1983); Sivar. & P. Mathew, Fl. Nilambur 131. 1997; Jain & Bennett in Hajra *et al.*, Fl. India 4: 469.1997. *Aglaia tamilnadensis* Nair & Rajan in Nair & Henry, Fl. Tamil Nadu 1: 66. 1983; V. S. Ramach. & V. J. Nair, Fl. Cannanore 88. 1988; Manilal, Fl. Silent Valley 48. 1988.

Trees; branchlets and younger parts covered with light brown fimbriate scales. Leaves 6-8 foliolate; leaflets 13-15 x 6-7 cm, elliptic-oblong, abruptly acuminate at apex, oblique at base, densely scaly; nerves 7-9 pairs, nervules indistinct; petiole 1-1.5 cm long. Male flowers in panicles from upper leaves, 10-15 cm long, axillary; flowers 0.5-0.7 cm across; calyx cupular, lobes obscure; petals orbicular, concave, glabrous, not spreading; staminal tube lobose; anthers 10. Berry obovoid, obtuse, smooth, brown; seeds 1-3, covered with thin red aril.

Flowering & Fruiting: December-February.

Distribution: Indo-Malesia to Pacific Islands. Occasional; in evergreen forests. *RNMK 3326,* Chanthanthodu; *RNMK 1789,* Vythiri.

Aglaia malabarica Sasidh., Kew Bull. Addl. ser. 16, 369. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 91. 1996. **Fig.18, Plate 12f.**

Trees, to 20 m high, bark smooth, brown; blaze reddish-brown; young shoots golden brown, densely peltate scaly. Leaves imparipinnate, alternately, exstipulate; rachis 25-35 cm long, stout, covered with peltate scales, swollen at base, grooved above; leaflets 7-11, alternate, estipellate; petiolule slender, grooved above, covered with peltate scales, lamina 6-21 x 2.5-8 cm, oblong-lanceolate or elliptic-lanceolate, base obliquely round or acute, apex acuminate, margin entire, upper surface minutely pitted with peltate scales, lower surface with numerous peltate scales on the midrib and lateral nerves, coriaceous; lateral nerves 10-19 pairs, parallel, prominent, intercostae reticulate, obscure. Male flowers inflorescence 15-20 cm long, densely covered with peltate scales; calyx lobes 5, round, densely scaly; petals 5, yellow; stamens 5; anthers 5, included; female inflorescence 5-5.5 cm long, covered with reddish-brown peltate scales; female flowers 4-4.5 mm long; calyx thick and fleshy at base; lobes 5, rounded, densely scaly; petals 5; staminodes 5, included; ovary superior, depressed globose, with reddish-brown scales, 3-celled, ovules one in each cell; stigma subglobose with an apical depression. Fruit a capsule, obovoid or subglobose with an apical depression; seeds completely surround by a thin pale pink translucent aril.

Flowering & Fruiting: December-July.

Distribution: Endemic to southern Western Ghats (Kerala). Rare; in evergreen forests. *RNMK 3385,* Vythiri Ghat.

Aglaia simplicifolia (Bedd.) Harms in Engl. & Prantl, Naturl. Pflanzenr. (ed. 2) 196. 1: 146. 1940; V. S. Ramach. & V. J. Nair, Fl. Cannanore 87. 1988; Pannell, Kew Bull. Addl. ser. 16, 306.1992; Jain & Bennett in Hajra *et al.*, Fl. India 4: 474.1997. *Beddomea simplicifolia* Bedd., Fl. Sylv. t. 135. 1871; Hiern in Hook. f., Fl. Brit. India 1: 566. 1875; Gamble, Fl. Pres. Madras 184(132). 1915. *Beddomea simplicifolia* var. *parviflora* Bedd., Fl. Sylv. t. 135. 1871. *Beddomea simplicifolia* var. *racemosa* Bedd., Fl. Sylv. t.135. 1871.

Small trees or large shrubs; branchlets stellate hairy. Leaves 13-20 x 5-10 cm, elliptic, shortly acuminate, nerves 10-12 pairs, nervules parallel; petiole 2–2.5 cm long, jointed above the middle. Panicle 5-7 cm across, very hairy. Flowers 5-6-merous; calyx-lobes obtuse, densely hairy; petals orbicular, dull white, glabrous; anthers 5; ovary stellate hairy. Drupe 3-4 x 2-3 cm; obovoid, acute at apex, dark brown, stellate hairy many ridged.

Flowering & Fruiting: November-June.

Distribution: Indo-Malesia. Common; in evergreen forests. *RNMK 1897,* Chanthanathodu; *RNMK 1345*, Kunchome.

APHANAMIXIS Blume

Bijdr. 165. 1825.

Aphanamixis polystachya (Wall.) Parker, Indian For. 57: 486. 1931; Manilal & Sivar., Fl. Calicut 63. 1982; Ansari, Fl. Kasaragod Div. 95. 1985; Manilal, Fl. Silent Valley 48. 1988; Vajr., Fl. Palghat Dist. 110. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 94. 1996; Sivar. & P. Mathew, Fl. Nilambur 131. 1997; Jain & Bennett in Hajra *et al.,* Fl. India 4: 477. 1997; Mohanan & Sivad., Fl. Agasthyamala 150. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 116. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 166. 2009. *Aglaia polystachya* Wall. in Roxb., Fl. Ind. 2: 429. 1824. *Andersonia rohituka* Roxb., Fl. Ind. 2: 213. 1832. *Amoora rohituka* (Roxb.) Wight & Arn. Prodr. 119. 1834; Hiern in Hook. f., Fl. Brit. India 1: 559. 1875; Gamble, Fl. Pres. Madras 181(130). 1915. *Amoora beddomei* Kosterm., Acta Bot. Neerl. 31: 133. 1982; Kamble & Sharma, J. Econ. Tax. Bot. 5: 493.1984.

Shrubs or small trees. Leaves 20-65 cm long, 7-17-foliolate; leaflets 10-23 x 3-7 cm, opposite, ovate-oblong, acute, glabrous; nerves to 13 pairs; petiolule 4-5 mm long. Panicle to 70 cm long, drooping, many-flowered; pedicels 5-6 mm long. Flowers 7-9 mm across; sepals 5, orbicular, thick; petals 3, orbicular; staminal tube 4-5 mm long, globose; anthers 8, oblong, sessile; ovary 3-celled, conical; ovules 2 in each cell; style absent; stigma capitate, 3-ridged. Capsule 2.5-3 cm across, 3-lobed, shortly stalked, glabrous; seeds 1-3, covered with orange-red aril.

Flowering & Fruiting: January-December.

Distribution: India, Pakistan, Nepal, Bhutan, Bangladesh, Myanmar and Sri Lanka. Occasional; in evergreen forests. *RNMK 2287,* Vythiri.

CHUKRASIA A. Jussieu

Mem. Mus. Hist. Nat. 19. 251. 1830.

Chukrasia tabularis A. Juss., Mem. Mus. Hist. Nat. Paris 19: 251. t.22. 1830; Hiern in Hook. f., Fl. Brit. India 1: 568. 1875; Gamble, Fl. Pres.Madras 186(133). 1915; Ansari, Fl. Kasaragod Div. 96. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 88. 1988; Vajr., Fl. Palghat Dist. 110. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 94. 1996; Sivar. & P. Mathew, Fl. Nilambur 132. 1997; Jain & Bennett in Hajra *et al.*, Fl. India 4: 481. 1997.

Tall trees, bark dark brown, young shoots lenticellate; branchlets glabrous or velvety hairy. Leaves 30-35 cm long, imparipinnate; leaflets alternate, 13-15 x 6-8 cm, ovate, acute, sharply unequal at base, glabrous or hairy; petiolule 1-1.5 cm long. Panicle to 20 cm across, terminal; bracts lanceolate; flowers bisexual, yellowish-white; calyx campanulate, 6-7 mm across, hairy or glabrous; petals 5-6, 1-1.3 cm long, oblong; staminal tube cylindrical, anthers 10; ovary densely hairy, 3-5-celled; ovules many in each cell, style stout, stigma clavate. Fruit a capsule, 4-5 cm long, 4-5-valved, glabrous; seeds winged.

Flowering & Fruiting: May-March.

Distribution: Indo-Burma. Common in moist deciduous forests. *RNMK 2298,* Begur; *RNMK 1198,* Muthanga.

CIPADESSA Blume

Bijdr. 162. 1825.

Cipadessa baccifera (Roth) Miq., Ann. Mus. Lugd.-Bat. 4: 6. 1868; Gamble, Fl. Pres. Madras 176(126). 1915; Manilal & Sivar., Fl. Calicut 64. 1982; Manilal, Fl. Silent Valley 49. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 88. 1988; Vajr., Fl. Palghat Dist. 110. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 95. 1996; Sivar. & P. Mathew, Fl. Nilambur 132. 1997; Jain & Bennett in Hajra *et al.*, Fl. India 4: 482. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 118. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 167. 2009. *Melia baccifera* Roth, Nov. Pl. Sp. 215. 1821. *Cipadessa fruticosa* Bl., Bijdr. 162. 1825; Hiern in Hook. f., Fl. Brit. India 1: 545. 1875.

Shrubs. Leaves 20-30 cm long, 7-9-foliolate; leaflets 8-10 x 4-5 cm, elliptic, acute, serrate, hispid along the nerves below; nerves 9-15 pairs. Flowers 4-5 mm across, in long peduncled axillary cymes; calyx cupular, 5-lobed; petals oblong, pale yellow; stamens 10, filaments adnate below; anthers oblong; ovary truncate, 5-celled, glabrous, 5-celled; ovules 2 in each cell style, one short; stigma clavate. Drupe 5-7 mm across, reddish, glabrous; seeds 1 or 2, angled.

Flowering & Fruiting: November-July.

Distribution: Indo-Malesia. Common; in moist deciduous forests. *RNMK 3554,* Tholpetty; *RNMK 1209,* Chedalayam; *RNMK 2343*, Thirunelli; *RNMK 1079*, Begur.

DYSOXYLUM Blume

Bijdr. 172. 1825.

Dysoxylum malabaricum Bedd. ex Hiern in Hook. f., Fl. Brit. India 1: 548. 1875; Gamble, Fl. Pres. Madras 178(128). 1915; Sasidh. & Sivar., Fl. Pl. Thrissur For. 95. 1996; Sivar. & P. Mathew, Fl. Nilambur 133. 1997; Jain & Bennett in Hajra *et al.*, Fl. India 4: 489. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 118. 2005. **Plate 12j.**

Tall trees; bark corky-lenticellate; branchlets densely hispid. Leaves 35-40 x 17-20 cm; 10-foliolate. Leaflets 17-20 x 5-7 cm, ovate-oblong, acute, rounded

at base, nerves 17-19 pairs, prominent below; petiolule 7-8 mm long. Raceme 15-20 cm long, axillary. Flowers shortly pedicellate; calyx deeply lobed; petals oblong, acute; staminal tube 7-8 mm long; disk hispid at rim; style 4-5 mm long. Fruit a capsule, 5-7.5 cm long, pyriform, verrucose, bright yellow, with 4 longitudinal furrows; seeds 3-4, reddish-brown, bluntly trigonus.
Flowering & Fruiting: February-June.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2764,* Kunchome; *RNMK 1333,* Chooralmala.

MELIA Linnaeus
Sp. Pl. 384. 1753.

Melia dubia Cav., Diss. 7: 364. 1789; Hiern in Hook. f., Fl. Brit. India 1: 545. 1875; Ansari, Fl. Kasaragod Div. 96. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 89. 1988; Vajr., Fl. Palghat Dist. 111. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 97. 1996; Jain & Bennett in Hajra *et al.*, Fl. India 4: 495. 1997; Mohanan & Sivad., Fl. Agasthyamala 151. 2002. *Melia composita* Willd., Sp. Pl. 2: 509. 1799; Gamble, Fl. Pres.Madras 176(126). 1915. *Melia superba* Roxb., Fl. Ind. 2: 396. 1832. *Melia robusta* Roxb., Fl. Ind. 2: 397. 1832.

Large trees, bark flaking off, branchlets lenticellate. Leaves 3-pinnate, 80-90 cm long, secondary rachis 3 pairs; leaflets 2-5 pairs, opposite, 5-8 x 2-3 cm, ovate- lanceolate, apex acuminate, base cordate, serrate; petiole to 10 cm, petiolule to 1 cm. Panicles axillary, 15-18 cm; flowers greenish-white; calyx lobes ovate, pubescent; petals obovate; anther exserted; ovary 5-celled, stigma capitate. Drupe 2-3 cm long, globose.
Flowering & Fruiting: March-February.
Distribution: Indo-Malesia to Australia. Common in moist deciduous forests and plantations. *RNMK 1789,* Muthanga.

MUNRONIA Wight
Ic. Pl. Ind. Or. 1(5): 1. 1838.

Munronia pinnata (Wall.) Harms, Ber. Beutsch. Bot. Ges. 35: 78. 1917; Rao, Bull. Bot. Surv. India 5:255: Manilal, Fl. Silent Valley 49. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 89. 1988; Vajr., Fl. Palghat Dist. 111. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 97. 1996; Jain & Bennet in Hajra *et al.*, Fl. India 4: 497. 1997. *Turraea pinnata* Wall., Pl. Asiat. Rar. 2: 21. t.119. 1831. *Munronia wallichii* Wight, Ill. 1: t.54. 1840; Hiern in Hook. f., Fl. Brit. India 1: 543. 1875; Gamble, Fl. Pres.Madras 175(125). 1915.

Shrubs, younger parts villous. Leaves 25-30 cm long, imparipinnate; leaflets 10-14, opposite, 10-13 x 4-5.5 cm, ovate-lanceolate, rounded or cordate at base, hispid below. Flowers few, in axillary short cymes; pedicel ca. 1 cm long; calyx tubular, lobes oblanceolate, leafy; petals 5, white, 2.5-3 cm long, spathulate, partly cohering below; staminal tube 1-2 cm long, 10-toothed; anthers 10, apiculate; ovary 5-celled; ovules 2 in each cell; style

slender, longer than staminal tube. Capsule 1.5-2 cm across, depressed globose, hispid; seeds 5, oblong, smooth.
Flowering & Fruiting: September-May.
Distribution: India. Occasional in evergreen forests. *RNMK 1666,* Sugandhagiri; RNMK 1785, Chanthanathodu.

NAREGAMIA Wight & Arnott
Prodr. 116. 1834, *nom. cons.*

Naregamia alata Wight & Arn., Prodr. 117. 1834; Wight, Ic. t. 90. 1838: Hiern in Hook. f., Fl. Brit. India 1: 542. 1875; Gamble, Fl. Pres. Madras 175(125). 1915; Manilal & Sivar., Fl. Calicut 64. 1982; Ansari, Fl. Kasaragod Div. 96. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 90. 1988; Vajr., Fl. Palghat Dist. 111. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 98. 1996; Sivar. & P. Mathew, Fl. Nilambur 135. 1997; Jain & Bennet in Hajra *et al.*, Fl. India 4: 498. 1997; Mohanan & Sivad., Fl. Agasthyamala 151. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 119. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 168. 2009.

Glabrous herbs. Leaves 3-foliolate; petiole winged; leaflets 3-5 x 2-3 cm, elliptic, crenate, obtuse, sessile. Flowers 1-3-together, in axillary fascicles, pedicellate; calyx campanulate, lobed half way down, tomentose; petals 5, white, 2-3 cm long, oblanceolate; staminal tube 1.5-2.5 cm long, slender; anthers 10; ovary 3-celled, glabrous; ovules paired; style filiform, 1-2 cm long; stigma capitate. Capsule depressed globose; seeds solitary, ellipsoid, transversally rugose.
Flowering & Fruiting: August-December.
Distribution: Endemic to Peninsular India. Occasional; in moist deciduous forest. *RNMK 1345,* Muthanga.

REINWARDTIODENDRON Koorders
Mede. Land. Plant. 19. 389. 1898.

Reinwardtiodendron anamalaiense (Bedd.) Mabb., Malays. For. 45: 452. 1982; Jain & Bennett in Hajra *et al.*, Fl. India 4: 498.1997. *Lansium anamalaiense* Bedd., J. Lit. Sci. ser.3, 1: 40. 1864. *Lansium anamallayanum* Bedd., Fl. Sylv. t. 131. 1871 & Ic. t. 104. 1868-1874; Hiern in Hook. f., Fl. Brit. India 1: 558. 1875; Gamble, Fl. Pres. Madras 182(130). 1915. *Aglaia anamallayana* (Bedd.) Kosterm., Reinwardtia 7: 257, t.10. 1966; Vajr., Fl. Palghat Dist. 109. 1990. *Reinwardtiodendron anamallayanum* (Bedd.) Sald. in Sald. & Nicols. Fl. Hassan Dist. 392. 1976; Manilal, Fl. Silent Valley 50. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 90. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 98. 1996; Sivar. & P. Mathew, Fl. Nilambur 135. 1997.

Small trees, bark greyish-brown, mottled with grey, lenticellate, branchlets minutely grey tomentose. Leaves pinnate, 5-7 foliolate, leaflets 8-12 x 3-5 cm elliptic, apex acuminate, base cuneate, glabrous; lateral nerves 5-8 pairs. Spike axillary. Flowers creamy yellow; sepals ovate-orbicular; petals 5; anthers

10 in two whorls, within the staminal tube; ovary 5-celled, cell 2-ovuled, stigma capitate. Berry 2-3 cm long, oblong; seeds covered with white mucilaginous aril.
Flowering & Fruiting: March-November.
Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 1885,* Vythiri.

TOONA (Endlicher) M.J. Roemer
Fam. Nat. Syn. Monogr. 1: 131. 1846.

Toona ciliata Roemer, Syn. Hesper. 139. 1846; Manilal, Fl. Silent Valley 50. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 90. 1988; Vajr., Fl. Palghat Dist. 112. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 98. 1996; Jain & Bennett in Hajra *et al.*, Fl. India 4: 504. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 121. 2005. *Cedrela toona* Roxb. ex Rottl. & Willd., Ges. Naturf. Freunde Berlin Neue Schriften 2: 198. 1803; Wight, Ic. t. 161. 1839; Hiern in Hook. f., Fl. Brit. India 1: 568. 1875; Gamble, Fl. Pres. Madras 186(133). 1915.

Tall trees. Leaves 60-70 cm long, imparipinnate, 12-16-foliolate; leaflets alternate, 12-15 x 4-6 cm, ovate, acuminate, glabrous; petiolules 7-8 mm long. Panicle 25-30 x 12-15 cm, terminal. Flowers 6-7 mm across, sessile; calyx cupular, 5-toothed, tomentose; petals dull yellow, oblong, spreading; stamens 5, free; disk pubescent; ovary 5-celled, densely hairy, stigma discoid. Capsule 2-2.5 cm long; seeds many, winged at both ends.
Flowering & Fruiting: February-May.
Distribution: Indo-Myanmar; cultivated in Sri Lanka, Afghanistan, Africa and the Hawaiian Islands. Common in semi-evergreen forests. *RNMK 1339,* Manikkunnumala.

TRICHILIA P. Browne
Civ. Nat. Hist. Jamaica 278. 1756 *nom. cons.*

Trichilia connaroides (Wight & Arn.) Bentv., Acta Bot. Neerl. 11: 13. 1962; Manilal, Fl. Silent Valley 51. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 91. 1988; Vajr., Fl. Palghat Dist. 112. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 99. 1996; Sivar. & P. Mathew, Fl. Nilambur 137. 1997; Jain & Bennet in Hajra *et al.*, Fl. India 4: 515. 1997; Mohanan & Sivad., Fl. Agasthyamala 152. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 121. 2005. *Zanthoxylum connaroides* Wight & Arn., Prodr. 148. 1834, "*Zanthoxylon*". *Heynea trijuga* Roxb. ex Sims, Bot. Mag. 41 t. 1738. 1815, non *Trichilia trijuga*, Vell., 1825; Hiern in Hook. f., Fl. Brit. India 1: 565. 1872; Gamble, Fl. Pres. Madras 183(131). 1915.

Small trees. Leaves alternate, 35-40 cm long, imparipinnate; leaflets 7-9, opposite, 13-15 x 5-7 cm, ovate, abruptly acuminate, unequal at base; petiolules 1-1.5 cm long. Panicle axillary; peduncle to 25 cm long, erect; flowers 4-5 mm across, many; calyx gamosepalous, 5-toothed; petals oblong, greenish white; staminal tube divided to the middle, pubescent; anthers 10;

ovary 3-celled, ovule 2 in each cell, style thickened above, stigma 2-toothed. Capsule 0.5-1 cm across, globose, glabrous, pinkish; seeds 1-3, covered with white aril.
Flowering & Fruiting: March-September.
Distribution: Indo-Malesia. Common in semi-evergreen forests and plantations. *RNMK 1309,* Manikkunnumala, *RNMK 1764,* Poothady.

TURRAEA Linnaeus
Mant. 2: 150. 1771.

Turraea villosa Bennett, Fl. Jav. Rar. 1: 182. 1840; Wight, Ic. t. 1593. 1850; Hiern in Hook. f., Fl. Brit. India 1: 542. 1875; Gamble, Fl. Pres.Madras 174(124). 1915; V. S. Ramach. & V. J. Nair, Fl. Cannanore 91. 1988; Vajr., Fl. Palghat Dist. 112. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 99. 1996; Jain & Bennet in Hajra *et al.*, Fl. India 4: 515. 1997. *Turraea virens* Hiern in Hook.f., Fl. Brit. India 1: 541. 1875, non L. 1771.

Shrubs, densely villous. Leaves simple, alternate, 10-13 x 6-8 cm, broadly ovate, abruptly acuminate, rounded at base, entire. Flowers 2-3-together in axillary fascicles; pedicel 2.5-3 cm long; sepals 5, ovate, connate at base; petals 4-5 cm, linear-oblong, spathulate at apex; white, partially connate; staminal tube 3-4 cm long, slender, toothed; anthers 10, projected above, disk tubular; ovary 5-celled, ovules solitary in each cell; style slender, bulged below the stigma. Capsule 1-1.5 cm across, depressed globose; seeds 5, reddish.
Flowering & Fruiting: April-June.
Distribution: Indo-Malesia. Occasional; in evergreen forest. *RNMK 1950,* Vythiri.

Azadirachta indica Juss., **Melia azedarach** L., and **Swetenia macrophylla** King in Hook., are found grown occasionally in plantations and along roadsides (Kalpetta; Sulthan Bathery).

DICHAPETALACEAE Baill.
in Martius, Fl. Bras. 12(1): 365. 1886.

DICHAPETALUM Thouars
Gen. Nov. Madag. 23. 1806.

Dichapetalum gelonioides (Roxb.) Engler in Engler & Prantl, Naturl. Pflanzenf. 3(4): 348. 1896; Gamble, Fl. Pres. Madras 188(134). 1915; Ansari, Fl. Kasaragod Div. 97. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 92. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 100. 1996; Nair in Hajra *et al.*, Fl. India 4: 528. 1997; Mohanan & Sivad., Fl. Agasthyamala 153. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 121. 2005. *Moacurra gelonioides* Roxb., Fl. Ind. 2: 69. 1832. *Chailletia gelonioides* (Roxb.) Bedd., For. Man. Bot. 59. Anal. Gen. t.9. f.1. 1871; Hook. f., Fl. Brit. India 1: 570. 1875.

Shrubs, branchlets slender. Leaves alternate, 10-14 x 3-4.5 cm, elliptic, caudate-acuminate, entire. Flowers unisexual, in axillary short peduncled

cymes, densely villous; bracts lanceolate; sepals 5, ovate; petals obovate, bilobed at apex, glabrous; stamens 5, filaments short, anthers ovoid, disc 4 lobed, scale like; ovary 3-celled; ovule 2 in each cell; style 1, 3 fid above. Fruit a 2-lobed, drupe, compressed, rugose; seeds covered with reddish mezocarp.
Flowering & Fruiting: March-July.
Distribution: Indo-Malesia. Common; in evergreen forests. *RNMK 2086,* Vythiri; *RNMK 2106,* Thirunelli.

OLACACEAE Mirb. ex DC.

Prodr. 1: 531. 1824.

STROMBOSIA Blume

Bijdr. 1154. 1826.

Strombosia ceylanica Gard., Calcutta J. Nat. Hist. 6: 350. 1846; Bedd., Fl. Sylv. t. 137. 1872; Mast. in Hook. f., Fl. Brit. India 1: 579. 1875; Gamble, Fl. Pres.Madras 191(137). 1915; Sasidh. & Sivar., Fl. Pl. Thrissur For. 101. 1996; Uniyal in N.P. Singh *et al.*, Fl. India 5: 14. 2000; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 122. 2005.

Large trees, bark uneven, light pink inside; branchlets glabrous. Leaves alternate, 17-18 x 6-7 cm, lanceolate, rounded at base, acute at apex; nerves 5-7 pairs, glabrous. Flowers many, yellow, fascicled in axillary or lateral tubercles; calyx campanulate, lobes 5, acute; petals lanceolate, tomentose inside; stamens 5, antipetalous, erect; ovary 1-celled. Berry 0.5-1 cm across; obovoid, smooth, truncate at apex; seed 1.
Flowering & Fruiting: January-April.
Distribution: Indo-Malesia. Rare' in evergreen forests. *RNMK 1007,* Chanthanathodu.

ICACINACEAE (Benth.) Miers

in Ann. Mag. Nat. Hist. ser. 2, 8: 174. 1851.

1. Trees or shrubs 2
1. Climbers 4
2. Leaves more than 20 cm long; flowers foul smelling ..... **Nothopodytes**
2. Leaves less than 15 cm long; flowers not foul smelling..... 3
3. Large shrubs or small trees; flowers in axillary cymes ..... **Gophandra**
3. Large trees; flowers in terminal panicles ..... **Apodytes**
4. Leaves dentate; flowers in long peduncled heads ..... **Miquelia**
4. Leaves entire; flowers in elongate spikes ..... **Sarcostigma**

APODYTES E. Meyer ex Arnott

Hooker's J. Bot. 3: 155. 1840.

Apodytes dimidiata Meyer ex Arn. in Hook.'s J. Bot. 3: 155. 1840; Manilal, Fl. Silent Valley 52. 1988; Vajr., Fl. Palghat Dist. 113. 1990; Mathur in N.P. Singh *et al.*, Fl. India 5: 18. 2000. *Apodytes benthamiana* Wight, Ic. t. 1153.

1846; Mast. in Hook. f., Fl. Brit. India 1: 588. 1875; Gamble, Fl. Pres. . 195(140). 1915. *Apodytes beddomei* Mast. in Hook. f., Fl. Brit. India 1: 588. 1875; Gamble, Fl. Pres. Madras 195(140). 1915. **Plate 13a.**

Trees, to 20 m high. Leaves alternate, 8-10 x 3-4 cm, oblong, alternate at base; nerves 6-7 pairs; petiole 1-1.5 cm long. Flowers in terminal panicle, 3-5 cm across, shortly pedicelled; calyx cupular, 5-toothed; petals oblong, acute; stamens 5, filaments broadened at base; anthers longer than the filament, lobed at base; ovary oblique, gibbous at base, 1-celled, ovules 2, pendulous; style 1, eccentric; stigma oblique. Drupe ellipsoid, 1-seeded.

Flowering & Fruiting: April-October.

Distribution: Paleotropics. Common; in evergreen forests. *RNMK 1004,* Sugandhagiri; *RNMK 2080,* Makkimala; *RNMK 3291,* Kurichiarmala.

GOMPHANDRA Wallich ex Lindley

Nat. Syst. ed. 2, 439. 1876.

Shrubs or small trees. Leaves alternate, entire. Flowers in peduncled cymes, axillary or extra-axillary, unisexual; calyx a truncate rim; corolla tubular, lobes 5; stamens 5 in male flowers, filaments exerted; anthers oblong; pistillode conical, hairy; ovary in female flowers 1-celled, 2-ovuled; stigma discoid. Fruit an oblong drupe, crowned with remains of stigma; seed-1.

1. Leaves coriaceous; cymes glabrous..... **G. coriacea**
2. Leaves membranous; cymes puberulus .....**G. tetrandra**

Gomphandra coriacea Wight, Ill. 1: 103. 1840; Gamble, Fl. Pres. Madras 195(140). 1915; Manilal, Fl. Silent Valley 52. 1988; Vajr., Fl. Palghat Dist. 114. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 102. 1996; Sivar. & P. Mathew, Fl. Nilambur 139. 1997; Mathur in N.P. Singh *et al.*, Fl. India 5: 22. 2000; Mohanan & Sivad., Fl. Agasthyamala 154. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 123. 2005. *Gomphandra polymorpha* Wight, Ill. 1: 103. 1840 p.p., Ic. tt. 953,954. 1843; Mast. in Hook. f., Fl. Brit. India 1: 586. 1875; Gamble, Fl. Pres. .Madras 195(139). 1915.

Small trees; branchlets brown. Leaves 12-15 x 5-6 cm, elliptic, abruptly acuminate; nerves obscure, 4-6 pairs; petiole 1-1.5 cm long. Cymes peduncled, extra-axillary; flowers 5-9 together, greenish-yellow; calyx cup truncate; corolla lobes acute; pistillode in male flowers pubescent. Drupe 1-1.5 cm long, oblong, terete.

Flowering & Fruiting: December-March.

Distribution: South India and Sri Lanka. Common in evergreen forests. *RNMK 1005,* Vythiri; *RNMK 2995,* Thariodu.

Gomphandra tetrandra (Wall.) Sleumer, Notizbl. Bot. Gart. Berlin-Dahlem. 15: 238. 1940 & Blumea 17: 204. 1969; Ansari, Fl. Kasaragod Div. 98. 1985; Manilal, Fl. Silent Valley 52. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore

93. 1988; Vajr., Fl. Palghat Dist. 114. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 102. 1996; Mathur in N.P. Singh *et al.*, Fl. India 5: 25. 2000; Mohanan & Sivad., Fl. Agasthyamala 155. 2002. *Lasianthera tetrandra* Wall. in Roxb., Fl. Ind. 2: 238. 1824. *Gomphandra axillaris* Wall. ex Bedd., Fl. Sylv. t. 61. 1870; Mast. in Hook. f., Fl. Brit. India 1: 586. 1875. *Gomphandra polymorpha* Wight, Ill. 1: 103. 1840 p.p.; Gamble, Fl. Pres. Madras 195(139). 1915.

Shrubs, to 2 m high; branchlets green. Leaves 13-16 x 3.5-4.5 cm, oblong, acute at base, acuminate at apex, nerves 5-9 pairs. Cymes peduncled; peduncle 0.4-1 cm long; flowers 3-10 together, greenish-yellow; calyx cupular; corolla lobes cuspidate; filaments connate. Drupe 1-1.3 cm long, obovate, acute.

Flowering & Fruiting: September-December.

Distribution: South and south east Asia, also in China. Common; in evergreen forests. *RNMK 1110,* Vythiri; *RNMK 1942*, Thariodu.

MIQUELIA C. F**.** Meissner

Pl. Vasc. Gen. 1: 152. 1838 *nom. Cons.*

Miquelia dentata Bedd., J. Lit. Sci. ser. 3, 1: 38. 1864; Mast. in Hook. f., Fl. Brit. India 1: 593. 1875; Gamble, Fl. Pres. Madras 197(141). 1915; Ansari, Fl. Kasaragod Div. 98. 1985; Manilal, Fl. Silent Valley 53. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 93. 1988; Vajr., Fl. Palghat Dist. 114. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 102. 1996; Sivar. & P. Mathew, Fl. Nilambur 140. 1997; Mathur in N.P. Singh *et al.*, Fl. India 5: 29. 2000; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 123. 2005.

Glabrous slender climbers. Leaves 9-16 x 4-7 cm, ovate, rounded or truncate at base, acute, dentate, more sharply near the base; petiole 3-4 cm long. Flowers unisexual, in peduncled globose spike; peduncle to 6 cm long; calyx cupular, 4-toothed; petals 4, oblong; stamens 4 or 5, in male flowers; ovary 1-celled, 4-angled; style absent; stigma 4-angled; ovules 2, pendulous. Drupe 1.8-2 cm long, 3-8 together, ovoid, sessile, yellow; seeds stalked, pitted.

Flowering & Fruiting: April-September.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1222,* Talimala.

NOTHAPODYTES Blume

Mus. Bot. Lugd.-Bat. 1: 248. 1850.

Nothapodytes nimmoniana (Graham) Mabberly in Manilal, Bot. Hist. Hort. Malab. 88. 1980; Manilal & Sivar., Fl. Calicut 65. 1982; Ansari, Fl. Kasaragod Div. 99. 1985; Manilal, Fl. Silent Valley 53. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 94. 1988; Vajr., Fl. Palghat Dist. 115. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 104. 1996; Sivar. & P. Mathew, Fl. Nilambur 141. 1997; Mathur in N.P. Singh *et al.*, Fl. India 5: 31. 2000; Mohanan & Sivad., Fl. Agasthyamala 156. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 123. 2005. *Premna nimmoniana* Graham, Cat. Pl. Bombay 155. 1839. *Stemonurus foetidus* Wight, Ic. t. 955. 1845. *Mappia foetida* (Wight) Miers,

Ann. Mag. Nat. Hist. ser. 2, 9: 395. 1852; Gamble, Fl. Pres. .Madras 196(141). 1915. *Nothapodytes foetida* (Wight) Sleumer, Notizbl. Bot. Gart. Berlin-Dahlem. 15: 247. 1940 & Blumea 17: 232. 1969. *Mappia wightiana* Miers, Ann. Mag. Nat. Hist. ser. 2, 9: 397. 1852; Gamble, Fl. Pres. Madras 197(141). 1915. *Mappia tomentosa* Miers, Ann. Mag. Nat. Hist. ser. 2, 9: 397. 1852; Mast. in Hook. f., Fl. Brit. India 1: 589. 1875; Gamble, Fl. Pres. 196(141). 1915. *Mappia ovata* Miers, Ann. Mag. Nat. Hist. ser. 2. 9: 396. 1852; Mast. in Hook. f., Fl. Brit. India 1: 589. 1852; Gamble, Fl. Pres. Madras 197(141). 1915. **Plate 13f.**

Small trees; branchlets prominently lenticellate. Leaves 14-17 x 7-9 cm, broadly ovate or elliptic, acute or acuminate, base unequal, tomentose along the veins beneath and glabrous above, lateral nerves 8-10 pairs, domatia present in the axils of nerves; petiole to 6 cm long. Flowers creamy yellow, in terminal panicles, foul smelling; calyx cupular, 5-lobed; petals connate, tomentose outside, villous within, apex inflexed; stamens 5, filaments as long as the petals, staminodes 5, hairy; ovary 1-celled, densely hairy. Drupe oblong, reddish-brown, glabrous.

Flowering & Fruiting: June-September.

Distribution: Indo-Malesia and China. Occasional in semi-evergreen and moist deciduous forest. *RNMK 1005,* Manikkunnumala; *RNMK 1164*, Tholpetty.

SARCOSTIGMA Wight & Arnott

Edinburgh New Philos. J. 14: 299. 1833.

Sarcostigma kleinii Wight & Arn., Edinburgh New Phil. J. 14: 299. 1833; Wight, Ic. t. 1854; Mast. in Hook. f., Fl. Brit. India 1: 594. 1875; Gamble, Fl. Pres. Madras 199(142). 1915; Manilal & Sivar., Fl. Calicut 65. 1982; Ansari, Fl. Kasaragod Div. 99. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 94. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 104. 1996; Sivar. & P. Mathew, Fl. Nilambur 141. 1997; Mathur in N.P. Singh *et al.*, Fl. India 5: 35. 2000; Mohanan & Sivad., Fl. Agasthyamala 157. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 125. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 170. 2009. **Plate 13 i.**

Large climbers, branchlets glabrous. Leaves 20-22 x 10-12 cm, ovate, acute at base and apex; lateral nerves 6-8 pairs, reticulate; petiole 5-15 cm long. Spikes to 35 cm long, slender, from old branches; flowers 3-6 together; calyx cupular, 5-toothed; petals oblong, recurved; stamens 5, anthers versatile, staminodes 5- in female flowers, hairy; ovary 1-celled, densely hairy; stigma sessile, discoid; pistillode in male flowers conical. Drupe 2.5-3 cm long, ovoid, orange, glabrous.

Flowering & Fruiting: February-June.

Distribution: Indo-Malesia. Occasional; in evergreen forests. *RNMK 3308,* Vythiri; *RNMK 2664*, Vaduvanchal.

OPILIACEAE (Benth.) Valeton

Crit. Overz. Olacin. 136. 1886.

CANSJERA A. Jussieu

Gen. 448. 1789, *nom.cons.*

Cansjera rheedei Gmel., Syst. 1: 280. 1791; Mast. in Hook. f., Fl. Brit. India 1: 582. 1875; Gamble, Fl. Pres. Madras 193(138). 1915; Manilal & Sivar., Fl. Calicut 64. 1982; Ansari, Fl. Kasaragod Div. 97. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 92. 1988; Mathur in N.P. Singh *et al.*, Fl. India 5: 40. 2000; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 170. 2009.

Climbing shrubs. Leaves alternate, 10-12 x 4-7 cm, ovate, acute at apex, rounded at base, rugose, shortly petiolate. Flowers bisexual, in axillary spikes; calyx minute, 4-toothed; petals 4, united into an urceolate tube, lobes valvate, reflexed, stamens 4, free; disc 4-lobed, lobes erect, tridentate; ovary oblong, 1-celled, ovule 1; style cylindric; stigma capitate, 4-lobed. Fruit a drupe; seed 1.

Flowering & Fruiting: November-February.

Distribution: India through Malaya to Hong Kong and North Australia. Occasional; in moist deciduous forests. *RNMK 2298,* Tholpetty.

ERYTHROPALACEAE Kunth

Nov. Gen. Sp. 5, ed. 4: 175. 1822.

ERYTHROPALUM Blume

Bijdr. 921. 1826.

Erythropalum scandens Bl. Bijdr. 922. 1826; Mast. in Hook. f., Fl. Brit. India 1: 578. 1875; Sasidh. & Sivar., Fl. Pl. Thrissur For. 100. 1996; Sivar. & P. Mathew, Fl. Nilambur 138. 1997; Uniyal in N.P. Singh *et al.*, Fl. India 5: 5. 2000. *Mackaya populifolia* Arn., Jard. Mag. Zool. Bot. 2: 531. 1838. *Erythropalum populifolium* (Arn.) Mast. in Hook. f., Fl. Brit. India 1: 578. 1875; Gamble, Fl. Pres. Madras 191(137). 1915; V. S. Ramach. & V. J. Nair, Fl. Cannanore 92. 1988; Manilal, Fl. Silent Valley 51. 1988; Vajr., Fl. Palghat Dist. 113. 1990; Mohanan & Sivad., Fl. Agasthyamala 153. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 122. 2005.

Weak tendrillate climbers. Leaves alternate, 12-15 x 8-10 cm, ovate to deltoid, acuminate, truncate at base, 3-ribbed, glaucous below, membranous. Flowers in axillary peduncled cymes, drooping, pedicellate; sepals cupular, 5-toothed; petals 5, oblong, obtuse, yellow; stamens 5, filaments very short, staminodes hairy; disc surrounds the ovary; ovary 1-celled, 1-3-ovuled; style short; stigma 3-fid. Fruit an ovoid drupe, orange-red, glabrous; seed 1, black, aril red.

Flowering & Fruiting: December-March.

Distribution: Indo-Malesia to south west China and Celebes. Common; in evergreen and semi-evergreen forests. *RNMK 3381,* Vaduvanchal; *RNMK 2055,* Thirunelli; *RNMK 1104*, Sugandhagiri.

AQUIFOLIACEAE Bartl.

Ord. Nat. Pl. 228. 1830.

ILEX Linnaeus

Sp. Pl. 125. 1753.

Ilex malabarica Bedd., Fl. Sylv. t. 143. 1871; Mast. in Hook. f., Fl. Brit. India 1: 600. 1875; Gamble, Fl. Pres. Madras 200(143). 1915; Basu in N.P. Singh *et al.,* Fl. India 5: 63. 2000.

Small tress; branches glabrous. Leaves 8-9 x 3-3.5 cm, elliptic-oblong, acuminate, acumen twisted, nerves 7-8 pairs; petiole 1.5-1.8 cm long. Flowers in shortly peduncled cymes or umbels; sepals ovate; petals oblong, obtuse, greenish; anthers sagitate at base; ovary 4-celled; stigma stipitate. Berry 4-5 mm long, globose with knot like persistent stigma.

Flowering & Fruiting: June-September.

Distribution: Endemic to Western Ghats. Rare; in evergreen forests. *RNMK 2209,* Kalladi.

CELASTRACEAE R. Br.

in Flinders, Voy. Terra. Austr. 2: 571. 1814.

1. Climbibg shrubs; leaves alternate ..... **Celastrus**
1. Shrubs or trees; leaves opposite 2
2. Peduncle much longer than leaves ..... **Glyptopetaum**
2. Peduncle much shorterthan leaves 3
3. Flowers fascicled in axillary tubercles .....**Microtropis**
3. Flowers in axillary or terminal cymes or panicles.....4
4. Fruit a drupe..... **Cassine**
4. Fruit a capsule 5
5. Capsule obcordate, to 3 cm long; leaves with deciduous stipule ..... **Euonymus**
5. Capsule compressed, to 20 cm long; leaves exstipulate ..... **Lophopetalum**

CASSINE Linnaeus

Sp. Pl. 268. 1753.

Cassine paniculata (Wight & Arn.) Lobr.-Callen, Adansonia ser. 2. 15: 220. 1976; Ramam. in N.P. Singh *et al.*, Fl. India 5: 83. 2000. *Elaeodendron paniculatum* Wight & Arn., Prodr. 157. 1834; Gamble, Fl. Pres. Madras 212(152). 1918. *Elaeodendron glaucum* sensu Lawson in Hook. f., Fl. Brit. India 1: 623. 1875,p.p. non Pers. 1805.

Large trees, branchlets terete, slender. Leaves opposite, 7-8 x 3-4 cm, elliptic-oblong, crenate, membranous, reddish-black; petiole 1-1.2 cm long. Inflorescence a dichaesial cyme, dichotomously branched, 3-6 cm across; peduncle 5-5.5 cm long, slender; pedicels 6-7 mm long. Flowers 1-1.3 cm across; sepals 9, unequal, orbicular; petals oblong, greenish yellow; disk thick, spreading, glabrous; stamens 5, filaments short along the margin of the disk;

anthers orbicular; ovary 2-5-celled, surrounded by disk; ovules 2 in each cell; style very short, as a small conical projection above the disk. Fruit a drupe, 2-2.5 cm long, globose to ellipsoid, apiculate; seed 1, erect.
Flowering & Fruiting: March-June.
Distribution: Indo-Malesia. Rare; in evergreen forests. *RNMK 1665,* Sugandhagiri.

CELASTRUS Linnaeus
Sp. Pl. 196. 1753.

Celastrus paniculatus Willd., Sp. Pl. 1: 1125. 1797; Roxb., Fl. India 1:621. 1832; Wight, Ic. t. 158. 1839 & Ill. Bot. T. 72. 1840; Lawson in Hook. f., Fl. Brit. India 1: 617. 1875; Gamble, Fl. Pres. Madras 208(150). 1918; Vajr., Fl. Palghat Dist. 117. 1990; V. S. Ramach. & V. J. Nair, Fl. Cannanore 95. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 105. 1996; Sivar. & P. Mathew, Fl. Nilambur 142. 1997; Ramam. in N.P. Singh *et al.*, Fl. India 5: 87. 2000; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 125. 2005.

Large climbers; stem lenticellate. Leaves alternate, 10-12 x 6-7 cm, broadly ovate, abruptly acuminate, membranous, crenulate; petiole 6-8 mm long. Panicle 12-15 cm long, terminal. Flowers many, 5-6 mm across; sepals 5, small, imbricate, ciliate; petals white, ovate, obtuse; stamens 5, erect, anthers sagitate at base; ovary 3-celled, ovules 2 in each cell; stigmas 3, recurved. Capsule loculicidal, 3-celled, yellow; seeds 3, aril reddish.
Flowering & Fruiting: December-May.
Distribution: South Asia and Australia Common; in semi-evergreen and moist deciduous forests. *RNMK 1321,* Pulpally; *RNMK 1509*, Manikkunnumala.

EUONYMUS Linnaeus
Sp. Pl. 197. 1753, *orth. cons.*

Shrubs or trees. Leaves opposite or ternate, entire crenate or serrate. Flowers in axillary peduncled cymes; sepals 4 or 5, spreading; petals 4 or 5, orbicular, spreading; stamens 4 or 5; filaments inserted on the disk; ovary 3-5-lobed, sunken in the disk, ovules 2 in each cell; style conical; stigma toothed. Fruit an obcordate capsule, 3-5-celled; seeds 3-10, arillate.

1. Cymes to 3 flowered ..... **E. indicus**
1. Cymes more than 5 flowered 2
2. Branches 4- angled ..... **E. angulatus**
2. Branches terete 3
3. Cymes many from a stout axillary peduncle ..... **E. paniculatus**
3. Cymes few directly on the leaf axils 4
4. Small trees; leaves obtuse at apex ..... **E. dichotomous**
4. Large shrubs; leaves acuminate with sharp tip at apex..... **E. serratifolius**

Euonymus angulatus Wight, Ic. t. 1053. 1846; Lawson in Hook. f., Fl. Brit. India 1: 610. 1875; Gamble, Fl. Pres. Madras 203(146). 1918; Manilal, Fl.

Silent Valley 54. 1988; Vajr., Fl. Palghat Dist. 117. 1990; Ramam. in N.P. Singh *et al.*, Fl. India 5: 93. 2000; Mohanan & Sivad., Fl. Agasthyamala 158. 2002. **Plate 13b.**

Small trees; branches 4-angled. Leaves 3-7 x 1-3 cm, narrowly attenuate at base, recurved on margins; peduncles 4-5 cm long. Flowers 7-15 per cyme; calyx lobes 5, orbicular; petals 5, purple, orbicular; stamens 5, attached to disc; disc annular, thick; ovary sunk in the disc, 5-celled; ovules 2 per cell; stigma short, 5-lobed. Capsule 1-2 x 2-2.5 cm; seeds ovoid, arillate.

Flowering & Fruiting: December-April.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1790,* Thariodu.

Euonymus dichotomus Heyne ex Roxb., Fl. Ind. 2: 410. 1824; Lawson in Hook. f., Fl. Brit. India 1: 609. 1875; Gamble, Fl. Pres. Madras 203(146). 1918; Vajr., Fl. Palghat Dist. 117. 1990; Ramam. in N.P. Singh *et al.*, Fl. India 5: 97. 2000; Mohanan & Sivad., Fl. Agasthyamala 159. 2002.

Small trees. Leaves 4-7 x 3-4 cm, elliptic-ovate, apex obtuse, base cuneate, upper half obscurely serrate, pale greenish below; petiole to 8 mm. Cymes dichasial, 4-6 cm, axillary. Flowers red, peduncle and pedicels slender; bracts minute, ovate; sepals connate at base, orbicular; petals orbicular; stamens inserted on disc; ovary 3-5 celled, cell 2-ovuled. Capsule 1-1.5 cm across, obcordate; seeds 5, reddish; aril yellowish-white.

Flowering & Fruiting: March-August.

Distribution: South India and Sri Lanka. Occasional; in semi-evergreen forest. *RNMK 1278,* Makkimala.

Euonymus indicus Heyne ex Roxb., Fl. Ind. 2: 409. 1824; Lawson in Hook. f., Fl. Brit. India 1: 608. 1875; Gamble, Fl. Pres. Madras 202(146). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 95. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 106. 1996; Sivar. & P. Mathew, Fl. Nilambur 143. 1997; Ramam. in N.P. Singh *et al.*, Fl. India 5: 102. 2000; Mohanan & Sivad., Fl. Agasthyamala 160. 2002. *Euonymus goughii* Wight, Ic. t. 215. 1839. **Plate 13c.**

Small trees, branchlets 0.5-1 mm thick, yellow. Leaves 5-12 x 2-4 cm, elliptic-lanceolate, acuminate, tip rounded, entire, grey when dry; nerves obscure; petiole 6-7 mm long. Peduncle 6-8 mm long, stout; pedicel stout; flowers 1-2 cm across; sepals orbicular, dark pink; petals ciliate, dark purple. Capsule 1-1.5 cm long, obcordate, dark purple; seeds oblong, reddish, with yellow aril.

Flowering & Fruiting: September-March.

Distribution: Endemic to southern Western Ghats. Common; in evergreen forests. *RNMK 1200,* Thariodu; *RNMK 1988,* Pozhuthana; *RNMK 2675*, Amba.

Euonymus paniculatus Wight ex Lawson in Hook. f., Fl. Brit. India 1: 609. 1875; Gamble, Fl. Pres. Madras 203(146). 1918; Ramam. in N.P. Singh *et al.*,

Fl. India 5: 105. 2000. *Euonymus crenulatus* Wall. ex Wight & Arn. var. *laxiflora* Wight, Ic. t. 214. 1839; Gamble, Fl. Pres. Madras 203(146). 1918.

Large shrubs; branchlets grey. Leaves 7-8 x 2-2.5 cm, lanceolate, acuminate, serrulate along upper half, attenuate to the base; petiole 6-7 mm long, grey. Cymes broad, on short axillary peduncle; secondary peduncle 1-2 cm long, slender, trichotomously branched, spreading, 6-12 flowered; flowers 5-7 mm across; sepals entire, orbicular, green; petals entire, orbicular, deep purple, glabrous. Capsule 1.5-2 cm long; seeds 5, orange-yellow; aril white.
Flowering & Fruiting: February-May.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1080,* Kunchome; *RNMK 1100,* Aranamala.

Euonymus serratifolius Bedd., For. Man. Bot. 64. 1872 & Ic. t. 171. 1868-1874; Lawson in Hook. f., Fl. Brit. India 1: 609. 1875; Gamble, Fl. Pres. Madras 203(146). 1918; Ramam. in N.P. Singh *et al.*, Fl. India 5: 107. 2000. **Fig.19.**

Shrubs; branchlets slender terete, yellow. Leaves 7-9 x 3-3.5 cm, elliptic, acuminate with sharp tip at apex, attenuate to the base, serrate, entire towards the base; nerves 4 or 5 pairs slender; petiole 6-7 mm long. Capsule obcordate, deep red; seeds dark reddish-brown, smooth.
Flowering & Fruiting: December-May.
Distribution: Endemic to southern Western Ghats. Rare; in high altitude evergreen forests. *RNMK 1110,* Chembra.

GLYPTOPETALUM Thwaites
Hook. Kew J. 8: t. 7B, 267. 1856.

Glyptopetalum grandiflorum Bedd., Ic. t. 102. 1868-1874; Lawson in Hook. f., Fl. Brit. India 1: 613. 1875; Gamble, Fl. Pres. Madras 204(147). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 96. 1988; Ramam. in N.P. Singh *et al.*, Fl. India 5: 111. 2000. **Fig. 20, Plate 13d & 13e.**

Shrubs; branches terete. Leaves elliptic-oblong, 9-16 x 5-7 cm, acute or acuminate, base cuneate, thinly coriaceous, entire. Inflorescence in 3-flowered cymes; peduncles filiform, slender, 10-15 cm long; Flowers bisexual; pedicels 2-2.5 cm long; sepals 4-lobed; petals 4, obovate, 0.7-0.9 mm long, yellow; stamens 4, sessile; ovary inserted in the disc. Fruit capsular, rounded, 2-2.5 cm across, pale, smooth, 4-seeded; seeds ovate, ca. 1.5 cm across, arillate.
Flowering & Fruiting: February-June.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2882,* Kurichiarmala; *RNMK 2008*, Kallady.

LOPHOPETALUM Wight ex Arnott
Ann. Nat. Hist. 3: 150. 1839.

Lophopetalum wightianum Arn., Ann. Nat. Hist. 3: 151. 1839; Wight, Ic. t. 162. 1839; Lawson in Hook. f., Fl. Brit. India 1: 615. 1875; Gamble, Fl. Pres.

Madras 205(147). 1918; Manilal, Fl. Silent Valley 55. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 96. 1988; Vajr., Fl. Palghat Dist. 119. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 106. 1996; Ramam. in N.P. Singh *et al.*, Fl. India 5: 116. 2000; Mohanan & Sivad., Fl. Agasthyamala 161. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 126. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 171. 2009.

Large trees, branches terete, brown. Leaves opposite, 9-20 x 3-5 cm, oblong, acute, many-nerved, entire; petiole 1-1.5 cm long. Flowers 1-1.5 cm across, in lax axillary cymes; peduncle 2-5 cm long, dichotomously branched, glabrous; sepals 5, orbicular; petals 5, orbicular, uneven, clawed, pale pink; disk prominent, spreading, 5-lobed, deep pink; stamens 5, inserted on the disk, filaments short erect; ovary 2-celled, cells many-ovuled, immersed in the disk. Capsule 15-20 cm long, flat, coriaceous, loculicidal; seeds thin, arillate.

Flowering & Fruiting: December-July.

Distribution: Indo-Malesia. Occasional; in evergreen and moist deciduous forest. *RNMK 3396,* Chanthanathodu; *RNMK 1875*, Kuruva.

MICROTROPIS Wallich ex Meissner

Gen. 1: 68. 1837, *nom cons.*

Microtropis stocksii Gamble, Bull. Misc. Inform. Kew 1916: 132. 1916 & Gamble, Fl. Pres. Madras 206(148). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 96. 1988; Vajr., Fl. Palghat Dist. 119. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 107. 1996; Sivar. & P. Mathew, Fl. Nilambur 145. 1997; Ramam. in N.P. Singh *et al.*, Fl. India 5: 131. 2000.

Large shrubs; branchlets brown. Leaves 10-12 x 5-6 cm, elliptic, obtusely acuminate, attenuate at the base, margins folding, green or yellow when dried; petiole 0.8-1.5 cm long, yellow. Flowers 1-2 mm across, few in axillary clusters; sepals ovate, obtuse; petals ovate, obtuse, white, glabrous. Capsule 1-1.3 cm, brown; aril red.

Flowering & Fruiting: February-July.

Distribution: Endemic to southern Western Ghats. Common; in evergreen forests. *RNMK 1885,* Chanthanathodu.

HIPPOCRATEACEAE Juss.

Ann. Mus. Natl. Hist. Nat. 18: 486. 1811

1. Fruit a berry; seeds not winged ..... **Salacia**
1. Fruit a follicle; seeds winged 2
2. Leaves acuminate; flowers to 0.5 cm across ..... **Reissantia**
2. Leaves acute; flowers to 1 cm across ..... **Hippocratea**

HIPPOCRATEA Linnaeus

Sp. Pl. 2: 1191. 1753.

1. Petals clawed, orbicular ..... **H. arnottiana**
1. Petals not clawed, triangular ..... **H. bourdillonii**

Hippocratea arnottiana Wight, Ill. 1: 133, t. 46. f. 47. 1840; Lawson in Hook. f., Fl. Brit. India 1: 624. 1875; Gamble, Fl. Pres. Madras 213 (153). 1918. *Loeseneriella arnottiana* (Wight) A.C. Smith, J. Arnold Arbor. 16: 174. 1945; Manilal & Sivar., Fl. Calicut 66. 1982; Ansari, Fl. Kasaragod Div. 100. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 97. 1988; Vajr., Fl. Palghat Dist. 118. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 108. 1996; Sivar. & P. Mathew, Fl. Nilambur 145. 1997; Ramam. & Naithani in N.P. Singh *et al.*, Fl. India 5: 140. 2000.

Branchlets terete. Leaves 8-12 x 4-6 cm, coarsely coriaceous, elliptic-oblong, apex acuminate, base rounded or acute; stipules small. Flowers in paniculate cymes, axillary or terminal; sepals ovate; petals obovate, yellowish; stamens inserted on disc; ovary sunken in the disk. Follicles 15-17 x 2-2.5 cm, oblong.

Flowering & Fruiting: February-March.

Distribution: South India and Sri Lanka. Occasional; in semi-evergreen and moist deciduous forests. *RNMK 1338,* Kuruva; *RNMK 2783*, Manikkunnumala.

Hippocratea bourdillonii Gamble, Bull. Misc. Inform. Kew 1916: 132. 1916 & Gamble, Fl. Pres. Madras 213(153). 1918. *Loeseneriella bourdillonii* (Gamble) Ramam. in Sald. & Nicols. Fl. Hassan Dist. 315. 1976; V. S. Ramach. & V. J. Nair, Fl. Cannanore 97. 1988; Vajr., Fl. Palghat Dist. 118. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 108. 1996; Ramam. & Naithani in N.P. Singh *et al.,* Fl. India 5: 140. 2000.

Climbing shrubs, branchlets 4-angled, glabrous. Leaves 11-13 x 5-6 cm, oblong, abruptly acuminate, nerves 7-9 pairs, obscure, margins recurved. Flowers in pedunculate cymes; peduncle 4-5 cm long, quadrangular; sepals ovate, acute, pubescent; petals lanceolate, acute, pubescent outside; disk densely hairy along the rim; ovary projected above the disk. Follicles 6-8 cm long, oblong, obtuse at apex.

Flowering & Fruiting: March-May.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 1335,* Vythiri.

REISSANTIA Halle

Bull. Mus. Hist. Nat. (Paris) Ser. 2, 30: 466. 1958.

Reissantia indica (Willd.) Halle, Mem. Inst. Franc. Afrique Noire 64: 85. 1962; Manilal & Sivar., Fl. Calicut 66. 1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 97. 1988; Sivar. & P. Mathew, Fl. Nilambur 146. 1997; Ramam. & Naithani in N.P. Singh *et al.,* Fl. India 5: 149. 2000. *Hippocratea indica* Willd., Sp. Pl. 1: 193. 1797; Lawson in Hook. f., Fl. Brit. India 1: 625. 1875; Gamble, Fl. Pres. Madras 213(153). 1918.

Woody climbers with looping branchlets. Leaves opposite, 9-12 x 4.5-7 cm, obovate, obtusely acute, attenuate to the base; nerves 4 or 5 pairs, ascending;

petiole 1-1.3 cm long. Flowers in axillary drooping panicles, pedicellate; sepals 5, ovate, acute, glabrous; petals 5, oblong, curved, glabrous; stamens 3, filaments short, curved; ovary 3-celled, sunken in the disk; ovules 2-10 in each cell. Fruit a winged samara

Flowering & Fruiting: March-April.

Distribution: Indo-Malesia. Occasional; in moist deciduous forests. *RNMK 1780,* Kuruva; *RNMK 1696*, Pulpally.

SALACIA Linnaeus

Mant. 159. 1771, *nom .cons*.

Woody climbers. Leaves opposite, exstipulate, penninerved. Flowers in axillary or extra-axillary fascicles or cymes, pedicellate; calyx deeply 5-lobed; petals 5, imbricate, spreading; stamens 3, inner to the disk; filaments free, recurved; disk thick, broad; ovary 3-celled, deeply sunken in the disk; style short; stigma capitate or 3 lobed. Fruit a berry, globose; seeds few, angular.

1. Flower in cymes ..... **S. fruticosa**
1. Flowers fascicled 2
2. Leaves to 11 cm long; veins 4 or 5 pairs; branchlets rough with globose tubercle .... **S. macrosperma**
2. Leaves 16-21 cm long; veins 8-10 pairs; branchlets not as above 3
3. Sepals ciliate; leaf-margin denticulate ..... **S. malabarica**
3. Sepals not ciliate; leaf-margin entire ..... **S. beddomei**

Salacia beddomei Gamble, Bull. Misc. Inform. Kew 1916: 133. 1916 & Gamble, Fl. Pres. Madras 215(155). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 98. 1988; Vajr., Fl. Palghat Dist. 120. 1990; Ramam. & Naithani in N.P. Singh *et al.*, Fl. India 5: 151. 2000; Mohanan & Sivad., Fl. Agasthyamala 163. 2002. **Fig. 21, Plate 13g.**

Scandent shrubs, branchlets lenticellate. Leaves 10-20 x 7-9 cm, oblong, obtuse at base and apex, faintly crenate; nerves 11-13 pairs, distinct below. Flowers pinkish yellow, 3-9 together; pedicels 0.5-1 cm long, slender; sepals triangular; petals ovate, acute, glabrous, yellow with white margins; filaments curved. Berry 3-3.5 cm across, coarsely rugose, depressed globose, tubercled, yellowish green to pale orange; seeds 3, ellipsoid, 1-1.5 x 0.5-1.3 cm.

Flowering & Fruiting: January-March.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen and moist deciduous forests. *RNMK 1996*, Vythiri; *RNMK 2220,* Chanthanathodu; *RNMK 3207*, Kuruva.

Salacia fruticosa Heyne ex Lawson in Hook. f., Fl. Brit. India 1: 628. 1875; Gamble, Fl. Pres. Madras 215(155). 1918; Manilal & Sivar., Fl. Calicut 66. 1982; Ansari, Fl. Kasaragod Div. 101. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 98. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 108. 1996; Ramam. & Naithani in N.P. Singh *et al.*, Fl. India 5: 153. 2000; Mohanan &

Sivad., Fl. Agasthyamala 164. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 127.2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 173.2009.

Climbing shrubs; branchlets looped with circular lenticels. Leaves 11-13 x 3-4 cm, oblong, acuminate at apex, rounded at base; nerves 9-11 pairs, regular; petiole 4-5 mm long. Cymes 3-9-flowered; peduncle 5-7 mm long, slender; flowers 2-3 mm across; sepals orbicular, with white margins; petals orbicular; ovary not exserted above the disk. Berry 3-5 x 2-4 cm, reddish; seeds ovoid, tuberculate.

Flowering & Fruiting: February-May.

Distribution: Endemic to Western Ghats. Occasional; in semi-evergreen forests. *RNMK 1090,* Manikkunnumala; *RNMK 1887*, Kuruva.

Salacia macrosperma Wight, Ic. t. 962. 1845; Lawson in Hook. f., Fl. Brit. India 1: 628. 1875; Gamble, Fl. Pres. Madras 215(154). 1918; Manilal, Fl. Silent Valley 57. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 109. 1996; Ramam. & Naithani in N.P. Singh *et al.*, Fl. India 5: 157. 2000. **Plate 13h.**

Climbers; branchlets stout, black, densely lenticellate. Leaves 9-11 x 3-4 cm, elliptic, acute at apex and base, crenulate; petioles ca. 8 mm long. Flowers many, on large axillary or extra-axillary tubercles; pedicels 5-7 mm long, slender; sepals ovate, acute; petals ovate, acute, pink. Berry 2-3 cm across, globose.

Flowering & Fruiting: January-March.

Distribution. Endemic to Western Ghats. Occasional; in semi-evergreen forests. *RNMK 1100,* Thirunelli.

Salacia malabarica Gamble, Bull. Misc. Inform. Kew 1916: 133. 1916 & Fl. Pres. Madras 215(154). 1918; Ramam. & Naithani in N.P. Singh *et al.*, Fl. India 5: 158. 2000; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 127. 2005. **Fig. 22.**

Stout climbers; branchlets smooth, black; nodes slightly elevated by the persistent bases of fascicles. Leaves 15-25 x 6-12 cm, oblong, acute at apex, base acute to obtuse; margins distantly denticulate; nerves 9-15 pairs, coarsely reticulate; petiole ca. 1 cm long, black, channelled. Flowers 2-6 together on slightly elevated receptacle, axillary; pedicels 6-8 mm long, slender, smooth; sepals ovate; petals greenish-yellow, longer than sepals, ovate, acute. Berry hard, globose.

Flowering & Fruiting: February-April.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1332,* Vythiri; *RNMK 3330*, Chanthanathodu.

RHAMNACEAE Juss.

Gen. Pl. 376. 1789

1. Fruit winged; plants unarmed 2
1. Fruit wingless; plants armed .....**Zizyphus**

2. Tendrils present; fruit with 3 wings ..... **Gouania**
2. Tendrils absent; fruit with one elongate wing..... **Ventilago**

GOUANIA N. J. Jacquin
Sel. Strip. Amer. Hist. 263. 1763.

Gouania microcarpa DC., Prodr. 2: 40. 1825; Lawson in Hook. f., Fl. Brit. India 1: 643. 1875; Gamble, Fl. Pres. Madras 225(161). 1918; Ansari, Fl. Kasaragod Div. 101. 1985; Manilal, Fl. Silent Valley 57. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 99. 1988; Vajr., Fl. Palghat Dist. 120. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 109. 1996; Sivar. & P. Mathew, Fl. Nilambur 147. 1997; Bhandari & Bhansali in N.P. Singh *et al.*, Fl. India 5: 176. 2000; Mohanan & Sivad., Fl. Agasthyamala 165. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 130. 2005.

Large tendrillate climbers; branchlets tomentose. Leaves 10-15 x 4-5 cm, ovate, acuminate, rounded or cordate at base, fulvous hairy below; nerves 4-5 pairs, prominent, regular. Inflorescence a terminal panicle, ca. 25 x 20 cm, tomentose. Flowers 4-5 mm across, 3-6 together; sepals 5, triangular, densely hairy; petals obovate, curved, concave; stamens 5, free; ovary 3-celled, hairy; ovules one in each cell; style short; stigma capitate. Capsule 3-winged, yellowish, septicidal; seeds 3, obovoid, compressed, dark-brown
Flowering & Fruiting: October-March.
Distribution: India, Sri Lanka, Myanmar, Malaysia and Indonesia. Occasional; in evergreen forests. *RNMK 1091,* Thalimala; *RNMK 551*, Sughandhagiri; *RNMK 2771*, Chanthanathodu.

VENTILAGO J. Gaertner
Fruct. 1: 223. 1788.

1. Flowers in panicles; disc flattened, 5 angled ..... **V. maderaspatana**
2. Flowers in axillary fascicles; disc cup shaped..... **V. bombaiensis**

Ventilago bombaiensis Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 36. 1851; Lawson in Hook. f., Fl. Brit. India 1: 631. 1875; Gamble, Fl. Pres. Madras 217(157). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 99. 1988; Vajr., Fl. Palghat Dist. 120. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 110. 1996. *Smythea bombaiensis* (Dalz.) Banerj. & Mukh., Indian For. 96:214.1970; Manilal, Fl. Silent Valley 57. 1988; Bhandari & Bhansali in N.P. Singh *et al.*, Fl. India 5: 210. 2000; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 130. 2005.

Large unarmed climbers; stems ribbed; branchlets looping. Leaves ca. 9 x 4 cm, elliptic-oblong, acute at either ends, crenulate; nerves 5-6 pairs, nerve-axils hairy, nervules parallel. Flowers 4-6 mm across, 20-30 together, in axillary clusters; pedicels ca. 5 mm long; sepals 5, triangular; petals 5, obovate, emarginate to 2-lobed, glabrous; stamens 5; disk cup-shaped; ovary 2-celled, densely hairy. Fruit subglobose with a long flattened style, 6-6.5 cm long.

Flowering & Fruiting: February-June.
Distribution: Endemic to Western Ghats. Rare; in evergreen forests. *RNMK 2665,* Vythiri; *RNMK 1432,* Periya; *RNMK 1077*, Palchuram.

Ventilago maderaspatana Gaertn., Fruct. 1: 223. t. 49. f. 2. 1788; Lawson in Hook. f., Fl. Brit. India 1: 631. 1875; Gamble, Fl. Pres. Madras 218(156). 1918; Bhandari & Bhansali in N.P. Singh et al., Fl. India 5: 221. 2000.

Climbing shrubs; young branchlets black when dry. Leaves 7-8 x 3-3.5 cm, ovate-elliptic, apex and base obtuse, crenate along the lower half, coriaceous; petiole ca. 1 cm. Panicles axillary and terminal, 10-15 cm long, grey pubescent; pedicels pubescent; calyx tube obconic, lobes triangular; petals obovate; stamens 5, opposite to the petals; disc flattened, 5-angled; ovary half inferior, pubescent, stigma shortly bifid.
Flowering & Fruiting: December-March.
Distribution: Indo-Malesia. Rare; in evergreen forests. *RNMK 1666,* Vythiri.

ZIZIPHUS P. Miller

Gard. Dict. Abr. ed. 4. 1754.

Stout climbing or rambling shrubs, thorns many, strong. Leaves alternate, simple, 3-5-ribbed. Flowers in axillary fascicles or cymes; calyx broadly obconical, lobes triangular, spreading; valvate; petals 5, cucullate, deflexed, stamens 5, antipetalous, enclosed in petals; disk 5-10-lobed, flat; ovary 2-4-celled, sunken in the disk; ovules one in each cell; styles 3, free or connate. Fruit a 1-4-celled drupe; seeds 1-4, planoconvex.

1. Flowers in paniculate cymes; petals absent.....**Z. rugosa**
1. Flowers in condensed cymes; petals present 2
2. Leaves orbicular; branchlets white tomentose 3
2. Leaves otherwise; branchlets not white tomentose 4
3. Climbing shrubs ..... **Z. nummularia**
3. Small trees ..... **Z. mauritiana**
4. Styles 2; drupe to 1 cm diameter..... **Z. oenoplia**
4. Styles 3; drupe more than 2 cm diameter..... **Z. xylopyrus**

Ziziphus mauritiana Lam., Encycl. 3: 319. 1789; Manilal & Sivar., Fl. Calicut 67. 1982; Ansari, Fl. Kasaragod Div. 102. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 214. 1988; Bhandari & Bhansali in N.P. Singh *et al.*, Fl. India 5: 234. 2000; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 131. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 174. 2009. *Ziziphus jujuba* Lamk., Encycl. 3: 318. 1789; Wight, Ic. t. 149. 1871; Lawson in Hook. f., Fl. Brit. India 1: 632. 1875; Gamble, Fl. Pres. Madras 219(157). 1918. *Perin-todali* Rheede, Hort. Malab. 4:85-86, t.41. 1683.

Small trees, armed; branchlets white tomentose. Leaves 2.5-5 x 1.5-3 cm, orbicular, apex rounded, base slightly oblique, 3-ribbed, coarsely crenate, tomentose beneath. Flowers in fascicles, sessile; calyx lobes ovate; petals

concave, margin strongly curved; disc of 10 grooved lobes. Drupe ca. 1 cm, globose, rugose.
Flowering & Fruiting: February-April.
Distribution: Paleotropics. Occasional; in moist deciduous forests. *RNMK 1124,* Pulpally.

Ziziphus nummularia (Burm.f.) Wight & Arn., Prodr. 162. 1834; Lawson in Hook. f., Fl. Brit. India 11: 633. 1875; Gamble, Fl. Pres. Madras 220(158). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 101. 1988; Bhandari & Bhansali in N.P. Singh *et al.*, Fl. India 5: 236. 2000. *Rhamnus nummularia* Burm.f., Fl. India 61. 1768.

Climbing shrubs. Leaves 3-4 x 1-1.5 cm, orbicular, acute, sparsely tomentose above, densely tomentose beneath. Flowers ca. 0.6 cm long, greenish-yellow, in axillary , pubescent cymes. Drupe globose, rugose.
Flowering & Fruiting: August-September.
Distribution: India and Central Asia. Occasional; in moist deciduous forests. *RNMK 1223,* Pulpally:

Ziziphus oenoplia (L.) Mill., Gard. Dict. (ed. 8). 3.1768; Lawson in Hook. f., Fl. Brit. India 1:634.1875; Gamble, Fl. Pres. Madras 220(158). 1918; Manilal & Sivar., Fl. Calicut 67. 1982; Ansari, Fl. Kasaragod Div. 102. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 101. 1988; Vajr., Fl. Palghat Dist. 121. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 110. 1996; Sivar. & P. Mathew, Fl. Nilambur 147. 1997; Bhandari & Bhansali in N.P. Singh *et al.*, Fl. India 5: 238. 2000; Mohanan & Sivad., Fl. Agasthyamala 166. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 131. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 175. 2009. *Rhamnus oenoplia* L., Sp. Pl. 194. 1753.

Scandent shrubs, thorns many, recurved; branchlets densely silky hairy. Leaves 4-6.5 x 2-3 cm, ovate, apex acuminate, base oblique, 3 or 4 ribbed, densely fulvous hairy, sessile or shortly petioled. Flowers 3-5 mm across, shortly pedicelled, 6-20 in axillary clusters; sepals triangular, hispid outside; petals clawed, concave, greenish yellow; disk flat, glabrous. Drupe 5-6 mm long, globose, black.
Flowering & Fruiting: November-April.
Distribution: Tropical Asia and Australia. Throughout the hotter parts of India. Common; in moist deciduous forests. *RNMK 1776,* Muthanga; *RNMK 1098*, Chedelayam; *RNMK 1377*, Begur; *RNMK 2628*, Kuruva.

Ziziphus rugosa Lamk., Encycl. 3: 319. 1789; Wight, Ic. t. 339. 1840; Lawson in Hook. f., Fl. Brit. India 1: 636. 1875; Gamble, Fl. Pres. Madras 221(158). 1918; Manilal & Sivar., Fl. Calicut 67. 1982; Ansari, Fl. Kasaragod Div. 102. 1985; Manilal, Fl. Silent Valley 58. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 101. 1988; Vajr., Fl. Palghat Dist. 121. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 110. 1996; Sivar. & P. Mathew, Fl. Nilambur 148. 1997;

Bhandari & Bhansali in N.P. Singh *et al.,* Fl. India 5: 241. 2000; Mohanan & Sivad., Fl. Agasthyamala 166. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 132.2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 175.2009.

Scandent shrubs, thorns ca. 6 mm long, recurved. Leaves 11-12 x 6.5-7 cm, ovate-orbicular, acute, unequally cordate at base, fulvous-tomentose beneath, coriaceous, crenulate; petiole 1-1.4 cm long. Flowers 6-20 together; subsessile, 4-5 mm across; sepals densely tomentose outside; disk flat, glabrous; ovary densely tomentose, 2-celled; styles 2, curved out. Drupe 6-8 mm across, white, glabrous.

Flowering & Fruiting: November-May.

Distribution: India, Sri Lanka, Bangladesh and Myanmar. Common; in moist deciduous forests. *RNMK 1221,* Begur; *RNMK 1966*, Muthanga; *RNMK 2199*, Pulpally.

Ziziphus xylopyrus (Retz.) Willd., Sp. Pl. 1: 1104. 1798; Lawson in Hook. f., Fl. Brit. India 1: 636. 1875; Gamble, Fl. Pres. Madras 221(158). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 101. 1988; Vajr., Fl. Palghat Dist. 121. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 111. 1996; Sivar. & P. Mathew, Fl. Nilambur 148. 1997; Bhandari & Bhansali in N.P. Singh *et al.,* Fl. India 5: 243. 2000. *Rhamnus xylopyrus* Retz., Obs. Bot. 2: 11. 1781.

Scandent shrubs or semi-erect small trees, unarmed, branchlets pubescent. Leaves 6-8 x 3-4 cm, ovate-oblong, apex apiculate, base subcordate, 3-ribbed, crenate, glabrous above, tomentose below. Cymes axillary, pubescent; calyx 5-lobed, radiating; petals spathulate; disc 5-lobed. Drupe globose, woody.

Flowering & Fruiting: May-June.

Distribution: India, Nepal and Sri Lanka. Occasional; in moist deciduous forests. *RNMK 1875,* Baveli; *RNMK 1334*, Pulpally.

Maesopsis eminii Engl., (native of Africa, introduced to tropics) is seen planted in Kalpetta.

VITACEAE Juss.

Gen. Pl. 267. 1789

1. Flowers pentamerous ..... **Ampelocissus**
1. Flowers tetramerous..... 2
2. Stem tuberculate; flowers polygamous; seeds two-furrowed .....**Tetrastigma**
2. Stem not tuberculate; flowers bisexual; seeds one-furrowed or smooth..... 3
3. Leaves simple, cordate at base; berry with one seed ..... **Cissus**
3. Leaves 3-7-foliolate, acute at base; berry with 2-4 seeds.....**Cayratia**

AMPELOCISSUS J. E. Planchon

Vigne Amer. Vitic. Eur. 8: 371. 1884, *nom. cons.*

Climbing shrubs. Tendrils adnate to the peduncles. Leaves simple, entire or lobed. Flowers 5- merous, in pedunculate cymes or panicles; calyx cupular,

lobes obscure; petals recurves; disc vertically 5-10 furrowed; ovary immersed in the disc, 2-celled ; ovules 2 in each cell. Berry 2 or 3 seeded.

Leaves broadly ovate; inflorescence dense racemes of umbels..... **A. indica**
1. Leaves 3-5 lobed; inflorescence pyramidal-thyrsoid ..... **A. latifolia**

Ampelocissus indica (L.) Planch., Vigne Amer. Eur. 8: 375. 1884; Sasidh. & Sivar., Fl. Pl. Thrissur For. 111. 1996; Shetty & Singh in N.P. Singh *et al.*, Fl. India 5: 254. 2000; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 176. 2009. *Vitis indica* L., Sp. Pl. 202. 1753; Lawson in Hook. f., Fl. Brit. India 1: 653. 1875. *Ampelocissus arnottiana* Planch. in A. & C. DC., Monogr. Phan. 5: 379. 1887; Gamble, Fl. Pres. Madras 231(165). 1918; Manilal & Sivar., Fl. Calicut 68. 1982.

Climbing shrubs, stem glabrous. Leaves broadly ovate, 10-25 x 8-18 cm, acuminate at apex, cordate at base, dentate at margins with the teeth hardened at tip, coriaceous, glabrescent above; petioles 2-8 cm long. Inflorescence 3-5 x 0.7-1 cm, peduncles upto 9 cm long; flowers reddish brown; pedicels glabrous; disc elongate, covering most of ovary; ovary glabrous; stigma sessile, concave. Berries globose, ca. 1 cm across; seeds mucronate at base.

Flowering & Fruiting: March-September.

Distribution: Peninsular India and Sri Lanka. Occasional; in semi-evergreen forests: *RNMK 3321,* Chooralmala.

Ampelocissus latifolia (Roxb.) Planch., Vigne Aner. Europe 8: 374. 1884 & in A. & C. DC., Monogr. Phan. 5: 370. 1887; Gamble, Fl. Pres. Madras 230(165). 1918; Manilal & Sivar., Fl. Calicut 68. 1982; Ansari, Fl. Kasaragod Div. 103. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 102. 1988Vajr., Fl. Palghat Dist. 122. 1990; Sivar. & P. Mathew, Fl. Nilambur 149. 1997; Shetty & Singh in N.P. Singh *et al.*, Fl. India 5: 256. 2000. *Vitis latifolia* Roxb., Fl. India 1: 661. 1820; Lawson in Hook. f., Fl. Brit. India 1: 652. 1875.

Climbing shrubs. Leaves 3-5 lobed, 10-25 x 9-20 cm, acute at apex, deep cordate at base, serrate at margins; petioles 5-15 cm long. Inflorescence pyramidal-thyrsoid; peduncles 5-10 cm long, glabrous; flowers 2-4 mm long, reddish brown; petals oblong; anthers globose; ovary glabrous; stigma subsessile. Berries globose, 7-9 mm across, 2-4-seeded, black when ripe; seeds elliptic-oblong.

Flowering & Fruiting: May-June.

Distribution: South Asia. Rare' in evergreen forests. *RNMK* 1621, Vythiri.

CAYRATIA A. L. Jussieu

Dict. Sci. Nat.10: 103. 1818, *nom. cons.*

Tendrillate climbers; tendrils leaf-opposed. Leaves pedately 3-9-foliolate. Flowers in axillary, short-peduncled corymbose cymes; calyx cupular,

truncate; petals 4, ovate or oblong, valvate; stamens 4, free, inserted outside the disk; disk adnate to the ovary, entire or lobed; ovary 2-celled; ovules 2 in each cell; style entire, subulate; stigma pointed. Berry obovoid, white; seeds 2-4, obcordate or hemispheric.

1. Leaves 3-foliolate, softly villous..... 2
1. Leaves 5-9 foliolate 3
2. Peduncle less than 2 cm, extra-axillary ..... **C. mollissima**
2. Peduncle 6-8 cm, axillary ..... **C. trifolia**
3. Leaves 7-9 foliolate, tomentose ..... **C. pedata**
3. Leaves 5- foliolate, glabrescent 4
4. Berries black; seeds sharply angled ..... **C. tenuifolia**
4. Berries white; seeds pyriform ..... **C. japonica**

Cayratia japonica (Thunb.) Gagnep. in Lecomte, Notul. Syst. (Paris) 1: 349. 1911; Gamble, Fl. Pres. Madras 237(169). 1918; Ansari, Fl. Kasaragod Div. 103. 1985; Vajr., Fl. Palghat Dist. 123. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 112. 1996; Sivar. & P. Mathew, Fl. Nilambur 150. 1997; Shetty & Singh in N.P. Singh *et al.*, Fl. India 5: 269. 2000; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 132. 2005. *Vitis japonica* Thunb., Fl. Jap. 104. 1784. *Vitis tenuifolia* Wight & Arn., Prodr. 129. 1834 p.p.; Lawson in Hook. f., Fl. Brit. India 1: 660. 1875.

Slender herbaceous climber. Leaves pedately 5-foliolate; leaflets obovate, obtuse or acute, margins crenate, glabrous, terminal leaflet 6-8 cm long; petiole 4-6 cm long. Flowers in axillary corymbs; calyx irregularly lobed, margins ciliate; petals white, oblong-obtuse; disc lobed. Berry 1-1.5 cm across.
Flowering & Fruiting: March-June.
Distribution: Indo-Malesia. Rare; in evergreen forests. *RNMK 3367,* Vythiri.

Cayratia mollissima (Wall.ex Roxb.) Gagnep. in Lecomte, Notul. Syst. (Paris) 1: 345. 1911; Gamble, Fl. Pres. Madras 237(169). 1918; Ansari, Fl. Kasaragod Div. 104. 1985; Manilal, Fl. Silent Valley 58. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 103. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 112. 1996; Shetty & Singh in N.P. Singh *et al.*, Fl. India 5: 270. 2000. *Vitis mollissima* Wall. ex Roxb., Fl. Ind. 2: 482. 1824; Lawson in Hook. f., Fl. Brit. India 1: 656. 1875.

Weak climbers; stem scabrous. Leaflets 3, 8-12 x 4-7 cm, ovate, acuminate at apex, acute at base, distantly spineus-serrate; nerves 4-5 pairs, glabrous; petiole 4-5 cm long. Peduncle 1-1.5 cm long, extra-axillary, trichotomous cymes ca. 2 x 3 cm; flowers greenish-yellow; calyx a membranous cup, entire; petals oblong. Berry 6-8 mm across, obovoid, glabrous; seeds pitted on sides.
Flowering & Fruiting: October-December.
Distribution: Indo-Malesia. Common; in moist deciduous forests. *RNMK 3247,* Tholpetty; *RNMK 1666*, Thirunelli.

Cayratia pedata (Lamk.) A. Juss. ex Gagnep. in Lecomte, Notul. Syst. (Paris) 1: 346. 1911; Gamble, Fl. Pres. Madras 236(169). 1915; Manilal & Sivar., Fl. Calicut 69. 1982; Manilal, Fl. Silent Valley 58. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 103. 1988; Vajr., Fl. Palghat Dist. 123. 1990; Sivar. & P. Mathew, Fl. Nilambur 150. 1997; Shetty & Singh in N.P. Singh *et al.,* Fl. India 5: 272. 2000; Mohanan & Sivad., Fl. Agasthyamala 168. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 134. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 177. 2009. *Cissus pedata* Lamk., Encycl. 1: 31. 1783. *Vitis pedata* (Lamk.) Wall. ex Wight & Arn., Prodr. 128. 1834; Lawson in Hook. f., Fl. Brit. India 1: 661. 1875. *Vitis canarensis* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 123. 1851.

Weak climbers; stem minutely hispid. Leaves pedately 5-9-foliolate; leaflets 7-15 x 3-6 cm, ovate, acuminate, serrate, hispid, nerves 8-10 pairs, regular, prominent; rachis 7-9 cm long; petiolule 1-1.5 cm long, of terminal leaflet 3-3.5 cm long. Cymes 7-8 cm long, hispid; peduncle 2-3 cm long; flowers 6-8 mm across, greenish; petals ovate, acute; disk a fleshy rim. Berry 2-4 lobed, rusty tomentose; seed faces rugose.

Flowering & Fruiting: June-July.

Distribution: Indo-Malesia. Occasional; in evergreen forests. *RNMK 1557,* Kalladi; *RNMK 2278*, Periya.

Cayratia tenuifolia (Wight & Arn.) Gagnep. in Lecomte, Notul. Syst. (Paris) 1: 343. 1911; Gamble, Fl. Pres. Madras 237(170). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 103. 1988; Vajr., Fl. Palghat Dist. 124. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 112. 1996; Shetty & Singh in N.P. Singh *et al.*, Fl. India 5: 273. 2000; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 134. 2005. *Vitis tenuifolia* Wight & Arn., Prodr. 129. 1834p.p.; Lawson in Hook. f., Fl. Brit. India 1: 660. 1875.

Climbers. Leaflets elliptic or obovate, apex acute or obtuse, base acute or rounded, crenate, glabrous, terminal leaflets 3-6 x 2-3 cm; petiole 2.5-3 cm long. Flowers in axillary, dichotomous cymes; pedicels very slender; calyx truncate; petals white, ovate-oblong, hooded at apex, 2-2.5 mm long; disc lobed. Berry 0.8- 1 cm across, obovoid; seeds 1-4.

Flowering & Fruiting: September-March.

Distribution: Indo-Malesia, China and Japan. Occasional; in semi-evergreen forests. *RNMK 1808,* Chooralmala.

Cayratia trifolia (L.) Domin, Biblioth. Bot. 89: 370. 1927; Manilal & Sivar., Fl. Calicut 69. 1982; Ansari, Fl. Kasaragod Div. 104. 1985; Vajr., Fl. Palghat Dist. 124. 1990; Shetty & Singh in N.P. Singh *et al.*, Fl. India 5: 275. 2000; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 178. 2009. *Vitis trifolia* L., Sp. Pl. 203. 1753. *Vitis carnosa* (Lam.) Wall. ex Wight & Arn., Prodr. 127. 1834; Lawson in Hook. f., Fl. Brit. India 1: 654. 1875. *Cissus carnosa* Lamk., Encycl. 1: 31. 1789. *Cayratia carnosa* (Lamk.) Gagnep. in Lecomte, Notul. Syst. (Paris) 1: 347. 1911; Gamble, Fl. Pres. Madras 237(169). 1918.

Creeper or climber; stem hispid; tendrils 3-fid. Leaflets 5-6 cm long, broadly elliptic to obovate, obtuse, crenate, densely hispid; nerves 4-5 pairs; lateral leaflets smaller, with rounded base; petiolule ca. 8 mm long, of terminal leaflet larger; petiole ca. 5 cm long. Peduncle ca. 8 cm long, axillary; cymes 3-5 cm across, hispid; flowers greenish-yellow; pedicels stout; petals obtuse, densely hispid. Berries obovoid-globose, 3-4-seeded; seeds triangular-obovoid.
Flowering & Fruiting: Throughout the year.
Distribution: Indo-Malesia, China and Australia. Occasional; in evergreen forests. *RNMK 1773*, Periya Ghat.

CISSUS Linnaeus
Sp. Pl. 117. 1753.

Climbing shrubs; tendrils leaf-opposed. Flowers bisexual, in leaf opposed umbellate cymes with ultimate branches umbellules; calyx truncate or shortly toothed; petals triangular to oblong, valvate, spreading or deflexed; stamens 4, outside the disk; disk 4-lobed; ovary globose, 2-celled; ovules 2 in each cell; style slender, pointed. Fruit a 1-seeded berry; seeds with an encircling raphe.

1. Stem 4- winged..... 2
1. Stem terete or angular 3
2. Mature branches leafleless; corymbs leaf opposed .....**C. quadrangularis**
2. Mature branches leafy; cymes extra-axillary .....**C. glyptocarpa**
3. Branchlets 5 or 6 angled .....**C. discolor**
3. Branchletes terete .....**C. repens**

Cissus discolor Bl. Cat. Gew. Buitenz. 39. 1823; Gamble, Fl. Pres. Madras 235(168). 1918; Ansari, Fl. Kasaragod Div. 105. 1985; Manilal, Fl. Silent Valley 59. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 104. 1988; Vajr., Fl. Palghat Dist. 124. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 112. 1996; Sivar. & P. Mathew, Fl. Nilambur 152. 1997; Shetty & Singh in N.P. Singh *et al.*, Fl. India 5: 282. 2000. *Vitis discolor* (Bl.) Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 2: 39. 1850; Lawson in Hook. f., Fl. Brit. India 1: 648. 1875. *Cissus javana* DC., Prodr. 1: 628. 1824; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 135. 2005.

Creeping or climbing shrubs; stem reddish, quadrangular. Leaves 6-13 x 3-7 cm, acuminate, cordate at base, spinous serrate, usually pink beneath; petiole 1-3 cm long. Cymes 2-3 cm across, reddish; peduncle 1-2 cm long; flowers pedicelled; calyx rim white; petals reddish; disk pubescent. Berry oblique-obovoid, smooth; seeds pitted.
Flowering & Fruiting: July-January. *Distribution*: Indo-Malesia.
Common in moist deciduous and semi-evergreen forests. *RNMK 1440,* Muthanga; *RNMK 1339,* Tholpetty; *RNMK 2295*, Chedalayam.

Cissus glyptocarpa (Thw.) Planch. in A. & C. DC., Monogr. Phan. 5: 477. 1887; Gamble, Fl. Pres. Madras 235(168). 1918; Manilal, Fl. Silent Valley 60.

1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 104. 1988; Vajr., Fl. Palghat Dist. 125. 1990; Sivar. & P. Mathew, Fl. Nilambur 153. 1997; Shetty & Singh in N.P. Singh *et al.*, Fl. India 5: 285. 2000; Mohanan & Sivad., Fl. Agasthyamala 169. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 135. 2005. *Vitis glyptocarpa* Thw., Enum. Pl. Zeyl. 62. 1858; Lawson in Hook. f., Fl. Brit. India 1: 645. 1875.

Creepers or climbers; branches with corky wings, glabrous. Leaves ca. 10 x 7 cm, ovate, acuminate at apex, cordate at base, serrate, puberulus, nerves 4-7 pairs; petiole ca. 3 cm long. Cymes 3-5 cm long, extra- axillary, peduncled; flowers many, 1-1.5 mm long, greenish; petals oblong, green. Berries oblique-pyriform, purple, 1-seeded.

Flowering & Fruiting: April-October.

Distribution: Peninsular India and Sri Lanka. Common; in evergreen forests. *RNMK 2335,* Kunchome; *RNMK 2010,* Niravilpuzha.

Cissus quadrangularis L., Mant. Pl. 1: 39. 1767; Gamble, Fl. Pres. Madras 233(167). 1915; Shetty & Singh in N.P. Singh *et al.*, Fl. India 5: 288. 2000; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 135. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 179. 2009. *Vitis quadrangularis* (L.) Wall. ex Wight, Cat. Ind. Pl. 26.1833; Lawson in Hook. f., Fl. Brit. India 1:645.1875.

Scandent shrubs, fleshy, stem 4-angled and winged, tendrils leaf opposed, mature branches leafless. Leaves 4-5 x 3-4 cm; ovate, obtuse, obscurely crenate, fleshy; petiole 1.5-2 cm, stipule ovate. Corymbs leaf opposed, ca. 4 cm, peduncles 2-3 cm; calyx truncate; petals 5, oblong, hooded at apex; disc 4-lobed; stamens 4; subsessile, included; ovary globose. Berry 6-8 mm long, globose, apiculate.

Flowering & Fruiting: June-January.

Distribution: Widespread in the drier parts of Africa, Arabia and Indo-Malesia. Occasional; in dry deciduous forests. *RNMK* 2775, Muthanga; *RNMK 2444*, Baveli.

Cissus repens Lam., Encycl. 1: 31. 1783; Gamble, Fl. Pres. Madras 233(167). 1918; Manilal & Sivar., Fl. Calicut 68. 1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 105. 1988; Shetty & Singh in N.P. Singh *et al.*, Fl. India 5: 290. 2000. *Cissus glauca* Roxb., Fl. India 1:425.1820; Gamble, Fl. Pres. Madras 234(168). 1918; Manilal & Sivar., Fl. Calicut 68. 1982; Ansari, Fl. Kasaragod Div. 105. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 104. 1988; Vajr., Fl. Palghat Dist. 125. 1990; Mohanan & Sivad., Fl. Agasthyamala 169. 2002; Sivar. & P. Mathew, Fl. Nilambur 152. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 135. 2005. *Vitis repens* (Lamk.) Wight & Arn. in Wight, Cat. 58.1833 & Prodr. 125.1834; Lawson in Hook. f., Fl. Brit. India 1:646.1872.

Creepers; stem glaucous, terete. Leaves 10-16 x 6-11 cm, ovate, acuminate, deeply cordate at base, 5 nerved from base, midrib with 3 pairs of lateral nerves; petiole 4-7 cm long. Cymes 5-7 cm across, glabrous; peduncle 5-6 cm

long; junctions with orbicular bracts; pedicels 5-8 together, 1-1.5 cm long; flowers many; calyx obtusely lobed, ciliate; petals reddish; disk glabrous. Drupe oblique-obovoid, smooth.
Flowering & Fruiting: November-December.
Distribution: Indo-Malesia. Common; in moist deciduous forests. *RNMK 3330,* Tholpetty.

TETRASTIGMA (Miquel) Planchon
in Alph. de Candolle *et* A. C. de Candolle,
Monogr. Phan. 5: 320, 423. 1887.

Tendrillate climbers; old stems flattened, younger stems tubercled. Leaves pedately 3-7-foliolate; leaflets elliptic-obovate, acute at base, penninerved, crenate, serrate. Flowers in axillary dichotomous cymes; calyx cupular, truncate; petals 4, spreading or recurved, hooded; stamens 4, reduced in female flowers; ovary globose, 2-celled; ovules 2 in each cell; stigma 4-lobed, recurved. Berry globose, white; seeds 4, obovoid, truncate with 2 oblique furrows on one face and one furrow on other face.

1. Stem tuberculate; leaves 3-5 foliolate ..... **T. sulcatum**
1. Stem not tuberculate; leaves 3- foliolate ..... **T. gamblei**

Tetrastigma gamblei Shetty & Singh, Kew Bull. 42: 933. 1987; Shetty & Singh in N.P. Singh *et al.*, Fl. India 5: 312. 2000. *Tetrastigma canarense* Gamble, Fl. Pres. Madras 228(164). 1918. *Vitis canarense* Dalz. In Hook's J. Bot. Kew Gard. Misc. 3 : 123. 1851 ; V. S. Ramach. & V. J. Nair, Fl. Cannanore 106. 1988.

Climbing shrubs, branches slender, terete. Leaves 3-foliolate, glabrous; petioles 4-9 cm long, terminal leaflets 7-11 x 4-7.5 cm, ellitptic to obovate, acuminate at apex, cuneate at base, serrate at margins. Inflorescence umbellate cymes, 3-3.5 cm long, pubescent; peduncles 1-2 cm long; flowers 2-4 mm long; calyx subtruncate or obscurely 4-lobed, pubescent; petals oblong-ovate, acute; anthers obovoid. Berries globose, 6-8 mm across, 1-seeded; seeds subglobose.
Flowering & Fruiting: November-March.
Distribution: Endemic to Peninsular India. Occasional; in evergreen forests. *RNMK 1559,* Mundakai.

Tetrastigma sulcatum (Lawson) Gamble, Fl. Pres. Madras 229(164). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 106. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 113. 1996; Shetty & Singh in N.P. Singh *et al.*, Fl. India 5: 319. 2000; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 136. 2005. *Vitis sulcatum* Lawson in Hook. f., Fl. Brit. India 1: 661. 1875.

Small climbers or creepers; stem thick, tuberculate. Leaves 3-5-foliolate; leaflets ovate-elliptic, acuminate, crenate-serrate, nerves 13-15 pairs; rachis 3-

4 cm long. Peduncle 1-2 cm long, dichotomous, glabrous; flowers 5-7 mm across; sepals ovate, acute; petals oblong, obtuse. Berry 2-2.5 cm across, white, glabrous; seeds 4, brownish.
Flowering & Fruiting: November-March.
Distribution: Endemic to Peninsular India. Common; in moist deciduous forests. *RNMK 1772,* Tholpetty; *RNMK 1019,* Chedalayam.

Vitis vinifera L., is grown in homesteds by planters in Pulpally area.

LEEACEAE (DC.) Dumort.
Anal. Fam. Pl. 21, 27. 1829.

LEEA D. van Royen ex Linnaeus
Syst. Nat. ed. 12, 2: 627. 1767, *nom. cons.*

Shrubs or small trees with striate branches. Leaves alternate, simple or variously pinnate; leaflets penninerved, serrate or crenate; lateral nerves opposite; petiole dialated at base into a sheathing stipule. Flowers many, in terminal or subterminal peduncled corymbose cymes; calyx cupular, 5-toothed; petals 5, connate at base with the staminal tube, recurved; stamens 5, filaments short, erect, inserted between the lobes of disk, connate at base, anthers small; disk 5-lobed, united with stamens; ovary 3-6-celled, seen above the disk; ovule solitary in each cell; style short. Fruit a 3-6-lobed berry; seeds 3-5, trigonous.

1. Flowers red ..... **L. guineensis**
1. Flowers greenish-yellow or white 2
2. Leaves 1 pinnate 3
2. Leaves 2-3 pinnate 4
3. Stem crispately winged; leaves glabrous ..... **L. asiatica**
3. Stem not winged; leaves pubescent ..... **L. robusta**
4. Leaves glabrous; berry black-purple ..... **L. indica**
4. Leaves sparsely pubescent; berry greenish grey ..... **L. macrophylla**

Leea asiatica (L.) Ridsd. in Manilal, Bot. Hist. Hort. Malab. 189. 1980; Manilal, Fl. Silent Valley 61. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 107. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 114. 1996; Sivar. & P. Mathew, Fl. Nilambur 156. 1997; Naithani in N.P. Singh *et al.*, Fl. India 5:330.2000. *Phytolacca asiatica* L., Sp. Pl. 474. 1753. *Leea crispa* Royen ex L., Syst. Nat. (ed. 12) 2: 627. 1767; Lawson in Hook. f., Fl. Brit. India 1: 665. 1875; Gamble, Fl. Pres. Madras 240 (171). 1918. *Leea aspera* Edgw., Trans. Linn. Soc. London 20: 36. 1846; Gamble, Fl. Pres. Madras 240(171). 1918. *Leea herbacea* Ham., Trans. Linn. Soc. London 14: 228. 1823; Gamble, Fl. Pres. Madras 240(171). 1918. *Leea pumila* Kurz, J. Asiat. Soc. Bengal 41: 303. 1872; Lawson in Hook. f., Fl. Brit. India 606. 1875. *Leea edgeworthii* Sant., Rec. Bot. Surv. India 19: 54. 1953.

Shrubs or undershrubs, stem oftem crispately winged. Leaves 1 or 2 pinnate; leaflets 15-18 x 6-8 cm; ovate-oblong, acuminate, serrate, glabrous, lateral veins 12-14 pairs, intercostae scalariform; stipules narrowly elliptic to oblong, 1-3 cm long. Flowers greenish-white in 5-12 cm long corymbs; staminal tube divided halfway down, lobes bifid. Berry 6-lobed, purple black, 6-7 mm across.
Flowering & Fruiting: March-November.
Distribution: Indo-Malesia and China. Common; in evergreen and moist deciduous forests. *RNMK 1118,* Periya; *RNMK 2710*, Muthanga; *RNMK 3304*, Tholpetty.

Leea guineensis G. Don, Gen. Hist. 712. 1831; Sasidh. & Sivar., Fl. Pl. Thrissur For. 114. 1996; Sivar. & P. Mathew, Fl. Nilambur 156. 1997; Naithani in N.P. Singh *et al.*, Fl. India 5: 336. 2000; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta Dist. 137. 2005. *Leea wightii* Clarke, J. Bot. 19: 105. 1881; Gamble, Fl. Pres. Madras 239(171). 1918. **Fig. 23, Plate 13j.**

Glabrous shrubs. Leaves bipinnate; leaflets 15-17 x 5-6 cm, ovate-lanceolate, caudate-acuminate, base truncate or acute, serrate; lateral nerves 7-10 pairs, intercostae sub-scalariform; petiolule 5-7 mm long; rachis 20-23 cm long; stipules 3-4 cm long obovate. Cymes 2-6 cm across; flowers crimson red, densely packed, 3-5 mm across; calyx and corolla glabrous; staminal tube shortly notched at apex. Berry 6-lobed, 6-7 mm across.
Flowering & Fruiting: May-August.
Distribution: Indo-Malesia and Africa. Rare; in evergreen forests. *RNMK 1119,* Vaduvanchal; *RNMK 2239*, Mundakai.

Leea indica (Burm. f.) Merr., Philipp. J. Sci. 14. 245. 1919; Manilal & Sivar., Fl. Calicut 70. 1982; Ansari, Fl. Kasaragod Div. 106. 1985; Manilal, Fl. Silent Valley 61. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 107. 1988; Vajr., Fl. Palghat Dist. 127. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 114. 1996; Sivar. & P. Mathew, Fl. Nilambur 157. 1997; Naithani in N.P. Singh *et al.*, Fl. India 5: 337. 2000; Mohanan & Sivad., Fl. Agasthyamala 170. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 137. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 182. 2009. *Staphylea indica* Burm. f., Fl. Ind. 75,t.23. f.2. 1768. *Leea sambucina* (L.) Willd., Sp. Pl. 1: 1177. 1798; Lawson in Hook. f., Fl. Brit. India 1: 666. 1875; Gamble, Fl. Pres. Madras 240(172). 1918.

Shrubs to small trees. Leaves 2 or 3-pinnate; young leaves bright-red. leaflets 10-14 x 4-5 cm, oblong or elliptic-lanceolate, caudate-acuminate, serrate-dentate; lateral nerves 12-15 pairs, intercostae parallel, curved; stipules obovate-obtuse. 3-4 cm long. Cymes 6-8 cm long; peduncles 3-4 cm long, paired, axillary; flowers greenish-white; staminal tube shortly lobed at apex, anthers combined. Berry purple, 5-6 mm across; seeds densely red-glandular.
Flowering & Fruiting: March-August.
Distribution: Indo-Malesia, China and Australia. Common; in evergreen forests. *RNMK 2296,* Palchuram; *RNMK 1966*, Periya.

Leea macrophylla Roxb. ex Hornem., Hort. Hafn. 1: 231. 1813; Lawson in Hook. f., Fl. Brit. India 1: 664. 1875; Gamble, Fl. Pres. Madras 239(171). 1918; Manilal & Sivar., Fl. Calicut 70. 1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 108. 1988; Vajr., Fl. Palghat Dist. 127. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 114. 1996; Sivar. & P. Mathew, Fl. Nilambur 158. 1997; Naithani in N.P. Singh *et al.*, Fl. India 5: 339. 2000. *Leea diffusa* Lawson in Hook.f., Fl. Brit. India 1: 664. 1875; Gamble, Fl. Pres. Madras 240(171). 1918. *Leea latifolia* Wall. ex Kurz, J. Asiat. Soc. Bengal 44: 178. 1875; Gamble, Fl. Pres. Madras 240(171). 1918. *Leea cinerea* Lawson in Hook.f., Fl. Brit. India 1: 665. 1875 *Leea coriacea* Lawson in Hook.f., Fl. Brit. India 1: 665. 1875. *Leea venkobarowii* Gamble, Bull. Misc. Inform. Kew 1917: 26. 1917 & Gamble, Fl. Pres. Madras 240(172). 1918.

Shrubs with tuberous roots. Leaves unifoliolate, 4-5 cm long; broadly ovate, base cordate, coarsely serrate, hoary beneath and glabrous above, stipules 3-4 x 1-1.5 cm semi-lunulate,. Flowers greenish-white, in much branched large corymbose cymes; staminal tube deeply divided, lobes entire or emarginate. Berry greenish-grey, 0.8-1 cm across.

Flowering & Fruiting: November-December.

Distribution: South and south east Asia. Occasional; in evergreen forests. *RNMK 2502,* Vaduvanchal.

Leea robusta Roxb., Fl. Ind. 2: 468. 1824; Lawson in Hook. f., Fl. Brit. India 1: 667. 1875; Gamble, Fl. Pres. Madras 240(171). 1918; P. Mathew *et al.*, Rheedea 2: 67. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 114. 1996; Sivar. & P. Mathew, Fl. Nilambur 159. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 183. 2009. *Leea macrophylla* sensu Ridsd., Blumea 22: 85. 1974, non Roxb. ex Hornem. 1813.

Large shrubs, stem pubescent. Leaves 1-pinnate; leaflets 5 or 7, ca. 28 x 12 cm, oblong, acute, rounded at base, serrate, pubescent along nerves; nerves 12-14 pairs, nervules parallel; petiolule 3-5 cm long. Cymes axillary, 10-13 cm across; peduncle 10-12 cm long; branches hirtus; flowers green, 5-7 mm across; calyx lobes ovate, acute; petals puberulus outside. Capsule 6-8 mm across, black.

Flowering & Fruiting: July-December.

Distribution: India and southeast Asia. Common; in moist deciduous forests. *RNMK* 2107, Chedalayam; *RNMK 3300*, Pulpally.

SAPINDACEAE Juss.

Gen. Pl. 246. 1789.

1. Petals absent.....2
1. Petals present.....4
2. Leaves simple.....**Dodonaea**
2. Leaves compound.....3
3. Lower leaflets stipulace ; fruit 2-3-lobed, densely muricate ..... **Otonephelium**
3. Lower leaflets not as above; fruit undivided, sparsely muricate..... **Schleichera**

4. Leaves 3-foliolate ..... **Allophylus**
4. Leaves many-foliolate 5
5. Slender climbers..... **Cardiospermum**
5. Trees or shrubs 6
6. Leaf rachis broadly winged .....**Filicium**
6. Leaf rachis not winged..... 7
7. Fruit an inflated 2-lobed capsule ..... **Harpullia**
7. Fruit otherwise 8
8. Drupe densely rounded-tubercled.....**Dimocarpus**
8. Drupe smooth 9
9. Petals clawed, with scales inside.....**Lepisanthes**
9. Petals not clawed, without scales inside .....**Sapindus**

ALLOPHYLUS Linnaeus
Sp. Pl. 348. 1753.

Erect or straggling shrubs. Leaves alternate, digitately 3-foliolate. Flowers polygamodioecious, 3-10 together, in long or short axillary branched or unbranched racemes; sepals 4, free, in opposite pairs; petals 4, free, white or cream; disk 1-sided, glandular; stamens 8, inside the disc; ovary 2-lobed, 2-celled; ovule solitary in each cell; style 2, recurved; pistillode present in staminate flowers. Fruit a biglobose drupe, indehiscent.

1. Leaves glabrous..... 2
1. Leaves tomentose 3
2. Leaflets entire; racemes branched .....**A. concanicus**
2. Leaflets sharply serrate; racemes unbranched..... **A. distachys**
3. Racemes unbranched; nerves 8-13 pairs .....**A. serratus**
3. Racemes branched; nerves 9-10 pairs .....**A. cobbe**

Allophylus cobbe (L.) Raeusch., Nomencl. Bot. (ed. 3) 108. 1797; Hiern in Hook. f., Fl. Brit. India 1: 673. 1875 p.p; Manilal, Fl. Silent Valley 62. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 109. 1988; Vajr., Fl. Palghat Dist. 129. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 116. 1996; Sivar. & P. Mathew, Fl. Nilambur 160. 1997; Pant in N.P. Singh *et al.*, Fl. India 5: 346. 2000; Mohanan & Sivad., Fl. Agasthyamala 172. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 184. 2009. *Rhus cobbe* L., Sp. Pl. 267. 1753. *Schmidelia rheedei* Wight, Ic. t. 964. 1845. *Allophylus rheedei* (Wight) Radlk. in Engl. & Prantl, Naturl. Pflanzenfam. 3(5): 313. 1895; Gamble, Fl. Pres. Madras 246(176). 1918; Ansari, Fl. Kasaragod Div. 106. 1985.

Erect shrubs. Leaflets 10-11 x 5-5.5 cm, obovate, abruptly acuminate, deep brown when dried, sharply serrulate, pale white-tomentose beneath; nerves 9-10 pairs; petiole 7-7.5 cm long. Raceme 26-30 cm long, slender, hispid, 1-3-branched; flowers 2-3 mm across, 1-3 together, shortly pedicelled; sepals orbicular, glabrous; ovary densely hairy. Drupe densely hairy.
Flowering & Fruiting: July-November.

Distribution: South India, Sri Lanka and southeast Asia. Common; in moist deciduous forests. *RNMK 3111,* Tholpetty; *RNMK 3441*, Chedalayam.

Allophylus concanicus Radlk., Sitzungsber. Math.-Phys. Cl. Koenigl. Bayer. Akad. Wiss. Muenchen 20:230.1890; Gamble, Fl. Pres. Madras 246(176). 1918; Vajr., Fl. Palghat Dist. 129. 1990; Sivar. & P. Mathew, Fl. Nilambur 161. 1997; Pant in N.P. Singh *et al.,* Fl. India 5:348.2000; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 141. 2005. *Allophylus concanicus* Radlk. var. *lanceolatus* Gamble, Fl. Pres. Madras 246(176). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 110. 1988.

Stragglers, branchlets brownish, lenticellate. Leaflets 13-17 x 6-6.5 cm, ovate, acuminate, cuspidate; 5-6-nerved, serrate towards the apex, black above when dried; midrib pubescent; domatia hairy. Raceme branched, hispid; flowers solitary or paired, 2-3 mm across; sepals orbicular, ciliate; petals densely white hairy within; filaments hairy, reddish, connective broad; disk lobes 4, globular. Fruit subglobose, glabrous.

Flowering & Fruiting: December-April.

Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 2776,* Brahmagiri.

Allophylus serratus (Roxb.) Kurz, J. Asiat. Soc. Bengal 44: 185. 1876; Gamble, Fl. Pres. Madras 246(175). 1918; Manilal & Sivar., Fl. Calicut 71. 1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 111. 1988; Pant in N.P. Singh *et al.*, Fl. India 5: 349. 2000; Mohanan & Sivad., Fl. Agasthyamala 173. 2002. *Ornitrophe serrata* Roxb., Pl. Corom. t. 61. 1796. *Schmidelia serrata* (Roxb.) DC., Prodr. 1: 610. 1824. *Allophylus cobbe* forma *serratus* (Roxb.) Hiern in Hook. f., Fl. Brit. India 1: 673. 1875, p.p.

Straggling shrubs; branchlets lenticellate. Leaflets 18-20 x 9-11 cm, ovate, acuminate at apex, attenuate at base; nerves 8-13 pairs; petiolule 3-7 mm long; petiole 8-10 cm long. Flowers 3-5-together, 4-5 mm across; pedicel jointed; sepals orbicular; petals spathulate; lobes of disc orbicular. Drupe 4-5 mm across, puberulus.

Flowering & Fruiting: July-October.

Distribution: India and Sri Lanka. Common; in moist deciduous forest. *RNMK 2905,* Pakkam; *RNMK 2660,* Pulpally.

Allophylus subfalcatus Radlk., Rec. Bot. Surv. India 3: 342. 1907, var. **distachyus** (DC.) Mukerjee, Indian For. 98: 493. 1972; Pant in N.P. Singh *et al.*, Fl. India 5: 351. 2000. *Schmidelia distachya* DC., Prodr. 1: 610. 1824. *Allophylus cobbe* forma *distachya* (DC.) Hiern in Hook.f., Fl. Brit. India 1: 673. 1875. *Allophylus distachys* (DC.) Radlk. in Engl. & Prantl, Naturl. Pflanzenfam. 3:313. 1895; Gamble, Fl. Pres. Madras 246(176). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 110. 1988; Manilal, Fl. Silent Valley 63. 1988; Vajr., Fl. Palghat Dist. 130. 1990.

Shrubs up to 2.5 m tall; bark lenticelled, grayish white. Leaves long petioled; leaflets ovate-lanceolate or elliptic-lanceolate, 7-24 x 1-8 cm, acuminate, unequal at base, lateral ones usually smaller, glabrous to glossy, chartaceous, distantly serrate-dentate, repand crenate. Racemes dense flowered, unbranched; sepals glabrescent; petals greenish-yellow, cuneate; disc puberlous. Fruit clavate-ellipsoid, glabrous, orange red.
Flowering & Fruiting: November-March.
Distribution: India, Bangladesh and Indo-Malaya. Occasaional; in evergreen forests. *RNMK 1601,* Chanthanathodu.

CARDIOSPERMUM Linnaeus
Sp. Pl. 366. 1753.

Cardiospermum halicacabum L., Sp. Pl. 366. 1753; Wight, Ic. t. 508. 1841; Hiern in Hook. f., Fl. Brit. India 1: 670. 1875; Gamble, Fl. Pres. Madras 244(175). 1918; Manilal & Sivar., Fl. Calicut 70. 1982; Ansari, Fl. Kasaragod Div. 107. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 111. 1988; Vajr., Fl. Palghat Dist. 130. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 116. 1996; Sivar. & P. Mathew, Fl. Nilambur 161. 1997; Pant in N.P. Singh *et al.*, Fl. India 5: 356. 2000; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 141. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 185. 2009.

Tendrillate climbers. Leaves bipinnate, 10-12 cm long, 3-7-foliolate; leaflets 3-4 x 2-2.5 cm, pinnatifid. Tendril trichotomous, middle one forms the cymes. Flowers 3-4 mm across, 3-7 together, polygamodioecious; sepals 4, ovate, acute, free; petals 4, white, oblanceolate, obtuse, hooded; stamens 8, one-sided; disk one-sided, lobed; ovary obovoid, 3-celled, one ovule in each cell; style 3-fid. Capsule membranous, shortly winged at angles, saccate, obcordate; seeds 3, globose, shining, black with a small white aril.
Flowering & Fruiting: July-February.
Distribution: Pantropical. Occasional; in waysides and plantations. *RNMK 2559,* Kottavayal.

DIMOCARPUS Loureiro
Fl. Cochinch. 233. 1790.

Dimocarpus longan Lour., Fl. Cochinch. 233. 1790; Manilal, Fl. Silent Valley 63. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 111. 1988; Vajr., Fl. Palghat Dist. 131. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 117. 1996; Sivar. & P. Mathew, Fl. Nilambur 162. 1997; Pant in N.P. Singh *et al.*, Fl. India 5: 358. 2000; Mohanan & Sivad., Fl. Agasthyamala 174. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 141. 2005. *Euphoria longana* (Lour.) Steud., Nomencl. Bot. 1: 328. 1821. *Euphoria longan* Lamk., Encycl. 3: 574. 1792. *Nephelium longana* (Lamk.) Camp., Mem. Mus. Hist. Nat. Paris 18: 30. 1829; Hiern in Hook. f., Fl. Brit. India 1: 688. 1875; Gamble, Fl. Pres. Madras 252(180). 1918.

Trees, to 25 m high, bark reddish brown. Leaves paripinnate; leaflets 4-10 pairs, 10-18 x 2-2.5 cm, elliptic-oblong, glaucous beneath, nerves 14-20 pairs,

petiolulate. Panicle 30-35 cm long, terminal; flowers pedicelled, polygamous, 6 –8 mm across; sepals hairy outside; petals oblanceolate, densely hairy, deflexed; stamens 8, filaments hairy; ovary 2-lobed; ovule one in each cell, style long; stigma bifid. Fruit of 1-2 nutlets, oblong, each 1.3-1.5 cm long, densely rugose, tubercled, brown.

Flowering & Fruiting: March-August.

Distribution: Indo-Malesia. Common; in evergreen and semi-evergreen forests. *RNMK 1429,* Chooralmala.

DODONAEA P. Miller

Gard. Dict. Abr. ed. 4. 28. 1754.

Dodonaea viscosa (L.) Jacq., Enum. Syst. Pl. 19. 1760; Hiern in Hook. f., Fl. Brit. India 1: 697. 1875; Gamble, Fl. Pres. Madras 253(181). 1918, var. **angustifolia** (L. f.) Benth., Fl. Austral. 1: 476. 1863; Manilal & Sivar., Fl. Calicut 72. 1982; Pant in N.P. Singh *et al.*, Fl. India 5: 361. 2000. *Dodonaea angustifolia* L. f., Suppl. Pl. 218. 1781. *Ptelea viscosa* L., Sp. Pl. 118. 1753.

Large shrubs. Leaves alternate, simple, 8.5-10 cm long, oblanceolate, glandular, nerves many, close. Panicle terminal, 6-8 cm long, pilose; flowers polygamous, 5-7 mm across; pedicel covered with viscid glands; sepals 4, ovate, acute, glandular; stamens 10, anthers sessile, curved, connective produced into a short cusp; disk absent; ovary 3-celled; ovule 2 in each cell; pistillode clavate. Capsule membranous, 3-angled and 3 winged; seeds biconvex, black.

Flowering & Fruiting: January-May.

Distribution: Pantropical. Rare; in Moist deciduous forests. *RNMK 1888,* Muthanga.

FILICIUM Thwaites ex J. D. Hooker

in Bentham et J. D. Hooker, Gen. 1: 325. 1862.

Filicium decipiens (Wight & Arn.) Thw., Enum. Pl. Zeyl. 408. 1864; Bennett in Hook. f., Fl. Brit. India 1: 539. 1875; Gamble, Fl. Pres. Madras 249(178). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 112. 1988; Pant in N.P. Singh *et al.*, Fl. India 5: 363. 2000. *Rhus decipiens* Wight & Arn., Prodr. 172. 1834.

Large trees, branchlets angular. Leaves imparipinnate; leaflets 6-8 pairs, 9-12 x 2-3 cm, elliptic-oblong, many-nerved; rachis winged. Panicle axillary and terminal; branches glandular. Flowers polygamous, 4-6 mm across; sepals ovate, pubescent inside, ciliate; petals orbicular, smaller; disk densely white-hairy; stamens 5, free, filaments erect, glabrous; ovary 2-celled, glabrous; ovule one in each cell; style short. Drupe obovoid, glabrous, brown; seeds 1 or 2.

Flowering & Fruiting: October-December.

Distribution: India and Sri Lanka. Rare; in evergreen forests. *RNMK 1550,* Periya Ghat.

HARPULLIA Roxburgh

Fl. Ind. 2: 441. 1824.

Harpullia arborea (Blanco) Radlk., Sitzungsber. Math.-Phys. Cl. Koenigl. Bayer. Akad. Wiss. Muenchen 16: 404. 1890; V. S. Ramach. & V. J. Nair, Fl. Cannanore 112. 1988; Vajr., Fl. Palghat Dist. 131. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 117. 1996; Sivar. & P. Mathew, Fl. Nilambur 163. 1997; Pant in N.P. Singh *et al.*, Fl. India 5: 365. 2000; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 142. 2005. *Ptelea arborea* Blanco, Fl. Philipp.(ed. 1) 63. 1837. *Harpullia imbricata* (Bl.) Thw., Enum. Pl. Zeyl. 56. 1858; Gamble, Fl. Pres. Madras 253(180). 1918. *Octonychium imbricatum* Blume, Rumphia 3: 180. 1849. *Harpullia cupanoides* sensu Hiern in Hook. f., Fl. Brit. India 1: 692. 1875p.p., non Roxb. 1832.

Small to medium sized trees; branchlets fulvous tomentose. Leaves paripinnate, leaflets 5 pairs, 15-16 x 6-7 cm, elliptic-oblong, abruptly acuminate, membranous, oblique at base. Flowers in loose axillary panicle; pedicels 4-5 cm long, slender; sepals obovate, hairy; petals yellow, oblong, clawed; stamens 5; filaments 8-9 mm long, free; ovary 2-celled; one ovule in each cell; style elongate. Capsule 5-7 cm long, 2-lobed, inflated, saccate, red; seeds black, shining.

Flowering & Fruiting: January-April.

Distribution: Indo-Malesia and Australia. Common; in evergreen forests. *RNMK 3007,* Vythiri.

LEPISANTHES Blume

Bijdr. 237. 1825.

Shrubs or trees. Leaves imparipinnate; leaflets sub-opposite, entire. Flowers in racemes or panicles, axillary or terminal, polygamodioecious; sepals 4 or 5, free, imbricate; petals 4 or 5, unequal, clawed, with lobed scale inside; stamens 8, free, filaments long; anthers divided at base; ovary 3-celled, ovule solitary in each cell; style-1, stigma oblique. Fruit a trigonous or lobed berry; seeds 3, arillate.

1. Leaves paripinnate ..... **L. tetraphylla**
2. Leaves imparipinnate ..... **L. erecta**

Lepisanthes erecta (Thw.) Leenh., Blumea 17: 69. 1969; Manilal, Fl. Silent Valley 64. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 113. 1988; Vajr., Fl. Palghat Dist. 131. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 118. 1996; Pant in N.P. Singh *et al.*, Fl. India 5: 368. 2000. *Nephelium erectum* Thw., Enum. Pl. Zeyl. 57. 1858. *Sapindus erecta* (Thw.) Hiern in Hook. f., Fl. Brit. India 1: 683. 1875, "erectus". *Thraulococcus erectus* (Thw.) Radlk., Sitzungsber. Math.-Phys. Cl. Koenigl. Bayer. Akad. Wiss. Muenchen 8: 300. 1878; Gamble, Fl. Pres. Madras 251(179). 1918.

Shrubs. Leaves 35-50 cm long; leaflets 4-5 pairs, 20-25 x 5-9 cm, oblong, acute at either ends, nerves 10-13 pairs; petiolule 5-7 mm long, smooth.

Panicle 20-25 cm long, terminal, erect; flowers clustered, subsessile, dull yellow; sepals ovate, obtuse, pubescent outside; petals obovate, broadly clawed; scale oblong, not lobed, hairy; filaments hairy above. Drupes oblong, obtuse, minutely fulvous-tomentose.
Flowering & Fruiting: October-January.
Distribution: South India, Sri Lanka and Myanmar. Common; in evergreen forests. *RNMK 3295,* Vaduvanchal; *RNMK 3377,* Chembra.

Lepisanthes tetraphylla (Vahl) Radlk., Sitzungsber. Math.-Phys. Cl. Koenigl. Bayer. Akad. Wiss. Muenchen 8: 276. 1878; Gamble, Fl. Pres. Madras 247(176). 1918; Manilal, Fl. Silent Valley 64. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 113. 1988; Vajr., Fl. Palghat Dist. 132. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 118. 1996; Sivar. & P. Mathew, Fl. Nilambur 164. 1997; Pant in N.P. Singh *et al.*, Fl. India 5: 372. 2000; Mohanan & Sivad., Fl. Agasthyamala 174. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 142. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 185. 2009. *Sapindus tetraphylla* Vahl, Symb. Bot. 3: 1794. *Hemigyrosa canescens* (Roxb.) Bl. Rumphia 3: 166. 1849; Hiern in Hook. f., Fl. Brit. India 1: 671. 1875. *Molinaea canescens* Roxb., Pl. Corom. t. 60. 1796. *Lepisanthes deficiens* (Wight & Arn.) Radlk., Sitzungsber. Math.-Phys. Cl. Koenigl. Bayer. Akad. Wiss. Muenchen 8: 276. 1878; Gamble, Fl. Pres. Madras 247(176). 1918. *Sapindus deficiens* Wight & Arn., Prodr. 111. 1834.

Trees, 5-9 m high. Leaves 25-30 cm long; leaflets 2-4 pairs, sub-opposite, 15-18 cm long, oblong-lanceolate; nerves 11-13 pairs, prominent; petiolule 5-6 mm long, transversally rugose. Panicle terminal or subterminal, erect or spreading, 35-40 cm long, branches fulvous-tomentose; flowers crowded; sepals orbicular, hairy outside; petals dull white, oblanceolate, clawed; scale 2-lobed, hairy. Capsule 2-2.5 cm, obovoid, obtusely trigonous, densely fulvous tomentose, apiculate.
Flowering & Fruiting: February-July.
Distribution: Indo-Malesia and Africa. Common; in semi-evergreen forests. *RNMK 2996,* Manikkunnumala.

OTONEPHELIUM Radlkofer
Sitzungsber Math.-Phy. Cl. Konigl. Bayar
Akad. Wiss. Munchen 20: 253, 288. 1890.

Otonephelium stipulaceum (Bedd.) Radlk., Sapind. Holl. Ind. 71. 1879; Gamble, Fl. Pres. Madras 252(180). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 113. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 118. 1996; Sivar. & P. Mathew, Fl. Nilambur 164. 1997; Pant in N.P. Singh *et al.*, Fl. India 5: 378. 2000; Mohanan & Sivad., Fl. Agasthyamala 175. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 143. 2005. *Nephelium stipulaceum* Bedd., Trans. Linn. Soc. London 25: 212. 1865 & Ic. t. 103. 1868-1874; Hiern in Hook. f., Fl. Brit. India 1: 690. 1875; Gamble, Fl. Pres. Madras 252(180). 1918. **Plate 13k.**

Trees to 20 m high; branchlets glabrous. Leaves paripinnate, 6-8 foliolate, leaflets 18-20 x 7-10 cm, elliptic, acuminate at either ends, glaucous below; lowest pair small, reniform; nerves 10-11 pairs, domatia present in the axils of nerves. Panicle 15-18 cm long, terminal or axillary. Flowers 3-5 mm across, crowded; sepals 6, ovate, acute, free, densely tomentose; petals absent; stamens 6, filaments free, shorter than anthers; pistillode globose, densely hairy; ovary 2-4-lobed, ovule 1 in each cell; style terminal. Fruit of 1-3 drupelets, 2-2.5 cm long, oblong, densely soft-prickled.
Flowering & Fruiting: February-July.
Distribution: Endemic to southern Western Ghats. Common; in evergreen forests. *RNMK 2234,* Periya; *RNMK 2760,* Vythiri.

SAPINDUS Linnaeus
Sp. Pl. 367. 1753.

Sapindus trifoliatus L., Sp. Pl. 367. 1753; Hiern in Hook. f., Fl. Brit. India 1: 682. 1875; Ansari, Fl. Kasaragod Div. 108. 1985; Nicols., Suresh & Manilal, Interp. Hort. Malab. 237. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 119. 1996; Sivar. & P. Mathew, Fl. Nilambur 165. 1997; Pant in N.P. Singh *et al.*, Fl. India 5: 382. 2000; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 186. 2009. *Sapindus laurifolius* Vahl, Symb. Bot. 3: 54. 1794; Gamble, Fl. Pres. Madras 250(178). 1918; Manilal & Sivar., Fl. Calicut 71. 1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 114. 1988; Vajr., Fl. Palghat Dist. 132. 1990; Mohanan & Sivad., Fl. Agasthyamala 176. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 143. 2005.

Trees to 10 m high; branchlets lenticellate. Leaves 2-3-foliolate; leaflets 13-15 x 4.5-7 cm, elliptic-lanceolate; nerves 10-14 pairs, prominent and raised below. Panicles 13-15 x 18-20 cm, spreading, densely branched, puberulus. Flowers 3-5 together; sepals ovate, obtuse; petals oblong; scales densely hairy; filaments densely hairy. Drupelets globose, densely hairy, with sticky pulp inside.
Flowering & Fruiting: December-April.
Distribution: South Asia. Occasional; in semi-evergreen forests. *RNMK 3455,* Manikkunnumala.

SCHLEICHERA Willdenow
Sp. Pl. 4: 1096. 1806, *nom. cons.*

Schleichera oleosa (Lour.) Oken, Allg. Naturgesch. 3:1341. 1841; Manilal & Sivar., Fl. Calicut 71. 1982; Ansari, Fl. Kasaragod Div. 108. 1985; Manilal, Fl. Silent Valley 64. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 114. 1988; Vajr., Fl. Palghat Dist. 133. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 119. 1996; Sivar. & P. Mathew, Fl. Nilambur 166. 1997; Pant in N.P. Singh *et al.*, Fl. India 5: 384. 2000; Mohanan & Sivad., Fl. Agasthyamala 176. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 143. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 187. 2009. *Pistacia oleosa* Lour., Fl. Cochinch. 615. 1790.

Schleichera trijuga Willd., Sp. Pl. 4: 1096. 1805; Lawson in Hook. f., Fl. Brit. India 1: 681. 1875; Gamble, Fl. Pres. Madras 248(177). 1915.

Large trees; bark grey, reddish inside; branchlets puberulus. Leaves paripinnate; leaflets 3-5 pairs, 15-19 x 6-8 cm, sessile, oblong, acute, tomentose along the nerves below; nerves 15-20 pairs. Flowers polygamodioecious, 3-5 mm across, in terminal or axillary panicles; sepals 5, ovate, acute; petals absent; stamens 8, free, filaments 6-8 mm long, glabrous; ovary ovoid, 3-celled, with solitary ovule in each. Fruit 2-3 cm long, ovoid, globose, spiny, glabrous; seeds 3, hemispheric, smooth.

Flowering & Fruiting: March-June.

Distribution: Indio-Malesia. Common; in moist deciduous forests. *RNMK 2332,* Chedalayam; *RNMK 2701*, Tholpetty.

Litchi chinensis Sonner. and **Nephelium lappaceum** L. are often raised in the district by planters.

STAPHYLEACEAE (DC.) Lindl.

Syn. Brit. Fl. 75. 1829

TURPINIA Ventenat

Mem. Cl. Sci. Math. Inst. Natl.
France 1807(1): 3. 1807, *nom. cons.*

Trees. Leaves opposite, imparipinnate, leaflets opposite, crenulate, penninerved, petiolulate. Flowers bisexual, in axillary or terminal panicles, with opposite branches; sepals 5, free, imbricate; petals 5, imbricate, spreading; stamens 5, free; disk inside the stamens, erect, lobed; ovary 3-lobed, 3-celled, sessile; ovule paired in each cell; style short; stigma capitate. Fruit a berry, globose, 3-celled; seeds 3 or 4, angular.

1. Leaves 20-25 cm long; filaments glabrous .....**T. cochinchinensis**
1. Leaves 35-40 cm long; filaments villous..... .**T. malabarica**

Turpinia cochinchinensis (Lour.) Merr., J. Arnold Arbor. 19: 43. 1938; Manilal, Fl. Silent Valley 62. 1988; Pant in N.P. Singh *et al.*, Fl. India 5: 415. 2000. *Triceros cochinchinensis* Lour., Fl. Cochinch. 184. 1790. *Turpinia nepalensis* Wall. ex Wight & Arn., Prodr. 156. 1834; Gamble, Fl. Pres. Madras 241(172). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 108. 1988; Vajr., Fl. Palghat Dist. 128. 1990. *Turpinia pomifera* sensu Hiern in Hook.f., Fl. Brit. India 1: 698. 1875, non DC. 1824.

Small trees, branchlets white. Leaves 20-25 cm long; leaflets 3-5, 8-10 x 5-6 cm, elliptic, acuminate at apex, crenate-serrate; petiolule 0.7-0.9 cm long. Panicles 5-7 cm long, axillary or terminal; flowers 5-7 mm across, shortly pedicelled; sepals ovate, obtuse, ciliolulate; petals ovate, acute; filaments glabrous. Berry globose, glabrous with a knot at apex.

Flowering & Fruiting: March-October.
Distribution: Indo-Malesia and China. Occasional; in evergreen forests. *RNMK 3221,* Kunchome; *RNMK 1116,* Periya.

Turpinia malabarica Gamble, Bull. Misc. Inform. Kew 1917: 135. 1916. & Gamble, Fl. Pres. Madras 241(173). 1918; Manilal, Fl. Silent Valley 62. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 108. 1988; Vajr., Fl. Palghat Dist. 128. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 115. 1996; Sivar. & P. Mathew, Fl. Nilambur 159. 1997; Pant in N.P. Singh *et al.*, Fl. India 5: 416. 2000; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 139. 2005. **Fig. 24.**

Buttressed trees to 20 m tall; branchlets brown. Leaves 35-40 cm long; leaflets broadly elliptic, crenate, acuminate at apex; petiolule 0.7-2 cm long. Panicles 18-20 x 14-15 cm, glabrous, axillary; peduncle 8-10 cm long; flowers greenish yellow, pedicelled; sepals ovate, slightly connate at base, obtuse, ciliate; filaments villous; style 3-fid at apex. Berry globose, brown, rough.
Flowering & Fruiting: January-April.
Distribution: Endemic to southern Western Ghats. Occasinal; in evergreen forests. *RNMK 2360,* Chooralmala.

SABIACEAE Blume

Mus. Bot. 1: 368. 1851.

MELIOSMA Blume

Cat. Buitenzorg 10. 1823.

Trees. Leaves alternate, simple or imparipinnate; leaflets sub-opposite. Flowers in terminal or axillary panicles; bracteoles 4; sepals 5; bracteoles and sepals together form a spiral around the petals; petals 3, orbicular, imbricate; stamens 5, antipetalous, 2 stamens fertile, filaments flattened, with a bifid scale which produced into a hood over the ovary; disc annular; ovary 2 or 3-celled, sessile; ovules paired in each cell; style simple or bifid. Fruit an obliquely sub-globose drupe, 1-celled; seed 1, globose.

1. Leaves simple 2
1. Leaves imparipinnate ..... **M. pinnata** ssp**. arnottiana**
2. Leaves oblanceolate; nerves 15-16 pairs ..... **M. simplicifolia** ssp**. simplicifolia**
2. Leaves elliptic-obovate; nerves 10-13 pairs ..... **M simplicifolia** var**. pungens**

Meliosma pinnata (Roxb.) Maxim. ssp. **arnottiana** (Wight) Beus., Blumea 19: 499. 1971; Manilal, Fl. Silent Valley 65. 1988; Vajr., Fl. Palghat Dist. 133. 1990; V. S. Ramach. & V. J. Nair, Fl. Cannanore. 115. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 120. 1996; Majumdar in N.P. Singh *et al.*, Fl. India 5: 423. 2000; Mohanan & Sivad., Fl. Agasthyamala 177. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 144. 2005. *Meliosma rhoifolia* Maxim. ssp. *barbulata* Cufod., Oest. Bot. 88. 254. 1939. *Millingtonia arnottiana* Wight, Ill. 1: t.53. 1840. *Meliosma arnottiana* (Wight) Walp., Rep. 1: 423. 1842; Hook. f.,

Fl. Brit. India 2: 6. 1876,p.p.; Gamble, Fl. Pres. Madras 256(183). 1918. *Millingtonia pinnata* Roxb., Fl. Ind. 1: 103. 1820.

Medium sized trees, branchlets thickly tomentose. Leaves 10-16-foliolate; leaflets opposite, 10-13 x 3-3.5 cm, elliptic, acuminate, densely hairy, petiolulate; rachis bulged at base. Panicles terminal, 30-35 cm across, densely tomentose; flowers 4-6 mm across, sessile; sepals ovate, hairy; petals orbicular, pale yellow; ovary densely hairy. Drupe 7-9 mm across, globose.
Flowering & Fruiting: March-June.
Distribution: Indo-Malesia and China. Occasional; in evergreen forest. *RNMK 2995,* Kurichiarmala.

Meliosma simplicifolia (Roxb.) Walp. Rep. 1: 423. 1842, ssp. **simplicifolia** Hook. f., Fl. Brit. India 2: 5. 1876; Gamble, Fl. Pres. Madras 256(182). 1918; Manilal, Fl. Silent Valley 65. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 115. 1988; Vajr., Fl. Palghat Dist. 134. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 120. 1996; Sivar. & P. Mathew, Fl. Nilambur 166. 1997; Majumdar in N.P. Singh *et al.*, Fl. India 5: 423. 2000; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 144. 2005. *Millingtonia simplicifolia* Roxb., Pl. Corom. 3: 50. t. 254. 1820.

Small trees; branchlets glabrous. Leaves 25-25 x 7-10 cm, oblanceolate, acute at apex, glabrous; nerves 15-16 pairs, regular, scabrid, young leaves crimson-red, petiole 5-7 cm long. Flowers 2-3 mm across, in large axillary panicles; sepals 5, free, ovate, ciliate, petals 3, white, imbricate, glabrous. Drupe 5-7 mm across, ampulliform, glabrous.
Flowering & Fruiting: March-June.
Distribution: Indo-Malesia and China. Common; in evergreen forests. *RNMK 2998,* Kurichiarmala.

Meliosma simplicifolia (Roxb.) Walp. var. **pungens** (Wall. ex Wight & Arn.) Beus., Bl. 19: 466. 1971; Vajr., Fl. Palghat Dist. 134. 1990; Majumder in N.P. Singh *et al.*, Fl. India 5: 427. 2000. *Millingtonia pungens* Wall. ex Wight & Arn., Edinb. New Phil. J. 15: 178. 1833. *Meliosma pungens* (Wight & Arn.) Walp. Rep. 1: 423. 1842. *Meliosma wightii* Planch. ex Brandis, For. Fl. 116. 1874; Hook. f., Fl. Brit. India 2: 4. 1876; Gamble, Fl. Pres. Madras 256(182). 1918.

Small to medium trees, branchlets lenticellate. Leaves 20-25 x 7-9 cm, ellitpic-obovate, apex acute, base cuneate, margins more or less entire, coriaceous, nerves 10-13 pairs, impressed above, raised below, petiole 3-4 cm, pubescent when young. Panicles axillary and terminal, ca. 20 cm, pubescent, bracteoles 6; sepals 6, connate, ovate, ciliate; petals 3, ovate, concave; stamens 5, fertile 2, anthers globose, sterile ones bifid at apex. Drupe 1-celled, globose, crustaceous.
Flowering & Fruiting: September-March.
Distribution: Indo-Malesia and China Common; in evergreen forests. *RNMK 2552,* Chmbra.

ANACARDIACEAE Lindl.

Intr. Nat. Syst. Bot. 127. 1830.

1. Leaves pinnately compound..... 2
1. Leaves simple 4
2. Leaflets with intramarginal nerves 3
2. Leaflets without intramarginal nerves.....**Lannea**
3. Leaflets serrulate; style 1.....**Solenocarpus**
3. Leaflets entire; styles 5 .....**Spondias**
4. Leaves with petiolar appendages.....**Holigarna**
4. Leaves without petiolar appendages..... 5
5. Flowers in axillary racemes or panicled racemes under 5 cm long ..... **Nothopegia**
5. Flowers in axillary or terminal large panicles over 10 cm long..... 6
6. Fertile stamen 1 7
6. All stamens fertile..... 8
7. Flowers unisexual ..... **Mangifera**
7. Flowers bisexual ..... **Buchanania**
8. Styles 1; drupe globose .....**Gluta**
8. Style 3; drupe oblong, oblique ..... **Semicarpus**

BUCHANANIA Sprengel

J. Bot. (Schrader) 1800 (2): 234. 1802.

Buchanania lanzan Spreng., J. Bot. (Schr.) 2: 234. 1800; Hook. f., Fl. Brit. India 2: 23. 1876; Gamble, Fl. Pres. Madras 258(184). 1918; Vajr., Fl. Palghat Dist. 136. 1990; Sivar. & P. Mathew, Fl. Nilambur 168. 1997; Chandra & Mukh.in N.P. Singh *et al.*, Fl. India 5: 443. 2000; Mohanan & Sivad., Fl. Agasthyamala 178. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 145. 2005. *Buchanania latifolia* Roxb., Fl. Ind. 2: 385. 1832. **Plate 13 l & 14a.**

Small trees; branchlets stout, rusty tomentose. Leaves simple, 18-20 x 10-12 cm, oblong, obtuse at apex, round at base, coriaceous, densely hairy below, nerves 17-19 pairs, prominent; petiole 1-1.5 cm long, stout. Panicle 15-25 cm long, terminal, branches stout, densely rusty-tomentose; flowers many, clustered, bisexual, 6-7 mm across, sessile; sepals 5, free, ovate; petals 5, ovate-oblong, glabrous; fertile stamen 1, sterile ones 4; disk densely hairy; fertile carpel 1, sterile carpels 4; style short. Drupe 1-1.5 cm long, oblong, dark, glabrous.

Flowering & Fruiting: January-April.

Distribution: India and Myanmar. Common; in moist deciduous forests. *RNMK 2773,* Muthanga.

GLUTA Linnaeus

Mant. Pl. 2: 293. 1771.

Gluta travancorica Bedd., Fl. Sylv. t. 60. 1870; Hook. f., Fl. Brit. India 2: 22. 1876; Gamble, Fl. Pres. Madras 261(186). 1918; Chandra & Mukh. in N.P. Singh *et al.*, Fl. India 5: 456. 2000; Mohanan & Sivad., Fl. Agasthyamala 179. 2002. **Plate 14b.**

Evergreen trees, to 35 m high, bark 6-8 mm thick, greyish-brown, smooth; blaze pink; exudation black, acrid. Leaves simple, alternate, crowded at the tips of branchlets, exstipulate; petiole 1-2 cm, stout, glabrous, winged; lamina 8-18 x 3.5-7 cm, elliptic-ovate, obovate-spathulate or spathulate, base cuneate or attenuate, apex obtuse, sometimes emarginate; margin entire, glabrous, coriaceous; lateral nerves 13-18 pairs, pinnate, prominent; secondary laterals prominent, intercostae reticulate, prominent. Flowers bisexual, cream coloured, 8-9 mm across, in axillary and terminal panicles; calyx spathaceous, splitting irregularly, deciduous; petals 4-6, inserted on the disc and adnate with it below, imbricate, spreading in flower; disc elongate, cylindric; stamens 4-6, inserted on the disc; filaments filiform; anthers dorsifixed; ovary obliquely ovoid, superior, sessile or stipitate, pubescent, 1-celled, 1-ovuled, pendulous; style lateral, filiform; stigma simple. Fruit a drupe, 2.5-3.5 cm across, globose, brown; pericarp thick; seed adherent to the pericarp.
Flowering & Fruiting: March-January.
Distribution: Endemic to southern Western Ghats (Kerala). Rare; in evergreen forests. *RNMK 1806,* Chanthanathodu.

HOLIGARNA Hamilton ex Roxburgh
Pl. Corom. 3: 79. 1820, *nom. cons.*

Tall trees; sap black, acrid. Leaves simple, alternate, nerves many, parallel; petiole bristled. Flowers polygamo-dioecious, in terminal or axillary large panicles; sepals 4 or 5, united into a cup, 4 or 5-toothed; petals 4 or 5, ovate, densely hairy inside; stamens 5, free, outside the disk; ovary in female flowers 1-celled, inferior; styles 3, free; stigma capitate. Fruit a compressed drupe, enclosed in a hypocarp at base; seed one.

1. Leaves tomentose below; bristles on petiole 2-3 pairs ..... **H. grahamii**
1. Leaves glabrous below; bristles on petiole 1 pair.....2
2. Leaves obtusely acute at apex; drupe ellipsoid with a tuft of brown hairs at apex..... .....**H. arnottiana**
2. Leaves emarginate at apex; drupe obovoid, without tuft of hairs at apex.....3
3. Leaves oblanceolate; petals obtuse ..... **H. ferruginea**
3. Leaves spathulate; petals acute ..... **H. nigra**

Holigarna arnottiana Hook. f., Fl. Brit. India 2: 36. 1876; Gamble, Fl. Pres. Madras 268(191). 1918; Manilal & Sivar., Fl. Calicut 73. 1982; Ansari, Fl. Kasaragod Div. 110. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 116. 1988; Vajr., Fl. Palghat Dist. 136. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 121. 1996; Sivar. & P. Mathew, Fl. Nilambur 169. 1997; Chandra & Mukh. in N.P. Singh *et al.*, Fl. India 5: 457. 2000; Mohanan & Sivad., Fl. Agasthyamala 179. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 146. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 188. 2009.

Trees to 20 m high; branches stout, glabrous. Leaves 14-20 x 3-6 cm, oblanceolate, obtusely acute at apex, attenuate at base, nerves 12-20 pairs,

brown beneath; petiole 1-1.5 cm long, pubescent; bristle one on either side. Panicle 10-15 cm long, terminal; flowers yellowish white, many; branches and pedicels puberulus; petals 5, ovate, acute, hirsute outside. Drupe 1.5-2 cm long, obovoid-oblong, apex with a crown of golden brown hairs.
Flowering & Fruiting: January-July.
Distribution: Endemic to southern Western Ghats. Common; in evergreen and semi-evergreen forests. *RNMK 1335,* Vythiri; *RNMK 2995,* Manikkunnumala.

Holigarna ferruginea Marchand, Rev. Anacard. 171. 1868; Hook. f., Fl. Brit. India 2: 37. 1876; Gamble, Fl. Pres. Madras 268(191). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 117. 1988; Chandra & Mukh. in N.P. Singh *et al.*, Fl. India 5: 459. 2000.

Trees, to 25 m or more high; bark white, smooth. Leaves 13-15 x 5-7 cm, oblanceolate, obtuse, to emarginate, olive brown below when dried; nerves 7-10 pairs; petiole 1.5-2.5 cm long, bristles 1or 2, short. Panicles 10-13 cm long, terminal; branches thick, dark purple-tomentose; flowers 3-5 mm across, densely dark purple-tomentose; petals rose, ovate, obtuse. Drupe 2.5-3 cm long, obovoid, obtuse, narrowed to the base, glabrous.
Flowering & Fruiting: April-May.
Distribution: Endemic to southern Western Ghats. Common; in evergreen forests. *RNMK 3205,* Kunchome; *RNMK 2859,* Thariodu.

Holigarna grahamii (Wight) Kurz, J. Asiat. Soc. Bengal 42: 305. 1872; Hook. f., Fl. Brit. India 2: 37. 1876; Gamble, Fl. Pres. Madras 268(191). 1918; Vajr., Fl. Palghat Dist. 136. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 121. 1996; Chandra & Mukh. in N.P. Singh *et al.*, Fl. India 5: 460. 2000; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 146. 2005. *Semecarpus grahamii* Wight, Ic. t. 235. 1839. *Holigarna wightii* Balakr., J. Bombay Nat. Hist. Soc. 63: 327. 1966.

Trees, to 30 m high; sap very acrid; branchlets stout; densely fulvous-tomentose. Leaves 40-50 x 20-25 cm, oblanceolate, suddenly widening above the middle, glabrous above, densely golden brown tomentose below, nerves more then 30 pairs, prominent, regular, parallel. Panicle 20-35 cm long, terminal, densely fulvous-hairy; flowers many, sessile; sepals cupular, 4 or 5-toothed; petals dull white, densely hairy; filaments glabrous. Drupe 0.5-1 cm,oblicaly ovoid vertically shallowly grooved, reddish purple.
Flowering & Fruiting: October-March.
Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 3117,* Vythiri; *RNMK 1602*, Puliyarmala.

Holigarna nigra Bourd., Indian J. For. 30: 95. 1904; Gamble, Fl. Pres. Madras 268(191). 1918; Manilal, Fl. Silent Valley 66. 1988; Vajr., Fl. Palghat Dist. 137. 1990; Chandra & Mukh. in N.P. Singh *et al.*, Fl. India 5: 462. 2000; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta Dist. 146. 2005.

Medium trees. Leaves 10-15 x 3-5 cm, spathulate, apex rounded, base cuneate. Racemes 12-15 cm long, sparsely branched, densely brown fulvous tomentose; flowers sessile, 7-9 mm across, hairy. Drupe to 3-4 cm long, obovoid, glabrous.

Flowering & Fruiting: March-May.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 1377,* Kurichiarmala.

LANNEA A. Richard

in J.B.A. Guillemin *et al.,*

Fl. Seneg. Tent. 153. 1831, *nom. cons.*

Lannea coromandelica (Houtt.) Merr., J. Arnold Arbor. 19: 353. 1938; Manilal & Sivar., Fl. Calicut 72. 1982; Ansari, Fl. Kasaragod Div. 110. 1985; Manilal, Fl. Silent Valley 66. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 48. 1988; Vajr., Fl. Palghat Dist. 137. 1990; V. S. Ramach. & V. J. Nair, Fl. Cannanore 117. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 122. 1996; Chandra & Mukh. in N.P. Singh *et al.,* Fl. India 5: 463. 2000; Mohanan & Sivad., Fl. Agasthyamala 180. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 146. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 189. 2009. *Dialium coromandelicum* Houtt., Nat. Hist. ser. 2. 2: 39. t. 5. f. 2. 1774. *Odina wodier* Roxb., Fl. Ind. 2: 293. 1832; Hook. f., Fl. Brit. India 2: 29. 1876; Gamble, Fl. Pres. Madras 263(187). 1918. *Kalesjam* Rheede, Hort. Malab. 4: 67-68, t.32. 1683.

Small deciduous trees, to 10 m high; bark white outside, reddish inside; branches weak, glabrous. Leaves pinnate; leaflets opposite, 4-5 pairs, 8-10 x 4-5 cm, ovate, lanceolate, glabrous. Panicle ca. 15 x 15 cm, terminal, stellate-hairy; flowers clustered, unisexual, monoecious, 4-5 mm across; sepals 4, ovate, acute, spreading; petals 4, obovate, obtuse; stamens 8-10 in male flowers, free, all fertile; filaments glabrous; ovary 1-celled, ovule solitary. Fruit a drupe, 0.5-1 cm long, glabrous.

Flowering & Fruiting: January-May.

Distribution: Indo-Malesia and China. Common; in evergreen and moist deciduous forests. *RNMK 1755,* Talimala; *RNMK 2207,* Pathiri.

MANGIFERA Linnaeus

Sp. Pl. 200. 1753.

Mangifera indica L., Sp. Pl. 200. 1753; Hook. f., Fl. Brit. India 2: 13. 1876; Gamble, Fl. Pres. Madras 259(185). 1918; Manilal & Sivar., Fl. Calicut 73. 1982; Ansari, Fl. Kasaragod Div. 111. 1985; Manilal, Fl. Silent Valley 67. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 48. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore. 117. 1988; Vajr., Fl. Palghat Dist. 138. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 122. 1996; Sivar. & P. Mathew, Fl. Nilambur 169. 1997; Chandra & Mukh. in N.P. Singh *et al.*, Fl. India 5: 466. 2000; Mohanan & Sivad., Fl. Agasthyamala 181. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 147. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 190. 2009. *Mavu* Rheede, Hort. Malab. 4:1-4, t. 1-2. 1683.

Trees, to 20 m high; bark rough with vertical fissures. Leaves alternate, usually clustered towards the apex, 20-22 x 4-5 cm, oblong, acute at either ends, coriaceous; nerves 27-30, parallel; petiole ca. 2 cm long. Panicles usually terminal, ca. 20 x 10 cm, densely hispid; flowers many, unisexual, 7-8 mm across; sepals triangular; petals dull yellow, oblong, curved; fertile stamens 1; ovary 1-celled, ovule solitary; style lateral. Drupe oblong, mesocarp fleshy; endocarp fibrous; seed sub-reniform.
Flowering & Fruiting: January-May.
Distribution: Indo-Malesia. Common; in evergreen and moist deciduous forests. *RNMK 1533,* Chembra; *RNMK 2266,* Muthanga.

NOTHOPEGIA Blume
Mus. Bot. 1: 203. 1850, *nom. cons.*

Trees or shrubs. Leaves alternate, entire, glaucous below nerves many, parallel, close. Flowers polygamous, in short axillary racemes, fascicles or panicles, sessile or pedicellate; sepals 4, free, imbricate; petals 4, free, spreading; stamens 4, outside the disk, all fertile; ovary 1-celled, 1-ovuled; style terminal; stigma capitate. Fruit a globose or depressed globose, drupe, vertically striate.

1. Leaves rusty villous..... **N. travancorica**
1. Leaves glabrous 2
2. Terminal branchlets pubescent..... 3
2. Terminal branchlets glabrous 4
3. Petioles stout; nerves 12-15 pairs ..... **N. colebrookiana**
3. Petiole slender; nerves 15-25 pairs ..... **N. heyneana**
4. Petiole twisted; nerves distinct ..... **N. racemosa**
5. Petiole straight; nerves obscure ..... **N. beddomei**

Nothopegia beddomei Gamble in Bull. Misc. Inform. Kew 227. 1918 & Fl. Pres. Madras 265(189). 1918; Manilal, Fl. Silent Valley 67. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 119. 1988; Vajr., Fl. Palghat Dist. 138. 1990; Dali & Mukh. in N.P. Singh *et al.*, Fl. India 5: 473. 2000; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 147. 2005. *Nothopegia colebrookiana* sensu Hook.f. Fl. Brit. India. 2: 40. 1876p.p., non Bl. 1851; Bedd. Fl. Sylv. t. 164. 1871. *Nothopegia beddomei* Gamble var. *wynaadica* Ellis & Chandras. In Bull. Bot. Surv. India 12: 257. 1970.

Small trees up to 3.5 m tall. Leaves 7-12 x 1.5-3.5, lanceolate, base cuneate, acuminate at apex, margin undulate; lateral nerves 18-20 pairs, raised below, thin coriaceaous. Racemes axillary, 2-3 cm long; flowers 4-5 mm across; calyx lobes triangular; petals bright yellow. Drupe subglobose, apiculate, glabrous.
Flowering & Fruiting: April-July.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3006,* Brahmagiri.

Nothopegia colebrookeana (Wight) Bl. Mus. Bot. Lugd.-Bat 1: 203. 1850; Hook. f., Fl. Brit. India 2: 40. 1876; Gamble, Fl. Pres. Madras 265(189). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 118. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 124. 1996; Chandra & Mukh. in N.P. Singh *et al.*, Fl. India 5: 474. 2000. *Pegia colebrookeana* Wight, Ic. t. 230. 1839.

Trees to 5 m high; branchlets dark, lenticellate. Leaves 7-12 x 2.5-4 cm, obovate, attenuate at base, shining above, pale white beneath; nerves 19-21 pairs, regular; petiole 1-1.5 cm long. Panicle 5-6 cm long, conjested, rusty tomentose; flowers 2-3 mm across, densely rusty-tomentose; sepals 4, ovate, acute; petals oblong, puberulus inside, densely tomentose outside; stamens 4, filaments glabrous. Drupe 1-1.5 cm cm across, ovoid, acute, black.

Flowering & Fruiting: March-May.

Distribution: South India and Sri Lanka. Rare; in evergreen forests. *RNMK 1680,* Theethundamala.

Nothopegia heyneana (Hook. f.) Gamble, Fl. Pres. Madras 265(189). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore. 119. 1988; Chandra & Mukh. in N.P. Singh *et al.,* Fl. India 5: 476. 2000. *Nothopegia colebrookeana* (Wight) Bl. var. *heyneana* Hook. f., Fl. Brit. India 2: 40. 1876.

Shrubs, branchlets slender. Leaves 9-13 x 2-4 cm, oblong, acute at apex and base, brown when dried; nerves 18-20 pairs; intercostae irregular; petiole 4-5 mm long. Raceme axillary; flowers 5-6 mm across; sepals 4, triangular, glabrous; petals oblong, acute, glabrous; stamens 4, filaments erect; ovary conical; stigma capitate. Drupes 0.7-1 cm in diameter, compressed.

Flowering & Fruiting: May-June.

Distribution: Endemic to Western Ghats. Rare; in evergreen forests. *RNMK 2335,* Makkimala; *RNMK 3109*, Brahmagiri.

Nothopegia racemosa (Dalz.) Ramam. in Sald. & Nicols. Fl. Hassan Dist. 377. 1976; Manilal, Fl. Silent Valley 67. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore. 119. 1988; Vajr., Fl. Palghat Dist. 138. 1990; Chandra & Mukh. in N.P. Singh *et al.*, Fl. India 5: 476. 2000. *Glycycarpus racemosus* Dalz., J. Asiat. Soc. Bombay 3: 69. 1849. *Nothopegia dalzellii* Gamble, Fl. Pres. Madras 265(189). 1918. *Nothopegia colebrookeana* sensu Hook. f., Fl. Brit. India 2:40.1876 p.p., non (Wight) Bl. 1850.

Trees, to 10 m high; branchlets thinly tomentose. Leaves 30-32 x 8-10 cm, oblanceolate, abruptly long-acuminate at apex; nerves 30-44 pairs, very prominent below, intercostae regular, brown beneath, grey above; petiole 2-3 cm long. Panicles congested; flowers subsessile, 5-6 mm across; sepals triangular; petals obovate, white with reddish nerves; stamens 4, filaments hairy. Drupes compressed.

Flowering & Fruiting: May-June.

Distribution: Endemic to Western Ghats. Rare; in evergreen forests. *RNMK 2409,* Brahmagiri.

Nothopegia travancorica Bedd. ex Hook. f., Fl. Brit. India 2: 40. 1876; Gamble, Fl. Pres. Madras 265(189). 1918; Ansari, Fl. Kasaragod Div. 111. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 119. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 124. 1996; Chandra & Mukh. in N.P. Singh *et al.*, Fl. India 5: 477. 2000; Mohanan & Sivad., Fl. Agasthyamala 184. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 148. 2005.

Shrubs; branchlets lenticellate, ferrugineous tomentose. Leaves 14-18 x 4–5 cm, elliptic-oblong, obtusely acuminate at apex, nerves 15-17 pairs, prominent; yellow; intercostae regular, closely parallel; petiole 1-1.5 cm long, curved. Flowers in axillary fascicles, 2-3 together; calyx ferrugineous tomentose; petals ovate, acute, hairy inside, ciliate. Drupes 1-1.5 cm long, compressed.

Flowering & Fruiting: December-May.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 3266,* Vythiri; *RNMK 2771,* Chanthanathodu.

SEMECARPUS Linnaeus

Suppl. Pl. 25, 182. 1782.

Trees. Leaves simple, entire. Flowers in terminal or axillary panicles, very small, polygamous; sepals 5, free; petals 5, free, ovate to oblong; stamens 5, inside the disk, perfect in male flowers, aborted in bisexual flowers; ovary 1-celled, globose; ovule solitary; styles 3, free; stigmas capitate. Drupe oblong, oblique, seated on a large fleshy hypocarp.

1. Leaves acute at base..... **S. anacardium**
1. Leaves auricled at base ..... **S. auriculata**

Semecarpus anacardium L. f., Suppl. Pl. 182. 1781; Wight, Prodr. 168. 1834, Ic. t.558. 1842; Hook. f., Fl. Brit. India 2: 30. 1876; Gamble, Fl. Pres. Madras 266(190). 1918; Vajr., Fl. Palghat Dist. 139. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 124. 1996; Chandra & Mukh. in N.P. Singh *et al.*, Fl. India 5: 500. 2000; Mohanan & Sivad., Fl. Agasthyamala 185. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 148. 2005. **Plate 14c.**

Medium sized deciduous trees, bark greyish-brown, reddish inside, young shoots sericeous. Leaves 25-30 x 10-15 cm, oblong-elliptic or obovate, apex emarginate or retuse, base acute, lateral nerves 10-15 pairs, intercostae reticulate; petiole ca. 4-5 cm long. Panicles to 20 cm long; flowers yellowish white; calyx lobes ovate, margins ciliate; disc villous; filaments glabrous.

Flowering & Fruiting: February-April.

Distribution: Africa, Indo-Malesia, China and Australia. Rare; in moist deciduous forests. *RNMK 2104,* Kuruva.

Semecarpus auriculata Bedd., Ic. T. 187. 1868-1874 ; Hook. f., Fl. Brit. India 2:32. 1876; Gamble, Fl. Pres. Madras 267. 1918; Vajr., Fl. Palghat Dist. 139.

1990; Chandra & Mukh. in N.P. Singh *et al.*, Fl. India 5: 500. 2000; Mohanan & Sivad., Fl. Agasthyamala 185. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 148. 2005. **Plate 14d.**

Small trees. Leaves oblanceolate, ca. 18 x 5 cm, base attenuate-auricled, apex shortly acuminate, thin coriaceaous. Panicle slender, to 25 cm long; flowers minute; caly-lobes 5, small; petals 5, greenish; ovary glabrous. Hypocarp smaller than drupe.

Flowering & Fruiting: December-April.

Distribution: Western Peninsular India. Rare; in evergreen forests. *RNMK 2016,* Kunchome.

SOLENOCARPUS Wight & Arnott

Prodr. 171. 1834.

Solenocarpus indicus Wight & Arn., Prodr. 172. 1834; Hook. f., Fl. Brit. India 2: 27. 1876; Gamble, Fl. Pres. Madras 262(187). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore. 120. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 125. 1996; Chandra & Mukh. in N.P. Singh *et al.*, Fl. India 5: 505. 2000. *Spondias indica* (Wight & Arn.) Airy Shaw & Forman, Kew Bull. 21: 16. 1967-1968; Manilal, Fl. Silent Valley 68. 1988; Vajr., Fl. Palghat Dist. 139. 1990; Sivar. & P. Mathew, Fl. Nilambur 171. 1997; Mohanan & Sivad., Fl. Agasthyamala 186. 2002. **Plate 14e.**

Small trees, sometimes epiphytic; bark brown, rough; branchlets slender. Leaves pinnately compound; leaflets 6-8 pairs, opposite or subopposite, 6-9 x 2-4 cm, ovate-lanceolate, acuminate, sessile, many-nerved, base obliquely cordate. Panicle ca. 20 x 20 cm, axillary or terminal, spreading; flowers many, bisexual, yellowish, 3-4 mm across; calyx 5-lobed, lobes small, imbricate; petals 5, ovate, white; stamens 10, inserted outside the disk; ovary sessile, uni-locular; ovule solitary, pendulous. Drupe 6-8 x 4-5 mm, obovoid, smooth, yellowish.

Flowering & Fruiting: March-May.

Distribution: Endemic to southern Western Ghats. Rare; in semi-evergreen forest. *RNMK 0890,* Varayal.

SPONDIAS Linnaeus

Sp. Pl. 371. 1753.

Spondias pinnata (L. f.) Kurz, Prelim. Rep. For. & Veg. Pegu Append. A.44. & B.42. 1875; Airy Shaw & Forman, Kew Bull. 21:8. 1967; Manilal & Sivar., Fl. Calicut 72. 1982; Ansari, Fl. Kasaragod Div. 111. 1985; Vajr., Fl. Palghat Dist. 139. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 125. 1996; Sivar. & P. Mathew, Fl. Nilambur 171. 1997; Chandra & Mukh. in N.P. Singh *et al.*, Fl. India 5: 507. 2000; Mohanan & Sivad., Fl. Agasthyamala 186. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 149. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 190. 2009. *Mangifera pinnata* L. f., Suppl. Pl. 156. 1781. *Spondias mangifera* Willd., Sp. Pl. 2: 751. 1799; Hook. f., Fl. Brit. India 2: 42. 1876; Gamble, Fl. Pres. Madras 261(186). 1918.

Trees, to 30 m high; bark yields a gum; branchlets stout, white. Leaves pinnate; leaflets 8-10 x 3-4 cm, opposite, oblong-acuminate; many-nerved, nerves parallel, forming an intramarginal vein. Panicle ca. 25 x 20 cm, terminal, glabrous; flowers 5-6 mm across, sessile; sepals 5, triangular; petals 5, oblong, glabrous; fertile stamen 1, staminodes 9; ovary 4-5-celled; ovule 1 in each cell; styles 4 or 5. Drupe 3.5-4 x 2-2.5 cm, ovoid-oblong, smooth.
Flowering & Fruiting: March-December.
Distribution: Indo-Malesia. Occasional; in moist deciduous forests. *RNMK 0987,* Muthanga.

Anacardium occidentale L. is occassionally raised in plantations in Manathavady area

CONNARACEAE R. Br.

in Tuckey, Narr. Exped. Zaire 431. 1818.

1. Calyx enlarged in fruit; follicle sessile ..... **Rourea**
1. Calyx not enlarged in fruit; follicle stipitata ..... **Connarus**

CONNARUS Linnaeus

Sp. Pl. 675. 1753.

Woody climbers. Leaves imparipinnate, 3-7-foliolate, leaflets entire. Flowers in terminal or axillary panicles, pedicelled; sepals 5, connate at base; petals 5, linear-oblong, broaden above; stamens 10, free, filaments alternatively longer and shorter, anthers oblong, deeply lobed at base; carpels 5, 4-sterile; style 1, slender, stigma capitate; ovules solitary. Fruit an inflated follicle; seeds one, arillate at base.

1. Leaves 7-foliolate ..... **C. wightii**
1. Leaves 5-foliolate 2
2. Leaflets with venation prominently reticulate, glabrous ..... **C. paniculatus**
2. Leaflets faintly reticulate, tomentose along the nerves below..... **C. monocarpus**

Connarus monocarpus L., Sp. Pl. 675. 1753; Hook. f., Fl. Brit. India 2: 50. 1876; Gamble, Fl. Pres. Madras 272(194). 1918; Manilal & Sivar., Fl. Calicut 74. 1982; Vajr., Fl. Palghat Dist. 141. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 126. 1996; Mondal in N.P. Singh *et al.*, Fl. India 5: 526. 2000; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 149. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 192. 2009.

Large climbing shrubs; branchlets glabrous. Leaflets 5-9 x 3-4 cm, ovate, obtusely acuminate; nerves 5-7 pairs, reddish brown beneath; petiole 7-8 mm long. Panicles ca. 15 x 10 cm, terminal, branches fulvous-tomentose; flowers many; pedicels hispid; sepals oblong, obtuse, hispid outside; petals 8-9 mm, acute, hispid outside; filaments glandular-hairy; ovary densely hairy. Capsule 5-6 cm, biconvex, stipitate, reddish, glabrous inside; seeds polished.

Flowering & Fruiting: April-June.
Distribution: Peninsular India and Sri Lanka. Occasional; in moist deciduous forests. *RNMK 2688,* Tholpetty.

Connarus paniculatus Roxb., Fl. Ind. 3: 139. 1832; Hook. f., Fl. Brit. India 2:52.1876; Gamble, Fl. Pres. Madras 273(194). 1918; Manilal, Fl. Silent Valley 68. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 120. 1988; Mondal in N.P. Singh *et al.*, Fl. India 5: 529. 2000.

Large lianas; bark rough. Leaves imparipinnate, 5-foliolate, glabrous; leaflets oblong to lanceolate, 10-16 x 3.5-6 cm, apex blunt to obtusely acuminate, base rounded; nerves 5-6 pairs, curved; petiolules 0.5-0.6 cm long; panicles pyramidal, up to 30 cm long, densely rusty tomentose, glabrescent; sepals 3-4 x 1-1.5 cm, elliptic to obovate, obtuse; petals lanceolate-spathulate, obtuse; stamens united at the base. Follicles 3-4 x 1-1.5 cm, ovoid, slightly compressed, narrowed at base.
Flowering & Fruiting: October-May.
Distribution: India, Bangladesh, Indo-China and Malaya Peninsula. Occasional; in evergreen forests. *RNMK 3397,* Chanthanathodu.

Connarus wightii Hook. f., Fl. Brit. India 2: 51. 1876; Gamble, Fl. Pres. Madras 272(194). 1918; Manilal, Fl. Silent Valley 68. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 120. 1988; Vajr., Fl. Palghat Dist. 141. 1990; Sivar. & P. Mathew, Fl. Nilambur 172. 1997; Mondal in N.P. Singh *et al.,* Fl. India 5: 532. 2000; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 151. 2005. *Connarus ritchiei* Hook. f., Fl. Brit. India 2: 51. 1876; Gamble, Fl. Pres. Madras 273(194). 1918.

Large climbing shrubs. Leaflets 15-17 x 5-6 cm, elliptic-oblong, abruptly acuminate, rounded at base; nerves 5-6 pairs, reticulate; petiole 6-7 mm long, transversally rugose. Panicle 18-23 cm long, axillary on old branches, ferrugineous hairy; flowers subsessile, few-together; sepals 2.5-3 mm long, hispid; petals 4.5-5 mm, oblanceolate, puberulus outside; filaments unequal; fertile one ca. 2 mm long; ovary densely hairy.
Flowering & Fruiting: March-May.
Distribution: Endemic to Western Ghats. Rare; in evergreen forests. *RNMK 2448,* Vduvanchal; *RNMK 1008,* Mundakai.

ROUREA Aublet
Hist. Pl. Guiane 1: 467. 1775.

Rourea minor (Gaertn.) Merr., Interpr. Rumph. Herb. Amboin. 413. 1917; Manilal & Sivar., Fl. Calicut 74. 1982; Ansari, Fl. Kasaragod Div. 113. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore. 120. 1988; Vajr., Fl. Palghat Dist. 141. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 126. 1996; Mondal in N.P. Singh *et al.*, Fl. India 5: 538. 2000; Mohanan & Sivad., Fl. Agasthyamala 188. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 151. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 192. 2009. *Aegiceras minor* Gaertn., Fruct. 1:

216. t.46. 1788. *Rourea santaloides* (Vahl) Wight & Arn., Prodr. 144. 1834; Hook. f., Fl. Brit. India 2: 47. 1876; Gamble, Fl. Pres. Madras 271(193). 1918. *Connarus santaloides* Vahl, Symb. Bot. 4: 87. 1794.

Lianas, bark brown, smooth; branchlets slender. Leaflets 5-9, 5-6 x 2-3 cm; elliptic-lanceolate or elliptic, caudate-acuminate, base rounded, glabrous, lateral veins and reticulations prominent. Follicle ovoid, orange-yellow, to 2 cm long; aril yellow.

Flowering & Fruiting: December-August.

Distribution: India, Sri Lanka, Bangladesh and Malesia. Occasional; in evergreen and moist deciduous forests: *RNMK 0766,* Vythiri; *RNMK 3305,* Muthanga.

FABACEAE Lindl.

Intr. Nat. Syst. Bot., ed. 2:148.1836.

Key to subfamilies

1. Flowers actinomorphic; petals valvate in bud; stamens usually indefinite..... ..... **Mimosoideae**
1. Flowers zygomorphic; petals imbricate or zero; stamens definite, 10 or fewer **2**
2. Corolla papilionaceous, aestivation imbricate-descending..... **Faboideae**
2. Corolla caesalpiniaceaous, aestivation imbricate-ascending..... **Caesalpinioideae**

Subfamily **FABOIDEAE (PAPILIONOIDEAE)**

1. Leaves paripinnate..... 2
1. Leaves simple or imparipinnate (3-many foliolate) 5
2. Shruby climbers; stamens 9; leaflets 9-14 pairs ..... **Abrus**
2. Erect or diffuse herbs; stamens 10; leaflets 2-8 pairs 3
3. Flowers and pods concealed by closely imbricating, reniform, ciliate, persistent bracts; pods 1-2 jointed ..... **Geissaspis**
3. Flowers and pods not concealed; bracts not as above; pods 2-6 jointed 4
4. Bracts peltate, glandular-punctate; calyx not 2-lipped; stamens 9+1; leaflets 1 pair, gland-dotted ..... **Zornia**
4. Bracts basifixed, not glandular-punctate; calyx 2-lipped; stamens 5+5; leaflets 2-8 pairs, not gland-dotted..... **Smithia**
5. Trees 6
5. Herbs, undershrubs or shrubs; prostrate, erect or twining 10
6. Leaves 3-foliolate; flowers orange-red or bright red 7
6. Leaves 5 or more foliolate; flowers other than reddish..... 8
7. Stem with prickles; standard much exceeding other petals; fruits generally 2-8 seeded ..... **Erythrina**
7. Stem without prickles; standard equalling other petals; fruits 1-seeded..... **Butea**
8. Leaflets alternate; pods not woody 9
8. Leaflets opposite; pods woody..... **Pongamia**

9. Flowers yellow; pods orbicular with a broad circular wing ..... **Pterocarpus**
9. Flowers white; pods oblong or elliptic-oblong, not winged ..... **Dalbergia** (p.p)
10. Pods tomentose, 1-many articulate, usually breaking into 1-seeded articles at maturity 11
10. Pods not articulated, dehiscent or indehiscent.....15
11. Leaves with 9-many leaflets; stamens 5+5 12
11. Leaves simple or 3-foliolate; stamens 9+1 or monadelphous 13
12. Leaflets 20 or more pairs; stipule peltate; calyx 2-lipped; joints of pod smooth ....**Aeschynomene**
12. Leaflets 9-13; stipule not peltate; calyx 5-toothed; joints of pod prickly .. **Ormocarpum**
13. Pod twisted, joints come face to face, enclosed in the calyx.....**Uraria**
13. Pod not twisted and enclosed in calyx.....14
14. Calyx scarious; joints of pod turgid; leaves 1-foliolate .....**Alysicarpus**
14. Calyx not scarious; joints of pod flat; leaves 3-foliolate, if 1-foliolate then the petiole winged..... **Desmodium**
15. Pubescence of medifixed hairs; anthers apiculate ..... **Indigofera**
15. Pubescence of basifixed hairs or absent; anthers not apiculate.....16
16. Leaves 1-3 foliolate 17
16. Leaves 5-many foliolate 37
17. Pod with oblique or transverse lines between seeds; leaves gland-dotted beneath .....**Cajanus**
17. Pod without oblique or transverse lines between seeds; leaves gland-dotted or not ... 18
18. Climbers.....19
18. Erect or prostrate herbs or shrubs 31
19. Pods conspicuously hooked at the apex by the persistent style; alternate stamens sterile ..... **Teramnus**
19. Pods not hooked at the apex; all stamens fertile 20
20. Leaves scattered, glandular below; corolla included within calyx ..... **Paracalyx**
20. Leaves not glandular below; corolla much exserted from calyx.....21
21. Style bearded below the stigma.....22
21. Style not bearded below the stigma 24
22. Standard appendaged at back; pods with 4 raised ribs near margins, apical horn to 1 cm long, pointed, calyx faintly spurred ..... **Centrosema**
22. Standard appendaged within; pods without raised ribs near margins, apical horn absent or very short; calyx not spurred 23
23. Stigma oblique; stylar hairs lateral ..... **Vigna**
23. Stigma terminal; stylar hairs at apex..... **Dolichos**
24. Stamens 10, monadelphous 25
24. Stamens 9+1, diadelphous 27
25. Nodes of racemes swollen; flowers pink or bluish-purple 26
25. Nodes of racemes not swollen; flowers white.....**Neonotonia**
26. Pods ribbed on upper suture, glabrous; standard appendaged .....**Canavalia**
26. Pods not ribbed on upper suture, hairy or glabrescent; standard unappendaged..... .....**Pueraria**

27. Flowers in pendulous racemes; standard about half the length of the wings; anthers dimorphic, alternately dorsifixed ..... **Mucuna**
27. Flowers not in pendulous racemes; petals nearly equal in length; anthers uniform 28
28. Nodes of raceme swollen; pods 1-seeded, indehiscent ..... **Spatholobus**
28. Nodes of raceme not swollen; pods 2 or more seeded, dehiscent 29
29. Calyx obliquely truncate, teeth indistinct; style dilated above the middle .. **Dumasia**
29. Calyx not truncate, teeth distinct; style uniform 30
30. Calyx-lobes setaceous, all free; pod cylindric, obscurely angled, straight .... **Calopogonium**
30. Calyx-lobes ovate, upper ones connate; pod linear, flat, recurved ..... **Shuteria**
31. Leaves scattered glandular below; pods 1-2 seeded 32
31. Leaves not scattered glandular; pods 4 or more seeded 34
32. Leaves unifoliolate; margins dentate; pod indehiscent, 1-seeded ..... **Psoralea**
32. Leaves 3-foliolate, if unifoliolate then flowers hidden within a large folded persistent floral bract; margins not dentate; pod dehiscent, 2-seeded 33
33. Pod compressed ..... **Rhynchosia**
33. Pod turgid ..... **Flemingia**
34. Pod inflated, turgid 35
34. Pod flat, compressed 36
35. Stamens 10, monadelphous; anthers dimorphous; flowers usually yellow, sometimes blue or white ..... **Crotalaria** (p.p)
35. Stamens diadelphous, 9+1; anthers uniform; flowers pink ..... **Pycnospora**
36. Pod viscid-pubescent; stamens diadelphous, 9 and 1 ..... **Pseudarthria**
36. Pod not viscid-pubescent; stamens 10, monadelphous ..... **Rothia**
37. Erect or prostrate herbs, subshrubs or shrubs 38
37. Climbing shrubs 39
38. Leaves digitately 5-foliolate; leaflets with netted venation; pod inflated, turgid; anthers dimorphic; flowers yellow ..... **Crotalaria** (p.p)
38. Leaves imparipinnate; leaflets with parallel venation; pod flattened, not inflated; anthers uniform; flowers not yellow ..... **Tephrosia**
39. Leaflets alternate ..... **Dalbergia**
39. Leaflets opposite 40
40. Leaf lamina rugose; vexillary stamen adnate to the base of standard petal; flowers dark purple ..... **Kunstleria**
40. Leaf lamina not rugose; vexillary stamen free at base; flowers white, pinkish-white or cream coloured 41
41. Stamens diadelphous (9+1); wing petals not adherent to keel in lower half ..... **Aganope**
41. Stamens monadelphous; wing petals adherent to keel in lower half ..... **Derris**

ABRUS Adanson

Fam. 2: 327, 511. 1763.

Straggling herbs or shrubs. Leaves paripinnate; leaflets opposite, sub-sessile. Inflorescence an axillary or terminal racemes or pseudoracemes.

Flowers clustered at the nodes on rachis, zygomorphic; bracts deciduous, bracteoles adpressed to the calyx; calyx truncate at apex; petals shortly clawed; stamens 9, connate into a sheath, sheath split above; anthers uniform; ovary subsessile; ovules many. Pods flat; seeds globose or compressed, brightly coloured or black.

1. Leaflets 1.5-3 cm long; pods 4-6 cm long; seeds dark red with black top,rounded ....**A. precatorius**
1. Leaflets 3-4 cm long; pods 7-10 cm long; seeds dark brown or balck, compressed..... ..... **A. pulchellus**

Abrus precatorius L., Syst. Nat. (ed. 12) 2: 472.1767; Roxb., Fl. Ind. 3:257. 1832; Baker in Hook. f., Fl. Brit. India 2:175.1876; Gamble, Fl. Pres. Madras 349(247). 1918; Ansari, Fl. Kasaragod Div. 115. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 119. 1988; Vajr., Fl. Palghat Dist. 145. 1990; Sanjappa, Leg. India 74. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 129. 1996; Sivar. & P. Mathew, Fl. Nilambur 173. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 155. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 196. 2009. *Glycine abrus* L., Sp. Pl. 753. 1753. *Kunni* Rheede, Hort. Malab. 8:71-72, t. 39. 1688.

Twining herbs, branchlets glabrous. Leaves 8-10 cm long; leaflets 9-14 pairs, 2-3 x 0.8-1 cm, oblong, apex obtuse, chartaceous, terminal leaflets larger; stipule lanceolate, deflexed. Flowers crowded in short tubercles, on long axillary raceme; calyx cupular; petals 0.7-1 cm long, mauve, standard obovate; wings falcate, clawed; keel oblong; ovary densely hairy. Pods 5-7 x 0.8-1 cm, oblong, slightly curved, compressed, glabrous; seeds many, dark red with black top.

Flowering & Fruiting: October-May.

Distribution: Pantropical. Occasional; in moist deciduous forests. *RNMK 3196,* Pulpally.

Abrus pulchellus Wall. ex Thw., Enum. Pl. Zeyl. 91. 1859; Baker in Hook. f., Fl. Brit. India 2: 175. 1876; Gamble, Fl. Pres. Madras 350(247). 1918; Manilal & Sivar., Fl. Calicut 83. 1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore124. 1988; Sanjappa, Leg. India 74. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 129. 1996; Sivar. & P. Mathew, Fl. Nilambur 174. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 155. 2005.

Twining herbs, stem slender, glabrous. Leaves paripinnate, leaflets opposite, 9-11 pairs, 3-4 x 1-1.5 cm, oblong, obtuse, chartaceous, terminal leaflets larger; stipule lanceolate, deflexed. Flowers in few flowered axillary raceme; calyx cupular, hispid; petals ca. 1 cm long, pink; ovary densely hairy. Pods 7-10 x 1 cm, oblong, compressed, glabrous; seeds many, dark brown.

Flowering & Fruiting: October-March.

Distribution: Indo-Malesia and China. Occasional; in semi-evergreen forests. *RNMK* 3136, Manikkunnumala.

AESCHYNOMENE Linnaeus

Sp. Pl. 713. 1753.

Aeschynomene indica L., Sp. Pl. 713. 1753; Baker in Hook. f., Fl. Brit. India 2: 151. 1876; Gamble, Fl. Pres. Madras 313(234). 1918; Manilal & Sivar., Fl. Calicut 84. 1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 124. 1988; Vajr., Fl. Palghat Dist. 145. 1990; Joseph, Aquatic Angiosp. Malabar 168. 1991; Sanjappa, Leg. India 75. 1992; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 197. 2009.

Erect glabrous herbs; stems slender, woody. Leaves 1-pinnate; leaflets 20-30 pairs, oblong, obtuse, glabrous, sessile; stipule 5-6 mm long, scarious. Flowers 2-3-together in short lateral racemes; bracts ovate; calyx 5-7 mm long, lobes oblong, obtuse; petals pink; standard obovate; wings clawed; keels acute; stamens 5 + 5; ovary stalked, 2-10-ovuled. Pods 5-6 x 0.4-0.5 cm, flat, 8-12-jointed; joints square, glabrous; seeds many, brown.

Flowering & Fruiting: August-December.

Distribution: Pantropics, probably native in southeast United States. Occasional; in moist deciduous forests. *RNMK 1923,* Bavali.

AGANOPE Miquel

Fl. Ind. Bat. Amsterdam 1: 151. 1855.

Aganope thyrsiflora (Benth.) Polhill var. **eualata** (Bedd.) Thoth. & Das, Rheedea 2: 63. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 129. 1996. *Derris thyrsiflora* Benth. var. *eualata* (Bedd.) Thoth., Bull. Bot. Surv. India 3: 195. 1961; Mohanan & Sivad., Fl. Agasthyamala 203. 2002; C.N. Sunil & Sivad., Fl. Pl. Div. Alappuzha Dist. 225. 2000. *Derris eualata* Bedd., Ic. t. 186. 1868-1874; Gamble, Fl. Pres. Madras 388(274). 1918. *Derris platyptera* Baker in Hook. f., Fl. Brit. India 2: 245. 1878. *Aganope thyrsiflora* (Benth.) Polhill, Kew Bull. 25: 270. 1971; Manilal & Sivar., Fl. Calicut 80. 1982; Ansari, Fl. Kasaragod Div. 116. 1985; Vajr., Fl. Palghat Dist. 145. 1990; Sanjappa, Leg. India 76. 1992.

Stout climbers, branches densely lenticellate. Leaves pinnately 5-9-foliolate; leaflets 9-11 x 5-6 cm, ovate-oblong, abruptly acuminate, acute or rounded at base, nerves 6-8 pairs, narrow; petioles minutely hispid. Panicle 17-20 x 6-7 cm, branches hairy; flowers many; calyx cupular, lobes obscure, thinly tomentose; petals white, standard orbicular, retuse; wings auricled; keel obovate; stamens 9 + 1, staminal sheath ca. 6 mm long; ovary densely hairy; ovules few. Pod samaroid, 6-7 x 3-3.5 cm, oblong, compressed, flat, broadly winged along one margin.

Flowering & Fruiting: March-August.

Distribution: Endemic to southern Western Ghats. Rare; in semi-evergreen forests. *RNMK 1725,* Karuvanthodu.

ALYSICARPUS Necker ex Desvaux

J. Bot. Agric. 1: 120. 1813, *nom. cons.*

Erect or prostrate herbs. Leaves 1-foliate, petioled, stipulate. Flowers in terminal raceme. Flowers paired, densely arranged, blue or pink; calyx 4-

lobed, glumaceous; petals not exerted; standard obovate to orbicular; wings obliquely oblong, adherent to the keel; keel obovate, incurved, obtuse; stamens diadelphous, vexillary stamen free, anthers uniform; ovary many-ovuled; style incurved at apex; stigma capitate. Pod fragile, many-jointed; joints terete or turgid, 1-seeded.

1. Calyx less than 5 mm long, shorter or very slightly longer than the first joint of the pod; joints reticulate ..... **A. vaginalis**
1. Calyx more than 5 mm long, much longer than the first jointof the pod; joint smooth or ribbed transversely 2
2. Joints of pod smooth, glabrous ..... **A. bupleurifolius**
2. Joints of pod strongly and closely ribbed transversely ..... **A. glumaceous**

Alysicarpus bupleurifolius (L.) DC., Prodr. 2: 352. 1825; Baker in Hook. f., Fl. Brit. India 2: 158. 1876; Gamble, Fl. Pres. Madras 338(239). 1918; Manilal & Sivar., Fl. Calicut 86. 1982; Ansari, Fl. Kasaragod Div. 117. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 121. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 124. 1988; Vajr., Fl. Palghat Dist. 146. 1990; Sanjappa, Leg. India 77. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 130. 1996; Sivar. & P. Mathew, Fl. Nilambur 188. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 156. 2005. *Hedysarum bupleurifolium* L., Sp. Pl. 745. 1753. *Nir-murri* Rheede, Hort. Malab. 9:59, t.32. 1689.

Erect herbs. Leaves 3-4 x 0.9-1 cm, oblong, acute, cordate or rounded at base, ciliate; petiole 3-4 mm long; stipule 1 cm long. Racemes 10-15 cm long, interrupted; bracts chaffy. Flowers grouped; calyx lobes ciliate at apex; petals bluish violet. Pods 2-2.3 cm long; joints reticulate, smooth.
Flowering & Fruiting: September-January.
Distribution: Indo-Malesia to Polynesia. Common; among the ground flora of moist deciduous forests. *RNMK 2032,* Chedalayam.

Alysicarpus glumaceus (Vahl) DC., Prodr. 2: 353. 1825; Sanjappa, Leg. India 78. 1992; Sivar. & P. Mathew, Fl. Nilambur 189. 1997. *Hedysarum glumaceum* Vahl, Symb. Bot.2: 106. 1791. *Hedysarum rugosum* Willd., Sp. Pl. 3: 1172. 1803. *Alysicarpus rugosus* (Willd.) DC., Prodr. 2: 353.1825; Baker in Hook. f., Fl. Brit. India 2:159.1876; Gamble, Fl. Pres. Madras 338(239). 1918; Vajr., Fl. Palghat Dist. 146. 1990.

Erect herbs, sparsely ciliate. Leaves 2.5-7.5 x 1-1.5 cm, oblong-elliptic, apex acute, mucronate, base cordate, erect pilose below; petiole ca. 1 cm, stipules 2, elliptic, acuminate, membranous. Racemes axillary and terminal, 6-7 cm, long, congested; bracts ovate; calyx deeply 4-lobed; standard petal 4-4.5 x 2-2.5 mm; staminal sheath 4-5 mm. Pod usually 1-3 jointed, 5-6 mm, transversally rugose, apex with triangular cap.
Flowering & Fruiting: September-December.
Distribution: Paleotropics. Occasional' in moist deciduous forests. *RNMK 7381,* Kuruva.

Alysicarpus vaginalis (L.) DC., Prodr. 2: 353. 1825, var. vaginalis; Baker in Hook. f., Fl. Brit. India 2: 158. 1876; Gamble, Fl. Pres. Madras 338(238). 1918; Manilal & Sivar., Fl. Calicut 86. 1982; Ansari, Fl. Kasaragod Div. 117. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 125. 1988; Vajr., Fl. Palghat Dist. 146. 1990; Sanjappa, Leg. India 81. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 130. 1996; Sivar. & P. Mathew, Fl. Nilambur 189. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 156. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 199. 2009. *Hedysarum vaginalis* L., Sp. Pl. 746. 1753. *Hedysarum cylindricum* Lamk., Encycl. 6: 400. 1805. *Alysicarpus cylindricus* (Lamk.) Desv., Ann. Linn. Soc. Paris 4: 301. 1826.

Procumbent herbs, stem glabrous. Leaves 3-4 x 1.5-2 cm, ovate, obtuse, cordate at base, thinly villous below; petiole ca. 1 cm long; stipule 1-1.5 cm long, lanceolate. Racemes 3-6 cm long, terminal; bract glabrous; flowers paired; pedicels slender; standard 5-6 mm long, pink. Pods 2-2.5 x 0.1-0.2 cm, jointed, joints 7, rectangular, minutely hooked-hairy.

Flowering & Fruiting: September-January.

Distribution: Paleotropics. Common; in moist deciduous forests. *RNMK 1278,* Baveli

BUTEA J. Konig ex Roxburgh

Asiat. Res. 3: 469. 1792 '1795' *nom. cons.*

Butea monosperma (Lamk.) Taub. in Engl. & Prantl, Naturl. Pflanzenfam. 3(3): 366. 1894; Manilal & Sivar., Fl. Calicut 90. 1982; Ansari, Fl. Kasaragod Div. 117. 1985; Manilal, Fl. Silent Valley 70. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 127. 1988; Vajr., Fl. Palghat Dist. 147. 1990; Sanjappa, Leg. India 99. 1992; Sivar. & P. Mathew, Fl. Nilambur 205. 1997; C.N. Sunil & Sivad., Fl. Pl. Div. Alappuzha Dist. 204. 2000. *Erythrina monosperma* Lamk., Encycl. 1: 391. 1785. *Butea frondosa* Koenig ex Roxb., Asiat. Res. 3: 369. 1792 & Pl. Corom. t. 21. 1795; Baker in Hook. f., Fl. Brit. India 2: 194. 1876; Gamble, Fl. Pres. Madras 357(252). 1918.

Small trees, branchlets tomentose. Leaves trifoliolate, terminal leaflet 10-14 x 12-15 cm, rhomboid-obovate, apex emarginate, pubescent on both sides when young, lateral leaflets 13-15 x 13-14 cm, oblique, obovate-oblong; petiole 10-12 cm, petiolule jointed. Racemes axillary, terminal and on old wood; flowers clustered at the node of the rachis, bright red; calyx tube ca. 1 cm, campanulate, tomentose; standard petal 4-5 x 2-2.5 cm, lanceolate, clawed; staminal tube 5-6 cm, hairy at base. Pods 14-16 x 4-5 cm, flat, tomentose.

Flowering & Fruiting: March-April.

Distribution: Tropical Asia. Occasional; in moist deciduous forests. *RNMK 1341*, Tholpetty; *RNMK 1067*, Chedalayam.

CAJANUS A. P. de Candolle

Cat. Horti Monspel. 85. 1813 *nom. cons.*

Herbs or shrubs. Leaves 3-foliolate; leaflets often with resinous dots below. Flowers axillary or terminal, racemose or paniculate; bracts large, caducous,

bracteoles absent; calyx persistent, upper 2-lobes connate; standard petal with two inflexed auricles at base, keel petals slightly incurved; stamens 9 + 1, anthers uniform; ovary sessile, 3 or more ovuled; style filiform, inflexed; stigma small. Pods septate between seeds; seeds strophiolate.

1. Erect shrubs.....2
1. Climbing herbs or shrubs.....3
2. Leaves resinous-glandular beneath; flowers in pairs, axillary; seeds with large strophiole ..... **C. lineatus**
2. Leaves not resinous-glandular beneath; flowers in terminal panicle and racemes; seeds with small strophiole ..... **C. cajan**
3. Pods not depressed outside between seeds; seeds scarcely strophiolate ... **C. heynei**
3. Pods depressed outside between seeds; seeds prominently strophiolate 4
4. Leaflets stipellate; racemes more than 12 cm long ..... **C. goensis**
4. Leaflets exstipellate; racemes less than 10 cm long.....5
5. Pods 2.5-5 cm long, 5-7 seeded, thinly white-hoary ..... **C. albicans**
5. Pods 2-2.5 cm long, 4-6 seeded, with golden spreading hairs..... **C. scarabaeoides**

Cajanus albicans (Wight & Arn.) van der Maesen, Agric. Univ. Wageningen Pap. 85-4: 55. 1985; Sanjappa, Leg. India 99. 1992. *Cantharospermum albicans* Wight & Arn., Prodr. 256. 1834 p.p. *Atylosia albicans* (Wight & Arn.) Benth. in Miq., Pl. Jungh. 243. 1852; Baker in Hook. f., Fl. Brit. India 2: 215. 1876; Gamble, Fl. Pres. Madras 369(260). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 126. 1988. *Cajanus wightii* Graham ex Wight & Arn., Prodr. 256. 1834.

Climbers; stem grey-tomentose, ridged. Leaflets 3-4 x 3-3.5 cm, obovate, obtuse, bluish-grey, tomentose, 3-ribbed from base; petiole 5-6 cm long. Racemes few-flowered; flowers 0.8-1 cm long; calyx lobes triangular, short; standard orbicular. Pods 4-5 x 1-1.2 cm, oblong, deeply impressed between seeds, densely dark-brown tomentose; seeds 7, dark brown.

Flowering & Fruiting: March-April.

Distribution: Peninsular India and Sri Lanka; Common; along margins of moist deciduous forests. *RNMK* 2040, Tholpettty.

Cajanus cajan (L.) Millsp., Publ. Field Columbian Mus. Bot. ser. Chicago 2: 53. 1900; Manilal & Sivar., Fl. Calicut 91. 1982; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 126. 1988; Vajr., Fl. Palghat Dist. 177. 1990; Sanjappa, Leg. India 100. 1992; Sivar. & P. Mathew, Fl. Nilambur 206. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 159. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 201. 2009. *Cytisus cajan* L., Sp. Pl. 739. 1753. *Cajanus indicus* Spreng., Syst. Veg. 3: 248. 1826; Baker in Hook. f., Fl. Brit. India 2: 217. 1876; Gamble, Fl. Pres. Madras 369(261). 1918. *Thora-paeru* Rheede, Hort. Malab. 6:23-24, t. 32. 1689.

Erect shrubs. Leaves 3-foliolate; leaflets elliptic-lanceolate, 4-8 x 1-2.5 cm, base cuneate, apex acute-acuminate, tomentose below. Inflorescens a terminal panicle or axillary raceme; corolla exserted, yellow; stamens 9+1; ovary subsessile. Pods linear-oblong, turgid; seeds 4-6.
Flowering & Fruiting: December-March.
Distribution: Worldwide. Occasionally run wild along way sides. *RNMK 3030,* Chooalmala.

Cajanus goensis Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 2: 264. 1850; Sanjappa, Leg. India 101. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 131. 1996. *Atylosia goensis* (Dalz.) Dalz., J. Linn. Soc. Bot. 13:186.1873; Gamble, Fl. Pres. Madras 369(260).1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 126. 1988; Vajr., Fl. Palghat Dist. 147. 1990. *Atylosia barbata* Baker in Hook.f., Fl. Brit. India 2: 216. 1876.

Climbers; stem villous. Leaflets 7-9 cm across, broadly ovate to deltoid, subglabrous, stipellate; petiole 7-8 cm long; stipule ovate, acute. Racemes 16-20 cm long, densely villous; flowers many; bracts ovate, acuminate; calyx lobes lanceolate, densely villous; standard orbicular, yellow with red lines; wings clawed, ovate; keel glabrous. Pods 3.5-4 x 0.8-1 cm, impressed between seeds, densely hairy.
Flowering & Fruiting: September-February.
Distribution: Indo-Malesia and China. Occasional; along margins of evergreen forests. *RNMK 1246,* Vythiri Ghats.

Cajanus heynei (Wight & Arn.) van der Maesen, Agric. Univ. Wageningen Pap. 85-4:129. 1985; Sanjappa, Leg. India 101. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 131. 1996. *Dunbaria heynei* Wight & Arn., Prodr. 258. 1834; Baker in Hook. f., Fl. Brit. India 2: 217. 1876; Gamble, Fl. Pres. Madras 370(261). 1918; Manilal, Fl. Silent Valley 81. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 142. 1988; Sivar. & P. Mathew, Fl. Nilambur 210. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 178. 2005.

Twining herbs, stem hairy. Leaflets obovate, apex caudate-acuminate, lateral leaflets 4-7 x 3-4.5 cm, oblique, tomentose, lateral nerves 4-5 pairs, impressed above; petiole 5-6 cm long. Flowers ca. 2 cm long, confined to the tip of axillary racemes; calyx red, pubescent; petals yellow; ovary pilose; style tomentose. Pods villous, 3-4 cm long; 4-5 seeded.
Flowering & Fruiting: October-February.
Distribution: South-west India, Sri Lanka and Indo-China. Occasional; in semi-evergreen forests. *RNMK 3018,* Manikkunnumala.

Cajanus lineatus (Wight & Arn.) van der Maesen, Agric. Univ. Wageningen Pap. 85-4:143. 1985; Sanjappa, Leg. India 101. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 131. 1996. *Atylosia lineata* Wight & Arn., Prodr. 258. 1834; Baker in Hook. f., Fl. Brit. India 2: 213. 1876; Gamble, Fl. Pres. Madras

368(260). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore126. 1988; Manilal, Fl. Silent Valley 69. 1988; Vajr., Fl. Palghat Dist. 147. 1990; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 157. 2005. **Fig. 25. Plate 14f.**

Erect shrubs, 1.5- 2 m high; stem terete, densely white-tomentose. Leaflets 3-3.5 x 1.5-2 cm, obovate, acute, 3-ribbed from base, tomentose; petiole ca. 1 cm long. Flowers paired, in axillary umbels; pedicel ca. 1 cm long; calyx 7-8 mm long, lobes unequal, lanceolate; standard 1.3-1.5 x 1.2-1.3 cm, obovate, retuse, yellow; wings ca. 1.5 cm long, oblong; keel ca. 1.3 x 6 mm, oblong. Pods 2-2.3 x 0.7-0.8 cm, oblique-oblong, densely hairy; seeds 3.

Flowering & Fruiting: June-January.

Distribution: Endemic to Western Ghats. Occasional; along the margins of grasslands. *RNMK 2716,* Kurichiarmala; *RNMK 2097*, Sugandhagiri.

Cajanus scarabaeoides (L.) Thouars, Dict. Sci. Nat. 6: 617. 1817; Sanjappa, Leg. India 100. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 131. 1996. *Dolichos scarabaeoides* L., Sp. Pl. 726. 1753. *Atylosia scarabaeoides* (L.) Benth. in Miq., Pl. Jungh. 242. 1852; Baker in Hook. f., Fl. Brit. India 2: 215. 1876; Gamble, Fl. Pres. Madras 369(261). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore127. 1988; Manilal & Sivar., Fl. Calicut 92. 1982; Mohanan & Sivad., Fl. Agasthyamala 191. 2002; Sivar. & P. Mathew, Fl. Nilambur 204. 1997; C.N. Sunil & Sivad., Fl. Pl. Div. Alappuzha Dist. 203. 2000; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 157. 2005.

Slender climbers; stem puberulus. Leaflets 1.7-2 x 1.8-2 cm, rhomboid, obtusely acute, 3-nerved from base, densely tomentose below, sparsely above; petiole 1-2 cm long; stipule triangular, minute; lateral branches with smaller leaves. Flowers many, along slender lateral branchlets; pedicels ca. 2.5 cm long, jointed and bracteate at middle; calyx 4-lobed, lobes ovate; standard yellow; Pods 2.1-2.4 x 0.6-0.7 cm, compressed, mucronate; seeds 4, black, velutinus hairy.

Flowering & Fruiting: September-January.

Distribution: Tropical Asia; introduced in Africa. Occasional; in moist deciduous forests. *RNMK 2531,* Chedalayam.

CALOPOGONIUM Desvaux

Ann. Sci. Nat. (Paris) 9: 423. 1826.

Calopogonium mucunoides Desv., Ann. Sci. Nat. (Paris) 9: 423. 1826; Hepper in Hutch. & Dalz., Fl. West. Trop. Africa 2 :563. 1958 ; Ansari, Fl. Kasaragod Div. 118. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 127. 1988; Vajr., Fl. Palghat Dist. 178. 1990; Sanjappa, Leg. India 104. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 132. 1996; Sivar. & P. Mathew, Fl. Nilambur 207. 1997; C.N. Sunil & Sivad., Fl. Pl. Div. Alappuzha Dist. 206. 2000; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 159. 2005.

Densely villous climbers. Leaves 3-foliolate; petiole 5-6 cm long; leaflets 5-7 x 4-6 cm, ovate-lanceolate, base cuneate, apex subacute, mucronate. Racemes

lateral, 7-10 cm long; flowers clustered towards apex; calyx lobes 5, linear; corolla red pink; petals clawed; stamens 9 + 1; ovary linear, villous; style short. Pod stout, cylindric, 3-3.5 cm long with golden silky hairs.
Flowering & Fruiting: August-December.
Distribution: Introduced from Tropical Asia; now wild in southern India. Common; along waysides. *RNMK 1172,* Nadavayal; *RNMK 1297*, Kenichira.

CANAVALIA A. P. de Candolle
Prodr. 2: 403. 1825, *nom. cons.*

Canavalia africana Dunn, Bull. Misc. Inform. Kew 1922: 135. 1922; Sanjappa, Leg. India 107. 1992; Sivar. & P. Mathew, Fl. Nilambur 207. 1997. *Dolichos virosus* Roxb., Fl. Ind. 3: 301. 1832, p.p. *Canavalia virosa* (Roxb.) Wight & Arn., Prodr. 253. 1834,p.p; Gamble, Fl. Pres. Madras 359(254). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 128. 1988. *Canavalia ensiformis* DC. var. *virosa* (Roxb.) Baker in Hook.f., Fl. Brit. India 2: 196. 1876.

Climbing shrubs. Leaflets 10-12 x 8-9 cm, obtuse or retuse, coriaceous. Flowers 3-4 cm long, pink, in axillary racemes, 20-26 cm long; calyx hispid; ovary pubescent. Pods oblong, pubescent, 9-11 x 1.5-2 cm.
Flowering & Fruiting: November-December.
Distribution: India, Sri Lanka, Africa and Hawaiian Islands. Occasional; along strems in open areas. *RNMK* 1197, Thirunelli.

CENTROSEMA (A. P. de Candolle) Bentham
Comentat. Legum. Gener. 53. 1837, *nom. cons.*

Centrosema molle Benth., Comm. Legum. Gen. 55. 1837. *Centrosema pubescens* auct. non Benth. 1837: Ansari, Fl. Kasaragod Div. 119. 1985; Manilal, Fl. Silent Valley 70. 1988; Vajr., Fl. Palghat Dist. 178. 1990; Sanjappa, Leg. India 111. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 133. 1996; Sivar. & P. Mathew, Fl. Nilambur 208. 1997; Mohanan & Sivad., Fl. Agasthyamala 193. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 204. 2009. *Centrosema virginianum* auct. non (L.) Benth. 1838; Thoth. & Prasad, Curr. Sci. 39:353.1970; Manilal & Sivar., Fl. Calicut 89. 1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 128. 1988; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 160. 2005. *Clitoria virginiana* L., Sp. Pl. 753. 1753.

Twining herbs; stem covered with hooked hairs. Leaves 3-foliolate; leaflets 7-7.5 x 3-3.5 cm, ovate-oblong, acuminate at apex, rounded at base, pubescent, stipellate; petiole 3-10 cm long; stipules ovate. Flowers 3-9-together, in umbellate racemes on long peduncles; bracts large, ovate; calyx campanulate, toothed; standard 3-3.5 cm across, violet-pink, hairy on back; wings obovate, clawed; keel curved, acute; stamens monadelphous. Pods 12-14 x 0.4-0.6 cm, sessile, glabrous, compressed with thick margins, cuspidate; seeds many, grey, mottled with green.
Flowering & Fruiting: September-January.
Distribution: Native of America; introduced in India. Common; along roadsides. *RNMK 3074,* Puthoorvayal.

CROTALARIA Linnaeus

Sp. Pl. 714. 1753.

Herbs or shrubs. Leaves simple, trifoliate or digitate. Flowers in terminal or leaf-opposed racemes, yellow or white; sepals 5, linear or lanceolate, variously connate below; petals unequal, standard petal: orbicular or oblong with a midrib, clawed at base; wing petals: obovate or oblong, curved, clawed and with minute transverse folds; keel petals: obovate or oblong, clawed, auriculate near the base; stamens 10, monadelphous; staminal tube split to the base along the upper margin; anthers dimorphous, on alternatively shorter and longer filaments; ovary 2-many-ovuled, oblong, densely hairy; style incurved at base; stigma oblique. Pod turgid, globose or oblong, widen towards the apex, stalked or sessile; seeds 2-many.

1. Leaves simple; petiole short or absent 2
1. Leaves digitately compound; petiole long 14
2. Stipules decurrent as a persistent wing to the branchlets..... **C. bidiei**
2. Stipules small or none, not decurrent.....3
3. Pod shorter or only little longer than calyx 4
3. Pod two or more times longer than the calyx 7
4. Flowers more than 1.5 cm long, in terminal many flowered racemes or panicles.....5
4. Flowers less than 1 cm long, in trminal or leaf-opposed umbels or heads 6
5. Pod hairy..... **C. berteroana**
5. Pod glabrous ..... **C. calycina**
6. Flowers in heads; pod 6-8 seeded ..... **C. dubia**
6. Flowers in terminal sessile umbels; pod 6-12 seeded ..... **C. nana**
7. Stipules semi-lunate; flowers bluish-white or white 8
7. Stipules subulate or lanceolate, sometimes 0; flowers yellow 9
8. Stems and branches angular, slightly winged; branches, inflorescence and leaves glabrous ..... **C. verrucosa**
8. Stems and branches terete; branches, inflorescence and undersurface of leaves appressed puberulous ..... **C. heyneana**
9. Pods glabrous.....10
9. Pods hairy 12
10. Prostrate herbs; racemes lateral or leaf opposed, less than 5 flowered . **C. prostrata**
10. Erect subshrubs; racemes terminal, more than 5-flowered 11
11. Leaves glabrous on the upper surface; stem and standard petals glabrous .... **C. retusa**
11. Leaves and branches golden-brown hairy; standard petals with golden hairs on the midrib..... **C. salicifolia**
12. Prostrate trailing herbs; racemes lateral or leaf-opposed..... ..... **C. evolvuloides** var. **acutifolia**
12. Erect subshrubs; racemes terminal 13
13. Branches 4-angled; stipules ovate .....**C. clarkei**
13. Branches terete; stipules subulate or absent ..... **C. juncea**
14. Leaves trifoliolate.....15
14. Leaves 5-foliolate.....**C. quinquefolia**

15. Leaflets 2-3 cm long; raceme 2-5 flowered; seeds 8-11..... **C. stipitata**
15. Leaflets 5-10 cm long; raceme many flowered; seeds many... **C. pallida** var. **pallida**

Crotalaria berteroana DC., Prodr. 2: 127. 1825, "berteriana"; Manilal, Fl. Silent Valley 71. 1988; Sanjappa, Leg. India 117. 1992. *Crotalaria fulva* Roxb., Fl. Ind. 3: 266.1832; Baker in Hook. f., Fl. Brit. India 2: 80. 1876; Gamble, Fl. Pres. Madras 298(211). 1918.

Silky tomentose undershrubs. Leaves 5-6 x 1.6-1.8 cm, elliptic-oblanceolate, acute, cuneate, subsessile, densely long silky villous. Flowers yellow in sparsely 2-10 flowered, axillary or terminal racemes; bracts persistant, erect; calyx densely fulvous. Pods oblong, silky, sessile, 2- seeded.
Flowering & Fruiting: December-April
Distribution: Native of Madagascar, Seychelles, Mauritius and South East Asia. Common; along roadsides in high elevations. *RNMK 1409,* Chembra estate.

Crotalaria bidiei Gamble, Bull. Misc. Inform. Kew 1917: 27. 1917 & Gamble, Fl. Pres. Madras 291(206). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 129. 1988; Sanjappa, Leg. India 117. 1992.

Erect herbs, 40-50 cm tall. Leaves 2-2.5 x 0.6-0.8 cm, linear-oblong, pubescent on both sides. Flowers 0.8-1 cm long, yellow. Pods 4-5 cm long, oblong, 8-10 seeded.
Flowering & Fruiting: April-August.
Distribution: Endemic to southern Western Ghats. Rare; in open grasslands margins. *RNMK 1409,* Chanthanathodu.

Crotalaria calycina Schrank, Pl. Rar. Hort. Monac. t.12. 1817; Baker in Hook. f., Fl. Brit. India 2: 72. 1876; Gamble, Fl. Pres. Madras 295(209). 1918; Sanjappa, Leg. India 118. 1992; Mohanan & Sivad., Fl. Agasthyamala 195. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 162. 2005.

Low shrubs with scandent branches; stems adpressed hairy. Leaves 6-7 x 1.3-1.5 cm, elliptic, densely hairy below, stipule subulate. Racemes terminal, many-flowered; bracts 1.3-1.5 cm long, lanceolate; bracteoles similar. Flowers distant; calyx 2.3-2.5 cm long, deeply lobed; lobes linear, densely hairy; standard ca. 1.5 cm long, yellow, hairy on back. Pods 2-2.5 cm long, oblong, glabrous.
Flowering & Fruiting: August-December.
Distribution: Paleotropics. Rare; in in grassy slopes of semi-evergreen forests. *RNMK 1558,* Manikkunnumala.

Crotalaria clarkei Gamble, Bull. Misc. Inform. Kew 1917: 27. 1917 & Fl. Pres. Madras 296(209). 1918; V. S. Ramach. *et al.*, J. Econ. Tax. Bot. 5: 136. 1984; V. S. Ramach. & V. J. Nair, Fl. Cannanore 130. 1988; Sanjappa, Leg. India 118. 1992; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 162. 2005.

Suberect herbs; stem quadrangular, pilose. Leaves 3-4 x 1-1.3 cm, oblong, obtuse, subcordate at base, hairy below; stipule ovate, oblique. Raceme 6-10

cm long, terminal or axillary; bracts ovate, cordate; flowers few; calyx ca. 1 cm long, lobes acuminate, densely fulvous; standard hairy; wings obtuse; keel ciliate. Pods ca. 2.5 x 0.9 cm, oblong.
Flowering & Fruiting: November-January.
Distribution: Endemic to Western Ghats. Occasional; in moist deciduous forests. *RNMK 2848,* Muthanga.

Crotalaria dubia Graham ex Benth. in Hook.'s London J. Bot. 2: 568. 1843; Baker in Hook. f., Fl. Brit. India 2: 73. 1876; Gamble, Fl. Pres. Madras 296(209). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 130. 1988; Sanjappa, Leg. India 119. 1992; Sivar. & P. Mathew, Fl. Nilambur 178. 1997.

Shrubs, branchlets silky pubescent. Leaves ca. 3-5 x 2 cm, obovate, apex obtuse, mucronate, subsessile. Flowers in short terminal heads; bracts and bracteoles ovate, acuminate; calyx lobed; corolla yellow, standard oblong; wings linear; keels curved. Pods 5-6 x 2-3 mm, 4-6 seeded; seeds reniform.
Flowering & Fruiting: November-December.
Distribution: South west India, Bangladesh and Myanmar. Occasional; in moist deciduous forests. *RNMK* 1213, Muthanga.

Crotalaria evolvuloides Wight ex Wight & Arn. var. **acutifolia** Gamble, Fl. Pres. Madras 292(206). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 130. 1988.

Procumbent herbs, 30-40 cm long; branchlets sparsely pubescent. Leaves simple, 3-5 x 1-2 cm, elliptic, obtuse or mucronate, cuneate. Flowers yellow, 1-1.3 cm long in terminal axillary racemes, 4-6-flowered, 7-9 cm long. Pods 1-1.5 cm long, oblong, 10-12 seeded.
Flowering & Fruiting: November-December.*Distribution*:
Endemic to Western Ghats. Occasional; in moist deciduous and semi-evergreen forests. *RNMK 3199,* Muthanga; *RNMK 2035,* Manikkunnumala.

Crotalaria heyneana Graham ex Wight & Arn., Prodr. 187. 1834; Baker in Hook. f., Fl. Brit. India 2: 78. 1876; Gamble, Fl. Pres. Madras 297(210). 1918; Ansari, Fl. Kasaragod Div. 120. 1985; Manilal, Fl. Silent Valley 71. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 131. 1988; Sanjappa, Leg. India 121. 1992; Vajr., Fl. Palghat Dist. 150. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 134. 1996; Sivar. & P. Mathew, Fl. Nilambur 180. 1997.

Erect shrubs; stem 3-angled, villous. Leaves 7-9 x 6-7 cm, ovate, obtuse, cuneate at base, minutely hairy below; stipule 7-8 mm broad, semi-lunar. Raceme 16-20 cm long, terminal; bracts deflexed; flowers numerous; pedicels 6-7 mm long, bracteolate at middle; calyx 7-8 mm long, lobes ovate, acuminate, thinly hairy; petals white or bluish white; standard 1-1.2 x 0.6-0.8 cm, glabrous; keel glabrous. Pods 3-3.5 x 1- 1.3 cm, minutely hispid, clawed.
Flowering & Fruiting: September-December.
Distribution: Endemic to southern Western Ghats. Common; in semi-evergreen forests. *RNMK 1178,* Thirunelli.

Crotalaria juncea L., Sp. Pl. 714. 1753; Baker in Hook. f., Fl. Brit. India 2: 79. 1876; Gamble, Fl. Pres. Madras 297(210). 1918; Manilal & Sivar., Fl. Calicut 78. 1982; Ansari, Fl. Kasaragod Div. 120. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 131. 1988; Vajr., Fl. Palghat Dist. 150. 1990; Sanjappa, Leg. India 122. 1992; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 164. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 206. 2009.

Subshrubs, branchlets striate, silky pubescent. Leaves 8-10 x 1 cm, oblong, apex obtuse, mucronate, base cuneate, pubescent on both sides, sessile; stipule adpressed, lanceolate, deciduous. Flowers yellow, in terminal racemes; bracts 4 –5 mm, linear; bracteoles cauducous; calyx lobes lanceolate, densely tomentose; standard petal 3 x 2.5 cm; stamens dimorphic; ovary villous. Pods 2.5-3 x 1 cm, oblong, densely brownish tomentose.

Flowering & Fruiting: July-September.

Distribution: Native of India; now spread to most tropical countries. Occasional; in moist deciduous forests. *RNMK 2224,* Tholpetty; *RNMK 2638,* Chedalayam.

Crotalaria nana Burm.f., Fl. Ind. 156,t.48. f.2. 1768; Baker in Hook. f., Fl. Brit. India 2: 71. 1876; Gamble, Fl. Pres. Madras 294(208). 1918; Manilal & Sivar., Fl. Calicut 78. 1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 132. 1988; Vajr., Fl. Palghat Dist. 151. 1990; Sanjappa, Leg. India 125. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 135. 1996; Sivar. & P. Mathew, Fl. Nilambur 181. 1997; Mohanan & Sivad., Fl. Agasthyamala 196. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 164. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 207. 2009. *Crotalaria umbellata* Wight ex Wight & Arn., Prodr. 191. 1834; Gamble, Fl. Pres. Madras 294(208). 1918; Manilal, Fl. Silent Valley 73. 1988; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 167. 2005. *Crotalaria nana* Burm. f. var. *umbellata* (Wight & Arn.) Prain, J. Asiat. Soc. Bengal 66: 351. 1897. **Plate 14g.**

Erect herbs, 25-30 cm high; stem fulvous. Leaves 2.5-3 x 0.8-1 cm, oblong, acute or obtuse, densely hairy. Flowers 16-30 together, in terminal sessile conjested umbel; bracts ca. 5 mm long, filiform; calyx lobes lanceolate, densely hairy; standard obovate, yellow; wings verrucose; keel ciliate along the margins. Pods 5-6 x 3-4 mm, globose, glabrous, 6-10-seeded.

Flowering & Fruiting: September-December.

Distribution: Indo-Malesia. Common; in grasslands. *RNMK 1052,* Chembra; *RNMK 2005,* Sugandhagiri.

Crotalaria pallida Dryand. in Ait., Hort. Kew (ed. 1) 3: 20. 1789, var. **pallida**; Manilal & Sivar., Fl. Calicut 78. 1982; Ansari, Fl. Kasaragod Div. 121. 1985; Manilal, Fl. Silent Valley 72. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 132. 1988; Vajr., Fl. Palghat Dist. 152. 1990; Sanjappa, Leg. India 126. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 135. 1996; Sivar. & P. Mathew, Fl. Nilambur 182. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 164.

2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 209. 2009. *Crotalaria mucronata* Desv., J. Bot. 3: 76. 1814. *Crotalaria striata* DC., Prodr. 2: 131. 1825; Baker in Hook. f., Fl. Brit. India 2: 84. 1876; Gamble, Fl. Pres. Madras 301(212). 1918. *Crotalaria striata* DC. var. *acutifolia* Trimen, Handb. Fl. Ceylon 2: 19. 1984.

Shrubs, 1-2 m tall; stem terete, minutely hairy. Leaves 3-foliolate; leaflets 8-10 x 4-4.5 cm, elliptic, acute or obtuse, mucronate, thinly hairy below; petiole 5-6 cm long; stipule absent. Raceme terminal, 20-25 cm long; bracts filiform; flowers 1.2-1.5 cm long; calyx 7-9 mm long; lobes acuminate; standard orbicular, yellow; wings falcate; keel glabrous. Pods 4-4.5 cm long; thinly hairy.

Flowering & Fruiting: September-January.

Distribution: Pantropical. Common; along waysides and open areas. *RNMK 1932,* Kalpetta.

Crotalaria prostrata Rottl. ex Willd., Enum. Hort. Berol. 2:747.1809; Baker in Hook. f., Fl. Brit. India 2:67.1876; Gamble, Fl. Pres. Madras 292(206). 1918; Manilal & Sivar., Fl. Calicut 78. 1982; Ansari, Fl. Kasaragod Div. 121. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 133. 1988; Sanjappa, Leg. India 127. 1992; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 210. 2009.

Herbs, 20-25 cm long, branches hairy. Leaves 3-3.5 x 1-1.2 cm, obovate-oblong, obtse, oblique at base, silky pubescent on both sides. Flowers yellow, in terminal or axillary, 2-4 flowered racemes, 7-9 cm long. Pods 1.3-1.5 cm long, linear-oblong, 12-15 seeded.

Flowering & Fruiting: November-December.

Distribution: Indo-Malesia. Rare; in moist deciduous forests: *RNMK 1694,* Baveli.

Crotalaria quinquefolia L., Sp. Pl. 716. 1753 & (ed.2) 1006. 1763; Gamble, Fl. Pres. Madras 301(213). 1918; Baker in Hook. f., Fl. Brit. India 2: 84. 1876; Wight, Ic. t. 16. 1838; Manilal & Sivar., Fl. Calicut 79. 1982; Ansari, Fl. Kasaragod Div. 122. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 133. 1988; Sanjappa, Leg. India 127. 1992; Sivar. & P. Mathew, Fl. Nilambur 182. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 210. 2009.

Erect herbs, 45-50 cm tall. Leaves 5-foliolate, leaflets 6-7 x 1-1.5 cm, linear-oblong or narrowly oblanceolate, glabrous on bothsides. Flowers 2.5-3 cm long in terminal racemes, yellow.

Flowering & Fruiting: September-December.

Distribution: Native of Tropical Asia; introduced in Jamaica and West Indies. Occasional in paddy fields. *RNMK 1213*, Manivayal; *RNMK 2076,* Ratakolli.

Crotalaria retusa L., Sp. Pl. 715. 1753; Baker in Hook. f., Fl. Brit. India 2: 75. 1876; Gamble, Fl. Pres. Madras 293(207). 1918; Manilal & Sivar., Fl. Calicut 78. 1982; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 133. 1988;

Ansari, Fl. Kasaragod Div. 122. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 133. 1988; Sanjappa, Leg. India 128. 1992; Vajr., Fl. Palghat Dist. 152. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 135. 1996; Sivar. & P. Mathew, Fl. Nilambur 183. 1997; Mohanan & Sivad., Fl. Agasthyamala 197. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 165. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 210. 2009. *Tandale-cotti* Rheede, Hort. Malab. 9: 45-46, t. 25. 1689.

Erect shrubs; stems glabrous, terete. Leaves 8-12 x 3-4 cm, oblanceolate, obtuse to retuse; petiole 1-1.3 cm long; stipule minute, filiform. Raceme terminal, many-flowered; bracts and bracteoles filiform; flowers yellow; pedicels ca. 1 cm long, deflexed; calyx lobes ovate, acute, thinly hairy; standard ca. 2.5 x 3 cm, orbicular, retuse, glabrous; wings ca. 2 cm long, verrucose; keel tomentose along the margins. Pods 5-6 x 1-1.3 cm, oblong, tomentose.

Flowering & Fruiting: September-January.

Distribution: Throughout the tropics. Common in open areas and semi-evergreen forests. *RNMK 3199,* Puthoorvayal; *RNMK 1178*, Manikkunnumala.

Crotalaria salicifolia Heyne ex Wight & Arn., Prodr. 182. 1834; Baker in Hook. f., Fl. Brit. India 2: 77. 1876; Gamble, Fl. Pres. Madras 294(208). 1918; Sanjappa, Leg. India 128. 1992; Vajr., Fl. Palghat Dist. 152. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 135. 1996; Mohanan & Sivad., Fl. Agasthyamala 197. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 165. 2005.

Shrubs; stems villous. Leaves 6-7 x 2-2.5 cm, elliptic, obtuse at apex, acute at base, densely fulvous tomentose; nerves 5-7 pairs; stipules absent. Raceme terminal; bracts 7-8 mm long, lanceolate, hairy; flowers many, calyx ca. 2 cm long, lobes slightly falcate, densely hairy; petals yellow; standard ca. 2.5 cm across, tomentose along the midrib; wings ca. 2 cm long; keel densely tomentose along the margins. Pods 5-5.6 x 2-2.5 cm, oblong, shortly stalked, glabrous.

Flowering & Fruiting: October-January. *Distribution*:

Endemic to Peninsular India. Occasional; in grassy slopes. *RNMK 1930,* Banasuramala.

Crotalaria stipitata Graham ex Wight & Arn., Prodr. 193. 1834. *Crotalaria laevigata* acut. non Lamk. 1786; Baker in Hook. f., Fl. Brit. India 2: 83. 1876; Gamble, Fl. Pres. Madras 300(212). 1918; Manilal & Sivar., Fl. Calicut 79. 1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 131. 1988; Vajr., Fl. Palghat Dist. 151. 1990; Sanjappa, Leg. India 123. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 134. 1996; Sivar. & P. Mathew, Fl. Nilambur 180. 1997.

Shrubs, branchlets glabrescent. Leaflets obovate or oblong, apex obtuse or retuse, membranous, glabrous, glaucous below, terminal much larger than the laterals, 2-3 x 1-1.5 cm; lateral nerves and reticulations faint; petiole 2.5-3 cm long; stipule subulate. Flowers 1.3-1.5 cm across, in axillary, 2-5 flowered

racemes; bracts minute, setaceous; calyx lobes puberulus, deltoid-lanceolate; petals bright yellow, standard ovate; keels beaked. Pods 1.3-1.5 x 0.4-0.5 cm, glabrous; seeds 10.
Flowering & Fruiting: October-January.
Distribution: Peninsular India and Madagascar. Occasional; in evergreen and moist deciduous forests. *RNMK 2473,* Periya; *RNMK 2197*, Chetyalathoor.

Crotalaria verrucosa L., Sp. Pl. 715. 1753; Gamble, Fl. Pres. Madras 297(210). 1918; Manilal & Sivar., Fl. Calicut 78. 1982; Ansari, Fl. Kasaragod Div. 122. 1985; Manilal, Fl. Silent Valley 74. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 134. 1988; Vajr., Fl. Palghat Dist. 153. 1990; Sanjappa, Leg. India 131. 1992; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 211. 2009.

Subshrubs, puberulus, stem 3-angled, slightly winged. Leaves 6-7 x 4-4.2 cm, ovate-deltoid or rhomboid, apex apiculate, base cuneate, chartaceous; petiole ca. 0.5 cm, stipules 8-9 mm, semi-lunate. Racemes terminal or lateral, 12-15 cm long; flowers bluish-white; bracts and bracteoles linear; pedicels pubescent; calyx lobes lanceolate; standard petal ca. 2 x 1.5 cm, ovate; wings obovate; keels beak twisted; ovary stipitate, pubescent; style pubescent. Pod 4-5 x 0.8-1 cm, oblong, terete, puberulus; seeds 10-15, bean shaped.
Flowering & Fruiting: August-November.
Distribution: Pantropical. Occasional in evergreen forests. *RNMK 2897,* Vythiri Ghats.

CULLEN Medikus

Vorles. Churpf. Phys. Ges. 2: 381. 1787.

Cullen corylifolium (L.) Medik., Vorles. Churpf. Phys. Ges. 2: 381. 1787. *Psoralea corylifolia* L., Sp. Pl. 764. 1753; Hook. f., Fl. Brit. India 2: 103. 1876; Gamble, Fl. Pres. Madras 314(222). 1918.

Annual herbs, with black or pellucid glands. Leaves unifoliolate, elliptic, dentate, petioled, covered with large black glands and white hairs. Flowers blue, long peduncled; bracts membranous; calyx tube companualte; corolla little exserted; stamens diadelphous; ovary sessile, 1-ovuled. Pod ovoid, pitted; seeds 1.
Flowering & Fruiting: September-December.
Distribution: Central Asia to China through India. Rare; in moist deciduous forests. *RNMK* 1286, Muthanga.

DALBERGIA Linnaeus

Suppl. Pl. 52. 1781, *nom. cons.*

Tree, shrubs or climbers. Leaves imparipinnate; leaflets alternate, estipellate. Flowers many, in simple or panicled cymes; calyx campanulate, shortly 5-toothed; standard erect, obovate; wings oblong, free; keel obovate-oblong, obtuse; stamens mono-or diadelphous; anthers uniform; ovary stipitate, ovules few, style short, incurved; stigma capitate. Pod compressed, samaroid; seeds 1-4, reniform.

1. Woody climbers 2
1. Trees 3
2. Standard petals erect; stamens 9-10, monadelphous ..... **D. horrida**
2. Standard petals reflexed; stamens 10, isodiadelphous (5+5) ..... **D. volubilis**
3. Stamens isodiadelphous, 5 and 5 ..... **D. lanceolaria** ssp **lanceolaria**
3. Stamens monadelphous, 9 or 10 4
4. Leaflets orbicular, obtuse or emarginated at apex; pod obtuse at apex..... **D. latifolia**
4. Leaflets obovate, acute at apex; pod acute at apex..... **D. sissoides**

Dalbergia horrida (Dennst.) Mabb., Taxon 26: 538. 1977; Ansari, Fl. Kasaragod Div. 123. 1985; Thoth., Dalberg. Indian subcont. 105. 1987; Sanjappa, Leg. India 136. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 136. 1996; Sivar. & P. Mathew, Fl. Nilambur 184. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 213. 2009. *Amerimnon horridum* Dennst., Schluss. Hort. Malab. 9, 18, 34. 1818. *Dalbergia spinosa* Roxb., Fl. Ind. 3: 234. 1832; Baker in Hook. f., Fl. Brit. India 2: 238. 1876; Gamble, Fl. Pres. Madras 381(269). 1918. *Dalbergia sympathetica* Nimmo ex Graham, Cat. Pl. Bombay 55. 1839; Baker in Hook. f., Fl. Brit. India 2:234. 1876; Manilal & Sivar., Fl. Calicut 82. 1982; Vajr., Fl. Palghat Dist. 154. 1990; Mohanan & Sivad., Fl. Agasthyamala 201. 2002. *Dalbergia multiflora* Heyne ex Prain, Ann. Roy. Bot. Gard. (Calcutta) 10: 43, t. 18. 1905; Gamble, Fl. Pres. Madras 381(269). 1918.

Lianas, young stem, petioles and peduncles densely brown pubescent. Leaflet emarginated at tip, round at base, pubescent on both sides when young, glabrescent above on ageing. Flowers in axillary cymose panicles; cymes dense; peduncles and pedicles brown pubescent; bracts and bracteoles minutely pubescent; calyx campanulate, lobes 5, pubescent; corolla white, 0.3-0.4 cm long; stamens 9-10; ovary hairy; stigma capitate.

Flowering & Fruiting: September-January.

Distribution: Endemic to southern Western Ghats. Occasional; in semi-evergreen forests. *RNMK 1409,* Karuvanthodu.

Dalbergia lanceolaria L. f., Suppl. Pl. 316. 1781, ssp. **lanceolaria**; Baker in Hook. f., Fl. Brit. India 2: 235. 1876; Gamble, Fl. Pres. Madras 383(270). 1918; Ansari, Fl. Kasaragod Div. 123. 1985; Manilal, Fl. Silent Valley 74. 1988; Vajr., Fl. Palghat Dist. 154. 1990; Sanjappa, Leg. India 136. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 137. 1996; Sivar. & P. Mathew, Fl. Nilambur 185. 1997; Mohanan & Sivad., Fl. Agasthyamala 199. 2002.

Trees, upto 25 m tall; bark white. Leaflets 12-20 pairs, 2-5 x 1-2 cm, oblong, obtuse, glabrous, nerves many, close. Panicles 12-15 x 6-8 cm, yellowish-hirsute; flowers greenish white; calyx lobes ovate, acute, hirsute; petals white; standard orbicular, glabrous; wings curved; keel glabrous. Pods 7-9 x 2-2.5 cm, elliptic-oblong, glabrous, acute at apex, narrowed to the base, 1-3 seeded; stalk very long.

Flowering & Fruiting: January-December.

Distribution: India, Myanmar, Nepal and Sri Lanka. Common; in moist deciduous forests. *RNMK 2643,* Chedalayam.

Dalbergia latifolia Roxb., Corom. Pl. 2: 7, t. 113. 1799; Wight, Ic. t. 1156. 1848; Baker in Hook. f., Fl. Brit. India 2: 231. 1876; Gamble, Fl. Pres. Madras 383(270). 1918; Thoth., Dalberg. Indian Subcont. 46. 1987 ; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 134. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 134. 1988; Vajr., Fl. Palghat Dist. 154. 1990; Sanjappa, Leg. India 137. 1992; Mohanan & Sivad., Fl. Agasthyamala 200. 2002; Sasidh. & Sivar., Fl. Pl. Thrissur For. 137. 1996; Sivar. & P. Mathew, Fl. Nilambur 185. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 168. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 221. 2009. *Dalbergia emarginata* Roxb., Fl. Ind. 3: 224. 1832. *Biti* Rheede, Hort. Malab. 5:115, t. 58. 1685.

Tall trees, upto 30 m tall; branchlets slender, white. Leaves 7-11-foliolate, leaflets 3-6 cm across, obovate-orbicular, rounded to emarginate at apex, rounded at base, glaucous beneath; petiolule 6-7 mm long. Panicles 8-10 x 3-4 cm, axillary, glabrous; flowers ca. 1 cm long, creamy white; calyx glabrous; standard clawed; wings curved; keel glabrous. Pods 8-10 x 1.5-2 cm, oblong, obtuse, glabrous, 1-6-seeded, stalk short.

Flowering & Fruiting: August-September.

Distribution: Indo-Malesia. Common in moist deciduous forests and plantations. *RNMK 1552,* Kalpetta; RNMK 2644, Beenachi.

Dalbergia sissoides Graham ex Wight & Arn., Prodr. 1: 265. 1834; Baker in Hook. f., Fl. Brit. India 2: 231. 1870; Gamble, Fl. Pres. Madras 383(270). 1918; Thoth., Dalberg. Indian Subcont. 53. 1987 ; V. S. Ramach. & V. J. Nair, Fl. Cannanore135. 1988; Vajr., Fl. Palghat Dist. 154. 1990; Sanjappa, Leg. India 140. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 137. 1996; Sivar. & P. Mathew, Fl. Nilambur 186. 1997. *Dalbergia latifolia* Roxb. var. *sissoides* (Graham ex Wight & Arn.) Baker in Hook.f., Fl. Brit. India 2: 231. 1876.

Tall trees, upto 25 m tall. Leaves 6-9-foliolate; leaflets 6-7 x 3.5-4 cm, obovate, acute at the apex and base; petiolule 6-7 mm long. Panicle 5-15 cm across, terminal or upper axillary, glabrous. Flowers 8-9 mm long, greenish yellow; pedicels slender; calyx lobes obtuse, glabrous; standard greenish yellow; keel glabrous. Pods 6-8 x 1-1.5 cm, elliptic-oblong, acute at apex, attenuate into a long stalk at base.

Flowering & Fruiting: February-August.

Distribution: Peninsular India and Indonesia. Common; in moist deciduous forests. *RNMK 2784,* Muthanga.

Dalbergia volubilis Roxb., Corom. Pl. 2: 48. t.191. 1805; Baker in Hook. f., Fl. Brit. India 2: 235. 1876; Gamble, Fl. Pres. Madras 384(270). 1918; Thoth., Dalberg. Indian Subcont. 163. 1987; Ansari, Fl. Kasaragod Div. 124. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore135. 1988; Manilal, Fl. Silent Valley 75. 1988; Vajr., Fl. Palghat Dist. 155. 1990; Sanjappa, Leg. India 142. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 137. 1996; Mohanan & Sivad., Fl. Agasthyamala 201. 2002.

Lianas, bark dark brown; stem softly hairy. Leaves 8-10-foliolate; leaflets 3-3.5 x 1.5-2 cm, obovate-oblong, obtuse at apex, glabrous. Panicle 20-25 x 8-10 cm, terminal; flowers ca.1 cm across, blue; calyx ca. 5 mm long, lobes ovate, acute, hairy; standard reflexed; keel glabrous; stamens isodiadelphous. Pod 3-3.5 x 1.2-1.5 cm, elliptic, obtuse at apex, shortly cuspidate, stalked, glabrous; seed solitary.

Flowering & Fruiting: February-June.

Distribution: India and Sri Lanka. Occasional; in semi-evergreen forests. *RNMK 2348,* Manikkunnumala.

DERRIS Loureiro

Fl. Cochinch. 2: 432. 1790, *nom. cons.*

Climbing shrubs. Leaves imparipinnate, leaflets opposite, entire, estipellate. Flowers in terminal or axillary racemes or panicles; bracts and bracteoles deciduous, minute; calyx campanulate, teeth very short; standard orbicular, erect, cuneate at base; wing curved-oblong, auricled at base; keel obovate, acute, auricled at base, staked; stamens 9 + 1; anthers centrifixed, ovate; ovary sessile; ovules 1-5; style incurved; stigma capitate. Pod compressed, oblong or orbicular; seeds 1-4, orbicular.

1. Pod winged along the upper suture only, 2-5 seeded 2
1. Pod winged on both sutures 3
2. Pods broadly oblong, persistently densely silky..... **D. brevipes**
2. Pods narrow, adpressed minutely tomentose .....**D. scandens**
3. Branchlets lenticellate; pods densely brown hispid ..... **D. benthamii**
3. Branchlets not lenticellate; pods glabrous ..... **D. canarensis**

Derris benthamii (Thw.) Thw., Enum. Pl. Zeyl. 413. 1864; Gamble, Fl. Pres. Madras 387(273). 1918; Thoth., in Fasc. Fl. India 8: 9. 1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 135. 1988; Manilal, Fl. Silent Valley 75. 1988; Sanjappa, Leg. India 143. 1992; Mohanan & Sivad., Fl. Agasthyamala 202. 2002. *Brachypterum benthamii* Thw., Enum. Pl. Zeyl. 93. 1859. *Derris paniculata* Benth., J. Linn. Soc. 4 (Suppl.): 105,1860; Baker in Hook. f., Fl. Brit. India 2: 242. 1878.

Stout climbers; branchlets densely lenticellate, minutely dark brown hispid. Leaves 7-9-foliolate; leaflets 3.5-4 x 1.5-2 cm, ovate, abruptly acuminate, acumen twisted, retuse, pubescent along the nerves below; petiolule hispid. Panicle to 30 x 30 cm, brown-hispid; flowers many; calyx oblique at mouth, densely hispid outside, lobes short; standard clawed, concave, white; keel oblong, clawed. Pods 3-3.5 x 1.5-2 cm, densely brown hispid, acute and hooked at apex, acute at base; seeds 1 or 2.

Flowering & Fruiting: December-May.

Distribution: Peninsular India and Sri Lanka. Occasional; in evergreen forests. *RNMK* 0003, Vaduvanchal.

Derris brevipes (Benth.) Baker in Hook. f., Fl. Brit. India 2: 244. 1878; Gamble, Fl. Pres. Madras 388(273). 1918; Thoth., Bull. Bot. Surv. India 3:184. 1962 & Fasc. Fl. India 8:11. 1982; Manilal, Fl. Silent Valley 75. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 136. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 138. 1996; Sanjappa, Leg. India 144. 1992; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 169. 2005. *Derris heyneana* Benth. var. *brevipes* Benth., J. Linn. Soc. 4 (Suppl.): 110. 1860. **Plate 14h.**

Stout climber; branchlets slender, glabrous. Leaves 3-9-foliolate; leaflets 10-12 x 4-5 cm, obovate-oblong, abruptly acuminate at apex, retuse, acute at base. Panicles 8-10 x 9-10 cm, axillary, rusty tomentose; flowers ca. 1.5 cm long; calyx cupular, hispid, black, lobes obtuse; standard obovate, emarginate, white, clawed; wing oblong; keel glabrate; stamens monadelphous; ovary densely hairy. Pods 4-5 x 2-2.5 cm, ovate, obtuse at either ends, densely dark brown-hispid; seeds 2.

Flowering & Fruiting: February-December.

Distribution: Endemic to Western Ghats

Occasional in evergreen and semi-evergreen forests margins. *RNMK 2529,* Kurichiarmala; *RNMK 2781,* Karuvanthodu.

Derris canarensis (Dalz.) Baker in Hook.f., Fl. Brit. India 2: 246. 1878; Gamble, Fl. Pres. Madras 387(273). 1918; Sanjappa, Legumes Ind. 144. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 138. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta Dist. 169. 2005. *Pongamia canarensis* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 2: 37. 1850. *Brachypterum canarense* (Dalz.) Dalz. in Dalz. & Gibs., Fl. Bombay 176. 1861.

Climbing shrubs. Leaves ca. 25 cm long; petiole 7-9 cm long; leaflets 16 pairs, 4-10 x 1-3 cm, oblong lanceolate or oblanceolate, obtuse at apex, cuneate at base, lower surface pubescent in young leaves, thin coriaceous; panicles axillary or terminal, ca. 15 mm long; flowers 3-6 per panicles-branches. Pod flat, oblong, both suture winged; seeds 1 or 2, reniform.

Flowering & Fruiting: September-January.

Distribution: Endemic to southern Western Ghats. Occasional in semi-evergreen forests. *RNMK 2348,* Pozhuthana.

Derris scandens (Roxb.) Benth., J. Linn. Soc. Bot. 4 (Suppl.) 103. 1860; Baker in Hook. f., Fl. Brit. India 2: 240. 1878; Gamble, Fl. Pres. Madras 387(273). 1918; Thoth., Bull. Bot. Surv. India 3:177. 1962 & Fasc. Fl. India 8:27. 1982; Manilal & Sivar., Fl. Calicut 81. 1982; Ansari, Fl. Kasaragod Div. 125. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 135. 1988; Sanjappa, Leg. India 148. 1992; Vajr., Fl. Palghat Dist. 155. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 138. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 169. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 215. 2009. *Dalbergia scandens* Roxb., Pl. Corom. 2: 49, t. 192. 1805. *Brachypterum scandens* (Roxb.) Benth., Ann. Wiener Mus. Naturgesch. Vienna 2: 101. 1838; Sivar. &

P. Mathew, Fl. Nilambur 223. 1997. *Noel-valli, Panni-valli* Rheede, Hort. Malab. 6:39, t.22. 1686.

Branchlets terete, lenticellate. Leaves 9-13 foliolate; leaflets 4-4.5 x 1-2 cm, oblong-obovate, puberulus beneath; petiolule 5-6 mm, stipels minute. Racemes 20-25 cm long, axillary and rarely terminal, nodes tumid; pedicels 7-8 mm, pubescent; bracteoles 2, above the middle of the pedicel; calyx truncate, campanulate; standard petal ovate-orbicular; wings appendaged, pinkish-white; ovary tomentose, style bent upwards, stigma globose. Pods winged on the upper suture, tapering at both ends, pubescent; seeds 1-4.
Flowering & Fruiting: June-December.
Distribution: Indo-Malesia. Common; in moist deciduous forests. *RNMK 1476*, Chedalayam; *RNMK 2328*, Kuruva.

DESMODIUM Desvaux

J. Bot. Agric. 1: 122. 1813, *nom. cons.*

Herbs or shrubs. Leaves simple or pinnately 3-foliolate, leaflets entire, stipellate; stipules striate. Flowers in terminal or axillary racemes, umbels or fascicles, pedicellate; bracts single or 3-together; bracteoles large or small; calyx tube short, lobes 5, acute or acuminate, upper two united to a higher level; standard petals erect, orbicular or obovate; wing petals curved-oblong, usually adhering to the keel, clawed; keel petals curved-obovate, clawed, obtuse, incurved; stamens diadelphous with upper stamens free or monadelphous; anthers uniform; ovary 2-many ovuled; style incurved, stigma small, capitate. Pod a jointed lomentum; joints 2-many, straight or slightly curved, dehiscent or indehiscent.

1. Leaves unifoliolate 2
1. Leaves 3-foliolate 4
2. Petiole broadly winged; stamens monadelphous ..... **D. triquetrum**
2. Petiole not winged; stamens diadelphous 3
3. Leaves ovate-lanceolate, acute, glabrescent; calyx-lobes twice as long as calyx tube . ..... **D. gangeticum**
3. Leaves broadly ovate-deltoid, obtuse or subacute, softly tomentose; calyx lobes more or less equal to calyx tube ..... **D. velutinum**
4. Trailing or prostrate herbs 5
4. Erect herbs, undershrubs or shrubs 6
5. Stem sparsely pubescent or glabrous; flowers axillary, 1-3 together; pedicels to 1 cm long ..... **D. triflorum**
5. Stem densely pubescent; flowers axillary, 1-3 together and in lax racemes; pedicels over 1 cm long ..... **D. heterophyllum**
6. Flowers in racemes, concealed by conspicuous bifarious, orbicular, foliaceous bracts; pods 2-jointed ..... **D. pulchellum**
6. Flowers in umbels or racemes not concealed; pods 4-9 jointed 7
7. Shrubs; flowers in short dense peduncled axillary umbels ..... **D. triangulare**
7. Herbs or subshrubs; flowers in elongated racemes 8

8. Stamens monadelphous; joints of pod cresent-shaped..... **D. repandum**
8. Stamens diadelphous; joints of pod not cresent shaped.....9
9. Lateral leaflets very small .....**D. motorium**
9. Lateral leaflets half as long or as long as terminal 10
10. Joints of pod with sticky, hooked hairs..... **D. laxiflorum**
10. Joints of pod without sticky, hooked hairs.....11
11. Joints of pods dehiscent..... **D. heterocarpon**
11. Joints of pods indehiscent.....12
12. Erect or suberect herbs, upto 30 cm high; lower leaves unifoliolate; flowers in pairs along rachis of raceme .....**D. alysicarpoides**
12. Erect subshrubs, upto 1.5 m high; all leaves 3-foliolate; flowers not in pairs ....**D. ferrugineum** ssp**. wynaadense**

Desmodium alysicarpoides van Meeuwen, Reinwardtia 6: 246. 1962; Manilal, Fl. Silent Valley 76. 1988; Sanjappa, Leg. India 149. 1992; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 173. 2005. *Alysicarpus parviflorus* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 211. 1851; Gamble, Fl. Pres. Madras 339(240). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 125, non Mart. 1843. *Desmodium parviflorum* (Dalz.) Baker in Hook. f., Fl. Brit. India 2: 172. 1876, non Mart. & Galeotti 1843.

Erect or suberect herbs, 25-30 cm high; stem villous. Leaflets 4-4.5 x 1.5-2 cm, elliptic, acute at apex, rounded at base, tomentose below; laterals much smaller. Racemes 27-30 cm long, terminal; pedicels 2 or 3-together; flowers blue; calyx lobes linear-lanceolate, densely hairy, standard, glabrous. Pods curved, 6-jointed, joint straight along one suture, glabrous.

Flowering & Fruiting: September-December.

Distribution: Indo-Malesia. Occasional; in moist deciduous forests. *RNMK 2086,* Kattikulam.

Desmodium ferrugineum Wall. ex Thw. ssp. **wynaadense** (Bedd. ex Gamble) Ohashi, Ginkgoana 1: 126. 1973; Manilal, Fl. Silent Valley 76. 1988; Sanjappa, Leg. India 153. 1992; Sivar. & P. Mathew, Fl. Nilambur 192. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 174. 2005. *Desmodium wynaadense* Bedd. ex Gamble, Fl. Pres. Madras 346(244). 1918.

Shrubs; stem fulvous hairy. Leaflets subequal, 7-8 x 2-3 cm, elliptic oblong, acute at either ends, glabrous above, tawny villous below; stipules ca. 1.2 cm long, lanceolate, subulate above. Racemes 15-20 cm long, axillary; rachis spreading-villous; slender; bracts ovate, acute; flowers many, bluish pink; calyx ca. 5 mm long, lobes unequal, hairy; standard pink; wings blue. Pods 2-3 x 0.3-0.5 cm, entire on either sutures; joints 8-10, reticulate, glabrous.

Flowering & Fruiting: November-January.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2032,* Pookodu.

Desmodium gangeticum (L.) DC., Prodr. 2: 327.1825; Wight, Ic. t. 271. 1840; Baker in Hook. f., Fl. Brit. India 2:168.1876; Gamble, Fl. Pres. Madras 345(244). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 137. 1988; Vajr., Fl. Palghat Dist. 157. 1990; Sanjappa, Leg. India 153. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 139. 1996; Sivar. & P. Mathew, Fl. Nilambur 193. 1997; Mohanan & Sivad., Fl. Agasthyamala 205. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 174. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 218. 2009. *Hedysarum gangeticum* L., Sp. Pl. 746. 1753. *Hedysarum collinum* Roxb., Fl. Ind. 3: 439. 1832.

Erect subshrubs, stem hispid, 3-angled. Leaves 10-12 x 6-8 cm, ovate, acute at apex, rounded or truncate at base, glabrous above, densely tomentose below; nerves prominent beneath. Racemes 25-30 cm long, axillary, villous; pedicels 2-5 together; flowers pale blue; calyx lobes acute; standard acute at base, retuse at apex. Pods straight, 8-jointed; joints ca. 2.5 x 2.5 mm, moniliform, glabrous, black.

Flowering & Fruiting: October-December.

Distribution: Paleotropics. Common; in moist deciduous forests . *RNMK 2058,* Muthanga.

Desmodium heterocarpon (L.) DC., Prodr. 2: 337. 1825; Van Meeuwen, Reinwardtia 6: 251. 1962; Ansari, Fl. Kasaragod Div. 126. 1985; Manilal, Fl. Silent Valley 76. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 137. 1988; Vajr., Fl. Palghat Dist. 157. 1990; Sanjappa, Leg. India 154. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 139. 1996; Sivar. & P. Mathew, Fl. Nilambur 193. 1997; Mohanan & Sivad., Fl. Agasthyamala 205. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 174. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 219. 2009. *Hedysarum heterocarpon* L., Sp. Pl. 747. 1753. *Hedysarum polycarpum* Poir. in Lamk., Encycl. 6: 431. 1805. *Desmodium polycarpum* (Poir.) DC., Prodr. 2: 334. 1825; Wight, Ic. t. 406. 1840; Baker in Hook. f., Fl. Brit. India 2: 171. 1876; Gamble, Fl. Pres. Madras 346(244).1918. *Desmodium patens* Wight, Ic. t. 407. 1840.

Erect herbs; stem strigose. Leaflets 6-7 x 3-3.5 cm, elliptic, obtuse at apex, rounded at base, pubescent below, glaucous, nervules parallel; stipules ca. 1.8 cm long, lanceolate, subulate above. Raceme 15-20 cm long, axillary, densely adpressed-strigose; flowers densely arranged; bracts ovate, acuminate; calyx lobes ovate, acute, standard obovate, pink. Pods ca. 2 cm long, 6-8 jointed; joints squarish, pubescent.

Flowering & Fruiting: October-December.

Distribution: Indo-Malesia, China and Japan. Common in semi-evergreen forests. *RNMK* 1049, Chooralmala; *RNMK 1267*, Manikkunnumala.

Desmodium heterophyllum (Willd.) DC., Prodr. 2: 334. 1825; Gamble, Fl. Pres. Madras 347(245). 1918; Van Meeuwen, Reinwardtia 6: 251. 1962; Manilal & Sivar., Fl. Calicut 84. 1982; V. S. Ramach. & V. J. Nair, Fl.

Cannanore 138. 1988; Vajr., Fl. Palghat Dist. 157. 1990; Sanjappa, Leg. India 155. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 140. 1996; Sivar. & P. Mathew, Fl. Nilambur 194. 1997; Mohanan & Sivad., Fl. Agasthyamala 206. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 174. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 219. 2009. *Hedysarum heterophyllum* Willd., Sp. Pl. 3: 620. 1802. *Desmodium triflorum* (L.) DC. var. *majus* Wight & Arn., Prodr. 229. 1834; Wight, Ic. t. 291. 1840.

Trailing herbs; stem densely villous, reddish. Terminal leaflets 2-2.5 x 1-1.2 cm, elliptic, obtuse, glabrous above; petiole ca. 1.5 cm long; lateral leaflets smaller, stipule lanceolate, ciliate. Racemes axillary, 1-3-flowered; pedicel ca. 1.3 cm long, slender, villous; flowers blue; calyx 3-4 mm long, lobes long-ciliate; standard 5-6 mm across; stamens diadelphous. Pods 2-2.5 x 0.3-0.4 cm, joints strongly reticulate, thinly pubescent.

Flowering & Fruiting: June-December.

Distribution: Indo-Malesia and China. Common; in moist deciduous forests. *RNMK* 2524, Muthanga; *RNMK 1417,* Nadavayal.

Desmodium laxiflorum DC., Ann. Sci. Nat. (Paris) 4: 100. 1825 & Prodr. 2: 335. 1825; Baker in Hook. f., Fl. Brit. India 2: 164. 1876; Gamble, Fl. Pres. Madras 344(243). 1918; Manilal & Sivar., Fl. Calicut 85. 1982; Ansari, Fl. Kasaragod Div. 127. 1985; Manilal, Fl. Silent Valley 77. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 138. 1988; Vajr., Fl. Palghat Dist. 158. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 140. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 175. 2005. *Desmodium recurvatum* (Roxb.) Graham ex Wight & Arn., Prodr. 226. 1834; Wight, Ic. t. 374. 1840; *Hedysarum recurvatum* Roxb., Fl. Ind. 3: 358. 1832.

Subshrubs, 35-40 cm high; stems angled, adpressed-hairy. Terminal leaflet 10-13 x 8-10 cm, ovate, acute at apex, rounded at base, densely hairy below, glabrate above; petiole 4-5 cm long; stipules 7-8 mm long, lanceolate; stipels filiform. Racemes 25-30 cm long, axillary or terminal; rachis hairy; flowers solitary or paired, pink; calyx hairy; standard emarginate. Pods 6-9 jointed; oblong, longitudinally striate.

Flowering & Fruiting: September-January.

Distribution: India to Thaiwan, Malesia. Common; in moist deciduous forests. *RNMK 3198,* Begur.

Desmodium motorium (Houtt.) Merr., J. Arnold Arbor. 19: 345. 1938; Van Meeuwen, Reinwardtia 6: 254. 1962; Manilal & Sivar., Fl. Calicut 85. 1982; Manilal, Fl. Silent Valley 78. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 139. 1988; Vajr., Fl. Palghat Dist. 158. 1990; Sanjappa, Leg. India 158. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 140. 1996; Sivar. & P. Mathew, Fl. Nilambur 195. 1997; Mohanan & Sivad., Fl. Agasthyamala 207. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 175. 2005. *Hedysarum motorium* Houtt., Nat. Hist. (ed. 2) 10: 246. 1779. *Desmodium gyrans* (L. f.)

DC., Prodr. 2: 326. 1825; Wight, Ic. t. 294. 1840; Baker in Hook. f., Fl. Brit. India 2: 174. 1876; Gamble, Fl. Pres. Madras 348(245). 1918. *Hedysarum gyrans* L. f., Suppl. Pl. 332. 1781. *Codariocalyx motorium* (Houtt.) Ohashi, J. Jap. Bot. 40: 367. 1965.

Shrubs, 1-1.5 m tall. Terminal leaflets 6-7 x 2-2.5 cm, elliptic-oblong, obtuse at either ends, glabrous above, tomentose below; nerves 6-8 pairs, regular; lateral leaflets 1.3-1.5 x 0.2-0.3 cm, oblong, folding. Raceme 16-20 cm long, axillary and terminal; bracts ovate, acute; flowers ca. 1 cm across, shortly pedicelled, pink; standard orbicular; wings curved; keel glabrous. Pods 4-5 x 0.5-0.6 cm, oblong, slightly curved, 6-8 jointed, minutely pubescent.
Flowering & Fruiting: October-January.
Distribution: India to Malesia and Australia. Occasional; in semi-evergreen and moist deciduous forests. *RNMK* 1356, Thirunelli; *RNMK 2378*, Baveli; *RNMK 2565*, Mundakai.

Desmodium pulchellum (L.) Benth., Fl. Hongk. 83. 1861; Baker in Hook. f., Fl. Brit. India 2: 162. 1876; Gamble, Fl. Pres. Madras 344(243). 1918; Van Meeuwen, Reinwardtia 6: 256. 1962; Sanjappa, Leg. India 160. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 140. 1996; V. S. Ramach. & V. J. Nair, Fl. Cannanore 139. 1988; Vajr., Fl. Palghat Dist. 158. 1990; Sivar. & P. Mathew, Fl. Nilambur 195. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 175. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 220. 2009. *Hedysarum pulchellum* L., Sp. Pl. 747. 1753. *Phyllodium pulchellum* (L.) Desv., J. Bot. ser. 2, 1: 124. 1813; Mohanan & Sivad., Fl. Agasthyamala 215. 2002.

Erect shrubs, 1-1.5 m tall; stems and branches arching. Leaflets 8-10 x 5-6 cm, obovate, obtuse at apex, acute at base, thinly hairy above, densely below. Racemes panicled, terminal or subterminal, 25-30 cm long; floral leaves bifarious, 1-1.2 cm across, orbicular, hispid, with one filiform appendage at base; flowers 1-3 together; bracts and bracteoles minute; standard pale blue, glabrous. Pods 2-jointed, 6-7 mm long, joints orbicular, glabrous.
Flowering & Fruiting: September-February.
Distribution: Tropical Asia and Australia. Occasional; in semi-evergreen and moist deciduous forests. *RNMK 2469*, Manikkunnumala; *RNMK 2097*, Begur.

Desmodium repandum (Vahl) DC., Prodr. 2: 334. 1825; Manilal, Fl. Silent Valley 78. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 140. 1988; Sanjappa, Leg. India 161. 1992; Sivar. & P. Mathew, Fl. Nilambur 196. 1997; Mohanan & Sivad., Fl. Agasthyamala 207. 2002. *Hedysarum repandum* Vahl, Symb. Bot. 2: 82. 1791. *Desmodium scalpe* DC., Prodr. 2: 334. 1825; Baker in Hook. f., Fl. Brit. India 2: 165. 1876; Gamble, Fl. Pres. Madras 345(243). 1918. *Desmodium strangulatum* Wight & Arn., Prodr. 228. 1834.

Undershrubs; branches slender. Leaves few; leaflets 18-20 x 5-6 cm, ovate, acuminate, rounded at base, glabrous above, adpressed pubescent below; nerves finely reticulated below; stipules ovate, acuminate. Flowers in panicled

racemes, terminal or axillary; rachis tomentose, 20-25 cm long; calyx 4-lobed, campanulate; standard reddish, orbicular, retuse at apex. Joints of pod 2 or 3, ca. 1.5 x 0.6 cm, falcate, densely covered with hooked hairs.
Flowering & Fruiting: December-April.
Distribution: Paleotropics. Occasional; in moist deciduous and semi-evergreen forests. *RNMK 3218,* Tholpetty; *RNMK 1650*, Pookodu.

Desmodium triangulare (Retz.) Merr., J. Arnold Arbor. 23: 170. 1942; Van Meeuwen, Reinwardtia 6: 261. 1962; Ansari, Fl. Kasaragod Div. 127. 1985; Manilal, Fl. Silent Valley 78. 1988; Sanjappa, Leg. India 162. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 141. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 176. 2005. *Hedysarum triangulare* Retz., Obs. Bot. 3: 40. 1783. *Desmodium cephalotes* (Roxb.) Wall. ex Wight & Arn., Prodr. 224. 1834; Baker in Hook. f., Fl. Brit. India 2: 161. 1876; Gamble, Fl. Pres. Madras 344(242). 1918. *Desmodium triangulare* (Retz.) Merr. var. *congestum* (Prain) Sant., Kew Bull. 1948: 276. 1948; V. S. Ramach. & V. J. Nair, Fl. Cannanore 140. 1988; Vajr., Fl. Palghat Dist. 159. 1990; Sivar. & P. Mathew, Fl. Nilambur 196. 1997; Mohanan & Sivad., Fl. Agasthyamala 208. 2002.

Shrubs; branchlets triangulare, adpressed hairy. Leaflets subequal, 7-9 x 3-4 cm, elliptic, acuminate, hairy when young; nerves 8-10 pairs, regular; petiole ca. 3 mm long; stipules ca. 1 cm long, ovate, acuminate. Flowers many-together, in axillary clusters; upper calyx lobes united and longer than the others; petals white; standard orbicular, glabrous; wings obovate; keels glabrous. Pods 2-2.5 cm long, curved, crenate; joints 4-6, adpressed tomentose.
Flowering & Fruiting: September-January.
Distribution: Indo-Malesia and China. Occasional; in moist deciduous forests. *RNMK 1417,* Nadavayal; *RNMK 2523,* Kuruva.

Desmodium triflorum (L.) DC., Prodr. 2: 334. 1825; Baker in Hook. f., Fl. Brit. India 2: 173. 1876; Gamble, Fl. Pres. Madras 347(245). 1918; Van Meeuwen, Reinwardtia 6: 261. 1962; Manilal & Sivar., Fl. Calicut 84. 1982; Ansari, Fl. Kasaragod Div. 128. 1985; Manilal, Fl. Silent Valley 79. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 140. 1988; Vajr., Fl. Palghat Dist. 159. 1990; Sanjappa, Leg. India 163. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 141. 1996; Sivar. & P. Mathew, Fl. Nilambur 197. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 176. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 222. 2009. *Hedysarum triflorum* L., Sp. Pl. 249. 1753. *Desmodium triflorum* (L.) DC. var. *minus* Wight & Arn., Prodr. 229. 1834; Wight, Ic. t. 292. 1840.

Prostrate herbs; branches trailing, slender, pilose. Leaflets 4-6 x 4-5 mm, orbicular, obtuse to retuse, pubescent below; stipule 4-5 mm long, ovate; flowers 3-4 mm across, 3-5 in short axillary raceme; calyx 5-lobed; standard orbicular, pink; wings obovate; keel glabrous. Pod 0.7-1 cm long, straight; joints 4-6, squarish, hooked-pubescent.

Flowering & Fruiting: July-December.
Distribution: Indo-Malesia and Australia. Common in open moist areas, semi-evergreen and moist deciduous forests. *RNMK 1950,* Puthoorvayal; *RNMK 2007,* Manikkunnumala.

Desmodium triquetrum (L.) DC., Prodr. 2: 326. 1825; Baker in Hook. f., Fl. Brit. India 2: 163. 1876,p.p.; Gamble, Fl. Pres. Madras 345(244). 1918; Manilal & Sivar., Fl. Calicut 85. 1982; Ansari, Fl. Kasaragod Div. 128. 1985; Manilal, Fl. Silent Valley 79. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 141. 1988; Vajr., Fl. Palghat Dist. 159. 1990; Sanjappa, Leg. India 163. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 141. 1996; Sivar. & P. Mathew, Fl. Nilambur 198. 1997; Mohanan & Sivad., Fl. Agasthyamala 208. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 177. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 220. 2009. *Hedysarum triquetrum* L., Sp. Pl. 746. 1753. *Tadehagi triquetrum* (L.) Ohashi, Ginkgoana 1: 290. 1973.

Erect subshrubs, 1-1.5 m tall, sparsely branched; stem scabrous, triquetrous. Leaves 9-11 x 2.5-3 cm, oblong, acuminate, cordate at base, pubescent; petiole 1.3-1.5 cm long, wing broad; stipule ca. 2 cm long, lanceolate. Raceme 35-40 cm long, terminal, rarely branched at base; bracts ca. 1 cm long, lanceolate; flowers subsessile; calyx lobes very unequal; petals pink, standard clawed; keel spurred, pink. Pod 2-2.5 x 0.5-0.6 cm, oblong, scabrous, straight.
Flowering & Fruiting: July-December.
Distribution: Indo-Malesia to Pacific Islands and China. Occasional; in semi-evergreen forests. *RNMK 2116,* Manikkunnumala; *RNMK 2186,* Pookodu.

Desmodium velutinum (Willd.) DC., Prodr. 2: 328. 1825; Van Meeuwen, Reinwardtia 6: 264. 1962; Manilal, Fl. Silent Valley 80. 1988; Vajr., Fl. Palghat Dist. 159. 1990; Sanjappa, Leg. India 165. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 142. 1996; Sivar. & P. Mathew, Fl. Nilambur 199. 1997; Mohanan & Sivad., Fl. Agasthyamala 209. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 177. 2005. *Hedysarum velutinum* Willd., Sp. Pl. 3: 1174. 1802. *Desmodium latifolium* (Roxb. ex Ker.) DC., Prodr. 2: 328. 1825; Baker in Hook. f., Fl. Brit. India 2: 168. 1876; Gamble, Fl. Pres. Madras 346(244). 1918. *Hedysarum latifolium* Roxb. ex Ker., Bot. Reg. 5: t. 355. 1819.

Shrubs, 1-1.5 m high; stem ferrugineous-tomentose. Leaves 10-13 x 8-10 cm, broadly ovate, acute or obtuse at apex, rounded at base, densely velutinus below; nerves 6-8 pairs, regular, prominent below; stipules 3-5 mm long, cordate at base, white. Raceme terminal, panicled, 20-30 cm long; flowers 4-5 mm across, pink. Pods 2-2.5 cm long, crenate along ventral suture; joints 8-10, roundish, hirsute.
Flowering & Fruiting: October-February.
Distribution: South and southeast Asia and Africa. Occasional; in moist deciduous forests. *RNMK 2252,* Kuruva.

DOLICHOS Linnaeus

Sp. Pl. 725. 1753.

Dolichos trilobus L., Sp. Pl. 726. 1753; Manilal, Fl. Silent Valley 80. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore141. 1988; Vajr., Fl. Palghat Dist. 160. 1990; Sanjappa, Leg. India 167. 1992; Sivar. & P. Mathew, Fl. Nilambur 208. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 177. 2005. *Dolichos falcatus* Klein ex Willd., Sp. Pl. 3: 1047. 1802; Baker in Hook. f., Fl. Brit. India 2: 211. 1876; Gamble, Fl. Pres. Madras 366(259). 1918.

Slender climbers, stems strigose. Leaves 3-foliolate; leaflets unequal, 6-7 x 5-5.5 cm, broadly deltoid-ovoid, hairy, stipellate; petiole 5-6 cm long. Racemes 4-5 cm long, 2-flowered; bracts ovate, acuminate; flowers yellow; calyx 6-7 mm long, upper 2 lobes connate, hispid; petals yellow; standard ca. 1.5 cm broad, orbicular, retuse; wings ca. 1.5 x 1 cm, obovate, spurred at base; keel ca. 1.4 x 0.5 cm, oblong, beaked; stamens 9+1; ovary oblong; style densely bearded above. Pods 5.5-6 x 0.7-0.8 cm, curved, compressed, 6-8-seeded.

Flowering & Fruiting: September-January.

Distribution: Africa and east Asia. Occasional; in wayside bushes in evergreen forests. *RNMK 1411,* Thirunelli.

DUMASIA A. P. de Candolle

Ann. Sci. Nat. (Paris) 4: 96. 1825.

Dumasia villosa DC., Ann. Sci. Nat. (Pairs) 4: 96. 1825 & Prodr. 2: 241. 1825; Wight, Ic. t. 445. 1840; Baker in Hook. f., Fl. Brit. India 2: 183. 1876; Gamble, Fl. Pres. Madras 351(247). 1918; Manilal, Fl. Silent Valley 81. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 142. 1988; Vajr., Fl. Palghat Dist. 160. 1990; Sanjappa, Leg. India 167. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 142. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 178. 2005.

Twining herbs; stem retrorsely hispid. Leaves 3-foliolate; leaflets 5- 7 x 4-5 cm, rhomboid, acute or obtuse, adpressed-hairy, stipellate; petiole 6-7 cm long; stipule 7-9 mm long, lanceolate. Racemes axillary, 4-5 cm long; bracts and bracteoles subulate; flowers many, yellow; calyx tubular, glabrous; corolla yellow; standard erect, ca. 2 cm long, obovate, clawed; wings ca. 1.5 cm long, obovate, long-clawed; keel brown at apex; stamens 9+1; anthers uniform; ovary villous, many-ovuled. Pods ca. 4-5 x 0.6 cm, oblong, sub-terete, acute, stalked, glabrous; seeds 3-5, black.

Flowering & Fruiting: August-December.

Distribution: Indo-Malesia, China and Africa. Common; in margins of evergreen forests. *RNMK* 2845, Kallady-900 forests; *RNMK 1478*, Thalimala.

ERYTHRINA Linnaeus

Sp. Pl. 706. 1753.

Trees, trunk and branchlets often prickly. Leaves 3-foliolate, the lateral leaflets unequal sided; stipules small; stipels glandular. Racemes axillary and terminal, flowers clustered on the rachis; calyx spatahaceous, truncate, mouth

oblique, often split down on one side; petals much exserted; stamens 10, the vexillary stamen free or partly connate at base, alternate filaments short; ovary stipitate; ovules many; style incurved, glabrous, stigma capitate. Pods turgid.

1. Wing and keel petals about equal in length; keel petals free 2
1. Keel petal is larger than wing petals; keel petals combined ..... **E. stricta**
2. Prickles on branches few or absent; pods 1-5 seeded..... **E. subumbrans**
2. Prickles on branches many, black; pods 6-8 seeded ..... **E. variegata**

Erythrina stricta Roxb., Fl. Ind. 3: 251. 1832; Baker in Hook. f., Fl. Brit. India 2: 189. 1876; Gamble, Fl. Pres. Madras 354(250). 1918; Krukoff, J. Arnold Arbor. 53:132. 1972; Manilal, Fl. Silent Valley 81. 1988; Sanjappa, Leg. India 173. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 142. 1996; Sivar. & P. Mathew, Fl. Nilambur 211. 1997; Mohanan & Sivad., Fl. Agasthyamala 210. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 178. 2005.

Tall trees; bark corky; branchlets densely prickled. Leaves 3-foliolate; leaflets 12-15 x 11-12 cm, broadly obovate-deltoid, 3-7-nerved from the base, glabrous; petiole 15-20 cm long. Flowers 6-7 cm long, in stout axillary racemes; calyx ca. 1 cm long, spathiform, split on one side; petals red, standard elliptic, acute; wings obovate; stamens monadelphous; anthers uniform; ovary stalked; style curved. Pods 13-15 x 0.8-1 cm, oblong, cylindrical, acuminate at apex; seeds 3-6.

Flowering & Fruiting: January-May.

Distribution: India, China, Nepal, Thailand and Vietnam. Occasional; in moist deciduous forests and plantations. *RNMK 2469,* Pulpally.

Erythrina subumbrans (Hassk.) Merr., Philipp. J. Sci. 5: 113. 1910; V. S. Ramach. & V. J. Nair, Fl. Cannanore143. 1988; Sanjappa, Leg. India 173. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 143. 1996; Sivar. & P. Mathew, Fl. Nilambur 212. 1997. *Hypaphorus subumbrans* Hassk., Hort. Bogor. Desc. 198. 1858. *Erythrina lithosperma* Bl.ex Miq., Fl. Ind. Bat. 1: 209. 1859; Baker in Hook. f., Fl. Brit. India 2: 190. 1876. *Erythrina mysorensis* Gamble, Bull. Misc. Inform. Kew 1919: 222. 1919 & Gamble, Fl. Pres. Madras 354(250). 1919; Subram., Indian For. 96:527-529.1970.

Trees, up to 15 m high; branchlets terete, glabrous. Leaves trifoliate, stipules small, lateral, cup-shaped, deciduous; rachis 10.5-17.5 cm long; stipels gland-like; lamina 8-16 x 3.8-10.5 cm, terminal leaflets broadly elliptic-obovate or rhomboid, apex acuminate, glabrous, 3-ribbed from the base, lateral nerves 5-9 pairs, intercostae scalariform. Flowers 3 cm long, orange-red, in terminal pyramidal racemes, 8-10 cm long; bracts and bracteoles lanceolate; calyx erect, split halfway down; tube 2-lipped; standard petals 2.5-3.5 cm long, oblanceolate; wings and keel ca. 1.5 cm long; stamens 9 +1, diadelphous, sheath ca. 1.5 cm, alternately long and short; anthers uniform. Fruit a pod, 8-12 x 1.5-2 cm, narrow-oblong, turgid, proximate half seedless, distal half with 1-5 seeds.

Flowering & Fruiting: January-May.
Distribution: Originally from Malesia, now common along Western Ghats. Common; in degraded evergreen forests and plantations. *RNMK 2674,* Vythiri.

Erythrina variegata L. in Stickman, Herb. Amboin. 10. 1754; Vajr., Fl. Palghat Dist. 161. 1990; Sanjappa, Leg. India 173. 1992. *Erythrina variegata* L. var. *orientalis* (L.) Merr., Interpr. Herb. Amboin. 276. 1917; Manilal & Sivar., Fl. Calicut 90. 1982; Sanjappa, Leg. India 173. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 143. 1996; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 224. 2009. *Erythrina indica* Lamk., Encycl. 2: 391. 1786; Baker in Hook. f., Fl. Brit. India 2: 188. 1876; Gamble, Fl. Pres. Madras 353(249). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 142. 1988.

Small trees, bark greenish, branchlets stellately pubescent. Leaves trifoliolate; leaflets 10-15 cm across, rhomboid-ovate, apex acuminate, base rounded; petiole 20-25 cm. Racemes 10-15 cm; bracts triangular; bracteoles subulate; flowers 7-7.5 cm long; pedicles ca. 1 cm; calyx spathaceous, apically 5-toothed; corolla bright-red, standard 6-6.5 x 2-2.5 cm, oblong-elliptic, obtuse, wings obovate; keels oblong falcate, staminal sheath 3- 3.5 cm; ovary pubescent.
Flowering & Fruiting: March-April.
Distribution: Indo-Malesia, China and Africa. Common; in plantations. *RNMK 2875,* Kalpetta.

FLEMINGIA Roxburgh ex W. Aiton et E. T. Aiton
Hortus Kew. ed. 2, 4: 349. 1812, *nom. cons.*

Shrubs. Leaves 1-3-foliolate; leaflets equal, usually 3-5-nerved from the base; stipule lanceolate, striate. Flowers in terminal or axillary racemes or panicles; bracts prominent, foliaceous; bracteoles minute; sepals 5, equal or one larger than other, connate at base; petals included or slightly exerted; standard orbicular, emarginate, auricled at base; wings curved-oblong; keel obovate, clawed; stamens 9 + 1; ovary 2-ovuled, sessile; style slender; stigma capitate. Pods oblong, turgid, oblique; seeds 2, sub-orbicular.

1. Leaves unifoliolate; flowers hidden within a persistent floral bracts .... **F. strobilifera**
1. Leaves 3-foliolate; flowers exposed from floral bracts 2
2. Trailing herbs; flowers in terminal heads; pod 1- seeded..... **F. nilgheriensis**
2. Erect undershrubs or shrubs; flowers in subcapitate axillary racemes; pod 2-seeded 3
3. Stem angular; leaflets glabrous except on nerves beneath ..... **F. macrophylla**
3. Stem terete; leaflets pubescent or tomentose beneath.....4
4. Sepals with yellow glands; pods glandular..... **F. wallichii**
4. Sepals with red glands; pods not glandular ..... **F. grahamiana**

Flemingia grahamiana Wight & Arn., Prodr. 242. 1834; Baker in Hook. f., Fl. Brit. India 2: 228. 1876; Gamble, Fl. Pres. Madras 378(267). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore144.1988; Sanjappa, Leg. India 175.1992. *Maghania grahamiana* (Wight & Arn.) O.Kuntze, Ren.Gen. Pl. 1199.1891.

Shrubs, stem scabrous, younger parts tomentose. Leaflets 8-10 x 4-5 cm, obovate, obtusely acute, grey-tomentose beneath; nerves 7-8 pairs, very prominent beneath, impressed above, reticulate; petiole 5-6 cm long, triquetrous. Racemes 3-5 cm long, 1-3 together, densely yellowish brown hairy; bracts ovate; flowers densely arranged, shortly pedicelled; calyx 6-8 mm long, densely red-glandular, lobes lanceolate; standard obovate, acute; wings linear-oblong; ovary densely hairy.
Flowering & Fruiting: November-December.
Distribution: India and Tropical Africa. Occasional; in evergreen forests. *RNMK 2715,* Brahmagiri.

Flemingia macrophylla (Willd.) Prain ex Merr., Philipp. J. Sci. 5: 130. 1910; Manilal & Sivar., Fl. Calicut 91. 1982; Manilal, Fl. Silent Valley 82. 1988; Sanjappa, Leg. India 176. 1992; Sivar. & P. Mathew, Fl. Nilambur 213. 1997; Mohanan & Sivad., Fl. Agasthyamala 211. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 179. 2005. *Crotalaria macrophylla* Willd., Sp. Pl. 3: 982. 1802. *Flemingia congesta* Roxb. ex Ait.f., Hort. Kew (ed. 2) 4: 349. 1812; Baker in Hook. f., Fl. Brit. India 2: 228. 1876; Gamble, Fl. Pres. Madras 378(267). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 144. 1988. *Moghania macrophylla* (Willd.) O. Kuntze., Rev. Gen. Pl. 1: 199. 1891. *Flemingia semialata* Roxb., Fl. Ind. 3: 340. 1832; Gamble, Fl. Pres. Madras 378(267). 1918; Manilal, Fl. Silent Valley 82. 1988; Vajr., Fl. Palghat Dist. 161. 1990; Sanjappa, Leg. India 178. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 143. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 181. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 225. 2009. *Flemingia congesta* Roxb. ex Ait.f. var. *semialata* (Roxb.) Baker in Hook.f., Fl. Brit. India 2: 229. 1876, p.p. *Moghania prostrata* (Roxb.) Mukerjee, Bull. Bot. Soc. Bengal 6: 19. 1953.

Shrubs, 2-3 m tall; branches obtusely triquetrous, adpressed hairy. Leaflets ovate, lanceolate, acute, pubescent along nerves, black glandular beneath; nerves 10 pairs, lowest pair from the base, rib-like; petiole 8-11 cm long. Racemes 3-4 cm long, axillary, densely hairy; bracts ovate; flowers densely packed; calyx 7-9 mm long, hairy, black-glandular, standard ovate; wings clawed; keel obovate. Pods 1-1.2 x 0.7-0.8 cm, oblong, hispid; seeds dark brown.
Flowering & Fruiting: November-January.
Distribution: Paleotropics. Occasional; in moist deciduous and semi-evergreen forests. *RNMK 2538,* Karuvanthodu; *RNMK 1725*, Thirunelli

Flemingia nilgheriensis (Baker) Wight ex Cooke, Fl. Pres. Bombay 1: 393. 1902, "nilgiriensis"; Gamble, Fl. Pres. Madras 379(267). 1918; Manilal, Fl. Silent Valley 82. 1988; Sanjappa, Leg. India 177. 1992. *Flemingia vestita* Benth. ex Baker var. *nilgheriensis* Baker in Hook.f., Fl. Brit. India 2: 230. 1876. *Flemingia procumbens* Wight, Ic. t. 987. 1845, non Roxb., 1832.

Trailing herbs. Leaves trifoliate, leaflets 2-5 x 1-1.5 cm, elliptic-ovate, shortly acuminate, cuneate, hairy on both sides, gland dotted beneath; flowers purple in terminal heads. Pod small, glabrous; seed 1.

Flowering & Fruiting: August-January.
Distribution: Endemic to southern Western Ghats. Rare; in grasslands. *RNMK 1061,* Chembra lake area.

Flemingia strobilifera (L.) R. Br. ex Ait., Hort. Kew (ed. 2) 4: 350. 1812; Wight, Ic. t. 267. 1840; Baker in Hook. f., Fl. Brit. India 2: 227. 1876; Gamble, Fl. Pres. Madras 377(266). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 144. 1988; Manilal, Fl. Silent Valley 83. 1988; Sanjappa, Leg. India 178. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 143. 1996; Sivar. & P. Mathew, Fl. Nilambur 213. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 181. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 225. 2009. *Hedysarum strobiliferum* L., Sp. Pl. 746. 1753. *Hedysarum bracteatum* Roxb., Fl. Ind. 3: 351. 1832. *Flemingia bracteata* (Roxb.) Wight, Ic. t. 268. 1840; Gamble, Fl. Pres. Madras 378(266). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 143. 1988; Vajr., Fl. Palghat Dist. 161. 1990; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 179. 2005. *Flemingia strobilifera* (L.) R. Br. ex Ait., var. *bracteata* (Roxb.) Baker in Hook.f., Fl. Brit. India 2:227.1876.

Shrubs, 1-2.5 m high. Leaves 1-foliolate, 12-15 x 5-6 cm, ovate-lanceolate, acuminate, glabrate; nerves 7-9 pairs, lowest pair rib-like; nervules parallel; petiole 1-1.5 cm long. Racemes 15-20 cm long, axillary, axis zig-zag, tomentose; floral leaves ca. 2.5 x 0.4 cm, orbicular, cuspidate, ciliolate; flowers included, 3-6-together in short cymes, pedicelled; calyx 6-8 mm long, hairy, one lobe larger; standard orbicular, pinkish; wings white; keel clawed. Pods oblong, pubescent.
Flowering & Fruiting: November-February.
Distribution: Indo-Malesia. Common; in moist deciduous forests. *RNMK 1986,* Muthanga; *RNMK 2715*, Tholpetty.

Flemingia wallichii Wight & Arn., Prodr. 242.1834; Baker in Hook. f., Fl. Brit. India 2:229.1876; Gamble, Fl. Pres. Madras 379(267). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 145. 1988; Sanjappa, Leg. India 179. 1992. Moghania wallichii (Wight & Arn.) O. Kuntze. Rev. Gen. Pl. 1: 199. 1891.

Shrubs; branches ribbed, thinly pubescent. Leaflets 5-7 x 3-3.5 cm, obovate, acute, coriaceous, hispid along nerves below; nerves 4-5 pairs, nervules prominent; petiole 3-4 cm long, slightly winged. Racemes 3-6 cm long, axillary, hispid; bracts 6-8 x 1-2 mm, lanceolate, acuminate; flowers densely packed, shortly pedicelled; calyx 7-8 mm long, lobes densely hairy, yellow-glandular; petals light pink, standard obovate, emarginate; wings oblong, transversely verrucose; ovary hairy.
Flowering & Fruiting: February-March.
Distribution: Peninsular India and Myanmar. Rare; in evergreen forests. *RNMK 1191,* Vythiri; *RNMK 2042*, Chanthanathodu.

GEISSASPIS Wight & Arnott
Prodr. 217. 1834.

Geissaspis cristata Wight & Arn., Prodr. 218. 1834; Baker in Hook. f., Fl. Brit. India 2: 141. 1876; Gamble, Fl. Pres. Madras 324(229). 1918; Manilal &

Sivar., Fl. Calicut 83. 1982; Ansari, Fl. Kasaragod Div. 129. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 145. 1988; Sanjappa, Leg. India 181. 1992; Joseph, Aquatic Angiosp. Malabar 170. 1991; Vajr., Fl. Palghat Dist. 162. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 144. 1996; Sivar. & P. Mathew, Fl. Nilambur 175. 1997; Mohanan & Sivad., Fl. Agasthyamala 212. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 181. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 227. 2009.

Slender prostrate herbs; stem woody at base. Leaves with a terminal bristle; leaflets 0.5-0.6 x 0.2-0.3 cm, obovate, obtuse to emarginate at tip; petiole 0.3-0.5 cm long; stipules ca. 0.6 cm long, ovate, membraneos, serrate on margins. Flowers axillary, small, covered with large suborbicular bracts, ciliate with stiff haris on margins; calyx deeply 2-lipped; corolla 0.2-0.3 cm long; ovary suborbicular. Pods 1-2 jointed, joints orbicular.

Flowering & Fruiting: July-September.

Distribution: South west India to Indo-China, Sri Lanka and China. Occasional; in moist open grassy patches. *RNMK 1345,* Pookodu lake top.

INDIGOFERA Linnaeus

Sp. Pl. 751. 1753.

Herbs or shrubs, covered with adpressed or laterally attached hairs. Leaves imparipinnate or trifoliolate; leaflets opposite; stipules small, adnate to the petiole. Flowers reddish or purple, in axillary racemes or spikes, pedicelled; calyx campanulate, lobes equal or unequal; corolla exerted; standard erect, ovate or orbicular, subsessile; wings slightly adherent to keel, oblong; keel erect, spurred at base; stamens 9+1; anthers uniform, apiculate; ovary sessile; style short; stigma capitate; ovules 2-many. Pods cylindrical, linear, 1- many-seeded, usually septate between the seeds.

1. Leaves 3-foliolate, leaflets gland-dotted..... **I. prostrata**
1. Leaves pinnately 5-many foliolate, leaflets not gland dotted..... 2
2. Pods oblong or subglobose, 2-3 seeded..... **I. linnaei**
2. Pods linear, more than 4 seeded..... 3
3. Prostrate herbs; racemes 2-5 flowered..... **I. glabra**
3. Erect subshrubs or shrubs, if trailing herbs then leaflets alternate; racemes many flowered..... 4
4. Trailing herbs; leaflets alternate..... **I. endecaphylla**
4. Erect subshrubs or shrubs; leaflets opposite..... 5
5. Leaflets 15 or more; racemes pendulous..... **I. cassioides**
5. Leaflets 5-13; racemes erect..... 6
6. Racemes shorter than the leaves; pods cylindric..... **I. tinctoria**
6. Racemes more or less equal to the leaves; pods tetragonous..... **I. constricta**

Indigofera cassioides Rottl. ex. DC., Prodr. 2: 225. 1825; Manilal & Sivar., Fl. Calicut 89. 1982; Sanjappa, Leg. India 186. 1992 & Fasc. Fl. Ind. 21:29. 1995.

Indigofera pulchella Roxb., Fl. Ind. 3: 382. 1832; Baker in Hook. f., Fl. Brit. India 2: 101. 1876; Gamble, Fl. Pres. Madras 313(221). 1918.

Erect shrubs, 1-1.5 m tall. Leaves 10-13 cm long; leaflets 8-10 pairs, ca. 2 x 1 cm, obovate, emarginate, cuspidate; stipule lanceolate. Racemes 5-15 cm long, axillary, many-flowered; bracts lanceolate, subulate above; flowers 1.3-1.5 cm long, pink; calyx 3.5-4 mm long, lobes acuminate, hairy; standard obovate, glabrous; wings oblanceolate; keel ciliate at apex. Pods 2.5-3 x 0.4-0.5 cm, oblong, compressed, glabrous, cuspidate, many-seeded.

Flowering & Fruiting: July-January.

Distribution: Pakistan, India to Indo-China. Occasional; in semi-evergreen forests. *RNMK 2037,* Manikkunnumala.

Indigofera constricta (Thw.) Trimen, Cat. Ceylon Pl. 23. 1885 & Handb. Fl. Ceylon 2: 27. 1894; Gamble, Fl. Pres. Madras 312(221). 1918; Chandrabose, Bull. Bot. Surv. India 18 : 327. 1976 ; V. S. Ramach. & V. J. Nair, Fl. Cannanore 146. 1988; Sanjappa, Leg. India 187. 1992 & Fasc. Fl. Ind. 21: 41. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 145. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 182. 2005. *Indigofera flaccida* var. *constricta* Thw., Enum. Pl. Zeyl. 411. 1864; Baker in Hook. f., Fl. Brit. India 2: 99. 1876.

Erect shrubs. Leaves odd-pinnate, 10-12 cm long; leaflets usually 11, opposite, elliptic, 1.5-4 x 0.7-2 cm, base and apex rounded, mucronulate, appressed hairy, membranous. Racemes 10-12 cm long, axillary; flowers 5-6 mm long; calyx 5-toothed; corolla scarlet couloured, appressed pubescent without; ovary linear. Pods slender, 4-5 cm long, curved, constricted between seeds.

Flowering & Fruiting: August-December.

Distribution: Peninsular India and Sri Lanka. Occasional; in moist deciduous forests. *RNMK 2240,* Tholpetty.

Indigofera endecaphylla Jacq. Ic. Pl. Rar. 3: t.570. 1789, "hendecaphylla"; Baker in Hook. f., Fl. Brit. India 2: 98. 1876; Gamble, Fl. Pres. Madras 311(220). 1918. *Indigofera spicata* Forssk., Fl. Aegypt.-Arab. 138. 1775 ; V. S. Ramach. & V. J. Nair, Fl. Cannanore147. 1988; Vajr., Fl. Palghat Dist. 164. 1990; Sanjappa, Leg. India 195. 1992; Sanjappa, Fasc. Fl. Ind. 21: 123. 1995; Mohanan & Sivad., Fl. Agasthyamala 213. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 183. 2005.

Undershrubs. Leaves 4-5 cm long; leaflets 8-10 pairs, 2-3 x 5-6 mm, oblanceolate, obtuse, shortly mucronate, sessile; stipules ca. 1 cm long, subulate. Racemes 10-12 cm long, slender. Flowers 6-7 mm long; calyx lobes subulate; standard pink, hispid outside. Pods ca. 2 x 0.2 cm, compressed, marginate, rugose, seeds 5-10.

Flowering & Fruiting: September-January.

Distribution: Sri Lanka, India, Africa and Madagascar. Common; in open areas of moist deciduous forests. *RNMK 2761*, Muthanga-trijunction.

Indigofera glabra L., Sp. Pl. 751. 1743; Gamble, Fl. Pres. Madras 311(219). 1918; Ansari, Fl. Kasaragod Div. 129. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 146. 1988; Sanjappa, Leg. India 189. 1992 & Fasc. Fl. Ind. 21: 64. 1995; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 229. 2009. *Indigofera pentaphylla* Mur., Syst. Veg. (ed.13) 564. 1774; Baker in Hook. f., Fl. Brit. India 2: 95. 1876.

Procumbent, annual herbs, up to 40 cm long. Leaflets 1-1.5 cm long, obovate, obtuse. Flowers ca. 0.2 cm long, red, in axillary 3-5-flowered racemes up 1.5-2 cm long. Pods 1.5- 1.7 cm long, subcylindric, slender, 10-12 seeded.
Flowering & Fruiting: November-December.
Distribution: India, Sri Lanka and Tropical Africa. Occasional; in moist open areas. *RNMK 2348,* Puthoorvayal.

Indigofera linnaei Ali, Bot. Not. 111:549. 1958; Manilal & Sivar., Fl. Calicut 88. 1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 147. 1988; Sanjappa, Leg. India 192. 1992 & Fasc. Fl. Ind. 21: 96. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 145. 1996; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 229. 2009. *Indigofera enneaphylla* L., Mant. Pl. 2: 272. 1771, nom. illeg.; Wight, Ic. t. 403. 1840 ; Baker in Hook. f., Fl. Brit. India 2: 94. 1876; Gamble, Fl. Pres. Madras 309(218). 1918.

Creeping herbs; stem tomentose. Leaves 3.5-4 cm long; leaflets 7-10 pairs, ca. 8 x 5 mm, obovate, obtuse, tomentose, shortly petioled. Racemes ca. 1 cm long, oblong to globose, very dense; flowers 2-3 mm long, densely packed, 20-25 together in a raceme; calyx lobes hairy; petals pink, glabrous. Pods 3-5 x 1-1.5 mm, oblong, acute, hairy; seeds 2-3, angular.
Flowering & Fruiting: September-December.
Distribution: Indo-Malesia to Australia and West Africa. Common; in open moist deciduous forests. *RNMK 2136,* Muthanga; *RNMK 2091,* Kuruva.

Indigofera prostrata Willd., Sp. Pl. 3: 1226. 1802; Gamble, Fl. Pres. Madras 310(219). 1918; Ansari, Fl. Kasaragod Div. 130. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 147. 1988; Vajr., Fl. Palghat Dist. 164. 1990; Sanjappa, Leg. India 194. 1992 & Fasc. Fl. Ind. 21: 115. 1995; Sivar. & P. Mathew, Fl. Nilambur 203. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 230. 2009. *Indigofera trifoliata* sensu Baker in Hook.f., Fl. Brit. India 2: 96. 1876, p.p. non L. 1753.

Procumbent herbs, 20-25 cm long. Leaflets 0.7-1 x 0.4-0.5 cm, obovate, mucronate, glabrous above, pubescent beneath, with glandular dots. Flowers in axillary racemes, pale red. Pods 1.3-1.5 cm, straight, deflexed, glabrescent, 6-8 seeded.
Flowering & Fruiting: November-December.
Distribution: Tropical Asia and Australia. Occasional; in moist deciduous forests. *RNMK 1670,* Tholpetty.

Indigofera tinctoria L., Sp. Pl. 751. 1753; Wight, Ic. t. 365. 1840; Baker in Hook. f., Fl. Brit. India 2: 99. 1876; Gamble, Fl. Pres. Madras 312(220). 1918; Ansari, Fl. Kasaragod Div. 130. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 148. 1988; Vajr., Fl. Palghat Dist. 165. 1990; Sanjappa, Leg. India 195. 1992 & Fasc. Fl. Ind. 21: 133. 1995; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 230. 2009. *Indigofera sumatrana* Gaertn., Fruct. 2: 317. t. 148. f. 4. 1791; Gamble, Fl. Pres. Madras 312(220). 1918.

Erect subshrubs. Leaves 4-5 cm long; leaflets 4-6 pairs, 1.3-1.5 x 0.6-0.7 cm, obovate, obtuse, glaucous below, glabrous. Racemes axillary, many-flowered; flowers 7-8 mm long, pedicelled; calyx 3-4 mm long, lobes subulate; petals violet-blue, exserted, glabrous. Pods 2.3-2.5 x 0.1-0.2 cm, minutely hispid, terete; seeds many, oblong, greenish.

Flowering & Fruiting: August-December.

Distribution: Widely cultivated. Occasional; in moist deciduous forests. *RNMK* 1098, Appapara.

KUNSTLERIA Prain

in King, J. Asiat. Soc. Bengal Pt. 2. Nat. Hist. 66(2): 109. 1897.

Kunstleria keralensis Mohanan & Nair, Proc. Indian Acad. Sci. (Pl. Sci.) 90: 207. 1981; Manilal, Fl. Silent Valley 84. 1988; Sanjappa, Leg. India 199. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 146. 1996; Sivar. & P. Mathew, Fl. Nilambur 223. 1997; Mohanan & Sivad., Fl. Agasthyamala 214. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 183. 2005. **Fig. 26, Plate 14i.**

Large climbers; stems slender. Leaves imparipinnate; leaflets opposite, 9-11 14-16 x 4-5 cm, ovate-oblong, acuminate, rounded at base, membranous; nerves 4 pairs, reticulate; rachis 20-25 cm long. Flowers in terminal and axillary panicles, branches slender, rusty tomentose; bracts and bracteoles minute.; flowers distantly packed; calyx 3-4 mm long, campanulate, rusty tomentose; petals brownish, 5-6 mm across; standard orbicular, glabrous; stamens 9 + 1; anthers uniform; ovary sessile, few-ovuled. Pods 9-11 x 2 cm, flat, oblong obtuse, prominently reticulate; seed 1, oblong.

Flowering & Fruiting: April-June.

Distribution: Endemic to southern Western Ghats (Kerala). Occasional; in evergreen forests. *RNMK 1270,* Vythiri Ghat; *RNMK 1134*, Periya.

MUCUNA Adanson

Fam. 2: 325, 579. 1763, *nom. cons.*

Twining herbs or shrubs. Leaves 3-foliolate; leaflets subequal or equal, petiolate; stipel minute, stipule deciduous. Flowers in large drooping racemes, closely packed, pedicellate; calyx campanulate, lobes ovate, acute, upper two lobes united; standard orbicular, smaller than wings and keel, clawed; wings oblong, shortly clawed; keel linear-oblong, curved, coriaceous, auricled at base; stamens 5 + 1, anthers dimorphous; ovary linear-oblong, densely, hispid; style recurved; stigma capitate; ovules 1-few. Pod orbicular to oblong, covered with bristles or tomentose. Seeds 1-few, orbicular.

1. Woody climbers; pods broadly ellipsoid..... 2
1. Herbaceous climbers; pods cylindric, curved .....**M. pruriens**
2. Pods obliquely plaited on their faces; bristles of pod orange-red..... **M. monosperma**
2. Pods not plaited; bristles of pod yellowish-brown.....**M. gigantea**

Mucuna gigantea (Willd.) DC., Prodr. 2: 405. 1825; Baker in Hook. f., Fl. Brit. India 2: 186. 1876; Gamble, Fl. Pres. Madras 355(251). 1918; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 138. 1988 ; Nair *et al.*, J. Econ. Tax. Bot. 2: 224. 1981; Manilal & Sivar., Fl. Calicut 91. 1982; Sanjappa, Leg. India 216. 1992; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 186. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 233. 2009. *Dolichos giganteus* Willd., Sp. Pl. 3: 1041. 1800. **Fig. 27, Plate 14j.**

Woody climbers. Leaflets ovate-oblong, 8-12 x 5-8 cm, base obtuse, apex cuspidate, thin coriaceous. Racemes long peduncled; flowers many, dense, calyx reddish tomentose; corolla greenish-yellow, 3.5-4 cm long. Pods flat, 10-12 x 4-5 cm, densely clothed with yellowish bown bristles.

Flowering & Fruiting: December-March.

Distribution: Indo-Malesia, Australia to the Pacific Islands. Rare; in semi-evergreen forests. *RNMK 1095,* Thirunelli.

Mucuna monosperma DC. ex Wight, Bot. Misc. 2: 346. Suppl. t.12. 1831; Baker in Hook. f., Fl. Brit. India 2: 185. 1876; Gamble, Fl. Pres. Madras 355(251). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 149. 1988; Vajr., Fl. Palghat Dist. 166. 1990; Sanjappa, Leg. India 216. 1992; Sivar. & P. Mathew, Fl. Nilambur 215. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 186. 2005. *Carpopogon monospermum* (DC. ex Wight) Roxb., Fl. Ind. 3: 283. 1832.

Stout climbers; stems terete. Leaflets 10-11 x 6-6.5 cm, ovate, abruptly acuminate, rounded to subcordate at base, hispid below; nerves 4-6 pairs; petiole 7-8 cm long; stipules ovate, densely hispid. Racemes 8-10 cm long, drooping; flowers few, greenish white; calyx ca. 1.5 cm long, lobes lanceolate, hairy, standard ca. 1 cm across, orbicular; wings ca. 3 cm long, linear-oblong, curved. Pods 6-7 x 5-6 cm, woody, compressed, winged along the margins, transversely ridged on sides, densely covered with strong reddish-brown bristles.

Flowering & Fruiting: January-April.

Distribution: Indo-Malesia. Occasional; in reverine forests. *RNMK* 2526, Karuvanthodu; *RNMK 2098*, Banasuramala.

Mucuna pruriens (L.) DC., Prodr. 2: 405. 1825; Baker in Hook. f., Fl. Brit. India 2: 187. 1876; Manilal & Sivar., Fl. Calicut 92. 1982; Manilal, Fl. Silent Valley 84. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 149. 1988; Vajr., Fl. Palghat Dist. 167. 1990; Sanjappa, Leg. India 217. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 147. 1996; Sivar. & P. Mathew, Fl. Nilambur 216. 1997;

Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 186. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 233. 2009. *Dolichos pruriens* L. in Stickman, Herb. Amboin. 23. 1754 & Syst. Nat. (ed. 10) 1162. 1759. *Stizolobium pruriens* (L.) Medik., Vorels. Churpfalz. Phys.-Ocon. Ges. 2: 339. 1787; Ansari, Fl. Kasaragod Div. 134. 1985. *Mucuna prurita* Hook., Bot. Misc. 2: 348. 1831; Gamble, Fl. Pres. Madras 356(251). 1918.

Herbaceous climbers, stem densely hispid. Leaflets 10-13 x 8-8.5 cm, broadly ovate, acute at base and apex, fulvous-tomentose; nerves 6-8 pairs; lateral leaflets inequilateral; petiole 12-12.5 cm long, hispid, stipule lanceolate. Racemes 15-17 x 9-10 cm, densely hispid. Flowers 3-together, 4-4.5 cm long; calyx ca. 1.5 cm long, lobes ovate, densely hispid; standard 2-2.2 cm across, wings oblong; keel linear-oblong, curved, acute at apex. Pods 6-7 x 1-1.5 cm, compressed, densely covered with black bristles.

Flowering & Fruiting: October-February.

Distribution: India, Myanmar and Sri Lanka. Occasional; in forest clearings. *RNMK 1925,* Karuvanthodu.

NEONOTONIA Lackey

Phytologia 37: 210. 1977.

Neonotonia wightii (Graham ex Wight & Arn.) Lackey, Phytologia 37: 209. 1977, var. **wightii**; Vajr., Fl. Palghat Dist. 162. 1990; V. S. Ramach. & V. J. Nair, Fl. Cannanore 149. 1988; Sanjappa, Leg. India 219. 1992; Sivar. & P. Mathew, Fl. Nilambur 217. 1997. *Notonia wightii* Graham ex Wight & Arn., Prodr. 208. 1834. *Glycine javanica* sensu Baker in Hook.f., Fl. Brit. India 2: 183. 1876,p.p. non L. 1753; Gamble, Fl. Pres. Madras 351(248). 1918. *Glycine wightii* (Graham ex Wight & Arn.) Verdc., Taxon 15: 35. 1966; Vajr., Fl. Palghat Dist. 162. 1990.

Stout climbers. Leaves 3-foliolate; leaflets equal, 6-8 x 5-6 cm, ovate, acute, pubescent. Racemes erect, 22-25 cm long, axillary. Flowers 8-9 mm long, densely clustered; bracts and bracteoles striate; calyx 4-5 mm long, lobes lanceolate; petals white, standard obovate; wings oblong, appendaged at base, keel obovate; stamens 10, monadelphous; anthers uniform; ovary densely hairy, 4-6 ovuled; style stout, stigma fimbriate. Pods 4-5 x 0.5-0.6 cm, oblong, deflexed, densely hairy, depressed between seeds; seeds oblong.

Flowering & Fruiting: November-December.

Distribution: Peninsular India, Sri Lanka and Africa. Occasional; in moist deciduous forests. *RNMK* 1511, Begur.

ORMOCARPUM Palisot de Beauvois

Fl. Oware 1: 95. 1810, *nom. cons.*

Ormocarpum cochinchinense (Lour.) Merr., Philipp. J. Sci. 5: 76. 1910; Sanjappa, Leg. India 222. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 148. 1996. *Diphaca cochinchinensis* Lour., Fl. Cochinch.454. 1790. *Ormocarpum sennoides* (Willd.) DC., Prodr. 2: 314. 1825; Wight, Ic. t. 297. 1840; Baker in

Hook. f., Fl. Brit. India 2: 152. 1876,p.p.; Gamble, Fl. Pres. Madras 332(234). 1918; V. S. Ramach. *et al.,* J. Econ. Tax. Bot. 3: 659. 1982; Ansari, Fl. Kasaragod Div. 131. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 150. 1988. *Hedysarum sennoides* Willd., Sp. Pl. 3: 1207. 1802.

Erect subshrubs. Leaves pinnately 10-13-foliolate; leaflets alternate, 2-3 x 1-1.2 cm, obovate-oblong, obtuse; petiole slender; stipule ovate. Flowers in slender axillary, 6-10 cm long, racemes; bracts ovate; calyx 6-7 mm long, lobes ovate, acute, hairy; corolla 8-9 mm, long, pink; standard clawed, wings orbicular, auricled; stamens monadelphous, spitting later; ovary linear, many-ovuled, hispid. Pods 2-3 cm long, 1-4 jointed; joints oblong with soft echinate process.

Flowering & Fruiting: August-November.

Distribution: Peninsular India and Sri Lanka. Occasional; in semi-evergreen forests. *RNMK 1523,* Chooralmala.

PARACALYX Ali

Univ. Stud. Karachi 5: 95. 1968.

Paracalyx scariosa (Roxb.) Ali, Univ. Studies Karachi 5: 95. 1968; V. S. Ramach. & V. J. Nair, Fl. Cannanore 150. 1988; Sanjappa, Leg. India 227. 1992. *Cylista scariosa* Roxb., Pl. Corom. 1: 64. t.92. 1795; Baker in Hook. f., Fl. Brit. India 2: 219. 1876; Gamble, Fl. Pres. Madras 371(262). 1918; Wight, Ic. t. 1957. 1850.

Twining shrubs; stem densely villous. Leaves 3-foliolate; leaflets 4-5 x 2-2.5 cm, ovate, acute, densely hispid below, petiole 4-5 cm long; stipules ovate. Racemes 8-10 cm long, axillary, many-flowered; flowers 3-3.5 cm long; calyx 2-lipped; upper lip smaller, 2-lobed; lower lip 3-lobed; middle lobe boat-shaped; reticulate, scarious; petals included, standard obovate, deeply auricled at base, hispid, yellow; wings oblong; keel obovate, clawed. Stamens 9+1; ovary sessile, hispid, 1-ovuled; style hairy at base, swollen at middle. Pods falcate-ovate, hairy.

Flowering & Fruiting: February-May.

Distribution: Nepal, India, Myanmar and Thailand. Occasional; in moist deciduous forests. *RNMK 2529,* Pulpally; *RNMK 2013*, Chedalayam.

PONGAMIA Ventenat

Jard. Malm. t. 28. 1803, *nom. cons.*

Pongamia pinnata (L.) Pierre, Fl. Forest. Cochinch. sub. t. 385. 1899; Thoth., Bull. Bot. Surv. India 3:418. 1962; Manilal & Sivar., Fl. Calicut 79. 1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 151. 1988; Vajr., Fl. Palghat Dist. 167. 1990; Sanjappa, Leg. India 230. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 148. 1996; Sivar. & P. Mathew, Fl. Nilambur 224. 1997; Mohanan & Sivad., Fl. Agasthyamala 215. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 187. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 234. 2009. *Cytisus pinnatus* L., Sp. Pl. 741. 1753. *Pongamia glabra* Vent., Jard.

Malm. 28. t.28.1803; Baker in Hook. f., Fl. Brit. India 2:240.1876; Gamble, Fl. Pres. Madras 385(272). 1918. *Derris indica* (Lamk.) Bennet, J. Bombay Nat. Hist. Soc. 68. 303. 1971; Ansari, Fl. Kasaragod Div. 125. 1985. *Galedupa indica* Lamk., Encycl. 2:594.1788.

Trees, branchlets lenticellate. Leaves paripinnate; leaflets 3-6 pairs, 6-9 x 3-4.5 cm, elliptic, apex acuminate, nerves 7- 8 pairs; petiole 1-1.5 cm, thick, stipules oblong. Racemes panicled, 12-15 cm, axillary and terminal; flowers pinkish-white; calyx tube campanulate, truncate; standard petal obovate; wings oblong; keel obtuse; staminal tube 7-8 mm; ovary subsessile, pubescent, style incurved, stigma capitate. Pods 4-5 x 2.5-3 cm, obliquely oblong, woody, indehiscent.

Flowering & Fruiting: April-December.

Distribution: Indo-Malesia. Occasional; in semi-evergreen and moist deciduous forests. *RNMK 1267,* Muthanga; *RNMK 2390,* Chooralmala.

PSEUDARTHRIA R. Wight & Arnott

Prodr. 209. 1834.

Pseudarthria viscida (L.) Wight & Arn., Prodr. 209. 1834; Wight, Ic. t. 286. 1840; Baker in Hook. f., Fl. Brit. India 2: 154. 1876; Gamble, Fl. Pres. Madras 334(236). 1918; Ansari, Fl. Kasaragod Div. 131. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 151. 1988; Vajr., Fl. Palghat Dist. 168. 1990; Sanjappa, Leg. India 230. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 149. 1996; Sivar. & P. Mathew, Fl. Nilambur 199. 1997; Mohanan & Sivad., Fl. Agasthyamala 216. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 187. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 235. 2009. *Hedysarum viscidum* L., Sp. Pl. 747. 1753.

Erect subshrubs, viscid pubescent. Leaves 3-foliolate, leaflets 7-10 x 6-7 cm, broadly ovate, acute, rounded at base, stipellate; petiole 7-8 cm long; stipule lanceolate. Flowers in terminal or axillary raceme; bracts minute; calyx 2-lipped, lobes lanceolate; petals red; standard 6-7 mm diam., orbicular, retuse; wings 3-4 mm long, oblong; keel glabrous; stamens 9+1; ovary sessile, many-ovuled; style inflexed. Pods 2-3 cm long, oblong, compressed, viscid hairy; seeds 3-5, reniform.

Flowering & Fruiting: November-March.

Distribution: Peninsular India and Sri Lanka. Occasional; in semi-evergreen and moist deciduous forests. *RNMK 1230,* Manikkunnumala; *RNMK 2451,* Chedalayam.

PTEROCARPUS N. J. Jacquin

Sel. Strip. Amer. Hist. 283. 1763, *nom. cons.*

Pterocarpus marsupium Roxb., Pl. Corom. t. 116. 1799; Baker in Hook. f., Fl. Brit. India 2: 239. 1876; Gamble, Fl. Pres. Madras 385(271). 1918; Rojo, Pterocarpus 58. 1972; Ansari, Fl. Kasaragod Div. 132. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 152. 1988; Vajr., Fl. Palghat Dist. 168. 1990;

Sanjappa, Leg. India 232. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 149. 1996; Sivar. & P. Mathew, Fl. Nilambur 187. 1997; Mohanan & Sivad., Fl. Agasthyamala 217. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 188. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 235. 2009.

Large trees; bark rough, black, reddish inside, red exudate. Leaves pinnate, leaflets 3-13, alternate, 7-10 x 6-7 cm, ovate-oblong, obtuse to retuse at apex, nerves many, close. Panicles 17-20 cm across, terminal, rusty tomentose; bracts ovate; flowers many, 1.5-2 cm long; calyx campanulate, shortly lobed, brown; petals yellow; standard obovate, crisped along the margins; wings obovate, auricled; keel similar to wings; stamens 5+5; ovary stalked, ovules 2, style incurved. Pods 5-6 cm across, compressed, orbicular, stalked, winged.
Flowering & Fruiting: September-December.
Distribution: India and Sri Lanka. Common; in moist deciduous forests and plantations. *RNMK 1098,* Kuruva; *RNMK 1781*, Muthanga; *RNMK 0150*, Poothady.

PUERARIA A. P. de Candolle
Ann. Sc. Nat. Ser.1. 4. 97. 1825.

Climbing shrubs; sometimes with large tuberous roots. Leaves 3-foliolate; stipules peltate or basifixed; stipels subulate. Flowers in panicles or racemes, fascicled on the rachis; bracts and bracteoles small, caduceus; calyx companulate, lobes unequal, upper two connate; petals clawed; stamens 10, monadelphous, vexillary stamen free at base; anthers uniform; ovary subsessile; ovules many; style incurved, glabrous; stigma capitate. Pods linear, septate or continous; seeds few to many.

1. Woody climbers with tuberous roots; pods brown-hirsute..... **P. tuberosa**
1. Herbaceous climbers without tuberous roots; pods glabrescent..... **P. phaseoloides**

Pueraria phaseoloides (Roxb.) Benth., J. Linn. Soc. Bot. 9: 125. 1865; Baker in Hook. f., Fl. Brit. India 2: 199. 1876; Chandrab. *Et al.*, J. Bombay Nat. Hist. Soc. 78: 630. 1981; Ansari, Fl. Kasaragod Div. 132. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore152. 1988; Sanjappa, Leg. India 234. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 150. 1996; Sivar. & P. Mathew, Fl. Nilambur 217. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 188. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 236. 2009. *Dolichos phaseoloides* Roxb., Fl. Ind. 3: 316. 1832.

Twining shrubs. Leaves 3-foliolate; leaflets unlobed, broadly obliquely ovate to rhombic-ovate, 6-10 x 5-6 cm, base cuneate, apex acute-apiculate, basally 3-nerved, lower surface appressed silky, chartaceous. Flowers subsessile, clustered on long peduncled racemes; calyx teeth short, upper 2 connate; corolla reddish pink; stamens 10, monadelpous; ovary sessile, tomentose. Pods 7-10 cm long, linear, glabrescent.
Flowering & Fruiting: October-March.
Distribution: Tropical Asia. Common; along waysides and rubber plantations: *RNMK 1295,* Vythiri.

Pueraria tuberosa (Roxb. ex Willd.) DC., Ann. Sci. Nat. (Paris) 4: 97. 1825; Wight, Ic. t. 412. 1840; Baker in Hook. f., Fl. Brit. India 2: 197. 1876; Gamble, Fl. Pres. Madras 360(254). 1918; Manilal, Fl. Silent Valley 85. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 152. 1988; Vajr., Fl. Palghat Dist. 168. 1990; Sanjappa, Leg. India 235. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 150. 1996. *Hedysarum tuberosum* Roxb. ex Willd., Sp. Pl. 3: 1197. 1803.

Woody climbers, roots tuberous. Leaves 3-foliolate, stipules peltate or basifixed; leaflets 13-18 x 10-14 cm, subequal, ovate, apex acuminate, base obtuse or acute, laterals oblique, glabrous above and glabrescent below, reticulations prominent; petiole 16-18 cm long; stipules ovate. Flowers 1-1.3 cm long, fascicled in much branched panicles; bracts caducous; calyx campanulate, brown tomentose, bluish-purple; petals clawed, standard orbicular, pale blue; stamens monadelphous, ovary densely brown-hirsute, style curved. Pods 1.5-3 cm long, linear, brown-hirsute.

Flowering & Fruiting: December-April.

Distribution: India, also in Tropical Himalayas. Common; in moist deciduous forests. *RNMK* 2892, Muthanga.

PYCNOSPORA R. Brown ex R. Wight *et* Arnott

Prodr. 197. 1834.

Pycnospora lutescens (Poir.) Schind., J. Bot. 64 : 145. 1926; Manilal, Fl. Silent Valley 85. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 153. 1988; Vajr., Fl. Palghat Dist. 169. 1990; Sanjappa, Leg. India 236. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 150. 1996; Sivar. & P. Mathew, Fl. Nilambur 200. 1997; Mohanan & Sivad., Fl. Agasthyamala 218. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 188. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 236. 2009. *Hedysarum lutescens* Poir. In Lamk., Encycl. 6: 417. 1805. *Pycnospora hedysaroides* R. Br. ex Baker in Hook. f., Fl. Brit. India 2: 153. 1876; Gamble, Fl. Pres. Madras 333(235). 1918. *Pycnospora nervosa* Wight & Arn., Prodr. 197. 1834.

Trailing herbs; stems villous. Leaves 3-foliolate; leaflets 1-3 x 0.5-1.5 cm, obovate-orbicular, retuse at apex, densely pubescent below; nerves reticulate; petiole 0.5-1 cm; stipules lanceolate; stipels filiform. Flowers in axillary or terminal slender racemes; bracts ovate, acuminate; calyx 3-4 mm long, lobes lanceolate, upper two lobes connate, petals pink; standard 5-6 mm long, orbicular, clawed; wings obliquely oblong, adnate to the keel; stamens 9+1; ovary hairy, many-ovuled; style reflexed. Pods 0.8-1 x 0.4-0.5 cm, oblong, turgid, hispid, maturing black; seeds many, reniform, smooth, black.

Flowering & Fruiting: September-December.

Distribution: Africa, Tropical Asia and Australia. Occasional; in grasslands. *RNMK 1983,* Chembra.

RHYNCHOSIA Loureiro

Fl. Cochinch. 425, 460. 1790, *nom. Cons.*

Twining herbs or shrubs. Leaves 3-foliolate; leaflets sparsely glandular beneath. Flowers in axillary racemes; bracteoles absent; calyx lobes longer

than the tube; standard petal auricled at the base; wings narrow; stamens 9+1; anthers uniform; ovary subsessile; usually 2-ovuled; style incurved; stigma terminal. Pods compressed, constricted between seds.

1. Calyx accrescent; pods 1-seeded..... **R. rufescens**
1. Calyx not accrescent; pods 2-seeded..... **R. cana**

Rhynchosia cana (Willd.) DC., Prodr. 2: 386. 1825; Baker in Hook. f., Fl. Brit. India 2: 222. 1876; Gamble, Fl. Pres. Madras 374(264). 1918; Sanjappa, Leg. India 237. 1992; Mohanan & Sivad., Fl. Agasthyamala 219. 2002. *Glycine cana* Willd., Sp. Pl. 3: 1063. 1802.

Subshrubs; branchlets glandular, pubescent. Terminal leaflets 4.5-5 x 2-2.5 cm, laterals 2.5-3 x 1-1.5 cm, ovate, acute, inequilateral, pubescent; stipule lanceolate. Flowers axillary, in pairs, yellow; pedicels 5-7 mm, deflexed; calyx tube 2-3 mm, lobes lanceolate, pubescent; corolla 6-8 mm long; ovary pubescent, stigma capitate. Pod 1.5-1.7 x 0.6-0.7 cm, oblong, puberulus to glabrous; seeds 1 or 2.

Flowering & Fruiting: December-February.

Distribution: Peninsular India and Sri Lanka. Rare; in moist deciduous forests. *RNMK 2036,* Chedalayam.

Rhynchosia rufescens (Willd.) DC., Prodr. 2: 387. 1825; Baker in Hook. f., Fl. Brit. India 2: 220. 1876; Gamble, Fl. Pres. Madras 373(263). 1918; Nooteb., Reinwardtia 5: 439. 1961; Manilal & Sivar., Fl. Calicut 91. 1982; Vajr., Fl. Palghat Dist. 170. 1990; Sanjappa, Leg. India 240. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 151. 1996; Sivar. & P. Mathew, Fl. Nilambur 218. 1997; Mohanan & Sivad., Fl. Agasthyamala 219. 2002. *Glycine rufescens* Willd., Ges. Naturf. Freunde Berlin Neue Schriften 4:222. 1803.

Subshrubs with trailing branches, glandular-hairy. Leaflets 6-6.5 x 2-2.5 cm, ovate, acute, rounded at base; petiole 4-5 cm long; stipules ovate. Flowers in short racemes; calyx 7-8 mm long, lobes oblong, obtuse; petals included, yellow; standard orbicular, glabrous; wings oblong. Pods 5-7 x 4-5 mm, ovoid, turgid, minutely hispid; seed-1, black.

Flowering & Fruiting: October-December.

Distribution: Indo-Malesia. Rare; in moist deciduous forests. *RNMK 2541,* Tholpetty.

ROTHIA Persoon

Syn. Pl. 2: 638 et Corrig. 1807.

Rothia indica (L.) Druce, Bot. Exch. Club Soc. Brit. Isles 3: 423. 1914; Manilal & Sivar., Fl. Calicut 76. 1982; Vajr., Fl. Palghat Dist. 170. 1990; Sanjappa, Leg. India 242. 1992; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 237. 2009. *Trigonella indica* L., Sp. Pl. 778. 1753. *Rothia trifoliata* (Roth) Pers., Syn. 2: 302. 1807; Baker in Hook. f., Fl. Brit. India 2: 63. 1876; Gamble, Fl. Pres. Madras 279(199). 1918. *Dillwynia trifoliata* Roth, Cat. Bot. 3:71. 1806.

Erect woody herbs, densely hispid. Leaves 3-foliolate; leaflets subsessile, 1.3-1.5 x 0.4-0.5 cm, obovate, obtuse, densely hairy; petiole 6-7 mm long; stipules 2-3 mm long, obovate. Flowers 7-9 mm long, in small axillary racemes; calyx 5-lobed, hispid, lobes lanceolate; standard obovate, pink; wings oblanceolate, without auricles at base; keel similar to wings; stamens 10, monadelphous; ovary densely hairy, many-ovuled; style straight. Pods 4-5 x 0.3-0.4 cm, linear-oblong, compressed, densely hairy; seeds many, cubical.
Flowering & Fruiting: August-December.
Distribution: Indo-Malesia and Australia. Occasional in semi-evergreen forests. *RNMK* 1670, Manikkunnumala.

SHUTERIA R. Wight & Arnott
Prodr. 207. 1834, *nom. cons.*

Shuteria involucrata (Wall.) Wight & Arn., Prodr. 207. 1834; Sanjappa, Leg. India 245. 1992. *Glycine involucrata* Wall., Pl. Asiat. Rar. 3: 22. t. 241. 1832. *Glycine involucrata* Wall. var. *glabrata* (Wight & Arn.) Ohashi, J. Jap. Bot. 50: 305. 1975. *Shuteria glabrata* Wight & Arn., Prodr. 207. 1834. *Shuteria vestita* Wight & Arn., Prodr. 207. 1834; Wight, Ic. t. 165. 1839; Baker in Hook. f., Fl. Brit. India 2: 181. 1876; Gamble, Fl. Pres. Madras 350(247). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 153. 1988; Manilal, Fl. Silent Valley 86. 1988; Vajr., Fl. Palghat Dist. 171. 1990; Sanjappa, Leg. India 245. 1992; Sivar. & P. Mathew, Fl. Nilambur 218. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 189. 2005.

Slender twiners, stem villous. Leaves 3-foliolate, leaflets unequal, 4-4.5 x 2-2.5 cm, ovate, obtuse, rounded at base, chartaceous, villous; petiole 5-6 cm long, stipules lanceolate, striate with a tuft of hairs at base. Racemes 15-20 cm long, axillary; bracts and bracteoles similar. Flowers many, white, deflexed; calyx 4-5 mm long, lobes acuminate; petals white; standard 5-7 x 4-5 mm, orbicular, wings spurred at base; keel oblong; stamens 9+1; ovary many-ovuled, densely hairy. Pods 4-5 x 0.4-0.5 cm, oblong, flat, densely hispid; seeds many, cubical.
Flowering & Fruiting: November-February.
Distribution: Indo-Malesia. Occasional; in evergreen forest margins. *RNMK 2495,* Talimala; *RNMK 2607*, Makkimala.

SMITHIA W. Aiton
Hortus Kew. 3: 496. 1789, *nom. cons.*

Herbs or undershrubs. Leaves paripinnate; rachis ending in a short bristle; leaflets oblong, 2-10 pairs, estipellate; stipules peltate. Flowers yellow or blue, in axillary unilateral racemes or in terminal heads or panicles; bracts and bracteoles persistent; calyx 2-lipped; upper lip entire or emarginate; lower lip equally 3-lobed; standard erect or recurved-oblong, clawed, auricled; wings oblong; keel obovate, curved, obtuse; stamens diadelphous of 5 each, anthers uniform; ovary many-ovuled; style filiform; stigma pointed. Pods included in the persistent calyx, divided into several 1-seeded joints; joints orbicular, turgid, folded together.

1. Stem bristly or glandular-pubescent; pods 8-12 jointed 2
1. Stem glabrous or glabrescent; pods 2-6 jointed 3
2. Diffuse herbs; leaflets 3-4 pairs ..... **S. hirsuta**
2. Erect herbs up to 1 m tall; leaflets 6-12 pairs ..... **S. setulosa**
3. Leaflets 2-3 pairs; calyx membranous with anastomosing veins 4
3. Leaflets 4-12; calyx rigid with close parallel simple veins 5
4. Leaflets 2-pairs; upper calyx-lips truncate, lower 3-lobed ..... **S. bigemina**
4. Leaflets 3-pairs; upper calyx-lips broad, lower acute ..... **S. gracilis**
5. Flowers in pairs; lomentum joints smooth ..... **S. conferta**
5. Flowers in short racemes; lomentum joints papillose ..... **S. sensitiva**

Smithia bigemina Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 208. 1851; Baker in Hook. f., Fl. Brit. India 2: 149. 1876; Gamble, Fl. Pres. Madras 329(233). 1918; Manilal, Fl. Silent Valley 87. 1988; Vajr., Fl. Palghat Dist. 172. 1990; Sanjappa, Leg. India 246. 1992; Mohanan & Sivad., Fl. Agasthyamala 220. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 190. 2005.

Diffuse herbs, stem wiry, glabrous. Leaflets ca. 1 x 0.3 cm, oblong, apex acute; stipule ca. 1 cm long. Racemes lax, peduncle 2.5-3 cm long; flowers yellow; pedicels ca. 0.5 cm long; bracts 7-8 mm long, ovate, cuspidate; calyx 2-lipped, lower 3-lobed. Lomentum reticulate, papillose.

Flowering & Fruiting: September-February.

Distribution: India and Pakistan. Rare; in moist grassy slopes. *RNMK 2224,* Banasuramala; *RNMK 2638*, Chembra.

Smithia conferta Smith in Rees, Cyclop. 33: 2. 1819; Gamble, Fl. Pres. Madras 329(232). 1918; Ansari, Fl. Kasaragod Div. 133. 1985; Steenis in Reinwardtia 5: 445. 1961; Vajr., Fl. Palghat Dist. 172. 1990; Sanjappa, Leg. India 246. 1992; V. S. Ramach. & V. J. Nair, Fl. Cannanore 154. 1988. *Smithia geminiflora* Roth, Nov. Pl. Sp. 352.1821; Baker in Hook. f., Fl. Brit. India 2:149.1876; Gamble, Fl. Pres. Madras 329(232). 1918.

Erect or scandent herbs; stems glabrous. Leaflets 5 or 6 pairs, 0.7-1.3 x 0.2-0.4 cm, oblong, acute, strongly bristled along margins and midribs below; rachis terminate into a bristle; stipule ca. 1.3 cm long, ovate above, 2-lobed below. Flowers solitary or paired, pedicelled, in axillary racemes; bracts ca. 7 mm long, ovate, cuspidate; calyx lobes undivided; petals yellow with red lineole. Pods 1.3-1.6 cm long, 3-4 jointed.

Flowering & Fruiting: November-February.

Distribution: Indo-Malesia to Australia. Common; in marshy areas. *RNMK 1358,* Kattikulam; *RNMK 1280*, Manikkunnumala.

Smithia gracilis Benth., Linnaea 24: 642. 1851; Baker in Hook. f., Fl. Brit. India 2: 150. 1876; Gamble, Fl. Pres. Madras 330(233). 1918; Sanjappa, Leg. India 247. 1992; Sivar. & P. Mathew, Fl. Nilambur 176. 1997; Mohanan & Sivad., Fl. Agasthyamala 221. 2002.

Small prostrate herbs. Leaflets 3 pairs, 0.3-0.5 x 0.1-0.3 cm, elliptic-ovate, ciliate on margins and midrib below. Racemes axillary and terminal, few flowered; bracts minuate, ca. 0.2 cm long, membraneos, ovate-lanceolate; calyx ca. 0.4 cm long, 2-lipped; corolla yellow, 0.4-0.5 cm long; ovary curled. Pod 3-4-jointed, joints, twisted.
Flowering & Fruiting: December-March.
Distribution: Endemic to southern Western Ghats. Rare; in grasslands. *RNMK 1239,* Chembra.

Smithia hirsuta Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 135. 1851; Gamble, Fl. Pres. Madras 330(233). 1918; Sanjappa, Leg. India 247. 1992. *Smithia blanda* Wall. ex Wight & Arn. var. *racemosa* Baker in Hook. f., Fl. Brit. India 2: 151. 1876,p.p.

Diffuse herbs; stems covered with bulbous based hairs. Leaflets 3 pairs, 6-9 x 2.5-3 mm, serrulate, obtuse, oblique at base, ciliate along margins and midribs; stipules 7-9 mm long, acuminate, bristled along the margins. Racemes 1.2-1.5 cm long; rachis densely villous; flowers pedicelled; calyx 5-6 mm long, 2-lipped, densely bristled; standard petals mucronate, clawed, yellow with red lines on either half; keel spurred. Pods 8-10-jointed, mucronate, dark brown.
Flowering & Fruiting: July-November.
Distribution: Himalayas and Peninsular India. Occasional; in marshy areas in grasslands. *RNMK 1374,* Banasuramala.

Smithia sensitiva Ait., Hort. Kew (ed. 1) 3: 496. 1789; Baker in Hook. f., Fl. Brit. India 2: 148. 1876,p.p.; Gamble, Fl. Pres. Madras 329(232). 1918; Meeuwen in Reinwardtia 5: 444. 1961; Manilal & Sivar., Fl. Calicut 83. 1982; Ansari, Fl. Kasaragod Div. 134. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 154. 1988; Joseph, Aquatic Angiosp. Malabar 174. 1991; Sanjappa, Leg. India 248. 1992; Sivar. & P. Mathew, Fl. Nilambur 176. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 239. 2009.

Scandent herbs. Leaflets 6 pairs, 7-9 x 2.5-3 mm, elliptic-oblong, acute, glabrous above, strongly bristled on midrib and margins below. Racemes 1-2.5 cm long, axillary; flowers 3-5-together; upper lip of calyx entire; lower lip 3-lobed; standard obovate, emarginate, yellow; wings shortly clawed; keel auricled to one side at base. Joints of pods ca. 2 x 2 mm, biconvex, papillose, dark brown.
Flowering & Fruiting: August-December
Distribution: Tropical Asia and Africa. Common; in marshy areas in grasslands and plantations. *RNMK 1203,* Manikkunnumala.

Smithia setulosa Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 208. 1851; Gamble, Fl. Pres. Madras 329(232). 1918; Baker in Hook. f., Fl. Brit. India 2: 149. 1876; V. S. Ramach. & V. J. Nair, Fl. Cannanore154. 1988; Sanjappa, Leg. India 248. 1992.

Erect, much branched herbs, up to 1 m tall. Leaflets 12-16, 2.5-3 cm long, margins covered with bristles. Flowers yellow, 1-1.3 cm long, 1-12 together in terminal panicles, 25-30 cm long. Pod small, 10-12 jointed.
Flowering & Fruiting: October-December.
Distribution: Endemic to Western Ghats. Occasional; in high altitude rocky grassy slopes. *RNMK 1757,* Chembra.

SPATHOLOBUS Hasskarl
Flora 25(2): 52. 1842.

Large climbing shrubs. Leaves 3-fololate; leaflets subequal, stipellate. Flowers in large terminal or axillary panicles; bracts and bracteoles minute; calyx 2-lipped; upper lip entire; lower lip 3-toothed; standard orbicular, long-clawed; wings oblong, clawed; keel straight, obtuse, auricled; stamens 9+1, anthers uniform; ovary 2-ovuled, sessile; style incurved; stigma capitate. Pod oblong, much compressed, winged, indehiscent; seed-1, compressed.

1. Young leaves and inflorescence densely yellow pubescent; pod tomentose, stalked ... .**S. parviflorus**
1. Young leaves and inflorescense glabrescent; pod glabrous, sessile.....**S. purpureus**

Spatholobus parviflorus (Roxb. ex DC.) O. Kuntze., Rev. Gen. Pl. 1: 205. 1891; Ridder-Numan & Wiriadinata, Reinwardtia 10: 87. 1985; Vajr., Fl. Palghat Dist. 172. 1990; Sanjappa, Leg. India 251. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 154. 1996; Sivar. & P. Mathew, Fl. Nilambur 219. 1997. *Butea parviflora* Roxb. ex DC., Prodr. 2: 415. 1825; Wight, Ic. t. 210. 1839; Manilal & Sivar., Fl. Calicut 90. 1982; Manilal, Fl. Silent Valley 70. 1988; Mohanan & Sivad., Fl. Agasthyamala 192. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 159. 2005. *Spatholobus roxburghii* Benth. in Miq., Pl. Jungh. 238. 1852; Baker in Hook. f., Fl. Brit. India 2: 193. 1876; Gamble, Fl. Pres. Madras 358(253). 1918.

Large climbers; branches puberulus. Leaflets ovate, obtusely acute at apex, rounded at base, densely hairy below, lateral nerves 7-8 pairs; nervules parallel; petiole 3-6 cm long. Panicles 17-20 x 13-15 cm, axillary, densely hispid; flowers 7-9 mm long; calyx 4-6 mm long, densely villous inside; standard glabrous, pale-pink; wings long-clawed; keel obovoid. Pods 12-14 x 4-4.5 cm, stalked; stalk ca. 3 cm long.
Flowering & Fruiting: September-April.
Distribution: Indo-Malesia. Occasional; in moist deciduous forests. *RNMK 1357,* Muthanga; *RNMK 2092,* Tholpetty.

Spatholobus purpureus Benth. ex Baker in Hook.f., Fl. Brit. India 2: 194. 1876; Gamble, Fl. Pres. Madras 359(253). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 155. 1988; Vajr., Fl. Palghat Dist. 173. 1990; Sanjappa, Leg. India 252. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 154. 1996. *Butea*

purpurea (Benth. ex Baker) Blatt., J. Indian Bot. Soc. 8: 137. 1929; Mohanan & Sivad., Fl. Agasthyamala 192. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 159. 2005. **Plate 14k.**

Large climbers; stems puberulus. Leaflets ovate-oblong, abruptly acuminate, rounded at base, glabrous, lateral nerves 5-6 pairs, regular; petiole 6-7 cm long. Panicles 16-18 x 8-10 cm, terminal, rusty puberulus; pedicels 4-6 mm long, slender; flowers many, light pink; calyx lobes obtuse; standard obovate; wings slightly pubescent; keel glabrous. Pods 8-10 x 2-2.5 cm, oblong, narrowed at both ends, compressed and thin.

Flowering & Fruiting: January-April.

Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK* 1872, Vythiri; *RNMK 2739*, Palchuram.

TEPHROSIA Persoon

Syn. Pl. 2: 328. 1807, *nom. cons.*

Herbs or undershrubs. leaves imparipinnate; leaflets 5-many, opposite except the terminal, parallel veined; stipules lanceolate, stipels absent. Flowers reddish or white, solitary or in leaf-opposed racemes, bracteolate; sepals subequal, connate below; standard suborbicular, clawed; wings curved-oblong or obovate; clawed; keel obovate, incurved; stamens diadelphous, the free vexillary stamens connate above; anthers uniform; ovary usually densely hairy, many-ovuled, style incurved, stigma small. Pod linear-oblong, flattened, continuous; seeds many, reniform.

1. Procumbent herbs; flowers white.....**T. pumila**
1. Erect subshrubs or shrubs; flowers red, pale pink or purple 2
2. Pod entirely covered with dense villous tomentum; pod curved.....**T. villosa**
2. Pod pilose or glabrescent, glabrous when mature; pod straight or slightly curved....3
3. Raceme axillary; flowers 1 cm or more long; style bearded.....4
3. Raceme extra-axillary; flowers up to 0.7 cm long; style not bearded..... **T. purpurea**
4. Stipules broadly ovate-deltoid..... **T. pulcherrima**
4. Stipules linear-lanceolate 5
5. Standard petals up to 1 cm long.....**T. tinctoria**
5. Standard petals 1.5 cm or more long.....**T. canarensis**

Tephrosia canarensis Drumm. in Gamble, Fl. Pres. Madras 319(225). 1918; Ansari, Fl. Kasaragod Div. 135. 1985; Vajr., Fl. Palghat Dist. 174. 1990; Sanjappa, Leg. India 256. 1992.

Erect subshrubs, stem channelled, hairy. Leaflets 7 or 9, 4-5.5 x 1-1.5 cm, oblong-elliptic, obtuse, apex mucronate, base acute, glabrous above, glaucous below; petiolule 3-4 mm, stipule ovate. Racemes axillary, 8-10 cm long; bracts and bracteoles subulate; flowers red; ovary velvety, style pubescent. Pods 7-7.5 x 0.6 cm, slightly curved, sparsely hairy; seeds many.

Flowering & Fruiting: October-February.

Distribution: South India and Sri Lanka. Occasional; in moist deciduous forests. *RNMK 2263,* Muthanga.

Tephrosia pulcherrima (Wight ex Baker) Gamble, Fl. Pres. Madras 319(225). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 156. 1988; Vajr., Fl. Palghat Dist. 174. 1990; Sanjappa, Leg. India 257. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 155. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 191. 2005. *Tephrosia tinctoria* Pers. var. *pulcherrima* Wight ex Baker in Hook. f., Fl. Brit. India 2: 112. 1876.

Shrubs; stem densely erect-hairy. Leaflets 5, 5-6 x 1.5-2 cm, elliptic-oblong, obtuse, mucronate, glabrous above; stipule ovate. Racemes axillary; peduncle 6-8 cm long, stout; flowers red; calyx lobes hairy; standard densely hairy on back, clawed; wings dark pink at apex, verrucose; keel yellowish-pink. Pods 6-7 x 0.5 cm, oblong, densely hairy.

Flowering & Fruiting: September-March.

Distribution: Peninsular India and Sri Lanka. Occasional; in grasslands. *RNMK 3453,* Banasuramala.

Tephrosia pumila (Lamk.) Pers., Syn. 2: 339. 1807; Baker in Hook. f., Fl. Brit. India 2: 113. 1876; Sanjappa, Leg. India 257. 1992. *Galega pumila* Lamk., Encycl. 2: 599. 1788. *Tephrosia purpurea* (L.) Pers. var. *ciliata* Craib, Fl. Siam. Enum. 1: 384. 1928. *Tephrosia purpurea* (L.) Pers. var. *pumila* (Lamk.) Baker in Hook.f., Fl. Brit. India 2: 113. 1876. *Tephrosia procumbens* Buch.-Ham. ex Dunn in Gamble, Fl. Pres. Madras 318(226). 1918. *Tephrosia diffusa* Wight & Arn., Prodr. 213. 1834.

Procumbent pubescent herbs. Leaflets 1.2-1.5 x 0.7-0.8 cm, obovate, mucronate, base cuneate, silky pubescent; stipule 5-6 mm, linear, hairy. Flowers white; bracts 5-7 mm, linear; calyx tube pubescent, lobes linear, hairy; corolla 7-8 mm long; ovary tomentose, style glabrous. Pod 3-3.5 x 0.3-0.4 cm, oblong, pubescent.

Flowering & Fruiting: July-September.

Distribution: Pantropical. Occasional; in rocky slopes in grasslands. *RNMK 1228,* Manikkunnumala.

Tephrosia purpurea (L.) Pers., Syn. 2: 329. 1807; Baker in Hook. f., Fl. Brit. India 2: 112. 1876,p.p.; Gamble, Fl. Pres. Madras 320(226). 1918; Manilal & Sivar., Fl. Calicut 87. 1982; Ansari, Fl. Kasaragod Div. 135. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 156. 1988; Vajr., Fl. Palghat Dist. 174. 1990; Sanjappa, Leg. India 258. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 155. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 191. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 242. 2009. *Cracca purpurea* L., Sp. Pl. 752. 1753. *Tephrosia hamiltonii* Drumm. ex Dunn in Gamble, Fl. Pres. Madras 320(226). 1918. **Plate 14 l.**

Shrubs, stem minutely scabrous. Leaflets 15-17 x 2-2.5 cm, oblanceolate, obtuse, mucronate, glabrous above, stipule 5-6 mm long, subulate, deflexed. Raceme 10-12 cm long, axillary; flowers lax; pedicels 6-8 mm long, slender; calyx 7-9 mm long, one lobe much smaller than others; standard red, clawed,

glabrous; wings curved; keel clawed. Pods 4-5 x 0.3-0.4 cm, minutely velutinus; seeds 7 or 8, rectangular, dark-brown.
Flowering & Fruiting: October-December.
Distribution: Indo-Malesia. Occasional; in moist deciduous forests and grasslands. *RNMK 3080,* Sugandhagiri; *RNMK 2456*, Chedalayam.

Tephrosia tinctoria Pers., Syn. 2: 329. 1807; Wight, Ic. t. 388. 1840; Hook. f., Fl. Brit. India 2: 111. 1876; Gamble, Fl. Pres. Madras 319(225). 1918; Manilal & Sivar., Fl. Calicut 86. 1982; Manilal, Fl. Silent Valley 88. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore156. 1988; Vajr., Fl. Palghat Dist. 174. 1990; Sanjappa, Leg. India 259. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 155. 1996; Sivar. & P. Mathew, Fl. Nilambur 226. 1997; Mohanan & Sivad., Fl. Agasthyamala 222. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 191. 2005.

Erect shrubs; stems densely retrorse-hairy. Leaflets 4-4.5 x 1-1.3 cm, oblong, obtuse, mucronate, acute at base, glabrous above; densely white-tomentose below. Racemes axillary; peduncle 8-10 cm long; bracts 6-8 mm long, lanceolate; flowers red; calyx lobes lanceolate; standard glabrous, narrowed to the base; keel obovate, glabrous; Pods 6-7 x 0.4-0.5 cm, oblong, slightly curved, minutely hirsute, many-seeded.
Flowering & Fruiting: September-December.
Distribution: Peninsular India and Sri Lanka. Occasional; in grasslands. *RNMK 1109,* Chembra; *RNMK 2463*, Kurichiarmala.

Tephrosia villosa (L.) Pres., Syn. 2: 329. 1807; Baker in Hook. f., Fl. Brit. India 2: 113. 1876; Ansari, Fl. Kasaragod Div. 136. 1985; Vajr., Fl. Palghat Dist. 174. 1990; Sanjappa, Leg. India 260. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 155. 1996; C.N. Sunil & Sivad., Fl. Pl. Div. Alappuzha Dist. 260. 2000. *Cracca villosa* L., Sp. Pl. 752. 1753. *Tephrosia hirta* (Buch.-Ham.) Gamble, Fl. Pres. Madras 318(225). 1918; Manilal & Sivar., Fl. Calicut 87. 1982. *Tephrosia incana* Graham ex Wight & Arn., Prodr. 212. 1834. *Tephrosia argentea* Pers., Syn. Pl. 2: 329. 1807. *Galega hirta* Buch.-Ham., Trans. Linn. Soc. London 13: 546. 1822.

Subshrubs, ferrugenous tomentose. Leaflets 11-17 pairs, 2.5-3 x 1-1.5 cm, obovate, oblong, emarginate to mucronate, silky pubescent; stipules 5-6 mm, linear. Racemes spiciform, axillary and terminal, 20-30 cm, interrupted, tomentose; flowers pink; bracts subulate; calyx tube ferrugenous tomentose, lobes linear; ovary densely tomentose. Pod 4-5 x 0.4-0.5 cm, densely villous, apex slightly curved.
Flowering & Fruiting: December-April.
Distribution: South Asia. Rare; in grassy slopes in degraded forest patches. *RNMK 2865,* Pookodu.

TERAMNUS P. Browne
Civ. Nat. Hist. Jamaica 290. 1756.

Slender herbaceous climbers. Leaves 3-foliolate, stipellate, stipules small. Flowers paired or fascicled on axillary racemes, bracteoles linear; upper 2

calyx lobes connate or free; standard petal narrowed at base, unappendaged; wings narrow, adnate to the keels; keels straight, obtuse; stamens monadelphous, alternate, anthers small and sterile; ovary sessile; many ovuled; style short, glabrous; stigma capitate. Pods linear, septate between seeds, 2-valved.

1. Leaflets glabrous, up to 6 cm long; pod glabrous .....**T. labialis**
1. Leaflets strigosely hairy, 6-12 cm long; pod villous ..... **T. mollis**

Teramnus labialis (L.f.) Spreng., Syst. Veg. 3: 235.1826; Baker in Hook. f., Fl. Brit. India 2:184.1876; Gamble, Fl. Pres. Madras 352(249). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 157. 1988; Vajr., Fl. Palghat Dist. 175. 1990; Sanjappa, Leg. India 261. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 156. 1996; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 243. 2009. *Glycine labialis* L.f., Suppl. Pl. 325. 1782; Wight, Ic. t. 168. 1839..

Herbaceous climbers, branchlets glabrescent. Leaves trifoliolate; leaflets 4-6 x 2-2.5 cm, ovate or elliptic, apex acute, membranous, puberulent below; petiole 4-5 cm. Flowers 4-6 mm long, on few-flowered slender racemes; calyx villous; petals red, standard petal narrowed at base, wings narrow, keel srait, obtuse, adnate to wings; stamens monadelphous, altrnate one sterile, small; ovary sessile. Pods 3.5- 4 x 0.2-0.3 cm, linear, beaked, compressed.
Flowering & Fruiting: October-December.
Distribution: Indo-Malesia and Africa. Occasional; in margins of evergreen forests. *RNMK 1794*, Vythiri; *RNMK 1286*, Chanthanathodu.

Teramnus mollis Benth., J. Linn. Soc. Bot. 8: 265. 1865; Gamble, Fl. Pres. Madras 352(249). 1918; Ansari, Fl. Kasaragod Div. 136. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 157. 1988; Sanjappa, Leg. India 261. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 156. 1996; Sivar. & P. Mathew, Fl. Nilambur 220. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 192. 2005. *Teramnus labialis* (L. f.) Spreng. var. *mollis* (Benth.) Baker in Hook.f., Fl. Brit. India 2: 184. 1876.

Slender twiners, stem patently hairy. Leaves 3-foliolate; leaflets unequal, terminal one rhombi-lanceolate, 8-9 x 4-4.5 cm, laterals oblong-lanceolate, 6-7 x 3-3.5 cm, base rounded to subcordate, apex acute, lower surface densely grayish tomentose, thin coriaceous. Racemes axillary, 5- 6 cm long, solitary or 2-3, in clusters; flowers lax; calyx campanulate; corolla pink, little exerted; petals clawed; anthers alternatively fertile and sterile; ovary stipitate; style curved. Pods compressed, ca. 4.5 x 0.5 cm, pubescent, apex hooked; seeds oblong.
Flowering & Fruiting: October-March.
Distribution: Tropical Asia. Occasional; in moist deciduous forests. *RNMK 2682,* Begur.

URARIA Desvaux
J. Bot. Agric. 1: 122. 1813.

Herbs or undershrubs. Leaves 3-foliolate; leaflets subequal; stipel subulate; stipule striate. Flowers in terminal racemes; bracts ovate, acuminate,

conspicuous; calyx 2-lipped, upper lip 2-lobed; lower lip 3-lobed; standard obovate or orbicular, clawed; wing falcate, adherent to keel; stamens 9+1, anthers uniform; ovary many-ovuled, sessile; style incurved, stigma capitate. Pod a lomentum of 2-6 one-seeded joints, folded within the calyx tube.

1. Trailing subshrubs; racemes under 10 cm long, very hairy; pod joints 2, smooth .... **U. lagopodoides**
1. Erect or straggling undershrubs; racemes up to 30 cm long; pod joints 4-6, hispid ... . **U. rufescens**

Uraria lagopodoides (L.) Desv. in DC., Prodr. 2: 324. 1825; "lagopoides"; Baker in Hook. f., Fl. Brit. India 2: 156. 1876; Gamble, Fl. Pres. Madras 336(237). 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore 157. 1988; Wight, Ic. t. 289. 1840; Sanjappa, Leg. India 268. 1992. *Hedysarum lagopodoides* L., Sp. Pl. 1198. 1753.

Trailing subshrubs; stems hispid. leaflets 4-5 x 2-2.5 cm, ovate-oblong, obtuse, mucronate, hispid below, subcordate at base; petiole 1-1.5 cm long; stipule ca. 1.2 cm long, filiform. Racemes 2-3 cm broad; bracts ciliate; flowers many, pedicelled; calyx lobes bristled, upper lobes smaller; standard acute to the base; wings clawed; keel auricled. Joints of pods 3-4 x 2.5- 3 mm, reticulate, shining.

Flowering & Fruiting: November-December. *Distribution*; Indo-Malesia to Australia and Pacific Islands. Occasional; in rocky slopes of moist deciduous forests. *RNMK 2170,* Thirunelli.

Uraria rufescens (DC.) Schind., Feddes Repert. 21: 14. 1925; Van Meeuwen, Reinwardtia 5:453. 1961; Ansari, Fl. Kasaragod Div. 136. 1985; Manilal, Fl. Silent Valley 88. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 158. 1988; Vajr., Fl. Palghat Dist. 175. 1990; Sanjappa, Leg. India 268. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 156. 1996; Sivar. & P. Mathew, Fl. Nilambur 201. 1997; Mohanan & Sivad., Fl. Agasthyamala 223. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 192. 2005. *Desmodium rufescens* DC., Ann. Sci. Nat. (Paris) 4: 101. 1825. *Doodia hamosa* Roxb., Fl. Ind. 3: 367. 1832. *Uraria hamosa* (Roxb.) Wall. ex Wight & Arn., Prodr. 222.1834; Wight, Ic.t. 284. 1840; Baker in Hook. f., Fl. Brit. India 2: 150. 1876; Gamble, Fl. Pres. Madras 336(237). 1918.

Erect subshrubs; stems triquetrous, hispid. Leaflets 8-8.5 x 4-4.5 cm, elliptic, acute or obtuse at apex and base, hispid below; petiole 1-2.5 cm long; stipules ca. 1.2 cm long, acuminate; stipel subulate. Flowers distant; bracts hispid; calyx glabrous; standard orbicular, cuneate at base, pinkish; wings oblique, auricled at base; keel shortly spurred near the base. Joints of pods 6-8, hispid, black.

Flowering & Fruiting: November-January.

Distribution: Indo-Malesia. Common in moist deciduous forests. *RNMK 3421,* Thirunelli.

VIGNA Savi

Pisa Nuov. Giorn. Lett. 8: 113. 1824, *nom. cons.*

Slender climbers. Leaves pinnately 3-foliolate; leaflets equal, laterals usually unequal at base; stipules ovate-lanceolate or peltate; stipel lanceolate. Flowers solitary or in umbellate racemes on long peduncles; bracts and bracteoles similar, lanceolate; calyx campanulate, upper 2 lobes connate, standard erect, orbicular, clawed, auricled at base; wings oblong, curved, auricled at base; keel incurved, twisted, beaked, auricled at base; stamens 9+1, anthers uniform; ovary sessile, many-ovuled; style densely hairy towards the apex; stigma capitate. Pod turgid, cylindrical, many-seeded.

1. Stipules basifixed; flowers reddish-purple or bluish 2
1. Stipules peltately fixed; flowers yellow 3
2. Keel spirally twisted; flowers bluish; pods 8-12 cm long ..... **V. grahamiana**
2. Keel not spirally twisted; flowers reddish-purple; pods 5-7 cm long ..... **V. vexillata**
3. Bracteoles broad; pods hirsute ..... **V. radiata** var. **sublobata**
3. Bracteoles linear; pods glabrous 4
4. Leaflets distinctly 3-lobed; pods cylindric ..... **V. trilobata**
4. Leaflets entire or obscurely lobed; pods compressed ..... **V. umbellata**

Vigna grahamiana (Wight & Arn.) Verdc., Kew Bull. 24: 562. 1970; V. S. Ramach. & V. J. Nair, Fl. Cannanore 158. 1988; Vajr., Fl. Palghat Dist. 176. 1990; Sanjappa, Leg. India 273. 1992. *Phaseolus grahamianus* Wight & Arn., Prodr. 244. 1834; Baker in Hook. f., Fl. Brit. India 2: 201. 1876; Gamble, Fl. Pres. Madras 362(256). 1918.

Twiners. Leaflets 2.5-5 x 1.5-4 cm, deltoid, apex acuminate, mucronate, base broadly ovate, appressed, pubescent; stipules 5-6 mm, ovate, stipels lanceolate. Racemes axillary; flowers blue; bracts 3-4 mm, ovate; calyx 2-labiate, upper lip emarginate, lower 3-lobed; standard petal orbicular; wings obovate; keel connate, spirally coiled; staminal tube ca. 1 cm, filaments ca. 1.5 cm long; ovary ca. 1 cm, linear, style ca. 1.5 cm, coiled, bearded, stigma oblique. Pod 10-12 x 0.2-0.3 cm, linear, thickened at the margins; many seeded.

Flowering & Fruiting: November-December.

Distribution: India and Sri Lanka. Rare; in evergreen forsts. *RNMK* 1681, Sugandhagiri; *RNMK 1902*, Kunchome.

Vigna radiata (L.) Wilczek var. **sublobata** (Roxb.) Verdc., Kew Bull. 24: 559. 1970; Manilal & Sivar., Fl. Calicut 92. 1982; Ansari, Fl. Kasaragod Div. 137. 1985; Manilal, Fl. Silent Valley 89. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 159. 1988; Vajr., Fl. Palghat Dist. 176. 1990. *Phaseolus sublobatus* Roxb., Fl. Ind. 3: 288. 1832; Gamble, Fl. Pres. Madras 363(256). 1918. *Phaseolus trinervius* Heyne ex Wight & Arn., Prodr. 245. 1834; Baker in Hook. f., Fl. Brit. India 2: 203. 1876. *Vigna sublobata* (Roxb.) Bairiganjan,

Panda, Choudhury & Patnaik, J. Econ. Tax. Bot. 7: 274. 1985; Babu & Sharma, Bull. Bot. Surv. India 27: 21. 1987; Sanjappa, Leg. India 276. 1992; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 244. 2009.

Slender climbers. Leaflets 3-4.5. x 2-3 cm, laterals smaller, ovate, acute or obtuse at apex, sparsely hispid; petiole 3-4 cm long; stipule 7-8 mm, deltoid. Flowers densely packed, sessile, 1-1.5 cm; calyx lobes obtuse, ciliate. Pods 3-5 x 0.4-0.5 cm, densely brown-strigose; seeds rectangular, longitudinally rugose.
Flowering & Fruiting: March-April.
Distribution: Indo-Malesia, widely cultivated. Occasional; in semi-revergreen forests.: *RNMK 1953*, Thirunelli.

Vigna trilobata (L.) Verdc., Taxon 17: 172. 1968 & Kew Bull. 24: 560. 1970; Manilal & Sivar., Fl. Calicut 93. 1982; Ansari, Fl. Kasaragod Div. 137. 1985; Vajr., Fl. Palghat Dist. 176. 1990; Sanjappa, Leg. India 276. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 157. 1996. *Dolichos trilobatus* L., Mant. Pl. 1: 101. 1767. *Phaseolus trilobus* Baker in Hook.f., Fl. Brit. India 2: 201. 1876; Gamble, Fl. Pres. Madras 362(256). 1918; Wight, Ic. t. 94. 1838.

Twining or prostrate herbs; branchlets pilose. Leaflets 3-3.5 x 2-2.5 cm, apex obtuse, base acute, tri-nerved, pilose; petiole 6-7 cm long. Flowers yellow, in axillary racemes; calyx campanulate, lobes 5, ovate; corolla 4-5 mm long; keel curved, produced to a beak; staminal tube to 4-5 mm; ovary pubescent, style curved, bearded at the apex, stigma oblique. Pods 3.5-4 x 0.1-0.2 cm, terete, puberulus.
Flowering & Fruiting: July-December.
Distribution: Indo-Malesia. Occasional; in moist deciduous forests. *RNMK 2184*, Pulpally; *RNMK 2714*, Kuruva.

Vigna umbellata (Thunb.) Ohwi & Ohashi, Jap. J. Bot. 44: 31. 1969; Verdc., Kew Bull. 24:560. 1970; V. S. Ramach. & V. J. Nair, Fl. Cannanore 159. 1988; Sanjappa, Leg. India 276. 1992; Vajr., Fl. Palghat Dist. 177. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 158. 1996; Mohanan & Sivad., Fl. Agasthyamala 224. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 193. 2005. *Dolichos umbellatus* Thunb., Trans. Linn. Soc. London 2: 339. 1794. *Phaseolus calcaratus* Roxb., Fl. Ind. 3: 289. 1832; Baker in Hook. f., Fl. Brit. India 2: 203. 1876; Gamble, Fl. Pres. Madras 363(256). 1918.

Slender twiners; stems reflexed hairy. Leaflets 8-10 x 4-5 cm, ovate, acuminate, hispid; petiole 5-7 cm long, slender, stipule 7-8 mm long, ovate, decurrent at base. Flowers in short axillary racemes, 2-3-together; calyx lobes ovate; petals yellow; standard strongly auricled at base; wings orbicular; keel incurved to one turn, spurred to one side. Pods 5-7 x 0.4-0.5 cm, compressed, many-seeded.
Flowering & Fruiting: October-December.
Distribution: Indo-Malesia. Common; in moist deciduous forests. *RNMK 1277,* Thirunelli.

Vigna vexillata (L.) A. Rich. in Sagra, Hist. Fist. Polit. Nat. Cuba 11: 191. 1845; Baker in Hook. f., Fl. Brit. India 2:206. 1876; Gamble, Fl. Pres. Madras 364(257). 1918; Verdc. in Kew Bull. 24: 553. 1970; V. S. Ramach. & V. J. Nair, Fl. Cannanore 160. 1988; Manilal, Fl. Silent Valley 89. 1988; Vajr., Fl. Palghat Dist. 177. 1990; Sanjappa, Leg. India 277. 1992. *Phaseolus vexillatus* L. Sp. Pl. 724. 1753. **Plate 15a.**

Slender climbers. Leaflets 4-4.5 x 1.5-2 cm, ovate, acute at apex, rounded at base, strigose hairy; petiole 4-5 cm long; stipule cordate at base. Flowers solitary or 2-3 together; calyx 8-9 mm long, strigose hairy; lobes lanceolate; petals yellow; standard ca. 3 x 3 cm, orbicular, wings auricled at base; keel strongly spurred on lateral side. Pods 5-5.5 x 0.4-0.5 cm, densely brown-hispid.

Flowering & Fruiting: March-April.

Distribution: Paleotropics. Occasional; in semi-evergreen forests. *RNMK 2115,* Manikkunnumala; *RNMK 2184,* Thrissileri.

ZORNIA J. F. Gmelin
Syst. Nat. 2: 1076, 1096. 1792.

Zornia gibbosa Span., Linnaea 15:192. 1841; Mohlenbrock, Webbia 16:112. 1961; Manilal & Sivar., Fl. Calicut 76. 1982; Ansari, Fl. Kasaragod Div. 138. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 160. 1988; Vajr., Fl. Palghat Dist. 177. 1990; Sanjappa, Leg. India 280. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 158. 1996; Sivar. & P. Mathew, Fl. Nilambur 177. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 194. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 246. 2009.

Diffuse herbs, glabrous. Leaves bifoliolate, leaflets 4-5 x 5-6 mm, lanceolate, gibbous at one side, acute, sessile; stipule peltate, acuminate; petiole ca. 1 cm long. Flowers sessile in terminal racemes; bracts paired, ca. 1.5 x 0.5 mm, peltate, acuminate; calyx lobes unequal, 2 upper connate, lateral ones smaller; corolla yellow, 4-5 mm long; standard orbicular, auriculated at base, clawed; wings oblong, clawed; keel obovate; stamens monadelphous; staminal tube cleft above. Pods 2-5-jointed; joints moniliform, covered with retrorsely hispid bristles.

Flowering & Fruiting: September-January.

Distribution: Indo-Malesia to Australia and China. Common; in moist deciduous forests. *RNMK 2333,* Muthanga.

Gliricidia sepium (Jacq.) Kunth ex Walp. and **Sesbania grandiflora** (L.) Poir. are extensively planted in the district as a source of green manure and **Pterocarpus dalbergioides** Roxb. is raised in plantations. **Canavalia cathartica** Thouars and **Lablab purpureus** (L.) Sweet are widely cultivated for its edible fruits and also runs wild. **Clitoria ternatea** L. is grown in the gardens and also runs wild in the district.

Subfamily: **CAESALPINIOIDEAE**

1. Leaves simple, bilobed ..... **Bauhinia**
1. Leaves pinnate 2
2. Leaves simple pinnate 3
2. Leaves bipinnate 10
3. Petals absent 4
3. Petals present.....5
4. Leaflets alternate; ovules 2 ..... **Kingiodendron**
4. Leaflets opposite; ovules many ..... **Saraca**
5. Leaflets 1 pair ..... **Cynometra**
5. Leaflets 2 or more pairs 6
6. Stipule large foliaceaous, appendaged ..... **Humboldtia**
6. Stipule not foliaceaous, un-appendaged 7
7. Petals 3; stamens monadelphous ..... **Tamarindus**
7. Petals 4 or 5; stamens free 8
8. Trees; fruit terete, woody ..... **Cassia**
8. Herbs or shrubs; fruit compressed, not woody 9
9. Bracteoles absent; seed coat with closed areole ..... **Senna**
9. Bracteoles present; seed coat without areoles ..... **Chamaecrista**
10. Stamens 5; tall unarmed trees..... **Acrocarpus**
10. Stamens 10; armed shrubs or climbers ..... **Caesalpinia**

ACROCARPUS R. Wight ex Arnott
Mag. Zool. & Bot. 2: 547. 1838.

Acrocarpus fraxinifolius Wight & Arn., Mag. Zool. Bot. 2: 547. 1838; Baker in Hook. f., Fl. Brit. India 2: 292. 1878; Wight, Ic.t. 254. 1839 ; Gamble, Fl. Pres. Madras 397(281). 1919; V. S. Ramach. & V. J. Nair, Fl. Cannanore 161. 1988; Sanjappa, Legumes India 1. 1992; Sivar. & P. Mathew, Fl. Nilambur 227. 1997; Mohanan & Sivad., Fl. Agasthyamala 227. 2002.

Very large trees with prominent buttress; bark thick, rough, pealing. Leaves bipinnate; pinnae 3-5 pairs, 4-6-foliolate; leaflets 7-12 x 3-6 cm, lanceolate, acuminate, petiolulate. Racemes dense, axillary, 25-30 cm long; flowers 2-2.5 cm long, deflexed, densely packed; calyx 0.8-1 cm long, tubular below, lobes ovate, obtuse, densely hairy; petals 5, oblong, obtuse, erect; yellowish-pink; stamens 5, free; filaments erect, ca. 1.5 cm long, pink; ovary stipitate, many-ovuled, style short, recurved. Pods 15-17 x 1.5-2 cm, compressed, oblong, winged, 10-12 seeded, glabrous.

Flowering & Fruiting: December-January.

Distribution: Indo-Malesia; introduced in Africa. Common; in plantations and evergreen forests. *RNMK 1017,* Kallady; *RNMK 2011,* Kalpetta.

BAUHINIA Linnaeus
Sp. Pl. 374. 1753.

Trees or climbers; leaves simple, bilobed, nerves from the base; stipule minute. Flowers in racemes, regular or irregular; bracts and bracteoles small,

deciduous; sepals 5, similar, free or basely united; petals 5, slightly unequal, clawed, erect or spreading; stamens 10 or less, free, filaments long, filiform, anthers versatile; ovary stalked, oblong; ovules many; style long or short; stigma terminal. Pods oblong, compressed, usually marginate; seeds many, compressed.

1. Climbing shrubs; flowers crimson ..... **B. phoenicea**
1. Trees; flowers creamy yellow to pink 2
2. Flowers in raceme; calyx spathaceous 3
2. Flowers in corymbs; calyx apically 5 –toothed ..... **B. malabarica**
3. Flowers 6-8 cm across, rose to pink ..... **B. purpurea**
3. Flowers 2-3 cm across, creamy yellow .....**B. racemosa**

Bauhinia malabarica Roxb., Fl. India 2: 321. 1832; Baker in Hook. f., Fl. Brit. India 2: 227. 1878; Gamble, Fl. Pres. Madras 407(288). 1919; V. S. Ramach. & V. J. Nair, Fl. Cannanore 162. 1988; Vajr., Fl. Palghat Dist. 179. 1990; Sanjappa, Legumes India 3. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 159. 1996; Sivar. & P. Mathew, Fl. Nilambur 228. 1997; Mohanan & Sivad., Fl. Agasthyamala 227. 2002. *Piliostigma malabaricum* (Roxb.) Benth. in Miq., Pl. Jungh. 261. 1852; Ansari, Fl. Kasaragod Div. 146. 1985. **Plate 15b.**

Trees, to 10 m high, bark black, red inside. Leaves 8-10 x 9-13 cm, orbicular, bilobed above; lobes obtuse, cordate at base, 9-11 ribbed, nervules reticulate; petiole 4-5 cm long; panicles axillary, 5-7 cm across. Flowers 2-2.5 cm long, few; calyx oblong, connate, rusty pubescent; petals 5, oblong, greenish yellow, glabrous, shortly stalked; stamens 10, inner 5, smaller, anthers oblong; ovary oblong, many-ovuled. Pods 25-28 x 2-3 cm, compressed, longitudinally striate; seeds many, oblong.
Flowering & Fruiting: September-March.
Distribution: Indo-Malesia. Common; in moist deciduous forests. *RNMK 2110,* Muthanga.

Bauhinia phoenicea Wight & Arn., Prodr. 296. 1834; Baker in Hook. f., Fl. Brit. India 2: 283. 1878; Gamble, Fl. Pres. Madras 408(289). 1919; Manilal, Fl. Silent Valley 89. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 162. 1988; Vajr., Fl. Palghat Dist. 179. 1990; Sanjappa, Legumes India 4. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 159. 1996; Mohanan & Sivad., Fl. Agasthyamala 228. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 195. 2005. *Phanera phoenicea* (Wight & Arn.) Benth. in Miq., Pl. Jungh. 262. 1852. *Bauhinia benthamii* Bedd., Ic. t. 107. 1868-1874. **Plate 15c.**

Large climbing shrubs, young shoots and tender leaves reddish. Leaves 10-13 cm across, orbicular, deeply bifid above, lobes acute, cordate at base, 7-9-ribbed from base, nervules parallel. Flowers in extra-axillary racemes, axis 10-20-flowered; pedicel 3-4 cm long; calyx tube short, lobes 2-2.5 cm long, oblong, puberulus outside; petals 5, 3-4 x 0.8-1 cm, long-clawed, spreading;

stamens 4 or 5, exserted, anthers linear; style slender; stigma peltate. Pods 15-16 x 2-2.5 cm, oblong, broaden above, densely rusty, pubescent, many-seeded.
Flowering & Fruiting: December-April.
Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 2708,* Periya Ghat.

Bauhinia purpurea L., Sp. Pl. 375. 1753; Baker in Hook. f., Fl. Brit. India 2: 284. 1878; Gamble, Fl. Pres. Madras 407(288). 1919; Manilal & Sivar., Fl. Calicut 94. 1982; Ansari, Fl. Kasaragod Div. 140. 1985; Vajr., Fl. Palghat Dist. 179. 1990; Sanjappa, Legumes India 5. 1992; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta Dist. 201. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 248. 2009.. *Phanera purpurea* (L.) Benth. in Miq., Pl. Jungh. 262. 1852.

Trees, to 15 m high, bark grey-brown; branchlets warty. Leaves simple, bilobed; stipules lateral, triangular; petiole 1.3-3.7 cm, slender, swollen at the base and tip, pubescent; lamina 4.5-11.5 x 4.2-12, oblong or orbicular, base subcordate, apex of each lobes obtuse; mucronate, margin entire, glabrous above, puberulent beneath, coriaceous; nerves 9-13 from the base, palmate, prominent, intercostae scalariform, prominent. Flowers bisexual, 6-8 cm across, rose to pink, in terminal or axillary racemes or panicles to 15 cm long; bracts to 4 cm; pedicel 2-2.5 cm; calyx tube turbinate, spathaceous, 1-2 x 1-1.5 cm, apex 2-cleft; petals 5, 3.5-4 x 1.5-2 cm, obovate; stamens 5; filaments to 2.5 cm; ovary half inferior, stipitate, compressed; style elongate; stigma capitate. Fruit a pod, 30-40 x 1.5-2 cm, oblong, compressed, apex horned; seeds 1-1.5 x 1-2 cm, ovoid, flat.
Flowering & Fruiting: September-December.
Distribution: Native of South East Asia. Occasional; in moist deciduous forests. *RNMK 1519,* Muthanga.

Bauhinia racemosa Lamk., Encycl. 1: 390. 1785; Baker in Hook. f., Fl. Brit. India 2: 276. 1878; Gamble, Fl. Pres. Madras 406(288). 1919; Manilal, Fl. Silent Valley 90. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 162. 1988; Vajr., Fl. Palghat Dist. 179. 1990; Sanjappa, Legumes India 5. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 160. 1996; Sivar. & P. Mathew, Fl. Nilambur 228. 1997. *Piliostigma racemosa* (Lamk.) Benth. in Miq., Pl. Jungh. 262. 1852.

Small to medium trees, bark pale brown, reddish inside. Leaves 5-6 x 6-8 cm, ovate oblong, bilobed above, lobes rounded, base cordate, 7-9 ribbed, nervules reticulate; petiole 2.5-3 cm long; racemes axillary. Flowers 2-3 cm long, few; calyx oblong, puberulous; petals 5, linear-oblong, creamy-yellow; stamens 10, filamens villous at base; ovary oblong, many-ovuled. Pods 18-20 x 2-3 cm, compressed; seeds many, oblong.
Flowering & Fruiting: March-December.
Distribution: India and Sri Lanka. Common; in moist deciduous forests. *RNMK 1218,* Muthanga; *RNMK 1983,* Chedalayam.

CAESALPINIA Linnaeus

Sp. Pl. 380. 1753.

Shrubs or climbers, usually armed with prickles. Leaves bipinnate; pinnae opposite, paripinnate; leaflets many, paired; stipels prickly. Flowers in racemes or panicles, terminal or axillary; bracts deciduous; bracteoles absent; sepals 5, slightly connate at base, usually unequal; petals 5, obovate to orbicular, clawed; one smaller than others; stamens 10, free, anthers uniform; ovary sessile, few to many-ovuled; style slender; stigma terminal. Pod oblong to ovoid; flattened or turgid; seeds 1-few, transverse.

1. Pods winged; leaflets 3-5 pairs ..... **C. cucullata**
1. Pods not winged; leaflets more than 7 pairs 2
2. Flowers sessile, orange-red ..... **C. spicata**
2. Flowers pedicelled, yellow 4
3. Branchlets glandular hairy; leaflets 10-15 pairs ..... **C. mimosoides**
3. Branchlets glabrous; leaflets large, 5-8 pairs ..... **C. bonduc**

Caesalpinia bonduc (L.) Roxb., Fl. India 2: 362. 1832; Sanjappa, Legumes India 9. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 161. 1996; Sivar. & P. Mathew, Fl. Nilambur 229. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 250. 2009. *Guilandina bonduc* L., Sp. Pl. 381. 1753. *Caesalpinia bonducella* (L.) Flem., Asiat. Res. 11: 159. 1810; Baker in Hook. f., Fl. Brit. India 2: 254. 1878. *Caesalpinia crista* sensu Gamble, Fl. Pres. Madras 393(278). 1919, non L. 1753.

Climbing shrubs, rusty, tomentose; prickeles recurved. Leaves 50-70 x 35-40 cm, pinnules 5-6- pairs; leaflets 6-8 pairs, 4-5 x 2-3 cm, ovate, abruptly acuminate, rachis armed with recurved spines; petiole 13-15 cm long; stipules foliaceaous. Racemes 30-35 cm long, axillary, tomentose; flowers yellow, 1.8–2 cm across; sepals oblong, obtuse, tomentose; petals obovate with wavy margins, yellow. Pods 10-12 x 4-5 cm, obovate-oblong, densely spiny, 2-3-seeded.

Flowering & Fruiting: March-May.

Distribution: Paleotropics. Occasional; in evergreen forests. *RNMK 1092,* Mundakai.

Caesalpinia cucullata Roxb., Fl. India 2: 358. 1832; Manilal, Fl. Silent Valley 90. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 163. 1988; Sanjappa, Legumes India 10. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 161. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 195. 2005. *Mezoneurum cucullatum* (Roxb.) Wight & Arn., Prodr. 283. 1834; Baker in Hook. f., Fl. Brit. India 2: 258. 1878; Gamble, Fl. Pres. Madras 395(279). 1919; Vajr., Fl. Palghat Dist. 182. 1990; Sivar. & P. Mathew, Fl. Nilambur 236. 1997.

Stout climbers; old stem covered with strong thorns with clavate thick base. Leaves 45-50 cm long; pinnules 5 or 6 pairs; leaflets 3 pairs, 8-10 x 3-4 cm,

ovate, acuminate, glabrous; rachis with strong curved thorns. Racemes 25-30 cm long, clustered. Flowers 2-3 cm across, irregular, cucullate; sepals unequal, lobes obtuse, glabrous; petals unequal, orbicular; filaments glabrate. Pods 8-10 x 2-2.5 cm, flattened, oblong, obtuse, glabrous.
Flowering & Fruiting: December-March.
Distribution: Indo-Malesia. Occasional in semi-evergreen and evergreen forests. *RNMK 1127,* Attamala; *RNMK 1846*, Vythiri.

Caesalpinia mimosoides Lamk., Encycl. 1: 452.1785; Wight, Ic. t. 392. 1840; Baker in Hook. f., Fl. Brit. India 2:256.1878; Gamble, Fl. Pres. Madras 394(279). 1919; Manilal & Sivar., Fl. Calicut 98. 1982; Ansari, Fl. Kasaragod Div. 141. 1985; Manilal, Fl. Silent Valley 90. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 163. 1988; Sanjappa, Legumes India 12. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 161. 1996; Sivar. & P. Mathew, Fl. Nilambur 23. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 195. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 251. 2009..

Rambling shrubs, densely prickly, pungent smelling when cut; stem tomentose. Leaves 30-40 x 20-25 cm; pinnules 10-14 pairs; leaflets 1-1.2 cm long, oblong inequilateral, obtuse. Raceme 40-50 cm long, axillary or terminal, densely prickly, pedicels solitary, 2-3 cm long; flowers 3-4 cm across; sepals oblong, obtuse; petals yellow, 1.5-2 cm long, orbicular, wavy along the margins. Pods 5-6 x 2-2.5 cm, compressed, brown, 1 or 2 seeded.
Flowering & Fruiting: January-March
Distribution: Indo-Malesia. Common; in open areas in semi-evergreen and moist deciduous forests. *RNMK 1429,* Meenagady; *RNMK 3366,* Tholpetty.

Caesalpinia spicata Dalz., Hook.'s J. Bot. Kew Gard. Misc. 3: 90. 1851; Sasidh. & Sivar., Fl. Pl. Thrissur For. 162. 1996. *Moullava spicata* (Dalz.) Nicols. in Manilal, Bot. Hist. Hort. Malab. 181. 1981; V. S. Ramach. & V. J. Nair, Fl. Cannanore 167. 1988; Ansari, Fl. Kasaragod Div. 146. 1985; Vajr., Fl. Palghat Dist. 183. 1990; Sanjappa, Legumes India 33. 1992; Sivar. & P. Mathew, Fl. Nilambur 237. 1997. *Wagatea spicata* (Dalz.) Wight, Ic. t. 1995. 1853; Baker in Hook. f., Fl. Brit. India 2: 261. 1878; Gamble, Fl. Pres. Madras 397(281). 1919; Manilal & Sivar., Fl. Calicut 98. 1982. **Plate 15d.**

Scandent shrubs with sharp scattered prickles. Leaves 30-35 cm long, pinnae 4 or 5 pairs; leaflets 5-6 pairs, elliptic-oblong, obtuse or acute, base rounded or cordate, glabrous above, pale beneath, 3-4 x 2-2.5 cm. Ramces 50-55 cm long; calyx scarlet, lobes oblong, obtuse, densely puberulos; petals ovate-spathulate, reituately veined, orange-yellow, 1-1.5 cm long; ovary pubescent; ovules 4-6, stigma shortly 2-lobed. Pods linear-oblong, subtorulose 5-6 x 1-1.5 cm; seeds 3 or 4.
Flowering & Fruiting: March-January.
Distribution: Endemic to Western Ghats. Rare; in evergreen forests and plantations. *RNMK 1783,* Vythiri; *RNMK 1092,* Karyambady.

CASSIA Linnaeus
Sp. Pl. 376. 1753.

Cassia fistula L., Sp. Pl. 377. 1753; Baker in Hook. f., Fl. Brit. India 2: 201. 1878; Gamble, Fl. Pres. Madras 400(283). 1919; Manilal & Sivar., Fl. Calicut 96. 1982; Ansari, Fl. Kasaragod Div. 143. 1985; Manilal, Fl. Silent Valley 91. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 129. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 164. 1988; Vajr., Fl. Palghat Dist. 181. 1990; Sanjappa, Legumes India 15. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 163. 1996; Sivar. & P. Mathew, Fl. Nilambur 233. 1997; Mohanan & Sivad., Fl. Agasthyamala 229. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta Dist. 197. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 239. 2009. *Cassia rhombifolia* Roxb., Fl. India 3: 334. 1832. *Conna* Rheede, Hort. Malab. 1:37-38, t. 22. 1678.

Small to medium sized trees. Leaves 30-35 cm long; leaflets 4-8 pairs, 8-10 x 4-5 cm, ovate, acute, eglandular. Racemes 40-50 cm long, axillary, drooping; pedicels 4-5 cm long; flowers 4-6 cm across; bracts minute; sepals ovate, obtuse, green; petals 2-3 x 2-3 cm, orbicular, concave; filaments unequal, 3.5-4 cm long, anthers dimorphic. Pods 40-45 cm long, septate, glabrous; seeds transverse, orbicular.

Flowering & Fruiting: March-April.

Distribution: Indo-Malesia. Common; in moist deciduous forests. *RNMK 1283,* Tholpetty; *RNMK 3271,* Chedalayam; *RNMK 2643*, Muthanga.

CHAMAECRISTA (Breyne) Moench
Meth. 272. 1794.

Herbs or shrubs. Leaves paripinnate, rachis glandular or not, leaflets opposite, estipellate. Flowers axillary solitary or in racemes, bracteolate; sepals 5, united into a short tube at base; petals yellow, subequal; stamens 5 or 10, anthers unequal, dehiscing by apical pore; ovary curved-oblong, many-ovuled; style incurved. Pod oblong, compressed, elastically dehiscent; seeds many, exarillate, compressed.

1. Leaflets 2, eglandular ..... **C. absus**
1. leaflets more than 6 pairs, with gland on the petiole 2
2. Leaflets 8-10 pairs, gland on the petiole stalked ..... **C. kleinii**
2. Leaflets more than 10 pairs; gland on the petiole sessile 3
3. Leaflets 16-25 pairs ..... **C. leschenaultiana**
4. Leaflets 25-40 pairs ..... **C. mimosoides**

Chamaecrista absus (L.) Irwin & Barneby, Mem. New York Bot. Gard. 35: 664. 1982. *Cassia absus* L., Sp. Pl. 376. 1753; Baker in Hook. f., Fl. Brit. India 2: 255. 1878; Gamble, Fl. Pres. Madras 403(285). 1919; Ansari, Fl. Kasaragod Div. 142. 1985; Sanjappa, Legumes India 14. 1992; Sasidh. & Sivar., Fl. Pl.

Thrissur For. 163. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 197. 2005.*Senna absus* (L.) Roxb., Fl. India 2:340. 1832.

Scabrid herbs. Leaves 6-8 cm long; leaflets 3-3.5 x 1-1.5 cm, ovate, acute, hispid; stipule lanceolate, deflexed. Flowers in terminal racemes, 6-8 mm across, shortly pedicelled; sepals oblong, obtuse; petals yellow, obovate, obtuse; stamens unequal; anthers dimorphic. Pods 4.5-5 x 0.7-1 cm, oblong, flat, hispid, oblique at base; seeds 6, biconvex.

Flowering & Fruiting: September-December.

Distribution: Sri Lanka, Peninsular India and Himalayas. Common; in moist deciduous forests. *RNMK 2643,* Appapara; *RNMK 3986*, Thirunelli.

Chamaecrista kleinii (Wight & Arn.) Matthew, Kew Bull. 48: 760. 1993. *Cassia kleinii* Wight & Arn., Prodr. 293. 1834; Baker in Hook. f., Fl. Brit. India 2: 266. 1878; Gamble, Fl. Pres. Madras 403(285). 1919; Manilal & Sivar., Fl. Calicut 95. 1982; Ansari, Fl. Kasaragod Div. 143. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 130. 1988; Sanjappa, Legumes India 17. 1992; Mohanan & Sivad., Fl. Agasthyamala 230. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 198. 2005. *Malamtodda-vadi* Rheede, Hort. Malab. 9:37, t.21. 1689.

Prostrate herbs. Leaves 3-6 cm; leaflets 8-13 pairs, 1-1.3 x 0.3-0.4 cm, falcate, mucronate, midrib near to upper margin, gland on the petiole stipitate, near to the lowest pair of leaflets. Flowers 1-3, axillary, yellow; bracts and bracteoles 2-3 mm; sepals 6-7 mm long, pubescent; petals 8-9 mm; stamens 10, subequal. Pods to 4-4.5 x 0.4-0.5 cm, flat, hairy, thickened on the sutures.

Flowering & Fruiting: November-March.

Distribution: Peninsular India and Sri Lanka. Common; in forest undergrowths. *RNMK 3218,* Muthanga; *RNMK 3873,* Kurumbalakotta.

Chamaecrista leschenaultiana (DC.) Degner, Fl. Haw. Fam. 169b. 1934. *Cassia leschenaultiana* DC., Mem. Soc. Phys. Hist. Nat. Geneva 2: 132. 1824; Gamble, Fl. Pres. Madras 403(286). 1919; V. S. Ramach. & V. J. Nair, Fl. Cannanore 164. 1988; Vajr., Fl. Palghat Dist. 181. 1990. *Cassia mimosoides* L. var. *wallichiana* (DC.) Baker in Hook.f., Fl. Brit. India 2: 266. 1878. *Cassia wallichiana* DC., Prodr. 2: 505. 1825. *Cassia mimosoides* L. ssp. *leschenaultiana* (DC.) Ohashi, J. Jap. Bot. 50: 308. 1975.

Erect undershrub, up to 50 cm tall. Leaves linear, subacute, obliquely mucronate, oblique at base. Flowers 1.5-2 cm long. Pods up to 6 cm long, linear, flat, nearly straight, glabrous.

Flowering: November.

Distribution: Pantropical. Occasional; in moist deciduous forest. *RNMK 1989,* Appapara.

Chamaecrista mimosoides (L.) Greene, Pittonia 4:27.1899. *Cassia mimosoides* L., Sp. Pl. 379. 1753; Hook. f., Fl. Brit. India 2: 266. 1878;

Gamble, Fl. Pres. Madras 403(285). 1919; Manilal & Sivar., Fl. Calicut 95. 1982; Ansari, Fl. Kasaragod Div. 144. 1985; Manilal, Fl. Silent Valley 92. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 165. 1988; Vajr., Fl. Palghat Dist. 181. 1990; Sanjappa, Legumes Ind. 17. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 163. 1996; Sivar. & P. Mathew, Fl. Nilambur 234. 1997; Mohanan & Sivad., Fl. Agasthyamala 231. 2002; N. Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 198. 2005.

Erect herbs, branchlets hispid. Leaves 8-10 cm long, leaflets 30-50 pairs, oblong, inequilateral, hirsute; stipule 1-1.2 cm long, lanceolate, subulate at apex. Flowers axillary, solitary or paired, 1-1.3 cm across; sepals lanceolate, acuminate, hairy; petals obovate, yellow; all stamens with fertile anthers, filaments equal. Pods 5-6 x 0.4-0.6 cm, oblong, sparsely hairy; seeds many.
Flowering & Fruiting: July-December.
Distribution: Paleotropics. Common; in open grassy patches. *RNMK 1839*, Ambalavayal.

Chamaecrista pumila (Lamk.) Larsen, Nordic J. Bot. 13: 404. 1993. *Cassia pumila* Lamk., Encycl. 1: 651. 1785; Baker in Hook. f., Fl. Brit. India 2: 266. 1878; Gamble, Fl. Pres. Madras 403(285). 1919; Ramach., J. Econ. Tax. Bot. 5: 139. 1984; V. S. Ramach. & V. J. Nair, Fl. Cannanore 165. 1988; Sanjappa, Legumes India 19. 1992. *Senna prostrata* Roxb., Fl. India 2: 352. 1832.

Erect herbs, up to 30 cm tall. Leaflets 10-20 pairs, each up to 2 cm long. Flowers 0.4-0.5 cm long, yellow. Pods 3.5-4 cm long, linear, straight or slightly curved, glabrous.
Flowering & Fruiting: November-December.
Distribution: Paleotropics. Occasional; in open grassy patches. *RNMK 3853,* Muthanga.

CYNOMETRA Linnaeus
Sp. Pl. 382. 1753.

Trees or shrubs. Leaves paripinnate; leaflets opposite, 1 to few pairs, oblique, subsessile; stipules caduceus. Flowers in axillary racemes, often fasciculate, bracts and bracteoles often large and coloured; calyx lobes 5 or 4, imbricate, reflexed at anthesis; petals 5, subequal; stamens 10, free; anthers uniform; ovary sessile or shortly stipitate; ovules 2; style filiform; stigma capitate. Pods verrucose, rarely smooth; seed compressed

1. Leaflets 2-3 pairs; lateral nerves 6-8 pairs ..... **C. beddomei**
1. Leaflets one pair; lateral nerves 10-12 pairs ..... **C. travancorica**

Cynometra beddomei Prain, J. Asiat. Soc. Bengal 65: 478. 1897; Gamble, Fl. Pres. Madras 414(293). 1919; Sanjappa, Legumes India 26. 1992; Mohanan & Sivad., Fl. Agasthyamala 23. 2002. *Cynometra bourdillonii* Gamble, Bull. Misc. Inform. Kew 1908: 446. 1908; Gamble, Fl. Pres. Madras 413(293). 1919; Sanjappa, Legumes India 26. 1992. **Fig. 28, Plate 15e & 15f.**

Trees, 20-25 m high; bark blackish-green. Leaves paripinnate, alternate; stipules free, lateral, cauducous; rachis 3-4 cm, slender, pulvinate, grooved above, pubescent; leaflets 4-6, opposite, exstipellate; petiolule 1-2 mm; lamina 2.5-5 x 1-1.8 cm, obliquely obovate-oblong or obovate, base oblique, acute or cuneate, apex obtusely acuminate, emarginate, margin entire, glabrous, coriaceous; lateral nerves 6-8 pairs, pinnate, secondary laterals present, faint; intercostae reticulate, faint. Flowers bisexual, creamy-white, in axillary clusters from conspicuous imbricate bracts; peduncle 1.2-2 cm, densely-patent-hairy; bracts ovate, appressed, hairy, ciliate, striate, imbricate, at length deciduous, smaller upwards; pedicel 5-6 mm, pubescent; receptacle 1-2 mm deep, campanulate, circum scissile under the ripening fruit; sepals 2-3 mm long, hairy, ciliate; petals 5, 3-3.5 x 0.5-1 mm, free, oblanceolate, subequal, glabrous; disc 0; stamens 10; filaments filiform, connective cleft at base, apex apiculate; anthers versatile; ovary half inferior, densely long brown hairy; style 2-2.5 mm, slender, hairy up to half way; stigma capitate. Fruit a pod, reniform-globose, grooved near sutures, indehiscent; seed one.
Flowering & Fruiting: February-August.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3284,* Vythiri Ghat.

Cynometra travancorica Bedd., Fl. Sylv. t. 316. 1872; Baker in Hook. f., Fl. Brit. India 2: 267. 1876; Gamble, Fl. Pres. Madras 413(293). 1919; Vajr., Fl. Palghat Dist. 182. 1990; Sanjappa, Legumes India 27. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 164. 1996. **Fig. 29, Plate 15g.**

Trees, to 20 m high, bole shortly buttressed, bark surface reddish-brown, smooth, lenticellate; blaze reddish-brown. Leaves alternate, 2-foliate; stipules small, free, lateral, cauducous; rachis 3-8 mm, stout, pulvinate, glabrous; petiolule 2-3 mm, opposite; leaflet 8-12 x 2-3 cm, often falcate, ovate-oblong, oblong or lanceolate, unequal sided, base oblique, apex acute or acuminate, margin entire, glabrous, coriaceous; lateral nerves 6-8 pairs, pinnate, prominent; intercostae reticulate, prominent. Flowers bisexual, 6-8 mm across, rosy white, in short dense flowered axillary racemes; peduncle puberulous; bracts ovate, puberulous and ciliate; bracteole very narrow, with only few hairs at the tip, inserted near the base of the pedicel; pedicel 2-4.5 mm, slender, pubescent; sepals 4, 2-3 mm long, oblong, reflexed, glabrous; petals 5, 3-4 mm long, subequal, clawed; stamens 10, alternate long and short, connective cleft at base, very slightly apiculate; filaments filiform; anthers small, versatile; ovary half inferior, semi-lunar, glabrous; stigma capitate. Fruit a pod 2.5-3 cm long, flat, smooth, rugose along the margin, semicircular, indehiscent; seed one.
Flowering & Fruiting: September-April.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2649,* Vythiri Ghat.

HUMBOLDTIA Vahl

Symb. Bot. 3: 106. 1794, *nom. cons.*

Humboldtia brunonis Wall., Pl. Asiat. Rar. 3: 17. t.233. 1832; Baker in Hook. f., Fl. Brit. India 2: 263. 1878; Gamble, Fl. Pres. Madras 411(291). 1919; Sanjappa, Blumea 31: 333. 1986 & Legumes India 30. 1992; Ansari, Fl. Kasaragod Div. 145. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 166. 1988. **Plate 15i.**

Trees, to 10 m high, bark dark brown to black; blaze pink-red; branchlets sometimes swollen, pubescent when young, lenticellate. Leaves paripinnate, alternate; stipules 1-2 x 0.25-0.5 cm, lateral, linear, prominently parallel veined, glabrous, depressed glandular; appendages broadly reniform, divergently veined, glabrous, glandular, persistent; rachis 2-4 cm long, obscurely winged, shallowly grooved above, tomentose, pulvinate; leaflets 2-4, opposite; petiolules 3-5 mm long, stout; lamina 7-20 x 2.2-8 cm, obovate oblong, oblong or elliptic-oblong, base unequal, apex obtusely acuminate, margin entire, glabrous, sparsely depressed glandular beneath, coriaceous; lateral nerves 7-13 pairs, pinnate, ascending, prominent, intercostae reticulate, prominent. Flowers bisexual, 2-3 cm long, white, in axillary pendulous, brown pubescent, racemes; pedicels 4-5 mm long, pilose; bracts ovate, acute, pubescent; bracteoles 2, pubescent on both surfaces, shortly ciliate along margin; calyx tube 0.8-1 cm long; lobes 4, concave, imbricate; petals 3, white, pink or orange, ovate, shortly clawed, veined, glabrous; stamens 5, perfect, free, alternating with 5 minute staminodes, deep pinkish; filaments 1-2 cm long, glabrous; anthers versatile; ovary 4-5 mm long, half inferior, ovules 3-5, densely pubescent; style filiform; stigma capitate. Fruit a pod 5-10 x 2-4 cm, brown pubescent when young; seeds 3-4.

Flowering & Fruiting: July-November.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 3219,* Vythiri Ghat; *RNMK 2763*, Periya Ghat.

KINGIODENDRON H. A. T. Harms

in Engl. & Prantl, Pflanzenf. Nachtr. 1: 194. 1897.

Kingiodendron pinnatum (Roxb. ex DC.) Harms in Engl. & Prantl, Naturl. Pflanzenf. 1(1): 194. 1897; Gamble, Fl. Pres. Madras 412(292). 1919; Sanjappa, Legumes India 32. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 165. 1996. *Hardwickia pinnata* Roxb. ex DC., Prodr. 2: 487. 1825; Baker in Hook. f., Fl. Brit. India 2: 270. 1878. **Plate 15j.**

Large trees; bark smooth, dark-grey, exudate resinous oil from heart wood. Leaves 1-pinnate, 6-7-foliolate; leaflets alternate, 11-13 x 4-5 cm, ovate, acuminate. Flowers 6-8 mm long, 4-5 mm across, in axillary or terminal branched racemes; calyx tube obsolete, lobes 5; petals absent; stamens 10, uniform, filaments slender, bearded at base; ovary 2-ovuled, sessile; style short, stigma minute. Pods 3-4 cm across, orbicular, concave on faces, glabrous; seed one, biconvex.

Flowering & Fruiting: February-December.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3732,* Vythiri Ghat; *RNMK 3154,* Kunchome.

SARACA Linnaeus
Syst. Nat., ed 12, 2: 469. 1767.

Saraca asoca (Roxb.) de Wilde, Blumea 15: 393. 1968; Manilal & Sivar., Fl. Calicut 94. 1982; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 142. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 167. 1988; Vajr., Fl. Palghat Dist. 184. 1990; Sanjappa, Legumes India 35. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 166. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 200. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 260. 2009. *Jonesia asoca* Roxb., Asiat. Res. 4: 365. 1799. *Saraca indica* sensu Bedd., Fl. Sylv. t. 57. 1870; Baker in Hook. f., Fl. Brit. India 2: 271. 1878, non L. 1769; Gamble, Fl. Pres. Madras 409(289). 1919. *Asjogam* Rheede, Hort. Malab. 5: 117, t. 53. 1679.

Trees, to 10 m high, bark brown or brownish-black, lenticellate; blaze pink. Leaves paripinnate, alternate; stipules 0.7-2 cm long, intra petiolar; rachis 4-25 cm long, slender, pulvinate, glabrous; leaflets 6-12, opposite; petiolule 0.2-1cm long, stout, glabrous; lamina 7-28.5 x 2-8.5 cm, narrowly oblong, oblong-ovate or ovate-lanceolate, base obtuse, round, cuneate or acute, apex acute or acuminate, margin entire, glabrous, coriaceous; lateral nerves 10-15 pairs, pinnate, arched towards the margin. Flowers bisexual, yellow-orange or red, in dense sessile paniculate corymbs, axillary to leaves or leaf scars; bracts ovate, small deciduous; bracteoles oblong-spathulate, coloured; calyx 3-4 cm long, petalloid, cylindric, enclosing a lobed disc; lobes 4, ovate-oblong, unequal, spreading, imbricate; petals 0; stamens 7 or 8, much exserted, free; filaments long, filiform, coloured, glabrous; anthers versatile; ovary half inferior, stipitate, the stipe adnate below to one side of the disc, pubescent; style incurved, glabrous; ovules many. Fruit a pod 10-5 x 2-5 cm, flat, oblong, almost woody, tapering at both ends; seeds 2-8, 3.8-4.5 cm long, slightly compressed.
Flowering & Fruiting: March-July. *Distribution*: India and Myanmar. Rare; in evergreen forests. *RNMK 2830,* Thirunelli.

SENNA P. Miller
Gard. Dict. Abr. Ed. 4. 1754.

Shrubs or subshrubs. Leaves alternate, even-pinnate; leaflets opposite, glandular or eglandular. Racemes axillary; pedicels articulate with the hypanthium; bracteoles absent. Flowers usually yellow; sepals 5, imbricate; petals 5; stamens 10, 3 adaxial stamens often staminodal; ovary 5 or many. Pod indehiscent or tardily dehiscent; funicle filiform, testa smooth with a closed areole.

1. Branchlets and pods hirsute 2
1. Branchlets and pods glabrous or glabrescent 4

2. Leaflets oblong-obovate; gland opposite the leaflets .....**S. auriculata**
2. Leaflets ovate-lanceolate; glands at the base of the petiole 3
3. Leaflets 4 pairs; pod slender, curved, densely hirsute ..... **C. hirsute**
3. Leaflets less than 4 pairs; pod stout, straight, sparsely pubescent..... **C. intermedia**
4. Leaves less than 15 cm; glands on the rachis between leaflets ..... **C. tora**
4. Leaves more than 15 cm; glands at the base of the petiole..... 5
5. Leaflets 6 pairs ..... **C. occidentalis**
5. Leaflets 8 pairs ..... **C. sophera**

Senna auriculata (L.) Roxb., Fl. India 2:349. 1832. *Cassia auriculata* L., Sp. Pl. 379. 1753; Baker in Hook. f., Fl. Brit. India 2: 263. 1878; Gamble, Fl. Pres. Madras 402(284). 1919; Vajr., Fl. Palghat Dist. 180. 1990; Sanjappa, Legumes India 14. 1992.

Shrubs; branchlets pubescent. Leaflets 2-2.5 x 0.8-1 cm, oblong-obovate or elliptic, shortly acuminate, pubescent, gland opposite the leaflets, stipitate; petiole 1-1.5 cm; stipules 0.4-1 cm, lunate, auricled. Corymbs axillary and terminal; peduncle 2-2.5 cm, pubescent. Flowers yellow; larger sepals 1-1.5 x 1-2 cm, broadly ovate, obtuse, outer smaller; petals 3-3.5 x 1.5-2 cm, ovate, orbicular, clawed; stamens 7 fertile and 3 staminodes. Pod flat, pubescent, mucronate.
Flowering & Fruiting: Throughout the year.
Distribution: Sri Lanka, India, Myanmar; cultivated in the tropics. Occasional; in moist deciduous forests. *RNMK 3111,* Pulpally; *RNMK 2622*, Baveli.

Senna hirsuta (L.) Irwin & Barneby, Phytologia 44: 499. 1979. *Cassia hirsuta* L., Sp. Pl. 378. 1753; Baker in Hook. f., Fl. Brit. India 2: 263. 1878; Gamble, Fl. Pres. Madras 401(284). 1919; Manilal & Sivar., Fl. Calicut 97. 1982; Ansari, Fl. Kasaragod Div. 143. 1985; Manilal, Fl. Silent Valley 91. 1988; Vajr., Fl. Palghat Dist. 181. 1990; Sanjappa, Legumes India 15. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 163. 1996; Sivar. & P. Mathew, Fl. Nilambur 233. 1997; Mohanan & Sivad., Fl. Agasthyamala 230. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 198. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 239. 2009.

Densely hispid shrubs, to 1.5 m tall. Leaves 25-28 cm long; leaflets 4 pairs, to 6-7 x 2-3 cm, ovate-lanceolate, acute, glandular at the base of the petiole; flowers 3-7-together, on axillary umbel, 3 cm across; sepals 5-6 x 3-4 mm, obovate, hispid; petals 1-1.2 x 0.7-0.8 cm, obovate, entire, glabrous; two stamens only with fertile anthers. Pods 15-17 x 0.5-0.7 cm, terete, falcate, densely hispid.
Flowering & Fruiting: September-December.
Distribution: Native of Tropical America. Occasional; along roadsides. *RNMK* 1128, Palvelicham.

Senna intermedia (Sharma, Vivek. & Rath.) Singh, J. Econ. Taxon. Bot. 16: 600. 1992. *Cassia intermedia*. Sharma, Vivek. & Rath., Proc. Indian Acad. Sci.

(Pl. Sci.) 80B:301. 1974; V. S. Ramach. & V. J. Nair, Fl. Cannanore 164. 1988; Sanjappa, Legumes India 16. 1992; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 198. 2005.

Erect shrubs; stem terete, often furrowed, young shoots hirsute. Leaves 13-15 cm long; leaflets 3-6 pairs, 2-9 x 0.6-3.5 cm, ovate, ovate-oblong, acute or acuminate, base narrowly or broadly rounded, hirsute on both sides; petiolule 1-2 mm long. Flowers 1-2.5 cm across, yellow, in short peduncled, few flowered axillary racemes or pseudoterminal panicles. Pods 2-9 x 0.4-0.6 cm, compressed, linear, often slightly curved, scarcely torulose, hirsute, sutures not distinct; seeds brown, 3-4 x 4-5 mm, flat.

Flowering & Fruiting: November-January.

Distribution: Endemic to southern Western Ghats. Occasional; in open areas in moist deciduous forest. *RNMK* 2334, Begur.

Senna occidentalis (L.) Link, Handb. 2: 140. 1831. *Cassia occidentalis* L., Sp. Pl. 377. 1753; Baker in Hook. f., Fl. Brit. India 2: 262. 1878; Gamble, Fl. Pres. Madras 401(284). 1919; Manilal & Sivar., Fl. Calicut 97. 1982; Ansari, Fl. Kasaragod Div. 144. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 165. 1988; Vajr., Fl. Palghat Dist. 182. 1990; Sanjappa, Legumes India 19. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 163. 1996; Sivar. & P. Mathew, Fl. Nilambur 235. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 199. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 256. 2009.

Glabrous shrubs, to 1 m tall. Leaves 22-25 cm long, glandular at the base of petiole; leaflets 6 pairs, 6-7 x 2-2.5 cm, lanceolate, ciliate, shortly petiolulate. Flowers ca. 3 cm across, pedicelled, in axillary two flowered umbel turning to terminal racemes; pedicels 1-1.5 cm long; sepals orbicular, green; petals yellow, obovate, clawed; 2-3 stamens with larger anthers, 4 stamens with short anthers, 3 staminodes. Pods 11-13 cm long, oblong, curved, compressed, marginate, long-cuspidate.

Flowering & Fruiting: July-December.

Distribution: Native of South America; naturalised in Asia. Common; along roadsides and disturbed areas. *RNMK* 2374, Puthoorvayal; *RNMK 1230*, Kalpetta; *RNMK 1167,* Sulthan Bathery; *RNMK 3425*, Meppady.

Senna sophera (L.) Roxb., Fl. India 2: 347. 1832. *Cassia sophera* L., Sp. Pl. 379. 1753; Baker in Hook. f., Fl. Brit. India 2: 262. 1878; Gamble, Fl. Pres. Madras 401(284). 1919; Ansari, Fl. Kasaragod Div. 144. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 130. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 166. 1988; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 199. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 2009. *Ponnam-tagera* Rheede, Hort. Malab. 2: 101-102, t. 52. 1679.

Shrubs, to 1 m tall. Leaves 20-23 cm long; leaflets 8 pairs, 5-6 x 1.5-2 cm, lanceolate, acute, rounded at base; petiole with a stalked gland at base. Panicles 10-13 x 6-8 cm, glabrous; flowers 2-3 cm across, pedicelled; sepals

ovate, obtuse, glabrous; petals yellow, obovate; 2 stamens with long anthers, 4 stamens with short anthers, 3 staminodes and one stamens with linear anther. Pods 16-18 x 0.5-0.6 cm, compressed, many-seeded, glabrous.
Flowering & Fruiting: November-February.
Distribution: Pantropical. Common along road sides. *RNMK 1763,* Panamaram; *RNMK 2866,* Kaniyambetta; *RNMK 3325,* Chundel.

Senna tora (L.) Roxb., Fl. India 2:340.1832. *Cassia tora* L., Sp. Pl. 376. 1753; Baker in Hook. f., Fl. Brit. India 2: 263. 1878; Gamble, Fl. Pres. Madras 401(284). 1919; Manilal & Sivar., Fl. Calicut 96. 1982; Ansari, Fl. Kasaragod Div. 145. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 130. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 166. 1988; Vajr., Fl. Palghat Dist. 182. 1990; Sanjappa, Legumes India 22. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 164. 1996; Sivar. & P. Mathew, Fl. Nilambur 236. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 199. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 239. 2009. *Tagara* Rheede, Hort. Malab. 2:103, t.53. 1679.

Glabrous shrubs. Leaves 10-12 cm long; rachis glandular between leaflets; leaflets 2-4 pairs, 4-5 x 2.5-3 cm, obovate, obtuse. Flowers 1-3 cm across, in axillary fascicles, pedicellate; calyx ovate, acute, hispid; petals obovate, not clawed; 7 stamens antheriferous, 3 staminodes, anthers subequal. Pods 15-17 x 0.3-0.4 cm; terete, glabrous.
Flowering & Fruiting: August-December.
Distribution: Native of South America. Common; along road sides. *RNMK 1100,* Kaniyambetta; *RNMK 3229*, Kalloor; *RNMK 2895*, Muttil.

TAMARINDUS Linnaeus
Sp. Pl. 34. 1753.

Tamarindus indica L., Sp. Pl. 34. 1753; Baker in Hook. f., Fl. Brit. India 2: 273. 1878; Gamble, Fl. Pres. Madras 409(290). 1919; Manilal & Sivar., Fl. Calicut 94. 1982; Ansari, Fl. Kasaragod Div. 147. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 143. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 168. 1988; Vajr., Fl. Palghat Dist. 184. 1990; Sanjappa, Legumes India 36. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 166. 1996; Sivar. & P. Mathew, Fl. Nilambur 237. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 201. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 261. 2009. *Balam-pulli, Madiram-pulli* Rheede, Hort. Malab. 1:39-40, t.23. 1678.

Trees, branchlets warty. Leaves paripinnate; leaflets 14-17 pairs, to 2 x 0.7 cm, oblong, apex obtuse; petiole 1-1.5 cm. Racemes terminal on short branches, to 6 cm long; bracts and bracteoles ovate; pedicel 7-8 mm; calyx tube 6-7 mm, turbinate, lobes 4, subequal; petals 3, 1-1.5 x 0.7-1 cm, oblanceolate, lateral clawed, subequal, yellow, outer one dotted with pink; stamens 10, 8 fertile, staminal tube 7-8 mm, filaments 6-7 mm, base villous; ovary 7-8 mm, stipitate, style 5-6 mm. Pods 13-15 x 2-3 cm, oblong-falcate, mesocarp pulpy.

Flowering & Fruiting: September-April.
Distribution: Native of Tropical Africa; introduced and widely grown in India and other parts of tropics. Occasional; in forest plantations and waysides. *RNMK 3911,* Kalloor.

Delonix regia (Hook.f) Rafin., **Peltophorum pterocarpum** (DC) Baker ex Heyne, **Caesalpinia sappan** L., **Caesalpinia coriaria** (Jacq.) Willd., and **Cassia roxburghii** DC. are often found growing in plantations and along roadsides. **Bauhinia acuminata** L., **Bauhinia tomentosa** L., **Bauhinia variegata** L., **Senna surattensis (**Burm.f.) Irwin & Barneby, **Senna siamea** (Lam.) Irwin & Barneby and **Caesalpinia pulcherrima** (L.) Swartz are the other common ornamental plants found in the study area.

Subfamily: **MIMOSOIDEAE**

1. Plants armed with prickles 2
1. Plants unarmed 3
2. Herbs; pods bristly ..... **Mimosa**
2. Trees, shrubs or woody climbers; pods glabrous ..... **Acasia**
3. Woody climbers; leaf rachis ending in hooked tendrils ..... **Entada**
3. Trees; leaves without tendrils 4
4. Pods twisted 5
4. Pods straight 6
5. Flowers in globose few flowerd spikes ..... **Archidendron**
5. Flowers in long many flowered spikes ..... **Racosperma**
6. Leaves with one pair of pinnae ..... **Xylia**
6. Leaves with more than one pair of pinnae 7
7. Pods spiraly coiled after dehiscence..... **Adenanthera**
7. Pods thin, flat, compressed ..... .**Albizia**

ACACIA P. Miller

Gard. Dict. Abr. ed. 4, 28. 1754.

Erect or climbing shrubs; stems prickled. Leaves bipinnate; pinnae opposite; leaflets many, opposite, exstipillate; stipule spinescent. Flowers in globose heads, polygamous; peduncles solitary, fascicled or in terminal panicles; bracts on the peduncle; bracteoles spathulate or peltate; calyx 5-lobed, campanulate; petals 5, connate; stamens many, filaments shortly connate at base; ovary oblong, 2-many-ovuled; style slender. Pod flat or turgid, continuous or depressed between seeds; seeds ovoid or compressed.

1. Pinnae 5 or 6 pairs ..... **A. caesia**
1. Pinnae more tan 6 pairs 2
2. Pinnae more than 15 pairs ..... **A. catechu**
2. Pinnae less than 15 pairs 3

3. Bracts ovate; pods thick ..... **A. sinuate**
3. Bracts linear-lanceolate; pods thin 4
4. Flowers sessile ..... **A. torta**
4. Flowers pedicellata 5
5. Pinnae 6-9 pairs ..... **A. nilotica** ssp**. indica**
5. Pinnae 10-13 pairs ..... **A. pennata**

Acacia caesia (L.) Willd., Sp. Pl. 4: 1090. 1806; Gamble, Fl. Pres. Madras 428(304). 1919; Ansari, Fl. Kasaragod Div. 148. 1985; Manilal, Fl. Silent Valley 92. 1988; Sanjappa, Legumes India 37. 1992; Chakrab. & Gangop., J. Econ. Tax. Bot. 20: 604. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 202. 2005. *Mimosa caesia* L., Sp. Pl. 522. 1753p.p. *Acacia intsia* Willd. var. *caesia* (L.) Baker in Hook. f., Fl. Brit. India 2: 297. 1878. *Acacia columnaris* Craib., Bull. Misc. Inf. Kew 1915: 410. 1915; Gamble, Fl. Pres. Madras 429(304). 1919.

Stout ramblers; old stem 4-6-angled; prickles strong, recurved, bark fibrous. Leaves 20-25 cm long, pinnae 5-8 pairs, to 7 cm long; leaflets 18-22 pairs, ca. 1.1 x 0.3 mm, oblong, truncate at base, apiculate at apex; thinly pubescent below, 3-nerved from base. Heads terminal, panicled. Pods 13-15 x 2-2.2 cm, oblong, flat, acuminate at both ends, marginate.
Flowering & Fruiting: October-December.
Distribution: Indo-Malesia. Common in semi-evergreen forests. *RNMK 3436,* Manikkunnumala; *RNMK 2008,* Puthoorvayal.

Acacia catechu (L.f.) Willd., Sp. Pl. 4: 1079. 1806; Hook. f., Fl. Brit. India 2: 295. 1878; Gamble, Fl. Pres. Madras 427(303). 1919; Sanjappa, Legumes Ind. 38. 1992; Chakrab. & Gangop., Journ. Econ. Tax. Bot. 20: 606. 1996. *Mimosa catechu* L. f., Suppl. Pl. 439. 1781.

Small tree; bark and branchlets dark brown. Leaves 15-25 cm, pinnae more than 15, 4 to 5 cm; leaflets 6-7 x 1-2 mm, oblong, puberulus, stipular spines none or small, recurved. Spike 10-12 cm long; flowers yellowish-white; petals, broadly crenate. Pods 5-10 cm long, flat.
Flowering & Fruiting: March-September.
Distribution: India and Myanmar. Occasional; in moist deciduous forests. *RNMK 1663*, Muthanga.

Acacia nilotica (L.) Willd. ex Del. ssp. **indica** (Benth.) Brenan, Kew Bull. 12: 84. 1957; Vajr., Fl. Palghat Dist. 185. 1990; Sanjappa, Legumes India 42. 1992; Chakrab. & Gangop., J. Econ. Tax. Bot. 20: 619. 1996; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 263. 2009. *Mimosa nilotica* L., Sp. Pl. 521. 1753. *Acacia arabica* Hook.f., Fl. Brit. India 2: 293. 1878, non (Lam.) Willd. 1808; Gamble, Fl. Pres. Madras 425(301). 1919. *Acacia arabica* Hook. f. var. *indica* Benth. in Hook.'s London J. Bot. 1: 500. 1842. *Mimosa arabica* Lamk., Encycl. 1: 19. 1783.

Trees, to 8 m high; bark black with deep narrow longitudinal fissures, exudation gummy. Leaves bipinnate, alternate; stipular spines in pairs, upto 5 cm, straight, slender, white with grey spots; rachis 5-7 cm, slender, pulvinate, grooved above, pubescent; pinnae 6-9 pairs, 1.5-3 cm, with a gland near the lowermost pinnae on upper side; leaflets 20-40, opposite, sessile. Flowers bright yellow, in heads on axillary peduncle; calyx campanulate, glabrescent, teeth triangular to ovate; corolla 2.5-3.5 mm long; stamens many, 4.5-5 mm long. Fruit a pod, 7.6-23 x 1.3-2 cm, flattened, strap-shaped, straight to slightly curved, deeply constricted between seeds; seeds 8-13, black.
Flowering & Fruiting: July-October.
Distribution: North India to North Africa through west Asia. Occasional; in moist deciduous forest. *RNMK 3536,* Ponkuzhy.

Acacia pennata (L.) Willd., Sp. Pl. 4: 1090. 1806; Baker in Hook. f., Fl. Brit. India 2: 297. 1878p.p.; Gamble, Fl. Pres. Madras 429(304). 1919; Manilal & Sivar., Fl. Calicut 100. 1982; Ansari, Fl. Kasaragod Div. 148. 1985; Manilal, Fl. Silent Valley 92. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 168. 1988; Vajr., Fl. Palghat Dist. 186. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 167. 1996; Sanjappa, Legumes India 42. 1992; Chakrab. & Gangop., J. Econ. Tax. Bot. 20: 620. 1996; Sivar. & P. Mathew, Fl. Nilambur 239. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 202. 2005. *Mimosa pennata* L., Sp. Pl. 522. 1753.

Ramblers; branchlets slender, terete, prickles few, minute. Leaves 18-20 cm long, pinnae 10-13 pairs, 7-8 cm long; leaflets oblong, cordate at base, inequilateral, obtuse at apex, overlapping. Spikes 1-2 cm across, in axillary cymes. Pods 10-11 x 2-2.3 cm, oblong, obtuse, flat, yellowish.
Flowering & Fruiting: October-January.
Distribution: Paleotropics. Common; in moist deciduous forests. *RNMK 3649*, Bavali; *RNMK 2125*, Tholpetty.

Acacia sinuata (Lour.) Merr., Trans. Amer. Philos. Soc. n.s.24: 186. 1935; V. S. Ramach. & V. J. Nair, Fl. Cannanore 168. 1988; Vajr., Fl. Palghat Dist. 186. 1990; Sivar. & P. Mathew, Fl. Nilambur 239. 1997; Chakrab. & Gangop., J. Econ. Tax. Bot. 20: 625. 1996. *Mimosa sinuata* Lour., Fl. Cochinch. 653. 1790. *Mimosa concinna* Willd., Sp. Pl. 4: 1039. 1806. *Acacia concinna* (Willd.) DC., Prodr. 2: 464. 1825; Baker in Hook. f., Fl. Brit. India 2: 296. 1878; Gamble, Fl. Pres. Madras 429(304). 1919; Sanjappa, Legumes India 38. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 167. 1996. *Acacia concinna* (Willd.) DC. var. *rugata* (Benth.) Baker in Hook. f., Fl. Brit. India 2: 297. 1878. *Acacia rugata* (Lamk.) J. Voigt, Hort. Suburb. Calcutt. 263. 1845, non Benth. 1842; Gamble, Fl. Pres. Madras 429(304). 1919.

Armed climbing shrubs, densely prickly; branchlets pubescent, black. Pinnae 8-10 pairs, to 5 cm long; leaflets oblong, truncate at base, pubescent; rachis prickled, glandular. Heads axillary, solitary or paired, 0.4-1 cm across;

peduncle 3-4 cm long. Flowers numerous, 2-3 mm long; filaments 5-6 mm long, yellow. Pods 10-12 x 2-3 cm, dark-brown; seeds transverse.
Flowering & Fruiting: February-March.
Distribution: Indo-Malesia. Common' in moist deciduous and semi-evergreen forests. *RNMK 1219,* Manikkunnumala; *RNMK 2553*, Muthanga.

Acacia torta (Roxb.) Craib, Bull. Misc. Inform. Kew 1915: 410. 1915; Gamble, Fl. Pres. Madras 428(304). 1919; V. S. Ramach. & V. J. Nair, Fl. Cannanore 169. 1988; Vajr., Fl. Palghat Dist. 186. 1990; Sanjappa, Legumes India 44. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 167. 1996; Sivar. & P. Mathew, Fl. Nilambur 240. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 202. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 264. 2009. *Mimosa torta* Roxb., Fl. India 2: 566. 1832. *Acacia caesia* Wight & Arn., Prodr. 278. 1834, non Willd. 1806.

Rambling shrubs; branchlets puberulus. Leaves 20-24 cm long; pinnae 10-12 pairs; leaflets oblong, obtuse at apex, subcordate at base, slightly pubescent, 1-nerved from base. Heads 1.5-2 cm across, in terminal panicles; flowers many, 3-4 mm long; filaments 5-5.5 mm long, yellow. Pods 14-16 x 2-2.5 cm, flat, papery, yellowish-brown, densely glandular.
Flowering & Fruiting: April-December.
Distribution: India and Pakistan. Common; in moist deciduous forests. *RNMK* 3276, Bavali.

ADENANTHERA Linnaeus
Sp. Pl. 384. 1753.

Adenanthera pavonina L., Sp. Pl. 384. 1753; Baker in Hook. f., Fl. Brit. India 2: 287. 1878; Gamble, Fl. Pres. Madras 418(296). 1919; Manilal & Sivar., Fl. Calicut 102. 1982; Ansari, Fl. Kasaragod Div. 149. 1985; Sanjappa, Legumes India 54. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 171. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 206. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 264. 2009.

Trees; to 20 m high; bark grey to reddish-brown, smooth, blaze dull yellow. Leaves bipinnate, alternate; rachis 14.5-62.5 cm long, stout, pulvinate, grooved above, glabrous, with a gland at the tip; pinnae 2-3 pairs, 2-42 cm, opposite or rarely subopposite, even pinnate, slender, grooved above, pulvinate; leaflets 8-20, alternate, exstipellate; lamina 1.3-8 × 8-4.2 cm, oblong, oblong-elliptic, base slightly oblique and truncate, apex round, emarginate or obtuse and mucronate, margin entire, puberulent above and glaucous beneath; lateral nerves 9-10 pairs, parallel. Flowers bisexual, pale yellow, 5-6 mm across, clustered in axillary spiciform racemes; bracts to 5 mm, linear; calyx tube campanulate, 5 toothed, pubescent; petals 5, connate below, linear-lanceolate, upto 4.5 mm long, glabrous; stamens 10, free, filaments filiform, alternately long and short; anthers oblong, ending in a stipitate gland; ovary subsessile, flat; stigma simple. Fruit a pod, 10-25 x 0.7-

1.5 cm, straight to falcate to slightly twisted, spirally coiled after dehiscence, tapered at base, apex acute, glabrous; seeds 6-15, red.
Flowering & Fruiting: January-September.
Distribution: Sri Lanka, Himalayas, Myanmar, Thailand, Malesia and China. Occasional; in plantations. *RNMK 2779,* Sulthan Bathery.

ALBIZIA Durazzini
Mag. Tosc. 3(4): 13. 1772.

Trees. Leaves bipinnate, pinnae, opposite; pinnules many, opposite, inequilateral, estipellate. Heads sessile, peduncled, axillary or in terminal panicles; bracts and bracteoles minute. Flowers many; calyx 5-lobed, gamosepalous; lobes erect; petals 5, connate; stamens many; filaments united at base, long, exserted; anthers small; ovary oblong, many-ovuled, sessile; style slender; stigma minute. Pod oblong, thin, flat; seeds few-many, compressed.

1. Leaflets to 0.5 cm broad 2
1. Leaflets over 1.5 cm broad 3
2. Stipule large, foliaceaous; pinnae 13-18 pairs .....**A. chinensis**
2. Stipule minute; pinnae 4-6 pairs .....**A. odoratissima**
3. Flower heads in axillary fascicles; flowers pedicelled 4
3. Flower heads in terminal panicles; flowers sessile .....**A. procera**
4. Pinnae 3-16 pairs .....**A. amara**
4. Pinnae 2 pairs .....**A. lebbeck**

Albizia amara (Roxb.) Boivin, Encycl. 19: 34. 1838; Baker in Hook. f., Fl. Brit. India 2: 301. 1878; Gamble, Fl. Pres. Madras 432(306). 1919; Sanjappa, Legumes India 54. 1992; Chakrab. & Gangop., J. Econ. Tax. Bot. 20: 583. 1996. *Mimosa amara* Roxb., Pl. Corom. 1. 122. 1799. *Acacia amara* (Roxb.) Willd., Sp. Pl. 4:1074.1806. *Acacia wightii* Graham ex Wight & Arn., Prodr. 274.1834.

Much branched trees; to 13 m high; bark thin, surface grey, rough, scaly. Leaves bipinnate, alternate; rachis 3-15 cm, pulvinate, with a gland near the base on the upper side, yellow tomentose; pinnae 3-16 pairs, opposite, even pinnate, 2.5-7 cm, slender, rachis with a gland in between terminal pairs on the upper side or between all pairs; leaflets 20-60, opposite, even pinnate. Flowers bisexual, white, heads solitary or 2-3 in axillary fascicles, 6-8 mm long; peduncle to 5 cm, slender, densely pubescent; calyx funnel-shaped, teeth 5, short; corolla, glabrous, lobes 5, oblong-lanceolate; stamens many, 1-1.5 cm long, monadelphous at base, tube as long as or slightly shorter than the corolla tube, filaments long exserted; ovary pubescent. Fruit a pod, 10-24 x 2.5-4 cm, flat, greyish-brown, veiny, straight or wavy along margin; seeds 6-13, compressed.
Flowering & Fruiting: August-February.
Distribution: India, Sri Lanka and parts of East Africa. Common; in moist deciduous forests. *RNMK 3892,* Chedalayam; *RNMK 3632*, Begur.

Albizia chinensis (Osb.) Merr., Amer. J. Bot. 3: 575. 1916; Manilal & Sivar., Fl. Calicut 100. 1982; Vajr., Fl. Palghat Dist. 187. 1990; Sanjappa, Legumes India 54. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 168. 1996; Chakrab. & Gangop., J. Econ. Tax. Bot. 20: 584. 1996; Mohanan & Sivad., Fl. Agasthyamala 236. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 203. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 265. 2009. *Mimosa chinensis* Osb., Dagbok. Ostind. Resa 233. 1757. *Acacia stipulata* DC., Prodr. 2: 469. 1825. *Albizia stipulata* (Roxb.) Boivin, Encycl. 19:33. 1838; Baker in Hook. f., Fl. Brit. India 2: 300. 1878. *Mimosa stipulata* Roxb., Fl. India 2: 549. 1832. *Albizia marginata* (Lamk.) Merr., Philipp. J. Sci. 5: 23. 1910; Gamble, Fl. Pres. Madras 433(307). 1919. *Mimosa marginata* Lamk., Encycl. 1:12.1783.

Tall trees; bark rough, black. Leaves 18-20 cm long, bipinnate; pinnae15-20 pairs; leaflets 30-40 pairs, oblong, broadened at base, acute at apex, pubescent below; rachis densely hairy. Panicles terminal and axillary, to 15 x 15 cm; heads 1-2 cm across, 16-20 flowered; flowers 7-8 mm long; corolla tube broaden up, pubescent; filaments ca. 2 cm long, white. Pods 20-23 x 3-4 cm, glabrous, yellowish brown.

Flowering & Fruiting: March-April.

Distribution: Indo-Malesia and south China. Common; in semi-evergreen forests and plantations. *RNMK 2093,* Puliyarmala; *RNMK 3229,* Kainatty.

Albizia lebbeck (L.) Benth. in Hook.'s London J. Bot. 3: 87. 1844; Baker in Hook. f., Fl. Brit. India 2: 298. 1878; Gamble, Fl. Pres. Madras 432(306). 1919; V. S. Ramach. & V. J. Nair, Fl. Cannanore 170. 1988; Sanjappa, Legumes India 56. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 168. 1996; Chakrab. & Gangop., J. Econ. Tax. Bot. 20: 589. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 203. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 266. 2009. *Mimosa lebbeck* L., Sp.Pl.516. 1753. *Mimosa sirissa* Roxb., Fl. India 2: 544. 1832.

Tall trees; bark smooth, white. Leaves 20-30 cm long; pinnae 2 pairs; leaflets 4-4.5 x 2-2.5 cm, oblong, obtuse, glabrate. Peduncles 10-12 cm long, axillary, paired; heads 4-5 cm across, dull yellow; flowers pedicelled, 1-1.2 cm long; calyx tube 5-6 mm long, glabrous; corolla glabrous, lobes ovate, acute; filaments 3-3.5 cm long. Pods 20-22 x 3-3.5 cm, smooth with thick margin, yellow.

Flowering & Fruiting: March-December.

Distribution: Indo-Malesia and south China. Occasional; in moist deciduous forests. *RNMK 1199,* Chedalayam.

Albizia odoratissima (L. f.) Benth. in Hook.'s London J. Bot. 3: 88. 1844; Baker in Hook. f., Fl. Brit. India 2: 299. 1878; Gamble, Fl. Pres. Madras 431(306). 1919; Ansari, Fl. Kasaragod Div. 149. 1985; Manilal, Fl. Silent Valley 93. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 170. 1988; Vajr., Fl. Palghat Dist. 187. 1990; Sanjappa, Legumes India 57. 1992; Chakrab. &

Gangop., J. Econ. Tax. Bot. 20: 593. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 168. 1996; Sivar. & P. Mathew, Fl. Nilambur 241. 1997; Mohanan & Sivad., Fl. Agasthyamala 236. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 267. 2009. *Mimosa odoratissima* L. f., Suppl. Pl. 437. 1781. *Acacia odoratissima* (L.f.) Willd., Sp. Pl. 4: 1063. 1806.

Trees to 20 m high; bark dark, rough. Leaves 23-25 cm long; pinnae 13-15 cm long; leaflets oblong, obtuse at either ends, pubescent below. Panicle 14-15 cm across, axillary or terminal; heads 3-4 cm across, 15-25-flowered; flowers 4-5 mm long, sessile; calyx cupular; corolla 5-fid to half way down; lobes acute, hispid; staminal filaments 1-1.5 cm long. Pods 18-21 x 2-2.5 cm, flat, brown, polished.

Flowering & Fruiting: April-January.

Distribution: Indo-Malesia. Occasional; in moist deciduous forests. *RNMK 3782,* Begur; *RNMK 2229,* Muthanga.

Albizia procera (Roxb.) Benth. in Hook.'s London J. Bot. 3: 89. 1844; Baker in Hook. f., Fl. Brit. India 2: 299. 1878; Gamble, Fl. Pres. Madras 431(306). 1919; Manilal, Fl. Silent Valley 93. 1988; Sanjappa, Legumes India 58. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 169. 1996; Chakrab. & Gangop., J. Econ. Tax. Bot. 20: 594. 1996. *Mimosa procera* Roxb., Pl. Corom. t. 121. 1798.

Medium trees, bark greyish-yellow, smooth, pinkish-red inside; young shoots silky pubescent. Leaves 40-45 cm long, pinnae 2-4 pairs; rachis glandular near the terminal pair of leaflets; leaflets 6-9 pairs, 3-4 x 1.5-2 cm, oblong or oblong-obovate, apex obtuse, base oblique, unequal, glabrous above and glaucous below; petiole to 15 cm with a large oblong gland near the base. Flower heads in terminal panicles; calyx glabrous, lobes ovate-acute; corolla 4-5 mm long, lobes lanceolate; filaments greenish-yellow. Pods 14-16 x 2-3 cm, lenear-oblong, flat; seeds elliptic.

Flowering & Fruiting: July-August.

Distribution: Indo-Malesia and China. Occasional; in moist deciduous forests. *RNMK 2777,* Pulpally.

ARCHIDENDRON F. H. Jacob von Mueller
Fragm. 5: 59. 1865.

Erect trees or large shrubs, unarmed. Leaves bipinnate; pinnae 1-many-pairs; leaflets few to many, opposite; stipule inconspicuous. Flowers few to many, 5-merous, in globose few-flowered spikes arranged in terminal or axillary panicles; calyx gamosepalous, shortly toothed; petals basely united, valvate; stamens much longer than the petals, monadelphous; ovary sessile or stalked; ovules many; stigma capitate. Pod strap-shaped, circinnate.

1. Branchlets minutely hairy; staminal filaments less than 1 cm long....**A. bigeminum**
1. Branchlets glabrescent; staminal filaments 1.5 cm long..**A. monadelphum** var. **gracile**

Archidendron bigeminum (L.) Neilson, Opera Bot. 76: 73. 1985. *Mimosa bigemina* L., Sp. Pl. 517. 1753. *Archidendron monadelphum* (Roxb.) Nielson, Adansonia 19: 21. 1979; Sanjappa, Legumes India 61. 1992; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 122. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 169. 1996; Sivar. & P. Mathew, Fl. Nilambur 242. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 204. 2005. *Mimosa monadelpha* Roxb., Fl. India 2: 544. 1832. *Pithecellobium bigeminum* (L.) Mart. ex Benth. in Hook.'s London J. Bot.3: 206. 1844; Baker in Hook. f., Fl. Brit. India 2: 303. 1878; Gamble, Fl. Pres. Madras 435(308). 1919. *Pithecellobium monadelphum* (Roxb.) Kosterm., Reinwardtia 3: 11. 1954; Manilal & Sivar., Fl. Calicut 100. 1982; Manilal, Fl. Silent Valley 94. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 171. 1988; Vajr., Fl. Palghat Dist. 189. 1990; N. Mohanan & Sivad., Fl. Agasthyamala 238. 2002. *Abarema bigemina* (L.) Kosterm., Bull. Org. Sci. Res. Indonesia 51, f. 34,35. 1954. *Katoukonna* Rheede, Hort. Malab. 6:21, t.12. 1686.

Small trees, branchlets minutely hairy. Leaves bipinnate, pinnae 2, opposite; leaflets 4 pairs, 13-15 x 5-6 cm, opposite, ovate, acuminate, oblique at base, glabrous; rachis glandular. Peduncle 3-8-flowered, axillary or terminal, densely rusty tomentose; flowers 3- 4 mm long; calyx 4-lobed, connate, lobes acute; petals 4, ovate, acute, united below; stamens 4, monadelphous; filaments 0.7-1 cm long; ovary many-ovuled, sessile; stigma minute. Pods twisted, strap-shaped, 1-2 cm broad; seeds 4-8, ovoid.

Flowering & Fruiting: March-April.

Distribution: South west India, eastern Himalayas, Myanmar and Sri Lanka. Common; in evergreen forests. *RNMK 1415*, Periya; *RNMK 1564*, Brahmagiri; *RNMK 1888*, Banasuramala.

Archidendron monadelphum (Roxb.) Nielson var. **gracile** (Bedd.) Sanjappa, Legumes India 62. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 169. 1996; Sivar. & P. Mathew, Fl. Nilambur 242. 1997. *Pithecellobium gracile* Bedd., Madras J. Lit. Sci. ser. 3, 1: 44. 1864; Gamble, Fl. Pres. Madras 435(308). 1919; Ansari, Fl. Kasaragod Div. 151. 1985; Vajr., Fl. Palghat Dist. 189. 1990. *Abarema monadelpha* (Roxb.) Kosterm. var. gracile (Bedd.) Kosterm., Bull. Org. Natuur. Ord. Indonesia 20: 50. 1954.

Shrubs, young shoots glabrescent. Leaves 23-25 cm long, pinnae one pair; leaflets 2 or 3 pairs, elliptic-oblong, ovate or obovate, caudate-acuminate, base truncate or obtuse, glabrous except the midrib below, 10-12 x 5-6 cm; lateral nerves 8-10 pairs, reticulations prominent; petiole 8-10 cm long, glandular towards the apex. Flowers white, heads in terminal panicles; calyx tube short, pubescent; petals oblong. Pods subcylindric, 7-8 x 2-2.5 cm, fruit wall orange-yellow inside; seeds black.

Flowering & Fruiting: October-March.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 1779,* Varayal.

ENTADA Adanson

Fam. 2: 318, 554. 1763, *nom. cons.*

Entada rheedei Spreng., Syst. Veg. 2: 325. 1825 "rheedii"; V. S. Ramach. & V. J. Nair, Fl. Cannanore 170. 1988; Vajr., Fl. Palghat Dist. 188. 1990; Sanjappa, Legumes India 66. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 170. 1996; Sivar. & P. Mathew, Fl. Nilambur 243. 1997; N. Mohanan & Sivad., Fl. Agasthyamala 238. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 204. 2005. *Mimosa entada* L., Sp. Pl. 518. 1753. *Entada pursaetha* DC., Prodr. 2: 425. 1825; Ansari, Fl. Kasaragod Div. 150. 1985. *Entada monostachya* DC., Prodr. 2: 425. 1825. *Entada scandens* sensu Hook.f., Fl. Brit. India 2: 86. 1878, non Benth. 1841; Gamble, Fl. Pres. Madras 417(296). 1919. **Plate 15h.**

Lianas, tendrillate, stems glabrous. Leaves bipinnate; pinnae 2 or 3 pairs, the terminal pair modified into a tendril; leaflets 4-7 pairs, 5-6 x 2-2.5 cm, curved-oblong, obtuse, inequilateral. Spikes 30-35 cm long, axillary, solitary or paired, erect; flowers 3-5 mm long, densely packed, yellow; calyx cupular, truncate; petals 4, free, valvate; stamens 10, free; filaments 6-7 mm long, ovary many-ovuled; style slender; stigma concave. Pods 60-80 cm long, thick, woody, crenate on both sutures; seeds many, biconvex, 4-5 cm across, orbicular, smooth.

Flowering & Fruiting: December-April.

Distribution: Indo-Malesia. Rare; in moist deciduous forests. *RNMK 1009,* Muthanga-Thakarapady.

MIMOSA Linnaeus

Sp. Pl. 516. 1753.

Herbs or trailing shrubs, prickly. Leaves bipinnate; pinnae opposite; leaflets small, oblong, sensitive. Flowers polygamous, densely packed in globose heads; peduncles axillary, solitary or fascicled; bracts and bracteoles minute; calyx campanulate, 4-toothed; petals 4, connate; stamens 4 or 8; filaments exserted, free; anthers minute; ovary stipulate, oblong, many-ovuled; style slender; stigma minute. Pod flat, of several 1-seeded joints; seeds orbicular.

1. Stem terete; pinnae 2-4; stamens 4 .....**M. pudica**
1. Stem 4-angled; pinnae 10-12; stamens 8..... **M. diplotricha** var. **inermis**

Mimosa diplotricha C. Wight ex Sanvalle var. **inermis** (Adelb.) Veldk., Fl. Males. Bull. 9: 416. 1987; Sanjappa, Legumes India 67. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 170. 1996; Sivar. & P. Mathew, Fl. Nilambur 244. 1997. *Mimosa invisia* C. Mart., Flora 20: Biebl. 8: 121. 1837, non C. Mart. ex Colla 1834. *Mimosa invisa* C. Mart. var. *inermis* Adelb. in Reinwardtia 2(2):359.1953; Nayar & Giri, J. Econ. Tax. Bot. 3: 603.1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 171. 1988; Vajr., Fl. Palghat Dist. 190. 1990; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 205. 2005.

Stout aggressively rambling shrubs; stem pubescent, prickles short, in 4-rows. Leaves 10-12 cm long; pinnae opposite, to 5 cm long; leaflets 30-35

pairs, ca. 5 x 1 mm, oblong, truncate at base, glabrous; rachis prickled. Spike 1-1.5 cm across, in terminal racemes, peduncled; flowers many, 3-5 mm long; stamens 10. Pods 2-5 cm long, bristly, black when mature.
Flowering & Fruiting: October-December.
Distribution: Native of Tropical America; a weed in India. Occasional; along roadsides and in forest plantations. *RNMK 1999,* Padinjarathara.

Mimosa pudica L., Sp. Pl. 518. 1753; Baker in Hook. f., Fl. Brit. India 2: 291. 1878; Gamble, Fl. Pres. Madras 421(298). 1919; Manilal & Sivar., Fl. Calicut 101. 1982; Ansari, Fl. Kasaragod Div. 150. 1985; Manilal, Fl. Silent Valley 94. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 171. 1988; Vajr., Fl. Palghat Dist. 188. 1990; Sanjappa, Legumes India 69. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 171. 1996; Sivar. & P. Mathew, Fl. Nilambur 245. 1997; N. Mohanan & Sivad., Fl. Agasthyamala 238. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 205. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 268. 2009.

Woody perennial herbs; prickles scattered. Pinnae 3-3.5 cm long; leaflets 20-30 pairs, oblong, cordate at base, acute at apex, spiny along the margins; stipule scarious, prominently fimbriate. Spikes 2-3 cm across, peduncled, axillary; flowers 1.5-2 mm long; calyx minute; corolla tube broaden above, lobes obtuse; filaments 4, 8-9 mm long. Pods 1.5-2.5 x 0.3-0.5 cm, 3-5-seeded; joints strongly bristly along the margins.
Flowering & Fruiting: July-January.
Distribution: Native of South America; now Pantropical. Common; in open areas and disturbed forests. *RNMK 2755,* Kalpetta; *RNMK 3388*, Puthoorvayal.

RACOSPERMA Martius

Hortus Regius Monacensis Seminifer 1835.

Racosperma auriculiforme (A.Cunn.ex Benth.) Pedley, Bot. J. Linn. Soc. 92: 247. 1986. *Acacia auriculiformis* A. Cunn. ex Benth. in Hook.'s London J. Bot. 1: 377. 1842; Sanjappa, Legumes India 45. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 167. 1996; Chakrab. & Gangop., J. Econ. Tax. Bot. 20: 603. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 206. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 263. 2009.

Trees, to 15 m high, bark brown, smooth; branchlets terete, glabrous. Phyllodes alternate; stipules lateral; petiole 0.8-2 cm long, pulvinate, slender, glabrous; lamina 7-20 x 1-5 cm, linear, falcate or falcate-elliptic-falcate, base attenuate, apex subacute or obtuse, margin entire, glabrous, coriaceous; 3-6 parallel ribs from the base, palmate, prominent, intercostae reticulate. Flowers bisexual, yellow, 2-2.5 mm, in axillary spikes, to 4-8 cm long; calyx ca. 0.5 mm, campanulate; lobes 5; corolla 5, lanceolate; stamens many; ovary superior, subsessile, glabrous; styles. Fruit a pod, 3-10 x 0.5-1 cm, flat, glabrous, woody and much twisted in irregular coils; seeds black, with orange-yellow coloured aril.

Flowering & Fruiting: Throughout the year.
Distribution: Native of Tropical Australia. Occasional; in open grasslands and plantations. *RNMK 1194,* Pookodu; *RNMK 2359,* Vellaramkunnu.

XYLIA Bentham
J. Bot. 4: 417. 1842.

Xylia xylocarpa (Roxb.) Taub., Bot. Centralbl. 47: 395. 1891; Gamble, Fl. Pres. Madras 417(295). 1919; Manilal & Sivar., Fl. Calicut 101. 1982; Ansari, Fl. Kasaragod Div. 152. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 172. 1988; Vajr., Fl. Palghat Dist. 190. 1990; Sanjappa, Legumes India 73. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 171. 1996; Sivar. & P. Mathew, Fl. Nilambur 245. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 206. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 273. 2009. *Mimosa xylocarpa* Roxb., Pl. Corom. t. 100. 1798. *Xylia dolabriformis* sensu Bedd., Fl. Sylv. t. 186. 1872, non. Benth. 1842; Baker in Hook. f., Fl. Brit. India 2: 286. 1878 p.p.

Trees to 20 m tall; bark roughs transversely splitting. Leaves bipinnate, pinnae 2; leaflets 5-7 pairs, 8-10 x 4-5 cm, elliptic-oblong, acute, glabrous, rachis glandular between the leaflets. Spike globose, 1.5-2 cm across, racemose; flowers numerous, 5-6 mm long, sessile, dull yellow; calyx 4-5 mm long, tubular, toothed at apex; petals 5, free or united at base, valvate; stamens 10, free, filaments 7-8 mm long; ovary many-ovuled; stigma minute. Pods 18-22 x 5- 6 cm, curved-obovate, compressed, woody; seeds 4-10, transverse, oblong.
Flowering & Fruiting: February-December.
Distribution: Indo-Malesia. Common; in moist deciduous forests. *RNMK 3003,* Muthanga; *RNMK 2177,* Chedalayam; *RNMK 1884*, Begur.

Acacia mangium Wiild. and **Paraserianthes falcataria** (L.) Neilson are sometimes raised in plantations. **Leucaena leucocephala** (Lamk.) de Wit, **Parkia biglandulosa** Wight. & Arn., **Pithocellobium dulce** (Roxb.) Benth. and **Samanea saman** (Jacq.) Merr. are often grown as avenue trees in the study area.

ROSACEAE Juss.
Gen. Pl. 334. 1789.

1. Scandent shrubs; stem armed; ovaries many, free..... **Rubus**
1. Erect trees or shrubs; stem unarmed; ovaries 1-3, united ..... **Prunus**

PRUNUS Linnaeus
Sp. Pl. 473. 1753

Prunus ceylanica (Wight) Miq., Fl. India Bot. 1: 366. 1855; Ansari, Fl. Kasaragod Div. 152. 1985; Manilal, Fl. Silent Valley 97. 1988; V. S. Ramach.

& V. J. Nair, Fl. Cannanore 172. 1988; Vajr., Fl. Palghat Dist. 190. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 172. 1996; Sivar. & P. Mathew, Fl. Nilambur 247. 1997; Mohanan & Sivad., Fl. Agasthyamala 241. 2002. *Polydontia zeylanica* Wight, Ill. 1: 203. 1840, "Polyodontia". *Pygeum zeylanicum* Bedd., Fl. Sylv. t. 59. 1871. *Pygeum acuminatum* Colebr., Trans. Linn. Soc. London 12: 300. t.18. 1818; Hook. f., Fl. Brit. India 2: 318. 1878; Gamble, Fl. Pres. Madras 439(311). 1919, non *Prunus acuminata* (Wall.) Dietr. 1803. *Pygeum wightianum* Bl. ex Muell. in Walp., Ann. 4: 642. 1857; Hook. f., Fl. Brit. India 2: 319. 1878; Gamble, Fl. Pres. Madras 439(311). 1919. *Pygeum gardneri* Hook. f., Fl. Brit. India 2: 321. 1878; Gamble, Fl. Pres. Madras 439(311). 1919. *Pygeum sisparense* Gamble, Bull. Misc. Inform. Kew 1918: 238. 1918; Gamble, Fl. Pres. Madras 438(311). 1919.

Large trees; bark black, splitting into rectangular pieces. Leaves alternate, simple, 10-12 x 4-5 cm, ovate, acuminate, entire, nerves 8-10 pairs, prominent. Racemes 10-13 cm long, axillary, erect, densely flowered; flowers white, 6-8 mm across; pedicels slender; calyx 2-3 mm long, cupular, campanulate, lobes ovate, acute, densely hairy; petals obovate, stamens many, filaments 3-4 mm long; ovary sessile, 1-celled, glabrous; ovules 2, pendulous; style 1, subulate; stigma capitate. Fruit a drupe, 2-lobed, 1-2 cm long, globose, glabrous; seeds 2, globose.

Flowering & Fruiting: September-April.

Distribution: Indo-Malesia. Common; in evergreen forests. *RNMK 1775,* Talimala; *RNMK 2098*, Chembra; *RNMK 2332*, Kurichairmala.

RUBUS Linnaeus

Sp. Pl. 492. 1753.

Straggling shrubs, prickly. Leaves alternate, simple or 3-7-foliolate; leaflets serrate; stipules free or adnate to the petiole. Flowers in terminal or axillary panicles; bracts ovate, dentate; calyx tube wide, lobes 5, persistent; petals 5, obovate, stamens many, inserted at the mouth of calyx tube; receptacle convex; carpels many, ovoid; 1-celled; ovules 2, pendulous; style subterminal; stigma capitate. Fruit a cluster of small, fleshy, 1-seeded drupes.

1. Leaves simple, lobed..... 2
1. Leaves pinnately compound..... 3
2. Bracts divided into linear lobes; prickles straight.....**R. glomeratus**
2. Bracts toothed, boat-shaped; prickles recurved .....**R. micropetalous**
3. Leaves 3-foliolate; petals white .....**R. ellipticus**
3. Leaves 5-7 foliolate; petals pink..... **R. niveus**

Rubus ellipticus Smith in Rees, Cyclop. 30: Rubus. n.16. 1815; Hook. f., Fl. Brit. India 2: 336. 1878; Gamble, Fl. Pres. Madras 441(313). 1919; Manilal, Fl. Silent Valley 98. 1988; Sivar. & P. Mathew, Fl. Nilambur 248. 1997. *Rubus gowreephul* Roxb., Fl. India 2: 517. 1832. *Rubus wallichianus* Wight & Arn., Prodr. 298. 1834. **Plate 15k.**

Ramblers; stems covered with red bristles; prickles recurved, leaflets 3-5 x 4-5 cm, obovate to orbicular, serrulate; hispid below; nerves 7- 8 pairs, spiny below; petiolule 5-6 mm long. Panicle axillary or terminal, fulvous tomentose; bracts 4-5 mm long, ovate, acute; flowers white; pedicels 1-1.5 cm long, villous; sepals 5-6 x 3-4 mm, ovate, acute, united at base, pubescent; petals 7-8 mm long, obovate; torus densely villous; ovaries glabrous. Drupes glabrous, yellow.
Flowering & Fruiting: November-March.
Distribution: India, Sri Lanka and Myanmar. Rare; in evergreen forest margins. *RNMK 3449,* Talimala.

Rubus glomeratus Bl., Bijdr. 1111. 1826; Manilal, Fl. Silent Valley 99. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 173. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 207. 2005. *Rubus fulvus* Focke, Biblioth. Bot. 17: 81. 1911, non Sudre 1902; Gamble, Fl. Pres. Madras 441(313). 1919. *Rubus moluccanus* sensu Hook. f., Fl. Brit. India 2: 330. 1878 p.p., non L. 1753.

Stem reddish, densely cottony hairy. Leaves 6-8 x 7-8 cm, shallowly 5-lobed, cordate at base, rugose above, densely fulvous, cottony tomentose below; petiole 3.5-4 cm long. Flowers in terminal panicles, bracts 7-8 mm long, densely hairy; bracteole bifid, filiform; pedicels 6-7 mm long; sepals ca. 1 cm long, united below; petals 3.5-4 x 1.5-2 mm, obovate; ovaries glabrous. Drupe ca. 2 mm across, ovoid, yellow.
Flowering & Fruiting: December-May.
Distribution: Endemic to Peninsular India. Occasional; in evergreen forest margins. *RNMK 3329,* Chembra.

Rubus micropetalus Gardn., Calcutta J. Nat. Hist. 8: 6. 1847; Gamble, Fl. Pres. Madras 441(312). 1919; V. S. Ramach. & V. J. Nair, Fl. Cannanore 173. 1988; Vajr., Fl. Palghat Dist. 191. 1990; Mohanan & Sivad., Fl. Agasthyamala 241. 2002. *Rubus molluccanus sensu* Hook. f. Fl. Brit. India 2.:330. 1878, p.p., *non* L. 1753.

Shrubs up to 2.5 m tall. Leaves 8-14 x 5-10 cm, broadly ovate, palmately 5-lobed; lobes acute to shortly acuminate, codate at base, leaves on back and nerves above densely fulvous tomentos. Flowes in short axillary and terminal corymbose panicles; bracts 1-1.5 cm, pectinately laciniate; calyx campanulate, tube 0.3-0.4 cm; petals 5, 0.2-0.3 cm long, ovate, smaller than calyx, pinkish; stamens many. Fruit a compound berry, 1-1.5 x 0.8-1 cm, oblong, reddish brown on ripening.
Flowering & Fruiting: February-June.
Distribution: Indo-Malesia. Rare; along margins of evergreen forests. *RNMK 1229,* Chanthanathodu.

Rubus niveus Thunb., Diss. Rub. 9. t.1. f.3. 1813; Gamble, Fl. Pres. Madras 442(313). 1919; V. S. Ramach. & V. J. Nair, Fl. Cannanore 173. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 173. 1996. *Rubus leucocarpus* Arn., Nova Acta

Phys. Med. Acad. Caes. Leop. Carol. Nat. Cur. 18: 16. 1834; Wight, Ic. t. 232. 1839; Hook.f., Fl. Brit. India 2:339. 1878. *Rubus niveus* Thunb. var. *subglaber* (Thw.) Gamble, Fl. Pres. Madras 442(313). 1919. **Plate 15 l.**

Shrubs up to 2.5 m tall. Branches glaucous; prickles few, 6-8 mm long. Leaflets 4-5 x 2-3 cm, elliptic, acute at either ends, subsessile, spinous-serrate, white-tomentose beneath, glabrous above; nerves 7-9 pairs. Racemes 2-3 together, axillary; flowers pink, 6-8 mm across; bracts 3-4 mm long, lanceolate, entire; pedicels 1-1.3 cm long, slender, villous; sepals 6-7 mm long, lanceolate, united at base; petals 3-4 x 2-2.5 mm, obovate; ovaries densely pubescent. Drupe ovoid, acute, subglabrous, bluish-black with white tomentum.

Flowering & Fruiting: April-May.

Distribution: Indo-Malesia and China; in India temperate Himalayas and south India. Occasional; in margins of evergreen forests and grasslands. *RNMK 3309,* Chembra; *RNMK 1108*, Banasuramala.

Eriobotrya japonica (Thunb.) Lindl. is commonly planted in homesteads for its edible fruit.

CHRYSOBALANACEAE R. Br.

ATUNA Rafinesque-Schmaltz

Sylva Tellur. 153. 1838.

Atuna indica (Bedd.) Kosterm., Reinwardtia 7: 423. 1969. *Parinarium indicum* Bedd., Ic. t. 109. 1868-1874; Hook. f., Fl. Brit. India 2:311.1878; Gamble, Fl. Pres. Madras 437(310). 1919. **Plate 16b.**

Medium trees, bark brownish, branchlets pubescent. Leaves simple, 12-15 x 3-4 cm, lanceolate, apex acuminate, base acute, glabrous; stipule subulate. Racemes terminal, silky-villous, drooping; bracts ovate-lanceolate, villous; flowers 1-1.5 cm across; calyx lobes ovate-cuspidate, villous outside; petals white, oblong; stamens many, purple, filamemts connate at base; ovary 2-celled, ovules 2. Drupe 3.5-4 cm long, suborbicular, compressed, brown, smooth.

Flowering & Fruiting: February-May.

Distribution: Endemic to Peninsular India. Rare; in evergreen forests. *RNMK 1555,* Niravilpuzha.

PARNASSIACEAE S. F. Gray

PARNASSIA Linnaeus

Sp. Pl. 1: 273. 1753.

Parnassia mysorensis Heyne ex Wight & Arn., Prodr. 35. 1834; Clarke in Hook. f., Fl. Brit. India 2: 402. 1878; Gamble, Fl. Pres. Madras 448(317). 1919; Mohanan & Sivad., Fl. Agasthyamala 242. 2002. **Plate 16a.**

Small scapigerous herbs. Leaves radical, orbicular to reniform, base cordate, 0.5-1.5 cm diameter; petiols 1-4.5 cm long. Flowers solitary on scape, 6-12 cm long; scape with a leafy bract at middle; calyx broadly campanulate, 0.3-0.4 cm long, lobes 5, broadly ovate; petals 5, white, broadly ovate; stamens 5, staminodes 5, alternating with stamens; ovary 0.3-0.4 cm long, ovoid, 1-celled; ovules many; style short; stigma 3-4. Capsule ovoid, 3-4-valved; seeds minute, many.
Flowering & Fruiting: September-December.
Distribution: Peninsular India and Eastern Himalayas. Rare; in high altitude grasslands. *RNMK 1774,* Chembra.

CRASSULACEAE DC.

in Lamark & Candolle, Fl. Franc., ed. 3, 4(1): 382. 1805.

KALANCHOE Adanson

Fam. 2: 248. 1763.

Fleshy herbs. Leaves opposite, entire, crenate or pinnatified, thick. Flowers in terminal paniculate cymes, bracteate; sepals 4, free or connate; petals 4, connate into a flask shaped tube, lobes spreading; stamens 8, biseriate; carpels 4, free, with 4 hypogynous scales adnate to the base of corolla tube; ovules many, parietal. Fruit of 4 free follicles; seeds many, oblong, ribbed.

1. Laves to 7 cm long; corolla yellowish ..... **K. grandiflora**
1. Leaves 10-15 cm long; corolla greenish ..... **K. pinnata**

Kalanchoe grandiflora Wall. ex Wight & Arn., Prodr. 359. 1834; Hook. f., Fl. Brit. India 2: 415. 1878; Gamble, Fl. Pres. Madras 451(319). 1919. **Plate 16c.**

Herbs, to 60 cm high. Leaves simple, 6-7 x 3-3.5 cm, obovate, obtuse, crenate, narrowed to the base, sessile. Cymes 10-12 cm across, panicled; flowers closely packed; pedicels ca. 1 cm long; sepals 5-6 x 2.5-3 mm, ovate, acuminate, red-streaked; corolla tube ca. 1.2 cm long, lobes ca. 6 x 4 mm, obovate, cuspidate; yellow; anthers ovate; styles ca. 4 mm long.
Flowering & Fruiting: December-May.
Distribution: Endemic to southern Western Ghats. Rare; along rocky slopes in grasslands. *RNMK 2873,* Chembra.

Kalanchoe pinnata (Lam.) Pers., Syn. 1: 446. 1805; Manilal & Sivar., Fl. Calicut 102. 1982; Ansari, Fl. Kasaragod Div. 153. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 174. 1988; Sivar. & P. Mathew, Fl. Nilambur 249. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 207. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 273. 2009. *Cotyledon pinnata* Lamk., Dict. 2: 141. 1786. *Bryophyllum calycinum* Salisb., Parad. Lond. t.3. 1805; Clarke in Hook. f., Fl. Brit. India 2: 413. 1878. *Bryophyllum pinnatum* (Lamk.) Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 40: 52. 1871; Gamble, Fl. Pres. Madras 451(319). 1919.

Sub-succulent tall herbs. Leaves decussate, simple, elliptic-ovate, 10-15 x 3-6 cm, base cuneate, margin deeply crenate, apex obtuse to rounded, herbaceous. Inflorescens a cymose panicles; flowers pendulous; calyx tube lobed above the middle, lobes 4, triangular; corolla greenish, 8-folded, glandular within; stamens 8, inserted above the constriction of corolla; hypogynous scales 4; carpels 4. Follicles enclosed with reddish calyx.
Flowering & Fruiting: December-March.
Distribution: Originally from Tropical Africa; now Pantropical. Occasional; in moist deciduous forests. *RNMK 1339,* Ayyappanpara-Tholpetty.

Kalanchoe verticillata Elliot is seen in gardens and in wild as a garden escape.

DROSERACEAE Salisb.

Parad. Lond. 2: ad. t. 95. 1808.

DROSERA Linnaeus

Sp. Pl. 218. 1753.

Insectivorous herbs with glandular hairs. Leaves radical or cauline. Flowers white or pink, solitary or in terminal racemes; calyx 4 or 5-lobed; petals 4 or 5, obovate; stamen 4 or 5, free; ovary 1-celled, free; ovules many, parietal; styles 2-5, free or basely united. Fruit a loculicidal membranous capsule, 2-5-valved; seeds many, obovoid, reticulate.

1. Leaves radical, spathulate ..... **D. burmannii**
1. Leaves cauline, not spathulate 2
2. Leaves peltate, semi-lunate; flowers white ..... **D. peltata**
2. Leaves linear, terete; flowers pink ..... **D. indica**

Drosera burmannii Vahl, Symb. Bot. 3: 50. 1794; Wight & Arn., Prodr. 34. 1834; Wight, Ic. t. 944. 1845; Clarke in Hook. f., Fl. Brit. India 2: 424. 1878; Gamble, Fl. Pres. Madras 452(320). 1919; Manilal & Sivar., Fl. Calicut 103. 1982; Manilal, Fl. Silent Valley 100. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 174. 1988; Vajr., Fl. Palghat Dist. 193. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 173. 1996; Sivar. & P. Mathew, Fl. Nilambur 250. 1997; Mohanan & Sivad., Fl. Agasthyamala 244. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 208. 2005. **Plate 16d.**

Small herbs. Leaves 8-9 x 6-8 mm, obovate, obtuse, prostrate, densely covered with glandular hairs, greenish pink; petioles absent. Flowers few in erect racemes; scape 6-8 cm high; calyx glandular; petals 3-4 mm across, white; style 3, free.
Flowering & Fruiting: August-December.
Distribution: Pantropical. Rare; in moist localities in evergreen forests. *RNMK* 1329, Kunchome; *RNMK 1556*, Banasurasagar dam area.

Drosera indica L., Sp. Pl. 282. 1753; Hook. f., Fl. Brit. India 2: 424. 1878; Gamble, Fl. Pres. Madras 452(320). 1919; Manilal & Sivar., Fl. Calicut 103. 1982; Ansari, Fl. Kasaragod Div. 153. 1985; Vajr., Fl. Palghat Dist. 193. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 173. 1996; Sivar. & P. Mathew, Fl. Nilambur 251. 1997; Mohanan & Sivad., Fl. Agasthyamala 244. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 208. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 275. 2009. **Plate 16e.**

Unbranched herbs, to 8 cm high. Leaves 2.5-3 cm long, green, curved or straight. Flowers 7-8 mm across, many, in terminal racemes; pedicel ca. 1 cm long; sepals ca. 4 x 1 mm, glandular hairy, petals ca. 5 x 5 mm, obovate, obtuse, glabrous. Capsule ca. 5 x 3 mm, obovoid, 3-valved; seeds many, black, obovoid, densely muriculate.

Flowering & Fruiting: September-December.

Distribution: South Asia, Africa & Australia. Common; along dripping rocks. *RNMK 1669,* Manikkunnumala.

Drosera peltata Smith in Willd., Sp. Pl. 1: 1546.1797; Wight & Arn., Prodr. 34. 1834; Wight, Ill. t. 20. 1840; Clarke in Hook. f., Fl. Brit. India 2:424.1878; Gamble, Fl. Pres. Madras 452(320). 1919; Manilal, Fl. Silent Valley 100. 1988; Vajr., Fl. Palghat Dist. 193. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 174. 1996; Mohanan & Sivad., Fl. Agasthyamala 245. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 208. 2005. **Plate 16f.**

Erect herbs, 14-18 cm high, unbranched. Leaves 4-6 mm across, semi-circular to lunar, covered with glandular hairs; petiole 1-1.5 cm long. Flowers in terminal racemes; pedicels 1-1.5 cm long, sepals 5, united at base, petals white, 4-5 x 3-4 mm, obovate, obtuse; styles 3, free.

Flowering & Fruiting: December-March.

Distribution: Indo-Malesia to Australia and east Asia. Common; in high altitude Grasslands. *RNMK 1555,* Chembra; *RNMK 3450*, Kurichiarmala.

RHIZOPHORACEAE R. Br.

in Flinders, Voy. Terra. Austr. 2: 549. 1814.

CARALLIA Roxburgh

Pl. Coromandel 3: 8. 1811, *nom. cons.*

Carallia brachiata (Lour.) Merr., Philipp. J. Sci. 15: 249. 1919; Manilal & Sivar., Fl. Calicut 104. 1982; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 216. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 175. 1988; Vajr., Fl. Palghat Dist. 194. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 174. 1996; Sivar. & P. Mathew, Fl. Nilambur 252. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 208. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 277. 2009. *Diatoma brachiata* Lour., Fl. Cochinch. 296. 1790. *Carallia integerrima* DC., Prodr. 3: 33. 1828; Gamble, Fl. Pres. Madras 459(325). 1919. *Kare-kandel* Rheede, Hort. Malab. 5:25-26, t. 13. 1685.

Trees; bark dark brown. Leaves opposite, 9-11 x 6-7 cm, obovate, obtuse at apex, attenuate at base, coriaceous, nerves indistinct; stipule interpetiolar,

ovate. Flowers in axillary resinous, peduncled cymes with dichotomous branches, 5-6 mm across; sepals 8, ovate, acute; petals 8, smaller, reddish, orbicular, lacerate; stamens 16, filaments villous, free; ovary half inferior, 4-celled; ovule 2 in each cell; style slender, 3-5 fid, above. Drupe, 7-8 x 5-6 mm, 1-seeded, glabrous.

Flowering & Fruiting: October-April.

Distribution: Indo-Malesia and Australia. Occasional; in semi-evergreen forests. *RNMK1336,* Manikkunnumala.

HALORAGACEAE R. Br.

MYRIOPHYLLUM Linnaeus

Sp. Pl. 2: 992. 1753.

Myriophyllum oliganthum (Wight & Arn.) F. v. Muell., Fragm. Phyt. Austr. 10: 54. 1876; V. S. Ramach. & V. J. Nair, Fl. Cannanore 174. 1988; Vajr., Fl. Palghat Dist. 194. 1990. *Haloragis oligantha* Wight & Arn., Prodr. 338. 1834. *Myriophyllum intermedium* Clarke in Hook.f., Fl. Brit. India 2: 433. 1878; Gamble, Fl. Pres. Madras 454(321). 1919, non DC. 1828. **Plate 16g.**

Aquatic floating herbs, glabrous. Leaves alternate, 1.2-1.5 x 0.1-0.2 cm, linear, flat, glabrous; lower ones pinnatisect into filiform lobes. Flowers sessile, in axillary clusters; sepals 4, ca. 1 mm long, oblong; petals absent; stamens 4, filaments short; anthers ca. 1 mm long, oblong; ovary 4-celled, ovules solitary in each cell, pendulous; styles 4, free, plumose. Fruit 4-partite, fruitlets ca. 0.5 mm long, tuberculate.

Flowering & Fruiting: Throughout the year.

Distribution: Endemic to Peninsular India. Occasional; in stagnant water bodies in moist deciduous forests. *RNMK 1225,* Muthanga.

COMBRETACEAE R. Br.

Prodr. 351. 1810.

1. Scandent or climbing shrubs; calyx tube produced above the ovary..... 2
1. Erect trees; calyx tube not produced above the ovary 4
2. Petals absent; sepals persistent..... **Calycopteris**
2. Petals present; sepals deciduous or small 3
3. Flowers on elongate spikes; fruit 4- winged..... **Combretum**
3. Flowers in cymes or racemes; fruit 5-winged ..... **Quisqualis**
4. Flowers in axillary globose spikes ..... **Anogeissus**
4. Flowers in panicles or spikes..... **Terminalia**

ANOGEISSUS (A. P. de Candolle) Guillemen

Perrottet & A. Richard

Fl. Seneg. Tent. 1: 280, t. 65. 1832

Anogeissus latifolia (Roxb. ex DC.) Wall. ex Guill. & Perr., Fl. Seneg. Tent. 7: 280. 1832; Clarke in Hook. f., Fl. Brit. India 2: 450. 1878; Gamble, Fl. Pres. Madras 466(330). 1919; Manilal, Fl. Silent Valley 101. 1988; V. S. Ramach. &

V. J. Nair, Fl. Cannanore 176. 1988; Vajr., Fl. Palghat Dist. 195. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 176. 1996; Sivar. & P. Mathew, Fl. Nilambur 253. 1997; Gangop. & Chakrab., J. Econ. Tax. Bot. 21: 288. 1997; Mohanan & Sivad., Fl. Agasthyamala 248. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 209. 2005. *Conocarpus latifolia* Roxb. ex DC., Prodr. 3: 16. 1828.

Medium sized trees; bark uneven, white. Leaves alternate and subopposite, 5-9 x 3-6.5 cm, broadly ovate, obtuse at apex and base, nerves 8-10 pairs, glabrous; petioles 1-1.5 cm long, glabrous. Flowers small, 10-20-together in globose spikes, axillary, shortly pedicelled; calyx 3-4 mm across, cupular, lobes 5, triangular, acute; petals absent; stamens 10, free, filaments glabrous; ovary 1-celled; ovules 1 or 2, pendulous; style subulate. Fruit a biconvex drupe, 4-6 cm long, collected in dense head, beaked.

Flowering & Fruiting: October-December.

Distribution: India, Sri Lanka and Pakistan. Common; in moist deciduous forests. *RNMK 2779,* Muthanga; *RNMK 2907*, Begur.

CALYCOPTERIS Lamarck

Tabl. Encycl. t. 35; 2(2): 485, t. 357. 1793.

Calycopteris floribunda (Roxb.) Poiret in Lamk., Encycl. (Suppl.) 2:41.1811 & Tabl. Encycl. 2:485. t. 357.1793; Clarke in Hook. f., Fl. Brit. India 2:449.1878; Gamble, Fl. Pres. Madras 467(331). 1919; Manilal & Sivar., Fl. Calicut 105. 1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 176. 1988; Vajr., Fl. Palghat Dist. 195. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 176. 1996; Sivar. & P. Mathew, Fl. Nilambur 255. 1997; Gangop. & Chakrab., J. Econ. Tax. Bot. 21: 294. 1997; Mohanan & Sivad., Fl. Agasthyamala 248. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta Dist. 211. 2005. *Getonia floribunda* (Lamk.) Roxb., Pl. Corom. t.87. 1798: Wight & Arn., Prodr. 315. 1834.

Stragglers. Leaves opposite, 9-11 x 3-6 cm, ovate, acuminate, entire, punctuate and tomentose below; nerves 6-8 pairs, nervules reticulate; petioles 1-1.3 cm long. Panicles axillary and terminal, 5-10 x 4-5 cm; bracts leafy, hispid; flowers sessile; calyx tube 5-7 mm long, campanulate, enlarging in fruit, lobes oblong; stamens 10, filaments glabrous; ovary 5-ribbed, densely hispid; 1-celled; ovules 1-3, pendulous. Fruit an ellipsoid drupe, 9-10 x 2-2.5 cm; fruiting sepals yellowish, persistent.

Flowering & Fruiting: January-May.

Distribution: Indo-Malesia. Common; in moist deciduous forests. *RNMK 3224,* Tholpetty.

COMBRETUM Loefling

Iter Hispan 308. 1758, *nom. cons.*

Combretum latifolium Bl. Bijdr. 641. 1826; Manilal & Sivar., Fl. Calicut 105. 1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 177. 1988; Vajr., Fl. Palghat Dist. 195. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 177. 1996; Gangop. &

Chakrab., J. Econ. Tax. Bot. 21: 311. 1997; Sivar. & P. Mathew, Fl. Nilambur 255. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 211. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 316. 2009. *Combretum extensum* Roxb. ex G. Don, Trans. Linn. Soc. London 15: 414. 1827; Clarke in Hook. f., Fl. Brit. India 2: 458. 1878; Gamble, Fl. Pres. Madras 469(332). 1919; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 85. 1988. *Pee-ul*a Rheede, Hort. Malab. 7:43, t. 23. 1688.

Lianas, bark dark brown, rough; young shoots glabrous. Leaves ovate or elliptic, acute or shortly acuminate, base obtuse or rounded, 8-13 x 6-8 cm. Flowers 1-1.3 cm long, greenish-yellow, in axillary often panicled spikes. Petals smaller than the calyx lobes. Fruits 4-winged, wings horizontally veined, 4-5 x 3-3.5 cm long.

Flowering & Fruiting: December-April.

Distribution: Indo-Malesia. Common; in evergreen and semi-evergreen forests. *RNMK 1765,* Vythiri; *RNMK 2907*, Kuruva.

QUISQUALIS Linnaeus

Sp. Pl. ed. 2, 1: 556. 1762.

Quisqualis malabarica Bedd., Ic. t. 155. 1868-1874; Clarke in Hook. f., Fl. Brit. India 2: 460. 1878; Gamble, Fl. Pres. Madras 469(332). 1919; Sivar. & P. Mathew, Fl. Nilambur 257. 1997; Gangop. & Chakrab., J. Econ. Tax. Bot. 21: 332. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 211. 2005. **Fig. 30, Plate 16h.**

Climbing shrubs. Leaves alternate or opposite, 12-15 x 4-6 cm, oblong, acuminate at apex; nerves 8-10 pairs, looping below the margins, domatia hairy; petiole 5-7 mm long. Flowers in terminal cymes; calyx tube 1.5-2 cm long, produced above the ovary, narrow, hispid outside, lobes 5, petals oblong, reddish; stamens 10, filaments short; ovary 1-celled, ribbed, pubescent; ovules 3-4, pendulous; style adnate to the calyx tube. Fruit 5-winged.

Flowering & Fruiting: February-April.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK1198,* Vythiri Ghat.

TERMINALIA Linnaeus

Syst. Nat. ed. 12, 2: 674. 1767, *nom. cons*.

Tall trees with fibrous bark. Leaves alternate or subopposite, entire, often glandular at base. Flowers in panicled spikes, bisexual or the upper ones male; calyx tube produced above the ovary, campanulate, lobes 5, triangular; petals absent; stamens 10, biseriate, filaments erect, subulate, anthers small; disk infra-staminal, 5-lobed, hairy; ovary 1-celled, inferior; ovules 2-3, pendulous; style 1, subulate, stigma small. Fruit a drupe, smooth, angular or winged, indehiscent; wings equal or unequal.

1. Fruits winged 2
1. Fruit not winged 4

2. Nerves of leaves up to 10 pairs; wings of fruits unequal..... **T. paniculata**
2. Nerves of leaves up to 20 pairs; wings of fruits equal.....3
3. Bark smooth; fruits large with 5-7 wings ..... **T. cuneata**
3. Bark split into rectangular pieces; fruit small with 4 or 5 wings ..... **T. elliptica**
4. Leaves obovate; drupe without ridges ..... **T. bellirica**
4. Leaves elliptic-oblong; drupe ridged 5
5. Twigs fulvous-tomentose; nerves 7 or 8 pairs ..... **T. chebula**
5 Twigs glabrous; nerves 13-16 pairs ..... **T. travancorensis**

Terminalia bellirica (Gaert.) Roxb., Pl. Corom. t. 198. 1805, & Fl. India 2: 431. 1832; Wight, Ic. t. 91. 1838 & Ill. t. 91. 1840; Clarke in Hook. f., Fl. Brit. India 2: 445. 1878; Gamble, Fl. Pres. Madras 463(328). 1919; Manilal & Sivar., Fl. Calicut 105. 1982; Ansari, Fl. Kasaragod Div. 156. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 85. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 178. 1988; Vajr., Fl. Palghat Dist. 196. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 177. 1996; Sivar. & P. Mathew, Fl. Nilambur 258. 1997; Gangop. & Chakrab., J. Econ. Tax. Bot. 21: 338. 1997; Mohanan & Sivad., Fl. Agasthyamala 249. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 212. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 284. 2009. *Myrobalanus bellirica* Gaert., Fruct. 2: 90. t. 97.1791.*Tani* Rheede, Hort. Malab. 4:23-24, t. 10. 1683.

Large trees; bark smooth, white; branchlets thinly fulvous-hairy. Leaves alternate, 16-18 x 8-10 cm, obtusely acuminate at apex, attenuate to the base; nerves 7-8 pairs, prominent, reticulate; petioles to 8 cm long, eglandular. Spikes axillary, 16-18 cm long; flowers sessile, appearing along with new leaves; calyx tube campanulate, lobes triangular, densely villous inside, hispid outside; stamens 5. Drupe 2.5-3 x 1.8-2 cm, obovoid, stalked, glabrous.
Flowering & Fruiting: December-January.
Distribution: Indo-Malesia. Common; in in semi-evergreen, moist deciduous forests and plantations. *RNMK 1239,* Muthanga; *RNMK 0987*, Manikkunnumala; *RNMK 0765,* Puliyarmala.

Terminalia chebula Retz., Obs. Bot. 5: 31. 1789; Clarke in Hook. f., Fl. Brit. India 2: 446. 1878,p.p.; Gamble, Fl. Pres. Madras Mohanan & Sivad., Fl. Agasthyamala 250. 2002. *Myrobalanus chebula* (Retz.) Gaert., Fruct. 2: 91. t. 97. 1791.

Small trees; bark rough. Leaves 13-15 x 7-8 cm, ovate, obtuse or acute, densely velvete tomentose; intercostae minutely reticulate; petiole 1-1.5 cm long, with 2 glands above the middle. Panicles axillary and terminal, fulvous hairy, to 10 cm long; flowers 5-6 mm across; sepals tomentose outside; stamens 5, filaments glabrous; ovary densely villous. Drupe 3-4 x 2-3 cm, 5-ridged, ellipsoid, glabrous.
Flowering & Fruiting: February-August.
Distribution: South Asia. Rare; in moist deciduous forests. *RNMK 1983,* Muthanga; *RNMK 2095*, Pakkam.

Terminalia cuneata Roth, Nov. Pl. Sp. 379. 1821; Gangop. & Chakrab., J. Econ. Tax. Bot. 16:556.1992; Gangop. & Chakrab., J. Econ. Tax. Bot. 21: 349. 1997. *Pentaptera cuneata* (Roth) DC., Prodr. 3: 14. 1828. *Terminalia arjuna* (Roxb. ex DC.) Wight & Arn., Prodr. 314. 1834; Clarke in Hook. f., Fl. Brit. India 2: 447. 1878; Gamble, Fl. Pres. Madras 465(329). 1919; Ansari, Fl. Kasaragod Div. 155. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 178. 1988; Manilal, Fl. Silent Valley 102. 1988; Vajr., Fl. Palghat Dist. 196. 1990. *Pentaptera arjuna* Roxb. ex DC., Prodr. 3: 14. 1828. *Terminalia berryi* Wight & Arn., Prodr. 314. 1834.

Trees, upto 30 m, bole often buttressed; bark surface pinkish-grey, smooth, flaking off in thin layers; blaze pink; exudation red, gummy; branchlets drooping. Leaves simple, opposite to alternate, exstipulate; petiole 0.5-1.5 cm long, stout, grooved above, glabrous; lamina 7.5-16 x 3.7-8.5 cm, oblong, elliptic, oblong-ovate or oblong-obovate, base round, obtuse or cordate, apex obtuse or round, margin crenulate or entire, glabrous, coriaceous, 2 glands at the base on the lowerside; lateral nerves 10-17 pairs, pinnate, arched towards the margin, prominent, intercostae reticulate, prominent. Flowers bisexual, dull yellow, 2-3 mm across, in short axillary spikes; calyx tube constricted above the ovary, pubescent; lobes 5, cream, triangular, glabrous; disc 5-lobed, pilose; petals 0; stamens 10, in 2 rows; filaments exserted; anthers small; ovary ovoid, inferior, pubescent, 1-celled; ovules 2 or 3, pendulous; style subulate, small. Fruit a drupe, 6-7 x 3-4 cm, oblong, 5-7 winged; wings equal, lines on the wings oblique and curving upwards, apex notched; seed one.
Flowering & Fruiting: November-June.
Distribution: India and Sri Lanka. Rare; in moist deciduous forests. *RNMK 0987,* Tholpetty; *RNMK 2238,* Begur.

Terminalia elliptica Willd., Sp. Pl. 4: 969. 1806; Gangop. & Chakrab., J. Econ. Tax. Bot. 16:601.1992 & 21: 351. 1997. *Terminalia alata* Heyne ex Roth, Nov. Pl. Sp. 379. 1821; Sivar. & P. Mathew, Fl. Nilambur 258. 1997. *Terminalia crenulata* Roth, Nov. Pl. Sp. 380. 1821; Gamble, Fl. Pres. Madras 465(329). 1919; Ansari, Fl. Kasaragod Div. 156. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 178. 1988; Vajr., Fl. Palghat Dist. 197. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 178. 1996; Mohanan & Sivad., Fl. Agasthyamala 250. 2002; Anilkumar, Sivad. & N. Ravi., Fl. Pathanamthitta 212. 2005. *Terminalia coriacea* (Roxb.) Wight & Arn., Prodr. 315. 1834; Gamble, Fl. Pres. Madras 465(329). 1919; V. S. Ramach. & V. J. Nair, Fl. Cannanore 178. 1988. *Pentaptera coriacea* Roxb., Fl. India 2: 438. 1832. *Terminalia tomentosa* (Roxb. ex DC.) Wight & Arn., Prodr. 314. 1834; Clarke in Hook. f., Fl. Brit. India 2: 447. 1878; Gamble, Fl. Pres. Madras 465(329). 1919. *Terminalia tomentosa* (Roxb. ex DC.) Wight & Arn. var. *crenulata* (Roth) Clarke in Hook. f., Fl. Brit. India 2: 448. 1878. *Pentaptera crenulata* (Roth) Roxb., Fl. India 2: 438. 1832.

Tall deciduous trees, bark black, split into rectangular pieces, red inside. Leaves subopposite, 20-25 x 7.5-9 cm, oblong, acute, glandular, nervules parallel; petiole 2-3 cm long, eglandular. Panicles 15-18 cm long, terminal, glabrous; flowers 5-6 mm across; calyx lobes triangular, densely villous inside;

stamens 5, filaments glabrous; ovary densely long-villous. Drupe 3-3.5 x 4-5.5 cm, wings 5 broad, coriaceous, reddish brown.
Flowering & Fruiting: April-May.
Distribution: India and Sri Lanka. Common; in moist deciduous forests. *RNMK 1098,* Chedalayam; *RNMK 1330*, Pulpally; *RNMK 3542*, Kuruva; *RNMK 1184*, Muthanga.

Terminalia paniculata Roth, Nov. Pl. Sp. 383.1821; Clarke in Hook. f., Fl. Brit. India 2:448.1878; Gamble, Fl. Pres. Madras 465(329). 1919; Manilal & Sivar., Fl. Calicut 104. 1982; Ansari, Fl. Kasaragod Div. 157. 1985; Manilal, Fl. Silent Valley 102. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 179. 1988; Vajr., Fl. Palghat Dist. 197. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 178. 1996; Sivar. & P. Mathew, Fl. Nilambur 259. 1997; Gangop. & Chakrab., J. Econ. Tax. Bot. 21: 357. 1997; Mohanan & Sivad., Fl. Agasthyamala 251. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 212. 2005. *Pentaptera paniculata* (Roth) Roxb., Fl. India 2: 442. 1832.

Large trees; bark pale brown, pink inside; branchlets reddish. Leaves 15-18 x 6-8 cm, ovate, oblong, minutely hirsute below; nerves 10-15 pairs, nervules reticulate; glands one on either side of the midrib at base; petiole 1-1.5 cm long. Panicles to 20 cm across, densely tomentose; flowers 7-8 mm across, white, closely packed; sepals ovate, densely villous inside; stamens 5, filaments glabrous. Drupe 1.3-1.5 cm long, puberulus, reddish brown.
Flowering & Fruiting: August-February.
Distribution: Endemic to Peninsular India. Common; in moist deciduous forests. *RNMK 3329,* Sulthan Bathery.

Terminalia travancorensis Wight & Arn., Prodr. 314. 1834; Gamble, Fl. Pres. Madras 464(329).1919; Raghavan & Kulkarni, J. Econ. Tax. Bot. 5:219. 1984; Sasidh. & Sivar., Fl. Pl. Thrissur For. 178.1996; Gangop. & Chakrab., J. Econ. Tax. Bot. 21: 361. 1997. *Terminalia angustifolia* sensu Roxb., Fl. Ind. 2: 437. 1832, non Jacq. 1776; Hook. f., Fl. Brit. India 2: 449. 1878. **Fig. 31, Plate 16i.**

Large trees; bark smooth, white; branchlets glabrous. Leaves opposite, 12-14 x 4-4.5 cm, elliptic-oblong, acuminate at apex, glabrous; petiole ca. 1 cm long. Panicles ca. 10 x 10 cm, terminal, branches hispid. Flowers ca. 2.5 mm across; sepals hispid outside, densely villous inside; stamens 10, filaments ca. 4 mm long; ovary densely tomentose. Drupe ca. 3 x 1.3 cm, ellipsoid, 5-ridged, glabrous.
Flowering & Fruiting: April-August.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2976,* Puliyarmala.

Terminalia catapa L. is a common tree seen planted along roadsides and Govt. office premises in Kalpetta and Sulthan Bathery. **Quisqualis indica** L. is rarely seen along roadsides as a garden escape.

MYRTACEAE Juss.

Gen. Pl. 322. 1789.

1. Flowers in many flowered cymes; calyx tube produced above the ovary .....**Syzygium**
1. Flowers axillary or supra axillary; calyx tube not produced above the ovary 2
2. Ovules many in each cells of 2-celled ovary ..... **Eugenia**
2. Ovules 4 in each cells of 2-celled ovary ..... **Meteoromyrtus**

EUGENIA Linnaeus

Sp. Pl. 470. 1753.

Shrubs or trees; tender parts usually hispid. Leaves opposite, entire, gland dotted. Flowers bisexual, solitary, fascicled or cymose, terminal or axillary; bracteoles 2, adpressed, to the calyx tube, persistent; calyx tube subglobose to globose; lobes 4, persistent; petals 4, free, orbicular to obovate; stamens many, free; staminal disk broad or absent; ovary 2-celled, ovules several in each cell; style-1, slender. Fruit a berry, globose or lobed; seeds 1 or 2, large, subglobose.

1. Young shoots and inflorescence glabrous .....**E. mooniana**
1. Young shoots and inflorescence tomentose 2
2. Leaves oblanceolate; pedicels more than 1 cm long .....**E. indica**
2. Leaves elliptic; pedicels lessthan 1 cm long 3
3. Flowers fascicled in the leaf-axils; fruits glabrous ..... **E. roxburghii**
3. Flowers solitary in the leaf axils; fruit appressed pubescent.....**E. argentea**

Eugenia argentea Bedd., Fl. Sylv. Anal. Genp. 109.1872; Hook. f., Fl. Brit. India 2: 503. 1879; Gamble, Fl. Pres. Madras 484(342). 1919. **Fig. 32, Plate 16j.**

Small trees, 6-8 m high; bark smooth. Leaves 10-12 x 2-2.5 cm, opposite, entire, lanceolate, apex long acuminate, rounded at base, short petioled, silvery pubescent beneath, broad; nerves prominent. Flowers creamy white, pubescent, solitary in leaf axils, bisexual; bracteoles 2, filiform, exceeds the calyx tube; calyx tube nearly globose, produced beyond the ovary, with 4 persistent lobes; petals 4, distinct; stamens numerous, distinct; ovary 2 celled, ovules several in each cell; style slender; stigma simple. Fruit nearly globose, adpressed-pubescent, 2 celled berry.

Flowering & Fruiting: January-October.

Distribution: Endemic to southern Western Ghats (Kerala). Rare; in evergreen forests. *RNMK 3952,* Kurichiarmala; *RNMK 3419,* Chanthanathodu; *RNMK 2669*, Kunchome.

Note: This tree can be easily identified with the silvery pubescent young leaves as its characteristic feature.

Eugenia indica (Wight) Chithra in Nair & Henry, Fl. Tamil Nadu India 1: 153. 1983; Vajr., Fl. Palghat Dist. 197. 1990; Mohanan & Sivad., Fl. Agasthyamala

254. 2002. *Jossinia indica* Wight, Ic. t. 523. 1842. *Eugenia jossinia* Duthie in Hook.f., Fl. Brit. India 2:500. 1879; Gamble, Fl. Pres. Madras 484(342). 1919.

Small trees. Leaves 3-5 x 1.5-2 cm, oblanceolate, apex obtuse, base acute; petiole ca. 7 mm. Flowers axillary, solitary or paired; pedicels 2-2.2 cm, tomentose; calyx tube 4-5 mm, campanulate, lobes 4, ca. 5 mm across, orbicular, tomentose, glabrous within; petals, 0.3-1 cm across, orbicular, white; filaments 7-8 mm; disc broad. Berry 7-9 mm across, globose, rusty, crowned with persistent calyx.

Flowering & Fruiting: March-May.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1712,* Chembra.

Eugenia mooniana Wight, Ic. t. 551. 1842 & Ill. 2: 13. 1850, non Gard. 1843; Duthie in Hook. f., Fl. Brit. India 2: 505. 1879; Gamble, Fl. Pres. Madras 484(342). 1919. *Eugenia thwaitesii* Duthie in Hook. f., Fl. Brit. India 2: 506. 1879; Manilal, Fl. Silent Valley 103. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 180. 1996; Mohanan & Sivad., Fl. Agasthyamala 255. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 214. 2005.

Shrubs; branchlets slender. Leaves 4-5 x 1.5-2 cm, ovate, caudate-acuminate at apex, rounded at base, pale below, glabrous; nerves few, obscure; petiole 2-3 mm long. Flowers 2-3 together, 6-7 mm across, in axillary fascicles; pedicels fulvous hairy; calyx tube short, hairy; sepals orbicular; petals white; filaments 6-7 mm long. Berry ca. 1 x 1.5 cm, glabrous, reddish; seeds 3, globose.

Flowering & Fruiting: October-December.

Distribution: Peninsular India and Sri Lanka. Rare; in evergreen forests. *RNMK 2519,* Kallady.

Eugenia roxburghii DC., Prodr. 3: 271. 1828. *Eugenia zeylanica* Roxb., Fl. India ed. 1832, 2: 490. 1832, nom. illeg. *Myrtus bracteata* Willd., Sp. Pl. 2: 969. 1799. *Eugenia bracteata* (Willd.) Raeusch. ex Roxb., Hort. Bengal. 37. 1814, nom. illeg.; Duthie in Hook. f., Fl. Brit. India 2: 502. 1879; Gamble, Fl. Pres. Madras 484(342). 1919; Sasidh. & Sivar., Fl. Pl. Thrissur For. 180. 1996; Mohanan & Sivad., Fl. Agasthyamala 252. 2002. *Syzygium bracteatum* (Willd.) Raizada, Indian For. 74:336. 1948, non Korth. 1847. *Eugenia rothii* Panigrahi, J. Econ. Tax. Bot. 5:994. 1984.

Shrubs; branchlets slender. Leaves 6-7 x 3-3.5 cm, elliptic, obtusely acute at apex, acute at base, pale below; nerves 10-13 pairs, sub-prominent below; petiole 3-4 mm long. Flowers in axillary fascicles, 8-9 mm across, densely fulvous hairy; pedicels 5-6 mm long, densely hairy; bracteoles 2, lanceolate; calyx tube short, globose, lobes 5, orbicular; petals 5, 4-5 mm, orbicular, glabrous.

Flowering: March-April. *Distribution*:

Peninsular India and Sri Lanka. Occasional; in evergreen forests. *RNMK 1590,* Chembra.

METEROMYRTUS Gamble

Bull. Misc. Inform. Kew 241. 1918.

Meteoromyrtus wynaadensis (Bedd.) Gamble, Bull. Misc. Inform. Kew 1918: 241. 1918 & Gamble, Fl. Pres. Madras 485(343). 1919; V. S. Ramach. & V. J. Nair, Fl. Cannanore 179. 1988. *Eugenia wynaadensis* Bedd., Ic. t. 161. 1868-1874; Duthie in Hook. f., Fl. Brit. India 2: 506. 1879. **Plates 16 k & 16 l.**

Trees, to 6 m high; young parts and inflorescence fulvous. Leaves simple, opposite, exstipulate; petiole 2-5 mm long, slender, grooved above, tomentose; lamina 4-8 x 1.5-2.5 cm, elliptic, elliptic-oblong or oblong-lanceolate, base acute, apex acuminate, margin entire, recurved, glabrous when mature, membranous; lateral nerves many, slender, parallel, close, faint, looped at the margin forming intramarginal nerve, intercostae reticulate, faint. Flowers bisexual, white, small, axillary or supra axillary; pedicel villous; bracteoles 2, linear, arising below the calyx tube and longer than the calyx; calyx tube short, not produced beyond the ovary, furnished with annual disc at the mouth; lobes 4, lanceolate, villous, rather longer than petals; petals 4, suborbicular, pellucid punctate, margin ciliate; stamens many, inserted in a ring around the disc; anthers small; ovary inferior, 2-celled, ovules 4 in each cell; pendulous from the apex; style elongate; stigma subcapitate.

Flowering & Fruiting: February-August.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3042,* Kunchome; *RNMK 3419,* Chanthanathodu.

SYZYGIUM R. Brown ex Gaertner

Fruct. 1: 166. 1788, *typ. cons.*

Trees, bark thick, granular; twigs usually glabrous. Leaves opposite, entire, penninerved, gland dotted; lateral nerves united forming a clear or faint intramarginal vein. Flowers bisexual, in terminal or axillary corymbose cymes; calyx tube hemispherical, globose or turbinate, tube produced above the summit of ovary, lobes 4 or 5 , ovate to suborbicular, imbricate; petals 4 or 5, orbicular, pellucid-glandular; stamens numerous, filaments inflexed in bud; staminal disk broad or absent; anthers globose; ovary inferior, 2-celled; ovules few-several in each cell; style 1, subulate, stigma simple. Fruit a berry, 1-celled; seeds few, globose or angled.

1. Flowers more than 2 cm across; staminal disk present 2
1. Flowers less than 2 cm across; staminal disk absent 5
2. Leaves cordate at base 3
2. Leaves acute or acuminate at base 4
3. Leaves lanceolate, acuminate; pedicels 1 cm long ..... **S. munronii**
3. Leaves oblong, obtuse; pedicels 0.5 cm long ..... **S. mundagam**
4. Pedicels 2-2.5 cm long; stamens yellow or pink ..... **S. laetum**
4. Pedicels ca. 0.6 cm long; stamens white ..... **S. hemisphericum**
5. Lateral nerves of leaves less than 15 pairs 6
5. Lateral nerves of leaves more than 25 pairs 8

6. Branchlets terete; peduncle less than 2 cm long..... **S. malabaricum**
6. Branchlets 4- angled; peduncle more than 3 cm long 7
7. Leaves with distinct intramarginal nerves.....**S. stocksi**
7. Leaves without distinct intramardinal nerves ..... **S. travancoricum**
8. Cymes axillary 9
8. Cymes terminal and axillary 10
9. Calyx tube funnel shaped ..... **S. lanceolatum**
9. Calyx tube turbinate .....**S. cumini**
10. Branchlets quadrangular 11
10. Branchlets terete 13
11. Leaves to 4 cm long.....**S. rubicundum**
11. Leaves over 5 cm long.....12
12. Leaves elliptic-obovate; petiole grooved ..... **S. grande**
12. Leaves oblong; petiole not grooved ..... **S. salicifolium**
13. Branches of cymes quadrangular 14
13. Branches of cymes slender, terete 15
14. Flowers sessile .....**S. densiflorum**
14. Flowers pedicelled .....**S. calophyllifolium**
15. Petiole more than 1 cm long .....**S. gardneri**
15. Petiole upto 1 cm long 16
16. Berry white, gland dotted .....**S. zeylanicum**
16. Berry black or violet 17
17. Leaves elliptic-oblong; berry obovoid .....**S. arnottianum**
17. Leaves obovate; berry globose .....**S. caryophyllatum**

Syzygium arnottianum (Wight) Walp., Rep. 2:180.1843; Gamble, Fl. Pres. Madras 475(338). 1919. *Eugenia arnottiana* Wight, Ic. t. 999. 1845; Duthie in Hook. f., Fl. Brit. India 2: 483. 1878. *Eugenia benthamiana* Wight ex Duthie in Hook. f., Fl. Brit. India 2: 484. 1878. *Eugenia arnottiana* (Walp.) Wight var. *benthamiana* Wight ex Duthie in Hook. f., Fl. Brit. India 2: 484. 1878. *Syzygium benthamianum* (Wight ex Duthie) Gamble, Fl. Pres. Madras 478(338). 1919; Vajr., Fl. Palghat Dist. 199. 1990; Mohanan & Sivad., Fl. Agasthyamala 257. 2002.

Small trees, branchlets terete. Leaves 9-11 x 4-5 cm, elliptic-oblong, obtusely acute at apex, subsessile, reddish brown when dried; nerves many, close, parallel. Umbels corymbose; flowers shortly pedicelled; calyx tube 2-2.5 mm long, ca. 3 mm across, turbinate, glabrous; petals free; filaments 4-5 mm long; glabrous. Berry 7-8 cm long, obovoid, glabrous, deep violet.
Flowering & Fruiting: December-March. *Distribution*: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3449,* Chembra.

Syzygium calophyllifolium Walp., Rep. 2: 180. 1843; Gamble, Fl. Pres. Madras 480(339). 1919; Manilal, Fl. Silent Valley 104. 1988; Sivar. & P. Mathew, Fl. Nilambur 261. 1997; Mohanan & Sivad., Fl. Agasthyamala 260.

2002. *Eugenia calophyllifolia* (Walp.) Wight, Ic. t. 1000. 1845; Duthie in Hook. f., Fl. Brit. India 2: 494. 1878. **Plate 17b.**

Trees, to 20 m high; bark thick, brown, rough; blaze pink; branchlets terete. Leaves simple, opposite, exstipulate; petiole 2-3 mm, stout, glabrous; lamina 2-5 x 1.5-3 cm, obovate or suborbicular, base obtuse, or round, obtusely acute or slightly emarginate, margin entire, glabrous, pellucid dotted, coriaceous; lateral nerves many, parallel, slender, very close, prominent, looped at the margin forming intramarginal nerve, intercostae reticulate, slender but prominent. Flowers bisexual, white, in dense terminal corymbs; peduncle 4 angled, articulated at ramifications; calyx tube 3-5 mm long, ovoid; lobes 4, minute; petals 4, calyptrate; stamens many, bent inwards at the middle in bud; ovary inferior, 2-celled; ovules many; style 5-6 mm long. Fruit a berry, 1-1.2 cm long, oblong or obovoid, dark purple.

Flowering & Fruiting: February-May.

Distribution: Western Ghats and Sri Lanka. Common; in evergreen forest margins. *RNMK 3423,* Kurichiarmala.

Syzygium caryophyllatum (L.) Alston in Trimen, Handb. Fl. Ceylon 6: (Suppl.) 116. 1931; Manilal & Sivar., Fl. Calicut 107. 1982; Ansari, Fl. Kasaragod Div. 158. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 194. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 181. 1988; Sivar. & P. Mathew, Fl. Nilambur 262. 1997; Mohanan & Sivad., Fl. Agasthyamala 260. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 215. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 287. 2009. *Myrtus caryophyllata* L., Sp. Pl. 472. 1753. *Syzygium caryophyllaeum* sensu Gamble, Fl. Pres. Madras 480(339).1919, non Gaertn. 1788. *Eugenia caryophyllaea* Wight, Ic. t. 540. 1842; Duthie in Hook. f., Fl. Brit. India 2: 490. 1878. *Njara* Rheede, Hort. Malab. 5:53, t. 27. 1685.

Trees, to 6 m high; bark thick, reddish-brown; branchlets terete. Leaves simple, opposite, exstipulate; petiole upto 3 mm long, stout, glabrous; lamina 3-8 x 1.3-3.5 cm, obovate or obovate-oblong, base attenuate or acute, apex obtuse, obtusely acute or emarginate, margin entire, glabrous, coriaceous, brown on drying, pellucid-dotted; lateral nerves many, close, slender, prominent looped at the margin forming intramarginal nerve; intercostae reticulate. Flowers bisexual, white, 5-6 mm across, in terminal corymbose cymes, inflorescence branches moderately thick, ascending; calyx tube 2-2.5 mm long, turbinate, no thick disc; petals calyptrate, stamens numerous, bent inwards at the middle when in bud, 2.5-3.5 mm long; ovary inferior, 2-celled, ovules many; style 1; stigma simple. Fruit a berry, 4-5 mm across globose, black.

Flowering & Fruiting: February-January.

Distribution: Western Ghats and Sri Lanka. Occasional; in evergreen and moist deciduous forests. *RNMK 3470,* Talimala: *RNMK 2624*, Muthanga: *RNMK 2774*, Sulthan bathery.

Syzygium cumini (L.) Skeels, U. S. DA. Bur. Pl. Industr. Bull. 248: 2. 1912; Manilal & Sivar., Fl. Calicut 107. 1982; Manilal, Fl. Silent Valley 104. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 194. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 181. 1988; Vajr., Fl. Palghat Dist. 199. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 181. 1996; Sivar. & P. Mathew, Fl. Nilambur 262. 1997; Mohanan & Sivad., Fl. Agasthyamala 261. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 216. 2005 ; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 287. 2009. *Myrtus cumini* L., Sp. Pl. 471. 1753. *Eugenia jambolana* Lamk., Encycl. 3: 198. 1789; Wight, Ic. t. 535. 1842; Duthie in Hook. f., Fl. Brit. India 2: 499. 1879. *Syzygium jambolanum* (Lam.) DC., Prodr. 3: 259. 1828; Gamble, Fl. Pres. Madras 481(340). 1919.*Perin-njara* Rheede, Hort. Malab. 5; 57-58, t. 39. 1685.

Medium sized trees; bark white, light pink inside. Leaves 16-18 x 7-8 cm, ovate, oblong, long-acuminate at apex, acute at base; nerves many, close, shining above; petiole 1.5-2 cm long. Panicles to 10 cm across, on leafless branchlets; flowers 6-9 mm across, subsessile; calyx tube 3-4 mm broad, turbinate; filaments 7-8 mm long. Berry 1-1.4 cm long, obovoid, deep blue.
Flowering & Fruiting: December-April.
Distribution: Indo-Malesia. Common; in evergreen forests. *RNMK 2789,* Manikkunnumala; *RNMK 1774*, Karuvanthodu; *RNMK 2774*, Sugandhagiri.

Syzygium densiflorum Wall. ex Wight & Arn., Prodr. 329. 1834; Vajr., Fl. Palghat Dist. 199. 1990; Mohanan & Sivad., Fl. Agasthyamala 261. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 216. 2005. **Plate 17c.**

Evergreen trees, to 20 m high; bark surface blackish-grey, rough; branchlets terete. Leaves simple, opposite, exstipulate; petiole 0.3-2 cm long, slender, grooved above, glabrous; lamina 3.5-9 x 1.8-3.7 cm, elliptic, elliptic-lanceolate or elliptic-oblong, base attenuate or acute, apex acuminate or caudate acuminate, margin entire, glabrous, glandular punctate, coriaceous, olive-green when dry; lateral nerves many, parallel, close, prominent, looped at the margin forming intramarginal nerve, intercostae reticulate, prominent. Flowers bisexual, creamy, 1-1.2 cm long, sessile, in dense clusters forming compact, terminal trichotomous cymes; calyx tube to 5-6 mm, turbinate; lobes 4; no thick disc; petals free, deciduous; stamens many free, bent inwards at the middle in bud; ovary inferior, 2-celled, ovules many; style 1; stigma simple. Fruit a berry, oblong-ovoid, dark purple, fleshy.
Flowering & Fruiting: December-April.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2619,* Chembra: *RNMK 1810*, Manikkunnumala.

Syzygium gardneri Thw., Enum. Pl. Zeyl. 117. 1859; Gamble, Fl. Pres. Madras 479(339). 1919; Sasidh. & Sivar., Fl. Pl. Thrissur For. 181. 1996; Sivar. & P. Mathew, Fl. Nilambur 264. 1997; Mohanan & Sivad., Fl. Agasthyamala 262. 2002. *Eugenia gardneri* (Thw.) Bedd., For. Man. Bot. 108.

1874; Duthie in Hook. f., Fl. Brit. India 2: 489. 1878. *Eugenia cymosa* Lamk. var. *rostrata* Duthie in Hook. f., Fl. Brit. India 2: 482. 1878. **Plate 17d.**

Large trees; bark white, smooth; branchlets terete. Leaves 9-10 x 4-6 cm, elliptic, caudate-acuminate at apex, acute at base; nerves many, close, intramarginal vein 1-2 mm away from the margin; petiole 1-1.5 cm long. Cymes 5-8 x 6-8 cm, lax, terminal; branches slender; flowers globose; pedicels 2-5 mm long; calyx tube obconical, lobes obtuse; petals calyptrate; filaments 4-5 mm long.

Flowering & Fruiting: March-April.

Distribution: Western Ghats and Sri Lanka. Occasional; in evergreen forests. *RNMK 2505,* Manikkunnumala.

Syzygium grande (Wight) Walp., Repert. Bot. Syst. 2: 180. 1843. *Eugenia grandis* Wight, Ill. Ind. Bot. 2: 17. 1841. *Eugenia montana* Wight, Ic. t. 1060. 1846, non Aubl. 1775; Duthie in Hook. f., Fl. Brit. India 2: 488. 1878. *Syzygium montanum* (Wight) Gamble, Fl. Pres. Madras 479(339). 1919, non Thw. 1859. *Syzygium tamilnadensis* Rathkr. & Chithra in Nair & Henry, Fl. Tamil Nadu India 1: 158. 1983, nom. superfl.; V. S. Ramach. & V. J. Nair, Fl. Cannanore 183. 1988; Mohanan & Sivad., Fl. Agasthyamala 265. 2002. **Plate 17e.**

Trees, to 20 m high, bark dark brown, peeling off in small flakes; branchlets tetragonous. Leaves simple, opposite, exstipulate; petiole 0.5-1.6 cm, stout, grooved above, glabrous; lamina 5-12.5 x 2.5-7.5 cm, elliptic, obovate or elliptic-obovate, base cuneate, apex obtuse or emarginate, margin entire, glabrous, coriaceous, pellucid-dotted; lateral nerves many, parallel, slender, slightly distant, prominent, looped near the margin forming intramarginal nerve; intercostae reticulate, slender, faint. Flowers bisexual, 5-6 mm across, sessile, white, in axillary or terminal corymbose panicles, inflorescence branches stout; calyx tube 3-4 mm long, obconic; lobes 4; no thick disc; petals calyptrate; stamens many, bent inwards regularly middle in bud, filaments 5-6 mm long; ovary inferior, 2-celled; ovules many; style 1; stigma simple. Fruit a berry, 6-8 mm across, globose, purple, succulent, crowned by calyx limb.

Flowering & Fruiting: February-May.

Distribution: Indo-Malesia. Rare; in evergreen forests. *RNMK 2601,* Talimala.

Syzygium hemisphericum (Wight) Alston in Trimen, Handb. Fl. Ceylon 6 (Suppl.):115. 1931; Manilal, Fl. Silent Valley 105. 1988; Vajr., Fl. Palghat Dist. 199. 1990; Sivar. & P. Mathew, Fl. Nilambur 264. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 216. 2005. *Eugenia hemispherica* Wight, Ic. t. 525. 1842; Duthie in Hook. f., Fl. Brit. India 2: 477. 1878. *Jambosa hemispherica* (Wight) Walp., Rep. 2: 191. 1843; Gamble, Fl. Pres. Madras 474(335). 1919. **Plate 17f.**

Large trees; bark dark-brown, rough; branchlets terete. Leaves 13-16 x 5-6.5 cm, elliptic, acute at base and apex; nerves 10-13 pairs, intramarginal vein absent, coriaceous. Cymes 15-18 cm across, terminal; branches

quadrangular; flowers 3-4 cm across, densely packed; pedicel 5-7 mm long; calyx tube 5-7 mm long, obconical, lobes 4, obtuse; petals 7-9 mm across, free; filaments 1.5-1.7 cm long. Berry 1-1.5 cm across, globose, rough.
Flowering & Fruiting: March-June.
Distribution: South India and Sri Lanka. Rare; in evergreen forests. *RNMK 2705,* Kurichiarmala.

Syzygium laetum (Buch.-Ham.) Gandhi in Sald.& Nicols., Fl. Hassan Dist. 282. 1976; Manilal, Fl. Silent Valley 106. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore. 182. 1988; Vajr., Fl. Palghat Dist. 200. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 181. 1996; Mohanan & Sivad., Fl. Agasthyamala 262. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 217. 2005. *Eugenia laeta* Buch.-Ham., Mem. Wern., Nat. Hist. Soc. 5: 338. 1826; Duthie in Hook. f., Fl. Brit. India 2: 479. 1878. *Jambosa laeta* (Buch.-Ham) Blume, Mus. Bot. Lugd.-Bat. 1:104.1849; Gamble, Fl. Pres. Madras 474(335). 1919. *Eugenia pauciflora* Wight, Ic. t. 526. 1842. *Jambosa pauciflora* (Wight) Wight, Ill. 2: 14. 1850. **Plate 17g.**

Small trees, branchlets terete, slender. Leaves 9-12 x 4-5 cm, elliptic, acuminate at both ends, pale below; nerves 10-12 pairs, intramarginal nerves obscure; petiole 5-6 mm long. Flowers 6-8 cm across, solitary or 2-5-together, on axillary or terminal cymes; pedicels 2-2.5 cm long; calyx tube 1-1.5 cm long, obconical; sepals orbicular, persistent; petals 1-1.3 cm long, glabrous, creamy white; stamens 2-3 cm long, yellow or pink. Berry 2.5-3 cm long, oblong, truncate at apex.
Flowering & Fruiting: December-July.
Distribution: Endemic to southern Western Ghats. Common; in evergreen forests. *RNMK 2788,* Vythiri; *RNMK 2521*, Makkimala; *RNMK 1572*, Karuvanthodu.

Syzygium lanceolatum (Lamk.) Wight & Arn., Prodr. 330. 1834; Ansari, Fl. Kasaragod Div. 159. 1985; Manilal, Fl. Silent Valley 106. 1988; Vajr., Fl. Palghat Dist. 200. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 183. 1996; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 288. 2009. *Eugenia lanceolata* Lamk., Encycl. 3: 200. 1789. *Syzygium wightianum* Wall. ex Wight & Arn., Prodr. 330. 1834; Gamble, Fl. Pres. Madras 478(338). 1919. *Eugenia wightiana* (Wall. ex Wight & Arn.) Wight, Ic. t. 529. 1842; Duthie in Hook. f., Fl. Brit. India 2: 485. 1878. **Plate 17h.**

Trees, branchlets terete. Leaves 7-11 x 3-4 cm, elliptic-lanceolate, apex obliquely acuminate, base cuneate, thinly coriaceous, nerves close, parallel; petiole 7-8 mm. Racemes axillary; peduncle 2.5-3 cm long; flowers white, 4-6 mm across; pedicels 2-3 mm long; calyx tube elongate, 1-1.5 cm long, widened. Fruit scarlet red.
Flowering & Fruiting: March-April.
Distribution: South India and Sri Lanka. Occasional in evergreen forests. *RNMK 3432,* Manikkunnumala; *RNMK 3469*, Chembra.

Syzygium malabaricum (Bedd.) Gamble, Fl. Pres. Madras 481(340). 1919; Sasidh. & Sivar., Fl. Pl. Thrissur For. 183. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 217. 2005. *Eugenia malabarica* Bedd., Fl. Sylv. t. 199. 1872; Duthie in Hook. f., Fl. Brit. India 2: 497. 1879.

Small trees; bark white, yellow inside; branchlets obtusely quadrangular. Leaves 10-11 x 7-8 cm, pale beneath, cuneate at base, coriaceous, nerves 8-10 pairs, irregular, intramarginal vein indistinct; petiole 2-2.5 cm long. Cymes 5-7 cm long, axillary, few-flowered; flowers 2-2.5 mm broad, shortly pedicelled; calyx tube turbinate, glabrous; petals calyptrate, white. Berry spherical.
Flowering & Fruiting: July-August.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3038,* Manikkunnumala.

Syzygium mundagam (Bourd.) Chithra in Nair & Henry, Fl. Tamilnadu 1: 157. 1983; Manilal, Fl. Silent Valley 107. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 182. 1988; Vajr., Fl. Palghat Dist. 200. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 183. 1996; Mohanan & Sivad., Fl. Agasthyamala 263. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 217. 2005. *Eugenia mundagam* Bourd., For. Trees Travancore 182. 1908. *Jambosa mundagam* (Bourd.) Gamble, Fl. Pres. Madras 473(335). 1919. **Plate 17i.**

Medium sized trees; branchlets quadrangular. Leaves 23-25 x 8-10 cm, oblong, obtuse, coriaceous; nerves 18-20 pairs, irregular, intramarginal nerves indistinct. Cymes terminal, corymbose; flowers few to many, 3-5 cm across; pedicels 5-6 mm long; calyx tube funnel shaped, lobes 6-7 mm across, orbicular; petals 1-1.2 cm diam., white; filaments 1-2 cm long, glabrous, white. Fruit a berry, 2.5-3 cm across, ovoid, greenish-pink.
Flowering & Fruiting: February-March.
Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 1586,* Chanthanathodu; *RNMK 3042,* Thariodu; *RNMK 1834*, Kunchome; *RNMK 2798*, Kalladi.

Syzygium munronii (Wight) Chandr., Biol. Mem. 2:58. 1977; Manilal, Fl. Silent Valley 107. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 182. 1988; Vajr., Fl. Palghat Dist. 201. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 183. 1996; Sivar. & P. Mathew, Fl. Nilambur 266. 1997; Mohanan & Sivad., Fl. Agasthyamala 263. 2002. *Eugenia munronii* Wight, Ic. t. 546. 1842; Duthie in Hook. f., Fl. Brit. India 2: 472. 1878. *Jambosa munronii* (Wight) Walp., Rep. 2: 191. 1843; Gamble, Fl. Pres. Madras 473(335). 1919. **Plate 17j.**

Large shrubs or small trees; branchlets quadrangular. Leaves 20-22 x 5-7 cm, lanceolate, subsessile, glabrous, nerves and intramarginal veins prominent. Cymes 5-10 cm broad, terminal; flowers few, 4-5 cm across; pedicels 1-1.5 cm long; calyx 2-2.5 cm long, funnel-shaped; lobes 0.2 -1 x 0.5-1 cm, orbicular; petals larger, yellowish white; filaments 2-2.5 cm long, white. Berry 2.5-3 cm long, ellipsoid, glabrous.

Flowering & Fruiting: December-May.
Distribution: Endemic to Western Ghats. Common; in evergreen forests. *RNMK 2798,* Theethundamala; *RNMK 1712*, Kurichairmala; *RNMK 3038*, Aranamala.

Syzygium rubicundum Wight & Arn., Prodr. 330. 1834; Gamble, Fl. Pres. Madras 479(339). 1919; V. S. Ramach. & V. J. Nair, Fl. Cannanore 183. 1988; Mohanan & Sivad., Fl. Agasthyamala 265. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 219. 2005. *Eugenia rubicunda* (Wight & Arn.) Wight, Ic. t. 538. 1842; Duthie in Hook. f., Fl. Brit. India 2: 495. 1878. *Eugenia lissophylla* (Thw.) Bedd., For. Man. Bot. 108. 1874; Duthie in Hook. f., Fl. Brit. India 2: 488. 1878. *Syzygium lissophylla* Thw., Enum. Pl. Zeyl. 117. 1859.

Medium sized trees; bark smooth, branchlets 4-angled. Leaves 4-5 x 1.5-2 cm, elliptic to obovate, obtusely shortly acuminate, attenuate to the base, black above when dried, nerves many, close; petiole 5-6 mm long. Cymes terminal, corymbose, densely flowered; flowers shortly pedicelled; calyx tube 2-3 mm long, turbinate, 2-2.5 mm broad; petals calyptrate, 3-4 mm across, pale yellow; filaments 3-4 mm long, spreading. Berry 6-8 mm across, globose, black.
Flowering & Fruiting: December-April.
Distribution: South India and Sri Lanka. Rare; in evergreen forests. *RNMK 1315,* Chanthanathodu.

Syzygium salicifolium (Wight) Graham, Cat. Pl. Bombay 73. 1839. *Eugenia salicifolia* Wight, Ill. Ind. Bot. 2: 16. 1841. *Eugenia heyneana* Duthie in Hook. f., Fl. Brit. India 2: 500. 1879. *Syzygium heyneanum* (Duthie) Wall. ex Gamble, Fl. Pres. Madras 482(341). 1919; Ansari, Fl. Kasaragod Div. 158. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 181. 1988; Sivar. & P. Mathew, Fl. Nilambur 265. 1997.

Large shrubs; branchlets obscurely quadrangular. Leaves 8-10 x 3-4 cm, oblong, obtuse at apex, acute at base, nerves many, irregular, pale below; petiole 3-4 mm long. Cymes 8-9 cm across, terminal; branches terete, stout; flowers sessile; calyx tube turbinate; petals calyptrate, 3-4 mm across, light pink; filaments 3-4 mm long. Fruit a berry, obovoid, 1-1.5 x 0.5-0.7 cm, crowned with the cup-like calyx limb.
Flowering & Fruiting: April-May.
Distribution: Endemic to Peninsular India. Rare; in evergreen forests. *RNMK 2488,* Chanthanathodu; *RNMK 3087*, Chembra.

Syzygium stocksii (Duthie) Gamble, Fl. Pres. Madras 481(340). 1919. *Eugenia stocksii* Duthie, Hook. f., Fl. Brit. India 2: 498. 1878. **Plate 17k.**

Lofty trees, to 15 m high, bark greyish-brown; branchlets tetragonus. Leaves simple, opposite, exstipulate; petiole 1-2 cm long, stout, grooved above, glabrous; lamina 8.5-17 x 4-7.5 cm, elliptic, elliptic-oblong or elliptic-obovate,

base narrowed and decurrent on petiole, apex rounded or obtusely acuminate, margin entire, chartaceous, glabrous; lateral nerves 9-12 pairs, parallel but very irregular, distant, prominent, curving upwards and becoming faint towards the margin forming indistinct intramarginal nerve, intercostae reticulate, obscure. Flowers bisexual, small, cymes axillary and from the leafless axils half the length of or equaling the leaves; peduncle 3-5 cm long, branches slender angled; calyx lobes 4, rounded or subacute; no thick staminal disc; petals calyptrate; stamens many, bent inwards at the middle when in bud; ovary inferior, 2-celled, ovules many; style 1; stigma simple. Fruit a berry, pink-purple, 0.2-0.8 x 5-6 cm.
Flowering & Fruiting: March-June.
Distribution: Endemic to southern Western Ghats. Rare; in semi-evergreen forests and plantations. *RNMK 1354,* Kattikulam; *RNMK 2669,* Poothady.

Syzygium travancoricum Gamble, Bull. Misc. Inform. Kew 1918: 240. 1918 & Gamble, Fl. Pres. Madras 480(339). 1919; Nair & Mohanan, J. Econ. Tax. Bot. 2: 234. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 185. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 219. 2005; C. N. Sunil & Sivad., Fl. Alappuzha Dist. 288. 2009. **Plate 17 l.**

Trees, to 25 m high, bark surface greyish-brown, longitudinally fissured, peeling off in thin irregular flakes, inner bark grey; branchlets tetragonus. Leaves simple, opposite, exstipulate; petiole 1-2 cm long, stout, grooved above, glabrous; lamina 8-16.5 x 5-8.5 cm, ovate or ovate-oblong, base narrowed and decurrent on petiole, apex acuminate, acumen folded, obtuse, margin entire, chartaceous, glabrous; lateral nerves 10-15 pairs, parallel but very irregular, distant, prominent, looped near the margin forming indistinct intramarginal nerve, intercostae reticulate, faint. Flowers bisexual, white, mostly in axillary lax cymose corymbose; peduncle 4.5-5 cm long, their branches also long, ascending; calyx tube short, lobes 4, very short; no thickened staminal disc; petals white, calyptrate; stamens numerous, free, bent inwards at middle when in bud; ovary inferior, 2-celled, ovules many; style 1; stigma simple. Fruit a berry, oblong-obtuse on both sides, 0.3-1 x 0.5-1 cm, deep violet, pericarp juicy; seed one.
Flowering & Fruiting: April-June.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1108,* Pookodu.

Syzygium zeylanicum (L.) DC., Prodr. 3: 260.1828; Gamble, Fl. Pres. Madras 479(338). 1919; Manilal & Sivar., Fl. Calicut 108. 1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 183. 1988; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 219. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 290. 2009. *Myrtus zeylanica* L., Sp. Pl. 472. 1753. *Eugenia zeylanica* (L.) Wight, Ill. 2: 15. 1841; Duthie in Hook. f., Fl. Brit. India 2: 485. 1878. *Syzygium zeylanicum* (L.) DC. var. *lineare* (Wall.) Alston in Trimen, Handb. Fl. Ceylon 6 (Suppl.): 115.1931; N. Mohanan & Sivad., Fl. Agasthyamala 266. 2002. **Fig. 33.**

Trees, to 10 m high, bark black.. Leaves simple, opposite, exstipulate; petiole 3-8 mm long, stout, grooved above, glabrous; lamina 2.4-9.5 x 0.8-5.5 cm, elliptic-lanceolate, ovate-lanceolate or oblong, base obtuse, round or acute, apex acute or acuminate, margin entire, pellucid dotted, glabrous, glossy, coriaceous; lateral nerves many, parallel, looped near the margin forming intramarginal nerve, prominent, intercostae reticulate, slender, faint. Flowers bisexual, in axillary and terminal cymes, small, white; peduncle 4-6 mm long; pedicel 3-4 mm long, slender; calyx tube campanulate, greyish, gland-dotted, 2.5-3 cm long; lobes 5, ovate; petals 5, 1.5-2 mm long, free, deciduous, white; stamens many, free, bent inwards at the middle when in bud; filament 4-6 mm long; no thickened staminal disc; ovary inferior, 2-celled, ovules many; style 1, 4-6 mm long; stigma simple. Fruit a berry, 0.6-1.2 cm long, white, gland-dotted, crowned with calyx segments.
Flowering & Fruiting: January-April.
Distribution: Indo-Malesia. Occasional; in semi-evergreen forests. *RNMK 3042,* Varayal; *RNMK 3419*, Kaniyaram; *RNMK 2613*, Kattikulam.

Callistemon citrinus (Curt.) Skeels is commonly seen in college and school campus as an ornamental tree. **Eucalyptus citriodora** Hook., and **Eucalyptus grandis** Hill ex Maid., are commonly raised in plantations for its leaves and **Eucalyptus tereticornis** Smith is seen along roadsides as avenue trees. **Psidium guajava** L., **Pimenta dioica** (L.) Merr., **Syzygium aqueum** (Burm.f.) Alston, **Syzygium aromaticum** (L.) Merr. & Perry, **Syzygium jambos** (L.) Alston, and **Syzygium malaccensis** (L.) Merr. & Perry are commonly cultivated in homesteads.

LECYTHIDACEAE Poit.

in Mem. Mus. Hist. Nat. 13: 143. 1825.

CAREYA Roxburgh

Pl. Coromandel 3: 13. 1811, *nom. cons.*

Careya arborea Roxb., Pl. Corom. t. 218. 1811; Clarke in Hook. f., Fl. Brit. India 2: 511. 1879; Gamble, Fl. Pres. Madras 488(345). 1919; Manilal & Sivar., Fl. Calicut 108. 1982; Ansari, Fl. Kasaragod Div. 160. 1985; Manilal, Fl. Silent Valley 108. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore Dist. 184. 1988; Vajr., Fl. Palghat Dist. 201. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 186. 1996; Sivar. & P. Mathew, Fl. Nilambur 267. 1997; N. Mohanan & Sivad., Fl. Agasthyamala 266. 2002; Anilkumar, Sivad. & N. Ravi., Fl. Pathanamthitta 220. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 292. 2009.

Small trees; branchlets puberulus; bark thick, pink inside. Leaves alternate, 18-20 x 11-13 cm, obovate, obtuse, cuneate to the base; petiole 1-1.5 cm long, channelled. Flowers 6-7 cm across, in axillary small racemes on old branches; sepals 4, orbicular, 2-3 cm across; petals 4, white, 3-4 cm

across, orbicular; stamens many, filaments long, connate at base; ovary 4-5-celled inferior, ovule; numerous on axils placentation; style 4-4.5 cm long. Fruit a berry 5-7 cm across, globose, crowned by sepals.
Flowering & Fruiting: February-July.
Distribution: Tropical Asia. Common; in semi-evergreen and moist deciduous forests. *RNMK 1666,* Manikkunnumala; *RNMK 1978,* Muthanga.

Couropita guianensis Aublet is commonly grown as a garden tree and also seen in temple premises.

MELASTOMATACEAE Juss.

Gen. Pl. 328. 1789

1. Leaves penninerved; ovary 1-celled ..... **Memecylon**
1. Leaves 3-9-nerved from the base; ovary 4 or 5 celled 2
2. Inflorescence scorpioid; flowers tri-merous ..... **Sonerila**
2. Flowers 4 or 5-merous 3
3. Epiphytic sub-shrubs; leaves fleshy ..... **Medinilla**
3. Terrestrial plants; leaves not fleshy 4
4. Stamens similar ..... **Osbeckia**
4. Stamens dimorphic ..... **Melastoma**

MEDINILLA Gaudichaud

in Freyc., Voy. Uranie Bot. 484. 1830.

Epiphytic shrubs; stems erect or scandent. Leaves opposite, thick, succulent, 3-ribbed from base. Flowers 5-merous, few to many, arranged in axillary cymes or axillary, solitary; calyx tube short, adnate to the ovary and projected a little above, lobes spreading; petals 5, obovate, spreading, white to lilac; stamens 8 or 10, free, anthers lanceolate, dehiscing by apical pore, connective with two small tubercles and a spur-like appendage at base; ovary 4 or 5-celled, ovules many, style slender. Fruit a berry, crowned by the calyx limb.

1. Leaves orbicular, 3-ribbed ..... **M. beddomei**
1. Leaves ovate, 5-7-ribbed ..... **M. malabarica**

Medinilla beddomei Clarke in Hook. f., Fl. Brit. India 2: 548. 1879; Gamble, Fl. Pres. Madras 496(351). 1919; Manilal, Fl. Silent Valley 108. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 185. 1988; Vajr., Fl. Palghat Dist. 202. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 186. 1996; Mohanan & Sivad., Fl. Agasthyamala 268. 2002; Sasidh. & Sujanapal, Rheedea 15: 105. 2005; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 221. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 42. 2009. *Medinilla radicans* sensu Bedd., Ic. t. 184. 1868-1874, non Bl.1831. **Plate 18a.**

Epiphytic shrubs; branches terete, pendulous. Leaves 2.5-3 cm across, obtuse at base and apex, very succulent, ribs indistinct; petiole 5-7 mm long.

Cymes axillary, 1-3 flowered; pedicels 2-2.5 cm long, glabrous; flowers white; calyx tube 7-8 mm long, wavy along the rim; petals white, 1.5-1.8 cm long, obovate, spreading; stamens 10, anthers 8-9 mm long, acuminate, spur at the base of the anther, curved up.
Flowering & Fruiting: May-June.
Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 2402,* Periya; *RNMK 2231*, Vythiri; *RNMK 1387,* Talimala.

Medinilla malabarica Bedd., Ic. t. 157. 1868-1874; Hook. f., Fl. Brit. India 2: 548. 1879; Gamble, Fl. Pres. Madras 496(351). 1919; Manilal, Fl. Silent Valley 109. 1988; Sasidh. & Sujanapal, Rheedea 15: 107. 2005; A.E.Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 44. 2009. **Plate 18b.**

Epiphytic shrubs; branchlets thick, rough. Leaves 6-7 x 3-4 cm, ovate, acute, 5-nerved from base, glabrous, thick; ribs reddish brown; petiole 6-7 mm long, thick. Cymes axillary, 1-3-flowered; flowers light pink; pedicels stout, glabrous; calyx tube 7-8 mm long, glabrous, truncate above; petals 1-1.2 x 7-8 mm, ovate, obtuse.
Flowering & Fruiting: September-December.
Distribution: Endemic to southern Western Ghats. Rare; in high altitude shola forests. *RNMK 2425,* Chembra.

MELASTOMA Lnnaeus
Sp.Pl. 389. 1753.

Melastoma malabathricum L., Sp. Pl. 390. 1753; Wight, Ill. 1, t. 95. 1840; Clarke in Hook. f., Fl. Brit. India 2: 523. 1879; Gamble, Fl. Pres. Madras 495(350). 1919; Manilal & Sivar., Fl. Calicut 110. 1982; Ansari, Fl. Kasaragod Div. 161. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 185. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 187. 1996; Sivar. & P. Mathew, Fl. Nilambur 269. 1997; Mohanan & Sivad., Fl. Agasthyamala 269. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 221. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 293. 2009.

Shrubs, branchlets covered with adpressed fimbriate brownish scales. Leaves elliptic, acute, adpressed hairy on both sides with fimbriate scales on the petiole and veins beneath, 11-13 x 4-5 cm. Flowers 3-4 cm across; hypanthium covered with adpressed fimbriate scales; intersepalar emergences subulate; petals purple; stamens 10, alternately short and long, anthers dimorphic; ovary 5-locular, ovules many. Fruits soft, dehiscing irregularly
Flowering & Fruiting: Throughout the year.
Distribution: South east Asia. Common; in marshy areas: *RNMK 2552,* Pookodu.

MEMECYLON Linnaeus
Sp. Pl. 349. 1753.

Shrubs or trees, densely branched. leaves simple, entire, opposite; lateral nerves many, close, inconspicuous, forming an intramarginal vain. Flowers

axillary or lateral, fascicled or cymose, many-together; sessile or pedicelled; calyx tube campanulate or urceolate, lower part fused with the ovary; 4-lobed; petals 4, ovate; stamens 8, equal, filaments long, connective spurred, anthers small; ovary 1-celled, inferior; ovules 6-12, on central placenta; style-1. Fruit a globose 1-seeded berry.

1. Leaves rounded or cordate at base..... 2
1. Leaves acute at base..... 3
2. Branchlets quadrangular .....**M. depressum**
2. Branchlets terete..... **M. randerianum**
3. Flowers sessile 4
3. Flowers pedicelled 5
4. Fascicles 5-flowered; leaves to 18 cm long, nerves prominent .....**M. lawsonii**
4. Fascicles many-flowered; leaves to 4 cm long, nerves obscure ..... **M. flavescens**
5. Peduncle up to 1.5 cm long ..... **M. gracile**
5. Peduncle less than 1 cm long 6
6. Lateral veins 14-16 pairs; berry dark purple..... **M. heyneanum**
6. Lateral veins not prominent; berry yellow 7
7. Berry puberulous .....**M. umbellatum**
7. Berry glabrous 8
8. Leaves ovate-lanceolate, acuminate at apex; nerves not visible ..... **M. talbotianum**
8. Leaves ovate-oblong, obtuse at apex; nerves prominent ..... **M. sisparense**

Memecylon depressum Benth. ex Triana, Trans. Linn. Soc. London 25: 158. 1865-1866; Gamble, Fl. Pres. Madras 505(357). 1919; Ansari, Fl. Kasaragod Div. 162. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 186. 1988; Vajr., Fl. Palghat Dist. 202. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 187. 1996; Mohanan & Sivad., Fl. Agasthyamala 272. 2002.*Memecylon amplexicaule* Roxb. var. *malabarica* Clarke in Hook. f. Fl. Brit. India 2: 559. 1879, p.p.

Shrubs; branchlets tetragonous towards the upper part of each internode, terete below. Leaves 11-13 x 5-5.5 cm, ovate-oblong, acute at apex, subsessile, brown when dried, nerves 12-14 pairs, subdistinct. Cymes 2.5-3 cm across, densely branched; flowers 4-5 mm across, many-together; calyx teeth acute; petals 2-2.2 x 1.3-1.5 cm, ovate, acute, bluish white; filaments 1-1.5 mm long, anthers 1-1.5 mm long, curved; style 3-4 mm long. Berry 7-9 mm across.
Flowering & Fruiting: January-March.
Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 2156,* Periya.

Memecylon flavescens Gamble, Bull. Misc. Inform. Kew 1919: 226. 1919 & Gamble, Fl. Pres. Madras 503(355). 1919; Manilal, Fl. Silent Valley 109. 1988; Sivar. & P. Mathew, Fl. Nilambur 270. 1997.

Densely branched shrubs; branchlets terete. Leaves 4-5 x 2-2.5 cm, obovate, obtuse, attenuate to the base, yellow when dry, nerves 4-5 pairs,

indistinct; petiole 5-7 mm long. Cymes 1-1.5 cm across; flowers sessile, 2-2.5 mm across; calyx teeth short, triangular; petals 1.5-1 x 1-2 mm, ovate, acute, pink; filaments 3-4 mm long. Berry 8-9 mm across, globose, yellow.
Flowering & Fruiting: March-April.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3090,* Aranamala.

Memecylon gracile Bedd., Ic. t. 164. 1868-1874; Clarke in Hook. f., Fl. Brit. India 2:563.1879p.p.; Gamble, Fl. Pres. Madras 504(356). 1919; Mohanan & Sivad., Fl. Agasthyamala 273. 2002. **Plate 18c.**

Slender erect shrubs. Leaves 2-5 x 0.8-2 cm, ovate-oblong, caudate acuminate at apex, round to slightly attenuate at base; petiole 0.1-0.2 cm long. Flowers axillary in 3-flowered cymes; peduncles slender, 0.6-1.5 cm long; pedicles 0.2-0.7 cm long; flowers ca. 0.2 cm across; calyx campanulate, 0.1-1cm long, truncate to slightly 4 toothed; petals white, 0.1-0.2 cm long, ovate; ovules many; style filiform; stigma pointed. Berry solitary, globose, 0.5-0.7 cm diameter; seed one, bluish-black.
Flowering & Fruiting: January-March.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forest. *RNMK 1880,* Kallady-900 forest.

Memecylon heyneanum Benth. ex Wight & Arn., Prodr. 319. 1834; Clarke in Hook. f., Fl. Brit. India 2: 560. 1879; Gamble, Fl. Pres. Madras 503(355). 1919; Manilal, Fl. Silent Valley 109. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 186. 1988; Vajr., Fl. Palghat Dist. 202. 1990; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 225. 2005. *Memecylon jambosoides* Wight, Ic. t. 277. 1840.

Shrubs. Leaves 7-18 x 2.5 cm, base acute or broadly cuneate, apex acuminate, lateral veins 14-16 pairs, forming loops with very prominent intramarginal nerves, coriaceous. Fascicles 3-4 cm long; flowers subsessile; calyx tube campanulate; disc rays conspicuous; petals blue, obovate. Berry globose, dark purple.
Flowering & Fruiting: February-September.
Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 2140,* Palchuram.

Memecylon lawsonii Gamble, Bull. Misc. Inform. Kew 1919: 226. 1919 & Gamble, Fl. Pres. Madras 503(355). 1919; Manilal, Fl. Silent Valley 109. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 186. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 187. 1996; Sivar. & P. Mathew, Fl. Nilambur 270. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 226. 2005. **Plate 18d.**

Shrubs; branches few, terete. Leaves 15-18 x 2.5-3.5 cm, lanceolate, acuminate; nerves 10-12 pairs, pale; petiole 1-1.4 cm long. Flowers 1-3, axillary; calyx 1-2 mm long, lobes ovate, acute, pale pink; petals 2.5-3 mm

long, obovate-oblong, keeled, blue; stamens 8, anthers 1-1.5 mm long, curved at base. Berry 7-9 mm long; yellow, sessile.
Flowering & Fruiting: September-March.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2552,* Vaduvanchal; *RNMK 1212*, Vythiri.

Memecylon randerianum S. M. & M. R. Almeida, J. Bombay Nat. Hist. Soc. 85: 521. 1989. *Memecylon malabaricum* (Clarke) Cogn. in A. & C. DC., Monogr. Phan. 7: 1148. 1891; Gamble, Fl. Pres. Madras 505(356). 1919; Manilal & Sivar., Fl. Calicut 111. 1982; Mohanan & Sivad., Fl. Agasthyamala 274. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 226. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 294. 2009. *Memecylon amplexicaule* Roxb. var. *malabarica* Clarke in Hook. f., Fl. Brit. India 2: 559.1879p.p. **Fig. 34, Plate 18e.**

Large shrubs; branchlets terete. Leaves 9-10 x 3-3.5 cm, subsessile, ovate-oblong, greenish yellow below when dry; nerves 10-12 pairs, scarcely visible. Cymes 1.5-2 cm across, peduncle very short or absent; pedicel 3-4 mm long, slender; flowers 2-3 mm across; many-together; calyx lobes ovate, white-margined, glabrous; petals 1-2 mm across, obovate, blue. Berry globose, bluish.
Flowering & Fruiting: February-May.
Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 1231,* Banasuramala.

Memecylon sisparense Gamble, Bull. Misc. Inform. Kew 1919: 227. 1919 & Gamble, Fl. Pres. Madras 505(356). 1919. **Plate 18f.**

Large shrubs or small trees. Leaves 6-8 x 2.5-3 cm, nearly sessile, ovate-oblong, obtuse at apex, cordate at base; intramarginal veins prominent, nerves 10. Flowers fascicled, in very short peduncled cymes on lateral tubercles; calyx companulate, reddish, above the ovary; calyx teeth acute; petals deep blue; stamens 8, equal; ovary 1-celled. Berry ellipsoid, crowned by the calyx-limb.
Flowering & Fruiting: November-January.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3060,* Chanthanathodu.

Memecylon talbotianum Brandis in Talbot, Bombay List. (ed. 2) Append. 1902 & Indian Trees 336. 1906; Gamble, Fl. Pres. Madras 503(355). 1919; Ramach. *et al.*, J. Econ. Tax. Bot. 5: 140. 1984; V. S. Ramach. & V. J. Nair, Fl. Cannanore 186. 1988; Sivar. & P. Mathew, Fl. Nilambur 271. 1997; Mohanan & Sivad., Fl. Agasthyamala 276. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 226. 2005.

Trees or large shrubs; branchlets terete. Leaves 15-17 x 5.5-6 cm, ovate-lanceolate, obtusely acuminate at apex, acute at base, drying dull yellow; nerves not visible; petiole 5-8 mm long. Peduncle 5-6 mm long, on old

branches; pedicels 3-4 mm long. Berry 5-7 mm long, yellow, glabrous, crowned by persistent sepals.
Flowering & Fruiting: February-May.
Distribution: Endemic to Western Ghats. Common; in evergreen forests. *RNMK 2756,* Chanthanathodu; *RNMK 2704*, Kunchome; *RNMK 2285*, Mundakai.

Memecylon umbellatum Burm.f., Fl. Ind. 87. 1768; Gamble, Fl. Pres. Madras 504(355). 1919; Manilal & Sivar., Fl. Calicut 110. 1982; Ansari, Fl. Kasaragod Div. 163. 1985; Manilal, Fl. Silent Valley 110. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 187. 1988; Vajr., Fl. Palghat Dist. 202. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 187. 1996; Sivar. & P. Mathew, Fl. Nilambur 271. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 226. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 295. 2009. *Memecylon edule* Roxb., Pl. Corom. t. 82.1798; Clarke in Hook. f., Fl. Brit. India 2:563.1879 p.p.; Gamble, Fl. Pres. Madras 504(356).1919; Ansari, Fl. Kasaragod Div. 162. 1985; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 225. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 294. 2009.

Small trees; branchlets terete. Leaves 6-7 x 2-2.5 cm, elliptic-lanceolate, acuminate and shortly cuspidate at tip, yellow when dry; petiole 5-6 mm long, slender. Peduncle 1-2 together, 2-3 mm long, stout, 3-6 flowered; pedicel 2-3 mm long. Flowers 6-7 mm across; calyx lobes acute; petals 2-3 mm across, blue. Berry 5-7 mm across, globose, puberulus, yellow.
Flowering & Fruiting: February-March.
Distribution: Peninsular India and Sri Lanka. Common; in moist deciduous forests: *RNMK 1755,* Muthanga; *RNMK 2082*, Chedalayam.

OSBECKIA Linnaeus

Sp. Pl. 345. 1753.

Shrubs or herbs, erect; branches terete or quadrangular. Leaves opposite, 3-7-ribbed, usually covered with adpressed hairs with line of crystalliferous cells above and with simple hairs below. Flowers in terminal cymes or smaller panicles, shortly pedicelled, 4-5-merous; calyx tube urceolate, covered with solitary or clustered, sessile or stalked bulbous based bristles; lobes triangular to lanceolate, bristled; inter-sepalar appendages present; petals obovate, spreading; stamens 8 or 10, similar, anthers truncate or attenuate at apex; ovary perigynous, 4-5-celled; ovules many, on projected axile placentation; style-1, long. Capsule globose, truncate at apex, opening by apical pores; seeds many, curved.

1. Flowers tetramerous.....2
1. Flowers pentamerous 4
2. Calyx tube covered with simple hairs only 3
2. Calyx tube covered with simple and stellate hairs .....**O. muralis**
3. Small herbs; stem hairy ..... **O. brachystemon**
3. Shrubs; branches glabrous .....**O. gracilis**

4. Calyx tube with few large, peltate, strongly bristled scale..... **5**
4. Calyx tube densely bristled or hairy..... **6**
5. Flowers many in terminal panicled cymes; leaves 5- ribbed ..... **O. wynaadensis**
5. Flowers few in terminal cymes; leaves 3-ribbed ..... **O. virgata**
6. Branchlets reddish; calyx bristles less than 15 ..... **O. cupularis**
6. Branchlets not reddish; calyx bristles more than 25 ..... **O. aspera var. aspera**

Osbeckia aspera (L.) Blume, Bijdr. Natuurk. Wetensch. 6: 220. 1831, var. **aspera** Clarke in Hook. f., Fl. Brit. India 2: 519. 1879, p.p'; Gamble, Fl. Pres. Madras 492(347). 1919; Manilal, Fl. Silent Valley 110. 1988; Vajr., Fl. Palghat Dist. 203. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 189. 1996; Mohanan & Sivad., Fl. Agasthyamala 278. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta. 222. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 296. 2009. *Melastoma asperum* L., Sp. Pl. 389. 1753. *Osbeckia kleinii* Wight & Arn., Prodr. 323. 1834; Gamble, Fl. Pres. Madras 492(348). 1919. *Osbeckia courtallensis* Gamble, Bull. Misc. Inform. Kew 1918: 242. 1918 & Gamble, Fl. Pres. Madras 492(348). 1919. *Osbeckia kewensis* Fischer, Bull. Misc. Inform. Kew 1938: 34. 1938. *Osbeckia lawsonii* Gamble, Bull. Misc. Inform. Kew 1918: 242. 1918 & Gamble, Fl. Pres. Madras 503(348). 1919.

Shrubs; branches shortly atrorsely scabrid. Leaves 5-4 x 2-2.5 cm, elliptic-oblong, acute at both ends, hairy; hairs half adnated; petiole 5-6 mm long. Flowers 3-9-together, in terminal cymes, sessile; calyx tube 0.8-0.9 x 1-1.2 cm, densely covered with stalked tufts of bristles; stalk 1-2 mm long, with about 30 bristles, bristles 1-3 mm long; sepals 3-4 x 2.5 mm, oblong, retuse, ciliate and bristled; petals 1.7-2 cm long, obovate, pink, ciliate; anthers 8-9 mm long.

Flowering & Fruiting: August-April.

Distribution: Peninsular India and Sri Lanka. Occasional; in grasslands. *RNMK 1245,* Chembra; *RNMK 1524*, Manikkunnumala.

Osbeckia brachystemon Naud., Ann. Sci. Nat. Bot. ser. 3, 14: 57. 1850; Manilal, Fl. Silent Valley 111. 1988; Mohanan & Sivad., Fl. Agasthyamala 278. 2002. *Osbeckia truncata* D. Don ex Wight & Arn., Prodr. 322. 1834 p.p.; Clarke in Hook. f., Fl. Brit. India 2: 514. 1879; Gamble, Fl. Pres. Madras 494 (349). 1919. *Osbeckia cupularis* D. Don ex Wight & Arn., Prodr. 323. 1834, p.p.; Clarke in Hook. f., Fl. Brit. India 2: 514. 1879; Gamble, Fl. Pres. Madras 494 (349). 1919.

Herbs, to 30 cm high; stems pilose. Leaves 4-5 x 2-2.5 cm, elliptic, acute at base and apex, 3-ribbed, hairy, hairs half adnated above, not adnated below; petiole 3-5 mm long. Flowers 3-9 together, in terminal sessile cymes; calyx tube 5-6 mm long, densely covered with simple hairs, lobes 1-2 x 2-3 mm, triangular, bristled at apex; petals pink, 5-6 x 4-5 mm, obovate; anthers obovate, truncate; seeds curved.

Flowering & Fruiting: October-December.

Distribution: Endemic to southern Western Ghats. Rare; in grasslands. *RNMK 1026,* Manikkunnumala.

Osbeckia cupularis D.Don ex Wight & Arn., Prodr. Fl. Ind. 323. 1834. *Osbeckia leschenaultiana* DC., Prodr. 3: 142. 1828; Hook. f., Fl. Brit. India 2:520.1879; Gamble, Fl. Pres. Madras 493(348). 1919; Sivar. & Mathew, Fl. Nilambur 272. 1997; Mohanan & Sivad., Fl. Agasthyamala 279. 2002. *Osbeckia gardneriana* Wight, Ic. t. 997. 1843-45. **Plate 18g.**

Shrubs, branchlets reddish, pilose. Leaves 1.5-3 x 1-1.2 cm, ovate, base acute, base rounded, 3-ribbed, hairy; hairs and lineoles parallel to the midrib, black above, pale green below. Flowers 3-5 together, sessile in terminal clusters; calyx tube ca. 7 mm long, densely covered with stalked bristles, stalk ca. 1.5 mm long, to 15-bristled, lobes ca. 4 x 3 mm, ovate, obtuse, with a tuft of 3-9 bristles at apex, ciliate; petals ca. 15 x 17 mm, orbicular, ciliate; anthers ca. 9 mm long, acuminate; filaments clavate.

Flowering & Fruiting: April-May

Distribution: Endemic to southern Western Ghats. Rare; in wet rocky areas in grasslands. *RNMK 1198*, Chembra hills.

Osbeckia gracilis Bedd., Madras J. Lit. Sci. ser. 3, 1: 45. 1864; Clarke in Hook. f., Fl. Brit. India 2: 518. 1879; Gamble, Fl. Pres. Madras 494(349). 1919. *Osbeckia sublaevis* Cogn. in A. & C. DC., Monogr. Phan. 7:321.1891; Gamble, Fl. Pres. Madras 492(348). 1919. *Osbeckia lineolata* Gamble, Bull. Misc. Inform. Kew 1918: 241. 1918 & Gamble, Fl. Pres. Madras 492(347). 1919. *Osbeckia lineolata* Gamble var. *anamalayana* Giri & Nayar, Bull. Bot. Surv. India 25: 244. 1983.

Stout shrubs; branches glaucous, glabrous. Leaves 3.5-4 x 2-2.5 cm, elliptic-oblong, obtuse at apex and base, cuspidate, yellowish green, densely covered with half-adnated hairs spreading from midrib, 3-ribbed; petiole 3-4 mm long. Flowers in terminal cymes, pedicelled; calyx tube 7-8 mm long, densely simple-hairy, lobes 2-4 x 1-3 mm, ovate-oblong, obtuse, ciliate; petals 1.5-2 x 1-1.2 cm, obovate, ciliate, pink; anthers 5-6 mm long.

Flowering & Fruiting: January-April.

Distribution: Endemic to southern Western Ghats. Rare; in grasslands. *RNMK 1866,* Chembra.

Osbeckia muralis Naud., Ann. Sci. Nat. Bot. ser.3, 14: 456. 1850; Ansari, Fl. Kasaragod Div. 165. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 187. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 190. 1996; Sivar. & P. Mathew, Fl. Nilambur 273. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 223. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 297. 2009. *Osbeckia truncata* D. Don ex Wight & Arn., Prodr. 322. 1834, p.p; Clarke in Hook. f., Fl. Brit. India 2: 514. 1879; Gamble, Fl. Pres. Madras 494(349). 1919. *Osbeckia truncata* var. *kurzii* Clarke in Hook.f., Fl. Brit. India 2: 514. 1879. **Plate 18h.**

Herbs, stem patently hairy. Leaves 3-4 x 1.5-2 cm, elliptic or elliptic-oblong, apex acute, 3-5 ribbed; petiole 2-3 mm long. Flowers 0.6-0.8 cm across, in terminal clusters; hypanthium with simple hairs only; calyx lobes and intersepalar emergences bristly at apex; petals light purple, 2-3 mm long.

Flowering & Fruiting: September-December.
Distribution: Endemic to Western Ghats. Common; in grasslands. *RNMK 2401,* Chembra.

Osbeckia virgata D. Don ex Wight & Arn., Prodr. 323. 1834; Ansari, Fl. Kasaragod Div. 165. 1985; Manilal, Fl. Silent Valley 111. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 190. 1996; Sivar. & P. Mathew, Fl. Nilambur 274. 1997; Mohanan & Sivad., Fl. Agasthyamala 280. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 223. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 297. 2009. *Osbeckia octandra* sensu Clarke in Hook.f., Fl. Brit. India 2: 521. 1879, non (L.) DC. 1828; Gamble, Fl. Pres. Madras 493(348). 1919.

Shrubs; branchlets quadrangular, sparsely adpressed hairy. Leaves 5-9 cm long, elliptic, acute at both ends; hairs adnate its major length above, free below; petiole 5-7 mm long. Flowers 1.5-2 cm across, in terminal cymes, 3-9 together; calyx cup 6-7 mm long, covered with stalked stellate and simple bristles; sepals 3-4 mm long, acuminate, bristled; petals 7-9 mm long, pink, bradly ovate, anthers acuminate. Capsule 6-8 mm long.
Flowering & Fruiting: August-March.
Distribution: Peninsular India and Sri Lanka. Common in open areas and moist deciduous forests. *RNMK 2068,* Kalpetta; *RNMK 2187*, Meppady; *RNMK 3553*, Muthanga.

Osbeckia wynaadensis Clarke in Hook. f., Fl. Brit. India 2:521.1879; Gamble, Fl. Pres. Madras 493(348). 1919; V. S. Ramach. & V. J. Nair, Fl. Cannanore 188. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 190. 1996. **Plate 18i.**

Tall shrubs; branches densely scabrid. Leaves 15-18 x 3-4 cm, lanceolate, acute, 3-5-nerved, hairy; hairs adnated and spreading from the midrib. Flowers many, in terminal panicled cymes; pedicels 4-5 mm long; calyx tube 8-9 mm long, bristles 4 or 5 in a tuft, lobes lanceolate, ciliate; petals 2-3 cm long, obovate, stamens not twisted, 1.6-1.8 cm long. Seeds 0.5-1 x 0.3-0.8 mm obovoid, minutely muriculate.
Flowering & Fruiting: February-March.
Distribution: Endemic to southern Western Ghats. Occasional; in marshy areas in plantations. *RNMK 2146,* Chooralmala; *RNMK 1026,* Banasurasagar dam site.

SONERILA Roxburgh
Fl. Indica 1: 180. 1820, *nom. cons.*

Annual or perennial herbs; stems erect, decumbent or absent. Leaves opposite, simple, entire or serrate, 3-ridged or penninerved. Flowers few to many, in axillary or terminal peduncled cymes or on elongated scapes; calyx tube campanulate or hemispheric, adnated to the ovary, lobes 3; petals 3, obovate or elliptic, spreading; stamens 3, equal; anthers oblong to lanceolate; ovary 3-celled, inferior; ovules many on axile placentation; style-1, simple; stigma terminal, capitellate. Fruit capsule, dehiscing apically; seeds many, elliptic or oblong.

1. Scapigerous herbs; flowers on elongated scapes 2
1. Caulescent herbs; flowers on axillary or terminal peduncled cymes 3
2. Petals 1-1.2 x 0.8-0.9 cm; peduncle red..... **S. rotundifolia**
2. Petals ca. 0.5 x 0.4 mm; peduncle green..... **S. wallichii**
3. Calyx tube hemispheric; capsule with a corky rim ..... **S. rheedii**
3. Calyx tube longer than broad; capsule without a corky rim 4
4. Branched herbs; calyx tube glabrous 5
4. Unbranched herbs; calyx tube glandular hairy 6
5. Flowers in terminal cymes ..... **S. versicolor** var. **versicolor**
5. Flowers in axillary cymes..... **S. versicolor** var. **axillaris**
6. Stem bulbous at base; leaves round at base ..... **S. sahyadrica**
6. Stem not bulbous; leaves oblique at base ..... **S. cannanorensis**

Sonerila cannanorensis Giri & M.P. Nayar, Bull. Bot. Surv. India 27: 86. 1985(1987); V. S. Ramach. & V. J. Nair, Fl. Cannanore 189. 1988.

Erect herbs, 6-30 cm tall. Leaves ovate-lanceolate, base distinctly unequal, oblique. Racemes 4-10 flowered, axillary or terminal; stamens 3, anthers broadly ovate, apex acute, not beaked. Capsule 0.5-0.6 cm long, indistinctly 6-ribbed.

Flowering & Fruiting: November-December.

Distribution: Enedmic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2705,* Chanthanathodu.

Sonerila rheedei Wight & Arn., Prodr. 321. 1834, 'rheedii'; Gamble, Fl. Pres. Madras 500(353). 1919; Manilal & Sivar., Fl. Calicut 109. 1982; Ansari, Fl. Kasaragod Div. 166. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 189. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 193. 1996; Sivar. & P. Mathew, Fl. Nilambur 275. 1997; Mohanan & Sivad., Fl. Agasthyamala 283. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta Dist. 224. 2005. *Sonerila wallichii* sensu Clarke in Hook. f., Fl. Brit. India 2: 538. 1879 p.p., non Bennett 1844. **Plate 18j.**

Stem to 15 cm high, quadrangular, hispid. Leaves 11-14 x 6-7 cm, ovate, penninerved, acute at apex; rounded or cordate at base, hirtus, green; nerves 4-5 pairs; petiole 4-5 cm long, hispid. Peduncle terminal or upper axillary, 8-12-flowered; flowers 1-1.4 cm across; pedicel 8-9 mm long; sepals triangular, glandular hairy; petals elliptic, with a hairy midrib; pink; anthers acute. Capsule 4-5 x 3-3.5 mm, glandular hairy; seeds obovoid, brown, glandular.

Flowering & Fruiting: July-August

Distribution: Endemic to southern Western Ghats. Common; in evergreen forests and grasslands. *RNMK* 2227, Chembra; *RNMK 2220*, Sughandhagiri.

Sonerila rotundifolia Bedd., Madras J. Lit. Sci. ser. 3, 1: 74. 1861 & Ic. t. 169. 1868-1874; Clarke in Hook. f., Fl. Brit. India 2: 538. 1879; Gamble, Fl. Pres. Madras 500(353). 1919; Manilal, Fl. Silent Valley 112. 1988; Vajr., Fl.

Palghat Dist. 204. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 193. 1996. **Fig. 35. Plate 18k.**

Stemless herbs. Leaves few, 6.5-8 cm across, orbicular, deeply cordate at base, crenate, 7-9 ribbed from base, pilose along the nerves, reddish brown; petiole 1-1.2 cm long. Peduncle 12-15 cm long, 8-10 flowered; flowers 2-2.5 cm across, confined to the apex of the scape in scorpioidal cyme; pedicel 0.5-1 cm long, pink; sepals triangular; petals obovate, deep pink; anthers 6-7 mm long, acuminate, deeply cleft at base.

Flowering & Fruiting: July-October.

Distribution: Endemic to southern Western Ghats. Common; in moist rocky areas. *RNMK* 0097, Manikkunnumala; *RNMK 1982,* Chembra.

Sonerila sahyadrica Giri & M.P. Nayar, Bull. Bot. Surv. India 26: 174. 1984; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 224. 2005.

Small herbs; stems bulbous at base. Leaves opposite or fascicled, 2-4 x 1.5-2 cm, ovate, acute at apex, round at base, serrulate, ciliate; nerves 5-7 pairs, variegate above, densely hairy; petioles 0.5-1 cm long. Racemes terminal; peduncles 6-8 cm long, unbranched; flowers few; pedicels 4-5 mm long, glandular hairy; calyx tube 3.5-4 mm long; lobes triangular; petals elliptic, acute, pink. Capsule cup shaped, sparsely glandular hairy.

Flowering & Fruiting: November-December.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1524*, Sughandhagiri-Amba.

Sonerila versicolor Wight, Ic. t. 1057. 1846, var. **versicolor** Clarke in Hook. f., Fl. Brit. India 2: 535. 1879; Gamble, Fl. Pres. Madras 499(352). 1919; V. S. Ramach. & V. J. Nair, Fl. Cannanore 190. 1988; Vajr., Fl. Palghat Dist. 204. 1990; Mohanan & Sivad., Fl. Agasthyamala 284. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 224. 2005.

Branched herbs. Leaves elliptic, 5-8 x 2-3 cm, base rounded, margins finely serrulate, apex acute, sparsely long hairy on both surface, pinnately veined. Flowers few in terminal cyme; petals pink. Capsule in crowded clusters.

Flowering & Fruiting: June-December.

Distribution: Endemic to southern Western Ghats. Common; in evergreen forests. *RNMK 1006,* Periya: *RNMK 2146*, Sughandhagiri.

Sonerila versicolor Wight var. **axillaris** (Wight) Gamble, Fl. Pres. Madras 499(352). 1919; Manilal, Fl. Silent Valley 113. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 190. 1988; Vajr., Fl. Palghat Dist. 204. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 193. 1996. *Sonerila axillaris* Wight, Ic. t. 1058. 1846. *Sonerila versicolor* sensu Clarke in Hook.f., Fl. Brit. India 2: 535. 1879,p.p., non Wight 1846. **Plate 18 l.**

Herbs with glabrous elongated stem. Leaves oblong or ovate-lanceolate, acuminate, base unequally rounded, serrulate along margins, membranous,

glabrous, 14-16 x 4-5 cm; lateral nerve 7-9 pairs; petiole 6-7 cm long. Flowers 1-1.2 cm across, in axillary few flowered short cymes; calyx tube and pedicels glabrous; petals pink, 5-6 mm long.
Flowering & Fruiting: August-November.
RNMK Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2456*, Kallady-900 forest; *RNMK 2675*, Theethundamala.

Sonerila wallichii Bennett, Pl. Jav. Rar. 215. 1844; Clarke in Hook. f., Fl. Brit. India 2: 538. 1879,p.p.; Gamble, Fl. Pres. Madras 500(353). 1919; Manilal, Fl. Silent Valley 113. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 190. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 193. 1996; Sivar. & P. Mathew, Fl. Nilambur 276. 1997.

Stemless herbs. Leaves one or very few, 5-6 x 3-3.5 cm, ovate, acute, cordate at base, serrulate, crispate, hairy above, 2-3 pairs of nerves from the base; petiole 1-3 cm long. Peduncles 8-9 cm long, glandular hairy; 4-6 flowered; flowers 1-1.3 cm across; pedicels 4-5 mm long; sepals triangular, hairy; petals elliptic, acute, pink; anther 2-3 mm long, acute; style 5-6 mm long, glabrous. Capsule 2.5-3 cm long, hemispheric, glandular hairy.
Flowering & Fruiting: August-November.
Distribution: Endemic to southern Western Ghats. Rare in evergreen forests. *RNMK 2231,* Periya Ghat.

Dissotis rotundifolia L., is a common plant in the district in open areas as a garden escape.

LYTHRACEAE J. St.-Hil.

Expos. Fam. Nat. 2: 175. 1805.

1. Trees; petals clawed; seeds flattened and winged..... **Lagerstroemia**
1. Marshy herbs; petals not clawed; seeds ellipsoid or hemispheric 2
2. Flowers axillary, solitary..... **Rotala**
2. Flowers 2-40 together, axillary 3
3. Flowers subsessile..... **Ammannia**
3. Flowers pedicelled ..... **Nesaea**

AMMANNIA Linnaeus

Sp. Pl. 119. 1753.

1. Leaves acute at apex ..... **A. baccifera** ssp. **baccifera**
2. Leaves obtuse at apex ..... **A. multiflora**

Ammannia baccifera L., Sp. Pl. (ed.2) 175. 1762, ssp. **baccifera** Koehne in Engl., Bot. Jahrb. Syst. 1: 260. 1880; Clarke in Hook. f., Fl. Brit. India 2: 569. 1879; Gamble, Fl. Pres. Madras 510(360). 1919; Manilal & Sivar., Fl. Calicut 111. 1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 191. 1988; Vajr., Fl. Palghat Dist. 204. 1990; Joseph, Aquatic Angiosp. Malabar 101. 1991; Sivar.

& P. Mathew, Fl. Nilambur 277. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 227. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 298. 2009. *Ammannia vesicatoria* Roxb., Fl. India 1: 426. 1832.

Herbs. Leaves 4-6 x 0.8-1 mm, oblong-elliptic, apex acute, base cuneate. Cymes axillary, dichasial, sub-sessile; flowers 3-4 mm long; calyx tube 1-1.5 mm long, campanulate, lobes 4; petals absent; stamens 4; ovary 4-celled. Capsule 2-3 mm across; seed globose, turgid.

Flowering & Fruiting: September.

Distribution: Tropical Africa, Asia, Europe and Australia. Common; in marshy areas. *RNMK 2111*, Panamaram; *RNMK 3299*, Tholpetty.

Ammannia multiflora Roxb., Fl. Ind. 1: 447. 1820; Hook. f., Fl. Brit. India 2: 570. 1879; Gamble, Fl. Pres. Madras 509(360). 1919.

Marshy branched herbs, stems quadrangular at base, branchlets grooved. Leaves ca. 2.5 x 0.4 cm long, decussate, oblong, obtuse, membranous. Flowers in axillary dichasia, 10-20 flowered; peduncles ca. 1 cm long; bracts 2, ca. 1.5 mm long; linear; calyx membranous; lobes 2 mm long; petals 1 mm long, rarely absent; stamens 4-many, style 0.5 mm long; ovary 2-5 locular. Capsule 2 mm long, globose, circumscissile.

Flowering & Fruiting: December-February.

Distribution: Paleotropics. Occasional; in moist deciduous forests. *RNMK 1998,* Muthanga.

LAGERSTROEMIA Linnaeus

Syst. Nat. ed. 10, 2: 1068, 1076, 1372. 1759.

Trees. leaves opposite, entire, stipulate. Flowers in terminal panicles or in axillary racemes, usually 6-merous; bracts and bracteoles 2 each, opposite; calyx tube campanulate, lobes triangular; petals 6, clawed, wrinkled, spreading; stamens many; filaments long, inserted near the base of calyx tube; ovary 3-6-celled; ovules many, on axile placentation; style 1, long; stigma capitate. Fruit a loculicidal capsule, 6-valved; seeds many, compressed, winged at one end.

1. Leaves to 20 cm long; flower ca. 5 cm across; calyx tube ribbed ..... **L. speciosa**
1. Leaves to 10 cm long; flowers ca. 1 cm across; calyx tube smooth 2
2. Bark smooth, white; capsule 6 valved .....**L. microcarpa**
2. Bark vertically furrowed, dark brown; capsule 3-4 valved .....**L. parviflora**

Lagerstroemia microcarpa Wight, Ic. t. 109. 1839; Manilal, Fl. Silent Valley 113. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 192. 1988; Vajr., Fl. Palghat Dist. 205. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 195. 1996; Sivar. & P. Mathew, Fl. Nilambur 277. 1997; Mohanan & Sivad., Fl. Agasthyamala 286. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 228. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 298. 2009. *Lagerstroemia*

lanceolata Wall. ex Clarke in Hook. f., Fl. Brit. India 2: 576. 1879; Gamble, Fl. Pres. Madras 513(362). 1919. *Lagerstroemia thomsonii* Koehne in Engl., Pflanzenreich Lythrac. 257. 1903; Gamble, Fl. Pres. Madras 513(362). 1919. **Plate 17a.**

Large trees; bark smooth, white; branchlets terete. Leaves 8-10 x 4-5 cm, elliptic-lanceolate, glaucous below; nerves 8-10 pairs; petiole 1-1.5 cm long, subopposite. Flowers pedicellate; calyx lobes triangular, pubescent; petals 3-5 mm long, obovate, white, clawed; filaments erect, ovary 5-6-celled. Capsule 1-1.5 x 0.2 -0.6 cm, obovoid, 6-valved; seeds 3-4 in each cell, flat, winged.
Flowering & Fruiting: June-February.
Distribution: Endemic to Western Ghats. Common; in moist deciduous forests. *RNMK 1097,* Muthanga; *RNMK 1775*, Chedelayam; *RNMK 2553*, Sulthan Bathery.

Lagerstroemia parviflora Roxb., Pl. Corom. t. 66. 1795; Gamble, Fl. Pres. Madras 514(362). 1919.

Trees, to 15 m high; bark dark brown or greyish-black, vertically furrrowed, exfoliating in long, thin flakes; blaze dull yellow. Leaves simple, opposite; stipules intrapetiolar, deciduous; petiole 5-6 mm long, slender, glabrous; lamina 3.5-7.5 x 2-3 cm, elliptic, obovate-elliptic or oblong, base round or acute, apex acute, acuminate or obtuse-retuse, margin entire, glabrous or shortly pubescent beneath, coriaceous; lateral nerves 6-8 pairs, pinnate, slender, prominent; intercostae reticulate, prominent. Flowers bisexual, white, fragrant, in lax axillary panicles; calyx tube 7-8 mm long, campanulate, with a ring inside, smooth with out; lobes 6, appressed to the capsule in fruit; petals 6, ovate-suborbicular; claw 4-5 mm long; stamens many, inserted near the base of the calyx tube, exserted; filaments ca. 1 cm; ovary sessile, glabrous, 4-6-celled, ovules many; style curved; stigma capitate. Fruit a capsule, 3-4 x 1-1.5 cm, 3-4 valved, ovoid, brown; seeds many; wing terminal.
Flowering & Fruiting: March-February.
Distribution: Tropical Himalaya, India and Myanmar. Occasional; in moist deciduous forests. *RNMK 2098,* Chedalayam.

Lagerstroemia speciosa (L.) Pers., Syn. 2:72.1806; Manilal & Sivar., Fl. Calicut 114. 1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 192. 1988; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 299. 2009. *Lagerstroemia reginae* Roxb., Pl. Corom. t. 65. 1796; Ansari, Fl. Kasaragod Div. 166. 1985; Vajr., Fl. Palghat Dist. 205. 1990. *Lagerstroemia flos-reginae* Retz., Obs. Bot. 5: 25.1788; Clarke in Hook. f., Fl. Brit. India 2:577.1879; Gamble, Fl. Pres. Madras 513(362). 1919. *Lagerstroemia hirsuta* (Lamk.) Willd., Sp. Pl. 2: 1178. 1799; Sivar. & P. Mathew, Fl. Nilambur 278. 1997; Mohanan & Sivad., Fl. Agasthyamala 286. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 227. 2005. *Adambea hirsuta* Lam., Encycl. 1: 39. 1783.

Small to medium sized trees; branchlets terete. Leaves 15-20 x 5-8 cm, ovate-lanceolate, green beneath, nerves 16-18 pairs, looped; petiole 1-1.5 cm long. Panicles 20-30 cm long; branches puberulus; flowers many; pedicel 1-1.5 cm long; calyx tube hemispherical, puberulus; petals 4-5 cm long, obovate, pink; filaments attached below the rim of calyx tube; ovary 6-celled; style 2-2.5 cm long. Capsule 2.5-3 cm across, globose, glabrous; seeds many, winged.

Flowering & Fruiting: March-November.

Distribution: Indo-Malesia. Occasional; in moist deciduous forests. *RNMK 1985,* Pulpally.

NESAEA Commerson ex Humboldt, Bonpland et Kunth
Nova Gen. Sp. 6: ed. fol. 191. 1823, *nom. cons.*

Nesaea brevipes Koehne in Engl., Bot. Jahrb. Syst. 3: 326. 1882; Gamble, Fl. Pres. Madras 510(360). 1919; Ramach. & Nair in J. Econ. Tax. Bot. 3:661. 1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 193. 1988; Joseph, Aquatic Angiosp. Malabar 104. 1991; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 300. 2009. *Ammannia cordata* Wight & Arn. Prodr. 304. 1834; Clarke in Hook.f. Fl. Brit. India 2: 570. 1879.

Erect woody herbs, 30-60 cm high; stem reddish, terete. Leaves 3-3.5 x 1-1.5 cm, elliptic-oblong, entire, 6-7-nerved, cordate and amplexicaule at base. Flowers shortly pedicelled; bracts and bracteoles similar; calyx 1.5-2 mm long, lobes 4, triangular, reddish; petals absent; stamens 4, filaments attached below the middle of calyx tube; ovary obovoid, truncate, 4-celled; style short. Capsule globose; seeds many, concave, brown.

Flowering & Fruiting: July-November.

Distribution: India and Sri Lanka. Rare; in moist deciduous forests. *RNMK 1095,* Tholpetty.

ROTALA Linnaeus
Mant. 143, 175. 1771.

Floating or marshy herbs. Leaves opposite or whorled, decussate, entire, shortly petioled or sessile. Flowers axillary, solitary or in terminal spike or racemes; calyx tube campanulate, 3-6-lobed; petals 3-6, smaller, orbicular to obovate; stamens 3-6, antisepalous, inserted on the calyx tube; ovary 2-4-celled, globose; ovules many; style short; stigma capitate. Capsule 2-4-valved; seeds many, minute.

1. Flowers 4-merous 2
1. Flowers 5-merous ..... **R. rosea**
2. Flowers axillary, solitary or in leafy spikes 3
2. Flowers in terminal spikes 5
3. Calyx appendiculate 4
3. Calyx exappendiculate ..... **R. indica**

4. Calyx lobes triangular; petals large .....**R. densiflora**
4. Calyx-lobes very short; petals very small ..... .**R. mexicana**
5. Leaves sessile; stamens exserted.....**R. rotundifolia**
5. Leaves petioled; stamens included ..... **R. macrandra**

Rotala densiflora (Roth ex Roem. & Schult.) Koehne in Engl., Bot. Jahrb. Syst. 1: 164. 1880; Gamble, Fl. Pres. Madras 508(359). 1919; Manilal & Sivar., Fl. Calicut 113. 1982; Ansari, Fl. Kasaragod Div. 167. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 193. 1988; Joseph, Aquatic Angiosp. Malabar 110. 1991; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 304. 2009. *Ammannia densiflora* Roth ex Roem. & Schult., Syst. Veg. 3: 304. 1818. *Rotala roxburghiana* Wight, Ic. t. 260B.1840.

Erect herbs with tetragonous stems, up to 10 cm tall. Leaves 1-3 x 0.4 cm, linear-lanceolate, acute, those on flowering branches much smaller. Flowers in numerous leafy spikes, 0.2-0.3 cm across; calyx lobes triangular, acute; petals obovate. Capsules globose, glabrous.

Flowering & Fruiting: July-September.

Distribution: Indo-Malesia to Australia. Rare; in marshy areas of moist deciduous forests. *RNMK 1652,* Muthanga.

Rotala indica (Willd.) Koehne in Engl., Bot. Jahrb. Syst. 1: 172. 1880; Gamble, Fl. Pres. Madras 508(359). 1919; Manilal & Sivar., Fl. Calicut 112. 1982; Vajr., Fl. Palghat Dist. 206. 1990; Joseph, Aquatic Angiosp. Malabar 112. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 196. 1996; Sivar. & P. Mathew, Fl. Nilambur 279. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 228. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 305. 2009. *Peplis indica* Willd., Sp. Pl. 2: 244. 1799. *Ammannia peploides* Spreng., Syst. Veg. 1: 444. 1825; Clarke in Hook. f., Fl. Brit. India 2: 566. 1879. *Ammannia nana* Roxb., Fl. Ind. 1: 427. 1820.

Erect or procumbent herbs; stems winged. Leaves decussate, 1-1.5 x 0.7-0.9 cm, obovate-oblong, obtusely acute, 5-nerved. Flowers in lax racemes; bracts oblanceolate, glabrous; bracteoles as long as calyx tube, linear; calyx 2-3 mm long, campanulate, lobes ovate, acuminate; petals smaller than calyx lobe, elliptic, acute, pink; filaments attached at the middle of calyx tube.Capsule dehiscing by 2-valves.

Flowering & Fruiting: July-December.

Distribution: Tropical Asia; naturalised in Europe, Africa and America. Common; in paddy fields. *RNMK 1209*, Kottathara; *RNMK 1786,* Venniyodu.

Rotala macrandra Koehne in Engl., Bot. Jahrb. Syst. 1: 176. 1880; Gamble, Fl. Pres. Madras 509(359). 1919; Manilal & Sivar., Fl. Calicut 113. 1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 194. 1988; Joseph, Aquatic Angiosp. Malabar 114. 1991; Vajr., Fl. Palghat Dist. 207. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 196. 1996; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 305. 2009. *Ameletia rotundifolia* Wight, Ic. t. 258. 1840, non Roxb.1820.

Aquatic and amphibious herbs; stem terete, creeping and rooting below, branches decumbent, pink; submerged leaves ternate, lanceolate, membarous; aerial leaves opposite, ovate-orbicular, obtuse or rounded, 2-2.5 cm across, midrib and lateral nerves pink. Flowers in terminal simple or branched spikes; bracts closely imbricating, ovate, acute, ca. 2.5 mm long; bracteoles linear, half as long as the flowers; calyx lobes ovate, acute, appendages 0; petals white, obovate, 2-3 mm long. Capsule globose, 1.5-2 mm across.
Flowering & Fruiting: September-January.
Distribution: Endemic to Western Ghats. Rare; in evergreen forests. *RNMK 1312,* Banasurasagar dam site.

Rotala mexicana Cham. & Schltr., Linnaea 5: 567. 1830; Sasidh. & Sivar., Fl. Pl. Thrissur For. 196. 1996; Nair & Nambiar, J. Bombay Nat. Hist. Soc. 63: 784. 1965; Joseph, Aquatic Angiosp. Malabar 119. 1991. *Ammannia pygmaea* S. Kurz in Seem., J. Bot. 5:376.1887; Clarke in Hook. f., Fl. Brit. India 2:568.1879. *Rotala pygmaea* (Kurz) Rajagopal & Ramayya, Kew Bull. 23: 465. 1969.

Aquatic or amphibious annual branched tuft-forming herbs, branches 4-angled, creeping and ascending. Leaves opposite and in in whorls of 3-4, linear, 4-5 x 0.4-0.5 mm. Flowers solitary, axillary; bracteoles as long as the flowers; calyx tube red, lobes 4, triangular; stamens 2, not exserted. Capsule globose 2 or 3 valved.
Flowering & Fruiting: July-November.
Distribution: Pantropical. Rare; in marshy areas. *RNMK 1452,,* Banasurasagar dam area.

Rotala rosea (Poir.) Cook, Boissiera 29: 86. 1979; Manilal & Sivar., Fl. Calicut 113. 1982; Ansari, Fl. Kasaragod Div. 168. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 194. 1988; Joseph, Aquatic Angiosp. Malabar 122. 1991; Vajr., Fl. Palghat Dist. 207. 1990; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 229. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 306. 2009. *Ammannia rosea* Poir. in Lamk., Suppl. Encycl. 329. 1810. *Rotala leptopetala* (Bl.) Koehne in Engl., Bot. Jahrb. Syst. 1: 162. 1880; Gamble, Fl. Pres. Madras 508(358). 1919. *Ammannia leptopetala* Bl., Mus. Bot. Lugd.-Bat. 2: 134. 1856. *Ammannia pentandra* Roxb., Fl. India 1: 427. 1820; Clarke in Hook. f., Fl. Brit. India 2: 568. 1879. **Plate 19a.**

Erect herbs; stems 4-angled and narrowly winged. Leaves 0.8-1 x 0.2-0.3 cm, oblong, obtusely acute, round or retuse, sessile. Flowers axillary, solitary; bracteoles linear; calyx 1.5-2 mm long, lobes triangular; intersepalar appendages subulate; petals 0.5-1 mm long, elliptic; stamens 5, attached below the middle of calyx tube, exserted; ovary 0.7-1 x 0.3-0.8 mm, style short; stigma pilose. Capsule 2-3 mm across, globose, 3-valved; seeds many, trigonous.
Flowering & Fruiting: August-February.
Distribution: Indo-Malesia and East Asia. Rare; in moist situations in evergreen forests. *RNMK 1564,* Aranamala.

Rotala rotundifolia (Buch.-Ham. ex Roxb.) Koehne in Engl., Bot. Jahrb. Syst. 1: 175. 1880; Gamble, Fl. Pres. Madras 509(359). 1919; Manilal & Sivar., Fl. Calicut 113. 1982; Ansari, Fl. Kasaragod Div. 168. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 194. 1988; Joseph, Aquatic Angiosp. Malabar 124. 1991; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 229. 2005. *Ammannia rotundifolia* Buch.-Ham. ex Roxb., Fl. Ind. 1: 446. 1820; Clarke in Hook. f., Fl. Brit. India 2: 566. 1879.

Erect herbs, 10-15 cm high; stem reddish, 4-angled. Leaves 6-8 x 5-6 mm, oblong-orbicular, sessile, glabrous, 5-nerved. Racemes 1-1.5 cm long, terminal, bracteoles 1-2 mm long, lanceolate; calyx tube 2-2.5 mm long, lobes triangular, acute; intersepalar appendages absent; petals obovate; filaments attached near the base of calyx tube, rose coloured; ovary obovoid, truncate, obtuse, 4-angled.

Flowering & Fruiting: September-March.

Distribution: South and south east Asia and also in Japan. Common; in marshy areas in evergreen and moist deciduous forests. *RNMK 1920*, Periya; *RNMK 1341*, Pilakavu; *RNMK 3241,* Tholpetty.

Lawsonia inermis L. often seen grown as hedge plant and **Woodfordia fruticosa** (L.) Kurz is sometimes cultivated for its medicinal uses.

Punica granatum L. (PUNICACEAE) is often grown in homesteads for its edible fruits.

ONAGRACEAE Juss.

Gen. Pl. 317. 1789.

LUDWIGIA Linnaeus

Sp. Pl. 118. 1753.

Undershrubs with horizontal roots. Leaves alternate, entire. Flowers axillary, solitary, shortly pedicelled, bracteate; calyx tube adnate to the ovary, not produced above; lobes 4, triangular, persistent; petals yellow or white, obovate, deciduous, imbricate; stamens 8 or 10, free; ovary 4-5-celled; inferior, ovules numerous, axile, style 1; stigma 4-5-lobed. Fruit a linear capsule, terete or angled, crowned by persistent sepals; seeds many, rugulose

1. Roots at lower nodes modified into floats; flowers white .....**L. adscendens**
1. Roots not as above; flowers yellow 2
2. Branchlets puberulus on apices; stamens 4 ..... **L. perennis**
2. Branchlets not puberulus on apices; stamens 8 or 10 3
3. Branchets glabrous, angled .....**L. hyssopifolia**
3. Branchlets densely hairy, not angled.....4
4. Capsule linear, terete, hispid .....**L. octovalvis** subsp. **sessiliflora**
4. Capsule oblong, slightly 4- angled ..... **L. peruviana**

Ludwigia adscendens (L.) Hara, J. Jap. Bot. 28: 290. 1953; Ansari, Fl. Kasaragod Div. 169. 1985; Joseph, Aquatic Angiosp. Malabar 159. 1991; Anil

Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta Dist. 230. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 310. 2009. *Jussiaea adscendens* L., Mant. Pl. 1: 69. 1767. *Jussiaea repens* L., Sp. Pl. 1: 388. 1753, non *Ludwigia repens* Forst. 1771; Clarke in Hook. f., Fl. Brit. India 2: 587. 1879; Gamble, Fl. Pres. Madras 516(365). 1919.

Floating herbs, roots from lower nodes modified into air-filled, white floats. Leaves 4.5 x 1.5 cm, obovate, obtuse, attenuate at base, glabrous; nerves parallel; petiole 5-9 mm long. Flowers pedicelled; pedicel 3-3.5 cm long; calyx lobes 5, 1.1-1.6 x 0.2-0.7 mm, lanceolate, hispid, free; petals obovate to orbicular; stamens 8, anthers ovate; ovary densely hispid, style 4-5 mm long, hispid. Capsule 3-3.5 cm long, terete.

Flowering & Fruiting: Throughout the year.

Distribution: Continental Asia, Malesia and Australia. Occasional; in water bodies. *RNMK 1511*, Panamaram.

Ludwigia hyssopifolia (G. Don) Exell, Garcia de Orta 5: 471. 1957; Ansari, Fl. Kasaragod Div. 170. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 195. 1988; Joseph, Aquatic Angiosp. Malabar 161. 1991; Vajr., Fl. Palghat Dist. 208. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 197. 1996; Sivar. & P. Mathew, Fl. Nilambur 280. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 230. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 311. 2009. *Jussiaea hyssopifolia* G. Don, Gen. Hist. 2: 693. 1832. *Jussiaea linifolia* Vahl, Ecolg. Amer. 2: 32. 1798, non *Ludwigia linifolia* Poir., 1813; Gamble, Fl. Pres. Madras 1875(1298). 1936. *Jussiaea suffruticosa* Ridley, J. Bot. 59: 257. 1921, non L. *Fissendocarpa linifolia* (Vahl) Bennet, J. Bombay Nat. Hist. Soc. 67: 126. 1970; Manilal & Sivar., Fl. Calicut 116. 1982.

Herbs, branchlets angled or winged. Leaves 4-6 x 2-2.5 cm, elliptic-lanceolate, apex acute, base cuneate, glabrous, membranous; petiole 1-1.5 cm. Flowers solitary, axillary; calyx lobes 4, lanceolate, 3-4 mm long, persistent; petals 4, yellow, obovate; stamens 8. Capsule ca. 2 x 0.2 cm; seeds dimorphic, upper ones larger.

Flowering & Fruiting: August-December.

Distribution: Pantropical. Common; in marshy places. *RNMK 3299,* Begur; *RNMK 3172,* Panamaram.

Ludwigia octovalvis (Jacq.) Raven ssp. **sessiliflora** (Michx.) Raven, Kew Bull 15: 476. 1962; V. S. Ramach. & V. J. Nair, Fl. Cannanore 195. 1988; Vajr., Fl. Palghat Dist. 208. 1990. *Jussiaea octonervia* var. *sessiliflora* Michx., Mart. Fl. Bars. 13: 171. 1875. *Jussiaea suffruticosa* L., Sp. Pl. 388. 1753; Clarke in Hook. f., Fl. Brit. India 2: 587. 1879; Gamble, Fl. Pres. Madras 516(365). 1919, non *Ludwigia suffruticosa* Walt. 1788. *Jussiaea villosa* Lamk., Encycl. 3: 331. 1789. *Ludwigia octovalvis* (Jacq.) Raven, Kew Bull 15:476.1962; Manilal & Sivar., Fl. Calicut 116. 1982; Ansari, Fl. Kasaragod Div. 170. 1985; Manilal, Fl. Silent Valley 114. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 110. 1988; Joseph, Aquatic Angiosp. Malabar 162. 1991; Sivar. & P. Mathew,

Fl. Nilambur 281. 1997; Mohanan & Sivad., Fl. Agasthyamala 287. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 231. 2005.*Cattu-carambu* Rheede, Hort. Malab. 2: 97, t. 50. 1679.

Erect herbs, to 1.5 m high; stem densely villous. Leaves 5-7 x 1.5-2 cm, lanceolate, densely hairy; nerves many, oblique; petiole 4-5 mm long. Flowers axillary, sessile; calyx lobes 4, 8-9 x 4-5 mm, ovate, acuminate, hispid; petals obovate, glabrous; anthers oblong; ovary hispid; disk 8-lobed, lobes clavate. Capsule 4.5-5 cm, linear, terete, hispid; seeds obliquely orbicular, muriculate, one side transversely rugose.

Flowering & Fruiting: May-November.

Distribution: Pantropical. Common; in moist situations. *RNMK 2170,* Puthoorvayal; *RNMK 1703*, Tholpetty; *RNMK 2665*, Venniyodu.

Ludwigia perennis L., Sp. Pl. 119. 1753; Manilal & Sivar., Fl. Calicut 117. 1982; Ansari, Fl. Kasaragod Div. 171. 1985; Vajr., Fl. Palghat Dist. 208. 1990; Joseph, Aquatic Angiosp. Malabar 164. 1991; Sivar. & P. Mathew, Fl. Nilambur 282. 1997; Mohanan & Sivad., Fl. Agasthyamala 288. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 231. 2005. *Ludwigia parviflora* Roxb., Fl. India 1:440.1820; Clarke in Hook. f., Fl. Brit. India 2:588.1879; Gamble, Fl. Pres. Madras 517(365).1919. *Jussiaea perennis* (L.) Brenan, Kew Bull. 1953: 163. 1953.

Erect herbs with spreading roots; stems narrowly winged. Leaves 4-5 x 1.5-2 cm, elliptic, acute at apex, attenuate to the petiole, nerves many, close; petiole 2.5-3 cm long. Flowers axillary, solitary, subsessile; calyx lobes 4, lanceolate; petals obovate, yellow; stamens 4, equal; ovary 4-celled, inferior; ovules many, style 1, stigma capitate. Capsule 2-2.5 cm long, terete, glabrous.

Flowering & Fruiting: Throughout the year.

Distribution: Tropical Africa, Asia and Australia. Common; in marshy areas. *RNMK 2172,* Panamaram.

Ludwigia peruviana (L.) H. Hara, J. Jap. Bot. 28: 293. 1953; Manilal, Fl. Silent Valley 114. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 196. 1988; Vajr., Fl. Palghat Dist. 208. 1990; Sivar. & P. Mathew, Fl. Nilambur 283. 1997. *Jussiaea peruviana* L., Sp. Pl. 388. 1753. *Jussiaea speciosa* Ridley, J. Bot. 59. 1921; Gamble, Fl. Pres. Madras 1875(1298). 1936.

Subshrubs, branchlets hirsute. Leaves 8-12 x 3-4 cm, oblong-lanceolate, apex acute, base attenuate, hirsute; petiole 1-1.5 cm. Flowers *4*- 5 cm across; bracteoles ca. 1 cm long, deciduous; pedicel 2-2.5 cm long; calyx tube 2-3 cm long, hirsute, 4-lobed, lanceolate; petals 4, 3-4 x 2-2.5 cm, sub-orbicular, yellow; stamens 8; ovary 4-celled, ovules numerous. Capsule 3-4 cm long, oblong, slightly 4-angled.

Flowering & Fruiting: March-April.

Distribution: Originally from America now naturalised throughout the Old World. Occasional; in paddy fields. *RNMK 0156*, Mananthavady; *RNMK 2593*, Pilakavu.

TRAPACEAE Dum.

TRAPA Linnaeus

Sp. Pl. 1: 120. 1753.

Trapa natans L., Sp. Pl. 120. 1753; Vajr., Fl. Palghat Dist. 209. 1990; Joseph, Aquatic Angiosp. Malabar 255. 1991. *Trapa natans* L. var. *bispinosa* (Roxb.) Makino, Iinuma Somoku-Dzusezii (ed.3) 1: 137. 1907. *Trapa bispinosa* Roxb., Pl. Corom. t. 234. 1815; Clarke in Hook. f., Fl. Brit. India 2: 590. 1879; Gamble, Fl. Pres. Madras 518(366). 1919. *Trapa quadrispinosa* Roxb., Fl. India 1: 430. 1820; Clarke in Hook. f., Fl. Brit. India 2: 590. 1879 *pro syn.*

Aquatic floating herbs. Leaves dimorphic, floating one rhomboid, submerged one root like; petiole with a spongy swelling near its apex. Flowers solitary, axillary, peduncled; calyx tube short, lobes 4, 2 becoming spines on the fruit; petals 4, white; stamens 4; ovary 2-celled; ovule solitary in each cell, pendulous. Fruit I- celled with 4 angles.

Flowering & Fruiting: September-May.

Distribution: Cosmopolitan. Rare; in water bodies of moist deciduous forests. *RNMK 0224,* Kuruva.

PASSIFLORACEAE Juss. ex Kunth

in Humboldt *et al.,* Nov. Gen. Sp. 2. ed. 4: 126.1817.

1. Stem glandular hispid; flowers bisexual; fruit a berry ..... **Passiflora**
1. Stem glabrous; flowers unisexual; fruit a capsule ..... **Adenia**

ADENIA Forsskal

Fl. Aegypt.-Arab. 77. 1775.

Adenia hondala (Gaertn.) de Wilde, Blumea 15: 265. 1967; Ansari, Fl. Kasaragod Div. 172. 1985; Rao *et al.*, J. Econ. Tax. Bot. 11: 243. 1987; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 105. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 197. 1988; Vajr., Fl. Palghat Dist. 210. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 197. 1996; Sivar. & P. Mathew, Fl. Nilambur 284. 1997; N. Mohanan & Sivad., Fl. Agasthyamala 289. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 232. 2005. *Granadilla hondala* Gaertn., Fruct. 2: 480. t.180. f.10. 1791. *Adenia palmata* (Lamk.) Engl., Bot. Jahrb. Syst. 14: 375. 1892; Gamble, Fl. Pres. Madras 525(371). 1919. *Modecca palmata* Lamk., Encycl. 4: 209. 1797; Mast. in Hook. f., Fl. Brit. India 2: 603. 1879. *Orela-modecca* Rheede, Hort. Malab. 8. 45, t. 23. 1688.

Climbers with tuberous roots, tendrils simple. Leaves palmately 3-5-lobed, lobes 14-16 x 6-7 cm, oblong, membranous, with large circular sessile glands between lobes; petiole 8-10 cm long. Flowers monoceous, in axillary cymes, 8-9 mm across; calyx gamosepalous, 1.3-1.5 cm long, lobes 5, ovate; petals 5, 1.3-2 x 1-2 mm, linear-oblong, ciliate, attached at the rim of calyx tube; stamens 5, free, staminodes in female flowers 5, free; ovary stipitate, globular,

superior, 1-celled; ovules many, parietal, style 1, 3-fid at apex. Capsule 5-7 cm across, globose, 3-valved.
Flowering & Fruiting: March-August.
Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 2463,* Vythiri.

PASSIFLORA Linnaeus
Sp. Pl. 955. 1753.

Tendrillate climbers. Leaves alternate, entire or lobed, nerved from base, petiolate. Flowers solitary or in axillary cymes, pedicelled; bracteoles 3, entire or laciniate; calyx tube broad; lobes 5; petals 5, oblong, obtuse, white; corona of several whorls with filiform appendages; torus elongated into a gynandrophore; stamens 5, spreading; ovary 1-celled, many-ovuled; styles 3, free. Fruit a globose berry or capsule, fleshy.

1. Bracteoles 2-pinnatisect ..... **P. foetida**
1. Bracteoles not pinnatisect 2
2. Leaves suborbicular, 3 ribbed, truncate at apex ..... **P. leschenaultii**
2. Leaves 3-5-lobed, lobes acute 3
3. Leaves serrate; berry ovoid ..... **P. edulis**
3. Leaves entire; berry globose ..... **P. subpeltata**

Passiflora edulis Sims in Curtis, Bot. Mag. t. 1989. 1818; Gamble, Fl. Pres. Madras 524(370). 1919; Sivar. & P. Mathew, Fl. Nilambur 286. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 314. 2009.

Large climbers. Leaves 10-14 x 10-12 cm, lobes ovate, median one larger, base truncate to cordate, subcoriaceous, margins serrate. Flowers solitary, to 5 cm across; hypanthium lobes 3.5-4 cm long; petals 5, 1-2 x 0.5-1 cm, oblong; corona in 4-5 whorls, filaments 2-2.5 cm, violet at apex and white at base. Berry 5-7 cm across, ovoid, shell hard, pulp sweet, orange coloured; seeds black.
Flowering & Fruiting: Throughout the year. *Distribution*: Originally from America; introduced in India. Occasional; in forest plantations. *RNMK 1919,* Chooralmala.

Passiflora foetida L., Sp. Pl. 959. 1753; Gamble, Fl. Pres. Madras 524(370). 1919; Manilal & Sivar., Fl. Calicut 118. 1982; Ansari, Fl. Kasaragod Div. 172. 1985; Manilal, Fl. Silent Valley 114. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 197. 1988; Vajr., Fl. Palghat Dist. 210. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 198. 1996; Sivar. & P. Mathew, Fl. Nilambur 286. 1997; Mohanan & Sivad., Fl. Agasthyamala 289. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 233. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 3315. 2009.

Densely pilose climber; tendrils leaf-opposed. Leaves 8-10 x 9-9.5 cm, shallowly, 3-lobed, cordate at base; lobes triangular, acute; petiole 4- 5 cm

long. Flowers solitary, axillary; bracteoles much divided into linear lobes, glandular; sepals 1.5-2 x 1-0.7 cm, ovate, acute, hairy outside; petals 1.8-2 x 1-1.3 cm, ovate, acute, white, glabrous; corona 4-seriate, pale violet; gynandrophore 0.8-1 cm long, stout. Berry 1.5-1 cm across, yellow; seeds black.
Flowering & Fruiting: July-December.
Distribution: Native of Tropical America; now naturalised in India, China and Africa. Occasional; in semi-evergreen forests. *RNMK 1921,* Manikkunnumala; *RNMK 1793*, Chooralmala.

Passiflora leschenaultii DC., Prodr. 3: 326. 1828; Mast. in Hook. f., Fl. Brit. India 2: 599. 1879; Gamble, Fl. Pres. Madras 524(370). 1919; Manilal, Fl. Silent Valley 115. 1988.

Slender climbers. Leaves 4-5 x 7-8 cm, flat above, sub-orbicular, 3-ribbed; petiole 2-2.5 cm long. Flowers solitary, axillary, 3-4 cm across; pedicels 2.5-3 cm long; calyx 1-1.5 cm long, deeply lobed to the base; petals 1.5-2.5 cm long, ovate, obtuse, white; corona 3-seriate, linear, pinkish; gynandrophore 0.3-1 cm long; filaments 1-1.5 cm long. Berry 4.5-5 x 2.5-3 cm, oblong, reddish, smooth, 3- valved; seeds ovoid, prominently and regularly pitted.
Flowering & Fruiting: March-May.
Distribution: Endemic to Peninsular India. Rare; in evergreen forests. *RNMK 1916,* Vythiri.

Passiflora subpeltata Ortega, Nov. Rar. Pl. Hort. Matrit. 6: 78. 1798; Vajr., Fl. Palghat Dist. 211. 1990. *Passiflora calcarata* Mast., Trans. Linn. Soc. London 27: 638. 1871; Gamble, Fl. Pres. Madras 524(370). 1919.

Twining shrubby palnts. Leaves simple, 6-8- x 5-7 cm, 3-lobed, glandular beneath; stipules leafy. Flowers solitary, bracteoles 3; calyx lobes 5; petals 5, inserted on the throat of the calyx. Berry globose, 4-5 cm across; seeds many.
Flowering & Fruiting: February-May.
Distribution: Native of south America, widely naturalised in other tropical countries. Occasional in semi-evergreen forest margins and forest plantations. *RNMK 2555,* Pozhuthana.

CUCURBITACEAE Juss.

Gen. Pl. 393. 1789.

1. Tendrils branched 2
1. Tendrils simple 4
2. Petals fimbriate ..... **Trichosanthes**
2. Petals entire 3
3. Male flowers in racemes; fruit dry, fibrous inside ..... **Luffa**
3. Male flowers in fascicles; fruit fleshy, non fibrous ..... **Diplocyclos**
4. Leaves lobed or angled 6
4. Leaves neither lobed nor angled 5
5. Male flowers in large drooping panicles; fruit cylindric ..... **Zanonia**
5. Male flowers in few fowered racemes; fruit globose ..... **Kedrostis**

6. Male flowers with large spathaceous bracts ..... **Momordica**
6. Male flowers without spathaceous bracts 7
7. Stem glabrous; all stamens 2-celled ..... **Zehneria**
7. Stem scabrid or variously pubescent; all stamens not 2-celled 8
8. Leaves amplexicaule .....**Solena**
8. Leaves not amplexicaule.....9
9. Calyx tube tubular; anthers included .....**Gymnopetalum**
9. Calyx tube campanulate; anthers not included.....10
10. Berry globose or sub globose 11
10. Berry fusiform or ellipsoid 12
11. Connective produced above the anthers ..... **Cucumis**
11. Connective not prolonged ..... **Mukia**
12. Hood of the connective not laciniate; fruit fusiform..... **Cucumella**
12. Hood of the connective laciniate; fruit not fusiform..... **Coccinia**

COCCINIA R. Wight et Arnott
Prodr. 347.1834.

Coccinia grandis (L.) Voight, Hort. Suburb. Calcutt. 59. 1845; Chakrav., Fasc. Fl. India 11: 24. 1982; Manilal & Sivar., Fl. Calicut 121. 1982; Ansari, Fl. Kasaragod Div. 174. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 198. 1988; Vajr., Fl. Palghat Dist. 212. 1990; C.N. Sunil & Sivad., Fl. Pl. Div. Alappuzha Dist. 376. 2000; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 234. 2005. *Bryonia grandis* L., Mant. 1: 126. 1767. *Coccinia indica* Wight & Arn., Prodr. 347. 1834; Gamble, Fl. Pres. Madras 537(379). 1919. *Cephalandra indica* (Wight & Arn.) Naud., Ann. Sci. Nat. Bot. ser. 5, 16. 1866; Clarke in Hook. f., Fl. Brit. India 2: 621. 1879. *Coccinia cordifolia* (L.) Cogn. in A. & C. DC., Monogr. Phan. 3: 529. 1881.

Vines. Leaves 3-5 angled, ca. 8 x 9 cm, apex acute, apiculate, margins crenate, base deeply cordate, chartaceous, palmately veined, gland dotted beneath; petiole 2-3 cm. Flowers axillary, solitary, monoceous, white; pedicels 2-3 cm; calyx tube 3-5 mm, campanulate, lobes 2-3 mm, ovate, acute; corolla 2.5-3 cm, 5-lobed, campanulate, pubescent without, acute at apex; ovary glandular, pubescent, ovules numerous, stigma 3-partite, fimbriate.

Flowering & Fruiting: December-April.

Distribution: Peninsular India and Sri Lanka. Occasional; in open wastelands and moist deciduous forests. *RNMK* 0263, Mananthavady; *RNMK 1272*, Baveli.

CUCUMELLA Chiovenda
Fl. Somalia 183. 1929.

Cucumella silentvalleyii Manilal, Sabu & Mathew, Acta. Bot. India 13: 283. 1985; Manilal, Fl. Silent Valley 115. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 199. 1996; Sivar. & P. Mathew, Fl. Nilambur 287. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 234. 2005.

Creepers, stems scabrid. Leaves 4-4.5 x 5-5.5 cm, obtusely 5-angular, cordate at base crenate, scabrid; petiole 6-7 cm long. Flowers monoecious, axillary, solitary, pedicellate; calyx tube tubular; lobes ovate, acute; petals 5, obovate, obtuse, yellow; stamens 3, free, erect, connective produced into a hood; anthers flexuous, hispid; ovary fusiform, hispid. Fruit 1.5-2 x 0.8-0.9 cm, ellipsoid, hispid; seeds obovate, compressed, smooth.
Flowering & Fruiting: July-December.
Distribution: Endemic to southern Western Ghats (Kerala). Rare; in margins of evergreen forests. *RNMK 1703,* Sugandhagiri-Amba.

CUCUMIS Linnaeus
Sp. Pl. 2: 1011. 1753.

Cucumis prophetarum L., Cent. I. Pl. 33. 1755; Clarke in Hook. F., Fl. Brit. India 2 : 619. 1879 ; Gamble, Fl. Pres. Madras 535(378). 1919 ; Chakrav., Fasc. Fl. India 11 : 35. 1982; Manilal, Fl. Silent Valley 116. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 199. 1996; Sivar. & P. Mathew, Fl. Nilambur 288. 1997.

Slender climbers; stems scabrid; tendril simple. Leaves 12-14 cm across; entire or shallowly 5-lobed, scabrous; petiole 13-15 cm long; male flowers in fascicles of 3-5; pedicel 1-1.5 cm long; calyx tube □aturalized, hispid; petals 7-9 mm long, obovate, yellow; stamens 3, anthers flexuous, coherent, connective crested with laciniate lobes; female flowers solitary; calyx and corolla similar to male flowers; ovary oblong, many-ovuled. Berry 3.5-4 x 2-2.5 cm, oblong, softly scattered-spinous, greenish-yellow with white stripes; seeds many, compressed.
Flowering & Fruiting: September-March.
Distribution: Paleotropics. Occasional; in margins of evergreen forests. *RNMK 2475,* Sugandhagiri; *RNMK 1091,* Vaduvanchal.

DIPLOCYCLOS Post & O. Kuntze
Lex. 178. 1903.

Diplocyclos palmatus (L.) Jeffrey, Kew Bull. 15: 352. 1962; Chakrav., Fasc. Fl. Ind. 11: 48. 1982; Manilal & Sivar., Fl. Calicut 122. 1982; Ansari, Fl. Kasaragod Div. 174. 1985; Manilal, Fl. Silent Valley 116. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 96. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 199. 1988; Vajr., Fl. Palghat Dist. 212. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 202. 1996; Sivar. & P. Mathew, Fl. Nilambur 288. 1997; Mohanan & Sivad., Fl. Agasthyamala 290. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 235. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 319. 2009. *Bryonia □atural* L., Sp. Pl. 1012. 1753. *Bryonia laciniosa* L., Sp. Pl. 1013. 1753,p.p. excl. typus; Wight, Ic. T. 500. 1841; Clarke in Hook. F., Fl. Brit. India 2: 622. 1879. *Bryonopsis laciniosa* sensu Naud., Ann. Sci. Nat. Bot. ser. 4, 12: 141. 1859; Gamble, Fl. Pres. Madras 534(377). 1919 ; Chakrav., Fasc. Fl. India 11 : 16. 1982, non L. 1753. *Nehoemeka* Rheede, Hort. Malab. 8: 37-38, t. 19. 1688. **Plate 19b.**

Slender climbers, tendrils bifid. Leaves 10-12 cm across, palmately deeply 5-lobed, serrate, lobes scabrous; petiole 3-5 cm long. Flowers monoecious, fascicled, axillary, 3-7-together; pedicel 1-1.5 cm long; calyx tube 3-5 mm long, □aturalized, lobes subulate; petals 5, 6-7 x 5-4 mm, obovate; stamens 3, anthers conduplicate; pistillode clavate, 3-lobed above; ovary globose, ovules horizontal; style slender; stigmas 3. Fruit a berry, 1.5-2 cm across, globose, red with white lines; seeds pyriform, compressed, thinly rugose.
Flowering & Fruiting: November-January.
Distribution: Indo-Malesia, China and Africa. Common; in semi-evergreen forests and plantations. *RNMK 2463,* Sugandhagiri; *RNMK 0260*, Chooralmala.

GYMNOPETALUM Arnott
in Hooker's J. Bot. 3: 278. 1841.

Gymnopetalum tubiflorum (Wight & Arn.) Cogn. In DC., Mon. Phan. 3: 388. 1881. *Bryonia tubiflora* Wight & Arn., Prodr. 1: 347. 1834. *Gymnopetalum wightii* Arn., Madras J. Lit. Sci. 8: 52. 1840; Clarke in Hook. F., Fl. Brit. India 2 : 611. 1879 ; Gamble, Fl. Pres. Madras 530(374). 1919 ; Chakrav., Fasc. Fl. India 11 : 54. 1982; Ansari, Fl. Kasaragod Div. 175. 1985; Manilal, Fl. Silent Valley 118. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 199. 1988; Vajr., Fl. Palghat Dist. 213. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 202. 1996; Sivar. & P. Mathew, Fl. Nilambur 290. 1997. *Gymnopetalum zeylanicum* Arn., Hook.'s J. Bot. 3:278.1841.

Scabrous climber; tendrils bifid. Leaves 5-6 x 4-5 cm, cordate at base, entire or shallowly 3-lobed, acute, distantly spineus toothed; petiole 2-2.5 cm long; male flowers 3-7 together, on long-peduncled cymes; peduncle 4-5 cm long; calyx tube 1.6-1.8 mm long, constricted above, tubular, lobes subulate; petals 1-1.7 x 0.7-1 cm, obovate, entire, yellow; stamens 3, anthers conduplicate; female flowers axillary, solitary; □aturalized; ovary elliptic, densely hispid; style 1, stigmas 3, linear. Berry 5-6 cm long, oblong, red, acuminate at both ends; seeds compressed, black.
Flowering & Fruiting: October-November.
Distribution: Peninsular India and Sri Lanka. Rare; in evergreen forest margins. *RNMK 2172,* Kallady-900 forest; *RNMK 1919*, Vythiri Ghat.

KEDROSTIS Medikus
Philos. Bot. 2: 69. 1971.

Kedrostis courtallensis (Arn.) Jeffrey, Kew Bull. 15: 353. 1962. *Bryonopsis courtallensis* Arn., Hook.'s J. Bot. 3: 274. 1841. *Bryonopsis bennettii* Miq., Fl. Ind. Bat. 1: 657. 1855. *Aechmandra zeylanica* Thw., Enum. Pl. Zeyl. 125. 1859. *Cerasiocarpum zeylanicum* (Thw.) Hook. F. in Benth. & Hook.f., Gen. Pl. 1: 832. 1862 & Hook. F., Fl. Brit. India 2: 629. 1879. *Cerasiocarpum bennettii* (Miq.) Cogn. In A. & C. DC., Monogr. Phan. 3: 729. 1881; Gamble, Fl. Pres. Madras 541(382). 1919; Chakrav., Fasc. Fl. Ind. 11: 18. 1982; Sasidh. & Sivar., Fl. Pl. Thrissur For. 199. 1996.

Scabrous creeper. Leaves 12-13 x 6-7 cm, ovate-oblong, entire, distantly denticulate, acuminate at apex, cordate at base, coarsely scabrous. Flowers monoecious; male flowers in axillary racemes, female flowers axillary, solitary, 3-4 mm across; calyx tube □aturalized; petals 5, obovate, free; stamens in male flowers 3, free, anthers straight; ovary in female flowers globular, 1-celled; ovules 5-6; style columnar, stigma 3-fid. Fruit globose, 8-9 mm across. Smooth; seeds ovoid, marginate.

Flowering & Fruiting: August-October.

Distribution: India, Sri Lanka and Indonesia. Rare; in evergreen forest margins. *RNMK 2593,* Chooralmala.

LUFFA P. Miller

Gard. Dict. Abr. Ed. 4. 1754.

Luffa cylindrica (L.) Roem., Syn. Monogr. 2: 63. 1846; Chakrav., Fasc. Fl. India 11: 70. 1982; Manilal & Sivar., Fl. Calicut 122. 1982; Ansari, Fl. Kasaragod Div. 175. 1985; Manilal, Fl. Silent Valley 118. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 203. 1988; Vajr., Fl. Palghat Dist. 213. 1990; Sivar. & P. Mathew, Fl. Nilambur 292. 1997. *Momordica cylindrica* L., Sp. Pl. 1009. 1753. *Luffa aegyptiaca* Mill., Gard. Dict. (ed. 4) 500.1785; Clarke in Hook. F., Fl. Brit. India 2:614.1879; Gamble, Fl. Pres. Madras 533(376). 1919; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 235. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 321. 2009. *Luffa pentandra* Roxb., Fl. Ind. 3:712. 1832.

Climbers, tendrils 3-6-fid. Leaves 6-7 x 6-7 cm, shallowly 5-lobed, lobes triangular, acute, toothed, densely hispid below, scabrous above; petiole 5-6 cm long; female flowers axillary, solitary; pedicel 6-7 cm long. Fruit 21-24 cm long, cylindric, terete, fibrous; seeds many.

Flowering & Fruiting: February-December.

Distribution: Paleotropics, often cultivated. Occasional; in moist deciduous forests. *RNMK 1918,* Bavali.

MOMORDICA Linnaeus

Sp. Pl. 1009. 1753.

Climbing herbs, monoecious or dioecious. Leaves undivided, lobed or 3-9 foliolate. Tendrils simple or bifid. Male flowers solitary or in racemes; calyx tue short, lobes 5; corolla often 5-partite to the base; stamens 3, free, anthers flexuose; female flowers solitary; placenta 3, ovules numerous, style linear, stigma 3-lobed or entire; staminode 0. Berry muricate or echinate; seeds smooth or rugose.

1. Calyx lobes linear-lanceolate, acute ..... **M. dioica**
1. Calyx lobes ovate-oblong, obtuse ..... **M. subangulata**

Momordica dioica Roxb. Ex Willd., Sp. Pl. 4: 605.1805; Clarke in Hook. F., Fl. Brit. India 2 :617.1879 ; Gamble, Fl. Pres. Madras 531(375). 1919 ; Chakrav., Fasc. Fl. India 11 : 94. 1982; Ansari, Fl. Kasaragod Div. 178. 1985; V. S.

Ramach. & V. J. Nair, Fl. Cannanore 200. 1988; Vajr., Fl. Palghat Dist. 214. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 204. 1996; Sivar. & P. Mathew, Fl. Nilambur 294. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 236. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 322. 2009.

Slender climbers; tendrils simple. Leaves 6-8 x 6-7 cm, ovate, cordate at base, entire or shallowly 3-lobed, distantly glandular-toothed, scabrous below; petiole 2-2.5 cm long. Flowers dioecious, solitary, axillary; pedicels 4-6 cm long, bracteate at middle; bracts of male flower 1.5-1.7 cm across; calyx tube short, □aturalized, lobes lanceolate; petals 2.7-3 cm long, obovate, yellow; stamens 3, anthers free, conduplicate; female flowers few; ovary densely muricate, ovules horizontal; stigma 3-lobed. Berry 5-7 x 2-3 cm, ellipsoid, densely echinate, red; seeds irregular, rugose, black.

Flowering & Fruiting: July-December.

Distribution: Indo-Malesia and China. Rare; in moist deciduous forests. *RNMK 1341,* Pupally.

Momordica subangulata Bl., Bijdr. 928. 1826 ; Gamble, Fl. Pres. Madras 532(375). 1919 ; Chakrav., Fasc. Fl. India 11: 95. 1982. **Plate 19c.**

Leaves 5-9 x 4-8 cm, broadly ovate, deeply 3-5 lobed, lobes acuminate, base cordate, margin denticulate, petiole 2-4 cm, glabrescent; tendrils simple; male flowers solitary; pedicel 5-10 cm long, slender, villous, apex bracteate; bract sessile, □aturaliz, reniform, 5-7 mm across, margin ciliate; calyx lobes ca. 8 x 4 mm, ovate, oblong, obtuse, densely villous; corolla 4-6 cm, broad yellow; female flowers solitary, axillary, pedicel 5- 7 cm, minutely bracteate at base. Berry 5-7 x 3-4 cm, ovoid, densely echinate; seeds oblong.

Flowering & Fruiting: June-October.

Distribution: Indo-Malesia. Rare; in evergreen forests. *RNMK 2470*, Vythiri Ghat.

MUKIA Arnott

Madras J. Lit. Soc. 17 : 50. 1840**.**

Mukia maderaspatana (L.) Roem., Syn. Monogr. 2: 47. 1846; Manilal & Sivar., Fl. Calicut 123. 1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 200. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 204. 1996; Sivar. & P. Mathew, Fl. Nilambur 294. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 236. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 323. 2009. *Cucumis maderaspatanus* L., Sp. Pl. 1012. 1753. *Bryonia cordifolia* L., Sp. Pl. Pl. 1012. 1753. *Bryonia scabrella* L.f., Suppl. Pl. 424. 1781. *Mukia scabrella* (L. f.) Arn. In Hook.'s, J. Bot. 3: 276. 1841; Clarke in Hook. F., Fl. Brit. India 2: 623. 1879. *Melothria maderaspatana* (L.) Cogn. In A. & C. DC., Monogr. Phan. 3: 623. 1881; Gamble, Fl. Pres. Madras 539(381). 1919; Ansari, Fl. Kasaragod Div. 177. 1985; Vajr., Fl. Palghat Dist. 213. 1990.

Stem coarsely scabrous. Leaves 8-9 x 6-7 cm, ovate, cordate at base; entire or shallowly 5-lobed; spineus serrate, densely scabrous from peltate tubercles;

petiole 6-7 cm long. Male flowers 8-12 together, 4-6 mm across, yellow; pedicel 5-6 mm long; calyx densely hairy outside, lobes subulate; petals 2-2.5 mm long, obovate, yellow; female flowers solitary or 2-3 together. Berry 1-1.5 cm across; seeds obovate, marginate, yellowish white, rugose.
Flowering & Fruiting: Throughout the year.
Distribution: Paleotropics. Common; in moist deciduous and evergreen forests. *RNMK 1562*, Aranamala; *RNMK 2170*, Pulpally; *RNMK 0260*, Manikkunnumala.

SOLENA Lourerio
Fl. Cochinch. 477, 514. 1790.

Solena amplexicaulis (Lamk.) Gandhi in Sald. & Nicols., Fl. Hassan Dist. 179. 1976; Manilal, Fl. Silent Valley 119. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 200. 1988; Vajr., Fl. Palghat Dist. 215. 1990; Sivar. & P. Mathew, Fl. Nilambur 296. 1997; Mohanan & Sivad., Fl. Agasthyamala 291. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 236. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 324. 2009. *Bryonia amplexicaulis* Lamk., Encycl. 1: 496. 1785. *Solena heterophylla* Lour., Fl. Cochinch. 514. 1790; Manilal & Sivar., Fl. Calicut 123. 1982. *Bryonia umbellata* Klein in Willd., Sp. Pl. 4: 618. 1805. *Zehneria umbellata* (Klein) Thw., Enum. Pl. Zeyl. 125. 1859; Clarke in Hook. F., Fl. Brit. India 2: 625. 1879. *Melothria amplexicaulis* (Lamk.) Cogn. In A. & C. DC., Monogr. Phan. 3: 621. 1881; Gamble, Fl. Pres. Madras 539(380). 1919; Chakrav., Fasc. Fl. India 11: 77. 1982. *Melothria heterophylla* (Lour.) Cogn. In A. & C. DC., Monogr. Phan. 3:618.1881; Gamble, Fl. Pres. Madras 539(380). 1919; Chakrav., Fasc. Fl. India 11: 79. 1982; Ansari, Fl. Kasaragod Div. 176. 1985. **Plate 19d.**

Slender climbers; stem scabrous. Leaves 13-15 x 7-7.5 cm, ovate, hastate and amplexicaule at base, coriaceous, scabrous. Flowers dioecious; male flowers in axillary racemes; pedicels 8-9 mm long, bracteate at middle; calyx tube 5-6 mm long, □aturalized, lobes minute; petals 1-1.5 mm long, triangular; stamens 3, erect, anthers transverse, connective produced into a globose hood; female flowers solitary, □aturalized. Berry 2-2.5 x 2.5-3 cm, globose, smooth; seeds globose, rugose along the margins, dark brown.
Flowering & Fruiting: July-January.
Distribution: Indo-Malesia to Australia. Rare; in semi-evergreen forests. *RNMK 2171,* Chooralmala.

TRICHOSANTHES Linnaeus
Sp. Pl. 1008. 1753.

Climbers. Leaves entire or palmately lobed, denticulate, tendrils simple or 2-5-fid. Flowers dioecious; female flowers solitary; male flowers in bracteate racemes; calyx tube tubular, broaden above, lobes 5; petals 5, fimbriate, basely connate, white; stamens 3, anthers connate, conduplicate; ovary 1-celled; ovules many, horizontal, on 3-parietal placentas; style slender; stigmas 3. Fruit a berry, smooth; seeds ellipsoid or angular, many.

1. Leaves unlobed, ovate .....**T. nervifolia**
1. Leaves palmately lobed.....2
2. Lobes of leaf denticulate, hairy .....**T. cucumerina**
2. Lobes of leaf entire, glabrous.....3
3. Leaves glabrous.....**T. tricuspidata** var. **tricuspidata**
3. Leaves tomentose .....**T. palmata** var. **tomentosa**

Trichosanthes cucumerina L., Sp. Pl. 1008. 1753; Clarke in Hook. F., Fl. Brit. India 2 : 609. 1879 ; Gamble, Fl. Pres. Madras 529(373). 1919; Chakrav., Fasc. Fl. India 11 : 112. 1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 201. 1988; Vajr., Fl. Palghat Dist. 215. 1990; Sivar. & P. Mathew, Fl. Nilambur 298. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 237. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 326. 2009.

Climbers. Leaves 16-17 cm across, 5-9-lobed; lobes obovate or ovate, acute, spineus serrate, densely villous and coarsely reticulate below; petiole 3-3.5 cm long. Male flowers in 8-15 flowered racemes; female flowers axillary, solitary; calyx tube 1-1.5 cm long; petals 2-2.5 cm long, white. Berry 7-9 x 3-3.5 cm, fusiform with a cuspidate tip, glabrous; seeds oblong, compressed, undulate, truncate.

Flowering & Fruiting: December-May.

Distribution: Indo-Malesia. Rare; in moist deciduous forests. *RNMK 0147*, Pulpally.

Trichosanthes nervifolia L., Sp. Pl. 1008. 1753; Gamble, Fl. Pres. Madras 529(373). 1919; Chakrav., Fasc. Fl. India 11: 119. 1982; Manilal & Sivar., Fl. Calicut 120. 1982; Manilal, Fl. Silent Valley 120. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 206. 1996; Sivar. & P. Mathew, Fl. Nilambur 300. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 237. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 326. 2009. *Trichosanthes cuspidata* Lamk., Encycl. 1: 188. 1783; Gamble, Fl. Pres. Madras 529(373). 1919. **Plate 19e &19f.**

Slender climber. Leaves 13-15 x 8-9 cm, ovate, acute, cordate at base, distantly denticulate, coarsely reticulate, glabrous; petiole 2-2.5 cm long. Male racemes 4-5 cm long, zig-zag, many flowered, glabrous; pedicel 1-1.5 cm long; calyx tube 3.5-4 cm long, narrow; petals 2-3 cm long, fimbriate into narrow lobes; female flowers solitary. Berry ca. 11 x 7 cm, ellipsoid, smooth, yellow; seeds many, irregularly lobed; dark brown.

Flowering & Fruiting: September-January.

Distribution: South-west India and Sri Lanka. Rare; in evergreen forest margins. *RNMK 0224,* Pookodu.

Trichosanthes tricuspidata Lour., Fl. Cochinch. 589. 1790, var. **tricuspidata**; Manilal, Fl. Silent Valley 121. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 201. 1988; Sivar. & P. Mathew, Fl. Nilambur 300. 1997; C.N.

Sunil & Sivad., Fl. Alappuzha Dist. 327. 2009. *Trichosanthes bracteata* (Lamk.) Voigt, Hort. Suburb. Calcutt. 58. 1845; Manilal & Sivar., Fl. Calicut 119. 1982; Ansari, Fl. Kasaragod Div. 179. 1985; Vajr., Fl. Palghat Dist. 215. 1990. *Modecca bracteata* Lamk., Encycl. 4: 210. 1797. *Trichosanthes □atural* Roxb., Fl. India 3: 704. 1832; Clarke in Hook. F., Fl. Brit. India 2: 606. 1879; Gamble, Fl. Pres. Madras 529(374). 1919. *Trichosanthes lepiniana* (Naud.) Cogn. In A. & C. DC., Monogr. Phan. 3: 377. 1881; Gamble, Fl. Pres. Madras 530(374). 1919; C.N. Sunil & Sivad., Fl. Pl. Div. Alappuzha Dist. 387. 2000. *Involucraria lepiniana* Naud. In Huber, Cat. 11. 1868.

Glabrous climbers. Leaves 10-12 x 13-15 cm, palmately 3-lobed, lobes oblong, acuminate; petiole 1-2 cm long. Male flowers in peduncled cymes; peduncle 6-8 cm long; bracts 2-3 x 1.5-2 cm, obovate, coarsely fimbriate; calyx tube 2.5-3 cm long, lobes lanceolate, 1.8-2 cm long. Fruit 2-3 cm across, globose, red.

Flowering & Fruiting: November-May.

Distribution: Indo-Malesia to Australia and east Asia. Occasional; in plantation margins. *RNMK 1916,* Puliyarmala; *RNMK 3011*, Maniyankodu.

Trichosanthes palmata Roxb. var. **tomentosa** Heyne ex Clarke in Hook.f., Fl. Brit. India 2: 607. 1879; Gamble, Fl. Pres. Madras 530(374). 1919; *Trichosanthes tricuspidata* Lour. var. *tomentosa* (Heyne ex Clarke) Kumari in Nair & Henry, Fl. Tamil Nadu 1: 174. 1983; V. S. Ramach. & V. J. Nair, Fl. Cannanore 202. 1988.

Large climbers. Leaves palmately lobed, 9-11 x 11-12 cm, tomentose beneath. Male flowers in peduncled cymes; peduncle 4-5 cm long; bracts large, 3-5 x 2-3 cm, deeply laciniate; calyx lobes shortly dentate; petals 5, margins fimbriate; stamens 3, inserted in the calyx tube; stigmas entire. Fruit globose, 5-7 cm across, orange-red.

Flowering & Fruiting: December-January.

Distribution: India and Sri Lanka. Occasional; along margins of plantations. *RNMK 1974,* Kottathara.

ZANONIA Linnaeus

Sp. Pl. 1028. 1753.

Zanonia indica L., Sp. Pl. (ed. 2) 1457. 1763; Clarke in Hook. F., Fl. Brit. India 2 : 633. 1879 ; Gamble, Fl. Pres. Madras 543(383). 1919 ; Chakrav., Fasc. Fl. India 11 : 124. 1982; Manilal, Fl. Silent Valley 121. 1988; Vajr., Fl. Palghat Dist. 216. 1990; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 328. 2009.

Large climbers, mature stem with corcky bark; tendrils 2-fid. Leaves alternate, 11-15 x 6-10 cm, ovate, oblong, entire, cordate at base, 5-7 ribbed from base. Panicles 35-40 x 12-15 cm, axillary, drooping. Flowers dioecious, 2-8 together, pedicelled; sepals 5, 2-3 mm long, ovate, acute, free; petals 3-3.5 x 1-2 mm, oblong; stamens 5, free; anthers transverse; female flowers larger; ovary obconic, glabrous. Fruits 6-10 x 2.5-3 cm, cylindric, clavate, truncate at apex; seeds many, compressed, oblong, winged.

Flowering & Fruiting: October-November.
Distribution: Indo-Malesia. Rare; in evergreen forests. *RNMK 2840,* Vythiri.

ZEHNERIA Endlicher
Prodr. Fl. Norfolk. 1: 69. 1833.

Slender climbers. Leaves ovate to triangular, entire or shallowly 3-lobed, glandular toothed, petiolate. Flowers dioecious or monoecious; male flowers in □aturalized umbels; calyx tube □aturalized, teeth short; petals 5, free, obovate; stamens 3, distinct, erect; anthers obovoid; connective grown into a hood; female flowers usually solitary or rarely in fascicles; calyx and petals similar to male flowers; ovary globose, ovules many, horizontal; style 3-fid at apex. Berry globose, smooth; seeds obovate, not marginate, smooth.

1. Plant monoecious; petals glabrous .....**Z. maysorensis** var. **maysorensis**
1. Plant dioecious; petals villous within.....**Z. scabra**

Zehneria maysorensis (Wight & Arn.) Arn. In Hook.'s, J. Bot. 3: 275. 1841, var. **maysorensis**; Manilal, Fl. Silent Valley 122. 1988; Vajr., Fl. Palghat Dist. 216. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 206. 1996; Sivar. & P. Mathew, Fl. Nilambur 301. 1997; Mohanan & Sivad., Fl. Agasthyamala 292. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 238. 2005. *Bryonia maysorensis* Wight & Arn., Prodr. 345. 1834. *Melothria □aturaliz* sensu Chakrav. Rec. Bot. Sur. India 17: 148. 1959, non (Bl.) Cogn. 1881. *Melothria perpusilla* var. *subtruncata* Cogn. In A. & C. DC., Monogr. Phan 3: 606. 1881; Chakrav., Fasc. Fl. India 11 : 86. 1982. *Melothria perpusilla* sensu Gamble, Fl. Pres. Madras 538(380). 1919, non (Bl.) Cogn. 1881. **Plate 19g.**

Branchlets glabrous. Leaves 8-10 x 7-8 cm, widely cordate at base, shallowly 5-lobed, lobes glandular-serrate, glabrous; petiole 4-5 cm long. Female flowers solitary, 5-6 mm across; pedicels 2.5-3 cm long; petals 2.5-3 x 1.5-2 mm, densely hispid; staminodes subulate; style 3-fid at apex. Male flowers 3-10, on peduncled umbels, 6-7 mm across; filaments bearded. Berry 1-1.3 x 0.4-0.6 cm, oblong, cylindrical, reddish; seeds obovoid, smooth.
Flowering & Fruiting: October-December.
Distribution: India to south-east Asia. Occasional; in evergreen forests. *RNMK 0155*, Talimala; *RNMK 1320*, Aranamala.

Zehneria scabra (L. f.) Sond. In Harv. & Sond., Fl. Cap. 2: 486. 1862; Manilal, Fl. Silent Valley 122. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 202. 1988; Vajr., Fl. Palghat Dist. 217. 1990; Sivar. & P. Mathew, Fl. Nilambur 302. 1997; Mohanan & Sivad., Fl. Agasthyamala 292. 2002. *Bryonia scabra* L. f., Suppl. Pl. 423. 1781. *Zehneria hookeriana* Arn. In Hook.'s, J. Bot. 3: 275. 1841; Clarke in Hook. F., Fl. Brit. India 2: 624. 1879. *Melothria perpusilla* sensu Chakrav., Rec. Bot. Sur. India 146. 1959 p.p, *Melothria □aturaliz* sensu Gamble, Fl. Pres. Madras 538(380). 1919, non (Bl.) Cogn. 1881.

Glabrous climbers. Leaves 6-7 x 6-7 cm, triangular, cordate at base, 3-lobed or entire, glandular toothed; petiole 2-3 cm long. Umbel 3-5 flowered; peduncle 1.5-2 cm long; female flowers 5-6 mm across; calyx tube 2-3 mm long, aturalized; petals 2-2.5 x 1.5-2 mm, obovate; stigma 3-lobed; male flowers larger, 7-8 mm across; petals ovate, acute. Berry 7-8 mm across, globose; seeds obovate, biconvex, smooth.

Flowering & Fruiting: February-June.

Distribution: Tropical Africa, India and south-east Asia. Common; in evergreen forests and plantations. *RNMK 2665,* Kalpetta; *RNMK 1921,* Puliyarmala; *RNMK 3633*, Sugandhagiri.

BEGONIACEAE C. Agardh

Aphor. Bot. 200. 1824.

BEGONIA Linnaeus

Sp. Pl. 1056. 1753.

Annuals or perennial herbs; stem fleshy or absent. Leaves alternate, asymmetric, entire, toothed or lobed, petiolate; stipules 2, dominant, deciduous. Flowers monoecious, in axillary peduncled cymes; bracts opposite; bracteoles similar; sepals 2 or 4, in biseriate opposite pairs, inner smaller; stamens in male flowers many; filaments free or united at base; anthers obovoid; ovary inferior, 3-celled, 3-angled or winged; ovules many, on simple or branched axile placentation; style 2-4, free; stigma branched. Fruit a loculicidal capsule, 3-winged; seed many, with reticulate testa.

1. Scapigerous herbs; scape 20-80 cm long ..... **B. floccifera**
1. Stem elongate; peduncles to 5 cm long 2
2. Sepals 4; wings of the capsule strongly truncate at apex ..... **B. integrifolia**
2. Sepals 2-4; wings of capsule round 3
3. Leaves pubescent, margins coarsely serrate ..... **B. malabarica**
3. Leaves glabrous, entire or distantly dentate ..... **B. fallax**

Begonia fallax A.DC. in DC., Prodr. 15:329. 1864; Clarke in Hook. F., Fl. Brit. India 2: 643. 1879; Ansari & Nair, J. Econ. Tax. Bot. 5: 125. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 207. 1996; Sivar. & P. Mathew, Fl. Nilambur 303. 1997. *Diploclinium lindleyanum* Wight, Ic. T. 1817. 1852.

Shrubs; stems reddish, glabrous. Leaves 15-18 x 8-10 cm, ovate, unequally cordate at base, entire or shallowly and broadly dentate, glabrous, nerves prominent, reddish, dividing after the middle of the lamina; petiole 2-5 cm long; stipules ca. 2.5 x 0.8 cm, oblong-lanceolate, glabrous, whitish; peduncle 3-4 cm long, axillary, dichotomously branched; cymes 5-6 cm across; flowers few; pedicels ca. 1 cm long; male sepals 4, orbicular, pale pink, inner smaller; anthers truncate. Capsule ca. 2 x 3.5 cm, obovate, 3-winged; wing horizontal at apex; placentas 2-fid; seeds many, minute, oblong, cylindrical, ridged and reticulate at one end.

Flowering & Fruiting: December-March.
Distribution: Endemic to Peninsular India. Occasional; in evergreen forests. *RNMK 1665,* Vythiri.

Begonia floccifera Bedd., Ic. T. 11. 1868-1874; Clarke in Hook. F., Fl. Brit. India 2: 654. 1879; Gamble, Fl. Pres. Madras 546(386). 1919; Vajr., Fl. Palghat Dist. 218. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 207. 1996; Mohanan & Sivad., Fl. Agasthyamala 295. 2002.

Stem rhizomatous. Leaves 16-18 cm across, reniform or orbicular, obliquely cordate, distantly toothed, floccose-pubescent below, nerves 10-11, prominent; petiole 27-30 cm long. Peduncle solitary or 2-3 together, pubescent; cymes 9-10 cm across, branched; pedicels filiform; flowers many; male sepals 4, outer sepals orbicular; anthers truncate at apex; female sepals 2, orbicular; styles 3, stigmas branched. Capsule 1-1.2 x 1-1.5 cm; seeds many, vertically ridged, brown.
Flowering & Fruiting: January-February.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1755,* Meenmutty.

Begonia integrifolia Dalz. In Hook.'s J. Bot. Kew Gard. Misc. 3: 230. 1851; Hook. F., Fl. Brit. India 2: 648. 1879; Gamble, Fl. Pres. Madras 546(385). 1919; Ansari, Fl. Kasaragod Div. 180. 1985; Vajr., Fl. Palghat Dist. 218. 1990; Sivar. & P. Mathew, Fl. Nilambur 303. 1997.

Sacculent herbs; stem short. Leaves 10-14 x 6-8 cm, ovate, cordate, nearly entire, acute, glabrous. Peduncles solitary, axillary; flowers many; sepals of male flowers 4 in 2-rows, outer sepals ovate, larger; stamens numerous; ovary 3 celled; stigmas twisted. Capsules 0.8-1 cm across, 2-celled, wings broad, truncate at apex; seeds many
Flowering & Fruiting: July-August.
Distribution: Endemic to Peninsular India. Rare; in open areas in hills. *RNMK 1987,* Chembra.

Begonia malabarica Lamk., Encycl. 1: 393. 1785; Gamble, Fl. Pres. Madras 546(386). 1919; Ansari & Nair, J. Econ. Tax. Bot. 5: 126. 1985; Ansari, Fl. Kasaragod Div. 180. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 203. 1988; Vajr., Fl. Palghat Dist. 219. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 207. 1996; Sivar. & P. Mathew, Fl. Nilambur 304. 1997; Mohanan & Sivad., Fl. Agasthyamala 295. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 239. 2005. *Diploclinium dipetala* Wight, Ic. T. 1813. 1852. **Plate 19h.**

Shrubs, to 2 m high; stem terete, glabrous. Leaves 15-18 x 5-8 cm, ovate, strongly unequal at base, toothed and serrate along the margins, hispid; petiole 6-7 cm long; stipule 1-1.3 x 0.5-1 cm, lanceolate. Peduncles 3-3.5 cm, axillary; cymes 5-10 cm across, dichotomous; flowers many; male sepals 2, 1-

1.5 cm across, orbicular, pink; anthers 2-3 mm long, connective produced into a orbicular appendage; female sepals reniform. Capsule 2-3 x 1.5-2 cm, wings obtuse

Flowering & Fruiting: August-April.

Distribution: Peninsular India and Sri Lanka. Occasional; in evergreen forests. *RNMK 1232,* Chembra.

DATISCACEAE R. Br. ex. Lindl.

Intr. Nat. Syst. Bot. 109. 1830.

TETRAMELES R. Brown

Observ. Pl. Denham & Clapperton 230. 1826.

Tetrameles nudiflora R. Br. In Bennett, Pl. Jav. Rar. 79. T.17. 1838; Hook. F., Fl. Brit. India 2: 627. 1879; Gamble, Fl. Pres. Madras 544(384). 1919; Ansari, Fl. Kasaragod Div. 181. 1985; Vajr., Fl. Palghat Dist. 217. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 208. 1996; Sivar. & P. Mathew, Fl. Nilambur 304. 1997; Mohanan & Sivad., Fl. Agasthyamala 293. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 239. 2005. *Tetrameles grahamiana* Wight, Ic. T. 1956. 1853.

Tall trees with large buttresses; bark white, smooth. Leaves alternate, 13-15 cm across, orbicular, cordate at base, 2-3 lobed, glandular-serrate, densely pubescent below; petiole 5-10 cm long. Flowers dioecious in panicled drooping racemes; male flowers 4-5 mm across; sepals 4, ovate, united at base; stamens 4, free; female flowers 4-5 mm long; ovary 1-celled; inferior; ovules many, on 4-parietals placentas, styles 4, free, bulged at tip. Fruit a capsule, ovoid, opening by terminal pore; seeds brown.

Flowering & Fruiting: March-May.

Distribution: Paleotropics. Occasional; in evergreen and moist deciduous forests. *RNMK 3342,* Thariodu; *RNMK 1887*, Muthanga.

CACTACEAE Juss.

Gen. Pl. 310. 1789.

OPUNTIA P. Miller

Gard. Dict. Abr. Ed. 4. (unpaged) 1754.

Opuntia vulgaris Mill., Gard. Dict. (ed. 8) 1.1768; Anil Kumar, Sivad. & N.Ravi., Fl. Pathanamthitta 240. 2005. *Cactus monacanthos* Willd., Enum. Pl. Suppl. 33. 1813 Opuntia monacantha (Willd.) Haw., Suppl. Pl. Succ. 81. 1819; Gamble, Fl. Pres. Madras 548(387). 1919. *Cactus indicus* Roxb., Fl. India 2: 475. 1832.

Subshrubs, fleshy branches, areoles woolly; spines 2-2.5 cm. Leaves subulate or absent. Flowers solitary, sessile; calyx lobes 0.7-0.8 cm, ovate, pubescent, tube adnate to ovary; corolla 6-7 cm across; stamens many, filaments 0.5-2 cm; ovary inferior, 2-3 cm long; ovules many, style 1-2 cm, stigma 3-5 lobed. Berry 4-5 x 2-3.5 cm, obovoid.

Flowering & Fruiting: November-March.
Distribution: South east America; naturalized in India. Occasional; in moist deciduous forests. *RNMK 1564,* Pulpally.

AIZOACEAE Rudolphi

TRIANTHEMA Linnaeus

Sp. Pl. 1: 223. 1753.

Trianthema portulacastrum L., Sp. Pl. 223. 1753; Gamble, Fl. Pres. Madras 550(389). 1919; Manilal & Sivar., Fl. Calicut 125. 1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 203. 1988; Vajr., Fl. Palghat Dist. 221. 1990; Sivar. & P. Mathew, Fl. Nilambur 305. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 334. 2009. *Trianthema monogyna* L., Mant. Pl. 1: 69. 1767; Clarke in Hook. f., Fl. Brit. India 2: 660. 1879. *Trianthema obcordata* Roxb., Fl. India 1: 445. 1832.

Prostrate herbs, glandular tomentose. Leaves opposite, 3-3.5 x 2-2.5 cm, orbicular, obtuse, entire, densely hairy; petioles 2-2.5 cm, connate with stipules. Flowers 7-8 mm across, axillary, solitary, sessile; calyx tube adnate to the ovary, lobes pink, ca. 5 mm long; stamens 20, free; ovary 2-celled; style 1. Capsule 5-6 mm long, turbinate, truncate at apex, 2-lobed; seeds 2, subreniform.
Flowering & Fruiting: April-June.
Distribution: Tropics of the World. Common; in open areas. *RNMK 3541,* Puthoorvayal.

MOLLUGINACEAE Hutch.

Fam. Fl. Pl. 1: 128. 1926.

1. Flowers in terminal and axillary cymes or in panicles .....**Mollugo**
1. Flowers in terminal and axillary clusters .....**Glinus**

GLINUS Linnaeus

Sp. Pl. 463. 1753.

Glinus lotoides L., Sp. Pl. 463. 1753; V. S. Ramach. & V. J. Nair, Fl. Cannanore 204. 1988; Vajr., Fl. Palghat Dist. 220. 1990. *Mollugo hirta* Thunb., Prodr. Fl. Cap. 24. 1794; Clarke in Hook. f., Fl. Brit. India 2: 662. 1879. *Mollugo lotoides* (L.) O. Kuntze., Rev. Gen. Pl. 1: 214. 1891; Gamble, Fl. Pres. Madras 552(390). 1919.

Prostrate herbs. Leaves whorled, 3 or 4 at each node, ca. 3 x 1.5 cm, obovate to orbicular, obtuse, penninerved; petiole 5-9 mm long. Flowers in greenish-white, axillary fascicles of 3-5; pedicels 5-8 mm long; sepals densely stellate hairy, keeled; stamens 10-15, mixed with staminodes; ovary 3-celled, ellipsoidal, glabrous; styles 3, short.
Flowering & Fruiting: April-May.
Distribution: Widespread in tropics and subtropics. Occasional; in moist deciduous forests. *RNMK 2987,* Bavali.

MOLLUGO Linnaeus

Sp. Pl. 49. 1753.

Mollugo pentaphylla L., Sp. Pl. 89. 1753; Gamble, Fl. Pres. Madras 553(390). 1919; Manilal & Sivar., Fl. Calicut 127. 1982; Ansari, Fl. Kasaragod Div. 183. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 205. 1988; Vajr., Fl. Palghat Dist. 221. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 209. 1996; Sivar. & P. Mathew, Fl. Nilambur 307. 1997; Mohanan & Sivad., Fl. Agasthyamala 296. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 241. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 333. 2009. *Mollugo stricta* sensu Clarke in Hook. f., Fl. Brit. India 2: 663. 1879 p.p., non L. 1762.

Erect herbs, to 20 cm high; stem quadrangular. Leaves whorled, 3-5 at each node, 2.5-3 x 0.8-1 cm, obovate to lanceolate, obtuse or acute. Flowers 3-4 mm across, greenish-white, in terminal panicled cymes; pedicels 5-8 mm long, filiform; sepals 5, obovate, obtuse, glabrous, white turning green; stamens 3, free; ovary 3-5 celled, ovules many, axile, styles 3, free. Capsule ellipsoid, glabrous; seeds many, sub-reniform, muriculate, dark brown.

Flowering & Fruiting: July-September.

Distribution: Pantropical. Common; moist deciduous forests. *RNMK 3247,* Thakarapady.

APIACEAE Lindl.

Intr. Nat. Syst. Bot. ed. 2: 21. 1836.

1. Prostrate herbs; leaves simple 2
1. Erect herbs; leaves pinnate 3
2. Leaves digitately 7-9 lobed ..... **Hydrocotyle**
2. Leaves not lobed ..... **Centella**
3. Lower leaves simple; mericarps subglobose, not winged..... **Pimpinella**
3. All leaves compound; mericarps dorsally compressed, laterally winged..... 4
4. Leaves radical; prominently spinous dentate ..... **Eryngium**
4. Leaves not radical and not spinous dentate 5
5. Leaflets linear-lanceolate; petals radiant ..... **Peucedanum**
5. Leaflets ovate; petals not radiant ..... **Heracleum**

CENTELLA Linnaeus

Sp. Pl. ed. 2, 1393. 1763.

Centella asiatica (L.) Urban in Mart., Fl. Braz. 11:287. t.78. f. 1879; Gamble, Fl. Pres. Madras 556(392). 1919; Manilal & Sivar., Fl. Calicut 128. 1982; Ansari, Fl. Kasaragod Div. 183. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 205. 1988; Manilal, Fl. Silent Valley 124. 1988; Vajr., Fl. Palghat Dist. 222. 1990; Mukh. & Constance, Umbell. India 15. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 209. 1996; Sivar. & P. Mathew, Fl. Nilambur 308. 1997; Mohanan & Sivad., Fl. Agasthyamala 297. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 241. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 336. 2009. H*ydrocotyle asiatica* L., Sp. Pl. 234. 1753.

Herbs, rooting at nodes. Leaves 4.5-5 cm across, orbicular-reniform, crenate or sub-entire, glabrous, nerves radiating; petiole 10-12 cm long, sheathing at base. Flowers sessile, pink, in 2-5 flowered umbels; peduncles 1-2 cm long, axillary; calyx tube adnate to the ovary, lobes minute; petals 4, recurved at apex, pink; stamens 4, filaments erect; ovary 2-celled, ovule solitary in each cell; style erect, bilobed at apex. Fruit ovoid, 7-9-ribbed.
Flowering & Fruiting: Throughout the year.
Distribution: Tropical Asia and Africa. Common; in moist localities. *RNMK 2453,* Puthoorvayal; *RNMK 1187*, Poothady.

ERYNGIUM Linnaeus
Sp. Pl. 232. 1753.

Eryngium foetidum L., Sp. Pl. 232. 1753; Ellis & Karthik., J. Bomb. Nat. Hist. Soc. 70:597. 1973(1974); Mukh. & Constance, Umbell. India 19. 1993; V. S. Ramach. & V. J. Nair, Fl. Cannanore 206. 1988.

Erect herbs, up to 45 cm tall. Leaves 13-15 x 2-2.5 cm, radical, elliptic-obovate, spathulate, prominently spinous-dentate; petiols winged, sheathing. Inflorescence up to 20 cm long, in cylindric heads at the ends of the branches; bracts 2-2.5 x 1-1.5 cm. Cremocarps warted, glabrous.
Flowering & Fruiting: February-November.
Distribution: Indigenous to Central America; introduced and sometimes cultivated in Tropical Africa and Tropical and Subtropical Asia. Common; in open areas and margins of forests. *RNMK 3348*, Puthoorvayal.

HERACLEUM Linnaeus
Sp. Pl. 249. 1753.

Heracleum candolleanum (Wight & Arn.) Gamble, Fl. Pres. Madras 565(399). 1919; Mukh. & Constance, Umbell. India 243. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 209. 1996; Mohanan & Sivad., Fl. Agasthyamala 298. 2002. *Pastinaca candolleana* Wight & Arn., Prodr. 372. 1834. *Heracleum rigens* Wall. ex DC. var. *candolleana* (Wight & Arn.) Clarke in Hook. f., Fl. Brit. India 2: 715. 1879, p. p. *Heracleum rigens* var. *ligusticifolium* (Wight) Clarke in Hook. f., Fl. Brit. India 2: 716. 1879. *Heracleum courtallense* Gamble, Fl. Pres. Madras 565(399). 1919.

Shrubs; stem ridged, branched. Leaves 40-45 x 20-25 cm, 1 or 2 pinnate; leaflets 7-9 or more, 13-15 x 9-10 cm, lobed, acute, serrate, scabrous, coriaceous. Umbels compound, terminal, corymbose; secondary peduncles to 6 cm long; rays 13, each 3-5 cm long, spreading; pedicels 6-9 mm long, many-together, spreading; flowers 5-merous, 2-4 mm across, calyx 5-toothed; petals 3, ovate, acuminate, with a strong midrib, glabrous; stamens 5, free, anthers ovate; ovary compressed. Fruit 7-9 x 4-7 mm, biconvex, dorsally compressed, winged, glabrous.
Flowering & Fruiting: April-October.
Distribution: Endemic to southern Western Ghats. Occasional; in grasslands. *RNMK 3009,* Chembra.

HYDROCOTYLE Linnaeus

Sp. Pl. 234. 1753.

Creeping herbs with runners, rooting at nodes. Leaves alternate or clustered at nodes, orbicular, cordate at base, palminerved, long-petioled. Flowers 10-30 together in axillary sessile or peduncled umbels, pedicelled; calyx teeth minute; petals 5, oblong, incurved at apex; stamens 5, alternipetalous; ovary 2-celled, inferior; ovules 1 in each cell; styles 2, dialated at base, stigmas 2, recurved. Fruit a two laterally compressed mericarps, ridged.

1. Leaves ca. 7 cm across; petiole to 30 cm long; umbels 3-5 together ..... **H. javanica**
1. Leaves to 1.5 cm across; petiole to 6 cm long ..... **H. sibthorpioides**

Hydrocotyle javanica Thunb., Diss. Hydroc. n. 17. t. 2. 1798; Gamble, Fl. Pres. Madras 556(392). 1919; V. S. Ramach. & V. J. Nair, Fl. Cannanore 206. 1988; Manilal, Fl. Silent Valley 125. 1988; Vajr., Fl. Palghat Dist. 222. 1990; P.K. Mukh. & Constance, Umbell. India 11. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 210. 1996; Sivar. & P. Mathew, Fl. Nilambur 309. 1997; Mohanan & Sivad., Fl. Agasthyamala 298. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 242. 2005. *Hydrocotyle hispida* Buch.-Ham ex D. Don, Prodr. Fl. Nepal. 182. 1825. *Hydrocotyle polycephala* Wight & Arn., Prodr. 366. 1834.

Creepers, stem villous, rooting at nodes. Leaves 8-9-lobed, crenate, obtuse, 8-9-ribbed from base; sparsely villous. Umbels fascicled; peduncles 1.5-2 cm long; flowers 20-30 together, pedicellate; petals ovate, acute. Fruit 1-1.5 x 2-3 mm, mericarps compressed, hemispherical, smooth.

Flowering & Fruiting: October-May.

Distribution: Tropical Asia. Common; in evergreen forests and plantations. *RNMK 1876,* Pookodu; *RNMK 1098*, Pozhuthana; *RNMK 1234*, Sugandhagiri.

Hydrocotyle sibthorpioides Lamk., Encycl. 3: 153. 1789; Mukh. & Constance, Umbell. India 12. 1993. *Hydrocotyle tenella* Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 183. 1825. *Hydrocotyle rotundifolia* Roxb. ex DC., Prodr. 4: 64. 1830; Gamble, Fl. Pres. Madras 556(392). 1919.

Slender creeping herbs, rooting at nodes, glabrous. Leaves 7-9 lobed, lobes crenate, villous beneath. Umbels peduncled, solitary; peduncles 1-2 cm long; flowers greenish-yellow, densely packed; petals 2-3 mm long, oblong, greenish. Mericarps hemispherical, compressed, muricate.

Flowering & Fruiting: Throughout the year.

Distribution: Tropical Asia, Africa, China, and Japan; introduced into America, Australia and India. Rare; in moist places. *RNMK 3457,* Kalpetta.

PEUCEDANUM Linnaeus

Sp. Pl. 245. 1753.

Peucedanum anamallayense Clarke in Hook. f., Fl. Brit. India 2: 710. 1879; Gamble, Fl. Pres. Madras 563(397). 1919 ; Vajravelu, Fl. Palghat Dist. 222.

1990 ; Mukherjee & Const., Umbell. India 218. 1993 ; Sasidh. & Sivar., Fl. Pl. Thrissur For. 210. 1996.

Decumbent herbs, rootstock tuberous. Leaves decompound, 15-20 x 10-15 cm, leaflets oblong, apex acute, penninerved; rachis widely sheathing at base. Umbels terminal, compound; rays 5-7, each 3 cm long; flowers polygamous, ca. 1.5 mm across, pedicels ca. 1 cm long, villous; calyx shortly 5 toothed; petals yellow, ovate, cuspidate with a strong midrib; stamens 5, eret, filaments ca. 1 mm long; pistillode biglobose; ovary glabrous, 2- celled, compressed. Mericarps orbicular, ca. 8 mm across, biconvex, striate, winged.
Flowering & Fruiting: November-January.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forest margins. *RNMK 2451,* Pookodu.

PIMPINELLA Linnaeus
Sp. Pl. 263. 1753.

Herbs. Leaves 2 or 3 pinnate, segments ovate or lanceolate, entire or toothed. Flowers polygamous in compound umbels with many rays; bracts linear to ovate; calyx truncate or with small teeth; petals inflexed at the tip, entire or emarginated; stylopods usually small; ovary glabrous. Fruit ellipsoid or suborbicular, winged, ridged, vittae solitary in the dorsal furrows and 2-6 on the commissure; seeds plano-convex.

1. Lower leaves 3- foliolate .....**P. wallichiana**
1. Lower leaves orbicular.....2
2. Fruit globose, glabrous .....**P. heyneana**
2. Fruit densely villous, ovate.....**P. candolleana**

Pimpinella candolleana Wight & Arn., Prodr. 369. 1834; Gamble, Fl. Pres. Madras 560(395). 1919; Mukh. & Constance, Umbell. India 148. 1993. *Carum candolleanum* (Wight & Arn.) Franchet, Bull. Soc. Philom. Paris VIII 6: 128. 1894.

Erect or decumbent herbs, to 65 cm high; stem terete. Leaves alternate, 5-7 cm across, lower leaves orbicular, upper ones 3-lobed, cordate at base, toothed; petiole 1-6 cm long, sheathing at base. Umbels terminal, panicled; rays 10; secondary rays many, each 3-4 cm long; flowers 9-16 in an umbellule, 1.5-2 mm across, white; pedicels 5-6 mm long; calyx shortly 5-toothed; petals 5, orbicular; stamens 5. Fruit ovate, densely villous, rugose.
Flowering & Fruiting: August-November.
Distribution: Endemic to Western Ghats. Rare; in evergreen forests. *RNMK 1346,* Chembra.

Pimpinella heyneana (DC.) Kurz, J. Asiat. Soc. Bengal 46: 115. 1877; Gamble, Fl. Pres. Madras 560(395). 1919; Ansari, Fl. Kasaragod Div. 184. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 207. 1988; Manilal, Fl. Silent Valley 126. 1988; Vajr., Fl. Palghat Dist. 223. 1990; Mukh. & Constance,

Umbell. India 145. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 212. 1996; Sivar. & P. Mathew, Fl. Nilambur 309. 1997. *Helosciadium heyneanum* DC., Prodr. 4: 106. 1830.

Erect or decumbent herbs, stem terete. Leaves alternate, 5-7 cm across, lower leaves orbicular, upper ones 3-lobed, base cordate, toothed; petiole 1-6 cm long, sheathing at base. Umbels terminal, panicled; rays 8-10; secondary rays many, each 3-4 cm long; flowers 9-16 in an umbellule, 1.5-2 mm across, white; pedicels 5-6 mm long; calyx shortly 5-toothed; petals 5, orbicular; stamens 5. Fruit globose, glabrous, rugose.

Flowering & Fruiting: October-February.

Distribution: India, Myanmar and Sri Lanka. Occasional; in evergreen forest. *RNMK 1778,* Kurichiarmala.

Pimpinella wallichiana (Miq.) Gandhi in Sald. & Nicols., Fl. Hassan Dist. 417. 1976; Mukh. & Constance, Umbell. India 150. 1993; V. S. Ramach. & V. J. Nair, Fl. Cannanore 207. 1988. *Helosciadium wallichianum* Miq., Bot. Zeit. 7: 775. 1849. *Pimpinella monoica* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 212. 1851; Gamble, Fl. Pres. Madras 560(395). 1919. *Pimpinella katrajensis* Rao & Hemadri, Indian For. 102: 232. 1976.

Erect herbs, up to 45 cm tall. Lower leaves 3-foliolate; leaflets ovate-lanceolate, acute, glabrous, sharply serrate, cordate at base; terminal leaflets smaller. Flowers whtie, small. Fruits didymous, sparsely papillose.

Flowering & Fruiting: November-December.

Distribution: Endemic to Peninsular India. Occasional; in moist deciduous forests. *RNMK 3568,* Muthanga.

ARALIACEAE Juss.

Gen. Pl. 217. 1789.

1. Stem and leaves densely prickly; leaves bipinnate; leaflets serrate..... **Aralia**
1. Stem and leaves unarmed; leaves digitate; leaflets entire..... **Schefflera**

ARALIA Linnaeus

Sp. Pl. 273. 1753.

Aralia malabarica Bedd., Fl. Sylv. t. 15. 1871; Clarke in Hook. f., Fl. Brit. India 2: 722. 1879; Gamble, Fl. Pres. Madras 567(400). 1919; Manilal, Fl. Silent Valley 126. 1988; Vajr., Fl. Palghat Dist. 223. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 212. 1996; Jun Wen *et al.,* Rheedea 12: 12. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta Dist. 243. 2005.

Large prickly shrubs. Leaves up to 1 m long, bipinnately compound; leaflets opposite, 16-18 x 5-7 cm, ovate, oblique at base, acuminate, sharply serrate, penninerved, sessile; rachis prickly, sheathing at base. Inflorescence large panicled umbels, 30-35 cm across; bracts ovate, acuminate; flowers 3-4 mm

across; 12-16 together; pedicels 1-1.5 cm long; sepals 5, ovate, acute; petals ovate-oblong, obtuse, spreading, yellow; stamens 5, inflexed in bud; ovary inferior, 5-celled, globose; ovule 1 in each cell; styles 5, free. Berry 5-angled, rugose; seeds five, 3-4 mm across, 3-angled, light brown.
Flowering & Fruiting: August-September.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1876,* Brahmagiri.

SCHEFFLERA J. R. Forster & G. Forster
Charact. Gen. 45. 1776.

Shrubs or trees, branches scandent, stout. Leaves alternate, digitate; leaflets entire or distantly toothed, petiolulate, penninerved; petiole long, sheathing at base. Flowers in terminal panicled umbels or racemes, pedicelled; calyx tube united to the ovary, mouth truncate or 5-toothed; petals 5, 6 or more, valvate, spreading, oblong; stamens 5, 6 or more, free; ovary 5, 6 or more-celled; ovules 1 in each cell; styles equal to the number of carpels, combined or free. Fruit a drupe, 5-6-angled; seeds 5 or 6, compressed.

1. Flowers sessile .....**S. capitta**
1. Flowers pedicellate 2
2. Leaflets uneven along the margins; branches of panicles racemosa .....**S. racemosa**
2. Leaflets entire; branches of panicles umbellate.....3
3. Lateral nerves of leaflets 6-8 pairs, prominently reticulate.....**S. venulosa**
3. Lateral nerves of leaflets indistinct 4
4. Umbels 20-30 flowered.....**S. wallichiana**
4. Umbels 8-12 flowered ..... **S. micrantha**

Schefflera capitata (Wight & Arn.) Harms in Engl. & Prantl, Naturl. Pflanzenfam. 3(8): 36. 1894; Gamble, Fl. Pres. Madras 571(403). 1919; V. S. Ramach. & V. J. Nair, Fl. Cannanore 207. 1988; Manilal, Fl. Silent Valley 127. 1988. *Paratropia capitata* Wight & Arn., Prodr. 378. 1834. *Brassaia capitata* (Wight & Arn.) Clarke in Hook. f., Fl. Brit. India 2: 732. 1879.

Medium sized trees, up to 7.5 m tall. Leaves digitate; leaflets 5-7, radiating, 14-15 x 5-6 cm, oblong-lanceoalte, coriaceous, shortly obtuse, glaucous beneath, reticulations not conspicuous above, petiolues up to 7 cm long. Flowers 0.5-0.7 cm across, in axillary branched panicles up to 22 cm long.
Flowering & Fruiting: February-May.
Distribution: Endemic to southern Western Ghats. Common; in evergreen forests. *RNMK 2132,* Chembra; *RNMK 2459,* Banasuramala; *RNMK 3321*, Chanthanathodu.

Schefflera micrantha (Clarke) Gamble, Fl. Pres. Madras 569(402). 1919. *Heptapleurum rostratum* (Wight) Bedd. var. *micranthum* Clarke in Hook. f., Fl. Brit. India 2: 729. 1879. *Schefflera rostrata* (Wight) Harms var. *micrantha*

(Clarke) Mahesh., Bull. Bot. Surv. India 2: 376. 1960; Manilal, Fl. Silent Valley 127. 1988; Sivar. & P. Mathew, Fl. Nilambur 310. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 243. 2005.

Trees. Leaves 15-20 x 5-9 cm, oblong-elliptic, base rounded, apex acute, lateral veins faint. Umbels 2-4 cm long, forming terminal panicles; flowers 8-12; calyx truncate; petals pale green. Drupe angled.

Flowering & Fruiting: April-August.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 1267,* Sugandhagiri.

Schefflera racemosa (Wight) Harms in Engl. & Prantl, Naturl. Pflanzenfam. 3(8): 38. 1894; Gamble, Fl. Pres. Madras 570(402). 1919; V. S. Ramach. & V. J. Nair, Fl. Cannanore 208. 1988. *Hedera racemosa* Wight, Ic. t. 1015. 1845. *Heptapleurum racemosum* (Wight) Bedd., Fl. Sylv. t. 214. 1872; Clarke in Hook. f., Fl. Brit. India 2: 729. 1879.

Small trees; young parts rusty tomentose. Leaves 8-foliolate; leaflets 10-11 x 4-4.5 cm, elliptic, acuminate at apex, acute at base, margins uneven; nerves 8-13 pairs, not prominent; petiolule 3-4 cm long; petiole 23-25 cm long. Panicles 30-35 cm broad, from stout old branches; flowers 5-7 mm across; pedicels 1-1.5 cm long; bracts ovate, obtuse; calyx teeth obtuse; petals ovate, acute; filaments 3-4 mm long; styles united into a short column. Berry 5-angled, glabrous with persistent style.

Flowering & Fruiting: March-April.

Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 1999,* Brahmagiri.

Schefflera venulosa (Wight & Arn.) Harms in Engl. & Prantl, Naturl. Pflanzenfam. 3(8): 39. 1894; Gamble, Fl. Pres. Madras 570(403). 1919; Manilal, Fl. Silent Valley 128. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 208. 1988; Vajr., Fl. Palghat Dist. 224. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 212. 1996; Sivar. & P. Mathew, Fl. Nilambur 310. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 243. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 337. 2009. *Paratropia venulosa* Wight & Arn., Prodr. 377. 1834. *Heptapleurum venulosum* (Wight & Arn.) Seem., J. Bot. 3: 80. 1865; Clarke in Hook. f., Fl. Brit. India 2: 729. 1879, p.p.

Small trees; branchlets 0.5-0.7 cm thick. Leaves 5 or 6 foliolate; leaflets 12-14 x 7-8 cm, ovate-oblong, abruptly acuminate, rounded at base; nervules prominently reticulate; petiolule 7-10 cm long; stipule ca. 5 mm broad, black. Panicles ca. 20 cm across, glabrous; umbels 2-3 cm across, 3-12-flowered; flowers brown; pedicel 8-12 mm long; calyx truncate; petals 1-2 x 2.5-3 mm, triangular. Berry 3-4 x 4-5 mm, globose, 5-angled.

Flowering & Fruiting: March-June.

Distribution: India, Myanmar and Indo-China; Common; in evergreen forests. *RNMK* 1598, Thirunelli.

Schefflera wallichiana (Wight & Arn.) Harms in Engl. & Prantl, Naturl. Pflanzenfam. 3(8): 38. 1894; Gamble, Fl. Pres. Madras 570(403). 1919; V. S. Ramach. & V. J. Nair, Fl. Cannanore 209. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 212. 1996. *Paratropia wallichiana* Wight & Arn., Prodr. 77. 1834. *Heptapleurum wallichianum* (Wight & Arn.) Clarke in Hook. f., Fl. Brit. India 2: 730. 1879.

Small trees or robust epiphytes; branchlets ca. 2 cm thick. Leaves 5-8-foliolate, leaflets 18-20 x 9-10 cm, oblong, acute at apex, rounded at base, nervules not prominent; petiolule ca. 5 cm long; stipule 1.5-2 cm broad, hyaline. Panicles large, terminal; umbels 20-30-flowered, peduncled; peduncle 2-3 cm long; flowers 5-6 mm across; pedicels 0.7-1 cm long; calyx truncate; petals 5, 2-3 x 3-4 mm, triangular; style absent; stigma sessile. Berry 5-6 x 6-7 mm, 5-angled.

Flowering & Fruiting: April-May.

Distribution: South India and Sri Lanka. Occasional; in evergreen forests. *RNMK 1695,* Chanthanathodu.

CORNACEAE (Dumort.) Dumort.

Anal. Fam. Pl. 33, 34. 1829.

MASTIXIA Blume

Bijdr. 654. 1825.

Mastixia arborea (Wight) Bedd. ssp. **meziana** (Wang.) Matthew, Blumea 23: 89. 1976; Matthew, Fasc. Fl. India 19: 27. 1988; Vajr., Fl. Palghat Dist. 225. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 213. 1996. *Mastixia meziana* Wang., Feddes Repert. 4: 336. 1907; Gamble, Fl. Pres. Madras 573(405). 1919. *Mastixia pentandra* sensu Clarke in Hook. f., Fl. Brit. India 2: 746. 1879, non Bl., 1826; Gamble, Fl. Pres. Madras 574(405). 1919.

Large trees, bark grayish-brown; branchlets ferruginous tomentose. Leaves 13-15 x 6-7 cm, cuneate at base, nerves 5-7 pairs, pale beneath; nervules parallel; petiole 2-3 cm long. Panicles densely tomentose; flowers sessile, 7-8 mm across; petals villous. Drupe 3-3.5 x 1.5-2 cm, oblong, glabrous.

Flowering & Fruiting: January-May.

Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 2074,* Chembra.

ALANGIACEAE DC.

Prodr. 3: 203. 1828.

ALANGIUM Lamarck

Encycl. Meth., Bot: 174. 1783, *nom. cons.*

Trees, shrubs or climbers, branchlets often spinescent. Leaves simple, alternate, entire to lobate. Flowers in axillary cymes or fascicles; calyx tube adnate to the ovary, lobes free; petals 4-10, valvate; stamens as many as or

thrice as the petals, uniseriate; disc annular; ovary inferior, 1 or 2 celled; ovule one, pendulous; style slender; stigma capitate, lobed or clavate. Drupe ribbed, crowned by the disc and calyx lobes.

1. Small trees; leaf base obliquely obtuse, puberulus below .....
..... **A. salvifolium** ssp. **salvifolium**
1. Scandent shrubs; leaf base rounded to subcordate..**A. salvifolium** ssp. **hexapetalum**

Alangium salvifolium (L. f.) Wang. in Engl., Pflanzenreich Alangiac. 9. 1910, ssp. **salvifolium**; Gamble, Fl. Pres. Madras 572(404). 1919; Matthew, Fasc. Fl. India 19: 5. 1988; Vajr., Fl. Palghat Dist. 224. 1990; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta Dist. 244. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 338. 2009. *Grewia salvifolia* L. f., Suppl. Pl. 409. 1781. *Alangium lamarckii* Thw., Enum. Pl. Zeyl. 133. 1859; Clarke in Hook. f., Fl. Brit. India 2: 741. 1879.

Small trees; branchlets tomentose. Leaves 10-15 x 3-4 cm, oblong, ovate or elliptic, apex acute, base obliquely obtuse, puberulus below; petiole 1-1.5 cm, tomentose. Flowers in axillary cymes or clusters, pedicel 4-5 mm, jointed; bracts ovate; calyx cupular, adnate to the ovary, tomentose; lobes 10, triangular-ovate; petals 2-2.5 x 4-5 cm, linear oblong, white, tomentose; stamens to 20; filaments ca. 1 cm long, base fleshy, villous; ovary turbinate, 1-celled; stigma capitate. Berry globose, crowned with calyx lobes.
Flowering & Fruiting: March-June.
Distribution: India, Sri Lanka, China, Vietnam, Thailand and Africa. Occasional; in moist deciduous forest and plantations. *RNMK 3548,* Pulpally; *RNMK 1185,* Poothady.

Alangium salvifolium (L.f.) Wang. ssp. **hexapetalum** (Lamk.) Wang. in Engl., Pflanzenreich Alangiac. 9. 1910; Gamble, Fl. Pres. Madras 572(404). 1919; Manilal & Sivar., Fl. Calicut 128. 1982; Ansari, Fl. Kasaragod Div. 184. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 209. 1988. *Alangium hexapetalum* Lamk., Encycl. 1: 175. 1783. *Alangium salviifolium* var. *hexapetalum* (Lamk.) Gamble, Fl. Madras 572(404). 1919. *Alangium glandulosum* Thw., Enum. Pl. Zeyl. 133. 1859. *Alangium salvifolium* (L. f.) Wang. ssp. *sundanum* (Miq.) Bloem., Bull. Jard. Bot. Buitenz. Ill, 16: 156. 1939; Matthew, Fasc. Fl. India 19: 5. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 213. 1996; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 404. 2009.

Scandent shrubs. Leaves alternate, 16-18 x 6-7 cm, obovate-oblong, acuminate at apex, round to subcordate at base, nerves 5-6 pairs, lowest pair from the base, rib-like; nervules reticulate, subparallel; petiole 1-1.5 cm long. Flowers 2-2.5 cm long, in axillary fascicles; pedicels 8-9 mm long pubescent; calyx cupular, 5-7 mm across, 7-teethed, densely tomentose; petals 7, linear-oblong, tomentose; stamens 14, filaments 8-9 mm long, ciliate below; anthers linear. Berry 2-2.5 x 1-1.3 cm, ellipsoid, tomentose.

Flowering & Fruiting: March-August.
Distribution: Indo-Malesia. Occasional; in moist deciduous forests. *RNMK 2246,* Mananthavady.

RUBIACEAE Juss.

Gen. Pl. 196. 1789.

1. Leaves whorled 2
1. Leaves opposite 3
2. Scabrous climbers; leaves 3-ribbed ..... **Rubia**
2. Erect shrubs; leaves penninerved ..... **Wendlandia**
3. Flowers in globose heads 4
3. Flowers not in globose heads 8
4. Calyx tubes fused into a fleshy mass; ovules many in each locule of the ovary ..... **Morinda**
4. Calyx tubes distinct, free; ovules 2 in each locule of the ovary 5
5. Bracts present; corolla lobes valvate 6
5. Bracts absent; corolla lobes imbricate 7
6. Leaves cordate at base; calyx toothed ..... **Haldina**
6. Leaves not cordate at base; calyx truncate ..... **Mitragyna**
7. Seeds winged ..... **Psydrax**
7. Seeds not winged ..... **Neolamarckia**
8. Ovules 2 or more in each locule of the ovary 9
8. Ovules in 1 each locule of the ovary 21
9. Corolla lobes valvate 10
9. Corolla lobes twisted 16
10. Seeds winged ..... **Hymenodictyon**
10. Seeds wingless 11
11. One calyx lobe enlarged, petalloid ..... **Mussaenda**
11. Calyx lobes equal 12
12. Anthers dehiscing by apical pore 13
12. Anthers dehiscing laterally 14
13. Small herbs to 15 cm high; calyx lobes 4; stigma 1 ..... **Argostemma**
13. Large herbs to 100 cm high; calyx lobes 5; stigmas 2 ..... **Neurocalyx**
14. Flowers in scorpioidal cymes; calyx lobes 5; capsule obcordate ..... **Ophiorrhiza**
14. Flowers not in scorpioidal cymes; calyx lobes 4; capsule otherwise 15
15. Capsule many-seeded; seeds with a ventral cavity ..... **Neanotis**
15. Capsule few-seeded; seeds without a ventral cavity ..... **Hedyotis**
16. Climbing shrubs ..... **Oxyceros**
16. Erect shrubs 17
17. Plants armed with axillary spines; flowers solitary ..... **Catunaregam**
17. Plants unarmed; flowers cymose 18
18. Leaves decussate ..... **Tarenna**
18. Leaves not decussate 19
19. Corolla lobes valvate 20
19. Corolla lobes twisted 29

20. Flowers axillary 21
20. Flowers terminal.....27
21. Erect or creeping herbs 22
21. Shrubs or trees 25
22. Stipules entire; fruit a fleshy berry ..... **Geophila**
22. Stipules lobed or fimbriate; fruit a capsule 23
23. Sepals unequal; fruit dehiscence circumscissile..... **Mitracarpus**
23. Sepals equal; fruit dehiscence apical or lateral 24
24. Ovary 3-celled ..... **Richardia**
24. Ovary 2-celled ..... **Spermacoce**
25. Corolla tube with a transverse row of deflexed hairs inside ..... **Canthium**
25. Corolla tube not with a transverse row of deflexed hairs inside 26
26. Foetid plants; ovary 2-loculed..... **Saprosma**
26. Plants not foetid; ovary 4-loculed..... **Lasianthus**
27. Corolla tube curved ..... **Chassalia**
27. Corolla tube not curved 28
28. Annual herbs; corolla tube narrow ..... **Knoxia**
28. Perennial shrubs or small trees; corolla tube short ..... **Psychotria**
29. Ovary 1-loculed ..... **Tamilnadia**
29. Ovary 2-loculed 30
30. Flowers axillary ..... **Prismatoteris**
30. Flowers terminal.....31
31. Stigma 2..... **Ixora**
31. Stigma 1.....32
32. Style much longer than the corlla..... **Pavetta**
32. Style equal to corolla 33
33. Corolla 4 lobed 34
33. Corolla 5 lobed 35
34. Unarmed trees; fruit capsule in globose heads..... **Ochreinauclea**
34. Armed trees; fruit globose woody ..... **Ceriscoides**
35. Corolla tube 2 -2.5 cm long ..... **Psilanthus**
35. Corolla tube below 1.5 cm long.....36
36. Stamens included..... **Oldenlandia**
36. Stamens exserted ..... **Pseudidia**

ARGOSTEMMA Wallich

in Roxburgh, Fl. Indica 2: 324. 1824.

Argostemma courtallense Arn., Ann. Nat. Hist. 3: 22. 1839; Wight, Ic.t. 1160. 1846; Hook. f., Fl. Brit. India 3: 42. 1880; Gamble, Fl. Pres. Madras 590(417). 1921; Manilal & Sivar., Fl. Calicut 139. 1982; Ansari, Fl. Kasaragod Div. 187. 1985; Manilal, Fl. Silent Valley 129. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 211. 1988; Sivar., J. Bombay Nat. Hist. Soc. 63: 462. 1984; Vajr., Fl. Palghat Dist. 227. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 216. 1996; Sivar. & P. Mathew, Fl. Nilambur 313. 1997; Mohanan & Sivad., Fl. Agasthyamala 307. 2002. **Plate 19i.**

Erect annual herbs with a tuberous rootstock. Leaves 7-8 x 5-6 cm, opposite or in whorls of 4, orbicular, cordate at base, villous above; lateral nerves 5 or 6 pairs; petiole ca. 0.5 cm; stipule ca. 0.8 cm long, ovate, entire. Flowers in terminal umbels; peduncle 3-6 cm long, 1-3 together, up to 1 cm across; calyx tube turbinate, lobes 4, ovate; corolla tube broad, glabrous; lobes 4, ovate, white; stamens 4, included, anthers lanceolate; ovary 2-celled; ovules many; style slender, stigma terminal, globose; seeds compressed.
Flowering & Fruiting: August-October.
Distribution: Endemic to southern Western Ghats. Rare; in moist rocks in evergreen forests. *RNMK 0068,* Banasuramala; *RNMK 1256*, Manikkunnumala.

CANTHIUM Lamarck
Encycl. Meth., Bot. 1: 602. 1785.

Shrubs or trees, armed or unarmed. Leaves petiolate, decussate, simple, entire; stipules interpetiolar, entire, connate. Flowers in axillary fascicles or cymes; calyx tube turbinate, 4-5-teethed; corolla tube funnel-shaped, with a dense ring of deflexed hair inside, lobes 4 or 5, deflexed; stamens 4 or 5, filaments short or absent; disk cushion-like; ovary 2-celled; ovule 1 in each cell; style stout, stigma capitate, bifid at apex. Fruit a drupe, bilobed or subglobose; seeds 2, oblong.

1. Stems unarmed; flowers 4-merous ..... **C. travancoricum**
1. Stems armed with supra-axillary thorns; flowers 5-merous 2
2. Leaves cordate at base; flowers in axillary fascicles 3
2. Leaves acute at base; flowers in sessile cymes ..... **C. angustifolium**
3. Domatia glandular; calyx lobes triangular ..... **C. neilgherrense**
3. Domatia not glandular; calyx lobes not triangular, minute ..... **C. rheedei**

Canthium angustifolium Roxb., Fl. Ind. 2: 169. 1824; Hook. f., Fl. Brit. India 3: 135. 1880; Ridsdale in Manilal, Bot. Hist. Hort. Malab. 132.1980; Nicols., Suresh & Manilal, An Interper. Hort. Malab. 217.217. 1988; Manilal & Sivar., Fl. Calicut 130. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 212. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 217. 1996; Mohanan & Sivad., Fl. Agasthyamala 309. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 248. 2005. *Plectronia rheedei* (DC.) Bedd. var. *angustifolia* (Roxb.) Gamble, Fl. Pres. Madras 625(441).1921. *Canthium leschenaultii* (DC.) Wight & Arn. in Wight, Cat. 77. 1833 & Prodr. 426. 1834.*Dondisia leschenaultii* DC., Prodr. 4: 469. 1830.*Kattukara valli* Rheede, Hort. Malab. 7:33, t. 17. 1688. **Plate 19j.**

Erect shrubs with slender branches; spines slender, straight. Leaves 10-11 x 4-5 cm, lanceolate, long acuminate; domatia present in the axils of nerves, glandular; petiole 0.3-0.6 cm long; stipule acuminate, villous within. Cymes short, sessile; flowers shortly pedicelled, greenish yellow; calyx tube nearly truncate; corolla 0.5-0.8 cm long, tube globose, lobes lanceolate, spreading; anthers strongly cuspidate, hispid at tip. Style ca. 0.3 cm long, densely bearded at middle. Drupe ca. 1 cm across, globose, black.

Flowering & Fruiting: September-February.
Distribution: Endemic to Western Peninsular India. Occasional; in semi-evergreen forests. *RNMK 2877*, Chooralmala.

Canthium neilgherrense Wight, Ic. t. 1064. 1846; Hook. f., Fl. Brit. India 3: 133. 1880; Manilal, Fl. Silent Valley 130. 1988; Sivar. & P. Mathew, Fl. Nilambur 317. 1997; Mohanan & Sivad., Fl. Agasthyamala 309. 2002. *Plectronia neilgherrensis* (Wight) Bedd., For. Man. Bot. 134/6. 1872; Gamble, Fl. Pres. Madras 625(441). 1921. **Plate 19k.**

Large armed shrubs. Leaves 5-6 x 2.5-3 cm, elliptic to obovate, subcoriaceous; domatia glandular; petiole ca. 0.5 cm long; stipules ovate, acute. Flowers 3-12 together in axillary fascicles; pedicels ca. 0.3 cm long; calyx ca. 0.2 cm long, obconical, lobes triangular, glabrous; corolla tube ca. 0.4 cm long, campanulate, densely reflexed hairy below the stamens and erect hairy above the stamens in side; lobes oblong; style hispid. Drupe ca. 1.3 cm across, obovoid.
Flowering & Fruiting: December-March.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1576,* Chembra.

Canthium rheedei DC., Prodr. 4: 474. 1830, 'rheedii'; Wight & Arn., Prodr. 426. 1834; Hook. f., Fl. Brit. India 3: 134. 1880; Vajr., Fl. Palghat Dist. 229. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 217. 1996; Sivar. & P. Mathew, Fl. Nilambur 317. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 248. 2005. *Plectronia rheedei* (DC.) Bedd., For. Man. Bot. 134-135. 1872; Gamble, Fl. Pres. Madras 625(441). 1921. **Plate 19 l.**

Stout shrubs with scandent branches; stem strigose, thorn 1-2 cm long, stout, recurved. Leaves 4-5 x 3-4 cm, broadly ovate, acute at apex; nerves 4-6 pairs, domatia hairy; petiole ca. 0.3 cm long, hairy. Flowers ca. 1.2 cm long, in axillary fascicles; calyx obconical, teeth minute; corolla tube ca. 0.4 cm long, globose, with a row of hairs inside; lobes 0.7 x 0.3 cm long, lanceolate, acuminate, spreading; anthers with a hispid beak; style ca. 0.5 cm long, densely bearded at middle. Drupe ca. 1.5 x 1.2 cm, obovoid, black; seeds rugose, hard.
Flowering & Fruiting: March-June.
Distribution: Endemic to Peninsular India. Common; in evergreen forests. *RNMK 3048,* Vythiri.

Canthium travancoricum (Bedd.) Hook. f., Fl. Brit. India 3: 134. 1880; V. S. Ramach. & V.J. Nair, Fl. Cannanore 212. 1988; Vajr., Fl. Palghat Dist. 229. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 217. 1996; *Plectronia travancorica* Bedd., Ic. t. 239. 1868-1874; Gamble, Fl. Pres. Madras 625(441). 1921. **Plate 20a.**

Unarmed shrubs or small trees with subtetragonous branchlets. Leaves on short arrested branchlets, 6-7 x 4-4.5 cm, ovate, acute, membranous; nerves 4-7 pairs, domatia very small; petiole 1-1.5 cm long; stipule orbicular, densely villous inside. Cymes 1-3 cm across, peduncled, with many slender villous branches; flowers pale green; calyx teeth acute, glabrous; corolla tube densely villous near the mouth, lobes ovate, acute; style glabrous, ca. 0.4 cm long. Drupe ca. 1 cm across, pale yellow.
Flowering & Fruiting: February-April.
Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 2530,* Vythiri.

CATUNAREGAM Adanson
Fam. 2: 85. 1763.

Catunaregam spinosa (Thunb.) Tirveng., Bull. Mus. Hist. Nat. (Paris) Ser. 3. 35: 13. 1978; Manilal & Sivar., Fl. Calicut 132. 1982; Ansari, Fl. Kasaragod Div. 187. 1985; Manilal, Fl. Silent Valley 130. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 213. 1988; Vajr., Fl. Palghat Dist. 230. 1990; Sivar. & P. Mathew, Fl. Nilambur 318. 1997. *Gardenia spinosa* Thunb., Diss. Gard. 7: 16. t.2. f.4. 1780. *Gardenia dumetorum* Retz., Obs. Bot. 2: 14. 1781. *Randia dumetorum* (Retz.) Poir. var. *floribunda* (DC.) Gamble, Fl. Pres. Madras 616(434). 1921; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 266. 2005. *Randia brandisii* Gamble, Fl. Pres. Madras 616(434). 1921; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 266. 2005. *Randia spinosa* (Thunb.) Poir. in Lam., Encycl. Suppl. 2:329.1811; Hook. f., Fl. Brit. India 3:110.1880. *Xeromphis spinosa* (Thunb.) Keay, Bull. Jard. Bot. Brux. 28: 37. 1958.

Small trees with small straight axillary spines. Leaves opposite on short lateral branchlets, 4-4.5 x 1.5-2 cm, obovate, obtuse, tomentose below, petiolate; lateral nerves 7-9 pairs, domatia present in the nerve axils; petiole to 1.5 cm long; stipule ovate, cuspidate. Flowers solitary, terminal or lateral branches, pedicellate; calyx tube ca. 0.5 cm long, lobes obovate, hispid; corolla tube ca. 0.6 cm long, broad, densely villous at the base inside; lobes 5, ca. 1.2 cm long, obovate, twisted, white; stamens 5, anthers sessile at the mouth of the corolla; ovary 2-6-celled; ovules many; style ca. 1.2 cm long, stout; stigma fusiform, ribbed. Fruit an obovoid berry, ca. 4 x 3 cm, subglobose, glabrous; seeds many, embedded in pulp.
Flowering & Fruiting: April-December.
Distribution: Tropical Asia and Africa. Common; in semi-evergreen and moist deciduous forests. *RNMK 1563,* Manikkunnumala.

CERISCOIDES (Hook.f.) Tirvengadum
Bull. Mus. Natl. Hist. Nat., Sér. 3, Bot. 35: 13 (1978).

Ceriscoides turgida (Roxb.) Tirveng. in Bull. Mus. Hist. Nat. (Paris) Ser. 3. 35: 15. 1978; V. S. Ramach. & V.J. Nair, Fl. Cannanore 213. 1988. *Gardenia turgida* Roxb., Fl. Ind. 2: 557.1824; Hook. f., Fl. Brit. India 3:118.1880;

Gamble, Fl. Pres. Madras 619(437). 1921. Wight, Ic.t.579. 1840-43; *Gardenia montana* Roxb., Fl. Ind. 1: 709. 1832.

Deciduous trees with stout branches, up to 8 m tall, armed with leaf-bearing spines. Leaves 14-15 x 6-6.5 cm long, oblong, obtuse, coriaceous. Flowers 3-4 cm across, dimorphic, male flowers in fascicles, female flowers solitary; calyx lobes minute in male flowers, longer in female flowers. Fruit globose, woody.

Flowering & Fruiting: November-March.

Distribution: Sri Lanka, India, Myanmar, Thailand and Indo-China. Rare; in moist deciduous forests. *RNMK 2883,* Baveli.

CHASSALIA Commerson ex Poiret
in Dict. Sc. Nat. 8: 198. 1817.

Chassalia curviflora (Wall. ex Kurz) Thw. var. **ophioxyloides** (Wall.) Deb & Krishna, Bull. Bot. Surv. India 24: 222. 1982(1983); Sasidh. & Sivar., Fl. Pl. Thrissur For. 218. 1996. *Psychotria ophioxyloides* Wall. in Roxb., Fl. Ind. 2: 167. 1824. *Chassalia ophioxyloides* (Wall.) Craib, Gard. Bull. Straits Settlem. 6:474.1930; Ansari, Fl. Kasaragod Div. 188. 1985; Manilal, Fl. Silent Valley 131. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 213. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 221. 1988; Vajr., Fl. Palghat Dist. 230. 1990; Sivar. & P. Mathew, Fl. Nilambur 319. 1997; Mohanan & Sivad., Fl. Agasthyamala 310. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 249. 2005. *Katou-belluta-ampelpodi* Rheede, Hot. Malab. 5: 66, t.33.1685.

Shrubs, to 1.5 m tall. Leaves 20-22 x 7-8 cm, oblanceolate, abruptly acuminate; nerves 12 pairs, regular; petiole to 3 cm long, stipule connate, ovate, membraneous, 2-fid. Cymes 6-7 cm long, terminal, panicled, glabrous; flowers ca. 1.5 cm long, subsessile; calyx globose, white, lobes 5, ovate; corolla 0.8-1 cm long, curved, tube purple, lobes ovate, yellow, obtuse; stamens 5, included; anthers linear; ovary 2-celled, ovule one in each cell; style 2-fid at apex. Fruit 5-6 mm across, globose, glabrous, 2-seeded.

Flowering & Fruiting: July-February.

Distribution: Indo-Malesia. Common; in open areas. *RNMK 1690,* Vellaramkunnu.

GEOPHILA D. Don
Fl. Nepal. 136. 1825, *nom. cons.*

Geophila repens (L.) Johnston, Sargentia 8: 281. 1949; Ansari, Fl. Kasaragod Div. 189. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 214. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 221. 1988; Vajr., Fl. Palghat Dist. 231. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 219. 1996; Sivar. & P. Mathew, Fl. Nilambur 321. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 249. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 346. 2009. *Rondeletia repens* L., Syst. Nat. (ed.10) 928. 1759. *Geophila reniformis*

D. Don, Prodr. Fl. Nepal. 136. 1825; Hook. f., Fl. Brit. India 3:178.1880; Gamble, Fl. Pres. Madras 643(454). 1921. *Geophila herbacea* (Jacq.) K. Schum. in Engler & Prantl, Naturl. Pflanzenfam. 4(4): 199. 1891.*Karinta-kali* Rheede, Hort. Malab. 10: 41, t.21.1690.

Prostrate herbs; stems stoloniferous, rooting at nodes. Leaves 2-2.5 cm across, orbicular, cordate at base; petiole ca. 2.5 cm long, hispid; stipules ovate, entire. Flowers ca. 0.8 cm long, in 1-3 flowered axillary peduncled cymes; calyx tube globose, lobes 4, lanceolate, fimbriate; corolla tube ca. 0.6 cm long, villous inside, lobes 4 or 5, ca. 0.6 cm long, spreading, white; stamens included; anthers linear; ovary 2-celled, ovule one in each cell; style slender 2-fid at apex. Drupe ca. 0.8 cm across, red, globose; seeds 2, plano-convex, rugose.

Flowering & Fruiting: February-June.

Distribution: Pantropical. Rare; in sacred groves. *RNMK 1308,* Meppady.

HALDINA Ridsdale

Blumea 24: 360. 1978.

Haldina cordifolia (Roxb.) Ridsd., Blumea 24: 361. 1978; Ansari, Fl. Kasaragod Div. 189. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 215. 1988; Vajr., Fl. Palghat Dist. 231. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 219. 1996; Sivar. & P. Mathew, Fl. Nilambur 321. 1997; Mohanan & Sivad., Fl. Agasthyamala 312. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 250. 2005. *Nauclea cordifolia* Roxb., Pl. Corom. t. 53. 1796. Bedd., Fl. Sylv.t. 33. 1869. *Adina cordifolia* (Roxb.) Hook. f. ex Brand., For. Fl. 263. t.33. 1874; Hook. f., Fl. Brit. India 3: 24. 1880; Gamble, Fl. Pres. Madras 584(412). 1921. **Plate 20b.**

Large deciduous trees; bark pale brown; branchlets tomentose. Leaves 13-15 cm across, orbicular, cordate at base, tomentose below; petiole 5-8 cm long; stipule ca. 1.3 cm long, obovate, obtuse. Heads ca. 2 cm across, globose, 2-3 together, axillary, peduncled; receptacle hispid; flowers 0.9-1 cm long, sessile; calyx tube obovoid, lobes spathulate; corolla tube ca. 0.8 cm long, 5-ridged; lobes 5, ovate, acute, small; stamens 5, exserted; ovules many; style ca. 1.2 cm long, stigma globose. Capsule ca. 0.5 cm long, obovoid; seeds with tail at one end and a bifid wings at other end.

Flowering & Fruiting: October-March.

Distribution: India, Myanmar, Sri Lanka and Indo-China. Occasional; in moist deciduous forests. *RNMK* 3268, Muthanga.

HEDYOTIS Linnaeus

Sp. Pl. 101. 1753.

Herbs or shrubs, stems 4-angled or terete. Leaves opposite, ovate to linear lanceolate, entire or serrulate, sessile or shortly petiolate; stipule ovate to lanceolate, toothed. Flowers axillary, solitary to terminal corymbose or panicled cymes; sessile or pedicellate; calyx tube turbinate, obovoid or

globose, 4-10-ridged, lobes 4, ovate; corolla pink, violet or white, tube slender or cylindrical, villous within lobes 4, spreading; stamens 4, usually included; anthers oblong; ovary 2-celled; ovules many; style 1, stigmas 2, linear. Fruit a capsule, septicidal or loculicidal, usually dehiscent at apex; seeds many, angular.

1. Shrubs 2
1. Woody Herbs 3
2. Flowers in terminal panicles, glabrous..... **H. leschenaultiana** var. **leschenaultiana**
2. Flowers in axillary cymes, hairy..... **H.neesiana**
3. Stipules truncate .....**H. cyanantha**
3. Stipules triangular, many fringed ..... **H. wynaadensis**

Hedyotis cyanantha Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 45: 136. 1876; Dutta & Deb, Taxonomic Revision Hedyotis 167. 2004. *Hedyotis caerulea* Wight & Arn., Prodr. 412. 1834, *nom. illeg.*; Hook. f., Fl. Brit. India 3: 60. 1880; Manilal & Sivar., Fl. Calicut 141. 1982; Ansari, Fl. Kasaragod Div. 191. 1985. *Oldenlandia caerulea* (Wight & Arn.) Gamble, Fl. Pres. Madras 597(421). 1921, *nom. illeg.*

Annual, stiff, erect, scabrous herbs. Leaves 4-5 x 2.5-3 cm, linear-subulate, aristate; stipule truncate with about 5-6 pectinate bristles. Flowers blue, sessile, axillary or in terminal few-flowered heads. Capsule crustaceous, globose, late dehiscent.

Flowering & Fruiting: Throughout the year.

Distribution: Peninsular India and Sri Lanka. Occasional in rocky grasslands. *RNMK* 2227, Manikkunnumala.

Hedyotis leschenaultiana DC., Prodr. 4: 422. 1830, var. **leschenaultiana**; Deb & Dutta, Taxon 34: 296. 1985; Sivar. & P. Mathew, Fl. Nilambur 326. 1997; Dutta & Deb, Taxonomic Revision Hedyotis 75. 2004. *Hedyotis stylosa* R. Br. ex Wight & Arn., Prodr. 407. 1834; Hook. f., Fl. Brit. India 3: 51. 1880; Manilal, Fl. Silent Valley 132. 1988; Mohanan & Sivad., Fl. Agasthyamala 319. 2002. *Oldenlandia stylosa* (R. Br. ex Wight & Arn.) O. Kuntze., Rev. Gen. Pl. 1: 292. 1891; Gamble, Fl. Pres. Madras 598(422). 1921. *Oldenlandia anamalayana* Gamble, Bull. Misc. Inform. Kew 1920: 67. 1920 & Gamble, Fl. Pres. Madras 599(422). 1921. *Hedyotis anamalayana* (Gamble) R. Rao & Hemadri, Indian For. 99: 378. 1973. *Oldenlandia sisparensis* (Gage) Gamble, Fl. Pres. Madras 599(422). 1921. **Plate 20c.**

Small shrubs, glabrous. Leaves 7-8 x 3.5 cm, ovate-lanceolate, cuneate at base, shining above; petiole ca. 2 cm long; stipule 5-6 mm long, pinnatisect, hispid, sheathing at base. Panicles terminal, ca. 5 x 3 cm, glabrous; flowers ca. 7 mm long; calyx lobes ovate, obtuse, corolla white, lobes oblong, obtuse, tube densely villous within; stamens included; style ca. 7 mm long. Capsule ca. 4 x 4 mm, septicidal; seeds angular, black.

Flowering & Fruiting: November-March.
Distribution: Endemic to southern Western Ghats. Rare; in grasslands near shola margins. *RNMK* 1863, Kurichiarmala.

Hedyotis neesiana Arn., Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 18: 341. 1836; Dutta & Deb, Taxonomic Revision Hedyotis 174. 2004. *Hedyotis nitida* Wight & Arn., Prodr. 412. 1834, *nom. illeg.*; Hook. f., Fl. Brit. India 3: 61. 1880; Ansari, Fl. Kasaragod Div. 193. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 217. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 221. 1996; Sivar. & P. Mathew, Fl. Nilambur 327. 1997; Mohanan & Sivad., Fl. Agasthyamala 317. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 252. 2005. *Oldenlandia nitida* (Wight & Arn.) Gamble, Fl. Pres. Madras 597(421). 1921; Vajr., Fl. Palghat Dist. 240. 1990. **Plate 20d.**

Prostrate woody herbs; stems 4-angled, coarsely scabrid. Leaves 6-7 x 0.8-1 cm, linear-lanceolate to elliptic, coriaceous, pale below; stipule ca. 8 mm long, ovate, rounded at apex, strongly long-toothed, villous. Flowers sessile in axillary clusters, 1-3 together; calyx ca. 4 mm long, lobes acute, ciliate; corolla 4-5 mm long, lobes spreading, white. Capsule 3-4 x 1.5-2 mm, ovoid, glabrous; seeds angled; deep brown, ovoid, glabrous.
Flowering & Fruiting: September-December.
Distribution: Peninsular India and Sri Lanka. Common; in evergreen forests and moist deciduous forests. *RNMK* 2669, Muthanga.

Hedyotis wynaadensis (Gamble) Rao & Hemadri, Indian For. 99: 379. 1973; Dutta & Deb, Taxonomic Revision Hedyotis 76. 2004. *Oldenlandia wynaadensis* Gamble, Bull. Misc. Inform. Kew 1919: 405. 1919 & Gamble, Fl. Pres. Madras 599(422). 1921. **Plate 20e.**

Large shrubs. Leaves pale, 7-8 x 2-2.5 cm, lanceolate, acuminate, slightly bluish; main erves obscure, 3-4 pairs; stipules trialngular, pectinately many-fringed, villous. Cymes axillary, pedunculate, slender, 5-8 cm; flowers white; calyx glabrous; corolla glabrous. Capsule 2-3 mm long, glabrous.
Flowering & Fruiting: November-March.
Distribution: Endemic to southern Western Ghats (Kerala). Rare; in high altitude shoals. *RNMK 2514,* Chembra.

HYMENODICTYON Wall. Nom.cons**.**
Fl. Ind. 2: 148 (1824), nom. cons.

1. Small trees; flowers sessile; capsules erect.....**H.obovatum**
1. Large trees; flowers pedicelled; capsules pendulous.....**H. orixense**

Hymenodictyon obovatum Wall. in Roxb., Fl. Ind. 2: 153. 1824; Wight, Ic. t. 1159. 1846; Bedd., Fl. Sylv. t. 219. 1872; Hook. f., Fl. Brit. India 3: 36. 1880; Gamble, Fl. Pres. Madras 589(416). 1921; Manilal, Fl. Silent Valley 133. 1988;

Vajr., Fl. Palghat Dist. 232. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 223. 1996; Mohanan & Sivad., Fl. Agasthyamala 320. 2002. **Plate 20f.**

Small trees. Leaves 10-12 x 7-8 cm, obovate, apiculate, acute at base, glabrous; nerves 6-8 pairs, intercostae reticulate; petiole 4-6 cm long; stipule cm. 0.8 cm long, ovate, acute, glandular serrate. Raceme 8-10 cm long, erect, glabrous, terminal; flowers creamy-yellow with unpleasant odour; calyx lobes lanceolate, glabrous; corolla tube short, widening above, lobes ovate, glabrous; anthers elliptic; style ca. 0.6 cm long, glabrous. Capsule 1.2-1.5 cm long, ellipsoid, glabrous; seed wings narrowed at both ends.

Flowering & Fruiting: June-October.

Distribution: Endemic to Western Ghats. Occasional; in moist deciduous forests. *RNMK 4102*, Muthanga.

Hymenodictyon orixense (Roxb.) Mabb., Taxon 31: 66. 1982; Ansari, Fl. Kasaragod Div. 194. 1985; Vajr., Fl. Palghat Dist. 233. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 223. 1996; Sivar. & P. Mathew, Fl. Nilambur 329. 1997; Mohanan & Sivad., Fl. Agasthyamala 320. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 355. 2009. *Cinchona orixensis* Roxb., Bot. Descr. Swietenia 21. 1793 & in Med. Facts Obs. 6: 152. 1795. *Cinchona excelsa* Roxb., Pl. Corom. t. 106. 1799. *Hymenodictyon excelsum* (Roxb.) Wall. in Roxb., Fl. Ind. 2: 149. 1824; Hook. f., Fl. Brit. India 3: 35. 1880; Gamble, Fl. Pres. Madras 589(416). 1921.

Large trees. Leaves 18-20 x 11-12 cm, abruptly acuminate at apex, pubescent below; nerves 10 pairs; petiole 2-6 cm long; stipule ovate, obtuse. Panicle cylindrical, contracted, densely tomentose; flowers 7-9 mm long; calyx tube hispid; lobes ovate, acute; corolla tube slender, lobes triangular, tomentose outside; stamens exserted, anthers mucronate; style 7-8 mm long, stigma globose. Capsule 2-2.5 x 1-1.3 cm, ellipsoid, glabrous.

Flowering & Fruiting: February-August.

D*istribution:* Indo-Malesia. Rare; in moist deciduous forests. *RNMK 1093,* Kuruva.

IXORA Linnaeus

Sp. Pl. 110. 1753.

Shrubs or small trees; branchlets terete. Leaves opposite, coriaceous; stipule entire. Flowers in terminal corymbose cymes; branches trichotomous; bracts leafy, coriaceous; bracteoles 2, smaller; calyx tube ovoid to obovoid, lobes 4, persistent; corolla tube slender, lobes 4, spreading, twisted in bud; stamens 4, inserted on the mouth of corolla tube; anthers lanceolate, 2-fid at base, mucronate at tip; ovary 2-celled; ovule solitary in each cell; style slender, stigma 2-fid, fusiform. Fruit a globose or 2 lobed berry; seeds 1 or 2, planoconvex.

1. Peduncles more than 10 cm..... **I. elongata**
1. Peduncles to 5 cm long..... 2

2. Calyx lobes equal to the tube 3
2. Calyx lobes minute 4
3. Cymes corymbiform, sessile .....**I. coccinea**
3. Cymes brachiate, peduncled .....**I. lawsonii**
4. Leaves membraneous; calyx 4 lobed .....**I. nigricans**
4. Leaves coriaceous; calyx 4 toothed 5
5. Leaves subsessile; flower buds ellipsoid.....**I. pavetta**
5. Leaves petiolate, petiole to 2 cm; flower buds globose.....6
6. Small trees; berry ca. 4 mm across, globose .....**I. brachiata**
6. Stout undershrubs; berry ca. 1 cm across, globose.....7
7. Leaves 15-16 x 6-7 cm; corymbs axillary .....**I. notoniana**
7. Leaves 8-14 x 2- 4.5 cm; cymes sessile.....8
8. Calyx teeth ca. 0.3 cm long 9
8. Calyx teeth ca. 0.7cm long.....**I. polyantha**
9. Cymes trichotamously branched, with a pair of large basal bracts.....**I. cuneifolia**
9. Cymes dichasial with a pair of linear-lanceolate bracts..... **I. sivarajiana**

Ixora brachiata Roxb. ex DC., Prodr. 4: 488. 1830; Wight, Ic. t. 710. 1843; Hook. f., Fl. Brit. India 3: 142. 1880; Gamble, Fl. Pres. Madras 631(445). 1921; Ansari, Fl. Kasaragod Div. 195. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 219. 1988; Vajr., Fl. Palghat Dist. 233. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 225. 1996; Sivar. & P. Mathew, Fl. Nilambur 330. 1997; Mohanan & Sivad., Fl. Agasthyamala 324. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 255. 2005. **Plate 20g.**

Trees, upto 5 m tall; bark smooth, young shoots glabrous. Leaves 12-15 x 5-6 cm, oblong to oblanceolate, obtusely acute; nerves 8-10 pairs, reticulate, pale above; petiole 1.5-2 cm long; stipule triangular, acute. Cymes 18-20 x 12-15 cm, peduncled, puberulus; bracts and bracteoles minute; flowers sessile; calyx ca. 0.1 cm long, shortly 4-thoothed; corolla tube ca. 0.6 cm long, slender, lobes ca. 0.2 x 0.1 cm, oblong; style ca. 0.7 cm long, pubescent. Berry ca. 0.5 cm across, red, globose, glabrous.

Flowering & Fruiting: January-May.

Distribution: Endemic to Western Ghats. Common; in evergreen forests. *RNMK 2743,* Vythiri, *RNMK 2610*, Chanthanathodu.

Ixora coccinea L., Sp. Pl. 110. 1753; Wight, Ic. t. 153. 1839; Hook. f., Fl. Brit. India 3: 145. 1880; Gamble, Fl. Pres. Madras 631(445). 1921; Manilal & Sivar., Fl. Calicut 147. 1982; Ansari, Fl. Kasaragod Div. 195. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 225. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 220. 1988; Vajr., Fl. Palghat Dist. 233. 1990; Sivar. & P. Mathew, Fl. Nilambur 330. 1997; Mohanan & Sivad., Fl. Agasthyamala 324. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 255. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 356. 2009. *Schetti* Rheede, Hort. Malab. 2: 17-18, t.13.1679.

Woody herbs to small shrubs. Leaves subsessile, oblong to oblanceolate, 5-8 x 2.5-3.5 cm, base subcordate, apex subacute. Cymes corymbiform, sessile; flowers dense; corolla red, tube 3-3.5 cm long. Berry red, globose.
Flowering & Fruiting: Throughout the year.
Distribution: Peninsular India and Sri Lanka. Occasional; in moist deciduous forests. *RNMK 2730,* Kuruva.

Ixora cuneifolia Roxb. *ex* DC., Prodr. 4: 487. 1830; Wight, Ic. t. 709. 1843; Hook. f., Fl. Brit. India 3: 144. 1880; Gamble, Fl. Pres. Madras 631(445). 1921; Manilal, Fl. Silent Valley 133. 1988; Vajr., Fl. Palghat Dist. 234. 1990; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 255. 2005.

Glabrous shrubs. Leaves 8-14 x 2-4.5 cm, elliptic, acuminate at apex, acute at base; nerves 6-9 pairs, irregular; petiole ca. 1 cm long; stipule ca. 0.8 cm long, ovate, acuminate into a long mucro, glabrous. Cymes 5-7 cm across, sessile or subsessile, trichotomously branched with a pair of large basal bracts; flowers 2-2.4 cm long, sessile, 3-9 together; bracts and bracteoles filiform, hispid; calyx ca. 0.4 cm long, hispid, lobes ovate; corolla tube ca. 1.8 cm long, slender, lobes ca. 3.5 x 1.5 mm, oblong, puberulus; anthers ca. 4 mm long, tailed at base; style ca. 2 cm long, glabrous. Berry globose.
Flowering & Fruiting: December-April.
Distribution: India and Myanmar. Occasional; in evergreen forests. *RNMK 1746,* Vythiri; *RNMK 2610*, Thariodu.

Ixora elongata Heyne ex G. Don, Gen. Hist. 3: 571. 1834; Hook. f., Fl. Brit. India 3: 141. 1880; Gamble, Fl. Pres. Madras 630(445). 1921; Manilal, Fl. Silent Valley 134. 1988; Husain & Paul, J. Econ. Tax. Bot. (Addl. Ser.) 6: 149. 1989; V. S. Ramach. & V.J. Nair, Fl. Cannanore 220. 1988; Vajr., Fl. Palghat Dist. 234. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 225. 1996; Sivar. & P. Mathew, Fl. Nilambur 331. 1997; Mohanan & Sivad., Fl. Agasthyamala 325. 2002. **Plate 20h.**

Large shrubs, young shoots glabrous. Leaves 12-15 x 3-6 cm, elliptic-oblong or oblanceolate, acute at both ends, chartaceous, glabrous, lateral nerves 12-15 pairs; petiole ca. 1.5 cm long. Flowers in densely congested corymbs, peduncle 13-15 cm long, sparsely pubescent; calyx tube and lobes pubescent, lobes lanceolate; corolla tube ca.1 cm long, lobes reflexed.
Flowering & Fruiting: November-February.
Distribution : Endemic to India. Occasional; in evergreen forests. *RNMK* 2759, Thariodu; *RNMK 3535*, Vythiri; *RNMK 2884*, Chanthanathodu.

Ixora lawsonii Gamble, Bull. Misc. Inform. Kew 1920: 247. 1920 & Gamble, Fl. Pres. Madras 630(445). 1921; V. S. Ramach. & V.J. Nair, Fl. Cannanore 221. 1988. *Ixora manantoddii* Hussain & Paul, Bull. Jard. Bot. Natl. Belg. 61:15. 1991. **Plate 20i.**

Evergreen shrubs up to 2.5 m tall, branchlets puberulous. Leaves 13-15 x 6-7 cm long, coriaceous, elliptic-ovate to oblanceolate, shining above. Flowers in terminal, densely congested brachiate cymes.
Flowering & Fruiting: March-April.
Distribution: South India. Rare; in evergreen forests. *RNMK* 3486, Kurichiarmala.

Ixora nigricans R. Br. ex Wight & Arn., Prodr. 428.1834; Hook. f., Wight, Ic.t.318.1840; Fl. Brit. India 3: 148. 1880; Gamble, Fl. Pres. Madras 631(445). 1921; Ansari, Fl. Kasaragod Div. 195. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 221. 1988; Husain & Paul, J. Econ. Tax. Bot. (Addl. Ser.) 6: 111. 1989; Vajr., Fl. Palghat Dist. 234. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 225. 1996; Sivar. & P. Mathew, Fl. Nilambur 332. 1997; Mohanan & Sivad., Fl. Agasthyamala 326. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 256. 2005. **Plate 20j.**

Shrubs, young shoots glabrous. Leaves 13-16 x 4-5 cm, elliptic to oblanceolate, long-acuminate, attenuate at base; nerves 8-10 pairs, reticulate; petiole ca. 1 cm long; stipule ca. 7 mm long, ovate, acuminate. Cymes ca. 10 cm across; peduncles 4-6 cm long; flowers pedicelled, many; calyx ca. 2.5 mm long, lobes ca. 1.5 mm long, acuminate; corolla tube ca. 1 cm long, slender; lobes ovate, acute; style ca. 1.6 cm long. Drupe ca. 1 cm across, subglobose.
Flowering & Fruiting: December-March.
Distribution: Indo-Malesia. Occasional; in evergreen forests. *RNMK 2884,* Vannathimala.

Ixora notoniana Wall. ex G. Don, Gen. Hist. 3: 571. 1834; Hook. f., Fl. Brit. India 3:139.1880; Gamble, Fl. Pres. Madras 630(444).1921; V. S. Ramach. & V. J. Nair, Fl. Cannanore 221. 1988; Manilal, Fl. Silent Valley 134. 1988. *Ixora saulierei* Gamble, Bull. Misc. Inform. Kew 1920: 247. 1920 & Gamble, Fl. Pres. Madras 630(445). 1921.

Trees. Leaves 15-16 x 6-7 cm, elliptic-obovate, apex obtuse or acute, slightly mucronate, shining above, nerves impressed above; petiole 1.3-1.5 cm. Corymbs axillary; pedicel 3-4 cm; calyx teeth ca. 1 mm, triangular. Berry ca. 4 mm across, globose.
Flowering & Fruiting: December-June.
Distribution: Endemic to Peninsular India. Rare; in semi-evergreen forests. *RNMK 1705,* Makkimala.

Ixora pavetta Andrews, Bot. Rep. t. 78. 1799; V. S. Ramach. & V.J. Nair, Fl. Cannanore 222. 1988. *Ixora arborea* Roxb. ex Smith in Rees, Cyclop. 19: n. 5. 1811. *Ixora parviflora* Vahl, Symb. Bot. 3:11. t.52.1794, *non* L. 1791; Hook. f., Fl. Brit. India 2:142.1880; Gamble, Fl. Pres. Madras 631(445). 1921.

Small trees. Leaves 10-14 x 5-7 cm, elliptic-oblong, apex obtuse, glossy, subsessile; stipules ovate-acuminate. Cymes 10-12 cm long; calyx ca. 1 mm, truncate, teeth 4, minute; corolla tube ca. 6 mm, lobes oblong, spreading; stigma 2 fid. Berries 0.7-0.8 cm across, glabrous.

Flowering & Fruiting: January-March.
Distribution: India, Sri Lanka and Bangladesh. Rare; in evergreen forests. *RNMK 2816,* Meenmutti.

Ixora polyantha Wight, Ic. t. 1066. 1846; Hook. f., Fl. Brit. India 3: 140. 1880; Gamble, Fl. Pres. Madras 629(444). 1921; Ansari, Fl. Kasaragod Div. 196. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 222. 1988; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 256. 2005. **Plate 20k.**

Stout undershrubs. Leaves 10-15 x 5-8 cm long, obovate to broadly oblanceolate, base cuneate, shortly acuminate at apex. Cymes dense, shortly peduncled; flowers sessile; calyx lobes elliptic, ca. 6 mm long; corolla white. Berry ca. 1 cm across, globose.
Flowering & Fruiting: March-May.
Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 1313,* Vythiri, *RNMK 1742,* Palchuram.

Ixora sivarajiana Pradeep, Nordic J. Bot. 17:315. 1997. **Plate 20l.**

Small trees 5-8 m tall; stem glabrous with prominent leaf scars. Leaves in whorls of 3 or 4, crowded towards the apex of branchlets, elliptic-obovate, 9-16 x 2.5-6 cm, narrow at base; stipules broadly ovate 7-9 x 4-5 mm, long acuminate at apex, glabrous; petiole 1-3 cm long, glabrous. Infloresence a dense pendant, dichasial cyme; bracts linear-lanceolate, 2-3 mm long; flowers tetramerous, sessile; sepals lanceolate; corolla lobes oblong and flat; stamens attached to the throat by a short filament, anthers yellow and dorsifixed; ovary ellipsoid, two celled with one ovule in each cells; stigma bifid. Fruit depressed globose, dark purple with short persistent calyx.
Flowering & Fruiting: December-May.
Distribution: Endemic to southern Western Ghats (Kerala). Rare; in shoal forests. *RNMK 1241*, Chembra, *RNMK 1441,* Kurichiarmala.

KNOXIA Linnaeus

Sp. Pl. 104. 1753.

Herbs or shrubs; stems terete. Leaves penninerved; stipules jointed with the petiole, toothed. Flowers in terminal corymbose cymes, ebracteate; calyx tube ovoid, lobes 4; corolla tube narrow, villous at mouth, lobes 4, valvate; stamens 4, inserted at the throat of corolla tube; anthers linear; ovary 2-celled, ovule one in each cell, pendulous; style slender; stigmas 2, linear. Fruit of 2 indehiscent mericarps; seeds 2, oblong.

1. Stem white tomentose; flowers pink.....**K. sumatrensis**
1. Stem glabrous; flowers blue.....**K. wightiana**

Knoxia sumatrensis (Retz.) DC., Prodr. 4: 570. 1830; Bhattacharjee & Deb, J. Econ. Tax. Bot. 6: 89. 1985; Manilal, Fl. Silent Valley 134. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 223. 1988; Vajr., Fl. Palghat Dist. 235.

1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 226. 1996; Sivar. & P. Mathew, Fl. Nilambur 332. 1997; Mohanan & Sivad., Fl. Agasthyamala 328. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 256. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 357. 2009. *Spermacoce sumatrensis* Retz., Obs. Bot. 4: 23. 1786. *Knoxia mollis* Wight & Arn., Prodr. 439. 1834; Hook. f., Fl. Brit. India 3: 129. 1880; Gamble, Fl. Pres. Madras 622(439). 1921; V. S. Ramach. & V.J. Nair, Fl. Cannanore 222. 1988; Vajr., Fl. Palghat Dist. 235. 1990. *Knoxia sumatrensis* (Retz.) DC. var. *glaberrima* Bhattacharjee & Deb, J. Econ. Tax. Bot. 61: 92. 1985. *Knoxia heyneana* sensu Wight & Arn., Prodr. 439. 1834, non DC. 1830; Hook. f., Fl. Brit. India 3: 129. 1880; Gamble, Fl. Pres. Madras 622(439). 1921. *Knoxia sumatrensis* (Retz.) DC. var. *linearis* (Gamble) Bhattacharjee & Deb, J. Econ. Tax. Bot. 6: 93. 1985; Mohanan & Sivad., Fl. Agasthyamala 328. 2002. *Knoxia linearis* Gamble, Bull. Misc. Inform. Kew 1920: 68. 1920 & Gamble, Fl. Pres. Madras 622(439). 1921.

Erect subshrubs; stem white-tomentose. Leaves 11-13 x 2-3 cm, lanceolate, acuminate, hispid; nerves 10-13 pairs; petiole ca. 1 cm long; stipules orbicular, membraneous, long-toothed. Cymes 5-15 cm across, corymbose, terminal, pilose; flowers ca. 6 mm long, sessile; calyx lobes ovate, acute, hispid; corolla tube ca. 3 mm long, narrow, densely villous at mouth, lobes ovate, obtuse, lilac or pink; style ca. 5 mm long. Fruit ca. 2 x 1 mm, oblong, glabrous.

Flowering & Fruiting: August-September.

Distribution: Indo-Malesia and Australia. Occasional; in open rocky areas in evergreen forests. *RNMK 1910*, Vythiri Ghat.

Knoxia wightiana Wight & Arn., Prodr. 440. 1834; Hook. f., Fl. Brit. India 3: 129. 1880; Gamble, Fl. Pres. Madras 622(439). 1921; Bhattacharjee & Deb, J. Econ. Tax. Bot. 6: 81. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 223. 1988.

Glabrous woody herbs. Leaves 6-7 x 1-1.5 cm, linear-lanceolate, curved, folded, glabrous, sessile; stipules ovate, ca. 6 mm long, acute with few glandular teeth. Cymes 5-6 cm across, peduncled; flowers ca. 5 mm long, pale blue, sessile; calyx ca. 1.5 mm long, lobes obtuse; corolla-tube densely villous within; style ca. 4 mm long. Fruit ca. 2.5 x 2.5 mm; mericarps compressed, glabrous.

Flowering & Fruiting: November-March.

Distribution: Endemic to Peninsular India. Rare; in grasslands. *RNMK 1559,* Manikkunnumala.

LASIANTHUS W. Jack

Trans. Linn. Soc. London 14: 125. 1823, *nom. cons.*

Shrubs; branchlets deciduous, spiral. Leaves opposite, distichous, penninerved, nervules close, parallel; stipule entire, ovate-lanceolate. Flowers 1-few together, axillary, sessile or in peduncled cymes, bracteate; calyx tube

obovoid, lobes 3-7, minute; corolla tube funnel or salver-shaped, villous inside, lobes 3-7, valvate, white; stamens 3-7, on the throat of corolla tube, anthers included, apiculate; ovary 4-9-celled, ovule 1 in each cell; style short; stigma 3-9, globose. Fruit a drupe with 4-9 pyrenes; seeds 4-9, narrow.

1. Cymes sessile 2
1. Cymes peduncled 4
2. Bracts conspicuous, longer than flowers..... **L. jackianus**
2. Bracts minute or absent 3
3. Calyx limb and teeth glabrous or puberulous, nerves 4-5 pairs, indistinct..... **L . obovatus**
3. Calyx limb and teeth hairy, nerves 3-6 pairs, arching..... **L. acuminatus**
4. Leaves with parallel transverse nervules..... **L. cinereus**
4. Leaves with reticulate transverse nervules..... 5
5. Calyx lobes erect, nerves spreading, nervules much reticulate..... **L. venulosus**
5. Calyx lobes recurved, nerves ascending, nervules less reticulate ..... **L. capitulatus**

Lasianthus acuminatus Wight, Calcutta J. Nat. Hist. 6: 511. 1846; Hook. f., Fl. Brit. India 3: 185. 1880; Gamble, Fl. Pres. Madras 647(456). 1921; Deb & Gangop., J. Econ. Tax. Bot. 15: 274. 1991. *Lasianthus coffeoides* Fyson, Bull. Misc. Inform. Kew 1914: 185. 1914 & Gamble, Fl. Pres. Madras 647(456). 1921.

Large shrubs. Leaves 7-9 x 4-5 cm, elliptic, oblong, apiculate, glabrous; nerves 4 pairs, prominent; nervules closely parallel; petiole 5-7 mm long; stipule triangular, acute, glabrous. Flowers 1-3 together, sessile; calyx lobes acute, triangular, villous; corolla ca. 8 mm long, tube slender, lobes ovate, obtuse, densely villous. Drupe ca. 5 x 5 mm, globose, glabrous.
Flowering & Fruiting: May-November.
Distribution: Endemic to southern Western Ghats. Common; in evergreen forests. *RNMK* 2672, Chembra.

Lasianthus capitulatus Wight, Calcutta J. Nat. Hist. 6: 511. 1846; Hook. f., Fl. Brit. India 3: 191. 1880; Gamble, Fl. Pres. Madras 648(457). 1921; V. S. Ramach. & V.J. Nair, Fl. Cannanore 223. 1988.

Evergreen shrubs up to 2.5 m tall; branches slender, glabrous. Leaves 13-15 x 4-6 cm, elliptic ovate, acute at apex, cuneate or rounded at base. Flowers small, white, few in axillary cymes. Berries ca. 0.7 cm across, globose, glabrous, black when ripe.
Flowering & Fruiting: March-April.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2885,* Brahmagiri.

Lasianthus cinereus Gamble, Bull. Misc. Inform. Kew 1920. 249. 1920 & Gamble, Fl. Pres. Madras 648(457). 1921; Mohanan & Sivad., Fl. Agasthyamala 329. 2002.

Erect shrubs, branchlets pubescent. Leaves 10-12 x 2.5-3 cm, oblong-lanceolate, caudate-acuminate, base obtuse, glabrous above and puberulous below. Flowers white; calyx puberulous.
Flowering: January-March. *Distribution:*
Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2894,* Kurichiarmala.

Lasianthus jackianus Wight, Calcutta J. Nat. Hist. 6: 502. 1846; Hook. f., Fl. Brit. India 3: 180. 1880; Gamble, Fl. Pres. Madras 646(456). 1921; V. S. Ramach. & V.J. Nair, Fl. Cannanore 224. 1988; Manilal, Fl. Silent Valley 135. 1988; Vajr., Fl. Palghat Dist. 235. 1990; Deb & Gangop., J. Econ. Tax. Bot. 15: 286. 1991; Sivar. & P. Mathew, Fl. Nilambur 333. 1997. **Plate 21a.**

Evergreen shrubs up to 2.5 m tall. Leaves 14-15 x 3.5-4 cm, oblanceolate or oblong, caudate acuminate at apex. Flowers ca. 1 cm long, pale pink, covered with conspicuous bracts. Drupes ca. 0.5 cm across, globose, bluish violet when ripe.
Flowering & Fruiting: November-March.
Distribution: Endemic to southern Western Ghats. Common; in evergreen forests. *RNMK 2549,* Chembra, *RNMK 2672*, Sugandhagiri.

Lasianthus obovatus Bedd., Ic. t. 10. 1868-1874; Hook. f., Fl. Brit. India 3: 186. 1880; Gamble, Fl. Pres. Madras 647(456). 1921; Deb & Gangop., J. Econ. Tax. Bot. 15: 293. 1991.

Shrubs, much branched; branches very short with short internodes, black. Leaves hardly distichous, 4-6 x 2.5-3 cm., almost black when dry, with recurved margins; nerves 4-5 pairs; petiole small; stipules triangular. Flowers 4-merous; 1-3, sessile; calyx companulate, puberulous, teeth ovate or triangular; corolla-tube very short, glabrous.
Flowering & Fruiting: January-May.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2894,* Kurichiarmala.

Lasianthus venulosus (Wight & Arn.) Wight, Ic. t. 1032. 1845; Hook. f., Fl. Brit. India 3: 190. 1880; Gamble, Fl. Pres. Madras 648(457). 1921; Mohanan & Sivad., Fl. Agasthyamala 330. 2002. *Santia venulosa* Wight & Arn., Prodr. 422. 1834.

Small trees; young stem sparsely hirsute. Leaves 6-12 x 2.5-4 cm, elliptic-ovate to oblong, acute, acumiate at apex, rounded at base, hirsute on nerves below; stipules triangular ovate, hirsute. Flowers in short peduncled axillary cymes; peduncles 5-8 mm long, hirsute; bracteoles subulate, ca. 3 mm long; calyx tube 1-1.5 mm long; lobes 2-3 mm, hirsute; corolla white; tube 1.5-2.5 mm long; ovary 2-celled. Drupe globose, 5-6 mm across, purple on ripening.
Flowering & Fruiting: October-March.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2196,* Chanthanathodu.

MITRACARPUS Zuccarini
in Schultes, Mant. 3: 210. 1827.

Mitracarpus hirtus (L.) DC., Prodr. 4: 572. 1830; Ansari, Fl. Kasaragod Div. 196. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 224. 1988; Vajr., Fl. Palghat Dist. 236. 1990; Mohanan & Sivad., Fl. Agasthyamala 331. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 257. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 357. 2009. *Spermacoce hirta* L., Sp. Pl. ed. 2: 148. 1762. *Mitracarpus villosus* (Sw.) DC., Prodr. 4: 572. 1830; Sasidh. & Sivar., Fl. Pl. Thrissur For. 227. 1996; Sivar. & P. Mathew, Fl. Nilambur 334. 1997. *Spermacoce villosa* Sw., Prodr. 29. 1788. *Mitracarpus verticillatus* (Schum. & Thonn.) Vatke, Linnaea 40: 196. 1876; Sebastine & Ramam., Bull. Bot. Surv. India 9:921. 1968; Manilal & Sivar., Fl. Calicut 134. 1982; Manilal, Fl. Silent Valley 136. 1988.

Erect herbs, 45-50 cm high, little or not branched; stems 4-angled. Leaves to 3-3.5 x 1.5-2 cm, elliptic, acute, sessile, 3-5-nerved, plicate; stipules connate, membranous, fimbriate. Flowers minute, in axillary clusters; calyx lobes 4, unequal; corolla ca. 2.5 mm long, white, tube slender, lobes ovate, obtuse; stamens 4, anthers sessile at mouth of corolla tube; ovary 2-celled; ovule solitary in each cell; style 2-fid at apex. Capsule ca. 2 mm long, obovoid, with persistent calyx lobes; seeds 2, oblong, rugose.

Flowering & Fruiting: July-December.

Distribution: Tropical Africa and America; now common in south India. Common; in open areas. *RNMK 2576,* Puthoorvayal, *RNMK 2558*, Meppady.

MITRAGYNA P. W. Korthals
Observ. Naucleis Ind. 19: 1839, *nom. cons.*

Trees. Leaves with transverse parallel nerves; stipules interpetiolar, large, caducous. Flowers 5-merous, in globose heads, terminal and axillary; peduncle with 2 large bracts; intrafloral bracteoles paleaceous; calyx tube short, limb tubular, truncate or shortly lobed; corolla funnel shaped, throat glabrous or pilose, lobes valvate; stamens attached towards the apex of corolla tube, anthers apiculate; style long, filiform, stigma exserted, mitriform. Capsule separating into 2 many seeded cocci.

1. Domatia hairy; flowers greenish yellow ..... **M. parvifolia**
1. Domatia absent; flowers yellow with purple tinge..... **M. tubulosa**

Mitragyna parvifolia (Roxb.) Korth., Observ. Naucl. Ind. 19. 1839; Gamble, Fl. Pres. Madras 585(413). 1921; Manilal & Sivar., Fl. Calicut 133. 1982; Manilal, Fl. Silent Valley 136. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 225. 1988; Vajr., Fl. Palghat Dist. 236. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 227. 1996; Sivar. & P. Mathew, Fl. Nilambur 334. 1997. *Nauclea parvifolia* Roxb., Pl. Corom. t. 52. 1796. *Stephegyne parvifolia* (Roxb.) Korth., Verh. Nat. Gesch. Ned. Bezitt. Bot. 161.1840; Hook. f., Fl. Brit. India 3:25.1880.

Large trees; bark smooth. Leaves 10-17 x 8-12 cm, ovate, acute, rounded at base nerves 7-9 pairs, regular, villous below, nervules parallel, domatia hairy; petiole 2-5 cm long; stipule large, lanceolate, entire. Heads ca. 3 cm across, terminal, solitary; bracteoles spathulate; flowers ca. 1.2 cm long, greenish yellow, shortly pedicelled, calyx tube truncate; corolla tube ca. 8 mm long, villous inside, lobes 4, oblong, deflexed; anthers sessile; ovules many; style ca. 1.2 cm long, filiform. Capsule ca. 1.5 cm across, 6-ribbed, ellipsoid.
Flowering & Fruiting: March-December.
Distribution: Indo-Malesia. Common; in open areas in moist deciduous forests. RNMK 2558, Bavely; *RNMK 2558,* Pulpally.

Mitragyna tubulosa (Arn.) Hav., J. Linn. Soc. Bot. 33: 71. 1897; Gamble, Fl. Pres. Madras 585(413). 1921; Manilal & Sivar., Fl. Calicut 133. 1982; Ansari, Fl. Kasaragod Div. 197. 1985; Vajr., Fl. Palghat Dist. 237. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 227. 1996; Sivar. & P. Mathew, Fl. Nilambur 336. 1997; Mohanan & Sivad., Fl. Agasthyamala 331. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 257. 2005. *Nauclea tubulosa* Arn. in Thw., Enum. Pl. Zeyl. 137. 1859. Bedd., Ic. t.18. 1868. *Stephegyne tubulosa* (Arn.) Hook.f. ex Bedd., Fl. Sylv. t.29. f.1. 1869; Hook. f., Fl. Brit. India 3: 25. 1880.

Medium trees; bark greyish, branches horizontal. Leaves 15-20 x 5-8 cm, ovate-oblong or ovate, apex acute to acuminate, base truncate or obtuse, lateral nerves 10 pairs, domatia absent; petiole to 3 cm long; stipules oblong, obtuse ca. 0.8 cm long. Flower heads ca. 2 cm across; calyx tube truncate, glabrous; corolla funnel-shaped, yellow with purple tinge, tube ca. 3 mm long, lobes reflexed. Capsule ca. 6 x 5 mm, 2-follicular.
Flowering & Fruiting: April-May.
Distribution: Endemic to Peninsular India. Occasional; in evergreen forests. *RNMK 2642,* Vythiri Ghats.

MORINDA Linnaeus
Sp. Pl. 176. 1753.

Morinda umbellata L., Sp. Pl. 176. 1753; Hook. f., Fl. Brit. India 3: 157. 1880; Gamble, Fl. Pres. Madras 652(460). 1921; Manilal & Sivar., Fl. Calicut 144. 1982 ; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 359. 2009.

Climbers. Leaves 10-11 x 2.5-3 cm, oblanceolate, abruptly acuminate, scabrous below, nerves 4-6 pairs, reticulate; stipules 6-7 mm long, ovate, acute, entire. Flowers in globose umbellate, heads, radices fused together, hemispheric, truncate; corolla tube 4-5 mm long, funnel-shaped, lobes 4, valvate, white; stamens 4; anthers oblong; ovary 2-celled; ovule solitary in each cell; style slender, stigmas 2, linear. Fruit fused into a syncarpium of ca. 1 cm across; seeds oblong.
Flowering & Fruiting: Ferbruary-July.
Distribution: India, China, Japan and Australia. Rare; in riverside in moist deciduous forests. *RNMK 2718,* Muthanga.

MUSSAENDA Linnaeus

Sp. Pl. 177. 1753.

Mussaenda frondosa L., Syst. Nat. (ed.10) 2: 931.1759; Hook. f., Fl. Brit. India 3: 89. 1880; Gamble, Fl. Pres. Madras 610(430). 1921; Manilal & Sivar., Fl. Calicut 145. 1982; Sivar. & P. Mathew, Fl. Nilambur 337. 1997; Mohanan & Sivad., Fl. Agasthyamala 335. 2002. *Mussaenda belilla* Buch.-Ham., Trans. Linn. Soc. London 14: 203. 1824; Ridsd. in Manilal, Bot. Hist. Hort. Malab. 131. 1980; Ansari, Fl. Kasaragod Div. 198. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 226. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 225. 1988; Vajr., Fl. Palghat Dist. 237. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 228. 1996; Sivar. & P. Mathew, Fl. Nilambur 337. 1997; Mohanan & Sivad., Fl. Agasthyamala 335. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 258. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 360. 2009. *Mussaenda laxa* (Hook. f.) Hutch. ex Gamble, Fl. Pres. Madras 610(430). 1921. *Mussaenda frondosa* L. var. *laxa* Hook. f., Fl. Brit. India 3: 89. 1880. *Belilla* Rheede, Hort. Malab. 2.27-28, t.18.1679. **Plate 21b.**

Climbing shrubs. Leaves 10-11 x 7-8 cm, broadly ovate, acuminate, rounded at base, thinly hairy; nerves 10-12 pairs, parallel; petiole ca. 5 cm long, slender; stipule ca. 1.2 cm long. Flowers pedicelled; larger calyx lobes 8-9 cm across, orbicular, hirsute, white; other calyx lobes ca. 1 cm long, linear; corolla tube 2.5-2.9 cm long, orange-yellow, slender, adpressed hairy, densely villous inside. Fruits ca. 8 x 6 mm, globose.

Flowering & Fruiting: September-March.

Distribution: Endemic to Peninsular India. Common in streamside. *RNMK 2518* , Puthoorvayal.

NEANOTIS W. H. Lewis

Ann. Missouri Bot. Gard. 53: 34. 1966.

Diffuse or erect herbs. Leaves opposite, entire; stipule membraneous, ciliate. Flowers in axillary or terminal cymes, sessile or pedicelled; calyx tube globose, lobes 4; corolla tube slender, lobes 4, valvate; stamens 4, inserted at the mouth of the corolla tube; ovary 2-5-celled; ovules few in each cell; style slender; stigma linear. Fruit a few-seeded capsule, loculicidal; seeds planoconvex or curved.

1. Erect herbs.....**N. rheedei**
1. Procumbent herbs 2
2. Capsule 3 celled 3
2. Capsule 4 celled .....**N. monosperma**
3. Stem pubescent; lateral nerves 3-7 pairs .....**N. tubulosa**
3. Stem glabrous; lateral nerves 5-7 pairs .....**N. indica**

Neanotis indica (DC.) Lewis, Ann. Missouri Bot. Gard. 53: 38. 1966; V. S. Ramach. & V.J. Nair, Fl. Cannanore 226. 1988. *Putoria indica* DC., Prodr. 4: 577. 1830. *Anotis leschenaultiana* (Wall. ex Wight & Arn.) Hook.f., Fl. Brit.

India 3: 72. 1880; Gamble, Fl. Pres. Madras 604(426). 1921. *Hedyotis leschenaultiana* Wall. ex Wight & Arn., Prodr. 411. 1834. *Neanotis indica* (DC.) Lewis var. *affinis* (Wall. ex Wight & Arn.) Lewis, Ann. Missouri Bot. Gard. 53: 39. 1966; Manilal, Fl. Silent Valley 137. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 231. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 259. 2005. *Hedyotis affinis* Wall. ex Wight & Arn., Prodr. 411. 1834; Wight, Ic. t.1030. 1845. *Anotis leschenaultiana* (Wall. ex Wight & Arn.) Hook.f. var. *affinis* (Wall. ex Wight & Arn.) Hook.f., Fl. Brit. India 3: 72. 1880; Gamble, Fl. Pres. Madras 604(426). 1921.

Diffuse pubescent herbs, rooting at lower nodes. Leaves 3-5 x 2-3 cm, ovate, acute or shortly acuminate, base obtuse or acute, strigose on both sides; lateral nerves 5-7 pairs; petiole to 1 cm; stipules villous, lobes subulate. Flowers in terminal and axillary tomentose cymes; calyx lobes ovate-lanceolate; corolla pale pink, tomentose, funnel shaped, ca. 3 mm long; stigma 2-lobed. Capsule ca. 2 mm across; seeds pitted.

Flowering & Fruiting: November-December.

Distribution: Endemic to Western Ghats. Occasional; in the margins of evergreen forests. *RNMK 3012,* Periya.

Neanotis monosperma (Wall. ex Wight & Arn.) Lewis, Ann. Miss. Bot. Gard. 53: 39. 1966; Manilal, Fl. Silent Valley 137. 1988; Sivar. & P. Mathew, Fl. Nilambur 339. 1997. *Hedyotis monosperma* Wall. ex Wight & Arn., Prodr. 410. 1834. *Anotis monosperma* (Wall. ex Wight & Arn.) Hook. f., Fl. Brit. India 3: 75. 1880; Gamble, Fl. Pres. Madras 605(427). 1921. **Plate 21c.**

Profusely branched herbs. Leaves 2-3 cm long, ovate-lanceolate. Flowers in terminal branched cymes; corolla pink, larger than the calyx lobes. Capsule 4-celled, loculisidal.

Flowering & Fruiting: December-March.

Distribution: Endemic to Peninsular India. Common; in evergreen forests. *RNMK 1363,* Kurichiarmala.

Neanotis tubulosa (G. Don) Mabb. in Manilal, Bot. Hist. Hort. Malab. 92. 1980; Ansari, Fl. Kasaragod Div. 200. 1985; Manilal, Fl. Silent Valley 138. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 227. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 230. 1996. *Oldenlandia tubulosa* G. Don, Gen. Syst. 3: 531. 1834 p.p. *Anotis quadrilocularis* (Thw.) Hook. f., Fl. Brit. India 3: 74. 1880; Gamble, Fl. Pres. Madras 605(427). 1921. *Hedyotis quadrilocularis* Thw., Enum. Pl. Zeyl. 144. 1859. Bedd., Ic. t. 28. 1868-1874. *Neanotis quadrilocularis* (Thw.) Lewis, Ann. Missouri Bot. Gard. 53. 40. 1966.

Procumbent annual herbs; stems glabrous. Leaves 3-3.8 x 1-1.6 cm, ovate, acute at both ends, minutely villous; nerves 3-4 pairs; petiole ca. 5 mm long; stipule orbicular, ciliate, membraneous. Flowers 2-5 together, white or purple; calyx lobes ovate, acute, glabrous, corolla tube ca. 3 mm long, lobes ovate. Capsule glabrous, 3-celled; seeds 2-5 in each cell, pitted, concave on faces.

Flowering & Fruiting: October-November.
Distribution: Peninsular India and Sri Lanka. Occasional; in grasslands margins. *RNMK 3176,* Thirunelli.

Neanotis rheedei (Wall. ex Wight & Arn.) Lewis, Ann. Miss. Bot. Gard. 53: 40. 1966; Ansari, Fl. Kasaragod Div. 199. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 226. 1988. *Hedyotis rheedei* Wall. ex Wight & Arn., Prodr. 409. 1834. *Anotis rheedei* (Wall. ex Wight & Arn.) Benth. & Hook.f., Gen. Pl. 2: 59. 1873; Hook. f., Fl. Brit. India 3: 73. 1880; Gamble, Fl. Pres. Madras 605(426). 1921.

Erect annual herbs, 30-35 cm tall; branches quadrangular, glabrous. Leaves 6-7 x 2-2.3 cm, membranous, ovate, puberulous. Flowers ca. 1 cm long, pink in terminal and axillary cymes.
Flowering & Fruiting: October-December.
Distribution: Endemic to Western Ghats. Occasional; in shola margins. *RNMK 1356,* Chembra.

NEOLAMARCKIA J. Bosser
Adansonia Ser. 4, 6: 247. 1984.

Neolamarckia cadamba (Roxb.) Bosser, Bull. Mus. Natl. Hist. Nat. (Paris) sect. B. Adansonia 6: 247. 1984; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 227. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 227. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 232. 1996; Sivar. & P. Mathew, Fl. Nilambur 340. 1997; Mohanan & Sivad., Fl. Agasthyamala 338. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 259. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 361. 2009. *Nauclea cadamba* Roxb., Fl. Ind. 2: 121. 1824. *Anthocephalus chinensis* (Lamk.) A. Rich. ex Walp., Rep. 2: 491. 1843; Manilal & Sivar., Fl. Calicut 133. 1982. *Anthocephalus cadamba* (Roxb.) Miq., Fl. Ind. Bat. 2: 135. 1850; Hook. f., Fl. Brit. India 3: 23. 1880. *Anthocephalus indicus* A. Rich., Mem. Rubiac. 157. 1830; Gamble, Fl. Pres. Madras 583(411). 1921. *Katou tsjaka* Rheede, Hort. Malab. 3: 29-30, t.33. 1682.

Large trees; branchlets obtusely 4-gonous; bark vertically shallowly grooved. Leaves opposite, 18-22 x 10-12 cm, oblong, obtuse, apiculate, tomentose when young; nerves 12-14 pairs, nervules parallel; stipule lanceolate, entire. Heads 4-6 cm across, terminal, peduncled. Flowers sessile, densely packed; calyx lobes 5, each ca. 6 mm long, oblong; corolla tube ca. 1 cm long, slender, glabrous, lobes oblong, ca. 6 mm long; anthers sessile, sagittate at base, apiculate; ovary 2 or 4 celled; ovules numerous; style entire, stigma clavate. Capsule membraneous; seeds many, compressed.
Flowering & Fruiting: April-August.
Distribution: Asia, Pacific and Australia. Occasional; in stremside. *RNMK 0112,* Pookodu.

NEUROCALYX W. J. Hooker
Icon. Pl. 2: 174. 1837.

Neurocalyx calycinus (R. Br. ex Bennett) Robinson, Proc. Amer. Acad. Arts 45:402. 1910; Manilal, Fl. Silent Valley 138. 1988; V. S. Ramach. & V.J. Nair,

Fl. Cannanore 228. 1988; Vajr., Fl. Palghat Dist. 238. 1990; Sivar. & P. Mathew, Fl. Nilambur 341. 1997; Mohanan & Sivad., Fl. Agasthyamala 339. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 260. 2005. *Argostemma calycinum* R. Br. ex Bennett, Pl. Jav. Rar. 97. 1838. *Neurocalyx wightii* Arn., Ann. Nat. Hist. ser. 1. 3: 22. 1839; Hook. f., Fl. Brit. India 3: 47. 1880; Gamble, Fl. Pres. Madras 591(417). 1921. **Plate 21d.**

Large herbs, pubescent. Leaves 18-26 x 5-7 cm, oblanceolate, acute at apex, rusty puberulus; nerves 16-18 pairs, prominent below; stipule ca. 2 cm long, obovate, 2-fid at apex. Racemes 10-13 cm long, axillary, rarely branched; bracts lanceolate; flowers white, pedicelled; calyx tube hemispherical, lobes 5, ovate; corolla tube absent, lobes ovate, twisted; stamens 5, anthers connate into a conical tube; ovary 2-celled, ovules many, style slender. Capsule irregularly bursting; seeds many, pitted.

Flowering & Fruiting: May-August.

Distribution: Endemic to south-west India. Occasional; in evergreen forests. *RNMK 1832,* Chanthanathodu; *RNMK 1224*, Kanthanpara; *RNMK 1674*, Ladies smith forest.

OCHREINAUCLEA Ridsdale

Blumea 24: 332.1978.

Ochreinauclea missionis (Wall. ex G. Don) Ridsdale, Blumea 24: 332. 1978; Ansari, Fl. Kasaragod Div. 200. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 231. 1996; Sivar. & P. Mathew, Fl. Nilambur 341. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 260. 2005. *Nauclea missionis* Wall. ex G. Don, Gen. Hist. 3: 467. 1834; Hook. f., Fl. Brit. India 3: 27. 1880; Gamble, Fl. Pres. Madras 582(411). 1921. *Sarcocephalus missionis* (Wall. ex G. Don) Havil, J. Linn. Soc. Bot. 33: 32. 1897. **Plate 21e.**

Small to medium sized trees; bark grayish-brown. Leaves 11-14 x 4-5 cm, elliptic oblong, cuneate at base, apex obtuse to subacute, glabrous; lateral nerves 11-13 pairs, slender; petiole ca. 1 cm long; stipules oblong. Inflorescense globose, ca. 2.5 cm across; peduncle ca. 1.5 cm long with 4 bracts near the base; flowers 5- merous; calyx fused with fleshy receptacle; corolla greenish yellow, tube ca. 3 mm long, glabrous, lobes ovate, pubescent outside; stamens at corolla throat; ovary 2-locular; ovules many. Capsule in globose heads.

Flowering & Fruiting: June-November.

Distribution: Southern Western Ghats. Occasional; in streamsides. *RNMK 1549,* Kuruva.

OLDENLANDIA Linnaeus

Sp. Pl.: 119. 1753.

1. Flowers pedicelled, usually in pairs or threes 2
1. Flowers sessile or nearly so 4

2. Fruits globose, opening ventrally ..... **O. diffusa**
2. Fruits subglobose, didymous, opening at apex 3
3. Corolla white, with a ring of hairs at mouth..... **O. ovatifolia**
3. Corolla blue hispidous..... **O. hygrophila**
4. Corolla tube slender; capsule valve elongate ..... **O. herbacea**
4. Corolla tube short; capsule valve not elongate 5
5. Flowers 2-3; calyx lobes glabrous ..... **O. corymbosa**
5. Flowers 10-20 together; calyx lobes spreading, pubescent ..... **O**. **auricularia**

Oldenlandia auricularia (L.) K. Schum. in Engl. & Prantl, Naturl. Pflanzenfam. 4(4): 25. 1891; Gamble, Fl. Pres. Madras 597(421). 1921; Vajr., Fl. Palghat Dist. 239. 1990. *Hedyotis auricularia* L., Sp. Pl. 101. 1753; Bedd., Ic. t. 27. 1868. 1874; Hook. f., Fl. Brit. India 3: 58. 1880; Ansari, Fl. Kasaragod Div. 191. 1985; Manilal, Fl. Silent Valley 131. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab.222. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 216. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 220. 1996; Sivar. & P. Mathew, Fl. Nilambur 324. 1997; Mohanan & Sivad., Fl. Agasthyamala 314. 2002; Dutta & Deb, Taxonomic Revision Hedyotis 99. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 251. 2005 ; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 348. 2009. *Exallage auricularia* (L.) Bremek., Verh. Akad. Wtensch. Afd. Natuurk. Sect. 2, 48: 142. 1952. *Muriguti* Rheede, Hort. Malab. 10: 63, t. 32. 1690.

Herbs to 50 cm high; branches pubescent. Leaves 6-8 x 2.5-3 cm, elliptic, acute, scabrous below; nerves 4-5 pairs, prominent; petiole ca. 5 mm long; stipules obovate, teeth 7, 3-5 mm long, hairy. Cymes axillary, ca. 1 cm across; flowers 10-20 together; calyx lobes spreading, pubescent; corolla white; stamens included. Capsule ca. 2 mm across, globose; glabrous.
Flowering & Fruiting: October-December.
Distribution: Indo-Malesia. Common in open areas. *RNMK 2679,* Puthoorvayal.

Oldenlandia corymbosa L., Sp. Pl. 119.1753; Hook. f., Fl. Brit. India 3: 64. 1880, p.p.; Gamble, Fl. Pres. Madras 600(423). 1921; Vajr., Fl. Palghat Dist. 239. 1990. *Hedyotis corymbosa* (L.) Lamk., Encycl. 1: 272. 1792; Manilal & Sivar., Fl. Calicut 142. 1982; Ansari, Fl. Kasaragod Div. 192. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 216. 1988; Sivar. & P. Mathew, Fl. Nilambur 325. 1997; Mohanan & Sivad., Fl. Agasthyamala 315. 2002; Dutta & Deb, Taxonomic Revision Hedyotis 149. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 251. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 349. 2009.

Diffuse herbs, stem 4-angled, scabrous. Leaves 2.2-2.5 x 0.3-0.4 cm, lanceolate, acute, serrate, subsessile. Umbels axillary; peduncle 1.3-1.5 cm long, slender; flowers 2-3, ca. 5 mm long; pedicels 6-7 mm long, slender; calyx ca. 3 mm long, lobes ovate, serrate; corolla white, capsule globose, opening apically; seeds many, angled.

Flowering & Fruiting: April-September.
Distribution: Pantropical. Common in open areas. *RNMK 3017,* Muthanga.

Oldenlandia diffusa (Willd.) Roxb., Fl. Ind. 1: 444. 1820; Hook. f., Fl. Brit. India 3: 65. 1880; Gamble, Fl. Pres. Madras 601(423). 1921. *Hedyotis diffusa* Willd., Sp. Pl. 1: 566. 1768; Manilal & Sivar., Fl. Calicut 141. 1982; Ansari, Fl. Kasaragod Div. 192. 1985; Manilal, Fl. Silent Valley 132. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 217. 1988; Sivar. & Biju, Taxon 39: 672. 1990; Joseph, Aquatic Angiosp. Malabar 203. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 221. 1996; Dutta & Deb, Taxonomic Revision Hedyotis 144. 2004;.

Diffuse glabrous herbs, stem 4–angled, minutely hispid, often rooting at nodes. Leaves ca. 2.5 x 0.2 cm, sessile, linear lanceolate, glabrous, 1 nerved; stipules small, apex lacerate. Flowers in 2-5 flowered axillary cymes; calyx lobes triangular; shorter than corolla tube; corolla white, to 1.5 mm long; stamens included. Fruits subglobose, didymous, opening at apex.
Flowering & Fruiting: August-November.
Distribution: Tropical and sub-tropical Asia and America. Occasional; in evergreen forests. *RNMK 1241,* Sughandhagiri.

Oldenlandia herbacea (L.) Roxb., Fl. Ind. 1: 495. 1820; Gamble, Fl. Pres. Madras 601(424). 1921; Vajr., Fl. Palghat Dist. 240. 1990. *Hedyotis herbacea* L., Sp. Pl. 102. 1753; Manilal & Sivar., Fl. Calicut 141. 1982; Ansari, Fl. Kasaragod Div. 192. 1985; Manilal, Fl. Silent Valley 132. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 217. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab.223.1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 221. 1996; Sivar. & P. Mathew, Fl. Nilambur 326. 1997; Mohanan & Sivad., Fl. Agasthyamala 316. 2002; Dutta & Deb, Taxonomic Revision Hedyotis 120. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 252. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 352. 2009. *Oldenlandia heynei* R. Br. ex G. Don, Gen. Syst. 3: 531. 1834; Hook. f., Fl. Brit. India 3: 65. 1880. *Hedyotis heynei* R. Br. ex Wight & Arn., Prodr. 416. 1834. *Schanganam-pullu* Rheede, Hort. Malab. 10: 45t. 23, 1690.

Erect herbs, 26-30 cm high; stems 4-angled, glabrous. Leaves 3-5 x 0.2-0.5 cm, linear-oblong, acute, serrulate, sessile; stipule triangular, shortly toothed. Flowers axillary, solitary; pedicel 1.5-2 cm long, filiform; calyx ca. 2 mm long; lobes lanceolate, toothed; corolla white; stamens 4, included. Capsule septicidal at apex; seeds angled, black.
Flowering & Fruiting: July-December.
Distribution: Tropical Africa and Asia. Occasional; in open marshy areas. *RNMK 1559,* Puthoorvayal.

Oldenlandia hygrophila Bremek., Kew Bull. 29: 359. 1974. *Hedyotis hygrophila* (Bremek.) Bennet, J. Econ. Tax. Bot. 4: 592. 1983; Sasidh. &

Sivar., Fl. Pl. Thrissur For. 221. 1996; Dutta & Deb, Taxonomic Revision Hedyotis 140. 2004.

Herbs to 10 cm tall, stem 4-angled, hispid. Leaves sessile, linear, sparsely hispid, ca. 1 cm long; stipule ovate, bristly along the margins, hispid. Flowers axillary, pedicels ca. 1 cm long; calyx lobes ovate-lanceolate, hispid; corolla blue, ca. 2 mm long; stamens partly exserted, attached at the mouth of corolla tube. Fruits subglobose, hispid.

Flowering & Fruiting: August-December.

Distribution: Southern Western Ghats (Kerala). Rare; in moist deciduous forests. *RNMK 2228,* Muthanga.

Oldenlandia ovatifolia (Cav.) DC., Prodr. 4: 427. 1830. *Hedyotis ovatifolia* Cav., Ic. 6: 52. 1801; Sasidh. & Sivar., Fl. Pl. Thrissur For. 221. 1996; Sivar. & P. Mathew, Fl. Nilambur 328. 1997; Mohanan & Sivad., Fl. Agasthyamala 318. 2002; Dutta & Deb, Taxonomic Revision Hedyotis 112. 2004. *Gonotheca ovatifolia* (Cav.) Sant. & Wagh, Bull. Bot. Surv. India 5: 107. 1964. *Oldenlandia nudicaulis* Roth, Nov. Pl. Sp. 95. 1821; Hook. f., Fl. Brit. India 3: 70. 1880; Gamble, Fl. Pres. Madras 602(425). 1921. *Hedyotis nudicaulis* (Roth) Wight & Arn., Prodr. 416. 1834; Bedd., Ic.t.34. 1868-1874. *Thecagonum ovatifolium* (Cav.) Babu, Bull. Bot. Surv. India 11: 214. 1971.

Annual herbs, stem 4-angled. Leaves 3-5 x 2-2.5 cm, ovate or ovate-oblong, apex acute, base obtuse, minutely hispid, lateral nerves 5-7 pairs; petiole ca. 0.5 cm long; upper leaves sessile and fascicled. Peduncles terminal, 2 or 3, slender, dichotomous branched, 6-7 cm long, pedicels slender, ca. 1 cm long; calyx lobes indistinct; corolla white, with a ring of hairs at mouth, ca. 1 mm long. Capsule subglobose.

Flowering & Fruiting: August-September.

Distribution: Indo-Malesia. Occasional; in moist deciduous forests. *RNMK 1319,* Muthanga; *RNMK 1070*, Naikkuppa.

OPHIORRHIZA Linnaeus

Sp. Pl. 150. 1753.

Erect or decumbent annual or perennial herbs. Leaves opposite, entire, petiolate; stipule, interpetiolar, caducous, entire, deciduous. Flowers in branched scorpioidal cymes, terminal, bracteolate or ebracteate; calyx tube ovoid, lobes 5, small; corolla tube funneliform or tubular, lobes 5, valvate, keeled; stamens 5, inserted on the corolla-tube; filaments slender; anthers linear-oblong; disk two-lobed, erect; ovary 2-celled; ovules many; style slender; stigmas 2, clavate. Fruit a compressed capsule, obcordate dehiscing apically by valves; seeds many, angular.

1. Flowers deep pink ..... **O. pectinata**
1. Flowers white 2
2. Procumbent herbs; leaves to 5 cm long ..... **O. rugosa** var. **prostrata**
2. Erect herbs or subshrubs; leaves to 12 cm long 3

3. Flowers ebracteate 4
3. Flowers bracteate ..... **O. brunonis**
4. Flowers in axillary cymes ..... **O. mungos**
4. Flowers in pubescent terminal cymes ..... **O. hirsutula**

Ophiorrhiza brunonis Wight & Arn., Prodr. 404. 1834; Hook. f., Fl. Brit. India 3: 79. 1880; Gamble, Fl. Pres. Madras 608(428). 1921; Manilal, Fl. Silent Valley 139. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 228. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 232. 1996; Deb & Mondal, Bull. Bot. Surv. India 39: 34. 1997; Sivar. & P. Mathew, Fl. Nilambur 342. 1997. *Ophiorrhiza brunonis* Wight & Arn. var. *johnsonii* Hook. f., Fl. Brit. India 3: 80. 1880; Deb & Mondal, Bull. Bot. Surv. India 39: 34. 1997.

Small subshrubs; branches pubescent. Leaves 17-20 x 5.5-7 cm, lanceolate, acuminate, glabrous except the nerves; nerves 10-12 pairs, arching; petiole 2-4 cm long, hispid; stipule ca. 1 cm long, lanceolate, glabrous. Cymes 5-7 cm broad, terminal, corymbose; peduncle 2-6 cm long, hispid; flowers ca. 1.5 cm long, densely arranged; bracteoles ca. 1.3 cm long, filiform, villous; calyx lobes ca. 2 mm long, hairy; corolla white, tube ca. 8 mm long, hispid, lobes ovate, obtuse; anthers ca. 2.5 mm long, linear. Capsule faintly ribbed.

Flowering & Fruiting: February-September.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 1868,* Kurichiarmala.

Ophiorrhiza hirsutula Wight ex Hook. f., Fl. Brit. India 3: 81. 1880; Gamble, Fl. Pres. Madras 608(429). 1921; Manilal, Fl. Silent Valley 139. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 229. 1988; Vajr., Fl. Palghat Dist. 240. 1990; Deb & Mondal, Bull. Bot. Surv. India 39: 57. 1997; Sivar. & P. Mathew, Fl. Nilambur 343. 1997; Mohanan & Sivad., Fl. Agasthyamala 342. 2002. **Plate 21f.**

Undershrubs up to 40 cm tall, stem rusty-pubescent. Leaves 12-17 x 4-6 cm long, elliptic-lanceolate, long acuminate, glabrous above, pale green beneath; stipules very villous. Flowers in pubescent terminal cymes; corolla white with pinkish tinge, short. Capsule glabrous.

Flowering & Fruiting: March-May.

Distribution: India and Myanmar. Occasional; in evergreen forests. *RNMK 2641*, Chanthanathodu.

Ophiorrhiza mungos L., Sp. Pl. 150. 1753; Hook. f., Fl. Brit. India 3: 77. 1880; Gamble, Fl. Pres. Madras 607(428). 1921; Ansari, Fl. Kasaragod Div. 201. 1985; Manilal, Fl. Silent Valley 139. 1988; Vajr., Fl. Palghat Dist. 241. 1990; Deb & Mondal, Bull. Bot. Surv. India 39: 69. 1997; Sasidh. & Sivar., Fl. Pl. Thrissur For. 232. 1996; Sivar. & P. Mathew, Fl. Nilambur 343. 1997; Mohanan & Sivad., Fl. Agasthyamala 342. 2002; Anil Kumar, Sivad. & N.

Ravi, Fl. Pathanamthitta 261. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 361. 2009.

Large herbs, rooting at lower nodes; stems scabrous. Leaves 11-15 x 4-7 cm, ovate, acuminate at apex, decurrent or cuneate at base; nerves 10-14 pairs, regular, parallel, scabrid below; petiole 2-3 cm long; stipule triangular, acute. Cymes 5-8 cm broad, spreading, bracts absent; flowers pedicelled; calyx glabrous; corolla tube villous in a ring at mouth, lobes white with pink shades. Capsule glabrous; seeds angled, brown.

Flowering & Fruiting: August-October.

Distribution: India, Myanmar and Sri Lanka. Occasional; in evergreen forests. *RNMK* 0158, Vythiri; *RNMK 1509*, Sughandhagiri.

Ophiorrhiza pectinata Arn., Acta Phys.-Med. Acad. Caes. Leop. Carol. Nat. Cur. 18: 338. 1836; Hook. f., Fl. Brit. India 3: 81. 1880; Gamble, Fl. Pres. Madras 608(429). 1921; V. S. Ramach. & V.J. Nair, Fl. Cannanore 229. 1988; Deb & Mondal, Bull. Bot. Surv. India 39: 93. 1997; Mohanan & Sivad., Fl. Agasthyamala 343. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 261. 2005.

Erect herbs, to 40 cm high, glabrous. Leaves 12-17 x 5-7 cm, elliptic-lanceolate, acuminate at both ends; nerves 8 pairs; petiole ca. 5 cm long; stipule ovate, acute. Cymes 2-5 cm broad; peduncle 5-6 cm long; flowers densely packed; bracteoles ca. 8 x 4 mm, curved-oblong, acute; calyx lobes ovate, glabrous; corolla tube ca. 8 mm long with a ring of erect hairs at throat, lobes ovate, acute, pink; anthers nearly sessile. Capsule 2-winged, glabrous; seeds brown.

Flowering & Fruiting: July-September.

Distribution: Peninsular India and Sri Lanka. Occasional; in evergreen forests. *RNMK 0096*, Chembra.

Ophiorrhiza rugosa Wall. In Roxb., Fl. India (ed. Carey) 2: 546. 1824. var. **prostrata** (D. Don) Deb & Mondal, Bull. Bot. Surv. India 24: 228. 1982; Ansari, Fl. Kasaragod Div. 201. 1985; Deb & Mondal, Bull. Bot. Surv. India 39: 114. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 261. 2005. *Ophiorrhiza prostrata* D. Don, Prodr. Fl. Nepal. 136. 1825; Manilal & Sivar., Fl. Calicut 134. 1982; Manilal, Fl. Silent Valley 139. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 229. 1988; Vajr., Fl. Palghat Dist. 241. 1990; Sivar. & P. Mathew, Fl. Nilambur 343. 1997; Mohanan & Sivad., Fl. Agasthyamala 343. 2002. *Ophiorrhiza harrisonii* G. Don, Gen. Hist. 3: 523. 1834. *Ophiorrhiza harrisiana* Heyne ex G. Don, Gen. Syst. 3: 523. 1834; Wight, Ic., t. 1162. 1846; Hook. f., Fl. Brit. India 3: 78. 1880; Gamble, Fl. Pres. Madras 607(428). 1921.

Procumbent herbs. Leaves ovate, obtusely acute at apex, rounded at base, pubescent along the nerves below, chartaceous; nerves 4-6 pairs; petiole 1-2 cm long; stipule triangular, hairy. Cymes 1-2 cm across, congested; peduncle

ca. 5 cm long; flowers minute, white; bracteoles deciduous; calyx ca. 1 mm long, lobes ovate; corolla ca. 3 mm long, white. Capsule compressed; seeds 3-5, rugose, folded.
Flowering & Fruiting: August-December.
Distribution: Sri Lanka, India, Nepal and Myanmar. Rare; in evergreen forests. *RNMK 3072,* Chanthanathodu.

OXYCEROS Lour.
Fl. Cochinch.: 150 (1790).

Oxyceros rugulosus (Thw.) Tirveng., Nordic J. Bot. 3: 466. 1983; Manilal, Fl. Silent Valley 140. 1988; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 262. 2005. *Griffithia rugulosa* Thw., Enum. Pl. Zeyl. 159. 1859. *Randia rugulosa* (Thw.) Hook.f., Fl. Brit. India 3: 113. 1880; Gamble, Fl. Pres. Madras 617(435). 1921; Mohanan & Sivad., Fl. Agasthyamala 356. 2002. *Aidia rugulosa* (Thw.) Swamin., Biol. Mem. 2: 67. 1977. **Plate 21g.**

Climbing shrubs. Leaves 12-16 x 6-7 cm, elliptic, acuminate, glabrous; nerves 8-10 pairs; petiole ca. 1.5 cm long, thick; stipule 6-7 mm long, ovate, acuminate. Cymes lateral or axillary, 5-8 cm across; shortly peduncled; flowers ca. 2.5 cm long; calyx tube ca. 0.6 mm long, obconical, teeth 5, obsolete; corolla tube ca. 1.2 cm long, densely villous in a ring inside; lobes ca. 1.3 cm long, oblong, deflexed, white; stamens 5, filaments short, inserted at the mouth of corolla tube; anthers ca. 8 mm long, linear, apiculate; ovary 2-celled; ovules many, sunken in the axile placentas; style ca. 1.8 cm long, stigma clavate. Berry ca. 1 x 1 cm; seeds few, rugose.
Flowering & Fruiting: March-May.
Distribution: Peninsular India and Sri Lanka. Occasional; in evergreen forests. *RNMK 3539*, Kurichiarmala, *RNMK 3446*, Kallady-900 forests.

PAVETTA Linnaeus
Sp. Pl. 110. 1753.

Shrubs. Leaves opposite, membraneous; stipule entire, connate, deciduous. Flowers in axillary or terminal corymbose cyme; branches trichotomous; calyx tube turbinate, lobes 4 or 5; corolla tube slender; lobes 4 or 5, twisted, spreading; stamens 4 or 5, inserted on the mouth of the corolla tube; anthers linear; ovary 2-celled; ovule 1 in each cell; style slender, exerted stigma clavate, undivided. Fruit a berry with 2 pyrenes; seeds 2, planoconvex.

1. Calyx-teeth minute ..... **P. indica**
1. Calyx teeth short 2
2. Style long with minute stigmas 3
2. Style short with fusiform stigma 5
3. Leaves ovate or lanceolate, pubescent; nerves obscure 4
3. Leaves oblong, glabrous beneath; nerves regular ..... **P. zeylanica**
4. Stem hispid; nerves 6-8 pairs ..... **P. hispidula**
4. Stem white tomentose; nerves 8-10 pairs ..... **P. travancorica**

5. Calyx teeth brown hispid, recurved.....**P. brunonis**
5. Calyx teeth erect glabrous .....**P. wightii**

Pavetta brunonis G. Don, Gen. Hist. 3: 575. 1834; Hook. f., Fl. Brit. India 3: 152. 1880; Gamble, Fl. Pres. Madras 634 (447). 1921; Rout & Deb, Bull. Bot. Surv. India 41: 82. 1999. *Ixora nilagirica* O. Ktze., Rev. Gen. Pl. 1: 286. 1891.

A softly-tomentose shrub, greenish when dry. Leaves obovate or oblanceolate obtuse or acute softly hirsute beneath. Cymes terminal, sessile, contracted, densely tomentose; branches 3, very stout; flowers in cluster; stipular bracts large; calyx-teeth lanceolate, recurved; corolla glabrous, tube 1.5-2 cm, twice as long as the lobes; stigma narrowly clavate.
Flowering & Fruiting: April-June.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1821,* Sughandhagiri.

Pavetta hispidula Wight & Arn., Prodr. 431. 1834; Hook. f., Fl. Brit. India 3: 151. 1880; Gamble, Fl. Pres. Madras 633(447). 1921; Ansari, Fl. Kasaragod Div. 202. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 230. 1988; Vajr., Fl. Palghat Dist. 241. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 233. 1996; Sivar. & P. Mathew, Fl. Nilambur 344. 1997; Rout & Deb, Bull. Bot. Surv. India 41: 100. 1999; Mohanan & Sivad., Fl. Agasthyamala 347. 2002. *Pavetta siphonantha* Dalz. In Hook's J. Bot. Kew Gard. Misc. 2:133. 1850; Bedd., Fl. Sylv. t. 134. 1871.

Small shrubs; stems hispid. Leaves 12-15 x 3.5-4.5 cm, oblanceolate, acuminate, narrowed to the base, glabrous above, hispid below; nerves 6-8 pairs, looping below the margins; petiole ca. 2 cm long; stipules ovate, mucronate. Cymes 5-8 cm broad, lax, hispidulous; flowers white, pedicels ca. 8 mm long; calyx ca. 3 mm long, teeth short, recurved, hispid; corolla tube 1.5-2 cm long, thinly hispid, lobes ca. 8 x 3 mm long, oblong, glabrous. Berries ca. 1 cm across, globose.
Flowering & Fruiting: March-December.
Distribution: Western Ghats and Sri Lanka. Occasional; in moist deciduous forests. *RNMK 3074,* Chedelath.

Pavetta indica L., Sp. Pl. 110. 1753; Wight, Ic. t. 148. 1839; Hook. f., Fl. Brit. India 3: 150. 1880; Gamble, Fl. Pres. Madras 633(446). 1921; Manilal & Sivar., Fl. Calicut 146. 1982; Ansari, Fl. Kasaragod Div. 202. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 228. 1988; Vajr., Fl. Palghat Dist. 242. 1990; Sivar. & P. Mathew, Fl. Nilambur 345. 1997; Rout & Deb, Bull. Bot. Surv. India 41: 118. 1999; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 262. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 362. 2009. *Pavetta* Rheede, Hort. Malab. 5: 19-20, t. 10. 1685. **Plate 21h.**

Shrubs, branchlets glabrescent. Leaves 13-16 x 7-9 cm, obovate or oblanceolate, apex acuminate, base acute, glabrescent in both surface; petiole

1.7- 2 cm long. Cymes corymbose, axillary and terminal; calyx ca. 3 mm, lobes obovate; corolla white, tube ca. 1.2 cm long, lobes obovate; stamens 4; ovary ca. 2 mm, style ca. 3 cm. Berry 6-8 mm across, subglobose.
Flowering & Fruiting: April-July.
Distribution: India and Sri Lanka. Common; in moist deciduous forests. *RNMK 2583,* Muthanga.

Pavetta travancorica Bremek., Feddes Repert. 37: 81. 1934; Gamble, Fl. Pres. Madras 1877(1299). 1931; Rout & Deb, Bull. Bot. Surv. India 41: 161. 1999. *Pavetta laeta* Bremek., Feddes Repert. 37: 82. 1934; Gamble, Fl. Pres. Madras 1878(1299). 1936. *Pavetta bourdillonii* Sivad. & Mohanan, Bot. Bull. Acad. Sinica 40: 61. 1999; Mohanan & Sivad., Fl. Agasthyamala 345. 2002. **Plate 21i.**

Large shrubs; stem densely white-tomentose. Leaves 11-13 x 6-7 cm, ovate, acuminate, tomentose; nerves 8-10 pairs, reticulate; petiole ca. 3 cm long; stipule triangular, cuspidate, tomentose. Cymes 8-10 cm broad, terminal, densely tomentose, shortly peduncled; flowers pedicelled; pedicels 6-8 mm long; calyx ca. 2.5 mm long, retrose hairy, 4-toothed; corolla tube 1-1.2 cm long, glabrous, lobes ca. 7 x 1.5 mm long, oblong, hairy at base; anthers ca. 7 mm long, linear; style ca. 2.8 cm long, glabrous.
Flowering & Fruiting: February-November.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2645,* Kattimattom; *RNMK 2532*, Kallady.

Pavetta wightii Hook.f., Fl. Brit. India 3: 152. 1880; Gamble, Fl. Pres. Madras 634(447). 1921; Rout & Deb, Bull. Bot. Surv. India 41: 167. 1999; Mohanan & Sivad., Fl. Agasthyamala 349. 2002; Mohanan & Shaju, J. Econ. Tax. Bot. 28: 80. 2004.

Large shrubs. Leaves elliptic-lanceolate, acute, puberulous beneath with large oblong thickened glands, greenish when dry. Cymes terminal, slender; flowers long-pedicelled; calyx-teeth slender, lanceolate, acuminate, larger than the ovary; corolla glabrous, tube 1.5-2 cm long, slender, 2-3 times as long as the narrow acute lobes.
Flowering & Fruiting: March-June.
Distribution: Southern Western Ghats endemic. Rare; in evergreen forests. *RNMK 2575,* Sughandhagiri.

Pavetta zeylanica (Hook. f.) Gamble, Fl. Pres. Madras 633. 1921; Manilal, Fl. Silent Valley 141. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 231. 1988; Mohanan & Sivad., Fl. Agasthyamala 349. 2002. *Pavetta hispidula* Wight & Arn. var. *zeylanica* Hook. f., Fl. Brit. India 3: 151. 1880; Rout & Deb, Bull. Bot. Surv. India 41: 106. 1999. *Pavetta calophylla* Bremek., Feddes Repert. 37: 90. 1934; Gamble, Fl. Pres. Madras 1879(1299). 1936; Sasidh. & Sivar., Fl. Pl. Thrissur For. 232. 1996; Mohanan & Sivad., Fl. Agasthyamala 347. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 264. 2005.

Glabrous shrubs. Leaves 17-18 x 4-5 cm, elliptic, acuminate, attenuate at base and apex; nerves 8-9 pairs, hispid below; petiole ca. 2 cm long; stipule 7-8 mm long, ovate, acuminate. Cymes 6-10 cm broad, hispidulous; flowers pedicelled; calyx 2-3 mm long, obconical, lobes ciliate; corolla tube 1.8-2 cm long, slender, glabrous outside, villous inside, lobes ca. 9 x 4 mm, oblong, white; anthers ca. 7 mm long; style ca. 6.5 cm long. Berry globose.
Flowering & Fruiting: August-March.
Distribution: South India and Sri Lanka. Occasional; in evergreen forests. *RNMK 3404,* Vaduvanchal; *RNMK 2557*, Vythiri.

PRISMATOMERIS Thwaites
in Hook. Kew. J. 8: 268. t. 7A. 1856.

Prismatomeris tetrandra (Roxb.) K. Schum. in Engl. & Prantl, Naturl. Pflanzenfam. 4(4): 1381. 1891; Sasidh. & Sivar., Fl. Pl. Thrissur For. 233. 1996. *Coffea tetrandra* Roxb., Fl. Ind. 2:193. 1824; *Prismatomeris albidiflora* Thw. in Hook.'s J. Bot. Kew Gard. Misc. 8: 286. t.7A.1856 & Enum. Pl. Zeyl. 154. 1859; Hook. f., Fl. Brit. India 3: 159. 1880; Gamble, Fl. Pres. Madras 653(460). 1921.

Small trees, bark grey, fissured. Leaves 11-15 x 3-5 cm, obovate or oblong, apex abruptly acuminate, base cuneate, glabrous, glossy above, lateral nerves 7-9 pairs, reticulations thin, prominent; petiole 1.2-1.5 cm long; stipules glabrous, shining. Cymes terminal, few flowered; flowers ca. 2.5 cm long, white, slightly fragrant; calyx limb truncate, shortly 5-toothed; corolla lobes spreading; anthers linear, included; ovule pendulous, stigma 2-lobed. Berry ca. 1 cm across, crowned by the calyx limb.
Flowering & Fruiting: December-January.
Distribution: South India and Sri Lanka. Rare; in evergreen forests. *RNMK 1801,* Banasuramala.

PSEUDAIDIA Tirveng
Bull. Mus. Natl. Hist. Nat., B, Adansonia 8: 286 (1986).

Pseudaidia speciosa (Bedd.) Tirveng., Adansonia 3: 287. 1986; Sasidh. & Sivar., Fl. Pl. Thrissur For. 235. 1996; Sivar. & P. Mathew, Fl. Nilambur 346. 1997. *Griffithia speciosa* Bedd., Ic. t. 37. 1868-1874. *Randia speciosa* Bedd., For. Man. Bot. 133. 1872, non DC. 1830. *Randia rugulosa* auct. non Thw. 1859, Hook.f., Fl. Brit. India 3: 113. 1880, p.p., non Thw. 1859; Gamble, Fl. Pres. Madras 617(435). 1921.

Woody climbers. Leaves ovate or elliptic, obtusely acuminate, base acute, or attenuate, glabrous, chartaceous, 17-18 x 9-10 cm; stipules ovate-cuspidate, glabrous, ca. 0.5 cm long; bracts persistent. Pedicels 1.5-1.8 cm long; calyx puberulous, limb 5-toothed; corolla white with pink shades, tube ca. 1 cm long, lobes as long as the tube, reflexed; stamens exserted. Berry globose ca. 1 cm across.
Flowering & Fruiting: January-June.
Distribution: South west India and Sri Lanka. Occasional; in evergreen forests. *RNMK 2610,* Sughandhagiri.

PSILANTHUS Hook. f.

Hooker's Icon. Pl. 12: t. 1129 (1873).

Psilanthus travancorensis (Wight & Arn.) Leroy, Compt. Rend. Hebd. Seances Acad. Sci. 29, D:595. 1980; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 363. 2009. *Coffea travancorensis* Wight & Arn., Prodr. 433. 1834; Hook. f., Fl. Brit. India 3: 154. 1880; Gamble, Fl. Pres. Madras 637(449). 1921. **Plate 21j.**

Slender under shrub. Leaves 8-10 x 3-4 cm, membraneous, lanceolate, acuminate. Flowers appearing with the leaves, white; calyx-limb entire or toothed, often red-glandular; stipules shortly pointed. Fruit obovoid.

Flowering & Fruiting: October-December.

Distribution: Peninsular India and Sri Lanka. Rare; in evergreen forests. *RNMK 2596,* Vythiri.

PSYCHOTRIA Linnaeus

Syst. Nat. ed. 10, 929. 1364. 1759, *nom. cons.*

Shrubs or small trees. Leaves opposite or whorled, petiolate, entire; stipules ovate, entire, connate or free. Flowers sessile in terminal cymes or heads, bracteate and bracteolate; calyx tube short, truncate or shortly 4 or 5-toothed; corolla tube short, broad with a ring of tufted hairs inside, lobes 5 or 4, valvate; stamens 4 or 5, filaments attached at the throat or mouth of corolla tube, anthers oblong; ovary 2-celled; ovule solitary in each cell; style stout; stigmas 2, globose. Fruit oblong, ovoid or globose; pyrenes 2, planoconvex, 1-seeded; seeds planoconvex, endosperm ruminate or entire.

1. Cymes elongated..... **P. glandulosa**
1. Cymes globose 2
2. Prominent nerves looped near margin ; leaves lanceolate ..... **P. nigra**
2. Prominent nerves not looped near margin; leaves obovate.....3
3. Infloresence elongate racemeform 6
3. Infloresence spreading, corymbiform.....4
4. Bracts not early deciduous ..... **P. keralensis**
4. Bracts and bracteole none or very early deciduous 5
5. Stipules ovate densely wooly within ..... **P. nilgiriensis**
5. Stipules large oblong ..... **P. truncata**
6. Leaves elliptic-oblong ..... **P. flavida**
6. Leaves obovate-oblanceolate ..... **P. sohmeri**

Psychotria flavida Talbot, Trees & Shrubs Bombay 113. 1894; Gamble, Fl. Pres. Madras 641(452). 1921; Ansari, Fl. Kasaragod Div. 203. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 232. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 236. 1996; Mohanan & Sivad., Fl. Agasthyamala 352. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 364. 2009.

Small shrubs. Leaves 10-13 x 3-4 cm, oblanceolate, acuminate; nerves 10-12 pairs, parallel, ca. 8 mm apart, reticulate, prominent; stipule ca. 1 cm long,

ovate, uncinate. Cymes 2-3 x 2.5-3 cm, peduncled; flowers 4-5 mm long; calyx 5-lobed, lobes ovate; corolla 3-4 mm long, lobes, ovate, acute; style ca. 1 mm long, entire.
Flowering & Fruiting: March-May.
Distribution: Endemic to Peninsular India. Common; in evergreen forests. *RNMK 2666*, Chembra; *RNMK 1873*, Sughandhagiri.

Psychotria glandulosa (Dennst.) Suresh in Nicols. *et al.*, Interpr. Hort. Malab. 229.1988; Mohanan & Sivad., Fl. Agasthyamala 352. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 265. 2005. *Baldingera glandulosa* Dennst., Schluss. Hort. Malab. 9, 19, 31. 1818.

Shrubs. Leaves 7-10 x 4-6 cm, obovate, apex obtusely acute, nerves 12-15 pairs, ca. 5 mm apart, parallel, nervules reticulate, domatia glandular; petiole ca. 1 cm long; stipule ovate, acute, rufous hairy inside. Cymes 5-7 x 1-1.5 cm, hispid; flowers 7-8 mm long, grouped; calyx ca. 2 mm long, lobes ovate, acuminate, ciliate; corolla tube ca. 4 mm long, broadly villous inside, lobes 5, ovate, acute. Drupe 5-6 x 4-5 mm, globose, glabrous.
Flowering & Fruiting: October-December.
Distribution: Peninsular India and Sri Lanka. Occasional; in evergreen forests. *RNMK 2565,* Sughandhagiri; *RNMK 2610*, Kurichiarmala.

Psychotria keralensis Deb & Gangop., Bull. Bot. Surv. India 25: 213.1983 (1985) & J. Econ. Tax. Bot. Addl. ser. 7, 48.1989; V. S. Ramach. & V.J. Nair, Fl. Cannanore 232. 1988.

Shrubs. Leaves 15-19 x 5-6 cm, obovate, obtusely acuminate, cuneate at base; nerves 11-13 pairs, intercostae, reticulate, distinct; stipules ca. 1 x 0.9 cm, ovate, densely rufous hairy inside. Cymes 3-4 x 2-3 cm, branches opposite, glabrous; flowers 7-8 mm long, sessile; calyx ca. 2 mm long, lobes ovate, glabrous; corolla tube equal to the lobes, lobes 4, deflexed. Fruit ellipsoid, glabrous.
Flowering & Fruiting: November-December.
Distribution: Endemic to southern Western Ghats (Kerala). Rare; in evergreen forests. *RNMK 2553*, Chanthanathode.

Psychotria nigra (Gaertn.) Alston in Trimen, Handb. Fl. Ceylon 6 (Suppl.): 152. 1931; Manilal, Fl. Silent Valley 142. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 232. 1988; Vajr., Fl. Palghat Dist. 243. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 236. 1996; Sivar. & P. Mathew, Fl. Nilambur 347. 1997; Mohanan & Sivad., Fl. Agasthyamala 354. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 265. 2005. *Grumilea nigra* Gaertn., Fruct. 1: 138. t.28. 1788. *Psychotria thwaitesii* Hook. f., Fl. Brit. India 3: 162. 1880; Gamble, Fl. Pres. Madras 640(451). 1921.

Large shrubs, 2-3 m tall. Leaves 15-19 x 6-8.5 cm, obovate, obtuse, broadly apiculate, nerves 14-16 pairs, regular, 0.8-1 cm apart, domatia glandular;

stipule ca. 1.2 cm long, ovate, strongly mucronate. Cymes 3-6-together, globose, densely fulvous hairy; peduncle 2-3 cm long, stout; flowers many, densely packed, 5-6 mm long, greenish; calyx 1.5-2 mm long, campanulate, 5-toothed, ciliate; corolla white, ca. 3 mm long, tube hairy at mouth, lobes reflexed. Drupe 6-7 mm across, subglobose, pyrenes smooth.
Flowering & Fruiting: March-October.
Distribution: Peninsular India and Sri Lanka. Occasional; in evergreen forests. *RNMK 3069*, Theerthundamala; *RNMK 1347*, Chembra.

Psychotria nilgiriensis Deb & Gangop., Taxon 31: 546. 1982; Mohanan & Sivad., Fl. Agasthyamala 355. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 265. 2005. *Psychotria congesta* (Wight & Arn.) Hook.f., Fl. Brit. India 3: 162. 1880; Gamble, Fl. Pres. Madras 640(451). 1921; V. S. Ramach. & V.J. Nair, Fl. Cannanore 231. 1988; Vajr., Fl. Palghat Dist. 242. 1990. *Grumilea congesta* Wight & Arn., Prodr. 432. 1834; Wight, Ic. t. 1037. 1845.

Small shrubs. Leaves 8-12 x 3-5 cm, obovate, obtuse, cuneate at the base, green when dried; nerves 7-8 pairs, domatia glandular; petiole 2-3 cm long, stipule 6-7 mm long, ovate, acute. Cymes ca. 2 x 2 cm, terminal, congested; flowers 5-6 mm long; calyx cupular, lobes obtuse, ciliate; corolla ca. 5 mm long, tube shorter than lobes, villous along a transverse line inside. Fruit ca. 1 cm across, ellipsoidal, glabrous,purplish-black.
Flowering & Fruiting: September-December.
Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 0099*, Chembra.

Psychotria sohmeri Kiehn, Pl. Syst. Evol. 154: 215. 1986. *Psychotria elongata* (Wight) Hook. f., Fl. Brit. India 3: 163. 1880, non Benth. ex Orsted, 1852; Gamble, Fl. Pres. Madras 641(452). 1921. *Grumilea elongata* Wight, Ic. t. 1036. 1845. *Psychotria fosbergii* Sohmer, Bot. Not. 129: 381. 1977, non Steyermark, 1972.

Shrubs, 2-2.5 m high. Leaves 9-10 x 5-6 cm, obovate, obtusely acute, nerves 12-15 pairs, ca. 5 mm apart, parallel, nervules reticulate, domatia glandular; petiole ca. 1 cm long; stipule ovate, acute, rufous hairy inside. Cymes 5-7 x 1-1.5 cm, hispid; flowers 7-8 mm long, grouped; calyx ca. 2 mm long, lobes ovate, acuminate, ciliate; corolla tube ca. 4 mm long, broadly villous inside, lobes 5, ovate, acute. Fruit globose, glabrous.
Flowering & Fruiting: October-December.
Distribution: South India and Sri Lanka. Occasional; in evergreen forests. *RNMK 2456*, Chembra.

Psychotria truncata Wall. in Roxb., Fl. Ind. 2: 162.1824; Hook. f., Fl. Brit. India 3:163.1880; Gamble, Fl. Pres. Madras 640(451). 1921; V. S. Ramach. & V.J. Nair, Fl. Cannanore 233. 1988.

Large shrubs. Leaves 12-17 x 6-8 cm, obovate, obtuse, broadly apiculate; nerves 9-11 pairs, 6 mm apart, reticulate towards the margins; petiole ca. 1.5 cm long; stipule ca. 1.2 cm long. Cymes ca. 4 cm across, long-peduncled; branches whorled; flowers ca. 8 mm long, white, sessile; calyx ca. 1 mm long, shallowly lobed, ciliate; corolla lobes 6, oblong, deflexed. Fruit black.
Flowering & Fruiting: March-May.
Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 1263*, Brahmagiri.

PSYDRAX Gaertn.
Fruct. Sem. Pl. 1: 125 (1788).

Psydrax dicoccos Gaertn., Fruct. 1: 125. t.26. f.2. 1788. *Canthium didymum* (Brandis) Hook.f., Fl. Brit. India 3: 132. 1880, non Gaertn. f. 1806. *Plectronia didyma* Benth. & Hook. f. ex Brandis, For. Fl. 276.1874; Gamble, Fl. Pres. Madras 624(440). 1921. *Canthium dicoccum* (Gaertn.) Merr., Philipp. J. Sci. 35: 8. 1928.

Small trees; bark white, corky. Leaves ca. 12 x 4.5 cm, elliptic, obtusely acuminate, coriaceous, shining above, nerves 3-4 pairs; petiole 0.5-1 cm long; stipules triangular, cuspidate. Peduncle ca. 1 cm long, stout; pedicels 7-8 mm long, slender. Flowers ca. 1 cm long; calyx lobes ciliate; corolla lobes oblong, reflexed, tube densely villous; style 1.2-1.4 cm long, glabrous. Drupe obovoid, glabrous; seeds rugose.
Flowering & Fruiting: February-May.
Distribution: Indo-Malesia and China. Occasional; in evergreen forests. *RNMK 3218,* Manikkunnumala; *RNMK 2537*, Kurichiarmala.

RICHARDIA Linnaeus
Sp. Pl. 330. 1753.

Richardia scabra L., Sp. Pl. 330. 1753; V. S. Ramach. & V.J. Nair, Fl. Cannanore 233. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 237. 1996; Sivar. & P. Mathew, Fl. Nilambur 347. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 365. 2009.

Procumbent herbs, scabrous; stem narrowly 4-winged. Leaves 3.5-4 x 1.8-2 cm, obovate, obtuse, scabrid, subsessile; stipule connate, membraneous, teeth 4-5, tipped with glands. Flowers minute, white, in terminal sessile clusters, densely packed, supported by pairs of leaves; calyx turbinate, lobes 6, ovate, fimbriate; corolla 4-5 mm long, tube slender with a row of erect hairs inside; stamens 6, included; ovary 3-celled, ovules solitary in each cell; style bifid above. Capsule globose, septicidal; seeds 2, oblong.
Flowering & Fruiting: March-April.
Distribution: Native of Tropical America; introduced in Africa and Asia. Occasional; in semi-evergreen forests. *RNMK 1949,* Mananthavadi.

RUBIA Linnaeus
Sp. Pl. 109. 1753.

Rubia cordifolia L., Syst. Nat. (ed.12) 3: 229. 1768; Hook. f., Fl. Brit. India 3: 202. 1880; Gamble, Fl. Pres. Madras 655(462). 1921; Mukherjee & Thoth.in

Rec. Bot. Surv. Ind. 20: 121. 1921; *Rubia munjista* Roxb. Fl. Ind. 1: 383. 1820; Wight, Ic. t. 187. 1839; Manilal, Fl. Silent Valley 142. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 234. 1988; Vajr., Fl. Palghat Dist. 243. 1990; Sivar. & P. Mathew, Fl. Nilambur 348. 1997.

Scabrous climber, stem 4-angled, articulate. Leaves whorled, 4 in each node, equal or unequal, 6-7 x 2.5-3 cm, ovate, cordate at base, acuminate at apex, 3-5-ribbed from base; petiole 2-5 cm long. Flowers 3-4 mm across; in axillary dichotomous cymes; calyx tube turbinate, lobes 4, minute; corolla lobes ovate, valvate, spreading, white; anthers globose; ovules solitary in each cell, styles 2, stigmas capitate.

Flowering & Fruiting: November-December.

Distribution: Asia, Africa and Europe. Common; in evergreen forest margins. *RNMK 2508,* Manikkunnumala.

SAPROSMA Blume

Bijdr. 956. 1826.

Shrubs or small trees with white terete branchlets. Leaves opposite, entire; stipule connate, ovate, 2-3-toothed. Flowers solitary, fascicled or cymose, axillary or terminal; bracts and bracteoles minute; calyx tube obconical, lobes 4 or 5, spreading, valvate with inflexed margins; stamens 4 or 5, included, filaments short; ovary 2-celled; ovules one in each cell; style bifid at apex, stigma linear. Fruit a fleshy drupe with 1 or 2 pyrenes; seeds planoconvex, smooth.

1. Shrubs to 4 m tall; fruit a drupe, ellipsoid ..... **S. fragrans**
1. Shrubs to 1.5 m tall; fruit a berry, globose ..... **S. glomeratum**

Saprosma fragrans Bedd., For. Man, Bot. 134. 1872; Hook. f., Fl. Brit. India 3: 193. 1880; Gamble, Fl. Pres. Madras 649(458). 1921; Manilal, Fl. Silent Valley 143. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 234. 1988; Vajr., Fl. Palghat Dist. 243. 1990; Gangop., J. Econ. Tax. Bot. 15: 86. 1991; Sivar. & P. Mathew, Fl. Nilambur 349. 1997; Mohanan & Sivad., Fl. Agasthyamala 358. 2002. *Serissa fragrans* Bedd., Ic. t. 14. 1868-1874.

Foetid shrubs up to 4 m tall; branchlets glabrous, terete, dichotomous. Leaves 7-10 x 3-3.5 cm, elliptic or obovate, abruptly acuminate. Flowers in small axillary or terminal cymes, fragrant; corolla white. Drupe ellipsoid, 1 seeded.

Flowering & Fruiting: February-April.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 2852,* Chembra.

Saprosma glomeratum (Gard.) Bedd., For. Man. Bot. 134. 1872; Sant. & Merch., Bull. Bot. Surv. India 3:110. 1961; Manilal, Fl. Silent Valley 143. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 235. 1988; Vajr., Fl. Palghat Dist. 243. 1990; Gangop., J. Econ. Tax. Bot. 15: 86. 1991; Sasidh. & Sivar.,

Fl. Pl. Thrissur For. 237. 1996. *Dysodidendron glomeratum* Gard., Calcutta J. Nat. Hist. 7: 3. 1847. *Saprosma indicum* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 37. 1851; Hook. f., Fl. Brit. India 3: 192. 1880; Gamble, Fl. Pres. Madras 649(457). 1921. *Serissa glomerata* (Gard.) Bedd., Ic. t.16. 1868-1874. **Plate 21k.**

Shrubs, 1-1.5 m tall. Leaves 11-12 x 3.5-5 cm, ovate-oblong, acute, subcordate at base; domatia glandular; nerves 10-15 pairs. Flowers 3-6 together, in terminal clusters, 7-8 mm long, shortly pedicelled; calyx 2-3 mm long, lobes 4, ovate, acute; corolla white, densely hairy within; anthers sessile. Berry ca. 1 cm across, globose, emarginate, deep blue.

Flowering & Fruiting: October-June.

Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 2888*, Varayal.

SPERMACOCE Linnaeus

Sp. Pl. 102. 1753.

Herbs, stems tetragonous. Leaves opposite; petiole broad or absent, stipule connate with the petiole toothed or strongly bristled. Flowers sessile, in axillary clusters, many-together, bracteoles many, bristled; calyx tube turbinate or obovoid, 2-4 lobed; corolla tube funnel-shaped, lobes 4, valvate, stamens 4, anthers included, linear-oblong; ovary 2-celled; ovules solitary in each cell; style slender, stigma capitate. Fruit obovoid or globose, dehiscent, mericarps crustaceous; seeds 2, oblong, ventrally grooved.

1. Stem angle ciliate; calyx lobes 2 ..... **S. articularis**
1. Stem angle not ciliate; calyx lobes 4 2
2. Flowers many in terminal clusters..... **S. latifolia**
2. Flowers dense in axillary clusters 3
3. Capsule oblong, not scabrid above 4
3. Capsule ovoid, scabrid above..... **S. pusilla**
4. Mericarp dehiscing ventrally with a septum..... **S. ocymoides**
4. Mericarp dehiscing ventrally without a septum..... **S. exilis**

Spermacoce articularis L. f., Suppl. Pl. 119. 1781; Sivar. *et al.*, Proc. Indian Acad. Sci. (Plant. Sci.) 97:349.1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 238. 1996; Sivar. & P. Mathew, Fl. Nilambur 349. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 267. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 366. 2009. *Borreria articularis* (L.f.) F.N. Will., Bull. Herb. Boiss. 2. ser.5: 956. 1905; Manilal & Sivar., Fl. Calicut 138. 1982; Vajr., Fl. Palghat Dist. 227. 1990. *Borreria articularis* var. *articularis* Sivar. & Manilal, New Botanist 2:88. 1975.*Spermacoce hispida* Hook.f., Fl. Brit. India 3: 200. 1881, non L. 1753; Deb & Dutta, J. Econ. Tax. Bot. 5: 1046. 1984; Ansari, Fl. Kasaragod Div. 204. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 235. 1988; Mohanan & Sivad., Fl. Agasthyamala 359. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 267. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 367. 2009. *Borreria hispida* sensu Gamble, Fl. Pres. Madras 654. 1921.

Erect woody herbs, stems 4-winged, scabrid. Leaves 2.5-3 x 1-1.3 cm, acute at both ends, mucronate at apex, glabrous; nerves 6-7 pairs, very oblique; petiole 0.5-1 cm long, slender; stipule membranous, teeth, 5-7, 6-7 mm long, glabrous. Flowers many; calyx lobes acute, glabrous; corolla white. Capsule obcordate, glabrous; seeds black.
Flowering & Fruiting: October-December.
Distribution: Tropical Asia and Africa. Occasional; in open areas and plantations. *RNMK 1801,* Puthoorvayal.

Spermacoce exilis (L.O.Williams) C.D.Adams ex W.C. Burger & C.M.Taylor, Fieldiana Bot. n.s. 33: 316. 1993. *Borreria exilis* Williams, Phytologia 28: 227. 1974. *Spermacoce mauritiana* Osea Gideon ex Verdc., Kew Bull. 37: 547. 1983; Sivar. *et al.*, Proc. Indian Acad. Sci. (Pl. Sci.) 97: 356. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 238. 1996; Sivar. & P. Mathew, Fl. Nilambur 351. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 268. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 368. 2009. *Spermacoce ocymoides* sensu Hook. f., Fl. Brit. India 3: 200. 1881, p.p., non Burm. f. 1768. *Borreria ocymoides* Gamble, Fl. Pres. Madras 654(461). 1921, non (Burm. f.) DC. 1830; S*permacoce decandollei* Deb & Dutta, J. Econ. Tax. Bot. 5: 044. 1984; Mohanan & Sivad., Fl. Agasthyamala 358. 2002.

Diffuse herbs; stems hispid. Leaves 2-2.5 x 1-1.5 cm, ovate, acute, cuneate at base, subsessile, glabrous; stipule membranous, bristled. Flowers minute, many-together, densely packed; calyx lobes linear; corolla white, lobes erect, glabrous. Capsule with wings like persistent sepals; seeds oblong, minutely pitted, dark brown.
Flowering & Fruiting: September-October.
Distribution: Tropical America, widely introduced elsewhere. Occasional; in moist deciduous forests. *RNMK 1063,* Muthanga.

Spermacoce latifolia Aublet., Hist. Pl. Guiane Fr. 1: 55. t.19/1. 1775; Manilal & Sivar., Fl. Calicut 136. 1982; Ansari, Fl. Kasaragod Div. 204. 1985; Deb & Dutta, J. Bombay Nat. Hist. Soc. 87: 332. 1990; Sivar. *et al.*, Proc. Indian Acad. Sci. (Pl. Sci.) 97:355.1987; Manilal, Fl. Silent Valley 143. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 236. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 238. 1996; Sivar. & P. Mathew, Fl. Nilambur 350. 1997; Mohanan & Sivad., Fl. Agasthyamala 359. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 267. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 368. 2009. *Borreria latifolia* (Aublet.) K. Schum. in Mart., Fl. Bras. 4:61. 1888. *Borreria articularis* Mukerjee, Rec. Bot. Surv. India 20: 116. 1973, non K. Schum. 1888. *Borreria eradii* Ravi, J. Bombay Nat. Hist. Soc. 6: 539. 1970; Manilal & Sivar., Fl. Calicut 136. 1982.

Decumbent herbs; stem 4-winged, scabrous. Leaves 4.5-5 x 2-2.5 cm, acute, scabrous; nerves 4-5 pairs; petiole very short, broad; stipular teeth 4-6, hispid. Flowers in clusters of 2-5, axillary, sessile; calyx tube 2-3 mm long,

lobes hispid; corolla tube short, lobes erect. Capsule compressed, hispid; seeds ellipsoid, minutely pitted, dark brown.
Flowering & Fruiting: August-October.
Distribution: Native of Tropical America; now established in Tropical Africa Common; in plantations. *RNMK 2204,* Meppady.

Spermacoce ocymoides Burm.f., Fl. Ind. 34 & 13. f.1. 1768; Hook. f., Fl. Brit. India 3: 200. 1881; Deb & Dutta, J. Econ. Tax. Bot. 5: 1052. 1984; Sivar. *et al.*, Proc. Indian Acad. Sci. (Plant. Sci.) 97:356.1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 236. 1988. *Borreria ocymoides* (Burm.f.) DC., Prodr. 4: 544. 1830; Gamble, Fl. Pres. Madras 654(461). 1921; Manilal & Sivar., Fl. Calicut 136. 1982; Vajr., Fl. Palghat Dist. 228. 1990. *Borreria ocymoides* var. *thekkumalensis* Sivar. & Joseph, New Botanist 6:133. 1979.

Procumbent herbs, 25-30 cm tall; stems narrowly winged, densely hairy. Leaves 2-2.5 x 1-1.5 cm, acute, sessile; stipules small. Flowers white, in clusters at nodes. Capsule oblong, glabrous.
Flowering & Fruiting: October-December.
Distribution: Indo-Malesia and Tropical Africa. Occasional; in margins of tea plantations. *RNMK 2743,* Meppady.

Spermacoce pusilla Wall. in Roxb., Fl. Ind. 1: 379. 1820; Deb & Dutta, J. Econ. Tax. Bot. 5: 1057. 1984; Ansari, Fl. Kasaragod Div. 204. 1985; Sivar. *et al.*, Proc. Indian Acad. Sci. (Pl. Sci.) 97: 356. 1987; Manilal, Fl. Silent Valley 144. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 236. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 237. 1996; Mohanan & Sivad., Fl. Agasthyamala 360. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 268. 2005. *Borreria pusilla* (Wall.) DC., Prodr. 4: 543. 1830; Manilal & Sivar., Fl. Calicut 136. 1982; Vajr., Fl. Palghat Dist. 228. 1990. *Bigelowia lasiocarpa* Wight & Arn., Prodr. 437. 1834. *Bigelowia roxburghiana* Wight & Arn., Prodr. 437. 1834. *Borreria stricta* var. *stricta* Sivar. & Manilal, Bull. Bot. Soc. Uni. Sagar 19: 33. 1972.Borreria stricta auct. mult. non L.f. 1891:Gamble, Fl. Pres. Madras 461.1921.

Herbs, 25-30 cm high, stems glabrous. Leaves 4-5 x 0.7-1 cm, lanceolate, acuminate, thinly scabrid, sessile; stipule cupular, 6-7-teethed, teeth 7-8 mm long, glabrous. Flowers many, in dense axillary clusters; calyx lobes 4, acuminate, glabrous; corolla 2-3 mm long, white, lobes spreading. Capsule ovoid, scabrid above.
Flowering & Fruiting: October-November.
Distribution: India and Myanmar. Common; in open areas. *RNMK 2805,* Chooralmala.

TAMILNADIA Trivengadum & Sastry
in Mauritius Inst. Bull. 8: 4. 84. 1979.

Tamilnadia uliginosa (Retz.) Tirveng. & Sastry, Mauritius Inst. Bull. 8: 85. 1979; Manilal & Sivar., Fl. Calicut 132. 1982; Sasidh. & Sivar., Fl. Pl.

Thrissur For. 239. 1996; Sivar. & P. Mathew, Fl. Nilambur 352. 1997; Mohanan & Sivad., Fl. Agasthyamala 361. 2002. *Gardenia uliginosa* Retz., Obs. Bot. 2: 14. 1781. *Randia uliginosa* (Retz.) DC., Prodr. 4: 386. 1830; Wight, Ic. t. 397. 1840; Hook. f., Fl. Brit. India 3: 110. 1880; Gamble, Fl. Pres. Madras 615(434). 1921. *Catunaregam uliginosa* (Retz.) Sivar. in Manilal & Sivar., Manilal & Sivar., Fl. Calicut 132. 1982. *Xeromphis uliginosa* (Retz.) Mahesh., Bull. Bot. Surv. India 3: 92. 1961. **Plate 21**l **& 22a**

Small trees, branchlets 4-angled, terminating with 1-2 pairs of sharp thorns. Leaves crowded at the apex of branchlets, 7-10 x 3-5 cm, obovate or oblong, apex obtuse, base narrowed, coriaceous, glabrous above and pubescent below, lateral nerves 6-8 pairs; petiole 3-4 mm long. Flowers solitary at the end of branchlets, 4-5 cm across; calyx tube ca. 2.5 cm long, lobes 6, rounded; corolla white, lobes 6, orbicular, imbricate. Berry ovoid or ellipsoid, smooth, yellow.

Flowering & Fruiting: August-March.

Distribution: India and Myanmar. Occasional; in moist deciduous forests. *RNMK 1241*, Muthanga; *RNMK 3408*, Kuruva.

TARENNA Gaertner

Fruct. 1: 139. 1788.

Glabrous shrubs. Leaves opposite, entire, petiolate, penninerved; stipules ovate, entire, glabrous. Flowers in corymbose cymes peduncled, axillary or terminal; calyx tube globose, lobes 5, imbricate; corolla tube cylindrical, glabrous, lobes 5, spreading, oblong; stamens 5, exerted, attached at the mouth of corolla tube; ovary 2-celled, ovules 2-many in each cells, sometimes solitary; style entire, stigma fusiform. Fruit a capsule; seeds solitary in each cell or many, planoconvex.

1. Cymes peduncled, axillary.....**T. asiatica**
1. Cymes terminal, not peduncled 2
2. Corolla densely hairy at mouth ..... **T. alpestris**
2. Corolla not hairy at mouth 3
3. Corolla white; berry globose..... **T. canarica**
3. Corolla greenish white; berry subglobose.....**T. nilagirica**

Tarenna alpestris (Wight) Balakr., Bull. Bot. Surv. India 22: 175. 1980 (1982); Sasidh. & Sivar., Fl. Pl. Thrissur For. 240. 1996; Mohanan & Sivad., Fl. Agasthyamala 362. 2002. *Coffea alpestris* Wight, Ic. t. 1040. 1845. *Coffea grumelioides* Wight, Ic. t. 1041. 1845. *Webera leucens* Hook.f., Fl. Brit. India 3: 106. 1880. *Stylocoryne leucens* (Hook.f.) Gamble, Fl. Pres. Madras 635(448). 1921.

Large shrubs, young shoots resiniferous. Leaves elliptic or oblanceolate, acute, base cuneate, 9-15 x 2-4 cm; lateral nerves close and parallel; petiole 1-1.5 cm long; stipules ovate lanceolate. Flowers white, 1-1.5 cm long, in

terminal corymbose cymes; calyx glabrous; corolla densely hairy at mouth, lobes equal to the tube, reflexed.
Flowering & Fruiting: November-December.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2576*, Kallady-900 Forest.

Tarenna asiatica (L.) O.Kuntze. ex K. Schumann., Bot. Tidsskr. 24: 332. 1902; Ansari, Fl. Kasaragod Div. 205. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 237. 1988; Nicols., Suresh & Manilal, An. Interpr. Hort. Malab. 230. 1988; Vajr., Fl. Palghat Dist. 244. 1990; Mohanan & Sivad., Fl. Agasthyamala 362. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 268. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 369. 2009. *Rondeletia asiatica* L., Sp. Pl. 172. 1753; Hook. f., Fl. Brit. India 3: 102. 1880. *Chomelia asiatica* (L.) O. Kuntze., Rev. Gen. Pl. 1: 278. 1891; Gamble, Fl. Pres. Madras 613(432). 1921. *Cupi* Rheede, Hort. Malab. 2: 37-38.

Glabrous shrubs. Leaves 12-17 x 5-6 cm, elliptic-oblong, acuminate at apex and base, drying black, nerves 12-13 pairs; petiole 3-4 cm long. Cymes peduncled, axillary, 10-12 cm across; peduncle 5-6 cm long; branches slender; flowers 5-merous, calyx lobes short; corolla white, lobes twisted. Drupe 6-7 mm across, globose; seeds 2, black.
Flowering & Fruiting: February-September.
Distribution: Indo-Malesia. Occasional in evergreen forests. *RNMK 3090,* Vaduvanchal.

Tarenna canarica (Bedd.) Bremek., Feddes Repert. 37:208. 1934; V. S. Ramach. & V.J. Nair, Fl. Cannanore 237. 1988; Mohanan & Sivad., Fl. Agasthyamala 363. 2002. *Pavetta canarica* Bedd., For. Man. Bot. 134/8. 1872. *Webera canarica* (Bedd.) Hook.f., Fl. Brit. India 3: 106. 1880. *Stylocoryne canarica* (Bedd.) Gamble, Fl. Pres. Madras 635(448). 1921; Manilal, Fl. Silent Valley 144. 1988; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 270. 2005. **Fig. 36.**

Erect shrubs up to 2.5 m tall. Leaves 20-25 x 6-8 cm long, obovate to oblanceolate, base cuneate, apex acuminate; lateral nerves 12-16 pairs, drying dull black. Cymes corymbose, terminal; flowers 5-merous; calyx tube companulate; corolla white, tube ca. 3 cm long; styles ca. 5 cm long. Berry globose.
Flowering & Fruiting: November-January.
Distribution: Endmeic to southern Western Ghats. Rare; in evergreen forets. *RNMK 3091,* Makkimala.

Tarenna nilagirica (Bedd.) Bremek., Feddes Repert. 37: 197. 1934; Manilal, Fl. Silent Valley 145. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 238. 1988; Vajr., Fl. Palghat Dist. 244. 1990. *Pavetta nilagirica* Bedd., For. Man. Bot. 134/8. 1872. *Webera nilagirica* (Bedd.) Hook. f., Fl. Brit. India 3: 108. 1880. *Stylocoryne nilagirica* (Bedd.) Gamble, Fl. Pres. Madras 635(448). 1921. **Plate 22b.**

Shrubs up to 2.5 m tall. Leaves 13-16 x 7-8 cm, oblanceolate, caudate acuminate, cuneate at base, sparsely pubescent beneath, green when dry. Flowers in terminal corymbose cymes; calyx tube pubescent; corolla greenish white, tube longer than the lobes, fragrant. Berry ca. 1 cm across, globose, shining.
Flowering & Fruiting: March-November.
Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 2527*, Sughandhagiri; *RNMK 2626*, Chembra.

WENDLANDIA Bartling ex A. P. de Candolle
Prodr. 4: 411. 1830 (nom. cons.)

Wendlandia thyrsoidea (Roem. & Schult.) Steud., Nomencl. Bot. (ed. 2) 2: 786. 1841; V. S. Ramach. & V.J. Nair, Fl. Cannanore 238. 1988; Manilal, Fl. Silent Valley 145. 1988; Vajr., Fl. Palghat Dist. 244. 1990; Sivar. & P. Mathew, Fl. Nilambur 354. 1997; Mohanan & Sivad., Fl. Agasthyamala 364. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 270. 2005. *Canthium thyrsoideum* Schult. in Roem. & Schult., Syst. Veg. 6: 207. 1820. *Wendlandia notoniana* Wall. ex Wight & Arn., Prodr. 403. 1834; Hook. f., Fl. Brit. India 3: 40. 1880; Gamble, Fl. Pres. Madras 588(415). 1921.

Large stiff shrubs; stems terete, tomentose. Leaves ternate, 9-12 x 3-4.5 cm, elliptic, acute, tomentose beneath; nerves 5-12, regular; petiole ca. 1 cm long; stipule 6-7 mm long, ovate, acute. Panicle terminal, 15-18 cm across, hispid; flowers ca. 6 mm long, many, sessile; calyx globose, hispid, lobe 5, ovate; corolla tube slender, villous within, lobes orbicular, spreading; stamens 5, exserted; ovary 2-celled; ovules many, on globose placentas; style slender, stigma bifid. Capsule globose, 2 valved; seeds many, reticulate.
Flowering & Fruiting: December-April.
Distribution: Peninsular India and Sri Lanka. Common; in grasslands. *RNMK 2805,* Chembra.

Coffea arabica L., **Coffea liberica** Hiern, and **Coffea robusta** L. Linden are commercially raised in plantations throughout the district. **Gardenia resinifera** Roth is often grown in homesteds as a medicinal plant. **Gardenia angusta** (L.) Merr., **Hamelia patens** Jacq., **Ixora finlaysoniana** Wall. ex Don, and **Ixora javanica** DC. are commonly grown in gardens and temple premises and also run in wild as an escape.

VALERIANACEAE

VALERIANA Linnaeus
Sp. Pl. 1: 31. 1753.

Valeriana hookeriana Wight & Arn., Prodr. 444.1834; Hook. f., Fl. Brit. India 3:214.1881; Gamble, Fl. Pres. Madras 657(463). 1921. *Valeriana beddomei*

Clarke in Hook.f., Fl. Brit. India 3: 214. 1881; Gamble, Fl. Pres. Madras 657(463). 1921.

Softly pubescent herbs; nodes bearded. Leaves persistent; bractiform, except near the base of the stem; leaflets broad, ovate, usually crenate-dentate, softly puberulous, lowest pair often alternate with a large ovate terminal lobe. Corymb usually compact in flower; flowers white.

Flowering & Fruiting: August-December.

Distribution: Endemic to southern Western Ghats. Rare; in high altitude grasslands. *RNMK 1855*, Chembra.

ASTERACEAE Dumort.

Comment. Bot. 55. 1822.

1. Heads dimorphic, male and female in separate heads; achenes enclosed in glochidiate chambers ..... **Xanthium**
1. Heads not dimorphic, bisexual; achenes not enclosed in chambers 2
2. Heads with similar flowers 3
2. Heads with dissimilar flowers 19
3. Leaves opposite 4
3. Leaves alternate 10
4. Weak climbing shrubs ..... **Mikania**
4. Erect or prostrate herbs or shrubs 5
5. Receptacle spicata ..... **Spilanthes**
5. Receptacle flat, concave or convex, not spicata 6
6. Heads axillary, sessile; pappus absent ..... **Eleutheranthera**
6. Heads terminal, peduncled; pappus present 7
7. Pappus 2-3, bristle like ..... **Adenostemma**
7. Pappus 5-many, setaceous 8
8. Pappus scaly; anthers appendaged at apex ..... **Ageratum**
8. Pappus of hairs; anthers not appendaged 9
9. Outer involucral bracts pubescent; ovary glabrous ..... **Ageratina**
9. Outer involucral bracts glandular; ovary scaly ..... **Chromolaena**
10. Plants with latex; flowers all ligulate 11
10. Plants without latex; flowers all tubular 13
11. Scapigerous herbs; leaves all basal ..... **Launaea**
11. Stems elongate; leaves all cauline 12
12. Achenes truncate at apex, not beaked ..... **Sonchus**
12. Achenes acute at apex, beaked ..... **Cyathocline**
13. Leaves radical; groups of heads supported by 3-4 spathes; bracts calycina ..... **Elephantopus**
13. Leaves cauline; heads not supported by spathes; bracts paleaceous 14
14. Bracts uniseriate; heads long-peduncled 15
14. Bracts 2-3-seriate; heads short-peduncled 17
15. Flowers yellow or white; heads bracteolate ..... **Gynura**
15. Flowers pink; heads not bracteolate 16

16. Achenes 10-ribbed; heads in racemes.....**Crassocephalum**
16. Achenes 5-ribbed; heads long-peduncled, corymbose .....**Emilia**
17. Pappus in two series; outer smaller .....**Vernonia**
17. Pappus uniseriate, similar.....18
18. Flowers yellow; bracts 1-2-seriate.....**Cissampelopsis**
18. Flowers blue or violet, never yellow; bracts many-seriate, dissimilar.....
.....**Phyllocephalum**
19. Capitula densely packed into a globose head.....20
19. Capitula not packed as above.....21
20. Prostrate or diffuse herbs; leaves decurrent at base.....**Sphaeranthus**
20. Erect herbs; leaves not as above, petiolate.....**Tricholepis**
21. Leaves opposite 22
21. Leaves alternate 29
22. Capitula axillary, sessile.....23
22. Capitula terminal or axillary, peduncled.....24
23. Achenes densely covered with hooked spines; anthers sagittate at base .....
.....**Acanthospermum**
23. Achenes not as above, flat, winged; anthers obtuse at base .....**Synedrella**
24. Leaves pinnately compound or pinnatifid .....**Bidens**
24. Leaves simple, entire 25
25. Pappus absent or reduced into minute teeth 26
25. Pappus developed.....27
26. Involucral bracts longer than the head, viscid glandular hairy.....**Sigesbeckia**
26. Involucral bracts shorter or equal to the head, not viscid or hairy .....**Eclipta**
27. Achenes terete, densely hairy; pappus many, setaceous .....**Tridax**
27. Achenes 3-4-angled, glabrous; pappus 3-4, scaly 28
28. Capitula axillary, solitary, peduncled; flowers yellow .....**Wedelia**
28. Capitula in terminal peduncled cymes; flowers white.....**Galinsoga**
29. Large shrubs; capitula more than 4 cm across .....**Tithonia**
29. Herbs or small shrubs; capitula less than 2 cm across.....30
30. Anther bases tailed.....31
30. Anthers bases obtuse or entire, not tailed.....35
31. Bracts spreading; bisexual flowers all sterile .....**Anaphalis**
31. Bracts not spreading; bisexual flowers usually fertile 33
32. Aromatic plants; heads panicled or corymbose; bracts green .....**Blumea**
32. Not aromatic plants; heads densely packed in terminal panicles; bracts hyaline.....
.....**Gnaphalium**
33. Capitula solitary.....34
33. Capitula cymose or panicled.....36
34. Outer female florets rayed .....**Erigeron**
34. Outer female flowers not rayed 35
35. Glabrous plants; heads sessile; pappus zero.....**Centipeda**
35. Villous plants; heads pedunculate; pappus tubular.....**Grangea**
36. Anther bases sagittate .....**Laggera**

36. Anther base obtuse or entire.....37
37. Pappus present 38
37. Pappus absent.....40
38. Corolla of female flowers shorter than the corolla of bisexual flow..... **Conyza**
38. Corollas equal 39
39. Pappus many, prominent .....**Lagascea**
39. Pappus 4, small, deciduous bristles.....**Dichrocephala**
40. Leaves amplexicaule at base..... **Pentanema**
40. Leaves not amplexicaule at base.....41
41. Florets of outer row rayed..... **Parthenium**
41. Florets all tubular.....**Artemisia**

ACANTHOSPERMUM Schrank
Pl. Rar. Hort. Monac. Pl. 53. 1819.

Acanthospermum hispidum DC., Prodr. 5: 522. 1836; Gamble, Fl. Pres. Madras 704(495). 1921; Manilal & Sivar., Fl. Calicut 151. 1982; Ansari, Fl. Kasaragod Div. 207. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 240. 1988; Vajr., Fl. Palghat Dist. 247. 1990; Chowdhery in Hajra *et al.*, Fl. India 12: 361. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 243. 1996; Sivar. & P. Mathew, Fl. Nilambur 356. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 273. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 373. 2009.

Erect, branched, densely hispid herbs, 20-35 cm high. Leaves opposite, 2-4 x 1-2 cm, ovate, acute, entire. Heads 4-5 mm long, axillary, sessile; receptacle paleate; bracts 1-seriate, ca. 5 mm long, oblong, acute, hairy; outer row of flowers female, ligulate; limb yellow, 3-lobed at apex; inner flowers bisexual; corolla tubular, 5-toothed at apex, yellow; anthers sagitate at base. Achenes obovate, with two diverging long spines at apex, compressed, densely covered with hooks; pappus absent.

Flowering & Fruiting: January-June.

Distribution: Pantropical. Common; in forest plantation and along roadsides. *RNMK 3053,* Kalloor; *RNMK 1847*, Muthanga.

ADENOSTEMMA J. R. Forster & J. G. A.Forster
Charact. Gen. 89, t. 45. 1776.

Adenostemma lavenia (L.) O. Kuntze., Rev. Gen. Pl. 1:304. 1891; Gamble, Fl. Pres. Madras 677(476). 1921; Ansari, Fl. Kasaragod Div. 207. 1985; Manilal, Fl. Silent Valley 146. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 241. 1988; Vajr., Fl. Palghat Dist. 247. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 244. 1996; Uniyal in Hajra *et al.*, Fl. India 12: 346. 1995; Sivar. & P. Mathew, Fl. Nilambur 357. 1997; Mohanan & Sivad., Fl. Agasthyamala 367. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 273. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 374. 2009. *Verbesina lavenia* L., Sp. Pl. 902. 1753. *Adenostemma latifolium* D. Don, Prodr. Fl. Nepal. 181. 1825. *Adenostemma*

viscosum Forst. f., Char. Gen. 90. t. 45. 1776; Hook. f., Fl. Brit. India 3: 242. 1881, p.p.

Herbs, 30-90 cm high; stems viscid, glandular. Leaves 6-12 x 5-7 cm, broadly ovate, acute at apex, cuneate at base, crenate-serrate; nerves scabrous below. Heads many, 7-8 x 4-5 mm, hemispherical, pedunculate; bracts obovate, obtuse, brown, glabrous; flowers many, white; corolla tube puberulus; lobes hairy. Achenes curved-obovoid, 3-angled, black; pappus 3-4 glandular bristles.

Flowering & Fruiting: October-December.

Distribution: Paleotropics. Occasional; in evergreen forests. *RNMK 1041,* Chandanathode.

AGERATINA Spach

Hist. Nat. Veg. Phan. 10. 286. 1841.

Ageratina adenophora (Spreng.) King & Robins., Phytologia 19: 211. 1970; Manilal, Fl. Silent Valley 146. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 244. 1996; Sivar. & P. Mathew, Fl. Nilambur 358. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 274. 2005. *Eupatorium adenophorum* Spreng., Syst. Veg. 3: 420. 1826; Uniyal in Hajra *et al.*, Fl. India 12: 350. 1995. *Eupatorium glandulosum* Kunth, Nov. Gen. Sp. 4: 122, t. 346. 1820, non Michx. 1803; Matthew, Rec. Bot. Surv. India 20:135. 1969.

Subshrubs, glandular hairy; stems violet-blue. Leaves opposite, 7-8 x 3-4 cm, ovate, acute, serrate; petiole ca. 2 cm long. Heads 7-8 mm across, packed, in terminal corymbose panicle; bracts 3 -seriate, lanceolate, strongly 3-ribbed; outer florets bisexual, 4-5 mm long; corolla white, tube narrow, campanulate above, 5-lobed, hispid; inner florets female. Achenes curved, ellipsoid, 5-angled, brown, smooth; pappus 5-10, white, barbed.

Flowering & Fruiting: February-June.

Distribution: Originally from south America. Common; in disturbed forest areas. *RNMK 1778,* Kurichiarmala; *RNMK 1003*, Pookodu.

AGERATUM Linnaeus

Sp. Pl. 839. 1753.

Ageratum conyzoides L., Sp. Pl. 839. 1753; Clarke, Comp. Ind. 30. 1876; Clarke in Hook. f., Fl. Brit. India 3: 243. 1881; Gamble, Fl. Pres. Madras 677(476). 1921; Koster, Blumea 1:484. 1935; Manilal & Sivar., Fl. Calicut 151. 1982; Ansari, Fl. Kasaragod Div. 208. 1985; Manilal, Fl. Silent Valley 147. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 241. 1988; Vajr., Fl. Palghat Dist. 248. 1990; Uniyal in Hajra *et al.*, Fl. India 12: 348. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 244. 1996; Sivar. & P. Mathew, Fl. Nilambur 359. 1997; Mohanan & Sivad., Fl. Agasthyamala 368. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 274. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 374. 2009.

Herbs, viscid hairy. Leaves opposite, 6-7 x 4.5-5 cm, ovate, acute at apex, crenate, rounded at base; petiole 1-3 cm long. Heads white, 6-7 mm across, in terminal corymbose panicle; bracts 1-3-seriate, elliptic, toothed at apex, 3-ribbed; flowers all similar, bisexual; corolla 2.5-3 mm long, tubular, white, glabrous, 5-lobed at apex; stamens 5, anthers linear. Achenes linear, 5-angled, hirtus along the angles; pappus many, setaceous.
Flowering & Fruiting: August-December.
Distribution: Pantropical. Common; along roadsides and disturbed areas in the forest. *RNMK 3050,* Sugandhagiri; *RNMK 1789*, Kalpetta.

ANAPHALIS A. P. de Candolle
Prodr. 6: 271. 1837.

Herbs, whole plant densely covered with white wooly or cottony hairs; stems terete. Leaves alternate, linear-oblong to oblanceolate, acute or obtuse, 1 or 3-ribbed, sessile. Heads densely packed in terminal conjested corymbose cyme; bracts similar, 3-seriate, elliptic, acute, spreading; receptacle flat, naked. Flowers dissimilar; outer few rows female; inner few flowers bisexual; corolla of female flowers filiform, 4-toothed at apex; corolla of bisexual flowers tubular, 5-lobed above, glandular; anthers tailed at base. Achenes oblong or cylindrical, papillose or scaly; pappus many, setaceous.

1. Leaves strongly scented, tapering at apex ..... **A. aristata**
1. Leaves not scented, acute-obtuse at apex ..... **A. lawii**

Anaphalis aristata DC., Prodr. 6: 274. 1838; Wight, Ic. t. 199. 1846; Hook. f., Fl. Brit. India 3: 285. 1881; Gamble, Fl. Pres. Madras 696(489). 1921; Manilal, Fl. Silent Valley 147. 1988; Pant in Hajra *et al.*, Fl. India 13: 55. 1995; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 275. 2005.

Slender annual herbs; younger stems cottony wooly. Leaves 2-4 x 0.3 cm, narrowed from a broad amplexicaule or cordate base, acuminate at apex, 1-nerved, scabrous above. Heads ca. 3 x 3 mm, hemispherical, collected in terminal dense clusters; bracts spreading, elliptic, acute, wooly, solid at base; bisexual flowers central, 5 or 6; corolla 2.5-3 mm long, broader above; female flowers many. Achenes cylindrical, brown, papillose; pappus white.
Flowering & Fruiting: July-January.
Distribution: Endemic to Peninsular India. Occasional; in exposed hills. *RNMK 1389,* Banasuramala.

Anaphalis lawii (Hook. f.) Gamble, Fl. Pres. Madras 696(489). 1921; Pant in Hajra *et al.*, Fl. India 13: 66. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 245. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 276. 2005. *Anaphalis oblonga* DC. var. *lawii* Hook. f., Fl. Brit. India 3: 283. 1881.

Branched herbs, 50-60 cm high; stems white, wooly. Leaves 4-5 x 0.6-0.7 cm, oblong, acute at apex, amplexicaule at base. Heads 4-5 x 3-4 mm, in densely branched corymbose cymes; bracts 3-seriate, elliptic, acute, dentate

at apex; brown at lower part; outer ones wooly; bisexual flowers 5-7, central; corolla 2.5-3 mm long, white, 5-toothed at apex. Achenes cylindrical, scaly, brown.

Flowering & Fruiting: September-March.

Distribution: Endemic to Peninsular India. Occasional; in grasslands. *RNMK 3887,* Chembra; *RNMK 3050*, Chanthanathodu.

ARTEMISIA Linnaeus

Gen. Pl. ed. 5. 367. 1754.

Artemisia nilagarica (Clarke) Pamp., Nuovo. Giorn. Bot. Ital. 33:452.1926; Manilal, Fl. Silent Valley 149. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 65. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 242. 1988; Vajr., Fl. Palghat Dist. 248. 1990; Naithani in Hajra *et al.*, Fl. India 12: 36. 1995; Sivar. & P. Mathew, Fl. Nilambur 360. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 276. 2005. *Artemisia vulgaris* L. var. *nilagirica* Clarke, Comp. Ind. 162. 1876. *Artemisia indica* sensu Wight, Ic. t. 112. 1846. non Willd. 1803. *Artemisia vulgaris* sensu Hook. f., Fl. Brit. India 3: 325. 1881, non L.; Gamble, Fl. Pres. Madras 713(502). 1921. *Katu-tsjetti-pu* Rheede, Hort. Malab. 10:89, t. 45, 1690.

Perennial fragrant shrubs, 1-3 m high; stems terete, puberulus. Leaves 15-20 x 8-10 cm; lobes oblong, acute; upper ones entire. Panicle axillary and terminal, leafy; heads 3-4 mm long, globose; bracts ovate-oblong, softly woolly, ciliate; female flowers many; corolla white, narrow; bisexual flowers 4-6; corolla glabrous, connective of anthers mucronate. Achene oblong, glabrous.

Flowering & Fruiting: May-December.

Distribution: India and south west China. Common; along roadsides. *RNMK 3062,* Puthoorvayal.

BIDENS Linnaeus

Sp. Pl. 831. 1753.

Bidens biternata (Lour.) Merr. & Sherff, Bot. Gaz. 88. 293. 1929; Manilal, Fl. Silent Valley 149. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 242. 1988; Chowdhery in Hajra *et al.*, Fl. India 12: 367. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 245. 1996; Mohanan & Sivad., Fl. Agasthyamala 369. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 276. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 375. 2009. *Coreopsis biternata* Lour., Fl. Cochinch. 508. 1790.*Bidens pilosa* sensu Hook.f., Fl. Brit. India 3: 309. 1881, non L., 1753; Gamble, Fl. Pres. Madras 709. 1921.

Erect subshrubs; stem ribbed. Leaves pinnate or bipinnate, 14-16 cm long; leaflets 6-8 x 2.5-3 cm, ovate, acuminate, serrate. Heads 1.8-2 cm long, oblong, in loose corymbose cymes or solitary; bracts 2-seriate, oblong, acute; outer ones ciliate; flowers outer whorl ligulate; limb oblong, 3-lobed, white;

inner flowers bisexual; corolla tubular, 5-lobed, yellow, lobes obtuse. Achenes 1.4-1.6 cm long, linear, glabrous; pappus 3, retrorsely barbed, spinescent.
Flowering & Fruiting: April-October.
Distribution: Native of Tropical Africa; Indo-Malesia to Australia. Common; in plantations and along roadsides. *RNMK 3008,* Muthanga; *RNMK 2800*, Kakavayal.

BLUMEA A. P. de Candolle
Arch. Bot. 2: 514. 1883, *nom. cons.*

Herbs or shrubs, aromatic, usually glandular pubescent. Leaves alternate, serrate or variously lobed. Heads in axillary or terminal panicles or fascicles; bracts 2-3-seriate, outer smaller; flowers 2-types; outer few rows of female flowers with slender corolla and central few, around 10, bisexual flowers with broad corolla; corolla 5-lobed or toothed; anthers tailed at base. Achenes cylindrical, ribbed, hairy or glabrous; pappus many, setaceous.

1. Outer involucral bracts oblong-ovate to oblong-lanceolate ..... **B. alata**
1. All involucral bracts linear or lanceolate 2
2. Leaves glabrate on upper surface 3
2. Leaves variously pubescent on upper surface 4
3. Erect plants; receptacle glabrous; corolla lobes of female floretsglabrous .....
..... **B. lanceolaria**
3. Scandent plants; receptacle densely pubescent; corolla lobes of female florets hairy.
..... **B. clarkei**
4. Leaves spiny toothed; corolla hairy 5
4. Leaves not spiny toothed; corolla of female florets glabrous 7
5. Heads in sessile, axillary clusters; anthers well developed; achenes terete .....
..... **B. belangeriana**
5. Heads in pedunculate clusters; anthers abortive; achenes angled..... 6
6. Prostrate herbs with branches radiating from the rootstock; corolla hairy onlobes....
..... **B. oxyodonta**
6. Erect herbs; corolla lobes and tubes hairy all over..... **B. eriantha**
7. Achenes subangular, terete, not ribbed 8
7. Achenes ribbed..... 9
8. Heads purple; leaves not lyrately lobed..... **B. mollis**
8. Heads yellow; leaves not lyrately lobed ..... **B. lacera**
9. Plants glabrous, not glandular..... **B. virens**
9. Plants pubescent, glandular ..... **B. membranacea**

Blumea alata (D. Don) DC., Prodr. 5: 488. 1836; Wight, Ic. t. 1101. 1846; Manilal, Fl. Silent Valley 150. 1988; Mohanan & Sivad., Fl. Agasthyamala 370. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 278. 2005. *Erigeron alatum* D. Don, Prodr. Fl. Nepal. 171. 1825. *Laggera alata* (D. Don) Sch.-Bip. ex Oliver, Trans. Linn. Soc. London 29: 94. 1873; Hook. f., Fl. Brit. India 3: 271. 1881; Gamble, Fl. Pres. Madras 689(485). 1921; V. S. Ramach. & V.J. Nair, Fl. Cannanore 252. 1988; Kumar in Hajra *et al.*, Fl. India 13: 148.1995.

Subshrubs; stems winged, densely villous. Leaves alternate, 6-8 x 1.5-2 cm, obovate-oblong, obtuse, sessile, decurrent at base along the stem. Heads 1-1.2 x 0.2-0.4 cm, in terminal leafy panicle; bracts many-seriate, oblong-lanceolate, acute to acuminate; female flowers outer several rows; corolla 4-5 mm long, slender, 4 toothed at apex; bisexual flowers few, central; corolla 7-8 mm long, pink, lobes acute, glabrous. Achenes ribbed, hispid; pappus 7-8 mm long, white.

Flowering & Fruiting: December-March.

Distribution: India, Myanmar, China and Tropical Africa. Common; in plantations. *RNMK 2663,* Manikkunnumala.

Blumea belangeriana DC., Prodr. 5: 444. 1836; Hook. f., Fl. Brit. India 3: 266. 1881; Gamble, Fl. Pres. Madras 686(482). 1921; Ansari, Fl. Kasaragod Div. 208. 1985; Manilal, Fl. Silent Valley 151. 1988; Vajr., Fl. Palghat Dist. 249. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 246. 1996; Kumar in Hajra *et al.*, Fl. India 13: 119. 1995; Sivar. & P. Mathew, Fl. Nilambur 362. 1997.

Stem reddish-brown, branchlets villous, mixed with gland-tipped hairs. Leaves 5-6.5 x 3-4.5 cm, sessile, elliptic or obovate, apex acute or obtuse, base attenuate, irregularly dentate, lateral nerves 6-8 pairs. Heads 7-8 mm across, peduncles and phyllaries villous, mixed with gland-tipped hairs; corolla yellow. Achenes ribbed, hairy along the ribs.

Flowering & Fruiting: November-April.

Distribution: India and Sri Lanka. Occasional; in moist deciduous forests and plantations. *RNMK 3402,* Pulpally.

Blumea clarkei Hook. f., Fl. Brit. India 3: 267. 1881; Randeria, Blumea 10: 252. 1960; V. S. Ramach. & V.J. Nair, Fl. Cannanore 243. 1988; Kumar in Hajra *et al.*, Fl. India 13: 121. 1995. *Blumea malabarica* Hook. f., Fl. Brit. India 3: 267; Gamble, Fl. Pres. Madras 688(484). 1921.

Erect herbs, 65-80 cm tall. Leaves 7-8 x 1.5-2 cm, lanceolate-oblong, acute, glandular pubescent on both sides. Heads ca. 1.5 cm across; florets yellow. Achenes ribbed, oblong; pappus hairy, white.

Flowering & Fruiting: September-May.

Distribution: India, Myanmar, China, Philippines and south-east Asia. Rare; in evergreen forests. *RNMK 2761,* Brahmagiri.

Blumea eriantha DC. in Wight, Contrib. 15. 1834; Hook. f., Fl. Brit. India 3: 266. 1881; Gamble, Fl. Pres. Madras 686(482). 1921; Kumar in Hajra *et al.*, Fl. India 13: 122.1995.

Erect unbranched herbs, 40-50 cm high; stems reddish, sparsely hairy. Leaves 3-6 x 1-2 cm, elliptic to obovate, acuminate at base, scabrid above. Heads 5-6 x 6.5-7 mm, in terminal congested leafy panicle; peduncle 5-7 mm long; bracts lanceolate, acuminate, brown; outer smaller, pubescent; bisexual flowers few, central; corolla 4-5 mm long, sparsely hairy; lobes pubescent. Achene ribbed, sparsely hairy; pappus brownish.

Flowering & Fruiting: November-April.
Distribution: India. Rare; in degraded forest area. *RNMK 3051,* Kanthanpara.

Blumea lacera (Burm. f.) DC. in Wight, Contrib. 14. 1834; Hook. f., Fl. Brit. India 3: 263. 1881; Gamble, Fl. Pres. Madras 687(483). 1921; Randeria, Blumea 10: 264. 1960; Ansari, Fl. Kasaragod Div. 209. 1985; Kumar in Hajra *et al.*, Fl. India 13: 128. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 247. 1996; Sivar. & P. Mathew, Fl. Nilambur 363. 1997; Mohanan & Sivad., Fl. Agasthyamala 371. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 377. 2009. *Conyza lacera* Burm. f., Fl. Ind. t. 59. 1768. *Blumea subcapitata* DC., Prodr. 5:439.1836. *Blumea lacera* (Burm. f.) DC. var. *cinerascens* Hook. f., Fl. Brit. India 3: 263. 1881. *Blumea lacera* (Burm. f.) DC. var. *glandulosa* (DC.) Hook. f., Fl. Brit. India 3: 263. 1881; Gamble, Fl. Pres. Madras 687(483). 1921. *Blumea glandulosa* DC. in Wight, Contrib. 14. 1834.

Herbs; stems terete, glabrous. Leaves broadly elliptic, 8-10 x 4.5-5 cm, acute at both ends; irregularly toothed. Heads 7-8 x 6-7 mm, globose, terminal and upper axillary, 10-15 together; bracts hairy at apex, inner oblong, acute, outer smaller; bisexual flowers few; corolla 4-6 mm long, glandular, of female flowers slender. Achenes ribbed, hairy.
Flowering & Fruiting: Throughout the year.
Distribution: Paleotropics. Common in moist deciduous forest and plantations. *RNMK 3072,* Beenachi; *RNMK 2751,* Kalloor.

Blumea lanceolaria (Roxb.) Druce, Bot. Soc. Exch. Club. Brit. Isles 4: 609. 1917; Randeria, Blumea 10: 218. 1960; Kumar in Hajra *et al.*, Fl. India 13: 130. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 247. 1996; Sivar. & P. Mathew, Fl. Nilambur 363. 1997; Mohanan & Sivad., Fl. Agasthyamala 371. 2002. *Conyza lanceolaria* Roxb., Fl. Ind. 3: 432. 1832. *Blumea myriocephala* DC., Prodr. 5: 445. 1836; Hook. f., Fl. Brit. India 3: 269. 1881. *Blumea wallichii* Clarke, Comp. Ind. 87. 1876.

Subshrubs, branchlets pubescent. Leaves clustered towards the apex of branches, 14-18 x 3-5 cm, oblanceolate or lanceolate, apex acuminate, base attenuate, distantly serrate or subentire, glabrescent, lateral nerves 8-10 pairs. Heads 6-8 mm across, in large terminal pyramidal panicles, phyllaries pubescent; receptacle pilose. Achenes ribbed, hairy.
Flowering & Fruiting: February-April.
Distribution: Indo-Malesia. Common in evergreen forests. *RNMK 3200,* Vythiri; *RNMK 3298*, Chandanathode.

Blumea membranacea Wall. ex DC. var. **gracilis** Hook. f., Fl. Brit. India 3: 265. 1881; Gamble, Fl. Pres. Madras 687(483). 1921; V. S. Ramach. & V.J. Nair, Fl. Cannanore 244. 1988.

Slender herbs, 40-50 cm tall. Leaves 7-9 x 3-3.5, oblanceolate, dentate, sparsely pubescent on both surfaces. Heads 0.7-0.8 cm across, florets yellow. Achenes oblong, brown; pappus white hairy.

Flowering & Fruiting: January-April.
Distribution: Endemic to south India. Common; in evergreen forests. *RNMK 2692,* Kurichiarmala.

Blumea mollis (D. Don) Merr., Philipp. J. Sci. 5: 395. 1910; Manilal & Sivar., Randeria, Blumea 10: 261. 1960; Fl. Calicut 150. 1982; Ansari, Fl. Kasaragod Div. 209. 1985; Manilal, Fl. Silent Valley 152. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 244. 1988; Vajr., Fl. Palghat Dist. 249. 1990; Kumar in Hajra *et al.*, Fl. India 13: 135.1995; Sivar. & P. Mathew, Fl. Nilambur 364. 1997; Mohanan & Sivad., Fl. Agasthyamala 372. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 279. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 378. 2009. *Erigeron molle* D. Don, Prodr. Fl. Nepal. 172. 1825. *Blumea wightiana* DC. in Wight, Contrib. 14.1834; Hook. f., Fl. Brit. India 3: 261. 1881; Gamble, Fl. Pres. Madras 686(483). 1921. *Blumea neilgherrensis* Hook. f., Fl. Brit. India 3: 261. 1881; Gamble, Fl. Pres. Madras 686(483). 1921.

Herbs, 30-70 cm high; stems strigose. Leaves 4-5 x 2.5-3 cm, obovate, obtuse, glandular serrate, covered with simple and glandular hairs, nearly sessile. Heads 5-6 x 5-6 mm, in axillary and terminal thyrsiform clusters; peduncle strigose; bracts linear, hairy; outer smaller; bisexual flowers around 10, central; corolla 3-4 mm long, glandular; female flowers many; corolla slender. Achenes ellipsoid, ribbed, hairy; pappus 3 mm long.
Flowering & Fruiting: January-November.
Distribution: Indo-Malesia to Australia and Africa. Common; along roadsides, plantations and moist deciduous forests. *RNMK 1069,* Tholpetty; *RNMK 1149,* Achoor.

Blumea oxyodonta DC. in Wight, Contrib. 15.1834; Hook. f., Fl. Brit. India 3: 266. 1881; Gamble, Fl. Pres. Madras 686(482). 1921; Randeria, Blumea 10: 280. 1960; Manilal & Sivar., Fl. Calicut 150. 1982; Ansari, Fl. Kasaragod Div. 210. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 245. 1988; Kumar in Hajra *et al.*, Fl. India 13: 139. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 247. 1996; Sivar. & P. Mathew, Fl. Nilambur 365. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 379. 2009.

Prostrate herbs; stems slender, radiating from the root stock, pubescent. Radical leaves 7-8 x 2.5-3 cm, oblanceolate, obtuse, dentate; cauline leaves sessile, smaller. Heads few, 8-9 mm long, globose, in terminal panicles; bracts densely tomentose; outer lanceolate; inner linear; female flowers yellow, many; corolla 3-4 mm long, lobes glandular hairy; bisexual flowers few; corolla ca. 4 mm long, broad. Achenes ribbed, pubescent.
Flowering & Fruiting: October-May.
Distribution: Indo-Malesia and south China. Common; in moist deciduous forests. *RNMK 1884,* Chedalayam; *RNMK 0124*, Pulpally.

Blumea virens Wall. ex DC. in Wight, Contrib. 14. 1834; Hook. f., Fl. Brit. India 3: 264. 1881; Gamble, Fl. Pres. Madras 686(483). 1921; Randeria, Blumea 10: 252. 1960; Ansari, Fl. Kasaragod Div. 210. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 245. 1988; Kumar in Hajra *et al.*, Fl. India 13: 143. 1995; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 279. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 379. 2009. *Blumea virens* Wall. ex DC. var. *minor* Hook. f., Fl. Brit. India 3: 264. 1881.

Erect glabrous shrubs, 1-1.5 m high. Leaves 5-10 x 3-5 cm, pinnatisect and serrate, glabrous; petiole 1-5 cm long. Heads 5-7 x 6-7 mm, many, in axillary and terminal large panicles, peduncles 1.5-2 cm long, glabrous; outer bracts lanceolate, hairy at apex; inner larger, linear-oblong; bisexual florets 10, central; corolla 5-6 mm long, glandular; female florets many; corolla 4-5 mm long, slender. Achenes ribbed, oblong, hairy; pappus 4-5 mm long, white.
Flowering & Fruiting: December-June.
Distribution: Indo-Malesia. Common; in open areas. *RNMK 3053,* Kalpetta.

CENTIPEDA Loureiro
Fl. Cochinch. 492. 1790.

Centipeda minima (L.) A. Braun & Asch., Index Sem. Hort. Berol. App. 6. 1867; V. S. Ramach. & V.J. Nair, Fl. Cannanore 245. 1988; Naithani in Hajra *et al.*, Fl. India 12: 48. 1995. *Artemisia minima* L., Sp. Pl. 849. 1753. *Centipeda orbicularis* Lour., Fl. Cochinch. 493.1790; Hook. f., Fl. Brit. India 3:317.1881; Gamble, Fl. Pres. Madras 678(477). 1921; Wight, Ic. t. 1610. 1850. *Dichrocephala schmidtii* Wight, Ic. t. 1610. 1850.

Prostrate glabrous herbs; stems slender. Leaves alternate, 1-1.5 x 0.7-0.8 cm, obovate, obtuse, cuneate at base, dentate. Heads 3-4 x 1.5-2 mm, axillary, sessile, hemispherical; bracts 2-seriate, lanceolate, hairy; flowers 2-types; female flowers in outer few rows; corolla minute, tubular, shortly 4-toothed, yellow; bisexual flowers inner, few; corolla campanulate, 4-lobed, yellow; stamens 4, anthers entire at base. Achenes 4-angled, ciliate, brown; pappus absent.
Flowering & Fruiting: February-March.
Distribution: Indo-Malesia. Common; in paddy fields. *RNMK 3056,* Manivayal.

CHROMOLAENA A. P. de Candolle
Prodr. 5: 133. 1836.

Chromolaena odorata (L.) King & Robins., Phytologia 20: 204. 1970; Manilal & Sivar., Fl. Calicut 151. 1982; Ansari, Fl. Kasaragod Div. 210. 1985; Manilal, Fl. Silent Valley 152. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 247. 1988; Vajr., Fl. Palghat Dist. 250. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 248. 1996; Sivar. & P. Mathew, Fl. Nilambur 366. 1997; Mohanan & Sivad., Fl. Agasthyamala 373. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 280. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 379. 2009. *Eupatorium odoratum* L., Syst. Nat. (ed. 10) 1205. 1759; Hook. f., Fl. Brit. India 3: 244. 1881; Uniyal in Hajra *et al.*, Fl. India 12: 354.1995.

Shrubs, glandular hairy. Leaves opposite, 9-12 x 7-8 cm, ovate, acute at apex, cuneate at base, crenate, hispid; one pair of strong nerves from base, 3-4 pairs other nerves from midrib; petiole 2-4 cm long, cylindrical-oblong. Heads ca. 1 cm long, in terminal corymbose cymes; bracts 3-5-seriate, ovate, obtuse, 3-ribbed; flowers few to many, similar, bisexual; corolla 5-6 mm long, white, tubular, 5-lobed, pubescent at apex. Achenes 4-5 mm long, linear, 5-angled, scabrous, black; pappus many, 4-7 mm long, yellowish.
Flowering & Fruiting: November-May.
Distribution: Native of America; naturalised in Tropical Asia. Common; in disturbed moist deciduous forests. *RNMK 1908,* Tholpetty; *RNMK 1887*, Muthanga.

CISSAMPELOPSIS (A. P. de Candolle) Miquel
Fl. Ind. Batav. 2: 102. 1856.

Cissampelopsis corymbosa (Wall. ex DC.) Jeffrey & Chen., Kew Bull. 39: 341. 1984; Mathur in Hajra *et al.*, Fl. India 13: 199.1995; Sivar. & P. Mathew, Fl. Nilambur 367. 1997. *Senecio corymbosus* Wall. ex DC. in Wight, Contrib. 22. 1834; Wight, Ic. t. 1130. 1846; Hook. f., Fl. Brit. India 3: 351. 1881; Gamble, Fl. Pres. Madras 723(508). 1921; Manilal, Fl. Silent Valley 156. 1988; Mohanan & Sivad., Fl. Agasthyamala 386. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 286. 2005.

Large climbing shrubs; stem covered with fulvous-woolly hairs. Leaves 6-8 x 6-8 cm, broadly ovate, cordate at base, 5-7-ribbed, glabrous above, distantly serrulate; petiole 3-4 cm long. Heads 7-9 x 5-6 mm, in woolly panicles, axillary or terminal; bracts 1-seriate, with thick midrib, glabrous; corolla 6-7 mm long; lobes acute, yellow; anthers tailed at base. Achenes glabrous, brown; pappus ca. 7 mm long.
Flowering & Fruiting: March-November.
Distribution: India and Sri Lanka. Rare; in evergreen forests. *RNMK 2839,* Kattimattom; *RNMK 2016*, Chembra.

CONYZA Lessing
Syn. Gen. Comp. 203. 1832, *nom. cons.*

Shrubs or herbs. Leaves alternate, entire or crenate, hispid or tomentose. Heads few to numerous in terminal panicles; involucral bracts 2-3-seriate, lanceolate; flowers two types; outer few rows pistillate flowers; inner few bisexual flowers; corolla of female flowers usually shorter than that of bisexual flowers, equally 5-lobed; anther bases obtuse; style arms flattened in bisexual flowers. Achenes biconvex, hairy; pappus 1-seriate, setaceous.

1. Pappus hairs white or dirty white or yellow 2
1. Pappus hairs usually red.....3
2. Pappus hairs yellow ..... **C. bonariensis**
2. Pappus hairs white..... **C. canadensis**
3. Plants viscid; heads up to 1.5 cm across 4
3. Plants not viscid; heads less than 0.5 cm across ..... **C. stricta**

4. Leaves elliptic-oblong, narrowed at both end ..... **C. leucantha**
4. Leaves oblong-spathulate, obtuse at apex..... 5
5. Leaves pinnatilobed..... **C. aegyptiaca**
5. Leaves serrate-dentate or often entire ..... **C. japonica**

Conyza aegyptiaca (L.) Ait., Hort. Kew. (ed. 1) 3:183.1789; Hook. f., Fl. Brit. India 3:258.1881; Gamble, Fl. Pres. Madras 683(480). 1921; Hajra in Hajra *et al.*, Fl. India 12: 103. 1995. *Erigeron aegyptiacus* L., Mant. Pl. 1: 112. 1767, "aegyptiacum".

Erect herbs, 65-75 cm high; stems ridged, densely hispid. Leaves 7-8 x 4-4.5 cm, obovate-spathulate, crenate and deeply cut with a lower narrow part attenuate into an auricle, obtuse at apex, hispid. Panicle 12-15 cm across, terminal, corymbose; heads ca. 6 x 8 mm, globose; bracts thinly hispid; female corolla 1.5-2 mm long, slender, toothed at apex, white; bisexual corolla 2.5-3 mm long, broader, yellow. Achenes yellowish brown; pappus brown.
Flowering & Fruiting: September-May.
Distribution: India, Bangladesh, Africa, China, Japan and Australia. Occasional; in disturbed areas in semi-evergreen forests. *RNMK 2856,* Manikkunnumala.

Conyza bonariensis (L.) Cronq., Bull. Torrey Bot. Club 70. 632. 1943; V. S. Ramach. & V.J. Nair, Fl. Cannanore 247. 1988; Vajr., Fl. Palghat Dist. 251. 1990; Hajra in Hajra *et al.*, Fl. India 12: 104. 1995; Sivar. & P. Mathew, Fl. Nilambur 367. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 380. 2009. *Erigeron bonariensis* L., Sp. Pl. 863. 1753. *Erigeron linifolius* Willd., Sp. Pl. 3: 1955. 1803; Hook. f., Fl. Brit. India 3: 254. 1881. *Conyza ambigua* DC., Fl. Fr. 6: 468. 1815; Gamble, Fl. Pres. Madras 683(480). 1921.

Stout erect herbs, 90-120 cm high; stems ribbed, hispid. Leaves 8-20 x 1-3 cm, linear-elliptic to oblanceolate, distantly serrate, hispid; petiole 1-2 cm long. Panicle 30-60 cm long, oblong, leafy; heads ca. 7 x 2 mm, oblong, cylindrical; bracts oblong, obtuse, glabrous; outer bracts smaller, hispid; female corolla 3-4 mm long, slender; bisexual flowers inner, few; corolla ca. 4 mm long, widening upward. Achenes hairy, yellow; pappus yellow.
Flowering & Fruiting: June-January.
Distribution: Originally from America; now Pantropical. Common; along roadsides in moist deciduous forests. *RNMK 3008,* Tholpetty.

Conyza canadensis (L.) Cronq., Bull. Torrey Bot. Club. 79: 632. 1943; Hajra in Hajra *et al.*, Fl. India 12: 105.1995. *Erigeron canadensis* L., Sp. Pl. 863. 1753; Hook. f., Fl. Brit. India 3: 254. 1881; Gamble, Fl. Pres. Madras 681(479). 1921; Subram., Indian For. 96: 527. 1970; Manilal & Sivar., Fl. Calicut 153. 1982; Vajr., Fl. Palghat Dist. 253. 1990; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 283. 2005.

Tall suffrutescent herbs; branchlets slender, pubescent. Leaves simple, 4-8 x 0.5-3 cm, linear-lanceolate, margin toothed, apex subacute. Heads heterogamous, in axillary racemes or panicles; florests yellow, outer few female, inner bisexual; corolla tubular; stamens 5, included. Achenes compressed, pubescent.
Flowering & Fruiting: June-August.
Distribution: India, Nepal, Pakistan and north America. Occasional; in evergreen forest margins. *RNMK 2818*, Kurichiarmala.

Conyza japonica (Thunb.) Less., Syn. Gen. Comp. 204. 1832; Hook. f., Fl. Brit. India 3: 258. 1881; Gamble, Fl. Pres. Madras 683(480). 1921; Hajra in Hajra *et al.*, Fl. India 12: 105. 1995; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 280. 2005. *Erigeron japonica* Thunb., Fl. Jap. 312. 1784. *Conyza multicaulis* DC., Prodr. 5: 383. 1836.

Herbs; stem solitary, 25-35 cm high, hispid. Leaves 4-5 x 2.5 cm, obovate, obtuse, cuneate at base; petiole ca. 1 cm long. Heads ca. 7 x 9 mm, globose, 5-8 together, in terminal clusters; bracts lanceolate, glabrous; receptacle thinly hairy; female corolla 1.5-2 mm long; bisexual florets a few, at the centre; corolla 2.5-3 mm long, yellow; lobes acute. Achenes compressed, oblong, thinly hairy, pappus setaceous.
Flowering & Fruiting: April-July.
Distribution: Indo-Malesia. Common; in disturbed areas in evergreen forests. *RNMK 3445,* Sugandhagiri.

Conyza leucantha (D. Don) Ludlow & Raven, Kew Bull. 17: 70. 1963; V. S. Ramach. & V.J. Nair, Fl. Cannanore 247. 1988; Vajr., Fl. Palghat Dist. 251. 1990; Hajra in Hajra *et al.*, Fl. India 12: 105. 1995. *Erigeron leucanthum* D. Don, Prodr. Fl. Nepal. 171. 1825. *Conyza viscidula* Wall. ex DC., Prodr. 5: 383.1836; Hook. f., Fl. Brit. India 3:58.1881; Gamble, Fl. Pres. Madras 683(480). 1921.

Shrubs, 1-2 m high; branchlets terete, finely glandular-pubescent. Leaves 8-10 x 2-2.5 cm, elliptic, acute at apex, attenuate to nearly sessile at base, glabrous above, thinly puberulus below. Heads 6-7 x 4-5 mm, globose, 5-10 together, in lax corymbose cymes on branch tips; bracts lanceolate, glandular hairy; female corolla pink; bisexual flowers 4-6; corolla 4-5 mm long. Achenes pappus reddish, 5.5-6 mm long.
Flowering & Fruiting: February-September.
Distribution: Indo-Malesia to Australia. Occasional; in exposed hills. *RNMK 2751,* Sugandhagiri.

Conyza stricta Willd., Sp. Pl. 3: 1922. 1803; Hook. f., Fl. Brit. India 3: 258. 1881; Gamble, Fl. Pres. Madras 683(480). 1921; Hajra in Hajra *et al.*, Fl. India 12: 109. 1995; Garg & Sastry, J. Econ. Tax. Bot. 12:437. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 248. 1996.

Erect woody herbs, 25-30 cm high; stem terete or ridged, pubescent. Leaves to 2-5 x 0.8-1 cm, oblanceolate to spathulate, obtuse, entire or serrate, pubescent. Heads 3-4 x 2.5-3 mm, in dense corymbose panicle; bracts lanceolate, acute, pubescent outside; corolla similar, 2.5-3 mm long, bright yellow. Achenes ribbed, hairy; pappus yellow.

Flowering & Fruiting: September-October.

Distribution: Indo-Malesia and Africa. Occasional; in disturbed evergreen forests. *RNMK 2062,* Vythiri.

CRASSOCEPHALUM Moench

Meth. 516. 1794.

Crassocephalum crepidioides (Benth.) S. Moore, J. Bot. 1: 211. 1912; Belcher, Kew Bull. 462. 1955; Manilal & Sivar., Fl. Calicut 150. 1982; Ansari, Fl. Kasaragod Div. 210. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 248. 1988; Vajr., Fl. Palghat Dist. 251. 1990; Mathur in Hajra *et al.*, Fl. India 13: 201. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 248. 1996; Sivar. & P. Mathew, Fl. Nilambur 368. 1997; Mohanan & Sivad., Fl. Agasthyamala 373. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 381. 2009. *Gynura crepidioides* Benth. in Hook., Niger Fl. 438. 1849. *Erechtites valerianaefolia* sensu Fischer in Gamble, Fl. Pres. Madras 1882(1302).1936, non DC. 1838.

Erect herbs, up to 1 m high; stems fleshy. Leaves alternate, 12-15 x 5-6 cm, elliptic, acute, serrate, glabrous, attenuate to the petiole; nerves 5-6 pairs, regular, petiole ca. 2 cm long. Heads ca. 1.5 cm long, in corymbose cymes; bracts 1-seriate, overlapping, glabrous; flowers similar, bisexual; corolla 1-1.2 cm long, slender, 5-lobed at apex, pink. Achenes 10-ribbed; pappus ca. 1 cm long, white, silky.

Flowering & Fruiting: August-December.

Distribution: India, Sri Lanka, China, Africa and Madagascar. Common; in plantations and open areas. *RNMK 1069,* Kalpetta; *RNMK 1102*, Puliyarmala.

CYATHOCLINE Cassini

Ann. Sci. Nat. (Paris) 17: 419. 1829.

Cyathocline purpurea (D. Don) O. Kuntze., Rev. Gen. Pl. 1: 338. 1891; V. S. Ramach. & V.J. Nair, Fl. Cannanore 248. 1988; Hajra in Hajra *et al.*, Fl. India 12: 111.1995. *Tanacetum purpureum* D. Don, Prodr. Fl. Nepal. 181. 1825. *Cyathocline lyrata* Cass., Ann. Sco. Sci. Nat. ser. 1. 17. 420. 1829; Wight, Ic. t. 1098. 1846; Gamble, Fl. Pres. Madras 679(478). 1921.

Erect herbs, 20-25 cm tall. Leaves 13-15 cm long, pinnatisect, viscid glandular. Heads 4-5 mm across; florets purple. Achenes ovoid, glabrous.

Flowering & Fruiting: March-November.

Distribution: Indo-Malesia. Common; in paddy fields in moist deciduous forests. *RNMK 1203,* Begur; *RNMK 2507*, Tholpetty.

DICHROCEPHALA L' Heritier ex A. P. de Candolle
Arch. Bot. (Paris) 2: 517. 1833.

Dichrocephala integrifolia (L. f.) O. Kuntze., Rev. Gen. Pl. 1: 333. 1891; V. S. Ramach. & V.J. Nair, Fl. Cannanore 248. 1988; Manilal, Fl. Silent Valley 153. 1988; Vajr., Fl. Palghat Dist. 251. 1990; Hajra in Hajra *et al.*, Fl. India 12: 114. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 249. 1996; Sivar. & P. Mathew, Fl. Nilambur 369. 1997; Mohanan & Sivad., Fl. Agasthyamala 374. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 281. 2005. *Hippia integrifolia* L. f., Suppl. Pl. 389. 1781. *Dichrocephala latifolia* (Pers.) DC. in Wight, Contrib. 11. 1834; Hook. f., Fl. Brit. India 3: 245. 1881; Gamble, Fl. Pres. Madras 679(477). 1921: Wight, Ic. t. 1096. 1846. *Cotula latifolia* Pers., Syn. 2: 464. 1805; Hook. f., Fl. Brit. India 3: 245. 1881. *Dichrocephala bicolor* (Roth) Schltr., Linnaea 25: 209. 1952.

Diffuse herbs, hispid. Leaves alternate, 3.5-4 x 2.5-3 cm, ovate, obtuse, irregularly lobed; petiole 1-2 cm long. Heads 3-4 mm across, globose, in terminal panicles; bracts 1-seriate, lanceolate, acute, ciliate; female flowers in several outer rows; corolla tubular, 2-4-toothed at apex, glabrous; bisexual flowers few, central; corolla 4-lobed at apex, white; anthers 4, connate, included. Achenes 4-ribbed, glabrous; pappus 4 deciduous bristles.

Flowering & Fruiting: August-December.

Distribution: Tropical and subtropical Asia, Africa, Pacific Islands and Australia. Common; in grasslands. *RNMK 2154,* Chembra.

ECLIPTA Linnaeus
Mant. Pl. 12: 157, 286. 1771, *typ. cons.*

Eclipta prostrata (L.) L., Mant. Pl. 2: 286. 1771; Sant., J. Bombay Nat. Hist. Soc. 54:475. 1957; Manilal & Sivar., Fl. Calicut 152. 1982; Ansari, Fl. Kasaragod Div. 211. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 67. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 249. 1988; Chowdhery in Hajra *et al.*, Fl. India 12: 381. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 249. 1996; Sivar. & P. Mathew, Fl. Nilambur 369. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 281. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 382. 2009. *Verbesina prostrata* L., Sp. Pl. 902. 1753. *Eclipta alba* (L.) Hassk., Pl. Jav. Rar. 528. 1848; Hook. f., Fl. Brit. India 3: 304. 1881; Gamble, Fl. Pres. Madras 705(496). 1921; Vajr., Fl. Palghat Dist. 252. 1990. *Verbesina alba* L., Sp. Pl. 902. 1753. *Cajennaem* Rheede, Hort. Malab. 10: 81-82, t.41. 1690.

Erect or prostrate annual herbs, stems strigose. Leaves 2-3 x 0.8-1 cm, alternate, entire, elliptic, acute at either ends, hispid. Heads 0.8-1 cm across, depressed, conical, solitary, axillary, peduncled; bracts elliptic, acute, biseriate; receptacle covered with slender paleae; female flowers usually in outer 2 rows; corolla slender; white, bisexual flowers central, tubular; corolla slender, 4-5-toothed at apex; anthers obtuse at base. Achenes of outer flowers compressed, inner 3-angled, truncate, warted; pappus of 2 or 3 minute scales.

Flowering & Fruiting: Throuoghout the year.
Distribution: Pantropical. Common; in paddy fields. *RNMK 2691,* Poothady.

ELEPHANTOPUS Linnaeus
Sp. Pl. 814. 1753.

Elephantopus scaber L., Sp. Pl. 814. 1753; Roxb., Fl. Ind. 3:445; Hook. f., Fl. Brit. India 3: 242. 1881; Gamble, Fl. Pres. Madras 676(476). 1921; Manilal & Sivar., Fl. Calicut 149. 1982; Ansari, Fl. Kasaragod Div. 212. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 67. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 249. 1988; Vajr., Fl. Palghat Dist. 252. 1990; Uniyal in Hajra *et al.*, Fl. India 13: 333. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 249. 1996; Sivar. & P. Mathew, Fl. Nilambur 370. 1997; Mohanan & Sivad., Fl. Agasthyamala 375. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 281. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 382. 2009. *Ana-schovadi* Rheede, Hort. Malab. 10:13, t.7. 1690.

Stout perennial herbs. Leaves basal, rosetted, 10-15 x 4-5 cm, oblanceolate, obtuse at apex, decurrent along the petiole; petiole sheathed at base. Heads 5-6-flowered, 3-5 together, supported by cucullate spathes, arranged in lax cymes on strong erect scapes; involucral bracts lanceolate, calycine; flowers similar, bisexual; corolla tubular, 0.8-1 cm long, 5-lobed; pink; anthers sagittate at base. Achenes ribbed, hairy; pappus 6, bristle-like, scabrid, connate at base.
Flowering & Fruiting: October-January.
Distribution: Pantropical. Common; in moist deciduous forests. *RNMK 2660,* Muthanga- Ponkuzhy; *RNMK 2691,* Tholpetty.

ELEUTHERANTHERA Poit. ex Bosc.
Nouv. Dict. Hist. Nat. ed. 1, 7: 498. 1803.

Eleutheranthera ruderalis (Sw.) Sch.-Bip., Bot. Zeit. 24: 165. 1866; Sasidh. & Namb., Indian J. For. 4: 240. 1981; H.J. Chowdhery in Hajra et al., Fl. India 12: 383. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 250. 1996; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 383. 2009. *Melampodium ruderale* Sw., Fl. Ind. Occ. 3: 1372. 1806.

Annual herbs. Leaves 6-7.5 x 3.5-4 cm, ovate, acute, cuneate at base; nerves 3-4 pairs, basal pairs rib-like; petiole 0.5-1 cm long. Heads axillary, 0.5-0.8 cm across, shortly peduncled; bracts few, ovate, obtuse, outer bracts leafy; flowers 6-12, bisexual; corolla yellow, 0.3-0.4 mm long, 5-lobed above, pubescent; anthers sagittate at base. Achenes ca. 0.3 x 0.1 mm, 4-angled, obovoid, tubercled, black; pappus knot-like.
Flowering & Fruiting: November-February.
Distribution: Native of Tropical America. Occasional; in grassland margins. *RNMK 2692, C*hembra estate.

EMILIA Cassini

Bull. Sci. Soc. Philom. Paris 68. 1817.

Annual or perennial herbs. Leaves alternate, entire or pinnatisect. Heads cylindric, solitary or in lax corymbs, long-pedunculate; bracts uniseriate, oblong; receptacle rugose. Flowers numerous, similar, bisexual; corolla tubular; lobes oblong, glandular, pink; anthers entire at base. Achene 4-angled or ribbed; pappus numerous, white-cottony, setaceous.

1.Leaves crisped pubescent; stigma truncate.....**E.scabra**

1. Leaves glabrescent; stigma acute..... **E.sonchifolia**

Emilia scabra DC., Prodr. 6: 303. 1838; Gamble, Fl. Pres. Madras 716(503). 1921; V. S. Ramach. & V.J. Nair, Fl. Cannanore 250. 1988; Mathur in Hajra *et al.*, Fl. India 13: 211. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 251. 1996; Sivar. & P. Mathew, Fl. Nilambur 371. 1997. *Emilia sonchifolia* (L.) DC. var. *scabra* (DC.) Hook. f., Fl. Brit. India 3: 336. 1881.

Herbs, decumbent at base, crisped-pubescent; stems hirtus. Leaves usually basal, few are cauline, 2.5-4 x 1-1.5 cm, oblong, entire or lyrate, crenate, base auricled, crispately pubescent. Heads few, 1.2-1.5 cm long, on solid peduncles; bracts glabrous; flowers many; corolla 6-7 mm long, glandular, pink, lobes acute. Achenes ribbed, hispid along the angles.

Flowering & Fruiting: September-November. *Distribution*: India. Common in grasslands. *RNMK 2409,* Banasuramala.

Emilia sonchifolia (L.) DC. ex Wight, Contrib. 24.1834; Hook. f., Fl. Brit. India 3: 336. 1881; Gamble, Fl. Pres. Madras 716(503). 1921; Manilal & Sivar., Fl. Calicut 149. 1982; Ansari, Fl. Kasaragod Div. 212. 1985; Manilal, Fl. Silent Valley 154. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 67. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 250. 1988; Vajr., Fl. Palghat Dist. 252. 1990; Mathur in Hajra *et al.*, Fl. India 13: 212. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 251. 1996; Sivar. & P. Mathew, Fl. Nilambur 371. 1997; Mohanan & Sivad., Fl. Agasthyamala 376. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 282. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 384. 2009. *Cacalia sonchifolia* L., Sp. Pl. 835. 1753. *Muel-schevi* Rheede, Hor. Malab. 10:135, t. 8. 1690.

Herbs, 25-30 cm high. Leaves 3-8 cm long, ovate-oblong, entire or lyrate, pinnatisect, crenate with large terminal lobe. Heads 1-1.2 cm long, few, on long terminal peduncles; bracts with hyaline margins, acute; receptacle rugose; flowers many; corolla 8-9 mm long; lobes oblong, glandular. Achenes tetrangular, hispid along the angles; pappus ca. 1.3 cm long, white.

Flowering & Fruiting: July-December.

Distribution: Tropical and subtropical Africa and Asia. Common; in disturbed moist deciduous forests and paddy fields. *RNMK 2668,* Tholpetty; *RNMK 2693*, Panamaram.

ERIGERON Linnaeus

Sp. Pl. 863. 1753

Erigeron karvinskianus DC., Prodr. 5: 285. 1836; Hajra in Hajra *et al.*, Fl. India 12: 122. 1995. *Erigeron mucronatus* DC., Prodr. 5: 285. 1836; Gamble, Fl. Pres. Madras 682(480). 1921.

Erect or scandent herbs, 20-45 cm long; stems slender. Leaves alternate or fascicled, 2-3 x 0.8-1 cm, elliptic, acute at either ends, dentate. Heads ca. 8 x 8 mm, terminal, solitary, peduncled; bracts few-seriate, linear-lanceolate, acuminate; female flowers ligulate, peripheral; limb narrow, entire, purple; bisexual flowers inner, tubular; corolla 3-4 mm long, 5-lobed, yellow; anthers obtuse at base. Achenes compressed, hairy at base; pappus few, white.

Flowering & Fruiting: Throughout the year.

Distribution: India, Europe, Nepal, Bhutan, Myanmar and Japan. Occasional; in grasslands. *RNMK* 1*896*, Banasuramala.

GALINSOGA Ruiz & Pavon

Prodr. 110, t. 24. 1794.

Galinsoga parviflora Cav., Ic. 3: 41, t. 281. 1796; Hook. f., Fl. Brit. India 3: 311. 1881; Gamble, Fl. Pres. Madras 711(500). 1921; Chowdhery in Hajra *et al.*, Fl. India 12: 388. 1995; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 283. 2005.

Erect branched herbs, 30-40 cm high; stem smooth. Leaves opposite, 3-5 x 2-3 cm, ovate, acute, glabrous, serrate, 3-ribbed from base. Heads ca. 4 x 3 mm, many, in axillary or terminal peduncled cymes; peduncles dichotomous, slender; bracts biseriate, ovate, acute, glabrous; receptacle paleate; outer row of flowers ligulate, limb deeply 3-lobed, white. Inner flowers tubular, bisexual; corolla 5-toothed; anthers obtuse at base. Achenes truncate, black, 3-4-angled, scabrid; pappus of 3-4 fimbriate hyaline scales.

Flowering & Fruiting: December-April.

Distribution: India, Nepal, Sri Lanka, New Guinea and America. Occasional; in grasslands. *RNMK* 1887, Chembra.

GNAPHALIUM Linnaeus

Sp. Pl. 850. 1753.

Gnaphalium polycaulon Pers., Syn. 2: 421. 1807; V. S. Ramach. & V.J. Nair, Fl. Cannanore 251. 1988; Pant in Hajra *et al.*, Fl. India 13: 91. 1995; Mohanan & Sivad., Fl. Agasthyamala 378. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 283. 2005. *Gnaphalium indicum* Hook. f., Fl. Brit. India 3: 289. 1881, non L. 1753; Gamble, Fl. Pres. Madras 698(491). 1921. *Gnaphalium strictum* Roxb., Fl. Ind. 3: 424. 1832. *Gnaphalium multicaule* Roxb., Fl. Ind. 3: 425. 1832.

Erect woolly herbs, 20-30 cm high; stems terete. Leaves 5-7 x 0.8-1 cm, oblanceolate to spathulate, obtuse, narrow to the base, entire. Heads 3-5 x 1.5-2 mm, in axillary congested spikes; bracts 2-3-seriate, glabrous, hyaline;

bisexual flowers 2, central; corolla 2-3 mm long; lobes glandular; female flowers very many; corolla ca. 2 mm long, narrow. Achenes 2-3-angled, glandular between angles; pappus many, equal to corolla.
Flowering & Fruiting: Throughout the year.
Distribution: Pantropical. Common; in open grassy slopes. *RNMK* 1*18*0, Thirunelli; *RNMK 1897,* Manikkunnumala.

GRANGEA Adanson
Fam. 2: 121, 563. 1763**.**

Grangea maderaspatana (L.) Poir. in Lamk, Encycl. Suppl. 2: 825. 1812; Hook. f., Fl. Brit. India 3: 247. 1881; Gamble, Fl. Pres. Madras 680(478). 1921; Wight, Ic. t. 1097. 1846; Manilal & Sivar., Fl. Calicut 150. 1982; Ansari, Fl. Kasaragod Div. 213. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 251. 1988; Hajra in Hajra *et al.*, Fl. India 12: 127. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 251. 1996; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 385. 2009. *Artemisia maderaspatana* L., Sp. Pl. 849. 1753.

Prostrate herbs, densely hispid. Leaves alternate, 2-3 x 1-1.5 cm, oblanceolate, irregularly pinnate-lobed, auricled at base, sessile. Heads ca. 8 mm across, globose, axillary, solitary, pedunculate; bracts 2-3 seriate, hairy; receptacle convex, naked; outer few rows of flowers female; corolla ca. 2 mm long, slender, tubular, yellow; inner flowers bisexual; corolla ca. 2 mm long, campanulate, 5-lobed; anthers obtuse at base. Achenes obovate, compressed, hispid along margins; pappus a fimbriate crown.
Flowering & Fruiting: March-July.
Distribution: Indo-Malesia and Africa. Common; in paddy fields. *RNMK* 3666, Panamaram; *RNMK 1917,* Nadavayal.

GYNURA Cassini
Dict. Sci. Nat. 34: 391. 1825.

Gynura nitida DC. in Wight, Contrib. 24. 1834; Hook. f., Fl. Brit. India 3: 333. 1881; Gamble, Fl. Pres. Madras 714(502). 1921; Davies, Kew Bull. 35: 366. 1981; Manilal, Fl. Silent Valley 154. 1988; Vajr., Fl. Palghat Dist. 253. 1990; Mathur in Hajra *et al.*, Fl. India 13: 221. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 251. 1996; Mohanan & Sivad., Fl. Agasthyamala 379. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 284. 2005.

Stout herbs, 60-130 cm high; stems furrowed, glabrous. Leaves basal and cauline, similar, 10-15 x 3-4 cm, oblanceolate, entire, obtusely acute at apex, narrowed and amplexicaule at base. Heads 1.4-1.6 x 1-1.2 cm, cylindrical, 10-20 together, in panicled cymes, bracteolate; peduncle 2-4 cm long; bracts lanceolate, acute; receptacle rugose; flowers not all fertile; corolla lobes obtuse, glandular. Achenes 11-ribbed, truncate, black; pappus white.
Flowering & Fruiting: Throughout the year. *Distribution*: Endemic to Western Ghats. Common; in grasslands. *RNMK* 3243, Chembra; *RNMK 3068,* Banasuramala.

LAGASCEA Cavanilles

Anales Ci. Nat. 6: 331. 1803 'Lagasca'

Lagascea mollis Cav., Ann. Sci. Nat. Bot. 6:332. t. 44. 1803, "Lagasca"; Hook. f., Fl. Brit. India 3: 302. 1881; Gamble, Fl. Pres. Madras 703(494). 1921; V. S. Ramach. & V.J. Nair, Fl. Cannanore 252. 1988; Vajr., Fl. Palghat Dist. 254. 1990; Chowdhery in Hajra *et al.*, Fl. India 12: 397. 1995; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 385. 2009.

Herbs, pubescent. Leaves opposite or alternate, 3-5 x 1.5-2 cm, ovate-lanceolate, apex acuminate, base acute, pubescent; petiole 1.5-2 cm long. Head terminal, ca. 1.5 cm, across, pubescent, subtended by bracts, phyllaries 4 or 5, to 5 mm, linear-lanceolate, acuminate, connate below; florets bisexual, white; corolla 4-5 mm long, tubular campanulate, lobes 5, ovate; ovary pubescent above; style bifid; stigma pubescent. Achenes compressed.

Flowering & Fruiting: April-November.

Distribution: Pantropics. Common; in open areas in moist deciduous forests. *RNMK 1193*, Baveli; *RNMK 1907*, Pulpally.

LAGGERA Schultz-Bipontinus ex K. H. E. Koch

Linnaea 19: 391. 1847.

Laggera crispata (Vahl) Hepper & Wood, Kew Bull. 38:83.1983; Kumar in Hajra *et al.*, Fl. India 13: 151.1995; Vajr., Fl. Palghat Dist. 254. 1990. *Conyza crispata* Vahl, Symb. Bot. 1: 71. 1790. *Laggera pterodonta* (DC.) Sch.-Bip. ex Oliver, Trans. Linn. Soc. London 29: 94. 1873; Hook. f., Fl. Brit. India 3: 271. 1881; Gamble, Fl. Pres. Madras 689(485). 1921. *Blumea pterodonta* DC. in Wight, Contrib. 16. 1834.

Erect shrubs, ca. 2 m high; branches winged. Leaves alternate, 13-15 x 5-6 cm, obovate, viscid-glandular, irregularly lobed, decurrent at base, forming dissected wings along the stem. Heads 1-1.2 cm long, many, in large panicle, branches and peduncles winged; bracts many, oblong, acute, puberulus; flowers dissimilar; female flowers peripheral, in several rows; corolla 5-6 mm long, filiform; bisexual flowers 10-20, central; corolla ca. 6 mm long, yellow, 5-lobed; anthers entire at base. Achenes faintly ribbed, hairy; pappus ca. 8 mm long, many, reddish.

Flowering & Fruiting: January-March.

Distribution: India, China, Myanmar and Africa. Occasional; in moist deciduous forests. *RNMK 3097*, Pulpally.

LAUNAEA Cassini

Dict. Sci. Nat. 25: 61, 321. 1822.

Launaea acaulis (Roxb.) Babc. ex Kerr. in Craib, Fl. Siam. 2: 299. 1936; Manilal, Fl. Silent Valley 155. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 252. 1988; Hajra in Hajra *et al.*, Fl. India 12: 304. 1995; Mohanan & Sivad., Fl. Agasthyamala 381. 2002. *Prenanthes acaulis* Roxb., Fl. Ind. 3: 403. 1832. *Microrhynchus glabra* (DC.) Wight, Ic. t. 1145. 1846. *Lactuca glabra* (DC.)

Wight, Contrib. 26. 1834. *Crepis acaulis* (Roxb.) Hook. f., Fl. Brit. India 3: 396. 1881; Gamble, Fl. Pres. Madras 730(513). 1921; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 280. 2005.

Scapigerous perennial herbs with thick rootstock; juice milky. Leaves all basal, 8-15 x 1-3 cm, oblong, acute or obtuse, entire or finely toothed, glabrous. Heads 1.5-1.8- x 0.6-0.8 cm, cylindrical, 10-15 together, cymose, on elongated scapes; scapes 3-5, 15-20 cm high, branched, glabrous; bracts uniseriate, margins white; flowers all ligulate; corolla bright yellow, ca. 1.8 cm long, glabrous, limb oblong; anthers sagittate at base. Achenes compressed, yellowish brown.

Flowering & Fruiting: March-September.

Distribution: India, Afghanistan, Nepal, Pakistan and Iran. Common; in open grasslands. *RNMK 2437*, Brahmagiri; *RNMK 2800*, Banasuramala.

MIKANIA Willdenow

Sp. Pl. 3:1742.1803, *nom. cons.*

Mikania micrantha Kunth in HBK, Nov. Gen. Sp. 4: 134. 1820; Uniyal in Hajra *et al.*, Fl. India 12: 357.1995. *Mikania scandens* Clarke, Comp. Ind. 34. 1876, non L.; Hook. f., Fl. Brit. India 3: 144. 1881. *Mikania cordata* (Burm. f.) Robins., Contrib. Gray Herb. 104:65.1934; V. S. Ramach. & V.J. Nair, Fl. Cannanore 253. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 251. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 286. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 386. 2009. *Eupatorium cordatum* Burm. f., Fl. Ind. 176. t. 58. 1768.

Climbers; stems glandular-hispid. Leaves opposite, 6-8 x 5-6 cm, ovate, acute at apex, cordate at base, crenate, glabrate; petiole 2-4 cm long. Heads ca. 5 mm long, in axillary panicles; bracts biseriate, outer 2 smaller, inner 3-5, ovate, obtuse; flowers 3-5, similar, bisexual; corolla ca. 3 mm long, tubular, lobes 5, glandular, white; anthers linear. Achenes 5-ribbed, black, glabrous; pappus many, hispid.

Flowering & Fruiting: Ferbruary-April.

Distribution: Pantropical. Common; along margins of evergreen forests. *RNMK 1890*, Periya Ghat.

PARTHENIUM Linnaeus

Sp. Pl. 988. 1753.

Parthenium hysterophorus L., Sp. Pl. 988. 1753; Vajr., Fl. Palghat Dist. 259. 1990; H.J. Chowdhery in Hajra *et al.*, Fl. India 12: 403. 1995; Sivar. & P. Mathew, Fl. Nilambur 373. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 387. 2009.

Erect herbs; branches dichotomous, puberulus. Leaves alternate, deeply pinnatisect, lobes 7-10 x 1-2 cm, oblong-lanceolate, entire, acute at apex, pubescent, base decurrent. Heads in terminal, lax panicles; bracts 2-seriate, ciliate; florets dissimilar; outer florets 5, rayed, female; corolla ligulate; limb

short, entire; inner florets male; corolla tubular, white; anthers obtuse at base. Achenes broadly ovoid, compressed, puberulus; pappus absent or with two short hooks.
Flowering & Fruiting: May-March.
Distribution: Native of America; now naturalised in India. Common; along roadsides and disturbed areas of moist deciduous forests. *RNMK 1897*, Muthanga; *RNMK 1162*, Kalloor.

PENTANEMA Cassini
in Bull. Soc. Philom. 74: 1818

Annual or perennial herbs,. Leaves simple, alternate, often amplexicaule at base. Heads heterogamous, ligulate, solitary, axillary; involucral phyllaries many-seriate; outer ray florets female, corolla 2-dentate; disc florets bisexual, corolla 5-lobed. Anthers sagitate at base. Achenes angled; pappus uniseriate.

1. Leaves sessile; not amplexicaule and auricled .....**P.cernuum**
1. Leaves short petioled; leaves amplexicaule and auricled at base .....**P. indicum**

Pentanema cernuum (Dalz. & Gibs.) Ling, Acta Phyt. Sin. 10: 180. 1965; Kumar in Hajra *et al.*, Fl. India 13: 28.1995. *Vicoa cernua* Dalz. & Gibs., Bombay Fl. 126 & 314. 1861; Hook. f., Fl. Brit. India 3: 297. 1881; Gamble, Fl. Pres. Madras 701(493). 1921; V. S. Ramach. & V.J. Nair, Fl. Cannanore 258. 1988.

Erect herbs, 40-45 cm tall. Leaves 7-8.5 x 2.5-3 cm, elliptic-lanceolate, acute to acuminate, acute at base, sparsely pubescent. Heads 0.7-0.8 cm across; florets yellow. Achenes oblong; pappus bristly hairy.
Flowering & Fruiting: November-December.
Distribution: South Asia. Rare; in grasslands. *RNMK 1909,* Brahmagiri.

Pentanema indicum (L.) Ling, Acta Phyt. Sin. 10: 179. 1965; Wight, Ic. t. 1148. 1846; Vajr., Fl. Palghat Dist. 258. 1990; Kumar in Hajra *et al.*, Fl. India 13: 28.1995; Sivar. & P. Mathew, Fl. Nilambur 373. 1997. *Inula indica* L., Sp. Pl. (ed. 2) 1236. 1763. *Vicoa auriculata* Cass., Ann. Sci. Nat. Bot. ser. 1, 17: 418. 1829; Hook. f., Fl. Brit. India 3: 297. 1881. *Vicoa indica* (L.) DC. in Wight, Contrib. 10. 1834; Gamble, Fl. Pres. Madras 701(493). 1921; Manilal & Sivar., Fl. Calicut 152. 1982; Manilal, Fl. Silent Valley 162. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 258. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 256. 1996; Mohanan & Sivad., Fl. Agasthyamala 397. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 291. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 395. 2009.

Densely scabrous erect herbs; stems terete, reddish. Leaves 5-6 x 1-2 cm, elliptic, acute at apex, amplexicaule and auricled at base. Heads 10-12 x 0.7-0.8 cm, depressed-globose, solitary, usually on lateral small branches; bracts many, linear, acuminate; flowers outer ligulate, female; inner bisexual,

tubular; corolla linear-oblong, 3-toothed, yellow; corolla 4-5 mm long, shortly 5 lobed; anthers sagittate at base. Achenes cylindric, hairy; pappus of 10-12 bristles, setaceous.
Flowering & Fruiting: November-December.
Distribution: India, China, Thailand and West Africa. Common; along roadsides. *RNMK 3097,* Appapara; *RNMK 2437,* Thirunelli.

PHYLLOCEPHALUM Blume
Bijdr. 888. 1826.

Erect herbs. Leaves alternate, elliptic, serrate along the margins; densely white-tomentose beneath. Heads solitary or few, pedunculate, in terminal or upper axillary corymbose cymes; bracts in 2-3 series, oblong to lanceolate; flowers similar, bisexual; corolla tubular, 5-lobed, lobes oblong, obtuse or acute, blue or purple; anthers sagittate at base, auricle obtuse; stigmatic lobes subulate, puberulus. Achenes cylindrical, obtuse, 10-ribbed; pappus many, setaceous.

1.Leaves thinly scabrid above; achenes 12 ribbed, glabrous ..... **P.scabridum**
1.Leaves white woolly tomentose; achenes 10 ribbed ..... **P. phyllolaenum**

Phyllocephalum phyllolaenum (DC.) Narayana, Curr. Sci. 51. 438. 1982; Uniyal in Hajra *et al.*, Fl. India 13: 341. 1995. *Decaneurum phyllolaenum* DC., Prodr. 7: 264. 1838. *Centratherum phyllolaenum* (DC.) Benth. ex Clarke, Comp. Ind. 4. 1876; Hook. f., Fl. Brit. India 3: 228. 1881; Gamble, Fl. Pres. Madras 677(469). 1921; V. S. Ramach. & V.J. Nair, Fl. Cannanore 246. 1988.

Erect fleshy herbs. Leaves 9-12 x 3-4 cm, acuminate, white-woolly tomentose with brown nerves beneath; petioles 2-3 cm long. Heads 1.8 x 0.8-1 cm, peduncled, few; bracts 2 or 3-seriate, cuspidate, outer bracts tomentose; flowers 10-12, tubular; corolla 8-9 mm long, lobes acute, glabrous; anthers deep violet. Achenes 10-ribbed, glabrous, brown; pappus many, setaceous.
Flowering & Fruiting: September-November.
Distribution: India. Common along margins of evergreen forests. *RNMK 2800*, Chanthanathodu.

Phyllocephalum scabridum (DC.) Kirkman, Rhodora 83: 10. 1981; Ansari, Fl. Kasaragod Div. 213. 1985; Uniyal in Hajra *et al.*, Fl. India 13: 344.1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 252. 1996. *Decaneurum scabridum* DC. in Wight, Contrib. 7. 1834. *Decaneurum courtallense* Wight, Ic. t. 1081. 1846. *Centratherum molle* (DC.) Benth. in Benth. & Hook. f., Gen. Pl. 2: 225. 1873; Hook. f., Fl. Brit. India 3: 227. 1881; Gamble, Fl. Pres. Madras 666(469). 1921; Vajr., Fl. Palghat Dist. 250. 1990. *Centratherum courtallense* (Wight) Benth. ex Hook. f., Fl. Brit. India 3: 227. 1881; Gamble, Fl. Pres. Madras 666'(469). 1921. *Decaneurum molle* DC., Prodr. 5: 67. 1836. *Phyllocephalum courtallense* (Wight) Narayana, Curr. Sci. 51: 438. 1982; Sasidh. & Sivar., Fl. Pl. Thrissur For. 252. 1996; Mohanan & Sivad., Fl. Agasthyamala 383. 2002.

Fleshy herbs, up to 1 m high. Leaves 13-15 x 6-6.5 cm, elliptic, acuminate at both ends, thinly scabrid above, deeply serrate; nerves 11-12 pairs, nervules reticulate. Peduncles ca. 1.5 cm long, tomentose. Heads 1-1.3 x 0.9-1 cm, few; outer bracts white-tomentose, ciliate along the margins; flowers 12-15; corolla ca. 8 mm long, tube broadening up; lobes oblong, glabrous. Achenes 12-ribbed, glabrous; pappus few.

Flowering & Fruiting: July-December.

Distribution: Endemic to Western Ghats. Occasional; in grasslands. *RNMK 1449,* Sugandhagiri; *RNMK 2409*, Aranamala.

SIGESBECKIA Linnaeus

Sp. Pl. 900. 1753.

Sigesbeckia orientalis L., Sp. Pl. 900. 1753; Hook. f., Fl. Brit. India 3: 304. 1881; Gamble, Fl. Pres. Madras 704(495). 1921; Manilal, Fl. Silent Valley 158. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 254. 1988; Vajr., Fl. Palghat Dist. 254. 1990; Chowdhery in Hajra *et al.*, Fl. India 12: 407. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 253. 1996.

Erect subshrubs; stem scabrous and viscid. Leaves 7-15 x 3-10 cm, ovate, acute at apex, cuneate and decurrent at base, pubescent, dentate along the margins; petiole 1-5 cm long. Heads 7-8 x 3-4 mm, solitary, terminal, on slender, densely hairy peduncles; bracts biseriate, outer bracts spathulate, viscid hairy; inner ovate, short; flowers: outer row ligulate, female, inner rows bisexual, tubular; limb of ligulate corolla 2-3 mm long, 3-lobed, yellow; disc florets ca. 2 mm long. Achenes curved, truncate at apex, 4-angled; black; pappus absent.

Flowering & Fruiting: April-December.

Distribution: Throughout tropics. Occasional; in moist deciduous forests. *RNMK 1150*, Begur.

SONCHUS Linnaeus

Sp. Pl. 793. 1753.

Sonchus oleraceus L., Sp. Pl. 794. 1753; Hook. f., Fl. Brit. India 3: 414. 1881; Gamble, Fl. Pres. Madras 732(514). 1921; Vajr., Fl. Palghat Dist. 255. 1990; Hajra in Hajra *et al.*, Fl. India 12: 321. 1995. *Sonchus ciliatus* Lamk., Fl. Franc. 287. 1805.

Annuals, 80-90 cm high; stems glandular hairy. Leaves 13-15 x 5-6 cm, runcinate-pinnatifid, with a wide hastate terminal lobe, auricled and amplexicaule at base; lobes spinulose-serrate. Heads ca. 1.5 x 0.8 cm, few, in panicled cymes; bracts 3-seriate; female corolla ca. 1.2 cm long, limb yellow, 5-lobed; lobes obtuse. Achenes narrowed to the base, truncate at apex, muriculate; pappus white, cottony.

Flowering & Fruiting: March-November.

Distribution: Cosmopolitan. Occasional; in grasslands. *RNMK 2408*, Sugandhagiri.

SPHAERANTHUS Linnaeus

Sp. Pl. 927. 1753.

Sphaeranthus indicus L., Sp. Pl. 927. 1753; Hook. f., Fl. Brit. India 3: 275. 1881, pp.; Gamble, Fl. Pres. Madras 692(487). 1921; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 68. 1988; Manilal & Sivar., Fl. Calicut 151. 1982; Ansari, Fl. Kasaragod Div. 215. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 254. 1988; Vajr., Fl. Palghat Dist. 255. 1990; Kumar in Hajra *et al.*, Fl. India 13: 160. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 253. 1996; Sivar. & P. Mathew, Fl. Nilambur 377. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 287. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 389. 2009. *Sphaeranthus hirtus* Willd., Sp. Pl. 3: 2395. 1802. *Adaca-manjen* Rheede, Hort. Malab. 10:85-96, t. 43. 1690.

Diffuse aromatic herbs; stems with toothed wings. Leaves alternate, 3-4 x 1-2 cm, oblanceolate, obtuse at apex, decurrent to stem at base, spinulose serrate, hispid. Heads in globose spikes, numerous, densely packed; spikes to 1 cm across, peduncles winged; bracts 2-types, basal bracts of the spike ovate, obtuse; bracts of each head lanceolate, ciliate; flowers two types, few; outer female, inner bisexual, all tubular; corolla 5-lobed, pink; lobes acute; anthers tailed at base. Achenes angular, glabrous; pappus absent.

Flowering & Fruiting: January-April.

Distribution: Indo-Malesia, Australia and Africa. Common; in paddy fields and areca plantations. *RNMK 1159,* Kottathara.

SPILANTHES N. J. Jacquin

Enum. Pl. Carib. 8: 28. 1760.

Erect or procumbent herbs; stems terete. Leaves opposite, ovate, acute at base and apex. Heads conical, solitary or 2-3 together, axillary, on long peduncles, receptacle spicate, paleate; bracts 2-seriate, similar; flowers similar, bisexual, or dissimilar with outer female flowers and inner bisexual flowers; corolla ligulate or tubular, 3-5 lobed; anthers sagittate at base, stigmatic lobes truncate. Achene compressed or 3-angled, obovate, truncate.

1. Achene ciliate; pappus present..... 2
1. Achene not ciliate; pappus absent ..... **S. calva**
2. Heads white ..... **S. radicans**
2. Heads yellow or reddish-brown..... **S. paniculata**

Spilanthes calva DC. in Wight, Contrib. 19. 1834; Sivar. & Remesan, J. Econ. Tax. Bot. 10: 143. 1987; Manilal, Fl. Silent Valley 158. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 255. 1988; Vajr., Fl. Palghat Dist. 256. 1990; Chowdhery in Hajra *et al.*, Fl. India 12: 409. 1995; Sivar. & P. Mathew, Fl. Nilambur 378. 1997; Mohanan & Sivad., Fl. Agasthyamala 388. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 287. 2005. *Spilanthes acmella* var. *calva* (DC.) Clarke, Comp. Ind. 138. 1876. *Spilanthes acmella* sensu

Hook. f., Fl. Brit. India 3: 307. 1881, non (L.) Murr. 1844; Gamble, Fl. Pres. Madras 708(498. 1921.

Diffuse herbs, rooting at lower nodes, stem sparsely pubescent. Leaves ovate, acute, base truncate, serrate, sparsely hispid on both sides, 4-5 x 2.5-3 cm. Heads terminal, peduncle 8-10 cm long; corolla yellow. Achenes narrowly obovate.

Flowering & Fruiting: February-April.

Distribution: Indo-Malesia and China. Common; along roadsides and open areas. *RNMK 1899*, Kalpetta.

Spilanthes paniculata Wall. ex DC., Prodr. 5: 625. 1836; Manilal & Sivar., Fl. Calicut 153. 1982; Ansari, Fl. Kasaragod Div. 215. 1985; Sivar. & Remesan, J. Econ. Tax. Bot. 10: 143. 1987; Manilal, Fl. Silent Valley 158. 1988; Chowdhery in Hajra *et al.*, Fl. India 12: 410. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 254. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 288. 2005. *Spilanthes acmella* var. *paniculata* (DC.) Clarke, Comp. Ind. 139. 1876; Hook. f., Fl. Brit. India 3: 307. 1881.

Procumbent herbs, stems scabrid. Leaves 3-4 x 2-2.5 cm, ovate, acute, scabrous above and below; petiole ca. 1 cm long. Heads ca. 1 x 0.7 cm, solitary, conical; peduncles 8-10 cm long, bracts glandular; receptacle spicate, paleaceous; flowers similar; corolla tubular, 2.5-3 mm long, campanulate above; lobes glabrous; anthers black. Achenes dark brown, glandular.

Flowering & Fruiting: July-October.

Distribution: Indo-Malesia, America and New Guinea. Common; in wet areas in plantations. *RNMK 1113*, Puthoorvayal.

Spilanthes radicans Jacq., Collect. Bot. Chen. Hist. Nat. 11: 1714. 1804; Sivar. & Matthew, Anci. Sci. of Life 3: 169. 1984; Sivar. & Remesan, J. Econ. Tax. Bot. 10: 144. 1987; Manilal, Fl. Silent Valley 158. 1988; Chowdhery in Hajra *et al.*, Fl. India 12: 412. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 254. 1996; Sivar. & P. Mathew, Fl. Nilambur 379. 1997; Mohanan & Sivad., Fl. Agasthyamala 388. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 288. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 390. 2009.

Erect herbs, 30-70 cm high; stem glabrous. Leaves 6-7 x 3-4 cm, ovate, acute, crenulate along the margins, glabrous; petiole 1-2 cm long. Heads 7-12 x 6-8 mm, solitary or 2-3 together; peduncles 3-5 cm long, puberulus; bracts glabrous; flowers similar; corolla ca. 2 mm long, 3-lobed. Achenes 2 types, marginal ones 3-angled, central achenes laterally compressed, obovate, truncate, ciliate along the edges, cilia longer towards the apex.

Flowering & Fruiting: October-March.

Distribution: Native of Tropical America. Common; along roadsides and open areas. *RNMK 2165*, Kalpetta.

SYNEDRELLA J. Gaertner

Fruct. 2: 456. 1791, *nom. cons*.

Synedrella nodiflora (L.) Gaertn., Fruct. 2: 456. t. 171. 1791; Hook. f., Fl. Brit. India 3: 308. 1881; Gamble, Fl. Pres. Madras 708(498). 1921; Manilal & Sivar., Fl. Calicut 152. 1982; Ansari, Fl. Kasaragod Div. 216. 1985; Manilal, Fl. Silent Valley 159. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 255. 1988; Vajr., Fl. Palghat Dist. 256. 1990; Chowdhery in Hajra *et al.*, Fl. India 12: 413. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 254. 1996; Sivar. & P. Mathew, Fl. Nilambur 379. 1997; Mohanan & Sivad., Fl. Agasthyamala 389. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 289. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 392. 2009. *Verbesina nodiflora* L., Cent. Pl. 1: 28. 1755 & Ameon. Acad. 4: 290. 1759.

Subshrubs. Leaves opposite, 7-8 x 4.5-5 cm, ovate, acute, membranous, serrulate; nerves 2-pairs; petiole 1-3 cm long. Heads 1-3 together, axillary, sessile; bracts biseriate, lanceolate, acute, hyaline, coriaceous; flowers yellow, dissimilar; female flowers few, peripheral, ligulate; corolla yellow, limb 4-lobed at apex; bisexual flowers central, few; corolla 4-5 mm long, tube narrow, lobes 5, oblong; anthers linear, sagittate at base. Achenes compressed, shortly winged; of bisexual florets trigonous.

Flowering & Fruiting: Throughout the year.

Distribution: Native of West Indies; naturalised in India, China, Malesia and Polynesia. Common; along roadsides and moist areas in plantations. *RNMK 2716*, Meppady.

TITHONIA Desfontaines ex A. L. Jussieu

Gen. 189. 1789.

Tithonia diversifolia (Hemsl.) A. Gray, Proc. Amer. Acad. Sci. 19: 5. 1883; Subram., Indian For. 96: 528. 1970; Manilal & Sivar., Fl. Calicut 154. 1982; Chowdhery in Hajra *et al.*, Fl. India 12: 416. 1995; Sivar. & P. Mathew, Fl. Nilambur 380. 1997; Mohanan & Sivad., Fl. Agasthyamala 390. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 393. 2009. *Mirasolia diversifolia* Hemsl., Biol. Contrib. Amer. 2: 168. t. 47. 1881.

Large shrubs, 2-3 m high; stems striate, glabrous. Leaves alternate, 10-25 cm long, 3-5 lobed; lobes acute to acuminate, crenulate, decurrent at base, tomentose below. Heads 8-12 cm across, solitary, axillary, on long hollow peduncle; bracts 4-seriate, outer smaller, obtuse, puberulus; flowers 2-types; outer female, ligulate; limb 3-5 x 1-1.5 cm, oblong, entire or 2-toothed, yellow; inner flowers tubular, bisexual; corolla 0.8-1 cm long, 5-lobed, yellow; anthers erect, base obtuse, black. Achenes dark brown, hairy; pappus of two bristles.

Flowering & Fruiting: September-May.

Distribution: Cosmopolitan. Common; in exposed hiils. *RNMK 1713,* Meppady.

TRICHOLEPIS DC.

in Guill. Arch. Bot. 2: 515. 1833.

Tricholepis amplexicaulis Clarke, Comp. Ind. 240.1876; Hook. f., Fl. Brit. India 3:381.1881; Gamble, Fl. Pres. Madras 727(511). 1921; Ansari, Fl. Kasaragod Div. 216. 1985; Hajra in Hajra *et al.*, Fl. India 12:220. 1995; H.J. Chaudhary & Pandey, Rheedea 11:4.2001.

Tall erect leafy herbs, reaching about 1.5 m in height; stems ribbed and sometimes scaberulous. Leaves 10-13 x 4-5 cm, oblong, semi-amplexicaule and auricled at base, shortly sharply serrate. Flowers purple in many heads. Achenes obovoid.

Flowering & Fruiting: October-February.

Distribution: Endemic to Western Ghats. Occasional; in margins of evergreen forests. *RNMK 2437,* Banasuramala.

TRIDAX Linnaeus

Sp. Pl. 900. 1753.

Tridax procumbens L., Sp. Pl. 900. 1753; Hook. f., Fl. Brit. India 3: 311. 1881; Gamble, Fl. Pres. Madras 711(500). 1921; Manilal & Sivar., Fl. Calicut 154. 1982; Ansari, Fl. Kasaragod Div. 217. 1985; Manilal, Fl. Silent Valley 160. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 255. 1988; Vajr., Fl. Palghat Dist. 256. 1990; Chowdhery in Hajra *et al.*, Fl. India 12: 418. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 255. 1996; Sivar. & P. Mathew, Fl. Nilambur 381. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 289. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 393. 2009.

Procumbent herbs; stems terete, hispid. Leaves 3-6 x 1.5-3 cm, ovate, acute, serrate, bulbous-based hairy; petiole 5-9 mm long. Heads ca. 1.3 x 1.5 cm, solitary, on long peduncles; bracts in 3-series, lanceolate, hairy; outer row of flowers ligulate, female, limb 3-toothed, white; inner flowers bisexual, tubular; corolla 6-7 mm long, 5-lobed at apex, yellow; anthers sagittate at base. Achenes densely hairy; pappus many.

Flowering & Fruiting: Throughout the year.

Distribution: Native of tropical America; now widespread throughout tropics and subtropics. Occasional; along roadsides. *RNMK 2215*, Vythiri.

VERNONIA Schreber

Gen. 2: 541. 1791, *nom. cons.*

Trees, shrubs or herbs. Leaves alternate, elliptic, acute to acuminate at apex, entire or serrate, petiolate. Heads many, in lax corymbose panicle, terminal, peduncled with discflorets only; involucral bracts 2-many-seriate, oblong-lanceolate; receptacle glabrous or hairy; corolla tubular, equally 5-lobed, pink; stamens 5, filaments free, anthers combined into a tube, sagittate at base; stigmas 2, linear, puberulus. Achenes cylindric, ribbed or smooth; pappus 2-seriate; outer paleaceous, fimbriate; inner slender, setaceous.

1. Trees ..... **V.arborea**
1. Herbs or shrubs..... 2
2. Achenes glabrous..... 3
2. Achenes silky pubescent 5
3. Leaves white tomentose beneath ..... **V. indica**
3. Leaves green beneath, scabrid..... 4
4. Heads 5-flowered..... **V. divergens**
4. Heads more than 5-flowered..... **V. bourneana**
5. Outer involucral bracts foliaceaous..... ..... **V. anthelmintica**
5. Outer involucral bracts not foliaceous 6
6. Pappus hairs reddish ..... **V. ornata**
6. Pappus hairs white or straw coloured.....7
7. Stem and leaves densely white tomentose ..... **V. albicans**
7. Stem and leaves glabrous or pubescent..... 8
8. Leaves undulately toothed; outer pappus hairs long..... **P. cinerea**
8. Leaves sharply serrate; outer pappus hairs very short..... **P. conyzoides**

Vernonia albicans DC. in Wight, Contrib. 6. 1834; Gamble, Fl. Pres. Madras 676(475). 1921; Uniyal in Hajra *et al.*, Fl. India 13: 351. 1995. *Vernonia cinerea* sensu Hook. f., Fl. Brit. India 3: 233. 1881, p. p. non Less. 1829.

Stout under shrubs, 1-1.5 m high; stems ribbed, white-wooly. Leaves 4-5 x 3-4 cm, broadly ovate, rounded or cordate at base, crenate; petiole 1-1.5 cm long. Heads 11-12 x 6.5-7 mm, in large terminal panicle, peduncled; bracts elliptic, acute, tomentose outside; corolla 5-6 mm long, 5-toothed at apex, glabrous. Achenes densely adpressed hairy; outer pappus paleaceous, fimbriate; inner pappus ca. 4 mm long, white, setaceous.

Flowering & Fruiting: July-October.

Distribution: Western Ghats. Common; in moist deciduous forests. *RNMK 2154,* Muthanga.

Vernonia anthelmintica (L.) Willd., Sp. Pl. 3: 1634. 1803; Hook. f., Fl. Brit. India 3: 236. 1881; Ansari, Fl. Kasaragod Div. 218. 1985; Manilal, Fl. Silent Valley 160. 1988; Uniyal in Hajra *et al.*, Fl. India 13: 357.1995. *Conyza anthelmintica* L., Sp. Pl. (ed. 2) 1207. 1763. *Centratherum anthelminticum* (L.) O. Ktze., Rev. Gen. Pl. 1: 320. 1891; Gamble, Fl. Pres. Madras 667(469). 1921; V. S. Ramach. & V.J. Nair, Fl. Cannanore 246. 1988; Vajr., Fl. Palghat Dist. 250. 1990.

Stout herbs, 1-1.5 m high; stems scabrid. Leaves 12-13 x 4-5 cm, elliptic, acute at apex and base, scabrous; sharply serrate; nerves 10-11 pairs; petiole 1-2 cm long. Heads 1.3-1.5 x 1-1.2 cm, in lax corymbose panicles; bracts leafy, oblong, obtuse; inner bracts smaller; flowers 30-40; corolla ca. 1 cm long, with a narrow basal part, widen above, lobes acute, glabrous. Achenes glandular between ribs, pubescent; outer pappus paleacous, fimbriate, inner pappus reddish.

Flowering & Fruiting: September-March.
Distribution: Indo-Malesia. Occasional; in moist deciduous forests. *RNMK 3060,* Begur.

Vernonia arborea Buch.-Ham., Trans. Linn. Soc. London 14: 218. 1824; Hook. f., Fl. Brit. India 3: 239. 1881; V. S. Ramach. & V.J. Nair, Fl. Cannanore 256. 1988; Manilal, Fl. Silent Valley 160. 1988; Vajr., Fl. Palghat Dist. 257. 1990; Uniyal in Hajra *et al.*, Fl. India 13: 359. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 255. 1996; Sivar. & P. Mathew, Fl. Nilambur 381. 1997; Mohanan & Sivad., Fl. Agasthyamala 391. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 290. 2005. *Monosis wightiana* DC. in Wight, Contrib. 1. 1834 & Ic. t. 1085. 1846. *Vernonia monosis* Benth. ex Clarke, Comp. Ind. 24. 1876p.p., non Sch.-Bip. 1847; Gamble, Fl. Pres. Madras 672(473). 1921. *Vernonia arborea* Buch.-Ham. var. *wightiana* (DC.) Hook. f., Fl. Brit. India 3: 239. 1881. **Plate 22j.**

Trees, up to 10 m high; bark dark brown, narrowly vertically fissured; branchlets densely brown silky hairy. Leaves 15-17 x 7-10 cm, obovate, abruptly acuminate, densely pubescent, nerves 10-12 pairs, regular, prominent; petioles 1-2 cm long, stout. Panicle 20-25 x 18-20 cm, terminal, densely pubescent; heads many; bracts similar, inner bracts acute, pubescent; flower solitary; corolla 7-9 mm long, glabrous; lobes acute. Achenes 10-ribbed, hairy between the ribs; pappus similar, bent at base, white.
Flowering & Fruiting: September-March.
Distribution: Indo-Malesia. Common; in evergreen forests. *RNMK 2663,* Vaduvanchal; *RNMK 2874*, Kurichiarmala.

Vernonia bourneana W. W. Smith, Rec. Bot. Surv. Ind. 6: 101. 1914; Gamble, Fl. Pres. Madras 675(475). 1921; Uniyal in Hajra *et al.*, Fl. India 13: 364. 1995.

Large shrubs, branchlets and branches tomentose. Leaves 8-9 x 3.5-4 cm, elliptic or obovate, obtuse or acute, mucronate, puberulus above and brownish-tomentose below, entire or subentire; petiole 1-1.5 cm long. Panicles densely tomentose; phyllaries multiseriate, inner ca. 4 x 2 mm, ovate, acuminate, pubescent outside; outer ca. 2 mm, linear, pubescent. Achenes 4-angled, black, glandular; pappus 2-seriate, outer fimbriate, less than 1 mm, inner ca. 5 mm, feathery.
Flowering & Fruiting: January-May.
Distribution: Endemic to southern Western Ghats. Rare; in shola forests. *RNMK 2874*, Bansuramala.

Vernonia cinerea (L.) Less., Linnaea 4: 291. 1829; Hook. f., Fl. Brit. India 3: 233. 1881; Gamble, Fl. Pres. Madras 676(475). 1921; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 69. 1988; Manilal & Sivar., Fl. Calicut 149.

1982; Ansari, Fl. Kasaragod Div. 218. 1985; Vajr., Fl. Palghat Dist. 257. 1990; Uniyal in Hajra *et al.*, Fl. India 13: 367. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 256. 1996; Sivar. & P. Mathew, Fl. Nilambur 382. 1997; Mohanan & Sivad., Fl. Agasthyamala 392. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 290. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 394. 2009. *Conyza cinerea* L., Sp. Pl. 862. 1753.

Annuals or perennial herbs; stems ribbed, smooth or puberulus. Leaves variable, 2-8 x 1-3 cm, ovate, acute at apex and base, thinly hairy below; petiole 1-2 cm long, slender; heads ca. 5 x 3 mm, in terminal corymbose cymes, peduncled; outer bracts minute, inner oblong, acute, cuspidate, hairy; flowers 5-10, similar; corolla ca. 3 mm long, glabrous. Achenes hairy.

Flowering & Fruiting: Throughout the year.

Distribution: Pantropics. Common; along waysides and moist deciduous forests. *RNMK 3043,* Kalpetta; *RNMK 2507*, Panamaram.

Vernonia conyzoides DC. in Wight, Contrib. 6. 1834; Gamble, Fl. Pres. Madras 676(475). 1921; V. S. Ramach. & V.J. Nair, Fl. Cannanore 256. 1988; Vajr., Fl. Palghat Dist. 258. 1990; Uniyal in Hajra *et al.*, Fl. India 13: 369. 1995; Mohanan & Sivad., Fl. Agasthyamala 393. 2002. *Vernonia cinerea* sensu Hook. f., Fl. Brit. India 3: 233. 1881,p.p., non (L.) Less. 1829.

Subshrubs, pubescent. Leaves 6-8 x 3-4 cm, ovate, apex acuminate, dentate, puberulus above and white tomentose beneath; petiole ca. 2 cm. Panicles axillary and terminal; phyllaries 2-4 seriate, pubescent, lanceolate, sharply acuminate, inner longer, ca. 6 x 1 mm; florets ca. 4 mm, blue; anthers cleft at base, apiculate; ovary pubescent; pappus 2-seriate, outer small, ca. 2.5 mm, inner ca. 5 mm, feathery.

Flowering & Fruiting: September-March.

Distribution: Endemic to southern Western Ghats. Common; in moist deciduous forestsl. *RNMK 2269,* Tholpetty.

Vernonia divergens (Roxb.) Edgew., J. Asiat. Soc. Bengal 21: 172. 1853; Hook. f., Fl. Brit. India 3: 234. 1881; Gamble, Fl. Pres. Madras 673(473). 1921; Manilal, Fl. Silent Valley 161. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 257. 1988; Vajr., Fl. Palghat Dist. 258. 1990; Uniyal in Hajra *et al.*, Fl. India 13: 370. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 256. 1996; Sivar. & P. Mathew, Fl. Nilambur 383. 1997; Mohanan & Sivad., Fl. Agasthyamala 394. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 290. 2005. *Eupatorium divergens* Roxb., Fl. Ind. 3: 414. 1832.

Erect shrubs, 1-2 m high, usually unbranched; stems reddish, grey-tomentose. Leaves 8-10 x 4-5 cm, elliptic, acute at both ends, serrate, scabrous above, pubescent beneath; nerves 6-8 pairs, regular; petiole 1-2 cm long. Heads ca. 6 x 4 mm, globose; bracts oblong, acute, grey tomentose; flowers few, corolla 1-1.2 cm long, glabrous. Achenes glandular; pappus all setaceous, brown.

Flowering & Fruiting: November-March.
Distribution: Indo-Malesia. Common in semi-evergreen forests. *RNMK 2663,* Karuvanthodu.

Vernonia indica Clarke, Comp. Ind. 16. 1876; Hook. f., Fl. Brit. India 3: 238. 1881; Gamble, Fl. Pres. Madras 674(474). 1921; V. S. Ramach. & V.J. Nair, Fl. Cannanore 257. 1988; Uniyal in Hajra *et al.*, Fl. India 13: 372. 1995; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 291. 2005.

Shrubs, 1-2 m high, usually not branching; stems white-wooly. Leaves 10-12 x 4-5 cm, elliptic, acute at base and apex, serrate, glabrous above, densely white-tomentose below; nerves 6-8 pairs, raised below, reticulate. Heads many, ca. 8 x 5 mm, globose, in panicled cymes; bracts unequal, oblong, obtuse, cottony-hairy; flowers 5-10; corolla 6-7 mm long, pink, glabrous. Achenes strongly ribbed, glandular; pappus outer setaceous or absent; inner, yellow.
Flowering & Fruiting: October-December.
Distribution: Endemic to Western Ghats. Occasional in evergreen forests. *RNMK 3063,* Niravilpuzha.

Vernonia ornata Talbot, J. Bombay Nat. Hist. Soc. 11: 691. Pl. 13. 1898; Uniyal in Hajra *et al.*, Fl. India 13: 376. 1995. *Vernonia dalzelliana* Drumm. & Hutch., Bull. Misc. Inform. Kew 1909: 261. 1909; Gamble, Fl. Pres. Madras 674(474). 1921; V. S. Ramach. & V.J. Nair, Fl. Cannanore 257. 1988; Manilal, Fl. Silent Valley 161. 1988.

Erect undershrubs, 80-90 cm tall. Leaves 18-22 x 5-7 cm, oblanceolate, acuminate at apex, tapering at base, sparsely hairy. Heads pink, in corymbs. Achenes hairy; pappus pinkish.
Flowering & Fruiting: October-March.
Distribution: Southern Western Ghats. Rare; in evergreen forests. *RNMK 1228*, Palchuram.

WEDELIA N. J. Jacquin
Enum. Pl. Carib. 8, 28. 1760, *nom. cons.*

Wedelia trilobata (L.) A. S. Hitchc., Rep. Missouri Bot. Gard. 4: 99. 1898; Sivar. & Pradeep, Indian J. For. 11: 161. 1988; Chowdhery in Hajra *et al.*, Fl. India 12: 426. 1995; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 397. 2009. *Silphium trilobatum* L., Syst. (ed. 10) 1232. 1759.

Herbs, rooting at nodes; stems glabrous or pubescent near nodal region. Leaves 3-7 cm long, elliptic-obovate, usually with 3 angular lobes with toothed margins, acute at apex, basally cuneate, glabrous to sparingly pubescent. Heads radiate, solitary 2-2.5 cm across; peduncles strigose, 4-15 cm long; ray florets 5-8; corolla bright yellow, tube short; ovary trigonous; stigma bilobed; disc florets many; anthers black, syngenecious. Achenes blackish, warty, crowned by the persistent pappus cup.

Flowering & Fruiting: June-September.
Distribution: Native of tropical America. Common; along roadsides. *RNMK 1797*, Puthoorvayal.

XANTHIUM Linnaeus
Sp. Pl. 987. 1753.

Xanthium indicum Koenig in Roxb., Fl. Ind. 3: 601. 1832; Ansari, Fl. Kasaragod Div. 218. 1985; Chowdhery in Hajra *et al.*, Fl. India 12: 427. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 256. 1996; Sivar. & P. Mathew, Fl. Nilambur 385. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta. 292. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 398. 2009. *Xanthium strumarium* L., Sp. Pl. 987. 1753,p.p; Hook. f., Fl. Brit. India 3:303. 1881; Gamble, Fl. Pres. Madras 703(494). 1921; Manilal & Sivar., Fl. Calicut 154. 1982; Vajr., Fl. Palghat Dist. 259. 1990.

Stiff erect herbs; stem terete, scabrid. Leaves 8-15 x 9-10 cm, broadly ovate, shallowly lobed, cordate at base, 3-veined from the base, scabrous; petiole 8-10 cm long. Heads axillary; bisexual heads in upper axils and sterile female heads in lower axils; bracts few, free in bisexual heads, united into a two horned utricle in female heads, covered with hooks; corolla absent in female flowers, tubular in bisexual flowers; anthers free, filaments connate; bases obtuse. Achenes paired on each head, enclosed in a 2-beaked utricle; pappus absent.
Flowering & Fruiting: March-December.
Distribution: Indo-Malesia. Occasional; along roadsides. *RNMK 1449*, Kottavayal; *RNMK 1984*, Kalloor.

COMPANULACEAE Juss.
Gen. Pl. 163. 1789.

1. Corolla zygomorphic; stigma bifid ..... **Lobelia**
1. Corolla actinomorphic; stigma trifid ..... **Wahlenbergia**

LOBELIA Linnaeus
Sp. Pl. 929. 1753.

Annual or perennial herbs or shrubs, stem weak. Leaves alternate, simple, toothed along the margins. Flowers axillary, solitary or in terminal stout racemes; bracts lanceolate, leafy; calyx 5-partite, persistent; corolla 2-liped, upper lip 2-partite, lower lip 3-lobed, middle lobe broader; stamens 5; anthers oblong, connate into a cylindrical tube; filaments less united; ovary 2-celled, inferior; ovules many on hemispherical axile placentation; style long, curved. Fruit a capsule, dehiscent loculicidally; seeds compressed or trigonous.

1. Tall erect herbs; stem terete ..... **L. nicotianifolia**
1. Small decumbent herbs; stem angled or winged..... **L. alsinoides**

Lobelia alsinoides Lamk., Encycl. 3: 588. 1792; Manilal & Sivar., Fl. Calicut 155. 1982; Haridasan & Mukh., Fasc. Fl. Ind. 19: 42. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 259. 1988; Vajr., Fl. Palghat Dist. 260. 1990; Joseph, Aquatic Angiosp. Malabar 98. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 257. 1996; Sivar. & P. Mathew, Fl. Nilambur 385. 1997; Mohanan & Sivad., Fl. Agasthyamala 399. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 292. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 398. 2009. *Lobelia trigona* Roxb., Fl. Ind. 2: 111. 1824; Wight, Ic. t. 1178. 1848; Clarke in Hook. f., Fl. Brit. India 3: 423. 1881; Gamble, Fl. Pres. Madras 736(518). 1921.

Decumbent herbs, rooting from lower nodes; stems 3-winged. Leaves 1-2 x 1-1.5 cm, ovate-orbicular, crenate, obtuse, petiolate; petiole ca. 3 mm broad; upper leaves sessile, elliptic, acute, smaller. Flowers in terminal raceme; pedicels ca. 3 cm long, filiform; sepals ca. 5 mm long, lanceolate; corolla blue, ca. 1 cm long, upper 3 lobes obovate, lower 2 lobes narrower; all anthers hairy at apex. Capsule ca. 6 mm long, glabrous; seeds trigonous, brown.
Flowering & Fruiting: August-December.
Distribution: Indo-Malesia. Occasional; in grasslands. *RNMK 2286,* Manikkunnumala.

Lobelia nicotianifolia Roth ex Roem. & Schult., Syst. Veg. 5: 47. 1819; Roxb., Fl. Ind. 110. 1824; Wight, Ic. 2:111, 135. 1850; Clarke in Hook. f., Fl. Brit. India 3: 427. 1881; Gamble, Fl. Pres. Madras 736(518). 1921; Haridasan & Mukh., Fasc. Fl. Ind. 19: 53. 1988; Manilal, Fl. Silent Valley 163. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 260. 1988; Vajr., Fl. Palghat Dist. 260. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 258. 1996; Sivar. & P. Mathew, Fl. Nilambur 386. 1997; Mohanan & Sivad., Fl. Agasthyamala 400. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 293. 2005.

Succulent biennial shrubs, to 2 m high; old stems covered with persistent prominent leaf scars. Leaves 12-38 x 3-7 cm, narrowly elliptic, acute at both ends, serrulate, pubescent below, upper ones sessile, smaller. Racemes 10-25 cm long, panicled; flowers many, lax; bracts ca. 2 cm long, lanceolate; sepals ca. 1.2 cm long, elliptic, serrulate, scabrid; corolla ca. 3 cm long, ventral lobe ovate, lateral lobes linear, white, minutely tomentose; staminal sheath tubular; anthers ca. 6 mm long, pubescent, black, dorsal two anthers bearded at apex. Capsule ca. 9 mm across, globose; seeds ovoid.
Flowering & Fruiting: October-March.
Distribution: Indo-Malesia. Common; in grasslands and along roadside cuttings. *RNMK 2340,* Kurichiarmala; *RNMK 2966*, Chembra.

WAHLENBERGIA H. A. Schrader ex A. W. Roth
Novae Pl. Sp. 399. 1821 *nom. cons.*

Wahlenbergia marginata (Thunb.) A. DC., Monogr. Campan. 143. 1830; Sivar. & P. Mathew, Fl. Nilambur 387. 1997. *Campanula marginata* Thunb.,

Fl. Jap. 89. 1784. *Wahlenbergia gracilis* (G. Forst.) Schrad. ex A.DC., Monogr. Campan. 142. 1830; Clarke in Hook. f., Fl. Brit. India 3: 429. 1881; Gamble, Fl. Pres. Madras 738(519). 1921. *Campanula gracilis* G. Forst., Insul. Austr. Prodr. 84. 1786. *Wahlenbergia agrestis* A.DC., Monogr. Campan. 145. 1830.

Small herbs, hirsute. Leaves 1-2 x 0.3-0.5 cm, oblong, lanceolate, apex obtuse, margin thickened, recurved, hirsute especially on the nerves beneath, sessile. Flowers solitary, terminal, blue; pedicels to 9 cm; calyx lobes ca. 3 mm, lanceolate; corolla deeply 5-lobed, ca. 8 x 3 mm, oblong; ovary ca. 3 mm, 2-3 valved; stigma pubescent. Capsule loculicidal; seeds many.

Flowering & Fruiting: December-March.

Distribution: Africa, Asia, Australia and New Zealand. Rare; in grasslands. *RNMK 1801,* Manikkunnumala.

PLUMBAGINACEAE Juss.

Gen. Pl. 92. 1789.

PLUMBAGO Linnaeus

Sp. Pl. 151. 1753.

Plumbago zeylanica L., Sp. Pl. 151. 1753; Hook. f., Fl. Brit. India 3: 480. 1882; Gamble, Fl. Pres. Madras 744(524). 1921; Manilal & Sivar., Fl. Calicut 156. 1982; Ansari, Fl. Kasaragod Div. 219. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 260. 1988; Vajr., Fl. Palghat Dist. 262. 1990; Sivar. & P. Mathew, Fl. Nilambur 389. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 400. 2009.

Subscandent subshrubs; stems striate. Leaves alternate, ca. 6 x 4 cm, ovate, acute at apex, cuneate at base; petiole 1-2 cm long, sheathing at base. Flowers white, in terminal racemes; bracts broadly ovate, bracteoles smaller; calyx ca. 11 mm long, tubular, 5-ribbed, lobes small, obtuse, glandular hairy; corolla tube ca. 2.5 cm long, slender, lobes 5, obovate, spreading; stamens 5, included, filaments adnate at the base of corolla tube; ovary 1-celled, ellipsoid; ovules solitary, pendulous, style 1, 5-fid at apex. Fruit a capsule, ca. 2 mm long, circumscissile at base, glandular hairy.

Flowering & Fruiting: November-March.

Distribution: Pantropical. Occasional; in moist deciduous forests. *RNMK 2804,* Pulpally.

Plumbago indica L., is a pretty species frequently found in cultivation, with bright red flowers and larger leaves.

MYRSINACEAE R. Br.

Prodr. 532. 1810.

1. Climbing or scandent shrubs ..... **Embelia**
1. Erect shrubs or small trees 2

2. Flowers in umbels or racemes; corolla pink ..... **Ardesia**
2. Flowers in terminal and axillary short panicles; corolla white ..... **Maesa**

ARDISIA O. Swartz
Prodr. 3, 48. 1788. *nom. cons.*

Shrubs or small trees. Leaves alternate, membranous, gland-dotted, entire or crenate. Flowers bisexual, in axillary or terminal umbels or racemes, peduncled; sepals 5, free; corolla 4, 5 or 6-lobed, rotate, lobes twisted, tube short, broad; stamens 4, 5 or 6, antipetalous, filaments short, anthers sagittate; ovary 1-celled; ovules many, immersed in fleshy placenta; style erect, cylindric, stigma terminal. Fruit a berry, globose, seeds few, globose.

1. Calyx -lobes small, not overlapping to the right 2
1. Calyx-lobes large and broad, clearly overlapping to the right ..... **A. solanacea**
2. Leaves entire; nerves not prominent ..... **A. pauciflora**
2. Leaves crenate-serrate; prominently nerved..... 3
3. Leaves prominently dotted with glands; panicles short, compact ....**A. amplexicaulis**
3. Leaves coriaceous; panicles large.....**A. missionis**

Ardisia amplexicaulis Bedd., Ic. t. 170. 1868-1874; Clarke in Hook. f., Fl. Brit. India 3: 521. 1882; Gamble, Fl. Pres. Madras 755(531). 1921. **Fig. 37, Plate 22c.**

Shrubs to 2-3 m tall; Leaves 8-14 x 3-3.5 cm, membranous, gland-dotted, crenulate, oblong lanceolate, acuminate at apex, rounded at base. Flowers in terminal or subterminal panicles, few flowered; peduncles slender; calyx lobes acute; corolla pink; anthers acute. Berries blue, globose.
Flowering & Fruiting: December-May.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1703,* Kurichiarmala.

Ardisia missionis Wall. ex A. DC. in DC., Prodr. 8: 130.1844; Clarke in Hook. f., Fl. Brit. India 3:519.1882; Gamble, Fl. Pres. Madras 756(531). 1921; Ramach. *et al.*, J. Econ. Tax. Bot. 1: 93. 1980; V. S. Ramach. & V.J. Nair, Fl. Cannanore 261. 1988. *Ardisia courtallensis* Wight, Ic. t. 1215. 1848.

Small trees up to 3.5 m tall. Leaves ca. 19 x 8.5 cm, obovate to lanceolate, acute at apex, auricled at base, whorled at the base of the panicle. Flowers in terminal or subterminal large panicles, white, ca. 1.5 cm across. Berries ca. 0.6 cm across, red, globose, glabrous.
Flowering & Fruiting: March-August.
Distribution: South India and Sri Lanka. Occasional; in evergreen forests. *RNMK 3306,* Kunchome.

Ardisia pauciflora Heyne ex Roxb., Fl. Ind. 2: 279. 1824; Wt., Ic. t. 1214. 1848; Clarke in Hook. f., Fl. Brit. India 3: 529. 1882; Gamble, Fl. Pres.

Madras 755(531). 1928; Manilal, Fl. Silent Valley 166. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 261. 1988; Vajr., Fl. Palghat Dist. 263. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 259. 1996; Sivar. & P. Mathew, Fl. Nilambur 390. 1997; Mohanan & Sivad., Fl. Agasthyamala 404. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 294. 2005. **Plate 22d.**

Shrubs, branchlets radiate, densely punctuate with red glands. Leaves 10-13 x 3-3.5 cm long, elliptic, acuminate at both ends, densely punctuate with black glands below; nerves indistinct; petiole ca. 5 mm long. Racemes umbellate, axillary; peduncles ca. 1.5 cm long; flowers few-together; pedicels short; sepals ovate, acute, hairy, punctate; corolla lobes ca. 2.5 mm long, ovate, acute, reddish brown, glabrous; anthers apiculate. Berry ca. 6 mm across, globose, black, smooth.

Flowering & Fruiting: February-May.

Distribution: South India and Sri Lanka. Occasional; in evergreen forests. *RNMK 2940,* Brahmagiri.

Ardisia solanacea Roxb., Pl. Corom. t. 27. 1795 & Fl. Ind. 1:580.1832; Gamble, Fl. Pres. Madras 756(531).1921; V. S. Ramach. & V.J. Nair, Fl. Cannanore 262. 1988; Vajr., Fl. Palghat Dist. 263. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 259. 1996; Sivar. & P. Mathew, Fl. Nilambur 390. 1997. *Ardisia humilis* sensu Wight, Ic.t.1212. 1848, non Vahl 1794; Clarke in Hook. f., Fl. Brit. India 3: 529. 1882. **Plate 22e.**

Shrubs to small trees. Leaves 14-18 x 4-6 cm, broadly lanceolate or obovate, apex acuminate, base cuneate, coriaceous, punctate, lateral nerves 15-20 pairs, slender; petiole to 1 cm long. Peduncles axillary, to 5 cm long; bracts concave, 1.5-2 mm long, deciduous; calyx lobes broadly ovate, obtuse, ca. 3 mm long; corolla pink, punctate. Berry ca. 8 mm across, globose.

Flowering & Fruiting: March-August.

Distribution: Indo-Malesia and west China. Common; in evergreen and moist deciduous forests. *RNMK 1093,* Tholpetty; *RNMK 1654*, Vaduvanchal.

EMBELIA N. L**.** Burman

Fl. Ind. 62. 1768**.**

Climbers. Leaves alternate, entire, gland-dotted. Flowers bisexual or polygamo-dioecious, in terminal panicles; calyx 4 or 5 lobed, free; corolla tube short or absent, lobes 4 or 5, ovate to lanceolate, imbricate; stamens 4 or 5, antipetalous, filaments inserted at the base of corolla; anthers ovate; ovary 1-celled, globose; ovules few on globose placenta; style conical, stigma terminal. Fruit a 1-seeded berry, globose.

1. leaf margins serrulate; flowers in axillary short racemes ..... **E. tsjeriam-cottam**
1. Leaf margins entire; flowers in large terminal panicles..... 2
2. Leaves chartaceous, with pitted glands; branchlets without lenticels..... **E. ribes**
2. Leaves thickly coriaceous, without pitted glands; branchlets lenticellate ... **E. adnata**

Embelia adnata Bedd. ex Clarke in Hook. f., Fl. Brit. India 3: 514. 1882; Gamble, Fl. Pres. Madras 752(529). 1921; Sasidh. & Sivar., Fl. Pl. Thrissur For. 260. 1996.

Large climbers, branchlets stout, lenticellate, reddish. Leaves 8-11 x 3-4 cm, oblong, subacute at apex, rounded or cordate at base, thickly coriaceous, shining above; lateral nerves indistinct; petiole ca. 5 mm long, stout. Panicles terminal, branches long, puberulus; flowers many, shortly pedicellate; sepals ca. 1 mm long, ovate, pubescent outside; corolla lobes 5, ca. 2 mm long, ovate, densely villous within; anthers with a brown gland at back; ovary globose, glabrous; style conical.

Flowering & Fruiting: August-December.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3232,* Banasuramala.

Embelia ribes Burm. f., Fl. Ind. 62. t.23.1768; Clarke in Hook. f., Fl. Brit. India 3:513.1882; Gamble, Fl. Pres. Madras 752(529). 1921; Manilal, Fl. Silent Valley 166. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 262. 1988; Vajr., Fl. Palghat Dist. 264. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 263. 1996; Sivar. & P. Mathew, Fl. Nilambur 391. 1997; Mohanan & Sivad., Fl. Agasthyamala 408. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 294. 2005. *Embelia glandulifera* Wight, Ic. t. 1207. 1848.

Climbers; branchlets slender, white, without lenticellate. Leaves 7-8.5 x 3–3.5 cm, elliptic, acute at both ends; nerves many, parallel, faint, pitted glands very close to the midrib; petiole ca. 1 cm long. Panicles glabrous, branches long, slender racemose; pedicels ca. 1.5 cm long; flowers white, many; sepals small, triangular, tomentose; petals ca. 2 mm long, ovate, acute, densely tomentose. Berry 2.5-4 mm across, globose.

Flowering & Fruiting: March-August.

Distribution: Indo-Malesia and South China. Occasional; in evergreen forests. *RNMK 2870,* Palchuram; *RNMK 2288*, Thariodu; *RNMK 1709*, Karuvanthodu.

Embelia tsjeriam-cottam (Roem. & Schult.) DC., Trans. Linn. Soc. London 17: 131. 1834; Wight, Ic. t. 1209. 1848; Gamble, Fl. Pres. Madras 753(529). 1921; Sasidh. & Sivar., Fl. Pl. Thrissur For. 263. 1996; Sivar. & P. Mathew, Fl. Nilambur 393. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 488. 2000; Mohanan & Sivad., Fl. Agasthyamala 408. 2002. *Ardisia tsjeriam-cottam* Roem. & Schult., Syst. Veg. 4: 518. 1819. *Embelia villosa* Wall. ex Roxb., Fl. Ind. 2: 289. 1824; Gamble, Fl. Pres. Madras 753(529). 1921. *Embelia robusta* sensu Clarke in Hook.f., Fl. Brit. India 3: 515. 1882, non Roxb. 1832. *Embelia acutipetala* (Lam. ex Hassk.) M.R. & S.M. Almeida, J. Bombay Nat. Hist. Soc. 81: 741. 1984; Vajr., Fl. Palghat Dist. 264. 1990. **Plate 22f.**

Scandent deciduous shrubs, branches short spinescent. Leaves 5-9 x 3-4.5 cm, elliptic, apex acuminate, base acute, margin serrulate, glabrous, lateral nerves and reticulations prominent, impressed above and raised below; petiole

to 1 cm long. Flowers appear along with leaves; racemes glabrous; calyx lobes ovate-acuminate; petals yellow with a thick callous at base inside; anthers with red gland at the back.

Flowering & Fruiting: February-March.

Distribution: India and Myanmar. Common; in Moist deciduous forest. *RNMK 2508,* Muthanga.

MAESA Forsskal

Fl. Aegypt.-Arab. 66. 1775.

Maesa indica (Roxb.) DC., Trans. Linn. Soc. London 17: 134. 1834; Wight, Ic. t. 1206. 1848.Manilal, Fl. Silent Valley 166. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 262. 1988; Vajr., Fl. Palghat Dist. 264. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 263. 1996; Sivar. & P. Mathew, Fl. Nilambur 393. 1997; Mohanan & Sivad., Fl. Agasthyamala 409. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 294. 2005. *Baeobotrys indica* Roxb., Fl. Ind. 2: 230. 1824. *Maesa dubia* (Wall.) DC., Trans. Linn. Soc. London 17: 134. 1834; Clarke in Hook. f., Fl. Brit. India 3: 510. 1882; Gamble, Fl. Pres. Madras 749(527). 1921. *Maesa perrottetiana* A. DC. in DC., Prodr. 8: 80. 1844; Gamble, Fl. Pres. Madras 749(527). 1921. *Maesa indica* (Roxb.) DC. var. *perrottetiana* (A. DC.) Clarke in Hook. f., Fl. Brit. India 3:509. 1882.

Large shrubs; branchlets glandular. Leaves alternate, 10-15 x 4-8 cm, ovate, acute at apex, rounded and cuneate at base, serrate, glandular, membranous, with many glandular lines; nerves 10 pairs, regular; petiole 1.5-3 cm long. Flowers in axillary branched 3-6 cm long racemes; pedicels ca. 2 mm long; bracteoles 2, opposite, inserted, below the calyx; calyx tube adnate to the ovary, lobes 5, orbicular, ca. 0.5 mm long; corolla white, ca. 4 mm across, lobes obovate; stamens 5; anthers orbicular; ovary 1-celled, ovules many, immersed in globose placenta, stigma capitate. Fruit a fleshy berry, ca. 4 mm across; seeds few, angular, black.

Flowering & Fruiting: September-May.

Distribution: Indo-Malesia and Pakistan. Common; in evergreen, semi-evergreen forests and open areas. *RNMK 2250,* Karuvanthodu; *RNMK 2093,* Manikkunnumala.

SAPOTACEAE Juss.

Gen. Pl. 151. 1789.

1. Stamens as many as the number of calyx lobes.....2
1. Stamens twice or more the number of calyx lobes 3
2. Corolla lobes 5 or 6, uniseriate.....**Chrysophyllum**
2. Corolla lobes 18 or 24, 2 or more seriate .....**Mimusops**
3. Calyx lobes 6..... **Palaquium**
3. Calyx lobes 4..... ...4
4. Corolla lobes 4; stamens 8... ....**Isonandra**
4. Corolla lobes 8 or 12; stamens more than 16.....**Madhuca**

CHRYSOPHYLLUM Linnaeus

Sp. Pl. 192. 1753.

Chrysophyllum roxburghii G. Don, Gen. Hist. 4: 33. 1837-1838; Bedd., Fl. Sylv.t. 236. 1873; Clarke in Hook. f., Fl. Brit. India 3: 535. 1882; Gamble, Fl. Pres. Madras 758(533). 1921; Vajr., Fl. Palghat Dist. 265. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 264. 1996; Sivar. & P. Mathew, Fl. Nilambur 394. 1997. *Donella roxburghii* (Don) Pierre ex Lecomte, Fl. Indo-Chine 3: 897. 1930. *Chrysophyllum lanceolatum* (Blume) A. DC. in DC., Prodr. 8: 162. 188, nom. Cassar. 1843. *Nycterisition lanceolatum* Blume, Bijdr. 676. 1826.

Large trees, to 35 m high; branchlets slender, rusty tomentose. Leaves 14-15 x 4.5-5 cm, oblong, abruptly acuminate at base and apex, glabrous, nerves many, closely placed, parallel, forming an intramarginal vein; petiole ca. 5 mm long. Flowers in axillary fascicles; pedicel ca. 5 mm long, slender; sepals ca. 2.5 x 2 mm, ovate, obtuse; corolla white, ca. 3 mm long, lobed to the middle; lobes obtuse, glabrous, white; stamens 5, filaments ca. 1 mm long, anthers acute, sagittate at base; ovary globose, densely hairy; style conical. Berry 4-5 cm across, globose, glabrous.

Flowering & Fruiting: April-November.

Distribution: Tropical Asia. Occasional; in evergreen forests. *RNMK 3249,* Vythiri Ghats.

ISONANDRA Wight

Ic. t. 359. 1840.

Trees with milky latex. Leaves alternate, entire. Flowers bisexual, axillary, fascicled, 3-15-together, sessile or shortly pedicelled; bracts and bracteoles minute; sepals 4 in two series, free; corolla tube campanulate, lobes 4; stamens 8, equal, 1-seriate, attached to the base of corolla; anthers sagittate; ovary densely villous, 4-celled; style stout or slender; stigma terminal. Fruit an ellipsoid berry; seeds 1-4, ellipsoid or oblong.

1. Leaves oblong or oblong-lanceolate, caudate-acuminate, base cuneate . **I. lanceolata**
1. Leaves elliptic, acute, base rounded..... **I**. **perrottetiana**

Isonandra lanceolata Wight, Ic. t. 359. 1840; Clarke in Hook. f., Fl. Brit. India 3: 539. 1882; Gamble, Fl. Pres. Madras 761(535). 1921; Manilal, Fl. Silent Valley 167. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 263. 1988; Vajr., Fl. Palghat Dist. 266. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 264. 1996; Sivar. & P. Mathew, Fl. Nilambur 395. 1997; Mohanan & Sivad., Fl. Agasthyamala 411. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 295. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 407. 2009. *Isonandra wightiana* A. DC. in DC., Prodr. 8: 187. 1844; Clarke in Hook. f., Fl. Brit. India 3: 539. 1882. *Isonandra lanceolata* Wight var. anfractuosa Clarke in Hook.f., Fl. Brit. India 3: 539. 1882; Gamble, Fl. Pres. Madras 761(535). 1921. *Isonandra lanceolata* Wight forma *anfractuosa* (Clarke) Jeuken, Blumea 6: 560. 1952; Vajr., Fl. Palghat Dist. 266. 1990. **Plate 22g.**

Small trees or large shrubs; branchlets slender. Leaves thin, 14-16 x 6-7 cm, abruptly acuminate at apex, cuneate at base, 9-13-nerved, distinct below; petiole ca. 1 cm long. Flowers in axillary fascicles, shortly pedicelled; bracts acute; bracteoles rounded; sepals ca. 1.5 x 1 mm, ovate, acute, tomentose; corolla greenish yellow or dull white, ca. 7 mm long, lobes acute; stamens 8, anthers cuspidate at apex. Berry ca. 1.5 x 1 cm, ellipsoid, smooth, reddish.
Flowering & Fruiting: August-October.
Distribution: Indo-Malayasia. Rare; in evergreen forests. *RNMK 3876,* Kurichiarmala; *RNMK 2177*, Chandanathode.

Isonandra perrottetiana A. DC. in DC., Prodr. 8: 188. 1844; Clarke in Hook. f., Fl. Brit. India 3: 539. 1882; Gamble, Fl. Pres. Madras 761(535). 1921; V. S. Ramach. & V.J. Nair, Fl. Cannanore 263. 1988; Mohanan & Sivad., Fl. Agasthyamala 412. 2002. *Isonandra candolleana* Wight, Ic. t. 1220. 1850; Clarke in Hook. f., Fl. Brit. India 3: 539. 1882; Gamble, Fl. Pres. Madras 761(535). 1921.

Small trees; branchlets slender, lenticellate. Leaves 11-14 x 4-5.5 cm, elliptic, acute, base rounded, margins recurved, 7-9-nerved, nervules faint; petiole 3-5 mm long. Flowers in axillary fascicles, densely packed; pedicels ca. 2 mm long, tomentose; bracts and bracteoles obtuse; sepals ca. 2.5 x 2 mm, obtuse, tomentose; corolla dull white, ca. 4 mm long, lobes obtuse, emarginate; anthers obtuse, black-hairy at tip; ovary densely brown-tomentose. Berry ca. 1.7 x 1 cm, obovoid, cuspidate, glabrous.
Flowering & Fruiting: March-April.
Distribution: Southern Western Ghats. Rare; in evergreen forests. *RNMK 3008,* Chembra.

MADHUCA Hamilton ex J. F. Gmelin
Syst. Nat. 2: 773, 799. 1791.

Trees, latex milky. Leaves usually crowded at the apex of branchlets. Flowers in axillary or extra-axillary fascicles; calyx 4-lobed, outer pair much larger and thicker; corolla 8-12 lobed; stamens 16 or more, in 2 or 3 whorls, anthers lanceolate, connective appendaged, staminodes 0; ovary villous, 6-8 celled. Berry ellipsoid or globose; seeds 1-3, ellipsoid, compressed.

1. Pedicels slender; calyx lobes rusty pubescent.....**M. longifolia** var. **latifolia**
1. Pedicels stout; calyx lobes glabrous.....**M. nerifolia**

Madhuca longifolia (Koen.) Macbr. var. **latifolia** (Roxb.) A. Chev., Rev. Int. Bot. Appl. Agric. Trop. 23: 149. 1943; Vajr., Fl. Palghat Dist. 267. 1990. *Bassia latifolia* Roxb., Pl. Corom. t. 20.1795; Clarke in Hook. f., Fl. Brit. India 3:544.1882; Gamble, Fl. Pres. Madras 763(536). 1921. *Madhuca indica* J. Gmelin, Syst. Nat. 2:799. 1791; Sivar. & P. Mathew, Fl. Nilambur 395. 1997. *Madhuca latifolia* (Roxb.) J.F. Macbr. in Contr. Gray Herb. Harv. Univ. (ns) 53: 17. 1918. **Plate 22h.**

Medium sized trees, exudation milky. Leaves 15-20 x 6-10 cm, broadly elliptic, apex acute, clustered mostly at apex of branchlets, coriaceous, nerves 12 pairs; petiole to 4 cm. Flowers crowded at the tip of branchlets or rarely from the scars of fallen leaves, pedicels brown, tomentose, stout 3-4 cm; calyx lobes obovate, acuminate, densely brown tomentose; corolla lobes 12, ca. 5 x 2 mm, twisted; stamens 16, in 3 series, sessile; anthers apiculate, hairy on back; ovary 6-celled, 6-ovuled, tomentose, style thick, stigma obtuse.
Flowering & Fruiting: February-May.
Distribution: India and Myanmar. Common; in moist deciduous forests. *RNMK 2285,* Muthanga.

Madhuca neriifolia (Moon) H. J. Lam, Bull. Jard. Bot. Buitenz. ser. 3, 7.182,265. 1925; Ansari, Fl. Kasaragod Div. 220. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 264. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 265. 1996; Sivar. & P. Mathew, Fl. Nilambur 396. 1997; Mohanan & Sivad., Fl. Agasthyamala 413. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 296. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 407. 2009. *Bassia neriifolia* Moon, Cat. Pl. Ceylon 36. 1824. *Bassia malabarica* Bedd., For. Man. Bot. 140.1872; Clarke in Hook. f., Fl. Brit. India 3:544.1882; Gamble, Fl. Pres. Madras 763(537). 1921.

Small to medium trees; branchlets stout. Leaves closely packed, 14-15 x 3-4 cm, oblong, acute or obtuse at apex, entire, 12-15-nerved; petiole ca. 1 cm long. Flowers in axillary fascicles; pedicels 2-3 cm long, thinly tomentose; sepals 4, biseriate, outer sepals ca. 8 x 4 mm, ovate, hairy, inner smaller; corolla yellowish red, ca. 1.5 cm long, campanulate; densely hairy within, lobes equal to the tube, oblong, obtuse; stamens 20, filaments short, densely hairy; anthers lanceolate, long-ciliate at base, connective produced; ovary densely hairy, 8-celled; style ca. 2 cm long. Berry ellipsoid.
Flowering & Fruiting: November-March.
Distribution: India and Sri Lanka. Common along streamside. *RNMK 1502,* Panthipoyil.

MIMUSOPS Linnaeus
Sp. Pl. 349. 1753.

Mimusops elengi L., Sp. Pl. 349. 1753; Wight, Ic. t. 1586. 1850; Clarke in Hook. f., Fl. Brit. India 3: 548. 1882; Gamble, Fl. Pres. Madras 765(538). 1921; Manilal & Sivar., Fl. Calicut 157. 1982; Ansari, Fl. Kasaragod Div. 221. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 267. 1996; Sivar. & P. Mathew, Fl. Nilambur 397. 1997; Mohanan & Sivad., Fl. Agasthyamala 414. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 296. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 408. 2009.

Large trees; branchlets stout, rusty tomentose. Leaves 10-12 x 5-6 cm, broadly elliptic, abruptly acuminate, glabrous, glossy above; nerves many, closely placed, parallel; petioles to 2.5 cm long. Flowers 2-5 together, in axillary fascicles; pedicels ca. 7 mm long, stout, rusty tomentose; sepals 4 + 4;

outer sepals ca. 8 x 4 mm, ovate, acute, brown-tomentose, inner smaller, white tomentose; corolla yellowish brown, to 1.2 cm across, tube short, lobes 18-24, biseriate; stamens 8, filaments short, densely hairy, anthers villous on back, staminodes lanceolate, densely hairy; ovary ovoid, ridged, hairy. Berry ca. 3 x 2 cm, ovoid, glabrous; seed ellipsoid, compressed, yellowish brown.
Flowering & Fruiting: December-August.
Distribution: Indo-Malesia. Common; in evergreen forests. *RNMK 1779,* Manikkunnumala; *RNMK 2554*, Sughandhagiri.

PALAQUIUM Blanco
Fl. Filip. 403. 1837.

Palaquium ellipticum (Dalz.) Baill., Traite, Bot. Med. Phan. 1500. 1884; Gamble, Fl. Pres. Madras 764(537). 1921; Manilal, Fl. Silent Valley 168. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 264. 1988; Vajr., Fl. Palghat Dist. 267. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 267. 1996; Sivar. & P. Mathew, Fl. Nilambur 397. 1997; Mohanan & Sivad., Fl. Agasthyamala 414. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 296. 2005. *Bassia elliptica* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 36. 1851. Bedd., Fl. Sylv. t. 43. 1869. *Dichopsis elliptica* (Dalz.) Benth. in Benth. & Hook.f., Gen. Pl. 2: 658. 1876; Clarke in Hook. f., Fl. Brit. India 3: 542. 1882. **Plate 22i.**

Large trees; bark reddish inside; branches glabrous. Leaves 8-12 x 4-7 cm, elliptic, abruptly acuminate at apex, attenuate at base; lateral nerves 9 pairs, prominent below, parallel. Flowers in axillary fascicles; pedicels ca. 1.5 cm long, slender; outer sepals ca. 7 x 5 mm, ovate, acute, pubescent, inner smaller; corolla yellowish brown, ca. 1 cm long, tube cylindrical, hairy inside, lobes 6, ovate, acute; stamens 16-20, attached at the base of the corolla tube; anthers tomentose, crested; ovary densely white-tomentose. Berry ca. 3 x 1 cm, ellipsoid, ridged, curved, smooth.
Flowering & Fruiting: February-July.
Distribution: Western Ghats. Common; in evergreen forests. *RNMK 1108,* Kurichiarmala; *RNMK 2664*, Sugandhagiri.

Chrysophyllum cainito L., **Manilkara zapota** (L.) P.Royen, and **Pouteria campechiana** (Kunth) Baehni, are commonly cultivated in homesteads for its edible fruits.

EBENACEAE Gurke
in Engler & Prantl, Nat. Pflrnzenfam. 4(1): 153. 1891.

DIOSPYROS Linnaeus
Gen. Pl. ed. 6. 550. 1764.

Trees. Leaves alternate, simple, entire. Flowers dioecious, solitary or in cymes, 4-5-merous; calyx gamosepalous, lobes 4 or 5, erect, usually accrescent and deflexed in fruit; corolla tubular, urceolate or campanulate,

lobes 4 or 5, twisted; stamens 4-many, filaments free or connate; anthers lanceolate; staminodes present or absent in female flowers; ovary 4-5-celled; ovules solitary or paired in each cell; styles 1-4, stigmas 1-4. Fruit a berry; seeds 4 or 5, oblong.

1. Seeds with ruminate albumen..... 1
1. Seeds with the albumen not ruminate 3
2. Leaves elliptic ; calyx lobes cordate..... **D. melanoxylon**
2. Leaves elliptic-oblong; calyx lobes ovate..... **D. candolleana**
3. Fruit ovoid-conical, fulvous hirsute ....**D. pruriens**
3. Fruit globose, glabrous 4
4. Flowers long peduncled... .....**D. paniculata**
4. Flowers short peduncled or sessile..... 5
5. Leaves tomentose on both sides.....**D. saldanhae**
5. Leaves otherwise 6
6. Corolla tubular, often salver shaped... 7
6. Corolla companulate or urceolate 8
7. Stamens glabrous; anthers many in groups of 3 or more ..... **D. pyrrhocarpoides**
7. Stamens villous; anthers 16, in pairs... .....**D. nilagirica**
8. Fruiting calyx large, flattened, foliaceous..... **D. montana**
8. Fruiting calyx small, little enlarged, submembranous..... ...9
9. Stamens 16, in 2 rows.....**D. ovalifolia**
9. Stamens many, usually about 40... ....**D. perigrina**

Diospyros candolleana Wight, Ic. tt. 1221 & 1222. 1848; Clarke in Hook. f., Fl. Brit. India 3: 566. 1882; Gamble, Fl. Pres. Madras 773(543). 1923; Manilal & Sivar., Fl. Calicut 157. 1982; Ansari, Fl. Kasaragod Div. 221. 1985; Vajr., Fl. Palghat Dist. 269. 1990; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 298. 2005; V. Singh, Monogr. Indian Diospyros 63. 2005. *Diospyros canarica* Bedd., Ic. t.134. 1874.

Large trees; branchlets glabrous, black. Leaves 9-15 x 4-6.5 cm long, oblong, obtusely acuminate, base acute, glabrous; nerves obscure, pale beneath; petiole ca. 1 cm long. Flowers in axillary fascicles, 3-15 together, densely fulvous tomentose; calyx ca. 5 mm long, lobes 5, ovate, acute; corolla urceolate, ca. 8 mm long, lobes 5, ovate, acute; anthers distinctly unequal, filaments glabrous. Berry ca. 2.5 cm across, globose, yellowish brown; seeds oblong, glabrous, black, shining.

Flowering & Fruiting: April-March.

Distribution: Endemic to Peninsular India. Occasional; in evergreen forests. *RNMK 2584,* Chembra.

Diospyros melanoxylon Roxb., Pl. Corom. t. 46. 1795; Hook. f., Fl. Brit. India 3: 564. 1882; Gamble, Fl. Pres. Madras 772(543). 1923; V. Singh, Monogr. Indian Diospyros 149. 2005. *Diospyros dubia* Wall. ex A. DC. in DC., Prodr. 8:

223. 1844. *Diospyros exsculpta* Bedd., Fl. Sylv. t. 66. 1870. *Diospyros wightiana* Wall. ex A. DC. in DC., Prodr. 8: 223. 1844. *Diospyros tupru* Buch.-Ham., Trans. Linn. Sco. London 15: 111. 1827.

Trees; young branchlets tomentose. Leaves 10-12 x 6-6.5 cm, broadly ellitpic, apex obtuse, pubescent below, nerves slightly raised above; petiole to 1 cm. Umbels axillary, ca. 2 cm, pubescent; male flowers: calyx 4-5 lobed, ca. 5 mm, margin wavy, pubescent; corolla 4-5 lobed, campanulate, tube ca. 7 mm, lobes ovate, ca. 2 x 2 mm, tomentose; stamens 16, filaments variously united, anthers ca. 2 mm, oblong, acute to apiculate; pistillode reduced, pubescent.

Flowering & Fruiting: March-July.

Distribution: Peninsular India and Sri Lanka. Occasional; in moist deciduous forests. *RNMK 2247,* Muthanga.

Diospyros montana Roxb., Pl. Corom. t. 48. 1795; Wight, Ic. t. 1225. 1848; Clark in Hook. f., Fl. Brit. India 3: 555. 1882; Gamble, Fl. Pres. Madras 776(545). 1923; Sasidh. & Sivar., Fl. Pl. Thrissur For. 271. 1996; V. Singh, Monogr. Indian Diospyros 166. 2005.

Medium sized trees; bark greyish or reddish brown, thin, smooth, yellowish inside; trunk sometimes thorny when young. Leaves 8-10 x 4-5 cm, ovate-oblong, acute at apex, base rounded, subcoriaceous; nerves 7-10 pairs, minutely reticulate; petiole ca. 1 cm long. Male flowers in axillary cymes, sessile, ca. 6 mm across; calyx ca. 3 mm long, lobes 4, ovate, acute, ciliate; corolla greenish yellow, ca. 6 mm long, urceolate, glabrous, lobes 4, shorter than the tube; stamens 16; female flowers usually solitary, axillary. Berry ca. 1.5 cm across, globose, smooth, yellow; fruiting calyx ca. 2 cm across, flat or reflexed.

Flowering & Fruiting: April-February.

Distribution: Indo-Malesia to Australia. Occasional; in moist deciduous forests. *RNMK 3449,* Muthanga.

Diospyros nilagirica Bedd., Ic. t. 136. 1868-1874; Clark in Hook. f., Fl. Brit. India 3: 566. 1882; Gamble, Fl. Pres. Madras 775(545). 1923; Manilal, Fl. Silent Valley 168. 1988; Vajr., Fl. Palghat Dist. 269. 1990; Sivar. & P. Mathew, Fl. Nilambur 400. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 298. 2005; V. Singh, Monogr. Indian Diospyros 181. 2005. **Plate 22k.**

Small trees; bark black, smooth, yellowish when cut; younger branches fulvous tomentose, glabrous when mature. Leaves 12-12.5 x 3-3.5 cm, ovate or oblong-lanceolate, acuminate, sparsely pubescent beneath, margins recurved; nerves 7-8 pairs, nervules reticulate; petiole to 1 cm long. Male flowers axillary cymose, 1-3 together; stamens 8, filaments glabrous, anthers equal; female flowers solitary, axillary, sessile; calyx tube ca. 7 mm long, campanulate, lobes broadly ovate or orbicular, obtuse, densely fulvous hairy,

margins strongly reflexed, not accrescent; corolla pale yellow, ca. 1.5 cm long, salver shaped, lobes ca. 5 x 5 mm, ovate; staminodes 8, ovary densely hairy, ovoid; stigma 4-toothed. Berry globose, glabrous; seeds compressed.
Flowering & Fruiting: February-May.
Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 2118,* Kurichiarmala.

Diospyros ovalifolia Wight, Ic. t. 1227. 1848; Clarke in Hook. f., Fl. Brit. India 3: 559. 1882; Gamble, Fl. Pres. Madras 777(546). 1923; V. S. Ramach. & V.J. Nair, Fl. Cannanore 265. 1988; Mohanan & Sivad., Fl. Agasthyamala 417. 2002; V. Singh, Monogr. Indian Diospyros 185. 2005.

Small trees; bark dark brown, dull yellow inside; branchlets glabrous. Leaves 10-15 x 3-7 cm, obovate, obtuse, narrowed to base, subcoriaceous, glaucous beneath, nerves 8 pairs, prominently reticulate below; petiole ca. 1 cm long. Flowers 3-9 together on leaf scars, sessile; male flowers usually 4-merous, ca. 6 mm across; calyx ca. 3 mm across, ca. 3 mm long, lobes orbicular, densely hairy; corolla ca. 6 mm long, lobes orbicular, obtuse; stamens 14-16, anthers acuminate; female flowers axillary, clustered, usually 5-merous; calyx ca. 4 mm long, campanulate, lobes orbicular; corolla ca. 6 mm long, campanulate, white, glabrous; ovary densely hairy; staminodes absent. Berry ca. 1.5 cm across, greenish brown, thinly hispid.
Flowering & Fruiting: March-August.
Distribution: Peninsular India and Sri Lanka. Common; in evergreen forests. *RNMK 2012,* Chanthanathode.

Diospyros paniculata Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 4: 109. 1852; Bedd., Ic. t. 125. 1868-1874; Clarke in Hook. f., Fl. Brit. India 3: 570. 1882; Gamble, Fl. Pres. Madras 775(544). 1923; V. S. Ramach. & V.J. Nair, Fl. Cannanore 265. 1988; Vajr., Fl. Palghat Dist. 269. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 271. 1996; Sivar. & P. Mathew, Fl. Nilambur 400. 1997; Mohanan & Sivad., Fl. Agasthyamala 418. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 300. 2005; V. Singh, Monogr. Indian Diospyros 189. 2005.

Small to medium trees; bark black, smooth; branchlets densely hispid. Leaves 15-16 x 4-5 cm, oblong, acute, base round or cuneate; margin reflexed near the base; nerves 5 or 6 pairs, strongly reticulate, glossy above; petiole ca. 8 mm long. Male flowers 3-5 together in long peduncled cymes; calyx ca. 1 x 1.2 cm, globose, 5-angled, minutely hispid, lobes broadly ovate or orbicular, margins strongly revolute; corolla dull or creamy white, tube ca. 1.2 cm long, narrowed above, hispid; lobes ca. 8 x 4 mm, oblong; stamens 16-20 in 2-3 series, filaments paired, unequal; female flowers axillary, solitary. Berry 4-5 x 2-3 cm, ovoid to obovoid, obtuse, obtusely 5-angled, yellowish brown, puberulus; seeds few, ellipsoid; fruiting calyx ca. 1.5 x 3 cm, saccate.
Flowering & Fruiting: January-April.
Distribution: Endemic to Peninsular India. Occasional; in evergreen forests. *RNMK 2103,* Chembra.

Diospyros peregrina (Gaertn.) Gurke in Engl. & Prantl, Naturl. Pflanzenfam. 4(1): 164. 1891; Gamble, Fl. Pres. Madras 777(546). 1921; Manilal & Sivar., Fl. Calicut 157. 1982. *Embryopteris peregrina* Gaertn., Fruct. 145. 1788; V. Singh, Monogr. Indian Diospyros 192. 2005. *Diospyros malabarica* (Desr.) Kostel., Allg. Med. Pharm. Fl. 3: 1099. 1834; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 102. 1988; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 298. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 410. 2009. *Garcinia malabarica* Desr. in Lam., Encycl. 3: 701. 1792. *Diospyros embryopteris* Pers., Syn. 2: 624. 1807; Clarke in Hook. f., Fl. Brit. India 3: 556. 1882.*Panitsjika-maram* Rheede, Hort. Malab. 3: 45-47, t.41. **Plate 22 l.**

Medium trees; branchlets glabrous. Leaves 15-20 x 5-7 cm, coriaceous, elliptic-oblong, acute at both ends; nerves 8-10 pairs, basal nerves erose, coarsely reticulate; petiole ca. 1 cm long, stout. Flowers 4-merous; male flowers 8 per cymes; stamens 40 or more, filaments and connectives villous; female flowers few; calyx copular; corolla white, fleshy; staminodes 4; ovary globose. Berry 5-6 cm across, obovoid, densely covered with ferrugineus tomentum; seeds 2-2.5 x 0.8-1 cm, ellipsoid, rugose; fruiting calyx ca. 3 cm across, coriaceous, woody, reflexed.

Flowering & Fruiting: March-May.

Distribution: Indo-Malesia Common; along riverside in moist deciduous forests. *RNMK 2041,* Kuruva.

Diospyros pruriens Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 4: 110. 1852; Clarke in Hook. f., Fl. Brit. India 3: 553. 1882; Gamble, Fl. Pres. Madras 774 (544). 1923; Ansari, Fl. Kasaragod Div. 222. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 265. 1988; Manilal, Fl. Silent Valley 168. 1988; Sivar. & P. Mathew, Fl. Nilambur 400. 1997; V. Singh, Monogr. Indian Diospyros 207. 2005.

Trees to 10 m high; branchlets densely fulvous-tomentose. Leaves 12-15 x 4-6 cm, oblong-oblanceolate, abruptly acuminate at apex, base rounded, densely hispid below; nerves 12-14 pairs, closely reticulate, prominent; petiole 4-5 mm long, hispid. Male flowers ca. 1.5 cm long, yellow; female flowers in axillary fascicles, sessile; calyx ca. 1 cm long, deeply lobed, densely hispid; corolla tube ca. 8 mm long, urceolate, densely hispid, lobes ca. 7 x 4 mm, ovate, acute; staminodes 8, minute; ovary densely bristled; style 5-fid at apex. Capsule ca. 2 x 1.5 cm, ovoid, densely strong bristled.

Flowering & Fruiting: March-August.

Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 3092,* Chandanathode.

Diospyros pyrrcarpoides Ramesh & Franceschi, Blumea 38: 133. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 271. 1996; V. Singh, Monogr. Indian Diospyros 213. 2005.

Medium sized trees; bark brown, mottled with green. Leaves oblong or elliptic-oblong, shortly acute, base truncate, glabrous; lateral nerves 8-10

pairs, faint; petiole 1-1.5 cm long; Fruits globose, 3-3.5 cm across, densely brown tomentose; calyx lobes wavy.
Flowering & Fruiting: May-June.
Distribution: Endemic to Peninsular India. Rare; in evergreen forests. *RNMK 1806,* Kattimattam.

Diospyros saldanhae Kosterm., J. Bombay Nat. Hist. Soc. 74: 326. 1978; Ramach. *et al.*, J. Econ. Tax. Bot. 5:139.1984; V. S. Ramach. & V.J. Nair, Fl. Cannanore 266. 1988; V. Singh, Monogr. Indian Diospyros 225. 2005.

Small trees up to 3.5 m tall. Leaves 10-12 x 4.5-5 cm, elliptic-oblong, shortly acuminate at apex, fulvous hairy beneath. Fruits 2.5-3 x 1-1.5 cm, densely clothed with fulvous hairs.
Flowering & Fruiting: March-November.
Distribution: Endemic to south India. Occasional; in evergreen forests. *RNMK 2804,* Brahmagiri; *RNMK 1066*, Banasuramala.

SYMPLOCACEAE Desf.

in Mem. Mus. Hist. Nat. 6: 9. 1820.

SYMPLOCOS N. J. Jacquin

Enum. Pl. Carib. 5: 24. 1760.

Shrubs or trees, branchlets terete. Leaves alternate, simple, shortly petioled, exstipulate, elliptic to oblanceolate. Flowers axillary or terminal, solitary or in racemes or spikes; bracteoles 1-3, cauducous; calyx tube small, adnate to the ovary, lobes ovate or triangular, imbricate; petals 5, shortly connate at the base, spreading; stamens 10-100, adnate at the base of the corolla, anthers globose; ovary 2, 3 or 4 celled, 2-4 ovuled; style slender; stigma capitate. Drupe ovoid or oblong 1-3 seeded.

1. Drupe villous 2
1. Drupe minutely hispid or glabrous 3
2. Branchlets glabrous; leaves with 5-8 pairs... ..... **S. macrocarpa** ssp. **kanarana**
2. Branchlets pubescent; leaves with 10-12 pairs .... **S. macrophylla** ssp. **macrophylla**
3. Branchlets glabrous 4
3. Branchlets tomentose 7
4. Racemes often branched; drupe ampulliform..... ..**S. cochinchinensis** var. **laurina**
4. Racemes not branched; drupe oblong or ovoid..... .5
5. Leaves with 10 or 11 pairs of lateral nerves; sepals glabrous .....**S. racemosa**
5. Leaves with 5 or 6 pairs of lateral nerves; sepals hairy..... ..6
6. Leaves crenate-serrate, drying to brownish black ..... **S. wynadense**
6. Leaves entire, not drying to brownish black..... **S. obtusa**
7. Spike 8-10 cm long; sepals glabrous..... **S. foliosa**
7. Spike 1-5 cm long; sepals hairy.....**S. macrophylla** ssp. **rosea**

Symplocos cochinchinensis (Lour.) Moore ssp. **laurina** (Retz.) Nooteb., Rev. Symplocac. 156. 1975 & in Dassan & Fosb., Rev. Handb. Fl. Ceylon 3: 458. 1981; Manilal, Fl. Silent Valley 169. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 266. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 255. 1988; Vajr., Fl. Palghat Dist. 271. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 272. 1996; Mohanan & Sivad., Fl. Agasthyamala 419. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 300. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 412. 2009. *Myrtus laurina* Retz., Obs. Bot. 4: 26. 1786. *Drupatris cochinchinensis* Lour., Fl. Cochinch. 314. 1790. *Symplocos spicata* Roxb., Fl. Ind. 2: 542. 1832; Clark in Hook. f., Fl. Brit. India 3: 573. 1882. *Symplocos spicata* Roxb. var. *laurina* (Retz.) Clarke in Hook. f., Fl. Brit. India 3: 573. 1882; Gamble, Fl. Pres. Madras 782(549). 1921. *Symplocos spicata* Roxb. var. *malasica* Clarke in Hook. f., Fl. Brit. India 3: 573. 1882. *Symplocos spicata* Roxb. var. *attenuata* (A.DC.) Clarke in Hook. f., Fl. Brit. India 3: 573. 1882. *Symplocos laurina* (Retz.) Wall. ex G. Don, Gen. Hist. 4: 3. 1837-1838.*Patsjotti* Rheede, Hort. Malab. 5:9-10, t. 5. 1685.

Small trees. Leaves 10-13 x 4-6 cm, elliptic, acute at base and apex, dentate-crenulate, coriaceous, glabrous; lateral nerves 7-10 pairs, intercostae reticulate; petiole ca. 1.5 cm long, glabrous. Spikes ca. 7 cm long, solitary or branched, axis hispid. Flowers white, sessile, many, sepals rounded, ca. 1 mm across, hairy; corolla ca. 7 mm across, glabrous, lobes orbicular; stamens numerous, equal, arranged, in 5 groups; style glabrous. Drupe 5-6 mm long, ampulliform, glabrous.

Flowering & Fruiting: March-May.

Distribution: Indo-Malesia and China. Common; in evergreen forests. *RNMK 2888,* Chembra; *RNMK 3330*, Makkimala.

Symplocos foliosa Wight, Ic. t. 1234. 1848; Clarke in Hook. f., Fl. Brit. India 3: 582. 1882; Gamble, Fl. Pres. Madras 783(550). 1921; V. S. Ramach. & V.J. Nair, Fl. Cannanore 267. 1988; Vajr., Fl. Palghat Dist. 271. 1990; Mohanan & Sivad., Fl. Agasthyamala 420. 2002. *Symplocos nervosa* Wight, Ic. t. 1235. 1848, non DC. 1844.

Trees; branchlets fulvous tomentose, glabrous when mature. Leaves 12-15 x 3.5-4 cm, oblong or elliptic, acute at base, acuminate at apex, crenate-serrate, coriaceous, tomentose below, nerves 8-10 pairs, prominently reticulated below. Spikes unbranched, densely fulvous tomentose, stout, many-flowered; flowers ca. 1 cm across, white; sepals glabrous, roundish; corolla lobes orbicular, ciliate; stamens 30-40. Drupe ca. 1 x 0.5 cm, ellipsoid, greenish yellow.

Flowering & Fruiting: November-February.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 2009,* Thirunelli; *RNMK 3342*, Makkimala.

Symplocos macrocarpa Wight ex Clarke ssp. **kanarana** (Talbot) Nooteb., Rev. Symplocac. 22. 1975; V. S. Ramach. & V.J. Nair, Fl. Cannanore 267. 1988;

Vajr., Fl. Palghat Dist. 272. 1990; Chandra., J. Econ. Tax. Bot. 19: 446. 1995. *Symplocos kanarana* Talbot, J. Bombay Nat. Hist. Soc. 11: 238. 1897; Gamble, Fl. Pres. Madras 782(550). 1923.

Medium sized trees. Leaves elliptic or elliptic-oblong, acuminate to caudately acuminate, base acute, margins serrate, glabrous and glossy, 11-13 x 4.5-5 cm. Flowers in axillary and terminal few flowered spikes. Drupe 3-4 x 1-1.5 cm, smooth, glabrous, yellow.

Flowering & Fruiting: February-April.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1664,* Chanthanathode.

Symplocos macrophylla Wall. ex A. DC in DC., Prodr. 8: 257. 1844, ssp. **macrophylla** Nooteb.; Clarke in Hook. f., Fl. Brit. India 3: 578. 1882; Mohanan & Sivad., Fl. Agasthyamala 421. 2002. *Symplocos gardneriana* Wight, Ic. t. 1213. 1848; Clarke in Hook. f., Fl. Brit. India 3: 582. 1882; Gamble, Fl. Pres. Madras 782(550). 1921.

Small trees; branchlets densely fulvous-tomentose. Leaves 13-15 x 6-7 cm, elliptic, acute at base and apex, coriaceous, crenate, margins recurved, yellow when dry, densely hairy above and below; lateral nerves 7-8 pairs, coarsely reticulate below. Spike 3-5 cm long, stout, tomentose; flowers sessile; sepals ovate, rounded at tip, densely hairy. Drupe 1.2-1.5 x 0.6-0.7 cm, oblong, brown, densely hirsute.

Flowering & Fruiting: February-May.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2249,* Chanthanathode.

Symplocos macrophylla Wall. ex A. DC ssp. **rosea** (Bedd.) Nooteb., Rev. Symplocac. 229. 1975; V. S. Ramach. & V.J. Nair, Fl. Cannanore 268. 1988; Vajr., Fl. Palghat Dist. 272. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 272. 1996; Mohanan & Sivad., Fl. Agasthyamala 423. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 301. 2005. *Symplocos rosea* Bedd., Trans. Linn. Soc. London 25: 219. 1866; Clarke in Hook. f., Fl. Brit. India 3: 583. 1882; Gamble, Fl. Pres. Madras 783(550). 1921. *Symplocos barberi* Gamble, Kew Bull. 1921: 219. 1921 & Fl. Pres. Madras. 783(550). 1921.

Shrubs, 3-3.5 m high; branchlets hispid. Leaves oblanceolate, bluntly acuminate, spineus serrate, coriaceous, glabrous; nerves 4-5 pairs, midrib hairy below; petiole ca. 1 cm long. Spikes ca. 4 cm long, unbranched, hispid; bracts ovate, acute, hispid; flowers few, shortly pedicelled; sepals rounded, densely hairy; corolla ca. 1 cm across, glabrous, lobes roundish; stamens 50, unequal; disk hairy. Drupe ca. 1.5 x 0.4 cm, cylindrical, blue, glabrous.

Flowering & Fruiting: March-May.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 1223,* Vythiri; *RNMK 2446,* Pookodu.

Symplocos obtusa Wall. ex G. Don, Gen. Hist. 4: 3. 1837-1838; Gamble, Fl. Pres. Madras 783(550). 1923; Sasidh. & Anto in Manoharan *et al.*, Silent Valley-Whispers Reason 144. 1999. *Symplocos laeta* var. *pedicellata* Clarke in Hook. f., Fl. Brit. India 3: 583. 1882. *Symplocos obtusa* Wall. ex G. Don var. *pedicellata* (Clarke) Nooteb., Rev. Symplocac. 244. 1975 & Rev. Handb. Fl. Ceylon 3: 467. 1981.

Trees, to 10 m high. Leaves 6-7 x 2-2.5 cm, elliptic, acuminate at either ends, entire, dark grey when dry, glabrous; lateral nerves 5-7 pairs, sub-prominent, petiole 5-6 mm long. Racemes 2-3 cm long, unbranched, axis hispid; flowers few, distant; pedicels ca. 1 mm long, slender; sepals ca. 1.5 x 1 mm, obtuse, hairy. Drupe 1.2-1.5 x 0.4-0.5 cm, terete, yellowish-green, minutely hispid towards the apex.

Flowering & Fruiting: December-March.

Distribution: South India and Sri Lanka. Occasional; in evergreen forests. *RNMK 2998,* Vythiri.

Symplocos racemosa Roxb., Fl. Ind. 2: 539. 1832; Clarke in Hook. f., Fl. Brit. India 3: 576. 1882; V. S. Ramach. & V.J. Nair, Fl. Cannanore 269. 1988; Manilal, Fl. Silent Valley 170. 1988; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 301. 2005. *Symplocos beddomei* Clarke in Hook. f., Fl. Brit. India 3: 582. 1882; Gamble, Fl. Pres. Madras 783(551). 1921. *Symplocos candolleana* Brand. in Engl., Pflanzenreich Symploc. 49. 1901; Gamble, Fl. Pres. Madras 782(549). 1921.

Small to medium trees; branchlets glabrous. Leaves 8-9 x 4-4-5 cm, ovate to elliptic, shortly acuminate, crenate with recurved margins, glabrous; nerves 10-12 pairs, looping below the margins; petiole ca. 1.5 cm long, glabrous. Racemes 3-6 cm long, fulvous tomentose, many flowered; pedicels 2-3 mm long; sepals triangular, acute, glabrous. Drupe 1-1.3 x 0.4-0.5 cm, ovoid, glabrous, shallowly furrowed, yellow.

Flowering & Fruiting: December-February.

Distribution: India to Indo-China. Common; in evergreen forests. *RNMK 3327,* Chnathanathodu; *RNMK 2775*, Thariodu.

Symplocos wynadense (O. Kuntze.) Nooteb., Rev. Symplocac. 293. 1975; Mohanan & Sivad., Fl. Agasthyamala 424. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 301. 2005. *Eugeniodes wynadense* O. Kuntze., Rev. Gen. Pl. 2: 975. 1891. *Symplocos acuminata* Bedd., For. Man. Bot. 150. 1872. & Ic. t. 117. 1868-74, non Miq. 1859; Clarke in Hook. f., Fl. Brit. India 3: 583. 1882; Gamble, Fl. Pres. Madras 783(550). 1921. **Fig. 38, Plate 23a.**

Small trees; branchlets glabrous. Leaves 8-11 x 4-5 cm, elliptic, rounded or acute at base, acuminate at apex, crenate-serrate, glabrous, nerves 5-7 pairs, slender; petiole ca. 1 cm long, glabrous. Spike 4-6 cm long, unbranched; peduncle slender, densely hairy; flowers few; pedicels ca. 5 mm long; sepals ovate, obtuse, densely hairy; corolla white, ca. 8 mm across, glabrous; stamens numerous, free; style ca. 5 mm long, hairy. Drupe glabrous.

Flowering & Fruiting: January-September.
Distribution: Southern Western Ghats. Rare; in evergreen forests. *RNMK 2256,* Vythiri.

OLEACEAE Hoffmanns. & Link

Fl. Portug. 1: 385. 1813-1820.

1. Stems quadrangular; leaves 3-ribbed from base ..... **Myxopyrum**
1. Stems terete; leaves not 3-ribbed from base..... 2
2. Erect trees or shrubs..... .3
2. Scandent shrubs or climbers..... **Jasminum**
3. Leaves imparipinnate; leaflets 7-9; seeds winged ..... **Schrebera**
3. Leaves simple; seeds not winged..... 4
4. Corolla deeply divided to the base or free; fruit ribbed ....**Chionanthus**
4. Corolla divided to half of the length; fruit smooth 4
5. Panicle axillary or from leaf scars; flowers polygamous ..... .**Olea**
5. Panicles terminal; flowers all bisexual .....**Ligustrum**

CHIONANTHUS Linnaeus

Sp. Pl. 8. 1753.

Trees; branchlets white. Leaves opposite, entire, glabrous, petiolate. Flowers in axillary panicled cyme, pedicellate; calyx 4-lobed, lobes triangular; corolla 4-lobed, connate in pairs or nearly free; stamens 2, filaments shorter than anthers, inserted at the base of the petals; anthers curved with broad connective; ovary 2-celled, conical; style stout and short; stigma 2-toothed. Fruit an ellipsoid drupe; seeds solitary.

1. Leaves oblong or oblong-lanceolate..... **C. courtallensis**
1. Leaves elliptic to obovate, acuminate 2
2. Ovary glabrous; drupe 2-3 cm long..... **C. ramiflorus**
2. Ovary densely hairy; drupe ca.1 cm long ..... **C. mala-elengi**

Chionanthus courtallensis Bedd., For. Man. Bot. 155. 1872 & Fl. Sylv. t.156. 1872; Srivastava & Kapoor, J. Econ. Tax. Bot. 15: 132.1991; Mohanan & Sivad., Fl. Agasthyamala 426. 2002; P. S. Green, Kew Bull. 58: 262. 2003. *Linociera leprocarpa* var. *courtallensis* (Bedd.) Clarke in Hook. f., Fl. Brit. India 3: 608. 1882. *Linociera courtallensis* (Bedd.) Bourd., For. Trees Travancore 260.1908; Gamble, Fl. Pres. Madras 795(558). 1923. *Chionanthus leprocarpa* Thw. var. *courtallensis* (Bedd.) Nair & Janardh., J. Bombay Nat. Hist. Soc. 8: 331. 1981.

Small trees. Leaves oblong or oblong-lanceolate, acuminate, base cuneate or acute, 16-17 x 4-5 cm. Flowers in axillary, 1.5-2 cm long; calyx glabrous; corolla lobes yellowish, 3-4 mm long.
Flowering & Fruiting: January-March.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2537,* Kurichiarmala.

Chionanthus mala-elengi (Dennst.) P. S. Green, Bull. Bot. Surv. India 26. 124. 1984; V. S. Ramach. & V.J. Nair, Fl. Cannanore 269. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 199. 1988; Vajr., Fl. Palghat Dist. 273. 1990; Srivastava & Kapoor, J. Econ. Tax. Bot. 15: 133. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 273. 1996; Sivar. & P. Mathew, Fl. Nilambur 402. 1997; P. S. Green, Kew Bull. 58: 264. 2003; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 302. 2005. *Forsythia mala-elengi* Dennst., Schluss. Hort. Malab. 12,21, 31. 1818. *Linociera malabarica* Wall. ex G. Don, Gen. Syst. 4: 53. 1837-1838; Wight, Ic. t. 1246. 1848; Clarke in Hook. f., Fl. Brit. India 3: 607. 1882; Gamble, Fl. Pres. Madras 794(558). 1923; Manilal & Sivar., Fl. Calicut 158. 1982; Ansari, Fl. Kasaragod Div. 223. 1985. *Chionanthus malabaricus* (Wall. ex G. Don) Bedd., Fl. Sylv. t. 239. 1872. *Mala-elengi* Rheede, Hort.Malab. 5:109-110, t. 55. 1685.

Trees with spherical canopy, to 15 m high; branchlets thinly tomentose. Leaves 9-10 x 5-5.5 cm, obovate, abruptly acuminate, acumen twisted, glabrous, glaucous beneath; nerves 11-13 pairs; petiole ca. 1 cm long. Cymes congested, pedunculate; flowers sessile; calyx lobes ca. 1.5 mm long, ovate, obtuse; corolla ca. 7 mm long, lobes attached in pairs, linear acuminate, glabrous; ovary densely hairy. Drupe ca. 1 x 0.5 cm, ellipsoid, slightly curved, acute, ridged.

Flowering & Fruiting: December-April.

Distribution: Endemic to Peninsular India. Common; in semi-evergreen forests. *RNMK 3404,* Manikkunnumala; *RNMK 3786*, Banasuramala.

Chionanthus ramiflorus Roxb., Fl. Ind. 1: 106. 1820; Srivastava & Kapoor, J. Econ. Tax. Bot. 15: 133. 1991; P. S. Green, Kew Bull. 58: 260. 2003; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 302. 2005. *Linociera ramiflora* (Roxb.) G. Don, Gen. Syst. 4. 54. 1837-1838; Manilal, Fl. Silent Valley 172. 1988. *Linociera macrophylla* Wall. ex G. Don, Gen. Syst. 4:53.1837-1838; Clarke in Hook. f., Fl. Brit. India 3:610.1882; Gamble, Fl. Pres. Madras 795 (558).1923. *Chionanthus roxburghii* (Spreng.) Srivastava & Kapoor, Geophytology 11: 262. 1981 & J. Econ. Tax. Bot. 15: 139. 1991. *Olea roxburghii* Spreng., Neue Entdeck 5:78. 1822. *Olea paniculata* Roxb., Fl. Ind. 1:104. 1820, non R. Br. 1810. *Linociera intermedia* var. *roxburghii* (Spreng.) Clarke in Hook. f., Fl. Brit. India 3: 609.1882. *Chionanthus ramiflorus* Roxb. var. *peninsularis* Ravik. & Lakshm., Bull. Bot. Surv. India 31: 163. 1989.

Small to medium trees; branchlets glabrous. Leaves 12-15 x 5-7 cm, elliptic to obovate, abruptly acuminate, acumen twisted, glabrous; petiole 2-3 cm long. Panicle axillary and terminal, ca. 6 x 6 cm; branches glabrous; pedicel ca. 1 cm long; sepals acute, glabrous, 4-toothed; corolla ca. 3 mm long, cream coloured, connate in pairs; ovary glabrous. Capsule black, ellipsoid, glabrous.

Flowering & Fruiting: February-March.

Distribution: Indo-Malesia. Rare in evergreen forests. *RNMK 3119,* Banasuramala.

JASMINUM Linnaeus

Sp. Pl. 8. 1753.

Erect or climbing shrubs; branches terete. Leaves opposite, simple or 3-foliolate. Flowers axillary or terminal, usually in dichaesium; bracts and bracteoles minute or larger; calyx campanulate, lobes 4-9, triangular or linear; corolla tube long, narrow, lobes 4-10, spreading, imbricate; stamens 2, included; ovary 2-celled; ovules 2 in each cell, basilar; style filiform, stigma bifid. Fruit one or two berries, ovoid to oblong, smooth.

1. Leaves 3-foliolate 2
1. Leaves simple 3
2. Branchlets spirally twisted; stem fulvous tomentose..... **J. brevilobum**
2. Branchlets straight; stem glabrous ....**J. flexile**
3. Leaves cuneate at base ..... .**J. ritchi**
3. Leaves cordate or rounded at base..... .4
4. Calyx lobes glabrous..... .**J. cordifolium**
4. Calyx lobes pubescent 5
5. Stem pubescent..... 6
5. Stem glabrous 7
6. Corolla lobes obtuse at apex; bracts white ..... **J. coarctatum**
6. Corolla lobes acute at apex; bracts green.....**J. multiflorum**
7. Leaves acute at apex; berry ovoid, less than 1 cm long ..... **J. cuspidatum**
7. Leaves acuminate at apex; berry ellipsoid, 1.5-2 cm long..... **J. malabaricum**

Jasminum brevilobum A. DC. in DC., Prodr. 8: 307. 1844; Clarke in Hook. f., Fl. Brit. India 3: 600. 1882; Gamble, Fl. Pres. Madras 791(555). 1923; P. S. Green, Kew Bull. 58: 278. 2003.

Large climbing shrub; branchlets spirally twisted, fulvous tomentose. Leaves trifoliolate, terminal leaflets ovate, obtusely acute, mucronate, rounded at base, 5-6 x 2-3 cm long. Flowers in capitate few flowered cymes; corolla tube elliptic, lobes white. Fruit globose, black.

Flowering & Fruiting: October-January.

Distribution: Endemic to Peninsular India. Rare; in shola forests. *RNMK 3659,* Chembra peak.

Jasminum coarctatum Roxb., Fl. Ind. 1: 91. 1820; P. S. Green, Kew Bull. 58: 289. 2003. *Jasminum rottlerianum* Wall. ex A. DC. in DC., Prodr. 8: 305. 1844; Wight, Ic. t. 1249. 1848; Clarke in Hook. f., Fl. Brit. India 3: 593. 1882; Gamble, Fl. Pres. Madras 789(555). 1923; Ansari, Fl. Kasaragod Div. 224. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 272. 1988; Vajr., Fl. Palghat Dist. 275. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 274. 1996; Sivar. & P. Mathew, Fl. Nilambur 403. 1997; Seema & Narayanan, J. Econ. Tax. Bot. 26: 129. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 303. 2005. *Jasminum rottlerianum* Wall. ex A. DC. var. *glabrior* Clarke in Hook.f., Fl. Brit. India 3:593. 1882; Manilal, Fl. Silent Valley 171. 1988. **Plate 23b.**

Climbing shrubs; stems pubescent. Leaves 7-10 x 3-4 cm, oblong, acuminate, base rounded; nerves 4 pairs; petiole ca. 1 cm long. Cymes terminal, congested; peduncle 1.5-2 cm long, tomentose; bracts ca. 8 x 3 mm, hairy; flowers many, densely packed; calyx tube ca. 2 mm long, lobes ca. 4 mm long, subulate, densely hairy; corolla tube ca. 2 cm long, lobes 7- 8 mm long, oblong, obtuse, white with pink tinge, glabrous, mildly fragrant.
Flowering & Fruiting: January-June.
Distribution: Peninsular India and Sri Lanka. Occasional; in evergreen forests. *RNMK 1702,* Kurichiarmala.

Jasminum cordifolium Wall. ex G. Don, Gen. Hist. 4: 60. 1837-1838; Hook. f., Fl. Brit. India 3: 596. 1882; Gamble, Fl. Pres. Madras 790(555). 1923; Mohanan & Sivad., Fl. Agasthyamala 429. 2002; P. S. Green, Kew Bull. 58: 289. 2003. *Jasminum malabaricum* Wight var. *lawii* Clarke in Hook.f., Fl. Brit. India 3: 594. 1882; Gamble, Fl. Pres. Madras 789(554). 1923; Ansari, Fl. Kasaragod Div. 224. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 271. 1988.

Scandent shrubs; twigs glabrous. Leaves 9-10 x 6-6.5 cm, broadly ovate, acuminate, truncate or cordate at base; nerves 3-4 pairs, nearly basal, glabrous; petiole ca. 1.5 cm long. Flowers many, in terminal or axillary cymes; bracts ca. 6 mm long, subulate; calyx tube ca. 3 mm long, lobes ca. 1.3 cm long, narrow, glabrous; corolla tube ca. 1.2 cm long, lobes 5, ca. 8 x 3 mm, oblong, acute, glabrous, white. Berry 1-1.2 x 0.7-0.8 cm, oblong, obtuse, glabrous.
Flowering & Fruiting: January-April.
Distribution: Endemic to southern Western Ghats. Occasional; in semi-evergreen forests. *RNMK 3005,* Nedumpoyil.

Jasminum cuspidatum Rottl., Ges. Naturf. Fr. Ber. n. s. 4: 192. 1803; P. S. Green, Kew Bull. 58: 292. 2003. *Jasminum rigidum* Zenk. Pl. Ind. 5. t. 6. 1835; Clarke in Hook. f., Fl. Brit. India 3: 598. 1882; Gamble, Fl. Pres. Madras 790(555). 1923.

Erect shrubs; stem subscandent, glabrous. Leaves 4-6 x 2-3 cm, lanceolate, acute at apex, round at base; nerves from the base and from midrib, distinct below; petiole 2-3 mm long. Cymes terminal or axillary, lax; peduncle 5-10 cm long, glabrous; bracts 1-2 mm long, subulate; flowers 3-5 together; pedicel ca. 5 mm long, stout; calyx tube ca. 2 mm long, campanulate, glabrous, lobes ca. 6 mm long, narrow; corolla tube 2-2.5 cm long, lobes 1.5-1.7 cm long, oblong, acute. Berry 8-9 x 6-7 mm, ovoid, glabrous.
Flowering & Fruiting: January-April.
Distribution: Peninsular India and Sri Lanka. Rare; along streamside in moist deciduous forests. *RNMK 2053,* Muthanga.

Jasminum flexile Vahl, Symb. Bot. 3: 1. 1794 & Enum. Pl. 1: 31. 1804; Wight, Ic. t. 1253. 1848; Clarke in Hook. f., Fl. Brit. India 3: 601. 1882; Gamble, Fl. Pres. Madras 791(555). 1923; Sasidh. & Sivar., Fl. Pl. Thrissur For. 273. 1996; P. S. Green, Kew Bull. 58: 280. 2003. *Jasminum azoricum* Burm. f., Fl. Ind. 16. 1768, non L. 1753; Manilal & Sivar., Fl. Calicut 159. 1982; Manilal, Fl. Silent Valley 170. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 270. 1988; Vajr., Fl. Palghat Dist. 274. 1990; Sivar. & P. Mathew, Fl. Nilambur 402. 1997; Mohanan & Sivad., Fl. Agasthyamala 428. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 303. 2005 ; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 413. 2009. *Jasminum flexile* Vahl var. *travancorense* Gamble, Fl. Pres. Madras 791(556). 1921. *Jasminum azoricum* L. var. *travancorense* (Gamble) Mohanan, J. Econ. Tax. Bot. 6: 480. 1985; Vajr., Fl. Palghat Dist. 275. 1990; Mohanan & Sivad., Fl. Agasthyamala 429. 2002. **Plate 23c.**

Climbing shrubs; stem glabrous. Leaflets subequal, 8-10 x 4-5 cm, ovate-lanceolate, base rounded, apex acuminate, glabrous, acumen curved, lateral nerves 7 pairs; petiolules unequal, middle petiolulate ca. 2.5 cm long, laterals smaller. Cymes to 15 cm long, terminal, corymbose, peduncled; bracts and bracteoles minute, subulate; flowers many; pedicels ca. 1.5 cm long; calyx 3-4 mm long, truncate, glabrous; corolla tube ca. 3 cm long, lobes ca. 1.3 x 0.6 mm, oblong, obtuse, white with pink tinge. Berry ca. 1 x 0.5 cm, oblique-obovoid, black, glabrous.

Flowering & Fruiting: October-March.

Distribution: Peninsular India and Sri Lanka; Occasional; in evergreen forests. *RNMK 3893,* Kurichiarmala; *RNMK 3117*, Brahmagiri.

Jasminum malabaricum Wight, Ic. t. 1250. 1848; Clarke in Hook. f., Fl. Brit. India 3: 594. 1882; Gamble, Fl. Pres. Madras 789(554). 1923; Manilal & Sivar., Fl. Calicut 160. 1982; Ansari, Fl. Kasaragod Div. 223. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 270. 1988; Manilal, Fl. Silent Valley 171. 1988; P. S. Green, Kew Bull. 58: 287. 2003. **Plate 23d.**

Climbing shrubs. Leaves 10-12.5 x 6-7 cm, broadly ovate, acuminate, rounded at base, glabrous. Flowers in trichotomous terminal cymes, 3-4 cm long, white. Berries 1.5-2 x 0.4-0.5 cm, ellipsoid, glabrous, black.

Flowering & Fruiting: March-November.

Distribution: Endemic to Western Ghats. Occasional; in semi-evergreen forests. *RNMK 1886,* Manikkunnumala.

Jasminum multiflorum (Burm. f.) Andr., Bot. Repor. 8,t.496. 1807; Manilal & Sivar., Fl. Calicut 160. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 271. 1988; Vajr., Fl. Palghat Dist. 275. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 274. 1996; Seema & Narayanan, J. Econ. Tax. Bot. 26: 129. 2002; Mohanan & Sivad., Fl. Agasthyamala 430. 2002; P. S. Green, Kew Bull. 58: 288. 2003; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 414. 2009. *Nyctanthes multiflora*

Burm. f., Fl. Ind. 5. t.3. f.1. 1768. *Jasminum pubescens* Willd., Sp. Pl. 1: 37. 1797; Clarke in Hook. f., Fl. Brit. India 3: 592. 1882; Gamble, Fl. Pres. Madras 789(554). 1923. *Jasminum bracteatum* Roxb., Fl. Ind. 1:92. 1820; Wight, Ic. t. 1248. 1848.

Climbing shrubs; stem densely pubescent. Leaves 7-8 x 3.5-4 cm, ovate, acute to acuminate, round or cordate at base; petiole ca. 1 cm long, hairy. Cymes terminal, congested, pubescent; peduncle 4-8 cm long; bracts ca. 1.5 x 0.5 cm, acuminate, hispid; flowers densely packed; calyx tube short, lobes 7-8 mm long, subulate, hairy; corolla tube ca. 1.5 cm long, lobes 5-8, to 1 cm long, oblong, acute, white.

Flowering & Fruiting: December-March.

Distribution: Indo-Malesia and China. Occasional; in evergreen and moist deciduous forests. *RNMK 1771,* Chanthanathodu; *RNMK 2288*, Tholpetty.

Jasminum ritchiei Clarke in Hook.f., Fl. Brit. India 3: 598. 1882; Gamble, Fl. Pres. Madras 790(555). 1923; V. S. Ramach. & V.J. Nair, Fl. Cannanore 271. 1988; Manilal, Fl. Silent Valley 171. 1988; P. S. Green, Kew Bull. 58: 286. 2003.

Climbing shrubs. Leaves 5-7 x 2.5-3 cm, ovate or elliptic, acuminate, cuneate at base. Flowers in axillary or terminal subpaniculate cymes, ca. 6 cm long, white.

Flowering & Fruiting: July-August.

Distribution: Peninsular India and Sri Lanka. Rare; in moist deciduous forests. *RNMK 3447,* Tholpetty; *RNMK 2892*, Baveli.

LIGUSTRUM Linnaeus

Sp. Pl. 7. 1753.

Trees; branchlets terete, lenticellate. Leaves opposite, ovate-lanceolate. entire. Inflorescence a terminal panicle. Flowers pedicelled, bisexual; calyx tubular, 4-5 lobed at apex lobes obtuse; corolla lobes spreading, united below into a tube; stamens 2, filaments glabrous; anthers oblong, acute; ovary conical, glabrous; style stout, stigma capitate. Drupe oblong; seeds 1-3, compressed.

1. Branchlets with circular lenticels; nerves of leaves obscure .... **L. robustum** ssp. **walkeri**
1. Branchlets with elliptic lenticels; nerves of leaves 6-7 pairs, prominent...**L. perrotteti**

Ligustrum perrottetii A. DC. in DC., Prodr. 8: 294. 1844; Clarke in Hook. f., Fl. Brit. India 3: 615. 1882; Gamble, Fl. Pres. Madras 797(560). 1923; Manilal, Fl. Silent Valley 172. 1988; Srivastava, J. Econ. Tax. Bot. 22: 624. 1998; P. S. Green, Kew Bull. 58: 267. 2003. *Ligustrum neilgherrense* Wight, Ic. t. 1243. 1848. *Ligustrum decaisnei* Clarke in Hook.f., Fl. Brit. India 3: 616. 1882; Gamble, Fl. Pres. Madras 798(560). 1923; Manilal, Fl. Silent Valley 171. 1988; Sivar. & P. Mathew, Fl. Nilambur 404. 1997; Srivastava, J. Econ. Tax.

Bot. 22: 620. 1998; Mohanan & Sivad., Fl. Agasthyamala 430. 2002. *Ligustrum gamblei* Ramamoorthy in Saldanha & Nicols., Fl. Hassan Dist. 515. 1976; Vajr., Fl. Palghat Dist. 275. 1990; Srivastava, J. Econ. Tax. Bot. 22: 622. 1998. *Ligustrum roxburghii* Clarke in Hook.f., Fl. Brit. India 3: 615. 1882, non Bl. 1850, nec Hort. ex Decne. 1877; Gamble, Fl. Pres. Madras 797(560). 1923. *Ligustrum robustum* (Roxb.) Bedd., For. Man. Bot. 154. 1873, non Bl. 1850, nec Thw. 1860. *Phillyrea robusta* Roxb., Fl. Ind. 1:101.1820. *Ligustrum travancoricum* Gamble, Bull. Misc. Inform. Kew 1922: 119. 1922 & Gamble, Fl. Pres. Madras 797(560). 1923; Srivastava, J. Econ. Tax. Bot. 22: 625. 1998.

Large shrubs or smaller trees; branchlets with circular lenticels. Leaves 7-10 x 2-5 cm, acute to acuminate, glabrous; nerves 6-8 pairs, regular faint towards the margins; petiole ca. 1 cm long. Panicle effuse, pubescent; flowers many, closely packed; pedicel 1-2 mm long; calyx ca. 2 mm long, lobes obovate; corolla white, 3-5 mm across, lobes ovate, obtuse, white; ovary conical, style short. Drupe 6-7 mm long, obovoid, obtuse.

Flowering & Fruiting: February-June.

Distribution: Endemic to Western Ghats. Common; along shola margins. *RNMK 2895,* Chembra.

Ligustrum robustum (Roxb.) Bl. ssp. **walkeri** (Decne.)P. S. Green, Kew Bull. 40: 130. 1985 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 270. 1987; V. S. Ramach. & V.J. Nair, Fl. Cannanore 272. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 274. 1996; Srivastava, J. Econ. Tax. Bot. 22: 625. 1998; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 304. 2005. *Ligustrum walkeri* Decne., Nouv. Arch. Mus. Hist Nat. 2: 27. 1879; Clarke in Hook. f., Fl. Brit. India 3: 614. 1882; Gamble, Fl. Pres. Madras 797(560). 1923.

Large shrubs or small trees; branchlets with elliptical lenticels. Leaves 6-10 x 4-5 cm, ovate, acute, punctate; nerves indistinct; petiole ca. 1 cm long. Panicle loose, branches puberulus; flowers distant; pedicel ca. 2 mm long; calyx tube ca. 2 mm long, 5-toothed; corolla 5-6 mm long; lobes longer than the tube, ovate, obtuse, white; ovary truncate at apex; stigma spathulate. Drupe 7-8 mm long, obovoid.

Flowering & Fruiting: May-July.

Distribution: Sri Lanka and Peninsular India. Occasional; in evergreen forests. *RNMK 3111,* Banasuramala; *RNMK 2209,* Chembra.

MYXOPYRUM Blume

Bijdr. 683. 1825.

Myxopyrum smilacifolium Bl., Mus. Bot. Lug.-Bat. 1: 320. 1851; Clarke in Hook. f., Fl. Brit. India 3: 618. 1882; Kiew, Blumea 29: 509. 1984; Manilal, Fl. Silent Valley 172. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 275. 1996; Sivar. & P. Mathew, Fl. Nilambur 404. 1997; Mohanan & Sivad., Fl. Agasthyamala 431. 2002; P. S. Green, Kew Bull. 58: 273. 2003; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 304. 2005; C.N. Sunil & Sivad., Fl.

Alappuzha Dist. 415. 2009. *Chionanthus smilacifolia* Wall. in Roxb., Fl. Ind. 1: 108. 1820. *Myxopyrum serratulum* Hill., Kew Bull. 1910: 41. 1910; Gamble, Fl. Pres. Madras 798(561). 1923; V. S. Ramach. & V.J. Nair, Fl. Cannanore 272. 1988; Vajr., Fl. Palghat Dist. 276. 1990.

Climbing shrubs; stem quadrangular, scabrous. Leaves 13-15 x 4-5 cm, elliptic, acute at either ends, sharply serrulate, glabrous; petiole ca. 1 cm long. Panicle axillary, ca. 5 x 5 cm. Flowers sessile; calyx deeply 4-lobed, lobes triangular, acute; corolla tube ca. 2 mm long, cylindrical, lobes ca. 3 mm long, oblanceolate, terete; stamens 2, anthers cleft at base; ovary 2-celled, style absent, stigma 2-toothed. Berry ca. 1 x 1 cm, smooth, yellowish brown; seeds 2, spherical, black, rough.

Flowering & Fruiting: February-August.

Distribution: South east Asia and India. Rare; in evergreen forests. *RNMK 3733,* Vythiri.

OLEA Linnaeus

Sp. Pl. 8. 1753.

Olea dioica Roxb., Fl. Ind. 1: 105. 1820; Wt. Ill. 2, t. 151. 1850; Clarke in Hook. f., Fl. Brit. India 3: 612. 1882; Gamble, Fl. Pres. Madras 796(559). 1923; Manilal & Sivar., Fl. Calicut 158. 1982; Ansari, Fl. Kasaragod Div. 224. 1985; Manilal, Fl. Silent Valley 173. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 273. 1988; Vajr., Fl. Palghat Dist. 276. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 275. 1996; Sivar. & P. Mathew, Fl. Nilambur 405. 1997; P.S. Green, Kew. Bull. 57: 121. 2002; Mohanan & Sivad., Fl. Agasthyamala 432. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 304. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 415. 2009. *Olea laevis* Stokes, Bot. Comm. 1: 30. 1830.

Medium sized trees; bark rough; branchlets reddish. Leaves 10-15 x 3-6 cm, elliptic-oblong, acute, serrate or entire, glabrous; nerves 8-10 pairs, subprominent; petiole ca. 1 cm long. Inflorescence an axillary panicle. Flowers many; pedicel ca. 3 mm long; calyx campanulate; lobes 4, obtuse, ciliate; corolla ca. 2.5 mm long, lobes 4, shorter than the tube, triangular, obtuse, hairy within; stamens 2, anthers sessile; ovary 2-celled, 4-ovuled; style short, stigma capitate. Fruit an ellipsoid drupe, 8-9 x 5-6 mm; seeds ca. 6 x 4 mm, minutely muriculate.

Flowering & Fruiting: November-August.

Distribution: India. Common in evergreen forests. *RNMK 3668,* Vythiri; *RNMK 3100,* Manikkunnumala.

SCHREBERA Roxburgh

Pl. Corom. 2: 1. 1799, *nom. cons.*

Schrebera swietenioides Roxb., Pl. Corom. t. 101.1798; Clarke in Hook. f., Fl. Brit. India 3:604.1882; Gamble, Fl. Pres. Madras 792(557). 1923; Ramach. *et al.*, J. Econ. Tax. Bot. 5: 141.1984; V. S. Ramach. & V.J. Nair, Fl. Cannanore 273. 1988; P. S. Green, Kew Bull. 58: 271. 2003; Bedd. Fl. Sylv. t. 248. 1872. **Plate 23e.**

Medium trees. Leaves 13-16 cm long, imparipinnate, leaflets 7-9, opposite, to 5-6 x 2-2.5 cm, elliptic-lanceolate, apex acute, base cuneate. Cymes terminal, trichotomous; flowers ca. 1 cm, yellowish; calyx puberulent, obscurely 6 toothed, accrescent; corolla salver shaped, lobes 6, ca. 4 mm across, rounded; stamens 2; ovary 2-celled, cells 3 or 4 ovuled, style *ca.* 6 mm long. Capsule woody, 4-5 x 2.5 cm, obovoid, loculicidally 2-valved; seeds pendulous, winged.
Flowering & Fruiting: May-June.
Distribution: India and Myanmar. Occasional; in moist deciduous forests. *RNMK 2005,* Muthanga; *RNMK 2409*, Baveli.

Jasminum grandiflorum L. and **Jasminum sambac** (L.) Ait., are often found in wild as an escape from garden.

SALVADORACEAE Lindl.

AZIMA Lamark

Encycl. 1: 343. 1783.

Azima tetracantha Lamk., Encycl. 1: 343. 1783; Clarke in Hook. f., Fl. Brit. India 3: 620. 1882; Gamble, Fl. Pres. Madras 800(562). 1923.

Rambling shrubs; spine axillary, usually 4, straight, 2-2.5 cm, grooved, branchlets tetragonous, pubescent. Leaves opposite, 3-3.5 x 1.6-2 cm, ovate, mucronate, base obtuse, margin thickened, coriaceous, nerves 3-4 pairs near the base; petiole 5-6 mm. Spike axillary and terminal, up to 10 cm long; flowers clustered, white, unisexual; bracts ovate, mucronate, pubescent; calyx campanulate, bilobed, pubescent; petals 4, oblong; stamens 4, free, alternating with petals.
Flowering & Fruiting: August-September. *Distribution*: Paleotropics. Rare in moist deciduous forests. *RNMK 1096,* Muthanga.

APOCYNACEAE Juss.

Gen. Pl. 143. 1789.

1. Annual erect herbs ..... **Catharanthus**
1. Erect or scandent shrubs, climbers or trees 2
2. Leaves whorled 3
2. Leaves opposite 4
3. Fruit linear follicles; seeds comose..... **Alstonia**
3. Fruit drupaceous; seeds without coma ..... **Rauvolfia**
4. Plants with axillary spines..... **Carissa**
4. Plants without axillary spines..... .5
5. Climbers..... 9
5. Erect or scandent shrubs or trees..... .6

6. Fruit a drupe..... **Hunteria**
6. Fruit a follicle 7
7. Follicles divaricate, obliquely ovoid, to 4 cm long.....**Tabenaemontana**
7. Follicles not divaricate, elongate, cylindric, to 30 cm long.....8
8. Corolla with several coronal scales .....**Wrightia**
8. Corolla without scales ..... **Holarrhena**
9. Flowers large, more than 6 cm across.....10
9. Flowers small, less than 2 cm across.....11
10. Leaves orbicular-obtuse, base cordate .....**Chonemorpha**
10. Leaves oblong-ovate, base cuneate ..... **Beaumontia**
11. Anthers exserted; staminal filaments twisted.....**Parsonsia**
11. Anthers included; staminal filaments not twisted 12
12. Corolla lobes overlapping to the left 13
12. Corolla lobes overlapping to the right 14
13. Leaves oblong, abruptly acuminate..... .**Chilocarpus**
13. Leaves elliptic, acuminate..... .**Kamettia**
14. Branchlets brown tomentose .....**Icnocarpus**
14. Branchlets glabrous ..... **Vallaris**

ALSTONIA R. Brown

Wern. Nat. Hist. Soc. 1: 75. 1811, *nom. cons.*

Trees or large shrubs, juice milky. Leaves whorled, 5-7 at each node, entire; lateral nerves many, close, parallel, forming intramarginal vein. Flowers in terminal panicled cymes; pedicels short, stout; sepals 5, ovate, free; corolla salver-shaped, tube broad, dialated at the middle; lobes 5, spreading; stamens 5, anthers sagitate at base; carpels 2, free, style-1, filiform; ovules many. Fruit 2 slender follicles, terete or 2-angled; seeds oblong, flattened, comma of long brown hairs at one end.

1. Flowers in umbellate cymes; follicles to 35 cm long ..... **A. scholaris**
1. Flowers in corymbose cymes; follicles to 15 cm long..... **A. venenata**

Alstonia scholaris (L.) R. Br., Mem. Wern. Nat. Hist. Soc. 1: 76. 1811; Wight, Ic. t. 422. 1841; Hook. f., Fl. Brit. India 3: 642. 1882; Gamble, Fl. Pres. Madras 810(569). 1923; Manilal & Sivar., Fl. Calicut 164. 1982; Ansari, Fl. Kasaragod Div. 226. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 52. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 274. 1988; Vajr., Fl. Palghat Dist. 278. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 277. 1996; Sivar. & P. Mathew, Fl. Nilambur 407. 1997; Mohanan & Sivad., Fl. Agasthyamala 434. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 307. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 418. 2000. *Echites scholaris* L., Mant. Pl. 1: 53.1767.*Pala* Rheede, Hort. Malab. 1:81-82, t.45. 1678.

Large trees; bark grey, corky. Leaves 13-18 x 4-6 cm, oblanceolate, obtuse, glabrous; lateral nerves 36-40, parallel; petiole 1-2 cm long. Cymes globose, in

panicled umbels, pedicels short, puberulus; sepals ovate, obtuse, puberulus; corolla tube broad, lobes ca. 4 mm across, obovate to orbicular, creamy yellow. Follicle 35-50 cm long, terete; seeds elliptic-oblong, papillose.
Flowering & Fruiting: October-February.
Distribution: South and south-east Asia to Australia. Common; in evergreen forests. *RNMK 2834,* Manikkunnumala; *RNMK 1444*, Vaduvanchal.

Alstonia venenata R. Br., Mem. Wern. Nat. Hist. Soc. 1: 77. 1811; Wight, Ic. t. 436. 1841; Hook. f., Fl. Brit. India 3: 642. 1882; Gamble, Fl. Pres. Madras 810(569). 1923; Manilal, Fl. Silent Valley 174. 1988; Vajr., Fl. Palghat Dist. 278. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 277. 1996; Sivar. & P. Mathew, Fl. Nilambur 409. 1997; Mohanan & Sivad., Fl. Agasthyamala 435. 2002.

Shrubs or small trees. Leaves 12-20 x 1.2-3 cm, linear-oblong, acuminate at both ends, 5 at each node; lateral nerves many, very close. Cymes terminal, to 20 cm across, corymbose; flowers many; pedicels stout, glabrous; sepals ca. 1 mm long, ovate, acute, ciliate; corolla tube slender, hairy inside; lobes ca. 1.3 cm long, oblong, acute, white. Follicle 8-16 cm long, 2-angled, acute; seeds smooth.
Flowering & Fruiting: February-August.
Distribution: Endemic to Peninsular India. Rare; in evergreen forests. *RNMK 3529,* Vaduvanchal.

BEAUMONTIA Wallich

Tent. Fl. Nep. 14. t. 7. 1824.

Beaumontia jerdoniana Wight, Ic. tt. 1314 & 1315. 1848; Hook. f., Fl. Brit. India 3: 661. 1882; Gamble, Fl. Pres. Madras 772(575). 1923; V. S. Ramach. & V.J. Nair, Fl. Cannanore 275. 1988. **Plate 23f.**

Large climbing woody shrubs. Leaves 10-12.5 x 7-8 cm, oblong-ovate, abruptly acuminate, cuneate at base. Flowers 5-7 cm long, white in terminal cymes; corolla funnel shaped or companulate, throat naked; lobes broad; stamens inserted on the corolla tube, filaments long, often spirally twisted, anthers sagittate; disk deeply 5-lobed; ovary 2-celled, ovules many. Fruit woody.
Flowering & Fruiting: November-December.
Distribution: Endemic to Western Ghats. Rare; in evergreen forests. *RNMK 0152,* Vythiri Ghats.

CARISSA Linnaeus

Syst. Nat. ed. 12, 2: 189. 1767. *nom. cons.*

Erect or climbing shrubs, spines axillary and in nodes. Flowers in terminal and axillary pedunculate cymes; calyx 5-partite, lobes ovate-lanceolate, acuminate, eglandular; corolla tube slightly widened above the middle, lobes shorter than the tube, overlapping to the right; stamens not exserted, attached to the middle of corolla tube; anthers free, linear-oblong, apiculate;

ovary 2-celled, cell few ovuled, stigma fusiform. Berry ellipsoid or globose; seeds 2, sometimes to 4, compressed.

1. Woody climbers .....**C. inermis**
1. Shrubs 2
2. Spines to 4. 5 cm long; leaves elliptic-oblong .....**C. carandas**
2. Spines to 3 cm long; leaves ovate-orbicular .....**C. spinarum**

Carissa carandas L., Mant. Pl. 1: 52. 1767; Hook. f., Fl. Brit. India 3:630. 1882; Gamble, Fl. Pres. Madras 804(565). 1923; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 420. 2009.

Armed shrubs, latex milky, dichotomously branched, spines forked at apex, ca. 4.5 cm. Leaves ca. 6 x 3.5 cm, elliptic-oblong, apex obtuse or emarginate, subcoriaceous; petiole ca. 0.5 cm. Cymes axillary and terminal, corymbose, puberulus; flowers white; calyx 5-lobed, ca. 2.5 mm, ovate, , aristate; corolla hypocrateriform, tube ca. 2 cm, pubescent, twisted, ca. 7 x 3 mm, ovate, pubescent; stamens ca. 2.5 mm, obtuse, mucronate, sessile; ovary ca. 1 mm, stigma fusiform, twisted. Berry ca. 2.5 cm across, black when ripe.
Flowering & Fruiting: January-June.
Distribution: Indo-Malesia. Occasional; in moist deciduous forests. *RNMK 3073,* Muthanga.

Carissa inermis Vahl, Symb. Bot. 3: 43. 1794; Gamble, Fl. Pres. Madras 805(565). 1923; Manilal, Fl. Silent Valley 174. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 275. 1988; Vajr., Fl. Palghat Dist. 279. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 278. 1996; Sivar. & P. Mathew, Fl. Nilambur 410. 1997. *Carissa macrophylla* Wall. ex A. DC. in DC., Prodr. 8:332.1844; Hook. f., Fl. Brit. India 3:691. 1882. **Plate 23g.**

Stout woody climbing shrubs; thorns 1-3 cm long, deflexed. Leaves 5-8 x 3-4 cm, ovate, acuminate at apex, rounded at base, glabrous; lateral nerves 6 or 7 pairs; petiole ca. 5 mm long. Flowers in sessile or peduncled terminal cymes; pedicel ca. 3 mm long, stout; sepals ca. 4 mm long, lanceolate, reddish, pubescent; corolla white, tube ca. 2 cm long, cylindric, curved, bulged towards the apex, lobes ca. 9 mm long, oblong, acute; stamens included, anthers lanceolate, inserted near the mouth of the corolla tube; carpels 2, united; ovules 1-4 in each. Berry ca. 2 cm across, globose, glabrous; seeds 2-4, compressed.
Flowering & Fruiting: January-June.
Distribution: Endemic to Peninsular India. Common; in evergreen forests. *RNMK 2784,* Chanthanathodu.

Carissa spinarum L., Mant. Pl. 2: 559. 1771; Hook. f., Fl. Brit. India 3: 631. 1882; Gamble, Fl. Pres. Madras 805(565). 1923; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 307. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist.

420. 2009. *Carissa diffusa* Roxb., Fl. Ind. 2: 524. 1824. *Carissa congesta* Wight, Ic. t. 1289. 1848; Gamble, Fl. Pres. Madras 805(565). 1923; Mohanan & Sivad., Fl. Agasthyamala 436. 2002.

Shrubs, spines to 3 cm, often forked. Leaves 3-5 x 2-3 cm, ovate-orbicular, apex acute, mucronate; petiole ca. 4 mm. Cymes terminal, to 7-flowered; calyx lobes ca. 3 mm, lanceolate, acuminate; corolla ca. 1.5 cm; lobes ca. 1 cm, oblong, acute; stamens 5, ca. 5 mm; ovary ca. 1 mm, style ca. 4 mm, stigma forked. Berry globose, 1.5-2 cm across.

Flowering & Fruiting: April-July.

Distribution: India, Sri Lanka and Myanmar. Rare; in evergreen forests. *RNMK 1531,* Banasuramala; *RNMK 1467*, Vythiri Ghats.

CATHARANTHUS G. Don

Gen. Hist. 4: 71, 95. 1837.

Catharanthus pusillus (Murr.) G. Don, Gen. Hist. 4: 95. 1837-1838; Manilal & Sivar., Fl. Calicut 165. 1982; Ansari, Fl. Kasaragod Div. 226. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 53. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 276. 1988; Vajr., Fl. Palghat Dist. 279. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 278. 1996; Sivar. & P. Mathew, Fl. Nilambur 411. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 308. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 421. 2009. *Vinca pusilla* Murr., Comment. Goetting. 3: 66. t. 2, f. 1. 1773; Hook. f., Fl. Brit. India 3: 640. 1882. *Lochnera pusilla* (Murr.) K. Schum. in Engl. & Prantl, Naturl. Pflanzenfam. 4(2): 145. 1895; Gamble, Fl. Pres. Madras 809(568). 1923.

Erect herbs. Leaves 3-7 x 0.5-2 cm, lanceolate, acute at both ends, lateral nerves 6-8 pairs, slender, faint; petiole 3-5 mm long, axils glandular. Flowers axillary, solitary or paired; calyx 5-partite, lobes subulate, eglandular; corolla white, hypocrateriform, tube ca. 7 mm long, inflated below the mouth, mouth pilose, lobes obovate ca. 2 mm long; stamens included, anthers narrowly ovate, distinct. Follicles 2-3 cm long; seeds black.

Flowering & Fruiting: April-October.

Distribution: India and Sri Lanka. Common; in disturbed moist deciduous forest. *RNMK 1883,* Muhtanga.

CHILOCARPUS Blume

Cat. Gew. Buitenz. 22. 1823.

Chilocarpus denudatus Blume, Bijdr. 1025. 1826; Markgraf, Blumea 19:65.1971; Sasidh. & Sivar., Fl. Pl. Thrissur For. 279. 1996; Sivar. & P. Mathew, Fl. Nilambur 412. 1997. *Chilocarpus atrovirens* (G. Don) Bl., Mus. Bot. Lugd.-Bat 1:153. 1850; Hook. f., Fl. Brit. India 3:626. 1882; Gamble, Fl. Pres. Madras 802(564). 1923; Vajr., Fl. Palghat Dist. 280. 1990. *Hunteria atrovirens* G.Don, Syst. 4:105. 1837. *Chilocarpus malabaricus* Bedd., Ic. t. 175. 1868-1874; V. S. Ramach. & V.J. Nair, Fl. Cannanore 277. 1988; Mohanan & Sivad., Fl. Agasthyamala 436. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 308. 2005.

Large glabrous climbers, old stem with warty tubercles, tender parts yellow, glabrous. Leaves 11-15 x 4-5 cm, oblong, abruptly acuminate, base acute glabrous; nerves many, parallel, close, forming an intramarginal vein; petiole ca. 1 cm long, yellow. Flowers in axillary panicled cymes; peduncle 5-6 cm long; pedicels to 3 mm long, slender; bracts small ovate; calyx ca. 1 mm long, lobes ovate, acute, united at the lower half; corolla yellow, ca. 5 mm long, glabrous, lobes small, obovate, twisted; stamens 5, included, inserted inside the middle of the tube; ovary 1-celled, ovules many, stigma oblong. Fruit a berry, 6-7 x 2-3 cm; seeds many, embedded in the yellow pulp.
Flowering & Fruiting: March-August.
Distribution: Indo-Malesia. Common; in semi-evergreen forests. *RNMK 2661,* Kurichiarmala.

CHONEMORPHA G. Don
Gen. Syst. 4: 76. 1836, *nom. cons.*

Chonemorpha grandiflora (Roth) M. R. & S. M. Almeida, J. Bombay Nat. Hist. Soc. 90: 427. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 279. 1996. *Echites grandiflora* Roth, Nov. Pl. Sp. 136. 1821. *Chonemorpha fragrans* (Moon) Alston, Ann. Roy. Bot. Gard. (Peradeniya) 11: 203. 1929; Manilal & Sivar., Fl. Calicut 162. 1982; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 54. 1988; Sivar. & P. Mathew, Fl. Nilambur 413. 1997; Mohanan & Sivad., Fl. Agasthyamala 437. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 309. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 423. 2009. Echites fragrans Moon, Cat. 20.1824. Echites macrophylla Roxb., Fl. Ind. 2:13. 1832. *Chonemorpha macrophylla* (Roxb.) G. Don, Gen. Syst. 4: 76. 1837; Wight, Ic.t. 432. 1841; Hook. f., Fl. Brit. India 3: 661. 1882; Gamble, Fl. Pres. Madras 818(575). 1923.*Belutta-kaka-kodi* Rheede, Hort. Malab. 9:7, t.5-6. 1989.

Large climbers; branches hispid. Leaves 15-20 x 14-18 cm, orbicular, obtuse, base cordate, densely tomentose above and below; nerves 10-12 pairs, regular, prominent arching below the margins; petiole 7-8 cm long. Flowers in terminal or axillary cymes; few together; pedicels stout, pubescent; calyx 5-lobed, lobes obovate, obtuse; corolla tube ca. 2.5 cm long, cylindrical, glabrous lobes 5, 5-6 x 3-3.5 cm; stamens 5, included, anthers sagitate, acuminate spurred below; carpels free; style cleft below, stigma conical. Mericarps to 30 cm long, terete, glabrous; seeds many, obovate, comose; coma to 5 cm long, many, cottony.
Flowering & Fruiting: April-December.
Distribution: India, Myanmar, Sri Lanka and Andaman and Nicobar Islands. Occasional; in semi-evergreen forests. *RNMK 3388,* Manikkunnumala.

HOLARRHENA R. Brown
Mem. Wern. Nat. Hist. Soc. 1: 62. 1811.

Holarrhena pubescens (Buch.-Ham.) Wall. ex G. Don, Gen. Hist. 4: 78. 1837-1838; Ansari, Fl. Kasaragod Div. 227. 1985; Nicols., Suresh & Manilal, An

Interpr. Hort. Malab. 55. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 277. 1988; Vajr., Fl. Palghat Dist. 280. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 280. 1996; Sivar. & P. Mathew, Fl. Nilambur 413. 1997; Mohanan & Sivad., Fl. Agasthyamala 438. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 309. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 424. 2009. *Echites pubescens* Buch.-Ham., Trans. Linn. Soc. London 13: 521. 1821. *Echites antidysenterica* Roth in Roem. & Schult., Syst. Veg. 4: 394. 1819, non (L.) Roxb. ex Flem. 1810. *Holarrhena antidysenterica* (Roth) A. DC. in DC., Prodr. 8: 413. 1844; Hook. f., Fl. Brit. India 3: 644. 1882; Gamble, Fl. Pres. Madras 811(570). 1923; Manilal & Sivar., Fl. Calicut 165. 1982. *Holarrhena malaccensis* Wight, Ic. t. 1298. 1848. *Codaga-pala* Rheede, Hort. Malab. 1:85-86, t.47.1678. **Plate 23h.**

Large shrubs or small trees. Leaves opposite, 10-18 x 5-10 cm, ovate-oblong, abruptly acuminate at apex, rounded and oblique at base; nerves 10-13 pairs, prominent; petiole ca. 5 mm long. Flowers in terminal or axillary cymes; cymes 5-10 cm across; bracts lanceolate, glabrous; pedicels ca. 1.5 cm long, slender, glabrous; calyx ca. 3 mm long, lobes lanceolate; corolla yellowish white, tube ca. 10 mm long, pubescent outside, glabrous within; lobes ca. 13 x 6 mm, oblong, obtuse; stamens 5, included, anthers linear, mucronate, obtuse at base; ovary of 2 free carpels; ovules many, stigma oblong, bifid above. Mericarps 25-40 cm long, terete; seeds 1-2 cm long, linear oblong, acute, concave, comose.

Flowering & Fruiting: April-October.

Distribution: Indo-Malesia. Common; in moist deciduous forests. *RNMK 0768,* Chedeleth; *RNMK 2476*, Muthanga

HUNTERIA Roxburgh

Hort. Beng. 84. 1814.

Hunteria zeylanica (Retz.) Gard. ex Thw., Enum. Pl. Zeyl. 191. 1860; Pandura. *et al.*, J. Econ. Tax. Bot. 6: 271. 1985; Manilal, Fl. Silent Valley 174. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 280. 1996. *Cameraria zeylanica* Retz., Obs. Bot. 4: 24. 1786. *Hunteria corymbosa* Roxb., Fl. Ind. 1: 695. 1832; Hook. f., Fl. Brit. India 3: 637. 1882; Gamble, Fl. Pres. Madras 808(568). 1923; Vajr., Fl. Palghat Dist. 281. 1990. *Hunteria roxburghiana* Wight, Ic. t. 1294. 1848.

Small trees, young shoots glabrous, bark thick, yellowish-grey, with small lenticular tubercles. Leaves 11-15 x 2-4 cm, elliptic or oblong-lanceolate, apex acuminate, base obtuse or rounded, glabrous, coriaceous; petiole to 1.5 cm long. Cymes terminal and axillary. Flowers white, ca. 1.5 cm long; calyx lobes ca. 1.5 mm long, glabrous; corolla creamy white, tube ca. 0.8 mm long, lobes acuminate; stamens included, attached to the middle of the corolla tube, anthers apiculate; carpels distinct. Drupes ca. 2.5 cm long, ovoid, yellow.

Flowering & Fruiting: February-June.

Distribution: Indo-Malesia. Rare; in evergreen forests. *RNMK 3765,* Vythiri.

ICHNOCARPUS R. Brown

Mem. Wern. Nat. Hist. Soc. 1: 61. 1811.

Ichnocarpus frutescens (L.) R. Br. in Ait.f., Hort. Kew. (ed. 2) 2: 69. 1811; Hook. f., Fl. Brit. India 3: 669. 1882; Gamble, Fl. Pres. Madras 820(577). 1923; Manilal & Sivar., Fl. Calicut 162. 1982; Ansari, Fl. Kasaragod Div. 228. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 55. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 278. 1988; Vajr., Fl. Palghat Dist. 281. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 280. 1996; Sivar. & P. Mathew, Fl. Nilambur 414. 1997; Mohanan & Sivad., Fl. Agasthyamala 439. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 311. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 424. 2009. *Apocynum frutescens* L., Sp. Pl. 213. 1753.*Pal-valli* Rheede, Hort. Malab.9:19, t.12.1689.

Climbers, branchlets brown-tomentose. Leaves opposite, 4-6 x 2-3 cm, ovate, obtusely acute, rounded at base; nerves 5-6 pairs, golden brown-pubescent below; petiole to 5 mm long. Flowers ca. 3.5 mm long, in terminal or axillary panicled cymes; pedicels ca. 3 mm long; calyx ca. 1 mm long, 5-lobed, lobes ovate, acute, pubescent; corolla white, salver shaped, contracted at mouth, tube ca. 2 mm long, hairy inside, throat densely white-villous; lobes twisted, oblong, acuminate; stamens 5, included, anthers deeply sagitate at base, apiculate at apex; carpels free, stigma columnar. Mericarps follicular, 13-15 cm long, slender, rusty puberulus; seeds many, compressed, crowned with long silky coma.

Flowering & Fruiting: August-March.

Distribution: Indo-Malesia and Australia. Common; in moist deciduous forests. *RNMK 3562,* Muthanga.

KAMMETIA Kosteletzky

Allg. Med. Pharm. Fl. 3: 1062. 1834.

Kammetia caryophyllata (Roxb.) Nicols. & Suresh, Taxon 35: 354. 1986; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 55. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 278. 1988; Mohanan & Sivad., Fl. Agasthyamala 440. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 311. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 425. 2009. *Echites caryophyllata* Roxb., Hort. Bengal 20. 1814. *Ellertonia rheedei* Wight, Ic. t.1295. 1848; Hook. f., Fl. Brit. India 3: 641. 1882; Gamble, Fl. Pres. Madras 811(570). 1923; Manilal & Sivar., Fl. Calicut 162. 1982. *Kametti-valli* Rheede, Hort. Malab. 9: 23-24, t. 14-1689. **Plate 23i.**

Large climbers, glabrous, tender stem reddish. Leaves 3-4 at nodes, 8-12 x 4-5 cm, oblong, apex abruptly acuminate, nerves to 14 pairs; petiole ca. 5 mm long. Flowers in terminal peduncled cymes; bracts subulate; calyx ca. 2 mm long, lobes acuminate, glabrous, reddish; corolla tube ca. 1 cm long, curved, lobes ca. 5 mm long, oblong, obtuse; stamens included, anthers penicillate at apex; carpels free, style filiform, stigma oblong, 2-fid at apex. Follicles 8-11 cm long, divaricate, linear, terete; seeds many, ca. 2 cm long, oblanceolate, winged.

Flowering & Fruiting: September-January.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3651,* Palchuram.

PARSONSIA R. Brown
Asclepiadeae 53. 1811, *nom. cons.*

Parsonsia inodora (Lour.) M. R. & S. M. Almeida, J. Bombay Nat. Hist. Soc. 90: 428. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 281. 1996; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 426. 2009. *Cynanchum inodorum* Lour., Fl. Cochinch. 166. 1790. *Parsonsia alboflavescens* (Dennst.) Mabb., Taxon 26: 532. 1977; Manilal & Sivar., Fl. Calicut 163. 1982; Ansari, Fl. Kasaragod Div. 228. 1985; Manilal, Fl. Silent Valley 175. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 279. 1988; Vajr., Fl. Palghat Dist. 282. 1990; Sivar. & P. Mathew, Fl. Nilambur 416. 1997; Mohanan & Sivad., Fl. Agasthyamala 440. 2002. *Periploca alboflavescens* Dennst., Schluss. Hort. Malab. 23, 35. 1818. *Parsonsia spiralis* Wall. ex G. Don, Gen. Syst. 4: 80. 1837-1838; Hook. f., Fl. Brit. India 3: 650. 1882; Gamble, Fl. Pres. Madras 814(572). 1923. *Heligme rheedei* Wight, Ic. t. 1303. 1848. **Fig. 39.**

Twining shrubs; stem glabrous, green. Leaves 13-17 x 6-10 cm, elliptic-oblong, rounded at base, abruptly acuminate at apex, glabrous; nerves 4 or 5 pairs; petiole ca. 2 cm long. Flowers in axillary peduncle cymes; peduncles ca. 8 cm long, glabrous, pedicel ca. 6 mm long; sepals ovate, acute; corolla greenish yellow, tube ca. 1 cm long, mouth with a ring of hairs, lobes oblong, spreading, ca. 6 mm long; stamens 5, inserted at the base of the corolla tube, filaments twisted around the style; anthers ca. 4 mm long, lanceolate, connivent and adnate with the stigma; carpels 2, partly connated; ovules many; style filiform, stigma columnar. Follicle lanceolate, terete, cohering till maturity; seeds linear, comose by long silky hairs.
Flowering & Fruiting: March-April. *Distribution*: Indo-Malesia and South China Common in evergreen forests. *RNMK 1188,* Kunchome.

RAUVOLFIA Linnaeus
Sp. Pl. 208. 1753.

Shrubs; branchlets glabrous. Leaves in whorls of 3 or 4, simple, entire, petiolate. Inflorescence axillary or terminal cymes. Flowers pedicelled; sepals 5, free; corolla tube cylindric, constricted near the apex, hairy within; lobes twisted to the left; stamens included, filaments very short; anthers obtuse at base; carpels 2, basely connate, bi-ovulate; style slender; stigma bifid at apex. Drupe 2, fused at base, 1-seeded.

1. Leaves pubescent ..... **R. tetraphylla**
1. Leaves glabrous..... .2
1. Drupes obliquely ovoid; seeds smooth; peduncles red..... **R. serpentina**
1. Drupes ellipsoid; seeds rugose; peduncles green..... **R. verticillata**

Rauvolfia serpentina (L.) Benth. ex Kurz, For. Fl. Burma 2: 171. 1877; Hook. f., Fl. Brit. India 3: 632. 1882; Gamble, Fl. Pres. Madras 807(567). 1923; Manilal & Sivar., Fl. Calicut 164. 1982; Ansari, Fl. Kasaragod Div. 229. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 57. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 279. 1988; Vajr., Fl. Palghat Dist. 282. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 282. 1996; Sivar. & P. Mathew, Fl. Nilambur 417. 1997; Mohanan & Sivad., Fl. Agasthyamala 443. 2002; N. Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 313. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 427. 2009. *Ophioxylon serpentinum* L., Sp. Pl. 1043. 1753. *Tsjovanna-ampelodi* Rheede, Hort. Malab. 6:81-82, t.47.1686.

Shrubs, to 1 m high; rootstock thick, sap watery. Leaves 6-10 x 3-5 cm, oblanceolate, acuminate at either ends, glabrous; lateral nerves to 12 pairs. Cymes axillary and terminal, densely flowered; peduncles to 5 cm long. Flowers white; sepals ca. 4 mm long, oblong, acute; corolla tube ca. 1.5 cm long, lobes ca. 5 mm long, oblong, obtuse. Capsule 5-6 x 4-5 mm, ovoid, obtuse, black, smooth.

Flowering & Fruiting: April-October.

Distribution: South and south east Asia. Occasional; in moist deciduous forests. *RNMK 2770,* Muthanga.

Rauvolfia tetraphylla L., Sp. Pl. 208. 1753; Manilal & Sivar., Fl. Calicut 165. 1982; Ansari, Fl. Kasaragod Div. 230. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 279. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 282. 1996; Sivar. & P. Mathew, Fl. Nilambur 417. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 429. 2009. *Rauvolfia canescens* L., Sp. Pl. (ed. 2) 303. 1762; Gamble, Fl. Pres. Madras 808(568). 1923.

Shrubs to 2 m tall, branchlets pubescent. Leaves 4-10 x 2-5 cm long, broadly elliptic or obovate, acuminate, base acute, shortly pubescent. Cymes terminal and axillary, peduncle to 2 cm long; calyx lobes orbicular, ciliate, peduncle to 2 cm long; corolla white, ca. 4 mm long, lobes ovate, throat villous. Capsule 6-8 mm across, globose, purple.

Flowering & Fruiting: Throughout the year.

Distribution: Introduced from West Indies; now naturalised in western Peninsular India. Occasional; in moist deciduous forests. *RNMK 1095,* Tholpetty.

Rauvolfia verticillata (Lour.) Baill., Bull. Soc. Linn. Paris 1: 768. 1888; V. S. Ramach. & V.J. Nair, Fl. Cannanore 280. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 282. 1996; Sivar. & P. Mathew, Fl. Nilambur 418. 1997; Mohanan & Sivad., Fl. Agasthyamala 444. 2002. *Dissolena verticillata* Lour., Fl. Cochinch. 137. 1790. *Tabernaemontana densiflora* Wall., Bot. Reg. 15: t. 1273. 1829. *Rauvolfia densiflora* (Wall.) Benth. In Benth. & Hook. f., Fl. Brit. India 3: 633. 1882; Gamble, Fl. Pres. Madras 808(567). 1923; Manilal, Fl. Silent Valley 175. 1988. *Ophioxylon neilgherrense* Wight, Ic. t. 1292. 1848. *Ophioxylon ceylanicum* Wight, Ic. t. 1291.1848. **Plate 23j.**

Shrubs with milky latex, to 1.5 m high. Leaves 14-16 x 5-6 cm, obovate, abruptly acuminate, base acute to attenuate, subcoriaceous; lateral nerves 12-14 pairs, prominent, nervules slender; petiole 2-3 cm long. Cymes terminal or axillary; peduncles 5-8 cm long; flowers white; pedicels ca. 1 cm long; calyx lobes acuminate, glabrous, reddish; corolla ca. 1 cm long, lobes ovate, acute. Capsule ca. 1 x 0.7 cm, oblong, smooth, black.
Flowering & Fruiting: March-October. *Distribution*: South and south-east Asia. Occasional; in evergreen forests. *RNMK 2892,* Chembra.

TABERNAEMONTANA Linnaeus
Sp. Pl. 210. 1753.

Shrubs or small trees with corky bark. Leaves opposite, elliptic, glabrous. Inflorescence axillary or terminal corymbose cyme with dichotomous branches, glabrous. Flowers pedicellate; calyx 5-lobed, lobes usually free, glandular; corolla tube cylindric, dialated at mouth, villous inside; lobes 5, oblong, spreading, white; twisted in bud; stamens included; anthers sagitate at base, linear; carpels distinct, few to many-ovulate; style 1, long, bifid at tip. Fruit a curved mericarps opening along the ventral sutures; seeds 1-many, arillate, grooved.

1. Calyx lobes ciliate along margins; capsule 1-seeded ..... .**T. gamblei**
1. Calyx lobes not ciliate along the margins; capsule many seeded ..... .**T. alternifolia**

Tabernaemontana alternifolia L., Sp. Pl. 211.1753; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 57. 1988; Sivar. & P. Mathew, Fl. Nilambur 418. 1997; Mohanan & Sivad., Fl. Agasthyamala 445. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 313. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 431. 2009. *Tabernaemontana heyneana* Wall., Bot. Reg. 15: t. 1273. 1829; Hook. f., Fl. Brit. India 3: 646. 1882; Manilal & Sivar., Fl. Calicut 166. 1982; Ansari, Fl. Kasaragod Div. 230. 1985; Vajr., Fl. Palghat Dist. 283. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 283. 1996. *Ervatamia heyneana* (Wall.) Cooke, Fl. Pres. Bombay 2:134.1904; Gamble, Fl. Pres. Madras 813(572).1923; V. S. Ramach. & V.J. Nair, Fl. Cannanore 277. 1988. *Curutu-pala* Rheede, Hort.Malab.1:83-84, t.46.1678. **Plate 23k.**

Large shrubs or small trees; bark corky with shallow fissures; branches white. Leaves 17-18 x 6-7 cm, elliptic-oblong, acuminate at apex, acute at base; lateral nerves 12-15 pairs; petiole ca. 2 cm long. Cymes terminal or axillary; peduncles to 4 cm long. Flowers pedicellate; calyx ca. 4 mm long, lobes short, oblong, obtuse; corolla white, tube ca. 2.5 cm long; lobes ca. 1.5 cm long, oblong, obtuse, apex crisped. Capsule yellow, 5-6 x 1-1.5 cm, beak acuminate; aril red.
Flowering & Fruiting: April-October.
Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 2336,* Pookodu.

Tabernaemontana gamblei Subram. & Henry, Bull. Bot. Surv. India 12: 1. 1970; Vajr., Fl. Palghat Dist. 283. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 282. 1996; Mohanan & Sivad., Fl. Agasthyamala 446. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 314. 2005. *Ervatamia caudata* Gamble, Bull. Misc. Inform. Kew 1921: 310. 1921 & Gamble, Fl. Pres. Madras 813(571). 1923, non *Tabernaemontana caudata* Merr. 1909.

Shrubs, to 1.5 m high; branchlets white. Leaves opposite, often unequal, 5-10 x 2-4 cm, elliptic, caudate acuminate, acute at base, lateral nerves 7 pairs, petiole ca. 1 cm long. Cymes terminal; flowers white; pedicels stout, ca. 1 cm long; sepals ovate, obtuse; corolla tube to 1.7 cm long, cylindrical; lobes ca. 1.5 cm long, oblong, obtuse. Capsule ca. 3 x 1.25 cm, not curved; aril red.
Flowering & Fruiting: April-September.
Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 1606,* Thirunelli.

VALLARIS Burman
Fl. Ind. 51. 1768.

Vallaris solanacea (Roth) O. Ktze., Rev. Gen. Pl. 2: 417. 1891; Gamble, Fl. Pres. Madras 815(572). 1923; Manilal & Sivar., Fl. Calicut 162. 1982; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 432. 2009. *Peltanthera solanacea* Roth, Nov. Pl. Sp. 132. 1821. *Vallaris heynei* Spreng., Syst. Veg. Veg. 1: 635. 1825; Hook. f., Fl. Brit. India 3: 650. 1825. *Vallaris dichotoma* (Roxb.) Wall. ex G. Don, Gen. Hist. 4: 79. 1837-1838. *Echites dichotoma* Roxb., Fl. Ind. 2:19.1832.

Twining shrubs. Leaves 5-8 x 3-4 cm, elliptic-lanceolate, minutely dotted. Flowers white, in axillary or supra-axillary dichotomous cymes, often reduced to fasciles; calyx 5 lobed, glandular, lobes narrow; corolla salver shaped or sub rotate, throat naked, lobes broad, spreading, overlapping to the right; stamens inserted at the top of the tube of the corolla; filaments short; disk annular or copular, 5 lobed. Fruit of 2 follicles; seeds 2-seriate,
Flowering & Fruiting: September-March.
Distribution: Sri Lanka through India to Himalayas, Bangladesh, Myanmar, south China and Indo-China. Rare; in moist deciduous forests. *RNMK 2787,* Naikuppa.

WRIGHTIA R. Brown
Mem. Wern. Nat. Hist. Soc. 1: 73. 1811.

Small trees or large shrubs. Leaves opposite; petiolate. Flowers in terminal cyme, peduncled or sessile; calyx 5-lobed, short; corolla tube cylindric, throat with simple or lobbed corona, lobes twisted, spreading; stamens 5, inserted on the mouth of corolla tube; anthers exserted, sagitate, connivent around the stigma, spurred at base; carpels 2, free; ovules many; style-1, filiform, stigma with a fimbriate, basal ring. Fruit a pair of terete follicles, connate at apex or free; seeds linear, many, comose at base.

1. Branchlets tomentose; follicles fused..... **W. arborea**
1. Branchlets glabrous; follicles fused at the tip only..... .**W. tinctoria**

Wrightia arborea (Dennst.) Mabb., Taxon 26: 533. 1977; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 59. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 280. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 283. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 314. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 435. 2009. *Periploca arborea* Dennst., Schluss. Hort. Malab. 23, 25. 1818. *Wrightia tomentosa* Roem. & Schult., Syst. Veg. 4: 414. 1819; Wight, Ic. t. 443. 1841; Hook. f., Fl. Brit. India 3: 653. 1882; Gamble, Fl. Pres. Madras 816(573). 1923. *Nelam-pala* Rheede, Hort. Malab. 9:5, t 3-4.1689.

Small trees; branchlets pubescent. Leaves 8-10 x 4-6 cm, elliptic, acuminate at apex, base acute, scabrous above; nerves 9 or 10 pairs, regular; petiole ca. 5 mm long. Cymes terminal, sessile. Flowers reddish brown; pedicels ca. 1 cm long, stout; sepals ca. 4 mm long, obtuse, hairy; corolla tube ca. 5 mm long, lobes ca. 1.5 x 1 cm, obovate, puberulus; corona thick, erect, toothed, reddish brown; anthers conical, ca. 8 mm long, hairy. Follicles 14-16 x 1.5-2 cm, subterete, sparsely white-tubercled.

Flowering & Fruiting: April-December.

Distribution: Indo-Malesia. Common; in semi-evergreen and moist deciduous forests. *RNMK 2409,* Muthanga.

Wrightia tinctoria (Roxb.) R. Br., Mem. Wern. Nat. Hist. Soc. 1: 47. 1811; Wight, Ic. t.444.1841; Hook. f., Fl. Brit. India 3: 653. 1882; Gamble, Fl. Pres. Madras 815(573). 1923; Ansari, Fl. Kasaragod Div. 230. 1985; Manilal, Fl. Silent Valley 175. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 281. 1988; Vajr., Fl. Palghat Dist. 283. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 283. 1996; Sivar. & P. Mathew, Fl. Nilambur 420. 1997; Mohanan & Sivad., Fl. Agasthyamala 446. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 314. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 436. 2009. *Nerium tinctorium* Roxb., Orient. Repert. 1: 39. 1791.

Small trees; branchlets white, glabrous. Leaves 8-10 x 3-3.5 cm, elliptic-oblong, acuminate, base acute; nerves 7-10 pairs; petiole 3-5 mm long. Cymes peduncled, terminal; pedicels 10-12 mm long, slender; bracts ovate. Flowers white; sepals ovate, obtuse, ciliate; corolla tube ca. 4 mm long, broad, lobes ca. 12 x 5 mm, oblong, obtuse; corona many, erect, linear; anthers acuminate, coriaceous, ca. 6 mm long. Mericarps 26-30 cm long, terete, joined at apex, glabrous; seeds oblong.

Flowering & Fruiting: February-November.

Distribution: India, Myanmar and Timor. Common; in evergreen and semi-evergreen forests. *RNMK 3343,* Manikkunnumala; *RNMK 2222*, Meenmutti.

Allamanda cathartica L., **Catharanthus roseus** (L.) G. Don, **Kopsia fruticosa** (Ker-Gawl.) A. DC., **Nerium oleander** L., **Plumeria alba** L., **Plumeria rubra** L., **Tabernaemontana divaricata** (L.) R. Br., **Thevatia peruviana** (Pers.) Merr. and **Vocanga grandiflora** (Miq.) Rolfe, are widely cultivated as garden plants and many of these species are now run in wild and naturalised in the district.

ASCLEPIADACEAE R. Br.

Asclepideae 12,19. 1810.

1. Plant leafless; stem succulent..... **Sarcostemma**
1. Plant leafy; stem not succulent.....2
2. Erect shrubs 3
2. Twiners, lianas or epiphytic subshrubs 4
3. Corolla pale purple to greenish-white; gynostegium violet..... **Calotropis**
3. Corolla crimson; gynostegium yellow..... **Asclepias**
4. Epiphytes; leaves thick, fleshy..... **Hoya**
4. Terrestrial; leaves not fleshy.....5
5. Corolla tube elongated, more than 1.2 cm long..... **Ceropegia**
5. Corolla tube short, less than 7 mm long.....6
6. Corolla lobes alternating with fleshy ridges within the sinus.....7
6. Corolla lobes without ridges inside 8
7. Coronal ridges not produced beyond the sinus of corolla lobes; internode with 2 lines of pubescence..... **Bidaria**
7. Coronal ridges produced beyond the sinus of corolla lobes; pubescence of internode not in 2 lines..... **Gymnema**
8. Corolla divided to the base; follicles compressed, winged..... **Cynanchum**
8. Corolla shortly lobed or divided to half the length; follicles terete.....9
9. Corona 2-seriate..... **Pergularia**
9. Corona uniseriate.....10
10. Corona segments with a fleshy tooth at apex..... **Wattakaka**
10. Corona segments entire.....11
11. Corona cupular..... **Holostemma**
11. Corona otherwise 12
12. Corona lobes tubercle-like..... **Tylophora**
12. Corona lobes not tubercle-like..... **Marsdenia**

ASCLEPIAS Linnaeus

Sp. Pl. 214. 1753.

Asclepias curassavica L., Sp. Pl. 215. 1753; Hook. f., Fl. Brit. India 4: 18. 1883; Gamble, Fl. Pres. Madras 833(585). 1923; Manilal & Sivar., Fl. Calicut 170. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 282. 1988; Vajr., Fl. Palghat Dist. 293. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 284. 1996; Sivar. & P. Mathew, Fl. Nilambur 422. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 322. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 437. 2009.

Herbs, to 1 m tall; stem terete, glabrous, glaucous. Leaves lanceolate to linear-lanceolate, 9-10 x 2-3 cm, glabrous; nerves 8-13 pairs, narrow; petiole ca. 1 cm long. Flowers in axillary peduncled cyme; peduncle to 5 cm long, solitary, erect, dichotomous; pedicels 6-15 together, 1.5-2 cm long, slender; sepals ca. 2.5 mm long, ovate; corolla ca. 1.2 cm across, tube short, lobes oblong, yellow, deflexed; coronal lobes yellow, ca. 7 mm long. Follicle 5-7 x 1-1.5 cm, terete or fusiform; seeds many, comose.

Flowering & Fruiting: February-November.
Distribution: Originally from Tropical America; now naturalised throughout the tropics. Occasional; in open disturbed forests and wetlands. *RNMK 3355*, Muttil; *RNMK 3798*, Tholpetty.

BIDARIA (Endlicher) Decaisne
in DC., Prodr. 8: 623. 1844.

Bidaria montana (Roxb.) Rahman & Wilcock, Blumea 34: 99. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 285. 1996. *Asclepias montana* Roxb., Fl. Ind. 2: 45. 1832. *Gymnema tingens* (Roxb.) Wight & Arn. var. *ovalifolia* Wight, Ic. t. 592. 1842. *Gymnema montanum* (Roxb.) Hook. f., Fl. Brit. India 4: 31. 1883; Gamble, Fl. Pres. Madras 840(590). 1923; Manilal, Fl. Silent Valley 178. 1988.

Glabrous twining shrubs; branchlets terete. Leaves 14-16 x 8-10 cm, of branchlets much smaller, ovate or oblong, acute or acuminate, base truncate or rounded with few small glands; lateral nerves 5-7 pairs, reticulations prominent; petiole to 2-3.5 cm long. Peduncles ca. 0.5 cm long, stout; flowers 5-30 together; pedicels 6-7 mm long; slender, pubescent; calyx lobes linear-oblong, ciliate, ca. 2 mm long; corolla greenish white, glabrous, tube ca. 3 mm long, globose, lobes ca. 3 x 2 mm, oblong; corolline corona 5 pairs of densely pubescent ridges; gynostegium ca. 4 x 2 mm, ridged.
Flowering & Fruiting: April-May.
Distribution: India. Rare; in evergreen forests. *RNMK 2777,* Chooralmala.

CALOTROPIS R. Brown
Mem. Wern. Nat. Hist. Soc. 1: 39. 1811.

Calotropis gigantea (L.) R. Br. in Aiton.f., Hort. Kew (ed. 2) 2: 78. 1811; Hook. f., Fl. Brit. India 4: 17. 1883; Gamble, Fl. Pres. Madras 832(585). 1923; Manilal & Sivar., Fl. Calicut 170. 1982; Ansari, Fl. Kasaragod Div. 231. 1985; Manilal, Fl. Silent Valley 176. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 61. 1988; Vajr., Fl. Palghat Dist. 285. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 285. 1996; Sivar. & P. Mathew, Fl. Nilambur 423. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 315. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 439. 2009. *Asclepias gigantea* L., Sp. Pl. 214. 1753. *Ericu, Bel-ericu* Rheede, Hort. Malab. 2;53-56, t.31.1679.

Shrubs, to 1.5 m tall; stem rounded. Leaves 16-18 x 6-10 cm, of branchlets much smaller; elliptic-ovate to obovate, acute or obtuse, base cordate; lateral nerves 5-7 pairs, adpressed pubescent when young, becoming glabrous on maturity. Flowers pale purple or greenish-white, ca. 3 cm across; peduncle 5-7 cm long; pedicels to 3 cm long, stout; calyx lobes to 3 mm long; corolla campanulate, tube short, lobes ovate to oblong, recurved; staminal corona 5 vertical lobes, ca. 1 cm long. Fruit saccate, 5-6 x 2-3 cm, ovoid; seeds many.
Flowering & Fruiting: Throughout the year.
Distribution: Tropical Asia. Occasional; in moist deciduous forest. *RNMK 1609,* Mananthavady; *RNMK 2305,* Muthanga.

CEROPEGIA Linnaeus

Sp. Pl. 211. 1753.

Twining or rarely erect herbs with depressed globose tubers or with tuberous roots; latex watery. Leaves opposite, membranous or rarely absent. Flowers 1-10 together, on sessile or peduncled axillary cymes; calyx 5-fid to the base; corolla tubular, globose at base, broaden at mouth, usually with reflexed hairs inside, lobes attenuated and connate at apex; corona usually 2-seriate; outer entire, retuse, bifid or rarely absent, inner lobes 5, entire, erect; anthers without appendages; pollinia solitary from each anther cell, horizontal or erect; carpels free; stigma conical. Follicle lanceolate or linear, terete.

1. Flowers 5-8 cm long ..... **C. metziana**
1. Flowers to 4 cm long 2
2. Leaves to 11 cm long; inner corona spathulate ..... **C. decaisneana**
2. Leaves to 5 cm long; inner corona linear..... **C. elegans**

Ceropegia decaisneana Wight, Ic. t. 1259. 1848; Hook. f., Fl. Brit. India 4: 73. 1883; Gamble, Fl. Pres. Madras 859(604). 1923; M. Y. Ansari, Fasc. Fl. India 16: 13. 1984; Vajr., Fl. Palghat Dist. 286. 1990; Bruyns, Rheedea 7: 109. 1997; Sivar. & P. Mathew, Fl. Nilambur 424. 1997.

Twiners, root tuberous. Leaves 10-11 x 1-1.5 cm, linear lanceolate, apex apiculate, base obtuse, membranous; petiole 1-1.5 cm long. Cymes axillary; peduncle 8-10 cm long; pedicels 1-1.2 cm long; calyx linear, 3-4 mm long; corolla base inflated, tube 2-2.5 cm long, lobes 1.3-1.5 cm long, lanceolate; corona outer ca. 1 mm, inner spathulate, ca. 2 mm.

Flowering & Fruiting: October-December.

Distribution: Endemic to Western Ghats; Rare in evergreen forests. *RNMK 1807,* Kallady-900 Forest.

Ceropegia elegans Wall. in Curtis, Bot. Mag. 57: t. 3015. 1830; Hook. f., Fl. Brit. India 4: 68. 1883; Gamble, Fl. Pres. Madras 857(602). 1923; Ansari, Fasc. Fl. India 16: 14. 1984; V. S. Ramach. & V.J. Nair, Fl. Cannanore 282. 1988; Bruyns, Rheedea 7: 111. 1997; 30; Mohanan & Sivad., Fl. Agasthyamala 448. 2002. *Ceropegia mysorensis* Wight, Ic. t. 846. 1844-1845; Hook. f., Fl. Brit. India 4: 69. 1883; Gamble, Fl. Pres. Madras 857(602). 1923. *Ceropegia walkeriae* Wight, Ic. t. 1266. 1848; Hook. f., Fl. Brit. India 4: 69. 1883; Gamble, Fl. Pres. Madras 857(602). 1923.

Twiners. Leaves 3-4 x 2-3 cm, ovate, lanceolate, apex acute, base slightly cordate, membranous; petiole 1.2-1.5 cm. Cymes axillary; peduncles 1.5-1.7 cm long; pedicels 1-1.3 cm long; calyx 2-3 mm long, linear; corolla base bulbous, mouth broadly widened, tube, 1.8-2 cm long, curved, lobes 5, 1-1.2 x 0.5-0.6 cm, triangular, ovate, obtusely apiculate; outer corona lobes 5, deeply 2-fid, ca. 2 mm long; inner lobes 5, ca. 2 mm long, linear.

Flowering & Fruiting: June-December.

Distribution: Peninsular India and Sri Lanka. Occasional; in evergreen forests. *RNMK 2005,* Chandanathode.

Ceropegia metziana Miq., Ann. Bot. Ind. 3: 11. 1852; M.Y. Ansari, Fasc. Fl. India 16: 25. 1984; Sasidh. & Swarup., J. Econ. Tax. Bot. 18: 633. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 286. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 317. 2005. *Ceropegia gracilis* Bedd., Madras J. Lit. Sci. ser. 3, 1: 53. 1864. *Ceropegia brevicollis* Hook. f., Fl. Brit. India 4: 74. 1883, p. p.; Gamble, Fl. Pres. Madras 859(604). 1923,p.p. *Ceropegia stocksii* sensu Gamble, Fl. Pres. Madras 859(604). 1923, non Hook. f. 1883. **Plate 23 1.**

Twining herbs, stems pubescent at nodes. Leaves 13-15 x 4-5 cm, ovate or ovate-oblong, acute or acuminate, mucronate, base acute; petiole 2-3 cm long. Peduncle 1.5-2 cm long, glabrous or hairy. Flowers few together; pedicels 2-2.5 cm long, stout; sepals 7-8 mm long, linear; corolla 7-7.5 cm long, base inflated, funnel-shaped above, lobes 3-3.5 cm long, ovate-deltoid, dull pink with purple dots; outer corona ca. 6 mm across, lobes deltoid, bifid, hairy; inner corona ca. 2.5 mm long, glabrous. Follicle 23-28 cm long, 5-7 mm thick, terete, with ca. 5 cm long beak; seeds oblong.

Flowering & Fruiting: September-November.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2609, Aranamala*.

CYNANCHUM Linnaeus

Sp. Pl. 212. 1753.

Cynanchum callialatum Buch.-Ham. ex Wight & Arn. in Wight, Contrib. India Bot. 56. 1834 & Ic. t. 1274. 1848; Hook. f., Fl. Brit. India 4: 24. 1883; Gamble, Fl. Pres. Madras 836(588). 1923; Manilal, Fl. Silent Valley 178. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 283. 1988; Vajr., Fl. Palghat Dist. 288. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 288. 1996; Sivar. & P. Mathew, Fl. Nilambur 425. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 319. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 440. 2009.

Twiners. Leaves 5-8 x 3-4.5 cm, elliptic-oblong or linear-oblong, acute, base cordate, glabrous, glaucous below, lateral nerves 7-9 pairs, intercostae faint; petiole 2-2.5 cm long. Cymes umbellate, axillary; peduncles 3-4 cm long; flowers small; calyx 5-partite; corolla white, 0.5-0.6 cm long, divided nearly to the base, lobes oblong, acute; corona of 5 erect obtuse, bifid lobes, with shorter lobes between them; pollinia waxy, without pellucid margins; style conical at apex.

Flowering & Fruiting: October-March.

Distribution: India and Myanmar. Occasional; in evergreen forests. *RNMK 1055,* Chanthanathodu.

GYMNEMA R. Brown

Mem. Wern. Nat. Hist. Soc. 1: 33. 1811.

Gymnema sylvestre (Retz.) R. Br. ex Schult. in Roem. & Schult., Syst. Veg. 6: 57. 1820; Wight, Contrb. Bot. India 44. 1834 & Ic. t. 349. 1840; Hook. f., Fl. Brit. India 4: 29. 1883; Gamble, Fl. Pres. Madras 839(590). 1923; Manilal &

Sivar., Fl. Calicut 169. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 283. 1988; Vajr., Fl. Palghat Dist. 289. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 289. 1996; Sivar. & P. Mathew, Fl. Nilambur 426. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 441. 2009. *Periploca sylvestris* Retz., Obs. Bot. 2: 15. 1781. **Plate 24a.**

Climbers; branchlets fulvous-tomentose. Leaves 5-7 x 4-5 cm, often much smaller, elliptic to ovate or obovate, obtusely acute, base truncate or obtuse, subcoriaceous, densely tomentose below; nerves 3-4 pairs; petiole 1-3 cm long. Flowers 4-5 mm across, umbellate, many together; peduncle 1-1.3 cm long, hispid; pedicels 6-7 mm long, slender; sepals 1.5-2 mm long, ovate; corolla campanulate, yellow, 2-2.5 mm long, tube globose, lobes triangular; corolline corona 5 vertical pairs of pubescent ridges; gynostegium cylindrical. Follicle 7-7.5 x 0.7-0.8 cm, lanceolate, seeds much compressed.

Flowering & Fruiting: July-January.

Distribution: Indo-Malesia. Common; in evergreen forest. *RNMK 1792,* Chooralmala; *RNMK 3666,* Makkimala.

HOLOSTEMMA R. Brown

Mem. Wern. Nat. Hist. Soc. 1: 42. 1811.

Holostemma ada-kodien Schult. in Roem. & Schult., Syst. Veg. 6: 95. 1820; Vajr., Fl. Palghat Dist. 290. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 291. 1996. *Sarcostemma annulare* Roth, Nov. Pl. Sp. 178. 1821. *Holostemma rheedei* Spreng. ex Wall., Pl. Asiat. Rar. 2: 51. 1831; Hook. f., Fl. Brit. India 4: 21. 1883. *Holostemma annulare* (Roxb.) K. Schum. in Engl. & Prantl, Naturl. Pflanzenfam. 4(2): 250. 1895; Gamble, Fl. Pres. Madras 834(586). 1923; Manilal & Sivar., Fl. Calicut 167. 1982; Mohanan & Sivad., Fl. Agasthyamala 450. 2002. *Asclepias annularis* Roxb., Fl. India 2: 37. 1832.

Glabrous twiners. Leaves 11-12 x 7-8 cm, oblong or ovate, acute to cuspidate, base widely and deeply cordate; lateral nerves 4-7 pairs, lower 2 pairs basal, base with few papillate glands; petiole 4-5 cm long. Flowers few to many in axillary peduncled cymes; peduncles shorter than the petioles, stout; pedicels 1-1.5 cm long; calyx lobes ovate, 4-5 mm long; corolla 1.5-2 cm across, campanulate, pale purple, lobes 7-8 x 5-6 mm, ovate, obtuse; gynostegium 8-9 x 5-6 mm, outer corona short, truncate; inner corona 5, ovate, acute, glabrous.

Flowering & Fruiting: September-November.

Distribution: South Asia. Rare; in semi-evergreen forests. *RNMK 3320,* Mundakai.

HOYA R. Brown

Mem. Wern. Nat. Hist. Soc. 1: 26. 1811.

Climbing subshrubs with rooting at nodes; latex milky. Leaves opposite, succulent; lateral nerves indistinct. Flowers axillary or rarely terminal on short laterals, in few to many flowered, sessile or peduncled umbels; calyx 5

partite with glandular scales inside; corolla usually cream or white, lobes rotate, spreading, triangular, valvate; corona uniseriate, lobes 5, spreading, obovoid, attached to the staminal column; anthers conniving above the style by membranous appendage; pollinia erect, solitary from each anther sac; carpels free; style 5-fid at apex. Mericarps linear, cylindrical.

1. Leaves narrow, linear... ..... **H. pauciflora**
1. Leaves elliptic..... 2
2. Follicles slender, curved, lanceolate.....**H. ovalifolia**
2. Follicles cylindrical..... **H. wightii**

Hoya ovalifolia Wight & Arn. in Wight, Contrib. 37. 1834; Wight, Ic.t.847. 1845; Hook. f., Fl. Brit. India 4: 60. 1883; Gamble, Fl. Pres. Madras 849(597). 1923; V. S. Ramach. & V.J. Nair, Fl. Cannanore 285. 1988; Vajr., Fl. Palghat Dist. 290. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 293. 1996; Sivar. & P. Mathew, Fl. Nilambur 427. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 320. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 26. 2009.

Climbing shrubs; stem pendulous, glabrous, terete, usually rooting from nodes. Leaves 6-8.5 x 2-3 cm, elliptic or rhomboid, acute or obtuse, base acute, margins undulate; nerves not clear; petiole *0.6*-0.8 cm long. Flowers 6-12, in axillary peduncled umbel; peduncles stout, 3-3.5 cm long; pedicels slender, ca. 1.5 cm long; sepals oblong; corolla 1-1.2 cm across, creamy-white, lobes ovate, acute; corona purplish, ca. 4 x 4 mm, lobes acute. Follicles slender, curved, 7-9 x 1-1.2 cm, lanceolate.

Flowering & Fruiting: November-December.

Distribution: Peninsular India and Sri Lanka. Common; in evergreen forests. *RNMK 1777,* Chembra.

Hoya pauciflora Wight, Ic. t. 1269. 1848; Hook. f., Fl. Brit. India 4: 56. 1883; Gamble, Fl. Pres. Madras 849(597). 1923; Manilal, Fl. Silent Valley 179. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 285. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 293. 1996; Mohanan & Sivad., Fl. Agasthyamala 452. 2002; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 26. 2009.

Slender epiphytic glabrous climbers; stems sometimes rooting from nodes. Leaves 4-6 x 0.7-0.9 cm, linear-lanceolate, obtuse, base truncate; petiole 3-4 mm long. Flowers in few-flowered subsessile umbellate cymes, terminal or lateral smaller branches; pedicels 1.5-2 cm long, slander; sepals 1.5-2 mm long, ovate; corolla white, 1.2-2 cm across, campanulate, lobes shallow, triangular; corona ca. 4 mm across, lobes rounded at apex.

Flowering & Fruiting: November-December.

Distribution: South India and Sri Lanka. Rare; in evergreen forests. *RNMK 3255,* Brahmagiri.

Hoya wightii Hook. f., Fl. Brit. India 459. 1883; Gamble, Fl. Pres. Madras 849(597). 1923; V. S. Ramach. & V.J. Nair, Fl. Cannanore 285. 1988; Manilal, Fl. Silent Valley 179. 1988; Mohanan & Sivad., Fl. Agasthyamala 452. 2002; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 29. 2009. **Plate 24b.**

Perennial climbers, stem terete, glabrous. Leaves 6-7 x 3-4 cm, elliptic, acuminate, base acute, thick and coriaceous; nerves 6-8 pairs, horizontal; petiole 2-2.5 cm long. Flowers yellowish white, 1.3-1.5 cm across, many together in umbellate cymes; peduncles 1-1.2 cm long, stout; pedicels 2.2-2.5 cm long; sepals ovate, ciliolate; corolla lobes ovate, margins revolute; corona deep purple, lobes ca. 3 mm high, subglobose. Follicle cylindrical, glabrous, 7-7.5 cm long.

Flowering & Fruiting: March-April.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2556,* Chembra; *RNMK 1788*, Brahmagiri.

MARSDENIA R. Brown

Mem. Wern. Nat. Hist. Soc. 1: 28. 1811, *nom cons.*

Marsdenia raziana Yoga. & Subram., Proc. Indian Acad. Sci. (Pl. Sci.) 83B: 147. 1976; Sasidh. & Anto, J. Econ. Tax. Bot. 21: 247. 1997.

Climbing glabrous shrubs, stem striate, latex watery. Leaves oblong, acuminate, base rounded or acute, membranous, 10-19 x 7-10 cm. Flowers brownish-pink, 1-1.2 cm long, in 10-15 flowered umbellate racemes; calyx ovate, acute, ciliate along the margins; corolla urceolate, lobes reflexed.

Flowering & Fruiting: January-March.

Distribution: Endemic to south India. Occasional; in semi-evergreen forests. *RNMK 3340,* Mundakai.

PERGULARIA Linnaeus

Syst. Nat. ed. 12, 2: 191. 1767.

Pergularia daemia (Forssk.) Chiov., Result. Sci. Misc. Stefan. Paoli Somal. Ital. 1: 16. 1916; Manilal & Sivar., Fl. Calicut 168. 1982; Vajr., Fl. Palghat Dist. 291. 1990. *Asclepias daemia* Forssk., Fl. Aeg.-Arab. 51. 1775. *Daemia extensa* (Jacq.) R. Br. in Ait.f., Hort. Kew (ed. 2) 2: 76. 1811; Hook. f., Fl. Brit. India 4: 20. 1833. *Cynanchum extensum* Jacq., Misc. 2: 353. 1781. *Pergularia extensa* (Jacq.) N. E. Br. in Dyer, Fl. Cap. 4: 758. 1908; Gamble, Fl. Pres. Madras 837(588). 1923.

Pubescent twiner. Leaves 8-10 x 7-8 cm, ovate, caudate-acuminate, base deeply cordate; nerves 4-5 pairs; petiole 5-6 cm long. Flowers creamy, 1-1.3 cm across, in branched cymes, peduncles 10-12 cm long, pedicels 2-3 cm long, slender; sepals short, hispid; corolla campanulate, tube villous at mouth, lobes 0.5-0.4 cm long, ovate, acute, pubescent; outer corona membranous, shallowly lobed, lobes emarginate, inner corona lobes vermiform, incurved, winged. Follicle 5-6 x 1.5 cm, lanceolate, acuminate, covered with hooked glochidiate bristles.

Flowering & Fruiting: December-June.
Distribution: Paleotropics. Occasional in dry deciduous forests. *RNMK 2157,* Muthanga.

SARCOSTEMMA R. Brown
Asclepiadeae 39. 1810.

Sarcostemma viminale (L.) R. Br., Prodr. Fl. Nov. Holland. 464. 1810. *Euphorbia viminalis* L., Sp. Pl. 452. 1753. *Sarcostemma acidum* (Roxb.) Voigt, Hort. Suburb. Calcutt. 542. 1845. *Asclepias acida* Roxb., Fl. Ind. 2: 31. 1832. *Sarcostemma brevistigma* Wight & Arn. in Wight, Contrib. 59. 1834; Hook. f., Fl. Brit. India 4: 26. 1883; Gamble, Fl. Pres. Madras 838(589). 1923.

Shrubs with trailing leafless jointed stems; branchlets pendulous. Flowers small in terminal umbels, sessile; sepals small, ovate; corolla pale greenish- white; lobes ovate or oblong, obtuse; corona and column together rounded, very obtuse. Follicles thinly coriaceous; seeds flattened, ovate.
Flowering & Fruiting: August-May.
Distribution: India and Myanmar. Rare; in semi-evergreen forests. *RNMK 3550,* Manikkunnumala; *RNMK 2303*, Kunchome.

TYLOPHORA R. Brown
Mem. Wern. Nat. Hist. Soc. 1: 28. 1811.

Twining or rarely suberect herbs or subshrubs; latex milky. Leaves membranous or coriaceous, much variable. Flowers axillary or lateral, in simple or branched racemes or umbels; calyx 5-partite; corolla rotate or campanulate, lobes twisted, triangular or ovate; corona uniseriate, of 5 fleshy scales, adnate to the inside of the corolla; anthers with membranous appendages; pollinia erect or horizontal, small; carpels free; stigma pentagonal or 5 angled. Mericarps lanceolate or ovoid, broaden at base.

1. Stem erect or sub erect..... 2
1. Stem creeping or twining..... 3
2. Flowers ca. 3 x 2 mm, brownish ..... **T. fasciculata**
2. Flowers ca. 6 x 5 mm, bluish violet..... .**T. macrantha**
3. Plants glabrous 4
3. Plants pubescent..... 5
4. Leaves coriaceous, elliptic or oblong, acute, with 5-6 pairs of nerves, nerves distinct. .....**T. capparidifolia**
4. Leaves membranous, ovate, acute, nerves indistinct..... **T. tetrapetala**
5. Stem trailing; root-stock woody .....**T. rotundifolia**
5. Stem climbing; root stock not woody 6
6. Leaves apiculate; flowers 2-3 mm across ..... **T. mollissima**
6. Leaves not apiculate; flowers more than 1 cm across..... 7
7. Leaves broadly elliptic-oblong, acute; flowers greenish-yellow..... **T. indica**
7. Leaves ovate-oblong, acuminate; flowers reddish brown ..... **T. dalzellii**

Tylophora capparidifolia Wight & Arn. in Wight, Contrib. 51.1834; Hook. f., Fl. Brit. India 4:41.1883; Gamble, Fl. Pres. Madras 843(592). 1923.

Glabrous twiners; stem twining to the right, slender. Leaves 5-6 x 1.5-2 cm, elliptic or oblanceolate to obovate, apiculate, round to subcordate at base, coriaceous, with 4-6 pairs of prominent nerve, coarsely reticulate beneath; petiole 1-1.2 cm long. Raceme axillary, solitary, umbellate, congested, ca. 4 cm long; flowers few; pedicels 0.8-1.2 cm long, slender; sepals lanceolate; corolla 4-5 mm across, lobes obovate, revolute above, glabrous; corona brown, lobes 5, uneven. Follicle 3-4 cm long, 0.8-1 cm thick, ovoid, narrowed at apex into a beak.

Flowering & Fruiting: March-June.

Distribution: Endemic to southern Western Ghats. Rare; in grasslands. *RNMK 3509,*Chembra.

Tylophora dalzellii Hook. f., Hook. f., Fl. Brit. India 4: 43. 1883; Ramach., J. Econ. Tax. Bot. 5:135.1984; V. S. Ramach. & V.J. Nair, Fl. Cannanore 286.1988.

Twining shrubs, stems terete, sparsely pubescent. Leaves 8-9 x 3-3.5 cm, ovate-oblong, shortly acuminate, rounded at base. Flowers 1-1.3 cm across, in umbellate cymes, reddish brown.

Flowering & Fruiting: April-May.

Distribution: Endemic to Western Ghats. Rare; in evergreen forests. *RNMK 3102,* Chembra.

Tylophora fasciculata Buch.-Ham. ex Wight & Arn. in Wight, Contrib. 50.1834; Hook. f., Fl. Brit. India 4:40.1883; Gamble, Fl. Pres. Madras 842(592). 1923; Sivar. & P. Mathew, Fl. Nilambur 428. 1997.

Erect or suberect, pubescent twiners. Leaves 4-5 x 2-2.5 cm, ovate, acute, rounded at base; nerves 3-4 pairs, lowest pairs basal; young leaves pinkish; petiole ca. 1 cm long. Flowers brownish, 4-5 x 4-5 mm, 3-8 together, in axillary peduncled cymes; pedicels 5-8 mm long; sepals linear, puberulus; corolla lobes 2.5-3 mm long, elliptic, obtuse, pubescent within; gynostegium; corona process ovoid. Follicle 4-5 x 1-1.3 cm, ellipsoidal, glabrous

Flowering & Fruiting: July-October.

Distribution: India and Sri Lanka. Rare; in grasslands. *RNMK 2610,* Chembra.

Tylophora indica (Burm. f.) Merr., Philipp. J. Sci. 19: 373. 1921; Manilal & Sivar., Fl. Calicut 169. 1982; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 64. 1988; Vajr., Fl. Palghat Dist. 292. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 293. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 320. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 441. 2009. *Cynanchum indicum* Burm. f., Fl. Ind. 70. 1768. *Tylophora asthmatica* (L. f.) Wight & Arn. in Wight, Contrib. 51. 1834; Hook. f., Fl. Brit. India 4: 44. 1883; Gamble, Fl. Pres. Madras 843(593). 1923. *Asclepias asthmatica* L. f., Suppl. Pl. 171. 1781. *Asclepias prolifera* Rottl. ex Ainslie, Mat. Ind. 2: 225. 1826. *Nansjera-patsja* Rheede, Hort. Malab. 9:21-22, t.13.1689.

Stout twiners; stem pubescent. Leaves 7-10 x 4-6 cm, elliptic-oblong to ovate, acute, base rounded to subcordate, tomentose below; lateral nerves 5-7 pairs; petiole 1.3-1.5 cm long. Cymes dense; peduncle 2-2.5 cm long; corolla greenish-yellow, ca. 1 cm across; corona free at apex, arching over gynostegium. Follicle cylindric, 5-7 cm long.
Flowering & Fruiting: February-July.
Distribution: Indo-Malesia. Occasional; in semi-evergreen forests. *RNMK 1904,* Manikkunnumala.

Tylophora macrantha Hook. f., Fl. Brit. India 4: 40. 1883; Gamble, Fl. Pres. Madras 843(592). 1923; Manilal, Fl. Silent Valley 179. 1988.

Tuberous large herbs; stems thinly pubescent. Leaves 3-4 x 1.5 cm, ovate, lanceolate, acute, glabrous above except for the veins, puberulus beneath, base acute or round; nerves 3-4 pairs, slender; petiole 1-2 cm long, slender. Flowers ca. 6 x 5 mm, in 8-10-flowered, brown, axillary, peduncled cymes; peduncles 1-1.5 cm long, puberulus; pedicels 8-9 mm long, glandular punctate; sepals ca. 2 x 0.5 mm, ovate-lanceolate, acute, outside pubescent; corolla brown, ca. 1 cm across, lobes ca. 5 x 3.5 mm, elliptic, acuminate, truncate, inner pubescent.
Flowering & Fruiting: June-September.
Distribution: India to Myanmar. Rare; in grasslands. *RNMK 2003,* Manikkunnumala.

Tylophora mollissima Wight & Arn. in Wight, Contrib. 49. 1834; Hook. f., Fl. Brit. India 4: 48. 1883; Gamble, Fl. Pres. Madras 843(593). 1923.

Pubescent twiners. Leaves 4-5 x 1.5-2 cm, oblong, apiculate, rounded at base; nerves 4-5 pairs, narrow; petiole 0.5-1.5 cm long. Raceme 3-10 cm long, branched, umbellate, axillary; flowers pinkish, 2-3 mm across, clustered in short lateral groups; pedicels 5-9 mm long; sepals ovate, acute, hirsute; corolla brownish, lobes ovate-oblong, obtuse; corona shallowly 5-lobed.
Flowering & Fruiting: February-July.
Distribution: Endemic to south India. Rare; in shola margins. *RNMK 1222,* Chembra.

Tylophora rotundifolia Buch.-Ham. ex Wight, Contrib. 50. 1834; Hook. f., Fl. Brit. India 4: 43. 1883; Gamble, Fl. Pres. Madras 843(593). 1923.

Trailing herbs; stems covered with curved hairs. Leaves 5-7 x 4-7 cm, broadly ovate or orbicular, cordate at base, obtuse at apex; nerves 4-6 pairs, irregular; petiole 3-5 mm long. Umbels erect, axillary, 3-4 cm long, peduncled; flowers creamy, 7-8 mm across, many together; sepals linear, hirsute; corolla lobes ovate, obtuse; corona process globose. Follicle 4-6 x 1-1.5 cm, ellipsoid, glabrous.
Flowering & Fruiting: May-September.
Distribution: Endemic to Peninsular India. Rare; in moist deciduous forests. *RNMK 3764,* Muthanga-Ponkuzhy.

Tylophora tetrapetala (Dennst.) Suresh in Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 64. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 294. 1996; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 444. 2009. *Asclepias tenuissima* Roxb. ex Willd. in Roem. & Schult., Syst. Veg. 6: 86. 1820. *Tylophora tenuis* Bl., Bijdr. 1062. 1827; Hook.f., Fl. Brit. India 4:42. 1883; Gamble, Fl. Pres. Madras 843. 1923. *Tylophora tenuissima* (Roxb. ex Willd.) Wight & Arn. in Wight, Contrib. 49. 1834; Wight, Ic.t. 588. 1842.

Glabrous twiners. Leaves 4-5 x 1-1.5 cm, oblong-lanceolate, apiculate, rounded at base, nerves 4-5 pairs, very slender; petiole 0.5-0.7 cm long. Umbels in branched racemes, up to 4 cm long; peduncle 1.2-1.5 cm long, slender; flowers brownish, 3-5 mm across, 3-7 together, in lateral umbellate cluster; pedicels up to 8 mm long; sepals subulate, glabrous; corolla yellowish brown, lobes 4, ovate, acute; corona process globose. Follicle 4-5 cm long, ovoid, glabrous, narrowed into a short beak.

Flowering & Fruiting: May-June. *Distribution*:

India and Myanmar. Rare; in semi-evergreen forests. *RNMK 1778,* Manikkunnumala.

WATTAKAKA Hasskarl

Flora 40:99. 1857.

Wattakaka volubilis (L. f.) Stapf, Bot. Mag. 148: sub t. 8976. 1923; Manilal & Sivar., Fl. Calicut 170. 1982; Ansari, Fl. Kasaragod Div. 233. 1985; Manilal, Fl. Silent Valley 180. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 65. 1988;V. S. Ramach. & V.J. Nair, Fl. Cannanore 286. 1988; Vajr., Fl. Palghat Dist. 293. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 294. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 322. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 444. 2009. *Asclepias volubilis* L. f., Suppl. Pl. 170. 1781. *Marsdenia volubilis* (L. f.) Cooke, Fl. Pres. Bombay 2: 166. 1904; Gamble, Fl. Pres. Madras 846(595). 1923. *Hoya viridiflora* R. Br., Mem. Wern. Nat. Hist. Soc. 1: 27. 1811. *Dragea volubilis* (L. f.) Benth. ex Hook. f., Fl. Brit. India 4: 46. 1883.

Twiners. Leaves 7-8 x 4-5 cm, ovate, acuminate, base cordate, membranous, puberulus along nerves; petiole above the junction of lamina glandular; petiole 2-3 cm. Umbels axillary, 4-4.5 cm long, many flowered; pedicels 2-2.5 cm long, pubescent; calyx lobes unequal, lanceolate; corolla rotate, tube 3-4 mm long, orbicular; corona single, staminal, with 2 globular masses above the anthers; pollinia erect.

Flowering & Fruiting: March-July.

Distribution: Indo-Malesia and China. Common; in disturbed moist deciduous forest. *RNMK 3623,* Manikkunnumala.

Gomphocarpus physocarpus Meyer is sometimes seen in the district as an escape from garden.

PERIPLOCACEAE Schltr.

1. Corona processes connate with corolla .....**Cryptolepis**
1. Corona processes connate with stamens ..... **Hemidesmus**

CRYPTOLEPIS R. Brown

Mem. Wern. Nat. Hist. Soc. 1: 69. 1811.

Cryptolepis buchananii R. Br. ex Roem. & Schult., Syst. Veg. 4: 409. 1819; Wight, Ic. t. 494. 1841; Hook. f., Fl. Brit. India 4: 5. 1883; Gamble, Fl. Pres. Madras 826(580). 1923; Manilal & Sivar., Fl. Calicut 170. 1982; Manilal, Fl. Silent Valley 177. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 62. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 282. 1988; Vajr., Fl. Palghat Dist. 288. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 288. 1996; Mohanan & Sivad., Fl. Agasthyamala 454. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 319. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 439. 2009. *Nerium reticulatum* Roxb., Fl. Ind. 2: 8. 1832.*Katu-pal-valli* Rheede, Hort. Malab.9:17-18,t.32.1688.

Glabrous twiners. Leaves 10-20 x 5-8 cm, elliptic or oblong-lanceolate, obtuse or apiculate, base acute, glabrous and glossy; lateral nerves many, parallel, joined below the margin form an intramarginal vein; petiole 1-3 cm long. Flowers in ca. 3 cm broad axillary cymes, few together; peduncles to 2 cm long, glabrous; pedicels 3-5 mm long; sepals free, ovate, obtuse, with a small scale at the base inside; corolla campanulate, greenish-yellow, tube ca. 2 mm long, lobes linear-lanceolate, ca. 8 x 2 mm, imbricate; stamens 5, connivent around stigma; coronal lobes 1-seriate, clavate, connate with corolla tube; ovaries 2, ovules on marginal placenta. Follicle 9-11 x 1-1.3 cm, divaricate, lanceolate, glabrous.

Flowering & Fruiting: March-August.

Distribution: Peninsular India and Sri Lanka. Common in moist deciduous forests. *RNMK 2288,* Kuruva; *RNMK 3388*, Muthanga.

HEMIDESMUS R. Brown

Mem. Wern. Nat. Hist. Soc. 1: 56. 1811.

1. Stem glabrous; flowers in peduncled cymes.....**H. indicus** var. **indicus**
1. Stem pubescent; flowers in subsessile fascicles .....**H. indicus** var. **pubescens**

Hemidesmus indicus (L.) R. Br. in Aiton.f., Hort. Kew 2: 75. 1811, var. **indicus**; Wight, Ic.t.594.1842; Hook. f., Fl. Brit. India 4: 5. 1883; Gamble, Fl. Pres. Madras 825(580). 1923; Manilal & Sivar., Fl. Calicut 171. 1982; Ansari, Fl. Kasaragod Div. 233. 1985; Manilal, Fl. Silent Valley 178. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 62. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 284. 1988; Vajr., Fl. Palghat Dist. 290. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 289. 1996; Sivar. & P. Mathew, Fl. Nilambur 427. 1997; Mohanan & Sivad., Fl. Agasthyamala 455. 2002; Anil Kumar, Sivad. &

N. Ravi., Fl. Pathanamthitta 319. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 440. 2009. *Periploca indica* L., Sp. Pl. 211. 1753. *Naru-nindi* Rheede, Hort. Malab.10:67-68,t.34.1690.

Perennial twiners, stem slender, usually brownish. Leaves very variable, 4-15 x 0.7-2 cm, elliptic-oblong to linear-lanceolate, apex acute to acuminate, pale below, young leaves often variegated, nerves 10-15 pairs. Flowers in axillary shortly peduncled cymes; pedicels short, bracteate; sepals ovate, free; corolla mostly yellow, sometimes purple, 8-9 mm across, lobes ovate, acute, valvate; corona 5, scale-like, connate with corolla tube; stamens 5, filaments adnate at base: pollinia in pairs; gynostegium obovoid. Follicles 2, slender, terete.
Flowering & Fruiting: August-December.
Distribution: India and Sri Lanka. Common; in disturbed areas of moist deciduous forests. *RNMK 1885,* Muthanga.

Hemidesmus indicus (L.) R. Br. var. **pubescens** (Wight & Arn.) Hook. f., Fl. Brit. India 4: 4. 1883; Gamble, Fl. Pres. Madras 825(580). 1923; V.S. Ramach., J. Econ. Tax. Bot. 5: 139. 1984; V. S. Ramach. & V.J. Nair, Fl. Cannanore 284. 1988. *Hemidesmus pubescens* Wight & Arn. in Wight, Contrib. Ind.Bot. 63. 1834; Wight, Ic.t.1320. 1846. **Plate 24c.**

Twiners, pubescent. Leaves opposite, rarely ternate, 8-9 x 2-2.5 cm oblong-elliptic, apex acute, tip apiculate, sub coriaceous, pubescent ; petiole 0.4-0.5 cm long, pubescent. Flowers in axillary subsessile fascicles, bracts lanceolate; calyx lobes ovate, margins ciliate; corolla rotate, deeply lobed, lobes ovate, acute, rugose within; pollinia granular; corona single, corolline.
Flowering & Fruiting: February- May.
Distribution: Peninsular India. Rare; in moist deciduous forest. *RNMK 3705,* Tholpetty.

Cryptostegia grandiflora R. Br. is often grown in garden as an ornamental twiner.

LOGANIACEAE R. Br. ex Mart.

Nov. Gen. Sp. Pl. 2: 133. 1827.

1. Herbs ..... **Mitrasacme**
1. Trees, lianas or shrubs 2
2. Leaves 3-5-ribbed from the base..... **Strychnos**
2. Leaves penninerved 3
3. Large epiphytic shrubs; leaves succulent; corolla lobes twisted ..... **Fagraea**
3. Climbers; leaves not succulent; corolla lobes valvate ..... **Gardneria**

FAGRAEA Thunberg

Vetensk. Acad. Nya. Handb. 3:132. 1782.

Fagraea ceilanica Thunb., Vetensk. Acad. Nya. Handb. 3: 132. 1782; Clarke in Hook. f., Fl. Brit. India 4: 83. 1883 "zeylanica"; Gamble, Fl. Pres. Madras

865(608). 1923; Manilal & Sivar., Fl. Calicut 172. 1982; Ansari, Fl. Kasaragod Div. 234. 1985; Manilal, Fl. Silent Valley 180. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 162. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 287. 1988; Vajr., Fl. Palghat Dist. 294. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 295. 1996; Sivar. & P. Mathew, Fl. Nilambur 429. 1997; Mohanan & Sivad., Fl. Agasthyamala 456. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 323. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 445. 2009; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 40. 2009. *Fagraea obovata* Wall. in Roxb., Fl. Ind. 2: 33. 1824; Clarke in Hook. f., Fl. Brit. India 4: 83. 1883; Gamble, Fl. Pres. Madras 865(608). 1923. *Fagraea coromandelina* Wight, Ic. t. 1316. 1848. *Fagraea malabarica* Wight, Ic. t.1317. 1848. *Modogam* Rheede, Hort. Malab. 4:119, t.58. 1683.

Small trees or shrubs, terrestrial or epiphytic. Leaves 16-20 x 6-8 cm, obovate, obtuse, base cuneate, entire, fleshy, glossy above; petiole 2-2.5 cm long, united by stipular sheath at base. Flowers few to many, large, in terminal cymes, 5-merous; branches of cyme stout; calyx tube 5-7 mm long, lobes 8-9 mm long, obovate, obtuse, imbricate; corolla 4-7 cm long, creamy yellow, funnel shaped, lobes obovate, obtuse, twisted; stamens 5, exserted, filaments 2 cm long, inserted on throat of corolla tube; ovary 2-celled, ovule numerous; style 4-5 cm long; stigma capitate. Berry 4-6 cm long, ellipsoid, obtuse, glabrous, glossy.

Flowering & Fruiting: March-November.

Distribution: Indo-Malesia. Common; in evergreen and semi-evergreen forests. *RNMK 0756,* Thirunelli.

GARDNERIA Wallich ex Roxburgh

Fl. Ind. 1: 400. 1820.

Gardneria ovata Wall. in Roxb., Fl. Ind. 1: 400.1820; Clarke in Hook. f., Fl. Brit. India 4: 93. 1883; Gamble, Fl. Pres. Madras 869(611). 1923; Wight, Ic. t. 1313. 1848; V. S. Ramach. & V.J. Nair, Fl. Cannanore 288. 1988; Manilal, Fl. Silent Valley 181. 1988; Vajr., Fl. Palghat Dist. 294. 1990; Sivar. & P. Mathew, Fl. Nilambur 429. 1997. *Gardneria wallichii* Wight ex Wall., Pl. Asiat. Rar.3: 49. t. 281. 1832.

Small glabrous climbers. Leaves 10-11.5 x 5-5.5 cm, ovate, abruptly acuminate, acute at base, entire; nerves 4-5 pairs; petiole 1-1.4 cm long. Cymes axillary, 3-5-flowered, peduncled; bracts ovate, acute; flowers pedicellate; calyx shallowly 4-lobed, lobes obtuse; ciliate; corolla orange-yellow, lobes 5-6 mm long, basely united, oblong, acute; stamens 4, attached at the base of corolla lobes; ovary 2-celled, glabrous; style subulate. Berry 0.7-1 cm long, globose, blue; seeds 2, cup-shaped, with pulpy placenta on concave surface.

Flowering & Fruiting: February-May.

Distribution: Indo-Malesia. Occasional; in evergreen forests. *RNMK 0334,* Alattil; *RNMK 1208*, Periya.

MITRASACME Labillardiere

Nov. Holl. Pl. 1. 35. t. 49. 1804.

Mitrasacme indica Wight, Ic. t. 1601. 1850; Sasidh. & Sivar., Fl. Pl. Thrissur For. 295. 1996; Sivar. & P. Mathew, Fl. Nilambur 430. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 323. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 446. 2009. *Mitrasacme alsinoides* auct. non R. Br. 1810; Clarke in Hook.f., Fl. Brit. India 4: 80. 1883; Gamble, Fl. Pres. Madras 864(607). 1923; Manilal & Sivar., Fl. Calicut 173. 1982.

Herbs. Leaves 3-5 x 1.5-2 mm, linear-lanceolate, sessile, nerves indistinct; petiole joined in a small sheath. Flowers solitary or in fascicles of 2 or 3; pedicels filiform 7-8 mm long; calyx tube 1-2 mm long, lobes as long as the tube; corolla white, 1.5-2 mm long, sparsely hairy at base. Capsule globose, ca. 2 mm across.

Flowering & Fruiting: September-October.

Distribution: Indo-Malesia to Australia and east Asia. Occasional; in moist deciduous forests. *RNMK 1788,* Chedalayam.

STRYCHNOS Linnaeus

Sp. Pl. 189. 1753.

Small trees or tendrillate climbers; tendrils simple or bifurcated and curved, woody. Leaves opposite, elliptic-oblong, entire, 3-5-ribbed. Flowers 5-merous, in terminal or axillary cymes; bracts and bracteoles minute; calyx 5 or rarely 4-lobed, lobes ovate; corolla tube short or long, lobes ovate or oblong, spreading; stamens 5, filaments short or absent; ovules many; style stout; stigma capitate. Fruit an indehiscent globose berry; seeds many, globose or compressed, embedded in fleshy pulp.

1. Trees..... ..... **S. nux-vomica**
2. Climbers 2
2. Leaves 5-8 cm long, broadly elliptic ..... **S. colubrina**
2. Leaves 8-11 cm long, narrowly lanceolate..... **S. dalzellii** var. **lanceolaris**

Strychnos colubrina L., Sp. Pl. 189. 1753; Clarke in Hook. f., Fl. Brit. India 4: 87. 1883; Gamble, Fl. Pres. Madras 868(610). 1923; Sasidh. & Sivar., Fl. Pl. Thrissur For. 297. 1996; Mohanan & Sivad., Fl. Agasthyamala 457. 2002. *Strychnos wallichiana* Steud. ex A. DC. in DC., Prodr. 9: 13. 1845; V. S. Ramach. & V.J. Nair, Fl. Cannanore 289. 1988; Vajr., Fl. Palghat Dist. 296. 1990; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 325. 2005. *Strychnos rheedei* Clarke in Hook. f., Fl. Brit. India 4: 87. 1883. *Strychnos cinnamomifolia* Thw., Enum. Pl. Zeyl. 201. 1860, var. *wightii* Hill, Bull. Misc. Inform. Kew 194. 1917; Gamble, Fl. Pres. Madras 869(610). 1923; Manilal & Sivar., Fl. Calicut 172. 1982. **Plate 24d.**

Tendrillate climbers. Leaves 5-8 x 3-5 cm, broadly elliptic, abruptly acuminate, shining, green or black when dry; nervules prominent, irregular. Cymes peduncled, 5-6 cm across; flowers many; pedicels 2-3 mm long; calyx

1.5-2 mm long, lobes ovate, obtuse, ciliate; corolla greenish yellow, tube ca. 1 cm long, hairy inside, lobes 4-5 x 1.5-2 mm, oblong, obtuse; anthers sessile; style 1-1.2 cm long, stigmas bilobed, globose. Berry globose, glabrous, greenish.
Flowering & Fruiting: February-July.
Distribution: Indo-Malesia. Rare; in evergreen forests. *RNMK 3448,* Palchuram.

Strychnos dalzellii Clarke var. **lanceolaris** Hill, Bull. Misc. Inform. Kew 117. 1917: Gamble, Fl. Pres. Madras 868(610). 1923; V. S. Ramach. & V.J. Nair, Fl. Cannanore 288. 1988.

Climbers with pubescent tendrils. Leaves 10-12 x 3-3.5 cm long, narrowly lanceolate, acuminate, cuneate at base. Flowers 3-3.2 cm long, in axillary cymes, pale green, sparsely ciliate. Berries 3-5 cm across, glabrous.
Flowering & Fruiting: December-February.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3552,* Kambamala.

Strychnos nux-vomica L., Sp. Pl. 189. 1753; Clarke in Hook. f., Fl. Brit. India 4: 90. 1883; Gamble, Fl. Pres. Madras 868(610). 1923; Manilal & Sivar., Fl. Calicut 171. 1982; Ansari, Fl. Kasaragod Div. 234. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 164. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore289. 1988; Vajr., Fl. Palghat Dist. 296. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 297. 1996; Sivar. & P. Mathew, Fl. Nilambur 430. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 324. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 449. 2009. Caniram Rheede, Hort. Malab. 1:67-68, t.37. 1678.

Small to medium sized trees. Leaves 8-15 x 5-9 cm, broadly ovate, obtuse at apex, abruptly acute at base, 5-ribbed, prominent beneath; nervules irregular; petiole 1-1.5 cm long. Cymes 2-3 cm across, terminal. Flowers sessile; calyx lobes triangular, acute, pubescent; corolla greenish yellow, tube ca. 1 cm long, hairy within; lobes ca. 4 x 1.5 mm, oblong, acute; anthers sessile, inserted at the throat of corolla tube. Berry 3-5 cm across, red, glabrous; seeds 3 or 4, orbicular, flat.
Flowering & Fruiting: March-December.
Distribution: Indo-Malesia. Rare; in moist deciduous forests. *RNMK 2312,* Baveli.

BUDDLEIACEAE K. Wilh.

Samenpflanzen. 90. 1910.

BUDDLEJA Linnaeus

Sp. Pl. 112. 1753.

Buddleja asiatica Lour., Fl. Cochinch. 72. 1790; Clarke in Hook. f., Fl. Brit. India 4: 82. 1883; Gamble, Fl. Pres. Madras 865(608). 1923; Manilal, Fl. Silent

Valley 181. 1988; Vajr., Fl. Palghat Dist. 293. 1990; Sivar. & P. Mathew, Fl. Nilambur 431. 1997. *Buddleja discolor* Roth, Nov. Pl. Sp. 82. 1821.

Erect shrubs; stem densely white-pubescent. Leaves opposite, 9-11 x 2-3 cm, lanceolate, acuminate, white-tomentose beneath, glabrous above; petiole 5-6 mm long. Racemes terminal, panicled, 13-15 cm long; rachis densely white hairy; flowers closely placed, subsessile; bracts subulate; calyx deeply 5-partite, 2.5-3 mm long, hirsute; corolla 3-4 mm long, lobes very short, orbicular, glabrous, spreading; tube hairy within; stamens 5, anthers sessile, inserted on throat of corolla tube; ovary conical, style short, stigma obovoid. Capsule septicidal, 2-valved; seeds many, fusiform, reticulate, black.

Flowering & Fruiting: October-April.

Distribution: China, Indo-Malesia; introduced in tropical and sub-tropical countries. Rare; in evergreen forests. *RNMK 3111,* Kallady-900 forest.

GENTIANACEAE Juss.

Gen. Pl. 141. 1789

1. Flowers irregular 2
1. Flowers regular 3
2. Flowers sessile, yellowish ..... **Hoppea**
2. Flowers stalked, pink or white ..... **Canscora**
3. Calyx free; petals with a nectary chamber at base inside; ovary one celled... .**Swertia**
3. Calyx united; petals without nectary chambers; ovary 2-celled ..... **Exacum**

CANSCORA Lamarck

Encycl. Meth. Bot. 1: 601. 1785.

Annual herbs. Leaves opposite, ovate or elliptic, entire, 3-5-ribbed. Flowers in terminal cyme; bracts free or perfoliate. Flowers few, pedicellate; calyx tubular, winged or ribbed; lobes 4, smaller; corolla tube cylindrical, lobes unequal, two larger and two smaller; stamens 4, one fertile with longer anthers and longer filaments; ovary 1-celled; ovules many, on intruded placenta, style filiform; stigma 2-lobed. Capsule oblong, with septicidal dehiscence; seeds irregular.

1. Calyx winged 1
1. Calyx not winged 3
2. Flowers white ..... **C. decussate**
2. Flowers rose-coloured..... **C. perfoliata**
3. Stem obtusely quadrangular; pedicels filiform... ..... **C. diffusa**
3. Stem stongly 4 winged; pedicels slender ..... **C. pauciflora**

Canscora decussata (Roxb.) Schult. & Schult. f., Syst. Veg. 3: 229. 1827; Clarke in Hook. f., Fl. Brit. India 4: 104. 1883; Gamble, Fl. Pres. Madras 879(618). 1923; Agrawal, J. Econ. Tax. Bot. 3: 982. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 290. 1988; Mike Thiv, Bl. 48: 6. 2003; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 448.2009. *Pladera decussata* Roxb., Fl. Ind. 1:418.1820.

Erect herbs up to 30 cm high. Leaves 2.5-3 x 1-1.3 cm, ovate or lanceolate, acute, sessile, 3 nerved. Flowers 2-2.5 cm long, terminal paniculate cymes. Capsule 2-2.5 cm long, oblong-linear, membranous.
Flowering & Fruiting: November-December.
Distribution: Tropical Africa and south Asia. Rare; in moist deciduous forests. *RNMK 1005,* Begur; *RNMK 0984,* Tholpetty.

Canscora diffusa (Vahl) R. Br. ex Roem. & Schult., Syst. Veg. 3: 301. 1820; Clarke in Hook. f., Fl. Brit. India 4: 103. 1883; Gamble, Fl. Pres. Madras 878(617). 1923; Agrawal, J. Econ. Tax. Bot. 3: 982. 1982; Manilal & Sivar., Fl. Calicut 173. 1982; Ansari, Fl. Kasaragod Div. 235. 1985; Manilal, Fl. Silent Valley 181. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 290. 1988; Vajr., Fl. Palghat Dist. 298. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 298. 1996; Sivar. & P. Mathew, Fl. Nilambur 433. 1997; Mike Thiv, Bl. 48: 11. 2003; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 325. 2005. *Gentiana diffusa* Vahl, Symb. Bot. 3: 47. 1794. *Canscora decurrens* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 2:136.1850; Gamble, Fl. Pres. Madras 878(617). 1923; Ansari, Fl. Kasaragod Div. 235. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore290. 1988; Vajr., Fl. Palghat Dist. 298. 1990; Mohanan & Sivad., Fl. Agasthyamala 458. 2002. *Canscora lawii* Wight, Ic. t. 1327. 1848.

Branched annual herbs, 30-35 cm high; stem 4-angular. Lower leaves elliptic, petiolate; upper ones ovate, sessile, 3-ribbed, glabrous. Cymes terminal; bracts ovate; flowers many; pedicel 1-1.3 cm long, filiform; calyx 5-6 mm long, wingless, 5-toothed, glabrous; corolla white, 7-9 mm long, tube cylindrical, lobes lanceolate, acute; 2 stamens fertile, 2 sterile. Capsule 5–7 mm long, linear-oblong.
Flowering & Fruiting: October-January.
Distribution: Tropical Africa, Asia and Australia. Common; in open grasslands. *RNMK 2667,* Manikkunnumala; *RNMK 2771*, Banasuramala.

Canscora pauciflora Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 2: 136. 1850; Clarke in Hook. f., Fl. Brit. India 4: 103. 1883; Gamble, Fl. Pres. Madras 878(617). 1923; Manilal & Sivar., Fl. Calicut 173. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 291. 1988; Sivar. & P. Mathew, Fl. Nilambur 434. 1997.

Erect herbs up to 25 cm tall; stem 4-winged. Lower leaves 2-2.5 x 1-1.5 cm, ovate, obtuse. Flowers 1.5-2 cm long, in lax dichotomous cymes, pink; pedicel slender, angular, enlarged below the calyx; calyx 5-toothed, glabrous; corolla white; 2 stamens fertile. Capsule linear.
Flowering & Fruiting: October-November.
Distribution: Western Ghats. Rare; in evergreen forests. *RNMK 1068,* Chandanathode.

Canscora perfoliata Lamk., Encycl. 1: 601. 1785; Clarke in Hook. f., Fl. Brit. India 4: 1094. 1884; Gamble, Fl. Pres. Madras 879(618). 1923; Manilal, Fl. Silent Valley 182. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 291. 1988;

Vajr., Fl. Palghat Dist. 298. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 298. 1996; Sivar. & P. Mathew, Fl. Nilambur 434. 1997; Mohanan & Sivad., Fl. Agasthyamala 459. 2002; Mike Thiv, Bl. 48: 16. 2003; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 326. 2005. *Canscora grandiflora* Wight, Ic. t. 1326. 1848. **Plate 24e.**

Branched annual herbs, 40-55 cm high. Leaves 4-5 x 1.5-2 cm, ovate, acute, upper ones sessile, lower petiolate. Cymes terminal; bracts ca. 1 cm across, membranous; flowers many; pedicel 1-1.3 cm long, winged towards apex; calyx 1.5 cm long, 8-winged, lobes acuminate, wings strongly nerved; corolla 1.8-2 cm long, glabrous, lobes unequal. Capsule 7-8 x 1.5-2 mm, oblong; seeds irregular, brown, glassy.

Flowering & Fruiting: November-February.

Distribution: Endemic to Western Ghats. Common; in semi-evergreen and moist deciduous forests. *RNMK 1740,* Muthanga; *RNMK 1336*, Manikkunnumala.

EXACUM Linnaeus

Sp. Pl. 112. 1753.

Annual or perennials. Stem terete or winged. Leaves opposite, entire, 3-7-ribbed. Flowers 1-many on terminal dichasial cyme, usually corymbose; bracts ovate, leafy; calyx campanulate, divided to below the middle; lobes keeled to strongly winged on back; corolla blue, purple or white, rotate, spreading; stamens 4-5, filaments short, broad, attached on the throat of corolla; anthers oblong; ovary broadly ovoid, 2-celled, many-ovuled; style cylindric, stigma globose, not divided. Fruit a septicidal capsule, globose, 2-valved; seeds many, minute.

1. Calyx not winged; leaves to 1 cm long.....2
1. Calyx winged; leaves over 1.5 cm long 3
2. Leaves sessile, broadly ovate, cordate at base..... **E. sessile**
2. Leaves petiolate, elliptic-ovate, truncate at base ..... **E. lawii**
3. Leaves 4-5-ribbed; corolla ca. 1 cm long..... **E. carinatum**
3. Leaves 3-ribbed; corolla ca. 2 cm long ..... .**E. tetragonum**

Exacum carinatum Roxb., Fl. Ind. 1:415.1820; Vajr., Fl. Palghat Dist. 299. 1990. *Exacum petiolare* Griseb. in DC., Prodr. 9: 46. 1845; Clarke in Hook. f., Fl. Brit. India 4: 98. 1883; Gamble, Fl. Pres. Madras 874(614). 1923; Klackenberg, Opera Bot. 84:54.1985.

Stem 4-angled. Leaves 2-3 x 1-2 cm, rhomboid to elliptic, apex acute to acuminate, base narrowed, nerves 4-5, basal. Cymes terminal; flowers few, ca. 1 cm across; calyx 0.5-0.6 cm long, 5-winged, wings prominently nerved, lobes acuminate; corolla ca. 1 cm long, lobes obovate; anthers 3.5-4 mm long, bottle shaped.

Flowering & Fruiting: August-December.

Distribution: India and Sri Lanka. Rare; in grasslands. *RNMK 2888, P*ookodu.

Exacum lawii Clarke in Hook.f., Fl. Brit. India 4:98.1883; Gamble, Fl. Pres. Madras 874(615). 1923; Agrawal, J. Econ. Tax. Bot. 3: 983. 1982; Klackenberg, Opera Bot. 84: 53. 1985; Manilal, Fl. Silent Valley 182. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 299. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 327. 2005.

Erect herbs, up to 20 cm long; stem 4-angled, shortly winged.Leaves 1-1.5 x 1-1.3 cm, elliptic-ovate, base truncate; 3-5 nerved from base. Flowers subsessile, solitary or few in cymes; calyx lobes 4, ovate; corolla pale blue, lobes obovate. Capsule globose, 3-4 mm across.

Flowering & Fruiting: September-November.

Distribution: Endemic to Western Ghats. Rare; in grasslands. *RNMK 3612,* Banasuramala.

Exacum sessile L., Sp. Pl. 112. 1753; Clarke in Hook. f., Fl. Brit. India 4: 98. 1883; Gamble, Fl. Pres. Madras 874(614). 1923; Manilal & Sivar., Fl. Calicut 174. 1982; Klackenberg, Opera Bot. 84: 51. 1985; Manilal, Fl. Silent Valley 183. 1988; Vajr., Fl. Palghat Dist. 300. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 299. 1996; Mohanan & Sivad., Fl. Agasthyamala 461. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 327. 2005.

Erect herbs, up to 20 cm high; stem narrowly winged. Leaves 0.8-1 x 0.8 cm, broadly ovate, cordate at base, acute or obtuse at apex, 3-ribbed, sessile. Flowers few, in drooping terminal cymes, sessile and pedicelled, tetramerous; calyx 6-7 mm long, lobes oblong, acute; corolla violet or light blue, lobes deltoid; anthers ca. 1.5 mm long.

Flowering & Fruiting: August-October.

Distribution: Peninsular India and Sri Lanka. Occasional; in moist deciduous forests. *RNMK 1178,* Chedalayam.

Exacum tetragonum Roxb., Fl. Ind. 1: 413. 1820; Clarke in Hook. f., Fl. Brit. India 4: 95. 1883; Gamble, Fl. Pres. Madras 873(613). 1923; Agrawal, J. Econ. Tax. Bot. 3: 984. 1982; Manilal, Fl. Silent Valley 183. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 292. 1988; Klackenberg, Opera Bot. 84:37.1985; Sivar. & P. Mathew, Fl. Nilambur 435. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 328. 2005. *Exacum bicolor* Roxb., Fl. Ind. 1: 413.1820; Wight, Ic. t. 1321. 1848; Clarke in Hook. f., Fl. Brit. India 4: 96. 1883; Gamble, Fl. Pres. Madras 873(613). 1923; Agrawal, J. Econ. Tax. Bot. 3: 983. 1982; Manilal & Sivar., Fl. Calicut 174. 1982; Ansari, Fl. Kasaragod Div. 236. 1985; Vajr., Fl. Palghat Dist. 299. 1990. *Exacum perrottetii* Griseb. in DC., Prodr. 9: 45. 1845. **Plate 24f.**

Tall herbs, up to 120 cm high; stems quadrangular, not or narrowly winged. Leaves 5-7 x 1.5-2 cm, elliptic, narrowed to a broad petiole, acute at apex, 3-ribbed. Cymes terminal, corymbose; bracts 7-8 mm long, linear; flowers many; calyx 7-9 mm long, wings 2-3 mm broad, lobes acuminate; corolla blue, tube short, lobes 1.8-2 x 0.8-1 cm, elliptic, acute; anthers 7-8 mm long, eglandular, filaments broaden at base.

Flowering & Fruiting: November-January.

Distribution: Endemic to Peninsular India. Common; in grasslands. *RNMK 3609,* Chembra.

HOPPEA Willdenow

Ges. Naturf. Freunde Berlin Neue Schriften 3: 434. 1801.

Hoppea fastigiata (Griseb.) Clarke in Hook.f., Fl. Brit. India 4: 100. 1883; Gamble, Fl. Pres. Madras 877(616). 1923; Manilal & Sivar., Fl. Calicut 174. 1982; Manilal, Fl. Silent Valley 184. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 292. 1988; Vajr., Fl. Palghat Dist. 300. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 299. 1996; Sivar. & P. Mathew, Fl. Nilambur 435. 1997; Mohanan & Sivad., Fl. Agasthyamala 464. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 328. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 449. 2009. *Cicendia fastigiata* Griseb., Gen. Sp. Gent. 158. 1839.

Small herbs, glabrous, stem 4-angled. Leaves opposite, 4-8 x 2-5 mm, ovate, apex acute, base truncate or subcordate, subsessile. Cymes terminal and axillary; peduncles 4-5 mm long; calyx tube 4-5 mm long, teeth lanceolate, acuminate; corolla tube 4-5 mm long, lobes unequal, lanceolate, greenish-yellow; stamen 1 perfect, 3 sterile; ovary ellipsoid, one celled, many ovuled, stigma 2 lobed. Capsule ellipsoid, smooth.

Flowering & Fruiting: September-October.

Distribution: Peninsular India, Sri Lanka and Myanmar. Occasional; in grasslands. *RNMK 1551,* Pookodu lake top.

SWERTIA Linnaeus

Sp. Pl. 226. 1753.

Annual or perennial herbs. Leaves usually opposite. Flowers blue or white, sometimes with yellow nectaries, in terminal panicled or corymbose cymes; calyx deeply 4-5 partite; lobes linear-lanceolate or ovate; corolla rotate, lobes 4-5; each lobe having near the base 1 or 2 glandular nectarines naked or covered by a thin scale; stamens 4-5 inserted at the base of the corolla, filaments linear; anthers versatile; ovary 1-celled, ovules many; stigma bilobed. Fruit a sessile, 2-valved capsule; seeds many.

1. Nectary small, naked; calyx lobes ovate .....**S. beddomei**
1. Nectary large, ciliate, covered with a fimbriate scale; calyx lobes narrowly lanceolate .....**S. lawii**

Swertia beddomei Clarke in Hook. f., Fl. Brit. India 4: 127. 1883; Gamble, Fl. Pres. Madras 881(619). 1923.

Erect annual herbs; stem quadrangular. Leaves sessile, 4-5 x 1-5 cm, ovate, subobtuse, 3-nerved. Inflorescence terminal, flat topped corymb; sepals elliptic or oblong, scarcely acute; corolla lobes elliptic or oblong scarcely acute, bluish-white; one orbicular nectary at the base of each corolla lobes, margins fringed; style short.

Flowering & Fruiting: November-April.

Distribution: Endemic to southern Western Ghats. Rare; in high altitude grasslands. *RNMK 3755,* Chembra.

Swertia lawii (Wight ex Clarke) Burkill, J. Asiat. Soc. Bengal 2: 379. 1906; Gamble, Fl. Pres. Madras 881(619). 1923; V. S. Ramach. & V.J. Nair, Fl. Cannanore 292. 1988. *Swertia corymbosa* Wight var. *lawii* Wight ex Clarke in Hook.f., Fl. Brit. India 4:126.1883.

Erect herbs; branches 4-angled. Leaves 3-3.5 x 1-1.3 cm, decussate, lanceolate, acuminate, rounded-truncate at base, 3- nerved. Flowers ca. 3.5 cm long, in terminal lax cymes; corolla white with blue nerves, nearly free, stamens inserted near corolla base.

Flowering & Fruiting: November-January.

Distribution: Endemic to southern Western Ghats. Occasional; in grasslands. *RNMK 1966,* Chembra.

MENYANTHACEAE (Dumort.) Dumort.

Anal. Fam. Pl. 20, 25. 1829.

NYMPHOIDES J. Hill

Brit. Herbal. 77. 1756.

Nymphoides hydrophylla (Lour.) O. Kuntze., Rev. Gen. Pl. 2: 429. 1891; Ansari, Fl. Kasaragod Div. 237. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 293. 1988; Vajr., Fl. Palghat Dist. 297. 1990; Joseph, Aquatic Angiosp. Malabar 133. 1991; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 449. 2009. *Menyanthes hydrophylla* Lour., Fl. Cochinch. 129. 1790. *Nymphoides cristata* (Roxb.) O. Ktze, Rev. Gen. Pl. 1: 429. 1891; Manilal & Sivar., Fl. Calicut 175. 1982. *Menyanthes cristata* Roxb., Pl. Corom. t.105. 1798. *Limnanthemum cristatum* (Roxb.) Griseb., Gen. Sp. Gent. 342. 1839; Clarke in Hook. f., Fl. Brit. India 4: 131. 1883; Gamble, Fl. Pres. Madras 883(620). 1923.

Aquatic herbs; stem petiole like, radiating, rooting at the single node, to 30 cm long. Leaf solitary on each stem, 1-6 cm across, orbicular, deeply cordate at base, floating. Flowers in axillary fascicles, 5-10 together, supported by an orbicular bracts, pedicelled; sepals 5, ca. 4 x 1.5 mm, oblong, corolla to 1.3-1.5 cm across, white, lobes obovate, entire, bearded at base inside; stamens 5, free; ovary 1-celled, ovules many, on 2-parietal placentation; style absent, stigma 2-lobed. Fruit a capsule obovoid, glabrous; seeds many, biconvex.

Flowering & Fruiting: Throughout the year.

Distribution: Indo-Malesia and South China. Occasional; in water bodies in moist deciduous forests. *RNMK 2052,* Tholpetty.

HYDROPHYLLACEAE R. Br.

in Bot. Reg. 3: adt. 242. 1817.

HYDROLEA Linnaeus

Sp. Pl. ed. 2. 328. 1762, *nom. cons.*

Hydrolea zeylanica (L.) Vahl, Symb. Bot. 2: 46.1791; Clarke in Hook. f., Fl. Brit. India 4: 133. 1883; Gamble, Fl. Pres. Madras 884(621). 1923; Wight, Ic.

t. 601. 1840-43; Manilal & Sivar., Fl. Calicut 175. 1982; Ansari, Fl. Kasaragod Div. 238. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 293. 1988; Joseph, Aquatic Angiosp. Malabar 76. 1991; Vajr., Fl. Palghat Dist. 301. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 300. 1996; Sivar. & P. Mathew, Fl. Nilambur 437. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 457. 2009. *Nama zeylanica* L., Sp. Pl. 226.1753.

Annual herbs, suberect, rooting at nodes. Leaves alternate, 4-7 x 1.5 cm, elliptic or lanceolate, apex acute, base cuneate, membranous, young parts partly hirsute. Racemes axillary and terminal, pedicels to 0.5 cm; calyx lobes 5-6 x 1-1.5 mm, lanceolate, glandular, acute; corolla lobes 6-6.5 mm, ovate, obtuse, deep blue; stamens 5, filaments basally dialated; ovary 2-2.5 mm, oblong, many ovuled, sparsely hispid, styles 2, stigma globose. Capsule 4-5 x 1.5-2 mm, ovoid.

Flowering & Fruiting: August-January.

Distribution: Pantropical. Occasional; in moist deciduous forests. *RNMK 2888,* Tholpetty.

BORAGINACEAE Juss.

Gen. Pl. 128. 1789.

1. Trees or large shrubs; flowers in panicled cymes ..... **Cordia**
1. Low shrubs or herbs; flowers solitary or in racemes or scorpioidal cymes 2
2. Style gynobasic; nutlets glochidiate ..... **Cynoglossum**
2. Style terminal; nutlets smooth 3
3. Lower leaves opposite; anthers connivent in a cone ..... **Trichodesma**
3. Leaves all alternate; anthers free 4
4. Flowers solitary or 2-3 together ..... **Rotula**
4. Flowers in scorpioid cymes 5
5. Scandent glabrous shrubs ..... **Tournefortia**
5. Erect hispid herbs ..... **Heliotropium**

CORDIA Linnaeus

Sp. Pl. 190. 1753.

Cordia wallichii G. Don, Gen. Hist. 4: 379. 1837-1838; Gamble, Fl. Pres. Madras 887(623). 1923; Manilal, Fl. Silent Valley 185. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 294. 1988; Vajr., Fl. Palghat Dist. 302. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 301. 1996; Sivar. & P. Mathew, Fl. Nilambur 438. 1997. *Cordia obliqua* Willd. var. *wallichii* (G. Don) Clarke in Hook. f., Fl. Brit. India 4: 137. 1883. *Cordia obliqua* Willd. var. *tomentosa* Kazmi, J. Arnold. Arbor. 51. 143. 1970. **Plate 24g.**

Trees up to 15 m high; bark white corky; branchlets densely pubescent. Leaves 13-16 x 8-10 cm, elliptic, acute at base and apex, densely pubescent below, scarcely above; nerves 5-6 pairs, prominent; petiole 3-4.5 cm long. Cymes 6-8 cm long, terminal, corymbose; flowers creamy white; calyx lobes 3,

ovate, acute, hairy; corolla ca. 1.5 cm long; lobes 6, oblong, acute; stamens 6, filaments villous at base. Drupe 2-2.5 cm across, depressed-globose, yellow when ripe, shining.
Flowering & Fruiting: December-May.
Distribution: Endemic to Peninsular India. Occasional; in moist deciduous forests. *RNMK 3609,* Muthanga-Ponkuzhy.

CYNOGLOSSUM Linnaeus
Sp. Pl. 134. 1753.

Cynoglossum zeylanicum (Vahl ex Hornem.) Thunb. ex Lehm., Neue Schriften Naturf. Gen. Halle 3:20. 1817; Manilal, Fl. Silent Valley 185. 1988; Kazmi, J. Arnold Arbor. 52:344. 1971; V. S. Ramach. & V.J. Nair, Fl. Cannanore 295. 1988; Vajr., Fl. Palghat Dist. 303. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 303. 1996; Sivar. & P. Mathew, Fl. Nilambur 439. 1997. *Anchusa zeylanica* Vahl ex Hornem., Enum. Pl. Hort. Hafn. 3. 1807. *Cynoglossum denticulatum* A.DC. var. *zeylanicum* (Vahl ex Hornem.) Clarke in Hook.f., Fl. Brit. India 4: 157. 1883; Gamble, Fl. Pres. Madras 900(632). 1923. *Cynoglossum furcatum* Wall. in Roxb., Fl. Ind. 2: 6. 1824; Clarke in Hook. f., Fl. Brit. India 4: 155. 1883; Gamble, Fl. Pres. Madras 900(632). 1923.

Erect scabrid herbs, to 1 m tall, whole plant softly adpressed pubescent. Leaves alternate, 10-25 x 3-7 cm, oblong-lanceolate, acute at apex, cuneate at base; nerves 5-7 pairs, prominent, arching, upper leaves smaller; petiole 1-2 cm long, flat. Racemes 10-35 cm long, straight or arching; flowers sessile, many; sepals 5, spreading; corolla 3-5 mm across, blue, campanulate; stamens 5, inserted at the throat of the corolla tube; ovary 4-celled, style gynobasic. Fruit of 4 nutlets, 3-5 mm across, glochidiate.
Flowering & Fruiting: August-October.
Distribution: Indo-Malesia and China. Common; in open areas. *RNMK 1226,* Meppady.

HELIOTROPIUM Linnaeus
Sp. Pl. 130. 1753.

Herbs, often hairy, rarely glabrous. Leaves alternate or subopposite. Flowers 5-merous, usually in terminal elongated scorpioid cymes, sometimes axillary; calyx deeply lobed; corolla salver form, lobes imbricate, throat glabrous; stamens included; ovary 4-celled, 4-ovuled, style terminal with a depressed conical stigmatic ring below the apex. Fruit of 4 nutlets, free or paired.

1. Flowers in terminal scorpioid cymes; corolla bottle shaped ..... **H. indicum**
1. Flowers in short racemes; corolla funnel shaped..... **H. marifolium**

Heliotropium indicum L., Sp. Pl. 130. 1753; Clarke in Hook. f., Fl. Brit. India 4: 152. 1883; Gamble, Fl. Pres. Madras 896(630). 1923; Manilal & Sivar., Fl. Calicut 176. 1982; Ansari, Fl. Kasaragod Div. 239. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 75. 1988; V. S. Ramach. & V.J. Nair, Fl.

Cannanore 295. 1988; Vajr., Fl. Palghat Dist. 303. 1990; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 330. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 461. 2009. *Ben-patsja* Rheede, Hort. Malab. 10;95-96, t.48. 1690.

Erect herbs, to 40 cm high; stem hispid. Leaves alternate, 8-12 x 4-7 cm, ovate, obtuse at apex, rounded at base, entire, hispid; petiole 4-5 cm long. Flowers sessile, in terminal 5-20 cm long scorpioid cymes, densely packed; sepals lanceolate, hispid outside; corolla white, 3-5 mm long, bottle shaped, white; lobes 5, rounded; stamens 5, anthers sessile, inserted inside the corolla tube; ovary 4-celled; style terminal, stigma capitate. Fruit a 4-lobed drupe, glabrous; seeds 4, subglobose.

Flowering & Fruiting: September-March.

Distribution: Pantropical. Occasional; in wet places along paddy fields. *RNMK 1777,* Poothady; *RNMK 1560*, Varadoor.

Heliotropium marifolium Retz., Obs. Bot. 2: 8. 1781; Clarke in Hook. f., Fl. Brit. India 4: 152. 1883p.p; Kazmi, J. Arnold Arbor. 51: 155. 1970; Sasidh. & Sivar., Fl. Pl. Thrissur For. 304. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 330. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 462. 2009. *Heliotropium scabrum* Retz., Obs. Bot. 2: 8. 1781; Clarke in Hook. f., Fl. Brit. India 4: 152. 1883; Gamble, Fl. Pres. Madras 897(630).1923; Manilal & Sivar., Fl. Calicut 176. 1982; Ansari, Fl. Kasaragod Div. 240. 1985; Vajr., Fl. Palghat Dist. 304. 1990.

Woody herbs, scabrous. Leaves alternate, 2-2.5 x 0.1-0.2 cm, lanceolate, elliptic, pubescent, subsessile. Racemes short; calyx lobes lanceolate, hairy; corolla funnel shaped, tube 1-1.2 cm long, with a row of hairs outside, mouth widened; anthers apiculate, slightly connate, pubescent; ovary 4 celled, one ovuled each, stigma conical. Fruit 4 lobed, smooth.

Flowering & Fruiting: April-June.

Distribution: Peninsular India and Sri Lanka. Occasional; in moist deciduous forests. *RNMK 2509,* Muthanga.

ROTULA Loureiro

Fl. Cochinch. 121. 1790.

Rotula aquatica Lour., Fl. Cochinch. 121. 1790; Gamble, Fl. Pres. Madras 893(627). 1923; Ansari, Fl. Kasaragod Div. 240. 1985; Manilal, Fl. Silent Valley 185. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 295. 1988; Vajr., Fl. Palghat Dist. 304. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 304. 1996; Sivar. & P. Mathew, Fl. Nilambur 441. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 331. 2005. *Rhabdia lycioides* Mart. & Zucc., Nov. Gen. Sp. 2:136.1827; Clarke in Hook. f., Fl. Brit. India 4:145. 1883. *Ehretia cuneata* Wight, Ic. t. 1385. 1848.

Stout branching shrubs; branched virgate, usually pinkish, glabrous. Leaves alternate or fascicled, 1-2 x 0.4-0.5 cm, oblong-oblanceolate, obtuse, sessile. Flowers solitary or in few flowered cymes axillary; calyx 5-partite,

lobes lanceolate; corolla pink, 5-6 mm long, campanulate, 5-lobed; stamens 5, anthers sagitate at base; ovary 4-celled, style filiform, stigma capitate. Drupe with 4, 1-seeded pyrenes, free, yellowish, smooth.
Flowering & Fruiting: November-March.
Distribution: Pantropical. Occasional; in the rocky areas of streams. *RNMK 1603,* Thirunelli; *RNMK 1090*, Panthipoyil.

TOURNEFORTIA Linnaeus
Sp. Pl. 140. 1753.

Tournefortia heyneana Wall. ex G. Don, Gen. Hist. 4: 369. 1837-1838; Clarke in Hook. f., Fl. Brit. India 4: 145. 1883; Gamble, Fl. Pres. Madras 893(628). 1923; Manilal, Fl. Silent Valley 186. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 296. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 304. 1996; Sivar. & P. Mathew, Fl. Nilambur 441. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 331. 2005. *Tournefortia reticosa* Wight, Ic. t. 1386.1848; Clarke in Hook. f., Fl. Brit. India 4:146.1883; Gamble, Fl. Pres. Madras 893(628). 1923.

Scandent shrubs, branches glabrous. Leaves alternate, 13-15 x 3-4 cm elliptic, oblong, acuminate at apex, acute to rounded at base, entire; petiole 1-1.5 cm long. Flowers in dichotomous scorpioid cymes, terminal, pedicelled; calyx 5-lobed, ovate, acute; corolla 5-7 mm long, greenish–white, bottle-shaped, tubular, lobes 5, very short; stamens 5, included; anthers sessile, oblong; ovary 4-celled;. style terminal, bifid at apex. Drupe 4-5 mm long, dehiscent into 2 pyrenes.
Flowering & Fruiting: August-February.
Distribution: Southern Western Ghats. Rare; in evergreen forests. *RNMK 1002,* Chooralmala; *RNMK 2201*, Theerthundamala.

TRICHODESMA R. Brown
Prodr. 496. 1810, *nom. cons.*

Trichodesma zeylanicum (Burm. f.) R. Br., Prodr. 496. 1810; Clarke in Hook. f., Fl. Brit. India 4: 154. 1883; Gamble, Fl. Pres. Madras 899(632). 1923; Manilal, Fl. Silent Valley 186. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 296. 1988; Vajr., Fl. Palghat Dist. 305. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 305. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 331. 2005. *Borago zeylanica* Burm.f., Fl. Ind. 41. 1768.

Coarsely hispid erect herbs, to 50 cm high. Leaves 8-10 x 1.5-2 cm, lanceolate, acute at base and apex, tubercled hairy above, tomentose below; lateral nerves 4-5 pairs; petiole 5-7 mm long. Flowers axillary or in terminal cymes, pedicelled; sepals 0.8-1 cm long, enlarging in fruit, lobes 5, acuminate; corolla blue, 8-9 mm long, campanulate, lobes 5, triangular with twisted narrow tip; stamens 5, anthers sessile, connivent, connective produced in twisted threads; ovary 4-lobbed and 4-celled; ovules solitary, in each cell, style terminal. Fruit of 4 nutlets, rugose on the inner surface.

Flowering & Fruiting: November-February.
Distribution: Indo-Malesia and Australia. Occasional; in moist deciduous forests. *RNMK 0201,* Baveli.

CONVOLVULACEAE Juss.

Gen. Pl. 132. 1789.

1. Leafless parasitic climbers; petals with scales ..... **Cuscuta**
1. Leafy non parasitic climbers or creepers; petals without scales.....2
2. Styles 2 or 3 .....**Evolvulus**
2. Style 1.....3
3. Corolla deeply 5 lobed, each with 2 lobules ....**Erycibe**
3. Corolla entire 4
4. Outer 2 or 3 lobes of the sepals accrescent, foliosus .....**Hewittia**
4. Lobes of the sepals equal or sub-equal, not accrescent..... ...5
5. Pollen grains smooth 6
5. Pollen grains spinulose..... ...7
6. Leaves auriculate ....**Xenostegia**
6. Leaves not auriculate .....**Merremia**
7. Fruit dehiscent.....**Ipomoea**
7. Fruit indehiscent.....8
8. Calyx accrescent, larger than fruit..... ....**Stictocardia**
8. Calyx not accrescent, smaller than fruit .....**Argyreia**

ARGYREIA Loureiro

Fl. Cochinch. 95, 134. 1790.

Climbing or erect shrubs. leaves ovate, cordate or acute at base, variously tomentose. Flowers in axillary bracteate cymes, sepals 5, leafy, free; corolla funnel-shaped, red or purple, lobes shallow, slightly plicate; stamens 5, included, filaments villous at base; anthers oblong, erect; ovary 4-celled; style slender, stigma 3-globose. Fruit a dry or fleshy berry; seeds 4.

1. Erect shrubs ..... **A. cuneata**
1. Climbing shrubs..... ...2
2. Leaves cordate at base..... 3
2. Leaves truncate or acute at base 4
3. Young branches, leaves and sepals white pubescent ..... **A. nervosa**
3. Young branches, leaves and sepals not white pubescent ..... **A. hirsuta**
4. Leaves elliptic-ovate; berry less than 1 cm across .....**A. elliptica**
4. Leaves ovate-lanceolate; berry 3-4 cm across..... ...**A. sericea**

Argyreia cuneata (Willd.) Ker-Gawl., Bot. Reg. 8. t. 661. 1822; Hook. f., Fl. Brit. India 4: 191. 1883; Gamble, Fl. Pres. Madras 909(638). 1923; Vajr., Fl. Palghat Dist. 306. 1990. *Convolvulus cuneatus* Willd., Sp. Pl. 1: 873. 1798. *Rivea cuneata* (Willd.) Wight, Ic. t. 890. 1844-45. **Plate 24h.**

Erect shrubs; stem usually unbranched, terete, glabrous. Leaves 5-6 x 2.5 cm, entire, shortly apiculate at apex, glabrous above, tomentose below; nerves 5 pairs, pinnate; petiole ca. 8 mm long. Flowers in axillary peduncled cymes or solitary, peduncles ca. 2 cm long, few-flowered; sepals ca. 6 x 7 mm, orbicular, obtuse, glabrous; corolla ca. 4 cm across, bluish pink. Berry 0.8-1 cm long, ovoid, glabrous, yellow.
Flowering & Fruiting: October-February.
Distribution: Endemic to Peninsular India. Occasional; in moist deciduous forests. *RNMK 0051,* Muthanga.

Argyreia elliptica (Roth) Choisy, Mem. Soc. Phys. Geneve 6:417. 1834; V. S. Ramach. & V.J. Nair, Fl. Cannanore297. 1988; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 335. 2005, *Ipomoea elliptica* Roth, Nov. Pl. Sp. 113. 1821. *Lettsomia elliptica* (Roth) Wight ex Clarke in Hook. f., Fl. Brit. India 4: 192. 1883; Gamble, Fl. Pres. Madras 911(640). 1923. **Plate 24i.**

Twiners, branchlets sparsely pubescent. Leaves 5-12 x 3-8 cm, elliptic-ovate to obovate, apex acute, base acute to truncate. Cymes lax, corymbose, 8-10 cm long; bracts deciduous; calyx lobes 5, subequal, ovate, obtuse; corolla pink to rose, 3-4 cm across; stamens 5; ovary 1.5-2 mm long, 2-loculare, cell 2-ovuled, style ca. 1.5 cm long. Berry 0.7-0.8 cm across, orange.
Flowering & Fruiting: November-March.
Distribution: South India and Sri Lanka. Occasional; in evergreen forest margins. *RNMK 1171,* Chembra; *RNMK 2069*, Brahmagiri.

Argyreia hirsuta Wight & Arn., Nov. Acta Phys.-Med. Acad. Caes. Leop. Carol. Nat. Cur. 18: 356. 1836; Clarke in Hook. f., Fl. Brit. India 4: 189. 1883; Gamble, Fl. Pres. Madras 909(638). 1923; V. S. Ramach. & V.J. Nair, Fl. Cannanore 297. 1988; Vajr., Fl. Palghat Dist. 306. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 305. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 335. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 464. 2009. *Rivea hirsuta* (Wight & Arn.) Wight, Ic. t. 891. 1845. **Plate 24f.**

Climbers; stem hirsute along one side. Leaves 18-20 cm across, broadly ovate, cordate at base, acute at apex, densely pubescent with adpressed hairs; nerves 8-13 pairs, prominent below; petiole 15-18 cm long. Peduncles axillary, 8-10 cm long; bracts leafy, 3-4 cm long, elliptic, shortly petioled; sepals equal, ovate, obtuse, sparsely hairy; corolla 7-8 cm long, 5-6 cm broad, campanulate, hispid outside, pink. Berry 1-1.3 cm across, depressed-globose, yellow, glabrous.
Flowering & Fruiting: November-December.
Distribution: South India and Sri Lanka. Common; in disturbed forests. *RNMK 1401,* Manathavady; *RNMK 2683*, Nadavayal.

Argyreia nervosa (Burm.f.) Bojer, Hort. Maurit. 224. 1837; Manilal & Sivar., Fl. Calicut 179. 1982; Ansari, Fl. Kasaragod Div. 241. 1985; Manilal, Fl. Silent

Valley 187. 1988. *Convolvulus nervosus* Burm. f., Fl. Ind. 48, t.20, f. 1. 1768. *Argyreia speciosa* (L.f.) Sweet, Hort. Lond. 289.1827; Hook. f., Fl. Brit. India 4:185.1883; Gamble, Fl. Pres. Madras 907(637). 1923.

Scandent shrubs, young branches white pubescent; leaves 22-25 x 15-16 cm, ovate-deltoid, subacuminate, cordate, densely white pubescent below; flowers in axillary and terminal cymes; sepals broadly ovate, white tomentose; corolla pink. Berry indehiscent.

Flowering & Fruiting: August-October.

Distribution: Indo-Malesia, China and Mauritius. Occasional; in moist deciduous forests. *RNMK 3073,* Kuruva.

Argyreia sericea Dalz. in Dalz. & Gibs., Bombay Fl. 169. 1861; Clarke in Hook. f., Fl. Brit. India 4: 188. 1883; Gamble, Fl. Pres. Madras 908(638). 1923; Vajr., Fl. Palghat Dist. 306. 1990.

Densely hirsute stout climbing shrubs. Leaves 10-13 x 8-10 cm, deltoid, ovate to lanceolate, apex acute, base truncate, pubescent above, densely hirsute below; petiole 3-5 cm long. Cymes axillary; bracts 3-4 x 1-1.5 cm, oblong, tomentose; peduncles 8-10 cm long, pubescent; calyx lobes ca. 1 x 0.5 cm, oblong-lanceolate, pubescent, except the overlapping part, slightly unequal; corolla funnel shaped, tube 6-7 cm long, pink, hirsute on outside, especially on the conduplication. Berry 3-4 cm across, fruiting calyx enlarged.

Flowering & Fruiting: July-September.

Distribution: Endemic to Western Ghats. Occasional; in moist deciduous forests. *RNMK 2882,* Pulpally.

CUSCUTA Linnaeus

Sp. Pl. 124. 1753.

Cuscuta reflexa Roxb., Pl. Corom. t. 104. 1798 & Fl. Ind. 1;446. 1832; Hook. f., Fl. Brit. India 4: 225. 1883; Gamble, Fl. Pres. Madras 931(654). 1923; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 336. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 465. 2009; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 204. 2009.

Stout succulent parasitic twiners; stem reddish, glabrous. Flowers in stout racemes, sessile; sepals brown, fleshy, glabrous; corolla 5-6 mm long, reddish-rose, thick, lobes ovate-oblong; scale 2-3 mm long, obtuse and fimbriate at apex; style stout, short; stigma oblong, unequal.Capsule succulent; seeds black.

Flowering & Fruiting: November-March.

Distribution: Indo-Malesia and China. Occasional; along roadsides and plantations. *RNMK 1901,* Chooralmala; *RNMK 1170,* Chundel.

ERYCIBE Roxburgh

Pl. Corom. 2: 31, t. 159. 1798.

Erycibe paniculata Roxb., Pl. Corom. 2: 31. t.159.1798; Clarke in Hook. f., Fl. Brit. India 4:180. 1883; Gamble, Fl. Pres. Madras 930(653). 1923; Manilal

& Sivar., Fl. Calicut 179. 1982; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 87. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 298. 1988; Vajr., Fl. Palghat Dist. 307. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 306. 1996; Mohanan & Sivad., Fl. Agasthyamala 469. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 337. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 466. 2009. *Erycibe wightiana* Graham, Cat. Pl. Bombay 137. 1839; Gamble, Fl. Pres. Madras 930(653). 1923.*Erima-tali* Rheede, Hort. Malab. 7;73, t. 39. 1688. **Plate 24k.**

Large woody climbers, bark covered with warty tubercles; branchlets brown tomentose. Leaves alternate, 8-11 x 4-5 cm, elliptic, acute at base and apex, entire, coriaceous, glabrous, nerves 6-8 pairs; petiole 1-1.3 cm long, rusty tomentose. Flowers in axillary or terminal panicles; bracts and bracteoles minute; calyx densely hairy; lobes obovate; corolla yellow, 6-8 mm long, tube campanulate, lobes obcordate, spreading, glabrous; stamens 5, filaments broaden below; ovary 1-celled, ovules 4, basal; stigma sessile, globose. Fruit a berry, 5-9 mm across, obovoid.

Flowering & Fruiting: November-March.

Distribution: India, Himalayas, Andaman Islands. Occasional; in semi-evergreen forests. *RNMK 1397*, Thirunelli; *RNMK 1168*, Makkimala.

EVOLVULUS Linnaeus

Sp. Pl. ed. 2, 391. 1762.

Erect or creeping herbs. Leaves alternate, simple, entire. Flowers in terminal or axillary panicles; bracts and bracteoles small, deciduous.; sepals 5, subequal; corolla lobes deeply 5- lobed; stamens 5; pollen smooth; ovary 1-celled; ovules 4; style absent; stigma with 5 or 10 longitudinal ridges. Fruit bacate; I- seeded.

1. Leaves sericeous on either side; corolla blue..... .....**E. alsinoides**
1. Leaves glabrous; corolla white ..... **E. nummularius**

Evolvulus alsinoides (L.) L., Sp. Pl. (ed. 2) 392. 1762; Clarke in Hook. f., Fl. Brit. India 4: 220. 1883; Gamble, Fl. Pres. Madras 922(648). 1923; Manilal & Sivar., Fl. Calicut 188. 1982; Ansari, Fl. Kasaragod Div. 242. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 299. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 306. 1996; Sivar. & P. Mathew, Fl. Nilambur 444. 1997; Mohanan & Sivad., Fl. Agasthyamala 470. 2002 ; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 467. 2009. *Convolvulus alsinoides* L., Sp. Pl. 157. 1753.

Diffuse herbs, stem villous. Leaves 1.5-1.8 x 0.7-0.8 cm; elliptic oblong, acute, base rounded, densely villous, cuspidate. Flowers in axillary 1-3 flowered cymes, peduncles slender, 2-2.5 cm long; pedicels ca. 1 cm long, bracts and bracteoles similar, lanceolate; sepals lanceolate, hairy; corolla blue, campanulate, 6-8 mm across; lobes shallow; stamens included; ovary 2-celled, ovules 4, styles 2, free, forked, stigmas linear. Fruit a capsule, 3-4 mm across, globose, glabrous; seeds 4, ellipsoid, acute, black.

Flowering & Fruiting: March-August.
Distribution: Pantropical. Rare; in rocky areas in grasslands. *RNMK 2561,* Manikkunnumala; *RNMK 2079*, Kurumbalakotta.

Evolvulus nummularius (L.) L., Sp. Pl. (ed.2) 391. 1762; Balakr., Bull. Bot. Surv. India 6:86. 1964; Sivar. *et al.*, Bull. Bot. Surv. India 12: 279. 1970; Manilal & Sivar., Fl. Calicut 188. 1982; Ansari, Fl. Kasaragod Div. 242. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 299. 1988; Vajr., Fl. Palghat Dist. 307. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 307. 1996; Sivar. & P. Mathew, Fl. Nilambur 444. 1997; Mohanan & Sivad., Fl. Agasthyamala 470. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 338. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 467. 2009. *Convolvulus nummularius* L., Sp. Pl. 175. 1753. *Volvulopsis nummularia* (L.) Roberty, Candollea 14: 28. 1952.

Creeping herbs, stem glabrescent. Leaves 1-1.2 x 0.8-1 cm, broadly ovate to orbicular, base cordate; petiole 0.5-0.6 cm long. Flowers solitary or in pairs, axillary; calyx lobes 5, acute, ciliate, 2-2.5 mm long; corolla campanulate, 5-6 mm across. Capsule globose, 3-4 mm across.
Flowering & Fruiting: Throughout the year.
Distribution: Native of Tropical America; naturalised in Africa and Indo-Malesia. Occasional; in grasslands. *RNMK 2076*, Kurumbalakotta.

HEWITTIA R. Wight & Arnott
Madras J. Lit. Sci. 5: 17, 22. 1837.

Hewittia malabarica (L.) Suresh in Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 88. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 307. 1996; Sivar. & P. Mathew, Fl. Nilambur 445. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 338. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 468. 2009. *Convolvulus malabaricus* L., Sp. Pl. 155. 1753. *Hewittia scandens* (Milne) Mabb. in Manilal, Bot. Hist. Hort. Malab. 84. 1980; Manilal & Sivar., Fl. Calicut 179. 1982; Ansari, Fl. Kasaragod Div. 243. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 300. 1988; Manilal, Fl. Silent Valley 187. 1988; Vajr., Fl. Palghat Dist. 307. 1990. *Convolvulus bicolor* Vahl, Symb. Bot. 3: 25. 1974, non Desr. 1792. *Hewittia bicolor* (Vahl) Wight & Arn., Madras J. Lit. Sci. 5: 22. 1837; Clarke in Hook. f., Fl. Brit. India 4: 216. 1883; Gamble, Fl. Pres. Madras 924(649). 1923. *Hewittia sublobata* (L. f.) O. Ktze., Rev. Gen. Pl. 2: 441. 1891.

Creepers; stems densely hispid. Leaves 5-7 x 5-6 cm, ovate, truncate or cordate at base, entire, acute, hispid; petiole 3-4 cm long. Flowers axillary, 2-3 together, in peduncled cymes; bracts and bracteoles lanceolate, hairy; pedicels short, 2-3 mm long; sepals unequal, enlarging in fruit, 1.3-1.5 cm long, acute, hairy, inner smaller, lanceolate; corolla 2-2.5 cm long, lobed; yellow with brown eye; stamens equal; filaments glabrous; ovary densely hairy; style tomentose; stigmas 2, clavate, papillose. Capsule 6-8 mm long, 4-valved, depressed globose; hairy; seeds obovoid, dark brown.

Flowering & Fruiting: October-January.
Distribution: Asia, Africa and south America. Common; in disturbed forest areas and along roadsides. *RNMK 1432,* Puliyarmala.

IPOMOEA Linnaeus
Sp. Pl. 159. 1753.

Creepers or twiners; stem terete. Leaves entire or lobed, cordate at base. Flowers axillary, peduncled in cymes or solitary; bracts lanceolate or minute; sepals 5, free, equal or unequal, broadly ovate-lanceolate, corolla funneliform or campanulate, lobes obtuse, plicate, rotate; stamens 5, included, filaments unequal, glandular or hairy at base; anthers equal; ovary 4-celled, 4-ovuled, style slender; stigma biglobose, papillose. capsule 4-valved; seeds 4, obtusely trigonous with one convex face; hairy or glabrous.

1. Erect undershrubs ..... **I. carnea** ssp. **fistulosa**
1. Climbers 2
2. Flowers in subcapitate to capitate inflorescence 3
2. Flowers solitary or in open cymose inflorescence 6
3. Leaves deeply palmately 7-9 lobed; flowers white ..... **I. pes-tigridis**
3. Leaves entire or shallowly 3-lobed; flowers pale blue or purple 4
4. Inflorescence sessile with small inconspicuous bracts ..... **I. eriocarpa**
4. Inflorescence peduncled, subtended by large bracts 5
5. Peduncle to 5 cm long; capsule puberulus ..... **I. deccana**
5. Peduncle to 10 cm long; capsule glabrous ..... **I. wightii**
6. Corolla salver-shaped; sepals aristate 7
6. Corolla funnel-shaped or companulate; sepals not aristate 10
7. Stem often with short fleshy prickles; corolla 10-12 cm long, white ..... **I. alba**
7. Stem without prickles; corolla 2-3.5 cm long, red 8
8. Leaves deeply pinnatisect ..... **I. quamoclit**
8. Leaves ovate-cordate, entire or angled 9
9. Stamens included ..... **I. marginata**
9. Stamens exserted ..... **I. hederifolia**
10. Sepals linear-lanceolate, 2 cm or more long ..... **I. nil**
10. Sepals ovate or orbicular; 1 cm or less long 11
11. Leaves 3-5 lobed 12
11. Leaves entire 13
12. Petiole to 12 cm long; seeds covered with long cottony hairs ..... **I. mauritiana**
12. Petiole to 5 cm long; seeds pubescent ..... **I. cairica**
13. Stout climbers; corolla white-lilac, 6-8 cm long ..... **I. campanulata**
13. Slender climbers; corolla creamy white, 2-3 cm long ..... **I. obscura**

Ipomoea alba L., Sp. Pl. 161. 1753; Ooststr.in Steenis, Fl. Males. 1, 4: 480. 1953; Manilal, Fl. Silent Valley 188. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 89. 1988;V. S. Ramach. & V.J. Nair, Fl. Cannanore 301. 1988; Vajr., Fl. Palghat Dist. 309. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For.

308. 1996; Sivar. & P. Mathew, Fl. Nilambur 446. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 340. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 470. 2009. *Ipomoea bona-nox* L., Sp. Pl. (ed. 2) 228. 1762; Clarke in Hook. f., Fl. Brit. India 4: 197. 1883. *Calonyction bona-nox* (L.) Boj., Hort. Maurit. 227. 1837; Gamble, Fl. Pres. Madras 920(646). 1923. *Munda-valli* Rheede, Hort. Malab. 11; 103, t. 50. 1692.

Perennial climbers; stem stout, glabrous. Leaves 10-15 x 7-12 cm, ovate, acuminate at apex, cordate at base, 9-11 nerved from base; petiole 7-9 cm long. Peduncles 12-16 cm long, stout; flowers 1-3 together, but usually solitary; pedicels 2-2.5 cm long; sepals 1.3-1.5 cm long, lanceolate, strongly aristate, glabrous; corolla white, 8-10 cm broad, funnel shaped, lobes spreading, glabrous. Capsule 2-2.5 x 1-1.5 cm, glabrous; seeds glabrous.
Flowering & Fruiting: October-December.
Distribution: Native Tropical America; introduced and naturalised in many Asian countries. Common; along roadsides and edges of plantations. *RNMK 2511,* Kalpetta; *RNMK 2262*, Vellaramkunnu.

Ipomoea cairica (L.) Sweet, Hort. Brit. 287. 1827; Gamble, Fl. Pres. Madras 918(645). 1923; Manilal & Sivar., Fl. Calicut 183. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 301. 1988; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 340. 2005 ; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 471. 2009. *Convolvulus cairicus* L., Syst. Nat. (ed.10) 922. 1759. *Ipomoea palmata* Forssk., Fl. Aeg.-Arab. 43. 1775; Clarke in Hook. f., Fl. Brit. India 4: 214. 1883. *Ipomoea pulchella* Wight, Ic. t. 156. 1839, non Roth, 1821.

Glabrous climbers. Leaves 5-lobed, divided below the middle, lobes elliptic, chartaceous, acute at apex; petiole 3-4 cm long. Flowers solitary or in few flowered cymes; calyx lobes subequal, 5-7 x 3-3.5 mm, apiculate; corolla pink, 5-6 cm across. Capsule 5-7 mm across, globose, glabrous; seeds pubescent.
Flowering & Fruiting: September-January.
Distribution: Paleotropics. Common along edges in plantations. *RNMK 2041,* Vellaramkunnu.

Ipomoea campanulata L., Sp. Pl. 160. 1753; Gamble, Fl. Pres. Madras 917(643). 1923; Ansari, Fl. Kasaragod Div. 244. 1985; Vajr., Fl. Palghat Dist. 310. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 308. 1996; Sivar. & P. Mathew, Fl. Nilambur 448. 1997. *Ipomoea campanulata* L. var. *illustris* Clarke in Hook.f., Fl. Brit. India 4: 211. 1883. *Ipomoea illustris* (Clarke) Prain, Bengal Pl. 2: 735. 1903. *Strictocardia campanulata* Merr., Philipp. J. Sci. 9: 33. 1914, non L.

Stout climbers; stem adpressed tomentose. Leaves to 8 x 9 cm, broadly ovate to orbicular, nearly entire, abruptly acuminate, cordate at base, pubescent; nerves 12 pairs; petiole to 8 cm long. Peduncle ca. 8 cm long, stout; flower 1 or 2 together; pedicels ca. 3.5 cm long, stout; sepals ca. 1 x 1 cm, orbicular, outer 3 pubescent outside, growing in fruit; corolla ca. 9 cm

long, lobes acute, pale purple with dark purple at centre, glabrous; filaments hairy at base. Capsule ca. 2 x 2 cm, globose, glabrous; seeds black, hairy on angles.
Flowering & Fruiting: November-January.
Distribution: Indo-Malesia. Common; along roadsides. *RNMK* 1401; Pulpally.

Ipomoea carnea Jack. ssp. **fistulosa** (Mart. ex Choisy) Austin, Taxon 26: 237. 1977; V. S. Ramach. & V.J. Nair, Fl. Cannanore 302. 1988; Sivar. & P. Mathew, Fl. Nilambur 449. 1997; Joseph, Aquatic Angiosp. Malabar 64. 1991; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta Dist. 341. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 472. 2009. *Ipomoea fistulosa* Mart. ex Choisy in DC., Prodr. 9: 349. 1845; Manilal & Sivar., Fl. Calicut 181. 1982. *Ipomoea crassicaulis* (Benth.) Robins., Proc. Amer. Acad. Sci. 51: 530. 1916. *Batatas crassicaulis* Benth., Voy. Sulph. 134. 1845.

Erect to subscandent shrubs; branchlets glabrous. Leaves 12-15 x 6-7 cm, ovate-lanceolate, base cordate, apex gradually acuminate; lateral veins 8-10 pairs, prominent. Flowers 5-6.5 cm long, pale pink, in axillary corymbose cymes, calyx lobes subequal, corolla 7-9 cm long. Capsule ovoid.
Flowering & Fruiting: Throughout the year.
Distribution: Native of America; now Pantropical. Common; along roadsides. *RNMK 2087,* Manathavady.

Ipomoea deccana Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 324. 1980; Manilal, Fl. Silent Valley 188. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 302. 1988; Vajr., Fl. Palghat Dist. 310. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 308. 1996; Sivar. & P. Mathew, Fl. Nilambur 450. 1997; Mohanan & Sivad., Fl. Agasthyamala 471. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 341. 2005. *Ipomoea bracteata* Wight, Ic. t. 1374. 1848, non Cav. 1799; Clarke in Hook. f., Fl. Brit. India 4: 203. 1883; Gamble, Fl. Pres. Madras 918(644). 1923. *Ipomoea deccana* var. *lobata* (Clarke) Johri, J.Econ. Tax. Bot. 5: 432. 1984.

Hispid creepers. Leaves 3-4 x 3-4 cm, 5-lobed, cordate at base; lobes rhomboid, acute; petiole 4-5 cm long. Peduncle 2.5-5 cm long; bracts 1-1.5 x 0.7-1 cm, ovate, obtuse, 2-5 together, forming a capitate head; flowers 3 together; sessile; sepals unequal, 7-9 mm long, acute, hairy; inner smaller; corolla purple, ca. 1.5 cm long, campanulate, glabrous; filaments unequal, inserted near the base of corolla tube. Capsule globose, puberulus in vertical lines; seeds pubescent, black.
Flowering & Fruiting: November-January.
Distribution: India and Sri Lanka. Rare; in moist grasslands on rocky areas. *RNMK 1797,* Pookodu lake top.

Ipomoea eriocarpa R. Br., Prodr. 484. 1810; Clarke in Hook. f., Fl. Brit. India 4: 203. 1883; Ooststr. In Steenis, Fl. Males. 1, 4:462. 1953; Austin in Dassan.

& Fosb., Rev. Handb. Fl. Ceylon 1: 325. 1980; Manilal, Fl. Silent Valley 188. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 302. 1988; Vajr., Fl. Palghat Dist. 310. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 309. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 341. 2005. *Ipomoea hispida* (Vahl) Roem. & Schult., Syst. Veg. 4: 238. 1819, non Zucc. 1809; Gamble, Fl. Pres. Madras 915(643). 1923. *Convolvulus hispidus* Vahl, Symb. Bot. 3: 29. 1794. *Ipomoea sessiliflora* Roth, Nov. Pl. Sp. 116. 1821. Wight, Ic. t. 169. 1839.

Creepers, stem hispid. Leaves 5-6 x 3-3.5 cm, ovate, entire, acuminate, cordate at base, finely hirsute; petiole 1.5-2 cm long. Flowers in axillary sessile cymes; bracts and bracteoles minute, hairy; sepals outer 3 larger, 5-6 mm long, ovate, acuminate, inner 2 smaller, all hispid; corolla ca. 1 cm long, campanulate, pale pink, hairy; filaments glandular hairy at base; ovary densely hairy. Capsule globose, densely hispid; seeds triangular, glabrous.
Flowering & Fruiting: October-January.
Distribution: Paleotropics. Occasional; in forest plantations and disturbed moist deciduous forests. *RNMK 2087,* Nadavayal.

Ipomoea hederifolia L., Syst. Nat. (ed. 10) 925. 1759; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 325. 1980; Manilal & Sivar., Fl. Calicut 184. 1982; Ansari, Fl. Kasaragod Div. 245. 1985; Manilal, Fl. Silent Valley 189. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 303. 1988; Vajr., Fl. Palghat Dist. 311. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 309. 1996; Sivar. & P. Mathew, Fl. Nilambur 451. 1997; Mohanan & Sivad., Fl. Agasthyamala 472. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta Dist. 341. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 472. 2009. *Quamoclit phoenicea* (Roxb.) Choisy, Mem. Soc. Phys. Geneve 6: 433. 1834; Gamble, Fl. Pres. Madras 919(645). 1923. *Ipomoea phoenicea* Roxb., Fl. Ind. 2: 92. 1824. *Ipomoea coccinea* sensu Clarke in Hook. f., Fl. Brit. India 4: 199. 1883, non Rottl. 1803.

Slender climbers, stem glabrous. Leaves 8-10 x 7-8 cm, ovate, acuminate, cordate at base, entire or shallowly 3-lobed, membranous, glabrous; petiole 12-15 cm long. Peduncle 13-16 cm long, glabrous, slender, erect; flowers 2-6 together; pedicels 5-7 mm long; sepals 6-7 mm long, ovate, long-cuspidate; corolla red, 3-4 cm long, tubular to funneliform, glabrous, lobes acute; stamens equal. Capsule globose, glabrous; septum persistent, transparent; seeds trigonous, hairy.
Flowering & Fruiting: October-December.
Distribution: Native of tropical America; now naturalised in tropical Asia. Common; in disturbed areas and along margins of plantations. *RNMK 3149,* Talimala; *RNMK 2288*, Vythiri.

Ipomoea marginata (Desr.) Verdc., Kew Bull. 42: 658. 1987; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 91. 1988; Sivar. & P. Mathew, Fl. Nilambur 455. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 342.

2005. *Convolvulus marginatus* Desr. in Lamk., Encycl. 3: 558. 1792. *Ipomoea sepiaria* Roxb., Fl. Ind. 2: 90. 1824; Clarke in Hook. f., Fl. Brit. India 4: 209. 1883; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 338. 1980; Manilal & Sivar., Fl. Calicut 181. 1982; Ansari, Fl. Kasaragod Div. 246. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 304. 1988; Vajr., Fl. Palghat Dist. 312. 1990; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 473. 2009. *Tiru-tali* Rheede, Hort. Malab. 11:109-110, t. 53. 1692.

Slender climbers; stem glabrous. Leaves 5-7 x 3-5 cm, ovate-cordate, apex acute-apiculate, glabrous. Flowers 3-3.5 cm long, pink, in pedunculate sub-umbellate cymes; calyx lobes sub-equal, obovate; corolla salver-form, stamens included. Capsule globose; seeds pubescent.

Flowering & Fruiting: December-March.

Distribution: Paleotropics. Common; along margins of plantations. *RNMK 0155,* Pulpally.

Ipomoea mauritiana Jacq., Coll. Bot. 4: 216. 1719; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 331. 1980; Manilal & Sivar., Fl. Calicut 183. 1982; Ansari, Fl. Kasaragod Div. 245. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 92. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 309. 1996; Sivar. & P. Mathew, Fl. Nilambur 451. 1997; Mohanan & Sivad., Fl. Agasthyamala 472. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 342. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 473. 2009. *Ipomoea paniculata* R. Br., Prodr. 486. 1810; Gamble, Fl. Pres. Madras 918(644). 1923. *Ipomoea digitata* sensu Clarke in Hook. f., Fl. Brit. India 4: 202. 1883, non L. 1759. *Pal-Modecca* Rheede, Hort. Malab. 11:101-102, t. 49. 1692.

Stout perennial climbers, stem glabrous. Leaves 12-15 x 13-15 cm, orbicular in outline, deeply lobed, lobes elliptic, acuminate; petiole 10-12 cm long. Peduncle up to 17 cm long, erect, stout; flowers panicled; pedicels 2-2.5 cm long; sepals orbicular, glabrous; corolla 4.5-5.5 cm long, 4-4.5 cm across, campanulate, purple. Capsule 1.3-1.5 cm across, ovoid, glabrous, 4-valved; seeds obtusely trigonous, densely covered with long cottony hairs.

Flowering & Fruiting: August-September.

Distribution: Pantropical. Occasional; in moist deciduous forests. *RNMK 1438,* Kuruva.

Ipomoea nil (L.) Roth, Cat 1: 36. 1797; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 332. 1980; Manilal & Sivar., Fl. Calicut 182. 1982; Sasidh. & Sivar., Fl. Pl. Thrissur For. 309. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 343. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 474. 2009. *Convolvulus nil* L., Sp. Pl. (ed.2) 219. 1762. *Ipomoea hederacea* sensu Hook.f., Fl. Brit. India 4:199. 1883, non (L.) Jacq. 1787; Gamble, Fl. Pres. Madras 917(644). 1923.

Large twiners; stem covered with reflexed hairs. Leaves 8-9 x 5-6 cm, cordate at base, shallowly 3-lobed, lobes ovate, acute, thinly hairy; petiole 2-4

cm long. Peduncle 2.5-3 cm long; retrorse hairy; flowers solitary on peduncle; pedicels 5-7 mm long; sepals 3-3.5 cm long, lanceolate, sharply acuminate, densely bristled at base; corolla 7-8 cm long, funneliform, tube white, lobes purple, glabrous; filaments bristled at base. Capsule depressed globose, glabrous; seeds angular, glabrous.
Flowering & Fruiting: November-January.
Distribution: Native of South America; now naturalised in tropics. Occasional; in open areas. *RNMK 1006,* Anchukunnu.

Ipomoea obscura (L.) Ker-Gawl., Bot. Reg. 3. t. 239. 1817; Clarke in Hook. f., Fl. Brit. India 4: 207. 1883; Gamble, Fl. Pres. Madras 916(643). 1923; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 333. 1980; Manilal & Sivar., Fl. Calicut 183. 1982; Ansari, Fl. Kasaragod Div. 245. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 303. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 310. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 343. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 474. 2009. *Convolvulus obscurus* L., Sp. Pl. (ed. 2) 220. 1762.

Slender creepers; stem glabrous. Leaves 4-5 x 3-3.5 cm, broadly ovate, acuminate, base cordate; petiole 3.5-4 cm long. Peduncle axillary, 4-5 cm long, tomentose; flowers 1 or 2 on each peduncle; sepals 5-6 mm long, ovate, acute, glandular, outer 2 smaller; corolla 2-2.5 cm long, white with pink eye, glabrous; anthers sagitate at base. Capsule globose, glabrous; seeds compressed, brown, thinly pubescent.
Flowering & Fruiting: October-March.
Distribution: China, Tropical Asia and Africa. Occasional; along wayside thickets and moist deciduous forests. *RNMK 0224,* Baveli.

Ipomoea pes-tigridis L., Sp. Pl. 162. 1753; Roxb., Fl. Ind. 2:93. 1824: Wight, Ic. t. 836. 1844-45; Clarke in Hook. f., Fl. Brit. India 4: 204. 1883; Gamble, Fl. Pres. Madras 918(644). 1923; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 336. 1980; Manilal & Sivar., Fl. Calicut 184. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 304. 1988; Vajr., Fl. Palghat Dist. 311. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 310. 1996; Sivar. & P. Mathew, Fl. Nilambur 453. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 343. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 475. 2009. *Ipomoea pes-tigridis* L. var. *hepaticifolia* (L.) Clarke in Hook. f., Fl. Brit. India 4: 204. 1883. *Ipomoea hepaticifolia* L., Sp. Pl. 161. 1753.

Slender twiners. Leaves 8-10 x 10-12 cm, lobes obovate, acuminate; petiole 6-7 cm long. Flowers 3-5 together, subsessile, in bracteate heads; bracts densely bristly, foliaceous; sepals 7-9 mm long, pubescent; corolla 3-3.5 cm long, pink, funnel shaped. Capsule globose; seeds black, grey pubescent.
Flowering & Fruiting: September-December.
Distribution: Pantropic. Occasional; in moist deciduous forests. *RNMK 1082,* Pulpally.

Ipomoea quamoclit L., Sp. Pl. 159. 1753; Hook. f., Fl. Brit. India 4: 199. 1883; Manilal & Sivar., Fl. Calicut 184. 1982; Vajr., Fl. Palghat Dist. 312. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 310. 1996; Sivar. & P. Mathew, Fl. Nilambur 454. 1997; N. Mohanan & Sivad., Fl. Agasthyamala 473. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 476. 2009. *Quamoclit pinnata* (Desr.) Bojer, Hort. Maurit. 224. 1837; Gamble, Fl. Pres. Madras 919(645). 1923. *Convolvulus pinnatus* Desr. in Lam., Encycl. 3: 567. 1792.

Slender twining herbs. Leaves 1.5-4.5 cm long; lobes many, 1-1.5 cm long, very narrowly linear, glabrous. Flowers solitary, axillary or in few flowered axillary cymes; peduncles 4-5 cm long; pedicels 1-2 cm long; calyx lobes 4-5 mm long, lanceolate; corolla red; lobes 4-6 x 2.5-3 mm, ovate; filaments unequal, exserted; ovary 2-3 mm long, 4-celled; ovules 1 in each cell; stigmas capitate. Capsule 8-10 x 5-6 mm, ovoid; seeds 4, 4-5 x 1-1.5 mm, compressed, conical, black on drying.

Flowering & Fruiting: October-December.

Distribution: Native of Tropical America. Common; in moist deciduous forests. *RNMK 1602,Baveli.*

Ipomoea wightii (Wall.) Choisy, Mem. Soc. Phys. Hist. Nat. Geneve 6: 470. 1834; Clarke in Hook. f., Fl. Brit. India 4: 203. 1883; Gamble, Fl. Pres. Madras 917(644). 1923; Wight, Ic. t. 1364. 1848; V. S. Ramach. & V.J. Nair, Fl. Cannanore 304. 1988; Vajr., Fl. Palghat Dist. 312. 1990. *Convolvulus wightii* Wall., Pl. Asiat. Rar. 2: 55. t. 171. 1831.

Small twiners; stem hirsute. Leaves 8-10 x 7-9 cm, orbicular in outline, cordate at base, shallowly 3-lobed, lobes acute, distantly toothed, hirsute above, petiole 4-5 cm long. Peduncle 8-10 cm long; bracts many, linear-lanceolate, yellowish hispid; flowers 3-5 together, sessile; sepals 2-2.3 cm long, lanceolate, acuminate, densely hispid; corolla 2.5-3 cm long, campanulate, purple. Capsule globose, glabrous; seeds hairy on angles.

Flowering & Fruiting: December-January.

Distribution: Tropical Africa, Madagascar, Sri Lanka and India. Rare; along margins of plantations and moist deciduous forests. *RNMK 2980,* Kalpetta; *RNMK 3642*, Begur.

MERREMIA Dennstedt ex Endlicher

Gen. 1403. 1841, *nom. cons.*

Creeping or climbing herbs. Leaves lobed or entire, usually cordate at base. Flowers axillary, solitary or in umbellate, peduncled cyme; bracts and bracteoles minute; sepals equal; corolla campanulate, spreading above; stamens equal; filaments broader and hairy at base, anthers oblong, twisted; ovary 4-celled, 4-ovuled, style slender, stigma 2-lobed, globose. Capsule 4-valved or irregularly dehiscent; seeds 4, triangular.

1. Branchlets winged.....**M. turpethum**
1. Branchlets not winged..... .2

2. Leaves entire ..... **M. umbellata**
2. Leaves lobed..... **M. vitifolia**

Merremia turpethum (L.) Shah & Bhat, J. Bombay Nat. Hist. Soc. 74: 567. 1978; Sivar. & P. Mathew, Fl. Nilambur 459. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 347. 2005. *Convolvulus turpethum* L., Sp. Pl. 155. 1753. *Ipomoea turpethum* (L.) R. Br., Prodr. 485. 1810; Clarke in Hook. f., Fl. Brit. India 4: 212. 1883. *Operculina turpethum* (L.) Manso, Enum. Subst. Bras. 16. 1836; Gamble, Fl. Pres. Madras 929(653). 1923; V. S. Ramach. & V.J. Nair, Fl. Cannanore 307. 1988; Manilal, Fl. Silent Valley 191. 1988; Vajr., Fl. Palghat Dist. 314. 1990.

Large climbing shrubs; branchlets winged. Leaves 5-10 x 3-4.5 cm, entire, angular, ovate, glabrous, truncate at base, acute at apex, mucronate, thinly pubescent; petiole 2-7 cm long. Flowers solitary or few in axillary cymes; calyx lobes ovate, outer larger; corolla white; ovary 2-locular. Capsule ovoid, ca. 1.5 cm across.

Flowering & Fruiting: May-June.

Distribution: Paleotropics. Occasional; in semi-evergreen forests. *RNMK 0562,* Perumthatta.

Merremia umbellata (L.) Hall. f. in Engl., Bot. Jahrb. Syst. 16: 552. 1893; Gamble, Fl. Pres. Madras 928(651). 1923; Manilal & Sivar., Fl. Calicut 186. 1982; Ansari, Fl. Kasaragod Div. 248. 1985; Manilal, Fl. Silent Valley 190. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 306. 1988; Vajr., Fl. Palghat Dist. 313. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 312. 1996; Sivar. & P. Mathew, Fl. Nilambur 460. 1997; Mohanan & Sivad., Fl. Agasthyamala 474. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 348. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 479. 2009. *Convolvulus umbellatus* L., Sp. Pl. 155. 1753. *Ipomoea cymosa* Roem. & Schult., Syst. Veg. 4: 241. 1819; Clarke in Hook. f., Fl. Brit. India 4: 211. 1883.

Prostrate or twining herbs, stems sparsely hairy. Leaves 6-8 x 4-5 cm, oblong, acuminate at apex, entire, membranous, glabrous above, sparsely hairy below; petiole 1-1.3 cm long, hairy. Peduncle 2.5-3 cm long, hispid; flowers subumbellate; pedicels ca. 1 cm long; sepals suborbicular, obtuse; corolla 3-3.5 cm long, campanulate, white, lobes hairy at apex; filaments broaden and glandular below. Capsule 2-2.5 cm across, globose, seeds angular, black, pubescent

Flowering & Fruiting: January-April.

Distribution: Pantropical. Common in semi-evergreen and moist deciduous forest. *RNMK 1772,* Manikkunnumala; *RNMK 0933*, Muthanga.

Merremia vitifolia (Burm. f.) Hall. f. in Engl., Bot. Jahrb. Syst. 16: 552. 1893; Gamble, Fl. Pres. Madras 928(651). 1923; Manilal & Sivar., Fl. Calicut 185. 1982; Ansari, Fl. Kasaragod Div. 249. 1985; Manilal, Fl. Silent Valley

190. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 307. 1988; Vajr., Fl. Palghat Dist. 314. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 312. 1996; Sivar. & P. Mathew, Fl. Nilambur 460. 1997; Mohanan & Sivad., Fl. Agasthyamala 475. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 348. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 480. 2009. *Convolvulus vitifolius* Burm.f., Fl. Ind. 45.t.18. 1768. *Ipomoea vitifolia* (Burm.f.) Bl., Bijdr. 709. 1826; Clarke in Hook. f., Fl. Brit. India 4: 213. 1883.

Aggressive climbers; stems brownish, hirsute or glabrous. Leaves membranous, 6-8 x 6-9 cm, 5-7-lobed, lobes acute, distantly dentate, petiole 5-7 cm long. Peduncle 6-8 cm long, hirsute or glabrous; flowers few, racemose; pedicels 1-1.5 cm long; sepals 1.5-2 cm long, ovate, obtuse, emarginate, sparsely bristled; corolla yellow, 5-7 cm broad, funnel-shaped, glabrous; stamens 5, equal, filaments broaden and glandular at base. Capsule 1-1.5 cm across, glabrous; seeds trigonous, dark brown.

Flowering & Fruiting: November-February.

Distribution: Indo-China and China. Occasional; along roadsides. *RNMK 0881,* Kattikulam.

PORANA Burman

Fl. Ind. 51. t. 21. f. 1. 1768.

Porana racemosa Roxb., Fl. Ind. 2: 41. 1824. *Porana malabarica* Clarke in Hook. f., Fl. Brit. India 4: 223, 1883; Gamble, Fl. Pres. Madras 921(647). 1923.

Puberulous or nearly glabrous climbers. Leaves 5-7 x 3-4 cm, ovate, deeply cordate, acute. Racemes compound, dichotomous; bracts large, sessile, cordate, persistent; sepals linear-oblong, puberulous; corola lobed, nearly half-way, white; style linear; stigmas 2, short, oblong. Capsule apiculate, glabrous; fruiting sepals oblong-spathulate, with 3-5 strong longitudinal nerves.

Flowering & Fruiting: September-January.

Distribution: Endemic to southern Western Ghats. Rare; in semi-evergreen forests. *RNMK 0654,* Perumthatta.

STICTOCARDIA H.G. Hallier

Bot. Jahrb. 18: 159. 1893.

Stictocardia tiliifolia (Desr.) Hall.f. in Engl., Bot. Jahrb. Syst. 18: 159. 1894, "tiliaefolia"; Gamble, Fl. Pres. Madras 904(635). 1923; V. S. Ramach. & V.J. Nair, Fl. Cannanore 307. 1988. *Convolvulus tiliaefolius* Desr. in Lamk., Encycl. 3: 544. 1792. *Argyreia tiliaefolia* (Desr.) Wight, Ic. t. 1358. 1848; Clarke in Hook. f., Fl. Brit. India 4: 184. 1883.*Stictocardia campanulata* Merr. in Philpp. J. Sci. Bot. 9: 133. 1914 non *Ipomoea companulata* L. Sp. Pl. 160. 1753.

Twining subshrubs. Leaves 5-9 x 6-9 cm, broadly ovate to cordiform, apex acute, base cordate, chartaceous, margin entire, glabrous above and hairy along nerves below; petiole 7-8 cm long. Flower axillary, solitary; bracts

cauducous; corolla pink, 6-7 cm across, funnel-form; stamens 5, unequal, 3-3.5 cm long; ovary conical, 4-locular, each 1-ovuled, style 3-3.5 cm long, stigma biglobose. Capsule indehiscent; accrescent calyx enlarged and fleshy.
Flowering & Fruiting: November-February.
Distribution: Circumtropical. Occasional; in moist deciduous forests. *RNMK 3208,* Begur.

XENOSTEGIA D. F. Austin & G.W. Staples
Brittonia 32: 533. 1980.

Xenostegia tridentata (L.) Austin & Staples, Brittonia 32: 533. 1980. *Convolvulus tridentatus* L., Sp. Pl. 157. 1753. *Ipomoea tridentata* (L.) Roth in Roem., Arab. Bot. 1: 38. 1797; Clarke in Hook. f., Fl. Brit. India 4: 205. 1883. *Merremia tridentata* (L.) Hall. f. in Engl., Bot. Jahrb. Syst. 16: 552. 1893; Gamble, Fl. Pres. Madras 928(652). 1923; Manilal & Sivar., Fl. Calicut 186. 1982; Ansari, Fl. Kasaragod Div. 247. 1985; Manilal, Fl. Silent Valley 189. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 93. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 306. 1988; Vajr., Fl. Palghat Dist. 313. 1990; Sivar. & P. Mathew, Fl. Nilambur 458. 1997; Mohanan & Sivad., Fl. Agasthyamala 474. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 347. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 479. 2009. *Sendera-clanti* Rheede, Hort. Malab. 11: 133, t.65. 1692.

Trailing herbs. Leaves 2.5-3 x 0.7-1 cm, lanceolate to oblong, hastate at base, acute at apex, mucronate, chartaceous, penninerved, glabrate; petiole 5–6 mm long, hairy. Flowers solitary, axillary; pedicels 2-2.5 cm long, slender; sepals subequal, ovate, acute, cuspidate inner ones acuminate; corolla 1-1.2 cm long, white or cream to yellowish, throat usually pale purple. Capsule 6-8 mm long, glabrous; seeds glabrous, black.
Flowering & Fruiting: November-January.
Distribution: Paleotropics. Common; in semi-evergreen and moist deciduous forests. *RNMK 1905,* Manikkunnumala; *RNMK 2809*, Chedalayam.

Ipomoea batatas (L.) Lamk. and **Ipomoea turbinata** Lagasca often run wild as escapes from plantations.

SOLANACEAE Juss.
Gen. Pl. 124. 1789.

1. Anthers opening by apical pores.....2
1. Anthers opening by vertical slits.....3
2. Calyx tube truncate with or without small appendages below the rim.....**Lycianthes**
2. Calyx tube deeply lobed.....**Solanum**
3. Fruit echinate.....**Datura**
3. Fruit not echinate.....4
4. Flowers pendulous; corolla 20-30 cm long.....**Brugmansia**
4. Flowers not pendulous; corolla to 3 cm long.....5

5. Flowers to 3 cm across, blue; calyx tube angled.....**Nicandra**
5. Flowers to 1.5 cm across, yellow; calyx tube not angled.....**Physalis**

BRUGMANSIA Persoon
Syn. Pl. 1: 216. 1805.

Brugmansia suaveolens (Humb. & Bonpl. ex Willd.) Bercht. & Presl, Rostl. 1: 45. 1823; V. S. Ramach. & V.J. Nair, Fl. Cannanore 308. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 313. 1996. *Datura suaveolens* Humb. & Bonpl. ex Willd., Enum. Pl. Hort. Berol. 227. 1809.

Large shrubs; stems white, smooth. Leaves 23-25 x 13-15 cm, elliptic, acute, penninerved. Flowers solitary axillary; calyx tubular, shortly lobed, 11-12 cm long; corolla dull white, funneliform, 26-30 cm long, deflexed, lobes shallow; stamens 5, free large. Fruit oblong or ellipsoid, smooth.
Flowering & Fruiting: August-May.
Distribution: Tropical America, widely naturalised elsewhere. Occasional; along the fences around plantations. *RNMK 1199*, Manathavady.

DATURA Linnaeus
Sp. Pl. 179. 1753.

Annual or perennial herbs or shrubs. Leaves entire, sinuate or lobed.Flowers solitary, erect; calyx tubular, 5-lobed, circumscissile at base leaving a disc under the capsule; corolla funnel shaped, limb plaited, shortly 5 or 10 lobed, lobes cuspidate; stamens 5, attached towards the base of corolla tube, included; ovary 2-celled or 4-celled towards base; style filiform, stigma 2-lobed. Capsule 4-valved, tubercled or prickly; seeds laterally compressed.

1. Leaves ovate; calyx to 3 cm long .....**D. metal**
1. Leaves elliptic-ovate; calyx to 5 cm long.....**D. stramonium**

Datura metel L., Sp. Pl. 179. 1753; Clarke in Hook. f., Fl. Brit. India 4: 243. 1883; Gamble, Fl. Pres. Madras 941(660). 1923; Sant., J. Bombay Nat. Hist. Soc. 47: 657. 1948; Manilal & Sivar., Fl. Calicut 188. 1982; Ansari, Fl. Kasaragod Div. 250. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 309. 1988; Vajr., Fl. Palghat Dist. 315. 1990; Sivar. & P. Mathew, Fl. Nilambur 461. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 482. 2009. *Datura alba* Nees, Trans. Linn. Soc. London 17:73. 1834; Wight, Ic. t. 852. 1844. *Datura fastuosa* L., Syst. Nat. (ed.10) 932. 1759; Clarke in Hook. f., Fl. Brit. India 4: 242. 1883; Gamble, Fl. Pres. Madras 941(660). 1923. *Datura fastuosa* L. var. *alba* (Nees) Clarke in Hook.f., Fl. Brit. India 4: 243. 1883; Gamble, Fl. Pres. Madras 941(660). 1924.

Shrubs, stems terete. Leaves alternate, 10-20 x 6-12 cm, ovate, acute at apex, unequal at base, glabrous, membranous; petiole 8-10 cm long. Flowers erect, solitary, axillary, pedicellate; calyx green, 4-6 cm long, tubular, lobes 5, erect, acute, glabrous; corolla 13-15 cm long, white with violet shades,

glabrous, lobes 5, erect, truncate with short linear appendage; stamens 5, included, filaments equal, hairy at base, anthers oblong; ovary 2-celled; style filiform; stigma 2-lobed. Capsule 3-3.5 cm across, globose, prickly; seeds compressed, glabrous.
Flowering & Fruiting: March-December.
Distribution: Paleotropics. Occasional; in forest plantations. *RNMK 2091,* Puthoorvayal.

Datura stramonium L., Sp. Pl. 179. 1753; Hook. f., Fl. Brit. India 4: 242. 1883; Gamble, Fl. Pres. Madras 941(660). 1923; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta Dist. 349. 2005. *Datura stramonium* L. var. *tatula* Clarke in Hook. f., Fl. Brit. India 4: 242. 1883. *Datura tatula* L., Sp. Pl. (ed. 2) 256. 1762. *Datura inermis* Jacq., Hort. Vindov. 3: 44. t. 82. 1776. *Datura laevis* L.f., Suppl. Pl. 146. 1781. *Datura bertolonii* Paxt. ex Guss, Fl. Sic. Sy. 1: 267. 1842. *Datura ferox* Nees, Trans. Linn. Soc. London 17: 75. 1837, non L. *Datura wallichii* Dunal in DC., Prodr. 13: 539. 1852. *Stramonium vulgatum* Gaertn., Fruct. 2: 243. t. 132. f. 4. 1791.

Undershrubs. Leaves simple, alternate, 6-13 x 3-9 cm, broadly elliptic or elliptic-ovate, base obliquely cuneate, acuminate at apex, slightly pubescent. Flowers not pendulous; calyx to 3 cm long, not inflated; corolla white, to 16 cm long. Capsule globose; seeds compressed.
Flowering & Fruiting: August-October.
Distribution: Widely distributed most part of the temperate region of the world. Occasional; in forest plantations. *RNMK 2097,* Puthoorvayl

LYCIANTHES Hassler

Annuaire Conserv. Jard. Bot. Geneve 20: 180. 1917.

Lycianthes laevis (Dunal) Bitter, Abh. Nat. Ver. Bremen 24: 484. 1920; Manilal, Fl. Silent Valley 191. 1988; Vajr., Fl. Palghat Dist. 315. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 315. 1996; Mohanan & Sivad., Fl. Agasthyamala 476. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 349. 2005. *Solanum laeve* Dunal, Solan. Synop. 22. 1816; Clarke in Hook. f., Fl. Brit. India 4: 231.1883; Gamble, Fl. Pres. Madras 936(657). 1923. *Lycianthes bigeminatum* Nees in Trans. Linn. Soc. Bot. Lond. 17: 42. 1837. **Plate 25b.**

Herbs or shrubs; branches glabrous or scabrous. Leaves alternate or fascicled, 8-18 x 2-5 cm, elliptic, acuminate at either ends, entire, petiolate. Flowers solitary or fascicled; sepals a truncate cup-like rim with or without appendages; corolla spreading, tube very short, lobes oblong, glabrous white with violet shade; stamens 5, erect, anthers ovate, filaments very short; ovary conical; style glabrous, stigma terminal. Berry 5-6 x 5-6 mm, globose, red; seeds many, yellow, flat, concentricity reticulate.
Flowering & Fruiting: December-May.
Distribution: South India, Sri Lanka and Java. Rare; in evergreen forests. *RNMK 1871*, Kallady; *RNMK 2991*, Periya.

NICANDRA Adanson

Fam. Pl. 2: 219. 1763.

Nicandra physalodes (L.) Gaertn., Fruct. 2: 237. t.131. f.2. 1791, "physaloides"; Hook. f., Fl. Brit. India 4: 240. 1883; Gamble, Fl. Pres. Madras 941(661). 1923; Manilal, Fl. Silent Valley 192. 1988; Vajr., Fl. Palghat Dist. 316. 1990. *Atropa physalodes* L., Sp. Pl. 181. 1753. *Physalis daturaefolia* Lam., Encycl. 2: 102. 1786.

Erect subshrubs. Leaves alternate or fascicled, 5-15 x 2-7 cm, sometimes much larger, elliptic, acute at either ends; petiole 3-10 cm long. Flowers ca. 3 cm across, solitary, axillary; calyx campanulate, tube inflated, cordate at base, 5-angled; corolla ca. 2 cm long; ca. 3 cm across, campanulate, blue or bluish violet; stamens 5, free. Berry ca. 1.5 x 1.5 cm, smooth; seeds pitted.

Flowering & Fruiting: October-March.

Distribution: Native of south America. Occasional; as a weed. *RNMK 1908,* Pulpally.

PHYSALIS Linnaeus

Sp. Pl. 183. 1753.

Annual herbs. Leaves entire, toothed or sinuate. Flowers axillary, solitary. Calyx companualate, toothed or lobed, accrescent and inflated in fruit; corolla widely companualate, limb plicate, shortly lobed; stamens attached towards base of corolla tube; style linear; stigma obscurely 2-lobed. Berry globose, enclosed by the inflated calyx; seeds many, smooth.

1. Glabrous herbs, branches angular; fruiting calyx to 2 cm long ..... **P. angulata**
1. Pubescent herbs, branches not angular; fruiting calyx to 3 cm long ..... **P. peruviana**

Physalis angulata L., Sp. Pl. 183. 1753; Clarke in Hook. f., Fl. Brit. India 4: 238. 1883; Gamble, Fl. Pres. Madras 939(659). 1923; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 248. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 316. 1996; Sivar. & P. Mathew, Fl. Nilambur 462. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 350. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 483. 2009. *Physalis minima* L., Sp. Pl. 183. 1753; Clarke in Hook. f., Fl. Brit. India 4: 238. 1883; Gamble, Fl. Pres. Madras 939(659). 1923; Ansari, Fl. Kasaragod Div. 251. 1985; Manilal, Fl. Silent Valley 192. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 309. 1988; Vajr., Fl. Palghat Dist. 316. 1990.

Annual herbs, branches angular. Leaves 4-6 x 2-3 cm, ovate, apex acuminate, base cuneate, unequal sided, margins dentate or sinuate, sometimes entire; petiole 4-5 cm long. Flowers solitary, pedicels ca. 1 cm long; calyx 5-toothed, in fruit ca. 2 cm across; corolla pale-yellow, 0.6-0.8 cm across. Berry 0.7-1 cm across; seeds minutely rugose.

Flowering & Fruiting: July-December.

Distribution: Tropical Asia, Africa and Australia. Occasional; in plantations. *RNMK 1377*, Puthoorvayal; *RNMK 1826,* Pozhuthana.

Physalis peruviana L., Sp. Pl. (ed. 2) 1670. 1762; Roxb., Fl. Ind. 1: 562. 1832; Clarke in Hook. f., Fl. Brit. India 4: 238. 1883; Gamble, Fl. Pres. Madras 939(659). 1923; Vajr., Fl. Palghat Dist. 317. 1990; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 350. 2005. *Physalis edulis* Sims., Bot. Mag. t. 1068. 1807. *Physalis peruviana* L. var. *latifolia* (Lamk.) Dunal in DC., Prodr. 13: 440. 1852. *Physalis latifolia* Lamk., Tab. Encycl. 2: 20. 1793. *Physalis pubescens* R. Br., Prodr. 1: 447. 1810, non L.

Weak annual erect herbs, 50-60 cm high. Leaves alternate, 6-7 x 5-6 cm, broadly ovate, obliquely cordate at base, entire or shortly lobed, 3-nerved from base; petiole 2.5-3 cm long. Flowers axillary, solitary; pedicels ca. 1 cm long, slender; calyx campanulate, accrescent in fruit, membranous; corolla campanulate, yellowish with deep brown centre, ca. 1.5 cm across, tube hairy inside; stamens 5, anthers vertically splitting; ovary with many ovules, style glabrous; stigma 2-toothed. Berry globose, 1-1.5 cm across, covered by the balloon like 2.5-3 cm across fruiting calyx; seeds many, compressed.

Flowering & Fruiting: May-August.

Distribution: Tropical south America. Occasional; in evergreen forests. *RNMK 1735,* Sugandhagiri.

SOLANUM Linnaeus

Sp. Pl. 184. 1753.

Herbs, shrubs or climbers; often prickly. Leaves entire or smoothly divided or toothed, usually densely stellate or simple hairy. Flowers in raceme, cymes or panicles, terminal or axillary; calyx campanulate, lobes 5; corolla rotate, plicate, 5-lobed along the rim; stamens 5, inserted to the throat of corolla; anthers cohering into a cone around the stigma; dehiscence by an apical pore; ovary conical; style erect, stigma terminal. Berry globose; seeds many, compressed, oblique, smooth or pitted.

1. Climbing herbs or shrubs 2
1. Erect plants 3
2. Climbing shrubs ..... **S. seaforthianum**
2. Climbing herbs ..... **S. trilobatum**
3. Plants unarmed 4
3. Plants armed 5
4. Annual herbs; leaves glabrous; berry blak, smooth ..... **S. americanum**
4. Large shrubs; leaves stellately pubescent; berry yellow, hairy ..... **S. erianthum**
5. Flowers purplish blue 6
5. Flowers white 9
6. Berry less than 1 cm across 7
6. Berry to 4 cm across 8
7. Leaves entire; berry deep red ..... **S. giganteum**
7. Leaves shallowly lobed; orange yellow ..... **S. violaceum**
8. Berry densely covered with spinous bristles ..... **S. lasiocarpum**
8. Berry smooth ..... **S. virginianum**

9. Plants with both straight and recurved prickles.....**S. viarum**
9. Plants with either straight or recurved prickles..... ..... **S. torvum**

Solanum americanum Mill., Gard. Dict. (ed. 8) 5. 1768; Schill. & Anders., Bot. J. Linn. Soc. 102: 256. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 316. 1996; Sivar. & P. Mathew, Fl. Nilambur 463. 1997; Mohanan & Sivad., Fl. Agasthyamala 477. 2002 ; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 485. 2009. *Solanum nigrum* sensu Gamble, Fl. Pres. Madras 936(657). 1923, non L. 1753; Manilal & Sivar., Fl. Calicut 189. 1982; Ansari, Fl. Kasaragod Div. 252. 1985; Manilal, Fl. Silent Valley 194. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 312. 1988; Vajr., Fl. Palghat Dist. 319. 1990.

Glabrous annual herbs 30-50 cm high. Leaves 4-8 x 1.5-4 cm, ovate to broadly ovate, attenuate at base, entire or serrate, membranous. Peduncle 1-1.5 cm long. Flowers umbelled; pedicels ca. 1 cm long, filiform, glabrous; calyx deeply 5-partite, corolla white with bluish shade, 5-6 mm across, lobes oblong. Berry 5-6 x 5-6 mm, black, smooth, glossy; seeds orbicular, yellow, pitted.
Flowering & Fruiting: March-November.
Distribution: Cosmopolitan. Common; in plantations. *RNMK 0534,* Puthoorvayal; *RNMK 1871*, Poothady.

Solanum erianthum D. Don, Prodr. Fl. Nepal. 96. 1825; Manilal, Fl. Silent Valley 193. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 311. 1988; Vajr., Fl. Palghat Dist. 318. 1990. *Solanum verbascifolium* sensu Clarke in Hook.f., Fl. Brit. India 4: 230. 1883, non L. 1753; Gamble, Fl. Pres. Madr. 936. 1923; Wight, Ic. t. 1398. 1848.

Large shrubs or small trees, 3-6 m high, unarmed. Leaves 15-25 x 5-10 cm, elliptic, entire, densely hairy below, sparsely above; nerves prominent; stellate hairs with equal arms; petioles 4-5 cm long. Cymes terminal or subterminal; peduncle 4-5 cm long, stout; flowers many, erect, densely packed; pedicels ca. 1 cm long; corolla white, densely pubescent outside. Capsule 7-8 x 7-8 mm, orange-yellow, hairy when young.
Flowering & Fruiting: July-August.
Distribution: South east Asia and north Australia. Occasional; in moist deciduous forests. *RNMK 2559,* Tholpetty.

Solanum giganteum Jacq., Coll. Bot. 4: 125. 1791; Wight, Ic. t. 893. 1844-1845; Clarke in Hook. f., Fl. Brit. India 4: 233. 1883; Gamble, Fl. Pres. Madras 937(657). 1923; Ansari, Fl. Kasaragod Div. 251. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 311. 1988; Vajr., Fl. Palghat Dist. 318. 1990; Sivar. & P. Mathew, Fl. Nilambur 464. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 351. 2005. *Solanum niveum* Vahl, Symb. Bot. 2: 41. 1791. **Plates 25c & 25d.**

Large shrubs, 1-3.5 m high. Stems and leaves covered with very minute stellate hairs of equal arms; prickles on stems only, small, stout, grouped.

Leaves 20-25 x 5-7 cm, elliptic, acute at either ends, entire, membranous; petiole 4-5 cm long. Cymes terminal or subterminal; peduncle 4-5 cm long; flowers densely packed; pedicel ca. 1 cm long, densely white-stellate hairy; corolla blue, hairy outside. Berry 0.7-1 cm across, red, glabrous; seeds smooth.
Flowering & Fruiting: June-March.
Distribution: South India and Sri Lanka. Rare; in evergreen forests. *RNMK 2433*, Chembra; *RNMK 1933*, Brahmagiri.

Solanum lasiocarpum Dunal, Hist. Solanum 223. 1813; Manilal, Fl. Silent Valley 193. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 250. 1988; Sivar. & P. Mathew, Fl. Nilambur 465. 1997; Mohanan & Sivad., Fl. Agasthyamala 478. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 352. 2005. *Solanum ferox* auct. non L. 1753, Wight, Ic. t. 1399. 1848; Clarke in Hook. f., Fl. Brit. India 4: 233. 1883; Gamble, Fl. Pres. Madras 937(658). 1923; V. S. Ramach. & V.J. Nair, Fl. Cannanore 311. 1988. *Ana-schunda* Rheede, Hort. Malab. 2:65-66, t.35. 1679.

Robust shrubs, to 1.5 m high; stems densely spineus prickled and stellate hairy. Leaves 30-35 cm long, ovate-orbicular, entire or shallowly lacerate; stellate hairs unequally armed; petioles 5-10 cm long. Flowers in groups of 2-3, axillary, epedunculate; pedicels short; calyx densely stellate hairy; corolla 3-4 cm across, blue, hairy outside; ovary densely hairy. Berry 3-5 cm across, globose, golden yellow, densely covered with spineus bristles.
Flowering & Fruiting: December-February.
Distribution: Indo-Malesia and China. Occasional; in moist deciduous forests. *RNMK 1352*, Muthanga.

Solanum seaforthianum Andr., Bot. Rep. 8: t.504. 1808; Bor & Raizada, Ind. Climb. Shrub. 127.1954; V. S. Ramach. & V.J. Nair, Fl. Cannanore 312.1988.

Shrubby climberss. Leaves 6-8 x 3-4 cm, pinnate, pinnae 2-4 pairs, narrowly ovate or lanceolate, petiolate; peduncle 5-6 cm long. Flowers in corymbose cymes, blue, star shaped; pedicel ca. 1 cm long, narrow; corolla ca. 1.5 cm across, not spreading, blue. Berry 0.7-1 cm across, reddish.
Flowering & Fruiting: May-November.
Distribution: Native of Brazil; now widely naturalized. Occasional; along margins of moist deciduous forests. *RNMK* 1788, Begur.

Solanum torvum Sw., Prodr. 47. 1788; Wight, Ic. t. 345. 1840; Clarke in Hook. f., Fl. Brit. India 4: 234. 1883; Gamble, Fl. Pres. Madras 937(658). 1923; Manilal & Sivar., Fl. Calicut 189. 1982; Ansari, Fl. Kasaragod Div. 253. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 312. 1988; Vajr., Fl. Palghat Dist. 320. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 317. 1996; Sivar. & P. Mathew, Fl. Nilambur 466. 1997; Mohanan & Sivad., Fl. Agasthyamala 478. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 352. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 487. 2009.

Shrubs, to 2.5 m high, sparsely prickled; prickles stout, broaden at base. Leaves 15-18 x 10-13 cm, entire or shallowly lobed; petiole 3-4 cm long. Peduncle short; cymes congested, axillary; flowers many; pedicel 1-1.5 cm long, narrow; corolla white, ca. 1.5 cm across, stellate hairy outside, style glabrous. Berry 1-1.3 cm across, globose, yellow when ripe; seeds pitted.
Flowering & Fruiting: July-March.
Distribution: Throughout the tropics. Common; along the road sides and disturbed moist deciduous forests. *RNMK* 1792, Puthoorvayal; *RNMK 3562*, Muthanga.

Solanum trilobatum L., Sp. Pl. 185. 1753; Clarke in Hook. f., Fl. Brit. India 4: 229. 1883; Gamble, Fl. Pres. Madras 938(659). 1923 *Solanum acetosaefolium* Lamk., Encycl. 4: 306. 1797.

Scandent herbs, nearly glabrous; prickles short, stout, compressed, recurved. Leaves 5-6 x 2-3 cm, irregularly lobed, base not cordate. Peduncles short, mostly extra-axillary; pedicels with short, strong, recurved prickles; calyx lobes ovate-oblong, minutely stellately pubescent or glabrate, rarely prickly, hardly enlarged in fruit; corolla 2-3 cm across, pubescent, lobes triangular-lanceolate, as long as the tube. Seed smooth.
Flowering & Fruiting: July-September.
Distribution: Indo-Malesia. Occasional; in moist deciduous forests. *RNMK 1100,* Pulpally.

Solanum viarum Dunal in DC., Prodr. 13: 240. 1852; Babu in J. Bomb. Nat. Hist. Soc. 67: 609. 1970; Ansari, Fl. Kasaragod Div. 253. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 313. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 317. 1996. *Solanum khasianum* Clarke in Hook.f., Fl. Brit. India 4:234.1883, var. *chatterjeeanum* Sen Gupta, Bull. Bot. Surv. India 3: 411. 1961.

Undershrubs; stem pubescent, prickles recurved. Leaves 12-16 x 8-11 cm, ovate, irregularly lobed, base obliquely truncate, densely tomentose on lower surface; petiole 4-5 cm long; spines mostly on petiole and midrib. Flowers in 3-4 flowered cymes; pedicels 1-1.3 cm long, elongates to 2 cm long in fruit; calyx lobes lanceolate, pubescent; corolla ca. 1.5 cm across, lobes lanceolate. Berries 3-3.5 cm across, globose, yellow when ripe.
Flowering & Fruiting: August-April.
Distribution: Native of south America. Occasional; in disturbed forests. *RNMK* 3*003*, Mananthavady.

Solanum violaceum Ortega, Nov. Pl. Descr. Dec. 56. 1798; Hepper in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 378. 1987; Manilal & Sivar., Fl. Calicut 190. 1982; Matthew, Kew Bull. 46: 545. 1991; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 352. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 487. 2009. *Solanum anguivi* Lamk., Encyl. 2:23. 1794; V. S. Ramach. & V.J. Nair, Fl. Cannanore 310. 1988; Vajr., Fl. Palghat Dist. 318. 1990; Sasidh. & Sivar.,

Fl. Pl. Thrissur For. 317. 1996; Sivar. & P. Mathew, Fl. Nilambur 464. 1997. *Solanum indicum* Clarke in Hook. f., Fl. Brit. India 4: 234. 1883, non L. 1753; Gamble, Fl. Pres. Madras 938(658). 1923.

Erect armed herbs; prickles 5-6 mm long, straight with a broaden base. Leaves 9-11 x 5-6 cm, shallowly lobed, densely hairy below, sparsely above; petiole 3-5 cm long. Raceme axillary, 8-12-flowered, peduncled; flowers blue; pedicels 1.3-1.5 cm long, straight, erect; corolla ca. 2 cm across, densely stellate hairy outside; style hairy. Berry 5-7 mm across, orange-yellow, smooth.

Flowering & Fruiting: August-December.

Distribution: Indo-Malesia. Common; along the road sides. *RNMK 1829*, Muttil.

Solanum virginianum L., Sp. Pl. 187. 1753; Hepper & Jaeger, Kew Bull. 42: 434. 1986. *Solanum surattense* Burm. f., Fl. Ind. 57. 1768; Manilal & Sivar., Fl. Calicut 190. 1982; Ansari, Fl. Kasaragod Div. 252. 1985; Vajr., Fl. Palghat Dist. 320. 1990. *Solanum xanthocarpum* Schrad. & Wendl., Sert. Hannov. 1: 8. t.2. 1795; Clarke in Hook. f., Fl. Brit. India 4: 236. 1883; Gamble, Fl. Pres. Madras 938(658). 1923.

Branched diffuse herbs, stems glandular hairy; prickles 2-2.5 cm long, spinescent, gradually or not broaden towards the base, present on all parts except berries. Leaves 10-13 x 8-10 cm, lyrate, membranous; petioles 7-8 cm long. Peduncle absent; flowers 2-4 together, axillary; pedicel 2-2.5 cm long, stout; corolla 1.8-2 cm across, sparsely hispid. Berry ca. 2.5 cm across, smooth; seeds flat, not pitted.

Flowering & Fruiting: August-November.

Distribution: India, Himalaya, south-east Asia, Malesia, Australia, Polynesia. Occasional; along roadsides. *RNMK 0324*, Kalpetta; *RNMK 1643*, Chundel.

Capsicum annuum L., **Capsicum frutescens** L. and **Cestrum nocturnum** L. are often seen along roadsides and in abandoned plantations as escapes. **Withania somnifera** (L.) Dunal is often cultivated as a medicinal plant.

SCROPHULARIACEAE Juss.

Gen. Pl. 117. 1789.

1. Flowers regular ....**Scoparia**
1. Flowers irregular 2
2. All leaves devided into linear lobes 3
2. Leaves entire or toothed 4
3. Calyx lobes triangular, glandular.....**Sopubia**
3. Calyx lobes acuminate, not glandular.....**Parasopubia**
4. Upper leaves alternate, lower opposite.....5
4. All leaves opposite or whorled..... 6

5. Roots reddish; calyx spathaceous, split on one side.....**Centranthera**
5. Roots not reddish; calyx not spathaceous..... .....**Striga**
6. Filaments of lower stamens appendaged..... 7
6. Filaments of lower stamens not appendaged..... .8
7. Stout erect herbs; appendages of filaments orbicular, basal; capsule depressed-globose .....**Artanema**
7. Prostrate or trailing herbs, rarely erect; appendages of filaments linear or clavate, not basal; capsule oblong.....**Torenia**
8. Anthers stalked 9
8. Anthers not stalked ....**Lindernia**
9. Calyx lobe unequal..... 10
9. Calyx lobes equal 11
10. One anther lobe aborted..... .....**Adenosma**
10. Anther lobes not aborted .....**Baccopa**
11. Non-aromatic plants; calyx lobes foliaceous.....**Mecardonia**
11. Aromatic plants; calyx lobes not foliaceous.....**Limnophila**

ADENOSMA R. Brown

Prodr. Fl. Nov. 442. 1810.

Adenosma malabaricum Hook.f., Fl. Brit. India 4: 264. 1884; Gamble, Fl. Pres. Madras 949(666). 1923; V. S. Ramach. & V. J. Nair, Fl. Cannanore Dist. 314. 1988.

Aromatic herbs. Leaves 3-4 x 1-1.3 cm, opposite, ovate to ovate-oblong, crenulate. Flowers axillary, uppermost in leafy heads; calyx deeply lobed, one rather larger, hirsute; corolla 2-lipped, tube cylindric; stamens 4, didynamous; ovary with many ovules. Fruit an ovoid or ellipsoid capsule; seeds many, minute.

Flowering & Fruiting: August-September.

Distribution: Endemic to southern Western Ghats. Occasional; in moist deciduous forests. *RNMK 2233,* Pakkam.

ARTANEMA D. Don

in Sweet, Brit. Fl. Gard. Ser. 2, t. 234. 1834, *nom cons.*

Artanema longifolium (L.) Vatke, Linnaea 43: 207. 1881; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 228. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 314. 1988; Vajr., Fl. Palghat Dist. 321. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 318. 1996; Sivar. & P. Mathew, Fl. Nilambur 467. 1997; Mohanan & Sivad., Fl. Agasthyamala 480. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 355. 2005. *Columnea longifolia* L., Mant. Pl. 1: 90. 1767. *Achimenes sesamoides* Vahl, Symb. Bot. 2: 71. 1791. *Artanema sesamoides* (Vahl) Benth., Scroph. Ind. 39. 1835; Wight, Ic. t. 1410. 1849; Hook. f., Fl. Brit. India 4: 274. 1884; Gamble, Fl. Pres. Madras 955(670). 1923. *Bahel-tsjulli* Rheede, Hort. Malab. 9:169-170, t.87. 1689.

Undershrubs. Leaves opposite, 17-20 x 7-8 cm, elliptic, acuminate, serrate, attenuate at base, glabrous; nerves 5-6 pairs, distinct below; petiole short or absent. Racemes terminal, to 20 cm long; bracts leafy; bracteoles absent; flowers sessile, 2-2.5 cm long; calyx 1-1.2 mm long, campanulate, divided to the middle, lobes acuminate, glabrous; corolla ca. 2.5 cm long, 2-lipped, deep violet, upper lip round or emarginate, lower lip 3-lobed, lobes orbicular; stamens 4, filaments of longer stamen curved or arched, with an orbicular basal appendage, anthers connate in pairs; ovary 2-furrowed, many-ovuled; style long, slender, stigma spathulate. Capsule depressed globose; seeds cylindrical, puberulus, brown.

Flowering & Fruiting: August-December.

Distribution: Indo-Malesia. Occasional; in grasslands and marshy areas in evergreen and moist deciduous forests. *RNMK 3137,* Periya; *RNMK 1423*, Tholpetty; *RNMK 1945,* Chooralmala.

BACOPA Aublet

Hist. Pl. Guiane 128, t. 48. 1775, nom. Cons.

Bacopa monnieri (L.) Pennell, Proc. Acad. Nat. Sci. Philad. 98: 94. 1946; Manilal & Sivar., Fl. Calicut 193. 1982; Ansari, Fl. Kasaragod Div. 255. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 239. 1988; Vajr., Fl. Palghat Dist. 322. 1990; Joseph, Aquatic Angiosp. Malabar 211. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 319. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 355. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 491. 2009. *Lysimachia monnieri* L., Cent. Pl. 2: 9. 1756. *Gratiola monnieri* (L.) L., Syst. Nat. (ed. 10) 851.1759. *Moniera cuneifolia* Michx., Fl. Bor. Amer. 2: 22. 1803, "Monniera"; Gamble, Fl. Pres. Madras 953(669). 1923. *Herpestis monnieria* (L.) Kunth, Nov. Gen. Sp. 2: 366. 1818; Hook. f., Fl. Brit. India 4: 272. 1884. *Brami* Rheede, Hort. Malab. 10:27, t. 14. 1690.

Prostrate fleshy herbs, rooting at nodes. Leaves whorled, 1-2 x 0.3-0.5 cm, oblong, obovate, apex obtuse, base cuneate, fleshy, sessile. Flowers solitary, axillary, blue; calyx lobes unequal, outer lanceolate, acute, inner linear; corolla campanulate, tube 5-6 mm long, obscurely 2-lipped; stamens 4, didynamous, exserted, oblong; ovary oblong, style ca. 4 mm long, stigma flat.

Flowering & Fruiting: Throughout the year.

Distribution: Paleotropics. Occasional; in marshy areas. *RNMK 0087,* Nadavayal.

CENTRANTHERA R. Brown

Prodr. 438. 1810.

Centranthera indica (L.) Gamble, Fl. Pres. Madras 971(683). 1924; Manilal & Sivar., Fl. Calicut 206. 1982; Ansari, Fl. Kasaragod Div. 255. 1985; Manilal, Fl. Silent Valley 195. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 240. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 314. 1988; Joseph, Aquatic Angiosp. Malabar 214. 1991; Sasidh. & Sivar., Fl. Pl.

Thrissur For. 319. 1996; Sivar. & P. Mathew, Fl. Nilambur 467. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 356. 2005. *Rhinanthus indica* L., Sp. Pl. 603. 1753. *Centranthera procumbens* Benth. in DC., Prodr. 10: 525. 1846; Hook. f., Fl. Brit. India 4: 301. 1884. *Corosinam* Rheede, Hort. Malab. 9:133, t. 68. 1689.

Coarsely scabrid erect herbs, 10-20 cm high, roots reddish; stems terete. Lower leaves opposite, 3-4 x 0.4-0.6 cm, linear oblong, obtuse, densely bulbous based hairy. Flowers axillary, solitary, sessile or some times in terminal raceme; calyx spathaceous, split at one side, ribbed, lobes acute; corolla 2-2.5 cm long, pale yellow with brown lines, 2-lipped, tube ventricose, lobes equal, orbicular; stamens 4, filaments densely hairy; one anther lobe fertile, other sterile and tailed; ovary many-ovuled; style dialated above, stigma obovate. Capsule 6-8 mm long, ovoid; seeds spirally reticulate.

Flowering & Fruiting: September-January.

Distribution: Indo-Malesia, China and Australia. Occasional; in moist deciduous forests. *RNMK 1774,* Muhtanga-Maragada.

LIMNOPHILA R. Brown

Prodr. 442. 1810, *nom. cons.*

Aquatic or marshy herbs; stems terete. Leaves opposite or truncate, simple, incised or dissected into capillaceous lobes. Flowers axillary, solitary or in terminal racemes; calyx tubular, equally or subequally 5-lobed; corolla bilabiate, upper lobe orbicular, emarginate, lower lobe equally 3-lobed; stamens 4, anthers lobes stipitate; style declinate at apex, stigma bilamellate, oblique. Capsule dehiscing into 4 valves; seeds angular.

1. Flowers in terminal racemes 2
1. Flowers axillary, solitary 3
2. Prdicels glandular puberulous ..... **L. aromatica**
2. Pedicels glabrous ..... **L. aquatica**
3. Leaves penninerved, entire ..... **L. repens**
3. Leaves ribbed from base, lower ones or all multifid ..... **L. indica**

Limnophila aquatica (Roxb.) Alston, Ann. Roy. Bot. Gard. (Peradeniya) 11: 205. 1929; Manilal & Sivar., Fl. Calicut 204. 1982; Joseph, Aquatic Angiosp. Malabar 238. 1991; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 494. 2009. *Cyrilla aquatica* Roxb., Pl. Corom. t. 189. 1805. *Limnophila racemosa* Benth., Scroph. Ind. 26.1835; Hook. f., Fl. Brit. India 4: 271. 1884; Gamble, Fl. Pres. Madras 952(668). 1923.

Decumbent fleshy herbs, glabrous. Lower leaves opposite, 4-5 x 1-1.5 cm, elliptic-oblong, sessile, acute, serrate, penninerved, glabrous. Raceme 15-17 cm long, many-flowered; bracts subulate; pedicels 1-1.3 cm long, filiform, scabrous; calyx divided into 5 to the middle, glabrous; corolla 2-2.5 cm long, purple. Capsule 4-valved; seeds cylindric, black, muricate.

Flowering & Fruiting: July-March.
Distribution: Indo-Malesia and east and south China. Occasional; in marshy areas. *RNMK 1517,* Panamaram.

Limnophila aromatica (Lamk.) Merr., Interpr. Rumph. Herb. Amboin. 466. 1917; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 240. 1988; Joseph, Aquatic Angiosp. Malabar 239. 1991; Mohanan & Sivad., Fl. Agasthyamala 481. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 357. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 495. 2009. *Ambulia aromatica* Lamk., Encycl. 1: 128. 1783. *Limnophila gratissima* Bl. Bijdr. 749. 1826; Hook. f., Fl. Brit. India 4: 266. 1884; Gamble, Fl. Pres. Madras 951(667). 1923. *Manganari* Rheede, Hort. Malab. 10: 11-12, t. 6. 1690.

Erect herbs, glabrous. Leaves often 3-5, lower leaves opposite, upper ones ternate, 3-5 x 1-1.5 cm, elliptic-oblong, sessile, acute, serrate, penninerved, glabrous. Raceme 13-15 cm long, many-flowered; bracts subulate; pedicels 1-1.3 cm long, filiform, glandular puberulous; calyx divided into 5 to the middle, glabrous; corolla 2-2.5 cm long, purple. Capsule oblong; seeds minute.
Flowering & Fruiting: August-December.
Distribution: Indo-Malesia, China, Japan to northern Australia. Occasional; in paddy fields. *RNMK 1003,* Panamaram.

Limnophila indica (L.) Druce, Rev. Bot. Soc. Exch. Club. Br. Isles 1913, 3: 420. 1914; Manilal & Sivar., Fl. Calicut 203. 1982; Ansari, Fl. Kasaragod Div. 257. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 240. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 315. 1988; Vajr., Fl. Palghat Dist. 323. 1990; Joseph, Aquatic Angiosp. Malabar 242. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 320. 1996; Sivar. & P. Mathew, Fl. Nilambur 468. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 357. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 497. 2009. *Hottonia indica* L., Syst. Nat. (ed.10) 919. 1759. *Limnophila gratioloides* R. Br., Prodr. 442. 1810; Hook. f., Fl. Brit. India 4: 271. 1884; Gamble, Fl. Pres. Madras 952(668). 1923. *Tsejei-manga-nari* Rheede, Hort. Malab. 9;165, t. 85.1689.

Small herbs; stems erect, usually unbranched, glandular-pubescent. Lower leaves dissected, upper ones entire, 3-ribbed, serrate, glabrous, 1.5-2 cm long. Flowers axillary, solitary or in terminal raceme; pedicels ca. 1 cm long, slender; calyx campanulate, 5 toothed, glabrous; corolla yellow, ca. 1 cm long, shortly bilabiate, lobes obtuse, glabrous. Capsule subglobose, glabrous; seeds many, black.
Flowering & Fruiting: September-December.
Distribution: Pantropical. Occasional; in marshy areas in moist deciduous forests. *RNMK 3138,* Muthanga; *RNMK 1771*, Tholpetty.

Limnophila repens (Benth.) Benth. in DC., Prodr. 10. 387. 1846; Manilal & Sivar., Fl. Calicut 205. 1982; Ansari, Fl. Kasaragod Div. 257. 1985; V. S.

Ramach. & V.J. Nair, Fl. Cannanore 315. 1988; Joseph, Aquatic Angiosp. Malabar 245. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 320. 1996; Sivar. & P. Mathew, Fl. Nilambur 469. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 358. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 498. 2009. *Stemodia repens* Benth., Bot. Reg. 17: sub t. 1470. 1832. *Limnophila conferta* Benth. in DC., Prodr. 10: 386.1846; Hook. f., Fl. Brit. India 4: 265. 1884; Gamble, Fl. Pres. Madras 952(667). 1923. *Limnophila sessilis* (Benth.) C.E.C. Fisch., Bull. Misc. Inform. Kew 1932: 62. 1932.

Procumbent hispid herbs, to 40 cm long. Leaves 2.5-3 x 1-1.3 cm, oblanceolate, acute, serrate, sessile, gland-dotted. Flowers axillary, solitary or in terminal raceme, pedicelled; sepals oblong, acute, hirtus, basely connate; corolla 1-1.3 cm long, yellow, hairy, bilabiate, upper lip emarginate, lower lip 3-lobed, lobes equal, obtuse; anthers stalked; stigma with two small lateral projections. Capsule ovoid; seeds round, black.

Flowering & Fruiting: July-December.

Distribution: Tropical Asia. Occassional; in paddy fields. *RNMK 3211,* Neervaram.

LINDERNIA Allioni

Melanges Philos. Math. Soc. Roy. Turin. (Misc. Taur.) 3(1): 178. 1766.

Erect or decumbent herbs, usually rooting at lower nodes. Leaves opposite, ovate oblong or lanceolate, entire or crenate-serrate. Flowers axillary or terminal, solitary, racemose or panicled; calyx deeply 5-lobed; corolla tube cylindric, upper lip oblong or orbicular, entire or emarginate, lower lip 3-lobed; stamen 2 or 4, anthers confluent; staminodes 2 or absent, usually linear with a curved tip; ovary ovoid to ellipsoid; style slender; stigma 2-lobed, lanceolate. Capsule globose to linear-oblong, septicidal; seeds many, rugose.

1. Leaves penninerved 2
1. Leaves 3-ribbed from base 8
2. Perfect stamens 2; staminodes 2 3
2. Perfect stamens 4; staminodes absent 5
3. Leaves closely serrate ..... **L. ciliata**
3. Leaves crenate, entire or distantly serrate 4
4. Leaves 3-4-nerved, ovate-lanceolate, 7-10 mm wide; prostrate herb..... **L. antipoda**
5. Leaves 5-7-nerved; linear-oblong; 4 mm broad; suberect herbs. ..... **L. oppositifolia**
6. Flowers axillary; capsule longer than the calyx..... **L. anagallis**
6. Flowers terminal; capsule equal to the calyx..... 7
7. Stems green; leaves densely hairy..... **L. viscosa**
7. Stem bluish; leaves glabrous. ..... **L. crustacea**
8. Prostrate herbs; leaves orbicular. 9
8. Erect herbs; leaves ovate, acute..... 10
9. Stem glabrous ..... **L. rotundifolia**
9. Stem pubescent..... **L. caespitosa**

10. Flower in terminal racemes; corolla ca. 6 mm long .....**L. parviflora**
10. Flowers axillary; corolla 8-10 mm long ....**L. hyssopioides**

Lindernia anagallis (Burm. f.) Pennell, J. Arnold Arb. 24. 252. 1943; Mukherjee, J. Ind. Bot. Soc. 24: 133. 1945; Manilal & Sivar., Fl. Calicut 198. 1982; Ansari, Fl. Kasaragod Div. 258. 1985; Manilal, Fl. Silent Valley 195. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 316. 1988; Vajr., Fl. Palghat Dist. 324. 1990; Joseph, Aquatic Angiosp. Malabar 223 . 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 322. 1996; Sivar. & P. Mathew, Fl. Nilambur 470. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 359. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 499. 2009. *Ruellia anagallis* Burm. f., Fl. Ind. 135. 1768. *Vandellia pedunculata* Benth., Scroph. Ind. 37.1835; Hook. f., Fl. Brit. India 4: 282. 1885; Gamble, Fl. Pres. Madras 959(673). 1923. *Vandellia angustifolia* Benth., Scroph. Ind. 37. 1835 & in DC., Prodr. 10: 417. 1846; Hook. f., Fl. Brit. India 4: 282. 1884. *Lindernia angustifolia* (Benth.) Wettst. in Engl. & Prantl, Naturl. Pflanzenfam. 4. 3b.79. 1891; Ravi, Journ. Bombay Nat. Hist. Soc. 67: 611. 1971.

Procumbent herbs, 15-20 cm long, rooting from nodes. Leaves 2-2.5 x 1-1.5 cm, ovate, acute, crenate; nerves 5-6 pairs. Flowers axillary; pedicel ca. 2 cm long, solitary; sepals united at the base, glabrous; corolla blue, 1-1.2 cm long, upper lip entire; lower lip equally 3-lobed, lobes obtuse; filaments with a gland at the base of the lower stamen; anthers tailed at base; stigma spoon shaped. Capsule much exceeding the calyx; seeds oblong, rugose, orange-brown.
Flowering & Fruiting: July-December.
Distribution: Indo-Malesia. Common; in marshy areas. *RNMK 0210,* Mangavayal; *RNMK 0076,* Panamaram.

Lindernia antipoda (L.) Alston in Trimen, Fl. Ceylon 6: 214. 1931; Manilal & Sivar., Fl. Calicut 200. 1982; Ansari, Fl. Kasaragod Div. 258. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 316. 1988; Vajr., Fl. Palghat Dist. 324. 1990; Joseph, Aquatic Angiosp. Malabar 224. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 322. 1996; Sivar. & P. Mathew, Fl. Nilambur 471. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 359. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 500. 2009. *Ruellia antipoda* L., Sp. Pl. 635. 1753. *Gratiola grandiflora* Roxb., Pl. Corom. t. 179. 1805. *Gratiola veronicifolia* Retz., Obs. Bot. 4: 8. 1786. *Bonnaya grandiflora* (Roxb.) Spreng., Syst. Veg. 1: 41. 1824. *Bonnaya veronicifolia* (Retz.) Sprengel in L., Syst. Veg. (ed.16) 1: 41. 1824; Hook. f., Fl. Brit. India 4: 285. 1884. *Ilysanthes veronicifolia* (Retz.) Urban, Berl. Deutsch. Bot. Ges. 2: 436. 1884; Gamble, Fl. Pres. Madras 962(675). 1923. *Lindernia anagallis* (Burm.f.) Pennell var. *grandiflora* (Retz.) Mukerjee, J. Indian Bot. Soc. 24. 133. 1945.

Stems creeping and erect, 15-20 cm long, glabrous. Leaves 1.5-2 cm long, ovate-lanceolate, serrate; nerves 3-4 pairs; petiole smaller. Flowers in terminal raceme, sometimes axillary, solitary; pedicel 0.7-1 cm long, glabrous; sepals

connate below the middle, glabrous; corolla ca. 1 cm long, purple; upper lip emarginate; lower lip obtusely 3-lobed, glabrous; stamens 2. Capsule twice as long as the calyx, linear, terete, glabrous.
Flowering & Fruiting: August-October.
Distribution: Tropical and subtropical Asia and Australia. Common; in marshy situations. *RNMK 3207,* Panamaram; *RNMK 1893*, Muthanga.

Lindernia caespitosa (Bl.) Panigrahi, Taxon 33: 320. 1984; Ansari, Fl. Kasaragod Div. 259. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 241. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 317. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 322. 1996; Sivar. & P. Mathew, Fl. Nilambur 472. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 360. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 500. 2009. *Diceros caespitosus* Bl. Bijdr. 753. 1826. *Lindernia pusilla* (Willd.) Boldingh, Zakfl. Java 165. 1916; Manilal & Sivar., Fl. Calicut 199. 1982; Vajr., Fl. Palghat Dist. 325. 1990. *Gratiola pusilla* Willd., Sp. Pl. 1: 105. 1797. *Vandellia scabra* Benth., Scroph. Ind. 36. 1835; Hook. f., Fl. Brit. India 4: 281. 1884; Gamble, Fl. Pres. Madras 959(673). 1923. *Lindernia hirta* (Cham. & Schltr.) Pennell, J. Arnold Arbor. 24: 250. 1943. *Nanschera-canschabu* Rheede, Hort. Malab. 10:99, t. 50. 1690.

Prostrate herbs, pubescent. Leaves 1.6-1.8 x 1-1.2 cm, orbicular, acute at apex, serrate, hirsute, sessile. Flowers 2 per node, axillary; pedicel ca. 1 cm; calyx divided to base, lobes 5, lanceolate, glandular pubescent; corolla 6-7 mm across, violet. Capsule obovoid, enclosed in calyx lobes.
Flowering & Fruiting: August-October.
Distribution: Africa and Tropical Asia. Common; in marshy lands. *RNMK 0236 ,* Mangavayal; *RNMK 3010*, Thakarapady.

Lindernia ciliata (Colsm.) Pennell, Brittonia 2: 182. 1936; Mukherjee, J. Ind. Bot. Soc. 24:133. 1945; Manilal & Sivar., Fl. Calicut 199. 1982; Ansari, Fl. Kasaragod Div. 259. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 242. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 317. 1988; Vajr., Fl. Palghat Dist. 324. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 322. 1996; Sivar. & P. Mathew, Fl. Nilambur 472. 1997; Mohanan & Sivad., Fl. Agasthyamala 482. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 360. 2005 ; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 501. 2009. *Gratiola ciliata* Colsm., Prodr. Desc. Grat. 14. 1793. *Gratiola serrata* Roxb., Fl. Ind. 1: 140. 1820. *Ilysanthes serrata* (Roxb.) Urban, Berl. Deutsch. Bot. Ges. 2: 436. 1884; Gamble, Fl. Pres. Madras 962(675). 1923. *Bonnaya brachiata* Link & Otto, Ic. Pl. Select. 25, t.11. 1820; Hook. f., Fl. Brit. India 4: 284. 1884. *Lindernia bracteoides* (Blatt. & Hallb.) Mukerjee, J. Indian Bot. Soc. 24: 133. 1945. *Pee-tsjnga-puspam* Rheede, Hort. Malab. 9; 115, t. 59. 1689.

Small erect herbs, 6-8 cm high. Leaves 1-2 x 0.4-0.5 cm, oblong, sessile, obtuse, spineus serrate, glabrous. Flowers in terminal racemes; pedicels 1-2 mm long, slender; sepals lanceolate, united below the middle, acuminate;

corolla blue, 1-1.2 cm long, tube slender, upper lip orbicular, lower lip obtusely 3-lobed; stamens 2, anthers unequal; staminodes hooked. Capsule ca. 1.5 cm long, linear, exceeding the fruiting calyx.
Flowering & Fruiting: June-January.
Distribution: Indo-Malesia. Common; in marshy areas and paddy fields. *RNMK 3207,* Kottathara; *RNMK 1523*, Venniyodu.

Lindernia crustacea (L.) F. Muell., Syst. Cens. Austral. Pl. 1: 97. 1882; Mukherjee, J. Ind. Bot. Soc. 24: 130. 1945; Manilal & Sivar., Fl. Calicut 199. 1982; Ansari, Fl. Kasaragod Div. 260. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 243. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 317. 1988; Vajr., Fl. Palghat Dist. 324. 1990; Joseph, Aquatic Angiosp. Malabar 225. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 322. 1996; Sivar. & P. Mathew, Fl. Nilambur 473. 1997; Mohanan & Sivad., Fl. Agasthyamala 483. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta Dist. 360. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 501. 2009. *Capraria crustacea* L., Mant. Pl. 1: 87. 1767. *Vandellia crustacea* (L.) Benth., Scroph. Ind. 35. 1835; Wight, Ic. t. 863. 1844-1845; Hook. f., Fl. Brit. India 4: 274. 1884; Gamble, Fl. Pres. Madras 959(673). 1923. *Kattu-pee-tsjanga-puspam* Rheede, Hort. Malab. 9:113, t. 58. 1689.

Erect branched herbs, 5-15 cm high, rooting from lower nodes; stems bluish, glabrous. Leaves 1.5-2 x 1-1.3 cm, broadly ovate, obtusely acute, serrate; nerves 4-5 pairs; petioles 4-5 mm long. Racemes terminal or sometimes the flowers axillary; pedicels to 1.5 cm long; calyx 5-fid to below the middle, lobes acute, glabrous; corolla 5-7 mm long, purple; staminal filament of lower stamen appendaged at middle. Capsule globose, glabrous, equaling or smaller than the fruiting calyx; seeds obovoid, rugose, yellow.
Flowering & Fruiting: August-February.
Distribution: Africa, America and Tropical and subtropical Asia. Common; in Paddy fields and moist habitat. *RNMK 0268,* Panamaram.

Lindernia hyssopioides (L.) Haines, Bot. Bihar and Orissa 635. 1922; Mukherjee, J. Ind. Bot. Soc. 24:132. 1945; Manilal & Sivar., Fl. Calicut 200. 1982; Ansari, Fl. Kasaragod Div. 260. 1985; Manilal, Fl. Silent Valley 195. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 318. 1988; Vajr., Fl. Palghat Dist. 325. 1990; Joseph, Aquatic Angiosp. Malabar 227. 1991; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 361. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 502. 2009. *Gratiola hyssopioides* L., Mant. Pl. 2: 174. 1771. *Ilysanthes hyssopioides* (L.) Benth. in DC., Prodr. 10: 419. 1846; Wight, Ic. t. 857. 1844-1845; Hook. f., Fl. Brit. India 4: 283. 1884; Gamble, Fl. Pres. Madras 961(675). 1923.

Erect herbs, branched at base; stems glabrous. Leaves 1.2-1.5 x 0.8-1 cm, ovate, acute, sessile, erect, 3-ribbed from base; upper leaves smaller. Flowers axillary; pedicels 1.7-2 cm long, deflexed in fruit; sepals lanceolate,

puberulus; corolla blue, 0.8-1 cm long, tube glandular-hairy within; upper lip cleft at apex; lower lip 3-lobed, midlobe rhomboid; stamens 2, anthers tailless; staminodes filiform, curved, puberulus. Capsule acute, glabrous, twice as long as the fruiting calyx.
Flowering & Fruiting: March-September.
Distribution: South-east Asia, Malesia and China. Common; in wet lands. *RNMK 3288,* Karapuzha.

Lindernia oppositifolia (Retz.) Mukerjee, J. Ind. Bot. Soc. 24: 134. 1945; Manilal & Sivar., Fl. Calicut 200. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 318. 1988; Joseph, Aquatic Angiosp. Malabar 230. 1991; Sivar. & P. Mathew, Fl. Nilambur 474. 1997. *Gratiola oppositifolia* Retz., Obs. Bot. 4: 8. 1786. *Bonnaya oppositifolia* (Retz.) Spreng., Syst. Veg. 1: 41. 1824; Hook. f., Fl. Brit. India 4: 286. 1884. *Vandellia oppositifolia* (Retz.) Haines, Bot. Bihar and Orissa 634. 1922. *Ilysanthes oppositifolia* (Retz.) Urban, Berl. Deutsch. Bot. Ges. 2: 435. 1884; Gamble, Fl. Pres. Madras 962(676). 1923.

Procumbent herbs; stems glabrous. Leaves 3-4 x 0.4-0.5 cm, linear-oblong, acute, distantly serrate, sessile. Racemes to 13 cm long, terminal; pedicels opposite, 2-2.5 cm long, slender, perpendicular to the axis. Flowers paired; sepals linear lanceolate, free to the base; corolla 1-1.2 cm long; upper lip entire or emarginate, lower lip equally 3-lobed; anthers divaricate; staminodes linear, bulged at apex. Capsule 1.5-1.7 cm long, terete; seeds obovoid, minutely muriculate.
Flowering & Fruiting: July-October.
Distribution: Endemic to Peninsular India. Common; in paddy fields. *RNMK 1945*, Nadavayal; *RNMK 2029*, Panamaram.

Lindernia parviflora (Roxb.) Haines, Bot. Bihar and Orissa 645. 1922; Mukherjee, J. Ind. Bot. Soc. 24: 132. 1945; Manilal & Sivar., Fl. Calicut 201. 1982; Ansari, Fl. Kasaragod Div. 260. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 318. 1988; Joseph, Aquatic Angiosp. Malabar 231. 1991; Sivar. & P. Mathew, Fl. Nilambur 474. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 361. 2005. *Gratiola parviflora* Roxb., Corom. Pl. 3: 3, t.204. 1811. *Ilysanthes parviflora* (Roxb.) Benth., Scroph. Ind. 34. 1835; Hook. f., Fl. Brit. India 4: 283. 1884; Gamble, Fl. Pres. Madras 961(675). 1923.

Decumbent herbs, 10-20 cm high; stems glabrous. Leaves 1-1.5 x 0.7-0.8 cm, ovate, acute, entire, sessile; nerves 3 pairs. Flowers in terminal racemes or upper axillary; bracts ovate; pedicel deflexed in fruit, ca. 1.5 cm long; sepals connate at base; corolla 5-6 mm long; upper lip bifurcated at apex; lower lip obtusely 3-lobed; staminodes with lateral vermiform appendages. Capsule ovoid, glabrous, xceeding the calyx; seeds obovoid, yellow, glabrous.
Flowering & Fruiting: August-December.
Distribution: Tropical Africa, India, south east Asia. Common; in paddy fields and marshy areas. *RNMK 3196,* Padinjaraethara.

Lindernia rotundifolia (L.) Alston in Trimen, handb. Fl. Ceylon 6:214. 1931; Mukerjee, J. Indian Bot. Soc. 24: 132. 1945; Manilal & Sivar., Fl. Calicut 201. 1982; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 243. 1988; Joseph, Aquatic Angiosp. Malabar 233. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 323. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 361. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 503. 2009. *Gratiola rotundifolia* L., Mant. Pl. 1: 274. 1767. *Ilysanthes rotundifolia* (L.) Benth. in DC., Prodr. 10: 420. 1846; Hook. f., Fl. Brit. India 4: 254. 1885; Gamble, Fl. Pres. Madras 962(675). 1923. Tsjanga-puspam Rheede, Hort. Malab. 9:111, t. 57. 1689. *Tsjanga-puspam* Rheede, Hort. Malab. 9:111, t.57.1689.

Prostrate branched herbs, rooting from nodes, glabrous. Leaves 1-1.3 cm long, orbicular, glabrous, sessile, serrate or entire, 3-ribbed from base. Flowers axillary; pedicels 1.4-1.6 cm long , slender, solitary; sepals elliptic, glandular-hairy; corolla 1-1.3 cm long; upper lip notched at apex, lower lip 3-lobed, hairy at the throat; staminodes long, filiform, appendaged; stigmas hairy. Capsule 3-5 mm long, globose; seeds curved, striate, pale brown.
Flowering & Fruiting: August-January.
Distribution: Paleotropics. Common; in marshy habitats and paddy fields. *RNMK 2026*, Karapuzha; *RNMK 2677*, Muthanga.

Lindernia viscosa (Hornem.) Merr., Sp. Blanc. 14. 1918; Manilal & Sivar., Fl. Calicut 198. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 319. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 323. 1996; Sivar. & P. Mathew, Fl. Nilambur 476. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 362. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 507. 2009. *Gratiola viscosa* Hornem., Hort. Hafn. 19: 1807. *Vandellia hirsuta* Benth., Scroph. Ind. 36. 1835; Gamble, Fl. Pres. Madras 959(673). 1923. *Lindernia hirsuta* (Benth.) Wettst. in Engl. & Prantl, Naturl. Pflanzenfam. 4(3b): 73. 1891; Mukherjee, J. Ind. Bot. Soc. 24: 131. 1945.

Diffuse herbs, 12-15 cm high, hispid. Leaves 4-5 x 1.5-2 cm, ovate, obtuse, serrate, white below; lower ones petiolate, upper sessile. Raceme terminal, hispid; sepals free to the base; corolla 5-6 mm long, white; upper lip entire, lower lip 3-lobed, lobes orbicular. Capsule globose, almost equalling the fruiting calyx; seeds cylindrical, yellow, smooth.
Flowering & Fruiting: July-October.
Distribution: Indo-Malesia and China. Common; in marshy areas. *RNMK 1756*, Muthanga.

MECARDONIA Ruiz & Pavon
Prodr. 95. 1794.

Mecardonia procumbens (Mill.) Small, Fl. Southeast. U.S. 1065 & 1338. 1903; Joseph & Suresh in Indian J. Botany 5: 126. 1982; Ansari, Fl. Kasaragod Div. 261. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 320. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 324. 1996; Sivar. & P. Mathew,

Fl. Nilambur 476. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 507. 2009*Erinus procumbens* Mill., Gard. Dict. (ed.8) 6. 1768. Mecardonia dianthera (Sw.) Pennell, Proc. Acad. Nat. Sci. Philad. 98:87. 1940. *Bacopa procumbens* (Mill.) Greenm., Publ. Field Columbian Mus. Bot. ser. Chicago 2: 261. 1907.

Diffuse herbs, stems 4-angled. Leaves opposite, sessile, 1-1.5 x 0.5-0.6 cm, ovate-lanceolate, base acute, crenate-serrate, penninerved. Flowers axillary, solitary; pedicels ca. 1 cm long; bracteoles oblong, ca. 0.5 cm long; calyx deeply 5-partiate, inner 2 lobes much narrower, outer ovate-lanceolate; corolla yellow, 6-7 mm long, slightly 2-lipped with subequal lobes; stamens 4, didynamous, anthers stalked, ovary oblong with short style; stigma lamellate. Capsule 2-valved; seeds many, reticulate.

Flowering & Fruiting: October-December.

Distribution: Native of Tropical America; introduced and naturalised in India. Common; in wet areas and plantations. *RNMK 2081,* Puthoorvayal; *RNMK 1756*, Pulpally; *RNMK 1423*, Muthanga.

PARASOPUBIA Hofmann & Fischer

Bot. Jahrb. Syst. 125: 357. 2004.

Parasopubia delphiniifolia (L.) H.-P. Hofm. & Eb. Fisch., Bot. Jahrb. Syst. 125: 357. 2004. *Gerardia delphiniifolia* L., Cent. Pl. 2: 21. 1756. *Sopubia delphiniifolia* (L.) G. Don, Gen., Syst. 4: 560. 1837 "delphinifolia"; Hook. f., Fl. Brit. India 4: 302. 1885; Gamble, Fl. Pres. Madras 970(682). 1924; Manilal & Sivar., Fl. Calicut 207. 1982; Ansari, Fl. Kasaragod Div. 263. 1985; Manilal, Fl. Silent Valley 196. 1988; Vajr., Fl. Palghat Dist. 326. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 325. 1996; Mohanan & Sivad., Fl. Agasthyamala 485. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 363. 2005.

Annuals or perennials; stems hispid. Leaves 2-3.5 cm long, lobes narrow, filiform, hirtus. Flowers axillary; pedicels 2-3 cm long, slender; calyx ca. 9 mm long, tube ribbed, lobes acuminate, free to the middle, scabrid; corolla 2-2.5 cm long, tube ventricose, lobes subequal, obovate, obtuse; stamens 4, one anther lobe sterile, spurred. Capsule truncate at apex; seeds oblong, pitted.

Flowering & Fruiting: September-October.

Distribution: India and Sri Lanka. Common; in grasslands. *RNMK 1553,* Manikkunnumala; *RNMK 4203*, Kurumbalakotta.

SCOPARIA Linnaeus

Sp. Pl. 116. 1753.

Scoparia dulcis L., Sp. Pl. 116. 1753; Hook. f., Fl. Brit. India 4: 289. 1884; Gamble, Fl. Pres. Madras 964(678). 1924; Manilal & Sivar., Fl. Calicut 193. 1982; Ansari, Fl. Kasaragod Div. 262. 1985; Manilal, Fl. Silent Valley 196. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 320. 1988; Vajr., Fl. Palghat Dist. 326. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 324. 1996; Sivar. & P. Mathew, Fl. Nilambur 477. 1997; Mohanan & Sivad., Fl. Agasthyamala 484.

2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 363. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 509. 2009.

Erect annuals, 10-60 cm high; stems ridged. Leaves whorled, 3-3.5 x 1.3-1.5 cm, elliptic to obovate, acute, serrate; lateral nerves 3 pairs; petiole 7-9 mm long. Flowers axillary, solitary; pedicels 7-8 mm long, erect, slender; calyx deeply 4-lobed, lobes ovate, obtuse, curved; corolla rotate, 4-lobed, white, throat densely hairy, lobes obovate; stamens 4, subequal; ovary globose, style clavate, stigma truncate. Capsule globose, longer than the calyx, 2-valved; seeds many, pitted.

Flowering & Fruiting: Throughout the year.

Distribution: Native of tropical America; now Pantropical. Common; in open areas. *RNMK 0128,* Puthoorvayal.

SOPUBIA F. Hamilton ex D. Don

Prodr. Pl. Nepal. 88. 1825.

Sopubia trifida Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 88. 1825; Hook. f., Fl. Brit. India 4: 302. 1884; Gamble, Fl. Pres. Madras 970(682). 1924; Manilal, Fl. Silent Valley 197. 1988; Vajr., Fl. Palghat Dist. 326. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 325. 1996; Mohanan & Sivad., Fl. Agasthyamala 485. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 364. 2005.

Stout rigid herbs; stems hispid. Leaves 3-fid or upper ones entire; lobes 1-2 cm long, linear-oblong, coriaceous, covered with tubercle based hairs. Flowers axillary or in terminal racemes; pedicels 6-7 mm long; calyx campanulate, lobes triangular, glandular; corolla 1-1.2 cm across, lobes rotate, subequal; anthers bearded at base. Capsule emarginate at apex; seeds brown.

Flowering & Fruiting: April-May.

Distribution: Indo-Malesia and China. Common; in grasslands. *RNMK 4202,* Chembra; *RNMK 0128*, Banasuramala.

STRIGA Loureiro

Fl. Cochinch. 17. 1790.

Erect, coarsely scabrid parasitic herbs. Leaves: lower opposite upper alternate, linear-lanceolate. Flowers in terminal bracteate spike; bracteoles 2, linear; calyx tubular, 5-toothed or lobed near the apex, 5-15, ribbed; corolla tube slender, lobes 5, spreading, subequal; stamens 4, included, didynamous; anthers 1-celled; ovary many-ovuled, style clavate above. Capsule oblong, 2-valved; seeds cylindrical or angular.

1. Flowers yellow; calyx tube 10 ribbed .....**S. asiatica**
1. Flowers white; calyx tube 15 ribbed..... .**S. angustifolia**

Striga angustifolia (D. Don) Sald., Bull. Bot. Surv. India 5: 70. 1963; Manilal & Sivar., Fl. Calicut 195. 1982; Ansari, Fl. Kasaragod Div. 263. 1985; Manilal, Fl. Silent Valley 197. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 321. 1988; Vajr., Fl. Palghat Dist. 327. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For.

325. 1996; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 511. 2009; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 241. 2009. *Buchnera angustifolia* D. Don, Prodr. Fl. Nepal. 91. 1825. *Buchnera euphrasioides* (Benth.) in Hook. Comp. Bot. Mag. 1: 364. 1836; Hook. f., Fl. Brit. India 4: 299. 1884; Gamble, Fl. Pres. Madras 968(680). 1924.

Erect, little or not branched herbs, to 30 cm high, scabrid. Leaves 2-4 x 0.3-0.4 cm, linear-lanceolate, scabrid. Flowers in terminal spikes; bracts lanceolate; sepals ca. 1 cm long; corolla 1.2-1.4 cm long, 2-lipped, upper lip orbicular, lower lip 3-lobed. Capsule obovoid, cuspidate, glabrous; seeds cylindrical, brown.

Flowering & Fruiting: August-December.

Distribution: Indo-Malesia. Occasional; in grasslands and moist deciduous forests. *RNMK 1346,* Muthanga; *RNMK 2081*, Banasuramala.

Striga asiatica (L.) O. Kuntze., Rev. Gen. Pl. 2: 466. 1981; Hepper in Rhodora 76: 46. 1974; Manilal & Sivar., Fl. Calicut 194. 1982; Manilal, Fl. Silent Valley 197. 1988; Ansari, Fl. Kasaragod Div. 263. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 321. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 326. 1996; Mohanan & Sivad., Fl. Agasthyamala 486. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 364. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 242. 2009. *Buchnera asiatica* L., Sp. Pl. 1630. 1753. *Striga lutea* Lour., Fl. Cochinch. 22. 1790; Hook. f., Fl. Brit. India 4: 299. 1884; Gamble, Fl. Pres. Madras 968(680). 1924.

Erect, annual scabrid herbs, to 35 cm high. Leaves 3-4 x 0.3-0.5 cm, lanceolate to oblanceolate, thickly scabrid. Flowers sessile in terminal spike; bracts and bracteoles lanceolate; sepals ca. 1 cm long, oblong, glabrous, united to near the tip, tubercled hairy; corolla 1.3-1.5 cm long, tube slender; upper lip orbicular, entire. Capsule oblong, glabrous; seeds angular, pitted

Flowering & Fruiting: July-September.

Distribution: South east Asia and Africa. Common; in grasslands. *RNMK 1423,* Chanthanathodu; *RNMK 4203*, Manikkunnumala; *RNMK 0128*, Chembra.

TORENIA Linnaeus

Sp. Pl. 619. 1753.

Creeping or rarely erect herbs; stems 4-angled. Leaves ovate-acuminate, round at base, with blue nerves, serrate, long-petiolate. Flowers axillary, solitary or terminal cymes, pedicellate; calyx tubular, ribbed or winged, lobes 5, acuminate; corolla tube cylindric, curved; upper lip emarginate or lobed, lower lip equally 3-lobed; lobes obtuse, usually blue; stamens 4, didynamous; lower stamens with appendaged long filaments, arched and concealed in the upper lip; upper stamens with short filaments included in the tube; ovary oblong; style slender, stigma bilabiate. Capsule oblong, septicidal; seeds many, rugose or pitted.

1. Flowers up to 1 cm long .....**T. lindernioides**
1. Flowers more than 1 cm long..... 2

2. Flowers in axillary racemes ....**T. hirsute**
2. Flowers axillary, solitary.....….**T. bicolor**

Torenia bicolor Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 38. 1851; Hook. f., Fl. Brit. India 4: 278. 1884; Gamble, Fl. Pres. Madras 957(672). 1923; Sald., Bull. Bot. Surv. India 8: 129. 1966; Manilal & Sivar., Fl. Calicut 196. 1982; Ansari, Fl. Kasaragod Div. 265. 1985; Manilal, Fl. Silent Valley 198. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 322. 1988; Vajr., Fl. Palghat Dist. 327. 1990; Joseph, Aquatic Angiosp. Malabar 249. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 326. 1996; Sivar. & P. Mathew, Fl. Nilambur 478. 1997; Mohanan & Sivad., Fl. Agasthyamala 487. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 365. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 512. 2009.

Prostrate herbs. Leaves 3-4 x 1.5-2 cm, ovate, acute, serrate, base truncate to subcordate, thinly hairy; nerves 4-5 pairs; petiole 2-3 cm long. Flowers axillary, solitary; pedicels 4-5 cm long, slender; calyx ca. 1.5 cm long, ribbed with brown line, narrowly winged, glabrous, wing decurrent at base into the pedicel; lobes acuminate; corolla 2-2.5 cm long, deep-violet, with pale lower lip, lobes obtuse, glabrous; appendages of lower filament shortly subulate. Capsule included in the calyx.

Flowering & Fruiting: Throughout the year. *Distribution*: Endemic to Western Ghats. Common in wet areas in all forest types. *RNMK 1346,* Manikkunnumala; *RNMK 3137*, Tholpetty.

Torenia hirsuta Willd., Sp. Pl. 3: 266. 1800; Hook. f. Fl. Brit. India 4: 277. 1884; Gamble, Fl. Pres. Madras 957(672). 1923; V. S. Ramach. & V.J. Nair, Fl. Cannanore 322. 1988; Vajr., Fl. Palghat Dist. 327. 1990. *Torenia asiatica* L. var. *hirsuta* (Willd.) Hook.f., Fl. Brit. India 4: 277. 1884.

Erect diffuse annual herbs. Leaves 1.4-1.8 x 0.6-0.8 cm, deltoid-ovate, acute, truncate, coarsely serrate, pubescent. Flowers pale blue with deep blue throat, in axillary, racemes.

Flowering & Fruiting: February-March.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1002,* Periya; *RNMK 2068*, Theethundamala.

Torenia lindernioides Sald., Bull. Bot. Surv. India 8:129.1966; Manilal & Sivar., Fl. Calicut 197. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 322. 1988; Joseph, Aquatic Angiosp. Malabar 250. 1991; Sivar. & P. Mathew, Fl. Nilambur 478. 1997.

Erect branched herbs, to 10 cm tall. Leaves 1.5-1.7 x 0.8-1 cm, broadly ovate, acute, rounded at base, serrate; nerves 3 pairs; petiole 0.5-0.6 cm long. Racemes terminal, or sometimes the flowers upper axillary; pedicel ca. 1 cm long, slender; calyx campanulate, narrowly winged, 5-lobed at apex; corolla 6-8 mm long, violet, Capsule ellipsoid, glabrous, included within calyx; seeds ovoid, pitted, yellow.

Flowering & Fruiting: July-March.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2518,* Sugandhagiri.

Angelonia salicariaefolia Humb. & Bonpl. often run wild as a garden escape.

OROBANCHACEAE Ventenat

Tabl. Regne Veg. 2: 292. 1799.

1. Calyx tubular, 5 lobed.....**Christisonia**
1. Calyx spathaceous, split on one side .....**Aeginetia**

AEGINETIA Linnaeus

Sp. Pl. 632. 1753.

Glabrous parasitic herbs; scales very few or absent. Flowers peduncled, solitary or in clusters; bracteoles absent; calyx spathaceous, split on one side; corolla campanulate, tube broad, lobes 5, equal, orbicular, spreading; stamens 4, didynamous; upper stamen with one anthers lobe; lower stamen with one sterile and one fertile lobes; ovary 1-celled, placentas lobed, parietal, ovules many; style stout, stigma large, peltate. Capsule apically valvular; seeds many, rugose.

1. Scape unbranched, one flowered; corolla deep purple.....**A. indica**
1. Scape branched, many flowered; corolla tube yellow.....**A. pedunculata**

Aeginetia indica L., Sp. Pl. 632. 1753; Roxb., Pl. Corom. 91. 1798; Wight, Ic. 895. 1844-1845; Hook. f., Fl. Brit. India 4: 320. 1884; Gamble, Fl. Pres. Madras 974(685). 1924; Manilal, Fl. Silent Valley 198. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 204. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 323. 1988; Vajr., Fl. Palghat Dist. 328. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 327. 1996; Sivar. & P. Mathew, Fl. Nilambur 479. 1997; Mohanan & Sivad., Fl. Agasthyamala 489. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 365. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 234. 2009. *Tsjemcumulu* Rheede, Hort. Malab. 11:97, t. 47. 1692.

Root stock short, horizontal; scapes many, erect, unbranched, naked, glabrous, deep pink or brown, 15-30 cm long. Flowers solitary; bracts and bracteoles absent; calyx 2-3 cm long, glabrous, reddish; corolla 3-4 cm long, dark purple, tube broad, lobes equal, rounded, glabrous; upper stamens with one anther lobe; lower stamen with one sterile and one fertile lobes. Capsule 2-3 cm long, dehisce apically; seeds many, white, rugose
Flowering & Fruiting: August-September.
Distribution: Indo-Malesia and Japan. Occasional; in semi-evergreen forests. *RNMK 1929,* Manikkunnumala.

Aeginetia pedunculata Wall., Pl. Asiat. Rar. 3: 13.t.219.1831; Hook. f., Fl. Brit. India 4:320. 1884; Wight, Ic. t. 1421. 1849; Gamble, Fl. Pres. Madras 974(685). 1924; Ansari, Fl. Kasaragod Div. 265. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 323. 1988; Vajr., Fl. Palghat Dist. 329. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 327. 1996; Sivar. & P. Mathew, Fl. Nilambur 480. 1997; Mohanan & Sivad., Fl. Agasthyamala 489. 2002; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 236. 2009. **Plate 24 l** & **25 a.**

Rootstock erect, glabrous or scabrid. Scapes branched, 10-20 cm long, glabrous, pink or brownish yellow. Flowers many; calyx 3-4 cm long, split along one side, puberulus, acute. pale orange; corolla 6-7 cm long, ca. 4 cm across; tube widening above, yellowish pink; lobes rounded, deep purple to blue; sterile anthers with fleshy acute horn; stigma peltate, very prominent, glabrous, white.

Flowering & Fruiting: September-November.

Distribution: Indo-Malesia. Occasional; in grasslands. *RNMK 3063,* Manikkunnumala.

CHRISTISONIA Gardner

Calcutta J. Nat. Hist. 8: 153. 1897.

Christisonia tubulosa (Wight) Benth. ex Hook. f., Fl. Brit. India 4: 321. 1884; Gamble, Fl. Pres. Madras 975(685). 1924; Mohanan & Sivad., Fl. Agasthyamala 490. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 366. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 239. 2009. *Oligopholis tubulosa* Wight, Ic. t. 1422. 1849.

Stems reddish, to 40 cm high, glabrous. Peduncle 3-4 cm long, stout; bracts 8-9 mm long, ovate, acute; calyx 2-2.5 cm long, orange coloured, glabrous, lobes unequal, acute; corolla 5-7 cm long; tube slightly curved, 1.5-2 cm broad, yellowish white, lobes equal, ca. 1.5 cm across, thinly tomentose, pink; stamens equal, filaments hairy; sterile anther lobe hooked; stigma peltate, papillose.

Flowering & Fruiting: July-August.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2233, S*ugandhagiri.

LENTIBULARACEAE Rich.

in Poiteau & Turpin, Fl. Paris. 1, ed. 4 : 26. 1808.

UTRICULARIA Linnaeus

Sp. Pl. 18. 1753.

Erect, trailing or scapigerous herbs, terrestrial or aquatic; stems variously modified into rootlike or leaflike foliar organs; some organs are bladder like insect trapping; foliar organs are linear to orbicular, usually green, entire or dissected. Scapes erect or twining, with or without sterile bracts or scales. Flowers few to many, racemose; bracteoles smaller, at the base of the pedicels;

calyx lobes 2, equal or unequal, usually orbicular, accrescent; corolla bilabiate, upper lip saccate or pouched, enclosing the stamens, lower lip larger, deflexed, spurred below; stamens 2, included; ovary 1-celled, ovules many, free central; style short, stigma bi-lamellate. Fruit a 1-4-valved capsule, circumscissile or irregular-splitting; seeds many, lenticular.

1. Scapes twining ..... **U. reticulate**
1. Scapes not twining 2
2. Flowers rose pink; lower lip 5 lobed ..... **U. striatula**
2. Flowers blue, pink, violet or yellow; lower lip entire or 3 lobed 3
3. Bracts and scales medifixed 4
3. Bracts and scales basifixed... 5
4. Racemes 35-40 cm; spur larger than lower lip of corolla ..... **U. caerulea**
4. Racemes 12-15 cm; spur shorter than lower lip of corolla..... **U. roseo-purpurea**
5. Aquatic herbs; foliar organs much dissected..... **U. aurea**
5. Terrestrial herbs; foliar organs linear..... 6
6. Capsule wall uniformly thickened ..... **U. uliginosa**
6. Capsule wall thickened along dehiscent margins... ..... **U. graminifolia**

Utricularia aurea Lour., Fl. Cochinch. 26.1790; Taylor in Steenis, Fl. Males. 1,8:296. 1977; Manilal & Sivar., Fl. Calicut 208. 1982; Ansari, Fl. Kasaragod Div. 266. 1985; Janarth. & Henry, Bladderworts India 30. 1992; Vajr., Fl. Palghat Dist. 329. 1990; Joseph, Aquatic Angiosp. Malabar 83. 1991; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 367. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 515. 2009. *Utricularia flexuosa* Vahl, Enum. Pl. 1: 198. 1804; Clarke in Hook. f., Fl. Brit. India 4: 329. 1884; Gamble, Fl. Pres. Madras 980(689). 1924. *Utricularia fasciculata* Roxb., Fl. Ind. 1: 143. 1820; Wight, Ic.t. 1568. 1850.

Aquatic herbs; stolons much branched. Foliar organs much dissected, dichotomously branched; traps lateral; scape 5-8 flowered; bracts lanceolate; calyx lobes subequal; corolla yellow, spur slightly curved; ovary globose. Capsule enclosed by persistent calyx.

Flowering & Fruiting: September-December.

Distribution: Indo-Malesia to Australia and east Asia. Occasional; on dripping rocks. *RNMK 3101,* Chembra.

Utricularia caerulea L., Sp. Pl. 18. 1753; Wight, Ic. t. 1583. 1850; Gamble, Fl. Pres. Madras 983(691). 1924; Ansari, Fl. Kasaragod Div. 266. 1985; Janarth. & Henry, Bladderworts India 43. 1992; Vajr., Fl. Palghat Dist. 330. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 328. 1996; Mohanan & Sivad., Fl. Agasthyamala 491. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 367. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 516. 2009. *Utricularia racemosa* Wall. ex Walp. In Meyen, Observ. Bot. 19: 401. 1843; Wight, Ic. t. 1584, f. 1. 1850; Clarke in Hook.f., Fl. Brit. India 4:333. 1884.

Foliar organs spathulate, revolute, up to 8 mm long, 1 nerved. Traps ovoid, mouth terminal. Racemes 35-40 cm long, erect; bracts medifixed, rhomboid. Flowers bluish purple; calyx lobes subequal, broadly ovate, obtuse; upper lip of corolla oblong, lower lip broadly ovate, spur 3-4 mm long, larger than lower lip. Capsule subglobose; seeds ovoid, hilum terminal, testa reticulate, cells elongate.
Flowering & Fruiting: August-October.
Distribution: Paleotropics. Common; in grasslands in moist localities. *RNMK 3162,* Chembra; *RNMK 1560*, Manikkunnumala.

Utricularia graminifolia Vahl, Enum. Pl. 1: 195. 1804; Gamble, Fl. Pres. Madras 981(690). 1924; Manilal & Sivar., Fl. Calicut 208. 1982; Manilal, Fl. Silent Valley 199. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 323. 1988; Janarth. & Henry, Bladderworts India 57. 1992; Joseph, Aquatic Angiosp. Malabar 87. 1991; Vajr., Fl. Palghat Dist. 330. 1990; Sivar. & P. Mathew, Fl. Nilambur 480. 1997; Mohanan & Sivad., Fl. Agasthyamala 492. 2002. *Utricularia smithiana* Wight in Hook.'s J. Bot. Kew Gard. Misc. 1: 373. 1849; Gamble, Fl. Pres. Madras 982(690). 1924; Janarth. & Henry, Bladderworts India 101. 1992. *Utricularia conferta* Wight, Ic. t. 1575. 1850. *Utricularia caerulea* sensu Clarke in Hook.f., Fl. Brit. India 4: 331. 1884, non L. 1753.

Slendere terrestrial herbs. Foliar organs, linear, obtuse, 3-nerved, 1.5- 2 cm long. Traps subglobose, mouth basal, appendages 2, subulate, simple. Racemes 25-30 cm long; bracts basifixed, ovate, lanceolate; flowers blue to purple; calyx lobes unequal, ovate, acute, upper lip ca. 4 x 2.5 mm, lower lip ca. 3 x 2 mm; upper lip of corolla linear, oblong, lower lip obovate. Capsules ovoid, thickened along dehiscent margins; seeds subglobose; testa reticulate.
Flowering & Fruiting: September-March.
Distribution: India and Sri Lanka. Occasional; in moist localities. *RNMK 1156*, Mananthavady; *RNMK 3207*, Brhmagiri.

Utricularia reticulata J.E. Smith, Exot. Bot. 2. t.119. 1805; Wight, Ic. t. 1571, f.2. 1850; Clarke in Hook. f., Fl. Brit. India 4: 331. 1884; Gamble, Fl. Pres. Madras 982(690). 1924; Manilal & Sivar., Fl. Calicut 208. 1982; Ansari, Fl. Kasaragod Div. 266. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 162. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 324. 1988; Janarth. & Henry, Bladderworts India 91. 1992; Joseph, Aquatic Angiosp. Malabar 90. 1991; Sivar. & P. Mathew, Fl. Nilambur 481. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 368. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 520. 2009. *Nelipu* Rheede, Hort. Malab. 9; 137, t. 70. 1689.

Terrestrial herb, 25-30 cm long; scapes twining, with a few scales; traps minute. Flowers 2-2.5 cm long, bluish violet, distinctly pedicellate; calyx lobes ovate, fairly enlarged in the fruit, decurrent; large upper lip broadly obovate, lower lip suborbicular; spur short, slightly curved. Capsule globose.
Flowering & Fruiting: September-March.
Distribution: India and Sri Lanka. Common; in paddy fields. *RNMK 1346,* Panamaram.

Utricularia roseo-purpurea Stapf ex Gamble, Fl. Pres. Madras 983(691). 1924; Subram. & Banerjee, Bull. Bot. Surv. India 10: 103. 1968; Ansari, Fl. Kasaragod Div. 267. 1985; Janarth. & Henry, Bladderworts India 95. 1992; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 368. 2005. *Utricularia rosea* sensu Clarke in Hook.f., Fl. Brit. India 4: 333. 1884, non Edgew. 1847.

Slender herbs. Foliar organs 4-5 x 1.5 mm, spathulate to obovate, 1 nerved, base attenuate, decurrent on a pseudo-petiole. Racemes terminal, 12-15 cm long; flowers very distant, 1-9, pink; bracts medi-fixed, elliptic, acute, limbs unequal; calyx lobes unequal, broadly ovate; corolla with an yellow spot; spur subulate, straight, shorter than lower lip; ovary globose. Capsule 2-2.5 mm long, globose; seeds many, papillose.

Flowering & Fruiting: September-December.

Distribution: Peninsular India. Occasional; on dripping rocks in hills. *RNMK 1002,* Sugandhagiri.

Utricularia striatula Smith in Rees. Cyclop. 37: n.17. 1819; Gamble, Fl. Pres. Madras 983(691). 1924; Subram., Indian For. 96: 528. 1970; V. S. Ramach. & V.J. Nair, Fl. Cannanore 324. 1988; Janarth. & Henry, Bladderworts India 106. 1992; Vajr., Fl. Palghat Dist. 331. 1990; Joseph, Aquatic Angiosp. Malabar 94. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 328. 1996; Mohanan & Sivad., Fl. Agasthyamala 493. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 368. 2005. *Utricularia orbiculata* Wall. ex A. DC. in DC., Prodr. 8: 18. 1844; Clarke in Hook. f., Fl. Brit. India 4: 334. 1884. *Utricularia glochidiata* Wight in Hook.'s J. Bot. Kew Gard. Misc. 1: 373. 1849 & Ic. t. 1581. 1850.

Terrestrial, often lithophytic herbs. Foliar organs 3-4 x 2-3 mm, orbicular, rostrate at base; scape scattered on stolen, filiform. Traps globose, mouth lateral; scape 8-10 cm long, erect, 3-5-flowered; bracts medifixed; flowers rose pink; calyx unequal, papillose, upper lip orbicular, lower lip ovate, rounded; corolla bluish violet with yellow throat; upper lip suborbicular, lower lip 5-lobed, throat hairy, spur cylindrical, acute. Capsule ovoid, shorter than calyx.

Flowering & Fruiting: September-March.

Distribution: Paleotropics. Common; on moist rocks near running water: *RNMK 1338,* Vythiri.

Utricularia uliginosa Vahl, Enum. Pl. 1: 203. 1804; Gamble, Fl. Pres. Madras 981(689). 1924; Manilal & Sivar., Fl. Calicut 209. 1982; Janarth. & Henry, Bladderworts India 113. 1992; Vajr., Fl. Palghat Dist. 331. 1990; Joseph, Aquatic Angiosp. Malabar 96. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 328. 1996; Mohanan & Sivad., Fl. Agasthyamala 493. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta Dist. 369. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 498. 2009. *Utricularia affinis* Wight in Hook.'s J. Bot. Kew Gard. Misc. 1: 373. 1849 & Ic. t. 1580, f.1. 1850; Clarke in Hook. f., Fl. Brit. India 4: 330. 1884.

Terrestrial herbs; stolons filiform. Foliar organs linear, rounded, 4-5 cm long. Traps subglobose, glandular, mouth basal appendages 2, subulate. Racemes 25-30 cm long, erect; bracts basifixed. Flowers 3-6 in a raceme; calyx lobes unequal, upper lip blue, ovate, acute; calyx elliptic, acuminate or bidentate; corolla bluish purple, 6-8 mm long, upper lip oblong, emarginate, lower lip obovate or elliptic; spur conical. Capsule ovoid; seeds subglobose.
Flowering & Fruiting: August-November.
Distribution: Indo-Malesia, China and Australia. Occasional; in grasslands. *RNMK 1008,* Chembra

GESNERIACEAE Dumort.

Comment. Bot. 57. 1822.

1. Epiphytic subshrubs; seeds tipped with hairs .....A**eschynanthus**
1. Terrestrial herbs or shrubs; seeds not tipped with hairs 2
2. Leaves radical 3
2. Leaves cauline 4
3. Stamens 4 ..... **Jerdonia**
3. Stamens 2 ....**Didymocarpus**
4. Leaves unequal at base; flowers blue ....**Rhynchoglossum**
4. Leaves equal at base; flowers white or pale blue 5
5. Leaves oblanceolate; flowers white; staminodes absent..... **Rhynchotechum**
5. Leaves ovate-orbicular; flowers pale blue; staminodes 2 .....**Epithema**

AESCHYNANTHUS Jack

Trans. Linn. Soc. London 14: 42. 1823, *nom. cons.*

Aeschynanthus perrottetii A.DC. in DC., Prodr. 9: 261. 1845; Clarke in Hook. f., Fl. Brit. India 4: 339. 1884; Gamble, Fl. Pres. Madras 985(692). 1924; Subram. & Henry, Bull. Bot. Surv. India 12:1. 1970; Manilal, Fl. Silent Valley 199. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 325. 1988; Vajr., Fl. Palghat Dist. 332. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 329. 1996; Sivar. & P. Mathew, Fl. Nilambur 482. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 369. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 37. 2009. *Aeschynanthus perrottetii* A. DC. var. *planiculmis* Clarke in Hook.f., Fl. Brit. India 4: 340. 1884, 'platyculmis'; Mohanan & Sivad., Fl. Agasthyamala 494. 2002. *Aeschynanthus planiculmis* (Clarke) Gamble, Fl. Pres. Madras 985(692). 1924. **Plate 25e.**

Epiphytic subshrubs; stems terete, glabrous, scandent. Leaves opposite, 6-8 x 1.2-1.5 cm, elliptic, succulent, acute, pale below; petiole 4-5 mm long. Flowers axillary, solitary or rarely paired; pedicels 1-1.3 cm long; sepals free, lanceolate; corolla pink, 3.5-5 cm long, tubular, curved, widening above, oblique at mouth, lobes 5, subequal, ovate, obtuse, glandular-ciliate; stamens 4, all perfect; filaments 2-2.5 cm long, free, inserted at the middle of the corolla tube; upper stamens with smaller anthers, confluent in pairs; ovary

long-stipitate; linear, 1-celled, ovules many; style slender, stigma terminal. Capsule to 15-20 cm long, linear; seeds linear, many.
Flowering & Fruiting: November-January.
Distribution: Endemic to Western Ghats. Common; in evergreen forests. *RNMK 1445,* Chembra

DIDYMOCARPUS Wallich

Edinburgh Philos. J. 1: 378. 1819, *nom. cons.*

Scapigerous herbs; stems very short. Leaves radical, crowded at base, variously tomentose, sessile or petiolate, crenate, dentate, lobed or entire. Flowers blue, cymose, on erect scapes; pedicels paired; bracts small; sepals 5, free or united at base; corolla tube ventricose, with oblique mouth; lobes 5, equal; stamens 2, perfect, included, anthers connate in pairs; ovary 1-celled; sessile or stalked; ovules many, on 2 intruded-parietal placentas; style 1, stigma peltate or spoon-shaped. Fruit a loculicidal linear capsule; seeds many, reticulate or pitted.

1. Leaves regularly crenate; capsule pubescent... .....**D. ovalifolia**
1. Leaves irregular-crenately lobed or dentate; capsule densely glandular hairy .... **D. tomentosa**

Didymocarpus ovalifolia Wight, Ic. t. 1351. 1848; Clarke in Hook. f., Fl. Brit. India 4: 354. 1884; Gamble, Fl. Pres. Madras 988(694). 1924; Manilal, Fl. Silent Valley 200. 1988; Mohanan & Sivad., Fl. Agasthyamala 495. 2002.

Scapigerous herbs. Leaves few, 4-7 x 4-6 cm, ovate to orbicular, obtuse, rounded or cordate at base, regularly crenate, sparsely above and moderately below pubescent; nerves 6-8 pairs, prominently reticulate below; petiole 2-6 cm long, narrowly winged. Scape to 10 cm long, glandular-hairy, divided at apex into 2 elongate racemes; flowers many; pedicels 3-6 mm long, linear. Capsule 2-2.5 cm long, acuminate, pubescent.
Flowering & Fruiting: June-December.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2447,* Palchuram.

Didymocarpus tomentosa Wight, Ic. t. 1349. 1848; Clarke in Hook. f., Fl. Brit. India 4: 353. 1884; Gamble, Fl. Pres. Madras 989(695). 1924; Vajr., Fl. Palghat Dist. 332. 1990. *Didymocarpus rottleriana* var. *tomentosa* (Wight) Clarke in A. & C. DC., Monogr. Phan. 5: 101. 1883.

Scapigerous herbs. Leaves 6-7 x 3-4 cm, elliptic, acute, irregularly crenate-serrate, densely bullate above, densely fulvous tomentose below; nerves 4 –5 pairs, prominently reticulate below; petiole 1-3 cm long, ca. 5 mm broad; central leaves sessile. Scapes few, to 12 cm long; cymes glandular-hairy; pedicels ca. 1 cm long; flowers blue, subumbellate; sepals oblanceolate, obtuse, long-hairy; corolla 0.9-1.2 cm long, glandular-hairy, lobes obovate to orbicular; staminodes straight, bristle-like; ovary densely glandular, hairy. Capsule 2-3 x 0.1-0.2 cm, linear, densely glandular hairy

Flowering & Fruiting: May-October.
Distribution: Endemic to Peninsular India. Occasional; in evergreen forests in moist rock crevices. *RNMK 3441,* Manikkunnumala.

EPITHEMA Blume
Bijdr. 737. 1826.

Epithema carnosum (G. Don) Benth. var. *hispida* Clarke in A. & C. DC., Monogr. Phan. 5: 178. 1883 & Hook.f., Fl. Brit. India 4: 369. 1884; Gamble, Fl. Pres. Madras 992(697). 1924; Ansari, Fl. Kasaragod Div. 267. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 325. 1988; Vajr., Fl. Palghat Dist. 333. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 330. 1996. *Epithema ceylanicum* Wight, Ic. t. 1354. 1848, non Gard. 1846.

Erect leafy herbs; stems succulent, pilose. Leaves opposite and alternate, 7-14 x 6-10 cm, ovate, rounded or cordate at base, obtuse at apex, upper ones sessile, hairy above and below; nerves 6-8 pairs. Flowers small, in terminal or axillary scorpioid cymes; pedicels 5-6 mm long, hairy; calyx 4-5 mm long, campanulate, lobes 5, acuminate, united above the middle; corolla 7-8 mm long, 2-lipped, lobes 5, subequal, white; stamens 2, free; staminodes 3 or 4; ovary ovoid, 1-celled, ovules many, placenta parietal, not intruded; style 1, stigma minute. Capsule ovoid, circumscissile; seeds twisted, brown, ridged.
Flowering & Fruiting: July-October.
Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 1775,* Chooralmala; *RNMK 1004*, Periya Ghat; *RNMK 2288*, Vythiri Ghat.

JERDONIA Wight
Ic. t. 1352. 1848.

Jerdonia indica Wight, Ic. t. 1352. 1848; Hook. f., Fl. Brit. India 4: 366. 1884; Gamble, Fl. Pres. Madras 991(696). 1924; V. S. Ramach. & V.J. Nair, Fl. Cannanore 325. 1988. **Fig. 40, Plate 25f.**

Scapigerous herbs, from a thick root-stock. Leaves crowded at the base, elliptic, reticulate, long petioled. Flowers in slender few-flowered scapes; calyx 5-partite, lobes long pilose; corolla-tube elongate, swollen upwards, limb oblique, 2-lipped, lower lip 3-lobed; stamens 4, perfect, filaments dilated, anthers 2-celled; disk cup shaped. Fruit an ovoid, loculicidal capsule, 2-valved; seeds funicled, ellipsoid, grooved.
Flowering & Fruiting: March-July.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3454,* Periya; *RNMK 1449*, Kanthanpara.

RHYNCHOGLOSSUM Blume
Bijdr. 741. 1826.

Rhynchoglossum notonianum (Wall.) Burtt, Notes Roy. Bot. Gard. Edinb. 24: 170. 1962 & Rev. Handb. Fl. Ceylon 3: 99. 1981; Manilal & Sivar., Fl. Calicut 209. 1982; Ansari, Fl. Kasaragod Div. 268. 1985; Manilal, Fl. Silent Valley 200. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 326. 1988; Vajr.,

Fl. Palghat Dist. 333. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 330. 1996; Sivar. & P. Mathew, Fl. Nilambur 482. 1997; Mohanan & Sivad., Fl. Agasthyamala 496. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 370. 2005. *Wulfenia notoniana* Wall., Tent. Fl. Nepal. 46. 1826. *Klugia notoniana* (Wall.) A. DC. in DC., Prodr. 9: 276. 1845; Wight, Ic. t. 1353. 1848; Clarke in Hook. f., Fl. Brit. India 4: 366. 1889; Gamble, Fl. Pres. Madras 990(696). 1924.

Fleshy herbs, glabrous; stems thick. Leaves alternate and opposite, 15-17 x 10-11 cm, ovate, acute at apex, cordate at base, inequilateral, acute on one side; nerves 17-20 pairs, regular, prominent below. Flowers in terminal racemes; bracts ovate, acute; pedicels 4-5 mm long; sepals 5, lanceolate, united below; corolla blue, 1-2.5 cm long, bilabiate, tube white, upper lip smaller, 2-lobed, lower lip broad; stamens 4, anthers connate in pairs; ovary 1-celled, ovules many, on 2-parietal placenta; style slender; stigma oblique. Capsule 5-6 x 3.5-4 mm, ovoid, loculicidal; seeds many, reticulate.

Flowering & Fruiting: July-December.

Distribution: South west India and Sri Lanka. Occasional; along the banks of streams and on wet rocks in evergreen forests. *RNMK 1177,* Sugandhagiri.

RHYNCHOTECHUM Blume

Bijdr. 775. 1826.

Rhynchotechum permolle (Nees) Burtt, Notes Roy. Bot. Gard. Edinb. 24: 39. 1962; Manilal, Fl. Silent Valley 201. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 326. 1988; Vajr., Fl. Palghat Dist. 333. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 331. 1996; Mohanan & Sivad., Fl. Agasthyamala 497. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 370. 2005. *Isanthera permollis* Nees, Trans. Linn. Soc. London 17: 82. 1834; Wight, Ic. t. 1355. 1848; Clarke in Hook. f., Fl. Brit. India 4: 372. 1884; Gamble, Fl. Pres. Madras 992(697). 1924.

Subshrubs, 40-50 cm high, densely golden tomentose. Leaves alternate, 25-30 x 8-11 cm, oblanceolate, acute, attenuate at base, serrulate; nerves 17-20 pairs, regular. Flowers in axillary cymes, densely packed, shortly pedicelled; bracts ovate; calyx 5-partite, lobes 6-7 mm long, lanceolate; corolla white, 1-1.2 cm across, tube short, lobes rotate, obovate, glabrous; stamens 4, equal, filaments arcuate; ovary ovoid, produced into a stout style; ovules many. Berry globose.

Flowering & Fruiting: March-August.

Distribution: Peninsular India and Sri Lanka. Rare; in evergreen forests. *RNMK 3266,* Chanthanathodu.

BIGNONIACEAE Juss.

Gen. Pl. 137. 1789.

1. Leaves simple, pinnate 2
1. Leaves multi-pinnate 6

2. Fruit linear, angled or terete.....3
2. Fruit broadly flat.....4
3. Calyx spathaceous .....**Dolichandrone**
3. Calyx companulate..... .....**Stereospermum**
4. Flowers red; calyx spathaceous ..... **Spathodea**
4. Flowers rose or pinkish white; calyx not spathaceous.....5
5. Leaflets to 20 cm long, clearly oblique; capsule winged.....**Pajanelia**
5. Leaflets to 7 cm long, slightly oblique or not; capsule not winged .... **Heterophragma**
6. 4 stamens fertile; fruit with warty tubercles..... .....**Radermachera**
6. All 5 stamens fertile; fruit compressed smooth ....**Oroxylum**

DOLICHANDRONE Fenzl & Seemann
Ann. Mag. Nat. Hist. ser. 3, 10: 31. 1862.

Dolichandrone arcuata (Wight) Clarke in Hook.f., Fl. Brit. India 4: 380. 1884; Gamble, Fl. Pres. Madras 996(700). 1924; Vajr., Fl. Palghat Dist. 334. 1990. **Plate 25g.**

Medium trees. Leaves opposite, leaflets 3-5, 7-7.5 x 3-4 cm, oblong, elliptic, apex acute to obtuse, pubescent; petiole 2.5-3 cm long. Flowers few, in terminal corymbs or panicles; calyx spathaceous, split on one side and recurved, to 2.5 cm long; corolla tubular, widened at mouth, tube 5-6 cm long, lobes fringed, white; filaments 5, 7-8 mm long; ovary 5-6 mm long, style ca. 2 cm long. Capsule 4-4.5 x 1-1.5 cm, linear, terete, pubescent, speckled with white dots, curved; seeds ca. 0.7 cm across, wings to 1 cm.

Flowering & Fruiting: October.

Distribution: Endemic to Peninsular India. Occasional; in moist deciduous forests. *RNMK 3773,* Muthanga.

HETEROPHRAGMA A. P. de Candolle
Prod. 9: 210. 1845.

Heterophragma quadriloculare K. Schum. in Engl. & Prantl, Naturl. Pflanzenfam. 4(3b): 243. 1895. *Heterophragma roxburghii* DC., Prodr. 9: 210. 1845; Hook. f., Fl. Brit. India 4: 381. 1884; Gamble, Fl. Pres. Madras 997(701). 1924.

Medium trees. Leaves imparipinnate; leaflets 7-11, opposite or sub-opposite, 4-5 x 1.8-2.3 cm, elliptic, apex obtuse, margin crenate; petiole 4-5 mm long. Panicle woolly, corymbose terminal; pedicel 4-5 mm long, stout; calyx 2-3 cm long, tubular, irregularly 5-lobed; corolla to 3.5 cm, floccose, bilipped, lobes crisped, pale rose; stamens 4, didymous, included, anthers elliptic, divaricate; ovary ovate, style to 3 cm, stigma 2-lobed. Capsule 25-28 x 5-6.5 cm, elongate-oblong compressed, 2-valved, dissepiments spongy; seeds on the central suture, winged.

Flowering & Fruiting: December-February.

Distribution: Endemic to Peninsular India. Occasional; in moist deciduous forests. *RNMK 2765,* Muthanga.

OROXYLUM Ventenat

Decne., Gen. Nov. 8. 1808.

Oroxylum indicum (L.) Benth. ex Kurz, For. Fl. Burma 2: 238. 1877; Clarke in Hook. f., Fl. Brit. India 4: 378. 1884; Gamble, Fl. Pres. Madras 994(698). 1924; Manilal & Sivar., Fl. Calicut 210. 1982; Ansari, Fl. Kasaragod Div. 269. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 327. 1988; Vajr., Fl. Palghat Dist. 335. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 331. 1996; Sivar. & P. Mathew, Fl. Nilambur 483. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 372. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 524. 2009. *Bignonia indica* L., Sp. Pl. 625. 1753. Calosanthes indica (L.) Bl., Bijdr. 761. 1826; Wight, Ic. t. 1337. 1848.

Medium trees, bark grey, smooth, dull yellow inside. Leaves up to 1 m long, pinnae opposite, leaflets 2-4 pairs per pinnae, 8-12 x 6-9 cm, ovate or elliptic, apex acuminate, base rounded or cordate. Racemes 30-50 cm long; pedicels 1-2 cm long; calyx 2-2.5 cm long, coriaceous, glabrous; corolla 8-10 cm long, lobes 3-3.5 cm long, pale-purple streaked; four stamens exserted, filaments hairy at base. Capsule 40-75 x 5-8 cm, tapering at both ends; seeds 5-6 cm long, winged all around except at the base.

Flowering & Fruiting: July-December.

Distribution: South India and Sri Lanka. Occasional; in moist deciduous forests and plantations. *RNMK 2901,* Chedelayam; *RNMK 1986*, Kenichira.

PAJANELIA de Candolle

Bibl. Univ. Genev. 17: 130. 1838.

Pajanelia longifolia (Willd.) K. Schum. in Engl. & Prantl, Naturl. Pflanzenfam. 4(3b): 244. 1895; Manilal & Sivar., Fl. Calicut 210. 1982; Ansari, Fl. Kasaragod Div. 270. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 327. 1988; Vajr., Fl. Palghat Dist. 335. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 332. 1996; Sivar. & P. Mathew, Fl. Nilambur 484. 1997; Mohanan & Sivad., Fl. Agasthyamala 498. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 372. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 525. 2009. *Bignonia longifolia* Willd., Sp. Pl. 3: 306. 1800. *Pajanelia rheedei* Wight, Ic. tt. 1343,1344. 1848; Clarke in Hook. f., Fl. Brit. India 4: 384. 1884; Gamble, Fl. Pres. Madras 1000(702). 1924.

Medium trees, bole roundish, usually unbranched, covered with prominent leaf scars. Leaves up to 1 m long, leaflets 8-10 pairs, 16-20 x 10-12 cm, ovate, inequilateral, oblique at base, subsessile, acute to acuminate at apex. Flowers in terminal racemose panicles, pedicelled; calyx 4-4.5 cm long, campanulate, rusty tomentose, filled with sap; corolla 8-9 cm long and ca. 8 cm broad, tube broadly ventricose, constricted above the base, lobes subequal, hispid, pinkish white; stamens 4, free, filaments arching, anthers equal, oblong; ovary oblong, ovules many; placenta thin at centre; style ca. 6 cm long, stigma spoon shaped. Capsule 25-30 x 5-6 cm; winged; seeds flat, papery, winged.

Flowering & Fruiting: January-June.

Distribution: India and Myanmar. Occasional; in moist deciduous forests and plantations. *RNMK 2950,* Sulthan Bathery; *RNMK 2641*, Meenangady.

RADERMACHERA Zollinger & Moritzi
in Zollinger, Syst. Verzeichniss Ind. Archipel 3: 53. 1855.

Radermachera xylocarpa (Roxb.) K. Schum. in Engl. & Prantl, Naturl. Pflanzenfam. 4(3b): 243. 1895; Gamble, Fl. Pres. Madras 999(701). 1924; Vajr., Fl. Palghat Dist. 335. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 332. 1996; Sivar. & P. Mathew, Fl. Nilambur 485. 1997; Mohanan & Sivad., Fl. Agasthyamala 499. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 371. 2005. *Bignonia xylocarpa* Roxb., Fl. Ind. 3: 108. 1832; Wight, Ic. t. 1335. 1848; *Stereospermum xylocarpum* (Roxb.) Benth. in Benth. & Hook.f., Gen. Pl. 2: 1047. 1876; Hook. f., Fl. Brit. India 4: 383. 1884. **Plate 25h.**

Medium trees, bark grey-corky. Leaves 50-60 cm long, bipinnate; leaflets opposite, 7-8 x 4-5 cm, ovate, acute to acuminate, glabrous; nerves 5-7 pairs. Flowers in terminal panicled cymes, pedicelled, 5-8 together; calyx 0.8-1 cm long, campanulate, irregularly 5-lobed, corolla 4-4.5 cm long and ca. 4 cm across, white, campanulate, bilabiate, lobes equal, obtuse, crisped; stamens 4, included, anthers divaricate; staminodes filiform; ovary oblong, glabrous; ovules multiseriate, style slender; stigma spoon-shaped. Capsule 35-40 x 2-2.5 cm, woody, warty tubercled, bivalved; seeds winged, ca. 1.5 cm long.

Flowering & Fruiting: March-April.

Distribution: Endemic to Peninsular India. Occasional; in moist deciduous forests. *RNMK 2218*, Muthanga.

SPATHODEA Palisot de Beauvois
Fl. Oware 1: 46. 1805.

Spathodea campanulata P. Beauv., Fl. Owar. 1: 47. tt. 27-28. 1805; Gamble, Fl. Pres. Madras 1000(703). 1924; Manilal & Sivar., Fl. Calicut 210. 1982; Sasidh. & Sivar., Fl. Pl. Thrissur For. 333. 1996; Sivar. & P. Mathew, Fl. Nilambur 486. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 372. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 525. 2009.

Trees; twigs tomentose. Leaves 1-pinnate, 30-40 cm long; leaflets many, opposite, 10-12 x 6-7 cm, oblong-obovate, obtuse. Flowers large, few to many, in terminal cyme; calyx spathaceous, brown-tomentose; corolla scarlet to red, 5-8 cm across, campanulate, ventricose; stamens 4, anthers divaricate; ovary glabrous; stigma spoon-shaped. Capsule 16-20 cm long, erect, compressed, woody; seeds flat, winged 1-1.5 cm across, white.

Flowering & Fruiting: November-May.

Distribution: Native in tropical Africa. Common; in plantations and along roadsides. *RNMK 2217,* Puthoorvayal; *RNMK 2542*, Meppady.

STEREOSPERMUM Chamisso
Linnaea 7: 720. 1833.

Trees. Leaves imparipinnate; leaflets entire or serrate. Flowers in panicles, terminal or from the axils of upper leaves; calyx companulate, 3-5 lobed; corolla tubular ventricose, 2 lipped, upper lip of 2 lobes connate, lobes of

lower lip crisped; stamens 4, didynamous; staminode included, filaments woolly or pubescent at base; ovary linear; style slender, stigma 2-lobed. Capsule linear, terete or tetragonous; seeds trigonous with a deep transverse furrow across the centre, wings membranous on both sides of seed.

1. Leaves glabrous; filaments of the stamens with a tuft of woolly hair at the base ..... **S. colais**
1. Leaves pubescent; filaments of the stamens without a tuft of wooly hairs..... .....**S. suaveolens**

Stereospermum colais (Buch.-Ham. ex Dillw.) Mabb., Taxon 27: 553. 1979; Ansari, Fl. Kasaragod Div. 270. 1985; Manilal, Fl. Silent Valley 201. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 78. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 327. 1988; Vajr., Fl. Palghat Dist. 336. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 332. 1996; Sivar. & P. Mathew, Fl. Nilambur 485. 1997; Mohanan & Sivad., Fl. Agasthyamala 499. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 371. 2005. *Bignonia colais* Buch.-Ham. ex Dillw., Rev. Hort. Malab. 28. 1839. *Stereospermum tetragonum* DC., Prodr. 9: 210. 1845; Gamble, Fl. Pres. Madras 998(701). 1924. *Stereospermum chelonoides* sensu Wight, Ic. t. 1341. 1845, non (L. f.) DC.1838; Clarke in Hook. f., Fl. Brit. India 4: 383. 1884. *Stereospermum personatum* (Hassk.) Chatterj., Bull. Bot. Soc. Bengal 2:70. 1948; *Dipterospeerma personatum* Hassk., Flora 25(2); Biebl. 28. 1842. *Padiri* Rheede, Hort. Malab. 6; 47-48, t. 26. 1686.

Large trees, bark transversally rugose, grey. Leaves 30-35 cm long, 1-pinnate; leaflets 10-12 x 4-4.5 cm, 4-6 pairs, ovate, entire of serrate, caudate-acuminate, obtuse at base, slightly unequal-sided, petiolulate; nerves 8-10 pairs. Flowers in terminal panicles, many together; calyx 6-7 mm long, campanulate, shallowly lobed, lobes obtuse; corolla yellow, 2-2.5 cm long, ca. 1.5 cm broad, bilabiate, lobes subequal, crisped; stamens 5, included, filaments pubescent at base; ovary sessile, oblong, 2-celled, ovules many, 1-seriate, style slender, stigmas 2, spoon shaped. Capsule 30-35 x 0.5-0.7 cm, subtetragonous, spirally splitting; seeds 7-8 mm long, with membranous wing on both sides.

Flowering & Fruiting: February-October.

Distribution: Indo-China and Malesia. Common in moist deciduous forests. *RNMK 2985,* Muthanga; *RNMK 2619*, Pathiri.

Stereospermum suaveolens (G. Don) DC., Prodr. 9: 211. 1845; Hook. f., Fl. Brit. India 4: 382. 1884; Gamble, Fl. Pres. Madras 998(701). 1924. *Tecoma suaveolens* G. Don, Syst. 4: 244. 1837.

Large trees. Leaves 20-30 cm long; leaflets 7-9; 8-10 x 4-4.5 cm. Flowers in terminal panicles, many together; calyx hairy; lobes 3-5, very short, broad; corolla pale or dark purple, puberulous without hairy in the throat;

lobes rounded, crisped-crenate. Capsule to 30 cm long, slightly rough with tubercles, obscurely 4 ribbed, glabrous; seeds deeply notched at the middle.
Flowering & Fruiting: February-May.
Distribution: India and Sri Lanka. Occasional in moist deciduous forests. *RNMK 2954,* Muthanga.

Jacaranda mimosifolia D. Don., **Millingtonia hortensis** L.f. and **Tecoma stans** (L.) HBK are common trees planted along roadsides and Govt. office premises. **Adenocalyma alliaceum** Miers, **Pyrostegia venusta** (Ker-Kawl.) Miers, and **Tecomaria capensis** (Thunb.) Spach. are common garden plants grown in the district.

PEDALIACEAE R. Br.

Prodr. 519. 1810.

1. Fruit woody with 2 sharp anterior hooks ....**Martynia**
1. Fruit 4-angled, sharp conical spines at angles..... **Pedalium**

MARTYNIA Linnaeus

Sp. Pl. 2: 618. 1753.

Martynia annua L., Sp. Pl. 618. 1753; Gamble, Fl. Pres. Madras 1003(705). 1924; Manilal & Sivar., Fl. Calicut 213. 1982; Ansari, Fl. Kasaragod Div. 271. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 328. 1988; Vajr., Fl. Palghat Dist. 336. 1990; Sivar. & P. Mathew, Fl. Nilambur 486. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 527. 2009. *Martynia diandra* Gloxin, Obs. Bot. 14, t. 1. 1785; Clarke in Hook. f., Fl. Brit. India 4: 386. 1884.

Erect, pubescent herbs. Leaves 13-15 x 14-16 cm, deltoid-ovate, covered by a glutinous dew-like substance. Flowers 4-4.5 cm long, in axillary racemes. Fruit 4-5 cm long, woody, with 2 sharp anterior hooks.
Flowering & Fruiting: July-August.
Distribution: Tropical and subtropical America; naturalised in Indian subcontinent. Occasional; in open wastelands. *RNMK 1166,* Mananthavady.

PEDALIUM Linnaeus

Syst. Nat. (ed.10) 1123. 1759.

Pedalium murex L., Syst. Nat. (ed.10) 1123. 1759; Clarke in Hook. f., Fl. Brit. India 4: 386. 1884; Gamble, Fl. Pres. Madras 1001(704). 1924; Manilal & Sivar., Fl. Calicut 212. 1982; Ansari, Fl. Kasaragod Div. 271. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 328. 1988; Vajr., Fl. Palghat Dist. 337. 1990; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 527. 2009.

Documbent subfleshy herbs, foetid, up to 45 cm tall. Leaves 5-7 x 2.5-3 cm, broadly ovate-oblong, obtuse, cuneate at base, glaucous beneath. Flowers 1-1.5 cm long, solitary, axillary. Fruits 1.5-1.8 cm long, narrowed at base, 4-angled, sharp conical spines at angles.

Flowering & Fruiting: November-December.
Distribution: Tropical Africa, Sri Lanka, India and Pakistan. Occasional; in open wastelands. *RNMK 3447,* Mananthavady.

ACANTHACEAE Juss.

Gen. Pl. 102. 1789.

1. Fertile stamens 4 2
1. Fertile stamens 2 with or without staminodes 10
2. Climbers; calyx 10-15-toothed or absent ..... **Thunbergia**
2. Shrubs or herbs; calyx 4 or 5-partite 3
3. Seeds not supported on retinacula ..... **Staurogyne**
3. Seeds supported on retinacula 4
4. Corolla lobes equal or sub equal, spreading 5
4. Corolla 2 lipped 7
5. Ovules 2 in each cell ..... **Asystasia**
5. Ovules 3 or more in each cell 6
6. Flowers in terminal capitate spikes ..... **Hemigraphis**
6. Flowers axillary, solitary or in 2-flowered racemes ..... **Dipteracanthus**
7. Armed shrubs with sharp thornes at the nodes; flowers in axillary whorls; ovules 4 or more in each cell ..... **Hygrophila**
7. Unarmed plants; flowers in axillary or terminal spikes; ovules 2 in each cell 8
8. Bracts orbicular; bracteoles absnt; spikes 1-sided ..... **Phaulopsis**
8. Bracts not orbicular; bracteoles present; spikes cylindric 9
9. Corolla 2-lipped; bracts spinous ..... **Lepidagathis**
9. Corolla lobes subequal; bracts minute, not spinous ..... **Strobilanthes** (p.p)
10. Anther cells unequal, divergent, appendaged 11
10. Anther cell unappendaged 12
11. Both anther cells basally appendaged; placentae not separating elastically during fruit dehiscence ..... **Justicia**
11. Only one anther cell is basally appendaged; placentae separating during fruit dehiscence ..... **Rungia**
12. Ovules 3 or more in each cell 13
12. Ovules 2 or 1 in each cell 16
13. Calyx 4-partite; seeds not supported on retinacula ..... **Nelsonia**
13. Calyx 5-partite; seeds supported on retinacula 14
14. Capsule terete; seeds compressed ..... **Gymnostachyum**
14. Capsule compressed; seeds ovoid or angular 15
15. Flowers in whorls among axillary cladodes ..... **Haplanthodes**
15. Flowers in one one-sided racemes, spikes or panicles ..... **Andrographis**
16. Calyx 4-lobed ..... **Barleria**
16. Calyx 5-lobed 17
17. Corolla distinctly 2-lipped, upper lips sometimes very small 18
17. Corolla lobes equal or subequal, spreading 19
18. Corolla white; seeds rugose ..... **Rhinacanthus**
18. Corolla pink or purple; seeds papillose or glochidiate hairy ..... **Peristrophe**

19. Corolla tube long and slender 20
19. Corolla tube fairly broad, ventricose .....**Strobilanthes** (p.p)
20. Bracteoles longer than the calyx lobes ..... **Eranthemum**
20. Bracteoles shorter than the calyx lobes ..... **Pseuderanthemum**

ANDROGRAPHIS Wallich ex C.G.D. Nees
in Wallich, Pl. Asiat. Rar. 3: 77, 116. 1832.

Herbs or low shrubs; stems quadrangular. Leaves elliptic, entire, sessile or shortly petiolate. Inflorescence axillary or terminal panicle; bracts and bracteoles usually similar, subulate. Flowers unilateral on the branches of inflorescence; pedicellate; calyx deeply 5-partite; corolla tubular at base, bilabiate above; upper lip broad and emarginate; lower lip deeply 3-lobed, deflexed; stamens 2, equal; filaments broader; anthers bearded; ovary oblong; ovules 2-6 in each cell; style elliptic, capsule laterally compressed; seeds 6-12, ovoid or orbicular, glabrous.

1. Panicle congested; staminal filaments glabrous ..... .**A. neesiana** var. **producta**
1. Panicle lax; staminal filaments hairy 2
2. Scandent herbs; nerves of leaves 10 pairs; racemes solitary .....**A. macrobotrys**
2. Erect herbs; nerves of leaves 5 pairs; racemes panicled .....**A. paniculata**

Andrographis macrobotrys Nees in DC., Prodr. 11: 516. 1847; Clarke in Hook. f., Fl. Brit. India 4: 503. 1884; Gamble, Fl. Pres. Madras 1048(735). 1924; V. S. Ramach. & V.J. Nair, Fl. Cannanore 331. 1988; Vajr., Fl. Palghat Dist. 342. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 335. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 375. 2005.

Erect or scandent undershrubs; stems stout, glabrous. Leaves 11-13 x 2.5-3 cm, elliptic, lanceolate, coriaceous, glabrous; nerves 7-10 pairs; petiole 0.6-1 cm long. Racemes 16-19 cm long, upper axillary; flowers distant; calyx lobes glandular hairy; corolla ca. 2 cm long, tube ventricose; upper lip entire, midlobe of the lower lip broader than laterals, hairy; filaments bulged at base, hairy. Capsule ca. 2.5 cm long, linear oblong, glandular hairy, retinacula acute; seeds 8, glabrous.

Flowering & Fruiting: September-February.

Distribution: South India and Sri Lanka. Occasional; in evergreen forests. *RNMK 1344,* Sughandhagiri.

Andrographis neesiana Wight var. **producta** Clarke in Hook. f., Fl. Brit. India 4: 504. 1884. *Andrographis producta* (Clarke) Gamble, Fl. Pres. Madras 1049(735). 1924; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 375. 2005.

Erect shrubs; stem glabrous. Leaves 7-9 x 2-3 cm, sub membranous, lanceolate, acuminate at both ends, glabrous above. Racemes axillary; calyx-lobes 2.5-3 cm long, glandular; corolla with a prominent ventricose protruberance. Capsule 3-3.5 cm long; seeds glabrous.

Flowering & Fruiting: September-December.
Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 3123,* Manikkunnumala.

Andrographis paniculata (Burm. f.) Wall. ex Nees in Wall., Pl. Asiat. Rar. 3: 116. 1832; Wight, Ic.t. 518. 1840-1843; Clarke in Hook. f., Fl. Brit. India 4: 501. 1884; Gamble, Fl. Pres. Madras 1048(734). 1924; Manilal & Sivar., Fl. Calicut 214. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 331. 1988; Manilal, Fl. Silent Valley 202. 1988; Mohanan & Sivad., Fl. Agasthyamala 503. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 532. 2009. *Justicia paniculata* Burm. f., Fl. Ind. 9. 1768. *Andrographis subspathulata* Clarke in Hook. f., Fl. Brit. India 4: 502. 1884.

Slender woody herbs; branches glabrous. Leaves 7-9 x 1-1.5 cm, elliptic, acuminate at apex, base acute, decussate, glabrous. Panicle terminal and upper axillary, glandular-hairy; flowers many, distant; calyx lobes 3 linear, hairy, connate at base; corolla ca. 1.4 cm long, tube ventricose, hairy, upper lip entire, midlobe of lower lip broader than laterals, acute, glandular-hairy; ovary puberulus, style hairy. Capsule 2-3 x 0.2-0.3 cm, oblong, acute, hairy; retinacula spoon shaped; seeds 8, glabrous.
Flowering & Fruiting: March-December.
Distribution: Peninsular India and Sri Lanka. Common; in open areas and moist deciduous forests. *RNMK 3154,* Muthanga.

ASYSTASIA Blume
Bijdr. 796. 1826.

Herbs or weak shrubs; branches terete. Leaves ovate, entire. Inflorescence of terminal or axillary, one sided racemes, Flowers pedicelled, distant along the racemes; calyx 5-lobed, lobes free, linear-acuminate; corolla tube cylindrical below, ventricose above, lobes 5, subequal, spreading; stamens 4, unequal, filaments jointed at the base in pairs; anthers cells parallel, shortly spurred at base, glabrous; ovary oblong, ovules 2 in each cell, style slender, stigma terminal. Fruit a capsule with solid basal part, elliptic, compressed; seeds 2 in each chamber, orbicular, rugose or smooth.

1. Branches grey-puberulus; leaves obovate, base rounded ..... **A. gangetica**
1. Branches glabrous; leaves ovate, base decurrent ..... **A. dalzelliana**

Asystasia dalzelliana Sant., Kew Bull. 1948: 276. 1948; Manilal & Sivar., Fl. Calicut 222. 1982; Ansari, Fl. Kasaragod Div. 275. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 332. 1988; Vajr., Fl. Palghat Dist. 343. 1990; Sivar. & P. Mathew, Fl. Nilambur 490. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 376. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 533. 2009. *Asystasia violacea* Dalz. ex Clarke in Hook. f., Fl. Brit. India 4:494.1884; Gamble, Fl. Pres. Madras 1063(744). 1884, non Dalz. 1850. *Asystasia coromandelina* Curtis, Bot. Mag. t. 4248. 1846, non Wight.

Diffuse herbs; stems weak, glabrous. Leaves 6-10 x 2.5-3 cm, ovate, rounded and decurrent at base, pubescent; petiole ca. 2 cm long. Raceme solitary, axillary, 12-15 cm long, glabrous; flowers distant; calyx lobes free; corolla 2-2.2 cm long, violet with blue spots; lobes orbicular, obtuse. Capsule ca. 1.5 cm long, pubescent.
Flowering & Fruiting: September-December.
Distribution: Tropical Asia and Africa. Occasional; in open areas. *RNMK 1989,* Chooralmala.

Asystasia gangetica (L.) T. And. in Thw., Enum. Pl. Zeyl. 235. 1860; Clarke in Hook. f., Fl. Brit. India 4: 493. 1884; Gamble, Fl. Pres. Madras 1063(744). 1924; Manilal & Sivar., Fl. Calicut 221. 1982; Ansari, Fl. Kasaragod Div. 275. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 36. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 332. 1988; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 376. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 533. 2009. *Justicia gangetica* L., Cent. Pl. 2: 3. 1756. *Asystasia coromandeliana* Wight ex Nees in Wall., Pl. Asiat. Rar. 3:89. 1832; Wight, Ic. T. 1506. 1850; Clarke in Hook.f., Fl. Brit. India 4:493. 1884. *Valli-upu-da*li Rheede, Hort. Malab. 9:85, t. 45. 1689.

Erect or diffuse herbs, 20-35 cm high. Leaves 4-5 x 2.5-3 cm, obovate, acuminate at apex, base rounded, pubescent; petiole ca. 1 cm long, densely tomentose. Racemes terminal; flowers distant; calyx lobes 6-7 mm long, linear, acuminate, glandular hairy, free to the base; corolla 2-2.5 cm long, yellow; tube ventricose, lobes orbicular; anthers cuspidate at base. Capsule ca. 2.5 cm long, puberulus; seeds 4, compressed, rugose.
Flowering & Fruiting: November-December.
Distribution: Peninsular India, Sri Lanka, Arabia and Africa. Occasional; along roadsides. *RNMK 1992,* Periya.

BARLERIA Linnaeus

Sp. Pl. 636. 1753.

Shrubs or undershrubs. Leaves elliptic to lanceolate or orbicular, entire. Inflorescence axillary or terminal, spikes, racemes or helicoidal cymes; bracts 2; bracteoles absent. Flowers large; sepals 4, in opposite pairs; oblong-lanceolate, inner pair smaller; corolla with a long cylindrical tube at lower part; lobes 5, subequal, obtuse, imbricate; fertile stamens 2, free, anthers equal; sterile stamens 3, short, with aborted anthers; ovary oblong, glabrous; ovules 2 in each cell; style slender; stigma entire or bifid. Fruit an oblong capsule; seeds 4, compressed, hairy.

1. Plants armed.....2
1. Plants unarmed.....3
2. Leaf apex spine-tipped; flowers yellow ..... **B. prionitis**
2. Leaf apex not spine-tipped; flowers blue .....**B. mysorensis**
3. Inflorescence a terminal spike; stamens 4 .....**B. courtallica**
3. Inflorescence an axillary or terminal cyme; stamens 4 4

4. Outer calyx-lobes spinescent on margins; coroall blue.....**cristata**
4. Outer calyx-lobes not spinescent on margins; corolla pink...**B**. **involucrata** var. **elata**

Barleria courtallica Nees in DC., Prodr. 11: 226. 1847; Wight, Ic.t. 1529. 1850; Clarke in Hook. f., Fl. Brit. India 4: 489. 1884; Gamble, Fl. Pres. Madras 1060(743). 1924; V. S. Ramach. & V.J. Nair, Fl. Cannanore 333. 1988; Vajr., Fl. Palghat Dist. 344. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 336. 1996; Sivar. & P. Mathew, Fl. Nilambur 491. 1997; Mohanan & Sivad., Fl. Agasthyamala 505. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 377. 2005. **Plate 25i.**

Shrubs, up to 1 m high; branchlets glabrous. Leaves 15-20 x 6-8 cm, elliptic, acuminate at apex, base attenuate, glabrous; nerves 7-9 pairs; petiole 1-4 cm long. Spike 3-10 cm long; bracts and bracteoles similar, ca. 5 mm long, lanceolate; flowers closely packed; outer sepals 1.8-2 x 0.5-0.6 cm, elliptic, acuminate, pubescent; inner sepals ca. 1.5 cm long, linear, acuminate, hairy; corolla 4-5 cm long, tube and throat yellow or white; lobes ca. 1.5 cm long, obovate, blue; filaments villous at base. Capsule 2-2.5 x 0.7-1 cm, elliptic, glabrous; seeds 4, orbicular, hairy, brown.
Flowering & Fruiting: January-April.
Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 2751,* Vaduvanchal.

Barleria cristata L., Sp. Pl. 636. 1753; Hook. f., Fl. Brit. India 4: 488. 1884; Gamble, Fl. Pres. Madras 1060(743). 1924; Manilal & Sivar., Fl. Calicut 220. 1982; Vajr., Fl. Palghat Dist. 345. 1990; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 377. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 535. 2009.

Pubescent shrubs. Leaves 6-6.5 x 2-2.5 cm, elliptic, apex acute, base decurrent on the petiole pubescent; petiole ca. 1 cm. Cymes axillary, dense; flowers pink; bracts 1-1.2 cm, linear, ciliate; calyx lobes dissimilar, outer two larger, elliptic, many nerved from the base, scarious, spine tipped along the margins inner two 6-7 x 1-2 mm, oblong, ciliate; corolla 3.5-4 cm across, pink; filaments ca. 2 cm long. Capsule 1.2-1.4 cm long, oblong.
Flowering & Fruiting: December-March.
Distribution: Indo-Malesia and south China. Occasional; in moist deciduous forests. *RNMK 2803,* Muthanga.

Barleria involucrata Nees var. **elata** (Dalz.) Clarke in Hook. f., Fl. Brit. India 4: 486. 1884; V. S. Ramach. & V.J. Nair, Fl. Cannanore 333. 1988; Manilal, Fl. Silent Valley 202. 1988; Vajr., Fl. Palghat Dist. 345. 1990; Sivar. & P. Mathew, Fl. Nilambur 492. 1997; Mohanan & Sivad., Fl. Agasthyamala 506. 2002. *Barleria elata* Dalz. in Hook.'s J. Bot. Kew. Gard. Misc. 3: 227. 1851.

Shrubs, 2-4 m high; branchlets quadrangular, tawny pubescent. Leaves 10-15 x 4-6 cm, elliptic, acuminate at both ends, thinly pubescent above;

nerves 6-7 pairs, prominent; petiole 1-1.5 cm long. Cymes densely pubescent; bracts linear to oblanceolate; flowers many, outer sepals 3-3.5 x 1-1.3 cm, oblong-lanceolate, acute, densely tawny pubescent, one shortly bifid at apex, inner sepals ca. 1.5 x 0.3 cm, lanceolate, pubescent; corolla 7-8 cm long, tube 4-6 cm long, cylindrical, thinly hairy out, lobes spreading, blue; filaments villous at base. Capsule 3-3.5 cm long, oblong, glabrous.
Flowering & Fruiting: February-November.
Distribution: Endemic to Peninsular India. Rare; in evergreen forests. *RNMK 2842,* Periya.

Barleria mysorensis Heyne ex Roth, Nov. Pl. Sp. 313. 1821; Hook. f., Fl. Brit. India 4: 484. 1884; Gamble, Fl. Pres. Madras 1059(742). 1924; Manilal & Sivar., Fl. Calicut 220. 1982; Ansari, Fl. Kasaragod Div. 276. 1985; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 535. 2009.

Spinescent silky pubescent shrubs. Leaves 2-2.5 x 1.8-2 cm, obovate, elliptic, apex obtuse, mucronate, base cuneate, 5 nerved; petiole 0.5-0.7 cm. Flowers solitary, axillary, subsessile, blue; outer two calyx lobes 1-1.2 x 0.7-0.8 cm, ovate, silky pubescent, inner 0.4-0.5 cm long, lanceolate; corolla tube 1.7- 2 cm long, lobes ca. 1 cm long, obovate; filaments ca. 1 cm long; ovary ovoid, acute at apex.
Flowering & Fruiting: November-April.
Distribution: Pantropical. Occasional; in moist deciduous forests. *RNMK 1751,* Tholpetty.

Barleria prionitis L., Sp. Pl. 636. 1753; Wight, Ic. t. 452. 1841; Clarke in Hook. f., Fl. Brit. India 4: 482. 1884; Gamble, Fl. Pres. Madras 1058(741). 1924; Manilal & Sivar., Fl. Calicut 220. 1982; Nicols, Suresh & Manilal, An Interpr. Hort. Malab. 37. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 334. 1988; Vajr., Fl. Palghat Dist. 346. 1990; Sivar. & P. Mathew, Fl. Nilambur 494. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 377. 2005.

Erect armed shrubs, spines 1-1.2 cm long. Leaves 5-9 x 2.5-4 cm, elliptic, acute, mucronate, base cuneate, sparsely puberulus, ciliate on the margins, gland dotted beneath; petiole 1.7-2 cm. Cymes axillary; bracts 2, ca. 1.5 cm, oblong mucronate; outer calyx lobes 1.2-1.4 x 0.3-0.4 cm, mucronate, hirsute; corolla tube 2-2.5 cm, lobes ca. 2 cm obovate; filaments ca. 1.3 cm, staminodes 2, included at the base of the corolla tube; style ca. 2.5 cm. Capsules ovoid, 2-seeded.
Flowering & Fruiting: November-January.
Distribution: Tropical Africa and Asia. Occasional; in evergreen forests. *RNMK 2699,* Vythiri.

BLEPHARIS Jussieu

Gen. Pl. 103. 1789.

Blepharis repens (Vahl) Roth, Nov. Pl. Sp. 321. 1821; V. S. Ramach. & V.J. Nair, Fl. Cannanore 334. 1988; Ramach. & Nair, J. Econ. Tax. Bot. 3: 659.

1982. *Acanthus repens* Vahl, Symb. Bot. 2: 76. 1791. *Blepharis molluginifolia* Pers., Syn. Pl. 2. 180. 1806; Clarke in Hook. f., Fl. Brit. India 4: 479. 1884; Gamble, Fl. Pres. Madras 1013(712). 1924.

Prostrate herbs. Leaves ternate, 1-2.5 x 0.5-0.8 cm, oblong, apex obtuse, base narrowed hirsute. Flowers axillary, ca. 1 cm long, blue; bracts in 4 opposite pairs, margins dentate, bracteoles ca. 0.8 cm, lanceolate; calyx lobes 4, dissimilar, outer ca. 1 cm, emarginate, 2 nerved; corolla tube 2-3 mm long, lip 3 lobed, 7-8 mm long, hairy; ovary oblong.

Flowering & Fruiting: November-December.

Distribution: India and Sri Lanka. Occasional; in moist deciduous forests: *RNMK 1972,* Muthanga.

DIPTERACANTHUS C. G. D. Nees

in Wallich, Pl. Asiat. Rar. 3: 75, 81. 1832.

Dipteracanthus prostratus (Poir.) Nees in Wall., Pl. Asiat. Rar. 3: 81. 1832; Manilal & Sivar., Fl. Calicut 225. 1982; Ansari, Fl. Kasaragod Div. 27. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 334. 1988; Vajr., Fl. Palghat Dist. 347. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 337. 1996; Sivar. & P. Mathew, Fl. Nilambur 496. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 378. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 536. 2009. *Ruellia prostrata* Poir. in Lamk., Encycl. 6: 349. 1804; Clarke Hook. f., Fl. Brit. India 4: 411. 1884; Gamble, Fl. Pres. Madras 1017(714). 1924. *Ruellia prostrata* Poir. var. *dejecta* (Nees) Clarke in Hook. f., Fl. Brit. India 4: 412. 1884. *Dipteracanthus dejectus* Nees in Wall., Pl. Asiat. Rar. 3: 82. 1832.

Diffuse herbs, rooting at lower nodes; stems villous. Leaves 5-6 x 3.5-4 cm, ovate, acute, entire, base acute of obtuse; petiole 2-3 cm long. Flowers axillary, 2 or 3 together; bracts absent; bracteoles foliar, ca. 1.5 x 1 cm, ovate; calyx 5-partite, lobes linear, ciliate; corolla yellow, tube 7-8 mm long, lobes subequal, ca. 1 cm long, obovate; stamens 4, didynamous, filaments connate below; ovary 2-celled, style densely hairy. Capsule ca. 1.5 x 0.6 cm, linear oblong; seeds 5 in each cell, orbicular, compressed, marginate, smooth.

Flowering & Fruiting: October-April.

Distribution: India. Occasional in moist deciduous forests: *RNMK 0254,* Tholpetty.

ERANTHEMUM Linnaeus

Sp. Pl. 9. 1753.

Eranthemum capense L., Sp. Pl. 9. 1753; Sant., J. Bombay Nat. Hist. Soc. 51: 355. 1953; Manilal & Sivar., Fl. Calicut 216. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 335. 1988; Vajr., Fl. Palghat Dist. 348. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 338. 1996; Sivar. & P. Mathew, Fl. Nilambur 498. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta Dist. 378. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 537. 2009. *Eranthemum montanum* Roxb., Fl. Ind. 1: 100. 1820; Wight, Ic. t. 466. 1841; Gamble, Fl. Pres. Madras

1025(720). 1924. *Justicia montana* Roxb., Pl. Corom. t. 176. 1798. *Daedalacanthus montanus* (Roxb.) Anders. in Thw., Enum. Pl. Zeyl. 229. 1860; Clarke in Hook. f., Fl. Brit. India 4: 525. 1885; Gamble, Fl. Pres. Madras 1078(720). 1924. **Plate 25j.**

Subshrubs; branchlets glandular-pubescent. Leaves 13-15 x 4-5 cm, elliptic, acuminate at both ends, entire, glabrous; nerves 5-7 pairs; petioles 2.5-3 cm long. Spikes 3-7 cm long, terminal, branched; bracts lanceolate, acuminate, glandular hairy; bracteoles linear. Flowers many; sepals 5, united at the base, lanceolate, acuminate, hairy; corolla blue, tube 3-4 cm long, slender, glabrous, lobes equal, ca. 1.2 cm long, obovate, obtuse; stamens 2, anther cells subequal, parallel; staminodes 2, basely united; ovary 2-4-ovuled. Capsule oblong; seeds 2, orbicular, densely hairy; retinacula curved.
Flowering & Fruiting: January-March.
Distribution: Peninsular India and Sri Lanka. Occasional; in evergreen and moist deciduous forests. *RNMK 1406,* Chooralmala; *RNMK 1511*, Tholpetty.

GYMNOSTACHYUM C. G. D. Nees
in Wallich, Pl. Asiat. Rar. 3: 76, 106. 1832.

Shrubs or herbs, stems usually quadrangular. Leaves entire. Inflorescence a panicle or cymes, terminal or axillary; bracts and bracteoles minute, hairy, bracteoles usually at the middle of pedicel. Flowers few to many, pedicelled; sepals 5, lanceolate, basely united; corolla tube 2-5 times longer than lips, upper lip 2-lobed, lower 3-lobed, lobes subequal; stamens 2, free, anthers slightly unequal; ovary oblong, ovules 5-10 in each cell, style slender, thinly hairy. Capsule linear-oblong, terete; seeds compressed, hairy.

1. Scapigerous herbs ..... **G. febrifugum**
1. Erect subshrubs.....2
2. Stem 4-angled; lateral nerves 13-17 pairs ..... **G. canescens**
2. Stem not 4-angled; lateral nerves 10-13 pairs .....**G. latifolium** var**. latifolium**

Gymnostachyum canescens (Nees) T. And., J. Linn. Soc. Bot. 9: 505. 1867; Clarke in Hook. f., Fl. Brit. India 4: 509. 1884; Gamble, Fl. Pres. Madras 1053(738). 1924; V. S. Ramach. & V.J. Nair, Fl. Cannanore 336. 1988; Vajr., Fl. Palghat Dist. 349. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 339. 1996; Sivar. & P. Mathew, Fl. Nilambur 499. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 379. 2005. *Cryptophragmium canescens* Nees in Wall., Pl. Asiat. Rar. 3: 100. 1832; Wight, Ic. t. 1495. 1849.

Subshrubs, stems hirsute. Leaves 15-20 x 10-12 cm, broadly elliptic, acute to acuminate at either ends, lateral nerves 13-17 pairs, prominent. Cymes axillary, panicled, hirsute; bracts and bracteoles similar, ovate; flowers many, densely packed; sepals 5-6 mm long, glandular hairy; corolla greenish white, 1.5-1.7 cm long, tube ca. 1 cm long, narrow, lobes obtuse, hispid; anthers unequal, glabrous. Capsule 1.4-1.6 cm long, oblong, acute, hirsute; seeds many, orbicular, golden brown.

Flowering & Fruiting: October-January.
Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 2851,* Periya; *RNMK 1777*, Kallady.

Gymnostachyum febrifugum Benth., Flora 32: 558. 1849; Hook. f., Fl. Brit. India 4: 508. 1884; Gamble, Fl. Pres. Madras 1053(738). 1924; Ansari, Fl. Kasaragod Div. 279. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 336. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 339. 1996. *Gymnostachyum alatum* Wight, Ic. t. 1525. 1850.

Scapigerous herbs; stems very short. Leaves 5-7 x 3.5-4 cm, ovate, obtuse at apex, obtuse and decurrent at base; nerves 3-4 pairs, hirsute below; petiole 3-9 cm long. Scape to 30 cm long, solitary or few, simple or branched; flowers solitary or 2-4 together; bracts and bracteoles minute; sepals 3-4 mm long, glabrous; corolla pink, 2-2.5 cm long, yellow at mouth; anthers pubescent. Capsule 2.5-2.8 cm long, glabrous; seeds 16-20, orbicular, golden brown.
Flowering & Fruiting: November-January.
Distribution: Endemic to Peninsular India. Rare; in evergreen forests. *RNMK 2702,* Chanthanathodu.

Gymnostachyum latifolium (Dalz.) T. And., J. Linn. Soc. Bot. 9: 505. 1867, var. **latifolium**; Clarke in Hook. f., Fl. Brit. India 4: 509. 1884; Gamble, Fl. Pres. Madras 1053(738). 1924; Ansari, Fl. Kasaragod Div. 279. 1985; Manilal, Fl. Silent Valley 204. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 337. 1988. *Cryptophragmium latifolium* Dalz. in Hook.'s, J. Bot. Kew Gard. Misc. 2: 137. 1850. *Phlogacanthus latifolius* Wight, Ic. t. 1537. 1850.

Subshrubs. Leaves 9-12 x 5-6 cm, broadly elliptic, acuminate at apex, glabrous; nerves 10-13 pairs, nervules parallel; petiole 5-6 cm long. Panicles axillary and terminal, minutely strigose; bracts and bracteoles similar, linear; flowers densely packed, pedicelled; sepals 0.5-0.6 cm long, lanceolate, basally united; corolla ca. 1.5 cm long, blue, lobes oblong, obtuse; filaments thinly hairy at base. Capsule ca. 2 x 0.2 cm, linear-oblong, acute; seeds ovoid, golden brown, densely hairy.
Flowering & Fruiting: February-November.
Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 2700,* Theerthundamala.

HAPLANTHODES O. Kuntze

Post & Kuntze, Lexic. 265. 1903.

Haplanthodes neilgherryensis (Wight) Majumdar, Bull. Bot. Soc. Bengal 25: 76. 1971; Panigrahi & Das, Bull. Bot. Surv. India 23: 201. 1981; Ansari, Fl. Kasaragod Div. 280. 1985; Vajr., Fl. Palghat Dist. 349. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 339. 1996; Sivar. & P. Mathew, Fl. Nilambur 499. 1997. *Haplanthus neilgherryensis* Wight, Ic. t. 1556. 1850; Hook. f., Fl. Brit. India 4: 507. 1884; Gamble, Fl. Pres. Madras 1052(737). 1924. *Haplanthus*

tentaculatus Nees. var. *neilgherryensis* (Wight) Clarke in Hook. f., Fl. Brit. India 4: 507. 1884. *Bremekampia neilgherryensis* (Wight) Sreem., Bull. Bot. Surv. India 6: 323. 1965.

Profusely branched herbs, 25-40 cm high, branches quadrangular, glabrous. Leaves 6-7 x 2.5-3 cm, elliptic, acuminate at both ends, glabrous, attenuate and decurrent at base into a petiole of 4-9 cm long. Spikes terminal, to 5 cm long, cylindrical, densely covered with hairy cladodes; bracts and bracteoles minute; flowers in whorls; calyx 2-3 mm long, lobes filiform, hairy; corolla 8-9 mm long; upper lip 2-lobed and lower lip 3-lobed, hairy; stamens 2, free, anthers unequal, appendaged; ovary oblong, ovule 4-6 in each cell, style slender, stigma linear. Capsule ca. 7 mm long, oblong; seeds 6-12, thinly hairy.

Flowering & Fruiting: December-March.

Distribution: Endemic to south India. Rare; in evergreen forests. *RNMK 1195,* Vaduvanchal.

HEMIGRAPHIS Nees

Nees in DC., Prodr. 11: 722. 1847.

Herbs or shrubs. Leaves serrate, crenate or entire. Flowers in terminal or axillary heads or spikes, few flowered; bract large, enclosing the solitary flower; calyx lobes one larger than other; corolla ventricose or funnel-shaped, lobes subequal; stamens 4, didynamous, included; anther cells equal, parallel; stigma unequally 2-lobed. Capsule linear or oblong; seeds 6-12, hairy when wet.

1. Corolla tubular ventricose; filaments glabrous in the upper half .....**H. venosa**
1. Corolla funnel shaped; filaments densely bearded in the upper half .....**H. latebrosa**

Hemigraphis latebrosa (Heyne ex Roth) Nees in DC., Prodr. 11: 723. 1847; Clarke in Hook. f., Fl. Brit. India 4: 423. 1884; Gamble, Fl. Pres. Madras 1018(715). 1924; V.S. Ramach. *et al.*, J. Econ. Tax. Bot. 3: 659. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 338. 1988; Vajr., Fl. Palghat Dist. 349. 1990; Sivar. & P. Mathew, Fl. Nilambur 501. 1997. *Ruellia latebrosa* Heyne ex Roth, Nov. Pl. Sp. 307. 1821.

Straggling undershrubs, 40-50 cm tall. Leaves 8-9 x 3-3.5 cm, ovate, acuminate, crenate-serrate. Flowers blue. Capsule 1.5-2 cm long, tetragonous, pubescent; seeds 6.

Flowering & Fruiting: February-March.

Distribution: Central and Peninsular India. Occasional; in moist deciduous forests. *RNMK 2703,* Tholpetty.

Hemigraphis venosa Clarke in Hook. f., Fl. Brit. India 4: 423. 1884; Gamble, Fl. Pres. Madras 1018(715). 1924; V.S. Ramach. *et al.*, J. Econ. Tax. Bot. 5: 139. 1984; Ansari, Fl. Kasaragod Div. 280. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 338. 1988.

Creeping herbs, rooting at lower nodes. Leaves 3-3.5 x 0.8-1 cm, ovate, acute, crenate, pubescent. Flowers ca. 1 cm long, pink, in pseudo-axillary spikes or heads. Capsule ca. 1 cm long, linear, glabrous, compressed, discoid, hairy.
Flowering & Fruiting: November-December.
Distribution: Endemic to Peninsular India. Common; in moist deciduous forests. *RNMK 2701,* Bavali.

HYGROPHILA R. Brown
Prodr. 479. 1810.

Hebs to subshrubs, sometimes armed at nodes, branchlets 4-angled. Leaves subsessile or shortly petioled. Flowers fascicled in whorls at nodes; calyx lobes subequal, basally united; corolla 2-lipped, upper lip 2-lobed, erect, lower 3-lobed; stamens 4, exserted, filaments pairs united at base and forming a hirsute sheath; style hairy, stigma simple. Seeds 4-8, orbicular, hairy when wet.

1. Plants unarmed; calyx-lobes 5; ovules 16 or more .....**H. ringens**
1. Plants armed; calyx-lobes 4; ovules 8 .....**H. schulli**

Hygrophila ringens (L.) Steud., Nomencl. Bot. (ed. 1) 1: 418. 1821; Joseph, Aquatic Angiosp. Malabar 40. 1991; Sivar. & P. Mathew, Fl. Nilambur 502. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta Dist. 380. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 538. 2009. *Ruellia ringens* L., Sp. Pl. 635. 1753. *Hygrophila erecta* (Burm. f.) Hochr., Candollea 5: 230. 1934; Manilal & Sivar., Fl. Calicut 225. 1982; Ansari, Fl. Kasaragod Div. 281. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 339. 1988. *Hygrophila obovata* (Roxb. ex Hornem.) Nees in Wall., Pl. Asiat. Rar. 3: 81. 1832. *Hygrophila quadrivalvis* Nees in Wall., Pl. Asiat. Rar. 3: 80. 1832; Clarke in Hook. f., Fl. Brit. India 4: 408. 1884; Gamble, Fl. Pres. Madras 1016(714). 1924. *Hygrophila angustifolia* R. Br., Prodr. 1: 479. 1810; Gamble, Fl. Pres. Madras 1016(713). 1924. *Hygrophila salicifolia* (Vahl) Nees in Wall., Pl. Asiat. Rar. 3: 81. 1832; Manilal & Sivar., Fl. Calicut 224. 1982; Vajr., Fl. Palghat Dist. 350. 1990.

Erect subshrubs, rooting at lower nodes; stems quadrangular. Leaves 8-10 x 1-1.5 cm, linear-lanceolate, strigose along the nerves. Flowers in axillary clusters, sessile; bracts ca. 6 mm long, linear; bracteoles minute; calyx 1-1.2 cm long, tubular; lobes oblong, acuminate, hairy within; corolla pale pink, ca. 1.5 cm long, bilabiate; tube slender, ventricose above; stamens 4, filaments united into a sheath, ciliate. Capsule 1.2-1.4 x 0.2-0.3 cm, terete, glabrous; seeds many, densely hairy.
Flowering & Fruiting: October-March.
Distribution: Indo-Malesia. Common; in marshy areas and along streamsides. *RNMK 2064,* Muttil; *RNMK 2458*, Panamaram.

Hygrophila schulli (Buch.-Ham.) M. R. & S. M. Almeida, J. Bombay Nat. Hist. Soc. 83 (Suppl.): 221. 1986; Joseph, Aquatic Angiosp. Malabar 42. 1991;

Sasidh. & Sivar., Fl. Pl. Thrissur For. 340. 1996; Sivar. & P. Mathew, Fl. Nilambur 502. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 380. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 539. 2009. *Bahell schulli* Buch.-Ham., Trans. Linn. Soc. London 14: 289. 1825. *Asteracantha longifolia* (L.) Nees in Wall., Pl. Asiat. Rar. 3: 90. 1832; Clarke in Hook. f., Fl. Brit. India 4: 408. 1884; Gamble, Fl. Pres. Madras 1015(712). 1924. *Barleria longifolia* L., Cent. Pl. 2: t. 22. 1756, non *Hygrophila longifolia* Nees 1847. *Hygrophila auriculata* (K. Schum.) Heine, Kew Bull. 16: 172. 1962; Manilal & Sivar., Fl. Calicut 224. 1982; Ansari, Fl. Kasaragod Div. 281. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 338. 1988; Vajr., Fl. Palghat Dist. 350. 1990.

Subshrubs, strigose-hispid, with sharp thorns. Leaves in whorls of 8, unequal, 6-10 x 2-4 cm, linear-lanceolate, apex acute, base cuneate, margins dentate and wavy, larger pair, sessile. Thorns 2-3 cm long, axillary. Flowers in axillary whorls; bracts and bracteoles leafy, 1.2-1.3 cm long; calyx lobes 4, larger lobe ca. 1 cm long; corolla pink, ca. 1.5 cm long, bilipped, lobes obtuse, ciliate. Capsule ca. 1 cm long; seeds orbicular.

Flowering & Fruiting: September-April.

Distribution: India, Myanmar and Indo-China. Occasional; along streamsides and marshy areas. *RNMK 2668,* Muthanga-Kumizhi; *RNMK 1409*, Muttil.

JUSTICIA Linnaeus

Sp. Pl. 15. 1753.

Herbs or shrubs; erect or diffuse. Leaves entire. Inflorescence a cylindrical spike, axillary or terminal; bracts and bracteoles similar, lanceolate. Flowers densely packed; calyx 4 or 5-partite, lobes linear; corolla tube cylindrical, as long as the lobes, 2-lipped; the upper lip 2-lobed or entire, the lower lip 3-lobed; lobes imbricate in bud; with patches of hairs near the base inside; stamens 2, anthers cells in two levels, with glandular white appendages at base; ovary 2-celled; ovules 2 in each cell; style slender, 2-fid at apex. Capsule ovoid, compressed, with a solid stalk; seeds 2 or 4; compressed; rugose.

1. Shrubs 2
1. Herbs 5
2. Bracts white with green nerves ..... **J. betonica**
2. Bracts green 3
3. Branchlets dark purple ..... **J. gendarussa**
3. Branchlets otherwise 4
4. Branchlets obtusely 4-angled; corolla ca. 2 cm long ..... **J. santapaui**
4. Branchlets terete; corolla to 1.5 cm long..... **J. wynaadensis**
5. Bracteoles similar; fruiting spike intact 6
5. Bracteoles dissimilar; fruiting spike not intact..... **J. prostrata**
6. Leaves sessile ..... **J. nilgherrensis**
6. Leaves petioled 7
7. Spike to 2.5 cm long; bracts obovate ..... **J. procumbens**
7. Spike more than 4 cm long; bracts ovate ..... **J. japonica**

Justicia betonica L., Sp. Pl. 15. 1753; Clarke in Hook. f., Fl. Brit. India 4:525.1885; Gamble, Fl. Pres. Madras 1078(755).1924; Manilal & Sivar., Fl. Calicut 218. 1982; Manilal, Fl. Silent Valley 205. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 340. 1988; Vajr., Fl. Palghat Dist. 351. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 341. 1996; Sivar. & P. Mathew, Fl. Nilambur 506. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 381. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 542. 2009. *Adhatoda betonica* (L.) Nees in Wall., Pl. Asiat. Rar. 3: 103. 1832.

Shrubs, 1-3 m high; stems terete, glabrous. Leaves 5-15 x 3-4 cm, elliptic, acuminate at either ends, glabrous; nerves 10-12 pairs; petiole 4-5 cm long. Spike 10-13 cm long, terminal and upper axillary; bracts 1.2-1.5 x 0.3-0.5 cm, ovate, acuminate; flowers bluish-white; calyx 5-6 mm long, lobes oblong, hairy, 3-ribbed; corolla white with bluish streaks, 1-1.2 cm long, hairy; style hairy. Capsule hairy; seeds orbicular.

Flowering & Fruiting: November-January.

Distribution: Paleotropics. Common; along roadsides and moist deciduous forests. *RNMK 1184,* Puthoorvayal; *RNMK 1127*, Muthanga.

Justicia gendarussa Burm. f., Fl. Ind. 10. 1768; Clarke in Hook. f., Fl. Brit. India 4: 532. 1885; Gamble, Fl. Pres. Madras 1079(755). 1924; Ansari, Fl. Kasaragod Div. 283. 1985; Manilal, Fl. Silent Valley 205. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 341. 1996; Sivar. & P. Mathew, Fl. Nilambur 508. 1997. *Gendarussa vulgaris* Nees in Wall., Pl. Asiat. Rar. 3: 104. 1832; Manilal & Sivar., Fl. Calicut 216. 1982.

Shrubs, branches dark purple, terete, smooth. Leaves linear or oblong-lanceolate, acute or obtuse, base acute, chartaceous, glabrous, 7-10 x 1-1.8 cm; lateral nerves 5-7 pairs, bluish. Spikes terminal, 6-8 cm long, narrow; bracts linear; flowers white; calyx lobes linear-lanceolate, ca. 5 mm long; corolla white with purple streaks, ca. 1.5 cm long; ovary and style puberulus. Capsule 1-1.2 cm long, glabrous

Flowering & Fruiting: January-April.

Distribution: Tropical Africa and Asia. Occasional; in plantations. *RNMK 1179,* Puthoorvayal.

Justicia japonica Thunb., Fl. Jap. 20. 1784; V. S. Ramach. & V.J. Nair, Fl. Cannanore 234. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 342. 1996; Sivar. & P. Mathew, Fl. Nilambur 508. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 382. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 543. 2009. *Rostellularia japonica* (Thunb.) Ellis, Bull. Bot. Surv. India 22: 196. 1980 (1982). *Justicia simplex* D. Don, Prodr. Fl. Nepal. 118. 1825; Clarke in Hook. f., Fl. Brit. India 4: 539. 1885; Gamble, Fl. Pres. Madras 1080(756). 1924; Manilal, Fl. Silent Valley 206. 1988; Vajr., Fl. Palghat Dist. 353. 1990; Mohanan & Sivad., Fl. Agasthyamala 509. 2002. *Rostellularia mollissima* (Nees) Nees in DC., Prodr. 11: 373. 1847. *Rostellaria mollissima* Nees in Wall., Pl. Asiat. Rar. 3: 101. 1832.

Diffuse, branching herbs, 10-20 cm high; stems angular, strigose. Leaves 2-2.5 x 1.5-1 cm, ovate, acute, rounded at base, hirtus, yellow when dry; nerves 4-7 pairs, narrow. Spikes to 2 x 0.8 cm, cylindrical, terminal; bracts lanceolate, ciliate; flowers 7-9 mm long, densely packed; calyx lobes ciliate along margins and midribs; corolla purple with pink lines, 6-8 mm long, villous at base inside. Capsule glabrous; seeds 4, rugose, brown.
Flowering & Fruiting: August-January.
Distribution: Indo-Malesia and east Africa. Common; in grasslands. *RNMK 1427,* Chembra; *RNMK 1223*, Sugandhagiri.

Justicia nilgherrensis (Nees) Wall. ex T. Anders., J. Linn. Soc. Bot. 7:118.1863; Gamble, Fl. Pres. Madras 1078(755). 1924; V.S. Ramach. *et al.*, J. Econ. Tax. Bot. 5:140.1984; V. S. Ramach. & V.J. Nair, Fl. Cannanore 341. 1988. *Adhatoda nilgherrensis* Nees in Wall., Pl. Asiat. Rar. 3: 103. 1832.

Erect herbs, 25-30 cm tall with thick rootstocks. Leaves 3-4 x 0.8-1 cm, sessile, oblong or linear-oblong, glabrous. Flowers white with red spots, in terminal spikes, 0.8-1.1 cm long. Capsule 1-1.3 cm long, oblong.
Flowering & Fruiting: February-March.
Distribution: Endemic to southern Western Ghats. Rare; in grasslands. *RNMK 2415,* Banasuramala; *RNMK 1195*, Brahmagiri.

Justicia procumbens L., Sp. Pl. 15. 1753; Clarke in Hook. f., Fl. Brit. India 4: 539. 1885; Gamble, Fl. Pres. Madras 1080(756). 1924; Sasidh. & Sivar., Fl. Pl. Thrissur For. 342. 1996; Sivar. & P. Mathew, Fl. Nilambur 509. 1997; Mohanan & Sivad., Fl. Agasthyamala 509. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 382. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 543. 2009. *Rostellularia procumbens* (L.) Nees in DC., Prodr. 11: 371. 1847.

Diffuse herbs, 20-25 cm high, profusely branched. Leaves 4-6 x 2-3 cm, ovate, acute at either ends, hispid; nerves 5-6 pairs; petioles ca. 1 cm long, hirtus. Spikes 1-2.5 x 0.8-1 cm, terminal, oblong; bracts oblanceolate, cuspidate, ciliate, with green midrib; bracteoles linear. Flowers many; calyx lobes lanceolate, ciliate; corolla 6-8 mm long, hairy with pink lines, upper lip 2-lobed. Capsule glabrous; seeds orbicular, brown, striately rugose.
Flowering & Fruiting: June-November.
Distribution: Indo-Malesia and Australia. Occasional; in moist deciduous forests. *RNMK 2440,* Muthanga.

Justicia prostrata (Roxb. ex Clarke) Gamble, Fl. Pres. Madras 1081(757). 1924; V. S. Ramach. & V.J. Nair, Fl. Cannanore 341. 1988; Sivar. & P. Mathew, Fl. Nilambur 510. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 382. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 544. 2009. *Justicia diffusa* Willd., Sp. Pl. 1: 87. 1800, var. *prostrata* Roxb. ex Clarke in Hook. f., Fl. Brit. India 4: 538. 1885. *Rostellularia prostrata* (Roxb. ex Clarke) Majumdar, Bull. Bot. Soc. Bengal 25: 75. 1971; Manilal & Sivar., Fl. Calicut 219. 1982.

Erect or prostrate herbs; stems puberulus. Leaves 1.4-1.7 x 0.8-1 cm, ovate, obtuse or acute, base rounded; nerves 4-5 pairs; petioles 7-8 mm long. Spikes terminal, cylindrical to ovoid; bracts and bracteoles similar; flowers lax; calyx lobes lanceolate, glabrous; corolla 4-6 mm long, white, glabrous; ovary glabrous. Capsule glabrous; seeds triangular, rugose, puberulus, reddish brown.
Flowering & Fruiting: September-January.
Distribution: Peninsular India and Sri Lanka. Common; in open areas. *RNMK 2685,* Vythiri.

Justicia santapaui Bennet, J. Bombay Nat. Hist. Soc. 67: 358. 1970; V. S. Ramach. & V.J. Nair, Fl. Cannanore 341. 1988; Vajr., Fl. Palghat Dist. 352. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 342. 1996; Sivar. & P. Mathew, Fl. Nilambur 511. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 382. 2005. *Justicia montana* (Nees) Wall. ex Anders., J. Linn. Soc. Bot. 9: 509. 1867, non Roxb. 1805; Gamble, Fl. Pres. Madras 1078(755). 1924. *Hemichoriste montana* Nees in Wall., Pl. Asiat. Rar. 3: 102. 1832. *Justicia andersonii* Ramam. in Saldanha & Nicols., Fl. Hassan Dist. 551. 1976; Manilal, Fl. Silent Valley 204. 1988. **Plate 25k.**

Shrubs, 1-2.5 m high; branches terete or obtusely 4-angled, glabrous. Leaves 25-40 x 7-10 cm, oblanceolate, acute at apex, base attenuate, glabrous; nerves 8-10 pairs, prominent; petioles 5-6 cm long. Spike 20-25 cm long, axillary, peduncled, simple or branched; bracts and bracteoles similar, oblong, pubescent; flowers lax; calyx lobes 8-9 mm long, lanceolate, puberulus; corolla white with pink spots, villous at the base between the filaments; ovary densely hairy. Capsule 2.5 cm long, clavate, glabrous
Flowering & Fruiting: January-March.
Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 3185,* Kallady-900 forest; *RNMK 1195*, Thalimala.

Justicia wynaadensis (Nees) Heyne ex T. Anders., J. Linn. Soc. Bot. 9: 515. 1867; Clarke in Hook. f., Fl. Brit. India 4: 533. 1885; Gamble, Fl. Pres. Madras 1079(755). 1924; V. S. Ramach. & V.J. Nair, Fl. Cannanore 342. 1988; Vajr., Fl. Palghat Dist. 353. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 342. 1996; Sivar. & P. Mathew, Fl. Nilambur 511. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 383. 2005. *Gendarussa wynaadensis* Nees in Wall., Pl. Asiat. Rar. 3: 105. 1832. *Adhatoda wynaadensis* (Nees) Nees in DC., Prodr. 11: 406. 1847; Wight, Ic.t. 1545. 1850.

Erect shrubs; stems terete, smooth. Leaves 15-18 x 4-6 cm, lanceolate, acuminate at either ends, glabrous; lateral nerves 7-9 pairs; petioles 1-3.5 cm long. Spike 10-13 cm long, axillary and terminal, slender; rachis pubescent, sometimes branched; flowers in distant pairs; bracts hairy; corolla ca. 1.2 cm long, throat hairy; ovary glabrous. Capsule 1.5-1.7 cm long, pubescent; seeds obovoid, oblique, minutely rugulose, dark brown.

Flowering & Fruiting: November-March.
Distribution: Endemic to Western Ghats. Occasional; in semi-evergreen and moist deciduous forests. *RNMK 1349,* Manikkunnumala; *RNMK 2185*, Chedalayam.

LEPIDAGATHIS Willdenow
Sp. Pl. 3(1): 400. 1800.

Herbs or subshrubs. Leaves entire or crenate. Flowers in spikes, often one sided and capitate; bracts and bracteoles prominent; calyx lobes unequal, the lower 2 connate, often with sharp mucronate tip; corolla 2-lipped, upper lip notched or 2-fid, lower with 3 spreading lobes; stamens 4, included; anther cells unequal, sometimes bearded; style recurved, stigma capitate. Seeds compressed, ovoid, hairy.

1. Leaves entire or undulate; flowers in congested heads 2
1. Leaves crenate-serrate; flowers in axillary or terminal leafy cymes ..... **L. fasciculata**
2. Anther cells equal and opposite; filaments long and slender ..... **L. scariosa**
2. Anther cells unequal; filaments short ..... **L. incurva**

Lepidagathis incurva Buch.-Ham. ex D.Don, Prodr. Fl. Nepal. 119. 1825; Manilal & Sivar., Fl. Calicut 223. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 343. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 343. 1996; C.N. Sunil & Sivad., Fl. Pl. Div. Alappuzha Dist. 693. 2000. *Lepidagathis hyalina* Nees in Wall., Pl. Asiat. Rar. 3: 95. 1832; Clarke in Hook. f., Fl. Brit. India 4: 521. 1884; Gamble, Fl. Pres. Madras 1068(748). 1924.

Erect stiff herbs; stems angular, strigose. Leaves 6-8 x 2-3 cm, ovate, acute at apex, cuneate at base, hispid; nerves 6-7 pairs. Spikes terminal and axillary, clustered; bracts and bracteoles similar, lanceolate, ciliate, hyaline. Flowers densely packed; sepals 5, 4-5 mm long, linear-lanceolate, ciliate, glandular-hairy at apex; corolla 6-7 mm long, bilabiate, tube short, slender, upper lip entire, lower lip 3-lobed, hairy outside; stamens 4, didynamous, anthers softly hairy; ovary ovoid, thinly hairy. Capsule 4-6 mm long, ellipsoid, hairy at apex; seeds 4, compressed, rugose, brown.
Flowering & Fruiting: February-April.
Distribution: India, Myanmar and China. Common; in moist deciduous forests. *RNMK 1190,* Muthanga.

Lepidagathis fasciculata (Retz.) Nees in Wall., Pl. Asiat. Rar. 3: 95. 1832; Clarke in Hook. f., Fl. Brit. India 4: 522. 1885; Gamble, Fl. Pres. Madras 1068(748). 1924; Sant. In Bot. Mem. Univ. Bomb. 2;74. 1951; V. S. Ramach. & V.J. Nair, Fl. Cannanore 343. 1988. *Ruellia fasciculata* Retz., Obs. Bot. 4: 28. 1786.

Diffuse, softly villous herbs up to 30 cm tall. Leaves 3-3.5 x 1.5-2 cm, ovate or lanceolate, obtuse, decurrent at base. Flowers ca. 1 cm long, pale purple, in axillary or terminal leafy cymes. Capsule oblong.

Flowering & Fruiting: November-May.
Distribution: India and Bangladesh. Occasional; in semi-evergreen forests. *RNMK 2790,* Chooralmala.

Lepidagathis scariosa Nees in Wall., Pl. Asiat. Rar. 3:95.1832; Clarke in Hook. f., Fl. Brit. India 4: 520. 1885; Gamble, Fl. Pres. Madras 1068(748). 1924.

Woody prostrate herbs, pubescent. Leaves 3-3.5 x 1.5-2 cm, ovate, elliptic, apex acute, base cuneate, pubescent; petiole 1-1.5 cm. Heads terminal, 2-3 cm long, ovoid; bracts obovate, hairy; bracteoles hairy, mucronate; calyx lobes 5, upper obovate, ciliate, basally connate, spinescent, the lateral 2 lanceolate, ciliate; corolla tube ca. 1 cm long, hairy, white; filaments ca. 5 mm long; ovary oblong.
Flowering & Fruiting: November-February.
Distribution: Peninsular India and Arabia. Rare; in moist deciduous forests. *RNMK 1433,* Chedalayam.

NELSONIA R. Brown

Prodr. 480. 1810.

Nelsonia canescens (Lamk.) Spreng., Syst. Veg. 1: 42. 1825; Bremek., Reinwardtia 3:248. 1955; V. S. Ramach. & V.J. Nair, Fl. Cannanore 344. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 344. 1996; Sivar. & P. Mathew, Fl. Nilambur 513. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 383. 2005. *Justicia canescens* Lamk., Encycl. 1: 41. 1781. *Nelsonia campestris* R. Br., Prodr. 1: 481. 1810; Clarke in Hook. f., Fl. Brit. India 4: 394. 1884; Gamble, Fl. Pres. Madras 1010(709). 1924.

Trailing herbs, villous. Leaves entire, pairs subequal, basal ones 10-12 x 3.5-4 cm, oblong, obtuse, base attenuate, terminal ones 2.5-3 x 1-1.5 cm, oblong, sparsely pubescent. Flowering branches slender, trailing with smaller leaves, flowers 0.6-0.8 cm long, purple, in spikes; bracts ovate to oblong, acute, glandular villous; calyx lobes villous; corolla 0.5-0.6 cm long. Capsule 0.5-0.8 cm, glabrous, oblong; seeds rugose.
Flowering & Fruiting: January-March.
Distribution: Pantropical. Occasional; in moist deciduous forests. *RNMK 4064,* Begur.

PERISTROPHE C. G. D. Nees

in Wallich, Pl. Asiat. Rar. 3: 77, 112. 1832.

Erect herbs or subshrubs; stem terete or angled. Leaves entire. Flowers in cymes, often panicled; bracts larger than the calyx; calyx 5-partite; corolla 2-lipped, lower lip shortly 3-lobed; stamens 2, exserted; anther cells unequally placed; filaments hairy; style filiform, stigma 2-lobed. Capsule stipitate; seeds papillose, glochidiate.

1. Branchlets terete, glabrous.....**P. montana**
1. Branchlets angled, hispid.....**P. paniculata**

Peristrophe montana Nees in Wall., Pl. Asiat. Rar. 3: 113. 1832; Wight, Ic. t. 1553. 1850; Clarke in Hook. f., Fl. Brit. India 4: 556. 1885; Gamble, Fl. Pres. Madras 1084(759). 1924; V. S. Ramach. & V.J. Nair, Fl. Cannanore 346. 1988; Manilal, Fl. Silent Valley 210. 1988; Vajr., Fl. Palghat Dist. 357. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 344. 1996; Sivar. & P. Mathew, Fl. Nilambur 513. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 385. 2005.

Erect shrubs. Leaves 14-17 x 5-6 cm, ovate, acuminate, glabrous; nerves 7-9 pairs; petiole 4-6 cm long. Cymes axillary and terminal, trichotomous; bracts 2, opposite, 2-2.5 x 1-1.5 cm, ovate, obtuse; bracteoles linear; flowers pink; calyx lobes 5, linear, united below the middle; corolla tube ca. 3 cm long, slender, 2-lipped above; lower lip 3-lobed, upper orbicular, emarginate; stamens 2, filaments hairy, attached at the throat of corolla tube; anthers linear, curved, ovary glabrous, stigma 2-lobed. Capsule 1-1.3 cm long, tomentose.

Flowering & Fruiting: September-March.

Distribution: Indo-Malesia. Common; in evergreen forests. *RNMK 0250,* Periya Ghat; *RNMK 2558*, Vythiri Ghat.

Peristrophe paniculata (Forssk.) Brumm., Kew Bull. 38: 451. 1984; Ansari, Fl. Kasaragod Div. 287. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 344. 1996; Sivar. & P. Mathew, Fl. Nilambur 514. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 545. 2009. *Dianthera paniculata* Forssk., Fl. Aeg.-Arab. 7. 1775. *Peristrophe bicalyculata* (Retz.) Nees in Wall., Pl. Asiat. Rar. 3: 113. 1832; Clarke in Hook. f., Fl. Brit. India 4: 554. 1885; Gamble, Fl. Pres. Madras 1084(759). 1924; Manilal & Sivar., Fl. Calicut 215. 1982.

Erect herbs, stem 6-angular. Leaves 4.5-6 x 2-3 cm, ovate, apex acute, base rounded or truncate, glabrescent above and tomentose below. Panicles axillary; pedicels 1.7-2 cm long; bracts 2, unequal, bracteoles 4, linear, hirsute; calyx lobes linear; corolla tube 5-7 mm long, hairy, lobes 6-7 mm long; filaments hairy, cells muticous; ovary oblong. Capsule ellipsoid, tomentose.

Flowering & Fruiting: December-February.

Distribution: India, Myanmar and tropical Africa. Occasional; in semi-evergreen forests. *RNMK 2685,* Chooralmala.

PHAULOPSIS Willdenow

Sp. Pl. 3(1): 4, 342. 1800, *orth. cons.*

Phaulopsis imbricata (Forssk.) Sweet., Hort. Brit. (ed. 1) 327. 1827; Manilal & Sivar., Fl. Calicut 222. 1982; Ansari, Fl. Kasaragod Div. 287. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 347. 1988; Manilal, Fl. Silent Valley 210. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 345. 1996; Sivar. & P. Mathew, Fl. Nilambur 514. 1997; Mohanan & Sivad., Fl. Agasthyamala 514. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 386. 2005; C.N. Sunil & Sivad.,

Fl. Alappuzha Dist. 546. 2009. *Ruellia imbricata* Forssk., Fl. Aeg.-Arab. 113. 1775. *Ruellia dorsiflora* Retz., Obs. Bot. 6:31.1791. *Micranthus oppositifolius* Wendl., Bot. Beobacht 39. 1798; Gamble, Fl. Pres. Madras 1022(718). 1924. *Phaulopsis parviflora* Willd., sp. Pl. 3:342. 1800; Clarke in Hook.f., Fl. Brit. India 4:417. 1885. *Phaulopsis dorsiflora* (Retz.) Sant., Kew Bull. 1948: 276. 1948; Vajr., Fl. Palghat Dist. 358. 1990.

Diffuse herbs, branches glandular hairy. Leaves in unequal pairs, 4-5 x 1.5-2 cm, elliptic, acuminate at both ends, hairy along the nerves below; nerves 4–5 pairs; petiole 2-2.5 cm long. Spikes axillary, 1-sided; bracts paired, orbicular, hairy and long ciliate along the margins; bracteoles absent; flowers small, scarcely seen above the bracts; calyx lobes 5, unequal, oblanceolate, hairy; corolla 7-8 mm long, bilabiate, tube slender, lobes obtuse, white with pink spots; stamens 4, filaments united into an adnated sheath below, anthers shortly appendaged. Capsule glabrous; seeds 4, compressed.

Flowering & Fruiting: November-March.

Distribution: Indo-Malesia, China and Africa. Occasional; in moist deciduous forests. *RNMK 3088,* Tholpetty.

PSEUDERANTHEMUM Radlkofer

Sitzungsber. Math. Phys. C.L. Konigl. Bayer. Akad. Wiss. Munchen 13:282. 1883.

Pseuderanthemum malabaricum (Clarke) Gamble, Fl. Pres. Madras 1064(745). 1924; Manilal & Sivar., Fl. Calicut 217. 1982; Ansari, Fl. Kasaragod Div. 288. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 348. 1988; Vajr., Fl. Palghat Dist. 359. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 345. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 386. 2005. *Eranthemum malabaricum* Clarke in Hook. f., Fl. Brit. India 4: 497. 1884.

Shrubs; stems terete, white, smooth. Leaves 7-10 x 3-4 cm, elliptic, acuminate at base and apex, glabrous, glaucous below; nerves 5-6 pairs; petiole 2-2.5 cm long. Spike 3-8 cm long, terminal, slender; bracts and bracteoles similar, linear; flowers in small interrupted clusters; calyx 5-6 mm long, lobes united at base, acuminate; corolla tube ca. 3 cm long, slender; lobes ca. 1 cm long, obovate, equal; stamens 2, free, anthers oblong; ovary few-ovuled, style slender, elongated, stigma bilobed. Capsule 1.8-2 cm long, clavate, basal portion solid; seeds compressed, reticulate.

Flowering & Fruiting: December-March.

Distribution: Peninsular India and Sri Lanka. Occasional; in evergreen forests. *RNMK 2700,* Chooralmala; *RNMK 0245,* Periya.

RHINACANTHUS C.G.D. Nees

in Wallich, Pl. Asiat. Rar. 3: 76, 108. 1832.

Rhinacanthus nasutus (L.) Kurz, J. Asiat. Soc. Bengal 39: 79. 1870; Manilal & Sivar., Fl. Calicut 215. 1982; Ansari, Fl. Kasaragod Div. 288. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 42. 1988; V. S. Ramach. & V.J.

Nair, Fl. Cannanore 348. 1988; Vajr., Fl. Palghat Dist. 359. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 346. 1996; Sivar. & P. Mathew, Fl. Nilambur 515. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 387. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 546. 2009. *Justicia nasuta* L., Sp. Pl. 16. 1753. *Rhinacanthus communis* Nees in Wall., Pl. Asiat. Rar. 3: 109. 1832; Wight, Ic. t. 464. 1841; Clarke in Hook. f., Fl. Brit. India 4: 541. 1885; Gamble, Fl. Pres. Madras 1083(758). 1924. *Pul-colli* Rheede, Hort. Malab. 9:135, t. 69. 1689.

Erect shrubs; stems terete, tomentose. Leaves 9-12 x 7-8 cm, elliptic, acute at either ends, crenulate, minutely pubescent; nerves 7-10 pairs, regular; petioles 2-3 cm long. Cymes terminal, panicled; flowers sessile; bracts and bracteoles similar, hispid; flowers many, lax; sepals 5, 5-6 mm long, linear-lanceolate, hispid; corolla white, tube ca. 2.5 cm long, slender, hispid; upper lip entire, oblong, acuminate; lower lip broad, 3-lobed, obtuse; stamens 2, inserted near the throat of the tube, equal; one anther lobe lower than other, glabrous; ovules paired in each cell of the ovary, style slender. Capsule 2-2.5 cm long, clavate, with a lower solid slender stalk, glabrous; seeds 1 or 2 in each cell, rugose.

Flowering & Fruiting: November-February.

Distribution: India, Sri Lanka, Java and Madagascar. Occasional; along roadsides. *RNMK 1406,* Puthoorvayal.

RUNGIA C.G.D. Nees

in Wallich, Pl. Asiat. Rar. 3: 77, 109. 1832.

Herbs or undershrubs. Leaves ovate to lanceolate, entire, petiolate. Inflorescence of one sided spikes, solitary or clustered; bracts two types, fertile bracts and empty bracts, similar or dissimilar, bracteoles 2, ovate to lanceolate. Flowers densely arranged; sepals 5, lanceolate, united at the base, corolla tube longer than the lips; upper lip acuminate, bicuspidate at tip; lower lip obtusely 3-lobed; stamens 2, free, equal; one anther lower than the other, appendaged below; ovary ovoid; ovules 2 in each cell. Fruit an ovoid or oblong capsule; the placenta along with jaculator separating from the base; seeds 4, compressed, orbicular, tuberculate.

1. Basal bracts 2, opposite, usually at the middle of the peduncle ..... **R. wightiana**
1. Basal bracts absent 2
2. Spikes strictly axillary ..... **R. pectinata**
2. Spikes terminal and upper axillary 3
3. Leaves acute at both ends; lateral veins 3-4 pairs ..... **R. parviflora**
3. Leaves acuminate at both ends; lateral veins 6-8 pairs ..... **R. sisparensis**

Rungia parviflora (Retz.) Nees in Wall., Pl. Asiat. Rar. 3: 110. 1832; Clarke in Hook. f., Fl. Brit. India 4: 550. 1885; Gamble, Fl. Pres. Madras 1071(750). 1924; V. S. Ramach. & V.J. Nair, Fl. Cannanore 349. 1988; Vajr., Fl. Palghat

Dist. 360. 1990; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 387. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 549. 2009. *Justicia parviflora* Retz., Obs. Bot. 5: 9. 1788.*Rungia longifolia* sensu Bedd., Ic. t. 266. 1868-1874, non Nees, 1832.

Diffuse herbs, upto 15 cm tall. Leaves 7-9 x 3-4 cm, variable, ovate or lanceolate or linear-spathulate, base and apex acute; lateral veins 3-4 pairs. Spikes 1.5-2 cm long, terminal, flowers 4-5 mm long, blue, floral bracts glabrescent, elliptic, mucronate, narrowly margined. Capsule ellipsoid.
Flowering & Fruiting: March-April.
Distribution: Peninsular India and Sri Lanka. Occasional; in moist deciduous forests. *RNMK 2406,* Tholpetty; *RNMK 2791,* Muthanga.

Rungia pectinata (L.) Nees in DC., Prodr. 11: 469. 1847; Wight, Ic. t. 1547; Manilal & Sivar., Fl. Calicut 216. 1982; Ansari, Fl. Kasaragod Div. 289. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 350. 1988; Manilal, Fl. Silent Valley 211. 1988; Vajr., Fl. Palghat Dist. 360. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 346. 1996; Sivar. & P. Mathew, Fl. Nilambur 517. 1997; Mohanan & Sivad., Fl. Agasthyamala 516. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 388. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 549. 2009. *Justicia pectinata* L., Amoen. Acad. 4: 299. 1759. *Rungia parviflora* (Retz.) Nees var. *pectinata* (L.) Clarke in Hook. f., Fl. Brit. India 4: 550. 1885; Gamble, Fl. Pres. Madras 1071(750). 1924.

Profusely branched herbs; stems hairy. Leaves 4-6 x 1.7-2 cm, ovate to linear-oblong or obovate. Spikes 2-3 x 0.6-0.7 cm, 2-5 together, axillary, sessile; sterile bracts elliptic, narrowly winged on one side; fertile bracts obovate, broadly winged on either sides, emarginate, pubescent; bracteoles similar to bracts; flowers small, densely packed; sepals linear, acuminate, hyaline, hairy; corolla 4-5 mm long, upper lip entire, white; upper anthers hairy. Capsule 2.5-3 mm long, glabrous; seeds orbicular, rugose, brown.
Flowering & Fruiting: November-February.
Distribution: India, Sri Lanka and Myanmar. Common; in open areas. *RNMK 2791,* Talimala.

Rungia sisparensis (Benth.) T. And., J. Linn. Soc. Bot. 9: 518. 1867; Gamble, Fl. Pres. Madras 1071(750). 1924; V. S. Ramach. & V.J. Nair, Fl. Cannanore 150. 1988; Vajr., Fl. Palghat Dist. 361. 1990; Sivar. & P. Mathew, Fl. Nilambur 517. 1997; Biju in Manoharan *et al.*, Silent Valley-Whispers Reason 155. 1999. *Adhatoda sisparensis* Benth. in Hohenack, Pl. Ind. Exsicc. n. 1436. 1847; Clarke in Hook. f., Fl. Brit. India 4: 546. 1885.

Erect herbs; stems glabrous or hairy along one line. Leaves 13-15 x 2-2.5 cm, elliptic, acuminate at both ends, glabrous; lateral nerves 6-8 pairs. Spikes 1.5-3 x 1-1.5 cm, oblong, 2-3 together, axillary or terminal, peduncled or sessile; sterile bracts 7-8 x 1.5-2 mm, lanceolate, acuminate, narrow margined; fertile bracts 7-8 x 3-4 mm, lanceolate, broadly winged, apiculate,

ciliate along margins; flowers few to several; sepals 5-6 mm long, linear-lanceolate, acuminate, ciliate; corolla ca. 1 cm long, upper lip entire; lower lip obtusely 3-lobed; lower anthers with globose appendage.
Flowering & Fruiting: November-December.
Distribution: Endemic to southern Western Ghats (Kerala). Rare; in evergreen forests. *RNMK 2406,* Kallady-900 forest.

Rungia wightiana Nees in Wall., Pl. Asiat. Rar. 3: 110. 1832; Hook. f., Fl. Brit. India 4: 546. 1885; Gamble, Fl. Pres. Madras 1071(750). 1924; Sasidh. & Sivar., Fl. Pl. Thrissur For. 346. 1996; Mohanan & Sivad., Fl. Agasthyamala 517. 2002.

Herbs, stems glabrous. Leaves to 15 x 7 cm, elliptic, acute, glabrous; lateral nerves 6-7 pairs; petiole 3-4 cm long. Spikes 6-9 x 0.7-0.8 cm, terminal, 3-8 together, shortly peduncled or sessile, basal bracts lanceolate, acute; sterile bracts along two outer rows, ca. 7 x 5 mm, obovate, emarginate, cuspidate; fertile bracts ca. 5 x 2 mm, acute, aristate; bracteoles linear, acuminate; flowers pale blue; sepals ca. 5 mm long, glabrous; corolla ca. 11 mm long, upper lip bifid at apex, lower lip with brown transverse lines. Capsule 8-10 mm long, hairy; seeds brown with white tuberculations.
Flowering & Fruiting: Throughout the year.
Distribution: Endemic to Peninsular India. Rare; in evergreen forests. *RNMK 0910,* Chembra.

STAUROGYNE Wallich
Pl. Asiat. Rar. 2: 80, t. 186. 1831.

Herbs. Leaves entire or subentire. Flowers in simple or compound dense spikes, terminal as well as axillary; bracts sometimes leafy, bracteoles small; calyx deeply 5-partite; corolla funnel- shaped or cylindric, 2-lipped, lobes 5, spreading; stamens 4, included, didynamous; ovary 2-locular; ovules many per locule. Capsule oblong; seeds globose, smooth or pitted.

1. Erect herbs; upper leaves alternate; seeds smooth ..... **S. glauca**
1. Diffuse herbs; all leaves opposite; seeds pitted ..... **S. zeylanica**

Staurogyne glauca (Nees) O. Ktze., Rev. Gen. Pl. 2: 497. 1891; Gamble, Fl. Pres. Madras 1011(710). 1924; Manilal & Sivar., Fl. Calicut 223. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 350. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 347. 1996; Sivar. & P. Mathew, Fl. Nilambur 518. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 388. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 550. 2009. *Ebermaiera glauca* Nees in DC., Prodr. 11: 73. 1847; Wight, Ic. t. 1488. 1849; Clarke Hook. f., Fl. Brit. India 4: 395. 1884.

Viscous pubescent herbs. Leaves opposite and alternate, spathulate-oblong, obtuse, base attenuate, subentire, glabrescent, 4-5 x 1.2-1.5 cm. Spikes 10-12 cm long; lower bract leaf-like, upper smaller; bracteoles linear;

the larger calyx lobe 7-8 mm long, others 4-5 mm long, pubescent; corolla 5-6 mm long, bluish-purple, pubescent. Capsule 5-7 mm long, glabrous.
Flowering & Fruiting: February-May.
Distribution: Indo-Malesia. Common; in moist deciduous forests. *RNMK 1195,* Tholpetty.

Staurogyne zeylanica (Nees) O. Kuntze., Rev. Gen. Pl. 2: 497. 1891; Gamble, Fl. Pres. Madras 1011(710). 1924; Manilal & Sivar., Fl. Calicut 223. 1982; Ansari, Fl. Kasaragod Div. 290. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 351. 1988; Vajr., Fl. Palghat Dist. 361. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 347. 1996; Sivar. & P. Mathew, Fl. Nilambur 519. 1997; Mohanan & Sivad., Fl. Agasthyamala 517. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 388. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 552. 2009. *Ebermaiera zeylanica* Nees in DC., Prodr. 11: 74. 1847; Clarke in Hook. f., Fl. Brit. India 4: 397. 1884.

Erect herbs with trailing branches; stems terete, puberulus. Leaves 6-8 x 2-3 cm, oblanceolate, acuminate, attenuate at base, puberulus below, hirtus above; petiole 2-3 cm long. Spikes axillary and terminal, 6-8 cm long, cylindrical; bracts oblanceolate, hirtus; bracteoles smaller, linear; flowers few; sepals 5, unequal, linear, hirtus; corolla 4-5 mm long, tube short, upper part broad, 2-lipped; stamens 4, unequal, free; anthers divaricate, hairy; staminode one; ovary oblong, glabrous; style linear, glabrous, stigma 2-lobbed. Capsule 4-5 mm long, oblong, pubescent; seeds 8-10 pairs, brown, rugose; retinacula absent.
Flowering & Fruiting: January-March.
Distribution: India and Sri Lanka. Occasional; in evergreen forests. *RNMK 2875,* Chanthanathodu.

STROBILANTHES Blume

Bijdr. 781, 796. 1826.

Shrubs or undershrubs; branches terete, nodes thickened. Leaves usually in unequal pairs, elliptic, entire or serrate. Flowers in contracted or interrupted spikes or rarely in panicles; involucral or basal bracts 2, 4 or absent; floral bracts spirally disposed; bracteoles 2, usually equaling the sepals; sepals 5, lanceolate, united into a long or short tube; corolla tube narrow below, ventricose above, lobes 5, subequal, twisted; stamens 2 or 4, filaments united below into a sheath adnated to the corolla or free; anthers equal, oblong, obtuse; ovary 2-celled; ovules 2 in each cell; style linear; stigma terminal. Capsule compressed; seeds 1 or 2 in each cell, compressed, glabrous or hairy; retinacula sharp, curved.

1. Fertile stamens 2, hardly monadelphous ..... **S. lawsonii**
1. Fertile stamens 4, usually monadelphous..... 2
2. Flowers in capitate heads or short spikes 3
2. Flowers in erect or deflexed spikes.....11

3. Stem tetragonous, grooved and winged; petiole base swollen and auricled ... **S. barbatus**
3. Stems not tetragonous and winged; petioles not auricled.....4
4. Flowers in heads, hairy 5
4. Flowers in spikes, glabrous 9
5. Leaves rugose, usually with bulbous-based hairs 6
5. Leaves softly white glandular hairy..... **S. anceps**
6. Corolla base shorter than the urceolate upper part; filaments glabrous 7
6. Corolla base long and slender as long as the upper part; filaments hairy at thebase 8
7. Bracts lanceolate, acute; calyx lobes acuminate ..... .**S. wightianus**
7. Bracts obovate, obtuse, crenate; calyx lobes linear, obtuse..... **S. urceolaris**
8. Heads small, flattened, densely white hairy ..... .**S. pulneyensis**
8. Heads large, densely bristly hirsute..... **S. neilgherrensis**
9. Spikes erect, oblong, glandular hairy..... **S. warreensis**
9. Spikes deflexed, oblong or clavate, glabrous 10
10. Spikes small; corolla small; stamens exserted ..... **S. ciliatus**
10. Spikes long; corolla large; stamens included..... **S. anamallaica**
11. Seeds hairy 12
11. Seeds glabrous 13
12. Seed hairs not elastic when wetted ..... **S. aurita**
12. Seed hairs elastic when wetted ..... **S. neoasper**
13. Flowers in strobilate often cymose spikes; bracts rounded and concave.....14
13. Flowers in lax spikes, often panicled; bracts persistent..... **S. rubicundus**
14. Flowers on the branches, axillary or lateral; sheath of filaments long, narrow 15
14. Flowers from the old wood, often from near the ground, sheath of filaments short.. ..... **S. sessilis**
15. Leaves slightly decurrent, without bulbous based hairs; bracts glandular hairy .... **S. lupilinus**
15. Leaves with bulbous based hairs, not deccurrent; bracts not glandular hairy 16
16. Leaves thick, broadly elliptic; lateral nerves 8-10 pairs..... .**S. asperrimus**
16. Leaves thin, ovate or elliptic; lateral nerves 6-8 pairs..... **S. heyneanus**

Strobilanthes anamallaica Wood, Kew Bull. 50: 11. 1995; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 55. 2006. *Strobilanthes adenophorus* Bedd., Ic. t. 225. 1868-1874, non Nees 1847; Clarke in Hook. f., Fl. Brit. India 4: 440. 1884; Gamble, Fl. Pres. Madras 1040(729). 1924; Sasidh. & Sivar., Fl. Pl. Thrissur For. 348. 1996. *Didyplosandra lanceolata* (Hook. ex Nees) Bremek., Verh. Acad. Wet. afd. Natuurk. Sect 2, 41: 178. 1944. *Nilgirianthus beddomei* Bremek., Verh. Acad. Nederl. Wetensch. 41: 172. 1944; Vajr., Fl. Palghat Dist. 356. 1990; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 384. 2005.

Shrubs, branchlets slender. Leaves 6-10 x 2.5 cm, linear or oblanceolate, apex caudate-acuminate, base cuneate, chartaceous, subentire or serrulate, lateral nerves 6-8 pairs; petiole 3-3.5 cm long. Spikes axillary, 3-4 cm long; peduncle ca. 2 cm long; bracts obovate, acute, ca. 1 cm long; bracteoles

narrow; corolla 2-2.5 cm long, funnel-shaped, pale lavender.
Flowering & Fruiting: April-May.
Distribution: Endemic to southern Western Ghats. Common; in evergreen forests. *RNMK 1871,* Chembra.

Strobilanthes anceps Nees in DC., Prodr. 11: 189. 1847; Clarke in Hook. f., Fl. Brit. India 4: 442. 1884; T. Anders., J. Linn. Soc. Bot. London. 9:466. 1867; Gamble, Fl. Pres. Madras 1038(728). 1924; Sasidh. & Sivar., Fl. Pl. Thrissur For. 348. 1996; Sivar. & P. Mathew, Fl. Nilambur 520. 1997; Sasidh. & Sivar., Fl. Pl. Thrissur For. 348. 1996; Sivar. & P. Mathew, Fl. Nilambur 520. 1997; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 57. 2006. *Nilgirianthus punctatus* (Nees) Bremek., Verh. Acad. Nederl. Wetensch. 41: 174. 1944; Manilal, Fl. Silent Valley 209. 1988; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 385. 2005.

Shrubs, 1.5-2 m high; branches obscurely 4-angled; hairy along the angles. Leaves 14-16 x 4-5 cm, elliptic, caudate-acuminate, entire; nerves 6-7 pairs, glandular-pubescent; petiole 3-4 cm long. Spikes globose, 2-2.5 cm across, peduncled; involucral bracts ca. 6 x 6 mm, orbicular, ciliate; floral bracts ca. 8 x 8 mm, orbicular, glandular-ciliate along the margins; bracteoles oblanceolate; flowers several, densely packed; sepals 5, 4-5 mm long, lanceolate; corolla white or blue, 1.8-2 cm long, hairy outside, tube narrow below, ventricose above; staminal sheath glabrous.
Flowering & Fruiting: November-December.
Distribution: India and Sri Lanka. Occasional; in semi-evergreen forests. *RNMK 1373,* Chooralmala.

Strobilanthes asperrimus Nees in DC., Prodr. 11: 183. 1847; Hook. f., Fl. Brit. India 4: 443; 1884; Gamble, Fl. Pres. Madras 1041(730). 1924.

Stout bushy shrubs, 40-75 cm high; branches hirtus. Leaves 8-10 x 5-7 cm, broadly elliptic, bluntly acuminate at apex, attenuate to base, crenate, covered with bulbous based hairs; lateral nerves 8-9 pairs; petiole 3-4.5 cm long. Spikes 3-4 together, 2-3 x 1.5-2 cm, axillary, on trichotomous peduncles, ovoid; involucral bracts broadly ovate, obtuse; floral bracts ovate, concave, obtuse, glabrous; bracteoles absent; flowers few to many; sepals oblong, emarginate, connate a little above the base; corolla blue, 2-2.5 cm long; tube stout, with a patch of hairs inside above the stamens; staminal filaments and sheath hairy; style hairy. Capsule glabrous; seeds winged.
Flowering & Fruiting: November-February.
Distribution: India and Sri Lanka. Occasional; in evergreen forests. *RNMK 1141,* Brahmagiri.

Strobilanthes aurita Wood, Kew Bull. 50: 12. 1994; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 64. 2006. *Strobilanthes caudatus* sensu Beed., Ic. t. 213. 1868-1874, non Anders. 1860; Clarke in

Hook. f., Fl. Brit. India 4: 441. 1884; Gamble, Fl. Pres. Madras 1040(729). 1924. *Mackenziea caudata* (Anders.) Ramam. in Saldanha & Nicols., Fl. Hassan Dist. 553. 1976; V. S. Ramach. & V.J. Nair, Fl. Cannanore 343. 1988; Vajr., Fl. Palghat Dist. 355. 1990.

Subshrubs; branches terete, glabrous. Leaves 8-12 x 2-3 cm, elliptic, caudate acuminate, glabrous, entire; nerves 8-9 pairs. Spikes ca. 1.5 x 2 cm axillary, solitary or 2-3 together, peduncled; peduncle 3-5 cm long; involucral bracts smaller than floral bracts, linear; floral bracts linear, obtuse, glandular-hairy; bracteoles 3, linear. Flowers few; calyx 7-9 mm long, lobes linear-oblong, hairy; corolla 2-2.2 cm long, blue, tube narrow at base, with two patches of hairs at throat; staminal sheath hairy.

Flowering & Fruiting: July-November.

Distribution: India and Sri Lanka. Occasional; in evergreen forests. *RNMK 2699,* Chanthanathodu; *RNMK 1160*, Kunchome.

Strobilanthes barbatus Nees in Wall., Pl. Asiat. Rar. 3: 85. 1832; Santapau, Bot. Mem. Univ. Bombay 2:39. 1951; Clarke in Hook. f., Fl. Brit. India 4: 437. 1884; Gamble, Fl. Pres. Madras 1037(727). 1924; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 66. 2006. *Nilgirianthus barbatus* (Nees) Bremek., Mat. Monogr. Strob. 172. 1944; Manilal, Fl. Silent Valley 208. 1988; Vajr., Fl. Palghat Dist. 356. 1990; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 384. 2005.

Large shrubs; stem-angled,often winged. Leaves 10-17 x 5-7 cm, base acute, decurrent, apex acuminate, margin crenulate; lateral veins 10-12 pairs; petiole auricled at base. Flowers in dense capitate spikes; bracts ovate, acuminate, ciliate; bracteoles linear; calyx divided near to base; corolla white.

Flowering & Fruiting: September-December.

Distribution: Endemic to Western Ghats. Common; in evergreen forests. *RNMK 2014,* Chembra.

Strobilanthes ciliatus Nees in Wall., Pl. Asiat. Rar. 3: 85. 1832; Clarke in Hook. f., Fl. Brit. India 4: 439. 1884; Gamble, Fl. Pres. Madras 1039(728). 1924; Sasidh. & Sivar., Fl. Pl. Thrissur For. 348. 1996; Sivar. & P. Mathew, Fl. Nilambur 521. 1997; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 82. 2006. *Nilgirianthus ciliatus* (Nees) Bremek., Verh. Acad. Nederl. Wetensch. 41: 172. 1944; Ansari, Fl. Kasaragod Div. 285. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 345. 1988; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 385. 2005.

Shrubs, 1-2 m high; branches terete, glabrous. Leaves 12-15 x 4-5 cm, acuminate at either ends, glabrous; nerves 5-6 pairs, raised above, scabrid; petiole 2-2.5 cm long. Spikes 1.5-3 cm long, axillary, solitary, peduncled; bracts obovate; bracteoles linear-oblong; flowers 5-15; calyx 5-7 mm long, lobes oblong, connate below the middle; corolla 1.5-1.8 cm long, white with pink patches on lower lobes; staminal sheath hairy.

Flowering & Fruiting: December-May.
Distribution: Endemic to southern Western Ghats. Common; in evergreen forests. *RNMK 2633,* Thariodu.

Strobilanthes heyneanus Nees in Wall., Pl. Asiat. Rar. 3: 85. 1832; Clarke in Hook. f., Fl. Brit. India 4: 443. 1884; Gamble, Fl. Pres. Madras 1041(730). 1924; Sasidh. & Sivar., Fl. Pl. Thrissur For. 348. 1996; Sivar. & P. Mathew, Fl. Nilambur 522. 1997; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 109. 2006. *Nilgirianthus heyneanus* (Nees) Bremek., Verh. Acad. Nederl. Wetensch. 41: 173. 1944; Ansari, Fl. Kasaragod Div. 286. 1985; Vajr., Fl. Palghat Dist. 357. 1990; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 385. 2005. *Nilgirianthus heyneanus* (Nees) Bremek. var. *neesii* Bremek., Mat. Monogr. Strob. 173.1944; V. S. Ramach. & V.J. Nair, Fl. Cannanore 345.1988.

Shrubs; branches glabrous. Leaves 8-13 x 5-6 cm, elliptic, acuminate, attenuate to the base, glabrous. Spikes ca. 2 x 1.5 cm, axillary, 2-3 together on trichotomous peduncle, ovoid or globose; bracts orbicular or obovate, concave, glabrous; bracteoles absent; flowers 4-10 in each spike; sepals united to the middle, glabrous; corolla 2-2.5 cm long, white; staminal sheath ciliate. Capsule glabrous; seeds biconvex, densely hairy along the margins.
Flowering & Fruiting: November-Janaury.
Distribution: Endemic to south-west India. Occasional; in evergreen forests. *RNMK 2618,* Vythiri Ghat.

Strobilanthes lawsonii Gamble, Bull. Misc. Inform. Kew 1923: 374. 1923 & Fl. Pres. Madras. 1037(727). 1924, p.p.; Sasidh. & Sivar., Fl. Pl. Thrissur For. 348. 1996; Biju in Manoharan *et al.*, Silent Valley-Whispers Reason 162. 1999; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 135. 2006. *Phlebophyllum lawsonii* (Gamble) Bremek., Verh. Acad. Nederl. Wetensch. 41: 169. 1944; V. S. Ramach. & V.J. Nair, Fl. Cannanore 347. 1988; Mohanan & Sivad., Fl. Agasthyamala 515. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 386. 2005. *Strobilanthes gamblei* Carine, J. Alexander & Scotland, Kew Bull. 59: 5. 2004.

Shrubs, branches tawny-pubescent. Leaves 8-11 x 3-6 cm, broadly elliptic, acuminate at both ends, lateral nerves 11-13 pairs. Spikes 8-10 cm long, slender, tawny villous, interrupted, axillary, solitary or panicled; bracts lanceolate, glabrous within; flowers scattered; calyx tubular below the middle, lobes acuminate, villous; corolla ca. 2 cm long, blue, glabrous; staminal filaments hairy.
Flowering & Fruiting: October-December.
Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 3085,* Chembra; *RNMK 3541*, Periya Ghat.

Strobilanthes lupulinus Nees in Wall., Pl. Asiat. Rar. 3: 85. 1832; Clarke in Hook. f., Fl. Brit. India 4: 443. 1884; Gamble, Fl. Pres. Madras 1041(730).

1924; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 138. 2006. *Nilgirianthus lupulinus* (Nees) Bremek., Verh. Acad. Nederl. Wetensch. 41: 173. 1944; Ansari, Fl. Kasaragod Div. 286. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 345. 1988.

Erect undershrubs, 1.5-2 m tall. Leaves 17-20 x 6-7 cm, elliptic-ovate, acuminate, slightly decurrent at base, rugose. Flowers in strobiliate spikes; beacts rounded; calyx lobes oblong, obtuse; corolla 1.5-2 cm long, cylindric base as long as the urceolate upper part. Capsule 1-1.2 cm, enclosed in bracts.

Flowering & Fruiting: May-July.

Distribution: Endemic to Peninsular India. Occasional; in semi-evergreen forests. *RNMK 2014,* Thirunelly.

Strobilanthes neilgherrensis Bedd., Ic. t. 196. 1868-1874; Clarke in Hook. f., Fl. Brit. India 4: 438. 1884; Gamble, Fl. Pres. Madras 1038(728). 1924; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 152. 2006. *Nilgirianthus neilgherrensis* (Bedd.) Bremek., Verh. Acad. Nederl. Wetensch. 41: 174. 1944; V. S. Ramach. & V.J. Nair, Fl. Cannanore 346. 1988; Manilal, Fl. Silent Valley 208. 1988; Vajr., Fl. Palghat Dist. 357. 1990; Mohanan & Sivad., Fl. Agasthyamala 513. 2002.

Shrubs. Leaves 8-11 x 5-7 cm, ovate, apex acuminate, base rounded, crenate, hispid above, sparsely pubescent below. Head 3-3.5 cm across, ovoid; bract ca. 2 cm long, oblong; bracteoles 1-1.2 cm long, linear, setaceous; calyx ca. 1 cm long, lanceolate, scarious; corolla 3–3.5 cm long, cylindrical, pale violet; stamens 4, subequal, filaments pilose; style 2-2.5 cm long, hairy. Capsule ca. 1 cm long, ellipsoid; seed 4 obovate.

Flowering & Fruiting: May-November.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 2192,* Brahmagiri; *RNMK 3159*, Chembra.

Strobilanthes neoasper Venu & Daniel in Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 154. 2006. *Strobilanthes asper* sensu Wight, Ic. t. 1518. 1850, non Decne. 1834; Clarke in Hook. f., Fl. Brit. India 4: 452. 1884; Gamble, Fl. Pres. Madras 1041(730). 1924. *Nilgirianthus asper* (Wight) Sant., Bot. Mem. Univ. Bombay 2: 42. 1951; Vajr., Fl. Palghat Dist. 355. 1990; V. S. Ramach. & V.J. Nair, Fl. Cannanore 344. 1988.

Shrubs, branchlets softly hairy. Leaves 7-10 x 3-4.5 cm, ovate, apex acute or shortly acuminate, base cuneate, crenate. Spikes axillary, oblong, 3-4 cm long; bracts obovate, ca. 1 cm long; bracteoles linear; flowers few; sepals 5, lanceolate; corolla pale blue, 1.8-2 cm long; tube narrow below, ventricose above; staminal sheath glabrous.

Flowering & Fruiting: January-April.

Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 2694,* Brahmagiri; *RNMK 2440,* Kattimatom.

Strobilanthes pulneyensis Hook. f., Fl. Brit. India 4: 438. 1884; Gamble, Fl. Pres. Madras 1038(727). 1924; Sivar. & P. Mathew, Fl. Nilambur 523. 1997; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 164. 2006. *Strobilanthes punctatus* Bedd., Ic. t. 204. 1868-1874. *Xenacanthus pulneyensis* (Hook. f.) Bremek., Verh. Acad. Nederl. Wetensch. 41: 176. 1944; Manilal, Fl. Silent Valley 213. 1988; Vajr., Fl. Palghat Dist. 363. 1990.

Profusely branched shrubs; branchlets densely hirtus. Leaves elliptic, acuminate, densely hirtus; nerves 7-8 pairs, regular. Spikes peduncled, flattened, 1-3 in axils; bracts 1-3 x 1-1.2 cm, ovate to orbicular, serrate, densely white hairy at base; bracteoles linear, hairy; flowers few to many; sepals ca. 1 cm long, hairy; corolla 2.3-2.6 cm long, tube narrow, thinly hairy outside; staminal sheath ciliate.

Flowering & Fruiting: October-December.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2430*, Kattimattom; *RNMK 3450*, Mundakai.

Strobilanthes rubicundus (Nees) Anders, J. Linn. Soc. Bot. 9: 483. 1867; Clarke in Hook. f., Fl. Brit. India 4: 475. 1885; Gamble, Fl. Pres. Madras 1044(732). 1924; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 169. 2006. *Strobilanthes paniculatus* sensu Bedd., Ic. t. 199. 1868-1874, non Anders., 1867. *Leptacanthus rubicundus* Nees in Wall., Pl. Asiat. Rar. 3: 90. 1832; Manilal, Fl. Silent Valley 207. 1988; Vajr., Fl. Palghat Dist. 354. 1990; Mohanan & Sivad., Fl. Agasthyamala 510. 2002.

Shrubs; branchlets terete, glabrous. Leaves 8-10 x 2-4 cm, elliptic, caudate at apex, attenuate at base, glabrous. Panicles terminal, densely hairy; basal bracts paired, 5-7 mm long, lanceolate; flowers many, distant; calyx lobes glandular-hairy; corolla 1.5-1.7 cm long, glabrous, pale blue; capsule linear, glabrous.

Flowering & Fruiting: December.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2014,* Aranamala; *RNMK 1871*, Chembra.

Strobilanthes sessilis Nees in Wall., Pl. Asiat. Rar. 3: 185. 1832; Clarke in Hook. f., Fl. Brit. India 4: 452. 1884; Gamble, Fl. Pres. Madras 1042(731). 1924; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 178. 2006. *Pleocaulus sessilis* (Nees) Bremek., Verh. Acad. Nederl. Wetensch. 41: 185. 1944; V. S. Ramach. & V.J. Nair, Fl. Cannanore 348. 1988; Manilal, Fl. Silent Valley 210. 1988; Vajr., Fl. Palghat Dist. 358. 1990.

Sparingly branched subshrubs; stems terete, strigose. Leaves 2-5 x 2-3 cm, ovate, acute, sessile, serrate, densely strigose, base cordate; nerves 5-6 pairs. Spikes 3-5 cm long, cylindrical, axillary and terminal; bracts acuminate, densely hairy; flowers many, densely arranged; calyx lobes lanceolate, hairy; corolla ca. 3 cm long, blue, hairy, filaments densely hairy.

Flowering & Fruiting: November-December.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1043*, Brahmagiri.

Strobilanthes urceolaris Gamble, Bull. Misc. Inform. Kew 1923: 374. 1923 & Fl. Pres. Madras. 1038(727). 1924; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 184. 2006. *Nilgirianthus urceolaris* (Gamble) Bremek., Verh. Acad. Wet. afd. Natuurk. Sect. 2, 41: 173. 1944; V. S. Ramach. & V.J. Nair, Fl. Cannanore 346. 1988; Mohanan & Sivad., Fl. Agasthyamala 513. 2002.

Shrubs; branchlets densely hirtus. Leaves 7-9 x 4-5 cm, ovate, acute at either ends, densely scabrous, crenate, nerves 7-8 pairs; petiole ca. 3 cm long. Spikes 1.5-2 cm long, ovoid, 5-8-together on short lateral branches; bracts obovate, densely hirtus; bracteoles linear, hirtus; flowers few; calyx lobes linear, united above the base, densely hairy; corolla 1.5-1.7 mm long, glabrous, blue or white; filaments paired, united into two sheaths; style hairy. Capsule ca. 1 cm long, glabrous; seeds brown.

Flowering & Fruiting: April-May.

Distribution: Endemic to southern Western Ghats; Occasional; in evergreen forests. *RNMK 1993,* Kunchome.

Strobilanthes warreensis Dalz., Hook.'s J. Bot. Kew. Gard. Misc. 2: 341. 1850; Clarke in Hook. f., Fl. Brit. India 4: 439. 1884; Gamble, Fl. Pres. Madras 1039(728). 1924; Sivar. & P. Mathew, Fl. Nilambur 524. 1997; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 193. 2006. *Strobilanthes parviflorus* Bedd., Ic. t. 197. 1868-74. *Nilgirianthus warreensis* (Dalz.) Bremek., Verh. Acad. Nederl. Wetensch. 41: 173. 1944; Ansari, Fl. Kasaragod Div. 286. 1985; Manilal, Fl. Silent Valley 209. 1988.

Large shrubs with stilt roots from lower nodes; branchlets terete, glabrous. Leaves 12-15 x 5-6 cm, elliptic, acuminate to both ends, glabrous, coriaceous, crenate; nerves 6-7 pairs; petiole 3-4 cm long. Spikes 1.5-2 x 1-1.5 cm, ovoid, axillary, solitary or paired; bracts 1.3-1.6 cm long, with a broad base and filiform tip, glabrous; bracteoles similar; flowers few; calyx lobes united below the middle, glabrous; corolla ca. 2 cm long, white, tube ca. 1 cm long; staminal filaments hairy.

Flowering & Fruiting: September-January.

Distribution: Endemic to Western Ghats. Rare; in evergreen forests. *RNMK 0254 ,* Sugandhagiri.

Strobilanthes wightianus Nees in Wall., Pl. Asiat. Rar. 3: 86. 1832; Clarke in Hook. f., Fl. Brit. India 4: 438. 1884; Gamble, Fl. Pres. Madras 1037(727). 1924; Sivar. & P. Mathew, Fl. Nilambur 524. 1997; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 195. 2006. *Nilgirianthus wightianus* Bremek., Verh. Acad. Nederl. Wetensch. 41: 174.1944; Manilal, Fl. Silent Valley 209. 1988.

Shrubs; branches hirtus. Leaves 6-7 x 3.5-4 cm, ovate, acuminate, serrate, densely hirtus; nerves 4-5 pairs; petiole 2-3 cm long. Spikes 1.5-2 x 2-2.5 cm, obconical; peduncle 2-6 cm long; involucral bracts 2-4, leafy, 1-3 x 1-1.5 cm;

floral bracts densely hairy at base; bracteoles linear; flowers few; sepals hairy, united below the middle; corolla 2-2.5 cm long, pale blue, tube 5-6 mm long, villous inside. Capsule glabrous; seeds orbicular, glabrous, oblique at base.
Flowering & Fruiting: November-March.
Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 2802,* Aranamala.

THUNBERGIA Retzius

Physiogr. Salsk. Handl. 1(3): 163. 1780, *nom. cons.*

Climbers. Leaves opposite, serrate or dentate, cordate at base. Flowers axillary, solitary or in racemes; bracts leafy at the base of the pedicels; bracteoles white, large; calyx 10-16-toothed, minute or absent; corolla tube ventricose, curved; lobes 5, equal, twisted, obovate to orbicular; stamens 4, didynamous; disk cushion like; ovary 2-celled, ovules 2 in each cell; style slender; stigma funneliform or 2-lobed. Fruit a capsule, flattened above into a compressed beak.

1. Flowers axillary, solitary or in pairs, ... 2
1. Flowers in racemes, the lower ones often axillary..... 3
2. Flowers solitary; corolla white.....**T. fragrans**
2. Flowers in pairs; corolla yellow with purple-brown throat ..... .**T. alata**
3. Flowers in pendent racemes; corolla yellow.....**T. mysorensis**
3. Flowers in upper axils; corolla blue ..... **T. grandiflora**

Thunbergia alata Boj. ex Sins, Bot. Mag. t. 2591. 1825; Clarke in Hook. f., Fl. Brit. India 4: 391. 1884; Gamble, Fl. Pres. Madras 1008(708). 1924; Vajr., Fl. Palghat Dist. 362. 1990; Sivar. & P. Mathew, Fl. Nilambur 527. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 554. 2009.

Hispid climbers. Leaves 5-6 x 2-2.5 cm, ovate, hastate at base, 5-ribbed from base; petiole 5-6 cm long, winged. Flowers solitary; pedicel 5 cm long, bracteoles ca. 1.5 x 1 cm, ovate, cordate; corolla yellow, tube 1.6-1.8 cm long, brown inside, lobes obovate, obtuse. Capsule 0.7-1 cm across, globose, beak to 1.5 cm long, hispid.
Flowering & Fruiting: December-March.
Distribution: Africa and India, sometimes grown in gardens. Occasional; along roadsides and open areas. *RNMK 3050,* Klapetta; *RNMK 2694*, Puthoorvayal.

Thunbergia fragrans Roxb., Pl. Corm. t. 67. 1795 & Fl. Ind. 3:33. 1832; Clarke in Hook. f., Fl. Brit. India 4: 390. 1884; Gamble, Fl. Pres. Madras 1007(707). 1924; Manilal, Fl. Silent Valley 212. 1988; Vajr., Fl. Palghat Dist. 362. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 350. 1996; Sivar. & P. Mathew, Fl. Nilambur 527. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 389. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 555. 2009. *Thunbergia fragrans* Roxb. var. *laevis* (Nees) Clarke in Hook. f., Fl. Brit. India 4: 391. 1884; Gamble, Fl. Pres. Madras 1007(705). 1924. *Thunbergia laevis* Nees in Wall., Pl. Asiat. Rar. 3: 77. 1832.

Scabrous climber. Leaves 7-8 x 5-6 cm, ovate, entire, acute, base truncate to subcordate, scabrid, 5-nerved from base; petiole 4-5 cm long. Flowers solitary; pedicels 3-3.5 cm long; bracteoles ca. 1.5 cm long, ovate-oblong, obtuse, mucronate; sepals of 8-16 fibrils; corolla white, 4-5 cm across, lobes 3-3.5 cm long; filaments glandular hispid at base. Capsule 0.8-1 cm across, glabrous, beak ca. 1.5 cm long, acute.
Flowering & Fruiting: September-January.
Distribution: Indo-Malesia and Australia. Occasional; along roadsides and moist deciduous forests. *RNMK 1903,* Pathiri forest; *RNMK 1043*, Nadavayal.

Thunbergia grandiflora (Roxb. ex Rottl.) Roxb., Fl. Ind. 3: 34. 1832; Clarke in Hook. f. Fl. Brit. India 4: 392. 1884; Gamble, Fl. Pres. Madras 1008(708). 1924; Wight, Ic. t. 872. 1845; Manilal & Sivar., Fl. Calicut 226. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 351. 1988; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 389. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 555. 2009. *Flemingia grandiflora* Roxb. ex Rottl., Nov. Acta Phys. Med. Acad. Caes. Leop. Carol. Nat. Cur. 4: 202. 1803.

Large climbers. Leaves 9-11 x 4-4.5 cm, elliptic-lanceolate, acuminate, acute at base. Flowers 4-7 cm long, blue, in pendulous racemes. Capsule 4-5 cm long.
Flowering & Fruiting: February-July.
Distribution: India, Myanmar, China and Singapore. Occasional; along evergreen forest margins and roadsides. *RNMK 2434,* Periya Ghat.

Thunbergia mysorensis (Wight) T. And., J. Linn. Soc. Bot. London 9: 448. 1967; Clarke in Hook. f., Fl. Brit. India 4: 393. 1884; Gamble, Fl. Pres. Madras 1008(708). 1924; V. S. Ramach. & V.J. Nair, Fl. Cannanore 352. 1988; Manilal, Fl. Silent Valley 212. 1988; Vajr., Fl. Palghat Dist. 362. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 350. 1996; Sivar. & P. Mathew, Fl. Nilambur 528. 1997; Mohanan & Sivad., Fl. Agasthyamala 520. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 389. 2005. *Hexacentris mysorensis* Wight, Ic. t. 871. 1844.

Climbers. Leaves 10-14 x 6-8 cm, ovate-lanceolate or oblong, acute to acuminate, base truncate or hastate, scabrid, coarsely nerved, dentate; petiole 1-5 cm long. Racemes axillary, to 50 cm long, drooping; flowers many; bracteoles 1.5-2.5 x 0.5-1.2 cm, ovate-oblong-lanceolate, pedicels 2-3 cm long, opposite; calyx obscure; corolla yellow, 4-6 cm long, ca. 6 cm across, tube ventricose, lobes obovate, glabrous; filaments ciliate, anthers spurred. Capsule 3-4 cm long.
Flowering & Fruiting: December-March.
Distribution: Endemic to Western Ghats. Rare; in evergreen forest margins. *RNMK 3288,* Kallady-900 forest.

Crossandra infundibuliformis (L.) Nees and **Pachystachys lutea** (L.) Griff. often run wild as an escapes from garden.

VERBINACEAE J. St.-Hil.
Expos. Fam. Nat. 1: 245. 1805.

1. Leaves palmately 3-5 foliolate ..... **Vitex**
1. Leaves simple 2
2. Inflorescence a spike 3
2. Inflorescence a raceme, cyme or panicle 5
3. Spike capitate, axillary 4
3. Spikes elongate, terminal ..... **Stachytarpheta**
4. Prostrate herbs; fruit dry ..... **Phyla**
4. Straggling shrubs; fruit fleshy ..... **Lantana**
5. Corolla regular; young parts stellate hairy. 6
5. Corolla irregular; young parts not stellate hairy 7
6. Inflorescence terminal panicle; flowers 6-merous ..... **Tectona**
6. Inflorescence axillary corymbose cymes; flowers 4-merous ..... **Callicarpa**
7. Flowers in corymbose cymes ..... **Premna**
7. Flowers in condensed paniculate racemes 8
8. Calyx with glands; fruits with one pyrene ..... **Gmelina**
8. Calyx without glands; fruits with four pyrenes ..... **Clerodendrum**

CALLICARPA Linnaeus
Sp. Pl. 111. 1753.

Callicarpa tomentosa (L.) Murray, Syst. Veg. (ed. 13) 130. 1774; Manilal & Sivar., Fl. Calicut 227. 1982; Ansari, Fl. Kasaragod Div. 291. 1985; Manilal, Fl. Silent Valley 213. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 259. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 353. 1988; Vajr., Fl. Palghat Dist. 364. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 351. 1996; Sivar. & P. Mathew, Fl. Nilambur 529. 1997; Mohanan & Sivad., Fl. Agasthyamala 521. 2002; Rajendran & Daniel, The Indian Verbenaceae 53. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 390. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 556. 2009. *Tomex tomentosa* L., Sp. Pl. 118. 1753. *Callicarpa lanata* L., Mant. Pl. 2: 331. 1771, *nom. illeg.*; Gamble, Fl. Pres. Madras 1092(764). 1924. *Callicarpa arborea* Miq. ex Clarke in Hook. f., Fl. Brit. India 4: 507. 1885, non Roxb. 1832. **Plate 25 l.**

Small trees, branchlets densely grey-pubescent. Leaves 22-25 x 13-15 cm, broadly ovate, acuminate at apex, rounded at base, entire, densely covered with stellate hairs below; nerves 7-9 pairs; petiole 4-5 cm long. Flowers in axillary corymbose cymes, branched, densely tomentose; pedicels absent; calyx campanulate, lobes 5, obtuse; corolla 4-5 mm long, tube short; lobes 4, spreading; stamens 4; filaments glandular, anthers sagittate; ovary pubescent; style slender, stigma capitate. Berry 3-5 mm across, globose, glabrous.
Flowering & Fruiting: November-April.
Distribution: Peninsular India and Sri Lanka. Common; in disturbed areas of semi-evergreen and moist deciduous forests. *RNMK 1661,* Pookodu.

CLERODENDRUM Burman ex Linnaeus
Sp. Pl. 637. 1753.

Shrubs. Leaves opposite or verticillate, entire or toothed. Flowers in terminal panicles or cymes; bracts large; pedicels short or long; calyx campanulate; 5-lobed, persistent; corolla funnel-shaped, tube long, lobes 5, equal, spreading, oblique; stamens 4, didynamous, filaments long, slender; ovary incompletely; 4-celled, cells 1-ovuled; style slender, long, stigma, 4-grooved. Fruit a globose, drupe; seeds-1, oblong.

1. Straggling shrubs ..... **C. inerme**
1. Erect shrubs or subshrubs 2
2. Leaves whorled, base acute ..... **C. serratum**
2. Leaves opposite, base cordate or rounded 3
3. Laves glabrous; corolla red ..... **C. paniculatum**
3. Leaves pubescent; corolla white 4
4. Calyx red; corolla double ..... **C. phillippinum**
4. Calyx green; corolla single ..... **C. infortunatum**

Clerodendrum inerme (L.) Gaertn., Fruct. 1: 271, t. 75. 1788; Clarke in Hook. f., Fl. Brit. India 4: 589. 1885; Gamble, Fl. Pres. Madras 1099(769). 1924; Manilal & Sivar., Fl. Calicut 233. 1982; Ansari, Fl. Kasaragod Div. 293. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 353. 1988; Vajr., Fl. Palghat Dist. 364. 1990; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 559. 2009. Rajendran & Daniel, The Indian Verbenaceae 112. 2002. *Volkameria inermis* L., Sp. Pl. 889. 1753. *Clerodendrum neriifolium* Wall. ex Schauer in DC., Prodr. 11: 660. 1847; Clarke in Hook. f., Fl. Brit. India 4: 589. 1885; Gamble, Fl. Pres. Madras 1100(770). 1924.

Straggling shrubs. Leaves 5-6 x 2-2.5 cm, elliptic or obovate. Flowers 4.5-6 cm long, white, in axillary cymes. Drupes pyriform.

Flowering & Fruiting: November-December.

Distribution: Coastal India, Sri Lanka; now naturalised on the shores of Myanmar, Australia, China. Occasional; in open areas near water bodies. *RNMK 1975,* Panamaram.

Clerodendrum infortunatum L., Sp. Pl. 637. 1753, non L. 1771; Clarke in Hook. f., Fl. Brit. India 4: 594. 1885; Gamble, Fl. Pres. Madras 1100(770). 1924; Rajendran & Daniel, The Indian Verbenaceae 116. 2002. *Clerodendrum viscosum* Vent. Jard. Malm. T. 25. 1803; Manilal & Sivar., Fl. Calicut 232. 1982; Ansari, Fl. Kasaragod Div. 294. 1985; Manilal, Fl. Silent Valley 214. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 259. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 354. 1988; Vajr., Fl. Palghat Dist. 365. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 351. 1996; Sivar. & P. Mathew, Fl. Nilambur 531. 1997; Mohanan & Sivad., Fl. Agasthyamala 523. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 391. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 559.2009. *Peragu* Rheede, Hort. Malab. 2:41-42. t.25. 1679.

Large shrubs; stems sub-tetragonous, pubescent. Leaves 17-20 x 17-20 cm, orbicular, cordate at base, acute at apex, densely glandular-pubescent, nerves 4-6 pairs; lower pairs basal; petiole 7-8 cm long, pubescent. Flowers white, in large panicled cymes; calyx 1-1.2 cm long, lobes acuminate; corolla tube ca. 2 cm long, slender, lobes obovate, pubescent; filaments hairy at base. Berry 0.8-1 cm across, 1-3-lobed, black, glabrous.
Flowering & Fruiting: December-February.
Distribution: Indo-Malesia. Occasional; in moist deciduous forest. *RNMK 1893,* Tholpetty.

Clerodendrum paniculatum L., Mant. Pl. 1: 90. 1767, "paniculata"; Clarke in Hook. f., Fl. Brit. India 4: 593. 1885; Vivek., Bull. Bot. Surv. India 10: 240. 1969; Manilal & Sivar., Fl. Calicut 233. 1982; Ansari, Fl. Kasaragod Div. 293. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 354. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 355. 1996; Sivar. & P. Mathew, Fl. Nilambur 530. 1997; Rajendran & Daniel, The Indian Verbenaceae 128. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 391. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 559. 2009.

Shrubs, stems glabrous. Leaves 30-35 x 32-35 cm, broadly, ovate to orbicular, 2-3 dentate, shining above; petiole 5-15 cm long; axils with white hairs. Cymes panicled, pyramidal, 25-35 x 15-20 cm; flowers many; calyx lobes oblong, glabrous; corolla tube ca. 1 cm long, lobes obovate, red.
Flowering & Fruiting: September-December.
Distribution: Indo-Malesia. Occasional; in open areas and along roadsides. *RNMK 1936* Madakkimala; *RNMK 3060*, Karyambady.

Clerodendrum philippinum Schauer in DC., Prodr. 11: 667. 1847 ('Clerodendron'); Howard & Powell, Taxon 17: 54. 1968**;** Manilal & Sivar., Fl. Calicut 232. 1982; Sivar. & Manilal, J.Econ. Tax. Bot. 3: 815. 1982; Vajr., Fl. Palghat Dist. 365. 1990; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 391. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 560. 2009. Vokameria fragrans Vent., Jard. Malm. T. 70. 1804. Clerodendrum fragrans Willd., Enum. Hort. Berol. 659. 1809; Gamble, Fl. Pres. Madras 1100. 1924.

Erect subshrubs. Leaves deltoid, 8-17 x 7-14 cm, base truncate, margin coarsely dentate, apex acuminate, basally 3-veined, pubescent, chartaceous. Flowers in terminal condensed cymes; calyx tubular, lobes 5; corolla white.
Flowering & Fruiting: Through out the year.
Distribution: Native of Malesia. Common; in open areas and along roadsides. *RNMK 2290,* Kalpetta; *RNMK 1388*, Kambalakkad.

Clerodendrum serratum (L.) Moon, Cat. Pl. Ceylon 46. n.382. 1824; Wight, Ic. t. 1472. 1849; Clarke in Hook. f., Fl. Brit. India 4:592.1885; Gamble, Fl. Pres. Madras 1100(770). 1924; Manilal & Sivar., Fl. Calicut 233. 1982; Ansari, Fl. Kasaragod Div. 293. 1985; Manilal, Fl. Silent Valley 214. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 260. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 354. 1988; Vajr., Fl. Palghat Dist. 365. 1990;

Sasidh. & Sivar., Fl. Pl. Thrissur For. 351. 1996; Sivar. & P. Mathew, Fl. Nilambur 531. 1997; Mohanan & Sivad., Fl. Agasthyamala 522. 2002; Rajendran & Daniel, The Indian Verbenaceae 139. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 391. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 561. 2009. *Cyclonema serratum* (L.) Hochst., Flora 25: 227. 1842. *Tsjerou-theka* Rheede, Hort. Malab. 4:61-62, t. 29. 1683.

Shrubs; branchlets 4-angled. Leaves 30-35 x 22-25 cm, obovate, acuminate at both ends, serrate, scabrous, nerves 8-10 pairs; petiole 1-3 cm long, stout. Panicles terminal, oblong, 250-30 x 7-10 cm, pubescent; flowers blue, shortly pedicelled; calyx 4-6 mm long, lobes obtuse, hairy; corolla 1.5-2 cm long, hairy below, lobes round. Berry ca. 1 cm across, 2-4-lobed, depressed globose; seeds 2-4, rugose, black.

Flowering & Fruiting: August-December.

Distribution: India, Nepal, Myanmar and Sri Lanka. Occasional; in moist deciduous forests. *RNMK 2264,* Muthanga.

GMELINA Linnaeus

Sp. Pl. 626. 1753.

Gmelina arborea Roxb., Pl. Corom. t. 246. 1815; Wight, Ic. t. 1470. 1849; Clarke in Hook. f., Fl. Brit. India 4: 581. 1885; Gamble, Fl. Pres. Madras 1097(768). 1924; Ansari, Fl. Kasaragod Div. 295. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 261. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 355. 1988; Vajr., Fl. Palghat Dist. 365. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 352. 1996; Sivar. & P. Mathew, Fl. Nilambur 535. 1997; Mohanan & Sivad., Fl. Agasthyamala 523. 2002; Rajendran & Daniel, The Indian Verbenaceae 155. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 392. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 563. 2009. *Cumbulu* Rheede, Hort. Malab. 1: 75-76, t. 41. 1678.

Trees; bark white, branchlets stout, yellow-tomentose. Leaves 16-20 x 16-18 cm, broadly ovate, cordate or truncate at base, acute at apex, densely fulvous tomentose beneath, glabrous above; nerves 3-4 pairs, lowest pair from base; petiole 5-10 cm long, tomentose. Flowers in terminal racemes, subsessile; calyx 6-7 mm long, campanulate, 5-toothed, tomentose; corolla brownish-yellow, 3-3.5 cm across, bilabiate, tube ventricose, lobes subequal, obovate, obtuse, densely hairy; stamens 4, didynamous, anthers divaricate; ovary glabrous, globose, style 1, slender, glabrous. Berry 2-2.5 x 1.5-2 cm, ovoid, yellow, smooth.

Flowering & Fruiting: January-April.

Distribution: Indo-Malesia. Common; in semi-evergreen and moist deciduous forests. *RNMK 2115,* Manikkunnumala; *RNMK 3033*, Chedalayam.

LANTANA Linnaeus

Sp. Pl. 626. 1753.

Erect or rambling shrubs, stems quadrangular. Leaves opposite, crenate or serrate, petiolate. Flowers in peduncled, capitate or ovoid spikes; bracts many, prominent; calyx tubular, truncate; corolla tube narrow,

cylindrical, lobes 4 or 5, orbicular, spreading; stamens 4, included; anthers oblong; ovary 2-celled, ovules solitary in each cell; style short, stigma terminal. Fruit a drupe, 2-seeded.

1. Stem with prickles; bracts lanceolate..... **L. camara**
1. Stem without prickles; bracts ovate..... **L. indica**

Key to varieties of **Lantana camara**

1. Young shoots shortly white hirsute..... .**L. camara** var. **splendens**
1. Young shoots glabrous .....**L. camara** var. **camara**

Lantana camara L., Sp. Pl. 627.1757, var. **camara**; Rajendran & Daniel, The Indian Verbenaceae 181. 2002. *Lantana aculeata* L., Sp. Pl. 627. 1753; Gamble, Fl. Pres. Madras 1087(761). 1924. *Lantana camara* L. var. *aculeata* (L.) Moldenke, Torreya 34: 9. 1934; Clarke in Hook. f., Fl. Brit. India 4: 562. 1885; Manilal & Sivar., Fl. Calicut 230. 1982; Ansari, Fl. Kasaragod Div. 295. 1985; Manilal, Fl. Silent Valley 214. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 355. 1988; Vajr., Fl. Palghat Dist. 366. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 353. 1996; Sivar. & P. Mathew, Fl. Nilambur 536. 1997; Mohanan & Sivad., Fl. Agasthyamala 524. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 392. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 563. 2009.

Rambling shrubs; stems with retrorse prickles especially along the angles. Leaves 5-6 x 3-3.5 cm, ovate, acute at apex, rounded or cordate at base, coarsely scabrous, rugose, crenate; petiole 1-2.5 cm long. Spikes 1.2-1.5 cm across, globose, axillary, solitary peduncled; bracts ovate, obtuse, floral bracts much smaller, lanceolate; flowers densely packed; calyx truncate, ciliate; corolla reddish, 4-5 mm broad, tube curved, slender. Berry 4-5 mm long, dark blue, smooth.

Flowering & Fruiting: April-June.

Distribution: Native of Tropical America, widely naturalised in the tropics and subtropics. Common; in moist deciduous forests. *RNMK 2101,* Muthanga.

Lantana camara L., Sp. Pl. 627. 1753, var. **splendens** (Medic.) Moldenke, Phytologia 33: 130. 1976; Ansari, Fl. Kasaragod Div. 296. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 353. 1996; Rajendran & Daniel, The Indian Verbenaceae 184. 2002. *Lantana splendens* Medic., Hist. & Commentat, Acad. Elect. Sci. Theod.-Palat. 3: 226. 1756. *Lantana crenulata* Otto & Dier., Allg. Gaertn. 9: 363. 1841; Clarke in Hook. f., Fl. Brit. India 4: 563. 1885; Gamble, Fl. Pres. Madras 1087(761). 1924; V. S. Ramach. & V.J. Nair, Fl. Cannanore 356. 1988.

Erect under shrubs up to 1 m tall; branches 4-angled; young shoots shortly white hirsute. Leaves 7-8 x 3.5-4 cm, ovate-lanceolate, acute, base truncate, scabrid; petiole 1.3-1.6 cm; lateral nerves 5-7 pairs; peduncle 3-4 cm. Flowers ca. 1 cm long, pink.

Flowering & Fruiting: Throughout the year.
Distribution: Native of tropical and subtropical America. Occasional; in open areas and along roadsides. *RNMK 3126,* Mananthavady.

Lantana indica Roxb., Fl. Ind. 3: 89. 1832; Hook. f., Fl. Brit. India 4: 562. 1885; Gamble, Fl. Pres. Madras 1087(761). 1924; Manilal, Fl. Silent Valley 215. 1988; Rajendran & Daniel, The Indian Verbenaceae 185. 2002.

Subshrubs, densely covered with bulbous based hairs. Leaves 7-8 x 4.5-5 cm, ovate, acute at apex, rounded at base, crenate, densely bulbous based hairy; nerves 6 pairs; petiole to 1 cm long. Spikes 1.5-2 cm long, axillary; floral bracts ca. 1 x 0.5 cm, ovate, pubescent; calyx ca. 1 mm long, truncate, ciliate; corolla tube ca. 7 mm long, curved, hispid, lobes rounded, violet. Berry 5-6 mm long, reddish brown, smooth, enclosed by the bracts.
Flowering & Fruiting: August-December.
Distribution: Indo-Malesia. Occasional; in evergreen forests. *RNMK 2043,* Muthanga.

PHYLA Loureiro
Fl. Cochinch. 63, 66. 1790.

Phyla nodiflora (L.) Greene, Pittonia 4: 46. 1899; Manilal & Sivar., Fl. Calicut 231. 1982; Ansari, Fl. Kasaragod Div. 296. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 356. 1988; Vajr., Fl. Palghat Dist. 367. 1990; Rajendran & Daniel, The Indian Verbenaceae 206. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 564. 2009. *Verbena nodiflora* L., Sp. Pl. 20.1753. *Lippia nodiflora* (L.) A.Rich. in Michx., Fl. Bor. Amer. 2: 15. 1803; Clarke in Hook. f., Fl. Brit. India 4: 563. 1885; Gamble, Fl. Pres. Madras 1088(762). 1924.

Prostrate herbs. Leaves 0.7-1.5 x 0.6-0.8 cm, orbicular to obovate-spathulate, apex obtuse, base cuneate. Flowers 5-merous, sessile; bracts broadly ovate, thick, concave; corolla purplish white, 2-2.5 mm across, salver-form; stamens 4, attached in 2 pairs at the throat of tube; filaments curved; anthers ovate; ovary globose; stigma oblique. Drupe subglobose, endocarp hard, enclosing 2, 1-celled pyrenes; seeds minute.
Flowering & Fruiting: November-December.
Distribution: Tropics and subtropics. Common; in areca nut plantations. *RNMK 2115,* Kalpetta.

PREMNA Linnaeus
Mant. 154, 252. 1771, *nom. Cons.*

Scandent, epiphytic climbing shrubs or small herbs. Leaves entire, penninerved. Flowers in axillary or terminal corymbose cymes; calyx campanulate, truncate, 4-toothed, shortly bilabiate; corolla bilabiate, 4 or 5-lobed; stamens 4, didynamous, free; ovary 2-4-celled; ovules 4, style slender, stigma bifid. Fruit a globose drupe, seated on the persistent calyx cup; seeds 4.

1. Climbing shrubs; leaves coriaceous 2
1. Erect shrubs or trees; leaves membranous 3

2. Leaves coriaceous, glabrous; 4-7 nerved ..... **P. coriacea**
2. Leaves membranous, softly villous beneath, 6-8 nerved..... **P. villosa**
3. Leaves densely stellately tomentose; drupe subglobose..... **P. tomentosa**
3. Leaves glabrous or softly pubescent; drupe globose ..... **P. glaberrima**

Premna coriacea Clarke in Hook. f., Fl. Brit. India 4: 573. 1885; Gamble, Fl. Pres. Madras 1095(766). 1923; V. S. Ramach. & V.J. Nair, Fl. Cannanore 356. 1988; Vajr., Fl. Palghat Dist. 367. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 353. 1996; Sivar. & P. Mathew, Fl. Nilambur 536. 1997; Rajendran & Daniel, The Indian Verbenaceae 226. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 393. 2005. **Plate 26a.**

Large climbing shrubs; branchlets pilose, lenticellate. Leaves 16-18 x 9-10 cm, ovate-oblong, abruptly acuminate at apex, cordate at base, entire, glabrous; nerves 4-5 pairs, very prominent beneath. Cymes 13-15 cm across, corymbose, terminal; branches pilose; peduncles 10-12 cm long, erect; bracts ovate; flowers many, creamy white; pedicels hispid; calyx truncate, pinkish brown, puberulus; corolla 3-3.5 mm long, hairy. Drupe 0.5-07 cm long, glabrous.

Flowering & Fruiting: April-May.

Distribution: Endemic to south India. Occasional; moist-deciduous and semi-evergreen forests. *RNMK 2741,* Manikkunnumala; *RNMK 2124*, Kuruva.

Premna glaberrima Wight, Ic. t. 1484. 1849; Clarke in Hook. f., Fl. Brit. India 4: 577. 1885; Gamble, Fl. Pres. Madras 1096(767). 1923; Manilal, Fl. Silent Valley 215. 1988; Vajr., Fl. Palghat Dist. 368. 1990; Pandura. & V.J. Nair, J.Econ. Tax. Bot. 17: 180. 1993; 511; Sasidh. & Sivar., Fl. Pl. Thrissur For. 353. 1996; Mohanan & Sivad., Fl. Agasthyamala 525. 2002; Rajendran & Daniel, The Indian Verbenaceae 240. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 393. 2005.

Erect shrubs; branchlets scandent, puberulus. Leaves 13-15 x 5-6 cm, elliptic-oblong, abruptly acuminate, rounded at base, entire or distantly serrulate, glabrous; nerves 6-7 pairs; petiole ca. 1.5 cm long. Cymes 5-5 x 4-5 cm, terminal, corymbose; pedicels hairy; calyx shortly bilipped, hispid; corolla greenish white or cream, 5-7 mm long, throat hairy. Drupes hispid; seed 1, rugose, brown.

Flowering & Fruiting: March-June.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 2153,* Pookodu.

Premna tomentosa Willd., Sp. Pl. 3: 314. 1800; Clarke in Hook. f., Fl. Brit. India 4: 576. 1885; Gamble, Fl. Pres. Madras 1095(767). 1924; Vajr., Fl. Palghat Dist. 368. 1990; Rajendran & Daniel, The Indian Verbenaceae 289. 2002. *Cornutia corymbosa* Lamk., Encycl. 1: 54. 1783, non Burm.f. 1768. **Plate 26b.**

Trees, young branchlets tomentose. Leaves 6-18 x 5-15 cm, ovate, apex acuminate, base cordate, thick, densely tomentose below. Corymbs axillary and terminal, 5-7 cm long; flowers yellow; calyx pubescent; corolla 4-5 mm long, hairy at throat, bilabiate; stamens 2-3 mm long; ovary hairy at apex. Drupes 4-5 mm across, pubescent.
Flowering & Fruiting: February-April.
Distribution: Endemic to southern Western Ghats. Occasional; in moist deciduous forests. *RNMK 3142,* Chedalayam.

Premna villosa Clarke in Hook. f., Fl. Brit. India 4: 573. 1885; Gamble, Fl. Pres. Madras 1095(766). 1924.

Climbing shrubs; bark smooth, pale brown. Leaves 14-16 x 7-9 cm, densely villous with simple straight hairs beneath, most copiously on the nerves, glabrous above; petiole 4-5 cm long. Flowers in dense corymbs, white; calyx truncate; corolla white; stamens 3-4 mm long; ovary glabrous. Drupes glabrous.
Flowering & Fruiting: March-April.
Distribution: Endemic to southern Western Ghats. Rare; in moist deciduous forests. *RNMK 2143,* Chedalayam; *RNMK 1773*, Kuruva.

STACHYTARPHETA Vahl

Enum. 1: 205. 1804, *nom. cons.*

1. Spikes drooping..... **S. cayennensis**
1. Spikes stout 2
2. Erect shrubs; corolla blue ..... **S. jamaicensis**
2. Erect herbs; corolla purple ..... **S. mutabilis**

Stachytarpheta cayennensis (Rich.) Schou. In DC., Prodr. 11: 562. 1847; Nair *et al.*, J. Bombay Nat. Hist. Soc. 79:230. 1982; Rajendran & Daniel, The Indian Verbenaceae 303.2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 394. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 565. 2009. *Stachytarpheta dichotoma* Vahl. Enum. Pl. 1: 206. 1804: Rao *et al.*, J. Bombay Nat. Hist. Soc. 79:230.1982; Pradeep & Sivar., J. Econ. Tax. Bot. 14:619. 1990.

Subshrubs. Leaves elliptic-lanceolate or ovate-elliptic, 2-5 x 1-3 cm, base cuneate, margin crenate-serrate, apex acute or obtuse, drying blackish. Spike drooping, 12-30 cm long; bracts linear-lanceolate; calyx-teeth 5, anterior one very small; corolla white. Fruits 3-3.5 mm long.
Flowering & Fruiting: December-March.
Distribution: Native of tropical America; now introduced into tropics and subtropics. Occasional; in moist deciduous forests. *RNMK 1122,* Muthanga.

Stachytarpheta jamaicensis (L.) Vahl, Enum. Pl. 1: 206. 1804; Ansari, Fl. Kasaragod Div. 297. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 357. 1988; Vajr., Fl. Palghat Dist. 369. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For.

354. 1996; Sivar. & P. Mathew, Fl. Nilambur 537. 1997; Rajendran & Daniel, The Indian Verbenaceae 307. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 394. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 566. 2009. *Verbena jamaicensis* L., Sp. Pl. 19. 1753. *Stachytarpheta indica* (L.) Vahl var. *jamaicensis* (L.) Moon, Cat. Pl. Ceylon 68. 1885 & Handb. Fl. Ceylon 3: 348. 1895; Gamble, Fl. Pres. Madras 1090(763). 1924. *Stachytarpheta indica* sensu Clarke in Hook. f., Fl. Brit. India 4: 564. 1885,p.p.; non (L.) Vahl 1804; Manilal & Sivar., Fl. Calicut 227. 1982.

Erect glabrous shrubs. Leaves opposite, 8-10 x 5-6 cm, ovate, acute, crenate, serrate, base cuneate; lateral nerves 5-6 pairs, reticulate, nervules impressed above; petiole 1-3 cm long. Spikes terminal, 16-20 cm long, linear; flowers sunken in the rachis; bracts 6-7 mm long, linear-ovate; calyx tubular, 5-6 mm long, ridged; lobes acuminate; corolla blue, 6-7 mm long; tube cylindrical, lobes 5, obtuse, spreading, stamens 2, included; ovary glabrous, 2-celled; style slender, stigma globose. Fruit separating into 2, 1-seeded pyrenes; seeds oblong.

Flowering & Fruiting: June-December.

Distribution: Pantropical. Common; in moist deciduous forests and open areas. *RNMK 1976,* Muthanga; *RNMK 1895*, Mananthavady.

Stachytarpheta mutabilis (Jacq.) Vahl, Enum Pl. 1: 208. 1804; Gamble, Fl. Pres. Madras 1090(763). 1924; Manilal & Sivar., Fl. Calicut 227. 1982; Ansari, Fl. Kasaragod Div. 297. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 358. 1988; Vajr., Fl. Palghat Dist. 369. 1990; Rajendran & Daniel, The Indian Verbenaceae 312. 2002. *Verbena mutabilis* Jacq., Collect. 5:334. 1788.

Erect herbs, to 50 cm tall. Leaves 6-7.5 x 1-1.5 cm, ovate, acute, serrate, scabrous; bracts ca. 1 cm long, linear. Flowers 1.6-1.8 cm long, in stout terminal spikes.

Flowering & Fruiting: February-March.

Distribution: Native of Tropical America. Occasional; in open wastelands. *RNMK 1083,* Mananthavady.

TECTONA Linnaeus

Suppl. Pl. 20. 151. 1781. *nom. cons.*

Tectona grandis L. f., Suppl. Pl. 151. 1781; Roxb., Pl. Corom. t.6. 1785 & Fl. Ind. 1: 600. 1832; Clarke in Hook. f., Fl. Brit. India 4: 570. 1885; Gamble, Fl. Pres. Madras 1092(765). 1924; Manilal & Sivar., Fl. Calicut 231. 1982; Ansari, Fl. Kasaragod Div. 298. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 265. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 358. 1988; Vajr., Fl. Palghat Dist. 369. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 354. 1996; Sivar. & P. Mathew, Fl. Nilambur 537. 1997; Rajendran & Daniel, The Indian Verbenaceae 320. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 395. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 559. 2009.*Theka* Rheede, Hort. Malab. 4: 57-58. t. 27. 1683.

Large trees; branchlets 4-angled, puberulus. Leaves 40-45 x 30-35 cm, obovate, obtuse at apex; attenuate to the base, pubescent with minute red glands below; nerves 8-10 pairs, prominent; nervules parallel or scalariform; petiole 1-2 cm long. Cymes panicled, terminal, 40-50 x 35-40 cm, puberulus; flowers 5-7 mm across, white; calyx lobes 6, ovate, white, tomentose; corolla 6-7 mm long, lobes 6, oblong, spreading; stamens 6, equal, erect; ovary densely hairy, 4-celled; style slender, bifid at apex. Drupes 1.5-2 cm across; globose, densely floccose hairy, covered by the inflated calyx.
Flowering & Fruiting: May-June.
Distribution: South and south-east Asia. Common; in moist deciduous forests and plantations. *RNMK 0181,* Muthanga; *RNMK 1080*, Tholpetty.

VITEX Linnaeus
Sp. Pl. 638. 1753.

Trees or large shrubs. Leaves digitately 3-7-foliolate. Flowers in terminal or axillary panicled cymes, pedicelled; calyx campanulate, shortly 5-lobed; corolla bilabiate, upper lip 2-lobed, lower 3-lobed, midlobe longer; stamens 4, didynamous; anthers divaricate; ovary 4-celled, 4-ovuled; style slender, stigma bifid. Fruit a globose drupe, seeds 4.

1. Leaves 3-foliolate; petiole winged 2
1. Leaves 5-7 foliolate; petiole not winged ..... **V. leucoxylon**
2. Leaflets elliptic; bracts minute ..... **V. altissima**
2. Leaflets elliptic-oblanceolate; bracts foliaceous .....**V. pinnata**

Vitex altissima L. f., Suppl. Pl. 294. 1781; Roxb., Fl. Ind. 3: 71. 1832; Wight, Ic. t. 1466. 1849; Clarke in Hook. f., Fl. Brit. India 4: 584. 1885; Gamble, Fl. Pres. Madras 1102(772). 1924; Ansari, Fl. Kasaragod Div. 299. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 265. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 359. 1988; Vajr., Fl. Palghat Dist. 370. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 355. 1996; Sivar. & P. Mathew, Fl. Nilambur 539. 1997; Mohanan & Sivad., Fl. Agasthyamala 526. 2002; Rajendran & Daniel, The Indian Verbenaceae 344. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 395. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 568. 2009. *Vitex alata* Willd., Gen. Naturf. Fr. New Schr. 4: 203. 1803, non Heyne ex Roth 1821; Clarke in Hook. f., Fl. Brit. India 4: 584. 1885; Sivar. & P. Mathew, Fl. Nilambur 539. 1997. *Vitex altissima* L.f. var. *alata* (Willd.) Trimen, Handb. Fl. Ceylon 3: 358. 1895; Manilal & Sivar., Fl. Calicut 228. 1982. *Mail-elou* Rheede, Hort. Malab. 5: 1-2, 6.1.1685.

Large trees; bark grey, branchlets lenticellate, minutely tomentose. Leaflets sessile, 13-15 x 4-5 cm, elliptic, acuminate, entire; lateral nerves 10-12 pairs; petiole 8-10 cm long, winged. Panicles 20-25 x 10-15 cm, branches tomentose; flowers 3-10 together; calyx campanulate, lobes ovate, white, tomentose; corolla 5-7 mm long, blue, throat villous, lobes obtuse; filaments hairy at base; ovary densely hairy. Drupes 5-7 mm long, glabrous, blue.

Flowering & Fruiting: March-July.
Distribution: India, Indo-China, Malesia and Sri Lanka. Occasional; in semi-evergreen and moist deciduous forests. *RNMK 2115,* Manikkunnumala; *RNMK 1292,* Pulpally; *RNMK 1399*, Begur.

Vitex leucoxylon L. f., Suppl. Pl. 293. 1781; Clarke in Hook. f., Fl. Brit. India 3: 587. 1885; Gamble, Fl. Pres. Madras 1103(772). 1923; Manilal & Sivar., Fl. Calicut 228. 1982; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 266. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 355. 1996; Sivar. & P. Mathew, Fl. Nilambur 540. 1997; Rajendran & Daniel, The Indian Verbenaceae 356. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 395. 2005. *Wallrothia leucoxylon* (L. f.) Roth, Nov. Pl. Sp. 391. 1821; Wight, Ic. t. 1467. 1849. *Kariil* Rheede, Hort. Malab. 4: 75-76, t. 36. 1683.

Shrubs, branchlets glabrous. Leaflets 12-14 x 3-4 cm, elliptic, acute at both ends, glabrous, lateral nerves 12-14 pairs; petiolule ca. 2 cm long; petiole 7-8 cm long. Cymes axillary, dichotomous, long-peduncled, hispid; peduncle 7-8 cm long; flowers few to many; pedicels 5-6 mm long, calyx sub-bilabiate, tomentose, lobes acute; corolla 1.4-1.6 cm long, lobes, oblong to orbicular, curved, white, throat hairy; filaments unequal, hairy at base.
Flowering & Fruiting: March-July.
Distribution: Peninsular India and Sri Lanka. Occasinal; along banks of river and semi-evergreen forests. *RNMK 1784,* Manikkunnumala; *RNMK 1600*, Kuruva.

Vitex pinnata L., Sp. Pl. 638. 1753; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 266. 1988; Mohanan & Sivad., Fl. Agasthyamala 527. 2002; Rajendran & Daniel, The Indian Verbenaceae 370. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta Dist. 396. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 569. 2009. *Vitex pubescens* Vahl, Symb. Bot. 3: 85. 1794, non Heyne 1829; Clarke in Hook. f., Fl. Brit. India 4: 585. 1885; Gamble, Fl. Pres. Madras 1103(772). 1924. *Vitex arborea* Roxb., Fl. Ind. 3: 73. 1832. *Vitex arborea* Roxb., Fl. Ind. 3: 73. 1832; Wight, Ic. t. 1465. 1849.

Small trees. Leaves 3-foliolate; leaflets elliptic-oblanceolate, 6-16 x 4-6 cm, base acute or cuneate, apex shortly acuminate, lateral veins prominent beneath, pubescent. Cymose-panicle subterminal; bracts foliaceaous, persistent; calyx broadly cupular; corolla bluish. Drupe globose.
Flowering & Fruiting: March-May.
Distribution: Peninsular India and Sri Lanka. Rare; in moist deciduous forests. *RNMK 1508,* Pakkam; *RNMK 2277*, Pulapally.

Clerodendrum wallichii Merr., **Clerodendrum indicum** (L.) O. Kuntze, **Duranta erecta** L., **Citharexylum spinosum** L. and **Vitex negundo** L. are the common garden and hedge plants grown in the district. Many of these species are now getting naturalized and growing in wild.

LAMIACEAE Lindl.

Intr. Nat. Syst. Bot. ed. 2: 275. 1836.

1. Calyx lobes equal or subequal 2
1. Calyx lobes distinctly bilipped 7
2. Plants stellately pubescent; flowers yellow.....**Gomphostemma**
2. Plants not stellately pubescent; flowers otherwise.....3
3. Leaves in whorls of three; calyx tube much shorter than the lobes ..... **Colebrookea**
3. Leaves opposite; calyx tube longer than lobes.....4
4. Flowers in axillary clusters, cymes or globose heads.....5
4. Flowers in elongated spikes, racemes or panicles 6
5. Calyx 5 toothed; corolla blue .....**Hyptis**
5. Calyx 8-10 toothed; corolla white or orange..... **Leucas**
6. Corolla 4-lobed; stamens equal or subequal .....**Pogostemon**
6. Corolla 5-lobed; stamens didynamous.....**Anisomeles**
7. Flowers in dense uninterrupted spike forming oblong or ovoid heads 8
7. Flowers in interrupted whorls forming lax spike or thyrsus 9
8. Disc entire; upper lip of corolla longer than the lower lip .....**Acrocephalus**
8. Disc lobed; upper lip of corolla shorter than the lower lip .....**Anisochilus**
9. Upper lip of the corolla equal to or longer than the lower lip 10
9. Upper lip of the corolla shorter than the lower lip 11
10. Corolla tube narrow; stigma entire ..... **Orthosiphon**
10. Corolla tube broad; stigma bifid .....**Ocimum**
11. Flowers paired at nodes of racemes; lips of calyx deeply saccate at base..... **Scutellaria**
11. Flowers not paired at nodes; lips of calyx not saccate 12
12. Cymes dichasial, aggregated in thyrsus or flowers in falseverticals .....**Plectranthus**
12. Cymes paniculate.....**Isodon**

ACROCEPHALUS Bentham

Edwards's Bot. Reg. 15:t. 1282. 1829.

Acrocephalus hispidus (L.) Nicols., & Sivad., Taxon 29: 324. 1980; Manilal & Sivar., Fl. Calicut 235. 1982; Ansari, Fl. Kasaragod Div. 300. 1985; Manilal, Fl. Silent Valley 215. 1988; Nicols., Suresh & Manilal, An Interpr. Hort Malab.151. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 361. 1988; Vajr., Fl. Palghat Dist. 372. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 358. 1996; Sivar. & P. Mathew, Fl. Nilambur 543. 1997; Mohanan & Sivad., Fl. Agasthyamala 528. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 397. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 572. 2009. *Prunella indica* Burm.f., Fl. Ind. 130. 1768. *Acrocephalus indicus* (Burm.f.) O. Kuntze., Rev. Gen. Pl. 2: 511. 1891; Gamble, Fl. Pres. Madras 1115(780). 1924. *Acrocephalus capitatus* (Roth) Benth., Bot. Reg. 15. sub t.1282. 1829; Hook. f., Fl. Brit. India 4: 611. 1885. *Ocimum capitatum* Roth, Nov. Pl. Sp. 276. 1821. *Brunella indica* Burm. f., Fl. Ind. 130. 1768. *Minangani* Rheede, Hort. Malab. 9: 141, t. 72. 1689.

Erect or diffuse branched herbs; stem minutely pubescent. Leaves 2-3 x 0.8-1 cm, elliptic, acute at either ends, crenate, glabrous. Inflorescence an ovoid head, ca. 1.5 x 0.8 cm; basal bracts 2, foliar; floral bracts deltoid. Flowers densely packed; calyx bilabiate; upper lip entire, obovate; lower lip 4-toothed, scabrous; corolla white, 2-3 mm long, bilabiate; upper lip entire, lower lip 4-toothed, glabrous; stamens 4, didynamous; ovary 4-partite, glabrous; style slender, stigma 2-lobed. Nutlets oblong, smooth; seeds yellowish white, smooth.

Flowering & Fruiting: September-December.

Distribution: Indo-Malesia. Occasional; in exposed areas. *RNMK 2012,* Padinjarathara.

ANISOCHILUS Wallich ex Bentham

in Lindley, Edward's Bot. Reg. 15: t. 1300. 1830.

Anisochilus carnosus (L. f.) Wall. ex Benth. in Wall., Pl. Asiat. Rar. 2: 18. 1830; Wight, Ill. t. 176. 1850; Hook. f., Fl. Brit. India 4: 627. 1885; Gamble, Fl. Pres. Madras 1127(788). 1924; Manilal & Sivar., Fl. Calicut 235. 1982; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 151. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 361. 1988; Vajr., Fl. Palghat Dist. 372. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 358. 1996; Sivar. & P. Mathew, Fl. Nilambur 543. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 397. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 573. 2009. *Lavandula carnosa* L. f., Suppl. Pl. 273. 1781.*Katu-kurka* Rheede, Hort. Malab. 10: 179, t. 90. 1690.

Fleshy herbs; stem quadrangular, puberulus. Leaves 5-6 x 4.5-5 cm, broadly ovate, obtuse, cordate at base, crenate scabrous; petiole 5-7 cm long. Spikes 2-4 cm long, cylindrical, oblong, panicled; peduncle 5-7 cm long; flowers densely packed; bracts minute; calyx red glandular, upper lip entire, declined, lower lip orbicular; corolla 5-7 mm long, blue, upper lip oblanceolate, lower lip obtusely 4-lobed; filaments glabrous. Nutlets triangular, smooth, brown.

Flowering & Fruiting: September-December.

Distribution: South India, Sri Lanka and Myanmar. Occasional; in margins of moist deciduous forests. *RNMK 1923,* Tholpetty.

ANISOMELES R. Brown

Prodr. 503. 1810.

Subshrubs, often perennial, branches 4-angled, tomentose or pubescent. Flowers in close verticals, axillary and terminal; bracts 2; bracteoles lanceolate; calyx tubular-campanulate, lobes 5, equal, acuminate; corolla 2-lipped, tube pilose-annulate within, upper lip entire, villous, lower 3-lobed, midlobe larger, emarginated; stamens 4, didynamous, included within the corolla lip; filaments bearded; stigma unequally 2-lobed. Seeds ovoid or oblong, smooth.

1. Fruiting calyx hispid ..... **A. indica**
1. Fruiting calyx softly villous..... **A. malabarica**

Anisomeles indica (L.) O. Kuntze., Rev. Gen. Pl. 2: 512. 1891; Gamble, Fl. Pres. Madras 1140(797). 1924; Manilal & Sivar., Fl. Calicut 240. 1982; Ansari, Fl. Kasaragod Div. 301. 1985; Manilal, Fl. Silent Valley 216. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 151. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 362. 1988; Vajr., Fl. Palghat Dist. 373. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 359. 1996; Sivar. & P. Mathew, Fl. Nilambur 544. 1997; Mohanan & Sivad., Fl. Agasthyamala 530. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 398. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 574. 2009. *Nepeta indica* L., Sp. Pl. 571. 1753. *Anisomeles ovata* R. Br. in Ait.f., Hort. Kew. (ed. 2) 3: 364. 1811; Wight, Ic. t. 865. 1844-1845; Hook. f., Fl. Brit. India 4: 672. 1885. *Anisomeles heyneana* Benth. in Wall., Pl. Asiat. Rar. 1: 59. 1830; Hook. f., Fl. Brit. India 4: 672. 1885; Gamble, Fl. Pres. Madras 1140(797). 1924.*Tsjadaen* Rheede, Hort. Malab. 10: 175, t. 88. 1690. **Plate 26c.**

Shrubs; stem densely woolly. Leaves 10-12 x 6-7 cm, broadly ovate, acuminate at apex, densely woolly, unequally crenate; petiole 2-3 cm long. Racemes 5-12 x 2-3 cm, terminal; bracts foliar, 2-2.5 x 0.8-1 cm; flowers closely packed in globose thyrse; calyx lobes equal, acuminate, hispid; corolla violet or purple, 1.2-1.4 cm long, upper lip entire, acute, lower lip 4-lobed, white or lilac, covered with purple hairs, lobes obtuse; stamens 4, filaments erect, hairy; stigma 2-lobed; nutlets plano-convex, light brown.
Flowering & Fruiting: January-April.
Distribution: Indo-Malesia and China. Occasional; in semi-evergreen and moist deciduous forest. *RNMK 3249,* Pookodu; *RNMK 1720*, Muthanga.

Anisomeles malabarica (L.) R. Br. ex Sims., Bot. Mag. 46: t. 2071. 1819; Gamble, Fl. Pres. Madras 1140(797). 1924; Hook. f., Fl. Brit. India 4: 673. 1885; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 143. 1950; V. S. Ramach. & V.J. Nair, Fl. Cannanore 362. 1988; Vajr., Fl. Palghat Dist. 373. 1990. *Nepeta malabarica* L., Mant. Pl. 2: 566. 1771.

Erect undershrubs. Leaves 8-10 x 5-6 cm, oblong-lanceolate, acute, rounded at base, pale above, softly white tomentose beneath. Flowers 2-2.5 cm long, in axillary spikes, pale purple, slightly pubescent outside.
Flowering & Fruiting: November-December.
Distribution: Indo-Malesia to Australia. Occasional in evergreen forests. *RNMK 2655,* Kurichiarmala.

COLEBROOKEA J. J. Smith
Exot. Bot. 2: 111. 1806.

Colebrookea oppositifolia Smith, Exot. Bot. 2: 111, t.115. 1805; Hook. f., Fl. Brit. India 4: 642. 1885; Gamble, Fl. Pres. Madras 1138(796). 1924; Manilal,

Fl. Silent Valley 216. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 363. 1988; Vajr., Fl. Palghat Dist. 374. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 359. 1996; Sivar. & P. Mathew, Fl. Nilambur 544. 1997. *Colebrookea tenuifolia* Roxb., Pl. Corom. t. 245. 1815. **Plate 26d**.

Large shrubs; stem and leaves densely tomentose. Leaves 15-20 x 4-6 cm, elliptic, acuminate, crenulate, base acute to acuminate, nerves 10-15 pairs, oblique. Spikes 8-10 x 0.5-0.8 cm, panicled, terminal, densely hairy; flowers in close whorls; calyx tube very short, densely white-hairy, lobes subulate; corolla 2-3 mm long, equally 4-lobed; stamens 4, exserted in male flowers, included in female flowers, filaments glabrous; style 2-fid at tip. Nutlets hairy at apex; fruiting calyx larger.

Flowering & Fruiting: January-May.

Distribution: South and south east Asia. Occasional; in semi-evergreen and evergreen forests. *RNMK 2519,* Makkimala; *RNMK 2057*, Vythiri.

GOMPHOSTEMMA Wallich ex Bentham

In Wallich, Pl. Asiat. Rar. 2: 12. 1831.

Gomphostemma heyneanum Benth. in Wall., Pl. Asiat. Rar. 2: 12. 1830, var. **heyneanum**; Gamble, Fl. Pres. Madras 1167(808). 1924; Wight, Ic. t. 1456. 1849; V. S. Ramach. & V.J. Nair, Fl. Cannanore 364. 1988; Manilal, Fl. Silent Valley 218. 1988; Vajr., Fl. Palghat Dist. 375. 1990; Sivar. & P. Mathew, Fl. Nilambur 545. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 399. 2005. *Gomphostemma strobilinum* Wall. ex Benth. var. *heyneanum* (Benth.) Hook.f., Fl. Brit. India 4: 696. 1885. **Plates 26f & 26g.**

Subshrubs, stem obtusely 4-angular, stellate tomentose. Leaves 19-25 x 10-15 cm, broadly elliptic, acute at both ends, stellate tomentose below, sparsely hairy above, crenate, nerves 5-7 pairs; petiole 4-6 cm long. Racemes 16-18 x 2-2.5 cm; flowers 10 to 20 together; bracts elliptic, acute; calyx lobes lanceolate; corolla 1.3-1.5 cm long, tube 7-8 mm broad, cylindric, midlobe of lower lip obtuse, emarginate; filaments unequal, glabrous. Nutlets glabrous.

Flowering & Fruiting: October-December.

Distribution: Endemic to southern Western Ghats. Occasional; in moist deciduous forests. *RNMK 2073,* Pathiri.

HYPTIS N. J. Jacquin

Collectanea 1: 101, 103. 1787.

Hyptis suaveolens (L.) Poit., Ann. Mus. Natl. Hist. 7: 472. t.27. f.2. 1806; Hook. f., Fl. Brit. India 4: 630. 1885; Gamble, Fl. Pres. Madras 1129(789). 1924; Manilal & Sivar., Fl. Calicut 240. 1982; Ansari, Fl. Kasaragod Div. 304. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 364. 1988; Vajr., Fl. Palghat Dist. 376. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 360. 1996; Sivar. & P. Mathew, Fl. Nilambur 547. 1997; Mohanan & Sivad., Fl. Agasthyamala 532. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 400. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 577. 2009. *Ballota suaveolens* L., Syst. Nat. (ed. 10) 1100. 1759.

Shrubs, up to 1.5 m high; stem obtusely 4-angular, thinly hairy. Leaves ovate, acute, hispid below, glabrate above; petiole 4-5 cm long. Flowers in clusters of 1-12; calyx tube tubular, 10-ribbed, glandular hairy, teeth spinulose; corolla 4-5 mm long, lobes short, glabrous inside, blue. Nutlets 3-4 x 2.5-3 mm, compressed, with a ridge on dorsal surface, pubescent, deep brown, mucilaginous when wet.
Flowering & Fruiting: August-February.
Distribution: Originally from America now Pantropical. Common; in moist deciduous forests. *RNMK 3095,* Bavali.

ISODON (Schrader ex Bentham) Spach
Hist. Nat. Veg. Phan. 9:162. 1840.

1. Nerves and reticulations of leaves not prominent; fruiting calyx minutely scabrous ... . **I. wightii**
1. Leaves with prominent nerves and reticulations; fruiting calyx densely woolly..... ..... **I. nilgherricus**

Isodon nilgherricus (Benth.) H.Hara, J. Jap. Bot. 60: 236. 1985. *Plectranthus nilgherricus* Benth. in DC., Prodr. 12: 57. 1848; Hook. f., Fl. Brit. India 4: 619. 1885; Gamble, Fl. Pres. Madras 1121(784). 1924; Sasidh. & Sivar., Fl. Pl. Thrissur For. 363. 1996. *Rabdosia nilgherrica* (Benth.) Hara, J. Jap. Bot. 47: 198. 1972.

Shrubs; whole plant glandular hirtus. Leaves 5-10 x 3-6 cm, rounded or cordate at base, serrate; upper ones sessile, acuminate, densely hairy below; nerves 4-5 pairs; petioles 3-5 cm long. Panicle 20-30 cm long. Flowers 3-5 together, pedicelled; calyx 3.5-4 mm long, strongly ribbed, subequally 5-lobed, hirtus; corolla 7-8 mm long, white with red spot, glandular, lobes ciliate, midlobe larger than sidelobes; filaments glabrous. Nutlets brown, mucilaginous when wet; fruiting calyx glandular between ribs.
Flowering & Fruiting: October-February.
Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests margins. *RNMK 2421,* Chembra.

Isodon wightii (Benth.) Hara, J. Japan Bot. 60: 237. 1985. *Plectranthus wightii* Benth., Labiat. Gen. Spec. 41. 1832; Wight, ic. t. 1429; Hook. f., Fl. Brit. India 4: 619. 1855; Gamble, Fl. Pres. Madras 1120(784). 1924; Sasidh. & Sivar., Fl. Pl. Thrissur For. 364. 1996; Mohanan & Sivad., Fl. Agasthyamala 536. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 402. 2005. *Plectranthus pulneyensis* Hook. f., Fl. Brit. India 4: 617. 1855. *Plectranthus nepetaefolius* Benth. in DC., Prodr. 12: 57. 1848; Hook. f., Fl. Brit. India 4: 619. 1855. *Robdosia wightii* (Benth.) Hara, J. Jap. Bot. 47: 203. 1972; Vajr., Fl. Palghat Dist. 383. 1990; Sivar. & P. Mathew, Fl. Nilambur 555. 1997.

Annual herbs; stem densely hairy. Leaves 6-7 x 4-4-5 cm, broadly ovate, cordate at base, crenate-serrate; petiole 5-7 cm long. Panicle on terminal and

lateral branches, 10-25 cm long, puberulus; bracts minute; flowers many, white; calyx bilabiate, lobes acute, densely glandular hirtus, 10-ribbed; corolla 7-8 mm long, lower lip concave, obtuse; upper lip 4-lobbed, lobes equal, obtuse, glandular. Nutlets smooth.

Flowering & Fruiting: September-December.

Distribution: Endemic to Peninsular India. Occasional; in grasslands. *RNMK 3070,* Banasuramala.

LEUCAS R. Brown

Prodr. 504. 1810.

Herbs or undershrubs, erect or strangling; branches 4-angled. Leaves ovate-lanceolate. Flowers usually clustered in axillary or terminal globose heads; bracts linear-lanceolate, many, covering the base of the whorl; calyx tubular, 10 riffed, mouth truncate or oblique, teeth equal or unequal; corolla bilabiate, upper lip entire, concave, lower lip 3-lobed, terminal lobe larger; stamen 4, filaments unequal, anther cells connivent. Style slender, stigma lobes 2, unequal. Nut lets usually trigonous.

1. Mouth of the calyx oblique..... 2
1. Mouth of the calyx straight..... . 5
2. Leaves 0.5-1 cm broad; calyx teeth very unequal, glabrous..... 3
2. Leaves more than 1 cm broad; calyx teeth equal or subequal, hispid 4
3. Calyx teeth minute, scabrous ..... **L. lavandulifolia**
3. Calyx teeth with bulbous based hairs .....**L. aspera**
4. Calyx teeth spinescent.....**L. urticifolia**
4. Calyx teeth scabrous .....**L. zeylanica**
5. Throat of calyx tube glabrous 6
5. Throat of calyx tube villous..... 8
6. Leaves white tomentose beneath.....**L. marrubioides**
6. Leaves not white tomentose beneath 7
7. Leaves ovate ..... **L. angularis**
7. Leaves lanceolate.....**L. biflora**
7. Calyx teeth spreading.....**L. vestita**
7. Calyx teeth erect..... 8
8. Leaves lanceolate, obtuse; calyx teeth sub-equal .....**L. eriostoma**
8. Leaves elliptic, acute at base; calyx teeth equal 9
9. Bracts pubescent outside; calyx mouth with white hairs ..... **L. hirta**
9. Bracts glabrous outside; calyx mouth with brown hairs.....**L. ciliata**

Leucas angularis Benth. in Wall., Pl. Asiat. Rar. 1: 62. 1830; Hook. f., Fl. Brit. India 4: 684. 1885; Gamble, Fl. Pres. Madras 1151(805). 1924; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 181. 1940; Manilal, Fl. Silent Valley 219. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 365. 1988; Sivar. & P. Mathew, Fl. Nilambur 547. 1997; V. Singh, Monogr. Indian Leucas 38. 2001. *Leucas marrubioides* Desf. var. *pulneyensis* Hook.f., Fl. Brit. India 4: 684. 1885.

Prostrate branching herbs, pubescent. Leaves 3-3.5 x 1-1.5 cm, ovate, obtuse, base rounded or truncate, serrate, pubescent; petiole 0.5-0.6 cm. Flowers in axillary whorls, 4-6 flowered, white; bracts 3-4 mm long, linear, ciliate; calyx tube 7-8 mm long, 10 toothed, unequal, ciliate; corolla tube 7-9 mm long, subequal; filaments 5-7 mm long, pubescent.
Flowering & Fruiting: March-July.
Distribution: Indo-Malesia. Occasional; in evergreen forest margins and moist deciduous forests. *RNMK 2284,* Periya; *RNMK 2666*, Tholpetty.

Leucas aspera (Willd.) Link, Enum. Hort. Berol. Alt. 2: 113. 1822; Hook. f., Fl. Brit. India 4: 690. 1885; Gamble, Fl. Pres. Madras 1150(803). 1924; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 180.1940; Manilal & Sivar., Fl. Calicut 239. 1982; Ansari, Fl. Kasaragod Div. 305. 1985; Vajr., Fl. Palghat Dist. 377. 1990; Sivar. & P. Mathew, Fl. Nilambur 548. 1997; V. Singh, Monogr. Indian Leucas 43. 2001; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 579. 2009. *Phlomis aspera* Willd., Enum. Hort. Berol. 2: 621. 1809.

Herbs, pubescent. Leaves 4-5.5 x 0.7-0.8 cm, elliptic, apex obtuse, base cuneate, distantly serrate, membranous, pubescent. Whorls axillary and terminal, 2 cm across; flowers white; bracts 7-8 mm long, linear, ciliate, acute; calyx mouth oblique, ca. 5 mm long, 10-toothed, ciliate with bulbous based hairs at apex; corolla tube ca. 8 mm long, upper lobe ca. 4 mm long, lower ca. 8 mm long; filaments 4, pubescent.
Flowering & Fruiting: September-January.
Distribution: Indo-Malesia. Occasional; in open rocky areas in grasslands. *RNMK 3070,* Sugandhagiri.

Leucas beddomei (Hook. f.) Sunojkumar & Mathew, Rheedea 12: 170. 2002. *Leucas hirta* (Heyne ex Roth) Spreng. var. *beddomei* Hook.f., Fl. Brit. India 4:687.1885; Gamble, Fl. Pres. Madras 1153(806). 1915; V. Singh, Monogr. Indian Leucas 93. 2001. **Plate 26e.**

Sub-shrubs; root stock stout. Leaves 4-6 x 2-3 cm, softly villous with spreading hairs, linear-oblong. Flowers in whorls; calyx 1-1.3 cm, teeth very small, recurved, triangular, spinescent; villi of the calyx-month fewer and shorter; corolla with brown hairs on the upper lip. Nutlets elliptic.
Flowering & Fruiting: September-March.
Distribution: Endemic to southern Western Ghats (Kerala). Rare; in shola margins. *RNMK 1796,* Chembra.

Leucas biflora (Vahl) R. Br., Prodr. 504. 1810; Wight, Ic. t. 866. 1844-1845; Hook. f., Fl. Brit. India 4: 683. 1885; Gamble, Fl. Pres. Madras 1150(804). 1924; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 180. 1940; Manilal & Sivar., Fl. Calicut 239. 1982; Ansari, Fl. Kasaragod Div. 306. 1985; Manilal, Fl. Silent Valley 219. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 365. 1988; Vajr., Fl. Palghat Dist. 377. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 361. 1996;

Sivar. & P. Mathew, Fl. Nilambur 548. 1997; V. Singh, Monogr. Indian Leucas 49. 2001; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 400. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 579. 2009. *Phlomis biflora* Vahl, Symb. Bot. 3: 77. 1794. *Leucas procumbens* Desf., Mem. Mus. Hist. Nat. Paris 11: 7. t. 3. f. 2. 1824; Hook. f., Fl. Brit. India 4: 683. 1885; V. S. Ramach. & V.J. Nair, Fl. Cannanore 367. 1988. *Leucas biflora* (Vahl.) R.Br. var. *procumbens* (Desf.) Gamble, Fl. Pres. Madras 1151(804). 1924; Ansari, Fl. Kasaragod Div. 306. 1985.

Diffuse or scandent herbs; branches finely pubescent. Leaves broadly ovate, acute, base obtuse, membranous, crenate, 3-3.5 x 1.7-2 cm; petiole 0.4-0.5 cm long. Flowers solitary; calyx tubular, 6-7 mm long, finely strigose; corolla white, 1.2-1.4 cm long, annulate-villous inside at middle. Nutlets oblong, truncate.

Flowering & Fruiting: October-February.

Distribution: Peninsular India and Sri Lanka. Common; along margins of evergreen and moist deciduous forests. *RNMK 2581,* Chooralmala; *RNMK 2186*, Muthanga.

Leucas ciliata Benth. ex Wall., Pl. Asiat. Rar. 1: 61. 1830; Hook. f., Fl. Brit. India 4: 687. 1885; Gamble, Fl. Pres. Madras 1153(806). 1924; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 175. 1940; Ansari, Fl. Kasaragod Div. 306. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 366. 1988; Vajr., Fl. Palghat Dist. 378. 1990; Sivar. & P. Mathew, Fl. Nilambur 549. 1997; V. Singh, Monogr. Indian Leucas 61. 2001; Mohanan & Sivad., Fl. Agasthyamala 533. 2002.

Subscandent herbs with few branches; branches hispid. Leaves 6-8 x 2-3 cm, ovate, acute at both ends, densely hispid; petiole 1-1.5 cm long. Heads terminal, 3-3.5 cm across, globose; bracts ca. 1.5 cm long, strongly ciliate; flowers 30-40 in a head, densely packed; calyx tube 1-1.2 cm long, not ribbed, teeth ca. 5 mm long, ciliate; corolla tube ca. 1 cm long, upper lip obovate, concave, brown hairy, lower lip white, ca. 1 x 8 cm, 3-lobed, midlobe orbicular, glabrous. Nutlets 3-3.5 x 1.2-1.5 mm, 3-angled brown, smooth.

Flowering & Fruiting: November-March.

Distribution: Temperate Himalayas and Western Ghats. Occasional; in evergreen and moist deciduous forests. *RNMK 1796,* Chembra; *RNMK 1084*, Muthanga.

Leucas eriostoma Hook. f. Fl. Brit. India 4: 686. 1885; Gamble, Fl. Pres. Madras 1154(806). 1924; Mukerjee in Rec. Bot. Surv. Ind. 14(1); 176. 1940; V. S. Ramach. & V.J. Nair, Fl. Cannanore 366. 1988; V. Singh, Monogr. Indian Leucas 82. 2001.

Stout undershrubs up to 75 cm tall. Leaves 7-10 x 2-2.5 cm, lanceolate, obtuse, narrow at base, hispid-pubescent. Flowers ca. 1 cm long, in terminal whorls, 1.7-2 cm across.

Flowering & Fruiting: November-March.

Distribution: Endemic to south India. Occasional; in grasslands near shola margins. *RNMK 1274,* Kurichiarmala; *RNMK 3070*, Brahmagiri.

Leucas hirta (Heyne ex Roth) Spreng., Syst. Veg. 2: 743. 1825; Hook. f., Fl. Brit. India 4: 687. 1885; Gamble, Fl. Pres. Madras 1153(806). 1924; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 167. 1940; Manilal, Fl. Silent Valley 219. 1988; Vajr., Fl. Palghat Dist. 378. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 361. 1996; Sivar. & P. Mathew, Fl. Nilambur 549. 1997; V. Singh, Monogr. Indian Leucas 90. 2001; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 401. 2005. *Phlomis hirta* Heyne ex Roth, Nov. Pl. Sp. 264. 1821.

Erect herbs; branches covered with reflexed hairs. Leaves 5-6 x 1.5 cm, elliptic, obtuse, acute at base, distantly crenate, hirtus above, densely tomentose beneath; petiole 6-8 mm long. Heads terminal; bracts ca. 1 cm long, linear, bristly; flowers 15-30 in a head; calyx tube 5-7 mm long, white, densely hairy outside; corolla tube 5-6 mm long, upper lip emarginate, white, hairy, midlobe of lower lip emarginate.

Flowering & Fruiting: September-December.

Distribution: Endemic to Peninsular India. Common; in grasslands. *RNMK 1111*, Banasuramala; *RNMK 1796,* Pookodu lake top.

Leucas lavandulifolia J.E. Smith in Rees, Cyclop. 20: n. 2. 1812; V. Singh, Monogr. Indian Leucas 104. 2001. *Leonurus indicus* L., Syst. Nat. (ed.10) 1101. 1759. *Leucas indica* (L.) R. Br. ex Vatke in Oesterr., Bot. Zeits. 25: 95. 1875; Ansari, Fl. Kasaragod Div. 307. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 366. 1988; Vajr., Fl. Palghat Dist. 378. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 361. 1996; Mohanan & Sivad., Fl. Agasthyamala 534. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 401. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 579. 2009. *Leucas malabarica* W.Theob. in F.Mason, Burmah ed. 3, 2: 296. 1883. *Phlomis linifolia* Roth, Nov. Pl. Sp. 260. 1821. *Leucas linifolia* (Roth) Spreng., Syst. Veg. 2: 743. 1825; Hook. f., Fl. Brit. India 4:690. 1885; Gamble, Fl. Pres. Madras 1149 (803). 1924. *Leucas linifolia* (Roth) Spreng. var. *decipiens* Hook. f., Fl. Brit. India 4: 691. 1885. *Leucas lavandulifolia* Rees var. *decipiens* (Hook.f.) Chandrab. & Sriniv., Bull. Bot. Surv. India 17: 164. 1975. *Leucas indica* var. *decipiens* (Hook.f.) Bennet, J. Econ. Taxon. Bot. 5: 452. 1984.

Erect slender herbs; branches scabrid. Leaves 8-9 x 0.5 cm, linear, lanceolate, acuminate, scabrid; petiole ca. 1 cm long. Heads terminal and upper axillary, 1.5-2 cm across; bracts ca. 4 mm long, linear, hairy; flowers 10-15 in a head; calyx 5-7 mm long; mouth very oblique; teeth minute, scabrous; corolla tube 5-6 mm long, upper lip obovate, black or grey hairy; lower lip with very small lateral lobes. Nutlets 3-angled, brown, glabrous.

Flowering & Fruiting: July-December.

Distribution: Indo-Malesia and east Asia. Common; along roadsides and open areas. *RNMK 1084,* Mananthavady.

Leucas marrubioides Desf., Mem. Mus. Hist. Nat. Paris 11: 6. t. 3. f. 1. 1824; Hook. f., Fl. Brit. India 4: 683. 1885; Gamble, Fl. Pres. Madras 1152(805). 1924; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 181. 1940; V. S. Ramach. & V.J. Nair, Fl. Cannanore 367. 1988; V. Singh, Monogr. Indian Leucas 115. 2001.

Straggling undershrubs. Leaves 4-5 x 2.5-3 cm ovate or rounded, obtuse, rounded or cordate at base. Flowers 1.5-2 cm long, in whorls, white; calyx tube mouth rufous hairy; corolla tube 5-6 mm long, upper lip covered with brown hairs; lower lip 3-lobed; midlobe elliptic-orbicular, emarginate with undulate margins

Flowering & Fruiting: November-December.

Distribution: Indo-Malesia. Occasional; in semi-evergreen and moist deciduous forests. *RNMK 1391,* Thirunelli; *RNMK 1548*, Muthanga.

Leucas urticaefolia (Vahl) R. Br., Prodr. 504. 1810; Hook. f., Fl. Brit. India 4: 680. 1885; Gamble, Fl. Pres. Madras 1149(803). 1924; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 166. 1940; V. S. Ramach. & V.J. Nair, Fl. Cannanore 367. 1988; V. Singh, Monogr. Indian Leucas 144. 2001. *Phlomis urticifolia* Vahl, Symb. Bot. 3: 76. 1794.

Erect herbs, pubescent. Leaves 3.5-4 x 2-2.5 cm, ovate, oblanceolate, apex acute, crenate, pubescent; petiole ca. 1.5 cm long, tomentose. Whorls axillary, ca. 3 cm across, flowers white; bracts ca. 1.5 cm long, lanceolate, ciliate; calyx tube 7-8 mm long, mouth oblique, 10-toothed, spinescent, transverse nerves prominent, ciliate; corolla tube 4-5 mm long, lower pubescent, white. Nutlets trigonous, obliquely truncate and glandular at apex.

Flowering & Fruiting: August-September.

Distribution: West Asia to India. Common; in moist deciduous forests. *RNMK 2451*, Mananthavady.

Leucas vestita Benth. in Wall., Pl. Asiat. Rar. 1: 61. 1830; Wight, Ic. t. 338. 1840; Hook. f., Fl. Brit. India 4: 686. 1885; Gamble, Fl. Pres. Madras 1153(806). 1924; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 166. 1940; V. S. Ramach. & V.J. Nair, Fl. Cannanore 367. 1988; V. Singh, Monogr. Indian Leucas 149. 2001; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 401. 2005.

Stout herbs, 25-50 cm high, branches rufous hairy. Leaves 5-6 x 2-2.5 cm, ovate, obtuse at apex, acute at base, crenate-serrate, densely pubescent; petiole 5-7 mm long. Heads ca. 2 cm across, terminal; bracts ca. 1 cm long, linear, hairy; flowers 20-30 in each head; calyx tube mouth rufous hairy, teeth spreading; corolla tube 7-8 mm long, upper lip covered with brown hairs; lower lip 3-lobed; midlobe orbicular, emarginate with undulate margins.

Flowering & Fruiting: November-January.

Distribution: Endemic to southern Western Ghats. Occasional; in moist deciduous forests. *RNMK 2650,* Bavaly.

Leucas zeylanica (L.) R. Br., Prodr. 504. 1810; Wight, Ill. 2: t. 176. 1850; Hook. f., Fl. Brit. India 4: 689. 1885; Gamble, Fl. Pres. Madras 1150(803). 1924; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 166. 1940; Manilal, Fl. Silent Valley 220. 1988; V. Singh, Monogr. Indian Leucas 157. 2001; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 401. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 580. 2009. *Phlomis zeylanica* L., Sp. Pl. 586. 1753.

Small erect herbs; branches villous. Leaves 4-6 x 0.8-1 cm, elliptic, obtuse at apex, scabrous; petiole 4-5 mm long. Heads terminal and upper axillary; bracts ca. 6 mm long, linear, acute, ciliate; flowers 10-20 in a head; calyx mouth slightly oblique, teeth scabrous; corolla tube 7-8 mm long, upper lip obovate, with black hairs, midlobe of lower lip rounded.

Flowering & Fruiting: May-July.

Distribution: South and south-east Asia. Occasional; in open rocky areas in grasslands. *RNMK 1877,* Manikkunnumala.

OCIMUM Linnaeus

Sp. Pl. 597. 1753.

Herbs or shrubs; stem quadrangular. Leaves elliptic, acute or obtuse, petioled. Inflorescence a terminal, solitary or shortly panicled racemes; flowers in whorls of 6-8 at nodes; pedicels erect with recurved lip; calyx bilabiate with lobe entire, declinate; lower lip 4-lobed; corolla bilabiate with short tube; upper lip 4-lobed; lower lip entire, shorter than upper lip; stamens 4, declinate, exerted, free; ovary 4-partite; style bifid at apex. Nutlets 4, globose, mucilaginous when wet.

1. Leaves to 3 cm long, ovate-oblong ..... **O. basilicum**
1. Leaves more than 5 cm long, elliptic to obovate 2
2. Fruiting calyx villous inside; seeds smooth ..... **O. americanum**
2. Fruiting calyx glabrous inside; seeds rugose..... .**O. gratissimum**

Ocimum americanum L., Cent. Pl. 1: 15. 1755; Manilal & Sivar., Fl. Calicut 236. 1982; Vajr., Fl. Palghat Dist. 380. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 352. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 402. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 581. 2009. *Ocimum canum* Sims, Bot. Mag. 51: t.2452. 1823; Hook. f., Fl. Brit. India 4: 607. 1885; Gamble, Fl. Pres. Madras 1111(777). 1924; Ansari, Fl. Kasaragod Div. 308. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 368. 1988.

Woody herbs, stem hirtus. Leaves elliptic, acute to acuminate, base truncate or obtuse, subentire, sparsely hairy or glabrous; petiole 2-2.5 cm long. Racemes 13-15 cm long, densely pubescent; flowers 5-7 in each whorl; calyx ca. 3 x 5 mm, upper lip orbicular, densely hairy, corolla white, 4-5 mm long, glabrous; filaments glabrous. Nutlets 1.5-2 mm long, sub-trigonous, minutely pitted, dark brown

Flowering & Fruiting: Throughout the year.

Distribution: Paleotropics. Occasional; in moist deciduous forests. *RNMK* 1720, Muthanga.

Ocimum basilicum L., Sp. Pl. 597. 1753; Hook. f., Fl. Brit. India 4: 608. 1885; Gamble, Fl. Pres. Madras 1111(777). 1924; Ansari, Fl. Kasaragod Div. 307. 1985; Sivar. & P. Mathew, Fl. Nilambur 550. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 581. 2009. *Ocimum basilicum* var. *purpurascens* Benth. in Wall., Pl. Asiat. Rar. 2: 13 (1830); Gamble, Fl. Pres. Madras 1111(777). 1924.

Woody herbs, pubescent. Leaves 2-3 x 1.5-1.8 cm, ovate-oblong, apex acute, base cuneate, crenate, gland dotted; petiole 1-1.5 cm. Racemes terminal, 13-15 cm long; flowers 5-6 in a whorl; bracts linear, hairy; calyx tube pubescent; corolla 4-6 mm long, upper lip 3-4 fid.

Flowering & Fruiting: Throughout the year.

Distribution: Paleotropics. Common; in open areas as an escape. *RNMK 0079,* Puthorvayal.

Ocimum gratissimum L., Sp. Pl. 1197. 1753; Hook. f., Fl. Brit. India 4: 608. 1885; Gamble, Fl. Pres. Madras 1111(777). 1924; Manilal & Sivar., Fl. Calicut 236. 1982; Ansari, Fl. Kasaragod Div. 308. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 368. 1988; Vajr., Fl. Palghat Dist. 380. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 362. 1996; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 582. 2009.

Shrubs, 2-2.5 m high; stem glandular-scabrid. leaves elliptic to obovate, base attenuate serrate, acuminate at apex; nerves 6-8 pairs; thinly tomentose below; petiole 5-6 cm long. Racemes terminal, panicled; bracts oblanceolate; flowers 4-6 at each node; calyx 5-7 mm long, glabrous; upper lip ovate, obtuse, lobes of lower lip acuminate, glandular; corolla white, lobes obtuse; filaments glabrous or villous at base; anthers sagittate at base. Nutlets pitted, brown.

Flowering & Fruiting: August-December.

Distribution: Pantropical. Occasional; in moist deciduous forests. *RNMK 1391* Tholpetty; *RNMK 1084*, Ponkuzhy.

ORTHOSIPHON Bentham

Edward's Bot. Reg. 15: t. 1300. 1830.

Herbs or subshrubs, rootstock woody. Leaves serrate or crenate. Racemes terminal. Flowers in verticals of 6; calyx tubular or companulate, deflexed and accrescent in fruit, upper lip broadly ovate, lower subequally 4-lobed, lobes subulate or aristate; corolla tube straight or curved, upper lip 3-4 lobed, lower concave, entire; stamens 4, didynamous, declinate, included or much exserted; filaments glabrous, anther cells confluent; ovary 4-partite, style slender, stigma clavate or capitate. Nutlets ovoid or globose, smooth.

1. Upper leaves sessile, base cuneate ..... **O. rubicundus**
1. Upper leaves petioled, base cordate or rounded .....**O. thymiflorus**

Orthosiphon rubicundus (D. Don) Benth. in Wall., Pl. Asiat. Rar. 2: 14. 1830; Hook. f., Fl. Brit. India 4: 614. 1885; Gamble, Fl. Pres. Madras 1114(779).

1924; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 25. 1940; V. S. Ramach. & V.J. Nair, Fl. Cannanore 369. 1988; Manilal, Fl. Silent Valley 221. 1988. *Plectranthus rubicundus* D. Don, Prodr. Fl. Nepal. 116. 1825. *Orthosiphon rubicundus* (D. Don) Benth. var. *hohenackeri* Hook.f., Fl. Brit. India 4: 615. 1885; Gamble, Fl. Pres. Madras 1114(780). 1924; V. S. Ramach. & V.J. Nair, Fl. Cannanore 369. 1988.

Erect undershrubs, 45-50 m tall. Leaves 4.5-5.5 x 2-2.3 cm, ovate-lanceolate, acute, cuneate at base. Flowers in terminal racemes, 1-1.2 cm long, white with pink patches.

Flowering & Fruiting: June-September.

Distribution: India, Nepal and Myanmar. Occasional; in moist deciduous forests. *RNMK 2119,* Baveli.

Orthosiphon thymiflorus (Roth) Sleesen, Reinwardtia 5: 42. 1959; V. S. Ramach. & V.J. Nair, Fl. Cannanore 369. 1988; Vajr., Fl. Palghat Dist. 380. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 363. 1996; Sivar. & P. Mathew, Fl. Nilambur 552. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 584. 2009. *Ocimum thymiflorum* Roth, Nov. Pl. Sp. 269. 1821. *Orthosiphon tomentosum* Benth. in Wall., Pl. Asiat. Rar. 2: 14. 1830; Hook. f., Fl. Brit. India 4: 613. 1885. *Orthosiphon glabratus* Benth. in Wall., Pl. Asiat. Rar. 2: 14. 1830; Gamble, Fl. Pres. Madras 1114(779). 1924. *Orthosiphon viscosus* Benth. in Wall., Pl. Asiat. Rar. 2: 14. 1830; Gamble, Fl. Pres. Madras 1114(779). 1924. *Orthosiphon diffusus* (Benth.) Benth. in DC., Prodr. 12: 50. 1848; Hook. f., Fl. Brit. India 4: 613. 1885; Gamble, Fl. Pres. Madras 1113(779). 1924. *Ocimum diffusum* Benth. in Wall., Pl. Asiat. Rar. 2: 14. 1830.

Erect perennial herbs; stem hirtus. Leaves opposite, 4-5 x 2.5-3 cm, ovate, base rounded or cordate, acute at apex, thinly tomentose below; nerves 6-8 pairs; petioles to 3 cm long. Racemes 15-20 cm long, terminal, with distant whorls of flowers; flowers 5-6 in a whorl; calyx deflexed, 2-lipped; upper lip broad, entire, lower lip 4-lobed, lobes subulate, hairy; corolla 1-1.3 cm long, 2-lipped, tube cylindric, upper lip 4-lobed, lower lip cup-shaped; stamens 4, included, declinate, style slender, stigma terminal, capitate. Nutlets 2-4, orbicular, pitted.

Flowering & Fruiting: October-May.

Distribution: Indo-Malesia. Common; in moist deciduous forests. *RNMK 3092,* Muthanga.

PLECTRANTHUS L' Heritier

Stirp. Novae 84. 1788.

Herbs or shrubs, branches quadrangular. leaves broadly ovate, penninerved, acute, serrate, petiolate. Flowers in terminal panicle, pedicellate; bracts minute; calyx 2-lipped or 5-lobed, 10-ribbed, usually curved in fruit; corolla bilabiate, upper lip entire, lower lip 4-lobed; stamens 4, filaments unequal, declinate into the lower lip, glabrous; anthers confluent; ovary 4-partite; style slender, 2-fid at apex. Nutlets 4, ovoid or globose.

1. Sub-shrubs; leaves to 18 cm long..... **P. glabratus**
1. Herbs; leaves to 13 cm long.....**P. malabaricus**

Plectranthus glabratus (Benth.) Alston in Trim., Handb. Fl. Ceylon 6(Suppl.): 236. 1931. *Coleus glabratus* Benth., Labiat. Gen. Sp. 58. 1832. *Coleus wightii* Benth., Labiat. Gen. Spec. 58. 1832. *Plectranthus coleoides* Benth. in DC., Prodr. 12: 64. 1848; Hook. f., Fl. Brit. India 4: 622. 1885; Gamble, Fl. Pres. Madras 1122(785). 1924.

Fleshy subshrubs, pubescent. Leaves 16-18 x 10-12 cm, ovate-elliptic, membranous, puberulus, acuminate, base obtuse or slightly truncate, margin coarsely and prominently truncate; petiole 8-10 cm. Panicles of racemes terminal, 20-25 cm long; flowers pink; fruiting calyx 2-lipped to 7-9 mm, upper lip entire, ovate, lower lip 4-toothed, teeth unequal, glabrous. Nutlets 4, oblong, brown, shining.

Flowering & Fruiting: August-October.

Distribution: Endemic to Peninsular India. Occasional; in shola margins. *RNMK 3088,* Chembra; *RNMK 3186,* Kurichiarmala.

Plectranthus malabaricus (Benth.) Willemse, Blumea 25: 509. 1979; V. S. Ramach. & V.J. Nair, Fl. Cannanore 370. 1988. *Coleus malabaricus* Benth. in Wall., Pl. Asiat. Rar. 2: 16. 1830; Hook. f., Fl. Brit. India 4: 626. 1885; Gamble, Fl. Pres. Madras 1124(786). 1924; Ansari, Fl. Kasaragod Div. 302. 1985; Manilal, Fl. Silent Valley 217. 1988; Vajr., Fl. Palghat Dist. 375. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 359. 1996; Sivar. & P. Mathew, Fl. Nilambur 545. 1997; Mohanan & Sivad., Fl. Agasthyamala 531. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 398. 2005.

Herbs; stem pinkish, puberulus. Leaves 5-13 x 5-7 cm, broadly ovate, acute, base truncate or subcordate, crenate, puberulus, nerves 4-6 pairs; petiole 7-10 cm long. Racemes in terminal 25-30 cm long panicles, with distant whorls of flowers; bracts ovate; flowers 5-10 in each whorl; calyx striate, upper lip obtuse; lower lip unequally toothed, glabrous; corolla 1.5-2 cm long, pink; filaments glabrous.

Flowering & Fruiting: August-December.

Distribution: South India and Sri Lanka. Occasional; in evergreen forest margins and in shades in moist localities. *RNMK 2523,* Periaya, *RNMK 2688*, Mananthavady.

POGOSTEMON Desfontaines

Mem. Mus. Hist. Nat. 2: 154. 1815.

Shrubs or herbs, stem quadrangular. Leaves ovate, acute, crenate or dentate, petiolate. Flowers clustered in solitary spikes or panicled cymes, usually sessile; bracts and bracteoles present; calyx tubular, equally 5-lobed; corolla bilabiate, tube short, lower lip entire, upper lip 3-lobed; stamens 4, subequal, filaments exerted, bearded, anthers confluent; style slender; stigmas 2, linear. Nut obscurely triangular, smooth.

1. Bracteoles oblique, regularly imbricating; flowers in panicled cymes 2
1. Bracteoles lanceolate; flowers in cylindrical terminal spikes 5
2. Leaves tomentose, irregularly toothed along the margins.....3
2. Leaves glabrous, regularly serrate along the margins.....4
3. Diffuse herbs; cymes closely packed; calyx densely hairy ..... **P. purpurascens**
3. Erect subshrubs; cymes distant, one sided; calyx hirtus ..... **P. paniculatus**
4. Cymes 4-8-flowered, distant .....**P. heyneanus**
4. Cymes 10-25-flowered, closely placed..... **P. benghalensis**
5. Diffuse herbs; leaves orbicular, obtuse ..... .**P. rotundatus**
5. Erect herbs or shubs; leaves ovate, acute to acuminate.....6
6. Staminal filaments naked or hairy at the base only ..... **P. grdneri**
6. Staminal filaments bearded.....7
7. Corolla lobes equal .....**P. auricularius**
7. Corolla lobes unequal..... .**P. pubescens**

Pogostemon auricularius (L.) Hassk. in Tijdsch. Nat. Gesch. 10: 127. 1843; Watson & Airy Shaw in Taxon 16: 186. 1967; V. S. Ramach. & V.J. Nair, Fl. Cannanore 371. 1988. *Mentha auricularia* L., Mant. Pl. 1: 81. 1767. *Dysophylla auricularia* (L.) Bl., Bijdr. 826. 1826; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 79. 1940; Wight, Ic. t. 1445. 1849; Hook. f., Fl. Brit. India 4: 638. 1885; Gamble, Fl. Pres. Madras 1135(794). 1924.

Scandent herbs; stem terete, villous. Leaves 5-6 x 2-2.5 cm, lanceolate, acute, rounded at base, crenulate, densely glandular villous. Spike 6-7 cm long, cylindrical, terminal; bracts ovate, bracteoles lanceolate; flowers many, densely packed; calyx lobes 5, equal; corolla 3-5 mm long; lobes 4, equal, obtuse, hairy; stamens 4, filaments bearded, anthers 1-celled; ovary glabrous, style slender, stigma 2-lobed. Nutlets glabrous, smooth, brown.
Flowering & Fruiting: February-July.
Distribution: Indo-Malesia to Australia and south *China.* Occasional; in evergreen forests. *RNMK 2199,* Pilakavu.

Pogostemon benghalensis (Burm. f.) O. Kuntze., Rev. Gen. Pl. 2: 517. 1891; V. S. Ramach. & V.J. Nair, Fl. Cannanore 371. 1988; Vajr., Fl. Palghat Dist. 381. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 364. 1996; Mohanan & Sivad., Fl. Agasthyamala 537. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 403. 2005. *Origanum benghalense* Burm. f., Fl. Ind. 128,t.38, f. 3. 1768. *Pogostemon plectranthoides* Desf., Ann Mus. Natl. Hist. Nat. Paris 2: 156. t. 6. 1808; Hook. f., Fl. Brit. India 4: 632. 1885; Gamble, Fl. Pres. Madras 1133(793). 1924; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 69. 1940.

Shrubs, 1.5-2 m high; stem hoary pubescent, subterete, reddish. Leaves 12-15 x 5-6 cm, ovate to lanceolate, acute, base attenuate, serrate, nerves 3-5 pairs; petiole 2-5 cm long. Panicle large, 15-25 cm long, with many congested and 1-sided cymes; bracteoles ovate, acute, hairy; flowers many, densely packed; calyx pubescent outside, glabrous inside; lobes acuminate; corolla

pink, 7-8 mm long, lobes acute, hairy, pink; staminal filaments unequal. purple, bearded with moniliform hairs.
Flowering & Fruiting: January-March.
Distribution: India. Occasional; in evergreen forests. *RNMK 1275,* Sugandhagiri-Amba.

Pogostemon gardneri Hook.f., Fl. Brit. India 4: 632. 1885; Gamble, Fl. Pres. Madras 1133(792). 1924; Manilal, Fl. Silent Valley 222. 1988.

Erect herbs; stem villous; leaves 10-12 x 7-8 cm, long-petioled, ovate, acuminate, cuneate at base, crenate, pubescent. Flowers in terminal panicled spikes; bracts oblong–lanceolate, ciliate; corolla pink. Nutlets orbicular.
Flowering & Fruiting: March-May.
Distribution: Endemic to southern Western Ghats. Occasional; in shola margins. *RNMK 2843,* Chembra.

Pogostemon heyneanus Benth. in Wall., Pl. Asiat. Rar. 1: 31. 1830; Wight, Ic. t. 1440; Gamble, Fl. Pres. Madras 1133(792). 1924; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 71. 1940; V. S. Ramach. & V.J. Nair, Fl. Cannanore 371. 1988; Vajr., Fl. Palghat Dist. 381. 1990; Sivar. & P. Mathew, Fl. Nilambur 553. 1997; Mohanan & Sivad., Fl. Agasthyamala 537. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 403. 2005. *Pogostemon patchouli* sensu Hook. f., Fl. Brit. India 4: 653. 1885, non Pellet 1845; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 156. 1988. *Cottam* Rheede, Hort. Malab. 10: 153, t. 77. 1690.

Subshrubs; stem hoary tomentose. Leaves 9-11 x 5-6 cm, ovate, acute, irregularly crenate, glabrescent; petiole 3-4 cm long. Racemes panicled, interrupted, not 1-sided; bracts and bracteoles similar, 2-2.5 mm; flowers few together; calyx glandular, lobes triangular; corolla 4-5 mm long; lower lip 3-lobed, middle lobe narrower, acute; filaments bearded. Nutlets biconvex, orbicular, smooth, brown.
Flowering & Fruiting: November-February.
Distribution: Indo-Malesia. Occasional; in evergreen forest margins. *RNMK 1092,* Vythiri; *RNMK 3096*, Sugandhagiri.

Pogostemon paniculatus (Willd.) Benth. in Wall., Pl. Asiat. Rar. 1:30.1830; Hook. f., Fl. Brit. India 4: 631. 1885; Gamble, Fl. Pres. Madras 1132(792). 1924; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 68. 1940; Manilal & Sivar., Fl. Calicut 240. 1982; Ansari, Fl. Kasaragod Div. 309. 1985; Manilal, Fl. Silent Valley 222. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 156. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 372. 1988; Vajr., Fl. Palghat Dist. 382. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 364. 1996; Sivar. & P. Mathew, Fl. Nilambur 553. 1997; Mohanan & Sivad., Fl. Agasthyamala 538. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 403. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 585. 2009. *Elsholtzia paniculata* Willd., Sp. Pl. 3: 59. 1800. *Manam-podam* Rheede, Hort. Malab. 10: 129, t. 65. 1690.

Subshrubs. Leaves 7-8 x 3.5-4 cm, ovate, acuminate at either ends, irregularly dentate, densely hirtus-tomentose; lateral nerves 3-4 pairs; petiole ca. 2 cm long, tomentose. Panicle large, branches 5-10-flowered, 1-sided; bracteoles oblique, falcate, imbricating regularly; flowers densely packed; calyx 5-ribbed; lobes acuminate, hirtus; corolla purplish, 5-6 mm long; pubescent outside; filaments bearded; nutlets globose.
Flowering & Fruiting: October-February.
Distribution: Peninsular India and Myanmar. Occasional; in semi-evergreen forests. *RNMK 0196,* Manikkunnumala.

Pogostemon pubescens Benth. in DC., Prodr. 12: 142. 1848; Gamble, Fl. Pres. Madras 1133(792). 1924; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 69. 1940; V. S. Ramach. & V.J. Nair, Fl. Cannanore 372. 1988; Manilal, Fl. Silent Valley 223. 1988; Vajr., Fl. Palghat Dist. 382. 1990. *Pogostemon parviflorus* Benth. in Wall., Pl. Asiat. Rar. 1: 31. 1830,p.p.; Hook. f., Fl. Brit. India 4: 632. 1885.

Shrubs. Leaves 7-8 x 3-4 cm, ovate, apex acute, base cuneate, doubly crenate membranous, sparsely hirsute; petiole 3-3.5 cm. Panicles axillary and terminal; bracts ca. 5 mm, oblong, ciliate; calyx teeth pubescent; corolla tube 3-5 mm, upper lip, 3-lobed, white with purple tinge; filaments ca. 6 mm long, bearded. Nutlets ellipsoid.
Flowering & Fruiting: November-December.
Distribution: India and Sri Lanka. Occasional; in evergreen forests. *RNMK 2199,* Kunchome.

Pogostemon purpurascens Dalz. in Hook.'s J. Bot. Kew. Gard. Misc. 2: 337. 1850; Hook. f., Fl. Brit. India 4: 632. 1885; Gamble, Fl. Pres. Madras 1133(792). 1924; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 71. 1940; V. S. Ramach. & V.J. Nair, Fl. Cannanore 372. 1988; Vajr., Fl. Palghat Dist. 382. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 364. 1996; Sivar. & P. Mathew, Fl. Nilambur 554. 1997.

Densely pubescent diffuse herbs. Leaves 6-7 x 4-5 cm, ovate, oblique at base, acute at apex, irregularly dentate, nerves 4 pairs; petiole ca. 1 cm long. Spikes 10-20-flowered, clustered, racemose or panicled; bracteoles ovate-falcate, regularly imbricating, hairy; flowers densely packed; calyx lobes acute; corolla purple, 6-7 mm long, hairy, lobes acute, hairy; filaments bearded with purple moniliform hairs. Nutlets trigonous, dark brown, smooth
Flowering & Fruiting: January-April.
Distribution: Endemic to south-west India. Occasional; in moist deciduous forests. *RNMK 1087,* Muthanga.

Pogostemon rotundatus Benth. in Wall., Pl. Asiat. Rar. 1: 31. 1830; Hook. f., Fl. Brit. India 4: 636. 1885; Gamble, Fl. Pres. Madras 1134(793). 1924; Sasidh. & Sivar., Fl. Pl. Thrissur For. 365. 1996. **Plate 26h.**

Profusely branched herbs; stem villous. Leaves ca. 3 x 2.5 cm, villous above and below, crenate along the margins; nerves 3 pairs; petiole to 1 cm long. Spike 6-12 x 0.8-1 cm, terminal solitary, cylindrical, continuous; bracts and bracteoles minute; flowers densely packed; calyx ca. 4 mm long, densely hairy, lobes acuminate; corolla white or yellow, ca. 6.5 mm long; lobes obtuse; filaments bearded. Nutlets biconvex, obovoid, minutely reticulate, brown.
Flowering & Fruiting: November-January.
Distribution: Endemic to Peninsular India. Rare; in grasslands. *RNMK 2001,* Kurichiarmala; *RNMK 3233*, Chembra.

SCUTELLARIA Linnaeus
Sp. Pl. 598. 1753.

Soft erect herbs; stem terete. Leaves ovate, usually cordate at base, crenate, petiolate. Flowers in terminal racemes, paired at each node, bracteoles small; calyx bilabiate; lips closed in fruit, upper lip saccate, pouched on its dorsal surface; lower lip saccate; corolla 2-lipped; lower lip broad, 3-lobed; upper lip entire, broad; stamens 4, didynamous; anthers connivent; ovary 4-partite, style slender, stigmatic lobes unequal. Nutlets globose, glandular or tubular.

1. Leaf base cordate; nutlets spinulose ..... **S. violacea**
1. Leaf base cuneate; nutlets tuberculate ..... **S. colebrookeana**

Scutellaria colebrookiana Benth. in Wall., Pl. Asiat. Rar. 1:67. 1830, "colebrookeana"; Gamble, Fl. Pres. Madras 1142(799). 1924; Manilal & Sivar., Fl. Calicut 236. 1982. *Scutellaria violacea* Heyne ex Benth. var. *colebrookIana* (Benth.) Hook. f., Fl. Brit. India 4: 668. 1885.

Puberulus herbs. Leaves 3-4 x 3-4 cm, deltoid, acute, base truncate, dentate, nerves 4-6 pairs; petioles 2-2.5 cm long. Racemes 10-12 cm long, bracts ovate, acute; flowers paired, calyx upper lip and lower lip equal, white, glabrous; corolla 1-1.2 cm long, pale purple, glabrous, lower lip broader; filaments glabrous. Nutlets tuberculate, dark brown
Flowering & Fruiting: October-December.
Distribution: Endemic to Western Ghats. Occasional; in shola forest fringes. *RNMK 3249,* Chembra; *RNMK 3093*, Kurichiarmala.

Scutellaria violacea Heyne ex Benth. in Wall., Pl. Asiat. Rar. 1: 66. 1830; Hook. f., Fl. Brit. India 4: 668. 1885; Gamble, Fl. Pres. Madras 1142(798). 1924; Mukerjee in Rec. Bot. Surv. Ind. 14(1): 145. 1940; Wight, Ic. t. 1449. 1849; Manilal, Fl. Silent Valley 224. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 373. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 365. 1996; Mohanan & Sivad., Fl. Agasthyamala 539. 2002. *Scutellaria violacea* Heyne ex Benth. var. *sikkimensis* Hook.f., Fl. Brit. India 4: 668. 1885.

Erect herbs; stem hispid. Leaves 6-7 x 4-5 cm, ovate, acute, crenate, base cordate, hispid; petiole 4-5 cm long. Racemes 13-15 cm long, glandular hispid; bracts ovate; flowers paired, long-pedicelled; calyx glabrous, upper

lobe saccate; corolla pale blue, ca. 1.5 cm long, lateral lobes of lower lip shorter, glabrous; filaments fimbriate at base; anthers bearded, confluent. Nutlets spherical, tuberculate
Flowering & Fruiting: February-May.
Distribution: South India and Sri Lanka. Occasional; in evergreen forests. *RNMK 1390,* Brahmagiri.

Salvia leucantha Cav., **Plectranthus zeylanicus** Benth., **Plectranthus amboinicus** (Lour.) Spreng. **Ocimum tenuiiflorum** L. and **Orthosiphon aristatus** (Bl.) Miq. are getting naturalised and **Pogostemon cablin** (Blanco) Benth., a native of Sri Lanka and South East Asia is now widely cultivated in the district.

PLANTAGINACEAE Juss.

Gen. Pl. 89. 1789.

PLANTAGO Linnaeus

Sp. Pl. 112. 1753.

Plantago erosa Wall. in Roxb., Fl. Ind. 1: 423. 1820. *Plantago major* sensu Hook. f., Fl. Brit. India 4: 705. 1885 p.p., non L. 1753; Manilal, Fl. Silent Valley 224. 1988. *Plantago asiatica* sensu Wight, Ill. t. 177. 1850; Gamble, Fl. Pres. Madras 1160(811). 1923, non L. 1753.

Herbs; stem short or absent. Leaves radical 7-9 x 5-7 cm, ovate, obtuse, decurrent at base into a winged petiole, villous; petiole 5-7 cm long, sheathing at base. Flowers in elongated axillary spikes, densely packed, bracts ovate, keeled; sepals 4, ovate, free; corolla white, 2-2.5 mm long, salver-shaped, shortly lobed at apex, white; stamens 4, epipetalous, anthers versatile; ovary 1-celled; ovules 5-10, free central; style 1, terminal, stigma linear. Fruit a circumscissile capsule, 5-6 x 2.5-3 mm; seeds many, oblong, black.
Flowering & Fruiting: August-October. *Distribution*: Pantropical. Occasional in evergreen forest margins. *RNMK 3063,* Kallady-900 forest.

NYCTAGINACEAE Juss.

Gen. Pl. 90. 1789.

1. Diffuse herbs; flowers bisexual ..... **Boerhavia**
1. Scandent shrubs; flowers unisexual ..... **Pisonia**

BOERHAVIA Linnaeus

Sp. Pl. 3. 1753.

Boerhavia diffusa L., Sp. Pl. 3. 1753; Gamble, Fl. Pres. Madras 1162(814). 1925; Manilal & Sivar., Fl. Calicut 242. 1982; Ansari, Fl. Kasaragod Div. 310. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 373. 1988; Vajr., Fl. Palghat Dist. 383. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 366. 1996; Sivar. & P.

Mathew, Fl. Nilambur 556. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 586. 2009. *Boerhavia repens* L., Sp. Pl. 3. 1753; Hook. f., Fl. Brit. India 4: 709. 1885; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 40. 1988; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 404. 2005. *Boerhavia procumbens* Banks ex Roxb., Fl. Ind. 1: 148. 1820; Wight, Ic. t. 874. *Taludama* Rheede, Hort. Malab. 7:105, t.56. 1988.

Herbs with long trailing branches; stem reddish, tomentose. Leaves unequal, ovate, obtuse, undulate along margins, truncate to subcordate at base, tomentose; petiole 1-1.5 cm long. Flowers 4-5 mm long, 4-10 together, in axillary or terminal, peduncled umbels; bracts 5, ovate, glandular, perianth pink, stamens 3, capsule ca. 3 x 1 mm, clavate, 5-ribbed, glandular.
Flowering & Fruiting: August-December.
Distribution: Pantropical. Occasional; in open areas. *RNMK 3251*, Poothady.

PISONIA Linnaeus
Sp. Pl. 1026. 1753.

Pisonia aculeata L., Sp. Pl. 1026. 1753; Wight, Ic. t. 1763. 1852; Hook. f., Fl. Brit. India 4: 711. 1885; Gamble, Fl. Pres. Madras 1163(815). 1925; V. S. Ramach. & V.J. Nair, Fl. Cannanore 374. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 366. 1996.

Scandent shrubs, branchlets pubescent. Leaves opposite and alternate, 5-8 x 2-4 cm, ovate, apex obtuse, base cuneate, chartaceous; petiole ca. 2 cm long. Umbels axillary; peduncles pubescent; bracteoles ovate, pubescent; perianth 4-6 mm across, funnel shaped, 10-lobed, alternately long and short; stamens 6-10, filaments ca. 5 mm long, connate at base; ovary seated on a disc, 1-celled, one ovuled. Fruit to oblong, 5-ribbed, stalked viscid glandular.
Flowering & Fruiting: March-April.
Distribution: Pantropics. Occasional; in semi-evergreen forests. *RNMK 3466,* Mnaikkunnumala.

AMARANTHACEAE Juss.
Gen. Pl. 87. 1789.

1. Leaves alternate 2
1. Leaves opposite 6
2. Flowers in globose heads ..... **Allmania**
2. Flowers in simple or paniculate heads 3
3. Spike simple, lax, glabrous ..... **Celosia**
3. Spike paniculate or in axillary clusters 4
4. Spike in axillary clusters, white tomentose ..... **Aerva**
4. Spike paniculate, glabrous 5
5. Spike dense; flowers unisexual ..... **Amaranthus**
5. Spike lax; flowers bisexual ..... **Indobanalia**
6. Inflorescence an elongated, slender spike 7
6. Inflorescence otherwise 8

7. Flowers all fertile, solitary; bracteole spinescent .....**Achyranthes**
7. Flowers fertile and sterile, in groups; bracteoles not spinescent.....**Cyathula**
8. Prostrate or decumbent herbs; anthers 1-celled .....**Alternanthera**
8. Erect herbs; anthers 2-celled..... **Gomphrena**

ACHYRANTHES Linnaeus
Sp. Pl. 204. 1753.

Erect woody herbs; branches few, quadrangular. Leaves opposite, simple, entire, shortly petioled. Spike terminal or upper axillary, much elongated, narrow; bracts and bracteoles lanceolate. Flowers distant; tepals 5, equal, lanceolate, free or connate at base; stamens 5, filaments united into a membranous tube, staminodes small, membranous, truncate or semicircular; ovary 1-celled, truncate at apex; style undivided; stigma terminal. Achene oblong, truncate at apex.

1. Leaves linear-lanceolate to 16 cm, membranous; staminal tube truncate .....**A. bidentata**
1. Leaves ovate-elliptic to 10 cm, coriaceous; staminal tube semi-circular.....**A. aspera**

Achyranthes aspera L., Sp. Pl. 204. 1753; Wight, Ic. t. 1777. 1852; Hook. f., Fl. Brit. India 4: 730. 1885; Gamble, Fl. Pres. Madras 1176(823). 1925; Manilal & Sivar., Fl. Calicut 245. 1982; Ansari, Fl. Kasaragod Div. 311. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 375. 1988; Vajr., Fl. Palghat Dist. 385. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 367. 1996; Sivar. & P. Mathew, Fl. Nilambur 557. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 405. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 588. 2009

Erect stout herbs; stems tomentose. Leaves 7-10 x 4-6 cm, broadly elliptic to obovate, abruptly acuminate, tomentose, nerves 6-8 pairs; petiole 4-7 mm long. Spike 15-25 cm long, hispid; bracts lanceolate, aristate; bracteoles entire, aristate; flowers deflexed; tepals 7-7.5 x 2-2.5 mm, elliptic, acute, glabrous, equal; staminal sheath truncate; ovary truncate at apex. Achenes ca. 3 mm long, ovoid, brown.
Flowering & Fruiting: October-March.
Distribution: Pantropical. Common; in plantations and moist deciduous forests. *RNMK 3032,* Puthoorvayal; *RNMK 1535*, Muthanga.

Achyranthes bidentata Bl., Bijdr. 545. 1826; Wight, Ic. t. 1779. 1852; Gamble, Fl. Pres. Madras 1176(824). 1925; Manilal, Fl. Silent Valley 225. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 375. 1988; Vajr., Fl. Palghat Dist. 385. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 367. 1996.

Erect herbs; stems glabrous. Leaves lanceolate, to linear-lanceolate, acuminate, thinly pubescent, nerves 7-9 pairs; petiole 5-7 mm long. Spike axillary and terminal, 15-30 cm long, narrow, glabrous; bracts lanceolate, long-aristate; bracteoles entire, strongly aristate; flowers distant, perpendicular to axis; tepals equal, 7-8 x 1.5-2 mm, lanceolate, acuminate,

glabrous; staminal sheath truncate. Achenes ca. 3 x 1.5 mm, cylindrical, longitudinally striate, reddish-brown.
Flowering & Fruiting: September-December.
Distribution: Indo-Malesia to Australia and east Asia. Rare; in evergreen forests. *RNMK 0129,* Chooralmala; *RNMK 2490*, Sugandhagiri.

AERVA Forsskal
Fl. Aegypt.-Arab. 170, 122. 1775, *nom. cons.*

Aerva lanata (L.) Juss. ex Schult., Ann. Mus. Natl. Hist. Nat. 11: 131. 1808; Wight, Ic. t. 723. 1840; Hook. f., Fl. Brit. India 4: 728. 1885; Gamble, Fl. Pres. Madras 1178(825). 1925; Manilal & Sivar., Fl. Calicut 244. 1982; Ansari, Fl. Kasaragod Div. 312. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 44. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 376. 1988; Vajr., Fl. Palghat Dist. 385. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 368. 1996; Sivar. & P. Mathew, Fl. Nilambur 558. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 405. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 589. 2009. *Achyranthes lanata* L., Sp. Pl. 204. 1753. *Aerva floribunda* Wight, Ic. t. 723. 1840. Scheru-bula Rheede, Hort. Malab. 10:57, t.29. 1690.

Herbs, white woolly. Leaves 3-4 x 2-3 cm, orbicular to ovate, apex obtuse, mucronate, pubescent above, densely woolly below, membranous; petiole ca. 1 cm long. Spikes axillary, 1-2 cm, densely tomentose; bracts and bracteoles ovate; tepals 1.5-2 mm, oblong, woolly mucronate; filaments basally connate, staminodes subulate.
Flowering & Fruiting: September-April.
Distribution: Widespread in the tropics and subtropics. Occasional; in open areas. *RNMK 1260,* Poothady.

ALLMANIA R. Brown ex R. Wight
J. Bot. (Hooker) 1: 226. 1834.

Allmania nodiflora (L.) R. Br. ex Wight in Hook., J. Bot. 1: 226. t. 128. 1834; Hook. f., Fl. Brit. India 4: 716. 1885; Gamble, Fl. Pres. Madras 1167(817). 1925; Manilal, Fl. Silent Valley 225. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 44. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 368. 1996; Sivar. & P. Mathew, Fl. Nilambur 558.1997; Mohanan & Sivad., Fl. Agasthyamala 540. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 406. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 589. 2009. *Celosia nodiflora* L., Sp. Pl. 205. 1753.*Pee-tardavel* Rheede, Hort. Malab. 9:153, t.79. 1689.

Diffuse herbs, stem puberulus. Leaves alternate, 2-6 x 1-1.5 cm, elliptic-oblong, acute, entire, glabrous. Flowers in terminal and axillary globose congested cymes, pedicelled; bracts and bracteoles lanceolate, acuminate with filiform tips; tepals 5, equal, lanceolate, acute, free to the base, 1-nerved, glabrous; stamens 5, filaments united below into a membranous cup, glabrous; ovary obovoid, 1-celled, 1-ovuled; style 1, slender; stigma 2-toothed. Achenes ellipsoid with a long beak, biconvex, black.

Flowering & Fruiting: July-October.
Distribution: Tropical Asia. Rare; in moist deciduous forests. *RNMK 1902,* Muthanga.

ALTERNANTHERA Forsskal
Fl. Aegypt.-Arab. 28. 1775.

Diffuse or prostrate herbs. Leaves opposite, simple, entire. Flowers in axillary sessile spikes, densely arranged, bisexual; bracts and bracteoles hyaline; perianth lobes 5, unequal, outer 3 larger, inner smaller, all calycine; stamens 3 or 5; filaments connate in a short cup; ovary obovoid, 1-celled, 1-ovuled; style absent, stigma globose or bilobed, sessile. Fruit a utricle, orbicular or obovoid; seeds compressed, lenticular.

1. Stems densely pilose; perianth lobes aristate, spinescent 2
1. Stems glabrous or sparsely hairy; perianth lobes acute, scarious 3
2. Bracts and bracteoles hairy.....**A. bettzickiana**
2. Bracts and bracteoles glabrous ..... **A. pungens**
3. Leaves spathulate; perianth lobes unequal..... **A. paronychioides**
3. Leaves oblong-oblanceolate; perianth lobes equal..... **A. sessilis**

Alternanthera bettzickiana (Regel) Voss in Vilmorin, Blumengartn. (ed 3) 1: 869. 1896. *Telanthera betzickiana* Regel, Index Sem. Hort. Petrop. 1862: 28. 1862.

Erect or ascending herbs. Leaves elliptic or rhomboid, acute or acuminate, base attenuate, 8-10 x 4-4.5 cm. Heads globose, ca. 1 cm across, axillary, peduncle 1-1.5 cm long.; tepals lanceolate, mucronate, white; staminodes laciniate at apex.
Flowering & Fruiting: October-February.
Distribution: Native of Tropical America; now getting naturalised in Asia. Occasional; in moist deciduous forests. *RNMK 2438,* Muthanga-Thakarapady.

Alternanthera paronychioides A. St. Hill, Voy. Bres. 2: 439. 1833; Sundaraj, J. Bombay Nat. Hist. Soc. 53: 525. 1956; Veldk., Bl. 19:167. 1971; Sasidh. & Sivar., Fl. Pl. Thrissur For. 369. 1996.

Prostrate herbs; stem sparsely covered with long crisped hairs. Leaves 2-5-3 x 0.7-1 cm, oblanceolate to spathulate, acute, glabrous. Spike solitary, axillary, few-flowered, sessile; bracts and bracteoles similar, hyaline, apiculate; flowers densely packed; tepals 5, outer three larger, ovate, acute, inner smaller, all hairy; stamens 3-5; ovary obovoid, compressed, stigma bilobed.
Flowering & Fruiting: June-August.
Distribution: Native of Tropical America, getting established in tropical Asia. Common along roadsides. *RNMK 2791,* Puthoorvayal; *RNMK 3447*, Kalloor.

Alternanthera pungens Kunth in HBK, Nov. Gen. Sp. 2: 206. 1817; Townsend in Kew Bull. 28: 145-146. 1973; V. S. Ramach. & V.J. Nair, Fl. Cannanore 376. 1988; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 591. 2009.

Prostrate herbs. Leaves 1.5-2 x 0.8-1 cm, deltoid to obovate, obtuse, base narrowed into a short petiole, glabrous. Spikes 2-3 together, axillary, sessile; bracts and bracteoles equal, ca. 5 mm long, scarious, aristate; flowers densely packed; tepals 5, outer three larger, ca. 5 mm long, lanceolate, aristate, one oblong, obtuse, inner smaller, boat shaped, keeled, aristate, all 3-ribbed, barbed at base; stamens 5, filaments united at base; ovary obovoid; stigma capitate, sessile.

Flowering & Fruiting: May-June.

Distribution: Native of American; now wide spread as a weed in the tropics and subtropics of the Old World. Common; in moist deciduous forests. *RNMK 1535,* Bavali.

Alternanthera sessilis (L.) R. Br. ex. DC., Cat. Hort. 4: 77. 1813; Wight, Ic. t. 513. 1841; Hook. f., Fl. Brit. India 4: 731. 1885; Manilal & Sivar., Fl. Calicut 245. 1982; Ansari, Fl. Kasaragod Div. 312. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 45. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 377. 1988; Joseph, Aquatic Angiosp. Malabar 49. 1991; Vajr., Fl. Palghat Dist. 386. 1990; Sivar. & P. Mathew, Fl. Nilambur 559. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta406. 2005 ; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 591. 2009. *Gomphrena sessilis* L., Sp. Pl. 225. 1753. *Alternanthera triandra* Lamk., Encycl. 1: 95. 1785; Gamble, Fl. Pres. Madras 1179(825). 1925. *Coluppa* Rheede, Hort. Malab. 10:21-22, t.11. 1960.

Erect or prostrate herbs; stems glabrous. Leaves 4-5 x 1-1.5 cm, elliptic-oblong to oblanceolate, obtuse, crenate, attenuate at base into a petiole, glabrous. Spike sessile, solitary or 2-3 together; bracts and bracteoles similar, broadly ovate, acute, glabrous; flowers yellowish red; tepals equal, ovate, acute, glabrous, 3-nerved at base; stamens 3. Achenes obovoid, emarginate at apex; seed orbicular, compressed, brown.

Flowering & Fruiting: Throughout the year.

Distribution: Pantropical. Common; in marshy areas and paddy fields. *RNMK 0020,* Puthoorvayal; *RNMK 0140*, Kalpetta.

AMARANTHUS Linnaeus

Sp. Pl. 989. 1753.

Erect or documbent, unarmed or spinous annual herbs. Flowers unisexual in spikes, axillary, solitary or terminal and panicled; tepals 3-5, free; stamens 3-5, filaments free; anthers 2-celled; staminodes absent; ovary 1-ovuled; style 1, stigmas 2 or 3. Utricle membranous.

1. Plants with axillary spines.....**A. spinosus**
1. Plants unarmed.....**A. viridis**

Amaranthus spinosus L., Sp. Pl. 991. 1753; Wight, Ic. t. 513. 1841; Hook. f., Fl. Brit. India 4: 718. 1885; Gamble, Fl. Pres. Madras 1170(819). 1925; Manilal & Sivar., Fl. Calicut 243. 1982; Ansari, Fl. Kasaragod Div. 313. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 378. 1988; Manilal, Fl. Silent Valley 226. 1988; Vajr., Fl. Palghat Dist. 387. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 369. 1996; Sivar. & P. Mathew, Fl. Nilambur 561. 1997; Mohanan & Sivad., Fl. Agasthyamala 541. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 407. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 593. 2009.

Subshrubs, armed, spines axillary. Leaves 5-10 x 3-4 cm, ovate-oblong, apex obtuse, base cuneate, mucronate, membranous; petiole 5-7 cm long. Spikes axillary and terminal, dense, 15-20 cm long; bracts and bracteoles curved; male flowers-tepals lanceolate; stamens 5, female flowers-tepals oblong, subequal.

Flowering & Fruiting: June-December.

Distribution: Originally from America; now found throughout the warmer regions of the world. Common; along roadsides. *RNMK 0130,* Kalpetta; *RNMK 0120*, Chundel.

Amaranthus viridis L., Sp. Pl. (ed. 2) 1405. 1763; Hook. f., Fl. Brit. India 4: 720. 1885; Gamble, Fl. Pres. Madras 1171(820). 1925; Manilal & Sivar., Fl. Calicut 243. 1982; Ansari, Fl. Kasaragod Div. 313. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 378. 1988; Vajr., Fl. Palghat Dist. 387. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 369. 1996; Sivar. & P. Mathew, Fl. Nilambur 561. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 407. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 594. 2009.

Glabrous herbs, stems green or sometimes reddish. Leaves 5-10 x 2-5 cm, alternate, ovate, acute, truncate at base; nerves 3-6 pairs; petiole 4-6 cm long. Spikes terminal and axillary, interrupted; flowers unisexual, mixed, densely arranged; bracts and bracteoles similar, ovate, acuminate; tepals 3, obovate, obtuse; stamens 3, free; ovary obovoid, styles 2, frees stigmas terminal. Achenes ovoid, acute, membranous; seed biconvex, dark brown, shining with hexagonal epidermal cells.

Flowering & Fruiting: June-December.

Distribution: Pantropical. Common; along roadsides and moist shady places. *RNMK 3047,* Manivayal; *RNMK 3042*, Puthoorvayal.

CELOSIA Linnaeus

Sp. Pl. 205. 1753.

Celosia argentea L., Sp. Pl. 205. 1753; Hook. f., Fl. Brit. India 4: 714. 1885; Gamble, Fl. Pres. Madras 1166(816). 1925; Manilal & Sivar., Fl. Calicut 246. 1982; Ansari, Fl. Kasaragod Div. 313. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 378. 1988; Vajr., Fl. Palghat Dist. 387. 1990; Sivar. & P. Mathew, Fl. Nilambur 562. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 595. 2009.

Erect herbs; 40-50 cm tall. Leaves 8-10 x 0.5-0.7 cm, linear-lanceolate, acute to acuminate. Flowers in spikes, terminal, spike elongated, ellipsoid. 12-15 cm long, flowers white, ca. 1 cm long. Seeds black, shining.
Flowering & Fruiting: November-December.
Distribution: Cosmopolitan. Occasional; in moist deciduous forests. *RNMK 1535,* Muthanga.

CYATHULA Blume
Bijdr. 548. 1826, *nom. cons.*

Cyathula prostrata (L.) Bl., Bijdr. 549. 1826; Hook. f., Fl. Brit. India 4: 722. 1885; Gamble, Fl. Pres. Madras 1172(820). 1925; Manilal & Sivar., Fl. Calicut 243. 1982; Ansari, Fl. Kasaragod Div. 314. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 47. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 379. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 370. 1996; Sasidh. & Anto in Manoharan *et al.*, Silent Valley-Whispers Reason 136. 1999; Mohanan & Sivad., Fl. Agasthyamala 541. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 407. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 595. 2009. *Achyranthes prostrata* L., Sp. Pl. (ed. 2) 296. 1762. Desmochaeta prostrata (l.) Dc., Cat. Hort. Monosp. 102. 1813; Wight., Ic. t. 733. 1843. *Scheru-cadelari* Rheede, Hort. Malab. 10; 157, t. 79. 1690.

Decumbent herbs. Leaves opposite, 6-7 x 3-3.5 cm, rhomboid, acute at either ends, thinly pubescent; petiole 0.5-1.5 cm long. Spike terminal, 15-18 cm long, slender, solitary; flowers in groups of 3-5 of which one perfect and other neutor flowers; bracts and bracteoles similar, lanceolate, acuminate, pubescent; sepals 5, free, elliptic, acute, hooked, awn like in neutor flowers; stamens 5, filaments united into a membranous truncate cup; staminodes membranous, alternate with stamens, fimbriate; ovary ovoid, style simple, stigma capitellate. Achenes obovoid, compressed, golden brown.
Flowering & Fruiting: September-April.
Distribution: Pantropical. Common; in open areas and along roadsides. *RNMK 1541*, Kalpetta; *RNMK 2062*, Muthanga.

GOMPHRENA Linnaeus
Sp. Pl. 224. 1753.

Diffuse or erect herbs. Leaves decussate. Spikes terminal or axillary, subtended by basal leaves; floweres bisexual, 2 bracteolate; tepals 5, unequal; stamens 5, connate below; ovary 1- ovuled. Utricle irregularly rupturing.

1. Spikes 6-8 cm long; axillary or terminal ..... **G. celosioides**
1. Spikes to 2 cm long; terminal ..... **G. serrata**

Gomphrena celosioides Martius. Beitr. Amarantac. 93. 1825; Manilal & Sivar., Fl. Calicut 246. 1982; Vajr., Fl. Palghat Dist. 388. 1990; Sivar. & P. Mathew, Fl. Nilambur 562. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 408. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 596. 2009.

Gomphrena decumbens sensu Gamble, Fl. Pres. Madras 1179(825). 1925, non Jacq. 1805.

Prostrate herbs, branchlets woolly. Leaves 2-4 x 0.8-1 cm, elliptic, obovate, apex acute, mucronate, spathulate, woolly beneath. Spikes terminal and sometimes axillary, 6-8 cm long; bracts scarious, mucronate, ciliate at apex; bracteoles 2, ovate, mucronate; tepals 5, lanceolate, acute at apex, woolly at the back of the inner 3 tepals; stamens 5; ovary 1-ovuled, stigma 2-fid.
Flowering & Fruiting: September-December.
Distribution: Originally from south America; now widespread in the tropics. Occasional in moist deciduous forests. *RNMK 0126,* Muthanga.

Gomphrena serrata L., Sp. Pl. 224. 1753; Mears in Taxon 29:86. 1980; V. S. Ramach. & V.J. Nair, Fl. Cannanore 379. 1988. *Gomphrena decumbens* Jacq., Hort. Schoenbr. t. 482. 1805.

Decumbent herbs; stems hispid. Leaves opposite, 4-5 x 0.9-1 cm, obovate, obtuse, tomentose. Spikes ca. 2 x 1 cm, oblong, supported by 2 basal bracts; flowers many, densely packed; tepals 5, outer ones lanceolate, 7-8 mm long, strongly aristate, white-cottony hairy, inner smaller; stamens 5, filaments combined into a tube; ovary obovoid; style forked above. Achenes membranous, circumscissile; seed one, muriculate, brown; sterile flowers with hooked, bristle like tepals.
Flowering & Fruiting: July-November.
Distribution: Native of south America. Occasional; in moist deciduous forests. *RNMK 2438,* Tholpetty.

INDOBANALIA A. N. Henry et B. Roy
Bull. Bot. Surv. India 10: 274. 1969.

Indobanalia thyrsiflora (Moq.) Henry & Roy, Bull. Bot. Surv. India 10: 274. 1968; Manilal, Fl. Silent Valley 226. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 379. 1988; Vajr., Fl. Palghat Dist. 388. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 370. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 408. 2005. *Banalia thyrsiflora* Moq. in DC., Prodr. 13: 278. 1849; Wight, Ic. t. 1774. 1852; Hook. f., Fl. Brit. India 4: 716. 1885; Gamble, Fl. Pres. Madras 1167(817). 1925. **Plate 26i.**

Erect herbs; stems glabrous, ribbed. Leaves alternate, 7-10 x 4-5 cm, ovate, acuminate, cuneate at base, hairy below; lateral nerves 8-10 pairs; petiole ca. 2 cm long. Spikes thyrsoid, panicled, narrow, terminal and axillary; bracts and bracteoles similar, broadly ovate; flowers 2-3 together; sepals free, equal, 3-nerved, glabrous; stamens 5, filaments jointed into a tube; ovary ellipsoid, compressed, 1-ovuled, style-1, slender; stigmas 2, linear, papillose. Achenes globose; seed orbicular, black.
Flowering & Fruiting: December-March.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1194,* Thirunelli.

PSILOTRICHUM Blume
Bijdr. 544. 1825-1826.

Psilotrichum elliotii Baker & Clarke in Dyer, Fl. Trop. Africa 6: 58. 1909. *Psilotrichum calceolatum* Moq. ex Hook. f., Fl. Brit. India 4: 725. 1885; Gamble, Fl. Pres. Madras 1174(822). 1925. *Psilotrichum nudum* sensu Wight, Ic. t. 1775. 1852, non (Heyne ex Wall.) Moq. 1849.

Herbs. Leaves to 4 x 2 cm, ovate, acute at apex, obtuse at base, pubescent; petiole ca. 3 mm long. Spikes axillary, to 2 cm long; bracts ca. 1.5 mm long, ovate, acute, pubescent; bracteoles 2, ca. 1.5 x 1.2 mm, broadly ovate, acute, pubescent; tepals 5, ca. 4 mm long, prominently nerved, silky pubescent lanceolate, acute; stamens 5, connate at base, filaments ca. 1.5 mm long; ovary ca. 0.5 mm long, globose, 1-ovuled, style ca. 0.5 mm long, stigma capitellate. Utricle ca. 2 mm long.

Flowering & Fruiting: December-February.

Distribution: South India and Tropical Africa. Rare; in moist deciduous forests. *RNMK 3437,* Kattikulam.

Alternanthera versicolor (Regel) Hort. *ex* Regel, and **Amaranthus tricolor** L. are widely grown as ornamental plants. **Alternanthera brasiliana** (L.) Kuntze, **Celosia argentea** L., **Gomphrena globosa** L., and **Amaranthus caudatus** L. are common weed in waysides and cultivated areas in the district.

CHENOPODIACEAE Vent.
Tabl. Regne. Veg. 2: 253. 1799.

CHENOPODIUM Linnaeus
Sp. Pl. 218. 1753.

Erect or prostrate herbs. Leaves alternate, entire, lobed or toothed. Flowers minute, hermaphrodite, in axillary clusters or cymes. Perianth usually 5-lobed, lobes concave, incurved; stamens 5 or fewer, anthers 2-celled; ovary depressed-globose, ovules solitary, subsessile; stigmas 2-5. Fruit a membranous utricle, enclosed in the perianth. Seeds usually horizontal.

1. Aromatic glandular herbs; stigmas 5 ..... **C. ambrosioides**
1. Herbs not aromatic; stigmas 2 ..... **C. album**

Chenopodium album L., Sp. Pl. 219. 1753; Hook. f., Fl. Brit. India 5: 3. 1886; Gamble, Fl. Pres. Madras 1181(827). 1925.

Erect scentless herbs. Leaves 5-7 x 2.5-3 cm rhomboid deltoid or lanceolate, entire or lobed. Flowers minute in clusters in panicled spikes; perianth 5-lobed; stamens 5. Utricle enclosed in the perianth; seeds smooth, shining.

Flowering & Fruiting: Throughout the year.

Distribution: Pantropical. Occasional; in moist deciduous forests. *RNMK 1099,* Puthoorvayal.

Chenopodium ambrosioides L., Sp. Pl. 219. 1753; Wight, Ic. t. 1786. 1852; Hook. f., Fl. Brit. India 5: 4. 1886; Gamble, Fl. Pres. Madras 1181(827). 1925; V. S. Ramach. & V.J. Nair, Fl. Cannanore 380. 1988; Vajr., Fl. Palghat Dist. 389. 1990; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 409. 2005.

Erect pungent smelling herbs, profusely branching. Leaves alternate, 6-8 x 2-3 cm, elliptic to lanceolate, entire to deeply lobed, base attenuate, glabrous, membranous; upper leaves smaller. Flowers bisexual, minute, sessile, clustered in terminal and axillary cymes; perianth 5-lobed, herbaceous, green; stamens 5, free; ovary 1-celled, with solitary ovule; styles 3; stigmas 3. Fruit a utricle enclosed by the persistent perianth.

Flowering & Fruiting: March-April.

Distribution: Native of Tropical America; widely introduced elsewhere. Common; along waysides and paddy fields. *RNMK 1766,* Ponkuzhy; *RNMK 1995,* Meenangady.

BASELLACEAE Moquin-Tandon

Chenop. Monogr. Enum. 1840.

BASELLA Linnaeus

Sp. Pl. 272. 1753.

Basella alba L., Sp. Pl. 272. 1753; Manilal & Sivar., Fl. Calicut 247. 1982; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 597. 2009. *Basella rubra* L., Sp. Pl. 272. 1753; Hook. f., Fl. Brit. India 5: 20. 1886; Gamble, Fl. Pres. Madras 1185(830). 1925. *Basella alba* L. var. *rubra* (L.f.) J.L. Stewart, Punjab Pl. 177.1869.

Twining fleshy herbs; stems terete, glabrous. Leaves 4-5 x 3-4 cm, ovate, acute or obtuse, rounded at base, thick, fleshy, glabrous; petiole ca. 1 cm long. Flowers in axillary, stout, erect, 3-10 cm long spikes; bracts ovate, bracteoles orbicular; perianth calycine, lobes 5, united at base; stamens 5, antitepalous, free; ovary glabrous, 1-celled; ovule 1, styles 3, stigma linear. Utricle globose, 5-7 mm across, fleshy, white, glabrous.

Flowering & Fruiting: December-February.

Distribution: Native of tropical Asia and Africa. Occasional; in moist deciduous forests: *RNMK 1498,* Thakarapady.

PHYTOLACCACEAE R. Br.

in Tuckey, Narr. Exped. Zaire 454. 1818.

RIVINIA Linnaeus

Sp. Pl. 121. 1753.

Rivinia humilis L., Sp. Pl. 121. 1753; Backer in Steenis, Fl. Males. 1, 4: 229. 1951; Ghosh & Sikdar, J., Econ. Tax. Bot. 4: 160. 1983; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 598. 2009. *Rivinia laevis* L., Mant. Pl. 1: 41. 1767; Hook. f., Fl. Brit. India 5: 21. 1888.

Erect herbs or subshrubs; branchlets thinly pubescent. Leaves 3-8 x 1.5-4 cm, ovate-lanceolate, base rounded, margins entire to minutely crenulate; petiole to 3.6 cm long. Racemes terminal and axillary, lax; flowers white, ca. 4 mm across; pedicel to 2 mm long; bracts lanceolate; tepals 4, ca. 2 mm long; stamens 4, filaments ca. 1.5 mm long; ovary globose; style bent, recurved in fruit. Fruit globose, ca. 5 mm across, blood red when ripe; seed lenticular, ca. 2 mm across.

Flowering & Fruiting: November-January

Distribution: Native in tropical America; naturalised in Indo-Malesia. Common in open waste places. *RNMK 1199*, Meppady.

POLYGONACEAE Juss.

Gen. Pl. 82. 1789.

1. Prostrate herbs; flowers in axillary clusters ..... .**Polygonum**
1. Erect or scandent herbs; flowers in heads, racemes or spikes..... **Persicaria**

PERSICARIA (Linnaeus) P. Miller

Gard. Dict. Abr. Ed. 4. 1754.

Herbs or subshrubs. Leaves alternate, entire; stipules connate into a tube, covering the stem, membranous. Flowers bisexual in globose or oblong spike or in panicled racemes, bracteate; perianth lobes 4 or 5, free or connate, imbricate; stamens 4-8, antitepalous, free; ovary 1-celled, ovules solitary, basal, style 3, free or basely united, stigma capitate. Fruits ovoid or trigonous nutlets.

1. Scandent herbs; flowers in heads .....**P. chinensis**
1. Erect herbs; flowers in elongated spikes or racemes 2
2. Ochrea truncate, glabrous at mouth..... **P. glabra**
2. Ochrea obliquely clefted, long ciliate at mouth..... 3
3. Perianth eglandular.....**P. barbatum**
3. Perianth glandular ..... **P. hydropiper**

Persicaria barbata (L.) Hara, Fl. E. Himal. 1: 70. 1966; Joseph, Aquatic Angiosp. Malabar 198. 1991. *Polygonum barbatum* L., Sp. Pl. 362. 1753; Wight, Ic. t. 1798. 1852; Hook. f., Fl. Brit. India 5: 37. 1886; Gamble, Fl. Pres. Madras 1189(833). 1925; Subram., Indian For. 96: 527. 1970; Manilal & Sivar., Fl. Calicut 247. 1982; Ansari, Fl. Kasaragod Div. 315. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 211. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 381. 1988; Vajr., Fl. Palghat Dist. 390. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 371. 1996; Sivar. & P. Mathew, Fl. Nilambur 564. 1997; Mohanan & Sivad., Fl. Agasthyamala 542. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 409. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 600.2009. *Belutta-modela-maccu* Rheede, Hort. Malab. 10:159, t.80. 1690.

Erect stout herbs. Leaves 6-12 x 2-3 cm, elliptic-lanceolate, acuminate at either ends, glabrate or pubescent, subsessile; nerves many, slender; ochrea

ca. 1.5 cm long, strigose, mouth oblique, shortly bristled, pubescent. Spike 2-4 cm long, shortly peduncled, stout, in 15-20 cm long panicles; bracts obovate, obtuse, long-ciliate; flowers white, 4-10 in each bracts, long-pedicelled; pedicels persistent; tepals 5, free, ca. 2.5 mm long, oblong, obtuse, glandular; stamens 8; styles 3. Nut trigonous, acute, glabrous.
Flowering & Fruiting: August-March.
Distribution: Paleotropics. Occasional; along river courses. *RNMK 3447,* Kuruva.

Persicaria chinensis (L.) Gross. in Engl., Bot. Jahrb. Syst. 49: 269,277,315. 1913; Manilal, Fl. Silent Valley 226. 1988. *Polygonum chinense* L., Sp. Pl. 363. 1753; Wight, Ic. t. 1806. 1852; Hook. f., Fl. Brit. India 5: 44. 1886; Gamble, Fl. Pres. Madras 1190(833). 1925; Ansari, Fl. Kasaragod Div. 315. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 212. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 381. 1988; Vajr., Fl. Palghat Dist. 390. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 371. 1996; Sivar. & P. Mathew, Fl. Nilambur 564. 1997; Mohanan & Sivad., Fl. Agasthyamala 543. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 410. 2005. *Piripu* Rheede, Hort. Malab. 7: 101, t. 54. 1688.

Trailing or scandent shrubs; stem glabrous. Leaves ovate, cordate at base, oblique, abruptly acuminate, punctuate, glabrous except the midrib below; nerves many; petiole 1-1.5 cm long; ochrea 2-3 cm long, membranous, ribbed, oblique at mouth, glabrous. Spike panicled, globose; peduncles glandular-hairy; bracts ovate, obtuse, 1-flowered; flowers pedicelled; tepals 4, white, oblong, obtuse, glabrous; stamens 8, styles 3. Nut trigonous, glabrous, acute, brown.
Flowering & Fruiting: Throughout the year.
Distribution: Indo-Malesia and China. Common in semi-evergreen forests and roadsides. *RNMK 2447,* Manikkunnumala; *RNMK 1332*, Pozhuthana.

Persicaria glabra (Willd.) Gomez, Ann. Inst. Segunda Ensef. Habana 2: 278. 1896; Manilal, Fl. Silent Valley 227. 1988. *Polygonum glabrum* Willd., Sp. Pl. 2: 447.1799; Wight, Ic. t. 1797. 1852; Hook. f., Fl. Brit. India 5:34.1886; Gamble, Fl. Pres. Madras 1189(832). 1925; Manilal & Sivar., Fl. Calicut 247. 1982; Ansari, Fl. Kasaragod Div. 316. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 212. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 381. 1988; Vajr., Fl. Palghat Dist. 391. 1990; Sivar. & P. Mathew, Fl. Nilambur 565. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 410. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 600. 2009.*Schovanna-modela-muccu* Rheede, Hort. Malab. 12: 147, t. 77. 1693.

Stout erect herbs, glabrous, 75-90 cm high. Leaves 14-16 x 2.5-3 cm, linear-lanceolate, acuminate at both ends, punctuate.; petiole ca. 2 cm long; ochrea tubular, mouth truncate, glabrous. Racemes stout, long peduncled; bracts obovate, obtuse, glabrous; flowers few-several in each bract; tepals 4, oblong, obtuse, eglandular; stamens 8; style 2-fid. Nuts biconvex, acute, brown.

Flowering & Fruiting: August-December.
Distribution: Paleotropics. Occasional; in moist deciduous forests. *RNMK 2255,* Tholpetty; *RNMK 2779*, Kuruva.

Persicaria hydropiper (L.) Spach., Hist. Veg. 10: 536. 1841. *Polygonum hydropiper* L., Sp. Pl. 361.1753; Hook. f., Fl. Brit. India 5:39.1886; Gamble, Fl. Pres. Madras 1190(833). 1925; Sivar. & P. Mathew, Fl. Nilambur 566. 1997; Sasidh. & Sivar., Fl. Pl. Thrissur For. 371. 1996; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 602. 2009.

Slender erect herbs. Leaves 3-6 x 1.5-2 cm, elliptic, acuminate, base acute, subsessile, scabrous along the nerves, nerves many, slender; ochrea ca. 1 cm long, with immersed hairs, mouth ciliate. Racemes 3-8 cm long, panicled, slender, sometimes drooping; bracts obovate, ciliate; flowers solitary or paired in each bract; tepals oblong, obtuse, red-glandular; stamens 5; styles 3-fid. Nut trigonous, apiculate.
Flowering & Fruiting: March-July.
Distribution: Pantropical. Occasional; in moist deciduous forests. *RNMK 3119,* Tholpetty; *RNMK 2409*, Kattikulam.

POLYGONUM Linnaeus
Sp. Pl. 359. 1753, *typ. cons.*

Polygonum plebeium R. Br., Prodr. 420. 1810. "plebejum; Hook. f., Fl. Brit. India 5: 27. 1886; Gamble, Fl. Pres. Madras 1188(832). 1925; V. S. Ramach. & V.J. Nair, Fl. Cannanore 382. 1988; Vajr., Fl. Palghat Dist. 391. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 371. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 410. 2005. *Polygonum indicum* Heyne ex Roth, Nov. Pl. Sp. 208. 1821; Wight, Ic. t. 1808. 1852.

Prostrate woody herbs with radiate branches; stems glabrous. Leaves 0.8-1 x 0.4-0.6 cm, oblong, sessile, acute, glabrous; ochrea chartaceous, white, ciliate. Flowers 3-7 together, sessile, axillary; tepals 5, ovate, acute, glabrous; stamens 5. Nut trigonous, acute, glabrous, brown.
Flowering & Fruiting: March-April.
Distribution: Pantropical. Common; in marshy areas in moist deciduous forests. *RNMK 2475,* Muthanga; *RNMK 2660,* Tholpetty.

Antigonon leptopus Hook. & Arn., often grown as ornamental plant, now getting naturalisedin in the district.

PODOSTEMACEAE Rich. ex C. Agardh
Aphor. Bot. 125. 1822.

1. Stem thread-like; free floating..... **Indotristicha**
1. Stem otherwise; appressed, erect or free floating 2
2. Thallus ribbon like 3
2. Thallus attached throughout the length..... 4

3. Flowers emerging from a spathe; stamens 20 .....**Cladopus**
3. Flowers on margins or upper surface of thallus; stamens 3 .....**Dalzellia**
4. Capsule isolobous .....**Polypleurum**
4. Capsule anisolobous 5
5. Leaves persistent..... **Podostemum**
5. Leaves cauducous .....**Zeylanicum**

CLADOPUS H. Muller

Ann. Jard. Bot. Buitenzorg, ser.2, 1:115. 1899.

Cladopus hookeriana (Tul.) Cusset., Fl. Cambod. Laos & Viet-Nam 14:72.1973; Joseph, Aquatic Angiosp. Malabar 178. 1991; Sivar. & P. Mathew, Fl. Nilambur 567. 1997. *Mniopsis hookeriana* Tul., Ann. Sci. Nat. Bot. ser. 3, 11: 105. 1849. *Podostemon hookerianus* (Tul.) Wedd. in DC., Prodr. 17: 74. 1873; Hook. f., Fl. Brit. India 5: 65. 1866. *Griffithella hookeriana* (Tul.) Warm., Danske Vid. Selsk. Skr. ser. 6, 11: 13. 1901; Gamble, Fl. Pres. Madras 1197(838). 1925; Mathew & Satheesh, Aqua. Bot. 57: 248. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 411. 2005.

Lithophytic herbs. Thallus variable, attached firmly through out the length, bearing leafy secondary shoots. Leaves sheathing. Flowers minute, bisexual, naked, emerging from a spathe; stamens 20, monadelphous; staminodes 2, linear; ovary 2- locular, oblique, ovules many. Capsule globose, splitting into 2 unequal lobes.

Flowering & Fruiting: November-February.

Distribution: Endemic to Western Ghats. Occasional; on rocks in running water. *RNMK 0645,* Thalimala.

DALZELLIA Wight

Icon. Pl. Ind. Or. 5:34. 1852**.**

Dalzellia zeylanica (Gard.) Wight, Ic. t.5. 1919-1920. 1852; Nagendran & Arekal, Bull. Bot. Surv. India 23: 229. 1981; Ansari, Fl. Kasaragod Div. 317. 1985; Joseph, Aquatic Angiosp. Malabar 180. 1991; Mathew & Satheesh, Aqua. Bot. 57: 248. 1997; Sivar. & P. Mathew, Fl. Nilambur 567. 1997; Mohanan & Sivad., Fl. Agasthyamala 544. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 412. 2005. *Tristicha zeylanica* Gard., Calcutta J. Nat. Hist. 7: 117. 1847. *Lawia zeylanica* (Gard.) Tul., Ann. Sci. Nat. Bot. ser. 3, 2: 112. 1849; Gamble, Fl. Pres. Madras 1195(836). 1925. *Terniola zeylanica* (Gard.) Tul., Podost. Monogr. 190. t. 13. 1852; Hook. f., Fl. Brit. India 5: 62. 1886; Vajr., Fl. Palghat Dist. 393. 1990.

Thallus firmly attached throughout the length on rocks, suborbicular or stellate. Leaves reddish brown. Flowers on margins or upper surface of thallus, enclosed basally by sheathing cupules; tepals 3; stamens 3; ovary 3-locular. Capsule 9-ribbed.

Flowering & Fruiting: February-March.

Distribution: South west India and Sri Lanka. Occasional; on exposed rocks in streams. *RNMK 2774,* Banasuramala-meenmuty.

INDOTRISTICHA van Royen

Acta Bot. Neerl. 8: 474. 1959.

Indotristicha ramosissima (Wight) van Royen, Acta Bot. Neerl. 8: 474. 1959; Ansari, Fl. Kasaragod Div. 317. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 372. 1996; Joseph, Aquatic Angiosp. Malabar 184. 1991; Mathew & Satheesh, Aqua. Bot. 57: 246. 1997; Sivar. & P. Mathew, Fl. Nilambur 569. 1997; Mohanan & Sivad., Fl. Agasthyamala 545. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 411. 2005. *Dalzellia ramosissima* Wight, Ic. t.1920. f.1. 1852. *Terniola ramosissima* (Wight) Willis, Ann. Roy. Bot. Gard. (Peradeniya) 1: 208, 293, 306 tt. 5-9, f.29. 1902. *Tristicha ramosissima* (Wight) Willis, Ann. Roy. Bot. Gard. (Peradeniya) 1: 208. 1902 & 1:293-306. ff. 5-9. 1902; Gamble, Fl. Pres. Madras 1194(836). 1925.

Stem free floating, branched, 50-60 cm long, attached to rock by base, stem with 1.5-2.5 cm long ramuli and scale leaves. Flowers 1-6 mm long, axillary along the stem; pedicels 1-2.5 cm long, slender, erect; perianth 3, free, ca. 2 mm long, ovate; stamens 3; ovary ca. 2.5 mm long, ellipsoid, stigma 3-lobed.
Flowering & Fruiting: January-March.
Distribution: Endemic to southern Western Ghats. Occasional; on submerged rocks in streams. *RNMK 3335,* Kallady river.

PODOSTEMUM Michaux

Fl. Bor. Am. 2: 164, t. 44. 1803.

Podostemon subulatus Gard., Calcutta J. Nat. Hist. 7: 184. 1846; Hook. f., Fl. Brit. India 5: 65. 1886; Gamble, Fl. Pres. Madras 1196(838). 1925; Sasidh. & Sivar., Fl. Pl. Thrissur For. 372. 1996; Joseph, Aquatic Angiosp. Malabar 185. 1991; Mathew & Satheesh, Aqua. Bot. 57: 257. 1997; Sivar. & P. Mathew, Fl. Nilambur 569. 1997.

Thallus branched, ribbon like, creeping, attached to rocks, secondary shoots ascending, 1 cm long. Leaves 5-6 cm long, 5 or 6, alternate, distichous, delicate, subulate, base sheathing. Spathella variable, splitting irregularly into 4 or 5 lobes. Tepals shorter than ovary; stamens and andropodium 5-6 mm long; ovary 6-ribbed, stigma lobes equal. Capsule ovoid.
Flowering & Fruiting: January-March. *Distribution*: South India and Sri Lanka. Occasional; along steams. *RNMK 1443,* Thirunelli.

POLYPLEURUM (Tulsane) Warming

Kongel. Danske Vidensk.-Selsk. Skr. Ser. 6, II: 64. 1901

Polypleurum stylosum (Wight) Hall, Kew Bull. 26: 131. 1971; Nagendran & Arekal, Bull. Bot. Surv. India 23: 232. 1981; Ansari, Fl. Kasaragod Div. 318. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 382. 1988; Vajr., Fl. Palghat Dist. 393. 1990; Joseph, Aquatic Angiosp. Malabar 189. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 373. 1996; Mathew & Satheesh, Aqua. Bot. 57: 257. 1997; Sivar. & P. Mathew, Fl. Nilambur 571. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 412. 2005. *Dicraeia stylosa* Wight, Ic. t. 1917. f.2.

1852; Gamble, Fl. Pres. Madras 1196(837). 1925; Manilal, Fl. Silent Valley 228. 1988. *Podostemon stylosus* (Wight) Benth. ex Hook. f., Fl. Brit. India 5: 64. 1886. *Podostemon algaeformis* (Bedd.) Benth. ex Hook.f., Fl. Brit. India 5: 65. 1886.

Thallus ribbon like, branched, 15-20 cm long; attached at base; bracts 4-6, alternate, distichous. Spathella splitting into 4 or 5 lobes; pedicel ca. 1 cm long. Flowers solitary on secondary shoots, enclosed by spathes at base; tepals ca. 2 mm long; stamens and andropodium ca. 4 mm long; ovary 6-ribbed, stigma lobes subequal. Capsule ovoid, 6-ribbed, pedicel 1.2-1.5 cm long; seeds many.

Flowering & Fruiting: October-February.

Distribution: India and Sri Lanka. Occasional' on rocks along streams. *RNMK 1227,* Soojipara.

ZEYLANIDIUM (Tulasne) Engler

in Engler & Prantl, Nat. Pflanzenfam. ed. 2, 18a : 61. 1930.

Zeylanidium lichenoides (Kurz) Engl. in Engl. & Prantl, Naturl. Pflanzenfam. (ed. 2) 18a:62. 1928; Nagendran & Arekal, Bull. Bot. Surv. India 23: 231. 1981; Joseph, Aquatic Angiosp. Malabar 193. 1991; Mathew & Satheesh, Aqua. Bot. 57: 265. 1997. *Hydrobryum lichenoides* Kurz, J. Asiat. Soc. Bengal 42:103. 1873; Gamble, Fl. Pres. Madras 1199(839). 1925. *Podostemon acuminatus* Wedd. in DC., Prodr. 17: 75. 1873; Hook. f., Fl. Brit. India 5: 66. 1886. *Podostemon microcarpus* Wedd. in DC., Prodr. 17: 76. 1873; Hook. f., Fl. Brit. India 5: 66. 1886.

Thallus ribbon like, lower smaller; upper larger. Spathella prostrate. Flowers 2.5-3 x 0.8-1 mm, zygomorphic; tepals 2, ca. 1 mm long, scarious, subulate; stamens 2, monadelphous; anthers bilobed, lobes unequal; ovary ellipsoid, smooth; stigma bilobed, lobes unequal, smooth. Capsule ellipsoid, ribs 8; one lobe persistent.

Flowering & Fruiting: February-March.

Distribution: India and Sri Lanka. Occasional; on rocks in river: *RNMK 3552,* Banasuramala-meenmutty.

ARISTOLACHIACEAE Juss.

Gen. Pl. 74. 1789.

1. Erect shrubs; flowers actinomorphic .....**Thottea**
1. Climbers; flowers zygomorphic .....**Aristolochia**

ARISTOLOCHIA Linnaeus

Sp. Pl. 960. 1753.

Climbers. Leaves alternate, entire, petiolate, 3-7 nerves from base. Flowers axillary, solitary, fascicled or racemose, pedicellate; perianth tubular, curved, dialated at base, 2-lipped above; stamens 6, anthers adnate to the columnar

style, oblong, connectives produced; ovary 6-celled, inferior, elliptic-oblong, ovules many; style columnar, thick, stigmas 3-6, disciform. Fruit a dehiscent capsule, ellipsoidal to globose; seeds many, flat.

1. Leaves deeply cordate at base, to 18 cm long..... .**A. tagala**
1. Leaves subcordate or truncate at base, to 13 cm long.....**A. indica**

Aristolochia indica L., Sp. Pl. 960. 1753; Roxb., Fl. Ind. 3: 349. 1832: Hook. f., Fl. Brit. India 5: 75. 1886; Gamble, Fl. Pres. Madras 1202(841). 1925; Manilal & Sivar., Fl. Calicut 248. 1982; Ansari, Fl. Kasaragod Div. 318. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 47. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 383. 1988; Vajr., Fl. Palghat Dist. 394. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 373. 1996; Mohanan & Sivad., Fl. Agasthyamala 546. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 414. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 604. 2009. *Aristolochia lanceolata* Wight, Ic. t. 1858. 1852. *Careloe-vegon* Rheede, Hort. Malab. 8:49, t.25. 1688.

Twiners; stem glabrous. Leaves 11-13 x 5-6 cm, ovate-oblong, acuminate at apex, 5-ribbed from the flat or subcordate base, midrib with 3 or 4 pairs of lateral nerves; petiole ca. 2 cm long. Flowers 4-4.5 cm long, 3-5 together in axillary cymes, greenish-brown; pedicels ca. 1.5 cm long, perianth tube 1.5-2 cm long, globose at base, hairy inside, glabrous outside, limbs obovate, brown, glabrous; stamens 6, filaments short, anthers adnate to the columnar style; ovary 6-celled. Capsule obovoid, glabrous; seeds brown, samaroid.
Flowering & Fruiting: July-March.
Distribution: Indo-Malesia. Rare; in semi-evergreen forests. *RNMK 1888,* Manikkunnumala.

Aristolochia tagala Cham., Linnaea 7: 207. t. 5. f. 3. 1832; Gamble, Fl. Pres. Madras 1202(841). 1925; Ansari, Fl. Kasaragod Div. 319. 1985; Manilal, Fl. Silent Valley 229. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 384. 1988; Vajr., Fl. Palghat Dist. 394. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 374. 1996; Sivar. & P. Mathew, Fl. Nilambur 572. 1997; Mohanan & Sivad., Fl. Agasthyamala 547. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 415. 2005. *Aristolochia roxburghiana* Klotzsch, Monatsb. Akad. Berlin 596. 1859; Hook. f., Fl. Brit. India 5: 75. 1886.*Aristolochia acuminata* Roxb., Fl. Ind. 3:489. 1832: Wight, Ic. t. 771. 1844, non Lamk. 1783.

Twiners; stem glabrous. Leaves 16-18 x 8-10 cm, ovate, acuminate at apex, glabrous, 5-7-nerved from deeply cordate base; petiole 4-5 cm long. Flowers 5-6.5 cm long, in axillary raceme; bracts ca. 5 mm long, ovate; perianth tube ca. 1 cm long, hairy inside, glabrous outside; limb 4-4.5 cm long, ca. 1 cm broad, brown, tomentose; stamens 12, biseriate; connective broad, anthers oblong; style 6-7-fid, short. Capsule obovoid, stalked, 6-celled.
Flowering & Fruiting: January-June.
Distribution: Indo-Malesia and China. Occasional; in evergreen forests. *RNMK 3654,* Vythiri Ghat.

THOTTEA Rottboell

in Nye, Dansk. Vidensk. Selsk. Skrift. 2: 529, t. 2. 1783.

Erect undershrubs. Leaves alternate, entire, 3-5-ribbed at base, nerves reticulate. Flowers in axillary cymes or racemes, 1-5 together, pedicelled; perianth lobes 3, united into campanulate tube, valvate; stamens 6-12, 1 or 2-seriate, variously connate at base; anthers extrorse, oblong; ovary inferior, ovules many in each cell, in vertical rows; style column short, thick; stigmas 3, linear. Fruit a septicidal capsule; seeds many, trigonous.

1. Perianth lobes suorbicular; anthers in 3 groups ..... **T. siliquosa**
1. Perianth lobes obovate; anthers free ..... **T. sivarajanii**

Thottea siliquosa (Lamk.) Ding Hou, Blumea 27: 327. 1981; Ansari, Fl. Kasaragod Div. 319. 1985; Manilal, Fl. Silent Valley 229. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 28. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 384. 1988; Vajr., Fl. Palghat Dist. 395. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 374. 1996; Sivar. & P. Mathew, Fl. Nilambur 573. 1997; Mohanan & Sivad., Fl. Agasthyamala 548. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 416. 2005. *Apama siliquosa* Lamk., Encycl. 1: 91. 1783; Gamble, Fl. Pres. Madras 1200(840). 1925. *Bragantia wallichii* R. Br. ex Wight & Arn., Edinb. New Phil. J. 15: 181. 1833; Wight, Ic. t. 520. 1842; Hook. f., Fl. Brit. India 5: 73. 1886. *Alpam* Rheede, Hort. Malab. 6:51-52, t.28. 1689.

Shrubs; branchlets angled. Leaves 20-25 x 6-8 cm, elliptic-oblong, inequilateral, acuminate at apex, tomentose below; nerves 5-8 pairs, basal pair rib-like, extending above the middle, nervules parallel; petiole ca. 5 mm long. Flowers in axillary fascicles, 1-5 together, ca. 1.5 cm across; perianth lobed, united into a cup, acute, yellow or brown, lined inside; stamens 12, united in 3 groups; stigma peltate, many-lobed. Capsule 10-12 cm long, 4-5 mm broad, cylindrical; seeds trigonous, rugose.

Flowering & Fruiting: Throughout the year.

Distribution: Peninsular India and Sri Lanka. Common; in evergreen forests. *RNMK 3309,* Sugandhagiri; *RNMK 1447*, Kurichiarmala.

Thottea sivarajanii Santhosh, Khan & Binu, Rheedea 10: 117. 2000**.**

Undershrubs with stellate hairs. Leaves 14-17 x 5-7 cm, lanceolate, acuminate, nerves from the midrib 4-7 pairs, joining in arches. Flowers axillary; perianth lobes obovate, abruptly apiculate, brown; stamens 10; stigma many lobed. Capsule 7-9 cm long.

Flowering & Fruiting: Throughout the year.

Distribution: Endemic to southern Western Ghats (Kerala). Rare; in evergreen forests. *RNMK 3602,* Chanthanathodu.

Aristolochia brasiliensis Mart. & Zucc. is often seen in Manikkunnumala as an escape.

PIPERACEAE C. Agardh

Aphor. Bot. 201. 1824.

1. Woody climbing shrubs, rooting at nodes; spikes unisexual ..... **Piper**
1. Soft erect herbs or subshrubs; not rooting at nodes; spikes bisexual..... 2
2. Leaves over 20 cm across; bracts triangular, stalked ..... **Lepianthes**
2. Leaves below 5 cm across; bracts orbicular, sessile ..... **Peperomia**

LEPIANTHES Rafinesque

Sylva Tellur. 84. 1838.

Lepianthes umbellata (L.) Rafin., Sylva Tellur. 85. 1838; Ansari, Fl. Kasaragod Div. 320. 1985; Manilal, Fl. Silent Valley 230. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 384. 1988; Vajr., Fl. Palghat Dist. 395. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 374. 1996; Sivar. & P. Mathew, Fl. Nilambur 574. 1997; Mohanan & Sivad., Fl. Agasthyamala 549. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 416. 2005. *Piper umbellatum* L., Sp. Pl. 30. 1753. *Hackeria subpeltata* (Willd.) Kunth, Linnaea 13: 571. 1839; Gamble, Fl. Pres. Madras 1208(846). 1925. *Piper subpeltatum* Willd., Sp. Pl. 1: 166. 1797; Hook. f., Fl. Brit. India 5: 95. 1886. *Pothomorphe subpeltata* (Willd.) Miq., Comm. Phyt. 37. 1840; Wight, Ic. t. 1925. 1853. **Plate 26j.**

Erect shrubs, 1-1.5 m high; stems ridged. Leaves 20-40 x 20-40, orbicular, rounded at apex, cordate at base, entire, pubescent above and below; nerves palmately radiating from base; petiole sheathing at base, 15-20 cm long. Spikes 8-15 x 0.2-0.3 cm, cylindric, 3-7 together, umbellate, peduncled, axillary, bracts peltate, stalked, triangular, ciliate; flowers densely packed; stamens 3, filaments short; ovary obovoid, truncate, stigmas 3, sessile, curved out. Berry trigonous, minute.

Flowering & Fruiting: June-February.

Distribution: Paleotropics. Common; in evergreen forests. *RNMK 1603,* Talimala; *RNMK 1809*, Sugandhagiri.

PEPEROMIA Ruiz. & Pavon

Prodr. 8. 1794.

Succulent herbs, epiphytic or terrestrial. Leaves alternate, opposite or whorled, usually obovate, entire. Spike erect, 1-3 together, terminal or leaf-opposed; bracts peltate, sessile, orbicular with white margins; flowers usually sunken in the cavities of the rachis, perianth absent; stamens 2, free; filaments very short; ovary ellipsoid, 1-celled, style absent, stigma 3-toothed, sessile. Fruit a dry nutlet ellipsoid, partly embedded in axis.

1. All leaves whorled; spike pubescent..... **P. tetraphylla**
1. Leaves alternate, opposite or rarely whorled; spikes glabrous 2
2. Leaves opposite and whorled, pubescent; spikes 7-12 cm long ..... **P. blanda**
2. Leaves alternate and opposite, glabrous; spikes to 5 cm long..... .3

3. Leaves cordate at base, 5-7-ribbed, membranous ..... **P. pellucida**
3. Leaves acute, cuneate or rounded at base, fleshy 4
4. Leaves all alternate, rounded at base.....**P. heyneana**
4. Leaves alternate and upper opposite, cuneate at base ..... **P. portulacoides**

Peperomia blanda (Jacq.) Kunth, Nov. Gen. Sp. 1: 67,t.13. 1815; Mohanan & Sivad., Fl. Agasthyamala 550. 2002; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 189. 2009. *Piper blandum* Jacq., Collect. 3: 211. 1789, var. *floribunda* (Miq.) Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 294. 1987. *Peperomia arabica* Decne. var. *floribunda* Miq., Syst. Piperac. 122. 1843. *Peperomia dindigulensis* Miq., Syst. Piperac. 122. 1843; Hook. f., Fl. Brit. India 5: 98. 1886; Gamble, Fl. Pres. Madras 1210(847). 1925; V. S. Ramach. & V.J. Nair, Fl. Cannanore 385. 1988; Vajr., Fl. Palghat Dist. 396. 1990. *Piper heyneana* Wight, Ic. t. 1922. 1853.

Erect terrestrial herbs, to 30 cm high; stem pubescent. Leaves 2-4.5 x 1.5-3 cm, elliptic to obovate, acute at either ends, 5-ribed from base, pubescent; petiole ca. 1.2 cm long. Spike slender, erect; peduncle 1-2 cm long; bracts orbicular, peltate with white margins; flowers distant. Nutlets ca. 0.5 x 0.5 mm, obovoid to orbicular, acute, scaly.

Flowering & Fruiting: July-December.

Distribution: Endemic to Peninsular India. Common; in evergreen and semi-evergreen forests. *RNMK 1224,* Kurichiarmala.

Peperomia heyneana Miq., Syst. Piperac. 123. 1843; Hook. f., Fl. Brit. India 5: 99. 1886; Gamble, Fl. Pres. Madras 1210(847). 1925; V. S. Ramach. & V.J. Nair, Fl. Cannanore 385. 1988; Mohanan & Sivad., Fl. Agasthyamala 551. 2002; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 191. 2009. *Peperomia wightiana* Miq. in Hook.'s London J. Bot. 5: 548. 1846; Hook. f., Fl. Brit. India 5: 98. 1886; Gamble, Fl. Pres. Madras 1210(847). 1925; Manilal, Fl. Silent Valley 230. 1988.

Small slender epiphytic or lithophytic herbs. Leaves elliptic to orbicular, 2-2.5 cm across. Spikes slender, 4-5 cm long. Seeds minutely scaly and rugose.

Flowering & Fruiting: August-November.

Distribution: South India and Sri Lanka. Occasional; in evergreen forests. *RNMK 1335*, Thirunelli.

Peperomia pellucida (L.) Kunth, Nov. Gen. Sp. 1: 64. 1815; Gamble, Fl. Pres. Madras 1210(847). 1925; Manilal & Sivar., Fl. Calicut 248. 1982; Ansari, Fl. Kasaragod Div. 320. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 386. 1988; Vajr., Fl. Palghat Dist. 396. 1990; Sivar. & P. Mathew, Fl. Nilambur 575. 1997; Mohanan & Sivad., Fl. Agasthyamala 551. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 417. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 605. 2009; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 191. 2009. *Piper pellucidum* L., Sp. Pl. 30.1753.

Peperomia exigua (Blume) Miq., Syst. Piperac. 77. 1843; Hook. f., Fl. Brit. India 5: 97. 1886.

Fleshy herbs, 15-20 cm high. Leaves alternate, 2.5-3 x 1.5-2 cm, ovate, cordate at base, acute, glabrous, 5-ribed, fleshy, shortly petioled. Spikes axillary, solitary, 3-4 cm long, slender.

Flowering & Fruiting: September-December.

Distribution: Native of tropical America; now Pantropical. Common; in semi-evergreen forests and moist places. *RNMK 2098,* Manikkunnumala.

Peperomia portulacoides (Lamk.) Dietr., Sp. Pl. (ed. 6) 172. 1831; Hook. f., Fl. Brit. India 5: 98. 1886; Gamble, Fl. Pres. Madras 1210(847). 1925; V. S. Ramach. & V.J. Nair, Fl. Cannanore 386. 1988; Vajr., Fl. Palghat Dist. 396. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 375. 1996; Sivar. & P. Mathew, Fl. Nilambur 576. 1997; Mohanan & Sivad., Fl. Agasthyamala 552. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 417. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 192. 2009. *Piper portulacoides* Lamk., Tabl. Encycl. 1: 82. 1791. *Peperomia courtallensis* Miq. in Hook.'s London J. Bot. 5: 549. 1846.

Glabrous terrestrial herbs, 15-20 cm high. Leaves to 3.5-4 x 2-2.5 cm, obovate-rhomboid, obtuse at apex, cuneate at base, glabrous, upper opposite; lower alternate, smaller, 3-nerved from base. Spike terminal and axillary, ca. 5 cm long, slender, glabrous; peduncle ca. 2 cm long; bracts orbicular, sessile, margins white. Nut partially embedded in the rachis.

Flowering & Fruiting: July-December.

Distribution: South India and Sri Lanka. Occasional; in evergreen forests. *RNMK 1762,* Chembra.

Peperomia tetraphylla (G.Forst.) Hook. & Arn., Bot. Beech Voy. 97. 1841; Manilal, Fl. Silent Valley 230. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 386. 1988; Vajr., Fl. Palghat Dist. 397. 1990; Sivar. & P. Mathew, Fl. Nilambur 576. 1997; Mohanan & Sivad., Fl. Agasthyamala 552. 2002; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 194. 2009. *Piper tetraphylla* G.Forst., Prod. 5. 1759. *Peperomia reflexa* (L. f.) Dietr., Sp. Pl. 1:180.1839, non HB.K. 1815; Hook. f., Fl. Brit. India 5:99.1886; Gamble, Fl. Pres. Madras 1209(847). 1925; Wight, Ic. t. 1923. 1. 1853. **Plate 26k.**

Epiphytic herbs; branches diffuse to procumbent; stem and leaves thinly pubescent. Leaves 7-9 x 5-7 mm, orbicular, obtuse. Spike 1.5-2 cm long, erect, stout; peduncle ca. 0.8 cm long; bracts peltate, sessile, with white margins; flowers densely arranged; stamens 2; stigmas 3-toothed. Nutlets ovoid, beaked, brown, glabrous.

Flowering & Fruiting: February-March.

Distribution: Pantropical. Occasional in evergreen and moist deciduous forests. *RNMK 1375,* Kurichiarmala; *RNMK 1120*, Tholpetty.

PIPER Linnaeus

Sp. Pl. 28. 1753.

Aromatic climbing shrubs with roots at nodes, stem articulate at nodes. Leaves alternate, ovate or elliptic, 3-7-nerved from base, stipulate, entire. Spike solitary, leaf-opposed, pendulous or hermaphrodite, sessile, distantly or closely packed; bracts peltate, cupular or adnate to the spike; perianth absent; stamens 1-3, anthers ovoid, cells distant; ovary 1-celled, ovule one; style absent, stigma 2-5, radiating. Fruit a 1-seeded berry; seeds globose.

1. Spike erect 2
1. Spike pendulous 3
2. Leaves obliquely cordate at base; female spike to 3 cm long..... .**P. longum**
2. Leaves acute at base; female spike to 1 cm long .....**P. mullesua**
3. Leaves penninerved; peduncles more than 7 cm long .....**P. barberi**
3. Leaves 3-7 nerved from base; peduncles to 5 cm long.....4
4. Branchlets and leaves pubescent; berries ovoid.....**P. hymenophyllum**
4. Branchlets and leaves glabrous; berries otherwise.....5
5. Receptacle distant, stalked or subsessile ..... .**P. trioicum**
5. Receptacle sclose, sessile.....6
6. Leaf base oblique, acute; bracts minutely pubescent ..... **P. trichostachyon**
6. Leaf base not oblique, rounded or truncate; bracts glabrous .....**P. nigrum**

Piper barberi Gamble, Bull. Misc. Inform. Kew 1924: 387. 1924 & Fl. Pres. Madras. 1206(844). 1925; Nayar & Sastry, Red Data Book Indian Pl.2: 181. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 375. 1996; Mohanan & Sivad., Fl. Agasthyamala 553. 2002.

Slender climbing shrubs. Leaves 10-15 x 2-6 cm, oblong-lanceolate, abruptly acuminate at apex, acute or obtuse at base; lateral nerves 6-9 pairs, looped below the margins, glabrous and glossy above; petiole ca. 1 cm long; stipule ca. 1.5 cm long, lanceolate. Spike 13-15 cm long, glabrous, slender, pendulous; peduncles puberulus; bracts peltate, orbicular, entire; flowers densely arranged; stamen 1. Berry 3.5-4 mm across, globose; stigma 3-lobed.
Flowering & Fruiting: March-September.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 0985,* Chembra.

Piper hymenophyllum Miq. in Hook.'s London J. Bot. 5: 554. 1846; Hook. f., Fl. Brit. India 5: 93. 1886; Gamble, Fl. Pres. Madras 1207(845). 1925; Wight, Ic. t. 1942. 1853; Manilal, Fl. Silent Valley 231. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 387. 1988; Vajr., Fl. Palghat Dist. 398. 1990; Sivar. & P. Mathew, Fl. Nilambur 577. 1997; Mohanan & Sivad., Fl. Agasthyamala 555. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 418. 2005.

Slender climbers. Leaves 10-13 x 5-6 cm, ovate, rounded to subcordate at base, often unequal sided, acuminate at apex, 7-ribbed, membranous; petiole

ca. 1 cm long. Spike 15-20 cm long, slender, drooping; male spike shorter; bracts oblong, adnate to the rachis with free margins, hairy; stamens 2 or 3. Berry ca. 5 mm across, ovoid, beaked; stigma 3-lobed.
Flowering & Fruiting: Januiary-April.
Distribution: Endemic to Peninsular India. Occasional; in evergreen forests. *RNMK 0875,* Thariodu.

Piper longum L., Sp. Pl. 29. 1753; Hook. f., Fl. Brit. India 5: 83. 1886; Gamble, Fl. Pres. Madras 1205(844). 1925; Manilal & Sivar., Fl. Calicut 248. 1982; Ansari, Fl. Kasaragod Div. 321. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 208. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 387. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 376. 1996; Sivar. & P. Mathew, Fl. Nilambur 577. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 418. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 606. 2009. *Chavica roxburghii* Miq., Syst. Piperac. 239. 1843; Wight, Ic. t. 1928. 1853. *Cattu-tirpali* Rheede, Hort. Malab. 7: 27, t. 14. 1688.

Scandent or straggling shrubs, sometimes ascending and climbing. Leaves 6-8 x 3-4 cm, ovate, acute at apex, cordate and strongly oblique at base, 5-7-nerved, membranous, shining above; nerves impressed; petiole 1-3 cm long. Female spike stout, erect; peduncle 1.3-1.5 cm long; bracts peltate, orbicular; male spike 7-9 cm long, erect, slender; stamens 2. Berry ca. 2 mm across, glabrous, black or deep red.
Flowering & Fruiting: August-January.
Distribution: Indo-Malesia. Occasional; in evergreen forests. *RNMK 1227,* Thalimala; *RNMK 1894*, Vythiri; *RNMK 3450*, Banasuramala.

Piper mullesua Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 20. 1825; V. S. Ramach. & V.J. Nair, Fl. Cannanore 388. 1988; Mohanan & Sivad., Fl. Agasthyamala 556. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 418. 2005. *Piper brachystachyum* Wall. ex Hook. f., Fl. Brit. India 5: 87. 1886; Gamble, Fl. Pres. Madras 1206(844). 1925; Manilal, Fl. Silent Valley 231. 1988. *Chavica sphaerostachya* Miq., Syst. Piperac. 279. 1843: Wight, Ic. t. 1931. 1853. **Plate 26 l.**

Slender climbers. Leaves 7-9 x 3-4 cm, elliptic, acuminate at apex, acute at base, 3-5 ribbed from base, secondary nerves prominent, glabrous. Female spike 6-7 x 3-4 mm, erect, oblong; peduncle ca. 3 mm long; male spike 3-4 cm long, erect, slender; bracts peltate, orbicular; stamens 3. Berry ca. 1.5 mm across, red; stigmas 3, spreading.
Flowering & Fruiting: January-April.
Distribution: Peninsular and northeast India. Occasional; in evergreen forests. *RNMK 3206,* Chanthanathodu; *RNMK 2117*, Chembra.

Piper nigrum L., Sp. Pl. 28. 1753; Hook. f., Fl. Brit. India 5: 90. 1886; Gamble, Fl. Pres. Madras 1206(845). 1925; Manilal & Sivar., Fl. Calicut 248.

1982; Ansari, Fl. Kasaragod Div. 321. 1985; Manilal, Fl. Silent Valley 231. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 209. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 388. 1988; Vajr., Fl. Palghat Dist. 398. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 376. 1996; Sivar. & P. Mathew, Fl. Nilambur 578. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 418. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 607. 2009. *Molago-codi* Rheede, Hort. Malab. 7: 23-24, t. 12. 1688.

Glabrous climbers. Leaves 12-16 x 7-10 cm, ovate, acuminate at apex, acute, rounded or truncate at base, 7-9 nerved, nervules subparallel; petiole 2.5-3.5 cm long. Spikes 8-12 cm long, slender; peduncles 2-2.5 cm long; bracts united forming a cup below the flower; flowers closely placed; stamens 2. Drupes 5-7 mm across, globose, smooth, deep red; stigmas 3-5, recurved.
Flowering & Fruiting: July-March.
Distribution: Peninsular India and Sri Lanka, cultivated elsewhere. Common; in evergreen forests. *RNMK 3405,* Thariodu; *RNMK 1559,* Kunchome.

Piper trichostachyon (Miq.) C. DC. in DC., Prodr. 16:242. 1869; Hook. f., Fl. Brit. India 5: 80. 1886; Gamble, Fl. Pres. Madras 1205(844). 1925; V. S. Ramach. & V.J. Nair, Fl. Cannanore 388. 1988; Manilal, Fl. Silent Valley 232. 1988; Vajr., Fl. Palghat Dist. 399. 1990; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 419. 2005. *Muldera trichostachyon* Miq. in Hook.'s London J. Bot. 5: 556. 1846; Wight, Ic. t.1944. 1853.

Stout climbers. Leaves 8-12 x 3-6 cm, elliptic-ovate, acuminate at apex, oblique and acute at base, 3-5-ribbed; petiole 1-2 cm long. Spikes 7-10 cm long, stout, drooping; bracts pubescent, formed into a fleshy cup; stamens 2. Berry ca. 6 x 6 mm, globose, yellowish red; stigmatic lobes 3.
Flowering & Fruiting: March-April.
Distribution: Endemic to Peninsular India. Rare; in evergreen forests. *RNMK 3566,* Chembra; *RNMK 3105*, Brahmagiri.

Piper trioicum Roxb., Fl. Ind. 1: 151. 1820; Wight, Ic. tt. 1935 & 1936. 1853; Ansari, Fl. Kasaragod Div. 321. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 389. 1988; Vajr., Fl. Palghat Dist. 399. 1990; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 419. 2005. *Piper attenuatum* Ham. ex Miq., Syst. Piperac. 306. 1843; Hook. f., Fl. Brit. India 5: 92. 1886; Gamble, Fl. Pres. Madras 1207(845). 1925. *Piper sylvestre* sensu Wight, Ic. t. 1937. 1853, non Lour., 1791; Hook.f., Fl. Brit. India 5:93. 1886.

Slender climbers. Leaves 12-15 x 6-8 cm, broadly ovate to elliptic-ovate, abruptly acuminate, rounded or cordate at base; 7 nerved from base, thick chartaceous. Spikes 18-22 cm long, slender. Berries ellipsoid, 4-5 mm across, ripening yellow.
Flowering & Fruiting: March-May.
Distribution: Indo-Malesia. Occasional; in evergreen forests. *RNMK 1779,* Brahmagiri; *RNMK 1511*, Chembra.

Piper betle L., and **Piper chaba** Hunter, are often grown in homesteds in the district.

CHLORANTHACEAE R. Br. ex Lindl.

Coll. Bot. ad. t. 17. 1821.

SARCANDRA Gardner

Calcutta J. Nat. Hist. 6: 348. 1846.

Sarcandra chloranthoides Gard., Calcutta J. Nat. Hist. 6: 348. 1846; Wight, Ic. t.1946. 1853; V. S. Ramach. & V.J. Nair, Fl. Cannanore 389. 1988; Vajr., Fl. Palghat Dist. 399. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 376. 1996; Sivar. & P. Mathew, Fl. Nilambur 578. 1997; Mohanan & Sivad., Fl. Agasthyamala 557. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 419. 2005. *Chloranthus brachystachya* sensu Hook. f., Fl. Brit. India 5: 100. 1886,p.p., non Bl. 1829; Gamble, Fl. Pres. Madras 1211(848). 1925. *Sarcandra irvingbaileyi* Swamy, Proc. Natn. Inst. Sci. India 19: 301. 1953. *Sarcandra grandifolia* (Miq.) Subram. & Henry, Bull. Bot. Surv. India 12: 5. 1972; Manilal, Fl. Silent Valley 232. 1988. *Chloranthus grandifolius* Miq., Fl. Ind. Bat. 1: 802. 1856.

Evergreen shrubs; branchlets glabrous, terete. Leaves opposite, 14-17 x 5-6.5 cm, elliptic, acute at base and apex, serrate, glabrous; nerves 7-8 pairs. Flowers in terminal, trichotomous 8-10 cm long spike, unisexual, clustered; bracts yellow, petalloid, ca. 6 mm long, perianth absent; stamen 1, filaments and connectives broad, thick; ovary 1-celled, ovule 1, basal, stigma sessile, truncate. Berry 7-8 x 3-4 mm, ovoid, purplish-black, smooth.

Flowering & Fruiting: December-May.

Distribution: India and Sri Lanka. Common; in evergreen forests: *RNMK 3228,* Pookodu.

MYRISTICACEAE R. Br.

Prodr. 399. 1810

1. Staminal column peltate; anthers along the rim of the disc ..... **Knema**
1. Staminal column not peltate; anthers not as above 2
2. Anther tips raised above the staminal column ..... **Gymnacranthera**
2. Anther tips below the level of the staminal column ..... .**Myristica**

GYMNACRANTHERA Warburg

Ber. Oentsch. Bot. Ges. 13: 90, 91, 94. 1896.

Gymnacranthera farquhariana (Hook.f. & Thoms.) Warb., Monogr. Myris. 365. 1897; V. S. Ramach. & V.J. Nair, Fl. Cannanore 390. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 377. 1996. *Myristica farquhariana* Hook. f. & Thoms., Fl. Ind. 162. 1855, non Hook. f. 1886. *Myristica canarica* Bedd. ex King, Ann. Roy. Bot. Gard. (Calcutta) 3: 306. t.138. 1891. *Gymnacranthera*

canarica (Bedd. ex King) Warb., Monogr. Myris. 368. 1897; Gamble, Fl. Pres. Madras 1212(849). 1925; Manilal & Sivar., Fl. Calicut 249. 1982; Mohanan & Sivad., Fl. Agasthyamala 558. 2002. *Gymnacranthera eugeniifolia* (A.DC.) Sinclair, Gard. Bull. Singapore 16: 447. 1958; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 420. 2005.

Small trees with red sap, bark smooth, reddish inside; branchlets ferrugineus tomentose. Leaves 16-20 x 5-6 cm, oblong, shortly acuminate, rounded at base, glabrous, pale beneath; nerves 16-18 pairs, reticulate, prominent beneath. Panicles axillary, 5-15 cm across; thinly tomentose; flowers 8-16 together; pedicels 5-6 mm long, perianth ca. 4 mm long, ovoid, lobed to the middle; stamens 6, filaments combined into a short column below the level of anthers; anthers free at apex; ovary 1-celled, stigma sessile, subentire. Fruit a globose capsule with thick rind; seed one, globose, with laciniate aril.

Flowering & Fruiting: March-April.

Distribution: Indo-Malaya. Occasional; in evergreen forests. *RNMK 3571,* Kurichiarmala.

KNEMA Loureiro

Fl. Cochinch. 604. 1790.

Knema attenuata (Hook. f. & Thoms.) Warb., Monogr. Myris. 590. 1897; Gamble, Fl. Pres. Madras 1215(851). 1925; Ansari, Fl. Kasaragod Div. 322. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 390. 1988; Vajr., Fl. Palghat Dist. 400. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 377. 1996; Sivar. & P. Mathew, Fl. Nilambur 579. 1997; Mohanan & Sivad., Fl. Agasthyamala 558. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 420. 2005. *Myristica attenuata* Wall. ex Hook. f. & Thoms., Fl. Ind. 157. 1855; Hook. f., Fl. Brit. India 5: 110. 1886. *Myristica corticosa* Bedd., Fl. Sylv. t. 278. 1872. **Plate 27b.**

Trees with radiating branches and reddish exudation; bark greyish black; branchlets rusty tomentose. Leaves 17-20 x 6-7.5 cm, elliptic-oblong, acuminate at apex, rounded at base; fulvous tomentose below; nerves 15-18 pairs, parallel; petiole ca. 1 cm long. Cymes axillary, peduncled, densely fulvous-tomentose; pedicels 7-8 mm long; male flowers ca. 7 mm across; perianth 3-lobed to the base; lobes triangular; spreading; stamens 12-14, arranged along the rim of the stipitate disc, anthers vertical; ovary 1-celled; style short; stigmas 2, laciniate. Capsule 4-5 x 2-2.5 cm, ellipsoid, cuspidate at apex, 2-valved; seed 1, ellipsoidal.

Flowering & Fruiting: December-June.

Distribution: Endemic to Western Ghats. Common; in evergreen forests. *RNMK 3448,* Vythiri.

MYRISTICA Gronovius

Fl. Orient. 141. 1755, *nom. cons.*

Trees with reddish juice. Leaves alternate, entire, penninerved. Flowers dioecious in cymes or fascicles, axillary; bracts ovate, deciduous; bracteoles persistent; perianth urceolate or ovoid, 3-lobed; stamens 12-30; filaments

connate into a column produced above the level of anthers; anthers sessile, linear; ovary 1-celled; ovules 1, basal; style absent; stigma shortly, 2-lobed. Fruit a fleshy capsule, 2-valved; rind thick; seed 1, ovoid, reticulate, reddish.

1. Perianth urceolate, glabrous; pedicel to 1 cm long.....**M. malabarica**
1. Perianth ovoid, thickly tomentose; pedicel absent..... .**M. beddomei** ssp. **beddomei**

Myristica beddomei King, Ann. Roy. Bot. Gard. (Calcutta) 3: 291, t. 118. f.1-8,1891, ssp. **beddomei**: de Wilde, Blumea 42: 151. 1997; Gamble, Fl. Pres. Madras 1214(850). 1915. *Myristica dactyloides* auct. non Gaertn. 1788; Sinclair, Gard. Bull. Singapore 23: 445. 1968; Manilal, Fl. Silent Valley 233. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 390. 1988; Vajr., Fl. Palghat Dist. 400. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 378. 1996; Sivar. & P. Mathew, Fl. Nilambur 580. 1997; Mohanan & Sivad., Fl. Agasthyamala 559. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 421. 2005. *Myristica laurifolia* auct. non Hook. f. & Thoms. 1855; Hook. f., Fl. Brit. India 5: 103. 1886. *Myristica laurifolia* var. *lanceolata* Hook.f., Fl. Brit. India 5: 103. 1886. *Myristica contorta* Warb., Monogr. Myris. 5-7. 1897; Gamble, Fl. Pres. Madras 1214(850). 1925. **Plate 27c.**

Medium trees with reddish sap; bark black, red inside; branchlets glabrous. Leaves 22-25 x 5-6 cm; oblong, obtusely acute at either ends, glabrous; nerves 18-20 pairs, regular, prominent; petiole 2-2.5 cm long. Cymes in short panicles; densely fulvous hairy; flowers ca. 4 mm across, 3-5 together; calyx tube ca. 4 mm long, shortly 3-lobed; anthers 10, linear; female flowers solitary. Capsule 4-5 cm across; globose, densely puberulus.
Flowering & Fruiting: December-May.
Distribution: South India and Sri Lanka. Occasional; in evergreen forests. *RNMK 1221,* Thalimala; *RNMK 2345*, Sugandhagiri.

Myristica malabarica Lamk., Acad. Roy. Sci. Mem. Math. Phys. (Paris) 162. 1791; Hook. f., Fl. Brit. India 5: 103. 1886; Gamble, Fl. Pres. Madras 1213(850). 1925; Manilal & Sivar., Fl. Calicut 249. 1982; Manilal, Fl. Silent Valley 233. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 233. 1988; Vajr., Fl. Palghat Dist. 401. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 378. 1996; Sivar. & P. Mathew, Fl. Nilambur 581. 1997; Mohanan & Sivad., Fl. Agasthyamala 559. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 421. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 607. 2009. *Panam-pallca* Rheede, Hort. Malab. 4:9-10, t.5 1683. **Plate 27d.**

Medium trees with red sap, bark black, red inside; branchlets glabrous. Leaves 18-20 x 8-10 cm, elliptic-oblong, acute at apex and obtuse or rounded at base, glabrous; nerves 10-12 pairs, obscure; petiole 2-2.5 cm long. Panicle 5-6 cm across, branchlets slender, glabrous; flowers 7-7.5 mm long; perianth yellow, urceolate, 3-lobed at apex; androphore ca. 6 mm long, shortly stipitate; anthers 10-20. Capsule 7-8 x 3-3.5 cm, oblong, tomentose; aril red.

Flowering & Fruiting: December-April.
Distribution: Endemic to Western Ghats. Common; in evergreen forests. *RNMK 3847,* Vythiri; *RNMK 3003*, Sugandhagiri.

Myristica fragrans Houtt. is commonly cultivated as an intercrop in Areca plantations.

LAURACEAE Juss.

Gen. Pl. 80. 1789.

1. Parasitic twining herbs ..... **Cassytha**
1. Trees 2
2. Leaves 3-ribbed from base or little above from the base 3
2. Leaves penninerved 4
3. Leaves opposite or sub-opposite; flowers in cymes or panicles ..... **Cinnamomum**
3. Leaves alternate; flowers in axillary or extra-axillary umbellules ..... **Neolitsea**
4. Leaves in whorls or pseudo-whorls ..... **Actinodaphne**
4. Leaves alternate, sometime crowded at apex 5
5. Flowers in axillary or extra-axillary simple or compound racemose umbels. .... **Litsea**
5. Flowers in racemes or panicles 6
6. Anthers 2 celled 7
6. Anthers 4 celled 9
7. Young shoots tomentose ..... **Cryptocarya**
7. Young shoots glabrous 8
8. Leaves lanceolate, caudate acuminate ..... **Apollonias**
8. Leaves elliptic or broadly ovate, acute or obtusely acuminate ..... **Beilschmiedia**
9. Leaves alternate, equidistant; panicles many flowered ..... **Persea**
9. Leaves alternate fascicled at apex of branchlets; panicles few flowered 10
10. Staminal glands stipitate ..... **Phoebe**
10. Staminal glands sessile ..... **Alseodaphne**

ACTINODAPHNE Nees

in Wallich, Pl. Asiat. Rar. 2: 68. 1831.

Shrubs or trees. Leaves subverticillate, penninerved; leaf buds covered with scales. Flowers dioecious in axillary cymes or racemes or in bracteate umbellules; perianth 6-lobed, tube short; stamens in male flowers 9, filaments 2-glandular, anthers introrse, 4-celled; staminodes in female flowers 9, spathulate or linear; ovary in female flowers ovoid, 1-celled; style small, stigma discoid. Fruit a berry, seated on the perianth tube.

1. Leaves oblanceolate; lateral nerves very oblique ..... **A. bourdillonii**
1. Leaves elliptic; lateral nerves otherwise 2
2. Leaves rufous-tomentose ..... **A. lawsonii**
2. Leaves otherwise 3
3. Nervules of leaves prominent; flowers in sessile clusters ..... **A. tadulingamii**
3. Nervules of leaves obscure; flowers in racemes ..... **A. malabarica**

Actinodaphne bourdillonii Gamble, Bull. Misc. Inform. Kew 1925: 129. 1925 & Gamble, Fl. Pres. Madras 1231(862). 1925; Manilal, Fl. Silent Valley 234. 1988; Mohanan & Sivad., Fl. Agasthyamala 562. 2002.

Large trees; branchlets densely tomentose. Leaves 23-25 x 6-7 cm, oblanceolate, long-acuminate, attenuate to the base; nerves 9 pairs, nervules parallel, prominent; densely tomentose below; petiole to 1 cm long; scales covering the sprout, 4-5 cm long, densely hispid. Flowers 8-10 together on peduncled umbel, pedicels to 6 mm long; bracts ca. 1.2 x 0.8 cm, orbicular; tepals ca. 5 mm long, oblong; stamens 8, filaments densely hispid, outer ones with stalked glands near the base; female flowers 5-10 together, in lateral tubercles, pedicels to 1.5 cm long. Drupes ca. 9 mm across, globose, black, smooth.

Flowering & Fruiting: December-March.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1390,* Chembra.

Actinodaphne lawsonii Gamble, Bull. Misc. Inform. Kew 1925: 129. 1925 & Gamble, Fl. Pres. Madras 1231(862). 1925.

Small trees. Leaves 15-19 x 6-7 cm, elliptic, obtuse or obtusely acute at apex, cuneate at base, densely rufous-tomentose beneath and on midrib above; nerves 8-9 pairs, often branched; petiole 1-1.5 cm long. Inflorescence densely rufous-tomentose; flowers 8-12 together on peduncled umbel; bracts lanceolate; stamens 8, outer one with stalked glands. Drupes elliptic, black, smooth.

Flowering & Fruiting: January-April.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1888,* Chembra.

Actinodaphne malabarica Balakr., J. Bombay Nat. Hist. Soc. 63: 329. 1967; V. S. Ramach. & V.J. Nair, Fl. Cannanore 392. 1988; Vajr., Fl. Palghat Dist. 402. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 379. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 422. 2005. *Actinodaphne hirsuta* Hook. f., Fl. Brit. India 5: 152. 1886, non Blume 1851; Gamble, Fl. Pres. Madras 1231(862). 1925.

Medium trees; bark smooth, lenticellate; branchlets densely dark hispid. Leaves 15-18 x 5-6 cm, elliptic, acuminate, base acute; nerves 12-14 pairs, obscure towards margins; nervules parallel, obscure, densely hispid below, glabrous above; petiole 2-2.5 cm long. Racemes 2.5-3 cm long, densely tomentose; bracts orbicular; flowers pedicelled; tepals 4-5 mm long, oblong, obtuse, densely hispid; filaments 2-glandular at base; female flowers in short racemes; pedicels slender. Berry 1-1.2 cm across, globose; fruiting calyx entire.

Flowering & Fruiting: August-June.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 2214,* Chembra; *RNMK 1004*, Kurichiarmala; *RNMK 1777*, Brahmagiri.

Actinodaphne tadulingamii Gamble, Bull. Misc. Inform. Kew 1925: 130. 1925 & Fl. Pres. Madras. 1231(862). 1925; V. S. Ramach. & V.J. Nair, Fl. Cannanore 392. 1988; Vajr., Fl. Palghat Dist. 402. 1990; Pandura. & V.J. Nair, J. Econ. Tax. Bot. 17: 173. 1993; Sivar. & P. Mathew, Fl. Nilambur 582. 1997; Mohanan & Sivad., Fl. Agasthyamala 564. 2002.

Medium trees; branchlets rusty tomentose. Leaves 18-20 x 4-5 cm, elliptic-lanceolate, acuminate, base acute; nerves 12-15 pairs, nervules parallel, prominent, densely hispid below, glabrate above; petiole 1-1.5 cm long. Female flowers 3-5 together on lateral tubercles, sessile.

Flowering & Fruiting: August-December.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 1203,* Chembra; *RNMK 1185,* Chanthanathodu.

ALSEODAPHNE C.G.D. Nees

in Wallich, Pl. Asiat. Rar. 2: 61, 71. 1831.

Alseodaphne semecarpifolia Nees in Wall., Pl. Asiat. Rar. 2: 72. 1831; Wight, Ic. t. 1826 & 1827. 1852; Hook. f., Fl. Brit. India 5: 144. 1886; Gamble, Fl. Pres. Madras 1226(858). 1925; Ansari, Fl. Kasaragod Div. 322. 1985; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 423. 2005.

Small trees, bark brownish black, with pleasant aromatic smell; branchlets stout, young shoots glabrous. Leaves 7-15 x 3-7 cm, obovate, obtuse, attenuate to base, glabrous; nerves 7-8 pairs. Panicle 5-6 x 2-3 cm, axillary; peduncle 4-5 cm long, slender. Flowers 3-4 mm across, bisexual, pedicellate; tepals 6, obovate, glabrous without, densely rusty tomentose inside; stamens 9, in 3 rows; anthers of inner most row extrorse; filaments rusty tomentose; staminodes cordate, stalked; ovary ovoid, glabrous, style short. Drupes 2-2.3 x 1.8-2 cm, ellipsoid to globose.

Flowering & Fruiting: April-July.

Distribution: Peninsular India and Sri Lanka. Occasional; in evergreen forests. *RNMK 1376,* Kallady-900 forest.

APOLLONIAS Nees

Laurin. Expos. 10. 1833.

Apollonias arnottii Nees, Syst. Laurin. 670. 1836; Hook. f., Fl. Brit. India 5: 121. 1886; Gamble, Fl. Pres. Madras 1219(854). 1925; Wight, Ic. t.1819. 1852; Manilal, Fl. Silent Valley 234. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 392. 1988; Sivar. & P. Mathew, Fl. Nilambur 583. 1997; Mohanan & Sivad., Fl. Agasthyamala 564. 2002.

Small trees, young shoots glabrescent. Leaves lanceolate, caudate-acuminate, base attenuate, glabrous, coriaceous, 13-15 x 3-3.5 cm; lateral nerves 8-10 pairs, slender. Panicles 2.5-5 cm long, terminal or from the axills of upper leaves. Perianth 6-lobed, lobes subequal; stamens 9, anthers 2-celled.

Flowering & Fruiting: November-December.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 1662,* Attamala; *RNMK 1098*, Chanthanathodu.

BEILSCHMIEDIA C.G.D. \Nees

in Wallich, Pl. Asiat. Rar. 2: 61, 69. 1831.

Beilschmiedia wightii (Nees) Benth. ex Hook. f., Fl. Brit. India 5: 124. 1886; Gamble, Fl. Pres. Madras 1221(855). 1925; Sasidh. & Sivar., Fl. Pl. Thrissur For. 380. 1996. *Haasia wightii* Nees, Syst. Laurin. 676. 1836; Wight, Ic. t. 1831. 1852.

Medium trees; bark brown, smooth, branchlets rough, glabrous. Leaves 10–15 x 4-6 cm, broadly ovate, obtusely acuminate at apex, acute at base, coriaceous; nerves 7-9 pairs, intercostae coarsely reticulate, glabrous; petiole 1-1.5 cm long; panicles axillary and terminal, branches slender. Berry 3-3.5 cm long, ovoid, smooth.

Flowering & Fruiting: January-February.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 0988,* Chembra; *RNMK 3547*, Aranamala.

CASSYTHA Linnaeus

Sp. Pl. 80. 1753.

Cassytha filiformis L., Sp. Pl. 35. 1753; Hook. f., Fl. Brit. India 5: 188. 1886; Gamble, Fl. Pres. Madras 1241(868). 1925; Wight, Ic. t. 1847. 1852; Manilal & Sivar., Fl. Calicut 250. 1982; Ansari, Fl. Kasaragod Div. 323. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 392. 1988; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 608. 2009; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 200. 2009.

Twiner, stem filiform. Flowers white in short spikes. Drupes ca. 0.5 cm across, white, subglobose, enclosed by an enlarged inflated perianth tube.

Flowering & Fruiting: August-September.

Distribution: Pantropical. Occasional; in tea and coffee plantations. *RNMK 1652,* Thalapuzha.

CINNAMOMUM Schaeffer

Bot. Exped. 74. 1760, *nom. cons.*

Tall trees with aromatic bark. Leaves opposite, 3-ribbed. Flowers bisexual, in axillary or subterminal panicles with dichaesial branchlets; perianth tube short, lobes 6, subequal, persistent; stamens 9 in 3 rows; anthers introrse except the innermost row, 4-celled; filaments of 3rd row glandular; staminodes cordate, stalked, in 4th row; ovary seated in the perianth tube, style thick; stigma discoid. Fruit a berry seated on the accrescent perianth tube.

1. Leaves tomentose below ..... **C. sulphuratum**
1. Leaves glabrous 2
2. Ribs reaching apex of the leaf 3
2. Ribs not reaching the apex of the leaf ..... **C. wightii**
3. Leaves to 10 cm long; cymes ca. 6 cm long, axillary ..... **C. verum**
3. Leaves 15-22 cm long; cymes 10-20 cm, axillary and terminal ..... **C. malabatrum**

Cinnamomum malabatrum (Burm. f.) Bl., Bijdr. 568. 1826; Kosterm., Bull. Bot. Surv. India 25: 102. 1983; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 157. 1988; Manilal, Fl. Silent Valley 234. 1988; Vajr., Fl. Palghat Dist. 403. 1990; Ansari, Fl. Kasaragod Div. 324. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 380. 1996; Sivar. & P. Mathew, Fl. Nilambur 583. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 423. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 609. 2009 *Laurus malabatrum* Burm. f., Fl. Ind. 92. 1768. *Cinnamomum iners* sensu Gamble, Fl. Pres. Madras 1224(857). 1925, non Reinw. ex Blume 1826. *Katou-karua* Rheede, Hort. Malab. 5:105-106, t 53. 1685. **Plate 27a.**

Small to medium trees; branchlets glabrous. Leaves 20-22 x 6-8 cm, oblong, acute at base and apex, ribbed from base or 1.5 cm above the base; petiole ca. 2 cm long. Panicle 10-20 x 3-5 cm, upper axillary, densely yellow-tomentose; flowers 3-4 mm across; pedicels 3-4 mm long; tepals ovate, acute; stamens in first and forth whorls; filaments tomentose; staminodes in second and third whorls; ovary glabrous. Berry ellipsoid on a deep perianth-cup, 0.8-1 cm long.

Flowering & Fruiting: March-April.

Distribution: Endemic to southern Western Ghats. Common; in evergreen and moist deciduous forests and plantations. *RNMK 2713,* Manikkunnumala; *RNMK 3204* Poothady.

Cinnamomum sulphuratum Nees in Wall., Pl. Asiat. Rar. 2: 74. 1831; Hook. f., Fl. Brit. India 5: 132. 1886; Gamble, Fl. Pres. Madras 1225(857). 1925; Kosterm., Bull. Bot. Surv. India 25: 114. 1983; Manilal, Fl. Silent Valley 235. 1988; Vajr., Fl. Palghat Dist. 403. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 381. 1996; Mohanan & Sivad., Fl. Agasthyamala 567. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 424. 2005.

Medium trees; bark reddish-brown with aromatic smell; branchlets tomentose. Leaves 8-15 x 2-5 cm, elliptic to linear-elliptic, acute at either ends, yellowish-tomentose below; ribs from the base reaching the apex; nervules regular, sub-parallel; petiole 0.7-1.5 cm long. Panicle 3-4 x 2-3 cm, axillary, tomentose; peduncle *5*-7 cm long; flowers 4-5 mm long; pedicels hairy; sepals 5, oblong, densely hairy; stamens in 3 whorls; glands globose; staminodes triangular. Berry ellipsoid.

Flowering & Fruiting: March-April.

Distribution: Endemic to Western Ghats. Occasional; in shola margins. *RNMK 3561,* Kurichiarmala; *RNMK 1666*, Chembra.

Cinnamomum verum Presl, Prir. Rostl. 2: 36. t. 7. 1825; Kosterm. In Reinwardtia 7: 141. 1965; Manilal & Sivar., Fl. Calicut 250. 1982; Ansari, Fl. Kasaragod Div. 324. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 393. 1988; Sivar. & P. Mathew, Fl. Nilambur 585. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 610. 2009. *Cinnamomum zeylanicum* Bl., Bijdr. 568. 1826;

Hook. f., Fl. Brit. India 5: 131. 1886; Gamble, Fl. Pres. Madras 1224(857). 1925; Wight, Ic. t. 123. 1839.

Medium size trees; branchlets glabrous. Leaves 8-10 x 5-5.5 cm, ovate, acute, rounded at base; ribs 0.5-1 cm above the base, intercostae irregular; petiole 2.5-3 cm long. Panicle 6-7 x 3-4 cm, axillary, pubescent; peduncle 6-7 cm long; flowers 5-6 mm long, ca. 6 mm across; tepals ovate, acute, densely hairy; stamens 6, in two rows, inner filaments with stalked glands; staminodes 3, inside the stamens. Fruiting calyx cupular, ribbed.
Flowering & Fruiting: March-April.
Distribution: South west India and Sri Lanka. Occasional; in evergreen forests. *RNMK 1081,* Vythiri.

Cinnamomum wightii Meisner in DC., Prodr. 15: 11. 1864; Hook. f., Fl. Brit. India 5: 132. 1886; Gamble, Fl. Pres. Madras 1224(857). 1925; Vajr., Fl. Palghat Dist. 403. 1990.

Small trees; branchlets glabrous. Leaves 7-9 x 3.5-4 cm, elliptic, acute at either ends, glabrous, glaucous below; ribs ca. 1 cm above the base, nervules parallel, regular, distinct; petiole 1-1.2 cm long, stout, glabrous. Cymes 3-4 cm long, 10-flowered. Flowers 5-6 mm long, closely packed; pedicels 5-7 mm long; tepals oblong, obtuse.
Flowering & Fruiting: April-June.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1120,* Chembra.

CRYPTOCARYA R. Brown

Prodr. Fl. Nov. Holland. 1: 402. 1810.

Trees. Leaves alternate, penninerved. Flowers bisexual, in axillary or terminal panicles; perianth tubular below, lobes 6, ovate; stamens 9, anthers of first and second row introrse, anthers of third row extrorse; filaments glandular; staminodes 3, inner to the stamens, cordate; ovary enclosed in the perianth tube, 1-celled; style short; stigma capitate. Fruit a drupe, enclosed in the perianth tube.

1. Leaves to 10 cm long; drupe oblong, puberulus ..... **C. beddomei**
1. Leaves more than 10 cm long; drupe globose, glabrous ..... **C. wightiana**

Cryptocarya beddomei Gamble, Bull. Misc. Inform. Kew 1925: 127. 1925 & Gamble, Fl. Pres. Madras 1218(853). 1925; V. S. Ramach. & V.J. Nair, Fl. Cannanore 394. 1988; Sivar. & P. Mathew, Fl. Nilambur 585. 1997 .

Medium trees; branchlets rusty puberulus. Leaves 10-12 x 6-6.5 cm, ovate-oblong, shortly acuminate at apex, rounded at base, glabrous; nerves 7-9 pairs, nervules sub-parallel, pinkish brown beneath; petiole ca. 1 cm long, stout. Panicle 10-12 x 4-5 cm, axillary, rusty puberulus; peduncles short. Drupes ca. 1 x 0.6 cm, puberulus.

Flowering & Fruiting: March-April.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1443,* Chembra; *RNMK 1996*, Theethundamala.

Cryptocarya wightiana Thw., Enum. Pl. Zeyl. 254. 1861; Hook. f., Fl. Brit. India 5: 120. 1886; Gangop. & Chakrab., J. Econ. Tax. Bot. 26: 475. 2002. *Cryptocarya bourdillonii* Gamble, Bull. Misc. Inform. Kew 1925: 125. 1925 & Fl. Pres. Madras. 1218(853). 1925; Manilal, Fl. Silent Valley 235. 1988; Vajr., Fl. Palghat Dist. 404. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 381. 1996.

Large trees; branchlets rusty puberulus. Leaves 13-16 x 5-7 cm, abruptly acute to acuminate, glabrous; nerves 9-10 pairs, irregular; nervules sub-parallel, prominent beneath; petiole 2-3 cm long, tomentose. Panicle 5-7 cm across, axillary, rusty tomentose; flowers 3-4 mm across, shortly pedicelled; perianth lobes 6, 3-4 mm long, ovate, tomentose; stamens 12, filaments pubescent, outer ones with glands; ovary glabrous. Drupes globose with an obtuse beak, glabrous.
Flowering & Fruiting: March-August.
Distribution: South Asia. Rare in evergreen forests. *RNMK 2004,* Kurichiarmala.

LITSEA Lamarck

Encycl. Meth., Bot. 3: 574. 1792, *nom. cons.*

Trees. Leaves alternate, penninerved, entire, glaucous beneath. Flowers dioecious, 4-15 together in umbellules supported by involucral bracts; umbellules solitary, cymose or racemose, peduncled; perianth tube absent or very small in male flowers, funnel-shaped and 4-6-lobed in female flowers; stamens in male flowers 9 or 12, in 3 or 4 rows; filaments of 3rd and 4th rows with glands at base; anthers introrse; staminodes in female flowers in 3 or 4 rows, outer linear, inner cordate; ovary globose, glabrous, 1-celled; ovule solitary; style 1, curved; stigma dialated. Fruit an oblong or globose berry; perianth tube enlarged into a cup.

1. Perianth lobes incomplete .....**L. deccanensis**
1. Perianth lobes complete.....2
2. Leaves pubescent or tomentose beneath.....3
2. Leaves glabrous beneath 4
3. Flowers in axillary or lateral clusters; berry oblong..... **L. bourdillonii**
3. Flowers in racemes; berry obovoid.....**L. floribunda**
4. Umbellules subsessile, in axillary or lateral clusters.....5
4. Umbellules long peduncled few flowered racemes 7
5. Leaves elliptic lanceolate, lateral nerves prominent.....**L. beddomei**
5 Leaves ovate-oblong, lateral nerves not prominent.....6
6. Leaves pale beneath; berries depressed globose, 2.5 cm across .....**L. oleoides**
6. Leaves reddish beneath; berries ellipsoid, to 1.5 cm long..... **L. ghatica**

7. Lateral nerves to 5 pairs; branchlets glabrous .....**L. coriacea**
7. Lateral nerves 6-15 pairs; branchlets hairy 8
8. Leaves linear lanceolate; lateral nerves 7 pairs; .....**L. mysorensis**
8. Leaves otherwise; lateral nerves to 12 pairs 9
9. Leaves acute at base ands apex; berry ellipsoid .....**L. laevigata**
9. Leaves caudate-acuminate, base obtuse; berry subsessile .....**L. venulosa**

Litsea beddomei Hook. f., Fl. Brit. India 5: 177. 1886; Gamble, Fl. Pres. Madras 1237(866). 1925; V. S. Ramach. & V.J. Nair, Fl. Cannanore 395. 1988.

Small trees; branchlets ferrugineus-tomentose. Leaves 10-12 x 4-5 cm, acute at apex, attenuate to the base; nerves 7-10 pairs, prominent below, glaucous; petiole 1-1.5 cm long. Racemes 3-4 cm long, axillary, ferrugineus-tomentose; male umbellule 8-9 mm across, peduncled; bracts orbicular, tomentose inside; flowers 4 in an umbellule; perianth lobes obovate, hairy; filaments glandular, tomentose; anthers with 4 openings; female umbellule 3-7 together; flowers 5-7; staminodes in 2 rows, biglobular with short cusp at centre.

Flowering & Fruiting: September-November.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1926,* Vythiri; *RNMK 3822*, Periya.

Litsea bourdillonii Gamble, Bull. Misc. Inform. Kew 1925: 131. 1925 & Gamble, Fl. Pres. Madras 1237(866). 1925; Sasidh. & Sivar., Fl. Pl. Thrissur For. 382. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta Dist. 425. 2005.

Small trees; branchlets ferrugineus-tomentose. Leaves 10-12 x 3.5-4 cm, acute at apex, attenuate to the base; nerves 7-10 pairs, prominent below, glaucous; petiole ca. 1.5 cm long. Racemes to 3 cm long, axillary, ferrugineus-tomentose; male umbellule ca. 8 mm across, peduncled; bracts orbicular, tomentose inside; flowers 4 in an umbellule; perianth lobes ca. 2 mm long, obovate, hairy; filaments glandular, tomentose; anthers with 4 openings; female umbellule ca. 12 mm across, 3-7 together; flowers 5-7; staminodes in 2 rows, biglobular with short cusp at centre.

Flowering & Fruiting: January-May.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 2010,* Kurichiarmala.

Litsea coriacea (Heyne ex Meisner) Hook. f., Fl. Brit. India 5: 166. 1886; Gamble, Fl. Pres. Madras 1236(865). 1925; Manilal & Sivar., Fl. Calicut 251. 1982; Ansari, Fl. Kasaragod Div. 325. 1985; Manilal, Fl. Silent Valley 236. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 395. 1988; Vajr., Fl. Palghat Dist. 404. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 382. 1996; Sivar. & P. Mathew, Fl. Nilambur 586. 1997; Mohanan & Sivad., Fl. Agasthyamala 569.

2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 425. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 610. 2009. *Tetranthera coriacea* Heyne ex Meisner in DC., Prodr. 15: 186. 1864.

Small to medium trees; branchlets glabrous. Leaves 14-18 x 4-5 cm, elliptic to obovate, acute at base, acuminate at apex, coriaceous; nerves 4-6 pairs; intercostae faint; petiole ca. 1 cm long. Umbellules 3-6 together, sessile, axillary on leafscars; flowers 8-10 in an umbellule; perianth lobes oblong, finely hirsute; stamens 12. Berry ovoid.

Flowering & Fruiting: December-January.

Distribution: Endemic to Peninsular India. Common; in evergreen forests. *RNMK 1700,* Sugandhagiri; *RNMK 2098*, Thariodu

Litsea deccanensis Gamble, Fl. Pres. Madras 1235(864). 1925; Kosterm. In Reinwardtia 7: 501. 1969; Manilal & Sivar., Fl. Calicut 251. 1982; Ansari, Fl. Kasaragod Div. 325. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 395. 1988; Sivar. & P. Mathew, Fl. Nilambur 586. 1997. *Litsea tomentosa* Heyne ex Nees in Wall., Pl. Asiat. Rar. 2: 65. 1831, non Bl. 1826; Hook. f., Fl. Brit. India 5: 157. 1886. *Tetranthera tomentosa* Roxb. ex Wight, Ic. t. 1834. 1852.

Small trees, young branchlets and leaves fulvous tomentose. Leaves 16-20 x 5-9 cm, ovate, elliptic, apex acute, base cuneate; petiole 4-5 cm. Umbellules solitary, axillary; peduncles 1-1.5 cm; involucral bracts 4, concave, tomentose outside; female flowers 6-8 per umbellule; pedicels 3-4 mm, pubescent, perianth absent, staminodes many, linear; ovary 1-ovuled.

Flowering & Fruiting: November-December.

Distribution: South India and Sri Lanka. Occasional; in evergreen forests. *RNMK 0241,* Manikkunnumala; *RNMK 2895,* Palchuram.

Litsea floribunda (Bl.) Gamble, Fl. Pres. Madras 1238(867). 1925; Manilal, Fl. Silent Valley 236. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 395. 1988; Vajr., Fl. Palghat Dist. 405. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 382. 1996; Sivar. & P. Mathew, Fl. Nilambur 587. 1997; Mohanan & Sivad., Fl. Agasthyamala 569. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 425. 2005. *Cylicodaphne floribunda* Bl., Mus. Bot. Lugd.-Bat. 1: 387. 1851. *Litsea wightiana* Hook. f., Fl. Brit. India 5: 177. 1886, p.p.

Tall trees; branchlets fulvous-tomentose. Leaves 12-18 x 6-9 cm, obovate, obtuse, acute at base, fulvous-tomentose below; nerves 9-13 pairs, prominent below, nervules subparallel; petiole ca. 1 cm long; dark brown-hairy. Racemes 4 –5 cm long, axillary; umbellules few, peduncle 7-8 mm long; bracts orbicular, densely tomentose outside; flowers 6-8 in an umbellule; perianth lobes silky tomentose; stamens 12; female umbellules panicled. Berry ca. 1 cm across, obovoid; fruiting calyx ca. 1 cm across, cupular.

Flowering & Fruiting: December-April.

Distribution: Endemic to Western Ghats. Common; in evergreen forests. *RNMK 3008,* Kurichiarmala; *RNMK 1711*, Chembra.

Litsea ghatica Sald., Fl. Karnataka 1: 67. 1984; Subram. *et al.*, Indian For. 115: 117. 1989; Manilal, Fl. Silent Valley 236. 1988.

Small trees; young shoots tomentose. Leaves 13-16 x 6-7 cm, elliptic-obovate, acute, cuneate at base, glabrous except on the veins above, grey – pubescent beneath. Flowers in solitary, tomentose, cauliferous 4-5 flowered umbels. Berry globose.

Flowering & Fruiting: September-February.

Distribution: Endemic to Western Ghats. Rare; in evergreen forests. *RNMK 1116,* Sughandhagiri.

Litsea laevigata (Nees) Gamble, Fl. Pres. Madras 1236(865). 1925; V. S. Ramach. & V. J. Nair, Fl. Cannanore 396. 1988; Manilal, Fl. Silent Valley 237. 1988. *Tetranthera attenuata* Nees var. laevigata Nees, Syst. Laurin. 677. 1836. *Litsea salicifolia* (Roxb. ex Nees) Hook. f., Fl. Brit. India 5: 167. 1886. *Tetranthera salicifolia* Roxb. ex Nees in Wall., Pl. Asiat. Rar. 2: 66. 1830.

Medium trees; branchlets puberulus. Leaves 15-18 x 4.5-5 cm, oblong, acute at base and apex, minutely pubescent beneath; nerves 8-12 pairs, prominent beneath; petiole ca. 1 cm long. Umbellule 7-9 mm across, 1-3 together, subsessile; bracts orbicular, pubescent; flowers 10-12 in an umbellule, pedicelled, perianth lobes ca. 2 mm long, densely hairy; stamens 12, filaments ca. 3 mm long, hairy, 2-glandular at base. Berry ellipsoid, glabrous.

Flowering & Fruiting: December-May.

Distribution: Endemic to Peninsular India. Occasional; in evergreen forests. *RNMK 1276,* Sughandhagiri.

Litsea mysorensis Gamble, Bull. Misc. Inform. Kew 1925: 130. 1925 & Gamble, Fl. Pres. Madras 1236(865). 1925.

Small trees. Leaves 8-10 x 2-2.5 cm, linear lanceolate, acuminate at both ends, glabrous and reticulate beneath; nerves 7 pairs. Flowers in umbellules, several together, subsessile, axillary clusters; perianth lobes 6, 2-3 mm; stamens 9, 4-celled. Berry globose, glabrous.

Flowering & Fruiting: July-October.

Distribution: Endemic to south India. Occasional; in evergreen forests. *RNMK 1564,* Sughandhagiri-amba.

Litsea oleoides (Meisner) Hook. f., Fl. Brit. India 5: 175. 1886; Gamble, Fl. Pres. Madras 1236(865). 1925; V. S. Ramach. & V.J. Nair, Fl. Cannanore 397. 1988; Vajr., Fl. Palghat Dist. 405. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 383. 1996; Sivar. & P. Mathew, Fl. Nilambur 587. 1997; Mohanan & Sivad., Fl. Agasthyamala 571.2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 425. 2005. *Tetranthera oleoides* Meisner in DC., Prodr. 15: 195. 1864.

Large trees; branchlets angled, glabrous. Leaves 14-18 x 6-7 cm, oblong, acute at both ends, pale beneath; nerves 9-12 pairs, not prominent; petiole 2-2.5 cm long. Umbellule 6-7 mm across, in long axillary raceme, peduncles ca.

6 mm long; bracts orbicular, pubescent; flowers 3-6 in an umbellule, pedicelled; stamens 9, all filaments with sessile glands at base, filaments hairy; staminodes in female flowers 3-seriate, glandular at base. Berry glabrous, 2-2.5 cm across, red with white spots.
Flowering & Fruiting: October-April.
Distribution: Endemic to southern Western Ghats. Common; in evergreen forests. *RNMK 1553,* Chembra; *RNMK 1801*, Vythiri.

Litsea venulosa (Meisner) Hook.f., Fl. Brit. India 5: 161. 1886; Gamble, Fl. Pres. Madras 1235(865). 1925; Mohanan & Sivad., Fl. Agasthyamala 572. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 426. 2005. *Tetranthera venulosa* Meisner in DC., Prodr. 15: 187. 1864.

Subscandent shrubs, branchlets and leaves glabrous. Leaves oblong, obtusely caudate-acuminate, base obtuse, glaucous below, 8-10 x 3.5-5 cm. Male umbellules solitary or in groups of 2 or 3, peduncles slender, 1-1.5 cm long; female solitary; perianth lobes 5 or 6, unequal, gland-dotted. Berry subglobose, ca. 1 cm across, pedicels thickened towards apex, yellow.
Flowering & Fruiting: May-August.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2079,* Chembra.

NEOLITSEA (Bentham) Merrill
Phillip. J. Sci. 1 (Suppl.): 56. 1906 *nom. cons.*

Neolitsea cassia (L.) Kosterm., J. Sci. Res.(Jakarta) 1: 85. 1952; V. S. Ramach. & V.J. Nair, Fl. Cannanore 397. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 383. 1996; Mohanan & Sivad., Fl. Agasthyamala 573. 2002. *Laurus cassia* L., Sp. Pl. 369. 1753. *Neolitsea zeylanica* (Nees) Merr., Philipp. J. Sci. Suppl. 1: 57. 1906; Gamble, Fl. Pres. Madras 1239(867). 1925; Vajr., Fl. Palghat Dist. 406. 1990. *Litsea zeylanica* Nees, Amoen. Bot. Benn. Fasc. 1: 58. t.5. 1823; Hook. f., Fl. Brit. India 5: 178. 1886; Wight, Ic. t. 1844. 1852.

Large shrubs to small trees; branchlets slender, glabrous. Leaves 7-9 x 3-5 cm, elliptic-lanceolate, acuminate at apex, attenuate to the base, glaucous beneath, thin, subcoriaceous; ribs from above the base, nervules indistinct; petiole 7-8 mm long. Umbellule 6-8 mm across, sessile, in fascicles of 3-5; bracts ca. 4 mm long, oblong, obtuse, glabrous. Berry ca. 1.5 x 1 cm, ellipsoid, smooth, black; calyx cup toothed.
Flowering & Fruiting: March-April.
Distribution: Indo-Malesia. Common; in evergreen forest margins. *RNMK 2672,* Thalimala; *RNMK 2011*, Kurichiarmala.

PERSEA P. Miller
Gard. Dict. Abr. ed. 4, 1754, *nom. cons.*

Persea macrantha (Nees) Kosterm., Reinwardtia 6: 193. 1962; V. S. Ramach. & V.J. Nair, Fl. Cannanore 397. 1988; Vajr., Fl. Palghat Dist. 407. 1990;

Sasidh. & Sivar., Fl. Pl. Thrissur For. 383. 1996; Sivar. & P. Mathew, Fl. Nilambur 588. 1997; Mohanan & Sivad., Fl. Agasthyamala 573. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 426. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 611. 2009. *Machilus macrantha* Nees in Wall., Pl. Asiat. Rar. 2: 70. 1831; Hook. f., Fl. Brit. India 5: 140. 1886; Gamble, Fl. Pres. Madras 1227(859). 1925; Wight, Ic. t. 1824. 1852.

Large trees; bark granular, smelling; branchlets glabrous. Leaves 18-20 x 6-10 cm, ovate-oblong, obtuse or obtusely acute, glaucous beneath; nerves 10-12 pairs; petiole 3-4 cm long. Panicle to 20 x 10 cm, axillary or terminal; branches white, thinly pubescent; flowers 8-9 mm across, shortly pedicelled; perianth lobes 6, greenish white, ca. 6 mm long, ovate; stamens 9, 3-seriate, innermost row with extrorse anthers, filaments pubescent; ovary conical, 1-celled, pubescent. Drupes 1-1.2 cm across, globose, black, glabrous.
Flowering & Fruiting: December-May.
Distribution: Peninsular India and Sri Lanka. Common; in semi-evergreen forests and plantations. *RNMK 1922,* Manikkunnumala.

PHOEBE Nees
Syst. Laurin. 98. 1836.

Phoebe lanceolata Nees, Syst. Laurin. 109. 1836; Wight, Ic. t. 1821. 1852; Hook. f., Fl. Brit. India 5: 141. 1886; Gamble, Fl. Pres. Madras 1228(860). 1925; V. S. Ramach. & V.J. Nair, Fl. Cannanore 398. 1988; Vajr., Fl. Palghat Dist. 407. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 384. 1996.

Small trees; branchlets slender. Leaves 18-20 x 6-7 cm, oblanceolate, long-acuminate, attenuate to the base; nerves 9-11 pairs; nervules subparallel; petiole 1-1.5 cm long. Peduncle 6-8 cm long, slender, axillary; pedicels 5-9 mm long, glabrous; flowers 5-6 mm across; perianth lobes 2.5-3 mm long, ovate, glabrous, connate at base; stamens 9; filaments 1.5-2 mm long, pubescent with two reniform appendages at base. Berry 1.5-1.8 cm long, ellipsoid, glabrous, black.
Flowering & Fruiting: January-March.
Distribution: India and Myanmar. Occasional; in evergreen forests. *RNMK 3494,* Kanthanpara; *RNMK 2895,* Ladies smith forest.

Persea americana Mill., often grown in homesteads.

PROTEACEAE Juss.
Gen. Pl. 78. 1789.

HELICIA Loureiro
Fl. Cochinch. 1: 83. 1790.

Helicia nilagirica Bedd., Madras J. Lit. Sci. ser. 3, 1: 50. t.11. 1864; Hook. f., Fl. Brit. India 5: 190. 1886; Gamble, Fl. Pres. Madras 1243(870). 1925; Manilal, Fl. Silent Valley 237. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 398. 1988; Vajr., Fl. Palghat Dist. 407. 1990.

Small trees; branchlets stout. Leaves 14-16 x 5-6 cm, elliptic, entire or serrate, acute, coriaceous; nerves 6-8 pairs, prominent; petiole 5-7 mm long. Flowers in racemes from below the leaves, bisexual; pedicels stout, perianth lobes 4, united below with a gibbous base, splitting above, white; stamens 4, epitepalous; antitepalous; connectives produced into a filiform appendages; ovary 1-celled; ovules 2, basal, style terminal, thickened above. Drupes globose, 1-1.2 mm across; seeds 1 or 2, rugose.
Flowering & Fruiting: June-July.
Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 2554,* Chanthanathodu.

Grevillea robusta A. Cunn. ex R. Br., the Australian silver oak, is commonly grown in tea plantations and cultivated by the coffee planters and Forest Department.

THYMELEACEAE Juss.

Gen. Pl. 76. 1789.

GNIDIA Linnaeus

Sp. Pl. 358. 1753.

Gnidia glauca (Fresen.) Gilg in Engl., Bot. Jahrb. Syst. 19: 265. 1894; Manilal, Fl. Silent Valley 238. 1988. *Lasiosiphon glaucus* Fresen., Flora 21: 603. 1838. *Gnidia ericephala* Meisner in Denkschr., Koenigl.-Baier. Bot. Ges. Regensburg 3: 292. 1841. *Lasiosiphon eriocephalus* (Meisner) Decne. In Jacq., Voy. Bot. 148. 1844: Hook. f., Fl. Brit. India 5: 197. 1886; Gamble, Fl. Pres. Madras 1244(871). 1925.

Large shrubs or small trees, branchlets glabrous. Leaves spiral, 5-9 x 2-3 cm, oblong, apex acute, base rounded, entire, glabrous, penninerved; petiole 2-3 mm long. Flowers many, in terminal heads surrounded by leafy bracts; pedicels ca. 3 mm long; perianth ca. 1.5 cm long, tubular, silky hairy at the middle, lobes 5, short; stamens 10, biseriate, free, filaments attached to the perianth tube; ovary 1-celled, ovule solitary, stigma capitate. Capsule ca. 4 x 1 mm, ellipsoid, thinly hairy, covered by the persisting base of the perianth tube.
Flowering & Fruiting: January-June.
Distribution: India, Sri Lanka and Africa. Common; in shola margins. *RNMK 1332,* Chembra.

ELAEAGNACEAE Juss.

Gen. Pl. 74. 1789.

ELAEAGNUS Linnaeus

Sp. Pl. 121. 1753.

Scandent shrubs, with or without thornes. Leaves alternate, simple, glabrous above and scaly below. Flowers bisexual, 4-merous; perianth

tubular-urceolate, apically 4-lobed; stamens 4, subexerted; ovary 1 celled, 1-ovuled. Nut enclosed by the fruiting perianth.

1. Leaves 5-6 nerved, thin ..... .**E. conferta**
1. Leaves 3-4 nerved, thick..... **E. kologa**

Elaeagnus conferta Roxb., Fl. Ind. 1: 460. 1820; Gamble, Fl. Pres. Madras 1246(873). 1925; Manilal & Sivar., Fl. Calicut 251. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 398. 1988; Vajr., Fl. Palghat Dist. 408. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 384. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 427. 2005. *Elaeagnus latifolia* Bedd., Fl. Sylv. t. 180.1872, non L. 1753; Hook. f., Fl. Brit. India 5:202.1886 p.p.

Thorny climbers, densely covered with silvery scales; thorns axillary, straight, 1-2 cm long. Leaves 12-14 x 7-7.5 cm, ovate, acute, glabrous above, silvery-white below; nerves 5-7 pairs, indistinct. Flowers bisexual, 3-6 in axillary fascicles, pedicelled; perianth greenish white, ca. 1 cm long, urceolate, gamotepalous, lobes 4, ovate; stamens 4, filaments free, broadened below; anthers transverse; ovary 1-celled; inferior; ovules solitary; style filiform, stigma lateral. Fruit a nut covered with thickened perianth base, 2-4-2.6 x 1-1.2 cm, reddish, fleshy.

Flowering & Fruiting: December-March.

Distribution: Indo-Malesia and China. Occasional; along margins of evergreen forest. *RNMK 2779,* Chembra.

Elaeagnus kologa Schult. in DC., Prodr. 14: 611. 1857; Gamble, Fl. Pres. Madras 1246(873). 1925; Manilal, Fl. Silent Valley 238. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 399. 1988; Vajr., Fl. Palghat Dist. 408. 1990; Sivar. & P. Mathew, Fl. Nilambur 590. 1997; Mohanan & Sivad., Fl. Agasthyamala 576. 2002. *Elaeagnus latifolia* L., Sp. Pl. 121. 1753, pro parte; Hook. f., Fl. Brit. India 5: 202. 1886.

Profusely branched shrubs or small trees, with silvery peltate scales. Leaves 4-5 x 2.5-3 cm, ovate, elliptic, apex subobtuse, base rounded or ovate; petiole 7-8 mm long. Flowers in axillary clusters, 5-8, greenish-white; perianth tube ca. 8 mm long, lobes 4, ca. 2 mm long; stamens included; style flattened, ca. 5 mm long, scaly hairy.

Flowering & Fruiting: January-May.

Distribution: Indo-Malesia and China. Occasional; in shola forests. *RNMK 2551,* Chembra.

LORANTHACEAE Juss.

Ann. Mus. Natl. Hist. Nat. 12: 292. 1808.

1. Bracts forming an involucre enclosing the inflorescence ..... .**Tolypanthus**
1. Bracts not involucrate 2
2. Leaves alternate .....**Taxillus**
2. Leaves opposite or sub-opposite 3

3. Corolla 4 lobed. 4
3. Corolla 5 or 6 lobed 5
4. Flowers in cymes or fascicles; corolla gamopetalous ....**Scurrula**
4. Flowers in spikes or racemes; corolla polypetalous .... **Helixanthera**
5. Flowers bracteate and bracteolate .... .**Macrosolen**
5. Flowers ebracteolate....6
6. Leaves 3-5 ribbed from base; flowers sessile .... **Helicanthes**
6. Leaves penninerved; flowers pedicelled .... **Dendrophthoe**

DENDROPHTHOE C. F. P. Martius
Flora 13. 1830.

Parasitic shrubs, branches erect or drooping. Leaves opposite, entire, thick and coriaceous, petiolate. Flowers in racemes or cymes, axillary; bracts ovate, obtuse; calyx copular, truncate; corolla gamopetalous, curved, lobes 5, oblong, stamens 5, filaments attached to petals; ovary globose, 1 ovuled, style slender, stigma globose. Berry ellipsoid or obovoid.

1. Branchlets trigonous; leaves fleshy.... **D. trigona**
1. Branchlets terete; leaves coriaceous .... **D. falcate** var. **falcata**

Dendrophthoe falcata (L. f.) Etting., Denkschr. Kaisel. Akad. Wiss. Math.-Naturwiss. Kl. 32: 52,53,58. t.13. 1871, var. **falcata**; Manilal & Sivar., Fl. Calicut 252. 1982; Ansari, Fl. Kasaragod Div. 326. 1985; Manilal, Fl. Silent Valley 239. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 399. 1988; Vajr., Fl. Palghat Dist. 409. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 385. 1996; Sivar. & P. Mathew, Fl. Nilambur 591. 1997; Mohanan & Sivad., Fl. Agasthyamala 579. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 612. 2009; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 207. 2009. *Loranthus falcatus* L. f., Suppl. Pl. 211. 1781. *Loranthus longiflorus* Desr. in Lamk., Encycl. 3: 598. 1792; Hook. f., Fl. Brit. India 5: 214. 1886; Gamble, Fl. Pres. Madras 1253(877). 1925. *Loranthus longiflorus* Desr. var. *falcata* (L. f.) Kurz, For. Fl. Burma 2: 321. 1877; Hook. f., Fl. Brit. India 5: 215. 1886; Gamble, Fl. Pres. Madras 1253(877). 1925. *Loranthus longiflorus* Desr. var. *amplexifolia* (DC.) Thw., Enum. Pl. Zeyl. 134. 1859; Hook. f., Fl. Brit. India 5: 215. 1886; Gamble, Fl. Pres. Madras 1253(877). 1925.

Branches stout, smooth. Leaves 17-20 x 7-10 cm, ovate-falcate, acute or obtuse at apex or orbicular, cordate at base, glabrous, coriaceous. Racemes 7-8 cm long, axillary, drooping, glabrous. Flowers many, closely packed; pedicel 3-5 mm long; calyx cupular; corolla 4-6 cm long, pink with greenish lobes; style glabrous, stigma slightly wider than style. Berry ca. 1 cm across, ovoid, crimson, smooth.

Flowering & Fruiting: December-May.

Distribution: Indo-Malesia to Australia. Common; in moist deciduous forests. *RNMK 3212*, Chedalayam; *RNMK 2377*, Sulthan Bathery.

Dendrophthoe trigona (Wight & Arn.) Danser ex Sant., Rec. Bot. Surv. India 16:163. 1953; Manilal, Fl. Silent Valley 239. 1988; Sivar. & P. Mathew, Fl. Nilambur 592. 1997; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 212. 2009. *Loranthus trigonus* Wight & Arn., Prodr. 386. 1834; Hook. f., Fl. Brit. India 5: 219. 1886; Gamble, Fl. Pres. Madras 1253(877). 1925.

Parasitic shrubs; branches to 15 mm thick, rugose, glabrous. Leaves 17-20 x 12-13 cm, ovate, obtuse, acute at base, coriaceous; petiole ca. 1.5 cm long, flattened or winged. Racemes to 3 cm long; bracts cup shaped; flowers pink; calyx cupular, truncate, glabrous; corolla 15-20 mm long, split to the middle. Berry ca. 1 x 0.5 cm, obovoid.

Flowering & Fruiting: May-August.

Distribution: Endemic to southern Western Ghats. Occasional; in moist deciduous forests. *RNMK 2889,* Kuruva.

HELICANTHES Danser

Verh. Kon. Ned. Akad. Wetensch., Afd. Natuurk. Tweede Sect. 29(6): 5. 1933.

Helicanthes elastica (Desr.) Danser, Verh. Akad. Wet. afd. Natuurk. Sect. 2. 29: 55. 1933; Manilal & Sivar., Fl. Calicut 253. 1982; Ansari, Fl. Kasaragod Div. 327. 1985; Manilal, Fl. Silent Valley 239. 1988; Vajr., Fl. Palghat Dist. 410. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 385. 1996; Mohanan & Sivad., Fl. Agasthyamala 580. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 612. 2009; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 213. 2009. *Loranthus elasticus* Desr. in Lam., Encycl. 3: 599. 1792; Hook. f., Fl. Brit. India 5: 216. 1886; Gamble, Fl. Pres. Madras 1254(877). 1925. *Dendrophthoe elasticus* (Desr.) Danser, Bull. Jard. Bot. Buitenz. ser. 3, 10: 308. 1929; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta Dist. 428. 2005.

Erect parasitic shrubs; branches woody, thickened at nodes, glabrous. Leaves to 10 x 5 cm, opposite, ovate, obtuse, ribbed from base; base obtuse or truncate, glabrous. Flowers axillary, fascicled, 1-3 together, sessile; bracts minute; calyx tube cupular, truncate; corolla ca. 2.5 cm long, lobes 5, spirally twisted, pale pink, tube lined with vertical pubescence inside; stamens 5; filaments and style slender, crimson; stigma globose. Berry ca. 5 mm across, globose, red.

Flowering & Fruiting: October-April.

Distribution: Endemic to Peninsular India. Occasional; in moist deciduous forests. *RNMK 1903,* Naikuppa.

HELIXANTHERA Loureiro

Fl. Cochinch. 142. 1790.

Densely branched parasitic shrubs; branches terete. Leaves opposite, thick and coriaceous, entire. Flowers in axillary racemes or spikes; bracts orbicular, small; calyx adnate to the ovary, cupular above; corolla lobes 4,

free, recurved, oblong; stamens 4, filaments adnated to petals; anthers linear-oblong; ovary inferior, 1-celled with a solitary ovule; style slender, stigma capitate. Fruit a one-seeded berry, crowned by persistent calyx.

1. Bracts with a small appendage; corolla dark brown at apex; branches tomentose..... .....**H. obtusata**
1. Bracts without appendage; corolla purplish at apex; branches glabrous.....2
2. Leaves to 12 cm long, acute at base; petals to 7 mm long..... **H. wallichiana**
2. Leaves to 7 cm long, obtuse at base; petals to 2 cm long .....**H. intermedia**

Helixanthera intermedia (Wight) Danser, Bull. Jard. Bot. Buitenz. ser. 3, 10: 317. 1929; V. S. Ramach. & V.J. Nair, Fl. Cannanore 400. 1988; Vajr., Fl. Palghat Dist. 410. 1990; Sivar. & P. Mathew, Fl. Nilambur 593. 1997; Mohanan & Sivad., Fl. Agasthyamala 581. 2002; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 216. 2009. *Loranthus intermedius* Wight, Calcutta J. Nat. Hist. 6: 361. 1846; Hook. f., Fl. Brit. India 5: 205. 1886; Gamble, Fl. Pres. Madras 1251(876). 1925.

Glabrous shrubs. Leaves ovate, obtuse, coriaceous, base obtuse, truncate, or sub-cordate; petiole ca. 1 cm long. Racemes 5-7 cm long, axillary, many-flowered; pedicel 6-7 mm long, slender, glabrous; flower buds 4-angled and curved; corolla lobes 4, straight, purplish pink, free to the base; stamens 4; filaments attached below the middle of the corolla; stigma globose.
Flowering & Fruiting: February-March.
Distribution: Endemic to southern Western Ghats. Occasional; in moist deciduous forests. *RNMK 1663,* Kuruva; *RNMK 1955*, Thirunelli.

Helixanthera obtusata (Schult.) Danser, Bull. Jard. Bot. Buitenz. ser. 3, 10: 317. 1929; Ansari, Fl. Kasaragod Div. 327. 1985; Manilal, Fl. Silent Valley 240. 1988; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta Dist. 428. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 217. 2009. Loranthus obtusatus Schult. in Roem. & Schult., Syst. Veg. 7: 1650. 1830; Hook. f., Fl. Brit. India 5: 205. 1886; Gamble, Fl. Pres. Madras 1251(876). 1925.

Branchlets terete, slender, ferrugineus-tomentose. Leaves 12-14 x 7-8 cm, ovate, obtuse, base rounded, coriaceous, glabrous; petiole ca. 1 cm long. Racemes ca. 8 cm long, densely golden tomentose; bracts with a small appendage; flowers many; pedicel ca. 5 mm long, reflexed; corolla dark pink, ca. 18 mm long, 4-angular and curved in bud, lobes 4, free, tomentose outside; anthers dark brown; stigma globose.
Flowering & Fruiting: January-June.
Distribution: Endemic to southern Western Ghats. Common; in moist deciduous forests. *RNMK 3543,* Chedalayam.

Helixanthera wallichiana (Schult.) Danser, Bull. Jard. Bot. Buitenz. ser. 3, 10: 319. 1929; Manilal & Sivar., Fl. Calicut 252. 1982; Manilal, Fl. Silent Valley 240. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 400. 1988; Vajr.,

Fl. Palghat Dist. 410. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 386. 1996; Sivar. & P. Mathew, Fl. Nilambur 593. 1997; Mohanan & Sivad., Fl. Agasthyamala 581. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 428. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 217. 2009. *Loranthus wallichianus* Schult. in Roem. & Schult., Syst. Veg. 7: 100. 1829; Hook. f., Fl. Brit. India 5: 205. 1886; Gamble, Fl. Pres. Madras 1251(876). 1925.

Undershrubs; branchlets rugose or lenticellate. Leaves ovate, obtuse, base acute or rounded glabrous; nerves 2-3 pairs; petiole 5-6 mm long. Racemes ca. 3 cm long, slender, glabrous; pedicel 3-5 mm long, corolla reddish, terete in bud, lobes 4, glabrous.

Flowering & Fruiting: August-September.

Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 3009,* Vythiri; *RNMK 3216*, Pookodu.

MACROSOLEN (Blume) Reichb

in J. A. Schultes et J. H. Schultes in

J. J. Roemer et J. A. Schultes, Syst. Veg. 7: 1731. 1830.

Macrosolen parasiticus (L.) Danser, Blumea 2: 36. 1936; Ansari, Fl. Kasaragod Div. 328. 1985; Manilal, Fl. Silent Valley 240. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 401. 1988; Vajr., Fl. Palghat Dist. 411. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 386. 1996; Sivar. & P. Mathew, Fl. Nilambur 594. 1997; Mohanan & Sivad., Fl. Agasthyamala 582. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 429. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 221. 2009. *Lonicera parasitica* L., Sp. Pl. 175. 1753. *Loranthus loniceroides* L., Sp. Pl. (ed. 2) 473. 1762; Hook. f., Fl. Brit. India 5: 221. 1886. *Elytranthe loniceroides* (L.) G. Don, Gen. Hist. 3: 427. 1834; Gamble, Fl. Pres. Madras 1255(879). 1925.

Branches terete, glabrous. Leaves ovate-lanceolate, acuminate, rounded at base; nerves obscure; petiole ca. 1.5 cm long. Peduncle ca. 1 cm long, 1-6-flowered; bracteoles orbicular; calyx 4-5 mm long, tubular, glabrous; corolla scarlet below, white or green at apex, curved; lobes deflexed, divided to above the middle; filaments green; stigma hemispherical. Berry ovoid, smooth, crowned with tubular calyx.

Flowering & Fruiting: December-May.

Distribution: South-west India and Sri Lanka. Occasional; in semi-evergreen and moist deciduous forests. *RNMK 2265,* Kuruva; *RNMK 3518*, Muthanga.

SCURRULA Linnaeus

Sp. Pl. 110. 1753.

Scurrula parasitica L., Sp. Pl. 110. 1753; V. S. Ramach. & V.J. Nair, Fl. Cannanore 401. 1988; Manilal, Fl. Silent Valley 241. 1988; Vajr., Fl. Palghat Dist. 412. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 386. 1996; Sivar. & P. Mathew, Fl. Nilambur 595. 1997; Mohanan & Sivad., Fl. Agasthyamala 583.

2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 429. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 69. 2009. *Loranthus buddleioides* Desr. in Lamk., Encycl. 3: 660. 1792; Gamble, Fl. Pres. Madras 1251(876). 1925. *Loranthus scurrula* L., Sp. Pl. (ed. 2) 472. 1762; Hook. f., Fl. Brit. India 5: 208. 1886.

Parasitic shrubs; branches erect, tomentose. Leaves 5-9 x 3-5 cm, ovate, rounded at base and apex; golden tomentose below; petiole ca. 1 cm long. Flowers in axillary fascicles or shortly peduncled cymes, 16-20 together; bract ovate, densely tomentose; calyx cupular; corolla ca. 1.5 cm long, slender, densely tomentose; lobes 4, ovate, acute; stamens 4, filaments glabrous; stigma clavate. Berry obovoid, densely hairy.

Flowering & Fruiting: November-February.

Distribution: South and south-east Asia. Common; in moist deciduous forests. *RNMK 2033,* Muthanga; *RNMK 1678*, Tholpetty.

TAXILLUS van Tieghem

Bull. Soc. Bot. France 42: 256. 1895.

Taxillus tomentosus (Heyne ex Roth) Tiegh., Bull. Soc. Bot. France 42: 256. 1895; V. S. Ramach. & V.J. Nair, Fl. Cannanore 401. 1988; Vajr., Fl. Palghat Dist. 412. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 387. 1996; Sivar. & P. Mathew, Fl. Nilambur 596. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 429. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 228. 2009. *Loranthus tomentosus* Heyne ex Roth, Nov. Pl. Sp. 191. 1821; Hook. f., Fl. Brit. India 5: 212. 1886; Gamble, Fl. Pres. Madras 1252(876). 1925.

Branches lenticellate, young shoots fulvous tomentose. Leaves 4-5 x 2-2.5 cm, obovate to oblong, obtuse, glabrous above; nerves 4-5 pairs; petiole 4-5 mm long. Flowers 3-8, fascicled; pedicels ca. 2 mm long; calyx ca. 2 mm long, lobes triangular; corolla greenish white, pink at base, 1.4-1.6 cm long, densely hairy, tube gibbous, lobes spreading; stigma hemispheric. Berry sub-globose, tomentose.

Flowering & Fruiting: December-January.

Distribution: South-west India and Sri Lanka. Occasional; in evergreen and moist deciduous forests. *RNMK 3455,* Pookodu; *RNMK 3053,* Kuruva.

TOLYPANTHUS Blume

Syst. Veg. ed. 15. 1731. 1830.

Tolypanthus lagenifer (Wight) van Tiegh., Bull. Soc. Bot. France 42: 249. 1895; V. S. Ramach. & V.J. Nair, Fl. Cannanore 402. 1988; Vajr. *et al.*, J. Econ. Tax. Bot. 5:424. 1984; Manilal, Fl. Silent Valley 241. 1988; Vajr., Fl. Palghat Dist. 412. 1990; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 231. 2009. *Loranthus lageniferus* Wight, Ic. t.306. 1840; Hook. f., Fl. Brit. India 5: 218. 1886; Gamble, Fl. Pres. Madras 1254(878). 1925.

Semiparasitic shrubs. Leaves 8-10 x 5-6 cm, orbicular or oblong, rounded at base. Bracts ca. 3 cm long, scarlet-red, bell shaped. Flowers in groups, 5-6 cm long, pale green, oblong-lanceolate.
Flowering & Fruiting: January-March.
Distribution: Endemic to Western Ghats. Rare; in evergreen forests. *RNMK 3247,* Chnathanathodu.

VISCACEAE Miq.

VISCUM Linnaeus
Sp. Pl. 1023. 1753.

Monoecious parasitic shrubs, branchlets terete, angular, or flattened; dichotomously branched. Leaves absent or present. Flowers 4-merous, in threes, axillary, fascicled; the central flower bisexual, lateral ones male; bract small, bracteoles 2, connate; perianth tube adnate to the ovary in bisexual flowers, lobes 4; stamens sessile, anther dehiscence by pores; ovary 1 or 2 ovuled; stigma sessile, persistent. Berry ovoid or globose, smooth or angular.

1. Stem leafless, green ..... **angulatum**
1. Stem leafy 2
2. Leaves lanceolate, falcate; berry oblong ..... **V. monoicum**
2. Leaves obovate, obtuse; berry obovoid truncate ..... **V. orientale**

Viscum angulatum Heyne ex DC., Prodr. 4: 283. 1830; Hook. f., Fl. Brit. India 5: 225. 1886; Gamble, Fl. Pres. Madras 1259(881). 1925; Manilal, Fl. Silent Valley 241. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 402. 1988; Vajr., Fl. Palghat Dist. 413. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 388. 1996; Sivar. & P. Mathew, Fl. Nilambur 597. 1997; Mohanan & Sivad., Fl. Agasthyamala 585. 2002; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 246. 2009.

Branches 4-angled, drooping, slightly broadened near the apex of the internode, smooth. Flowers solitary or 3-together, axillary, all female, all male or middle one female and laterals male; perianth lobes in male flowers 4, triangular, connate below; stamens 4, epiphyllous; anthers sessile; ovary obovoid, style short or absent. Berry ca. 5 x 5 mm, globose, yellowish.
Flowering & Fruiting: March-April.
Distribution: Indo-Malesia. Common; in moist deciduous forests. *RNMK 3366,* Muthanga; *RNMK 2232,* Kuruva.

Viscum monoicum Roxb. ex DC., Prodr. 4: 278. 1830; Hook. f., Fl. Brit. India 5: 224. 1886; Gamble, Fl. Pres. Madras 1258(880). 1925; Manilal, Fl. Silent Valley 242. 1988; Sivar. & P. Mathew, Fl. Nilambur 597. 1997; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 251. 2009.

Stem terete, erect or drooping. Leaves 7-8 x 1.5-2 cm, elliptic-lanceolate, attenuate to the base, 5-ribbed, glabrous. Flowers 3-5 together, axillary,

fascicled, sessile; bracts cupular with 2 acuminate edges; in each triad lateral flowers female and central flowers male or absent. Berry oblong.
Flowering & Fruiting: May-August.
Distribution: South-east Asia. Occasional; in moist deciduous forests. *RNMK 2458,* Muthanga.

Viscum orientale Willd., Sp. Pl. 4: 737. 1805; Hook. f., Fl. Brit. India 5: 224. 1886; Gamble, Fl. Pres. Madras 1258(880). 1925; Sasidh. & Sivar., Fl. Pl. Thrissur For. 388. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta Dist. 430. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 252. 2009.

Branchlets erect or drooping; internodes terete and angled towards the apex. Leaves 3-4 x 2-2.5 cm, obovate, acute at base, 3-5-ribbed, shortly petioled. Flowers sessile or sub-sessile, axillary, 3-together, middle one female, laterals male; bracts cupular. Berry obovoid, truncate, smooth.
Flowering & Fruiting: April-May.
Distribution: Indo-Malesia and Australia. Occasional; in semi-evergreen forests. *RNMK 3110,* Pookodu.

SANTALACEAE R. Br.

Prodr. 350. 1810.

1. Unarmed trees; flowers bisexual ..... **Santalum**
1. Armed shrubs; flowers unisexual ..... **Scleropyrum**

SANTALUM Linnaeus

Sp. Pl. 349. 1753.

Santalum album L., Sp. Pl. 349. 1753; Hook. f., Fl. Brit. India 5: 231. 1886; Gamble, Fl. Pres. Madras 1261(883). 1925; Manilal & Sivar., Fl. Calicut 254. 1982; Ansari, Fl. Kasaragod Div. 328. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 402. 1988; Vajr., Fl. Palghat Dist. 414. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 388. 1996; Sivar. & P. Mathew, Fl. Nilambur 598. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 613. 2009.

Small trees. Leaves opposite, 6-7 x 3-4 cm, elliptic, acute at apex, rounded at base; nerves 10-12 pairs; petiole ca. 1.5 cm long. Inflorescence of panicled cymes, ca. 5 cm across, terminal and axillary. Flowers bisexual, 5-merous, 5-6 mm across, perianth lobes equal, connate into a campanulate tube; mouth with 5 fleshy appendages, pink; stamens free, inserted on the mouth of perianth tube; ovary half inferior, 1-celled; ovules 2 or 3 pendulous; stigma 3-lobed. Drupe ca. 1 x 0.8 cm, obovoid, smooth, black.
Flowering & Fruiting: November-December.
Distribution: Peninsular India and Malesia. Occasional; in semi-evergreen and moist deciduous forest. *RNMK 1127,* Karuvanthodu; *RNMK 3450*, Tholpetty.

SCLEROPYRUM Arnott

in Mag. Bot. & Zool. 2: 549 1838, *nom. cons.*

Scleropyrum pentandrum (Dennst.) Mabb., Taxon 26: 533. 1977; Manilal & Sivar., Fl. Calicut 254. 1982; Ansari, Fl. Kasaragod Div. 329. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 236. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 403. 1988; Vajr., Fl. Palghat Dist. 414. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 388. 1996; Mohanan & Sivad., Fl. Agasthyamala 587. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 430. 2005. *Pothos pentandrus* Dennst., Schluss. Hort. Malab. 16, 24, 33. 1818. *Scleropyrum wallichianum* (Wight & Arn.) Arn., Mag. Zool. Bot. 2: 550. 1838; Hook. f., Fl. Brit. India 5: 234. 1886; Gamble, Fl. Pres. Madras 1262(884). 1925. *Sphaerocarya wallichiana* Wight & Arn., Edinb. New Phil. J. 15: 180. 1833. *Idou-moulli* Rheede, Hort. Malab. 4:41-42, t.18.1683.

Small trees; trunk with sharp axillary thorns. Leaves alternate, 12-15 x 7-9 cm, ovate or oblong, acute or acuminate, base truncate or rounded, coriaceous; nerves 5-7 pairs, irregular. Flowers polygamous on drooping spikes; spikes unequal, solitary or fascicled, along mature stems, 5-10 cm long; bracts triangular, acuminate, scarious; perianth orange-yellow, adnated to the ovary in bisexual and female flowers and free in male flowers, 5-fid at apex; stamens 4 or 5, anthers divaricate; ovary inferior, 1-celled, 3-ovuled; style short; stigma peltate. Drupes pyriform, 2.5-3 x 2-2.5 cm; purple, crowned by the perianth tube, 1-seeded.

Flowering & Fruiting: January-April.

Distribution: Peninsular India and Sri Lanka. Occasional; in evergreen forests. *RNMK 0234,* Vythiri; *RNMK 1782*, Thirunelli.

BALANOPHORACEAE Rich.

Mem. Mus. Hist. Nat. 8: 429. 1822.

BALANOPHORA J.R. Forster et J.G.A. Forster

Charact. Gen. 99, 100. 1776.

Balanophora fungosa J. R. & G. Forst., Char. Gen. Pl. 100. t. 50. 1776, ssp. **indica** (Arn.) Hansen, Dansk. Bot. Ark 28: 100. 1972; Manilal, Fl. Silent Valley 242. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 403. 1988; Vajr., Fl. Palghat Dist. 414. 1990; Sivar. & P. Mathew, Fl. Nilambur 599. 1997; Mohanan & Sivad., Fl. Agasthyamala 587. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 431. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 197. 2009. *Langsdorffia indica* Arn., Ann. Nat. Hist. 2:37. 1838. *Balanophora indica* (Arn.) Wall. ex Griff., Trans. Linn. Soc. London 20: 95. 1846; Hook. f., Fl. Brit. India 5: 237. 1886; Gamble, Fl. Pres. Madras 1263(885). 1925. **Plate 27e.**

Herbs; root parasite, fleshy; root stock globular; peduncle stout, 13-15 cm long, 2-3 cm thick, yellowish inside; covered by imbricating sheathing leaves. Flowers dioecious, densely packed in globose or oblong, heads; male and

female flowers dissimilar; male perianth lobes 5, valvate, erect, yellowish; stamens 5, filaments united into a column; anthers horse-shoe-shaped; female perianth absent; ovary 1-celled; style long, slender, ovules solitary. Fruit a 1-seeded capsule.

Flowering & Fruiting: January-March.

Distribution: Indo-Malesia and Australia. Occasional; in evergreen forsts. *RNMK 2255,* Chembra; *RNMK 2778*, Kallady-900 forests.

EUPHORBIACEAE Juss.

Gen. Pl. 384. 1789.

1. Climbing herbs ..... **Tragia**
1. Erect herbs, shrubs, trees or lianas 2
2. Leaves 3-foliolate ..... **Bischofia**
2. Leaves simple 3
3. Flowers in cyathea; stamen 1.....4
3. Flowers not in cyathea; stamens 2 or more 5
4. Shrubs or trees .....**Euphorbia**
4. Prostrate or erect herbs ..... **Chamaesyce**
5. Racemes densely clustered on trunk.....**Baccaurea**
5. Inflorescence axillary or terminal 6
6. Leaves distichous.....7
6. Leaves spirally alternating, rarely sub-distichous.....12
7. Leaves with white patches; tepals gland dotted ..... **Sauropus**
7. Leaves without white patches; tepals not gland dotted 8
8. Filaments and anthers free 9
8. Filaments and anthers connate.....10
9. Trees; monoecious.....**Cleistanthus**
9. Shrubs; dioecious ..... **Flueggea**
10. Branchlets zig zag .....**Glochidion**
10. Branchlets phyllanthoid 11
11. Fruiting perianth accrescent; disc absent .....**Breynia**
11. Fruiting perianth not accrescent; disc present..... **Phyllanthus**
12. Cells of ovary 2-ovuled 13
12. Cells of ovary 1-ovuled 18
13. Perianth biseriate ..... **Briedelia**
13. Perianth uniseriate.....14
14. Flowers solitary or in fascicles 15
14. Flowers in elongated racemes, spikes or cymes.....16
15. Fruits dry, dehiscent ..... **Margaritaria**
15. Fruits fleshy, indehiscent .....**Drypetes**
16. Ovary 1-celled ..... **Antidesma**
16. Ovary 2-4 celled 17
17. Fruit capsular ..... **Aporosa**
17. Fruit drupaceous..... **Daphniphyllum**

18. Plant with milky latex; petiole glandular ..... **Falconeria**
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23.Petiole to 7 cm long .....**Paracroton**
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24. Plants dioecious 30
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28. Disc present 29
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32. Leaves otherwise; ovary 3-locular ..... **Mallotus**
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33. Shrubs 35
34. Fruit fleshy, unlobed ..... **Trewia**
34. Fruit capsule, bilobed.....**Cleidion**
35. Leaves penninerved, cordiform or peltate.....**Jatropha**
35. Leaves penninerved, linear-lanceolate.....**Homonoia**

ACALYPHA Linnaeus

Sp. Pl. 1003. 1753.

Herbs or shrubs. Leaves alternate, serrate, petiolate, lower nerves from base. Flowers monoecious, in unisexual or bisexual racemes, minute; male flowers apical, basal or on separate unisexual racemes, sepals 4, minute, valvate; stamens 8, free; ovary globular, 3-celled, ovule 1 in each cell; styles 3, slender, 2-fid, linear. Fruit a 3-lobed capsule; seeds globose.

1. Racemes unisexual 2
1. Racemes bisexual .....**A. fruticosa**
2. Petiole longer than lamina .....**A. indica**
2. Petiole shorter than lamina .....**A. fruticosa**

Acalypha fruticosa Forssk., Fl. Aeg.-Arab. 161. 1775; Hook. f., Fl. Brit. India 5: 415. 1887; Gamble, Fl. Pres. Madras 1331(931).1925; Manilal & Sivar., Fl. Calicut 269. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 406. 1988; Vajr., Fl. Palghat Dist. 418. 1990; Sivar. & P. Mathew, Fl. Nilambur 601. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 617. 2009.

Subshrubs, branchlets tomentose. Leaves 3-4 x 1.5-2 cm, ovate, apex acute to acuminate, base oblique, crenate, puberulus above, tawny pubescent and yellow glandular below; petiole ca. 1.5 cm long, tomentose. Spikes axillary, pubescent; sepals 4, ca. 1.5 mm long, tomentose. Capsule 2-3 mm across.
Flowering & Fruiting: July-August.
Distribution: Paleotropics. Occasional; in moist places in plantaions. *RNMK 0042,* Chooralmala.

Acalypha indica L., Sp. Pl. 1003. 1753; Hook. f., Fl. Brit. India 5: 416. 1887; Gamble, Fl. Pres. Madras 1330(930). 1925; Manilal & Sivar., Fl. Calicut 269. 1982; Sivar. & P. Mathew, Fl. Nilambur 602. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 617. 2009.

Herbs. Leaves 3-5 x 3-4 cm, ovate, apex acute to acuminate, base cuneate, serrate, pubescent; petiole 3-4 cm. Spikes axillary, 3-3.5 cm; female flowers below; bracts 3-4 x 4-5 mm, campanulate, folded, many nerved, pubescent; male flowers minute. Capsule 2-4 mm across, pubescent.
Flowering & Fruiting: July-December.
Distribution: Indo-Malesia and tropical Africa. Occasional; in open areas in evergreen forests. *RNMK 2176,* Sughandhagiri.

Acalypha racemosa Wall. ex Baill., Etud. Gen. Euphorb.443. 1858; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 104. 1988; Manilal & Sivar., Fl. Calicut 270. 1982; Ansari, Fl. Kasaragod Div. 331. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 407. 1988; Vajr., Fl. Palghat Dist. 418. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 391. 1996; Sivar. & P. Mathew, Fl. Nilambur 602. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 617. 2009; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 434. 2005. *Acalypha paniculata* Miq., Fl. Ind. Bat. 1: 406. 1859; Hook. f., Fl. Brit. India 5: 415. 1887; Gamble, Fl. Pres. Madras 1330(930). 1925; Manilal, Fl. Silent Valley 243. 1988; Mohanan & Sivad., Fl. Agasthyamala 590. 2002. *Pee-cupameni* Rheede, Hort. Malab. 19:163, t. 82. 1690.

Undershrubs to 1.5 m tall; stem adpressed hairy. Leaves 3-8 x 2-5 cm, ovate, acuminate, base rounded, serrate, glabrous, except nerves; nerves 5-6 pairs, lowest pair from the base, strong; petiole 8-10 cm long, slender. Male racemes 10-12 cm long, axillary, solitary, unbranched; flowers 1-2 mm

across, clustered, sessile; sepals orbicular; stamens 8; female racemes in terminal branched panicles, 8-10 x 7-8 cm; flowers 1-2 mm across, clustered; sepals ovate. Capsule 2.5-3 mm across, 3-lobed, glandular hairy.
Flowering & Fruiting: August-December. *Distribution*: Indo-Malesia and tropical Africa. Occasional; in evergreen forest margins. *RNMK 2757,* Erattakolli; *RNMK 1819,* Mundakai.

AGROSTISTACHYS Dalzell
in Hooker's Kew J. 2: 41. 1850.

Shrubs or trees. Leaves alternate, spiral, simple, entire or serrate, penninerved, stipulate. Flowers dioecious in short or long axillary raceme; bracts prominent, carries few male flowers or one female flower; sepals 5, obovate, petals 5, shorter than sepals; stamens 8-12, filaments united at base; anthers versatile; ovary 3-celled; ovule 1 in each cell; styles free, bifid. Fruit a 3-lobed capsule, coccus globose, 1-seeded.

1. Female flowers lax in shorter racemes..... .**A. borneensis**
1. Female flowers solitary or 2-3 together .....**A. indica**

Agrostistachys borneensis Becc., Nelle For. Borneo 331. 1902; Manilal, Fl. Silent Valley 244. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 407. 1988; Vajr., Fl. Palghat Dist. 419. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 391. 1996; Mohanan & Sivad., Fl. Agasthyamala 592. 2002. *Agrostistachys longifolia* (Wight) Trimen, Syst. Cat. Fl. Pl. Ceylon 81. 1885, *nom. illeg.*; Hook. f., Fl. Brit. India 5: 407. 1887. *Sarcoclinium longifolium* Wight, Ic. tt. 1887, 1888. 1852. *Agrostistachys meeboldii* Pax & Hoffm. in Engl., Pflanzenr., Euphorb.-Chrozoph. 100. 1912; Gamble, Fl. Pres. Madras 1318(922). 1925.

Small to medium trees with white latex. Leaves 27-30 x 6-7 cm, oblanceolate, acute, base long-attenuate, coriaceous; nerves 12-14 pairs, regular, nervules indistinct; petiole flat. Male racemes axillary, slender; bracts broadly ovate, ciliate; flowers many in each bract; sepals 3-4 mm long, ovate; petals smaller, oblong; stamens 8, pistillode present; female flowers lax in shorter racemes; sepals and petals similar to male flowers. Capsule ca. 1.5 cm across; cocci globose, reddish; seeds globose, brown, polished.
Flowering & Fruiting: December-May.
Distribution: Indo-Malaya. Occasional; in evergreen forests. *RNMK 0037,* Kurichiarmala.

Agrostistachys indica Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 2: 41. 1850; Hook. f., Fl. Brit. India 5: 406. 1887; Gamble, Fl. Pres. Madras 1317(921). 1925; Manilal, Fl. Silent Valley 244. 1988; Vajr., Fl. Palghat Dist. 419. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 392. 1996; Mohanan & Sivad., Fl. Agasthyamala 592. 2002. **Plate 27f.**

Stout shrubs. Leaves 18-21 x 8-9 cm, elliptic-oblong, acute, coriaceous, base attenuate, spineus serrate; nerves 11-13 pairs, regular, prominent,

nervules parallel; petiole 1-1.5 cm long. Male flowers in short axillary racemes; bracts broadly ovate, densely tomentose; sepals white, 3-4 x 2.5 mm, obovate, obtuse; petals smaller than sepals, white; stamens 12, filaments united at base; female flowers solitary or 2-3 together, axillary; bracts many, imbricating, ciliate; pedicel 7-8 mm long, stout; sepals oblong, densely hairy. Capsule ca. 1.5 cm across, cocci minutely hispid; seeds globose, glabrous.
Flowering & Fruiting: February-March.
Distribution: Central and Peninsular India. Occasional;in evergreen forests. *RNMK 2650,*Chanthanathodu.

ANTIDESMA Linnaeus
Sp. Pl. 1027. 1753.

Trees or shrubs. Leaves alternate, entire, penninerved; stipule small. Flowers dioecious in axillary or terminal slender spike or racemes; bracts ovate, acute, carries a solitary flower; sepals 4 or 5, entire; stamens 5, inside the disc, ovary ovoid, 1-celled; ovules solitary; stigma short, 2-4-toothed. Fruit a drupe beaked by the stigma.

1. Stamens inserted in hollows of the disk 2
1. Stamens inserted within the disc..... **A. bunius**
2. Leaves ca. 6 cm long, obtusely acute at apex; stamens 2 ..... **A. acidum**
2. Leaves 8-15 cm, long; apex acuminate; stamens 3-5.....3
3. Female flowers sessile in close clusters .....**A. alexiteria**
3. Female flowers pedicellate in distant clusters ..... **A. montanum**

Antidesma acidum Retz., Obs. Bot. 5: 30. 1788; V. S. Ramach. & V.J. Nair, Fl. Cannanore 408. 1988; Vajr., Fl. Palghat Dist. 420. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 392. 1996; Sivar. & P. Mathew, Fl. Nilambur 603. 1997; Chakrab. & Gangop., J. Econ. Tax. Bot. 24: 8. 2000; Mohanan & Sivad., Fl. Agasthyamala 593. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 436. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 619. 2009. *Stilago diandra* Roxb., Pl. Corom. 2: 35, t. 166. 1802 & Fl. Ind. 3: 759. 1832. *Antidesma diandrum* (Roxb.) Spreng., Syst. Veg. 1: 826.1825; Hook. f., Fl. Brit. India 5: 361. 1887; Gamble, Fl. Pres. Madras 1298(908). 1925. *Stilago lanceolaria* Roxb., Fl. Ind. 3: 760. 1832. *Antidesma lanceolarium* (Roxb.) Wall. ex Wight, Ic. t. 766. 1844.

Shrubs; branchlets glabrous. Leaves 2.5-6 x 2-4 cm, broadly elliptic, hispid below; nerves 5-7 pairs, looping; petioles 2-3 mm long; stipule minute. Male racemes simple or branched, 3-5 cm long; flowers closely packed, sessile; tepals 4, free; disk prominent; stamens 5; female racemes 2-4 cm long; flowers many; pedicels 3-4 mm long; sepals ca. 2 mm across, ovate, fimbriate, greenish yellow. Drupes 5-6 mm across, oblong, red, smooth.
Flowering & Fruiting: July-December.
Distribution: Indo-Malesia and south China. Common; in evergreen forests. *RNMK 3438,* Vythiri.

Antidesma alexiteria L., Sp. Pl. 1027. 1753, Hook. f., Fl. Brit. India 5:359.1887; Chakrab. & Gangop., J. Econ. Tax. Bot. 24:11.2000. *Antidesma zeylanicum* Lamk., Tabl. Encycl. 1: 207. 1792; Gamble, Fl. Pres. Madras 1297(908). 1925; V. S. Ramach. & V.J. Nair, Fl. Cannanore 409. 1988; Mohanan & Sivad., Fl. Agasthyamala 597. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 436. 2005. **Plate 27g.**

Small trees, branchlets glabrous. Leaves 7-10 x 3-4 cm, elliptic-oblong, apex long-acuminate, base acute, glabrous, nerves 7-9 pairs, sub-prominent, shining above; petiole 5-6 mm long, stipule ovate, hairy. Female spikes 3-4 cm long, axillary, densely hairy; bracts ovate, acute; flowers closely packed; sepals 4, ovate, acute, hispid; ovary beaked, stigma recurved, glabrous.
Flowering & Fruiting: March-May.
Distribution: South India and Sri Lanka. Occasional; in semi-evergreen forests. *RNMK 1475,* Manikkunnumala.

Antidesma bunius (L.) Spreng., Syst. Veg. 1: 826.1825; Hook. f., Fl. Brit. India 5:358.1887; Gamble, Fl. Pres. Madras 1298(908). 1925; Manilal & Sivar., Fl. Calicut 272. 1982; Manilal, Fl. Silent Valley 245. 1988; Ansari, Fl. Kasaragod Div. 332. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 408. 1988; Sivar. & P. Mathew, Fl. Nilambur 604. 1997; Chakrab. & Gangop., J. Econ. Tax. Bot. 24: 12. 2000; Mohanan & Sivad., Fl. Agasthyamala 595. 2002. *Stilago bunius* L., Mant. Pl. 1: 122. 1767.

Small evergreen tree. Leaves elliptic, oblong or obovate, acute or acuminate, usually shining, 13-17 x 5-7 cm; nerves about 8 pairs, curved and looped. Male flowers in rather thick glabrous spikes; female flowers racemed. Disk lobed.
Flowering & Fruiting: March-May.
Distribution: Indo-Malesia to Australia and south China. Rare; in evergreen forests. *RNMK 1646,* Chembra.

Antidesma montanum Blume, Bijdr. 1124. 1826; Chakrab. & Gangop., J. Econ. Tax. Bot. 24: 26. 2000. *Antidesma pubescens* Roxb. var. *menasu* Tul., Ann. Sci. Nat. Bot. ser. 3, 15: 215. 1851. *Antidesma acuminatum* Wight, Ic. t. 1991. 1853; Hook. f., Fl. Brit. India 5: 363. 1887. *Antidesma moritzii* (Tul.) Muell.-Arg., Linnaea 34: 67. 1865 & in DC., Prodr. 15: 252. 1866; Hook. f., Fl. Brit. India 5: 362. 1887. *Antidesma refractum* Muell.-Arg. in DC., Prodr. 15: 257. 1866. *Antidesma smile* Muell.-Arg. in DC., Prodr. 15: 259. 1866. *Antidesma menasu* (Tul.) Miq. ex Muell.-Arg. in DC., Prodr. 15:257. 1866p.p., Hook. f., Fl. Brit. India 5: 364. 1887p.p,; Gamble, Fl. Pres. Madras 1297(908). 1925; Manilal & Sivar., Fl. Calicut 272. 1982; Ansari, Fl. Kasaragod Div. 332. 1985; Manilal, Fl. Silent Valley 245. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 104. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 408. 1988; Vajr., Fl. Palghat Dist. 420. 1990; Sivar. & P. Mathew, Fl. Nilambur 605. 1997; Mohanan & Sivad., Fl. Agasthyamala 596. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 436. 2005; C.N. Sunil & Sivad.,

Fl. Alappuzha Dist. 620. 2009. *Antidesma menasu* (Tul.) Miq. ex Muell.-Arg. var. *linearifolia* Hook.f., Fl. Brit. India 5: 364. 1887. *Antidesma montanum* Bl. var. *microcarpum* Airy Shaw, Kew Bull. 36: 263. 1981. *Noeli-tali, Nuli-tali* Rheede, Hort. Malab. 4:115-116, t. 56. 1683.

Small trees. Leaves 16-18 x 7-8 cm, ovate-oblong, abruptly acuminate at apex, acute to the base; nerves 7-9 pairs, regular, looping, prominent; petiole 5-6 mm long, hispid; female racemes 7-12 cm long, terminal, usually branched, minutely hispid; flowers 2-4 mm across; sepals ovate, free, concave, hispid; male racemes shorter, axillary or terminal; flowers sub-sessile; stamens 3. Drupes 5-6 x 2-3 mm, glabrous, reddish.

Flowering & Fruiting: Throughout the year.

Distribution: Indo-Malesia and east Himalayas. Common; in evergreen forests. *RNMK 2667,* Vythiri; *RNMK 3004,* Chembra.

APOROSA Blume

Bijdr. 514. 1824.

Trees or large shrubs. Leaves alternate, entire, petiolate, stipules small, deciduous. Flowers dioecious; male flowers in axillary, solitary or fascicled spikes, densely packed; bracts broadly ovate, carries 2-3 flowers; sepals 4, chartaceous; stamens 1-5, free, capillary; female flowers in short few-flowered spikes, bracts few; sepals 4, larger than male flowers; ovary 2 or 3 celled; ovules 2 in each cell; stigmas 3, linear, spreading, plumose. Fruit on ellipsoid to globose capsule, 2-4-valved; seeds 1, planoconvex, arillate.

1. Leaves to 20 cm long, ovate-oblong ..... **A. cardiosperma**
1. Leaves to 12 cm long, elliptic-oblong.....2
2. Male flowers in long spike; stamens 3 .....**A. acuminata**
2. Male flowers in short spike; stamens 5 .....**A. fusiformis**

Aporosa acuminata Thw., Enum. Pl. Zeyl. 288. 1861, 'Aporusa'; Hook. f., Fl. Brit. India 5: 348. 1887; Gamble, Fl. Pres. Madras 1309 (916). 1925; Chakrab. & Gangop., J. Econ. Tax. Bot. 17: 158. 1993; Vajr., Fl. Palghat Dist. 421. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 393. 1996; Mohanan & Sivad., Fl. Agasthyamala 598. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 437. 2005.

Slender shrubs with weak branchlets. Leaves 10-12 x 3-4 cm, elliptic-oblong, acute at base, entire, glabrous; nerves 7- 8 pairs, irregular; intercostae reticulate; petiole ca. 1 cm long, stipule 2-3 mm long, ovate, tomentose. Male flowers in 1.5-2 cm long spike, densely packed; stamens 3; female flowers 1-3 together, axillary, fascicled; bracts ovate, tomentose; sepals 4, 1-2 mm long, ovate, tomentose; styles bifid. Capsule 1-1.2 x 0.8-1 cm, ovoid, glabrous or hairy; seeds obovoid; glabrous; aril red.

Flowering & Fruiting: January-May.

Distribution: Peninsular India and Sri Lanka. Common; in evergreen forests. *RNMK 2559,* Pookodu.

Aporosa cardiosperma (Gaertn.) Merr., J. Arnold Arbor. 35: 139. 1954. *Croton cardiospermus* Gaertn., Fruct. Sem. Pl. 2: 120. 1790. *Scepa lindleyana* Wight, Ic. t. 361. 1840. *Aporosa lindleyana* (Wight) Baill., Etud. Gen. Euphorb. 645. 1858; Hook. f., Fl. Brit. India 5: 349. 1887; Gamble, Fl. Pres. Madras 1309(916). 1925; Manilal & Sivar., Fl. Calicut 260. 1982; Ansari, Fl. Kasaragod Div. 333. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 106. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 409. 1988; Vajr., Fl. Palghat Dist. 421. 1990; Chakrab. & Gangop., J. Econ. Tax. Bot. 17: 164. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 393. 1996; Sivar. & P. Mathew, Fl. Nilambur 605. 1997; Mohanan & Sivad., Fl. Agasthyamala 598. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 437. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 620. 2009. *Amvetti, Vetti-tali* Rheede, Hort. Malab. 5: 107-108, t.54. 1685.

Small to medium trees; branchlets glabrous. Leaves 16-18 x 7-8 cm, ovate-oblong, acuminate at apex, acute at base, coriaceous; nerves 6-7 pairs, prominent; petiole 2-3 cm long; stipules ca. 1 x 0.5 cm, ovate, acute, white. Male spike solitary or fascicled; bracts ovate, ciliate; flowers 1-3 in each bract; sepals 4, ovate, ciliate; stamens 2; female flowers 3-15, in small racemes, densely tomentose, pedicellate; sepals ovate, ciliate; ovary thinly hispid. Capsule ca. 1 cm across, aril orange-yellow.

Flowering & Fruiting: December-June.

Distribution: Peninsular India and Sri Lanka. Common; in evergreen and semi-evergreen forests. *RNMK 1334,* Manikkunnumala; *RNMK 1839*, Makkimala.

Aporosa fusiformis Thw., Enum. Pl. Zeyl. 288. 1861; Hook. f., Fl. Brit. India 5: 351. 1887; Gamble, Fl. Pres. Madras 1309(916). 1925; Chakrab. & Gangop., J. Econ. Tax. Bot. 17: 160. 1993.

Large shrubs; branchlets glabrous. Leaves 9-9.5 x 5-5.5 cm, elliptic-oblong, acute at both ends, entire, glabrous; nerves 5-6 pairs, reticulate; petiole 1-2 cm long, stipule falcate, ca. 6 mm long. Male spikes cylindrical, 1.5-2 cm long; bracts broadly ovate, acute, ciliate; flowers 2 or 3 in each bract; sepals 4, free, ovate; stamens 5; female flowers sessile; sepals 4, ovate, acute, ciliate; ovary ellipsoid; stigma coarsely plumose.

Flowering & Fruiting: January-April.

Distribution: India and Sri Lanka. Rare; in evergreen forests. *RNMK 2020,* Banasuramala.

BACCAUREA Loureiro

Fl. Cochinch. 651. 1790.

Baccaurea courtallensis (Wight) Muell.-Arg. in DC., Prodr. 15: 459. 1866; Hook. f., Fl. Brit. India 5: 367. 1887; Gamble, Fl. Pres. Madras 1310(916). 1925; Manilal & Sivar., Fl. Calicut 260. 1982; Ansari, Fl. Kasaragod Div. 333. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 409. 1988; Vajr., Fl. Palghat Dist. 421. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 393. 1996; Chakrab. &

Gangop., J. Econ. Tax. Bot. 21: 527. 1997; Sivar. & P. Mathew, Fl. Nilambur 606. 1997; Mohanan & Sivad., Fl. Agasthyamala 599. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 437. 2005. *Pierardia courtallensis* Wight, Ic. t. 1912. 1852. *Baccaurea sapida* Bedd., Fl. Sylv. t. 280. 1872. **Plate 27h.**

Trees, bole uneven with tubercles; bark white. Leaves alternate, often clustered towards the branch tips, 15-17 x 6-7 cm, oblanceolate, abruptly acuminate, base acute; nerves 4-6 pairs; petiole 1-3 cm long. Flowers dioecious, in densely clustered 15-20 cm long slender racemes, on old stem; male flowers 2-3 mm across; sepals 5, ovate, obtuse, ciliate; stamens 5, free; pistillode clavate; female flowers larger, sepals oblong, tomentose; ovary 3-celled, conical, fulvous tomentose, style absent, stigmas 3, stout. Capsule 5-6 cm across, globose, 3-valved, tomentose, red; seeds 3, oblong, arillate.

Flowering & Fruiting: January-June.

Distribution: Endemic to Peninsular India. Common; in evergreen forests. *RNMK 2760,* Vythiri; *RNMK 2198,* Kunchome; *RNMK 1827*, Chanthanathodu.

BALIOSPERMUM Blume

Bijdr. 603. 1825.

Baliospermum montanum (Willd.) Muell.-Arg. in DC., Prodr. 15: 1125. 1866; Gamble, Fl. Pres. Madras 1342(939). 1925; Manilal, Fl. Silent Valley 245. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 410. 1988; Vajr., Fl. Palghat Dist. 422. 1990; Chakrab. & Balakr., Bull. Bot. Surv. India 32: 5. 1990; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 438. 2005. *Jatropha montana* Willd., Sp. Pl. 4: 565. 1805. *Baliospermum solanifolium* (Geisl.) Suresh in Nicols. *et al.*, Interp. Hort. Malab. 106. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 395. 1996; Sivar. & P. Mathew, Fl. Nilambur 607. 1997. *Croton solanifolius* Geisl., Croton Monogr. 74. 1807. *Baliospermum axillare* Bl., Bijdr. 604. 1826; Hook. f., Fl. Brit. India 5: 461. 1887. *Baliospermum polyandrum* Wight, Ic. t. 1885.1852. *Naga-danti* Rheede, Hort. Malab. 10: 151, t. 76. 1690.

Subshrubs. Leaves 10-15 x 6-10 cm, broadly ovate often 3-lobed, apex acute or acuminate, base rounded, 3-5 ribbed, glabrous or sparsely hispid above and tomentose along the nerves beneath, inciso-crenate, with a pair of glands at base of lamina; petiole 5-6 cm long. Perianth lobes 4, concave, 1.5-2 mm long, pubescent; ovary densely tomentose, style 2-fid. Capsule 3-lobed, 1-1.2 cm long; seeds ovoid.

Flowering & Fruiting: August-Marc.

Distribution: Indo-Malesia. Occasional; in moist deciduous forests. *RNMK 2459,* Muthanga.

BISCHOFIA Blume

Bijdr. 1168. 1826-1827.

Bischofia javanica Bl., Bijdr. 1169. 1826; Hook. f., Fl. Brit. India 5: 345. 1887; Gamble, Fl. Pres. Madras 1312c. 1925; Manilal, Fl. Silent Valley 246. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 410. 1988; Vajr., Fl. Palghat

Dist. 422. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 395. 1996; Sivar. & P. Mathew, Fl. Nilambur 607. 1997; Mohanan & Sivad., Fl. Agasthyamala 599. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 438. 2005.

Large trees with round bole and reddish exudations; bark thinly peeling, red inside, fibrous. Leaves 3-foliolate; leaflets 14-16 x 8-9 cm, equal, ovate, acuminate, serrate or entire; petiole 12-15 cm long. Flowers dioecious, in axillary panicled 15-20 cm long racemes; sepals 5, ca. 1 mm long, recurved; stamens 5, free; ovary 3-celled, globose, glabrous, styles 2, hairy, spreading. Fruit a globose berry, 7-8 mm across; seeds 3, trigonous.

Flowering & Fruiting: March-October.

Distribution: Indo-Malesia to Pacific Islands. Common; in evergreen forests. *RNMK 2772,* Vythiri; *RNMK 2468*, Banasuramala.

BLACHIA Baillon

Etud. Gen Euph. 388. t. 19. 1858, *nom. cons.*

Blachia umbellata (Willd.) Baill., Etud. Gen. Euphorb. 387. t.19. 1858; Hook. f., Fl. Brit. India 5: 402. 1887; Gamble, Fl. Pres. Madras 1338(936). 1925; Ansari, Fl. Kasaragod Div. 334. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 410. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 396. 1996. *Croton umbellatus* Willd., Sp. Pl. 4: 545. 1805. *Blachia reflexa* Benth., J. Linn. Soc. Bot. 17: 226. 1880; Hook. f., Fl. Brit. India 5: 402. 1887; Gamble, Fl. Pres. Madras 1338(936). 1925.

Glabrous shrubs; branchlets slender. Leaves 13-15 x 4-5 cm, elliptic, acuminate at apex, base acute; nerves 10-13 pairs, irregular, looping; petiole ca. 1 cm long. Male flowers 5-6 mm across, 5-10 together in a terminal umbel; pedicel 1.5-2 cm long; sepals ovate, acute, glabrous; stamens 15-20; female flowers 8-9 mm across; 3-5, on stout peduncle, sepals 5, oblong, acute, glabrous; ovary glabrous; styles 3, 7-8 mm long, bifid. Capsule 1.5-2 cm across, 3-lobed, glabrous.

Flowering & Fruiting: February-April.

Distribution: South India and Sri Lanka. Common; in evergreen forests. *RNMK 2459,* Vythiri.

BREYNIA J. R. & G. Forster

Charact. Gen. 145. 1776, *nom. cons***.**

Erect shrubs. Leaves on deciduous lateral branchlets, entire, alternate, penninerved, stipule ovate, chartaceous. Flowers axillary, solitary, pedicelled, monoecious; sepals 6, ovate to obovate, united at base; stamens 3; filaments connate into a column; ovary globose; 3-celled, truncate or depressed at apex; ovules 2 in each cell; style 3, united below, 2-fid, recurved. Fruit a globose capsule, succulent, 6-valved; seeds 6, compressed.

1. Leaves to 5 cm long; capsule to 1.5 cm across ..... **B. vitis-idaea**
1**.** Leaves to 2 cm long; capsule to 0.5 cm across ..... **B. retusa**

Breynia retusa (Dennst.) Alston, Ann. Roy. Bot. Gard. (Peradeniya) 11: 204. 1929; Ansari, Fl. Kasaragod Div. 334. 1985; Manilal, Fl. Silent Valley 246. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 411. 1988; Vajr., Fl. Palghat Dist. 422. 1990; Chakrab. & Gangop., J. Econ. Tax. Bot. 20: 505. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 396. 1996; Sivar. & P. Mathew, Fl. Nilambur 608. 1997; Mohanan & Sivad., Fl. Agasthyamala 600. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 439. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 621. 2009. *Phyllanthus retusus* Dennst., Schluss. Hort. Malab. 24. 1818. *Breynia patens* (Roxb.) Rolfe, J. Bot. 11: 359. 1882; Hook. f., Fl. Brit. India 5: 329. 1887; Gamble, Fl. Pres. Madras 1304(912). 1925. *Phyllanthus patens Roxb.*, Fl. Ind. 3: 667. 1832. *Melanthesa turbinata* Wight, Ic. t. 1897. 1852. *Melanthesa obliqua* Wight, Ic. t. 1898. f. 2. 1852.

Glabrous shrubs. Leaves ovate, glaucous below, base rounded, black when dried; nerves 5-6 pairs; petiole 3-4 mm long; stipule ovate, cordate at base. Female flowers 3-4 mm across, solitary; pedicels 5-6 mm long; sepals 6, obovate, obtuse, united with disk into a glandular tube; styles united at base, stigma bifid; male flowers solitary, axillary; sepals 6, retuse or bilobed at apex; stamens 3. Capsule globose, pink; seeds 6, trigonous, white.

Flowering & Fruiting: February-September.

Distribution: Sri Lanka to Indo-China. Common; in moist deciduous forests. *RNMK 1827,* Muthanga.

Breynia vitis-idaea (Burm. f.) Fischer, Bull. Misc. Inform. Kew 1932: 65. 1932; Manilal & Sivar., Fl. Calicut 271. 1982; Ansari, Fl. Kasaragod Div. 335. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 411. 1988; Vajr., Fl. Palghat Dist. 423. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 396. 1996; Chakrab. & Gangop., J. Econ. Tax. Bot. 20: 509. 1996; Sivar. & P. Mathew, Fl. Nilambur 609. 1997; Mohanan & Sivad., Fl. Agasthyamala 601. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 439. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 622. 2009. *Rhamnus vitis-idaea* Burm. f., Fl. Ind. 61. 1768. *Breynia rhamnoides* (Retz.) Muell.-Arg. in DC., Prodr. 15:440. 1866; Hook. f., Fl. Brit. India 5: 330. 1887; Gamble, Fl. Pres. Madras 1304(912). 1925. *Phyllanthus rhamnoides* Retz., Obs. Bot. 5: 30. 1788. *Melanthesa rhamnoides* (Retz.) Wight, Ic. t. 1898, fig. 1. 1852.

Densely branched shrubs; stems glabrous. Leaves ovate, rounded at base, glabrous; nerves 5-8 pairs, reticulate, black when dried; petiole 3-5 mm long; stipule ovate, obtuse. Female flowers axillary; pedicels ca. 4 mm long; perianth 2-4 mm across, lobes ovate, acute; male flowers 2-5 together, fascicled; perianth lobes 1.5-2 mm long. Capsule globose, red; seeds 6, trigonous, white, glabrous.

Flowering & Fruiting: February-August.

Distribution: Indo-Malesia. Common; in semi-evergreen forests. *RNMK 2559,* Manikkunnumala.

BRIEDELIA Willdenow
Sp. Pl. 4(2): 978. 1806.

Shrubs or trees. Leaves alternate, entire, nerves parallel, prominent; nervules parallel, close. Flowers in axillary clusters or terminal branched racemes, monoecious or dioecious; calyx 5-lobed, valvate, petals 5, smaller than calyx-lobes; disk annular; stamens in male flowers 5, filaments radiating from an erect short gonophore, pistillode short, ovary 2-celled, surrounded by the disk, ovules 2 in each cell; style 2, free. Fruit a drupe, pyrenes 1 or 2; seeds 1 or 2, in each, planoconvex.

1. Trees; flowers fasicled in terminal paniculate spikes.....**B. retusa**
1. Scandent shrubs; flowers in axillary fascicle.....**B. stipularis**

Briedelia retusa (L.) A. Juss., Euphorb. Gen. 109. 1824; Hook. f., Fl. Brit. India 5: 268. 1887p.p.; Gamble, Fl. Pres. Madras 1280(896). 1925; Manilal & Sivar., Fl. Calicut 273. 1982; Ansari, Fl. Kasaragod Div. 335. 1985; Vajr., Fl. Palghat Dist. 423. 1990; Chakrabarty *et al.*, Journ. Econ. Tax. Bot. 26: 321. 2002; Mohanan & Sivad., Fl. Agasthyamala 602. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 439. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 623. 2009. *Clutia retusa* L., Sp. Pl. 1475. 1753. *Briedelia spinosa* (Roxb.) Willd., Sp. Pl. 4:979.1806. *Briedelia crenulata* Roxb., Fl. Ind. 3: 734. 1832. *Briedelia roxburghiana* (Muell.-Arg.) Gehrm., Bot. Jahrb. Syst. 41. 95: 30. 1908; Gamble, Fl. Pres. Madras 1280(896). 1925; Manilal & Sivar., Fl. Calicut 273. 1982. *Briedelia airy-shawii* P. T. Li, Acta Phyt. Sin. 20: 117. 1982, *nom. illeg.*; Sasidh. & Sivar., Fl. Pl. Thrissur For. 397. 1996; Sivar. & P. Mathew, Fl. Nilambur 610. 1997.

Medium trees, branchlets thinly hairy. Leaves 13-22 x 7-11 cm, elliptic-oblong, apex obtuse or retuse, base round or cordate, tomentose below, nerves 23-25 pairs, prominent, dichotomous near the margins, nervules parallel. Flowers grouped in terminal branched spikes, monoecious, 6-7 mm across; sepals 5, reddish brown, 3-4 x 1-1.5 mm, lanceolate, acute, hispid outside; petals small, yellow, obovate; styles 3, dichotomous. Capsule 8-9 mm across, glabrous, black.
Flowering & Fruiting: August-December.
Distribution: Indo-Malesia. Common; in moist deciduous forests. *RNMK 1161,* Tholpetty.

Briedelia stipularis (L.) Bl., Bijdr. 597. 1825; Hook. f., Fl. Brit. India 5: 270. 1887; Gamble, Fl. Pres. Madras 1281(896). 1925; V. S. Ramach. & V.J. Nair, Fl. Cannanore 412. 1988; Chakrabarty *et al.*, J. Econ. Tax. Bot. 26: 324. 2002. *Clutia stipularis* L., Mant. Pl. 1: 127. 1767. *Clutia scandens* Roxb., Pl. Corom. t. 173. 1802. *Briedelia scandens* (Roxb.) Willd., Sp. Pl. 4: 979. 1805; Gamble, Fl. Pres. Madras 1281(896). 1925; Manilal & Sivar., Fl. Calicut 273. 1982; Ansari, Fl. Kasaragod Div. 335. 1985; Manilal, Fl. Silent Valley 247.

1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 106. 1988; Vajr., Fl. Palghat Dist. 424. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 397. 1996; Sivar. & P. Mathew, Fl. Nilambur 611. 1997; Mohanan & Sivad., Fl. Agasthyamala 603. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 439. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 623. 2009. *Scherunam–cottam* Rheede, Hort. Malab. 2:23-24, t.16. **Plate 27i.**

Scandent shrubs; branchlets hispid. Leaves 11-14 x 6-7 cm, ovate-oblong, obtuse, hispid, below; nerves 8-10 pairs, prominent, dichotomous near the margins. Flowers 7-8 mm across, in axillary sessile clusters passing into terminal spike, pinkish; sepals 5, triangular, acute, hispid outside; petals obovate to orbicular, retuse, hispid; staminal column, slender; stamens 3-5; ovary depressed globose, styles 3, bifid at apex. Capsule 6-7 x 5-6 mm, obovoid; seeds 2, with a large depression on one side and a deep furrow on the other side.

Flowering & Fruiting: December-February.

Distribution: Endemic to Peninsular India. Common; in moist deciduous and semi-evergreen forests. *RNMK 2661,* Manikkunnumla; *RNMK 1837*, Muthanga.

CHAMAESYCE Gray

Nat. Arr. Brit. Pl. 3: 260. 1821.

Erect or diffuse herbs; latex milky. Leaves deciduous or persistent. Cyathia solitary or in terminal and axillary cymes. Involucre copular or companulatebracts usually 5; glands marginal when single; anthers usually globose; filaments jointed below; female florets solitary, usually stalked, erect or pendulous; styles 3. Capsule of 3, bivalved cocci; seeds globose or angular.

1. Erect unbranched herbs.....2
1. Prostrate herbs.....3
2. Leaves not glaoucous below; cyathia subsessile ..... **C. hirta**
2. Leaves glaoucous below; cyathia stalked ..... **C. indica**
3. Leaf margin serrulate ..... **C. thymifolia**
3. Leaf margin crenulate..... **C. rosea**

Chamaesyce hirta (L.) Millisp., Publ. Field Columbian Mus. Bot. Ser. 2: 303. 1909. *Euphorbia hirta* L., Sp. Pl. 454. 1753; Gamble, Fl. Pres. Madras 1275(892). 1925; Manilal & Sivar., Fl. Calicut 257. 1982; Ansari, Fl. Kasaragod Div. 337. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 415. 1988; Manilal, Fl. Silent Valley 249. 1988; Vajr., Fl. Palghat Dist. 428. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 403. 1996; Sivar. & P. Mathew, Fl. Nilambur 619. 1997; Mohanan & Sivad., Fl. Agasthyamala 608. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 445. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 629. 2009.

Erect unbranched herbs; stem villous, white or reddish. Leaves opposite, 3-4 x 1.5-2 cm, ovate, unequal at base, acute at apex, serrate, hirtus below, 3-

ribbed from base; petiole 3-4 mm long. cyathea 20-50 together, 1-2 mm across, densely packed in shortly peduncled cymes, involucral bracts obconical, hispid, glands 5, reddish; male florets 4-6; ovary glabrous; styles 3, bifid from the base. Capsule 3-lobed, lobes acute, hispid; seeds 3-angular, rugose.
Flowering & Fruiting: Throughout the year.
Distribution: Native of tropical America; now Pantropical. Common; in open areas in plantations. *RNMK 1315,* Puthoorvayal.

Chamaesyce indica (Lamk.) Croizat, Lilloa 8: 406. 1942. *Euphorbia indica* Lamk., Encycl. 2: 423. 1788; V. S. Ramach. & V.J. Nair, Fl. Cannanore 416. 1988. *Euphorbia hypericifolia* sensu Hook.f., Fl. Brit. India 5: 249. 1887, non L. 1753; Gamble, Fl. Pres. Madras 1275(892). 1925.

Erect herbs, hispid. Leaves 2-3 x 1-1.5 cm, oblong-ovate, apex obtuse, base oblique, crenulate, glaucous beneath; petiole ca. 3 mm long, pubescent. Cyathia in stalked clusters, *ca.* 15 mm across, axillary; stalk to 1.5 cm long, pubescent; involucre campanulate, ca. 8 mm long, pubescent; glands 5, minute, appendages ca. 0.5 mm long; male flowers 4-5; stalk ca. 0.5 mm long; female laterally pendulous; ovary ca. 8 mm long, pubescent. Capsule ca. 2 x 1.5 mm, pubescent.
Flowering & Fruiting: May-June.
Distribution: Tropics except Australia and Pacific Islands. Common; in margins of evergreen forests. *RNMK 1860,* Kunchome.

Chamaesyce rosea (Retz.) Webster, J. Arnold Arbor. 48: 423. 1967. *Euphorbia rosea* Retz., Obs. Bot. 4: 26. 1786; Hook. f., Fl. Brit. India 5: 251. 1887; Gamble, Fl. Pres. Madras 1275(892). 1925; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 624. 2009.

Prostrate herbs; branchlets sparsely pubescent. Leaves 1-1.2 x 0.5-0.6 cm, oblong, apex obtuse, base oblique, crenulate; petiole 2-3 mm long. Cyathia terminal and axillary, aggregated in clusters, limb of gland red; involucre campanulate, 1.5-2 mm long, pubescent inside; glands 4, oblong, appendages crenate at apex; male 4-6; stalk 1-2 mm long; female pendulous; ovary 1.5-2 mm across. Capsule 2.5 -3 mm across, pubescent.
Flowering & Fruiting: November-January.
Distribution: Sri Lanka, Peninsular India and Afghanistan. Common; in moist deciduous forests. *RNMK 2568,* Muthanga.

Chamaesyce thymifolia (L.) Millsp., Publ. Field Columbian Mus. Bot. Ser. 2: 412. 1916. *Euphorbia thymifolia* L., Sp. Pl. 454. 1753; Hook. f., Fl. Brit. India 5: 252. 1887; Gamble, Fl. Pres. Madras 1276(893). 1925; Manilal & Sivar., Fl. Calicut 257. 1982; Ansari, Fl. Kasaragod Div. 338. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 416. 1988; Vajr., Fl. Palghat Dist. 429. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 404. 1996; Sivar. & P. Mathew, Fl. Nilambur

620. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 445. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 625. 2009.

Prostrate herbs; branches radiating, slender, reddish, pubescent. Leaves opposite, oblong, obtuse, obliquely cordate at base, serrate, ciliate, subsessile, nervules aeriolate. Cyathium axillary, solitary or 2-5 together, ca. 0.5 mm across; involucre ca. 0.8 mm long, campanulate, 4-glandular; male flowers 1-4; ovary tomentose, styles 3, Capsule 1.5-2 mm across, minutely adpressed pubescent; seeds 3-angled, transversally rugose.

Flowering & Fruiting: November-May.

Distribution: Tropical Asia. Common; in moist deciduous forests. *RNMK 2657,* Tholpetty.

CHROZOPHORA Juss. Nom.cons.

Euphorb. Gen.: 27 (1824), nom. cons**.**

Chrozophora plicata (Vahl.) A. Juss., Euphorb. Gen. 28. 1824; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 5: 409. 1887. *Croton tinctorius* sensu Bumr. f., Fl. Ind. 304, t. 62, fig. 2. 1768, non L. 1753. *Croton plicatus* Vahl, Symb. Bot. 1: 78. 1790. *Croton rottleri* Geisl., Croton Monogr. 54. 1807. *Chrozophora rottleri* (Geisl.) A. Juss., Euphorb. Gen. 28. 1824; Gamble, Fl. Pres. Madras 1317(921). 1925; Manilal & Sivar., Fl. Calicut 267. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 412. 1988; Vajr., Fl. Palghat Dist. 424. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 397. 1996. *Chrozophora prostrata* Dalz. & Gibs., Bombay Fl. 233. 1861; Gamble, Fl. Pres. Madras 1316(921). 1925.

Monoecious subshrubs, up to 35 cm tall, branchlets fulvous stellately tomentose. Leaves 6-7 x 4-6 cm, broadly ovate, obtuse, base acute to subcordate, densely tomentose; basally 3-nerved; petiole 4-5 cm long. Racemes densely tomentose; perianth of male flowers yellow, 3-4 mm long; ovary densely tomentose; style and stigma pink red. Capsules ca. 0.8 cm across, globose, red.

Flowering & Fruiting: February-April.

Distribution: Tropical Africa and Asia. Occasional; in evergreen forests. *RNMK 1835,* Chanthanathodu.

CLEIDION Blume

Bijdr. 613. 1826.

Cleidion javanicum Bl., Bijdr. 613. 1826; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 5: 444. 1887; Gamble, Fl. Pres. Madras 1325(927). 1925; Sasidh. & Sivar., Fl. Pl. Thrissur For. 398. 1996; Sivar. & P. Mathew, Fl. Nilambur 611. 1997; *Cleidion spiciflorum* (Burm. f.) Merr., Inter. Rumph. Herb. Amboin. 322. 1917; Vajr., Fl. Palghat Dist. 424. 1990; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 440. 2005.

Small to medium dioecious trees; branchlets glabrous. Leaves 13-15 x 5-6 cm, alternate, elliptic-oblong, obtusely acuminate at apex, acute at base, serrate, penninerved, often with a pair of sessile glands on either side at the

base of lamina; petiole 4-5 cm long; stipule ovate, acute, entire. Perianth uniseriate; male flowers in axillary slender racemes; sepals 3, ovate, acute; stamens 30-50, free; female flowers axillary, solitary; pedicel 4-5 cm long, slender; ovary 2-celled, styles 2, connate at base, 2-fid above, linear. Fruit a 2-lobbed capsule, globose; seeds 1 in each cell, globose.
Flowering & Fruiting: November-March. *Distribution*: Indo-Malesia. Occasional in moist deciduous and semi-evergreen forests. *RNMK 2757,* Chedalayam; *RNMK 2886,* Manikkunnumala.

CLEISTANTHUS J. D. Hooker ex Planchon
In Hook. Ic. Pl. t. 779. 1848.

Monoecious trees or shrubs. Leaves alternate, bifarious. Flowers sessile in axillary fascicles. Perianth 2-seriate; calyx 5-lobed, lobes valvate in male; copular in female; petals 5, smaller than the calyx; stamens 5, on an erect receptacle; filaments free; styles 3, each bifid. Capsule ovoid or globose, with 3, two valved cocci.

1.Leaves obovate or orbicular; capsule more than 2 cm long ..... **C. collinus**
1.Leaves ovate or lanceolate; capsule less than 1 cm long..... **C. patulus**

Cleistanthus collinus (Roxb.) Benth. ex Hook.f., Fl. Brit. India 5: 274. 1887; Gamble, Fl. Pres. Madras 1282(897). 1925; Vajr., Fl. Palghat Dist. 425. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 398. 1996; Sivar. & P. Mathew, Fl. Nilambur 612. 1997; Chakrab. *et al.*, Journ. Econ. Tax. Bot. 26: 335. 2002. *Clutia collina* Roxb., Pl. Corom. t.169. 1802.

Medium sized monoecious trees, bark dark brown, rough, flaking off in rounded thick scales, reddish inside. Leaves 4-6.5 x 3-4 cm, obovate or orbicular, apex obtuse or retuse, base rounded or obtuse; lateral nerves 5-8 pairs, slender; petiole ca. 0.3 cm long; corolla lobes unequal, ovate lanceolate, ca. 5 mm long, yellow. Capsule ovoid-oblong, ca. 2 cm long; seeds globose, smooth.
Flowering & Fruiting: December-November.
Distribution: India and Sri Lanka. Occasional; in moist deciduous forests. *RNMK 2886,* Muthanga.

Cleistanthus patulus (Roxb.) Muell.-Arg. in DC., Prodr. 15: 505. 1866; Hook. f., Fl. Brit. India 5: 279. 1887; Gamble, Fl. Pres. Madras 1282(897). 1925; Chakrab. *et al.*, J. Econ. Tax. Bot. 26: 342. 2002. *Clutia patula* Roxb., Pl. Corom. 2:37, t.170.1802. *Briedelia patula* (Roxb.) Hook. & Arn., Bot. Beech. Voy. 212. 1837. *Amanoa indica* Wight, Ic. Pl. Ind. Or. 5: 30, t. 1911. 1852.

Small or moderate-sized tree; branches horizontal. Leaves 8-10 x 4-5 cm, ovate or lanceolate, acuminate at apex, acute or rounded at base, glabrous. Flowers in clusters in axillary spikes; calyx-lobes 0.3-0.4 cm; petals minute, obovate. Seeds have very thin albumen and large fleshy truncate cotyledons, heart shaped.

Flowering & Fruiting: April-October.
Distribution: Peninsular India and Sri Lanka; Occasional; in moist deciduous forests. *RNMK 2611,* Pathiri.

CROTON Linnaeus
Sp. Pl. 1004. 1753.

Shrubs or trees. Leaves alternate or opposite, entire, 2-glandular at base, lowest nerves always from the base; stipules linear. Flowers monoecious, solitary or clustered on terminal racemes, bracteate; female flowers lower few; male flowers upper part of the raceme; sepals 5, imbricate or valvate; petals 5, smaller, absent in female flowers; stamens many, free, inflexed in bud; receptacle villous; ovary 3-celled, ovule solitary in each cell; styles 3, dichotomous. Fruit a 3-valved capsule; seeds 3, caruncled.

1. Herbs ..... **C. bonplandianus**
1. Shrubs or small trees 2
2. Leaves silvery white beneath 3
2. Leaves not silvery white beneath 4
3. Leaves opposite or whorled..... **C. zeylanicus**
3. Leaves alternate ..... **C. malabricus**
4. Small trees; capsule 2-3 cm across..... **C. tiglium**
4. Scandent shrubs; capsule 1.5-2.5 cm across..... .**C. caudatus**

Croton bonplandianus Baill., Adansonia 4: 339. 1864; Manilal & Sivar., Fl. Calicut 266. 1982; Ansari, Fl. Kasaragod Div. 336. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 412. 1988; Vajr., Fl. Palghat Dist. 426. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 399. 1996; Sivar. & P. Mathew, Fl. Nilambur 613. 1997; Mohanan & Sivad., Fl. Agasthyamala 604. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 441. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 624. 2009. *Croton sparsiflorus* Morong. in Ann. New York Acad. Sci. 7: 221. 1893; Gamble, Fl. Pres. Madras 1316(920). 1925.

Erect undershrubs up to 40 cm tall; branches stellate-pubescent and viscous glandular. Leaves 4-5 x 1.7-2 cm, ovate-lanceolate, acute to acuminate at apex, base rounded, glabrous; nerves 10-12 pairs; petiole 1-1.5 cm long. Racemes 7-10 cm long, terminal; pedicels glandular on either side; female flowers 3-4 mm across; sepals triangular, glabrous; petals oblong, longer than sepals; torus densely villous; ovary densely hairy, styles divided, lobes curled; male flowers greenish white; stamens 10-15. Capsule obovoid, stellate hairy; seeds minutely pitted.
Flowering & Fruiting: February-May.
Distribution: Native of south America; now naturalised in Paleotropics. Common; in moist deciduous forests. *RNMK 1468,* Pulpally.

Croton caudatus Geiseler, Crot. Monogr. 73. 1807; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 5: 388. 1887; Gamble, Fl. Pres. Madras 1315(920).

1925; Sivar. & P. Mathew, Fl. Nilambur 614. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 441. 2005. *Croton caudatus* Geisel. var. *obovoideus* Balakr. & Chakrab., Bull. Bot. Surv. India 25: 190. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 399. 1996.

Scandent shrubs, bark rough, brown, young parts with stellate tomentum. Leaves 10-11 x 5-6 cm, ovate, acuminate, margin irregularly crenate and stalked glandular, cordate at base, sparsely stellate hairy; petiole 2-3.5 cm long, densely stellate hairy, stipule ca. 1.5 cm long, divided into 2-5 linear lobes. Racemes 20-22 cm long, densely tomentose; female flowers pedicelled, ca. 8 mm across; sepals lanceolate; petals hispid; ovary densely stellate hairy, style linear, not divided, 6-7 mm long; male flowers many; sepals ovate; petals similar to sepals; torus densely villous; stamens 20-30, filaments, glabrous. Capsule 2-3 x 1-1.5 cm, obovoid, apically depressed, densely stellate hairy. Seeds compressed.

Flowering & Fruiting: March-May.

Distribution: Indo-Malesia. Occasional; in evergreen forests. *RNMK 2542,* Vythiri.

Croton malabaricus Bedd., Ic.t.181.1868-1874; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 5: 386. 1887; Gamble, Fl. Pres. Madras 1314(919). 1925; Vajr., Fl. Palghat Dist. 426. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 399. 1996; Sivar. & P. Mathew, Fl. Nilambur 614. 1997; Mohanan & Sivad., Fl. Agasthyamala 605. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 442. 2005. **Plate 27j.**

Small trees, bark greyish white, smooth. Leaves 12-18 x 7-12 cm, ovate, rounded at base, acuminate, silvery white below; nerves 7-8 pairs; glands sessile; petiole 6-8 cm long; Racemes 10-15 cm long, terminal; female flowers pedicelled, ca. 1 cm across; sepals ovate, obtuse, silky tomentose; petals obovate; ovary stellate hairy; male flowers smaller; stamens 10-12, filaments bearded. Capsule 2-3 x 1.5-2 cm, obovoid, emarginate, densely brown scaly; seeds oblong, mottled with brown.

Flowering & Fruiting: April-November.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 2507,* Vythiri.

Croton tiglium L., Sp. Pl. 1004. 1753; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 5: 398. 1887; Gamble, Fl. Pres. Madras 1315(920). 1925; Manilal, Fl. Silent Valley 247. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 108. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 413. 1988; Vajr., Fl. Palghat Dist. 426. 1990; Sivar. & P. Mathew, Fl. Nilambur 616. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 442. 2005. *Tiglium officinale* Klotzsch, Nov. Acta Phys. Med. Acad. Caes. Leop. Carol. Nat. Cur. 19, Suppl. 1: 418. 1843. *Croton officinalis* (Klotzsch) Alston in Trimen, Handb. Fl. Ceylon 6: 264. 1931. *Cadel-avanacu* Rheede, Hort. Malab.2: 61-62, t.33-1679.

Small trees, younger parts stellate hairy. Leaves 13-15 x 6-7.5 cm, ovate, crenulate, rounded at base; nerves 4-5 pairs; petiole 5-8 cm long. Racemes 7-12 cm long, sparsely stellate hairy; male flowers ca. 0.5 cm across, pale green; sepals ovate, acute, tomentose at tip; petals oblong, white, densely villous; stamens 15-20. Capsule 2-3 cm across, obovoid; seeds dull white, trigonous.
Flowering & Fruiting: November-January.
Distribution: Native of China; introduced in India, also got naturalized. Common; in moist deciduous forests. *RNMK 2673,* Pulpally; *RNMK 1468*, Naikuppa.

Croton zeylanicus Muell.-Arg., Linnaea 34: 107. 1865 & in DC., Prodr. 15: 581. 1866; Manilal, Fl. Silent Valley 247. 1988; Vajr., Fl. Palghat Dist. 426. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 400. 1996; Mohanan & Sivad., Fl. Agasthyamala 605. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 442. 2005. *Croton reticulatus* Heyne ex Muell.-Arg. in DC., Prodr. 15: 580. 1866; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 5: 380. 1887; Gamble, Fl. Pres. Madras 1314(919). 1925.

Large shrubs, densely covered with brown, fimbriate scales. Leaves 15-20 x 4-6 cm, ovate-lanceolate, acuminate, rounded at base, white-scaly below; lateral nerves 6-10 pairs, glands 1 pairs, sessile; petiole 1-3 cm long. Racemes 6-8 cm long; female flowers pedicelled, ca. 4 mm across; sepals ovate, obtuse; petals obovate, smaller, tomentose; ovary brown stellate hairy; male flowers smaller; stamens many, filaments glabrous except at base. Capsule 1-1.3 x 0.8-1 cm, ovoid; seeds oblong, mottled with brown.
Flowering & Fruiting: March-October.
Distribution: Peninsular India and Sri Lanka. Occasional; in evergreen forests. *RNMK 2179,* Kallady-900 Forest.

DAPHNIPHYLLUM Blume

Bijdr. 1152. 1826.

Daphniphyllum neilgherrense (Wight) K. Rosenth. in Engl., Pflanzenreich. Daphniphyllac. 7. 1919; Gamble, Fl. Pres. Madras 1311(917). 1925; Mohanan & Sivad., Fl. Agasthyamala 623. 2002. *Goughia neilgherrensis* Wight, Ic. tt. 1878 & 1879. 1852. *Daphniphyllum glaucescens* Muell.-Arg. in DC., Prodr. 16: 3. 1866, non Blume 1826-1827; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 5: 353. 1887. *Daphniphyllum roxburghii* Baillon, Etude Euphorb. 565. 1858. **Plate 27k.**

Small evergreen trees; latex milky; branchlets stout. Leaves 8-10 x 4-5 cm, oblong-obovate, obtuse, entire; nerves 7-8 pairs, pale below, glabrous; petiole 2-3 cm long. Flowers dioecious; male flowers in axillary racemes; bracts ovate, obtuse, ciliate; sepals minute; stamens 12, free, anthers oblong, connective apiculate; female flowers few, bracteate; perianth similar to male flowers; ovary 2-celled; ovules paired in each cell; stigmas 2, recurved, undivided. Drupe ca. 1.2 cm across, reddish green.

Flowering & Fruiting: January-June.
Distribution: Indo-Malesia. Occasional; in evergreen forests. *RNMK 2638,* Kurichiarmala; 1846 Chembra.

DIMORPHOCALYX Thwaites
Enum. Pl. Zeyl. 278. 1861.

Dimorphocalyx glabellus Thw. var. **lawianus** (Muell.-Arg.) Chakrab. & Balakr., Proc. Indian Acad. Sci. (Pl. Sci.) 100: 296. 1990. *Trigonostemon lawianus* Muell.-Arg., Linnaea 34: 212. 1865. *Dimorphocalyx lawianus* Muell.-Arg., Hook. f. & Thoms. in Hook. f., Fl. Brit. India 5: 404. 1887; Gamble, Fl. Pres. Madras 1337(935). 1925; Sasidh. & Sivar., Fl. Pl. Thrissur For. 400. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 442. 2005.

Trees, bark smooth, branchlets slender, grayish white. Leaves 8-16 x 5-7 cm, elliptic, acuminate, base acute; nerves 10-13 pairs, irregular; petiole 1-2 cm long; stipule ovate, acute. Flowers dioecious, male flowers in ca. 5 cm long axillary raceme, ca. 1cm across; calyx ca. 0.5 cm long, campanulate, 5-toothed above; petals 5, obovate, creamy white; stamens 10-20, combined into a branched column; female flowers few, in short racemes; sepals 5, ca. 2.5 cm long, oblanceolate, persistent; corolla similar to male flowers; ovary 3-celled, densely hispid; ovule solitary in each cell, styles 3, connate at base, bifid, spreading. Capsule 3-lobed, 2-2.5 x 2-2.2 cm.
Flowering & Fruiting: March-October.
Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 1299,* Kurichyarmala.

DRYPETES Vahl
Eclog. 3: 49. 1807.

Trees, bole usually fluted. Leaves alternate, entire or rarely toothed. Flowers dioecious, in axillary fascicles, sessile or pedicelled; female flowers solitary or 2-3 together; perianth uniseriate, lobes 4 -6, imbricate; stamens many, placed round the disk, filaments free; ovary 1-4-celled, oblong, ovule 2 in each cell, pendulous; stigma 1-3, sessile, flat or recurved. Fruit a globose-ellipsoid or lobed, drupe 1-4-celled; seed solitary in each cell, arillate.

1. Leaves more than 20 cm long.....**D. oblongifolia**
1. Leaves up to 15 cm long..... 2
2. Branchlets and petiole tomentose .....**D. wightii**
2. Branchlets glabrous.....**D. venusta**

Drypetes oblongifolia (Bedd.) Airy Shaw, Kew Bull. 23: 57. 1969; Manilal, Fl. Silent Valley 248. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 414. 1988; Vajr., Fl. Palghat Dist. 427. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 401. 1996; Sivar. & P. Mathew, Fl. Nilambur 618. 1997; Chakrab. *et al.*, J. Econ. Tax. Bot. 21: 270. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 444. 2005. *Laneasagum oblongifolium* Bedd., Madras J. Lit. Sci. ser. 3, 6: 71. 1861. *Cyclostemon macrophyllus* sensu Gamble, Fl. Pres. Madras 1302(911).

1925, non Bl. 1826. *Cyclostemon macrophyllus* Bl. var. *sessiliflora* Bedd., Fl. Sylv. t. 278. 1872. *Cyclostemon macrophyllus* Bl. var. *peninsularis* Hook. f. & Thoms. in Hook. f., Fl. Brit. India 5: 341. 1887.

Medium trees with horizontal branches; branchlets scabrous. Leaves to 20-23 x 8-10 cm, oblong, rounded at base, acuminate at apex; nerves 9-11 pairs, prominent below, strongly reticulate. Female flowers sessile, solitary or paired; bracts minute, orbicular; sepals 4, orbicular, densely fulvous hairy outside; ovary globose, densely hairy; stigma discoid, shortly lobed, glabrous; male flowers subsessile; sepals ovate; stamens many. Drupes ca. 2.5 cm across, obovoid, densely brown hispid, rind hard.

Flowering & Fruiting: January-December.

Distribution: Indo-Malesia. Common in evergreen forests. *RNMK 3002,* Vaduvanchal; *RNMK 2657*, Periya.

Drypetes venusta (Wight) Pax & Hoffm. in Engl., Pflanzenr. Euphorb.-Phyllanthoid.-Phyllanth. 268. 1922; Chakrabarty *et al.*, J. Econ. Tax. Bot. 21: 277. 1997. *Astylis venusta* Wight, Ic. t. 1992. 1853. *Hemicyclia venusta* (Wight) Thw. in Hook.'s J. Bot. Kew Gard. Misc. 7: 272. 1855; *Drypetes elata* (Bedd.) Pax. & Hoffm. in Engl., Pflanzenr. 81:268; Manilal, Fl. Silent Valley 248. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 413. 1988; Vajr., Fl. Palghat Dist. 427. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 401. 1996; Sivar. & P. Mathew, Fl. Nilambur 617. 1997. *Hemicyclia elata* Bedd., Fl. Sylv. t. 279. 1872; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 5: 339. 1887; Gamble, Fl. Pres. Madras 1300(909). 1925.

Trees with fluted bole and drooping branches; branchlets glabrous. Leaves 9-12 x 3.5-4 cm, elliptic, abruptly acuminate, base acute; nerves 7-10 pairs, reticulate; petiole ca. 0.5 cm long. Male flowers fascicled, axillary; pedicels 3-6-together, 1-1.5 cm long, slender, minutely hispid; tepals 4, ca. 0.4 cm across, oblong, obtuse, hispid outside; stamens 8-10; female flowers solitary. Drupes obovoid, ca. 2 cm across, greenish yellow, drooping; seeds covered with pulpy mucilage.

Flowering & Fruiting: November-July.

Distribution: Endemic to southern Western Ghats. Common; in evergreen forests. *RNMK 2412,* Kurichiarmala.

Drypetes wightii (Hook. f.) Pax & Hoffm. in Engl., Pflanzenr. Euphorb.-Phyllanthoid.-Phyllanth. 273. 1922; Sasidh. & Anto in Manoharan *et al.*, Silent Valley-Whispers Reason 139. 1999; Chakrab. *et al.*, J. Econ. Tax. Bot. 21: 277. 1997. *Hemicyclia wightii* Hook. f. & Thoms. in Hook. f., Fl. Brit. India 5: 339. 1887; Gamble, Fl. Pres. Madras 1300(909). 1925.

Small trees; bole fluted; branches drooping; bark white, smooth; branchlets tomentose. Leaves 4-7 x 2-2.5 cm, elliptic, acuminate, glabrous; nerves many, irregular, prominently reticulate; petiole 5-6 mm long, tomentose. Male flowers sub-sessile, solitary or fascicled; calyx lobes 4, ovate, acute, ca. 0.2 cm

long, densely hispid, connate at base; stamens few, filaments glabrous; female pedicel ca. 1 cm long, densely hispid. Capsule obovoid, glabrous.
Flowering & Fruiting: October-March.
Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 2889,* Kurichiarmala; *RNMK 1465*, Chembra.

EPIPRINUS Griffith
Notul. Pl. Asiat. 4: 487. 1854.

Epiprinus mallotiformis (Muell.-Arg.) Croizat, J. Arnold Arbor. 23: 53. 1942; Manilal, Fl. Silent Valley 249. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 414. 1988; Vajr., Fl. Palghat Dist. 427. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 403. 1996; Mohanan & Sivad., Fl. Agasthyamala 607. 2002. *Symphyllia mallotiformis* Muell.-Arg., Linnaea 34: 156. 1865; Gamble, Fl. Pres. Madras 1323(925). 1925. *Adenochlaena indica* (Bedd.) Bedd. ex Hook. f., Fl. Brit. India 5: 418. 1887. *Cephalocroton indicum* Bedd., Fl. Sylv. t. 261. 1872.

Small trees; tender parts stellate-tomentose. Leaves alternate, 15-17 x 7-8 cm, elliptic, acute; nerves 5-6 pairs, prominent, nervules reticulate; petioles unequal, 5-6 cm long, upper leaves nearly sessile. Flowers monoecious, in long axillary raceme; female flowers 2-4, at basal parts of the raceme; sepals 5, ca. 0.3 cm long, lanceolate, densely tomentose; ovary 3-celled, densely hairy, styles 3, 1-1.5 cm long, twice bifid, linear, glandular; male flowers many, densely clustered along the upper part of the raceme; sepals 5, ovate, acute, thinly tomentose; stamens 5, free. Capsule 2-2.5 cm across, 3-lobed, lobes globular, densely stellate hairy; seeds 3, globose.
Flowering & Fruiting: March-April.
Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 2559,* Kallady-900 forests.

EUPHORBIA Linnaeus
Sp. Pl. 450. 1753.

Herbs, shrubs or small trees with milky latex. Leaves opposite, alternate or reduced to spines. Flowers monoecious, arranged in a circular inflorescence of many male florets surrounding a central female floret; inflorescence surrounded by an involucre of few connate bracts; perianth absent; stamens 1, filaments jointed at middle, anthers erect; ovary elevated on a straight or recurved pedicel, 3-celled, ovule solitary in each cell, styles 3, free, stigma simple or 2-fid. Fruit a capsule with 3 cocci; seeds 3, globose, caruncled.

1. Herbs; leaves opposite 2
1. Trees or shrubs; leaves alternate when present 3
2. Prostrate herbs; leaves under 1cm long; cyathia in subsessile clusters..**E. thymifolia**
2. Erect branched herbs; leaves ca. 12 cm long; cyathia in terminal clusters.....
..... **E. heterophylla**
3. Stem terete; leaves oblong obovate.....**E. nivulia**
3. Stem cylindric; leaves linear oblong .....**E. tirucalli**

Euphorbia heterophylla L., Sp. Pl. 453. 1753; Gamble, Fl. Pres. Madras 1278(894). 1925; Manilal & Sivar., Fl. Calicut 257. 1982; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 444. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 629. 2009. *Euphorbia prunifolia* Jacq., Hort. Schoenbr. 3: 15, t. 277. 1798; Hook. f., Fl. Brit. India 5: 266. 1887. *Euphorbia geniculata* Ortega., Nov. Rar. Pl. Matr. 18.1797; Fischer in Gamble, Fl. Pres. Madras 1884.1936. *Poinsettia heterophylla* (L.) Klotsch & Garcke, Monatsber Deutsch. Akad. Wiss. Berlin 1859: 253. 1859.

Erect branched herbs, 35-40 cm tall; stems glabrous, glaucous. Leaves 9-12 x 5-5.5 cm, alternate or opposite below, elliptic, acute or obtuse, glabrous above, pubescent below; petiole 3-4 cm long. Cyathia in terminal clusters; involucre companulate, gland 1, sessile; male florets 12-15, bracteolate, stamens many. Capsule ca. 0.6 cm across, cocci globular, puberulus; seeds angled.
Flowering & Fruiting: June-August.
Distribution: Native of Central America; now a Pantropical weed. Occasional; in open areas in moist deciduous forests. *RNMK 1475,* Pulpally.

Euphorbia nivulia Buch.-Ham., Trans. Linn. Soc. London 14: 286. 1824; Wt., Ic. t. 1862. 1852; Hook. f., Fl. Brit. India 5: 255. 1887; Gamble, Fl. Pres. Madras 1277(893). 1925; Sasidh. & Sivar., Fl. Pl. Thrissur For. 403. 1996; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 446. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 630. 2009.

Succulent trees, spines paired, short. Leaves alternate, 10-15 x 3-5 cm, elliptic-oblong or obovate, apex obtuse, base cuneate, glabrous, subsucculent, lateral nerves obscure. Cyathia paired in subterminal lax cymes; involucre broadly cupular, ca. 0.5 x 1 cm; glands 5, oblong; male florets in five fascicles; female laterally pendulous; style stout, erect, branched, stigma broad, fimbriate.
Flowering & Fruiting: March-April.
Distribution: India and Myanmar. Occasional; in moist deciduous forests. *RNMK 2076,* Begur.

Euphorbia rothiana Spreng., Syst. 3: 796. 1826; Hook. f., Fl. Brit. India 5: 263. 1887; Gamble, Fl. Pres. Madras 1278(894). 1925; Manilal, Fl. Silent Valley 249. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 416. 1988.

Erect subshrubs, stems glaucous, glabrous. Leaves alternate, opposite or whorled, 8-10 x 1-1.5 cm, acute at apex, entire, glabrous, glaucous below; base attenuate into a short petiole. Cyathium in terminal panicled cymes, 5-glandular around the rim of involucre; male florets many, filaments glabrous; ovary long-stalked. Capsule ca. 0.3 cm long, globular, smooth; seeds obovoid, smooth.
Flowering & Fruiting: March-April.
Distribution: India and Sri Lanka. Occasional; in shola margins. *RNMK 2893,* Kurichiarmala; *RNMK 3282*, Chembra.

Euphorbia tirucalli L., Sp. Pl. 452. 1753; Hook. f., Fl. Brit. India 5: 254. 1887; Gamble, Fl. Pres. Madras 1276(893). 1925; Manilal & Sivar., Fl. Calicut 257. 1982; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 446. 2005.

Shrubs to small trees, dichotomously branched; branchlets terete. Leaves 1-1.5 x 0.4-0.5 cm, linear lanceolate, deciduous; cyathia in terminal clusters; involucre cupular, 2-3 mm long; glands 5; male florets 15, anthers oblong; ovary pubescent. Capsule globose, pubescent.

Flowering & Fruiting: February-April.

Distribution: Paleotropics. Occasional; in moist deciduous forests. *RNMK 2570,* Begur.

FALCONERIA Royle

Bot. Himal. Mts.: 354 (Febr. 1839).

Falconeria insignis Royle, Bot. Himal. Mts. 354. t.98. f.2. 1839. *Sapium insigne* (Royle) Trimen, Cat.Pl. Ceylon 83. 1885; Hook. f., Fl. Brit. India 5: 471. 1888; Gamble, Fl. Pres. Madras 1346(941). 1925; Manilal & Sivar., Fl. Calicut 270. 1982; Ansari, Fl. Kasaragod Div. 346. 1985; Manilal, Fl. Silent Valley 254. 1988; Vajr., Fl. Palghat Dist. 437. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 413. 1996; Mohanan & Sivad., Fl. Agasthyamala 620. 2002. *Falconeria malabarica* Wight, Ic. t. 1866. 1852.

Small trees; branchlets stout, latex milky. Leaves alternate, 12-8 x 4.5-7 cm, elliptic-oblong, acuminate, crenate, serrate, base with 2-sessile glands; nerves 12-15 pairs, parallel; petiole ca. 5 cm long. Flowers monoecious; male and female flowers on separate spikes; male spike to 18-25 cm long, stout, glandular; bracts distinct, ovate; male flowers 5-10 together in each bracts, sepals orbicular, stamens 2 or 3, free; female spike shorter; flowers solitary in the bract; stigmas 3, sessile. Capsule 3-celled, subglobose; seeds 3, globose.

Flowering & Fruiting: January-February.

Distribution: Indo-Malesia. Occasional; in evergreen forests. *RNMK 1414,* Thalimala.

FLUEGGEA Willdenow

Sp. Pl. 4: 757. 1806 '1805'

Unarmed or spinescent shrubs. Leaves alternate, entire. Flowers minute, axillary, pedicelled, dioecious; male flowers numerous, clustered, sepals 5, imbricate; stamens 5, or fewer, alternating with as many disk glands; filaments free; anthers erect. Female flowers subsolitary; ovary 1-3 celled; styles recurved, united below; ovules 2 in each cell. Fruit globose, fleshy, 3 valved; seeds 3, triquetrous.

1. Small tree; unarmed ..... **F. virosa**
1. A large stiff straggling shrub; branchlets ends in spine..... **F. leucopyrus**

Flueggea leucopyrus Willd., Sp. Pl. 4: 757. 1806; Hook. f., Fl. Brit. India 5: 328. 1887; Gamble, Fl. Pres. Madras 1296(907). 1925. *Securinega leucopyrus* (Willd.) Muell.-Arg. in DC., Prodr. 15: 451. 1866.

Shrubs, branchlets angular, ending in spines. Leaves distichous, 2-2.5 x 1-1.5 cm, obovate, apex emarginate, base cuneate, membranous. Flowers greenish white; bracts many, minute; male flowers in axillary clusters, tepals ca. 0.7 mm long, concave, obtuse; stamens 5; filaments ca. 1.5 mm long; pistillode ca. 1 mm long. Capsule ca. 5 mm across, globose, white.
Flowering & Fruiting: June-September.
Distribution: India, Sri Lanka and Myanmar. Occasional; along the margins of evergreen forests. *RNMK 2464,* Vythiri.

Flueggea virosa (Roxb. ex Willd.) Voigt, Hort. Suburb. Calcutt. 152. 1845; Gamble, Fl. Pres. Madras 1296(907). 1926. *Securinega virosa* (Roxb. ex Willd.) Baill., Adansonia 6: 334. 1866; Airy Shaw, Kew Bull. 26 (2): 340. 1972; Manilal & Sivar., Fl. Calicut 271. 1982; Ansari, Fl. Kasaragod Div. 347. 1985; Manilal, Fl. Silent Valley 255. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 427. 1988; Vajr., Fl. Palghat Dist. 439. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 415. 1996; Sivar. & P. Mathew, Fl. Nilambur 644. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 457. 2005. *Phyllanthus virosus* Roxb. ex Willd., Sp. Pl. 4: 578. 1805. *Flueggea microcarpa* Bl., Bijdr. 580. 1826; Hook. f., Fl. Brit. India 5: 328. 1887.

Profusely branched shrubs, branchlets often thorny. Leaves alternate, 1.5-5 x 2-2.5 cm, obovate, apex obtuse, glabrous, nerves 5-7 pairs, reticulate; petiole ca. 0.5 cm long. Flowers dioecious, in axillary fascicles, 5-20 together, pedicels ca. 0.6 cm long, slender; calyx lobes oblong, white; stamens in male flowers 5, free, disk 5-lobed, staminode-like; ovary in female flowers conical, glabrous; styles 3, free, 2-fid; pistillode in male flowers 3 fid. Capsule ca. 0.5 cm across, depressed globose, glabrous; seeds trigonous, rough.
Flowering & Fruiting: March-September.
Distribution: Tropical Africa, Asia and Australia. Occasional; in moist deciduous forests. *RNMK 3258,* Kuruva.

GLOCHIDION J. R. Forster & J. G. A. Forster
Charact. Gen. 113, t. 57. 1776, (*nom. cons.*)

Shrubs or trees, branchlets terete or glandular. Leaves simple, alternate, distichous, entire. Flowers monoecious or dioecious in axillary fascicles, pedicelled; sepals 6, free in male flowers, connate at base in female flowers, imbricate; stamens 3-8, anthers oblong, connectives fused into a tube; ovary 3- 5 locular, conical, ovule 2 in each cell; styles 3-5, short, connate into a column. Fruit a capsule, 3-5 valved, globose or depressed globose; seeds hemispheric or laterally compressed.

1. Stamens 4 2
1. Stamens 3 3
2. Style 5-toothed at apex ; capsule ca. 1 cm across ..... **G. candolleanum**
2. Style 4 toothed at apex; capsule ca. 0.7 cm across ..... **G. zeylanicum**
3. Seeds glabrous, brown ..... **G. ellipticum**
3. Seeds smooth, grey ..... **G. heyneanum**

Glochidion candolleanum (Wight & Arn.) Chakrab. & Gangop., J. Econ. Tax. Bot. 19: 191. 1995. *Lobocarpus candolleanus* Wight & Arn., Prodr. 1: 7. 1834. *Glochidion neilgherrense* Wight, Ic. 5: 229. 1852; Hook. f., Fl. Brit. India 5: 316. 1887; Gamble, Fl. Pres. Madras 1307(914). 1925; Manilal, Fl. Silent Valley 251. 1988; Vajr., Fl. Palghat Dist. 430. 1990; Sivar. & P. Mathew, Fl. Nilambur 622. 1997. *Glochidion arboreum* Wight, Ic. t. 1907. f.1. 1852; Hook. f., Fl. Brit. India 5: 316. 1887; Gamble, Fl. Pres. Madras 1307(914). 1925; Manilal, Fl. Silent Valley 250. 1988. *Glochidion sisparense* Gamble, Fl. Pres. Madras 1307(914). 1926; Biju in Manoharan *et al.*, Silent Valley-Whispers Reason 161. 1999.

Small monoecious trees, branchlets tomentose. Leaves oblong or ovate-oblong, acute, base obtuse, tomentose along veins below, 8-9 x 3-4 cm, black when dry; nerves 6-10 pair. Flowering branches slender, zig-zag; male flowers greenish-yellow; sepals linear oblong; stamens 3; female flowers few, sub-sessile; sepals unequally 3-4 toothed; style elongated. Capsule ca. 0.8 cm across, 6-lobed, crowned with style.

Flowering & Fruiting: December-March.

Distribution: India and Sri Lanka. Occasional; in margins of shola forests. *RNMK 2433,* Chembra.

Glochidion ellipticum Wight, Ic. t. 1906. 1852; Hook. f., Fl. Brit. India 5: 321. 1887; Gamble, Fl. Pres. Madras 1308(915). 1925; V. S. Ramach. & V.J. Nair, Fl. Cannanore 418. 1988; Vajr., Fl. Palghat Dist. 430. 1990; Chakrab. & Gangop., J. Econ. Tax. Bot. 19: 199. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 404. 1996; Sivar. & P. Mathew, Fl. Nilambur 622. 1997; Mohanan & Sivad., Fl. Agasthyamala 609. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 446. 2005. *Phyllanthus malabaricus* Muell.-Arg., Linnaea 34: 69. 1865 & in Flora 48: 386. 1865 & in DC., Prodr. 15: 305. 1866. *Glochidion malabaricum* (Muell.-Arg.) Bedd., Fl. Sylv. 193. 1872; Hook. f., Fl. Brit. India 5: 319. 1887; Gamble, Fl. Pres. Madras 1308(915). 1925; V. S. Ramach. & V.J. Nair, Fl. Cannanore 419. 1988; Sivar. & P. Mathew, Fl. Nilambur 622. 1997; Mohanan & Sivad., Fl. Agasthyamala 609. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 446. 2005.

Small glabrous monoecious trees. Leaves 6-13 x 2-5 cm, elliptic-oblong, abruptly acuminate, acute and oblique at base; nerves 5-7 pairs, narrow; petiole ca. 0.5 cm long. Female flowers ca. 0.2 cm across, 6-10 together in the axils; pedicels ca. 0.6 cm long; sepals obovate, obtuse, hispid inside; ovary densely hispid, 4-5-celled; style 5-toothed at apex. Capsule ca. 1 cm across, orange red, depressed above, hirsute; seeds glabrous, brown.

Flowering & Fruiting: January-July.

Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 1623,* Pookodu.

Glochidion heyneanum (Wight & Arn.) Wight, Ic. t. 1908. 1852; Hook. f., Fl. Brit. India 5: 323. 1887; Chakrab. & Gangop., J. Econ. Tax. Bot. 19: 205. 1995. *Gynoon heyneanum* Wight & Arn., Edinb. New Phil. J. 14: 300. 1833 &

in Dietr., Syn. Pl. 5: 388. 1852. *Glochidion velutinum* Wight, Ic. t. 1907. f.2. 1852; Hook. f., Fl. Brit. India 5: 322. 1887; Gamble, Fl. Pres. Madras 1307(914). 1925; V. S. Ramach. & V.J. Nair, Fl. Cannanore 419. 1988.

Small monoecious trees. Leaves 6-8 x 3-4 cm, elliptic, acute at both ends, densely velutinous-tomentose; nerves 6-7 pairs, nervules subparallel; petiole ca. 0.5 cm long, tomentose. Flowers solitary or 2-3 together, pedicels ca. 0.5 cm long; sepals in female flowers ovate, acute, densely tomentose; ovary ovoid, style 5-toothed at apex; male flowers ca. 0.4 cm across, 2 or 3 together; stamens 3. Capsule 0.8-1 cm across, tomentose, 4-6 lobed; seeds grey, smooth.

Flowering & Fruiting: March-November.

Distribution: India, Himalaya, Bangladesh and Myanmar. Occasional; in evergreen forests. *RNMK 1102,* Manikkunnumala.

Glochidion zeylanicum (Gaertner) A. Juss., Euphorb. Gen. 107. 1824; Hook. f., Fl. Brit. India 5: 310. 1887; Gamble, Fl. Pres. Madras 1306(914). 1925; Manilal & Sivar., Fl. Calicut 260. 1982; Ansari, Fl. Kasaragod Div. 339. 1985; Chakrab. & Gangop., J. Econ. Tax. Bot. 19: 226. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 405. 1996; Sivar. & P. Mathew, Fl. Nilambur 623. 1997; Mohanan & Sivad., Fl. Agasthyamala 610. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 447. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 635. 2009. *Briedelia zeylanica* Gaertner, Fruct. 2: 128. t.109. 1790.

Small dioecious trees. Leaves 8-15 x 4-7 cm, ovate, obtusely acuminate, base round or cordate; nerves 8-9 pairs, nervules prominently reticulate; petiole ca. 0.6 cm long. Flowers 3-5, yellow in axillary umbel, peduncle ca. 0.8 cm long, adnate to the stem; pedicels of male flowers ca. 1 cm long; sepals 4 to 6, ovate, obtuse, connate at base; stamens 4 or more; sepals in female flowers almost free; ovary subglobose, 4-5 locular; style toothed at apex. Capsule ca. 0.7 cm across, subglobose, glabrous, beaked.

Flowering & Fruiting: March-May.

Distribution: Indo-Malesia. Common; in evergreen forests. *RNMK 1201,* Theethundamala.

HOMONOIA Loureiro

Fl. Cochinch. 637. 1790.

Homonoia riparia Lour., Fl. Cochinch. 637. 1790; Hook. f., Fl. Brit. India 5: 455. 1887; Gamble, Fl. Pres. Madras 1333(933). 1925; Ansari, Fl. Kasaragod Div. 340. 1985; Manilal, Fl. Silent Valley 251. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 420. 1988; Vajr., Fl. Palghat Dist. 431. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 405. 1996; Sivar. & P. Mathew, Fl. Nilambur 624. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 447. 2005. *Adelia neriifolia* Heyne ex Roth, Nov. Pl. Sp. 375. 1821; Wight, Ic.t. 1868. 1852. **Plate 27 l.**

Large rhoeophytic shrubs; branchlets pubescent, reddish. Leaves spiral, closely packed, 15-18 x 1.5-2 cm, linear-oblong, acute at either ends,

penninerved, covered with yellow scales below and pubescent along nerves; petiole ca. 1 cm long, tomentose; stipule filiform. Flowers dioecious in axillary 10-15 cm long racemes; male flowers ca. 0.3 cm across, sepals 2-5, glabrous, ciliate along the margins, yellowish red; stamens many, free; female flowers sessile, densely packed; bracts ovate; sepals lanceolate, ciliate; ovary densely hairy; styles 3, spreading, linear. Capsule ca. 0.5 cm across, globose, hairy.
Flowering & Fruiting: December-May.
Distribution: Indo-Malesia and south China; Common; along rocky areas in streams. *RNMK 2533,* Brahmagiri.

JATROPHA Linnaeus
Sp. Pl. 1006. 1753.

Jatropha curcas L., Sp. Pl. 1006. 1753; Roxb., Fl. Ind. 3: 686. 1832; Hook. f., Fl. Brit. India 5: 383. 1887; Gamble, Fl. Pres. Madras 1340(937). 1925; Airy Shaw, Euphorb. Borneo 137. 1975; Manilal & Sivar., Fl. Calicut 258. 1982; Ansari, Fl. Kasaragod Div. 340. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 420. 1988; Vajr., Fl. Palghat Dist. 431. 1990; Sivar. & P. Mathew, Fl. Nilambur 625. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 448. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 637. 2009.

Shrubs, bark white. Leaves palmatifid, 8-14 x 12-15 cm, ovate, orbicular, basally 5-nerved, lobes acute, base sheathing; petiole 12-15 cm long. Cymes axillary and terminal; bracts ca. 1 cm, elliptic, pubescent; male flowers-pedicels ca. 0.3 cm long, calyx 5-lobed, lobes oblong; corolla lobes 5, oblong, ciliate, pubescent on inner side, disc of 5 glands; staminal column branched; stamens 10, outer 5 free. Capsule globose.
Flowering & Fruiting: May-August.
Distribution: Native of tropical America; now widespread in Paleotropics. Common; along margins of plantations. *RNMK 1300,* Meppady. *RNMK 1751*, Puzhamudy.

MACARANGA Du Petit – Thouars
Gen. Nova Madag. 26. 1806.

Macaranga peltata (Roxb.) Muell.-Arg. in DC., Prodr. 15: 1010. 1866; Gamble, Fl. Pres. Madras 1326(928). 1925; Manilal & Sivar., Fl. Calicut 259. 1982; Ansari, Fl. Kasaragod Div. 341. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 421. 1988; Vajr., Fl. Palghat Dist. 432. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 405. 1996; Sivar. & P. Mathew, Fl. Nilambur 626. 1997; Mohanan & Sivad., Fl. Agasthyamala 610. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 449. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 638. 2009. *Osyris peltata* Roxb., Fl. Ind. 3: 755. 1832. *Mappa peltata* (Roxb.) Wight, Ic. t. 817. 1844-45. *Macaranga roxburghii* Wight, Ic. t. 1949, f.4. 1853; Hook. f., Fl. Brit. India 5: 448. 1887. *Macaranga tomentosa* Wight, Ic. t. 1949, f.1. 1853.

Medium dioecious trees, bark brown, reddish inside, exudation red, gummy; branchlets thick, terete. Leaves 13-20 x 11-15 cm, ovate-orbicular,

peltate, apex acuminate, lateral nerves 8-10, radiating from the centre, puberulus below; petiole 16-18 cm long. Flowers in axillary panicles; male flowers in fascicles; female solitary on each bract; bracts concave; perianth uniseriate, in male 3-lobed; stamens 3, free, filaments ca. 0.5 cm long; ovary 1-celled, stigma acute. Capsule globose, black; seed one.
Flowering & Fruiting: January-February.
Distribution: India, Sri Lanka and Andamans. Occasional; in semi-evergreen and moist deciduous forests. *RNMK 1536,* Manikkunnumala; *RNMK 1846*, Pulpally.

MALLOTUS Loureiro
Fl. Cochinch. 601. 1790.

Trees or shrubs. Leaves alternate or opposite, entire or toothed, 3-9-ribbed or penninerved, nervules parallel, gland-dotted beneath. Flowers dioecious in axillary or terminal simple or branched racemes; male sepals 3-5, orbicular, valvate; female sepals 3-5, spathaceous or lobed; stamens many, free, connective broad; ovary 2-4-celled, ovule 1 in each cell, styles 2-4, each simple or bifid, papillose. Fruit a capsule of 2-4 cocci, smooth or muricate; seeds angular or globose.

1. Scandent shrubs ..... **M. beddomei**
1. Shrubs or Trees 2
2. Capsule smooth 3
2. Capsule echinate or muricate 4
3. Capsule prominently red glandular ..... **M. philippensis**
3. Capsule not red glandular 5
4. Leaves alternate, peltate ..... **M. tetracoccus**
4. Leaves opposite, not peltate ..... **M. aureopunctatus**
5. Spike axillary, to 15 cm long; capsule with curved spines ..... **M. resinosus**
5. Racemes to 10 cm; capsule smooth ..... **M. atrovirens**

Mallotus atrovirens Muell.-Arg., Linnaea 34: 195. 1865; Hook. f., Fl. Brit. India 5: 440. 1887; Gamble, Fl. Pres. Madras 1322(925). 1925; Manilal & Sivar., Fl. Calicut 260. 1982; Sasidh. & Sivar., Fl. Pl. Thrissur For. 406. 1996; Sivar. & P. Mathew, Fl. Nilambur 627. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 639. 2009.

Small trees, bark ash-grey, dull yellow inside, branchlets glabrous. Leaves opposite, 8-12 x 4-6 cm, elliptic to obovate, apex acute to shortly acuminate, base acute, glabrous, yellow glandular, densely below, entire or subentire, lateral nerves 7-9 pairs, basal pair opposite; petiole 0.3-2 cm. Racemes 8-10 cm long, pedicels ca. 0.5 cm long, yellow glandular; perianth lobes ovate-lanceolate; ovary glabrescent, densely glandular; stigma sessile, 2, plumose. Capsule 2-lobed, less than 1 cm, smooth, yellow glandular; style deciduous; seeds 2, plano convex or hemispherical, smooth.

Flowering & Fruiting: January-July.
Distribution: Endemic to southern Western Ghats. Common; in evergreen forests. *RNMK 2179,* Kurichiarmala.

Mallotus aureopunctatus (Dalz.) Muell.-Arg. in DC., Prodr. 15: 973. 1866; Gamble, Fl. Pres. Madras 1323(925). 1925; Ansari, Fl. Kasaragod Div. 342. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 422. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 406. 1996. *Rottlera aureopunctata* Dalz. in Hook.'s J.Bot. Kew Gard. Misc. 3:122.1851. *Mallotus lawii* Muell.-Arg., Linnaea 34: 192. 1865; Hook. f., Fl. Brit. India 5: 438. 1887 p.p.

Large shrubs, branchlets minutely pubescent. Leaves opposite, 11-15 x 3-5 cm, oblong or obovate, apex acuminate, base obtuse or subtruncate, shortly sinuate crenate, margin recurved, lateral nerves 7-10 pairs, prominently reticulate; petiole 1-1.5 cm long. Male racemes 6-8 cm long, pubescent; female 6-7 cm long, flowers few, distant; perianth lobes of male broadly ovate, obtuse, densely tomentose; ovary with soft echinate processes; style short, stigma 2, plumose. Capsule 1-1.3 cm across.
Flowering & Fruiting: October-March.
Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 3254,* Chembra.

Mallotus beddomei Hook. f., Fl. Brit. India 5: 438. 1887; Gamble, Fl. Pres. Madras 1323(925). 1925; Manilal, Fl. Silent Valley 252. 1988; Vajr., Fl. Palghat Dist. 433. 1990.

Scandent shrubs; branchlets terete, smooth. Leaves 20-25 x 7-9 cm, elliptic to oblanceolate, long-acuminate at apex, base acute, dentate along the margins, glabrous; nerves 5-6 pairs, nervules parallel, prominent; petioles unequal, 0.5-3 cm long. Male racemes 5-10 cm long, shortly tomentose; flowers many, clustered; sepals 3, ovate, glabrous; stamens many; sepals in female flower 5, lanceolate. Capsules glandular stellately pubescent and clothed with soft spines.
Flowering & Fruiting: October-April.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2201,* Vythiri.

Mallotus philippensis (Lamk.) Muell.-Arg., Linnaea 34: 196. 1865; Hook. f., Fl. Brit. India 5: 442. 1887, "philippinensis"; Gamble, Fl. Pres. Madras 1322(924). 1925; Manilal & Sivar., Fl. Calicut 260. 1982; Ansari, Fl. Kasaragod Div. 342. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 422. 1988; Vajr., Fl. Palghat Dist. 433. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 408. 1996; Sivar. & P. Mathew, Fl. Nilambur 629. 1997; Mohanan & Sivad., Fl. Agasthyamala 612. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 450. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 640. 2009. *Croton philippensis* Lam., Encycl. 2: 206. 1786. *Ponnagam* Rheede, Hort. Malab. 5:41-42,t.21. 1685. *Tsjerou-ponnagam* Rheede, Hort. Malab. 5:53, t.22. 1685. *Pee-ponnagam* Rheede, Hot. Malab. 5:37, t.24. 1685.

Small trees; branchlets rusty tomentose. Leaves 16-18 x 6-8 cm, ovate, acuminate, 3-ribbed from the obtuse base, densely red-glandular beneath; nerves 6-7 pairs, nervules parallel, prominent; petiole 3-6 cm long, densely rusty puberulus. Flowers in terminal rusty puberulus panicle; male flowers ca. 0.4 cm across, sepals 3, ovate, acute, hairy; stamens many. Capsule ca. 0.7 cm across, globose, densely red-glandular; seeds 1-4, globose, glabrous, brown.
Flowering & Fruiting: October-March
Distribution: Indo-Malesia and Australia. Common; in semi-evergreen and moist deciduous forests. *RNMK 2650,* Muthanga; *RNMK 3254*, Manikkunnumala.

Mallotus resinosus (Blanco) Merr., Sp. Blancoan. 222. 1918; V. S. Ramach. & V. J. Nair, Fl. Cannanore Dist. 423. 1988; Vajr., Fl. Palghat Dist. 434. 1990; N. Mohanan & Sivad., Fl. Agasthyamala 612. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta Dist. 450. 2005. *Adelia resinosa* Blanco, Fl. Philipp. (ed. 2) 562. 1845. *Mallotus intermedius* (Baill.) Balakr., Bull. Bot. Surv. India 10: 245. 1969; Sivar. & P. Mathew, Fl. Nilambur 627. 1997. *Mallotus resinosus* (Blanco) Merr. var. *muricatus* (Wight) Balakr. & Chakrab., Rheedea 1: 39. 1991; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta Dist. 451. 2005.

Erect shrubs, branchlets rusty tomentose. Leaves 12-13 x 4-4.5 cm, oblanceolate, acuminate at apex, acute at base, distantly serrate, glandular; nerves 7-9 pairs, prominent, nervules closely parallel; petioles unequal, 0.3-1.8 cm long. Male racemes 1-4 cm long, rusty tomentose; flowers ca. 3 mm across, closely packed, tomentose. Capsule ca. 1.5 cm across, covered with curved spines and yellow glands; seeds ca. 5 mm across, globose, dull brown.
Flowering & Fruiting: December-March.
Distribution: Endemic to Peninsular India. Occasional; in evergreen forests. *RNMK 2412,* Periya.

Mallotus tetracoccus (Roxb.) Kurz, J. Asiat. Soc. Bengal Pt. 2, Nat. Hist. 41: 245. 1873; Ansari, Fl. Kasaragod Div. 342. 1985; Manilal, Fl. Silent Valley 253. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 423. 1988; Vajr., Fl. Palghat Dist. 434. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 408. 1996; Sivar. & P. Mathew, Fl. Nilambur 630. 1997; Mohanan & Sivad., Fl. Agasthyamala 613. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 451. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 641. 2009. *Rottlera tetracocca* Roxb., Fl. Ind. 3: 827. 1832. *Rottlera peltata* Wight, Ic. t. 1873. 1852. *Mallotus albus auct.*, non Muell.-Arg. 1865: Pax in Engl., Pflanzenr. IV: 147(7). 168. 1914, excl. basionym. *M.albus* var. *occidentalis* Hook. f., Fl. Brit. India 5: 429. 1887; Gamble, Fl. Pres. Madras 1321(924). 1925.

Small trees; branchlets tomentose. Leaves 17-18 x 15-16 cm, broadly ovate to orbicular, entire or shortly toothed; nerves 7-9 pairs, prominent, nervules parallel, brownish beneath; petioles unequal, 17-20 cm long. Female flowers in branched terminal panicles; sepals 5-6, ovate, stellate-tomentose; ovary

globose, densely hairy, styles 3, bifid, spreading; male flowers in groups of 3-6, sessile, sepals 4 or 5, orbicular, densely hairy; stamens many, free. Capsule ca. 1.5 cm across, 4-lobed, densely stellate hairy.
Flowering & Fruiting: July-April.
Distribution: India, Sri Lanka and China. Common; in plantations. *RNMK 4110,* Kalpetta.

MARGARITARIA Linnaeus
Suppl. 66, 428. 1782.

Margaritaria indica (Dalz.) Airy Shaw, Kew Bull. 20: 387. 1966 & Euphorb. Borneo 175. 1975. *Prosorus indicus* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 4: 346. 1852; Gamble, Fl. Pres. Madras 1294(905). 1925; Airy Shaw, Kew Bull. 16:342. 1963; Sasidh. & Sivar., Fl. Pl. Thrissur For. 408. 1996. *Phyllanthus indicus* (Dalz.) Muell.-Arg., Linnaea 32: 52. 1863; Hook. f., Fl. Brit. India 5: 305. 1887.

Deciduous dioecious trees, bark brown, smooth. Leaves bifarious, 9-10 x 4-5 cm, obovate, obtusely acuminate, glaucous beneath, membranous; lateral nerves 8 pairs; petiole ca.0.5 cm long. Male flowers fascicled, many together; perianth lobes 4, ovate, acute; stamens 4, free; pistillode clavate; female flowers solitary or a few together, axillary; pedicels 0.8-1 cm long, slender; perianth lobes 4, ovate, acute. Capsule ca. 0.8 mm across, depressed globose, 3-lobed; seeds trigonous, arillate.
Flowering & Fruiting: March-April.
Distribution: Indo-Malesia to Australia. Rare; in evergreen forests. *RNMK 0110,* Thariodu.

MICROCOCCA Bentham
in Hook. Niger Fl. 503. 1849.

Micrococca mercurialis (L.) Benth. in Hook., Niger. Fl. 503. 1849; Gamble, Fl. Pres. Madras 1328(929). 1925; Manilal & Sivar., Fl. Calicut 268. 1982; Ansari, Fl. Kasaragod Div. 344. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 410. 1996; Sivar. & P. Mathew, Fl. Nilambur 632. 1997; Mohanan & Sivad., Fl. Agasthyamala 615. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 643. 2009. *Tragia mercurialis* L., Sp. Pl. 980. 1753. *Claoxylon mercuriale* Thw., Enum. Pl. Zeyl. 271. 1861; Hook. f., Fl. Brit. India 5: 412. 1887; Susila *et al.*, Rheedea 5(2):131.1995.

Annual herbs. Leaves 3-4 x 2-2.5 cm, ovate or ovate-lanceolate, apex acuminate, base acute, serrate, puberulus, lateral nerves 4-5 pairs; petiole 2-2.5 cm. Spikes lax, slender, 4-5 cm long; bracts minute; perianth lobes of male ovate; of female 3, lanceolate. Capsule 3-lobed, ca. 0.5 cm across, glabrescent; seeds ca. 0.2 cm across.
Flowering & Fruiting: January-December.
Distribution: Tropical Africa, Arabia, India, Sri Lanka and Myanmar. Occasional; in moist deciduous forests. *RNMK 2179,* Naikuppa.

MICROSTACHYS A.Juss.

Euphorb. Gen.: 48 (1824).

Microstachys chamaelea (L.) Muell.-Arg., Linnaea 32: 95. 1863. *Tragia chamaelea* L., Sp. Pl. 981. 1758. *Sebastiana chamaelea* (L.) Muell.-Arg. in DC., Prodr. 15: 1175. 1866; Hook. f., Fl. Brit. India 5: 475. 1888; Gamble, Fl. Pres. Madras 1344(940). 1925; Ansari, Fl. Kasaragod Div. 347. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 426. 1988; Vajr., Fl. Palghat Dist. 438. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 414. 1996; Sivar. & P. Mathew, Fl. Nilambur 643. 1997; Mohanan & Sivad., Fl. Agasthyamala 621. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 456. 2005.

Erect monoecious herbs with milky latex. Leaves 4-6 x 0.7-1 cm, alternate, linear-oblong, apex obtuse, mucronate, base acute, glabrous. Male flowers in short axillary raceme, minute; bracts ovate, carries 1-3 flowers; sepals 4 or 5, ovate, ciliate; stamens 4 or 5, free; female flowers solitary, axillary; sepals 4 or 5, larger than male flowers, oblong, ciliate; styles 3, recurved, glabrous. Capsule ca. 0.6 cm across, 3-lobed, cocci with 2 vertical rows of tubercles; seeds 3, oblong, smooth.

Flowering & Fruiting: July-December.

Distribution: Indo-Malesia to Australia. Occasional; in moist deciduous forests. *RNMK 1739,* Naikuppa.

PARACROTON Miquel

Fl. Ind. Bat. 1(2): 382. 1859.

Trees. Branches lepidote or stellate-pubescent. Leaves alternate, entire or serrate; petioles biglandular at apex. Male inflorescence terminal, axillary or rarely leaf-opposed; flowers fascicled on a long, often pendulous rachis; calyx 5-lobed; petals 5, white; disc glands 5-10; stamens 12-32, outer free, inner united; female inflorescence terminal, thyrsoid or racemose; flowers 1-3 at each node; ovary 3 loculed with a single ovule in each; styles 3, bifid. Capsules subglobose.

1. Flowers fascicled; stamens 10-20..... **P. integrifolius**
1. Flowers in racemes; stamens many ..... **P. pendulus** ssp. **zeylanicus**

Paracroton integrifolius (Airy Shaw.) Balakr. & Chakrab., Kew Bull. 48: 718. 1993; Sivar. & P. Mathew, Fl. Nilambur 632. 1997. *Ostodes integrifolius* Airy Shaw, Kew Bull. 16: 362. 1963. *Ostodes zeylanicum* var. *minor* sensu Gamble, Fl. Pres. Madras 1336(935). 1925, non (Thw.) Hook.f. 1887. *Fahrenheitia integrifolia* (Airy Shaw) Airy Shaw, Kew Bull. 20: 410. 1966; V. S. Ramach. & V.J. Nair, Fl. Cannanore 417. 1988.

Medium trees. Leaves 10-16 x 4-7 cm, broadly elliptic, apex acuminate, distantly serrulate or entire. Racemes pubescent 20-23 cm; flowers fascicled, pale yellow; male tepals ovate, biseriate; stamens 10-20, filaments partially united; female tepals equal, ovary glabrous ca. 0.4 cm across, strigose, styles 2, short. Capsule 1.5-2 cm across, tomentose.

Flowering & Fruiting: November-December.
Distribution: Peninsular India and Sri Lanka. Occasional; in evergreen forests. *RNMK 1536,* Chanthanathodu.

Paracroton pendulus (Hassk.) Miq. ssp. **zeylanicus** (Thw.) Balakr. & Chakrab., Kew Bull. 48: 719. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 411. 1996; Sivar. & P. Mathew, Fl. Nilambur 633. 1997. *Desmostemon zeylanicus* Thw., Enum. Pl. Zeyl. 278. 1861. *Ostodes zeylanica* (Thw.) Muell.-Arg., Linnaea 34: 214. 1865; Hook. f., Fl. Brit. India 5: 400. 1887; Gamble, Fl. Pres. Madras 1336(934). 1925. *Fahrenheitia zeylanica* (Thw.) Airy Shaw, Kew Bull. 20: 410. 1966; Manilal, Fl. Silent Valley 250. 1988; Vajr., Fl. Palghat Dist. 429. 1990. **Plate 28a.**

Large shrubs. Leaves alternate, 10-12 x 5-6 cm, obovate, acuminate, glabrous; nerves 6-8 pairs, nervules horizontal. Flowers in elongate pendulous racemes; male flowers 3-8 together, clustered, shortly pedicellate; bracts ovate, ciliate; sepals 5, equal, ca. 2 mm long, ovate, glabrous, acute; petals 5, longer than calyx lobe, white; stamens many, filaments free; ovary 3-celled, ovule one in each cell; styles 3. Fruit a globose capsule, ca. 3 cm across, rusty tomentose.
Flowering & Fruiting: August-December.
Distribution: South western Ghats and Sri Lanka. Occasional; in evergreen forests. *RNMK 3295,* Kallady-900 forest.

PHYLLANTHUS Linnaeus

Sp. Pl. 981. 1753.

Herbs, shrubs or small trees. Leaves alternate, distichous, usually on lateral branchlets. Flowers monoecious, solitary or in axillary fascicles; perianth uniseriate, calyx lobes 5 or 6, imbricate, entire; stamens 3-6, filaments free or united at base; ovary 3-celled, ovules 2 in each cell; styles 3, free or connate at base, 2-fid, spreading. Fruit a dehiscent or indehiscent capsule; seeds 6, trigonous, smooth or rugose.

1. Trees; stamens 3 2
1. Erect or scandent shrubs; stamens 5 ..... **P. reticulata**
1. Fruits baccate 3
2. Fruits capsular 4
3. Leaves on the branchlets less than 1 cm long ..... **P. emblica**
3. Leaves on the branchlets more than 1.5 cm long ..... **P. indofisheri**
4. Perennials with woody root stock; stem many 5
4. Annuals; stem single 6
5. Leaves reddish; capsules densely muricate ..... **P. urinaria**
5. Leaves green; capsules smooth ..... **P. amarus**
6. Fruting perianth smaller than capsule 7
6. Fruting perianth as long as capsule 8
7. Leaves acuminate, unequal sided, glaocous beneath ..... **P. megacarpus**
7. Leaves acute, equal sided, membraneous beneath ..... **P. rheedii**

8. Leaves under 0.5 cm broad; capsule 2-3 mm across..... **P. airy-shawii**
8. Leaves 0.6-1cm broad; capsules 4-5 mm across ..... **P. kozhikodianus**

Phyllanthus airy-shawii Brunel & Roux, Nordic J. Bot. 4:470.1984; Sasidh. & Sivar., Fl. Pl. Thrissur For. 412. 1996. *Phyllanthus deblis* sensu Hook. f., Fl. Brit. India 5: 299. 1887; Gamble, Fl. Pres. Madras 1290(903). 1925; Airy Shaw, Kew Bull.26:92. 1971, non Klein ex Willd. 1805; Sivarajan & Indu Balachandran in Ancient Sci. Life 4(2): 103-105. 1984; Manilal & Sivar., Fl. Calicut 264. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 424. 1988; Sivar. & P. Mathew, Fl. Nilambur 635. 1997; Mohanan & Sivad., Fl. Agasthyamala 617. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 453. 2005.

Erect herbs, 35-40 cm tall. Leaves elliptic or elliptic-oblong, obtuse or acute, base rounded, 1.5-2 x 0.3-0.4 cm; stipules lanceolate, acuminate. Perianth oblong, obtuse. Capsule globose, smooth, 0.2-0.3 cm across; seeds trigonous, longitudinally striate.

Flowering & Fruiting: July-January.

Distribution: Peninsular India and Sri Lanka. Occasional; in moist deciduous forests. *RNMK 2504,* Pathiriyambam.

Phyllanthus amarus Schum. & Thonn. Kongl. Danske Vidensk.- Selsk. Skr. 4: 195. 1829; Airy Shaw, Euphorb. Borneo 182. 1975; Manilal & Sivar., Fl. Calicut 264. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 424. 1988; Vajr., Fl. Palghat Dist. 435. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 412. 1996; Sivar. & P. Mathew, Fl. Nilambur 635. 1997; Mohanan & Sivad., Fl. Agasthyamala 616. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 452. 2005. *Phyllanthus fraternus* Webster, Contrb. Gray Herb. 176. 53.1955; Ansari, Fl. Kasaragod Div. 345. 1985. *Phyllanthus niruri* auct., non L. 1753, Wt., Ic. t. 1894. 1852; Hook. f., Fl. Brit. India 5: 298. 1887; Gamble, Fl. Pres. Madras 1290(903). 1925.

Erect glabrous herbs, 20-25 cm tall; leafy branchlets 3-4 cm long. Leaves 0.8-1 x 0.3-0.4 cm, oblong, obtuse, chartaceous, base unequal sided; nerves indistinct, glaucous beneath, stipule not peltate, lanceolate. Female flowers solitary; pedicels ca. 0.2 cm long; sepals 5, oblong, obtuse with hyaline margins, glabrous; stamens 3, filaments connate; disc-glands 5. Capsule ca. 0.2 cm across, smooth; seeds trigonous, prominently 6-ridged on outer face, rugose along concentric lines on lateral faces.

Flowering & Fruiting: June-October.

Distribution: Originally from America; now naturalised in the tropics. Occasional; in plantaions. *RNMK 2198,* Puthoorvayal.

Phyllanthus emblica L., Sp. Pl. 982. 1753; Hook. f., Fl. Brit. India 5: 289. 1887; Airy Shaw, Kew Bull. 26:319. 1972; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 114. 1988; Manilal & Sivar., Fl. Calicut 262. 1982; Manilal, Fl. Silent Valley 253. 1988; Vajr., Fl. Palghat Dist. 436. 1990; Sasidh.

& Sivar., Fl. Pl. Thrissur For. 412. 1996; Sivar. & P. Mathew, Fl. Nilambur 636. 1997; Mohanan & Sivad., Fl. Agasthyamala 617. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 453. 2005. *Emblica officinalis* Gaertn., Fruct. 2: 122. 1791; Wiight, Ic.t. 1896. 1852; Gamble, Fl. Pres. Madras 1295(906). 1925; V. S. Ramach. & V.J. Nair, Fl. Cannanore 414. 1988. *Nilicamaram* Rheede, Hort. Malab. 1:69-70., t.38. 1678.

Small to medium trees; leafy branchlets 8-18 cm long, villous. Leaves 1-1.2 x 0.25-0.5 cm, numerous on lateral branchlets, oblong, obtuse, shortly apiculate, glabrous; nerves indistinct; stipules lanceolate, ciliate. Flowers densely clustered in leaf axils, pedicelled; sepals in male flowers 6, oblong, glabrous; stamens 3, filaments combined into a column; disc-glands 6; female sepals 6, oblanceolate, styles recurved. Capsule 1-2.5 cm across, subglobose, fleshy, dehiscing into 6 cocci on drying; seeds trigonous.

Flowering & Fruiting: February-May.

Distribution: Throughout the tropics. Common; in moist deciduous and semi-evergreen forests. *RNMK 1436,* Muthanga; *RNMK 2568*, Pozhuthana; *RNMK 2504*, Thirunelli.

Phyllanthus indofischeri Bennet, Indian For. 109: 221. 1983; Sasidh., Zoo's Print J. 16: 407. 2001. *Emblica fischeri* Gamble, Bull. Misc. Inform. Kew 1925: 330. 1925; Gamble, Fl. Pres. Madras 1295(906). 1925, non Pax 1894. **Plate 28b & 28c.**

Small trees; branches pale brown, rough. Leaves on the branchlets many, up to about 50, elliptic-oblong, rounded or retuse at apex, 1.5-2 x 0.5–0.7 cm. Glands in male flowers larger; style-arms in female slender, usually twice bifid, recurved.

Flowering & Fruiting: September-January.

Distribution: Endemic to southern Western Ghats. Rare; in deciduous forests. *RNMK 2657,* Maragatha.

Phyllanthus kozhikodianus Sivar. & Manilal, J. Indian Bot. Soc. 56. 165. 1977; Manilal & Sivar., Fl. Calicut 264. 1982; Manilal, Fl. Silent Valley 254. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 413. 1996; Sivar. & P. Mathew, Fl. Nilambur 639. 1997.

Erect herbs, 40-50 cm high; leafy branchlets 8-10 cm long, 3-winged. Leaves 1-2 x 0.8-1 cm, obovate, obtusely acute, chartaceous, glaucous below; nerves 4-6 pairs; stipule lanceolate, acuminate. Female flowers axillary, solitary; sepals 6, equal, obovate, obtuse with white margins; disk 6-lobed; styles 3, spreading; male flowers in axillary fascicles; sepals 5, acute; stamens 3. Capsule ca. 0.3 cm across, smooth, subglobose; seeds trigonous, 5-striated on outer face.

Flowering & Fruiting: July-October.

Distribution: Western Ghats and east Himalayas. Common; in evergreen forests. *RNMK 2543,* Sughandhagiri; *RNMK 1436*, Thalimala.

Phyllanthus megacarpus (Gamble) Kumari & Chadrab. in Henry *et al.*, Fl. Tamil Nadu ser. 1. 2: 235. 1987. *Reidia megacarpa* Gamble, Bull. Misc. Inform. Kew 1925: 332. 1925 & Gamble, Fl. Pres. Madras 1292(904). 1925.

Glabrous undershrubs. Leaves 5-7 x 3-4 cm, ovate-lanceolate, acuminate, unequal-sided. Flowers few; male flowers in lower axils; female flowers near the ends of the branches; calyx-lobes of male flower orbicular-ovate, dentate; of female flowers slightly toothed; disk of female flowers cushion-shaped. Capsule large; seeds appressed-hairy.

Flowering & Fruiting: December-February.

Distribution: Endemic to southern Western Ghats. Occasional; in moist deciduous forests. *RNMK 3079,* Kuruva.

Phyllanthus reticulatus Poiret in Lam., Encycl. 5: 298. 1804; Hook. f., Fl. Brit. India 5: 288. 1887; Airy Shaw, Euphorb. Borneo 185. 1975; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 115. 1988; Manilal & Sivar., Fl. Calicut 262. 1982; Ansari, Fl. Kasaragod Div. 345. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 413. 1996; Sivar. & P. Mathew, Fl. Nilambur 639. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 454. 2005. *Kirganelia reticulata* (Poiret) Baillon, Etude Gen. Euphorb. 613. 1858; Gamble, Fl. Pres. Madras 1294(905). 1925; V. S. Ramach. & V.J. Nair, Fl. Cannanore 421. 1988; Vajr., Fl. Palghat Dist. 432. 1990. *Anisonema multiflora* Wight, Ic. t. 1899. 1852.*Katou-nirouri* Rheede, Hort. Malab. 5:87, t. 44. 1685.

Densely branched shrubs, branchlets rough, villous, reddish brown. Leaves 2-3 x 1-1.3 cm, elliptic-oblong, obtusely acute, entire, glabrous, shortly petiolate; stipule lanceolate, sometimes spinescent. Male flowers fascicled on leaf axils; sepals 5, unequal, orbicular, reddish; stamens 5, outer filaments free, inner ones combined; disc glands 5; female flowers solitary, sepals 5, shortly connate, ovary globose; disc glands 5. Capsule ca. 0.4 cm across, dark blue, globose, fleshy; seeds trigonous, brown, reticulate.

Flowering & Fruiting: August-December.

Distribution: Paleotropics. Occasional; in moist deciduous forests. *RNMK 1779,* Kuruva; *RNMK 2177*, Baveli.

Phyllanthus rheedei Wight, Ic. t. 1895. f. 1. 1852; Hook. f., Fl. Brit. India 5: 293. 1887; Gamble, Fl. Pres. Madras 1289(902). 1925; V. S. Ramach. & V.J. Nair, Fl. Cannanore 425. 1988; Vajr., Fl. Palghat Dist. 436. 1990; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 454. 2005.

Woody herbs, 50-60 cm high; stems glabrous. Leaves 1-2.5 x 0.6-1.5 cm, obovate, obtusely acute, distant on lateral branchlets, glaucous beneath; nerves 7-9 pairs, stipules lanceolate, acuminate; petiole ca. 0.2 cm long. Flowers solitary or fascicled; male flowers subsessile, sepals 6, obovate, obtuse, green with narrow white margins, glabrous; disc 5-lobed; female flowers solitary, long pedicelled, ovary globose, styles 3, bifid, radiating. Capsule ca. 0.5 cm across, glabrous, smooth; seeds trigonous, longitudinally striate with minute cross bars.

Flowering & Fruiting: November-January.
Distribution: India and Sri Lanka. Occasional; in open wet areas. *RNMK 0143,* Kalpetta.

Phyllanthus urinaria L., Sp. Pl. 982. 1753; Hook. f., Fl. Brit. India 5: 293. 1887; Gamble, Fl. Pres. Madras 1289(902). 1925; Webster & Airy Shaw, Kew Bull. 26:91. 1971; Manilal & Sivar., Fl. Calicut 266. 1982; Ansari, Fl. Kasaragod Div. 345. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 425. 1988; Vajr., Fl. Palghat Dist. 437. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 413. 1996; Sivar. & P. Mathew, Fl. Nilambur 640. 1997; Mohanan & Sivad., Fl. Agasthyamala 619.2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 455. 2005. *Phyllanthus leprocarpus* Wight, Ic. t. 1895. f. 4. 1852.

Erect herbs, 25-30 cm high, leafy branchlets scabrid, 6-7 cm long. Leaves 0.7-1.5 x 0.4-0.7 cm, oblong, obtuse, pinkish, serrulate, sessile; nerves 4-6 pairs, stipule ovate, cordate at base, acuminate. Flowers subsessile, axillary, fascicled; male flowers in upper leaf axils, sepals 5 or 6, oblong or orbicular, obtuse; disk 6-lobed, female flowers in lower leaf axils, sepals 6, oblong; disc annular. Capsule ca. 0.3 cm across, depressed globose, coarsely verrucose; seeds 6, transversally prominently ridged.
Flowering & Fruiting: June-October.
Distribution: Native of tropical east Asia; now a circumtropical weed. Common in open areas and bunds of paddy fields. *RNMK 3456,* Puthoorvayal; *RNMK 2507*, Neervaram.

Phyllanthus virgatus Forster f., Ins. Austr. Prod. 65. 1786; Airy Shaw, Kew Bull. 26:325. 1972; Nicols., Suresh & Manilal, An Interpr. Hort. Malb. 115. 1988; Manilal & Sivar., Fl. Calicut 264. 1982; Ansari, Fl. Kasaragod Div. 346. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 425. 1988; Vajr., Fl. Palghat Dist. 437. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 413. 1996; Sivar. & P. Mathew, Fl. Nilambur 641. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 455. 2005. *Phyllanthus simplex* Retz., Obs. Bot. 5: 29. 1788; Hook. f., Fl. Brit. India 5: 295. 1887; Gamble, Fl. Pres. Madras 1289(902). 1925. *Phyllanthus oblongifolia* Wight, Ic. t. 1902, f.1. 1852. *Niruri, Nirpulla* Rheede, Hort. Malab. 10:53, t27. 1690.

Erect woody herbs 60-70 cm high, glabrous; leafy branchlets scabrous. Leaves 1-1.8 x 0.4-0.6 cm, 21-30 pairs on lateral branchlets, oblong, acute at either ends, serrulate; nerves 8-10 pairs; petiole ca. 0.1 cm long; stipule ovate, cordate at base, decurrent on either sides. Female flowers sessile, solitary; sepals 5 or 6, ovate, acute; male flowers solitary, subsessile; sepals ovate, stamens 3, free; disc glands 6. Capsule ca. 0.3 cm across, rugose; seeds 6, trigonous, transversally strongly ridged connected with minute parallel crossbars.
Flowering & Fruiting: Throughout the year.
Distribution: Indo-Malesia to Polynesia and China. Occasional; in moist deciduous forests. *RNMK 0135,* Kuruva.

RICINUS Linnaeus

Sp. Pl. 1007. 1753.

Ricinus communis L., Sp. Pl. 1007. 1753; Hook. f., Fl. Brit. India 5: 457. 1887; Gamble, Fl. Pres. Madras 1335(933). 1925; Manilal & Sivar., Fl. Calicut 258. 1982; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 118. 1988; Manilal, Fl. Silent Valley 254. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 426. 1988; Vajr., Fl. Palghat Dist. 440. 1990; Sivar. & P. Mathew, Fl. Nilambur 641. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 455. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 650. 2009. *Avanacu, Citavanacu, Pandi-avanacu* Rheede, Hort. Malab. 2:57-60, t.32.1679.

Shrubs, stem glaucous. Leaves alternate, 35-40 cm across, peltate, palmately 6-9-lobed, lobes lanceolate, serrate; nerves palmate, strongly reticulate; petiole 17-20 cm long; stipule sheathing, large. Flowers monoecious, in long terminal racemes; male flowers at the base of the raceme, ca. 0.7 cm across; sepals 9, ovate; stamens many, free; female flowers terminal in the racemes, many, sepals similar to male flowers; ovary densely bristly; styles 3, free, bifid, reddish. Capsule 1-1.2 cm across, 3-valved; seeds oblong, carunculate, mottled with white and brown.

Flowering & Fruiting: May-June.

Distribution: Native of tropical Africa; now cultivated throughout tropics. Common; along roadsides. *RNMK 1428*, Kambalakkad; *RNMK 3295*, Puthoorvayal.

SAUROPUS Blume

Bijdr. 595. 1825-1826.

Shrubs. Leaves alternate, bifarious, on lateral branchlets, entire. Flowers monoecious, clustered or solitary, axillary, pedicelled; perianth uniseriate, 6 lobed; lobes in male flower ovate, united, urceolate; female sepals orbicular, spreading, accrescent; stamens 3, filaments united into a column; anthers linear, erect; ovary 3-celled, globose, glabrous, concave at apex; ovule 2 in each cell, styles 3, free, 2-fid. Fruit a globose, capsule fleshy, 6-valved; seeds 6, trigonous.

1. Leaves to 2.5 cm long, obtuse at apex ..... **S. quadrangularis**
1. Leaves more than 5 cm long, acuminate at apex.....2
2. Fruits 2-2.5 cm across ..... **S. saksenianus**
2. Fruits 1 cm across..... **S. androgynus**

Sauropus androgynus (L.) Merr., Bull. Bur. Forest. Philipp. Islands 1: 30. 1903; Gamble, Fl. Pres. Madras 1303(911). 1925; Manilal & Sivar., Fl. Calicut 261. 1982; V. S. Ramach. & V.J. Nair, Fl. Cannanore 426. 1988; Vajr., Fl. Palghat Dist. 438. 1990; Chakrab. & Gangop., J. Econ. Tax. Bot. 20: 519. 1996; Sivar. & P. Mathew, Fl. Nilambur 643. 1997; Mohanan & Sivad., Fl. Agasthyamala 621. 2002; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 456. 2005. *Clutia androgyna* L., Mant. Pl. 1: 128. 1767. *Sauropus albicans* Bl.,

Bijdr. 596. 1826; Hook. f., Fl. Brit. India 5: 332. 1887. *Sauropus indicus* Wight, Ic. t. 1952. f.2. 1853.

Erect shrubs; branchlets glabrous. Leaves 3-6 x 1-2.5 cm, ovate-lanceolate, truncate at base, glaucous below, glabrous; nerves 4-6 pairs, prominent below; petiole very short, slender; stipules lanceolate. Male flowers greenish-yellow with reddish centre; female flowers solitary, brownish, axillary; pedicel ca.1 cm long. Capsule ca. 1 cm across, sessile, white with reddish tinge, glabrous.
Flowering & Fruiting: August-December.
Distribution: Indo-Malaya. Occasional; in evergreen forests. *RNMK 1142,* Periya.

Sauropus quadrangularis (Willd.) Muell.-Arg., Linnaea 32: 73. 1863; Hook. f., Fl. Brit. India 5: 335. 1887; Gamble, Fl. Pres. Madras 1303(911). 1925; Manilal & Sivar., Fl. Calicut 261. 1982; Ansari, Fl. Kasaragod Div. 347. 1985; Vajr., Fl. Palghat Dist. 438. 1990; Chakrab. & Gangop., J. Econ. Tax. Bot. 20: 534. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 414. 1996; Sivar. & P. Mathew, Fl. Nilambur 642. 1997. *Phyllanthus quadrangularis* Willd., Sp. Pl. 4: 585. 1805. *Sauropus compressus* Muell.-Arg in DC., Prodr. 15: 243. 1866; Hook. f., Fl. Brit. India 5: 336. 1887; Chakrab. & Gangop., J. Econ. Tax. Bot. 20: 526. 1996.

Subshrubs. Leaves subsessile, broadly elliptic, acute, base rounded, 1.5-2 x 1-1.5 cm long; lateral nerves 5-7 pairs, slender. Perianth of female flowers membranous, broadly obovate or orbicular, apiculate. Capsule yellowish.
Flowering & Fruiting: Throughout the year.
Distribution: Indo-Malaya. Occasional; in evergreen forests. *RNMK 2671,* Vythiri.

Sauropus saksenianus Manilal, Prasann. & Sivar., J. Indian Bot. Soc. 64: 294. 1985; Manilal, Fl. Silent Valley 255. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 414. 1996; Chakrab. & Gangop., J. Econ. Tax. Bot. 20: 531. 1996; Biju in Manoharan *et al.*, Silent Valley-Whispers Reason 170. 1999; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 456. 2005.

Large shrubs. Leaves shortly petiolate, oblong lanceolate, apex acuminate, mucronate, base truncate-cuneate, glabrous, glaucous below, lateral nerves 6-8 pairs, stipules ca. 0.5 cm long. Flowers solitary; perianth lobes of male flowers oblong, unequal, greenish yellow, obovoid, female flowers brownish, sepals unequal, inner 3 smaller, ovate-rounded, imbricating. Capsule white, depressed obovoid, ca. 2 x 2.5 cm; seeds trigonous, smooth
Flowering & Fruiting: March-October.
Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 1144,* Kurichairmala.

TRAGIA Linnaeus

Sp. Pl. 980. 1753.

Twining herbs with stinging hairs. Leaves alternate, simple or palmately 3-lobed, serrate, petiolate; stipules large, entire, deciduous. Flowers

monoecious, in androgynous racemes; female flowers few, basal; sepals 6, pinnatifid, imbricate; ovary 3-celled, ovule 1 in each cell; style 1, 3-fid at apex; male flowers towards the upper part of the racemes, smaller; sepals 3-5, obovoid; stamens 3, filaments free or connate. Fruit a capsule, 3-lobed; seeds 3, globose.

1. Stem densely hispid; leaves cordate at base..... **T. bicolor**
1. Stem not densely hispid; leaves acute or rounded at base..... **T. involucrata**

Tragia bicolor Miq., Linnaea 26: 222. 1853; Hook. f., Fl. Brit. India 5: 465. 1888; Gamble, Fl. Pres. Madras 1332(932). 1925; V. S. Ramach. & V.J. Nair, Fl. Cannanore 427. 1988.

Densely hispid twiners, young parts fulvous-tomentose. Leaves 13-15 x 7-8 cm, ovate, acuminate, cordate at base, regularly serrate, densely hispid below, sparsely above; lateral nerves 5-6 pairs, nervules reticulate; stipule ca. 0.8 cm long, lanceolate, acuminate, 1 or 2-toothed on sides, ciliate. Racemes 7-8 cm long, hispid; bracts lanceolate, glandular-ciliate; pedicels ca. 0.3 cm long, glandular-hispid; male flowers ca. 0.3 cm across; sepals 3, orbicular, glabrous; stamens 3, filaments free. Capsules ca. 1 cm across, tomentose.
Flowering & Fruiting: November-February. *Distribution*: South India. Rare; in evergreen forests. *RNMK 1265,* Mundakai.

Tragia involucrata L., Sp. Pl. 980. 1753; Hook. f., Fl. Brit. India 5: 465. 1888, p.p.; Gamble, Fl. Pres. Madras 1332(931). 1925; Manilal & Sivar., Fl. Calicut 267. 1982; Ansari, Fl. Kasaragod Div. 348. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 118. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 427. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 415. 1996; Sivar. & P. Mathew, Fl. Nilambur 645. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 458. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 652. 2009. *Schorigenam* Rheede, Hort.Malab. 2: 73-74, t.39. 1679. *Valli-schorigenam* Rheede, Hort. Malab. 2:79. 1679.

Twining herbs. Leaves 7-10 x 4-6.5 cm, ovate or elliptic, apex caudate-acuminate, base acute or rounded, serrate, hispidulous, lateral nerves 6-8 pairs, basal pair opposite; petiole 2.5-3 cm long. Spikes 2-3 cm long; bract of male flowers spathulate; female flowers ebracteate, perianth lobes hairy. Capsule ca. 0.6 x 1 cm, hispid.
Flowering & Fruiting: July-December.
Distribution: India and Sri Lanka. Occasional; in evergreen forests. *RNMK 2067,* Makkimala.

TREWIA Linnaeus
Sp. Pl. 1193. 1753.

Trewia nudiflora L., Sp. Pl. 1193.1753; Hook. f., Fl. Brit. India 5: 425. 1887; Gamble, Fl. Pres. Madras 1319(922). 1925; Airy Shaw in Kew Bull. 26: 243. 1972; Wight, Ic. t. 1871. 1852; Manilal & Sivar., Fl. Calicut 271. 1982; Ansari,

Fl. Kasaragod Div. 348. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 428. 1988; Vajr., Fl. Palghat Dist. 440. 1990; Sivar. & P. Mathew, Fl. Nilambur 645. 1997; Anil Kumar, Sivad. & N. Ravi., Fl. Pathanamthitta 459. 2005.

Medium dioecious trees; bark yellowish, smooth; branchlets glabrous. Leaves opposite, 16-18 x 10-12 cm, broadly ovate, acuminate at apex, cordate at base, nerves 3 from the base; petioles unequal, 3-12 cm long. Male flowers in ca. 15 cm long racemes, appears along with new leaves, ca. 0.5 cm across, sepals 5, united; stamens many, free; female flowers axillary, solitary or paired, pedicels 4-5 cm long; calyx lobes truncate, tomentose; ovary densely stellate-tomentose, 3 locular; styles 3, connate below, ca. 2 cm long, papillose. Capsule 2-3 cm across, globose, tomentose; seeds 3, ovoid.

Flowering & Fruiting: May-November.

Distribution: Indo-Malesia. Common; in moist deciduous and semi-evergreen forests. *RNMK 1207,* Muthanga; *RNMK 3105*, Manikkunnumala.

Hevea braziliensis (Willd. ex A. Juss.) Muell.-Arg. and **Manihot esculenta** Crantz. are now widely cultivated in the district. **Jatropha gossypifolia** L. and **Manihot glaziovii** Muell.-Arg. are often grown along fences and also running wild in the district. **Jatropha multifida** L. and **Phyllanthus acidus** (L.) Skeels are often cultivated in homesteads.

URTICACEAE Juss.

Gen. Pl. 400. 1789.

1. Leaves 3-7 lobed; stipule foliaceaous..... **Girardinia**
1. Leaves not lobed; stipules lanceolate or inconspicuous 2
2. Female flowers aggregated on fleshy receptacle 3
2. Female flowers not aggregated on fleshy receptacle 5
3. Leaves opposite; receptacle long peduncled..... **Lecanthus**
3. Leaves alternate; receptacle sessile or shortly peduncled..... 4
4. Male and female flowers on fleshy receptacle..... **Elatostema**
4. Male flowers in cymes; female aggregated on receptacle ..... **Procris**
5. Leaves opposite or opposite and alternate 6
5. Leaves alternate..... 7
6. Fruiting perianth wingless ..... **Pilea**
6. Fruiting perianth winged..... **Pouzolzia**
7. Leaf base unequally cordate, 3-ribbed, entire..... **Pellionia**
7. Leaf base equal, penninerved, dentate, serrate or sub-entire..... 8
8. Flowers in lax paniculate cymes or fascicled on long interrupted spikes..... 9
8. Flowers on globose heads in short cymes 10
9. Herbs; leaves serrate or dentate ..... **Laportea**
9. Shrubs or small trees; leaves entire or subentire..... **Dendrocnide**
10. Leaves white tomentose below ..... **Debregeasia**
10. Leaves not white tomentose ..... **Boehmeria**

BOEHMERIA Jacquin

Enum. Pl. Carib. 9. 1760.

Boehmeria glomerulifera Miq. in Zoll., Syst. Veg. Ind. Archip. 101,104. 1854; Manilal & Sivar., Fl. Calicut 280. 1982; Ansari, Fl. Kasaragod Div. 359. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 435. 1988; Vajr., Fl. Palghat Dist. 451. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 417. 1996; Sivar. & P. Mathew, Fl. Nilambur 647. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 468. 2005. *Boehmeria malabarica* Wedd., Arch. Mus. Hist. Nat. 8: 355. 1855-56; Hook. f., Fl. Brit. India 5: 575. 1888; Fischer in Gamble, Fl. Pres. Madras 1387(970). 1928.

Shrubs, 1.5-2 m high; stem pilose. Leaves 15-18 x 7-8 cm, ovate, acuminate, serrulate, base rounded, pubescent below, glabrous above; lateral nerves 5-6 pairs, lowest pairs opposite, rib-like; petiole ca. 5 cm long. Flowers 10-20 together, axillary; male flowers 2-3 mm across; perianth lobes 4, united below, glabrous; stamens 4, free; female perianth lobes 4 or 5, hispid. Achenes obovoid, glabrous, stigma, persistent.

Flowering & Fruiting: April-May.

Distribution: Indo-Malesia. Occasional; in semi-evergreen forests. *RNMK 2661,* Manikkunnumala.

DEBREGEASIA Gaudichaud-Beaupre

Voyage Bonite Bot. Atlas t. 90. 1844.

Shrubs or trees. Leaves alternate, 3-ribed, punctuate; stipule intra-petiolar, connate. Inflorescence globose spikes, sessile or panicled. Flowers monoecious or dioecious, densely arranged; male perianth lobes 4, free, valvate; female perianth tubular, minutely toothed; stamens 4; pistillode ellipsoid; ovary 1-celled; included; ovule solitary, basal; stigma penicillate. Achene ellipsoid, covered by fleshy perianth.

1. Leaves orbicular; spikes paniculate..... **D. wallichiana**
1. Leaves linear or oblong-lanceolate; spikes cymose.....**D. longifolia**

Debregeasia longifolia (Burm. f.) Wedd. in DC., Prodr. 16:235. 1869; Manilal, Fl. Silent Valley 261. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 436. 1988; Vajr., Fl. Palghat Dist. 451. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 418. 1996; Sivar. & P. Mathew, Fl. Nilambur 648. 1997. *Urtica longifolia* Burm. f., Fl. Ind. 197. 1768. *Debregeasia velutina* Gaud., Voy. Bonite Bot. t. 90. 1844-46; Hook. f., Fl. Brit. India 5: 590. 1888; Fischer in Gamble, Fl. Pres. Madras 1389(971). 1928; Mohanan & Sivad., Fl. Agasthyamala 639. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 469. 2005. *Conocephalus niveus* Wight, Ic. t. 1959. 1853.

Shrubs; branchlets slender, densely shaggy-pubescent. Leaves 14-16 x 4.5-5 cm, ovate to oblong-lanceolate, acuminate, base acute or obtuse, serrulate, 3-ribbed, midrib with 4 pairs of lateral nerves, nervules reticulate, densely white tomentose below, scabrous above; petiole 3-4 cm long; stipules linear-lanceolate. Spike 4-6 mm across; peduncles 5-6 mm long; bracts and

bracteoles ovate, ciliate; male perianth lobes 4, free, ovate, densely woolly; stamens 4, free; fruiting perianth orange-yellow.
Flowering & Fruiting: December-April.
Distribution: Indo-Malesia. Common; in evergreen forests. *RNMK 3291,* Kallady; *RNMK 2816*, Vythiri.

Debregeasia wallichiana (Wedd.) Wedd., Monogr. Utric. 464, t. 14. 1857; Hook. f., Fl. Brit. India 5: 591. 1888. *Missiessya wallichiana* Wedd., Ann. Sci. Nat. Bot. ser. 4, 1: 195. 1854. *Debregeasia ceylanica* Hook.f., Fl. Brit. India 5: 592. 1888; Fischer in Gamble, Fl. Pres. Madras 1389(972). 1928; Manilal, Fl. Silent Valley 261. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 436. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 417. 1996; Sivar. & P. Mathew, Fl. Nilambur 648.1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 469.2005.

Small trees; branchlets stout. Leaves 20-25 cm across, subentire, densely white-tomentose beneath, base rounded, 3-ribbed, secondary nerves 8-11 pairs, curved below the margins, nervules prominent, parallel, regular; petiole 12-15 cm long; stipule ovate, bifid above. Spike 6-8 mm across, globose; peduncled; female flowers densely packed; perianth tubular, narrowed at apex, 3-5 toothed. Achenes ellipsoid, ribbed.
Flowering & Fruiting: May-June.
Distribution: Western Ghats and Sri Lanka. Occasional; in evergreen forests. *RNMK 2237,* Vythiri.

DENDROCNIDE Miquel
Pl. Jungh. 29. 1851.

Dendrocnide sinuata (Blume) Chew, Gard. Bull. Singapore 21: 206. 1965; Sasidh. & Sivar., Fl. Pl. Thrissur For. 418. 1996; Sivar. & P. Mathew, Fl. Nilambur 649. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 469. 2005. *Urtica sinuata* Bl., Bijdr. 505. 1826. *Urtica crenulata* Roxb., Fl. Ind. 3: 591.1832; Wight, Ic. t. 686. 1840. *Laportea crenulata* (Roxb.) Gaud. in Freye., Voy. Bont. Bot. 498. 1826; Hook. f., Fl. Brit. India 5: 550. 1888; Gamble, Fl. Pres. Madras 1373(961). 1928; Manilal, Fl. Silent Valley 263. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 438. 1988; Vajr., Fl. Palghat Dist. 453. 1990; Mohanan & Sivad., Fl. Agasthyamala 642. 2002. **Plate 28d.**

Large shrubs to small trees; branchlets terete, white, covered with soft stinging hairs. Leaves 16-20 x 8-10 cm, elliptic to oblong-lanceolate, acute at either ends, entire or crenate, lateral nerves 9-11 pairs; petiole 6-7 cm long. Inflorescence axillary, peduncled cymes, branches dichotomous, 16-20 x 18-20 cm; flowers monoecious or dioecious; male perianth lobes 4 or 5, ovate, cupular; female perianth lobes 4, ovate, free, pubescent; stamens 4, free; pistillode clavate; ovary 1-celled, ovules solitary; style puberulus, persistent. Achenes 6-7 mm, ovoid, white, glabrous.
Flowering & Fruiting: November-December.
Distribution: Peninsular India and Sri Lanka. Occasional; in evergreen forests. *RNMK 2695,* Chembra; *RNMK 3214*, Periya Ghat.

ELATOSTEMA J. R. & J. G. A. Forster

Charact. Gen. 105. 1776, *nom. cons.*

Herbs or subshrubs. Leaves alternate, distichous, unequal at base and above, 3-ribbed from base, sessile or subsessile. Flowers monoecious or dioecious, crowded on involucrate receptacle; receptacle unisexual, sessile or peduncled; flowers mixed with bracteoles; male perianth lobes 4 or 5, free, tuberculate or spurred on the back; female perianth lobes similar, smaller; stamens 4 or 5, free; ovary 1-celled; ovules solitary, basal, style absent, stigma penicillate. Achene ellipsoid or fusiform, ribbed.

1. Leaves oblong-lanceolate, base slightly oblique .....**E. acuminatum**
1. Leaves asymmetrically elliptic, base very oblique ..... **E. lineolatum**

Elatostema acuminatum (Poir.) Brongn. in Duper., Voy. Bot. 211. 1834; Hook. f., Fl. Brit. India 5: 566. 1888; Fischer in Gamble, Fl. Pres. Madras 1377(963). 1928; Manilal, Fl. Silent Valley 261. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 437. 1988; Vajr., Fl. Palghat Dist. 452. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 418. 1996; Sivar. & P. Mathew, Fl. Nilambur 650. 1997; Mohanan & Sivad., Fl. Agasthyamala 640. 2002. *Procris acuminata* Poir. in Lamk., Encycl. 5: 629. 1804.

Galbrous shrubs with elongated stem. Leaves 12-15 x 3-4 cm, oblong-lanceolate, caudate acuminate, base rounded, slightly oblique, coarsely crenate-toothed; lateral nerves 7-9 pairs, archingly joining along margin. Receptacle sessile, solitary; bracts obovate-obtuse; bracteoles linear; flowers minute, pale green.

Flowering & Fruiting: March-April.

Distribution: Indo-Malesia. Common; along streams in evergreen forests. *RNMK 0133,* Chanthanathodu; *RNMK 0075,* Chembra.

Elatostema lineolatum Wight, Ic. t. 1984. 1853; Hook. f., Fl. Brit. India 5: 565. 1888; Gamble, Fl. Pres. Madras 1376(963). 1928; Manilal, Fl. Silent Valley 262. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 438. 1988; Vajr., Fl. Palghat Dist. 452. 1990; M. Mohanan & Sasidh. & Sivar., Fl. Pl. Thrissur For. 419. 1996; Sivar. & P. Mathew, Fl. Nilambur 650. 1997; Mohanan & Sivad., Fl. Agasthyamala 641. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 470. 2005.

Subshrubs; branches scandent, pilose. Leaves to 9 x 3 cm, rhomboid, acuminate at apex, gibbous at one side, crenate, 3-ribbed from base, sessile, shortly hispid; lateral nerves 4 pairs from the midrib; cystolith scattered. Receptacle 0.5-1.5 cm across, 2-3 together, axillary; male flowers pedicellate; bracteoles ca. 3 mm long, oblanceolate; perianth lobes 4, ca. 1.5 x 1 mm, hairy at apex, red-glandular; stamens 4, anthers deeply cleft at base.

Flowering & Fruiting: March-April.

Distribution: India, Myanmar and Sri Lanka. Occasional; in evergreen forests. *RNMK 1407, S*ughandhagiri; *RNMK 3213*, Banasuramala; *RNMK 3020*, Kunchome.

GIRARDINIA Gaudichaud-Beaupre
in Freycinet Voyage Monde, Bot. 498. 1830.

Girardinia diversifolia (Link) Friis, Kew Bull. 36: 145. 1981; Ansari, Fl. Kasaragod Div. 359. 1985; Manilal, Fl. Silent Valley 262. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 258. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 438. 1988; Vajr., Fl. Palghat Dist. 453. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 419. 1996; Sivar. & P. Mathew, Fl. Nilambur 651. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 470. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 654. 2009. *Urtica diversifolia* Link, Enum. Hort. Berol. 2: 385. 1822. *Girardinia heterophylla* Decne. in Jacq., Voy. 4: 151. t.153. 1844; Hook. f., Fl. Brit. India 5: 551. 1888 incl. var. *palmata*. *Girardinia leschenaultiana* Decne. in Jacq., Voy. 4: 152. 1844; Fischer in Gamble, Fl. Pres. Madras 1372(960). 1928. *Girardinia zeylanica* Decne. in Jacq., Voy. 4: 152. 1844; Fischer in Gamble, Fl. Pres. Madras 1373(960). 1928; Manilal & Sivar., Fl. Calicut 279. 1982. *Girardinia heterophylla* Decne. var. *zeylanica* (Decne.) Hook. f., Fl. Brit. India 5: 551. 1888. *Ana-schorigenum* Rheede, Hort. Malab. 2:77-78, t. 41. 1679.

Erect shrubs with sharp stinging hairs and prickles. Leaves alternate, 16-18 x 20-22 cm, deeply palmately lobed, irregularly dentate, densely pubescent below, strongly ribbed; petiole 10-12 cm long, densely prickly; stipule connate, lanceolate. Inflorescence of simple or branched spikes of ca. 6 x 6 cm, curved; flowers monoecious or deciduous, female perianth lobes 2, opposite, keeled, bristled, male perianth lobes 4 or 5, free, valvate; stamens 4 or 5; ovary 1-celled, ovule solitary; stigma penicillate, papillose. Achenes biconvex, orbicular, yellow, smooth.

Flowering & Fruiting: October-November.

Distribution: Tropical Asia. Occasional; in evergreen forests. *RNMK 1867,* Vythiri Ghat; *RNMK 2569*, Periya Ghat.

LECANTHUS Weddell
Ann. Sci. Nat., Bot. sér. 4, 1: 187. 1854.

Lecanthus peduncularis (Wall. ex Royle) Wedd. in DC., Prodr. 16: 164. 1869; Manilal, Fl. Silent Valley 263. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 439. 1988; Vajr., Fl. Palghat Dist. 454. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 420. 1996. *Procris peduncularis* Wall. ex Royle, Illustr. Bot. Himal. t.83. f.2. 1836. *Lecanthus wightii* Wedd., Ann. Sci. Nat. Bot. ser. 4, 1: 187. 1854; Hook. f., Fl. Brit. India 5: 559. 1888; Gamble, Fl. Pres. Madras 1374(961). 1928. *Elatostema ovatum* Wight, Ic. t. 1985. 1853, 'ovata'.

Small herbs, 25-30 cm. Leaves 7-9 x 3-4 cm, broadly ovate or elliptic, acute, base obtuse, oblique; pubescent below and glabrescent above; petioles unequal. Flowers dioecious, white, in long peduncled heads; peduncle 0.5-1 cm long.

Flowering & Fruiting: October-November.

Distribution: Paleotropics. Common; in evergreen shola forests. *RNMK 1091,* Chembra.

LAPORTEA Gaudichaud-Beaupre
in Freycinet, Voyage Monde, Uranie Physicienne Bot. 498. 1830, *nom. cons.*

Laportea interrupta (L.) Chew, Gard. Bull. Straits Settlem 21: 200. 1965; Manilal & Sivar., Fl. Calicut 279. 1982; Ansari, Fl. Kasaragod Div. 360. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 258. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 439. 1988; Vajr., Fl. Palghat Dist. 453. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 420. 1996; Sivar. & P. Mathew, Fl. Nilambur 652. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 471. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 654. 2009. *Urtica interrupta* L., Sp. Pl. 985. 1753 ; Roxb., Fl. Ind. 3 :585. 1832 ; Wight, Ic. t. 692. 1840 ; *Fleurya interrupta* (L.) Gaud., Voy. Uranie 12: 497. t.8. 1830; Wight, Ic. t. 1975. 1853 ; Hook. f., Fl. Brit. India 5: 548. 1888; Fischer in Gamble, Fl. Pres. Madras 1372(959). 1928. *Batti-schorigenam* Rheede, Hort. Malab. 2:75, t.40. 1979.

Herbs with strong stinging hairs. Leaves 9-15 x 7-10 cm, broadly ovate, acuminate, rounded at base, coarsely serrulate; nerves 3-6 pairs, reticulate; petiole 5-6 cm long. Spikes 17-22 cm long, interrupted, axillary; erect or horizontal; peduncles 10-12 cm long; female perianth lobes ovate, hispid, keeled; ovary compressed; ovary compressed; male perianth lobes 4, curved, hirtus; stamens 4. Achenes ovate, acute, rugose at margins.

Flowering & Fruiting: August-September.

Distribution: Paleotropics.Occasional; in plantations and moist places. *RNMK 1996,* Kalpetta; *RNMK 1482*, Poothady.

PELLIONIA Gaudichaud-Beaupre
in Freycinet, Voyage Bot. 494, t 119. 1826, *nom. cons.*

Pellionia heyneana Wedd., Monogr. Urtic. 287. t.5. 1856; Hook. f., Fl. Brit. India 5: 561. 1888; Fischer in Gamble, Fl. Pres. Madras 1380(965). 1928; Manilal, Fl. Silent Valley 264. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 440. 1988; Vajr., Fl. Palghat Dist. 455. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 421. 1996; Sivar. & P. Mathew, Fl. Nilambur 653. 1997; Mohanan & Sivad., Fl. Agasthyamala 643. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 471. 2005.

Woody herbs; stem arched, angled, densely lineolate. Leaves distichous, lamina 17-20 x 4-6 cm, falcate-elliptic, inequilateral, acuminate, acute at base, 3-ribbed; cystolith many, linear; petiole 1-1.5 cm long. Flowers in axillary peduncled cymes; peduncles stout, erect, 12-15 cm long; male flowers pedicelled, perianth reddish, lobes 4, equal, oblong; stamens 4, free; female flowers pedicelled, in short lateral congested cymes; peduncle 1-1.5 cm long; perianth reddish, lobes 5, unequal, oblong. Achenes obovate, acute, biconvex, tubercled.

Flowering & Fruiting: June-September.

Distribution: South-west India and Sri Lanka. Occasional; in evergreen forests. *RNMK 1274,* Chooralmala; *RNMK 1105*, Kurichiarmala.

PILEA Lindley

Collect. Bot. ad. t. 4. 1821, *nom. cons.*

Pilea microphylla (L.) Liebm., Vidensk. Selsk. Skr. 5:296. 1851; Fischer in Gamble, Fl. Pres. Madras 1379(965). 1928; Manilal & Sivar., Fl. Calicut 279. 1982; Ansari, Fl. Kasaragod Div. 360. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 440. 1988; Mohanan & Sivad., Fl. Agasthyamala 644. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 472. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 650. 2009. *Parietaria microphylla* L., Syst. Nat. (ed.10):1308. 1759. *Pilea muscosa* (L.) Lindl., Coll. Bot. t. 4. 1821; Hook. f., Fl. Brit. India 5: 551. 1888.

Small delicate herbs. Leaves 0.7-1 x 0.1-0.3 cm, elliptic to spathulate. Male and female flowers minute, in axillary cymes. Achenes ovoid, compressed.

Flowering & Fruiting: August-November.

Distribution: South America; now introduced into other tropical regions. Common; in moist situations and walls. *RNMK 2554,* Puthoorvayal.

POUZOLZIA Gaudichaud-Beaupre

in Freycinet Voyage Bot. 503. 1826.

Erect herbs. Leaves alternate, opposite or whorled, simple, 3-ribbed, with large persistent stipules. Inflorescence axillary, sessile clusters or axillary or terminal racemes. Flowers monoecious, 3-many together, shortly pedicelled; bracts ovate; flowers bud truncate or ovoid; perianth 4-5-lobed or partite, concave or transversely plicate; female perianth tubular, 2-4-toothed; stamens 4 or 5, pistillode clavate or oblong; ovary 1-celled; ovules solitary, erect; style absent, stigma filiform. Achene enclosed in a winged or wingless perianth.

1. Flowers in axillary clusters ..... **P. zeylanica**
1. Flowers in axillary or terminal racemes 2
2. Racemes axillary ..... **P. meeboldii**
2. Racemes terminal ..... **P. wightii**

Pouzolzia meeboldii W.W. Smith & Ramaswami, Rec. Bot. Surv. India 6:40.1914; Gamble, Fl. Pres. Madras 1383 (967). 1928; Vajr., Fl. Palghat Dist. 456. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 422. 1996.

Erect shrubs; stem glaucous. Leaves ternate, to 18 x 4 cm, oblong-lanceolate, acuminate at apex, base rounded or cordate, sessile; intercostae parallel. Racemes to 12 cm long, axillary. Flowers 3-5 together; bracts ca. 6 x 3 mm, ovate; male flowers ca. 2 mm across, truncate at apex; perianth lobes 4, transversally plicate; female flowers smaller; perianth lobe ca. 0.5 mm long, ciliate at apex, stigma ca. 2 mm long. Achenes ca. 1 mm long, ridged, brown.

Flowering & Fruiting: April-November.

Distribution: Endemic to southern Western Ghats. Occasional; in open areas. *RNMK 2021,* Puthoorvayal.

Pouzolzia wightii Bennett, Pl. Jav. Rar. 1: 66. 1838; Hook. f., Fl. Brit. India 5:584.1888; Gamble, Fl. Pres. Madras 1383(967). 1928; V.S. Ramach. & V.J.

Nair, Fl. Cannanore 441. 1988; Vajr., Fl. Palghat Dist. 457. 1990; Mohanan & Sivad., Fl. Agasthyamala 646. 2002

Herbs; stem pilose. Leaves to 6.5 x 2.5 cm, ovate to elliptic, acuminate, 3-ribbed, hispid; stipuleca. 8 x 6 mm, ovate. Spike to 35 cm long, terminal; bracts ca. 12 x 8 mm, ovate, cordate at base. Flowers 3-6 together in the axils of bracts; male and female flowers mixed; male flowers hemispherical, truncate above, shortly pedicelled; perianth lobes 4, ca. 2.5 mm long, ciliate; filaments puberulus; female flowers sessile; perianth tube striate, hispid. Achenes ca. 1.5 x 1 mm, ovoid, wingless.

Flowering & Fruiting: December-March.

Distribution: Endemic to southern Western Ghats. Occasional; in margins of grasslands. *RNMK 2469,* Chembra.

Pouzolzia zeylanica (L.) Bennett, Pl. Jav. Rar. 1: 67. 1838; Manilal & Sivar., Fl. Calicut 280. 1982; Ansari, Fl. Kasaragod Div. 361. 1985; Manilal, Fl. Silent Valley 265. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 441. 1988; Vajr., Fl. Palghat Dist. 457. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 422. 1996; Sivar. & P. Mathew, Fl. Nilambur 654. 1997; Mohanan & Sivad., Fl. Agasthyamala 646. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 473. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 655. 2009. *Parietaria zeylanica* L., Sp. Pl. 1052. 1753. *Parietaria indica* L., Mant. Pl. 1: 128. 1767. *Pouzolzia indica* (L.) Gaud., Voy. Uranie 12: 503. 1830; Hook. f., Fl. Brit. India 5: 581. 1888; Gamble, Fl. Pres. Madras 1382(967). 1928.

Slender procumbent herbs. Leaves alternate or opposite, 4-5 x 2-2.5 cm, ovate or elliptic, acute to acuminate, base rounded, entire, membranous; lateral nerves 3 or 4 pairs, basal pairs opposite; petiole to 2 cm. Flowers in axillary clusters; bracts 2, concave, scarious; tepals 4, ovate-lanceolate, ca. 1.5 mm long, sparsely villous. Achenes 2-winged.

Flowering & Fruiting: August-December.

Distribution: Tropical Asia. Common; in grassland margins. *RNMK 1355,* Chembra.

PROCRIS Commerson ex Jussieu
Gen. 403. 1789.

Procris crenata Robins., Philipp. J. Sci. 5: 507. 1911; Sasidh. & Sivar., Fl. Pl. Thrissur For. 422. 1996. *Procris wightiana* Wall. ex Wedd., Monogr. Urtic. 336. 1856; Fischer in Gamble, Fl. Pres. Madras 1378(963). 1928. *Procris laevigata* sensu Hook.f., Fl. Brit. India 5: 575. 1888, non Blume 1825-1826.

Succulent herbs, usually epiphytic, stem erect or scandent. Leaves 7-8 x 2-2.5 cm, elliptic-lanceolate, crenate, penninerved, cystolith linear; petiole 3-5 mm long; lower part of the stem with small orbicular nanophylls. Flowers monoecious, in axils of leaf scars; male flowers in small cymes; female flowers in peduncled receptacle; male perianth lobes 5, free, fleshy; female perianth lobes 3-5, free, fleshy, cucullate; stamens 5; ovary 1-celled, ovoid; ovule 1, basal; stigma sessile, globose. Achenes ovoid, apiculate, rugose.

Flowering & Fruiting: October-January.
Distribution: Indo-Malesia and Africa. Occasional; in evergreen forests- found growing in crevices of tree trunks. *RNMK 2002,* Chembra.

ULMACEAE Mirb.

Elem. Physiol. Veg. Bot. 2: 905. 1815.

1. Flowers fascicled in axils of leafscars; fruits winged ..... **Holoptelea**
1. Flowers in axillary cymes; fruits not winged 2
2. Plants monoecious; leaves 3-ribbed from base ..... **Celtis**
2. Plants dioecious; leaves 5-ribbed from base ..... **Trema**

CELTIS Linnaeus

Sp. Pl. 1043. 1753.

Trees. Leaves alternate, simple, 3-ribed at base; stipules lateral. Flowers monoecious, in axillary conjested cymes; perianth lobes 4 or 5; stamens 4 or 5, free; pistillode densely wooly; ovary in female flowers 1-celled; ovule solitary, pendulous, style 2, free, stigma linear, pubescent. Fruit a small drupe, ovoid.

1. Leaves with primary nerves above basal ribs..... **C. tetrandra**
1. Leaves without primary nerves above basal ribs..... **C. timorensis**

Celtis tetrandra Roxb., Fl. Ind. 2: 63. 1832; Hook. f., Fl. Brit. India 5: 482. 1888; Fischer in Gamble, Fl. Pres. Madras 1348(944). 1928; V.S. Ramach. & V.J. Nair, Fl. Cannanore 428. 1988; Vajr., Fl. Palghat Dist. 441. 1990.*Celtis serotina* Planch., Ann. Sci. Nat. Bot. ser. 3, 10: 301. 1848.

Medium trees; branchlets slender, pubescent. Leaves 8-11 x 4-5 cm, ovate, oblique, acuminate, unequal at base, serrulate, punctate above, pubescent along the nerves below; lateral nerves from midrib 2 pairs, extending almost to the apex, coarsely reticulate; petiole ca. 1 cm long. Flowers fascicled or in short cymules, axillary, pedicels ca. 1 cm long, filiform; male sepals ciliate; stamens 4. Drupes 1-1.5 cm across, ovoid, glabrous, orange red when ripe.
Flowering & Fruiting: February-March.
Distribution: Indo-Malesia. Common; in evergreen forests. *RNMK 4001,* Vythiri.

Celtis timorensis Span., Linnaea 15: 343. 1841; Soep. in Steenis, Fl. Males. ser. 1, 8: 65. 1977; Manilal, Fl. Silent Valley 257. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 429. 1988; Vajr., Fl. Palghat Dist. 441. 1990; Sivar. & P. Mathew, Fl. Nilambur 656. 1997. *Celtis cinnamomea* Lindl. ex Planch., Ann. Sci. Nat. Bot. ser. 3, 10: 303. 1848; Hook. f., Fl. Brit. India 5: 482. 1888; Fischer in Gamble, Fl. Pres. Madras 1349(944). 1928. *Celtis trinervia* sensu Bedd., Fl. Sylv. t. 312. 1873, non Roxb. 1814.

Tree, up to 10 m tall. Leaves 11-13 x 5-6 cm, ovate, broadly elliptic-lanceolate, acuminate, acute or cuneate at base; basally 3-nerved, unequal at base. Flowers in axillary racemes. Drupes ovoid-globose, narrowed towards tip, black when ripe.

Flowering & Fruiting: January-March.
Distribution: Indo-Malesia. Occasional; in evergreen forests. *RNMK 3901,* Vythiri Ghat; *RNMK 4003*, Thirunelli.

HOLOPTELEA Planchon

Ann. Sci. Nat. Bot. Ser. 3, 10: 259, 266. 1848.

Holoptelea integrifolia (Roxb.) Planch., Ann. Sci. Nat. Bot. ser. 3, 10: 259. 1848; Wight, Ic. t. 1968. 1858; Hook. f., Fl. Brit. India 5: 481. 1888; Fischer in Gamble, Fl. Pres. Madras 1348(943). 1928; Vajr., Fl. Palghat Dist. 441. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 424. 1996. *Ulmus integrifolius* Roxb., Pl. Corom. t. 78. 1798.

Deciduous polygamous trees; branchlets pubescent. Leaves 7-10 x 5-6 cm, ovate, entire, abruptly acuminate at apex, rounded or subcordate at base, punctate below, nerves 7-9 pairs; petiole 1-1.5 cm long. Flowers appear before leaves, in axillary congested cymes, monoecious or bisexual; tepals 4 or 5, free, oblong, hispid; stamens 5, free; anthers pubescent; female flowers with longer pedicels; ovary compressed, long-stipitate, 2-winged; 1-celled; ovule 1, style 2-fid. Fruit 2.5-3 cm across, orbicular, samaroid, glabrous.
Flowering & Fruiting: December-March.
Distribution: Indo-Malesia. Occasional; in semi-evergreen forests. *RNMK 2601,* Manikkunnumala.

TREMA Loureiro

Fl. Cochinch. 539, 562. 1790.

Trema orientalis (L.) Bl., Mus. Bot. 2: 62. 1856; Hook. f., Fl. Brit. India 5: 484. 1888; Fischer in Gamble, Fl. Pres. Madras 1350(944). 1928; Manilal & Sivar., Fl. Calicut 274. 1982; Ansari, Fl. Kasaragod Div. 350. 1985; Manilal, Fl. Silent Valley 258. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 429. 1988; Vajr., Fl. Palghat Dist. 442. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 424. 1996; Sivar. & P. Mathew, Fl. Nilambur 656. 1997; Mohanan & Sivad., Fl. Agasthyamala 623. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 459. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 656. 2009. *Celtis orientalis* L., Sp. Pl. 1044. 1753; Wight, Ic. tt. 602, 603, 1842. *Sponia wightii* Planch., Ann. Sci. Nat. Bot. ser. 3, 10: 322. 1848.

Small dioecious trees; branchlets scabrous to adpressed pubescent. Leaves to 12-15 x 4-5 cm, alternate, ovate, acuminate, serrulate, cordate at base, 3-5-ribbed from base, tomentose below, scabrous above; lateral nerves 5-6 pairs; petiole ca. 1 cm long. Flowers in axillary fascicles or cymes; male flowers usually sessile; tepals 4 or 5, equal, curved; stamens 5; female flowers in cymes; tepals unequal, ciliate; ovary ovate, 1-celled, style 2-fid, curved, stigmas plumose. Fruit a drupe, 3-5 mm across, globose.
Flowering & Fruiting: September-December.
Distribution: Tropical Africa, Asia and Australia. Common; in plantations and moist deciduous forests. *RNMK 2608,* Puthoorvayal; *RNMK 2297*, Begur.

MORACEAE Link

Handbuch 2: 444. 1831.

1. Herbs.....**Dorstenia**
1. Trees, stranglers or woody climbers 2
2. Flowers enclosed in syconia .....**Ficus**
2. Flowers not enclosed in syconia 3
3. Male flowers on globose or oblong heads; fruits sorosis .....**Artocarpus**
3. Male flowers on disciform receptacles or cylindrical spike; fruit otherwise..... 4
4. Female flowers without perianth; male flowers on discoid or flat receptacle . **Antiaris**
4. Female flowers with 4 periant lobes; male flowers in capitate clusters..... **Streblus**

ANTIARIS Leschenault

Ann. Mus. Par. 16: 478, t. 22. 1810, *nom. cons.*

Antiaris toxicaria Lesch., Ann. Mus. Natl. Hist. Nat. Paris 16: 478, t.22. 1820; Hook. f., Fl. Brit. India 5: 537. 1888; Fischer in Gamble, Fl. Pres. Madras 1367(957). 1928; Sasidh. & Sivar., Fl. Pl. Thrissur For. 425. 1996; Sivar. & P. Mathew, Fl. Nilambur 658. 1997; Mohanan & Sivad., Fl. Agasthyamala 624. 2002. *Antiaris innoxia* Bl., Rumphia 1: 172, t. 54. 1835. *Antiaris saccidora* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3:232. 1851; Wight, Ic. t. 1958. 1853.

Lofty deciduous trees with large buttresses, exudation sticky; bark greyish white, smooth pale white inside, strongly fibrous. Leaves bifarious, 13-15 x 4-5 cm, elliptic-oblong, obtusely acuminate, base rounded or cordate, entire or distantly crenulate, subsessile; lateral nerves 6-8 pairs, coarsely reticulate below. Male flowers 3-5, crowded on an axillary peduncled ca. 1.5 cm broad receptacle surrounded by imbricating bracts; sepals 3 or 4, oblanceolate to spathulate; stamens 3-8; female flowers solitary in an involucre of few connate bracts; sepals absent; ovary 1-celled, uni-ovulate. Drupes 1.5-2.5 x 1-2 cm, pyriform or obovoid, fleshy, scarlet.

Flowering & Fruiting: January-April.

Distribution: Paleotropics.Occasional. in evergreen forests. *RNMK 4005,* Vythiri Ghat.

ARTOCARPUS J. R. & J. G. A. Forster

Charact. Gen. 101. 1776, *nom. cons.*

Tree with white sticky latex. Leaves alternate, entire or pinnatifid, penninerved; stipule large, amplexicaul, deciduous. Flowers monoecious, thickly packed in globose, oblong or cylindrical receptacles; receptacles are usually axillary and solitary; male receptacle usually narrower; perianth lobes in male flowers, 2-4, free or united, of female flowers united into a tubular upper part with lower part confluent with the receptacle; stamen 1; ovary 1-celled; ovule –1, pendulous; style1, stigma entire. Fruit a syncarp, globose or oblong, smooth or warty with fleshy perianth.

1. Fruit smooth, to 5 cm long..... **A. gomezianus** ssp. **zeylanicus**
1. Fruit echinate, more than 10 cm long 2
2. Young shoots hirsute; male spike more than 10 cm long.....**A. hirsutus**
2. Young shoots glabrous; male spike to 5 cm long .....**A. heterophyllus**

Artocarpus gomezianus Wall. ex Trecul ssp. **zeylanicus** Jarrett, J. Arnold Arbor. 41: 90. 1960; Vajr., Fl. Palghat Dist. 443. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 425. 1996; Sivar. & P. Mathew, Fl. Nilambur 659. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 460. 2005. *Artocarpus lakoocha* sensu C.E.C. Fischer in Gamble, Fl. Pres. Madras 1369(958). 1928, non Roxb. 1832; Mohanan & Sivad., Fl. Agasthyamala 627. 2002.

Medium sized to large trees, bark brownish black, pinkish inside; twigs grey adpressed tomentose. Leaves 13-16 x 6-8 cm, elliptic-oblong, acuminate, base truncate or subcordate, subscabrous below; lateral nerves 9-15 pairs, regularly arching below the margins, intercostae reticulate; petiole 1-2.5 cm long. Male spike globose, 7-8 mm across, peduncles ca. 1 cm long. Fruit subglobose, uneven, fleshy, greenish yellow.
Flowering & Fruiting: January-April.
Distribution: South-west India and Sri Lanka. Occasional; in semi-evergreen forests. *RNMK 4009,* Manikkunnumala.

Artocarpus heterophyllus Lamk., Encycl. 3: 209. 1789; Jarrett, J. Arnold Arbor. 40 :334. 1959 ; Manilal & Sivar., Fl. Calicut 278. 1982; Ansari, Fl. Kasaragod Div. 350. 1985; Manilal, Fl. Silent Valley 258. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 182. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 430. 1988; Vajr., Fl. Palghat Dist. 443. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 426. 1996; Sivar. & P. Mathew, Fl. Nilambur 659. 1997; Mohanan & Sivad., Fl. Agasthyamala 625. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 460. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 657. 2009. *Artocarpus integrifolius* Wight, Ic. t. 678. 1840; Hook. f., Fl. Brit. India 5: 541. 1888, non L.f. 1781; Fischer in Gamble, Fl. Pres. Madras 1369(957). 1928. *Tsjaka-maram* Rheede, Hort. Malab. 3:17-20, t. 26-28. 1682.

Large trees with white sticky sap, bark dark greyish-brown, trunk with warty tubercles; branchlets glabrous. Leaves 13-15 x 5-7 cm, obovate or oblong-obovate, acute or obtuse, base cuneate, entire (seedling leaves often lobed); nerves 6-8 pairs, prominent, nervules reticulate; petioles 1-2 cm long; stipules 3-5 cm long, ovate-lanceolate. Spikes enclosed by spathe-like bracts; male from young branches; female from the trunk and mature branches; perianth fleshy in fruit. Sorosis 30-40 x 25-30 cm; seeds oblong, smooth.
Flowering & Fruiting: November-April.
Distribution: Widely cultivated in the tropics, origin is probably south India. Occasional; in evergreen forests. *RNMK 4023*, Periya.

Artocarpus hirsutus Lamk., Encycl. 3: 210. 1789; Wight, Ic. t. 1957. 1853; Hook. f., Fl. Brit. India 5: 541. 1888; Fischer in Gamble, Fl. Pres. Madras

1369(957). 1928; Manilal & Sivar., Fl. Calicut 278. 1982; Ansari, Fl. Kasaragod Div. 351. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 183. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 430. 1988; Vajr., Fl. Palghat Dist. 443. 1990; M. Sasidh. & Sivar., Fl. Pl. Thrissur For. 426. 1996; Sivar. & P. Mathew, Fl. Nilambur 660. 1997; Mohanan & Sivad., Fl. Agasthyamala 626. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 461. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 657. 2009. *Ansjeli* Rheede, Hort. Malab. 3:25-27, t. 32. 1682.

Very large trees with white sticky latex; bark brownish-black; branchlets angled, hispid. Leaves 16-18 x 10-12 cm, broadly ovate or elliptic, acuminate, base truncate or rounded, entire, coriaceous; nerves 8-12 pairs, prominent, regularly arched below the margins; nervules parallel; petiole 1-2.5 cm long; stipule 3-5 cm long, lanceolate, densely hirsute. Male spikes linear-oblong, 10-15 cm long, cylindrical; peduncle 4-5 cm long. Syncarp echinate, tomentose, 10-12 x 7-8 cm, yellow when ripe.

Flowering & Fruiting: December-March.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests and plantations. *RNMK 4004,* Vythiri; *RNMK 4015*, Kalpetta.

DORSTENIA Linnaeus

Sp. Pl. 121. 1753.

Dorstenia indica Wall. ex Wight, Ic.t.1964. 1853; Hook. f., Fl. Brit. India 5: 494. 1988; Gamble, Fl. Pres. Madras 1370(958). 1928; Vajravelu, Fl. Palghat Dist. 444. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 426. 1996. **Plate 28e.**

Herbs. Leaves alternate, 5-9 x 2-2.5 cm, obovate or oblanceolate, apex acute, base attenuate or cuneate, membranous, distantly toothed, sparsely hirsute along the nerves beneath; petiole ca. 1 cm long. Receptacle axillary, solitary, discoid, 5-angled, to 1.5 cm across, marginal lobes to 0.5 cm long; peduncle to 2 cm long; male flowers towards the periphery of the receptacle; perianth connate and adnate with receptacle; stamens 3; female flowers grouped at the centre; ovary sunken in the tissue of the receptacle, style lateral, stigmas 2. Fruit an achene.

Flowering & Fruiting: August-December.

Distribution: South India and Sri Lanka. Rare; in evergreen forests. *RNMK 4022,* Kurichiarmala.

FICUS Linnaeus

Sp. Pl. 1059. 1753.

Trees or climbers, with milky latex. Leaves simple or lobed, alternate, stipulate, stipule deciduous. Receptacle solitary or paired, axillary or on leafless drooping tubercles or shoots. Flowers 4 types, minute, placed inside the cavity of receptacle; bracts many, thickly placed closing the mouth of receptacle; male flowers few, seen around the mouth of receptacle in one or two rows; perianth cupular, 3-lobed; stamens one or two; female flowers

many, usually at the bottom of the receptacular chamber, perianth lobes similar to male flowers; ovary 1-celled; style lateral; stigma linear; gall flowers similar to female flowers but sterile with an insect in the ovary; neuter flowers scattered along the inner walls of the receptacle. Fruit an achene placed inside the fleshy receptacle or fig.

1. Climbers or scandent shrubs 2
1. Independent or epiphytic trees 3
2. Branchlets triangular; receptacles in axillary pairs ..... **F. rigida** var. **bracteata**
2. Branchlets terete; receptacles fascicled on the naked mature stem ..... **Ficus leavis** var. **macrocarpa**
3. Figs cauliflorus or on trailing leafless branches 4
3. Figs not cauliflorus 5
4. Leaves opposite, hispid pubescent ..... **F. hispida**
4. Leaves alternate, glabrous ..... **F. racemosa**
5. Receptacle more than two per axil ..... **F. tsjahela**
5. Receptacle solitary or paired 6
6. Receptacle sessile 7
6. Receptacle peduncled 12
7. Leaves beneath and branchlets densely tomentose ..... **F. drupacea** var. **pubescens**
7. Leaves and branchlets glabrous 8
8. Leaves broadly ovate, cusp more than 4 cm long ..... **F. religiosa**
8. Leaves otherwise, cusp to 2 cm long 9
9. Leaves cordate at base ..... **F. arnottiana**
9. Leaves rounded or acute at base 10
10. Figs less than 1 cm across 11
10. Figs to 2 cm across ..... **F. benghalensis**
11. Leaves strongly nerved above the base, obtuse at apex ..... **F. microcarpa**
11. Leaves without such nerves, acuminate to cordate at apex ..... **F. talbotii**
12. Leaf base asymmetric, one side gibbose or rounded, other side cuneate ..... **F. tinctoria** ssp. **parasitica**
12. Leaf base equal 12
13. Upper surface of leaves very glabrous, margin serrate ..... **F. exasperata**
13. Upper surface of leaves glabrescent, margins entire 14
14. Figs with 3 persistent bracts at base 15
14. Figs without persistent bracts 16
15. Leaves to 13 cm long; petiole to 5 cm long ..... **F. beddomei**
15. Leaves more than 18 cm long; petiole more than 10 cm long ..... **F. virens**
16. Figs solitary, green, more than 2 cm across ..... **F. callosa**
16. Figs paired, red, less than 1.5 cm across ..... **F. nervosa**

Ficus arnottiana (Miq.) Miq., Ann. Mus. Lugd.-Bat. 3: 287. 1867; King in Hook. f., Fl. Brit. India 5: 513. 1888; Fischer in Gamble, Fl. Pres. Madras 1363(953). 1928; Ansari, Fl. Kasaragod Div. 353. 1985; Sasidh. & Sivar., Fl.

Pl. Thrissur For. 428. 1996; Mohanan & Sivad., Fl. Agasthyamala 629. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 462. 2005. *Urostigma arnottiana* Miq. in Hook.'s London J. Bot. 6: 564. 1847.

Small trees; bark grey, reddish inside; branchlets glabrous, slender. Leaves 12-17 x 7-10 cm, ovate, caudately acuminate at apex, acumen 4-5 cm long, deeply cordate at base; margins sometimes uneven; lateral nerves 10-14 pairs, reddish brown when dried; intercostae reticulate; petiole 6-10 cm long; stipules 6-7 mm long, ovate, acuminate. Figs in pairs, sessile or very shortly peduncled, on axils of leaf scars or axillary, yellowish brown; bracteoles at the base of the fig.

Flowering & Fruiting: December-April.

Distribution: India and Sri Lanka. Occasional; in semi-evergreen forests. *RNMK 4011,* Manikkunnumala.

Ficus beddomei King, Ann. Roy. Bot. Gard. (Calcutta) 1: 26. t. 24 1887; King in Hook. f., Fl. Brit. India 5: 513. 1888; Fischer in Gamble, Fl. Pres. Madras 1364(954). 1928; Corner, Gard. Bull. Straits Settlem. 21:12. 1965; Vajr., Fl. Palghat Dist. 446. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 428. 1996; Sivar. & P. Mathew, Fl. Nilambur 663. 1997; Mohanan & Sivad., Fl. Agasthyamala 630. 2002.

Tall trees; bark smooth, brown; branchlets with prominent stipular scars. Leaves 18-20 x 10-12 cm, ovate, abruptly sharply acuminate, rounded to truncate at base; nerves 12-15 pairs, parallel, regularly looped below the margins, lowest pairs from base, nervules joined at the middle into a median vain; petiole 8-10 cm long, glandular at apex below; stipule 4-5 cm long, lanceolate, glabrous. Figs in axillary pairs, globose, glabrous, green, with 3 ovate bracts at base, ca. 2 cm across; peduncle 1.5-2 cm long, stout, angled.

Flowering & Fruiting: July-February. *Distribution*: Endemic to Western Ghats. Common in evergreen forests. *RNMK 4009* Vythiri; 4016 Periya; 4003 Talimala.

Ficus benghalensis L., Sp. Pl. 1059. 1753; King, Ann. Roy, Bot. Gard. (Culcutta) 1: 18, t. 13. 1887; King in Hook. f., Fl. Brit. India 5: 499. 1888; Fischer in Gamble, Fl. Pres. Madras 361(952). 1928; Manilal & Sivar., Fl. Calicut 277. 1982; Ansari, Fl. Kasaragod Div. 354. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 184. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 431. 1988; Vajr., Fl. Palghat Dist. 450. 1990; Sivar. & P. Mathew, Fl. Nilambur 663. 1997; Mohanan & Sivad., Fl. Agasthyamala 630. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 463. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 661. 2009. *Urostigma bengalense* (L.) Gasp., Nov. Gen. Fici 7. 1844; Wight, Ic. t. 1989. 1853. Peralu, Rheede, Hort. Malab. 1:49-50, t. 28. 1678.

Large trees. Leaves alternate, elliptic-ovate, 10-18 x 7-12 cm, base rounded or subcordate, apex obtuse to subacute, basally 3-5 nerved; lateral nerves 6-8 pairs. Fig 1 or 2, axillary, depressed globose, ca. 2 cm across.

Flowering & Fruiting: May-August.
Distribution: Indian subcontinent; widely grown as avenue tree. Occasional; along roadsides. *RNMK 4014,* Kalloor.

Ficus callosa Willd., Mem. Acad. Roy. Sci. Hist. (Berlin) 102. 1798; King in Hook. f., Fl. Brit. India 5: 516. 1888; Fischer in Gamble, Fl. Pres. Madras 1364(954). 1928; Corner, Gard. Bull. Straits Settlem. 21:29. 1965; Manilal & Sivar., Fl. Calicut 276. 1982; Ansari, Fl. Kasaragod Div. 354. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 184. 1988; Vajr., Fl. Palghat Dist. 446. 1990; Mohanan & Sivad., Fl. Agasthyamala 631. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 463. 2005. *Handir-alou* Rheede, Hort. Malab. 3: 77-78, t. 59. 1682.

Medium trees; bark dark grey, pale white inside; branchlets scabrous. Leaves 20-22 x 12-14 cm, elliptic-oblong, obtusely acute at apex, rounded to cordate at base, minutely scabrous beneath, coriaceous, glossy above; nerves 10-15 pairs, prominent, regularly arched below the margins; petiole 3-7 cm long; stipule ca. 1 cm long, broadly ovate. Figs ca. 2.5 cm across, axillary, solitary, globose, scabrous, yellow; peduncle 1.5-2 cm long, slender; bracteoles below the apex.
Flowering & Fruiting: March-April.
Distribution: Indo-Malesia. Occasional; in moist deciduous and semi-evergreen forests. *RNMK 4017,* Manikkunnumala; *RNMK 4007*, Muthanga.

Ficus drupacea Thunb. var. **pubescens** (Roth) Corner, Gard. Bull. Singapore 17: 381. 1960 & 21: 13. 1965; Manilal & Sivar., Fl. Calicut 276. 1982; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 184. 1988; Vajr., Fl. Palghat Dist. 446. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 428. 1996; Sivar. & P. Mathew, Fl. Nilambur 665. 1997; Mohanan & Sivad., Fl. Agasthyamala 631. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 463. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 661. 2009. *Ficus mysorensis* Heyne ex Roth in Roem. & Schult., Syst. Veg. 1: 508. 1817; King in Hook. f., Fl. Brit. India 5: 500. 1888; Fischer in Gamble, Fl. Pres. Madras 1361(952). 1928. *Ficus mysorensis* Heyne ex Roth var. *pubescens* Roth in Roem. & Schult., Syst. Veg. 1: 508. 1817. *Katu-alou* Rheede, Hort. Malab. 3:73-74, t. 57. 1682.

Large trees; bark dark brown, branchlets thick, fulvous tomentose. Leaves 15-17 x 8-10 cm, ovate, acute; rounded to subcordate at base; lateral nerves 12-15 pairs, parallel, looping below the margins forming an intramarginal vain; lowest pair narrow; petiole 3-4 cm long; stipule 2-3 cm long, glabrous towards the apex. Figs sessile, in axillary pairs, ca. 2 cm across, densely fulvous pubescent when young, glabrous when mature, orange yellow; bracteoles 3, ovate, tomentose towards the apex.
Flowering & Fruiting: March-April.
Distribution: India, Sri Lanka, Bangladesh and Laos. Occasional; in moist deciduous and semi-evergreen forests. *RNMK 4031,* Tholpetty; *RNMK 4018*, Manikkunnumala.

Ficus exasperata Vahl, Enum. Pl. 2: 197. 1805; Manilal & Sivar., Fl. Calicut 275. 1982; Corner, Gard. Bull. Straits Settlem. 21:74. 1965; Ansari, Fl. Kasaragod Div. 355. 1985; Manilal, Fl. Silent Valley 259. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 185. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 432. 1988; Vajr., Fl. Palghat Dist. 447. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 429. 1996; Sivar. & P. Mathew, Fl. Nilambur 665. 1997; Mohanan & Sivad., Fl. Agasthyamala 632. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 464. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 662. 2009. *Ficus asperrima* Roxb., Fl. Ind. 3: 554. 1832; Wight, Ic. t. 633. 1840; King in Hook. f., Fl. Brit. India 5: 522. 1888; Fischer in Gamble, Fl. Pres. Madras 1366(955). 1928. *Teragam* Rheede, Hort. Malab. 3:79, t. 60. 1682.

Small trees; bark thick, greyish brown; branchlets scabrous. Leaves 15-20 x 9-12 cm, ovate to obovate, acute to acuminate at apex, base acute to round, coarsely scabrous; lateral nerves 4-6 pairs, basal pair opposite, intercostae coarsely reticulate; leaves of saplings and coppice often lobed; petiole 5-7 cm long. Figs solitary, axillary, ca. 1.5 cm across, globose, yellow, deep pink when ripe, coarsely scabrid; peduncle ca. 1 cm long, bracteoles 6 or 7, above the base, ovate.

Flowering & Fruiting: February-April.

Distribution: East Africa, Arabia, India and Sri Lanka. Common; in moist deciduous forests. *RNMK 4023,* Chedalayam; *RNMK 4010*, Tholpetty.

Ficus hispida L. f., Suppl. Pl. 442. 1781; King in Hook. f., Fl. Brit. India 5: 522. 1888; Fischer in Gamble, Fl. Pres. Madras 1367(956). 1928; Corner, Gard. Bull. Straits Settlem. 21:89. 1965; Manilal & Sivar., Fl. Calicut 275. 1982; Ansari, Fl. Kasaragod Div. 356. 1985; Manilal, Fl. Silent Valley 259. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 185. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 432. 1988; Vajr., Fl. Palghat Dist. 447. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 429. 1996; Sivar. & P. Mathew, Fl. Nilambur 667. 1997; Mohanan & Sivad., Fl. Agasthyamala 633. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 464. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 663. 2009. *Ficus oppositifolia* Roxb., Pl. Corom. t.124. 1799; Wight, Ic. t. 638. 1843. *Perin-teragam* Rheede, Hort. Malab. 3:81, t.61. 1682.

Small trees; branchlets hollow, cylindrical. Leaves 15-18 x 8-10 cm, ovate-oblong or obovate-oblong, abruptly acuminate; base round to subcordate; lateral nerves 5-7 pairs, lowest pairs opposite, basal; intercostae subparallel; petiole 2-3 cm long; stipule 1.5-2 cm long, ovate, acute. Figs 2-3 cm across, fascicled on trunk or on slender drooping long leafless branches, many, obovoid-globose, hispid, greenish yellow; peduncles very short or absent

Flowering & Fruiting: September-May.

Distribution: Indo-Malesia to Australia. Common; along the sides of streams and moist deciduous forests. *RNMK 4026,* Kalpetta; *RNMK 4033*, Muthanga.

Ficus laevis Bl. var. **macrocarpa** (Miq.) Corner, Gard. Bull. Singapore 18:7. 1960. *Ficus amplocarpa* Govind. & Masila., Proc. Indian Acad. Sci. (Pl. Sci.) 91: 117. 1982. *Ficus macrocarpa* (Miq.) Wight ex King, Ann. Roy. Bot. Gard. (Culcutta) 1:166. t.208. 1888; Hook.f., Fl. Brit. India 5:534. 1888, non Bl. 1825; Gamble, Fl. Pres. Madras 1365(955). 1928; Vajravelu, Fl. Palghat Dist. 447. 1990. *Pogonotrophe macrocarpa* Miq. In Hook's London J. Bot. 7:74. 1848. **Plate 28f.**

Large climbers, stem rounded, rooting, branchlets subglabrous. Leaves 11-15 x 7-10 cm, ovate, apex abruptly acuminate, base cordate, often unequal, 3-ribbed, hispid below, lateral nerves 2 or w pairs, minutely hispid; petiole ca. 7 cm long. Receptacle many together on lateral tubercles on old stem, globose, mottled with pink, pubescent; peduncle ca. 1 cm long, bracteolate at the middle.

Flowering & Fruiting: November-December.

Distribution: South India and Sri Lanka. Rare; in evergreen forests. *RNMK 4052,* Kurichiarmala.

Ficus microcarpa L. f., Suppl. Pl. 442. 1781; Corner, Gard. Bull. Straits Settlem. 21:22. 1965; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 186. 1988; Manilal & Sivar., Fl. Calicut 276. 1982; Ansari, Fl. Kasaragod Div. 356. 1985; Vajr., Fl. Palghat Dist. 448. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 429. 1996; Mohanan & Sivad., Fl. Agasthyamala 634. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 465. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 664. 2009. *Ficus retusa* King, Ann. Roy. Bot. Gard. (Calcutta) 1: 50. tt.61 & 84 P.1887, non L. 1767; King in Hook. f., Fl. Brit. India 5: 511. 1888; Fischer in Gamble, Fl. Pres. Madras 1362(952). 1928. *Ficus retusa* var. *nitida* sensu Hook. f., Fl. Brit. India 5: 511. 1888, non Thunb. 1781-1801; Fischer in Gamble, Fl. Pres. Madras 1362(952). 1928. *Itty-alu* Rheede, Hort. Malab. 1:45-46, t.26. 1678.

Medium trees with few aerial roots; bark smooth; branchlets angled, glabrous. Leaves 4-10 x 2-4 cm, elliptic to obovate, acute at base, coriaceous; lateral nerves 7-11 pairs, lowest pair above the base, rib-like; petiole 1-1.5 cm long; stipule 0.7-1 cm long, ovate, glabrous. Figs 7-8 mm across, axillary, paired, sessile, globose, smooth, yellow; bracteoles 3, ovate, obtuse.

Flowering & Fruiting: March-May. *Distribution*:

Indo-Malesia to Pacific Islands and south China. Occasional; in semi-evergreen forests. *RNMK 4035,* Karuvanthodu.

Ficus nervosa Heyne ex Roth in Roem. & Schult., Syst. Veg. 1: 513. 1817; King in Hook. f., Fl. Brit. India 5: 512. 1888; Fischer in Gamble, Fl. Pres. Madras 1364(954). 1928; Corner, Gard. Bull. Straits Settlem. 21:31. 1965; V.S. Ramach. & V.J. Nair, Fl. Cannanore 432. 1988; Vajr., Fl. Palghat Dist. 448. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 429. 1996; Sivar. & P. Mathew, Fl. Nilambur 668. 1997; Mohanan & Sivad., Fl. Agasthyamala 634. 2002. *Ficus angustifolia* Roxb., Fl. Ind. 3: 554. 1832; Wight, Ic. t. 660. 1840.

Large trees; bark greyish brown to black; branchlets glabrous. Leaves 15-18 x 7-8 cm, ovate-oblong, obtusely shortly acuminate, rounded at base, coriaceous; lateral nerves 8-12 pairs, lower ones opposite, forming an intramarginal vein; petiole 2-2.5 cm long; stipule ca. 1 cm long, lanceolate. Fig ca. 1.5 cm across, paired, axillary, reddish-brown, smooth; peduncle ca. 1 cm long, bracteoles minute at the base of the peduncle.
Flowering & Fruiting: March-May.
Distribution: Indo-Malesia to Australia. Common; in evergreen and semi-evergreen forests. *RNMK 4040,* Vythiri; *RNMK 4032*, Manikkunnumala.

Ficus racemosa L., Sp. Pl. 1060. 1753; Manilal & Sivar., Fl. Calicut 275. 1982; Ansari, Fl. Kasaragod Div. 357. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 433. 1988; Vajr., Fl. Palghat Dist. 448. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 430. 1996; Sivar. & P. Mathew, Fl. Nilambur 668. 1997; Mohanan & Sivad., Fl. Agasthyamala 635. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 664. 2009. *Ficus glomerata* Roxb., Pl. Corom. t. 123. 1799; Wight, Ic. t. 667. 1840; King in Hook. f., Fl. Brit. India 5: 535. 1888; Fischer in Gamble, Fl. Pres. Madras 1364(954). 1928.

Small trees without aerial roots; branchlets puberulus, slender. Leaves 12-15 x 5-6 cm, elliptic-oblong to lanceolate, acute at apex; acute to rounded at base; lateral nerves 5-8 pairs, lowest pair from the base, opposite, ribbed; intercostae reticulate; petiole 2.5-3 cm long; stipule ca. 1.5 cm long, glabrous; tubercles branched, drooping, 20-25 cm long; Figs ca. 2 cm across, globose, ashy-puberulus; peduncles 7-8 mm long; bracteoles 3, at the base of the peduncle.
Flowering & Fruiting: February-May.
Distribution: Indo-Malesia to Australia. Common; in moist deciduous and semi-evergreen forests. *RNMK 4041,* Manikkunnumala; *RNMK 4029*, Muthanga.

Ficus rigida Jack, Malay. Misc. 2: 72. 1822, var. **bracteata** (Corner) Bennet, Indian J. For. 5:326. 1982; Vajr., Fl. Palghat Dist. 449. 1990; Pandura. & V.J. Nair, J. Econ. Tax. Bot. 17: 176. 1993; Mohanan & Sivad., Fl. Agasthyamala 636. 2002. *Ficus glaberrima* Bl. var. *bracteata* Corner, Gard. Bull. Singapore 17: 388. 1959(1960). *Ficus travancorica* King, Ann. Roy. Bot. Gard. (Calcutta) 1: 28. tt.26 & 820. 1887; King in Hook. f., Fl. Brit. India 5: 503. 1888; Fischer in Gamble, Fl. Pres. Madras 1365(955). 1928; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 466. 2005.

Large scandent epiphytic shrubs; branchlets angled, densely covered with stipular scars, glabrous. Leaves 17-20 x 5-6 cm, oblong-lanceolate, acuminate, acute at base, reddish when dry; lateral nerves 14-16 pairs, prominent, regularly looping below the margins; lowest pair from the base, rib-like; petiole ca. 3 cm long; stipule ca. 4 cm long, glabrous. Fig 0.8-1.2 cm across, axillary, paired, globose, glabrous; peduncle ca. 5 mm long; bracteoles 3, ovate, at the apex of the peduncle.

Flowering & Fruiting: March-May.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 4047,* Sugandhagiri.

Ficus talbotii King, Ann. Roy. Bot. Gard. (Calcutta) 1: 51. tt.63 & 84. 1887; King in Hook. f., Fl. Brit. India 5: 512. 1888; Fischer in Gamble, Fl. Pres. Madras 1363(953). 1928; Corner, Gard. Bull. Straits Settlem. 21:19. 1965; Manilal & Sivar., Fl. Calicut 277. 1982; Ansari, Fl. Kasaragod Div. 357. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 433. 1988; Vajr., Fl. Palghat Dist. 449. 1990; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 465. 2005.

Large trees; branchlets glabrous, reddish. Leaves 10-12 x 5-6 cm, ovate, acuminate to shortly caudate, acute to cuneate at base; lateral nerves 10-12 pairs, regularly looping below the margins, reddish brown when dry; petiole 2-2.5 cm long; stipule 6-7 mm long, ovate, pubescent. Figs paired, 6-7 mm across, obovoid, sessile, reddish-brown; bracteoles ovate, obtuse, at the base of the fig.
Flowering & Fruiting: January-April.
Distribution: India, Sri Lanka and Indo-China. Occasional; in evergreen forests. *RNMK 4066,* Thirunelli.

Ficus tinctoria G. Forst. ssp. **parasitica** (Koen. ex Willd.) Corner, Gard. Bulll. Singapore 17: 476. 1960; Manilal & Sivar., Fl. Calicut 276. 1982; Ansari, Fl. Kasaragod Div. 358. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 186. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 433. 1988; Vajr., Fl. Palghat Dist. 449. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 430. 1996; Sivar. & P. Mathew, Fl. Nilambur 669. 1997; Mohanan & Sivad., Fl. Agasthyamala 636. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 466. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 666. 2009. *Ficus parasitica* Koenig ex Willd., Mem. Acad. Roy. Sci. Hist. (Berlin) 2: 102. 1798. *Ficus gibbosa* Bl. var. *parasitica* (Koenig ex Willd.) King, Ann. Roy. Bot. Gard. (Calcutta) 1: t.2,16. 1887; King in Hook. f., Fl. Brit. India 5: 497. 1888; Fischer in Gamble, Fl. Pres. Madras 1365(955). 1928. *Athi-meer-alou* Rheede, Hort. Malab. 3:75-76, t. 58. 1682.

Small trees, with aerial roots. Leaves 13-15 x 5-6 cm, elliptic-lanceolate to ovate-elliptic or subrhombic, acute to strongly acuminate, cuneate. Figs 0.7-0.9 across, axillary, golden yellow, scabridulous, pyriform to subglobose; basal bracts small.
Flowering & Fruiting: March-April.
Distribution: Indo-Malesia. Occasional; in semi-evergreen forests. *RNMK 4055,* Manikkunnumala.

Ficus tsjahela Burm. f., Fl. Ind. 227. 1768; King in Hook. f., Fl. Brit. India 5: 514. 1888, "tjakela"; Fischer in Gamble, Fl. Pres. Madras 1362(953). 1928; Corner, Gard. Bull. Straits Settlem. 21:7. 1965; Manilal & Sivar., Fl. Calicut 277. 1982; Ansari, Fl. Kasaragod Div. 358. 1985; Manilal, Fl. Silent Valley

260. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 188. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 434. 1988; Vajr., Fl. Palghat Dist. 450. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 430. 1996; Sivar. & P. Mathew, Fl. Nilambur 671. 1997; Mohanan & Sivad., Fl. Agasthyamala 637. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 466. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 666. 2009. *Tsjakela* Rheede, Hort. Malab. 3:87, t.64. 1682.

Large deciduous trees, sometimes epiphytic; bark black, smooth, light pink inside, fibrous; branchlets glabrous. Leaves 18-20 x 7-8 cm, ovate-oblong, abruptly acuminate, rounded at base, shining above, coriaceous; lateral nerves 10-12 pairs, regular, lowest pair opposite, very oblique, rib-like, nervules coarsely reticulate; petiole 5-7 cm long; stipule ca. 6 cm long, lanceolate, yellowish red. Figs in clusters, ca. 5 mm across, 3-6, sessile, globose, yellow; bracteoles 3, glabrous, yellow.

Flowering & Fruiting: March-April.

Distribution: Peninsular India and Sri Lanka. Common; in moist deciduous forests and plantations. *RNMK 4048,* Chedalayam; *RNMK 4054*, Pozhuthana.

Ficus virens Ait., Hort. Kew (ed. 1) 3: 451. 1789; Sivar. & P. Mathew, Fl. Nilambur 671. 1997. *Ficus infectoria* Roxb., Fl. Ind. 3: 551. 1832, non Willd. 1806; Hook. f., Fl. Brit. India 5: 515. 1888; Gamble, Fl. Pres. Madras 1362(953). 1928.

Deciduous trees. Leaves 20-25 x 10-12 cm; nerves 5-7 pairs, not very prominent; petiole indistinctly jointed with the blade; stipules 1-1.5 cm; broadly ovate, acute, pubescent. Male flowers few, sessile, near the mouth of the receptacles; anther broadly ovate, filament shorter; sepals 4 or 5, linear; sepals in female flowers 3 or 4, sessile; style of female long; stigma elongate.

Flowering & Fruiting: January-March.

Distribution: Indio-Malesia to Solomon Islands. Occasional; in evergreen forests. *RNMK 4060,* Thalimala.

STREBLUS Loureiro

Fl. Cochinch. 599, 614. 1790.

Streblus asper Lour., Fl. Cochinch. 615. 1790; Hook. f., Fl. Brit. India 5: 489. 1888; Gamble, Fl. Pres. Madras 1353(947). 1928; Manilal & Sivar., Fl. Calicut 274. 1982; Ansari, Fl. Kasaragod Div. 358. 1985; Vajr., Fl. Palghat Dist. 450. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 430. 1996; Sivar. & P. Mathew, Fl. Nilambur 672. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 467. 2005. *Epicarpurus orientalis* Bl., Bijdr. 488. 1826; Wight, Ic. t. 1961. 1853.

Small trees, bark grey; branchlets on trunk often arrested and thorny. Leaves 4-5 x 2-2.5 cm, elliptic to obovate, acute or acuminate, base acute, serrate, scabrid; lateral nerves 5-6 nerves; petiole 5-6 mm long. Perianth lobes ovate, acute; stamens 4. Drupe globose, 6-8 mm across, yellow.

Flowering & Fruiting: January-October.

Distribution: India, China and Malesia. Occasional; in moist deciduous forests. *RNMK 4054,* Muthanga.

Artocarpus incisa L.f. and **Ficus auriculata** Lour. are often grown in homesteds for their edible fruits. **Ficus benjamina** L. and **Ficus elastica** Roxb. ex Hornem. are often grown in the district as ornamental trees. **Ficus religiosa** L. is a common tree in temple premises and **Morus alba** L. is widely cultivated for sericulture.

SALICACEAE Mirb.

Elem. Physiol. Veg. Bot. 2: 905. 1815.

SALIX Linnaeus

Sp. Pl. 1015. 1753.

Salix tetrasperma Roxb., Pl. Corom. t. 97. 1798; Hook. f., Fl. Brit. India 5: 626. 1888; Gamble, Fl. Pres. Madras 1390(973). 1928; Wight, Ic. t. 1954. 1853; Manilal, Fl. Silent Valley 266. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 442. 1988; Vajr., Fl. Palghat Dist. 458. 1990.

Small trees. Leaves alternate, 9-11 x 3-4 cm, ovate, acuminate, serrate, nerves many, close, glaucous beneath. Flowers unisexual, dioecious, in long drooping, axillary 6-15 cm long, racemes; bracts densely woolly, perianth absent; stamens 8, free; ovary stalked, 1-celled; tomentose; ovule few; stigma sessile, notched. Capsule 5-6 mm across, 2-4 valved; seeds 1-4, oblong, crowned with long, cottony hairs.

Flowering & Fruiting: July-December.

Distribution: Indo-Malesia and south China. Occasional; along banks of streams in moist deciduous forests. *RNMK 3901*, Kuruva; *RNMK 2093*, Tholpetty.

BURMANNIACEAE Blume

Enum. Pl. Javae 27. 1827.

BURMANNIA Linnaeus

Sp. Pl. 287. 1753.

Burmannia coelestis D. Don, Prodr. Fl. Nepal. 44. 1825; Hook. f., Fl. Brit. India 5: 665. 1888; Fischer in Gamble, Fl. Pres. Madras 1399(979). 1928; Hajra, Fasc. Fl. Ind. 19: 9. 1988; Manilal, Fl. Silent Valley 267. 1988; Vajr., Fl. Palghat Dist. 462. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 431. 1996; Mohanan & Sivad., Fl. Agasthyamala 647. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 475. 2005. *Gonianthes pusilla* Wall. ex Miers, Trans. Linn. Soc. London 18: 537. t. 38. f. 3. 1841. *Burmannia pusilla* (Wall. ex Miers) Thw., Encycl. 325. 1864; Hook. f., Fl. Brit. India 5: 665. 1888; Manilal & Sivar., Fl. Calicut 282. 1982; Hajra, Fasc. Fl. Ind. 19: 13. 1988. *Burmannia coelestis* var. *pusilla* (Miers) Trimen, Fl. Ceylon 4: 131. 1898.

Small herbs, stem much reduced. Leaves absent. Flowers regular, on long terminal peduncle, 1-3 together; calyx tube 3-winged, ca. 1 cm long, retuse at apex, bright pink; petals absent; stamens 3, anthers sessile, ovate, erect;

ovary inferior, 3-celled, winged, ovules many, style 3-lobed. Fruit a dehiscent winged capsule; seeds numerous, minute, reticulate.
Flowering & Fruiting: October-December.
Distribution: Indo-Malesia. Occasional; in open moist grassy slopes. *RNMK 3086,* Chembra; *RNMK 0063*, Manikkunnumala; *RNMK 2877*, Muthanga.

ORCHIDACEAE Juss.

Gen. Pl. 64. 1789

1. Epiphytic 2
2. Terrestrial 40
2. Plants with terete leaves 3
2. Plants without leaves or leaves flat or keeled or subterete and sulcate 6
3. Flowers many in a pendulous raceme; lip with large spur and conspicuous lobes .. 4
3. Flowers 2-5 on an erect raceme; lip with inconspicuous spur or without it, with large lobes 5
4. Pendulous epiphytes; flowers pink in axillary racemes ..... **Seidenfadeniella**
4. Erect plants; flowers white in leaf opposed panicles ..... **Schoenorchis**
5. Lip without spur ..... **Luisia**
5. Lip with a spur ..... **Papilionanthe**
6. Leaves absent (roots green and assimilatory) 7
6. Leaves present 8
7. Column with a distinct foot; ovary puberulous ..... **Chilochista**
7. Column without a foot; ovary glabrous ..... **Taeniophyllum**
8. Leaves equitant, ensiform 9
8. Leaves otherwise 10
9. Stem very short; leaves tufted; spike elongate, many flowered ..... **Oberonia**
9. Stem elongate; leaves imbricating throughout; spike short, few flowered . **Podochilus**
10. Plants with pseudobulb 11
10. Plants without pseudobulb 24
11. Plants with 1 or 2 leaves 12
11. Plants with more than 2 leaves 19
12. Pseudobulb with solitary leaf 13
12. Pseudobulb with few or many leaves 15
13. Inflorescence single flowered 14
13. Inflorescence few to many flowered ..... **Bulbophyllum**
14. Flowers from the tip of the pseudobulb ..... **Flickingeria**
14. Flowers from the lateral side of the pseudobulb ..... **Trias**
15. Pseudobulb with 3-4 leaves 16
15. Pseudobulb with more than 4 leaves ..... **Cymbidium**
16. Pseudobulb clothed with scales 17
16. Pseudobulb without scales 18
17. Inflorescence pendulous with squamate bracts; rachis zigzag ..... **Pholidota**
17. Inflorescence small, straight; rachis straight ..... **Thelasis**
18. Pseudobulb shield-shaped ..... **Propax**
18. Psudobulb not sheld-shaped 19

19. Flowers minute; sepals equal;.....**Phreatia**
19. Flowers large; sepals subequal .....**Coelogyne**
20. Lip larger than sepals and petals ..... **Dendrobium**
20. Lip same length as sepals and petals 21
21. Inflorescence hairy 22
21. Inflorescence not hairy 23
22. Pseudobulb elongated.....**Eria**
22. Pseudobulb discoid.....**Conchidium**
23. Lateral sepals triangular; lip clawed; column not winged .....**Polystachya**
23. Lateral sepals otherwise; lip entire; column winged ..... **Liparis**
24. Lip with 2 spurs .....**Diplocentrum**
24. Lip with 1 spur 25
25. Stem cylindric, erect, often woody.....26
25. Stem not cylindric and woody 29
26. Leaves lobed at the apex.....27
26. Leaves not lobed at the apex.....28
27. Inflorescence always drooping; sepals and petals similar; column withlong foot..... ..... **Aerides**
27. Inflorescence erect, rarely drooping; sepals and petals dissimilar; column with short foot, or absent .....**Rhynchostylis**
28. Sepals and petals flat, subsimilar; lip upcurved, saccate; foot absent .....**Acampe**
28. Sepals and petals spreading; lip immovable; foot present..... **Vanda**
29. Plants with leafy stem.....30
29. Plants without leafy stem.....37
30. Plant short, less than 10 cm tall 31
30. Plants tall, more than 10 cm tall.....33
31. Disc with sharp appendages ..... **Kingidium**
31. Disc without appendages 32
32. Inflorescence much shorter than leaves .....**Smithsonia**
32. Inflorescence equaling the length of leaves..... **Thrixspermum**
33. Inflorescence short, pendulous, thick, branched.....34
33. Inflorescence long, thin, branched 35
34. Sepals and petals free; lip spurred, side lobes present, short ..... **Xenikophyton**
34. Sepals and petals not free, similar; lip lobed, side lobes absent.....**Robiquetia**
35. Pendulous epiphytes; leaves linear .....**Cleisostoma**
35. Plant erect; leaves otherwise 36
36. Leaves flat, narrow; lip adnate to the side of the column..... **Trichoglottis**
36. Leaves long, narrow, coriaceous; lip sessile..... **Cottonia**
37. Leaves hanging downward 38
37. Leaves not hanging downward 39
38. Leaves mottled with blue-grey patches; inflorescence from alternate sides .... **Phalaenopsis**
38. Leaves green; inflorescence not from alternate sides ..... **Pteroceras**

39. Inflorescence many flowerd, axis persisting; dorsal sepal hooded; pollinia 4..... .....**Sirhookera**
39. Inflorescence few flowered, axis not persisting; sepals spathaceous; pollinia 2..... .....**Gastrochilus**
40. Leafless either during flowering time or through out 41
40. Plant leafy through out 46
41. Plant leafless through out.....42
41. Leaf appearing after flowering 44
42. Racemes 4-8 flowered; disc papillose ..... **Didymoplexis**
42. Racemes many flowered; disc not papillose.....43
43. Flowers with slender ovary; lip without spur.....**Aphyllorchis**
43. Flowers with very swollen ovary; lip with a saccate spur .....**Epipogium**
44. Flowers glandular pubescent .....**Pachystoma**
44. Flowers glabrous 45
45. Leaves orbicular to broadly ovate, solitary .....**Nervilia**
45. Leaves linear, 2 or more..... **Eulophia** (p.p.)
46. Lip with 2 spurs ..... **Satyrium**
46. Lip with 1 spur or none 47
47. Plants with pseudobulbs.....48
47. Plants without pseudobulbs.....53
48. Leaves solitary 49
48. Leaves 2 or more.....50
49. Pseudobulb stout; pollinia 8 ..... **Tainia**
49. Pseudobulb narrow; pollinia 2 .....**Chrysoglossum**
50. Pseudobulb angular or ovoid 51
50. Pseudobulb corm like 52
51. Column pouched or spurred; pollinia 2..... **Eulophia** (p.p.)
51. Column long with long curved foot; pollinia 8 ..... **Acanthephippium**
52. Leaves more than 30 cm long; racemes to 1 m long .....**Calanthe**
52. Leaves less than 15 cm long; racemes to 15 cm long..... **Seidenfia**
53. Plants with short or elongate creeping rhizome 54
53. Plants with underground tubers or tuberous roots 61
54. Stem succulent.....55
54. Stem non-sacculent.....56
55. Inflorescence axis glandular pubescent; sepals free; lip adnate to the column through a sharp bend.....**Anoectochilus**
55. Inflorescence axis not hairy; sepals connate; lip inserted at the base of column ....**Cheirostylis**
56. Leaves deep green or coloured 57
56. Leaves not coloured ..... **Malaxis**
57. Leaves 3 or 4 .....**Dienia**
58. Leaves 5 or more.....59
59. Lip superior..... **Hateria**
59. Lip inferior.....60

60. Lip hairy, hollow or saccate, sessile on the base of the column; glands absent..... ..... **Goodyera**
60. Lip not hairy; adnate to the base of the column, with saccate base containing 2 glands ..... **Zeuxine**
61. Plant with 2 or 3 leaves 62
61. Plants with 3 or more leaves 63
62. Stem woody; leafes towards the apex of stem ..... **Tropidia**
62. Stem short, not woody; leaves from the base..... **Ipsea**
63. Leaves with sheathing base 64
63. Leaves without sheathing base 67
64. Leaves not plaited..... 65
64. Leaves plaited..... 66
65. Leaves stout; petals narrower than dorsal sepal; lip fringed ..... **Pectilis**
65. Leaves thin; sepals and petals more or less equal; lip not fringed..... **Habenaria**
66. Leaves sessile; flowers green or white; bracts not foliaceous..... **Peristylus**
66. Leaves slightly stalked; flowers pink; bracts foliaceous ..... **Brachycorythis**
67. Sepals and petals sub-similar..... **Disperis**
67. Sepals and petals similar..... 68
68. Inflorescence lateral or axillary ..... **Corymborkis**
68. Inflorescence terminal 69
69. Pollinia 2 ..... **Geodorum**
69. Pollinia 4 ..... **Liparis** (p.p)

ACAMPE Lindley

Folia Orchid. Fasc. 4: 95. 1853, *nom. cons.*

Epiphytic herbs. Leaves thickly coriaceous, keeled, distichous, apex oblique. Flowers corymbose, often panicled, fleshy; sepals and petals flat, subsimilar, lateral sepal adnate to the small spur; lip upcurved, adnate to the column, often pubescent; column short, thick; foot 0; anther 2 celled; pollinia 2, waxy, globose.

1. Inflorescence much longer than leaves, axillary; flowers laxly arranged in branched panicles ..... **A. ochracea**
1. Inflorescence shorter than leaves, leaf opposed, subcorymbose; flowers densely arranged ..... **A. praemorsa**

Acampe ochracea (Lindl.) Hochr., Bull. New York Bot. Gard. 6: 270. 1910; Abraham & Vatsala, Introd. Orch.452. 1981; V. S. Ramach. & V.J. Nair, Fl. Cannanore 446. 1988; Sathish & Manilal, Orchid Memories 163. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 477. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 49. 2009. *Saccolabium ochraceum* Lindl., Bot. Reg. Misc. 2. 1842; Hook. f., Fl. Brit. India 6: 62. 1890.

Epiphytes. Leaves 16-19 x 1.5-2 cm, oblong, keeled, obliquely bilobulate at apex. Flowers yellow, ca. 1.5 x 1.5 cm, in 10-20 cm long, axillary, racemose panicles; dorsal sepal obovate, obtuse, 5-veined; lateral sepals obliquely

oblong, acute, 3-veined; petals 6-7 x 1-2 mm, obovate-oblong or spathulate, 6-veined; lip 4-5 x 1-2 mm, triangular, obtuse, papillate, with 5-6 x 1-2 mm, cylindrical spur.
Flowering & Fruiting: February-April.
Distribution: Indo-Malesia. Rare; in moist deciduous forests. *RNMK 3211,* Kuruva; *RNMK 1493*, Muthanga.

Acampe praemorsa (Roxb.) Blatter & McCann, J. Bombay Nat. Hist. Soc. 35: 495. 1932; Abraham & Vatsala, Introd. Orch.450. 1981; Manilal & Sivar., Fl. Calicut 284. 1982; Ansari, Fl. Kasaragod Div. 367. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 297. 1988; Vajr., Fl. Palghat Dist. 465. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 433. 1996; Sivar. & P. Mathew, Fl. Nilambur 677. 1997; Sathish & Manilal, Orchid Memories 163. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 477. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 673. 2009; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 50. 2009. *Epidendrum praemorsum* Roxb., Pl. Corom. 34, t.43. 1795. *Saccolabium praemorsum* (Roxb.) Hook.f., Fl. Brit. India 6: 62. 1890. *Acampe wightiana* Lindl., Fol. Orch. Acampe 2.1853; Fischer in Gamble, Fl. Pres. Madras 1447(1011).1928. *Vanda wightiana* (Lindl.) Wight, Ic. t. 1670. 1851. *Saccolabium wightianum* (Lindl.) Hook.f., Fl. Brit. India 6: 62. 1890. *Thalia-maravara* Rheede, Hort. Malav. 12:9, t.4. 1693.

Leaves 14-20 x 2-3 cm, linear, thick, coriaceous; midrib impressed above. Corymbs leaf-opposed, 5-6 cm long. Flowers ca. 1 cm across; sepals and petals creamy yellow with reddish-brown transverse bands; lip creamy white with narrow red streaks; midlobe ovate-obtuse, margins crispate, lateral lobes small, entire, spur short.
Flowering & Fruiting: March-April.
Distribution: India, Sri Lanka and Seychelles. Occasional; along roadside trees. *RNMK* 0069, Mananthavady.

ACANTHEPHIPPIUM Bl. ex Lindley
Bijdr. 353. 1825.

Acanthephippium bicolor Lindl., Bot. Reg. 20. t.1730. 1835; Hook. f., Fl. Brit. India 5: 815. 1890; Fischer in Gamble, Fl. Pres. Madras 1426(997). 1928; Abraham & Vatsala, Introd. Orch. 272. 1981; Manilal, Fl. Silent Valley 268. 1988; Vajr., Fl. Palghat Dist. 466. 1990; Sathish & Manilal, Orchid Memories 164. 2004. **Fig. 41. Plate 28g.**

Terrestrial herbs; pseudobulbs ovoid, 5-14 x 2-5 cm. Leaves 2 or 3, 20-40 x 6-12 cm, broadly lanceolate, acuminate. Flowers yellow with purplish red, 3.5-4 cm across, in 2-5-flowered racemes from the top of new pseudobulbs; bracts 3-3.5 x 2.5-3, cymbiform; sepals fused to form gibbous tube; dorsal sepals oblong, obtuse; lateral sepals as long as or broader than dorsal sepal, fused with the foot along their inner edges forming the base of the pitcher, obtuse, recurved at apex; petals 3-3.5 x 1-1.5 cm, spathulate, obtuse; lip 3-lobed, ca.

1.5 x 2 cm, lateral lobes erect, rounded; midlob recurved, oblong-spathulate, obtuse, disc 3-lamellate.
Flowering & Fruiting: March-April.
Distribution: South India and Sri Lanka. Occasional; in evergreen forests. *RNMK 1667,* Chembra; *RNMK 3305*, Sugandhagiri; *RNMK 1623*, Kurichiarmala.

AERIDES Loureiro
Fl. Cochinch. 2: 525. 1790.

Epiphytes with prominent leaf bases. Leaves flat, coriaceous. Flowers usually in many flowered racemes or panicles; sepals and petals similar; lateral sepals adnate to the foot of the column; lip 3-lobed; midlobe large, side lobes smaller; spur curved forward with a callus inside; column short; pollinia 2, globose, bipartite, caudicle subulate, long.

1. Stem 20-30 cm tall; midlob of the lip ovate-deltoid; spur half the length of the lip..... ..... **A. crispa**
1. Stem 5-20 cm tall; midlob of the lip linear oblong; spur almost equal in length to the lip ..... **A. ringens**

Aerides crispa Lindl., Gen. Sp. Orch. Pl. 239. 1833; Hook. f., Fl. Brit. India 6: 45. 1890; Fischer in Gamble, Fl. Pres. Madras 1442(1008). 1928; Sant & Kapad., Orch. Bombay: 122-124. 1966; Abraham & Vatsala, Introd. Orch. 446. 1981; Ansari, Fl. Kasaragod Div. 367. 1985; Manilal, Fl. Silent Valley 268. 1988; Sivar. & P. Mathew, Fl. Nilambur 678. 1997; Sathish & Manilal, Orchid Memories 165. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 52. 2009. *Aerides lindleyana* Wight, Ic. 5:9, t.1677. 1852. **Plate 28h.**

Robust epiphytes; stem woody, 20-30 cm tall, sheathed with old leaves. Leaves leathery 8-12 cm long, linear oblong, bilobed at apex. Inflorescence branched with 10-15 pinkish white flowers; flowers fragrant, ca. 3 cm long; petals white inside and pink on dorsal side; lip 3-lobed, hinged to the foot of the column; midlob deep pink; spur white, broadly funnel shaped.
Flowering & Fruiting: June-September.
Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 1032*, Manikkunnumala; *RNMK 1610*, Chembra; *RNMK 0242*, Makkimala.

Aerides ringens (Lindl.) Fischer, Bull. Misc. Inform. Kew 1928: 284. 1928 & Gamble, Fl. Pres. Madras 1442(1008). 1928; Abraham & Vatsala, Introd. Orch. 446. 1981; Manilal, Fl. Silent Valley 269. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 447. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 433. 1996; Sivar. & P. Mathew, Fl. Nilambur 679. 1997; Sathish & Manilal, Orchid Memories 165. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 478. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 54. 2009.

Saccolabium ringens Lindl., Gen. Sp. Orchid. Pl. 221. 1833. *Aerides radicosa* A. Rich., Ann. Sci. Nat. Bot. ser. 2, 15: 65. 1841; Hook. f., Fl. Brit. India 6: 46. 1890. *Saccolabium paniculatum* Wight, Ic. t. 1676. 1851. *Aerides lineare* Hook. f., Fl. Brit. India 6: 47. 1890. *Saccolabium rubrum* Wight, Ic. t. 1673. 1851, non Lindley 1833. **Plate 28i.**

Leaves 13-15 x 0.4-0.5 cm, linear, keeled, obliquely bilobulate. Flowers white with pink, 1.5-2 x 1-1.5 cm, in about 20 cm long, lax racemes; dorsal sepal oblong-ovate, acute, 5-veined; laterals broadly ovate, acute, 5-veined; petals oblong, obtuse, 5-veined; lip 6-7 x 1-2 mm, ovate, acute, side lobes oblong or orbicular small, midlobe linear-oblong, acute; disc with fleshy callus; spur 5-6 x 1-2 mm, cylindrical.

Flowering & Fruiting: June-July.

Distribution: South India and Sri Lanka. Common; in semi-evergreen and evergreen forests. *RNMK 1650*, Manikkunnumala; *RNMK 1672*, Chembra.

ANOECTOCHILUS Blume

Bijdr. 8: 411, t. 15. 1825.

Anoectochilus elatus Lindl., Proc. Linn. Soc. Bot. 1: 178. 1857; Hook. f., Fl. Brit. India 6: 95. 1890 'elatior'; Fischer in Gamble, Fl. Pres. Madras 1453(1016). 1928; Abraham & Vatsala, Introd. Orch. 196. 1981; Manilal, Fl. Silent Valley 269. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 434. 1996; Sathish & Manilal, Orchid Memories 165. 2004.

Terrestrial herbs with creeping rhizome. Leaves 4-5 x 3.5-4 cm, ovate or elliptic, acute, dark maroon with golden netted veins; petiole ca. 1.5 cm long. Flowers white, 2.5-3 x 0.8-1 cm, in about 25 cm long raceme; dorsal sepal ovate, acuminate, 1-veined; lateral sepals obovate-oblong, subacuminate, 1-veined; petals obliquely oblong, acuminate, 1-veined, connate with dorsal sepal; lip 3-lobed, ca. 2 x 2 cm, side lobes oblong, retuse, curved, mesochile with 5-7 pairs of long fimbriate epichile, bilobed, lobes broad at apex, truncate; spur bilobulate, with spindle-shaped gland.

Flowering & Fruiting: November-December.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3216,* Vythiri.

APHYLLORCHIS Blume

Bijdr. t. 77. 1825.

Aphyllorchis montana Rchb.f., Linnaea 41: 57. 1877; Hook. f., Fl. Brit. India 6: 116. 1890; Fischer in Gamble, Fl. Pres. Madras 1457(1019). 1928; Mohanan *et al.*, J. Bombay Nat. Hist. Soc. 79: 234. 1982; Sathish & Manilal, Orchid Memories 166. 2004. *Aphyllorchis prainii* Hook.f., Fl. Brit. India 6: 117. 1890; Manilal, Fl. Silent Valley 270. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 447. 1988; Vajr., Fl. Palghat Dist. 467. 1990.

Saprophytes, 50-60 cm tall. Flowers yellow, 2.5-3 x 0.8-1 cm, racemose; bracts ca. 1 x 2 cm, linear lanceolate; dorsal sepal oblong, obtuse; lateral

sepals oblong, obtuse; petals oblong, obtuse; lip 8-9 x 4-5 mm, ovate, acute, 3-lobed, side lobes obliquely ovate-obtuse; midlobe ovate, acute.
Flowering & Fruiting: August-September.
Distribution: Indo-Malesia. Rare; in evegreen forests. *RNMK 1622*, Vythiri Ghats.

BRACHYCORYTHIS Lindley
Gen. Sp. Orch. 363. 1838.

Brachycorythis iantha (Wight) Summerh., Kew Bull. 1955: 238. 1955; Abraham & Vatsala, Introd. Orch. 254. 1981; Vajr., Fl. Palghat Dist. 468. 1990; Sathish & Manilal, Orchid Memories 167. 2004. *Platanthera iantha* Wight, Ic. t. 1692. 1851. *Platanthera affinis* Wight, Ic. t. 1693. 1851. *Habenaria galeandra* Benth., Hook. f., Fl. Brit. India 6: 163. 1890. *Phyllomphax obcordata* (D. Don) Schltr., Feddes Repert. 4: 119. 1919; Fischer in Gamble, Fl. Pres. Madras 1474(1031). 1928. **Plate 28j.**

Unbranched terrestrial herbs. Leaves 2.5-3 x 0.9-11 cm, elliptic-oblong, acute, 3-nerved, well spaced. Flowers pink, 1.5-1.8 x 0.8-1 cm; dorsal sepal ovate-lanceolate, acute, 3-veined; lateral sepals falcate, ovate-oblong, acute, 3-veined; petals lanceolate, obliquely acute at apex, 1 or 2-veined; lip 1.4-1.5 x 1-1.2 cm, obcordate with a large sinus, sac ovate, obtuse, biparted.
Flowering & Fruiting: July-August.
Distribution: Endemic to Western Ghats. Rare; in grasslands. *RNMK 3487*, Aranamala.

BULBOPHYLLUM Du Petit-Thouars
Hist. Pl. Orch., tabl. esp. 3 sub u. 1822, *nom. cons.*

Epiphytic herbs with creeping rhizomes. Leaves 1 or 2 on pseudobulb. Flowers solitary, umbellate or racemose; scape arising from rhizome.; sepals subequal or unequal, dorsal smaller than the laterals, laterals often twisted; petals shorter or longer than the sepals; lip usually elongated, tongue-shaped, sessile or clawed, jointed on the foot, mobile, sometimes small and recurved; column short, often 2-horned at apex; pollinia 4, in 2 groups.

1. Flowers in racemes 2
1. Flowers in umbels.....4
2. Plants large, to 20 cm; inflorescence terminal ..... **B. fuscopurpureum**
2. Plants short, to 12 cm long; inflorescence lateral 3
3. Inflorescence shorter than leaves; flowers dense, glabrous.....**B. sterile**
3. Inflorescence longer than leaves; flowers lax, hairy .....**B. tremulum**
4. Leaves membranous; plants with crowded, lemon yellow pseudobulbs.....
.....**B. fimbriatum**
4. Leaves thick; pseudobulbs not crowded 5
5. Lateral sepals densely papillose 6
5. Lateral sepals smooth without 7

6. Pseudobulbs corrugated; leaves linear-oblong; flowers pale yellow ...**B. elegantulum**
6. Pseudobulbs not corrugated; leaves linear-oblanceolate; flowers yellow mottled with purple dots .....**B. fischeri**
7. Scape longer than the leaves.....**B. acutiflorum**
7. Scape shorter than the leaves 8
8. Flowers 1 or 2, golden yellow; peduncle less than 4 cm long .....**B. aureum**
8. Flowers more than 2; peduncle more than 5 cm long 9
9. Dorsal sepal boat shaped, gland dotted.....**B. rheedei**
9. Dorsal sepal otherwise, not gland dotted.....10
10. Flowers pinkish-brown, 5-7; peduncle to 10 cm long ..... **B. kaitense**
10. Flowers yellowish, 3-4; peduncle to 6 cm long.....11
11. Dorsal sepal elliptic, apiculate; column with narrow wings .....**B. silentvalliensis**
11. Dorsal sepal lanceolate, acuminate; column not winged.....**B. mysorensis**

Bulbophyllum acutiflorum A. Rich., Ann. Sci. Nat. Bot. ser. 2, 15: 18. t. 7. 1841; Rao, Cons. Wild. Orch. Kodagu W. Ghats 193. 1998; Sathish & Manilal, Orchid Memories 167. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 56. 2009. *Cirrhopetalum acutiflorum* (A. Rich.) Hook. f., Fl. Brit. India 5: 779. 1890; Fischer in Gamble, Fl. Pres. Madras 1421(993). 1928. *Cirrhopetalum albidum* Wight, Ic. t. 1653. 1851. *Bulbophyllum albidum* (Wight) Hook. f., Fl. Brit. India 5: 757. 1890; Fischer in Gamble, Fl. Pres. Madras 1418(992). 1928; Sathish & Manilal, Orchid Memories 168. 2004. **Plate 28k.**

Rhizome creeping with pseudobulbs at intervals; pseudobulbs 1-1.5 x 0.5-0.7 cm. Leaves linear-oblong, obtuse, 5-8 x 0.7-1.5 cm. Inflorescence umbel at the tip of elongated, slender scape, 5-10 cm long with a few tubular sheaths; flowers many, yellowish-green with reddish streaks on the lip; bracts lanceolate, acuminate; lateral sepals twice as long as dorsal sepal, lanceolate, subacute; petals oblong, obtuse; lip much smaller than sepals and lateral petals.

Flowering & Fruiting: March-April.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1410,* Kurichiarmala.

Bulbophyllum aureum (Hook. f.) J.J. Smith, Bull. Buitz. ser. 2, 8: 22. 1912; Abraham & Vatsala, Introd. Orch.338. 1981; Manilal, Fl. Silent Valley 270. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 435. 1996; Sathish & Manilal, Orchid Memories 168. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 57. 2009. *Cirrhopetalum aureum* Hook. f., Fl. Brit. India 5: 777. 1890; Fischer in Gamble, Fl. Pres. Madras 1420(993). 1928. **Plate 28 l.**

Pseudobulb ovoid, 1-1.3 x 1-1.5 cm, tapering towards apex, ridged, distantly placed on stout rhizomes. Leaves solitary, 3-5 x 1-1.5 cm, elliptic-oblong, base subacuminate to form ca. 1 cm long petiole, apex obtuse-

emarginate. Flowers 1 or 2, golden yellow, ca. 3 x 1 cm, in ca. 4 cm long slender peduncle; bract lanceolate, acute, 3-veined; dorsal sepals elliptic, obtuse at apex, 5-veined; lateral sepals oblong, lanceolate, acute, 5-veined; petals ovate, oblong, broad at base, 3-veined; lip 7-8 x 2-3 mm, ovate-oblong, obtuse, curved, fleshy.
Flowering & Fruiting: November-December.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 2092*, Sughandhagiri.

Bulbophyllum elegantulum (Rolfe) J. J. Smith, Bull. Buit. ser. 2, 8: 23. 1912; Sathish & Manilal, Orchid Memories 169. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 60. 2009. *Cirrhopetalum elegantulum* Rolfe, Gard. Chron. 9: 552. 1891; Fischer in Gamble, Fl. Pres. Madras 1421(993). 1928.

Pseudobulb ovoid, ridged, distantly placed, 1.5-2 x 0.8-1 cm, Leaves solitary, 6-9 x 0.8-1 cm, linear-oblong, obtuse, emarginate at apex; petiole to 1 cm long. Flowers 4-6, deep pink, in 6-8 cm long slender peduncle; bracts lanceolate, acute, 3-veined; pedicel 2.5-4 mm long; dorsal sepal elliptic, apiculate, 5-veined, puberulus, hooded; lateral sepals oblong, lanceolate, acute, 5-veined, connate along the dorsal margins, papillate near the base; petals elliptic, obovate-oblong, obtuse, 3-veined, speckled with brown spots; lip 2-3.5 x 0.8-1 mm, ovate, oblong, obtuse, slightly curved.
Flowering & Fruiting: May-June.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3086*, Chembra.

Bulbophyllum fimbriatum (Lindl.) Rchb.f., Walp. Ann. 6: 260. 1861; Abraham & Vatsala, Introd. Orch. 336. 1981; Sathish & Manilal, Orchid Memories 169. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 60. 2009. *Cirrhopetalum fimbriatum* Lindl., Bot. Reg. Misc. 72. 1839; Hook. f., Fl. Brit. India 5: 774. 1890; Fischer in Gamble, Fl. Pres. Madras 1420(993). 1928; V. S. Ramach. & V.J. Nair, Fl. Cannanore 449. 1988. **Plate 29a.**

Pseudobulb subglobose, ca. 2 x 1.5 cm, distantly placed on stout rhizome, leafless in flowering. Flowers 5-6, creamy, in 10-14 cm long slender peduncle; bracts lanceolate, subacuminate; pedicel 2-3 mm long; dorsal sepals ovate, long-caudate, 3-veined, fimbriate along the margins, hooded; lateral sepals oblong, subacute, cuspidate at apex, 5-veined, connate along their ventral margins; petals lanceolate, acuminate, with long hairs, 1-veined; lip 3-5 x 0.7-0.9 mm, oblong, subacute, fleshy, curved, grooved.
Flowering & Fruiting: February-March
Distribution: Endemic to southern Western Ghats. Occasional; in semi-evergreen and evergreen forests. *RNMK 1319,* Manikkunnumala; *RNMK 1385*, Kurichiarmala.

Bulbophyllum fischeri Seidenf., Dansk Bot. Ark. 29: 202. 1973; Abraham & Vatsala, Introd. Orch. 341. 1981; Manilal, Fl. Silent Valley 271. 1988; Vajr., Fl. Palghat Dist. 468. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 435. 1996; *Phyllorkis gamblei* (Hook.f.) Kuntze, Revis. Gen. Pl. 2: 677. 1891. *Cirrhopetalum gamblei* Hook. f., Fl. Brit. India 5: 778. 1890; Fischer in Gamble, Fl. Pres. Madras 1420(993). 1928; Sathish & Manilal, Orchid Memories 174. 2004. *Bulbophyllum gamblei* (Hook.f.) J.J.Smith, Bull. Jard. Bot. Buitenzorg, II, 8: 24. 1912, nom. illeg. *Cirrhopetalum thomsonii* Hook. f., Fl. Brit. India 5: 778. 1890; Abraham & Vatsala, Introd. Orch. 343. 1981. **Plate 29b.**

Pseudobulb ovoid, ridged, 0.7-1 x 0.8-1 cm, distantly placed. Leaves solitary, 4-5.5 x 1-1.5 cm, elliptic-oblong or linear-oblong, base subacute; petiole ca. 1 cm long, obtuse, emarginate at apex. Flowers 4-8, pink, in 5-8 cm long slender peduncle; bracts 4-5.5 x 1-2.5 mm, elliptic, acute, 5-veined; dorsal sepal ovate or elliptic, acute, 5-veined, puberulus, hooded; lateral sepals linear-lanceolate, subacuminate, 5-veined, puberulus near the base; petals elliptic-oblong or orbicular, obtuse, 3-veined; lip 4-5 x 1-2 mm, ovate, oblong, obtuse, curved.

Flowering & Fruiting: October-November.

Distribution: South India, Sri Lanka and Laos. Common; in evergreen forests. *RNMK 1634*, Chembra; *RNMK 3274*, Kurichirmala.

Bulbophyllum fuscopurpureum Wight, Ic. t. 1651. 1851; Hook. f., Fl. Brit. India 5: 760. 1890; Fischer in Gamble, Fl. Pres. Madras 1418(992). 1928; Abraham & Vatsala, Introd. Orch. 334. 1981; Sathish & Manilal, Orchid Memories 169. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 61. 2009.

Pseudobulb ovoid, 3.5-4.5 x 1.5-2 cm, tapering towards apex, ridged, distantly placed. Leaves solitary, 15-20 x 3-3.8 cm, oblong, base acute; petiole 2-2.5 cm long. Flowers 4 or 5, yellowish-pink to darker, in 10-12 cm long sheathed raceme; bracts 1-1.2 x 0.7-0.8 mm, ovate, acute, 9-veined; dorsal sepal ovate, subacuminate, 7-veined; lateral sepals ovate, lanceolate, acute, keeled, fleshy, 7-veined; petals at base with a caudate long tail; lip 1.4-1.6 x 0.7-0.9 cm, ovate-oblong, subacute, apiculate at apex; side lobes falcately oblong, obtuse; disc channelled.

Flowering & Fruiting: April-May.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3311*, Chembra.

Bulbophyllum kaitiense Rchb.f., Walp. Ann. 6: 262. 1861; Abraham & Vatsala, Introd. Orch. 338. 1981. *Cirrhopetalum neilgherrense* Wight, Ic. t. 1654. 1851; Hook. f., Fl. Brit. India 5: 788. 1890; Fischer in Gamble, Fl. Pres. Madras 1420(993). 1928; Sathish & Manilal, Orchid Memories 174. 2004. *Phyllorkis kaitiensis* (Rchb.f.) Kuntze, Revis. Gen. Pl. 2: 677. 1891. **Plate 29c.**

Pseudobulb ovoid, 2-2.5 x 1-2 cm, distantly placed. Leaves solitary, 10-13 x 2.5-3 cm, oblong, subacute at base, obtuse at apex; petiole ca. 2 cm long. Flowers 5-7, pinkish-brown, ca. 9 cm long, peduncle; bracts 6-7 x 1-2 mm, ovate, acuminate, 5-veined; dorsal sepal broadly ovate, acute, 7-veined, hooded; lateral sepals ovate-oblanceolate, acute, 5-veined; petals ovate, apiculate, slightly oblique. Lip 2-4 mm, ovate-oblong, obtuse, curved.
Flowering & Fruiting: August-September.
Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 3328*, Kurichiarmala; *RNMK 3332*, Kattimattom.

Bulbophyllum mysorense (Rolfe) J.J. Smith, Bull. Jard. Bot. Buitenz. ser. 2, 8: 26. 1912; Fischer in Gamble, Fl. Pres. Madras 1418(992). 1928; Sathish & Manilal, Orchid Memories 169. 2004. *Cirrhopetalum mysorense* Rolfe, Bull. Misc. Inform. Kew 1895: 39. 1895.

Pseudobulb ovoid, 1.5-2 x 1-1.5 cm. Leaves solitary, 6-7.5 x 1-1.5 cm, linear-oblong, base subacute; petiole 0.8-1 cm long, obtuse, emarginate at apex. Flowers 3-4, yellowish-white, in about 5 cm long umbel from the base of pseudobulb; bracts 4-5 x 1-2 mm, lanceolate, acuminate, 1-veined; dorsal sepal lanceolate, acuminate, 5-veined; lateral sepals lanceolate, long-acuminate, 5-veined; petals elliptic, linear-lanceolate, acute, 3-veined; lip ca. 4 x 1 mm, oblong, acute, curved.
Flowering & Fruiting: June-September.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3323*, Sugandhagiri.

Bulbophyllum rheedei Manilal & Sathish, Rheedea 1: 55. 1991. *Rhytionanthos rheedei* (Manilal & Sathish) Garay, Hamer, Siegerist, Nordic J. Bot. 14: 639. 1994; Sathish & Manilal, Orchid Memories 216. 2004; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 6753. 2009. **Plate 29d.**

Small pseudobulbous herbs, pseudobulb dark green with a few disintegrating sheaths at base. Leaves 0.8-2 x 05-08 cm, oblong-ovate or elliptic with a very small petiole. Inflorescence from the basal part of the rhizome; flowers 2 or 3, creamy white; dorsal sepal boat shaped, gland dotted; petals oblong; lip creamy-yellow; column narrowly winged laterally.
Flowering & Fruiting: May-September.
Distribution: Endemic to southern Western Ghats. Rare; on trees along riversides. *RNMK 3334,* Kuruva.

Bulbophyllum silentvalliensis Sharma & Srivastava, J. Jpn. Bot. 68: 209. 1993; Sathish & Manilal, Orchid Memories 171. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 63. 2009. **Plate 29e.**

Pseudobulb ovoid, distantly placed. Leaves solitary, 4-5 x 0.8-1 cm, linear-oblong, obtuse at apex. Flowers 3-4, yellowish, in 4-5 cm long slender peduncle; bracts lanceolate, acute, 3-veined; dorsal sepal glabrous, elliptic,

apiculate, 5-veined; lateral sepals oblong, lanceolate, acute, 5-veined, connate along the dorsal margins, papillate near the base; petals elliptic, obovate-oblong, obtuse, 3-veined; lip 2-3 x 1-2 mm, grooved, oblong, base subacute; column with triangular apical teeth with curved foot.
Flowering & Fruiting: July-September.
Distribution: Endemic to southern Western Ghats (Kerala). Rare; in evergreen forests. *RNMK 3292*, 900 forest.

Bulbophyllum sterile (Lamk.) Suresh in Nicols., Suresh & Manilal, Interpr. Hort. Malab. 298. 1988; Sivar. & P. Mathew, Fl. Nilambur 680. 1997; Sathish & Manilal, Orchid Memories 171. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 479. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 674. 2009; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 63. 2009. *Epidendrum sterile* Lamk., Encycl. 1: 189. 1783. *Bulbophyllum neilgherrense* Wight, Ic. t. 1650. 1851; Hook. f., Fl. Brit. India 5: 761. 1890; Fischer in Gamble, Fl. Pres. Madras 1418(992). 1928; Abraham & Vatsala, Introd. Orchids 334. 1981; Manilal & Sivar., Fl. Calicut 284. 1982; Ansari, Fl. Kasaragod Div. 367. 1985; Manilal, Fl. Silent Valley 271. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 447. 1988; Vajr., Fl. Palghat Dist. 468. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 435. 1996. **Plate 29f.**

Pseudobulb ovoid, ridged, 3-3.5 x 1-2 cm. Leaves solitary, 10-16 x 3-4 cm, oblong, base subacute with ca. 1 cm long petiole, apex acute. Flowers brownish-yellow to brown, 1-1.2 x 0.8-1 cm, in 18-20 cm long dense raceme; dorsal sepal ovate, acute-apiculate, 5-veined, hooded; lateral sepals falcately elliptic-acuminate, 5-veined; petals ovate, acute, apiculate, 1-veined, glandular; lip 4-5 x 1-2 mm, acute, side lobes falcate.
Flowering & Fruiting: December-January.
Distribution: Endemic to Peninsular India. Occsional; in semi-evergreen forests. *RNMK 3242,* Kuruva; *RNMK 3324*, Talimala.

Bulbophyllum tremulum Wight, Ic. t. 1749. 1841; Hook. f., Fl. Brit. India 5: 763. 1890; Fischer in Gamble, Fl. Pres. Madras 1418(992). 1928; Abraham & Vatsala, Introd. Orch. 331. 1981; Manilal, Fl. Silent Valley 271. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 448. 1988; Vajr., Fl. Palghat Dist. 469. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 435. 1996; Sathish & Manilal, Orchid Memories 171. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 479. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 64. 2009. **Plate 29g.**

Pseudobulb ovoid, 0.6-0.8 x 1-2 cm. Leaves solitary, 5-6 x 0.8-1 cm, oblong, base acute into 4-5 mm long petiole, obtuse at apex. Flowers 10-12, brown, in 12-15 cm long slender lax racemes; bracts ca. 1.8 x 0.9 mm, ovate; sepals hairy inner and along margins; dorsal sepal subulates, 3-veined; lateral sepals ovate, subacuminate, 3-veined; petals falcately-lanceolate, acute, 1-veined; lip blong, obtuse, brownish, with acicular hairs, along the margins.

Flowering & Fruiting: March-April.
Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 1639*, Chembra; *RNMK 3309*, Manikkunnumala.

CALANTHE R. Brown

Bot Reg. 7: sub t. 573. 1821, *nom. cons.*

Calanthe sylvatica (Thouars) Lindl., Gen. Sp. Orchid. Pl. 250. 1833; Sathish & Manilal, Orchid Memories 171. 2004. *Centrosis sylvatica* Thouars, Orch. Iles. Aust. Afr. t. 35,36. 1822. *Bletia masuca* D. Don, Prodr. Fl. Nepal. 30. 1825. *Calanthe masuca* (D. Don) Lindl., Gen. Sp. Orchid. Pl. 249. 1833; Hook. f., Fl. Brit. India 5: 850. 1890; Fischer in Gamble, Fl. Pres. Madras 1432(1001). 1928; Abraham & Vatsala, Intr. Orch. 265. 1981; Manilal, Fl. Silent Valley 272. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 448. 1988; Vajr., Fl. Palghat Dist. 469. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 436. 1996; Mohanan & Sivad., Fl. Agasthyamala 659. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 479. 2005. **Plate 29h.**

Robust terrestrial herbs, base of stem pseudobulbous. Leaves 30-45 x 7-12 cm, broadly elliptic-oblong, lanceolate, acuminate, attenuate into 10-15 cm long petiole. Flowers pinkish, in 70-80 cm long terminal racemes; flower bearing portion about 10 cm long; dorsal sepal oblong-lanceolate, apiculate, 7-veined; lateral sepals oblong-lanceolate, acuminate, 7-veined; petals elliptic-lanceolate, obtuse, 5-veined; lip ca.1.5 x 1 cm long, 3-lobed, side lobes small, obliquely ovate, obtuse, midlobe obcordate; spur ca. 3 x 0.2 cm, cylindrical, acute.

Flowering: October-November.
Distribution: India to Malesia. Occasional; in evergreen forests. *RNMK 3309*, 900 forest-Chooralmala; *RNMK 1460*, Vythiri.

CHEIROSTYLIS Blume

Bijdr. 413, t. 16. 1825.

Cheirostylis flabellata (A. Rich.) Wight, Ic. 16. 1851; Hook. f., Fl. Brit. India 6: 105. 1890; Fischer in Gamble, Fl. Pres. Madras 1454(1017). 1928; Abraham & Vatsala, Introd. Orch. 194. 1981; Manilal, Fl. Silent Valley 272. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 448. 1988; Sathish & Manilal, Orchid Memories 172. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 480. 2005. *Goodyera flabellata* A. Rich., Ann. Sci. Nat. Bot. ser. 2, 15: 79. t. 12. 1841. *Monochilus flabellatum* Wight, Ic. t. 1727. 1851.

Delicate terrestrial herbs, 14-20 cm tall; stem reddish. Leaves few, 2-2.5 cm long, ovate, acute, sessile, brownish red. Racemes terminal, 10-20 cm long, glandular pubescent. Flowers white, glandular pubescent, 1-1.2 cm long; sepals oblong; petals linear oblong; lip bilobed, lobules obovate, dentate.

Flowering & Fruiting: February-May.
Distribution: South India, Sri Lanka, Bhutana and Myanmar. Rare; in evergreen forests. *RNMK 0228,* Vythiri; *RNMK 1640*, Kallady.

CHILOSCHISTA Lindley

Bot. Reg. 18: sub t. 1522. 1832.

Chiloschista fasciata (Muell.) Seidenf. & Ormerod, Opera Bot. 124: 64. 1995; Sathish & Manilal, Orchid Memories 172. 2004. *Sarcochilus fasciatus* Muell., Fragm. 5: 202. 1866. *Chiloschista usneoides* Wight, Ic. 5:19. t.741. 1851; *Sarcochilus wightii* Hook. f., Fl. Brit. India 6: 37. 1890 (excl. syns.) Trimen 1898. *Sarcochilus minimifolius* Hook.f., Fl. Brit. India 6: 37. 1890. *Chiloschista pusilla* auct. non Schltr., Feddes Repert. 4:275.1919; Fischer in Gamble, Fl. Pres. Madras 1441(1007). 1928; Abraham & Vatsala, Introd. Orch. 495. 1981. **Plate 29i.**

Very small orchid; plant body consisting of a mass of green fleshy roots formly attached to tree trunks; leaves scaly, appearing only for a short time after flowering. Flowering scape 1.7-2 cm long, 2-6 flowers successively, yellowish, pedicel pubescent; lip with a distinct epichile and hypochile.

Flowering & Fruiting: October-November.

Distribution: Southern India and Sri Lanka. Rare; in evergreen forests. *RNMK 3307*, Sugandhagiri.

CHRYSOGLOSSUM Blume

Bijdr.: 337 (1825).

Chrysoglossum ornatum Bl., Bijdr. 338. 1825. *Ania maculata* Thw., Enum. Pl. Zeyl. 301. 1861. *Chrysoglossum erraticum* Hook.f., Fl. Brit. India 5: 784. 1890. *Chrysoglossum maculatum* (Thw.) Hook.f., Fl. Brit. India 5: 784. 1890; Fischer in Gamble, Fl. Pres. Madras 1421(994). 1928; Abraham & Vatsala, Intr. Orch. 292. 1981; Ansari, Fl. Kasaragod Div. 368. 1985; Manilal, Fl. Silent Valley 272. 1988; Vajr., Fl. Palghat Dist. 470. 1990; Sathish & Manilal, Orchid Memories 173. 2004.

Large terrestrial orchids with pseudobulbs; pseudobulbs green, fusiform, 5-8 x 2.5-3 cm. Leaves single on the pseudobulb, dark green, 15-20 x 6-10 cm. Inflorescence lateral, 30-45 cm long; bracts ca. 1 cm long; flowers greenish-yellow, 2-5 cm across; petals smaller than sepal; lip with purple striations; column with two lobes in the middle.

Flowering: January-March.

Distribution: Peninsular India and Sri Lanka. Rare; in evergreen forests. *RNMK 1612,* 900 forest-Kallady.

CLEISOSTOMA Blume

Bijdr. 362. 1825.

Cleisostoma tenuifolium (L.) Garay, Bot. Mus. Leafl. Harvard Univ. 23: 175. 1972; Sasidh. & Sivar., Fl. Pl. Thrissur For. 436. 1996; Sivar. & P. Mathew, Fl. Nilambur 681. 1997; Sathish & Manilal, Orchid Memories 174. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 70. 2009. *Epidendrum tenuifolium* L., Sp. Pl. 952. 1753. *Sarcanthus peninsularis* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 343. 1851; Hook. f., Fl. Brit. India 6: 67.

1890; Fischer in Gamble, Fl. Pres. Madras 1447(1012). 1928. *Sarcanthus pauciflorus* Wight, Ic. t. 1747. 1851; Abraham & Vatsala, Introd. Orch.471. 1981; Ansari, Fl. Kasaragod Div. 375. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 462. 1988; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 494. 2005. **Plate 29j.**

Pendulous epiphytes, 20-30 cm long. Leaves 10-12 x 0.4-0.5 cm, linear, strongly keeled, acute. Flowers yellow, in 3-6 cm long, leaf-opposed racemes; dorsal sepal obovate-oblong, lanceolate, acute, 3-veined; lateral sepals elliptic, acute, 3-veined; petals falcately-oblong, truncate, 1-veined; lip 2-3 x 3-4 mm, 3-lobed, side lobes ovate, apiculate, midlobe ovate, with 2 fleshy calli; spur 3-4 x 1-2 mm, oblong-ovoid.

Flowering & Fruiting: July-August.

Distribution: South west India and Thailand. Common; in semi-evergreen forests and coffee plantations. *RNMK 1666*, Pozhuthana; *RNMK 1887*, Karuvanthodu.

COELOGYNE Lindley

Collect. sub t. 33. 1822.

Epiphytic or sometimes lithophytic pseudobulbous herbs. Leaves 2 or 1, on pseudobulbs, plaited. Flowers in few-flowered terminal racemes; bracts sheathing; sepals subequal, laterals often saccate at base; petals smaller than the sepals, narrower; lip 3-lobed, base concave or saccate and embracing the column; midlobe 2 or 3-keeled; column elongated, winged, hooded at apex; pollinia 4, in pairs of two.

1. Pseudobulb green or greenish brown; inflorescence drooping; 3-4 flowered..... ..... **C. breviscapa**
1. Pseudobulb lemon-yellow; inflorescence not drooping, many flowered.....2
2. Pseudobulb smooth, angled ..... **C. mossiae**
2. Pseudobulb rugose all over, not angled ..... **C. nervosa**

Coelogyne breviscapa Lindl., Fol. Orch. Coelogyne 4. 1854; Hook. f., Fl. Brit. India 5: 833. 1890; Fischer in Gamble, Fl. Pres. Madras 1430(1000). 1928; Abraham & Vatsala, Introd. Orch. 277. 1981; Manilal, Fl. Silent Valley 273. 1988; Vajr., Fl. Palghat Dist. 470. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 437. 1996; Sathish & Manilal, Orchid Memories 174. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 72. 2009. *Coelogyne angustifolia* Wight, Ic. t.1641. 1851; Hook. f., Fl. Brit. India 5: 833. 1890; Fischer in Gamble, Fl. Pres. Madras 1430(1000). 1928, non A. Rich. 1841. **Plate 29k.**

Pseudobulb ovoid, ridged, 4-5 x 1-1.5 cm, tapering towards apex. Leaves 2 per pseudobulb, 15-17 x 1-1.5 cm, linear, acute. Flowers white, in 10-13 cm long, 4-6-flowered, raceme from the rhizome; floral bracts 2-3 x 0.8-1 cm, lanceolate, acute; dorsal sepal oblong-lanceolate, acute, 5-veined; lateral

sepals oblong-lanceolate, acute, 5-veined; petals linear, acute, 3-veined; lip 1-1.2 x 0.7-0.8 cm, 3-lobed, middle ovate.
Flowering & Fruiting: March-April.
Distribution: Endemic to southern Western Ghats. Common; in semi-evergreen and evergreen forests. *RNMK 1669,* Manikkunnumala; *RNMK 1611,* Vannathymala.

Coelogyne mossiae Rolfe, Bull. Misc. Inform. Kew 1894: 156. 1894; Fischer in Gamble, Fl. Pres. Madras 1430(1000). 1928; Abraham & Vatsala, Introd. Orch. 285. 1981; Manilal, Fl. Silent Valley 273. 1988; Sathish & Manilal, Orchid Memories 175. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 74. 2009.

Pseudobulbs smoothly angled, lemon yellow, 3.5-4 x 2-3 cm. Leaves 2, thick, coriaceous, 12-15 cm long. Flowers 3-4, in 8-10 cm long racemes, 3-4 cm across, white ; sheaths brown; bracts 3-4 x 1-1.5 cm long; lip white marked with yellow, brown inside, 3 crenate ridges on the disc.
Flowering & Fruiting: August-December.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3347,* Chembra.

Coelogyne nervosa A. Rich., Ann. Sci. Nat. Bot. ser. 2, 15: 16. 1841; Fischer in Gamble, Fl. Pres. Madras 1430(1000). 1928; Abraham & Vatsala, Introd. Orch. 285. 1981; Manilal, Fl. Silent Valley 273. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 449. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 437. 1996; Sathish & Manilal, Orchid Memories 175. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 74. 2009. *Coelogyne corrugata* Wight, Ic. t. 1639. 1851; Hook. f., Fl. Brit. India 5: 835. 1890. **Plate 29l.**

Pseudobulb subglobose to ovoid; wrinkled. Leaves 2 per pseudobulb, 6-15 x 2-2.5 cm, oblong-lanceolate, acute; petiole 2-3 cm long. Flowers white, in 8-12 cm long, 3-4-flowered raceme from the middle of leaves; bracts 1.2-1.4 x 1.7-2 cm, ovate, acute; dorsal sepal oblong or elliptic, acute, to apiculate, 9-veined; lateral sepals oblong-elliptic, acute, apiculate, 9-veined; petals elliptic, acute at both ends, 5-veined; lip 2-2.4 x 0.7-1.5 cm, ovate, acute, trilobed, side lobes, obliquely ovate.
Flowering & Fruiting: June-July.
Distribution: Endemic to southern Western Ghats. Common; in high altitude shola forest and on dripping rocks in grasslands. *RNMK 1232*, Chembra; *RNMK 1777*, Kurichiarmala; *RNMK 3366*, Brahmagiri; *RNMK 1665*, Banasuramala.

CONCHIDIUM Griffith
Not. Pl. Asiat. 3: 321 (1851).

Epiphytic herbs; pseudobulb discoid, aggregated, reticulated. Leaves 2-5, oblanceolate or elliptic-oblong, obtuse, cuspidate, conduplicate, sheathing at

base, mucronate at tip, margin scabrous. Flowers creamy yellow, solitary or in slender terminal raceme; bracts triangular, encircling the pedicel, margins wavy, apiculate, gland-dotted; sepal lanceolate, subsimilar; petals lanceolate, acuminate, 3-veined; lip subsessile, ligulate, distally glandular on underside. Disc with 2 fleshy calli at base.

1. Flowers solitary, white ..... **C. braccatum**
1. Flowers in racemes, creamy yellow..... 2
2. Leaves 2-3, innermost largest; perianth obtuse-acute; lip ovate-lanceolate .. **C. filiforme**
2. Leaves 2-5, similar; perianth with acuminate tips; lip narrowly lanceolate 3
3. Leaves petioled; lip glandular..... **C. nanum**
3. Leaves sessile; lip not glandular..... **C. microchilos**

Conchidium braccatum (Lindl.) Brieger, Schlechter Orchideen 1: 751. 1981. *Dendrobium braccatum* Lindl., Gen. Sp. Orchid. Pl. 75. 1830. *Eria braccata* (Lindl.) Lindl., J. Proc. Linn. Soc. Bot. 3:46.1859; Hook. f., Fl. Brit. India 5:787.1890; Fischer in Gamble, Fl. Pres. Madras 1425(996). 1928; Sathish & Manilal, Orchid Memories 186. 2004. *Eria reticosa* Wight, Ic. t. 1637. 1851; Hook. f., Fl. Brit. India 5: 787. 1890; Abraham & Vatsala, Introd. Orch. 373. 1981; Manilal, Fl. Silent Valley 280. 1988; Vajr., Fl. Palghat Dist. 477. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 440. 1996; Sathish & Manilal, Orchid Memories 188. 2004. **Plate 30a.**

Pseudobulbs discoid, 6-9 mm diameter, reticulated. Leaves 2 per pseudobulb, 2-7 x 0.5-1.5 cm, oblanceolate to oblong-lanceolate, acute-apiculate, membranous. Flowers white, tinged with pink, solitary on 2-4 cm long slender scape from the pseudobulb; Bracts 8-9 x 5-7 mm, ovate, acute, 9-veined; dorsal sepal oblong-lanceolate, obtuse, 7-veined; lateral sepals obliquely ovate-lanceolate, acute, 7-veined; petals oblong-lanceolate, subacute, 5-veined; lip 1.6-1.9 x 5-9 mm, elliptic-oblong or ovate, obtuse emarginate at apex; disc with 2 white ridges reaching subapically.

Flowering & Fruiting: July-August.

Distribution: South India and Sri Lanka. Rare; in evergreen forests. *RNMK 3224*, Chembra; *RNMK 3813*, Sugandhagiri.

Conchidium filiforme (Wight) Rauschert, Feddes Repert. 94: 444. 1983. *Dendrobium filiforme* Wight, Ic. t. 1642. 1851. *Eria filiformis* (Wight) Rchb.f. in W.G.Walpers, Ann. Bot. Syst. 6: 268. 1861. *Dendrobium dalzellii* Hook. ex Dalz. in Hook.'s J. Bot. Kew. Gard. Misc. 4: 292. 1852. *Dendrobium fimbriatum* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 4: 292. 1852, nom. illeg. *Eria dalzellii* Lindl., J. Proc. Linn. Soc. Bot. 3: 47. 1859; Hook. f., Fl. Brit. India 5: 789. 1890; Fischer in Gamble, Fl. Pres. Madras 1425(996). 1928; Abraham & Vatsala, Introd. Orch. 375. 1981; Manilal, Fl. Silent Valley 279. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 454. 1988; Vajr., Fl. Palghat Dist. 477. 1990; Sathish & Manilal, Orchid Memories 186. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 482. 2005. *Eria dalzellii* (Hook. ex Dalz.) Lindl. var.

fimbriata (Dalz.) Hook. f., Fl. Brit. India 5: 789. 1890; Fischer in Gamble, Fl. Pres. Madras 1425(996). 1928. **Plate 30b.**

Pseudobulbs 1.5 cm in diameter. Leaves 3, 6-7 x 0.8-1 cm, oblanceolate, obtuse, mucronate. Racemes 8-10 cm long, peduncle ca. 4 cm long. Flowers greenish-yellow; bracts 4-5 x 1-2 mm, lanceolate; sepals subsimilar, lanceolate, acuminate, margins with stalked glands, 3-veined; petals slightly, narrower than sepals; lip 3-4 x 1-2 mm, falcate panduriform, minutely papillate; disc with 2 thick yellowish orange ridges.

Flowering & Fruiting: September-December.

Distribution: Endemic to Western Ghats. Rare; in evergreen forests. *RNMK 1668*, Banasuramala; *RNMK 1889*, Sugandhagiri.

Conchidium microchilos (Dalz.) Rauschert, Feddes Repert. 94: 444. 1983. *Dendrobium microchilos* Dalz., Hook.'s J.Bot. Kew Gard. Misc. 3: 34. 1851.*Eria microchilos* (Dalz.) Lindl., J. Proc. Linn. Soc. Bot. 3: 47. 1859; Sathish & Manilal, Orchid Memories 186. 2004.

Epiphytes with discoid, aggregated pseudobulbs. Leaves 2 to 5, sessile, oblong-lanceolate, 1 nerved. Flowers pale yellow, in slender racemes; petals and sepals glabrous; lip linear-oblong, crenulate, minutely puberulous, with 2 calli running throughout the length.

Flowering & Fruiting: July-August.

Distribution: Endemic to Peninsular India. Occasional; on dripping moss covered rocks. *RNMK 1601*, Manikkunumala.

Conchidium nanum (A.Rich.) Brieger, Schlechter Orchideen 1: 751. 1981. *Eria nana* A. Rich., Ann. Sci. Nat. Bot. ser. 2, 11: 19.1842; Hook. f., Fl. Brit. India 5:789.1890; Fischer in Gamble, Fl. Pres. Madras 1425(996). 1928; Abraham & Vatsala, Introd. Orch. 377. 1981; Sathish & Manilal, Orchid Memories 187. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 482. 2005. *Pinalia nana* (A.Rich.) Kuntze, Revis. Gen. Pl. 2: 679. 1891. *Eria muscicola* (Lindl.) Lindl. var. *ponmudiana* M. Mohanan & Henry, J. Econ. Tax. Bot. 8:425. 1986. **Plate 30c.**

Pseudobulb yellowish-green, discoid, 4-5 mm diameter. Leaves 2 or 3, ca. 4 x 0.4 cm, oblanceolate or elliptic-oblong, cuspidate, conduplicate, sheathing at base, mucronate at tip, 6-nerved, margin scabrous. Flowers creamy yellow, 7-8 mm long, in about 2 cm long, slender terminal raceme; bracts triangular, encircling the pedicel, margins wavy, apiculate, gland-dotted; dorsal sepal lanceolate, long-acuminate, 3-veined; lateral sepals ovate-lanceolate, acuminate, 3-veined; petals lanceolate, acuminate, 3-veined; lip 4-5 x 1-2 mm, subsessile, ligulate, distally glandular on underside; basal margins entire, distally crenulate, retuse to emarginate at apex; disc with 2 fleshy calli at base.

Flowering & Fruiting: July-October.

Distribution: Endemic to southern Western Ghats. Occasional; on moss covered tree trunks. *RNMK 1543*, Kurichiarmala.

CORYMBORKIS Du Petit- Thouars

Nouv. Bull. Soc. Philom. 19.318. 1809

Corymborkis veratrifolia (Reinw.) Bl., Coll. Orch. Arch. Ind. 125. Pl. 42-43. 1859; Fischer in Gamble, Fl. Pres. Madras 1452(1015). 1928; Abraham & Vatsala, Introd. Orch. 206. 1981; Manilal, Fl. Silent Valley 274. 1988; Sathish & Manilal, Orchid Memories 175. 2004. *Hysteria veratrifolia* Reinw., Nov. Pl. Ind. Gen.-Syll. Pl. Nov. 2: 5. 1825-26. *Corymbis veratrifolia* (Reinw.) Rchb.f., Flora 48: 184. 1865; Hook. f., Fl. Brit. India 6: 91. 1890.

Tall, rigid terrestrial leafy herbs; stem 1-2 m high. Leaves broad, 30-37 x 5-9 cm, elliptic-lanceolate, caudate-acuminate, sessile on the long ridged sheahs, plaited. Panicle 8-12 cm long, few flowered, flowers greenish white, fragrant; bracts ovate-lanceolate; sepals linear oblanceolate; petals slightly shorter; lip linear with the end expanded into an orbicular, apiculate recurved lobe.

Flowering & Fruiting: November-January.

Distribution: India to Pacific Islands. Rare; in evergreen forests. *RNMK 1226*, Kanthanpara.

COTTONIA Wight

Ic. t. 1755. 1852.

Cottonia peduncularis (Lindl.) Rchb.f., Cat. Orch. Schiller 52. 1857; Abraham & Vatsala, Introd. Orch. 456. 1981; V. S. Ramach. & V.J. Nair, Fl. Cannanore 450. 1988; Vajr., Fl. Palghat Dist. 471. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 437. 1996; Sivar. & P. Mathew, Fl. Nilambur 683. 1997; Sathish & Manilal, Orchid Memories 176. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 480. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 76. 2009. *Vanda peduncularis* Lindl., Gen. Sp. Orchid. Pl. 216. 1833. *Cottonia macrostachya* Wight, Ic. t. 1755. 1851; Hook. f., Fl. Brit. India 6: 26. 1890; Fischer in Gamble, Fl. Pres. Madras 1439(1006). 1928.

Epiphytes, 10-20 cm tall. Leaves few, spiral, closely packed, 8-10 x 0.8-1 cm, oblong, keeled, bilobed at apex. Flowers brown, in 20-40 cm long peduncle; dorsal sepal obovate-oblong, obtuse, 7-veined; lateral sepals obovate-oblong, obtuse, 7-veined; petals linear-oblong, obliquely truncate, 3-veined; lip subpanduriformis, 2-auricled at base with interposed calli, lateral lobes orbicular, midlobe trifid, lateral lobules orbicular.

Flowering & Fruiting: March-May.

Distribution: Peninsular India and Sri Lanka. Common; in semi-evergreen and moist deciduous forestrs. *RNMK 3373*, Manikkunnumala; *RNMK 3448*, Kuruva.

CYMBIDIUM Swartz

in Nova Acta Regiae Soc. Sci. Upsal. 6: 70. 1799.

Epiphytes or lithophytes, pseudobulbs covered with scaly sheaths. Leaves linear-lanceolate, thickly coriaceous. Flowers in few to many-flowered racemes from the base of pseudobulbs, erect or pendulous; sepals and petals subequal, spreading; lip sessile, 3-lobed, side lobes small, incurving, embracing the column; midlobe rounded; column elongated, winged; pollinia 2 or 4, sessile.

1. Leaves 20-30 cm long; inflorescence not sharply pendulous, almost the same length as leaves ..... **C. aloifolium**
1. Leaves 30-40 cm long; inflorescence sharply pendulous, much longer than the leaves.....**C. bicolor**

Cymbidium aloifolium (L.) Sw., Nov. Acta Regiae Soc. Upsal. 6: 73. 1799; Hook. f., Fl. Brit. India 6: 8. 1890; Fischer in Gamble, Fl. Pres. Madras 1436(1004). 1928; Ansari, Fl. Kasaragod Div. 368. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 450. 1988; Vajr., Fl. Palghat Dist. 471. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 437. 1996; Sivar. & P. Mathew, Fl. Nilambur 683. 1997; Sathish & Manilal, Orchid Memories 177. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 78. 2009. *Epidendrum aloifolium* L., Sp. Pl. 953. 1753. *Epidendrum pendulum* Roxb., Pl. Corom. 1: 35. t. 44. 1795.*Cymbidium pendulum* (Roxb.) Sw. & Lindl., Nova Acta Regiae Soc. Sci. Upsal. 6: 73. 1799; Fischer in Gamble, Fl. Pres. Madras 1436(1004). 1928; Abraham & Vatsala, Introd. Orch. 325. 1981. *Cymbidium erectum* Wight, Ic. t. 1753. 1851.

Robust epiphytic; roots numerous, densely covering the base. Leaves 30-35 x 1.5-2 cm, oblong, obtuse at apex. Flowers in 30-40 cm long, pendulous, lax slender racemes; sepals similar, linear-lanceolate, acute, 7-veined; petals oblong-lanceolate, acute, 5-veined; lip 1.5-1.7 x 0.9-1 cm, trilobed, lateral lobes obliquely oblong, obtuse, less than column; midlobe ovate, acute, disc with 2 fleshy calli at the mouth of the small saccate base.

Flowering & Fruiting: April-May

Distribution: Indo-Malesia. Common; in evergreen forests and plantations. *RNMK 3452,* Vythiri; *RNMK 3307,* Poothady.

Cymbidium bicolor Lindl., Gen. Sp. Orchid. Pl. 164. 1833; Hook. f., Fl. Brit. India 6: 11. 1890; Sathish & Manilal, Orchid Memories 177. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 79. 2009. *Cymbidium pubescens* Lindl., Bot. Reg. 26: Misc. 75, 1840. **Plate 30d.**

Robust epiphytic; roots numerous, densely covering the base. Leaves 25-30 x 0.8-1 cm, oblong, obtuse at apex. Flowers in 30-40 cm long, pendulous, lax slender racemes; sepals similar, linear-lanceolate, acute, 5-7 veined; petals oblong-lanceolate, prominent brown patch throughout with a narrow yellow margin, 5-veined; lip trilobed.

Flowering & Fruiting: May-June.

Distribution: India, Sri Lanka to Java. Common; in semi-evergreen forests and plantations. *RNMK 2554,* Puliyarmala.

DENDROBIUM Swartz

Nova Acta Regiae Soc. Sci. Upsal. 6: 82. 1799, *nom. cons.*

Epiphytes; stem elongated, cylindric or pseudobulbous. Leaves alternate on elongated shoots or terminal on pseudobulbs, often deciduous during

flowering. Flowers solitary or in fascicle or racemes; sepals subequal, laterals adnate to the column foot forming a mentum; petals similar to sepals; lip sessile or clawed, adnate and incumbent on the foot of the column; side lobes when present embracing the column; midlobe concave or saccate, sometimes lamellate; column short, angled or 2-toothed at apex; foot often elongated; pollinia 4, without caudicles.

1. Stem pseudobulbous; leaves from the top of pseudobulb 2
1. Stem elongate, plurinodal; leaves from the nodes 4
2. Pseudobulb uninodal 3
2. Pseudobulb 3 to 4 noded ..... **D. peguanum**
3. Leaves usually 2; bracts equalling the pedicel; lip suborbicular, 3 lobed .... **D. microbulbon**
3. Leaves 2-4; bracts shorter than the pedicel; lip long-clawed ..... **D. naum**
4. Flowers in elongate, few to many flowered racemes 5
4. Flowers solitary, fascicled or in very short racemes 8
5. Flowering shoot leafy; racemes very slender, usually few-flowered 6
5. Flowering shoot leafless; racemes stout, many flowered 7
6. Racemes axillary, flexuous, usually longer than the leaves; disk with a channelled ridge ..... **D. heyneanum**
6. Racemes terminal, straight, shorter than leaves; disk flat ..... **D. wightii**
7. Bracts ovate-acute; midlobe of the lip subquadrate ..... **D. ovatum**
7. Bracts lanceolate; midlobe of the lip bearded at the base with yellow hairs .... **D. barbatulum**
8. Flowers in very short racemes 9
8. Flowers fascicled or solitary 10
9. Stem pendulous, branched; racemes terminal ..... **D. herbaceum**
9. Stem simple, racemes lateral ..... **D. nutans**
10. Flowers wide open ..... **D. crepidatum**
10. Flowers not wide open 11
11. Flowers 2-4 from a leaf opposed tubercle bursting through the sheath below the mouth ..... **D. haemoglossum**
11. Flowers not on tubercles 12
12. Lip narrower than long, ovate-lanceolate ..... **D. heterocarpum**
12. Lip as broad as or broader than long 13
13. Plant leafy when flowering; stem subclavate ..... **D. aqueum**
13. Plant leafless when flowering; stem slender, pendulous ..... **D. aphyllum**

Dendrobium aphyllum (Roxb.) Fischer in Gamble, Fl. Pres. Madras 1416(991). 1928. *Limodorum aphyllum* Roxb., Pl. Corom. 1: 34. 1795. *Dendrobium macrostachyum* Lindl., Gen., Sp. Orch. 78. 1830; Hook. f., Fl. Brit. India 5: 735. 1890; Fischer in Gamble, Fl. Pres. Madras 1416(990). 1928; Abraham & Vatsala, Introd. Orch. 355. 1981; Manilal & Sivar., Fl. Calicut 285. 1982; Ansari, Fl. Kasaragod Div. 369. 1985; Manilal, Fl. Silent Valley

277. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 452. 1988; Vajr., Fl. Palghat Dist. 474. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 439. 1996; Sathish & Manilal, Orchid Memories 180. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 481. 2005. **Plate 30e.**

Stem pendulous, terete, 25-40 cm long. Leaves sessile, 6-7 x 1-1.5 cm, oblong-lanceolate, acute. Flowers creamy, fascicled on short tubercles of leafless nodes; pedicel ca. 2 cm long; dorsal sepal oblong-lanceolate, acute, 5-veined; lateral sepals obliquely oblong-lanceolate, acute, 5-veined; petals lanceolate, acute, 3-veined; lip 1.7 x 0.9-1 cm, quadrate, crenulate, ciliate, apiculate at apex.

Flowering & Fruiting: December-February.

Distribution: Tropical and subtropical Asia to Queesland. Common; in semi-evergreen forests. *RNMK 1637,* Sugandhagiri.

Dendrobium aqueum Lindl., Bot. Reg. 6: t.59. 1843; Hook. f., Fl. Brit. India 5: 739. 1890; Fischer in Gamble, Fl. Pres. Madras 1417(991). 1928; Abraham & Vatsala, Introd. Orch. 349. 1981; Manilal, Fl. Silent Valley 275. 1988; Vajr., Fl. Palghat Dist. 471. 1990; Sathish & Manilal, Orchid Memories 178. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 481. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 82. 2009. *Dendrobium album* Wight, Ic. t. 1645. 1851. **Plate 30f.**

Robust, pendulous epiphytes; leafy when flowering. Leaves alternate, elliptic-oblong, sessile. Flowers leaf-opposed, 2 to 3 together; dorsal sepal broadly ovate, laterals triangular ovate; petals whitish green, obovate, 3-nerved; lip 3- lobed, pale yellow within, midlob triangular.

Flowering & Fruiting: September-December.

Distribution: Endemic to Western Ghats. Common in evergreen forests: *RNMK 2594,* Kattimattom; *RNMK 3416*, Sugandhagiri; *RNMK 1635*, Kurichiarmala; *RNMK 1621*, Brahmagiri.

Dendrobium barbatulum Lindl., Gen. Sp. Orchid. Pl. 84.1830; Hook.f., Fl. Brit. India 5:719. 1890; Fischer in Gamble, Fl. Pres. Madras 1416(990). 1928; Manilal, Fl. Silent Valley 276. 1988; Vajr., Fl. Palghat Dist. 473. 1990; Sivar. & P. Mathew, Fl. Nilambur 684. 1997; Sathish & Manilal, Orchid Memories 178. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 82. 2009.

Stem 5-10 cm long, terete, leafless when flowering. Flowers creamy white, in about 5-8 cm long terminal 5-6-flowered racemes; pedicel ca. 1.2 cm long; dorsal sepal lanceolate, obtuse, 5-veined; lateral sepals ovate-lanceolate, acute, 5-veined; petals obovate, obtuse, 7-veined; lip ca. 1.3 x 1.1 cm, 3-lobed, side lobes ovate, obtuse, midlobe obovate, truncate at apex, disc with an oblong callus and yellow hairs.

Flowering & Fruiting: December-January.

Distribution: Endemic to Peninsular India. Rare; in evergreen forests. *RNMK 3801*, Chanthanathodu.

Dendrobium crepidatum Lindl. in Paxt., Fl. Gard. 1: 63. f.45. 1850-51; Hook. f., Fl. Brit. India 5: 740. 1890; Abraham & Vatsala, Introd. Orch. 349. 1981; V. S. Ramach. & V.J. Nair, Fl. Cannanore 451. 1988; Sathish & Manilal, Orchid Memories 178. 2004. *Dendrobium lawianum* Lindl., J. Proc. Linn. Soc. Bot. 3: 10. 1859; V. S. Ramach. & V.J. Nair, Fl. Cannanore 452. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 438. 1996; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 84. 2009. *Dendrobium actinomorphum* Blatt. & Hallberg., J. Indian Bot. Soc. 2: 50. 1921. **Plate 30g.**

Pendulous epiphytes; leafless when in flower; internodes thickned, sheathed. Leaves membranous, linear, oblong-lanceolate, many nerved. Flowers in pairs, arising from the nodes of swollen nodes, white, ca. 3 cm acroos, long pedicelled; sepals oblong, 5 nerved; petals pinkish-white, broadly oblong; lip lobed, orbicular, yellowish at the centre.

Flowering & Fruiting: January-February.

Distribution: India to Indo-China. Rare; in evergreen forests. *RNMK 3806*, Chanthanthodu; *RNMK 3899,* Makkimala.

Dendrobium haemoglossum Thw., Enum. Pl. Zeyl. 429. 1864; Hook. f., Fl. Brit. India 5: 740. 189; Fischer in Gamble, Fl. Pres. Madras 1416(990). 1928; Abraham & Vatsala, Introd. Orchids 365. 1981; Manilal, Fl. Silent Valley 276. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 451. 1988; Sivar. & P. Mathew, Fl. Nilambur 685. 1997; Sathish & Manilal, Orchid Memories 178. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 85. 2009. **Plate 30h.**

Stem woody, terete, pendulous, 30-40 cm long. Leaves 10-12 x 0.7-0.8 cm, linear, obliquely obtuse at apex. Flowers 2-4, yellow, on leaf opposed tubercles; pedicel ca. 1.2 cm long; dorsal sepal oblong-lanceolate, subacute, 5-veined; lateral sepals obliquely ovate-lanceolate, subacute, 5-veined; petals lanceolate, subacute, 3-5-veined; lip ca. 1 x 0.3mm, oblanceolately oblong, undulate, subacute, deep red.

Flowering & Fruiting: September-January.

Distribution: South India and Sri Lanka. Rare; in evergreen forests. *RNMK 3897,* Sugandhagiri.

Dendrobium herbaceum Lindl., Bot. Misc. 69.1840; Hook. f., Fl. Brit. India 5:719.1890; Fischer in Gamble, Fl. Pres. Madras 1416(990). 1928; Abraham & Vatsala, Introd. Orch. 368. 1981; Manilal, Fl. Silent Valley 276. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 451. 1988; Vajr., Fl. Palghat Dist. 473. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 438. 1996; Sathish & Manilal, Orchid Memories 179. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 85. 2009. *Dendrobium ramosissimum* Wight, Ic. t. 1648. 1851. **Plate 30i.**

Stem 30-40 cm long, branched, terete, leafless when flowering. Leaves 3-8 cm long, narrowly linear. Flowers white, in 4-6-flowered, 1-1.5 cm long,

slender racemes from nodes; pedicel 6-7 mm; dorsal sepal oblong-lanceolate, acute, 3-veined; lateral sepals oblong, subacute, apiculate, falcate, 3-veined; petals subfalcately oblong, obtuse, apiculate, 1-veined; lip 3-4 x 1-2 mm, side lobes ovate-orbicular; midlobe thick, orbicular, obtuse.
Flowering & Fruiting: December-January.
Distribution: Endemic to Peninsular India. Common; in semi-evergreen and moist deciduous forests. *RNMK 3871*, Manikkunnumala; *RNMK 3850*, Kuruva.

Dendrobium heterocarpum Lindl., Gen. Sp. Orchid. Pl. 78. 1830; Hook. f., Fl. Brit. India 5: 737. 1890; Fischer in Gamble, Fl. Pres. Madras 1416(991). 1928; Abraham & Vatsala, Introd. Orch. 361. 1981; Manilal, Fl. Silent Valley 276. 1988; Vajr., Fl. Palghat Dist. 473. 1990; Sathish & Manilal, Orchid Memories 179. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 86. 2009. *Dendrobium aureum* Lindl., Gen. Sp. Orchid. Pl. 77. 1830. **Plate 30j.**

Stem 20-35 cm, clavate. Leaves 8-10 x 1-2 cm, oblong-lanceolate, acute at both ends, 2 or 3 towards the tip. Flowers white, in short, 2-4 flowered raceme on leafless stem; dorsal sepal oblong-lanceolate, obtuse, 5-veined; lateral sepals obliquely ovate-oblong, lanceolate, subacute, 7-veined; petals obliquely elliptic, apiculate, 7-veined; lip 2-2.2 x 1-1.5 cm, quadrately ovate, apiculate, hairy within; side lobes ovate, obtuse; midlobe ovate, acute, apiculate, margins, crenulate.
Flowering & Fruiting: February-March.
Distribution: Indo-Malesia. Rare; in evergreen forests. *RNMK 3887,* Chembra.

Dendrobium heyneanum Lindl., Gen. Sp. Orchid. Pl. 78. 1830; Hook. f., Fl. Brit. India 5: 718. 1890; Fischer in Gamble, Fl. Pres. Madras 1413(990). 1928; Abraham & Vatsala, Introd. Orch. 358. 1981; Manilal, Fl. Silent Valley 277. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 452. 1988; Vajr., Fl. Palghat Dist. 474. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 438. 1996; Sathish & Manilal, Orchid Memories 179. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 87. 2009. **Plate 30k.**

Stem 6-10 cm long. Leaves 5-6 x 0.4-0.6 cm, linear, acute, sessile, sheathed at base. Flowers white, in 8-10 cm long, 10-12 flowered, slender axillary or terminal racemes; pedicel ca. 7 mm long; dorsal sepal oblong-lanceolate; acute, 5-veined; lateral sepals obliquely ovate-lanceolate, acute, 5-veined; petals oblanceolate-linear, acute, 3-veined; lip 1-1.2 x 0.4-0.6 cm, obovate, side lobes oblong-lanceolate, acute; midlobe, ovate, subacute, apiculate, margins dentate; disc with a fleshy callus.
Flowering & Fruiting: August-November.
Distribution: Endemic to Peninsular India. Rare; in evergreen forests. *RNMK 3810,* Sugandhagiri; *RNMK 3826*, Manikkunumala.

Dendrobium microbulbon A. Rich., Ann. Sci., Nat. ser. 2, 15: 19. t. 8. 1841; Hook. f., Fl. Brit. India 5: 716. 1890; Fischer in Gamble, Fl. Pres. Madras

1415(990). 1928; Abraham & Vatsala, Introd. Orch. 358. 1981; Sathish & Manilal, Orchid Memories 180. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 91. 2009. *Dendrobium humile* Wight, Ic. t. 1643. 1851. *Dendrobium crispum* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 4: 111. 1852. **Plate 30l.**

Pseudobulbs ovoid, ca. 1.5 x 1 cm, scaly. Leaves 3-4 per plant, 5-6 cm, linear-long, acute at apex, conduplicate at base, thin membranous. Flowers white, in about 5 cm long, terminal flexuous racemes; bracts ovate, cuspidate; dorsal sepal ovate-oblong, obtuse, 3-veined; lateral sepals ovate, obtuse, 3-veined; petals falcately oblanceolate, obtuse, 3-veined; lip greenish, ca. 5 x 4 mm, trilobed, sessile; midlobe orbicular, truncate, thick, wrinkled, retuse at apex, disc with thick calli, truncate, retuse at apex.

Flowering & Fruiting: Julu-August.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3854,* Chembra.

Dendrobium nanum Hook.f., Ic. Pl. t. 1853. 1889; Hook. f., Fl. Brit. India 5: 717. 1890; Fischer in Gamble, Fl. Pres. Madras 1415(990). 1928; Manilal, Fl. Silent Valley 277. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 453. 1988; Vajr., Fl. Palghat Dist. 474. 1990; Sathish & Manilal, Orchid Memories 180. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 481. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 91. 2009. *Dendrobium mabelae* Gammie, J. Bombay Nat. Hist. Soc. 16: 567. 1905.

Stemless; pseudobulbs ovoid, covered with basal portion of leaves. Leaves 3 or 4, 2-3 x 1-1.2 cm, lanceolate-elliptic. Racemes 6-8 cm; flowers 6-8, pinkish white; bracts ca. 0.5 cm long, lanceolate; sepals 7-8 mm long; lip tri-lobed, narrowed to a short stalk; lateral lobes narrow, shortly pectinate.

Flowering & Fruiting: September-August.

Distribution: Endemic to southern Western Ghats. Rare; in moist deciduous forests. *RNMK 3891,* Muthanga.

Dendrobium nutans Lindl., Gen. Sp. Orchid. Pl. 90. 1830; Hook. f., Fl. Brit. India 5: 734. 1890; Fischer in Gamble, Fl. Pres. Madras 1416(990). 1928; Abraham & Vatsala, Introd. Orch. 363. 1981; Manilal, Fl. Silent Valley 278. 1988; *Callista nutans* (Lindl.) Kuntze, Rev. Gen. Pl. 2: 655. 1891. *Dendrobium nutantiflorum* Hawkes & Heller, Lloydia 20: 121. 1957, nom. illeg.; Sathish & Manilal, Orchid Memories 180. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 92. 2009. *Dendrobium jerdonianum* Wight, Ic. t. 1644. 1851; Hook. f., Fl. Brit. India 5: 734. 1888; Sathish & Manilal, Orchid Memories 179. 2004. **Plate 31a.**

Stem 20-25 cm long, terete, tufted. Leaves 3.5-4 x 0.9-1 cm, sessile, ovate-lanceolate, obliquely bifid at apex. Flowers white, in leaf opposed 3-4-flowered, short racemes. Pedicel ca. 1.3 cm long; dorsal sepal oblong-lanceolate, acute, 5-veined; lateral sepals linear-lanceolate, acute, 5-veined; petals oblong-

lanceolate, acute, 5-veined; lip 1-1.7 x 0.4-0.6 cm, obovate-lanceolate, 3-lobed, lateral lobes oblong, rounded; midlobe ovate-lanceolate, acute; disc 4-lamellate.
Flowering & Fruiting: February-March.
Distribution: South India and Sri Lanka. Rare; in evergreen forests. *RNMK 3833,* Kurichiarmala; *RNMK 3895*, Chembra; *RNMK 3814,* Brahmagiri.

Dendrobium ovatum (L.) Kranz. in Engl., Pflanzenr. Orch.-Dendrob. pars 1, 71. 1910; Fischer in Gamble, Fl. Pres. Madras 1416(990). 1928; Abraham & Vatsala, Introd. Orch. 353. 1981; Ansari, Fl. Kasaragod Div. 369. 1985; Vajr., Fl. Palghat Dist. 474. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 439. 1996; Sivar. & P. Mathew, Fl. Nilambur 685. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 675. 2009; Sathish & Manilal, Orchid Memories 181. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 481. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 93. 2009. *Epidendrum ovatum* L., Sp. Pl. 952. 1753. *Cymbidium ovatum* (L.) Willd., Sp. Pl. 4: 101. 1805. *Dendrobium chlorops* Lindl., Bot. Reg. Misc. 44. 1844; Hook. f., Fl. Brit. India 5: 719. 1890. *Dendrobium barbatulum* Wight, Ic. t. 910. 1844. **Plate 31b.**

Stem 20-40 cm long; leafless when flowering. Flowers white, in 15-20 cm long terminal and axillary racemes; bracts 2-3 x 1.5-2 mm, lanceolate, acute, 1-veined; dorsal sepal oblong, obtuse, 5-veined; lateral sepals elliptic-oblong, acute, subfalcate, 5-veined; petals obovate, orbicular, 3-veined; lip 1-1.3 x 0.6-0.7 cm, obovate; side lobes falcately ovate-orbicular; midlobe obovate, acute; disc with a tuft of green hairs.
Flowering & Fruiting: December-January.
Distribution: Endemic to Western Ghats. Common; in semi-evergreen and moist deciduous forests. *RNMK 3865*, Manikkunnumala; *RNMK 3893*, Muthanga; *RNMK 3863,* Thirunelli.

Dendrobium peguanum Lindl., J. Linn. Soc. Bot. 3:19.1859; Sathish & Manilal, Orchid Memories 181. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 94. 2009. *Dendrobium pygmaeum* Lindl., Gen. Sp. Orch. 85, 1830; Bot. Mag. 30: Hook. f., Fl. Brit. India 5: 717, 1888. **Plate 31c.**

Small epiphytes with 2 to 4 noded, ovoid-conical psudobulbs; sheaths prominently nerved. Leaves 2-4, sessile, elliptic-oblong, 1 nerved. Flowers many in racemes, arising from the top of the pseudobulb; sepals greenish-pink, 3 nerved; petals white, 3 nerved; lip 3-lobed, midlob purplish, broadly triangular; column white, oblong, pouched basally; pollinia golden brown.
Flowering: September-February.
Distribution: Indo-Malesia. Rare; in evergreen forests. *RNMK 3845,* Kambamala.

Dendrobium wightii Hawkes & Heller, Orquidea 24: 16. 1962; Abraham & Vatsala, Introd. Orch. 351. 1981; V. S. Ramach. & V.J. Nair, Fl. Cannanore 453. 1988; Sathish & Manilal, Orchid Memories 182. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 95. 2009. *Dendrobium graminifolium* Wight, Ic. t. 1649. 1851; Hook. f., Fl. Brit. India 5: 718. 1890; Fischer in Gamble, Fl. Pres. Madras 1415(990). 1928.

Lithophyte on wet rocks, stem slender, terete, 15-20 cm tall. Leaves 6-7 x 0.4-0.5 cm, linear, acute, membranous. Flowers white, 4-5, in 6-10 cm long, slender flexuous terminal racemes; dorsal sepal oblong-lanceolate, acute, 3-veined; lateral sepals slightly obliquely oblong-lanceolate, acute, 3-veined; petals oblanceolate, acute, margins serrulate, 3-veined; lip 1.1 x 0.3-0.6 cm, 3-lobed; lateral lobes, obliquely ovate-oblong, obtuse; midlobe orbicular, margins crenate, wavy; base of the lip united with the column foot and lateral sepals forming a cylindric spur, 3-4 x 1-2 mm, obtusely bifid at apex.

Flowering & Fruiting: September-October.

Distribution: India and Sri Lanka. Rare; in evergreen forests. *RNMK 3879,* Chanthanathodu.

DIENIA Lindley

Bot. Reg. 10: t. 825 (1824).

Dienia ophrydis (Koenig) Ormerod in Seidenf., Contrib. Orch. Fl. Thailand 13: 18. 1997; Sathish & Manilal, Orchid Memories 183. 2004. *Epidendrum ophrydis* Koenig, Descr. Orch. 6: 46.1771. *Malaxis ophrydis* (Koenig) Ormerod in Seidenf., Descr. Epidendr. 1791. 18. 1995. *Malaxis latifolia* Smith in Rees, Cyclop. 22: 3. 1813; Mohanan *et al.*, J. Bombay Nat. Hist. Soc. 79: 236. 1982; Manilal, Fl. Silent Valley 292. 1988; Mohanan & Sivad., Fl. Agasthyamala 683. 2002. *Dienia congesta* Lindl., Bot. Reg. Sub. t. 825. 1824. *Malaxis congesta* (Lindl.) Deb, Bull. Bot. Surv. India 3: 128. 1961; Abraham & Vatsala, Intr. Orch. 399. 1981.

Terrestrial robust plants; stem deeply purplish. Leaves 3-4, 14-17 x 5-6 cm, base purple, Inflorescence 10-15 cm; flowers ca. 0.4 cm across, purple, dense; sepals and petals uniformly purple; column yellow.

Flowering: October-December.

Distribution: India and Sri Lanka. Rare; in evergreen forests. *RNMK 3832,* Chanthanathodu.

DIPLOCENTRUM Lindley

Edwards's Bot. Reg. 18: t. 1522 (1832).

Diplocentrum congestum Wight, Ic. t. 1682. 1851; Hook. f., Fl. Brit. India 6: 78. 1890; Fischer in Gamble, Fl. Pres. Madras 1449(1013). 1928; Sasidh. & Sivar., Fl. Pl. Thrissur For. 439. 1996; Sathish & Manilal, Orchid Memories 184. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 96. 2009.

Epiphytes, stem 2-4 cm long. Leaves 10-15 x 0.3-0.4 cm, linear, keeled, bilobed at apex. Flowers pink, in 10-20 cm long, rarely branched racemes;

sepals and petals dull yellow; dorsal sepal elliptic, bimucronate at apex, 3-veined; lateral sepals broadly obovate, acute, 3-veined; petals oblong-elliptic, obtuse, 3-veined; lip white with purple dots, ca. 6 x 3 mm, ovate-lanceolate, obtuse, 5-veined, with 2 collateral spurs.
Flowering: April-May
Distribution: Endemic to Peninsular India.
Rare in moist deciduous and semi-evergreen forests. *RNMK 3885*, Muthanga; *RNMK 3823*, Puliyarmala.

DISPERIS Swartz

Kongl. Vetensk. Acad. Nya Handl. 21: 214. 1800.

Disperis neilgherrensis Wight, Ic. t. 1719. 1851; Hook. f., Fl. Brit. India 6: 169. 1890; Fischer in Gamble, Fl. Pres. Madras 1478(1032). 1928; Abraham & Vatsala, Introd. Orch. 208. 1981; Sathish & Manilal, Orchid Memories 185. 2004; Kurzweil, Blumea 50: 145. 2005. *Disperis zeylanica* Trimen, J. Bot. 23: 245. 1885; Hook. f., Fl. Brit. India 6: 169. 1890; Manilal, Fl. Silent Valley 278. 1988; Vajr., Fl. Palghat Dist. 475. 1990; Sathish & Manilal, Orchid Memories 185. 2004.

Terrestrial herbs with a tuber, stem 10-15 cm tall. Leaves 0.7-1 x 0.8-0.9 cm, ovate, cordate, acute, sessile. Flowers pale-pink or rose, one or two in terminal raceme; floral bracts, foliaceous, cordate, acute; dorsal sepal and petals connated to form a hood over the column; dorsal sepal linear-lanceolate, 3-veined; lateral sepals obliquely obovate, obtuse, many-veined; petals obliquely obovate or elliptic, subacute, 3-veined; lip ca. 5 x 5 mm, anchor shaped, bifid, with two long linear recurved arms with yellow papillae.
Flowering & Fruiting: May-June.
Distribution: South India and Sri Lanka. Rare; in evergreen forests. *RNMK 3900,* Thariodu.

DIDYMOPLEXIS Griffith

Calcutta J. Nat. Hist. 4: 383 (1844).

Didymoplexis pallens Griff., Calcutta J. Nat. Hist. 4: 383, t. 17. 1844; Hook. f., Fl. Brit. India 6: 122. 1890; Fischer in Gamble, Fl. Pres. Madras 1459(1021). 1928; Vajr., Fl. Palghat Dist. 475. 1990; Sathish & Manilal, Orchid Memories 182. 2004. *Apetalon minutum* Wight, Ic. t. 1758. 1851. *Cheirostylis canarensis* Blatt. & McCann, J. Bombay Nat. Hist. Soc. 35: 732. 1932.

Slender saprophytic leafless, tuberous terrestrial herbs; rhizome fleshy. Scape simple, racemes terminal, 4-8 flowered, flowers dull yellowish-white; sepals and petals connate into a 2-lipped tube; lip inserted on the foot of the column, stipitate, membranous; disc papillose.
Flowering: December-May.
Distribution: Indo-Malesia. Rare; in moist deciduous forests. *RNMK 3836,* Muthanga.

EPIPOGIUM R. Brown

Prodr. 330, 331. 1810.

Epipogium roseum (D. Don) Lindl., J. Proc. Linn. Soc. Bot. 1: 177. 1857; Manilal, Fl. Silent Valley 279. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 453. 1988; Vajr., Fl. Palghat Dist. 476. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 440. 1996; Sathish & Manilal, Orchid Memories 185. 2004. *Limodorum roseum* D. Don, Prodr. Fl. Nepal. 30. 1825. *Epipogium nutans* Rchb.f., Bonplandia 5: 36. 1836; Hook. f., Fl. Brit. India 6: 124. 1890; Fischer in Gamble, Fl. Pres. Madras 1460(1021). 1928 'Epipogum'. *Podanthera pallida* Wight, Ic. t. 1759. 1851. **Plate 31d.**

Saprophytic tuberous herbs, 15-25 cm tall; tuber 2-3 x 1-2 cm, ovoid or oblongoid. Flowers white, speckled with pink spots, racemose; dorsal sepal linear, subacute, obtuse, 3-veined; lateral sepals linear, subacute, 3-veined; petals oblong-lanceolate, obtuse; disc with 2 rows of tubercles; spur saccate.

Flowering & Fruiting: April-May.

Distribution: Africa through Asia to Australia and New Guinea. Occasional; in evergreen forests. *RNMK 3852,* Banasuramala; *RNMK 3873,* Kallady.

ERIA Lindley

Bot. Reg. 11: t. 904. 1825, *nom. cons.*

Epiphytes. Pseudobulbs ovoid, elongated or discoid. Leaves 2 to many at the apex of pseudobulbs. Flowers solitary or several on racemes, lateral or terminal; dorsal sepal and petals similar, free; lateral sepals connate with the foot of column forming a short mentum; lip sessile on the top of foot, entire or 3-lobed; column free with elongated foot; pollinia 8, in 2 groups.

1. Plants with discoid or triangular pseudobulbs 2
1. Plants with elongate pseudobulb.....4
2. Plants leafy when flowering.....3
2. Plants leafless when flowering..... **E. exilis**
3. Scape and pedicel with ovary brown pubescent; lip sub-orbicular.....**E. albiflora**
3. Scape and pedicel glabrous; lip base clawed .....**E. tiagii**
4. Plants with pseudobulbs in large tufts; inflorescence with one or two flowers..... .....**E. pauciflora**
4. Plants with pseudobulbs not tufted; inflorescence with many flowers 5
5. Inflorescence from between the leaves, drooping; flowers straw coloured, fragrant ....**E. mysorensis**
5. Inflorescence from below the pseudobulb, arching; flowers creamy with yellow tips .. ..**E. polystachya**

Eria albiflora Rolfe, Bull. Misc. Inform. Kew 1893: 170. 1893; Fischer in Gamble, Fl. Pres. Madras 1425(996). 1928; Vajr., Fl. Palghat Dist. 477. 1990; Sathish & Manilal, Orchid Memories 185. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 98. 2009. **Plate 31e.**

Herbs; pseudobulbs aggregate, globose-ovoid, with small white scaly spots. Leaves 3-4, 2-6 x 0.6-0.8 cm, elliptic-lanceolate, abruptly narrowed into a short or long sheathing base. Flowers in 5-10 cm long racemes, white, scape and pedicel brown pubescent; bracts 3-4 mm long, persistant, longer than the pedicel; sepals and petals gland dotted, trinerved; lip 3-4 mm long, sub-orbicular, beaked at the tip.
Flowering & Fruiting: July-August.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3813*, Kurichiarmala; *RNMK 3824*, Kattimattom.

Eria exilis Hook. f., Fl. Brit. India 5: 788. 1890; Fischer in Gamble, Fl. Pres. Madras 1425(996). 1928; Sathish & Manilal, Orchid Memories 186. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 100. 2009. *Porpax chandrasekharanii* Bhargavan & Mohanan, Curr. Sci. 51: 990. 1982; Manilal, Fl. Silent Valley 301. 1988; Vajr., Fl. Palghat Dist. 491. 1990. *Eria chandrasekharanii* (Bhargavan & C.N. Mohanan) Sathish & Manilal, Taxon 35: 719. 1986. **Plate 31f.**

Pseudobulbs globose; leafless when in flower. Leaves 2-3 cm long. Flowers few in short racemes, glabrous, yellowish; bracts boat-shaped; lateral sepas de-curved, obtuse, dorsal lanceolate-oblong; petals linear-obovate, shorter than the latral sepals; lip minute.
Flowering & Fruiting: January.
Distribution: Endemic to Western Ghats. Common; in evergreen forests. *RNMK 3866*, Pozhuthana; *RNMK 3895*, Chembra; *RNMK 3888,* Thariodu.

Eria mysorensis Lindl., J. Proc. Linn. Soc. Bot. 3: 54. 1859; Manilal, Fl. Silent Valley 279. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 440. 1996; Sathish & Manilal, Orchid Memories 187. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 101. 2009. *Eria pubescens* Wight, Ic. 5: 4. 1851; Hook. f., Fl. Brit. India 5: 793. 1890; Fischer in Gamble, Fl. Pres. Madras 1425(996). 1928. *Eria polystachya* Wight, Ic. t. 1634. 1851, non A. Rich. 1841. **Plate 31g.**

Pseudobulbs aggregate, sheathed. Leaves arising terminally from pseudobulb, oblong-lanceolate or elliptic-lanceolate. Flowers yellowish-white, fragrant, on pendulous racems, shorter than leaves; bracts ovate; petals linear, lanceolate; lip 3-lobed, midlob reddish-brown.
Flowering & Fruiting: August-September.
Distribution: Endemic to Western Ghats. Occasional; in semi-evergreen forests. *RNMK 3224*, Manikkunnumala; *RNMK 3313*, Sugandhagiri.

Eria pauciflora Wight, Ic. t. 1636. 1851; Hook. f., Fl. Brit. India 5: 799. 1890; Fischer in Gamble, Fl. Pres. Madras 1425(996). 1928; Abraham & Vatsala, Introd. Orch. 377. 1981; Manilal, Fl. Silent Valley 280. 1988; Sathish & Manilal, Orchid Memories 187. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 103. 2009.

Stem clavate, 8-10 cm tall. Leaves 2, 4-6 x 0.8-1 cm, oblong-lanceolate, acute. Flowers white, in 1.5-2 cm long, 2-flowered, terminal raceme; bracts ca. 6 x 3 mm, oblong-lanceolate, acute, 3-veined; dorsal sepal obovate-oblong, acute, 3-veined; lateral sepals obliquely ovate, acute; petals oblong-lanceolate, subacute-obtuse, 3-veined; lip 6-7 x 3-4 mm, quadrate, emarginate at apex; disc with fleshy bilobed calli; midlobe with 3 fleshy ridges.
Flowering & Fruiting: August-September.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1658,* Sugandhagiri.

Eria polystachya A. Rich., Ann. Sci. Nat. Bot. ser. 2, 11: 20. t.9. 1841; Hook. f., Fl. Brit. India 5: 793. 1890; Gamble, Fl. Pres. Madras 1425(996). 1928; Abraham & Vatsala, Introd. Orch. 382. 1981; Sathish & Manilal, Orchid Memories 187. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 104. 2009. **Plate 31h.**

Pseudobulb 2-3 cm long, covered with sheathing scales. Leaves 13-16 x 1.5-2 cm, oblong, acute. Flowers yellowish, in 10-15 cm long, many-flowered, terminal raceme; bracts 5-9x 2-3 mm, lanceolate, longer than the pedicel with ovary; dorsal sepal linear-lanceolate, acute, 3-veined; lateral sepals falcately ovate-lanceolate, acute, 3-veined; petals oblong, 3-nerved; lip oblong, lanceolate, subacute, disc with 2 ridges at base, 3-veined.
Flowering & Fruiting: December-January.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1668,* Chembra.

Eria tiagii Manilal, Santhosh & Wood, J. Econ. Tax. Bot. 5: 483. 1984; Manilal, Fl. Silent Valley 280. 1988; Sathish & Manilal, Orchid Memories 188. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 106. 2009. **Plate 31i.**

Pseudobulbs compressed, 3-4 mm across, often sheathed. Leaves 2 or 3, 2-2.5 x 0.5-0.6 cm, oblanceolate, apex apiculate, sessile. Racemes zigzag to 5 cm, terminal, bracts 2-3 mm long, acuminate. Flowers white, 6-7 mm long, sepals lanceolate; petals lanceolate, lip 3-4 x 1-2 mm, base clawed; disc with two linear calli at base, distal end crenulate.
Flowering & Fruiting: May-June.
Distribution: Endemic to southern Western Ghats (Kerala). Occasional; in evergreen and semi-evergreen forests. *RNMK 1543,* Manikkunnumala: *RNMK 1601*, Aranamala: *RNMK 1659,* Banasuramala.

EULOPHIA R. Brown ex Lindley
in Bot Reg. 8: t. 686. 1823, *nom. cons.*

Terrestrial herbs with tuber or bulb. Leaves narrowly lanceolate, grass-like, plaited. Flowers racemose or panicled, on terminal or lateral erect scapes; sepals free, spreading; petals similar to sepals; lip erect from the foot of the column, base saccate or spurred, side lobes embracing the column, midlobe spreading or recurved; column long, with a producing foot; pollinia 2, globose.

1. Pseudobulb present; flowering shoot appears with leafy shoot 2
1. Pseudobulb absent; flowering shoots appear before leafy shoot 3
2. Pseudobulb conical or pear shaped; inflorescence from the middle of the pseudobulb..... **E. epidendraea**
2. Pseudobulb fusiform; inflorescence from the base of the pseudobulb .....**E. pulchra**
3. Tubers large, rounded; flowers 12-15, lemon yellow, drooping on the pedicel..... ..... **E. flava**
3. Tubers irregular with transverse leaf scars; flowers 10-20, deep blackish-purple, not drooping .....**E. spectabilis**

Eulophia epidendraea (Koenig) Schltr., Orchideen 346. 1914, 'epidendroides'; Abraham & Vatsala, Introd. Orch. 294. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 441. 1996; Sathish & Manilal, Orchid Memories 188. 2004; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 679. 2009. *Serapias epidendraea* (Retz.) Fischer in Gamble, Fl. Pres. Madras, 1434(1003). 19928. *Eulophia virens* (Roxb.) R. Br., Bot. Reg. sub. t. 573. 1822; Wight. Ic. t. 913. 1845; Hook. f., Fl. Brit. India 6: 1. 1890. *Limodorum virens* Roxb., Pl. Corom. t. 38. 1795 & Fl. Ind. 3: 467. 1832. **Plate 31j.**

Pseudobulbs conical, 5-6 x 2-3 cm, green. Leaves 3-8, 10-30 x 1-1.5. Inflorecence from the side of pseudobulb, 40-50 cm long, branched; flowers greenish-white, ca. 1.3 cm long; sepals and petals linear, cuspidate; lip ca. 1 cm long, obovate-oblong, white; side lobes ca. 5 mm long; midlobe obtuse, margin crenulate; spur 1.5-2 mm long.

Flowering & Fruiting: December-January.

Distribution: India and Sri Lanka. Rare; in evergreen forests. *RNMK 1663,* Banasuramala.

Eulophia flava (Lindl.) Hook.f., Fl. Brit. India 6: 7. 1890. *Cyrtopera flava* Lindl., Gen. Sp. Orchid. Pl. 189. 1833. *Cyrtopera cullenii* Wight, Ic. t. 1754. 1861. *Eulophia cullenii* (Wight) Bl, Orch. Arch. Ind. 182. 1859; Fischer in Gamble, Fl. Pres. Madras 1435(1003). 1928; Abraham & Vatsala, Introd. Orch. 298. 1981; Sathish & Manilal, Orchid Memories 188. 2004.

Robust terrestrial tuberous herbs; flowers appearing before the leafy shoot. Leaves 2-3, 20-30 x 5-6 cm, plicate. Scape 60-70 cm tall with 12-15 lemon-yellow flowers, ca. 4 cm across, slightly drooping; sepals ca. 3 cm long; petals shorter; lip 3-lobed, base saccate, sidelobes larger, red spots inside, midlobe with 2 calli at the base and 3 crenate ridges on the disc.

Flowering & Fruiting: March-April.

Distribution: Endemic to southern Western Ghats. Rare; in grasslands. *RNMK 3335,* Sughandhagiri-amba.

Eulophia pulchra (Thouars) Lindl., Gen. Sp. Orchid. Pl. 183. 1833; Sathish & Manilal, Orchid Memories 189. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 484. 2005. *Limodorum pulchrum* Thouars, Orch., Ill. Austr.

Afri. t. 43. 1822. *Oeceoclades pulchra* (Thouars) Clements & Cribb in Clements, Cat.Austr. Orch. 99.1989. *Eulophia macrostachya* Lindl., Gen. Sp. Orchid. Pl. 183. 1833; Hook. f., Fl. Brit. India 6: 4. 1890; Fischer in Gamble, Fl. Pres. Madras 1435(1003). 1928; Abraham & Vatsala, Introd. Orch.298. 1981. **Plate 31k.**

Terrestrial herbs, 60-80 cm tall. Pseudobulb 8-10 x 1.5-2 cm, fusiform. Leaves 40-50 x 4-6 cm, elliptic-oblong, lanceolate-acuminate, 3-ribbed, 2 per pseudobulb. Flowers purplish yellow, 2-3 x 1-1.5 cm, in about 85 cm long, lax raceme from the base of pseudobulb; bracts linear-lanceolate; dorsal sepal lanceolate, acuminate, 5-veined; lateral sepals falcate, lanceolate, acuminate, 5-veined; lip 1-1.2 x 1.5-1.7 cm, broader than long, 3-lobed; side lobes short, obtuse; midlobe obcordate, rounded; spur short, 3-4 x 1-2 mm, ampullifor.
Flowering & Fruiting: October-December.
Distribution: Widespread from Madagascar to the Pacific Islands. Rare; in rocky areas in semi-evergreen forests. *RNMK 3880*, Manikkunnumala.

Eulophia spectabilis (Dennst.) Suresh in Nicols., *et al.,* Interp. Hort. Malab. 119. 300. 1988; Sathish & Manilal, Orchid Memories 189. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 484. 2005. *Wolffia spectabilis* Dennst., Schluss. Hort. Malab. 11,25,38. 1818. *Eulophia nuda* Lindl., Gen. Sp. Orchid. Pl. 180. 1833; Hook. f., Fl. Brit. India 6: 5. 1890; Fischer in Gamble, Fl. Pres. Madras 1435(1003). 1928; Abraham & Vatsala, Introd. Orch. 303. 1981; Manilal, Fl. Silent Valley 282. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 454. 1988; Vajr., Fl. Palghat Dist. 479. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 441. 1996. *Cyrtopera fusca* Wight, Ic. t. 1690. 1851. *Eulophia nuda* var. *andersonii* Hook.f., Ann. Roy. Bot. Gard. (Calcutta) 5: 50. 1895; Abraham & Vatsala, Introd. Orch. 303.1981. *Eulophia nuda* var. *purpurea* Hook.f., Ann. Roy. Bot. Gard. (Calcutta) 5: 49. 1895. **Plate 31l.**

Leaves appears after flowering, 125-130 x 3-4 cm, including 66-70 cm long petiole, elliptic to oblong-lanceolate, acuminate. Flowers pink, in above 75 cm long lax racemes; dorsal sepal oblanceolate-oblong, obtuse, 9-veined; lateral sepals falcately oblong-lanceolate, obtuse, 9-veined; petals elliptic or oblong-lanceolate, obtuse, 9-veined; lip 2.3-2.5 x 1-1.7 cm, 3-lobed, side lobes orbicular; midlobe ovate-orbicular, emarginate, disc with rows of ridges.
Flowering & Fruiting: May-August.
Distribution: Indo-Malesia. Common; in grasslands. *RNMK 3817*, Sugandhagiri; *RNMK 3894*, Manikkunnumala; *RNMK 3861*, Soojipara; *RNMK 3864*, Brahmagiri; *RNMK 3870*, Banasuramala.

FLICKINGERIA Hawkes
Orchid Weekly 2: 451. 1961.

Flickingeria nodosa (Dalz.) Seidenf., Dansk Bot. Ark. 34: 41. 1980; Manilal, Fl. Silent Valley 283. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 442. 1996; Sathish & Manilal, Orchid Memories 190. 2004; A. E. Shanavas Khan &

Sivad., Epiphytes and Parasites of Kerala, India. 107. 2009. *Dendrobium nodosum* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 4:292.1852. *Dendrobium macraei* Hook. f., Fl. Brit. India 5: 714. 1890, non Lindl. 1830. *Desmotrichum fimbriatum* Fischer in Gamble, Fl. Pres. Madras 1412(988). 1928, non Bl., 1825. *Ephemerantha macraei* sensu Joseph, Orch. Nilgiris 88. 1982, non (Lindl.) Hunt & Summerh. 1961; Abraham & Vatsala, Introd. Orch. 370. 1981; Vajr., Fl. Palghat Dist. 476. 1990.

Tufted epiphytes with creeping root stock and sympodially branched stems, 20-30 cm long, each branch ends in a fusiform pseudobulb. Leaves one per pseudobulb, 7-10 x 2-2.5 cm, oblong-lanceolate, obtuse. Flowers white, 1-3 from the tip of a pseudobulb; bracts 1.8-2 x 2-2.5 mm, ovate, acuminate, 3-veined; dorsal sepal oblong-lanceolate, acute, 5-veined; lateral sepals obliquely oblong-lanceolate, acute, 7-veined; petals lanceolate, acute, 3-veined; lip ca. 1.2 x 0.6 cm, 3-lobed; lateral lobes oblong, obtuse; midlobe sub quadrate, recurved, crenulate.

Flowering & Fruiting: March-April.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 3875,* Vythiri; *RNMK 3815*, Chanthanathodu; *RNMK 3827*, Sugandhagiri; *RNMK 3833*, Brahmagiri.

GASTROCHILUS D. Don

Prodr. Fl. Nepal. 32. 1825.

Epiphytes. Stem short. Leaves few, long, linear, unequally notched at apex. Flowers in few-flowered racemes; sepals and petals subsimilar, free; lip 3-lobed, side lobes small, erect; midlobe saccate, mouth sometimes hairy or fimbriate, sac without callii or septa; pollinia 2, globose, caudicle narrow.

1. Leaves 3-5 cm long, falcate ..... **G. flabelliformis**
1. Leaves 10-15 cm long, not falcate 2
2. Sepals and petals gland dotted ..... **G. obliquus**
2 . Sepals and petals not gland dotted ..... **G. acaulis**

Gastrochilus acaulis (Lindl.) O. Kuntze, Rev. Gen. Pl. 2: 661. 1891; Sathish & Manilal, Orchid Memories 191. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 108. 2009. *Cleisostoma acaulis* Lindl., Gen. Sp. Orchid. Pl. 227. 1833. *Saccolabium acaule* (Lindl.) Hook. f., Fl. Brit. India 6: 61. 1890. *Vanda pulchella* Wight, Ic. t. 9. 1852. *Gastrochilus calceolare* (Buch.-Ham. ex Smith) D. Don, Prodr. Fl. Nepal. 32. 1825; V. S. Ramach. & V.J. Nair, Fl. Cannanore 455. 1988; Manilal, Fl. Silent Valley 283. 1988. *Saccolabium nilagiricum* Hook. f., Fl. Brit. India 6: 60. 1890. *Gastrochilus nilagiricus* (Hook.f.) O.Kuntze., Rev. Gen. Pl. 2: 661. 1891; Ansari, Fl. Kasaragod Div. 369. 1985. *Gastrochilus pulchellus* (Wight) Schltr., Feddes Repert. 12: 215. 1913; Abraham & Vatsala, Introd. Orch. 466. 1981; Vajr., Fl. Palghat Dist. 479. 1990. *Saccolabium pulchellum* (Wight) Fischer in Gamble, Fl. Pres. Madras 1446(1011). 1928. *Gastrochilus indicus* Garay, Bot. Mus.

Leafl. Harvard Univ. 23:180. 1972; Manilal, Fl. Silent Valley 284. 1988; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 484. 2005. **Plate 32a.**

Stem ca. 2 cm high. Leaves 4-10 x 1-1.5 cm, oblong, obliquely bifid at apex. Flowers yellow, on ca. 2 cm long, stout, lateral racemes; dorsal sepal obovate, obtuse; lateral sepals elliptic, obtuse; petals obovate; lip ca. 7 x 8 mm, deeply saccate; epichile triangular, margins dentate with few papillae near centre.
Flowering & Fruiting: October-November.
Distribution: Southern India and Sri Lanka. Common; in evergreen forests. *RNMK 3888,* Chembra; *RNMK 3844*, Kurichiarmala.

Gastrochilus flabelliformis (Blatt. & McCann) Sald., Fl. Hassan Dist. 830. 1976; Abraham & Vatsala, Introd. Orch. 469. 1981; Sathish & Manilal, Orchid Memories 191. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 110. 2009. *Saccolabium flabelliformis* Blatt. & McCann, J. Bombay Nat. Hist. Soc. 35: 722. 1931. **Fig. 42, Plate 32b.**

Epiphytes. Leaves 3-4.5 x 0.8-1 cm, falcate with purple tinges, unequally bilobed at apex. Racemes 1-1.5 cm long. Flowers 5-6 mm across; sepals ovate; petals spathulate yellow with red spots, lip 3-lobed, saccate, side lobes obtuse, midlobe fan shaped, crenate, white; column winged purple coloured, rostellum bifid, pollinia 2, glandular.
Flowering & Fruiting: October-November.
Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 3836*, Makkimala; *RNMK 3855*, Chanthanathodu.

Gastrochilus obliquus (Lindl.) Kuntze, Revis. Gen. Pl. 2: 661. 1891. *Saccolabium obliquum* Lindl., Gen. Sp. Orchid. Pl. 223. 1833. *Saccolabium bigibbus* Rchb.f. ex Hook. f., Bot. Mag. 95: t.5769. 1867; Hook. f., Fl. Brit. India 6: 61. 1890. *Gastrochilus bigibbus* (Rchb.f. ex Hook.f.) O. Ktze., Rev. Gen. Pl. 2: 661. 1891; Sasidh. & Sivar., Fl. Pl. Thrissur For. 442. 1996; Muktesh, Epiphytic Fl. Western Ghats 98. 1998; Sasidh., Fl. Periyar Tiger Reserve 418. 1998. **Fig. 43, Plate 32c.**

Stem 1-2 cm high. Leaves 10-15 x 2.5-3 cm, oblong, obliquely bifid at apex, obtuse. Flowers pale yellow, in ca. 2 cm long, lateral racemes; dorsal sepal ca. 6.5 x 3.2 mm, obovate, obtuse, 3-veined, gland-dotted; lateral sepals ca. 7 x 2.8 mm, obovate, obtuse, 3-veined, gland-dotted; lip ca. 6.5 x 8 mm, deeply saccate, ca. 4 mm broad; midlobe white with yellow centre, finely red-dotted, irregularly toothed on margin; sac with a few spots inside, naked.
Flowering : November-December.
Distribution: Burma and southern Western Ghats. Occasional; in evergreen forests. *RNMK 2981*, Makkimala.

GEODORUM Jackson
in Andrews Bot. Repos. 10: t. 626. 1811.

Geodorum densiflorum (Lamk.) Schltr., Feddes Repert. 4: 259. 1919; Fischer in Gamble, Fl. Pres. Madras 1437(1004). 1928; Abraham & Vatsala, Introd.

Orch. 327. 1981; Manilal & Sivar., Fl. Calicut 284. 1982; Manilal, Fl. Silent Valley 284. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 442. 1996; Sivar. & P. Mathew, Fl. Nilambur 688. 1997; Sathish & Manilal, Orchid Memories 192. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 485. 2005. *Limodorum densiflorum* Lamk., Encycl. 3: 516. 1792. *Geodorum purpureum* R. Br. in Ait.f., Hort. Kew. (ed. 2) 5: 207. 1813; Hook. f., Fl. Brit. India 6: 16. 1890. *Geodorum dilatatum* sensu Wight, Ic. t. 612. 1844; Hook. f., Fl. Brit. India 6: 17. 1890.

Terrestrial tuberous herbs, 60-70 cm tall; pseudobulb ovoid, ca. 5 x 2.5 cm. Leaves 30-50 x 7-10 cm, elliptic-oblong or lanceolate, acuminate. Flowers white or pinkish, raceme 50-60 cm long, from the base of the pseudobulb; flower bearing portion about 5 cm long, strongly decurved. Floral bracts ca. 1.5 x 0.4 cm, lanceolate, acuminate, 1-3-veined; dorsal sepal oblanceolate-oblong, acute, apiculate at apex, 5-veined; lateral sepals elliptic-oblong, acute, 7-veined; petals oblanceolate, obtuse; lip cymbiform, side margins incurved, apex faintly bilobed; disc with longitudinal callus.

Flowering & Fruiting: April-June.

Distribution: Peninsular India, Myanmar, China and Sri Lanka. Occasional; in open areas of semi-evergreen and moist deciduous forests. *RNMK 2851*, Kattikulam; *RNMK 3805*, Manikkunnumala; *RNMK 3809*, Muthanga.

GOODYERA R. Brown

in Aiton, Hort. Kew, ed. 2, 5: 197. 1813.

Goodyera procera (Ker.-Gawl.) Hook., Exot. Fl. t. 39.1823; Hook. f., Fl. Brit. India 6:111.1890; Fischer in Gamble, Fl. Pres. Madras 1456(1018). 1928; Abraham & Vatsala, Introd. Orch. 199. 1981; Manilal, Fl. Silent Valley 284. 1988; Sathish & Manilal, Orchid Memories 192. 2004. *Neottia procera* Ker-Gawl., Bot. Mag. 8: t. 639. 1822.

Terrestrial fleshy herbs, 30-40 cm tall. Leaves 14-16 x 2-2.5 cm, elliptic-lanceolate, acuminate; petiole sheathing at base. Flowers greenish-white, in 15-20 cm long, dense spike; bracts 7-8 x 2-2.5 cm, ovate-lanceolate, acuminate, margins glandular hairy, 1-veined; dorsal sepal ovate, acute, 3-veined; lateral sepals elliptic, acute, 3-veined; petals obliquely spathulate, 1-veined; lip 2-3 x 2-3 mm, cymbiform, with infolded margins; midlobe obtusely bilobed, recurved; hypochile with tuft of hairs; disc with 2 calli.

Flowering & Fruiting: February-March.

Distribution: Indo-Malaya to east Asia. Rare; in rocky areas of streams sides. *RNMK 3819*, Banasuramala.

HABENARIA Willdenow

Sp. Pl. 4(1): 5, 44. 1805.

Terrestrial herbs, with tuberous roots; stems erect, leafy, unbranched. Leaves 2-many, radical or cauline, simple. Flowers 2-many, in terminal spikes or racemes; dorsal sepal oblong, arched; lateral sepals larger, deflexed; petals entire, 2-lobed or 2-partite with filiform segments lip entire, 3-lobed or 3-

partite; spur usually longer than petals; column short, erect, without a foot; anther cells parallel or diverging; pollinia 2, granular; stigma 2-lobed.

1. Leaves 2, rarely 3, sub-orbicular, sub-cordate, radical, well appressed to the ground 2
1. Leaves 3 or more, cauline, not appressed to the ground 3
2. Bracts shorter than the ovary; lip longer than the sepals ..... **H. diphylla**
2. Bracts as long as the ovary; lip as long as the sepals ..... **H. brachyphylla**
3. Petals distinctly bipartite 4
3. Petals entire 5
4. Plants with inflorescence more than 60 cm tall; flowers brownish green; spur as long as or shorter than the ovary ..... **H. multicaudata**
4. Flowers white; plants with inflorescence less than 20 cm tall; spur much longer than the ovary ..... **H. rariflora**
5. Bracts much lesser than the leaves, not concealing the buds 6
5. Bracts large, foliaceous, imbricating, almost concealing the flowers ..... **H. perrottetiana**
6. Midlobe of the lip entire, lobes not tailed 7
6. Midlobe of the lip 2-lobed, lobes with long filiform tails ..... **H. crinifera**
7. Side lobes of the lip filiform or linear, midlobe broad ..... **H. heyneana**
7. Side lobes of the lip broad, midlob narrower 8
8. Spur much longer than the ovary 9
8. Spur shorter than the ovary ..... **H. barnesii**
9. Lip equal or shorter than the lateral sepals 10
9. Lip distinctly longer than the lateral sepals ..... **H. longicorniculata**
10. Spike lax flowered; side lobes of the lip longer than or nearly as long as the midlob, toothed or fimbriate; ovary not beaked 11
10. Spike dense flowered; side lobes of the lip much shorter than the midlob, entire; ovary beaked ..... **H. roxburghii**
11. Ovary curved; lip triangular-cuneate, side lobes lanceolate ..... **H. richardiana**
11. Ovary straight; lip trilobed, side lobes recurved-cuneate ..... **H. longicornu**

Habenaria barnesii Summerh. ex Fischer in Gamble, Fl. Pres. Madras 1887(1306). 1936; Abraham & Vatsala, Intr. Orch. 236. 1981; Nayar & Sastry, Red Data Book, Indian Pl. 1:256. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 443. 1996; Mohanan & Sivad., Fl. Agasthyamala 677. 2002; Sathish & Manilal, Orchid Memories 193. 2004.

Terrestrial tuberous herbs; stem slender, 16-20 cm long. Leaves 3-5, 2-2.5 x 0.4-0.5 cm, about the middle of the stem, oblong-lanceolate, acute. Flowers in secund spikes; bracts ca. 2.5 x 1 cm, cucullate, foliaceous, almost concealing flowers; dorsal sepal ovate, obtuse, 5-veined; lateral sepals falcately ovate-lanceolate, obtuse, 5-veined; petals falcately linear-lanceolate, obtuse, 2-veined, greenish-yellow; lip ca. 1 x 1.5 cm, 3-lobed; lateral lobes linear; midlobe oblong, obtuse; spur ca. 1.5 cm long, cylindric, obtuse, inflated towards the apex, shorter than ovary.

Flowering: August-September.
Distribution: Endemic to southern Western Ghats. Rare; in grasslands. *RNMK 1671*, Chembra.

Habenaria brachyphylla (Lindl.) Aitch., J. Linn. Soc. Bot. 19: 188. 1882. *Platanthera brachyphylla* Lindl., Gen. Sp. Orchid. Pl. 293. 1835. *Habenaria crassifolia* A. Rich., Ann. Sci. Nat. Bot. ser. 2, 15. 72. 1841; Hook. f., Fl. Brit. India 6: 151. 1890; Fischer in Gamble, Fl. Pres. Madras 1471(1028). 1928; Abraham & Vatsala, Introd. Orch. 231. 1981; Sathish & Manilal, Orchid Memories 193. 2004. **Plate 32d.**

Stem 10-50 cm high. Leaves 2-2.5 x 2-2.5 cm, broadly ovate, subacute or acute, adpressed to the ground. Flowers white, in about 17 cm long spike; bracts 6-7 x 1-2 mm, oblong-lanceolate, 2-veined; dorsal sepal broadly elliptic, obtuse, 5-veined; lateral sepals obliquely ovate, 3-veined; petals obliquely ovate-lanceolate, acute, 2-veined; lip ca. 5 x 5 mm, 3-lobed; lobes unequal; lateral lobes oblong, obliquely truncate, dentate at apex; midlobe oblong-lanceolate, obtuse; spur ca. 1.3 x 0.1 cm, cylindric, obtuse.
Flowering & Fruiting: August-September.
Distribution: Endemic to southern Western Ghats. Occasional; in moist deciduous forests. *RNMK 1622,* Muthanga.

Habenaria crinifera Lindl., Gen. Sp. Orchid. Pl. 323. 1835; Hook. f., Fl. Brit. India 6: 142. 1890; Fischer in Gamble, Fl. Pres. Madras 1471(1028). 1928; Abraham & Vatsala, Introd. Orch. 241. 1981; Manilal, Fl. Silent Valley 285. 1988; Vajr., Fl. Palghat Dist. 481. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 443. 1996; Sathish & Manilal, Orchid Memories 193. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 485. 2005. **Plate 32e.**

Stem 10-30 cm high. Leaves clustered towards base of stem, oblong-lanceolate, acute or acuminate. Scape 20-25 cm long. Flowers white, towards the apex of scape; sepals ovate; petals linear; lip ca. 2 cm long, clawed, side lobes cuneiform, serrate, apex filiform; midlobe flabelliform, serrate, apex caudate.
Flowering & Fruiting: August-October.
Distribution: Sri Lanka and south India. Rare; on tree trunks in evergreen forests. *RNMK 1683,* Sugandhagiri.

Habenaria diphylla (Nimmo) Dalz. in Hook.'s J. Bot. Kew. Gard. Misc. 2: 262. 1850; Hook. f., Fl. Brit. India 6: 151. 1890; Fischer in Gamble, Fl. Pres. Madras 1471(1028). 1928; Manilal & Sivar., Fl. Calicut 282. 1982; Sathish & Manilal, Orchid Memories 194. 2004. *Liparis diphyllos* Nimmo in J.Graham, Cat. Pl. Bomb. Bombay 252. 1839. *Habenaria jerdoniana* Wight, Ic. 5:14. t. 1715. 1851.

Terrestrial herbs, 10-15 cm tall. Leaves 2, appressed to the ground, orbicular, rounded or acute at tip, base cordate, pair unequal in size. Spike 5-

8 cm long; bracts ovate, acuminate; sepals ovate, acute; petals linear, subfalcate; lip longer than the sepals, lobes filiform; spur inflated, acute, as long as the ovary.
Flowering & Fruiting: September-November.
Distribution: India to Bangladesh and Philippines. Occasional; in grasslands. *RNMK 1678*, Pookodu.

Habenaria heyneana Lindl., Gen. Sp. Orchid. Pl. 320. 1835; Hook. f., Fl. Brit. India 6: 148. 1890; Fischer in Gamble, Fl. Pres. Madras 1471(1028). 1928; Abraham & Vatsala, Introd. Orch. 231. 1981; Manilal, Fl. Silent Valley 287. 1988; Vajr., Fl. Palghat Dist. 481. 1990; Sathish & Manilal, Orchid Memories 194. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 486. 2005. *Habenaria subpubens* A. Rich., Ann. Sci. Nat. Bot. ser. 2, 15: t. 4C.1841; Hook. f., Fl. Brit. India 6: 148. 1890. *Habenaria glabra* A. Rich., Ann. Sci. Nat. Bot. ser. 2, 15: 75. 1841. *Habenaria candida* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 2: 262. 1850. *Habenaria cerea* Blatt. & Mc Cann, J. Bombay Nat. Hist. Soc. 36: 21. t. 6. 1932. *Habenaria cerea* Blatt. & Mc Cann var. *polyantha* Blatt. & McCann, J. Bombay Nat. Hist. Soc. 36: 22. 1932. **Plate 32f.**

Stem 10-40 cm high. Leaves 4-6 x 0.5-0.9 mm, oblong-lanceolate, acute, cauline. Flowers white, on 3-5 cm long, secund spike; bracts ca. 1.5 x 0.6 cm, ovate-lanceolate, acute, foliaceous; dorsal sepal elliptic-oblong, acute, 5-veined; lateral sepals elliptic-oblong, obtuse-apiculate, 5-veined; petals obliquely ovate-lanceolate, obtuse, 3-veined; lip ca. 1 x 0.6 cm, 3-lobed; lobes subsimilar; lateral lobes obliquely oblong-lanceolate, obtuse; midlobe oblong-lanceolate, obtuse; spur 1.3-1.5 x 0.1-0.2 cm, cylindric, subacute to obtuse.
Flowering & Fruiting: August-October.
Distribution: Endemic to Peninsular India. Common; in grasslands. *RNMK 1620,* Chembra; *RNMK 1602*, Sugandhagiri; *RNMK 1609*, Brahmagiri; *RNMK 1683,* Aranamala.

Habenaria longicorniculata Graham, Cat. Bombay Pl. 202. 1839; Abraham & Vatsala, Introd. Orch. 238. 1981; Manilal, Fl. Silent Valley 287. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 455. 1988; Vajr., Fl. Palghat Dist. 482. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 444. 1996; Sathish & Manilal, Orchid Memories 195. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 486. 2005. *Habenaria longicalcarata* A.Rich., Ann. Sci. Nat. Bot. ser.2, 15: 71,t.3B.1841; Hook. f., Fl. Brit. India 6: 141. 1890; Fischer in Gamble, Fl. Pres. Madras 1470(1027). 1928. *Habenaria longicalcarata* var. *viridis* Blatt. & McCann, J. Bombay Nat. Hist. Soc. 36: 20. 1932. **Plate 32g.**

Stem 20-60 cm high. Leaves clustered towards base of stem, 12-15 x 1-2 cm, oblong-lanceolate or linear-lanceolate, acute. Scape 35-40 cm long. Flowers white, 2-2.5 cm across; sepals obliquely ovate; dorsal sepal concave; petals spathulate, obtuse; lip 3-partite, side lobes oblong, subcuneate, oblique at apex, subentire, midlobe linear-oblong, little shorter than the side lobes, narrower; spur 10-12 cm long, linear, subclavate.

Flowering & Fruiting: July-August.
Distribution: Endemic to Western Ghats. Common; in grasslands. *RNMK 1678,* Chembra; *RNMK 3008*, Sugandhagiri.

Habenaria longicornu Lindl., Gen. Sp. Orchid. Pl. 322. 1835; Hook. f., Fl. Brit. India 6. 139. 1890; Fischer in Gamble, Fl. Pres. Madras 1470(1027). 1928; Abraham & Vatsala, Introd. Orch. 229. 1981; Manilal, Fl. Silent Valley 287. 1988; Vajr., Fl. Palghat Dist. 482. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 444. 1996; Sathish & Manilal, Orchid Memories 195. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 486. 2005. *Habenaria montana* A. Rich., Ann. Sci. Nat. Bot. ser 2, 15: 73 t. 4A. 1841. **Plate 32h.**

Stem 10-40 cm high. Leaves 10-12 x 2-2.5 cm, clustered towards the middle of the stem, linear-oblong, lanceolate, acute or acuminate. Scape 20-25 cm tall. Flowers 6-8, 2-2.5 cm across; bracts shorter than the 2.5 cm long ovary; sepals ovate, acute; petals linear-oblong, narrower; lip 3-partite; side lobes ca. 1.2 x 0.5 cm, cuneate, apex obliquely truncate, fimbriate; midlobe linear, shorter; spur 9-10 cm long, apex clavate.
Flowering & Fruiting: September-October.
Distribution: Endemic to Peninsular India. Rare; in rocky areas of grasslands. *RNMK 1622,* Pookodu.

Habenaria multicaudata Sedgw., Rec. Bot. Surv. India 6: 352. 1919; Fischer in Gamble, Fl. Pres. Madras 1469(1026). 1928; Abraham & Vatsala, Introd. Orch. 216. 1981; Manilal, Fl. Silent Valley 288. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 455. 1988; Vajr., Fl. Palghat Dist. 482. 1990; Sathish & Manilal, Orchid Memories 196. 2004.

Stem 2-30 cm high. Leaves cauline, 6-20 x 2-5 cm, elliptic-oblong, clustered near the middle of the stem. Flowers greenish-white, in many flowered 25-30 cm long racemes; bracts shorter than ovary, sheathing; lateral sepals falcate; petals bilobed, lobes filiform; lip 3-lobed, lobes filiform; lateral lobes arched; midlobe shorted; spur shorter than the ovary, curved, swollen at apex.
Flowering & Fruiting: August-November.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1031*, Chanthanathodu.

Habenaria perrottetiana A. Rich., Ann. Sci. Nat. Bot. 15. 74. t.4.1841; Hook. f., Fl. Brit. India 6: 164. 1890; Fischer in Gamble, Fl. Pres. Madras 1471(1028). 1928; Abraham & Vatsala, Introd. Orch.236. 1981; Sathish & Manilal, Orchid Memories 197. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 487. 2005. *Platanthera lutea* Wight, Ic. t. 919. 1845. **Plate 32i.**

Stem 20-50 cm high. Leaves 6-7 x 2-3 cm, elliptic-oblong, acute. Flowers white, few, in about 15 cm long spike; bracts 2.5-3 x 1.5-1.7 cm, broadly elliptic, acute-apiculate, foliaceous, almost concealing the flowers; dorsal sepal ovate-oblong, obtuse, 5-veined; lateral sepals elliptic, obtuse, 7-veined; petals obliquely oblong, acute, 4-veined; spur ca. 1.5 cm long, clavate.

Flowering & Fruiting: September-October.
Distribution: Endemic to south India. Rare; in grasslands. *RNMK 1609*, Chembra.

Habenaria rariflora A. Rich., Ann. Sci. Nat. Bot. ser.2, 15: 70. t.2D.1841; Hook. f., Fl. Brit. India 6: 136. 1890; Fischer in Gamble, Fl. Pres. Madras 1460(1027). 1928; Abraham & Vatsala, Introd. Orch. 216. 1981; Sathish & Manilal, Orchid Memories 197. 2004. **Plate 32j.**

Herbs; stem 10-12 cm high. Leaves 2.5-3.5 x 0.3-0.4 cm, linear, acute. Flowers white, 1 or 2, in 5-10 cm long, terminal raceme; dorsal sepal broadly ovate, obtuse, 5-veined; lateral sepals obliquely elliptic-oblong, subacute, 5-veined; petals unequally biparted, larger lobe ovate, acute; smaller lobe linear acute; lip ca. 1.5 x 0.3 cm, 3-lobed; lateral lobes linear, acute, midlobe oblong, obtuse; spur 3.5-4 x 1-2 mm, cylindric, obtuse.
Flowering & Fruiting: July-September.
Distribution: Endemic to Western Ghats. Occasional; in dripping rocky areas of grasslands. *RNMK 1671*, Chembra.

Habenaria richardiana Wight, Ic. t. 1713. 1851; Hook. f., Fl. Brit. India 6: 139. 1890; Fischer in Gamble, Fl. Pres. Madras 1470(1027). 1928 ; Sathish & Manilal, Orchid Memories 197. 2004.

Slender tuberous herbs, 15-30 cm tall. Leaves subradical, 3-5, crowded, 5-7 x 1-2 cm, narrowly elliptic-lanceolate, abruptly changing into sterile and fertile bracts towards the apex. Flowers white, 3-10; bracts cucullate, acuminate; sepal ovate-lanceolate, 3-5 nerved; petals gibbous at base; lip 3 lobed towards the apex, sidelobes wing like; spur 3-5 cm long, curved, longer than the ovary.
Flowering & Fruiting: September-November.
Distribution: Endemic to southern Western Ghats. Rare; in grasslands. *RNMK 1678,* Sugandhagiri.

Habenaria roxburghii (Pers.) Nicols., in Sald.& Nicols., Fl. Hassan Dist. 834. 1976; Sathish & Manilal, Orchid Memories 197. 2004. *Orchis roxburghii* Pers., Syn. Pl. 2: 503. 1807. *Orchis platyphyllos* Willd., Sp. Pl. 4: 11. 1805, nom. superfl. *Habenaria platyphylla* (Willd.) Spreng., Syst. Veg. 690. 1826; Hook. f., Fl. Brit. India 6: 140. 1890; Fischer in Gamble, Fl. Pres. Madras 1470(1027). 1928; Abraham & Vatsala, Introd. Orch.229. 1981. **Plate 32k.**

Herbs; tubers one or two. Leaves 2 or 3, at the base, 5-7 x 4-5 cm, orbicular, acute at apex, base sheathing. Racemes densely flowered, 7-8 cm long, flowers white; bracts ca. 2 cm long, lanceolate; sepals broadly ovate, lip 3-lobed, side lobes smaller, lateral lobes oblong; spur 4-5 cm long, oblong, clavate at apex.
Flowering & Fruiting: August-October.
Distribution: Endemic to Peninsular India. Rare; in moist deciduous forests. *RNMK 1622*, Muthanga.

HETAERIA Blume

Bijdr.: 409 (1825).

Hetaeria ovalifolia (Wight) Benth. ex Hook.f., Fl. Brit. India 6: 115. 1890; Fischer in Gamble, Fl. Pres. Madras 1457(1019). 1928; Abraham & Vatsala, Introd. Orch 199. 1981; Sathish & Manilal, Orchid Memories 198. 2004. *Goodyera ovalifolia* Wight, Ic. t. 1730. 1851. *Rhamphidia ovalifolia* (Wight) Lindl., J. Proc. Linn. Soc. Bot. 1: 181. 1851.

Robust terrestrial plants, 50-60 cm in height. Leaves 15-20 x 7-9 cm long; petiole 3-4 cm long. Inflorescence 25-30 cm long, glandular pubescent, brownish, lax-flowered, flowers pink, 0.8-1 cm across; lip with several rows of warts inside the sac.

Flowering & Fruiting: February-March.

Distribution: Endemic to south India. Rare; in evergreen forests. *RNMK 1666,* Chembra.

IPSEA Lindley

Gen. Sp. Orchid. Pl.: 124 (1831).

Ipsea malabarica (Rchb.f.) Hook.f., Fl. Brit. India 5: 812. 1890; Abraham & Vatsala, Introd. Orch. 268. 1981; Manilal, Fl. Silent Valley 289. 1988; Manilal & Sathish, Bull. of Pure & Applied Sciences 2C: 38. 1983; Sathish & Manilal, Orchid Memories 198. 2004. *Pachystoma malabaricum* Rchb.f., Walp. Ann. 6: 462. 1861. *Spathoglottis malabarica* (Rchb.f.) Pradhan, Ind. Orch. 2: 702. 1979. **Plate 32**l**.**

Terrestrial tuberous herbs. Leaves 1-2, linear lanceolate, tapering at apex, 10-45 x 0.6-1.3 cm, 3-ribbed. Scape 20-35 cm long, puberulous, with 2-4 sheathes; flowers 1-2. 2.5-3.5 cm across, golden yellow; dorsal sepal oblong, 7-nerved, puberulous outside; lateral sepals ovate-oblong; petals oblong-lanceolate, 7-nerved; lip 3-lobed; disc with 5-6 serrated lamellae; column pubescent; pollinia 8, in 2 pairs of 4 each; ovary pubescent.

Flowering & Fruiting: September–October.

Distribution: Endemic to southern Western Ghats (Kerala). Rare; in rocky slopes of grasslands. *RNMK 1617*, Chembra.

KINGIDIUM P. F. Hunt

Kew Bull. 24: 97. 1970.

Epiphytes with short stem. Leaves crowded. Flowers on lateral short racemes; sepals subequal, spreading; petals similar to sepals; lip adnate to the column foot, 3-lobed, side lobes small, midlobe obovate, with a 2 awned plate; column foot narrowly winged; pollinia 2, globose, 2-partite; caudicle with large gland.

1. Racemes to 20 cm long; disc with a pair of appendages..... **K. mysorensis**
1. Racemes to 5 cm long; disc with 2 pairs of appendages.....**K. niveum**

Kingidium mysorensis (Sald.) Sathish in Sathish & Manilal, Cat. Indian Orch. 59.1994; Sathish & Manilal, Orchid Memories 199. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 113. 2009. *Phalaenopsis mysorensis* Sald., Indian For. 100: 571. t.3. 1974; Abraham & Vatsala, Introd. Orch. 464. 1981; Manilal, Fl. Silent Valley 300. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 460. 1988. **Plate 33a.**

Stem 1-1.3 cm long. Leaves 2-3, 10-15 x 3-3.4 cm, flat, oblong, lanceolate, unequally forked at apex. Flowers white, 6-10, in 15-20 cm long racemes; dorsal sepals obovate, obtuse; lateral sepals ovate, acute; petals obovate, obtuse; lip 3-lobed, sidelobes rounded, midlobe ovate, acute; disc with a pair of sharp pointed appendage.

Flowering & Fruiting: March-June.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3871*, Chandanathodu; *RNMK 3869*, Palchuram.

Kingidium niveum Sathish in Sathish & Manilal, Cat. Indian Orch. 53. t.16. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 445. 1996; Sathish & Manilal, Orchid Memories 199. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 115. 2009.

Epiphytes, stem short. Leaves 4-7 x 3-2 cm, oblong-elliptic, coriaceous, apex acute. Flowers white, 2-4, in 3-5 cm long slender raceme; dorsal sepal elliptic-oblong, obtuse, 5-veined; lateral sepals ovate, obtuse; petals obovate, obtuse; lip ca. 4.5 x 6.5 mm, yellow, 3-lobed; side lobes, obovate, toothed along margins, fleshy, bilobulate, lamellate; midlobe triangular, base with fleshy callus, margins subentire, disc with 2 pairs of unequal antennae.

Flowering: October-November.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3854*, Chembra.

LIPARIS L.C. Richard

Mem. Mus. Hist. Nat. 4: 43, 52. 1818, *nom. cons.*

Epiphytes or terrestrial herbs, stem sometimes pseudobulbous short or elongated. Leaves 1 or 2 on pseudobulbs or 3-5 in terrestrial species, plicate or flat. Scape terminal, racemose or spicate; flowers small, few to many; sepals free; petals similar to sepals or much narrower, erect or reflexed; lip sessile, entire, 2-fid or 3-lobed; spur 0; column elongated, curved, often winged; foot 0; pollinia ovoid, waxy, 4, united in pairs at tips.

1. Epiphytic plants; lip without conspicuous callus 2
1. Terrestrial plants; lip with conspicuous callus 4
2. Leaf solitary, small, narrowly elliptic; lip truncate ..... **L. caespitosa**
2. Leaves 2, long, acute-subacute at tip; lip not truncate 3
3. Pseudobulb narrow, elongate; leaves to 22 cm long; lip entire, ovate .... **L. viridiflora**
3. Pseudobulb ovoid, compressed; leaves to 12 cm long; lip suborbicular, obscurely 3-lobed ..... **L. elliptica**

4. Tall plants; stem more than ca10 cm tall 5
4. Dwarf plants; stem less than 5 cm tall 6
5. Leaves 3, ovate-orbicular; flowers dense; lip rhomboid, obtuse at tip .... **L. autopurpurea**
5. Leaves 2, narrowly elliptic-lanceolate; flowers lax; lip obcordate with a broad sinus, with or without an apicula ..... **L. odorata**
6. Leaves subradical; bracts reflexed on the rachis..... **L. wrayi**
6. Leaves cauline; bracts erect on the rachis 7
7. Lip without a claw, orbicular, finally papillose at margins, obtuse or obscurely retuse at tip ..... **L. wightiana**
7. Lip with a short claw, obovate, naked at margins, deeply cleft at apex ..... **L. biloba**

Liparis atropurpurea Lindl., Gen. Sp. Orchid. Pl. 28.1830; Hook. f., Fl. Brit. India 5:698.1890; Fischer in Gamble, Fl. Pres. Madras 1411(987). 1928; Abraham & Vatsala, Introd. Orch. 408. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 446. 1996; Sathish & Manilal, Orchid Memories 199. 2004. *Liparis olivacea* Wight, Ic. t 903. 1845, non Lindl. 1825; non Graham 1839. *Liparis walkeriae* Wight, Ic. t. 905. 1845, non Graham.

Terrestrial herbs, 20-30 cm tall with inflorescense; stem bulbous at the base, purplish in colour. Leaves 3-4, 10-15 x 5-6 cm; petiole dark purple. Inflorescence 5-10 cm long; flowers purple, ca. 0.8 cm across; petals filiform; lip with 2 calli at the base, 0.6-0.7 cm long.

Flowering & Fruiting: August-September. *Distribution*: South India and Sri Lanka

Rare; in evergreen forests. *RNMK 3218*, Sughandhagiri.

Liparis biloba Wight, Ic. t. 1633. 1851; Hook. f., Fl. Brit. India 5: 699. 1890; Fischer in Gamble, Fl. Pres. Madras 1410. 1928.

Small pseudobulbous herbs; fresh shoots lateral from the old pseudobulb, 6-8 cm long with inflorescence. Leaves membranous, 3-5 x 0.5-1-5 cm, ovate-elliptic, narrowed into a long sheathing petiole. Racemes terminal, 3-5 cm long; flowers purple, few; dorsal sepal oblong-lanceolate, obtuse, 3-nerved; petals linear, obtuse; lip 3.5-4 x 2-2.5 mm, shortly clawed at base with 2 calli on the dorsal side.

Flowering & Fruiting: July-September.

Distribution: Endemic to southern Western Ghats. Rare; in rock crevices in grasslands. *RNMK 3334*, Chembra; *RNMK 3314*, Kurichiarmala.

Liparis caespitosa (Lam.) Lindl., Bot. Reg. 11. sub. t. 882. 1825; Sathish & Manilal, Orchid Memories 200. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 116. 2009. *Epidendrum caespitosum* Lamk., Encycl. 1: 87. 1783. *Liparis duthiei* Hook., Ic. t. 1857. 1889; Fischer in Gamble, Fl. Pres. Madras 1411(987). 1928. **Plate 33b.**

Pseudobulb 1-1.5 x 0.7-0.8 cm, ovoid. Leaf 7-8 x 1-1.5 cm, with ca. 1.5 cm long petiole, oblong, acute. Flowers white, 5-6 mm long, in about 10 cm long, terminal raceme; dorsal sepal, oblong-lanceolate, 1-veined; lateral sepals ovate, acute, 1-veined; petals linear, retuse, 1-veined; lip oblong, acute, fleshy, glandular.
Flowering & Fruiting: August-September.
Distribution: Widespread from Africa to Pacific. Rare; in evergreen forests. *RNMK 3309,* Kallady- 900 forest.

Liparis elliptica Wight, Ic. t. 1735. 1851; Abraham & Vatsala, Introd. Orch. 412. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 446. 1996; Sathish & Manilal, Orchid Memories 200. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 488. 2005 ; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 117. 2009. *Liparis viridiflora* sensu Hook.f., Fl. Brit. India 5: 704. 1890, non Lindl. 1830; Fischer in Gamble, Fl. Pres. Madras 1411(987). 1928.

Terrestrial small herb; pseudobulb 2-3 x 1-1.5 cm, ovoid, laterally compressed, 2-leaved. Leaves 10-11 x 2.5-3 cm, linear-elliptic, acute; petiole ca. 1 cm long. Flowers white, in about 20 cm long terminal raceme; dorsal sepal elliptic, obtuse, 1-veined; lateral sepals elliptic-oblong, apiculate, 1-veined; petals linear, subacute; lip 3-4 x 1-2 mm, ovate, subacuminate, with an ear like folding subapically.
Flowering & Fruiting: April-May.
Distribution: Indo-Malesia. Occasional; in evergreen forests. *RNMK 1612,* Sughandagiri; *RNMK 1674,* Chembra.

Liparis odorata (Willd.) Lindl., Gen. Sp. Orchid. Pl. 26. 1830; Sathish & Manilal, Orchid Memories 200. 2004. *Malaxis odorata* Willd., Sp. Pl. 4: 91. 1805. *Liparis paradoxa* (Lindl.) Rchb.f., Walp. Ann. 6:218.1861; Hook. f., Fl. Brit. India 5:697.1890. *Liparis nervosa* auct. non (Thunb.) Lindl.: Fischer. in Gamble, Fl. Pres. Madras 1410(987). 1928; Abraham & Vatsala, Introd. Orch. 408. 1981; Manilal, Fl. Silent Valley 291. 1988; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 488. 2005.

Terrestrial herbs, stem 18-20 cm long, base bulbous. Leaves 8-9 x 2.5-3 cm, ovate, acute. Flowers pinkish; dorsal sepal oblong-lanceolate, obtuse; lateral sepals elliptic-lanceolate, subacute; petals linear-lanceolate, obtuse; lip 5-6 x 4-4.5 mm, obovate, fleshy, disc with 2 calli, margin crenate.
Flowering & Fruiting: July-September.
Distribution: Widespread. Occasional; in grasslands. *RNMK 3308*, Manikkunnumala; *RNMK 1633*, Sughandhagiri.

Liparis viridiflora (Bl.) Lindl., Gen. Sp. Orchid. Pl. 31. 1830; Abraham & Vatsala, Introd. Orch. 410. 1981; Ansari, Fl. Kasaragod Div. 370. 1985; Manilal, Fl. Silent Valley 291. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore

456. 1988; Vajr., Fl. Palghat Dist. 483. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 446. 1996; Sivar. & P. Mathew, Fl. Nilambur 689. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 488. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 117. 2009. *Malaxis viridiflora* Bl., Bijdr. 392. 1825. *Liparis longipes* Lindl., Gen. Sp. Orchid. Pl. 30. 1830; Hook. f., Fl. Brit. India 5: 703. 1890; Fischer in Gamble, Fl. Pres. Madras 1411(987). 1928.

Epiphytic herbs; pseudobulb 7-8 x 2-2.5 cm, tapering towards apex. Leaves 2 per pseudobulb, 20-25 x 1-2 cm, linear, acuminate. Flowers creamy, in 15-20 cm long raceme; dorsal sepal oblong acute, 1-veined; lateral sepals obliquely oblong, obtuse, 1-veined; petals linear, acute, 1-veined; lip 2-2.5 x 2-3 mm, oblong, acute, obtuse.

Flowering & Fruiting: September-October.

Distribution: Indo-Malesia. Common; in evergreen forests. *RNMK 1665*, Thariodu; *RNMK 3318*, Banasuramala.

Liparis wightiana Thw., Enum. Pl. Zeyl. 295. 1861; Hook. f., Fl. Brit. India 5: 695. 1890; Fischer in Gamble, Fl. Pres. Madras 1410(986). 1928; Abraham & Vatsala, Introd. Orch. 405. 1981; Manilal, Fl. Silent Valley 291. 1988; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 681. 2002; Sathish & Manilal, Orchid Memories 201. 2004. *Liparis atropurpurea* sensu Wight, Ic. t. 904. 1844, non Lindl. 1830.

Terrestrial herbs, 12-15 cm, base bulbous. Leaves 5-5.5 x 1.5-2 cm, ovate, acuminate. Flowers yellowish with brown tinge, in about 4-8 cm long racemes; bracts 7-9 x 3.5-4 mm, lanceolate, acuminate; dorsal sepal lanceolate, obtuse, 3-veined; lateral sepals subfalcately lanceolate, acute, 3-veined; petals linear, obtuse, 1-veined; lip ca. 7 x 6 mm, oblong-orbicular, auricled at base, disc with 2 tubercled calli, margins hairy.

Flowering & Fruiting: August-September.

Distribution: South India and Sri Lanka. Occasional; in grasslands. *RNMK 3309*, Sugandhagiri; *RNMK 1639*, Chembra; *RNMK 3315*, Kurichiarmala.

Liparis wrayi Hook. f., Fl. Brit. India 6: 181. 1890; Sathish & Manilal, Orchid Memories 201. 2004. *Liparis indiraii* Manilal & Sathish, Pl. Syst. Evol. 145: 155. 1984; Manilal, Fl. Silent Valley 289. 1988.

Terrestrial herbs, base swollen. Leaves 3 or 4, 5-8 x 2.5-3 cm, elliptic, apex acute, sessile, margin undulate. Racemes terminal, bracts 3-4 mm long, deltoid. Flowers creamy-yellow; sepals lanceolate, acute; petals linear, lip 5-6 x 3-4 mm, subpandurate, emarginate, apex shortly pectinate; disc with two calli at base.

Flowering & Fruiting: May-June.

Distribution: India, Myanmar, Malaya, Sumatra, Java and New Guinea. Rare; in moist deciduous forest. *RNMK 3385*, Kuruva.

LUISIA Gaudichaud-Beaupre
in Freycinet Voyage Monde,
Uranie Physicienne Bot. 426. 1829.

Epiphytes with elongated terete stem. Leaves terete, fleshy. Flowers in extra-axillary, few to many flowered spikes, resupinate; sepals subequal, dorsal smaller; laterals apically keeled; petal equal to or larger than lateral sepals; lip sessile towards base of column, subentire, base flat or concave, apically decurved, broad, ridged; column straight, short; foot 0; pollinia 2, globose, caudicle flat.

1. Leaves tufted 2
1. Leaves not tufted 3
2. Stem woody, erect; leaves 6-10-per shoot, grooved; lip longer than petals, white with purple markings..... **L. birchea**
2. Stem pendant; leaves 3-5 per shoot, not grooved; lip shorter than petals with deep purple marking..... **L. evangelinae**
3. Lip same length as sepals and petals, deep purple..... **L. tristis**
3. Lip longer than sepals and petals..... **L. macrantha**

Luisia birchea (A. Rich.) Bl., Mus. Bot. Ludg.-Bat. 1: 64. 1849; Abraham & Vatsala, Intr. Orch. 481. 1981; Ansari, Fl. Kasaragod Div. 370. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 447. 1996; Sivar. & P. Mathew, Fl. Nilambur 690. 1997; Sathish & Manilal, Orchid Memories 201. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 120. 2009. *Birchea teretifolia* A. Rich., Ann. Sci. Nat. Bot. ser. 2, 15: 67. 1841. *Luisia tenuifolia* Hook.f., Fl. Brit. India 6: 24. 1890; Fischer in Gamble, Fl. Pres. Madras 1438(1006). 1928. *Cymbidium triste* Wight, Ic. t. 911. 1845. *Luisia pulniana* Abraham & Vatsala, Intr. Orch. 486. 1981. **Plate 33c.**

Stout erect epiphyte, 15-40 cm tall. Leaves 15-25 x 0.2-0.3 cm, linear, obtuse. Flowers brownish, axillary, solitary; dorsal sepal oblong-lanceolate, obtuse, keeled, 3-veined; lateral sepals oblong-lanceolate, obtuse, keeled, 3-veined; petals linear, subacute, obtuse, 3-veined; lip ca. 1.6 x 0.7 mm, elliptic-oblong, apex 2-lobed, with 2 lateral smaller, fleshy ridges on the lip.
Flowering: July-September.
Distribution: Endemic to southern Western Ghats. Occasional; in moist deciduous forests. *RNMK 1640,* Muthanga.

Luisia evangelinae Blatt. & McCann, JBHNS 35: 493. 1932; Abraham & Vatsala, Introd. Orch. 483. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 447. 1996; Sathish & Manilal, Orchid Memories 202. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 121. 2009. *Luisia tenuifolia* Bl., var. *evangelinae* (Blatt. & McCann) Sant. & Kapad., J. Bombay Nat. Hist. Soc. 59: 829. 1962. **Plate 33d.**

Stem pendent, 20-30 cm long. Leaves 8-15 x 0.1-0.2 cm. Peduncle short, 1.3-1.5 cm long. Flowers ca. 3 cm long; sepals creamy white, oblong; petals

linear, creamy white with purple blotches; lip pandurate, 2-2.2 x 0.8-1 cm, white with purple blotches.
Flowering & Fruiting: December-January.
Distribution: Endemic to Western Ghats. Rare; in evergreen forests. *RNMK 1686,* Chanthanathodu.

Luisia macrantha Blatt. & McCann, J. Bombay Nat. Hist. Soc. 35: 492, t.10. 1932; Chandra., J. Econ. Tax. Bot. 17: 69. 1993; Sathish & Manilal, Orchid Memories 202. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 122. 2009. **Plate 33e.**

Stem terete. Leaves terete, straight, with short conical apuculumat apex. Flowers large, solitary; sepals suequal, dorsal ovate-elliptic, laterals cymbiform; petals strap shaped, arched, greenish-yellow, blotched with deep purple patches; lip oblong, sessile, 2-lobed, greenish with purple patch.
Flowering & Fruiting: January-April.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1677*, Banasurasagar dam area.

Luisia tristis (G.Forst.) Hook.f., Fl. Brit. India 6: 25. 1890. *Epidendrum triste* G.Forst., Fl. Ins. Austr. 60. 1786. *Luisia zeylanica* Lindl., Fol. Orch. Luisia 3. 1853; Abraham & Vatsala, Introd. Orch.486. 1981; Manilal & Sivar., Fl. Calicut 284. 1982; Manilal, Fl. Silent Valley 292. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 456. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 447. 1996; Sivar. & P. Mathew, Fl. Nilambur 690. 1997; Sathish & Manilal, Orchid Memories 202. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 488. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 677. 2009; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 123. 2009. *Luisia teretifolia* Gaudich., Voy. Uranie 426. 1829; Hook.f., Fl. Brit. India 6: 22. 1890; Fischer in Gamble, Fl. Pres. Madras 1438(1005). 1928. *Luisia truncata* Blatt. & McCann, J. Bombay Nat. Hist. Soc. 35: 491. t. 9. 1932.

Epiphytes, 15-20 cm tall. Leaves 12-15 cm long, linear, obtuse. Flowers yellow, in short leaf-opposed clusters; dorsal sepal oblong-lanceolate, obtuse, 5-veined; lateral sepals oblong, obtuse, keeled, 5-veined; petals oblong, acute, 5-veined; lip 6-7 x 2-4 mm, 3-lobed; side lobes small, obliquely ovate, obtuse; midlobe cordately ovate, obtuse, saccate at base.
Flowering & Fruiting: March-August.
Distribution: South Asia. Common; in semi-evergreen forests. *RNMK 1674,* Manikkunnumala; *RNMK 3873*, Karuvanthodu; *RNMK 1604*, Muthanga.

MALAXIS Solander ex Swartz
Prodr. 119. 1788.

Malaxis purpurea (Lindl.) O. Kuntze., Rev. Gen. 2: 673. 1891. *Microstylis purpurea* Lindl., Gen. Sp. Orchid. Pl. 20. 1830. *Crepidium purpureum* (Lindl.) Szlach., Syst. Orch. 3: 131. 1995; Sathish & Manilal, Orchid Memories 176.

2004. *Malaxis acuminata* auct. non D. Don, 1825: Abraham & Vatsala, Introd. Orch. 396. 1981; Manilal, Fl. Silent Valley 292. 1988; Vajr., Fl. Palghat Dist. 484. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 448. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 489. 2005. *Microstylis wallichii* sensu Hook. f., Fl. Brit. India 5:686.1888,p.p. non Lindl. 1830; Fischer in Gamble, Fl. Pres. Madras 1407 (985). 1928.

Terrestrial herbs, with swollen base. Leaves 7-8.5 x 2.5-3 cm, elliptic or ovate, acute. Scape about 20 cm; bracts 4-5 x 1-2 mm, lanceolate, acuminate, 1-veined. Flowers golden yellow or white, ca. 1 x 0.5 cm; dorsal sepal obovate, obtuse, 5-veined; lateral sepals broadly ovate, obtuse, 5-veined; petals linear, retuse at apex, 1-veined; lip auricled, apex bilobulate, obtuse; margin with a constriction, subapically; disc with purple oval fovea.

Flowering & Fruiting: April-May.

Distribution: Indo-Malesia. Occasional; in grasslands. *RNMK 3217*, Manikkunnumala; *RNMK 0094*, Chembra.

NERVILIA Commerson ex Gaudichaud-Beaupre
in Freycinet Voyage Monde,
Bot. 421. 1829, *nom. cons.*

Perennial tuberous herbs. Leaves usually appear after flowering, solitary, broadly ovate or orbicular, cordate, many nerved from base. Flowers 1 or 2 to several on erect racemes; sepals and petals subequal, spreading; lip inferior, adnate to the base of column, entire or 3-lobed, spur 0; column elongated, straight or curved; foot 0; pollinia 2, bifid or 4, granular, without caudicles.

1. Leaves stand above the surface of soil; raceme many flowered ..... **N. aragoana**
1. Leaves lie flat on the surface of soil; racemes few flowered 2
2. Leafless during flowering; inflorescence 2-3 flowered .....**N. plicata**
2. Leaves appear simultaneously with flower; inflorescence single flowered..... ..... **N. crociformis**

Nervilia aragoana Gaud. in Freyc. Voy. Bot. 422, t.35. 1829; Fischer in Gamble, Fl. Pres. Madras 1459(1020). 1928; Abraham & Vatsala, Introd. Orch. 430. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 448. 1996; Sivar. & P. Mathew, Fl. Nilambur 692. 1997; Sathish & Manilal, Orchid Memories 202. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 490. 2005. *Pogonia carinata* Lindl., Gen. Sp. Orchid. Pl. 414. 1840; Hook. f., Fl. Brit. India 6: 120. 1890. *Pogonia flabelliformis* Lindl., Gen. Sp. Orchid. Pl. 415. 1840; Hook. f., Fl. Brit. India 6: 121. 1890. *Nervilia carinata* (Lindl.) Schltr. in Engl., Bot. Jahrb. Syst. 45: 404. 1911; Fischer in Gamble, Fl. Pres. Madras 1459(1020). 1928. *Pogonia scottii* Rchb.f., Fl. 55: 276. 1872; Hook. f., Fl. Brit. India 6: 120. 1890.

Tubers about 2-3 cm across, subglobose, white. Leaf 10-12 x 7-8 cm, cordate, broadly ovate, acuminate, with 15-20 cm long petiole. Scape 17-20 cm tall, lax-flowered. Flowers greenish; bracts 1.5-2 x 2-3 mm, linear-lanceolate, subacuminate; sepals oblanceolate, acute; petals similar to sepals;

lip 2-2.2 x 0.4-0.5 cm, 3-lobed, obovate; lateral lobes oblong, acute; midlobe ovate, acute, crenulate, crimped, incurved.
Flowering & Fruiting: April-May.
Distribution: Indo-Malesia, China to Australia and the Pacific. Occasional; in moist deciduous forests. *RNMK 1698*, Muthanga.

Nervilia crociformis (Zoll. & Mor.) Seidenf., Dansk. Bot. Ark. 32: 151. 1978; Sathish & Manilal, Orchid Memories 203. 2004. *Bolborchis crociformis* Zoll. & Mor. in Moritzi, Syst. Verg. Pl. Zoll. 89. 1846. *Nervilia crispata* (Bl.) Schltr. in Engl., Bot. Jahrb. Syst. 45: 402. 1911. *Pogonia crispata* Bl., Mus. Bot. Lugd.-Bat. 1: 32. 1849. *Nervilia monantha* Blatt. & McCann, J. Bombay Nat. Hist. Soc. 35: 724. 1932; Fischer in Gamble, Fl. Pres. Madras 1886(1305). 1936. *Nervilia prainiana* (King & Pantl.) Seidenf., Dansk. Bot. Ark. 32: 149. 1978; Abraham & Vatsala, Introd. Orch. 432. 1981; Ansari, Fl. Kasaragod Div. 372. 1985; Manilal, Fl. Silent Valley 293. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 449. 1996; Sivar. & P. Mathew, Fl. Nilambur 693. 1997. *Pogonia prainiana* King & Pantl., J. Asiat. Soc. Bengal (Pt. 2) 65: 129. 1896.

Tubers about 2 cm across, subglobose. Leaves green, 6-7 x 7-8 cm, orbicular, cordate, velvety with short greenish white hairs on upper surface. Flowers pink, solitary; scape 8-10 cm long; bracts 2-3 x 1-2 mm, ovate, acute; sepals and petals similar, linear-oblanceolate, acute; petals slightly narrower; lip ca. 2 x 1.5 cm, 3-lobed; lateral lobes oblong, obtuse; midlobe truncate, crisped; disc with purplish hairs.
Flowering & Fruiting: May-June.
Distribution: Indo-Malesia, China, New Guinea and Australia. Common; in semi-evergreen forests. *RNMK 3807*, Manikkunnumala; *RNMK 1660*, Banasuramala.

Nervilia plicata (Andr.) Schltr. in Engl., Bot. Jahrb. Syst. 45: 403. 1911; Fischer in Gamble, Fl. Pres. Madras 1548(1020). 1928; Ansari, Fl. Kasaragod Div. 372. 1985; Vajr., Fl. Palghat Dist. 485. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 449. 1996; Sathish & Manilal, Orchid Memories 203. 2004. *Arethusa plicata* Andr., Bot. Repos. 5. t.321. 1803. *Pogonia plicata* (Roxb.) Lindl., Gen. Sp. Orchid. Pl. 415. 1840; Hook. f., Fl. Brit. India 6: 119. 1890. *Nervilia discolor* (Bl.) Schltr. in Engl., Bot. Jahrb. Syst. 45: 403. 1911. *Pogonia biflora* Wight, Ic. t. 1758. 1851; Hook. f., Fl. Brit. India 6: 119. 1890 *Nervilia biflora* (Wight) Schltr. in Engl., Bot. Jahrb. Syst. 45: 403. 1911; Fischer in Gamble, Fl. Pres. Madras 1549(1020). 1928.

Tubers 1-1.5 x 2-3 cm, subglobose, white. Leaf green with purple blotches, 6-7 x 5-6 cm, sessile, cordate, orbicular, obtuse, hairy, margins wavy. Scape 13-16 cm long, 2-flowered; bracts 4-5 x 2-3 mm, ovate-lanceolate; sepals and petals brownish, similar, oblong, lanceolate, acute; lip dark violet, 1.8 x 1-1.5 cm, elliptic, obtuse, margin wavy.
Flowering & Fruiting: February-March.
Distribution: India to Thailand. Rare; in moist deciduous forests. *RNMK 1679,* Muthanga.

OBERONIA Lindley

Gen. Sp. Orchid. Pl. 15. 1830, *nom. cons.*

Erect or pendulous epiphytes. Leaves distichous, laterally compressed, fleshy, base articulated or not. Inflorescence terminal, spike or racemes, unbranched. Flowers small, pedicelled or sessile; bracteate; sepals equal or subequal, sometimes gland dotted, spreading or reflexed; petals spreading or reflexed, similar to sepals or narrower; lip 2-3-lobed or entire, sometimes with saccate or cushion-like disc towards base; side lobes entire, spreading or erect or curved upwards, entire or dissected; midlobe entire, 2-lobed or laciniate; column minute, winged or not; pollinia 4, waxy, caudicle 0.

1. Leaves jointed 2
1. Leaves not jointed 3
2. Scape terete, not winged, often insignificant; flower pedicelled, 3-lobed 15
2. Scape flattened or two winged; flowers arranged in verticals, lip 2-3 lobed; lateral sepals reflexed 4
3. Lip with lateral lobes raised vertically above the column.....16
3. Lip not lobed or when lobed the lateral lobes are not raised vertically above the column 17
4. Disc of lip saccate 5
4. Disc of lip not saccate, but cushion like or indistinct.....10
5. Lateral lobes of lip laterally elongated; disc crescent shape.....**O. sebastiana**
5. Lateral lobes of lip longitudinally elongated; disc ovate or bisaccate 6
6. Lip papillose..... **O. chandrasekharanii**
6. Lip glabrous 7
7. Disc 2 lobed; midlobe of lip with a distinct rounded protruberance between the lobules.....**O. platicaulon**
7. Disc not 2 lobed; mid lobe of lip without any protruberance 8
8. Lateral lobes of lip folded upwards and encircling the column in flower.....9
8. Lateral lobes of lip spreading in flower..... **O. brunoniana**
9. Petals crossing each other; lip crenulate-serrulate.....**O. josephii**
9. Petals not crossing each other; lip entire ..... **O. wynadensis**
10. Lateral lobes of lip bend upwards and inter locking at their tips above the column; column more than 1 mm long; inflorescence with a definite sterile apex ....**O. swaminathanii**
10. Lateral lobes of lip not interlocking at their tips above the column; column less than 1 mm long; inflorescence with out any definite sterile apex 11
11. Lip deeply dentate along the margins 12
11. Lip entire, ovate, shallowly crenate.....13
12. Spike densely flowered; petals oblong; disc indistinct ..... **O. mucronata**
12. Spike laxly flowered; petals ovate; disc ovate. .....**O. gammeii**
13. Petals circinate; spike to 20 cm long; flowers not more than 3.5 mm long.....14
13. Petals not circinate; spike to 40 cm long; flowers more than 5 mm long..... ..... **O. anamalayana**
14. Disc globular. ..... **O. forcipata**
14. Disc ovate with crescent shaped, cushion like band at distal end .....**O. santapaui**

15. Inflorescence shorter than the leaves; lip pappillose ..... .**O. ferruginea**
15. Inflorescence longer than leaves; lip glabrous .....**O. verticillata**
16. Flower brownish red or orange red ; bract brownish yellow; lip 3-lobed, deep red ... .**O. bicornis**
16. Flower pale yellow or brownish yellow; bract pale yellow; lip 3- lobed .....**O. tenuis**
17. Lip 3-lobed .....**O. brachyphylla**
17. Lip not lobed ..... **O. proudlockii**

Oberonia anamalayana Joseph, J. Ind. Bot. Soc. 42: 222. 1963; Abraham & Vatsala, Introd. Orch. 425. 1981; Manilal, Fl. Silent Valley 294. 1988; Ansari & Balakr., Orch. Monogr. 4: 19. 1990; Sathish & Manilal, Orchid Memories 204. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 126. 2009.

Leaves 18-20 x 3-4 cm, oblong, acute, tan brown. Scape 6-7 cm, flattened. Spike up to 40 cm long. Flowers greenish yellow brown, ca. 5 x 2 mm, in verticils; dorsal sepal oblong, obtuse; lateral sepals oblong-ovate, obtuse; petals linear, obtuse, decurved along margins; lip 2.5-3 mm across, 3-lobed; lateral lobes longitudinally elongated; midlobe 2-lobuled; lobules orbicular, shallowly crenate, sinus with a rounded protuberance; disc ovate-lanceolate, cushion like.

Flowering & Fruiting: January-March.

Distribution: Endemic to southern Western Ghats. Common; in evergreen forests. *RNMK 3318*, Sughandahgiri

Oberonia brachyphylla Blatt. & McCann, J. Bombay Nat. Hist. Soc. 35: 257. 1931; Joseph *et al.*, Bull. Bot. Surv. India 20: 169. 1978; Abraham & Vatsala, Intr. Orch. 416. 1981; Manilal, Fl. Silent Valley 296. 1988; Ansari & Balakr., Orch. Monogr. 4: 38. 1990; Vajr., Fl. Palghat Dist. 486. 1990; Mohanan & Sivad., Fl. Agasthyamala 685. 2002; Sathish & Manilal, Orchid Memories 204. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 128. 2009. **Plate 33g.**

Pendulous epiphytes. Leaves 4-6 x 0.6-0.5 cm, oblong-ensiform, acuminate; scape terete. Spike 7-9 cm long; flowers ca. 2 x 1 mm, greenish-orange yellow, scattered; dorsal sepals ovate, acute; lateral sepals obliquely ovate, subacuminate; petals oblong, obtuse, dentate; lip 3-lobed; lateral lobes ear-like, dentate; midlobe obovate, 2-lobuled; lobules oblong, dentate at apex, sinus without any protuberance; disc obovate-orbicular, concave.

Flowering: January-April.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3318,* Sughandhagiri.

Oberonia bicornis Lindl., Gen. Sp. Orchid. Pl. 16. 1830; Hook. f., Fl. Brit. India 5: 682. 1888; Manilal, Fl. Silent Valley 294. 1988; Ansari & Balakr., Orch. Monogr. 4: 31. 1990; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 679.

2009; Sathish & Manilal, Orchid Memories 204. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 128. 2009. *Oberonia umbonata* Blatt. & McCann, J. Bombay Nat. Hist. Soc. 35: 259. 1931. **Fig. 44, Plate 33f.**

Pendulous epiphytes. Leaves 4-6 x 0.5-0.6 cm, linear-oblong, acute. Scape terete; spike 8-10 cm long. Flowers 2-2.5 x 2-3 mm, orange red in verticils; bracts larger than the pedicel and ovary; dorsal sepal lanceolate, acuminate, entire; lateral sepals shorter than dorsal, obliquely ovate, subacuminate; petals elliptic or linear, acute; lip 3-lobed; lateral lobes linear, acute, bend upwards, rounded the column with tips diverging; midlobe indistinctly 2-lobuled; lobules ovate, triangular protuberance in between; disc crescent shaped, narrow, cushion like.

Flowering: August-November.

Distribution: Endemic to Peninsular India. Rare; in evergreen forests. *RNMK 3901*, Kurichiarmala.

Oberonia brunoniana Wight, Ic. t. 1622. 1851; Hook. f., Fl. Brit. India 5: 681. 1888; Fischer in Gamble, Fl. Pres. Madras 1406(984). 1928; Abraham & Vatsala, Introd. Orch. 422. 1981; Manilal, Fl. Silent Valley 296. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 457.1988; Vajr., Fl. Palghat Dist. 486.1990; Ansari & Balakr., Orch. Monogr. 4: 16. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 449. 1996; Sathish & Manilal, Orchid Memories 204. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 490. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 129. 2009. Fig. 45, Plate 33h.

Leaves brownish, 25-28 x 2-2.5 cm, oblong-ensiform, acute. Scape flattened, adnated to upper most leaf. Spike 16-18 cm long, with a distinct reflexed sterile tip. Flowers brick red, ca. 4 x 2.5 mm, pedicelled, in close verticils; bracts ovate, acute, denticulate; dorsal sepal oblong, obtuse; lateral sepals ovate, acute; petals lanceolate, acute; lip ca. 2 x 2.5 mm, ovate in outline, 3-lobed; lateral lobes oblong, ear-like; midlobe 2-lobuled; lobules oblong, truncate, diverging, with broad sinus; disc ovate, saccate.

Flowering & Fruiting: December-January.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 3921*, Chembra.

Oberonia chandrasekharanii V.J. Nair, V.S. Ramach. & Ansari, Blumea 28:361.1983; Manilal, Fl. Silent Valley 296. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 458. 1988; Ansari & Balakr., Orch. Monogr. 4:12.1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 450. 1996; Sathish & Manilal, Orchid Memories 204. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 129. 2009. *Oberonia rangannaiana* Murthy, Yoganarasimhan & Nair, Curr. Sci. 56: 621. 1987. **Fig. 46, Plate 33i.**

Leaves articulated, 13-15 x 2-3 cm, ensiform, acute, scape flattened. Spike 20-25 cm long, pendulous. Flowers greenish-yellow, ca. 2 x 1 mm, in verticils;

bracts ovate, acute, denticulate, gland-dotted; dorsal sepals ovate-obtuse; lateral sepals ovate, acute; petals linear, truncate and denticulate at apex; lip ca. 1.5 x 2 mm, semi-orbicular in outline, 3-lobed, papillose, gland dotted; lateral lobes auriculiform, folded upwards, rounded the column by the proximal end; midlobe 2-lobuled with a broad sinus; lobules orbicular; disc ovate, concave, sac like.
Flowering & Fruiting: December-September.
Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 3911,* Sugandhagiri; *RNMK 3944*, Chembra; *RNMK 3903*, Chanthanathodu.

Oberonia ferruginea Parish ex Hook.f., Fl. Brit. India 5: 679. 1888; Sathish & Manilal, Orchid Memories 204. 2004. *Oberonia ensiformis* auct. non (Smith) Lindl. 1859: Hook. f., Fl. Brit. India 5: 679. 1888; Fischer in Gamble, Fl. Pres. Madras 1405(984). 1928; Abraham & Vatsala, Intr. Orch. 419. 1981; Vajr., Fl. Palghat Dist. 486. 1990; Ansari & Balakr., Orch. Monogr. 4: 27. 1990; Sivar. & P. Mathew, Fl. Nilambur 694. 1997; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 130. 2009. **Fig. 47, Plate 33j.**

Pendulous epiphytes. Leaves 35-45 x 1.5-2 cm, ensiform, acute or acuminate; scape terete. Spike 13-15 cm long; flowers ca. 3.5 x 1.5 mm, brownish-yellow, in verticils; dorsal sepals ovate, acute; lateral sepals broadly-obliquely ovate, acute; petals ovate-lanceolate, obtuse, dentate; lip 3-lobed; lateral lobes wing like; midlobe 2-lobuled, lobules rounded, sinus broad, without any protuberance.
Flowering: September-January.
Distribution: India to Indo-China. Occasional; in semi-evergreen forests. *RNMK 3924,* Manikkunnumala.

Oberonia forcipata Lindl., Fol. Orch. Oberonia 2. 1859; Hook. f., Fl. Brit. India 5: 681. 1888; Manilal, Fl. Silent Valley 297. 1988. *Malaxis forcipata* Rchb.f., Walp. Ann. 6: 209. 1861. **Plate 33k.**

Small epiphytes. Leaves ensiform; scape flat, slightly 2 winged. Spike recurved; flowers densely imbricate; lip quadrate with entire or erose side lobes.
Flowering: August-September.
Distribution: South India and Sri Lanka. Rare; in evergreen forests. *RNMK 3932*, Makkimala.

Oberonia gammiei King & Prantl, J. Asiat. Soc. Bengal 2, 66: 578. 1897; Sivar. & P. Mathew, Fl. Nilambur 695. 1997; Sathish & Manilal, Orchid Memories 205. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 132. 2009.

Erect herbs. Leaves 8-10 cm long, oblong, ensiform, acute or sub acuminate; scape flattened , adnate to the reduced uper most leaf. Spike 12-

14 cm long, laxly flowered: flowers pale yellow; sepals and petals reflexed, sparsely gland dotted; petals ovate, denticulate; lip quadrate, 3- lobed, sparsely gland dotted; lateral lobes denticulate, mid lobe 2- lobuled, lobules triangular, dentate; disc ovate.
Flowering and Fruiting: July-September.
Distribution: India to Burma, Thailand, Laos and Vietnam. Rare; in moist deciduous forests. *RNMK 3909*, Kuruva Island.

Oberonia josephii Saldanha, Indian For. 100: 568. 1974; Ansari & Balakr., Orch. Monogr. 4: 14. 1990; Muktesh & Stephen, Rheedea 9: 173. 1999; Sathish & Manilal, Orchid Memories 205. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 133. 2009. **Fig. 48, Plate 33 l.**

Pendulous epiphytes. Leaves 10-16 x 0.5-0.6 cm, ensiform, flattened, acute. Scape to 10 cm long, slightly winged. Inflorescence many flowered; spike with a sterile portion at the apex; floral bracts fimbriate; flower orange, in distinct verticels; sepals dissimilar; petals crossing each other; lip 3-lobed, sparsely gland dotted; disc ovate, serrate; pollinia 4.
Flowering: January-February.
Distribution: Endemic to south India. Occasional; in evergreen forests. *RNMK 3914*, Brahmagiri.

Oberonia mucronata (D. Don) Ormerod & Seidenf. in Seidenf., Contrib. Orchid. Fl. Thailand 13: 20. 1997; Sathish & Manilal, Orchid Memories 205. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 134. 2009. *Stelis mucronata* D. Don, Prodr. Fl. Nepal. 32. 1825. *Oberonia iridifolia* Rchb. ex Lindl. var. *denticulata* (Wight) Hook. f., Fl. Brit. India 5: 675. 1888; Fischer in Gamble, Fl. Pres. Madras 1406(983). 1928; Abraham & Vatsala, Intr. Orch. 416. 1981; Ansari, Fl. Kasaragod Div. 373. 1985. *Oberonia iridifolia* Rchb. ex Lindl., Gen. Sp. Orchid. Pl. 15. 1830. *Oberonia denticulata* Wight, Ic. t. 1625. 1851; Ansari & Bal., Orch. Monogr. 4:21.1990; Vajr., Fl. Palghat Dist. 487. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 450. 1996. **Plate 34a.**

Erect epiphytes. Leaves articulated at base, 18-20 x 2-2.5 cm, oblong-ensiform, acute; scape flattened. Spike 26-30 cm long; flowers brownish yellow, 2.5 x 1-2 mm, in verticils; bracts oblong-lanceolate, obtuse, denticulate; sepals similar, ovate, acute; petals ovate, acute, denticulate; lip ca. 1.5 x 1.5 mm, quadrate, 3-lobed; lateral lobes oblong, dentate; midlobe 2-lobuled; lobules oblong-ovate, acute, deeply dentate, diverging; disc ovate, indistinct.
Flowering: November-December.
Distribution: Indo-Malesia to Philippines. Occasional; in moist deciduous forests. *RNMK 3915*, Muthanga.

Oberonia platycaulon Wight, Ic. t. 1623. 1852; Hook. f., Fl. Brit. India 5: 682. 1888; Fischer in Gamble, Fl. Pres. Madras 1407(984). 1928; Abraham & Vatsala, Intr. Orch. 425. 1981; Ansari & Balakr., Orch. Monogr. 4:13. 1990; Mohanan & Sivad., Fl. Agasthyamala 686. 2002; Sathish & Manilal, Orchid Memories 206. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 491. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 136. 2009. *Oberonia bisaccata* Manilal & Sathish, Kew Bull. 39: 121. 1984; Manilal, Fl. Silent Valley 294. 1988.

Erect epiphytes. Leaves 3-12 x 0.8-1.5 cm, ensiform, acute at apex; scape 10-12 cm long, flattened and adnate to uppermost leaf, usually with sterile portion at tip, reflexed at middle; floral bracts minute, subulate. Flowers minute, pale yellow; sepals and petals minute, dissimilar; lip semi-orbicular 3-lobed, broader than long, 2-3 x 2.5-3 mm; lateral lobes ear-like, entire; pedicel and ovary 2-2.5 mm.

Flowering: September-March.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3917,* Sughandhagiri.

Oberonia proudlockii King & Pantl., J. Asiatic Soc. Bengal. 11. 66. 560. 1897; Fischer in Gamble, Fl. Pres. Madras 1406(983). 1928; Abraham & Vatsala, Intr. Orch. 422. 1981; Manilal, Fl. Silent Valley 297. 1988; Ansari & Balakr., Orch. Monogr. 4: 34. 1990; Sathish & Manilal, Orchid Memories 206. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 491. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 138. 2009. *Oberonia sedgwickii* Blatt. & McCann, J. Bombay Nat. Hist. Soc. 35: 257. 1931.

Tufted acaulescent epiphyte, *ca.* 10 cm high. Leaves 5-6 x 0.6-0.9 cm, oblong, subacute, equitant, articulated at base; scape not adnate to upper leaf, 7-8 cm long, rachis 3-4 cm long, laterally winged. Spike terete, 4-5 cm long with a sterile apex; flowers brownish-yellow, ca. 2 x 1 mm, sessile, closely spirally set; bracts ca. 1.5 x 1 mm, ovate, dentate; sepals and petals reflexed; dorsal sepal ovate, acute, 1-veined; lateral sepals ovate, acute, 1-veined; petals ovate-lanceolate, obtuse, 1-veined; lip ca. 1.1 x 1 mm, inferior, quadrate, apex obscurely 2-lobed; margins irregular, 3-veined; disc with ovate cavity.

Flowering: January-March.

Distribution: Endemic to southern Western Ghats; Occasional; in evergreen forests. *RNMK 3919*, Chembra.

Oberonia santapaui Kapad., J. Bombay Nat. Hist. Soc. 57: 265. 1960; Abraham & Vatsala, Intr. Orch. 429. 1981; Manilal, Fl. Silent Valley 297. 1988; Ansari & Balakr., Orch. Monogr. 4: 18. 1990; Vajr., Fl. Palghat Dist. 487. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 450. 1996; Sivar. & P. Mathew, Fl. Nilambur 695. 1997; Mohanan & Sivad., Fl. Agasthyamala 686. 2002; Sathish & Manilal, Orchid Memories 207. 2004; A. E. Shanavas Khan &

Sivad., Epiphytes and Parasites of Kerala, India. 139. 2009. *Oberonia lindleyana* Wight, Ic. t. 1624. 1851, non Brongn. ex Duperr. 1834; Hook. f., Fl. Brit. India 5: 681. 1888; Fischer in Gamble, Fl. Pres. Madras 1407(984). 1928. **Plate 34b.**

Erect epiphytes. Leaves 15-17 x 2-2.5 cm, oblong, obtuse, dull brown; scape flattened. Spike 16-19 cm long, thick; flowers ca. 3 x 1.5 mm, reddish-brown, in verticils; dorsal sepal oblong, obtuse; lateral sepals oblong-ovate, subacute; petals linear, truncate, reflexed; lip 3-lobed; lateral lobes longitudinally elongated, subcrenate; midlobe 2-lobuled; lobules oblong, crenate, converging, sinus broad, with a conical protuberance; disc ovate, crescent-shaped, cushion like band.

Flowering: November-December.

Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 3927,* Sughandhagiri.

Oberonia sebastiana Shetty & Vivek., Bull. Bot. Surv. India 17: 157. 1975 (1978); Ansari & Balakr., Orch. Monogr. 4: 11. 1990; Sathish & Manilal, Orchid Memories 207. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 141. 2009.

Pendulous epiphytes. Leaves 17-20 x 1-1.5 cm, ensiform, acute; scape flattened. Spike 25-30 cm long; flowers ca. 2.5 x 1 mm, yellow, subverticillate; dorsal sepal oblong, obtuse; lateral sepals ovate, subacute; petals oblong, obtuse; lip semi-orbicular, 3-lobed; lateral lobes oblong-obovate, wing-like; midlobe, 2-lobuled; lobules obovate, cuneate, diverging; disc crescent-shaped, saccate.

Flowering: October-December.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 3953*, Chembra.

Oberonia swaminathanii Ratheesh, Manudev, Anil Kumar & Sivad. s*p. nov.* (*ined.*). **Fig. 49, Plate 34c.**

Epiphytes, pendulous, acaulescent. Leaves 4-6, articulate at base up to ca. 16 x 1.8 cm, oblong-ensiform, acute or acuminate. Scape shorter than the larger leaf, up to 14 cm long, flattened, adnate to the reduced uppermost leaf. Spike up to 13 cm long, with a distinct sterile tip, ca. 1 cm long; flowers shortly pedicelled, ca. 4.2 x 1.4 mm, spirally arranged; bracts slightly larger than the ovary & pedicel, ca. 2 x 1.5 mm, elliptic-oblong, deeply crenate, subacute-rounded at apex, gland dotted; sepals and petals dissimilar, sparsely gland dotted, glabrous, reflexed; sepals subsimilar; dorsal sepal ca. 1.8 x 1.2 mm, elliptic-oblong, acute, entire; lateral sepals shorter than the dorsal sepals, ca. 1.5 x 1 mm, oblong, rounded at apex, entire; petals oblong-linear lanceolate, sub acute, ca. 1.5 x 0.8 mm, oblong, serrate along margins; lip antrorse, semiorbicular in outline, 3-lobed, ca. 1.5 mm long, ca. 3 mm across,

midlob ca. 1 mm across, gland dotted; lateral lobes ear like, entire, bend upwards encircling the column; midlobe 2 lobuled; lobules short, rounded, entire, diverging; sinus broad; disc distinct, triangular; ovary & pedicel ca. 2 mm long, ovary slightly ridged; column sub-globose, ca 1.2 x 0.5 mm; clinandrium apical, saccate; operculum ovate, minutely winged, ca. 0.2 x 0.1 mm, obtuse at apex; rostellum minute, triangular, acute; stigma semi-orbicular; pollinia 4, in pairs, ca. 0.2 x 0.1 mm, ovate.

Flowering & Fruiting: August-November

Distribution: Small populations of this species were observed in evergreen forest of Kurichiarmala in Kalpetta forest range, Wayanad.

Etymology: The specific epithet is in honour of Dr. M. S. Swaminathan, the great agricultural scientist and Chairman of M. S.Swaminathan Research Foundation.

Type: INDIA, Kerala, Wayanad district, Kurichiarmala, N 11^0 35.769' E 75^0 58.787' ±1092m. *M K Ratheesh Narayanan 1693 (Holotype*: MH; *Isotypes*: CALI, KFRI, MSSH)

Oberonia tenuis Lindl., Fol. Orch. Oberonia 3. 1859; Hook. f., Fl. Brit. India 5:682.1888; Manilal *et al.,* J. Econ. Tax. Bot. 4: 987. 1983; Manilal, Fl. Silent Valley 298. 1988; Sathish & Manilal, Orchid Memories 207. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 142. 2009. *Malaxis tenuis* (Lindl.) Rchb.f., Walp. Ann. 6: 211. 1861. *Iridorchis tenuis* (Lindl.) O. Kuntze., Rev. Gen. Pl. 2: 669. 1891. **Fig. 50, Plate 34d.**

Leaves 4-7 x 1-1.5 cm, sub-falcate, linear-lanceolate, acute. Inflorescence 7-12 cm long, terete, scape 4-5 mm long, bracts 3-4 mm long, small subulate, gland dotted. Flowers 3-4 mm long, brownish-red, sepal lanceolate, ovate, acuminate, subequal, gland dotted; petals linear, gland dotted, lip 3-lobed, lateral lobes erect, surrounding the column, gland doted, midlobe obscurely 3-lobulate, column short, pollinia 4.

Flowering & Fruiting: May-July.

Distribution: Endemic to south India and Sri Lanka. Rare; in evergreen forests. *RNMK 3918,* Chembra.

Oberonia verticillata Wight, Ic. t. 1626. 1851; Hook. f., Fl. Brit. India 5: 677. 1888; Fischer in Gamble, Fl. Pres. Madras 1405(983). 1928; Abraham & Vatsala, Introd. Orch. 419. 1981; Ansari, Fl. Kasaragod Div. 374. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 458. 1988; Ansari & Balakr., Orch. Monogr. 4: 28. 1990; Sathish & Manilal, Orchid Memories 208. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 491. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 145. 2009. *Oberonia verticillata* Wight var. *longibracteata* Blatt. & McCann, J. Bombay Nat. Hist. Soc. 35: 255. 1931. *Oberonia spiralis* Blatt. & McCann, J. Bombay Nat. Hist. Soc. 35: 256. 1931, non Griff. 1851, nec. Lindl. 1852. **Fig. 51, Plate 34e.**

Leaves 13-15 x 1-1.2 cm, oblong-ensiform, acute. Scape terete. Spike 24-27 cm long. Flowers orange-yellow, ca. 4.5 x 2 mm, in verticils; dorsal sepal oblong-ovate, obtuse; lateral sepals obliquely ovate, acute; petals oblong or ovate, obtuse; lip 3-lobed; lateral lobes rounded, auricled; midlobe 2-lobuled; lobules orbicular or obovate, serrate, overlapping each other, sinus narrow; disc indistinct.

Flowering & Fruiting: September-December.

Distribution: South India and Sri Lanka. Occasional; in semi-evergreen forests. *RNMK 3920*, Manikunnumala; *RNMK 3925*, Sughandhagiri.

Oberonia wynadensis Sivad. & Balakr., Nordic J. Bot. 9: 395. 1989; Sathish & Manilal, Orchid Memories 209. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 147. 2009. *Oberonia pakshipadalensis* Muktesh & Stephen, J. Orchid. Soc. Ind. 12: 31. 1998.

Tufted pendulous herbs. Flowers yellow; sepals and petals reflexed, glabrous; petals linear-oblong, apex acute, entire; lip quadrate, 3- lobed, glabrous; lateral lobes slightly longer than midlobe, entire; mid lobe 2-lobulate, lobules entire.

Flowering: August-October.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 3940*, Kurichiarmala.

PACHYSTOMA Blume

Bijdr. 376. 1825.

Pachystoma pubescens Bl., Bijdr. 376. 1825; Sasidh. & Sivar., Fl. Pl. Thrissur For. 451. 1996; Sathish & Manilal, Orchid Memories 210. 2004. *Pachychilus pubescens* (Bl.) Bl., Mus. Bot. 2: 178. 1856. *Pachystoma senile* (Lindl.) Rchb.f., Bonplandia 3: 251. 1856; Hook. f., Fl. Brit. India 5: 812. 1890; Fischer in Gamble, Fl. Pres. Madras 1426(997). 1928; Abraham & Vatsala, Introd. Orch. 270. 1981; Manilal, Fl. Silent Valley 299. 1988; Vajr., Fl. Palghat Dist. 488. 1990. *Eulophia hirsuta* Joseph & Vajr., Bull. Bot. Surv. India 17: 192. 1975 (1978); Vajr., Fl. Palghat Dist. 479. 1990. *Pachystoma hirsuta* (Joseph & Vajr.) Sathish & Manilal, Kew Bull. 42: 942. 1987; Sathish & Manilal, Orchid Memories 209. 2004. *Ipsea malabarica* sensu Abraham & Vatsala, Intro. Orch. 269. 1981, non (Rchb.f.) Hook. f. 1890.

Terrestrial herbs, with 'V'-shaped tuber, leafless when flowering. Leaves 1 or 2, linear, 15-20 x 1-1.5 cm; scape above ground portion 25-40 cm long. Flowers 3-8, towards the apex of scape, pink-purple; bracts 1.5-2.5 x 3-4 mm, ovate, long-acuminate; sepals pubescent outside, subsimilar; dorsal sepal elliptic-oblong, acute, 5-veined; lateral sepals oblong-lanceolate, acute, 5-veined; petals oblanceolate-oblong, obliquely acute, 3-5-veined; lip 1-1.4 x 0.4-0.8 cm, 3-lobed; side lobes obliquely ovate, obtuse; midlobe oblong, obtuse; disc ridged, base saccate.

Flowering & Fruiting: January-March.

Distribution: Indo-Malesia. Occasional; in grasslands. *RNMK 1515*, Banasuramala; *RNMK 3949*, Chembra; *RNMK 3922*, Pookodu.

PAPILIONANTHE Schlechter

Orchis 9: 78. 1915.

Papilionanthe cylindrica (Lindl.) Seidenf., Descr. Epidendr. Koing 1791: 33. 1995; Sathish & Manilal, Orchid Memories 210. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 148. 2009. *Aerides cylindricum* Lindl., Gen. Sp. Orchid. Pl. 240. 1833; Hook. f., Fl. Brit. India 6: 44. 1840; Fischer in Gamble, Fl. Pres. Madras 1442(1008). 1928; Abraham & Vatsala, Introd. Orch. 444. 1981; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 478. 2005. *Papilionanthe subulata* Pradhan, Indian Orch. 563. 1979, non (Koenig) Garay 1974; Subram. *et al.*, J. Econ. Tax. Bot. 11:9.1987; Manilal, Fl. Silent Valley 299.1988; Vajr., Fl. Palghat Dist. 488.1990. **Plate 34f.**

Epiphytes, 35-40 cm high; stem woody. Leaves scattered, 6-8 x 0.2-0.3 cm, linear, terete, acute. Flowers white, one or two in 1.5-2 cm long, short, leaf opposed racemes; dorsal sepal ovate, obtuse, 5-7-veined; lateral sepals obliquely ovate-lanceolate, obtuse, 7-veined; petals ovate, obtuse, 7-veined; lip ca. 1.5 x 1.2 cm, 3-lobed; lateral lobes oblong, obtuse; midlobe tongue-shaped, recurved, obtuse; disc with 2-longitudinal calli.

Flowering & Fruiting: February-April.

Distribution: South India and Sri Lanka. Common; in evergreen forests. *RNMK 3927,* Kallady- 900 forest; *RNMK 3912*, Kurichiarmala.

PECTEILIS Rafinesque-Schmaltz

Fl. Tellur. 2: 37. 1836.

Pecteilis gigantea (J. E. Smith) Rafin., Fl. Tellur. 2: 38. 1837; Manilal, Fl. Silent Valley 299. 1988; Vajr., Fl. Palghat Dist. 489. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 452. 1996; Sathish & Manilal, Orchid Memories 211. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 491. 2005. *Orchis gigantea* J.E. Smith, Exot. Bot. 2:79,t.100. 1805. *Habenaria susannae* Hook. f., Fl. Brit. India 6:137.1890, non (L.) R. Br. ex Spreng. 1826. *Platanthera susannae* Wight, Ic. t.920.1845, non (L.) Lindl. 1835; Fischer in Gamble, Fl. Pres. Madras 1475(1031). 1928. *Platanthera gigantea* (J.E. Smith) J. Vejik, Orchdeea 27:133. 1965.

Terrestrial tuberous herbs, 70-90 cm tall. Leaves 7-10 x 5-7 cm, ovate-lanceolate, acute, sessile, scattered. Flowers white, 9-10 x 8-9 cm, racemes terminal, 2-4-flowered; bracts 7-7.5 x 3-4 cm, ovate-acuminate, foliaceous; dorsal sepal rhomboid, 7-9-veined; lateral sepals oblique at base, oblong, subacute, obtuse, 7-9-veined; petals linear, falcate, obtuse; lip 9-15 cm long, including 12-13 x 0.5-0.6 cm cylindrical spur, 3-lobed; lateral lobes laciniate; midlobe oblong-lanceolate, obtuse.

Flowering & Fruiting: September-October.

Distribution: Indo-Malesia. Common; in grasslands. *RNMK 1679,* Muthanga; *RNMK 1625*, Kurichiarmala

PERISTYLUS Blume

Bijdr. 404, t. 30. 1825, *nom. cons.*

Tuberous, terrestrial herbs. Leaves often fascicled towards middle of stem or scattered. Flowers small, in terminal spikes, adpressed to the scape; bracts

lanceolate, often longer than the ovary; sepals subequal; dorsal galeate; laterals erect; petals similar to lateral sepals, conniving with the dorsal sepal; lip entire or 3-lobed; spur short; column short; foot 0; pollinia 2, powdery, caudicles short.

1. Leaves clustered about the middle of the plant 2
1. Leaves scattered and imbricate on the stem 4
2. Lip longer than sepals; spur as long as sepals, filiform..... **P. aristatus**
2. Lip as long as sepals; spur shorter than sepals, globose.....3
3. Plants about 90 cm tall; lateral sepals with a subterminal mucro .. **P. goodyeroides**
3. Plants below 30 cm tall; lateral sepals without mucro ..... **P. lawii**
4. Flowers spirally arranged; lip as long as the sepals and petals, without concave claw..... **P. spiralis**
4. Flowers imbricate; lip larger than the sepals and petals, with a concave claw 5
5. Spur equalling or slightly longer than midlob of the lip, clavate-elipsoid .... **P. richardianus**
5. Spur much shorter than the midlob of the lip ..... **P. brachyphyllus**

Peristylus aristatus Lindl., Gen. Sp. Orchid. Pl. 300. 1835; Fischer in Gamble, Fl. Pres. Madras 1474(1030). 1928; Abraham & Vatsala, Introd. Orch. 246. 1981; V. S. Ramach. & V.J. Nair, Fl. Cannanore 459. 1988; Manilal, Fl. Silent Valley 300. 1988; Vajr., Fl. Palghat Dist. 489. 1990; Sathish & Manilal, Orchid Memories 211. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 492. 2005. *Habenaria aristata* (Lindl.) Hook. f. in Trimen, Cat. Ceylon Pl. 91. 1885; Hook. f., Fl. Brit. India 6: 158. 1890.

Leaves 4-7 x 2-3 cm, elliptic-lanceolate, subacuminate. Flowers white, in 10-18 cm long, lax spike, peduncle 12-15 cm long; bracts 1-1.5 x 3-4 mm, lanceolate, acuminate, margins finely erose, 1-veined; dorsal sepal elliptic-oblong, obtuse, 1-veined; lateral sepals obliquely ovate-oblong, obtuse, 1-veined; petals oblanceolate-oblong, obtuse, 1-veined; lip ca. 5 x 2 mm, 3-lobed; lobes very unequal; lateral lobes linear, acute, midlobe oblong, obtuse; spur ca. 3.5 x 1.5 mm, ellipsoid, acute, with cylindric stalk.

Flowering & Fruiting: July-August.

Distribution: India, Sri Lanka, Myanmar and Indo-China. Occasional; in evergreen forests. *RNMK 3328*, Kurichiarmala.

Peristylus brachyphyllus A. Rich., Ann. Sci. Nat. Ser. 2. 15: 70. t. 2. 1841; Fischer in Gamble, Fl. Pres. Madras 1474(1030). 1928; *Habenaria malabarica* Hook.f., Fl. Brit. India 6:159. 1890.

Tuberous herbs, 15-20 cm tall; stem slender. Leaves alternate, 4-6, 2-4 x 0.6-1 cm, ovate-lanceolate, acuminate. Flowers in spikes, many flowered; flowers dull yellow; bracts lanceolate, acuminate; dorsal sepal ovate-oblong, obtuse, 3-nerved; petals oblanceolate, obtuse, 2-nerved; lip geniculate, sidelobes curved upwards; spur small, shorter than the midlob of the lip, globose.

Flowering & Fruiting: August-October.
Distribution: Endemic to southern Western Ghats. Rare; in grasslands. *RNMK 1624*, Sugandhagiri.

Peristylus goodyeroides (D. Don) Lindl., Gen. Sp. Orchid. Pl. 299. 1835; Fischer in Gamble, Fl. Pres. Madras 1475(1030). 1928; Abraham & Vatsala, Introd. Orch. 249. 1981; Manilal, Fl. Silent Valley 300. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 459. 1988; Vajr., Fl. Palghat Dist. 490. 1990; Sivar. & P. Mathew, Fl. Nilambur 696. 1997; Sathish & Manilal, Orchid Memories 211. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 492. 2005. *Habenaria goodyeroides* D. Don, Prodr. Fl. Nepal. 25. 1825; Hook. f., Fl. Brit. India 6: 161. 1890. **Plate 34g.**

Herbs 60-70 cm tall. Leaves 5-10 x 4-5 cm, broadly elliptic-ovate, acute. Spike densely flowered, 25-30 cm long, peduncle 13-15 cm long; bracts ca. 3 x 0.5 cm, oblong-lanceolate, acuminate. Flowers 1-1.5 cm long; dorsal sepals ovate-oblong, obtuse; lateral sepals obliquely obovate-oblong, concave, acute; petals elliptic, acute; lip 3-4 x 2-3 mm, 3-lobed; lateral lobes oblong, obtuse, midlobe ovate, truncate or acute; spur globular.
Flowering & Fruiting: July-November.
Distribution: Indo-Malesia. Rare; in moist deciduous forests. *RNMK 3328*, Kuruva.

Peristylus richardianus Wight, Ic. t. 1697.1851; Fischer in Gamble, Fl. Pres. Madras 1474(1030). 1928; Abraham & Vatsala, Introd. Orch. 246. 1981; Sathish & Manilal, Orchid Memories 212. 2004. *Peristylus robustior* Wight, Ic. t. 1699. 1851. *Habenaria bicornuata* Hook. f., Fl. Brit. India 6: 150. 1890.

Herbs, 20-50 cm high. Leaves 4-5 x 1-1.5 cm, lanceolate, acuminate. Flowers creamy, in about 15 cm long dense spike; dorsal sepal oblong, obtuse, keeled, 1-veined; lateral sepals oblong, obtuse, keeled, 1-veined; petals elliptic-lanceolate, obtuse, 1-veined with 2 lateral veins from the middle; lip ca. 0.6 x 1.8 cm, 3-lobed; lobes unequal; midlobe oblong, obtuse; lateral lobes linear, upcurved; spur clavate, acute at apex.
Flowering & Fruiting: August-September.
Distribution: India and Nepal. Occasional; in grasslands. *RNMK 3322,* Chembra.

Peristylus spiralis A.Rich., Ann. Sci. Nat. Bot. ser. 2, 15: 69. t.2B.1841; Fischer in Gamble, Fl. Pres. Madras 1474(1030). 1928; V. S. Ramach. & V.J. Nair, Fl. Cannanore 459. 1988; Sathish & Manilal, Orchid Memories 212. 2004. *Habenaria torta* Hook.f., Fl. Brit. India 6: 159. 1890.

Terrestrial slender herbs. Leaves 3-5, towards base of stem, linear-lanceolate, acute at apex. Flowers in spirally twisted spikes, greenish-white; bracts lanceolate, acute; dorsal sepal linear-oblong, laterals falcate, reflexed; petals ovate; lip 3-lobed; spur minute, sac like.

Flowering & Fruiting: November-March.
Distribution: South India and Sri Lanka. Rare; in grasslands. *RNMK 1624,* Sugandhagiri.

Peristylus lawii Wight, Ic. t. 1695. 1851; Abraham & Vatsala, Intr. Orch. 249. 1981; Sathish & Manilal, Orchid Memories 212. 2004. *Habenaria lawii* (Wight) Hook. f., Fl. Brit. India 6: 162. 1890.

Terrestrial herbs, 25-30 cm tall. Leaves 2-3 in number, 7-9 cm long, clustered near the middle of the stem. Flowers greenish yellow, 0.5-0.7 cm across; bracts ca. 1 cm long; sepal green; lip globose, yellow.
Flowering: August-September.
Distribution: Endemic to Peninsular India. Rare; in grasslands. *RNMK 1675,* Chembra.

PHALAENOPSIS Blume
Bijdr.: 294. 1825.

Phalaenopsis deliciosa Rchb.f., Bonplandia 2: 93. 1854. *Kingidium deliciosum* (Rchb.f.) Sweet, Amer. Orch. Soc. Bull. 39: 1095. 1970; Sasidh. & Sivar., Fl. Pl. Thrissur For. 445. 1996; Sathish & Manilal, Orchid Memories 199. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 487. 2005. *Phalaenopsis wightii* Rchb.f., Bot. Zeit. 20: 214. 1862. *Doritis wightii* (Rchb.f.) Benth., Gen. Pl. 3: 574. 1883; Hook. f., Fl. Brit. India 6: 32. 1890. *Kingiella decumbens* (Griff.) Rolfe, Orch. Rev. 25: 197. 1917; Fischer in Gamble, Fl. Pres. Madras 1439(1006). 1928. *Phalaenopsis decumbens* (Griff.) Holt., Gard. Bull. Straits Settlem. 11:286. 1947; Abraham & Vatsala, Intr. Orch. 464. 1981; V. S. Ramach. & V. J. Nair, Fl. Cannanore 460. 1988.

Epiphytic herbs. Leaves 4-10 x 1.5-5 cm, obovate to oblanceolate, base acute, obtuse to obtusely acute, thin chartaceous. Racemes 15-18 cm long; bracts lanceolate, persistent; flowers white, marked purplish; sepals subequal, linearly elliptic-lanceolate, lateral petals oblanceolate, lip 3-lobed, base saccate, mid-lobe 2-fid, disc basally with a 2-fid appendage; pollinia 2, bi-partite. Capsule ca. 4 cm long.
Flowering: July-August.
Distribution: Indo-Malesia. Occasional; in evergreen forests. *RNMK 3896,* Sughandhagiri.

PHOLIDOTA Lindley ex W. J. Hooker
Exot. Fl. 2: 138. 1825.

Pholidota imbricata Hook., Exot. Fl. t. 138. 1825; Fischer in Gamble, Fl. Pres. Madras 1431(1000). 1928; Ansari, Fl. Kasaragod Div. 374. 1985; Sivar. & P. Mathew, Fl. Nilambur 696. 1997; Sathish & Manilal, Orchid Memories 213. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 149. 2009. *Pholidota pallida* sensu Abraham & Vatsala, Intr. Orch. 288. 1981, non Lindl. 1836; Manilal, Fl. Silent Valley 301. 1988; V. S. Ramach. &

V.J. Nair, Fl. Cannanore 460. 1988; Vajr., Fl. Palghat Dist. 490. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 452. 1996; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 679. 2009; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 493. 2005. **Plate 34h.**

Epiphytes, 25-35 cm long. Pseudobulb 5-7 x 2-3 cm, sheathed, ovoid, subtetragonal smooth, crowded. Leaves 35-40 x 5-6 cm, solitary, oblanceolate-oblong, acute, coriaceous, shallowly plicate. Flowers creamy orange, in 50-60 cm long, terminal, pendulous racemes; flowering portion about 30 cm long; bracts 6-9 x 5-6 mm, ovate or orbicular, acute, imbricating distichous; flowers many, closely arranged; dorsal sepal ovate, obtuse, 3-5-veined; lateral sepals ovate, cymbiform, connate at base, acute, 3-5-veined; petals linear, subacute, 1-veined; lip 7-8 x 7-8 mm; saccate 5-veined; midlobe bifid, lobules rounded; column short, broadly winged.

Flowering & Fruiting: September-March.

Distribution: Indo-Malesia. Common; in evergreen and semi-evergreen forests. *RNMK 3859*, Manikkunnumala; *RNMK 1688*, Sughandhagiri; *RNMK 3880*, Makkimala.

PHREATIA Lindley

Gen. et Sp. Orch. Pl. 63. 1830.

Phreatia elegans Lindl., Gen. Sp. Orchid. Pl. 63. 1830; Hook. f., Fl. Brit. India 5:810.1890; Abraham & Vatsala, Introd. Orch. 497. 1981; Sathish & Manilal, Orchid Memories 213. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 151. 2009.

Epiphytes, 12-15 cm high, with small tufted pseudobulbs, ca. 1 x 0.5 cm, ovoid or subglobose. Leaves 2 or 3 per pseudobulb, 5-12 x 0.8-1 cm, linear-lanceolate, obtuse. Flowers white, in about 15 cm long dense flowered raceme from the base of pseudobulb, flower bearing portion 5-6 cm long; bracts ca. 3 x 1 mm, lanceolate, acute, 1-veined; dorsal sepal ovate, obtuse, 1-veined; lateral sepals ovate, subacute, 1-veined; petals elliptic, obtuse, 1-veined; lip 1-1.5 x 0.5-1 mm, obovate, obtuse, saccate at base; margins with short fleshy hairs.

Flowering & Fruiting: August-September.

Distribution: India and Sri Lanka. Rare; in evergreen forests. *RNMK 3859,* Chembra.

PODOCHILUS Blume

Bijdr. 295. t. 12. 1825.

Podochilus malabaricus Wight, t. 1748. 1857; Hook. f., Fl. Brit. India 6: 80. 1880; V. S. Ramach. & V.J. Nair, Fl. Cannanore 461. 1988; Sathish & Manilal, Orchid Memories 213. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 493. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 152. 2009. *Podochilus falcatus* auct. non Lindl. 1833: sensu Fischer in Gamble, Fl. Pres. Madras 1450(1014). 1928; Abraham & Vatsala, Introd. Orch. 390. 1981. **Plate 34i.**

Epiphytes, 11-15 cm tall. Leaves many, closely set, 6-7 x 1.2-1.5 mm, subulate, obtuse, equitant, distichous. Flowers white, in 4.5-5 cm long, slender, flexuous terminal racemes; bracts ca. 2 x 1 mm, ovate, acuminate, keeled, 1-veined; dorsal sepal ovate-lanceolate, acute, 1-veined; lateral sepals oblong-falcate, acute, 1-veined; petals oblong-lanceolate, acute, 1-veined; lip, ca. 2 x 0.5 mm, oblong-lanceolate, subacute, jointed to the foot; disc with 3 parallel ridges; column short with a well developed foot; pollinia 4, with a subclavate caudicle.

Flowering & Fruiting: September-January.

Distribution: South India and Sri Lanka. Rare; in evergreen forests. *RNMK 1684*, Sugandhagiri; *RNMK 1777*, Chanthanathodu.

POLYSTACHYA W. J. Hooker

Exot. Fl. 2, t. 103. 1825, *nom. cons.*

Polystachya concreta (Jacq.) Garay & H.R. Sweet, Revista Soc. Colomb. Orquideol. 9: 206. 1974; Manilal, Fl. Silent Valley 301. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 453. 1996; Sathish & Manilal, Orchid Memories 214. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 493. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 153. 2009. *Epidendrum concretum* Jacq., Enum. Syst. Pl. 30. 1760. *Polystachya purpurea* Wight, Ic. t. 1679. 1851; Hook. f., Fl. Brit. India 6: 21. 1890; Fischer in Gamble, Fl. Pres. Madras 1437(1005). 1928. *Polystachya wightii* Rchb.f., Walp. Ann. 6: 640. 1861; Fischer in Gamble, Fl. Pres. Madras 1437(1005). 1928. *Polystachya flavescens* (Blume) Smith, Fl. Buitenz. 6: 284. f.218. 1905; Abraham & Vatsala, Introd. Orch. 392. 1981; V. S. Ramach. & V.J. Nair, Fl. Cannanore 461. 1988; Vajr., Fl. Palghat Dist. 490. 1990.

Epiphytes, 13-15 cm high with globose pseudobulb, 1-1.3 x 1-1.5 cm. Leaves 6-10 x 0.9-1 cm, linear-lanceolate, obtuse, 3-4 per pseudobulb. Flowers pinkish-brown, in 10-15 cm long dense terminal raceme, flower bearing portion about 2-3 cm long; dorsal sepal ovate, acute, 3-veined; lateral sepals ovate, acute, basally connated and jointed with the column foot, 3-veined; petals linear, obtuse, apiculate, 1-veined; lip 2-3 x 1.5-2.8 mm, 3-lobed; lateral lobes obliquely oblong, acute; midlobe orbicular-ovate, truncate at apex; disc with a longitudinal callus; column short continued into a long foot; pollinia 2, globose.

Flowering & Fruiting: July-August.

Distribution: Pantropical. Common; in evergreen, moist deciduous and semi-evergreen forests. *RNMK 1517,* Sughandhagiri; *RNMK 1666*, Manikkunnumala; *RNMK 3870,* Muthanga.

PORPAX Lindley

Bot. Reg. 31: Misc. 66. 1845.

Small epiphytic herbs; pseudobulbs discoid or button-like covered with a reticulate sheath. Leaves 2, small, membranous. Flowers 1-3, small, on the

top of pseudobulb; sepals connate into a tube, broaden above; petals free, shorter and included within the calyx tube; lip sessile, 3-lobed, fleshy, jointed with the column foot; column short; pollinia 8, connate in fours.

1. Leaves caducous, broadly oblong; bracts entire..... **P. reticulata**
1. Leaves persistent, suborbicular; bracts 2-lipped .....**P. jerdoniana**

Porpax jerdoniana (Wight) Rolfe, Orch. Rev. 16: 18. 1908; Fischer in Gamble, Fl. Pres. Madras 1422(995). 1928; Abraham & Vatsala, Introd. Orch. 387. 1981; Manilal, Fl. Silent Valley 302. 1988; Vajr., Fl. Palghat Dist. 491. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 453. 1996; Sivar. & P. Mathew, Fl. Nilambur 697. 1997; Sathish & Manilal, Orchid Memories 214. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 155. 2009. *Lichenora jerdoniana* Wight, Ic. t. 1748. 1851. *Eria lichenora* Lindl., Proc. J. Linn. Soc. Bot. 3: 46. 1859; Hook. f., Fl. Brit. India 5: 787. 1890.

Pseudobulbs discoid, ca. 1 x 0.5 mm, with reticulately veined sheaths. Leaves 2, ca. 2 x 2 cm, oblong-orbicular, mucronate. Flowers 2, orange brown, from the centre of leaves, tomentose outer side; bracts ca. 3 x 5 mm, oblong-orbicular, gland-dotted, ciliolate; sepals united to form a tube; dorsal sepal obovate-oblong, obtuse; lateral sepals united, saccate at base; petals linear-oblong, obtuse; lip ca. 3 x 1 mm, subtruncate, obscurely lobed, midlobe ovate, truncate, papillate.

Flowering & Fruiting: July-August.

Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 3828,* Banasuramala.

Porpax reticulata Lindl., Bot. Reg. Misc. 31. 1845; Fischer in Gamble, Fl. Pres. Madras 1422(994). 1928; Abraham & Vatsala, Introd. Orch. 385. 1981; Manilal, Fl. Silent Valley 302. 1988; Vajr., Fl. Palghat Dist. 492. 1990; Sathish & Manilal, Orchid Memories 215. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 156. 2009. *Aggeranthus marchantioides* Wight, Ic. t. 1737. 1851. *Eria reticulata* (Lindl.) Benth., Gen Pl. 3: 509. 1883; Hook. f., Fl. Brit. India 5: 786. 1890. *Porpax papillosa* Blatt. & McCann, J. Bombay Nat. Hist. Soc. 35: 268. f. 4. 1931.

Pseudobulbs discoid, covered with long sheaths of reticulate nerves, ca. 5 x 2 cm, broadly ovate, spathulate, obtuse. Flowers deep brownish red, from the base of pseudobulbs; bracts 5-6 x 7-8 mm, suborbicular, retuse, denticulate; sepals united to form a campanulate tube, ca. 1.4 x 0.6 cm, saccate at base, 3-lobed at apex, densely papillose outside; lobes ovate, acute; petals subfalcately spathulate, acute, papillose; lip ca. 5 x 4 mm, panduriform, 3-lobed, toothed; lateral lobes erect, ovate, obtuse; midlobe suborbicular, obtuse, denticulate, papillose.

Flowering & Fruiting: April-June.

Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 3860*, Banasuramala.

PTEROCERAS Hasskarl

Flora jens 25(2) Biebl.; 6.1842

Pteroceras leopardinum (Parish & Rchb.f.) Seidenf. & Smitin., Orch. Thail. IV: 535 f.395. 1963; Sathish., Rheedea 3: 173. 1993; Sathish & Manilal, Orchid Memories 215. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 157. 2009. *Thrixspermum leopardinum* Parish & Rchb.f., Trans. Linn. Soc. London 30:145. 1874. *Sarcochilus leopardinum* (Parish & Rchb.f.) Hook.f., Fl. Brit. India 6: 38. 1890. *Proteroceras holttumii* Joseph & Vajr., J. Indian Bot. Soc. 53: 189. 1974. **Plate 34j.**

Epiphytic herbs; stem tall rect, unbranched. Leaves 5-8 x 1-2 cm, sessile, 4 or more, distichously alternate, linear or elliptic-lanceolate, usually bilobed. Inflorescence racemose from the axils of older leaf sheath; sepals and petals free, spreading, grayish white; labellum distinctly stalked; pollinia 2, obovoid. Capsule ellipsoid, depressed at apex.

Flowering & Fruiting: April-June.

Distribution: Indo-Malesia. Rare; in evergreen forests. *RNMK 3001*, Chembra peak forests.

RHYNCHOSTYLIS Blume

Bijdr. 285. t. 49. 1825.

Rhynchostylis retusa (L.) Bl., Bijdr. 286. 1825; Hook. f., Fl. Brit. India 6: 32. 1890; Fischer in Gamble, Fl. Pres. Madras 1440(1007). 1928; Abraham & Vatsala, Introd. Orch. 454. 1981; Manilal & Sivar., Fl. Calicut 285. 1982; Ansari, Fl. Kasaragod Div. 375. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 462. 1988; Vajr., Fl. Palghat Dist. 492. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 454. 1996; Sivar. & P. Mathew, Fl. Nilambur 698. 1997; Sathish & Manilal, Orchid Memories 215. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 494. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 159. 2009. *Epidendrum retusum* L., Sp. Pl. 953. 1753. *Saccolabium rheedei* Wight, Ic. 5: 19. 1851.

Epiphytes, 30-40 cm tall; stems stout, woody. Leaves 25-30 x 2-3 cm, lorate, obliquely bilobed at apex with a mucro in between, lobules rounded. Flowers violet pink, closely packed in 30-40 cm long, stout, compact, pendulous axillary raceme; sepals and petals similar; dorsal sepal ovate or ovate-oblong, obtuse; lateral sepals obliquely ovate, subacute; petals oblong-ovate, obtuse; lip entire, oblong, pink; clawed; claw deflexed, deeply inflexed, cuneiform; disc 2-lobed; spur 5-6 mm long, laterally compressed, tip emarginate; puberulus inside; column short; foot very short; pollinia 2, globose, with long caudicle.

Flowering & Fruiting: June-July.

Distribution: Indo-Malesia. Common; in semi-evergreen forests and plantations. *RNMK 3849,* Puthoorvayal; *RNMK 3819*, Manikkunnumala.

ROBIQUETIA Gaudichaud-Beaupre
in Freycinet Voyage Monde,
Uranie Physicienne Bot. 426. 1829.

Epiphytic herbs; stem leafy. Leaves long, linear, sometimes terete. Flowers solitary or in simple or branched, few to many flowered racemes; sepals and petals free, recurved or incurved; lip spurred, 3-lobed, rarely entire; spur saccate, naked within, or with calli on the front wall only; pollinia 2, entire or 2-partite.

1. Stem 10-20 cm long; inflorescence 6-8 cm long; lip entire..... **R. gracilis**
1. Stem 2-3 cm long; inflorescence 2-3 cm long; lip lobed ..... **R. rosea**

Robiquetia gracilis (Lindl.) Garay, Bot. Mus. Leafl. Harvard Univ. 23: 197. 1972; Manilal, Fl. Silent Valley 302. 1988; Sathish & Manilal, Orchid Memories 216. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 162. 2009. *Saccolabium gracile* Lindl., Gen. Sp. Orchid Pl. 225. 1833; Hook. f., Fl. Brit. India 6: 57. 1890; Fischer in Gamble, Fl. Pres. Madras 1446(1011). 1928. *Malleola gracilis* (Lindl.) Schltr., Feddes Repert. 1: 981. 1913; Abraham & Vatsala, Introd. Orch. 491. 1981; Vajr., Fl. Palghat Dist. 485. 1990. **Plate 34k.**

Stem pendulous from tree trunks, 20-30 cm long. Leaves thick and fleshy, 6-8 x 0.8-1 cm. Racemes slender, pendulous, 6-9 cm long; flowers white, ca. 0.5 x 0.2 cm; bracts minute; lip ca. 0.5 cm long, not lobed.
Flowering & Fruiting: December-June.
Distribution: South India and Sri Lanka. Rare; in evergreen forests. *RNMK 1649,* Kallady-900 forest.

Robiquetia josephiana Manilal & Sathish, Orch. Rev. 92: 293. 1984; Manilal, Fl. Silent Valley 304. 1988; Sathish & Manilal, Orchid Memories 217. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 164. 2009. *Malleola rosea* auct. non (Lindl.) Schltr. 1913: Abraham & Vatsala, Introd. Orch. 494. 1981.

Epiphytes, 7-8 cm tall. Leaves 4-7 x 0.3-0.4 cm, linear, grooved, blunt at apex. Flowers white, in about 5 cm long axillary lax raceme; bracts ca. 2 x 1 mm, ovate, acuminate, 1-veined; sepals obovate, acute, 1-veined; sepals and petals gland dotted; lip ca. 7 x 2.5 mm, obscurely 3-lobed with a conspicuous spur; side lobes insignificant; midlobe triangular.
Flowering & Fruiting: October-November.
Distribution: Endemic to Peninsular India. Occasional; in evergreen forests. *RNMK 1655,* Chembra.

SATYRIUM Swartz
Kongl. Vetensk. Acad. Nya Handl. 21: 214. 1800, *nom. cons.*

Satyrium nepalense D. Don, Prodr. Fl. Nepal. 26: 1825; Fischer in Gamble, Fl. Pres. Madras 1476(1032). 1928; Abraham & Vatsala, Introd. Orch.210.

1981; Sathish & Manilal, Orchid Memories 218. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 495. 2005. *Satyrium neilgherrensis* Wight ex Fyson, Fl. Ind. Hill. This 1876. 1932.

Terrestrial herbs, 25-30 cm tall, with oblong tuber. Leaves 2 or 3, 5.5-14 x 3-6 cm, ovate or elliptic-lanceolate, acute or subacuminate. Flowers pink, in 10-35 cm long, dense terminal raceme; dorsal sepal oblong-lanceolate, 3-veined; lateral sepals elliptic, obtuse, 5-veined; petals oblong, obtuse, 3-veined; lip, ca. 2 x 0.6 cm, superior, concave, keeled, enclosing the column with two parallel spurs; column erect; pollinia 2, with recurved caudicle.

Flowering & Fruiting: August-September.

Distribution: Sri Lanka, India, Bhutan and Myanmar. Common; in grasslands. *RNMK 3841*, Chembra.

SCHOENORCHIS Blume

Bijdr. 6: t. 3, f. 23. 1825.

Schoenorchis nivea (Lindl.) Schltr., Feddes Repert. 1: 986. 1913; Sathish & Manilal, Orchid Memories 218. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 166. 2009. *Saccolabium niveum* Lindl., Gen. Sp. Orchid. Pl. 224. 1833. *Saccolabium gemmatum* Lindl., Bot. Reg. Misc. 50. 1838; Abraham & Vatsala, Introd. Orch. 478. 1981.

Epiphytes, 12-15 cm high, stem woody. Leaves 3.5-4 x 0.4-0.6 cm, subterete, linear, subacute or obtuse. Flowers white, minute, in 5-10 cm long, leaf opposed, panicle; bracts ca. 2 x 1 mm, ovate, acuminate; dorsal sepal oblong, obtuse, 1-veined; lateral sepals oblong-lanceolate, subacute, 1-veined; petals oblong, obtuse or truncate, 1-veined; lip 1.5-2 x 0.5-0.6 mm, including ca. 0.6 mm long cylindrical spur; midlobe spathulate.

Flowering & Fruiting: August-October.

Distribution: South India and Sri Lanka. Rare; in evergreen forests. *RNMK 3847,* Kattimattom; *RNMK 1677*, Chembra.

SEIDENFADENIELLA Sathish

Cat. India Orch. 47. 1994.

Seidenfadeniella filiformis (Rchb.f.) Christm. & Ormerod. In Matthew, Fl. Palni Hills S. India 3: 1258. 1999; Sathish & Manilal, Orchid Memories 218. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 168. 2009. *Saccolabium filiforme* Rchb.f., Walp. Ann. 6: 887. 1864. Sarcanthus filiformis Wight, Ic. t.1684.1851, non Lindl. 1842. *Saccolabium filiforme* Lindl. Ex Hook. f., Fl. Brit. India 6: 56. 1890,p.p; Fischer in Gamble, Fl. Pres. Madras 1446(1010). 1928. *Schoenorchis filiformis* (Wight) Schltr., Feddes Repert. 1:986.1913; Abraham & Vatsala, Introd. Orch. 475. 1981; Manilal, Fl. Silent Valley 304. 1988. *Schoenorchis juncifolia* Thw., Enum. Pl. Zeyl. 304. 1864, non Bl. 1825. *Saccolabium chrysanthum* Alston in Trimen, Handb. Fl. Ceylon 6: 277. 1931. *Schoenorchis chrysantha* (Alston) Garay, Bot. Mus. Leafl. Harvard Univ. 23: 22. 1972. *Seidenfadeniella chrysantha* (Alston) Sathish in

Sathish & Manilal, Cat. Indian Orch. 47. 1994. *Saccolabium filiforme* Lindl. Ex Hook.f. var. *pulneyensis* Fyson, Fl. Pulney Nilghiri Hill tops 1:396 & 2:250.1915.

Pendulous epiphytes, 25-30 cm long, stem woody, terete, green. Leaves 10-11, terete, linear, acute. Flowers orange-yellow, in 5-6 cm long, erect, dense axillary racemes; bracts 1.5-2 x 1-2 mm, ovate-lanceolate, acuminate; dorsal sepal oblong, acute, serrulate, 3-veined; lateral sepals falcately oblanceolate, 1-veined; petals orbicular or broadly elliptic-oblong, rounded, 3-veined; lip 6-7 x 1.5-4 mm, 3-lobed, lateral lobes rounded, orbicular; midlobe ovate, acute, papillate, deflexed; spur 5.5-6 x 1-2 mm, inflated, laterally compressed, rounded at base, thickened on backwall; column short and broad.

Flowering & Fruiting: May-September.

Distribution: South India and Sri Lanka. Rare; in evergreen forests. *RNMK 3846,* Kurichiarmala; *RNMK 3379*, Chembra.

SEIDENFIA Szlachetko
Syst. Orch., Fragm. Florist.
Geobot. Suppl. 3:67.1995

Terrestrial or epiphytic herbs, pseudobulbous or not. Leaves 1 to many, sheathed. Flowers in terminal racemes, resupinate. Sepals spreading or recurved. Petals as long as the petals, narrower. Lip adnate to the base of the column, usually flat. Column very short with short spreading apical arms. Anther subterminal; pollinia 4.

1. Plants more than 20 cm tall; lip dentate with a few teeth ..... **S. rheedei**
1. Plants to 15 cm tall; lip pectinate 2
2. Plants with pseudobulb; lip rhomboid ..... **S. densiflora**
2. Plants without pseudobulb; lip flabellate 3
3. Inflorescence dense flowered; lip closely pectinate at margins ..... .**S. intermedia**
3. Inflorescence lax flowered; lip more or less irregularly crenulate ..... .**S. versicolor**

Seidenfia densiflora (A. Rich.) Szlach., Syst. Orch. 3: 122. 1995; Sathish & Manilal, Orchid Memories 221. 2004. *Liparis densiflora* A.Rich., Ann. Sci. Nat. Bot. ser. 2, 15: 18. 1841. *Malaxis densiflora* (A.Rich.) O.Kuntze., Rev. Gen. Pl. 2: 673. 1891; Abraham & Vatsala, Introd. Orch. 394. 1981; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 489. 2005. *Microstylis versicolor* Wight, Ic. t. 901. 1844, non Lindl. 1830; Hook. f., Fl. Brit. India 5: 691. 1890. *Microstylis luteola* Wight, Ic. t. 1632. 1852. *Microstylis densiflora* (A.Rich.) Fischer in Gamble, Fl. Pres. Madras 1408(985). 1928. **Plate 34 l.**

Pseudobulbous slender herbs, 7-9 cm long. Leaves 2-3, 5-6 x 2-3 cm. Flowering axis 10-12, purple, lax flowered, angled; flowers ca. 0.6 cm across, violet-purple; sepals and petals purple coloured; lip deeply lacinate, teeth rigid, pointed.

Flowering & Fruiting: June-August.

Distribution: Peninsular India and Sri Lanka; Rare; in grasslands. *RNMK 3807,* Chembra.

Seidenfia intermedia (A. Rich.) Szlach., Syst. Orch. 3: 122. 1995; Sathish & Manilal, Orchid Memories 221. 2004. *Liparis intermedia* A.Rich., Ann. Sci. Nat. Bot. ser. 2, 15: 17. 1841. *Malaxis intermedia* (A.Rich.) Seidenf., Bot. Tidsskr. 73: 99. 1978; Sivar. & P. Mathew, Fl. Nilambur 691. 1997; *Microstylis stocksii* Hook.f. in Hook.'s Ic. Pl. t. 1833. 1889 & Hook. f., Fl. Brit. India 5: 691. 1890; Fischer in Gamble, Fl. Pres. Madras 1408(985). 1928. *Malaxis stocksii* (Hook.f.) O. Ktze., Rev. Gen. Pl. 2: 673. 1891. *Seidenfia stocksii* (Hook. f.) Szlach., Fragm. Flor. Geobot. Suppl. 2: 122. 1995. **Plate 35a.**

Terrestrial herbs; stem stout, 6-9 cm long. Leaves 2-3, 5-8 cm long, shortly petioled, ovate or ovate-lanceolate, acute or acuminate. Flowers yellow, in terminal racemes, 5-9 cm long; lip deeply pectinate.

Flowering & Fruiting: June-September.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3873*, Chanthanathodu.

Seidenfia rheedei (Sw.) Szlach., Syst. Orch. 3: 122. 1995; Sathish & Manilal, Orchid Memories 221. 2004. *Malaxis rheedei* Sw., Kongl. Vetensk. Acad. Nya Handl. 21: 235. 1800; Manilal & Sivar., Fl. Calicut 283. 1982; Ansari, Fl. Kasaragod Div. 371. 1985; Manilal, Fl. Silent Valley 293. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 457. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 448. 1996. *Microstylis rheedei* (Sw.) Lindl., Gen. Sp. Orchid. Pl. 21. 1830p.p.; Hook. f., Fl. Brit. India 5: 690. 1890.

Terrestrial herbs, 25-35 cm tall. Leaves 15-18 x 5-6 cm, elliptic-lanceolate, acuminate. Flowers orange-yellow, turning purplish, 7-8 x 3.5-4 mm, in about 15-25 cm long terminal dense racemes; dorsal sepal linear, obtuse, 3-veined; lateral sepals linear, obtuse, 3-veined; petals lanceolate, obliquely truncate, 1-veined; lip 1.6 x 3-4 mm, subquadrate, pectinate, 9-10 toothed.

Flowering & Fruiting: July-September.

Distribution: India to Thailand, China and Sri Lanka. Occasional; in evergreen forests. *RNMK 3806*, Vythiri; *RNMK 3885,* Sugandhagiri.

Seidenfia versicolor (Lindl.) Marg. & Szlach., Pol. Bot. J. 46: 56. 2001; Sathish & Manilal, Orchid Memories 222. 2004. *Microstylis versicolor* Lindl., Gen. Sp. Orchid. Pl. 21. 1830; Fischer in Gamble, Fl. Pres. Madras 1408(985). 1928; Hook. f., Fl. Brit. India 6: 690. 1890. *Malaxis versicolor* (Lindl.) Abeyw., Ceylon J. Sci. Biol. Sci. 2: 147. 1959; Abraham & Vatsala, Intr. Orch. 399. 1981; Vajr., Fl. Palghat Dist. 484. 1990.

Terrestrial herbs without pseudobulbs; stem stout. Leaves 3-5, 6-9 x 4-5 cm, petioled, broadly avate or elliptic, acute. Racemes dense flowered; dorsal sepal linear, obtuse, 3-veined; petals lanceolate, obliquely truncate, 1-veined; lip obovate or ensiform, apex pectinate.

Flowering & Fruiting: July-September.

Distribution: South India and Sri Lanka. Occasional; in evergreen forests. *RNMK 1696,* Chanthanathodu.

SIRHOOKERA O. Kuntze
Rev. Gen. Pl. 2: 681. 1891.

Epiphytic herbs with creeping stem. Leaves basal, oblong, oblong-lanceolate, coriaceous. Flowers white or pinkish, in panicled racemes; sepals subequal; dorsal sepal concave, hooded; petals similar but narrower than sepals; lip saccate, 3-lobed, midlobe acute or emarginate, adnate to the base of column; column broad, equal to the sepals, shortly 2-winged upward; foot 0; pollinia 4, clavate in unequal pairs.

1. Leaves elliptic-oblong or oblanceolate; flowers white, tinged with purple .... **S. lanceolata**
1. Leaves broadly oblong; flowers yellow with purple stripes.....**S. latifolia**

Sirhookera lanceolata (Wight) O. Kuntze., Rev. Gen. Pl. 2: 681. 1891; Abraham & Vatsala, Introd. Orch. 258. 1981; Manilal, Fl. Silent Valley 305. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 462. 1988; Sathish & Manilal, Orchid Memories 222. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 495. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 169. 2009. *Josephia lanceolata* Wight, Ic. t. 1753. 1851; Hook. f., Fl. Brit. India 5: 823. 1890; Fischer in Gamble, Fl. Pres. Madras 1428(999). 1928. **Plate 35b.**

Epiphytic stemless herbs. Leaves 12-13 x 3.5-4 cm, including 4-5 cm long; petiole, elliptic-oblong or oblanceolate, subacute at apex. Flowers white, in 20-25 cm long, compound racemes; branches slender; dorsal sepal elliptic-obtuse, 3-veined; lateral sepals oblong, obtuse, 3-veined; petals oblanceolate, obtuse, 1-veined; lip 3-3.5 x 0.1-0.2 cm, panduriform, 3-lobed; lateral lobes short, blunt; midlobe elliptic-oblong, bifid at apex.

Flowering & Fruiting: August-November.

Distribution: South India and Sri Lanka. Common; in evergreen forests. *RNMK 1615,* Chembra; *RNMK 3878*, Brahmagiri.

Sirhookera latifolia (Wight) O. Kuntze., Rev. Gen. Pl. 2: 681. 1891; Manilal, Fl. Silent Valley 305. 1988; Vajr., Fl. Palghat Dist. 493. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 454. 1996; Sathish & Manilal, Orchid Memories 222. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 170. 2009. *Josephia latifolia* Wight, Ic. t. 1743. 1851; Hook. f., Fl. Brit. India 5: 823. 1890; Fischer in Gamble, Fl. Pres. Madras 1428(999). 1928.

Epiphytes with very short stem and vermiform roots. Leaves 9-10 x 2-2.5 cm, including a petiole of 1-1.5 cm long, oblong, acute. Flowers white, in 15-20 cm long branched racemes; branches slender; dorsal sepal obovate, obtuse, 3-veined; lateral sepals elliptic-oblong, obtuse, 3-veined; petals oblong, obtuse, 1-veined; lip ca. 4 x 2 mm, 3-lobed; lateral lobes smaller, oblong, obtuse, incurved; midlobe ovate, obtuse or acute.

Flowering & Fruiting: August-September.

Distribution: South India and Sri Lanka; Rare; in evergreen forests. *RNMK 3883,* Kurichiarmala.

SMITHSONIA Saldanha

J. Bombay. Nat Hist. Soc. 71: 75. 1975.

Smithsonia straminea Sald., J. Bombay Nat. Hist. Soc. 71: 74. 1974 & in Sald. & Nicols., Fl. Hassan Dist. 850. 1976; Joseph *et al.*, Bull. Bot. Surv. India 20: 169. 1978; V. S. Ramach. & V.J. Nair, Fl. Cannanore 463. 1988; Vajr., Fl. Palghat Dist. 493. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 454. 1996; Sivar. & P. Mathew, Fl. Nilambur 698. 1997; Sathish & Manilal, Orchid Memories 223. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 495. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 172. 2009.

Epiphytic herbs; stem ver short. Leaves oblong, unequally lobed at apex, 3-4 x 0.6-0.7 cm. Racemes 1.5-3 cm long. Flowers few, pale yellow with red spots; dorsal, ovate-acute concave, laterals obovate-acute. Lip white, 2-2.5 x 1-2 mm, midlobe with short lateral wings; spur purple, 1.5-2 mm long.

Flowering & Fruiting: September-December.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3373,* Chanthanathodu.

TAINIA Blume

Bijdr. 354. 1825.

Tainia bicornis (Lindl.) Rchb.f., Bonplandia 5: 54. 1857; Hook. f., Fl. Brit. India 5: 820. 1890; Fischer in Gamble, Fl. Pres. Madras 1427(998). 1928; Abraham & Vatsala, Introd. Orch. 290. 1981; Manilal, Fl. Silent Valley 306. 1988; Vajr., Fl. Palghat Dist. 493. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 455. 1996; Sathish & Manilal, Orchid Memories 224. 2004. *Ainia bicornis* Lindl., Bot. Reg. 28: 37. 1842. *Ania latifolia* Wight, Ic. 3:10. t. 914. 1844-45, non Lindl. 1831. **Plate 35c.**

Terrestrial herbs, 45-50 cm high, with ovoid conical pseudobulb, 8-10 x 1-2 cm. Leaves solitary, 10-20 x 6-7 cm, elliptic-oblong, acuminate, with 10-20 cm long petiole. Flowers greenish yellow, in 30-60 cm long, few-flowered raceme, from the base of pseudobulb; dorsal sepal linear-lanceolate, obtuse, 3-4-veined; lateral sepals subfalcately linear-lanceolate, obtuse, 3-5-veined; petals linear-lanceolate, falcate, subacute, 3-7-veined; lip 1.8-2 cm long, 3-lobed; lateral lobes ovate, obtuse; midlobe, obcordate or emarginate; disc with 3 parallel ridges.

Flowering & Fruiting: November-December.

Distribution: South India and Sri Lanka. Rare; in evergreen forests. *RNMK 3816,* Kallady- 900 forest.

TAENIOPHYLLUM Blume

Bijdr. 6: t. 3, f. 70. 1825.

Taeniophyllum alwisii Lindl., J. Proc. Linn. Soc. Bot. 3: 42. 1859; Hook. f., Fl. Brit. India 6: 76. 1890; Rajesh & Kishore, J. Econ. Tax. Bot. 28: 101. 2004; Sathish & Manilal, Orchid Memories 224. 2004.

Leafless epiphytic herbs, roots subterete, 5-8 x 0.1-0.2 cm. Flowers creamy white, ca. 4 x 2 mm, in 1.5-2 cm long, flexuous spikes; bracts ca. 0.9 x 1 mm, ovate, acute, persistent; sepals and petals united into a 6 toothed tube; lobes ovate, acute; lip ovate, acute, tip recurved, base saccate.
Flowering and Fruiting: February-June.
Distribution: Endemic to southern Western Ghats. Rare; in moist deciduous forests. *RNMK* 3829, Kuruva.

THELASIS Blume
Bijdr. 8: 385. 1825.

Thelasis pygmaea (Griff.) Lindl., J. Proc. Linn. Soc. 3:63.1859; Hook. f., Fl. Brit. India 6:86.1888; Fischer in Gamble, Fl. Pres. Madras 1450(1014). 1928; Sathish & Manilal, Orchid Memories 225. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 175. 2009. *Euphorboscis pygmaea* Griff., Calcutta. J. Nat. Hist. 5: 372. t.26. 1845. **Plate 35d.**

Epiphytes, 7-8 cm high, pseudobulb subglobose, 1-1.5 x 1-1.4 cm. Leaves 6-7 x 0.8-1 cm, oblong-lanceolate, obtuse, thin, membranous. Flowers creamy white, in 6-7 cm long compact spike, from the base of pseudobulb; peduncle about 5.5 cm long; bracts ovate, acute, keeled dorsally; dorsal sepal oblong-lanceolate, acute, 1-veined, gland-dotted; lateral sepals boat-shaped, strongly keeled, truncate at apex; petals elliptic-oblong, 1-veined, glandular; lip 2.5-3 x 1-2 mm, oblong, acute, with orbicular small side lobes, 3-veined, glandular.
Flowering & Fruiting: April-May.
Distribution: India to south-east Asia. Rare; in moist deciduous and semi-evergreen forests. *RNMK 3830,* Kuruva; *RNMK 3869*, Pookodu.

THRIXSPERMUM Loureiro
Fl. Cochinch.: 519 (1790).

Thrixspermum walkeri Seidenf. & Ormerod, Desc. Epidendr. Koenig 26. 1995; Sathish & Manilal, Orchid Memories 226. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 177. 2009. *Thrixspermum arachnites* (Bl.) Rchb.f., Xenia Orchidacea 2:121.1867; Abraham & Vatsala, Introd. Orch. 458. 1981; V. S. Ramach. & V.J. Nair, Fl. Cannanore 463. 1988. *Dendrocolla arachnites* Bl., Bijdr. 287. 1825. *Thrixspermum complanatum* Alston in Trimen, Fl. Ceylon 277. 1931. *Thrixspermum papillosum* Carr., Gard. Bull. Straits Settlem. 5: 33. t.13B.1929. **Plate 35e.**

Epiphytic herbs; stem slender, greenish. Leaves 10-12 x 1-1.5 cm. Inflorescence leaf opposed, with 2 rows of fleshy bracts; bracts triangular, green; flowers golden yellow, ca. 3 cm across; lip saccate, jointed to the foot of the column, midlob with a band of red speckles in the middle; disc hairy towards the base, fleshy callus in the middle.
Flowering & Fruiting: September-January.
Distribution: South India and Sri Lanka. Rare; in evergreen forests. *RNMK 3871*, Chanthanathodu.

TRIAS Lindley
in Wallich, Cat. 1977. 1829.

Trias stocksii Benth. ex Hook. f., Fl. Brit. India 5: 781. 1890; Vivek. *et al.*, Bull. Bot. Surv. India 10: 240. 1969; Vajr., Fl. Palghat Dist. 494. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 455. 1996; Sathish & Manilal, Orchid Memories 227. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 180. 2009. **Plate 35f.**

Pseudobulb subglobose, 1.5-1.8 x 1.5-2 cm, distantly placed on stout rhizome. Leaves solitary, 2.5-3.5 x 1-1.5 cm, elliptic, acute with ca. 5 mm long petiole. Flowers pinkish, 2 or 3 from the base of the pseudobulb; dorsal sepal ovate, obtuse, 7-veined; lateral sepals obliquely ovate, obtuse, 7-veined; petals linear, apiculate; lip ca. 4 x 1 mm, oblong, acute, fleshy, puberulus.

Flowering & Fruiting: December-January.

Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 3822*, Chanthanathodu; *RNMK 3111*, Thariodu.

TRICHOGLOTTIS Blume
Bijdr. 6: t. 3. 1825.

Trichoglottis tenera (Lindl.) Rchb.f., Gard. Chron. 699. 1872; Abraham & Vatsala, Introd. Orch. 460. 1981; Manilal, Fl. Silent Valley 306. 1988; Sivar. & P. Mathew, Fl. Nilambur 699. 1997; Sasidh. & Sivar., Fl. Pl. Thrissur For. 455. 1996; Sathish & Manilal, Orchid Memories 227. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 182. 2009. *Oeceoclades tenera* Lindl., Gen. Sp. Orchid. Pl. 236. 1833. *Cleisostoma tenerum* (Lindl.) Hook.f., Fl. Brit. India 6: 73. 1890; Fischer in Gamble, Fl. Pres. Madras 1448(1012). 1928. **Plate 35g.**

Epiphytes, 50-60 cm high, stem terete, woody, scandent. Leaves 2.5-3 x 1-1.5 cm, elliptic-oblong, obtuse. Flowers yellow, in few-flowered, 15-20 cm long, stout raceme; dorsal sepal elliptic, obtuse, 5-veined; lateral sepals oblanceolate, falcate, obtuse, 3-veined; petals smaller than sepals, oblong, obtuse, 5-veined; lip adnate to the base of column, 7-8 x 7.5-8 mm, 3-lobed; lateral lobes oblong, lanceolate, obtuse; midlobe ovate, obtuse, 3-lobuled, rounded; spur ca. 3 x 1 mm, cylindrical; column and foot very short; pollinia 2.

Flowering & Fruiting: April-May.

Distribution: South India and Sri Lanka. Rare; in evergreen forests. *RNMK 3870*, Chembra.

TROPIDIA Lindley
in Wallich, Cat. 7376. 1831.

Tropidia angulosa (Lindl) Bl., Coll. Orch. Arch. Ind. 122. 1859; Hook. f., Fl. Brit. India 6: 92. 1890; Fischer in Gamble, Fl. Pres. Madras 1452(1015). 1928; V. S. Ramach. *et a*l., J. Econ. Tax. Bot. 6: 265. 1985; V. S. Ramach. & V.J. Nair, Fl. Cannanore 464. 1988; Manilal, Fl. Silent Valley 307. 1988; Vajr., Fl. Palghat Dist. 494. 1990; Sathish & Manilal, Orchid Memories 228. 2004.

Cnemidia angulosa Lindl., Bot. Reg. t. 1618. 1833. *Govindooia nervosa* Wight, Ic. t. 2090. 1853.

Terrestrial woody herbs, 25-30 cm tall; stems sheathed below the leaves. Leaves 2 or 3, towards apex, 8-10 x 5-6 cm, elliptic, acute, sessile, membranous. Flowers white, in 8-10 cm long, in many-flowered terminal spike; bracts linear, 3-veined, spreading; dorsal sepal narrowly oblong, acute; lateral sepals oblong, acute, connate nearly to the apex forming a mentum enclosing the lip; petals oblong, obtuse; lip ca. 2 x 0.1 cm, obpanduratus, obtuse; spur cylindric; column short; pollinia 2, clavate.

Flowering & Fruiting: August-September.

Distribution: Indo-Malesia. Rare; in evergreen forests. *RNMK 3833*, Chembra.

VANDA Jones ex R. Brown

Bot. Reg. 6: 506. 1820.

Epiphytes with erect woody stem. Leaves coriaceous, strap shaped, channelled above, unequally lobed at apex. Inflorescence of erect raceme; flowers many; sepals and petals subequal, narrowed towards base, spreading; lip 3-lobed, saccate or spurred; column short, cylindric; anther terminal, pollinia 2, subglobose or obovoid, sulcate, stripe, strap shaped viscidium broad, orbicular or suborbicular.

1. Stem long, slender, scandent; leaves scattered.....**V. spathulata**
1. Stem short, erect, caespitose; leaves crowded 2
2. Inflorescence axis 30 cm or more long; flowers less than1.5 cm across .. **V. testacea**
2. Inflorescence axis less than 20 cm long; flowers more than 2 cm across 3
3. Racemes axillary; spur less than 6 mm long ..... **V. tessellata**
3. Racemes leaf opposed; spur more than 1 cm long.....**V. twaitesii**

Vanda tessellata (Roxb.) Hook. ex D. Don in Loud., Hort. Brit. 372.1830; Fischer in Gamble, Fl. Pres. Madras 1445(1010). 1928; Abraham & Vatsala, Introd. Orch. 438. 1981; Manilal, Fl. Silent Valley 307. 1988; Sivar. & P. Mathew, Fl. Nilambur 700. 1997; Sathish & Manilal, Orchid Memories 228. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 184. 2009. *Epidendrum tessellatum* Roxb., Pl. Corom. t. 42. 1795. *Vanda roxburghii* R. Br., Bot. Reg. 6. t.506. 1820; Hook. f., Fl. Brit. India 6: 52. 1890.

Scandent epiphytic subshrubs. Leaves 2-ranked, 10-15 x 2-2.4 cm, oblong, recurved conduplicate, 2-lobed at apex, with a mucro in between, base sheathing, coriaceous, closely packed. Racemes axillary; flowers ca. 5 cm across, white outside, inner tessellate with brown spots; petals 4-5 cm long; lip bluish dotted with purple, 3-lobed, side lobes ca. 7 mm long; spur 5-6 mm, conical.

Flowering & Fruiting: June-September. *Distribution*: India, Myanmar, China and Sri Lanka. Common; in semi-evergreen and moist deciduous forests. *RNMK 3882,* Manikkunnumala; *RNMK 3808*, Muthanga.

Vanda testacea (Lindl.) Rchb.f., Gard. Chron. 2: 166. 1877; Abraham & Vatsala, Introd. Orch. 436. 1981; V. S. Ramach. & V.J. Nair, Fl. Cannanore 464. 1988; Manilal, Fl. Silent Valley 307. 1988; Vajr., Fl. Palghat Dist. 495. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 456. 1996; Sivar. & P. Mathew, Fl. Nilambur 700. 1997; Sathish & Manilal, Orchid Memories 228. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 496. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 185. 2009. *Aerides testacea* Lindl., Gen. Sp. Orchid. Pl. 238. 1833. *Aerides wightiana* Lindl., Bot. Reg. 30: Misc. 57. 1844; Hook. f., Fl. Brit. India 6: 50. 1890. *Vanda parviflora* Lindl., Bot. Reg. 30: Misc. 57. 1844; Hook. f., Fl. Brit. India 6: 50. 1890; Fischer in Gamble, Fl. Pres. Madras 1444(1010). 1928. **Plate 35h.**

Stem stout, woody, 20-25 cm high. Leaves 9-16 x 1-1.5 cm, strap-shaped, keeled, unequally lobed at apex. Flowers pinkish, in 10-15 cm long, few-branched erect, raceme; dorsal sepal obovate- oblong or spathulate, obtuse, 5-veined; lateral sepals elliptic-subacute, 5-veined; petals spathulate, obtuse, 5-veined; lip ca. 1 x 0.5 cm, 3-lobed; lateral lobes oblong, obliquely lanceolate, obtuse; midlobe obconical, emarginate, margins finely close-dentate, with 2 parallel fleshy ridges; spur cylindrical.

Flowering & Fruiting: April-May.

Distribution: India, Myanmar and Sri Lanka. Occasional; in semi-evergreen forests. *RNMK 3847*, Sugandhagiri.

Vanda thwaitesii Hook. f. in Trimen, Handb. Fl.Ceylon 4: 193. 1898; Sathish, Rheedea 8: 249. 1998; Sathish & Manilal, Orchid Memories 228. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 186. 2009. *Aerides tessellatum* Thw., Enum. Pl. Zeyl. 305.1861, non Wight 1845. **Plate 35i.**

Stem stout, woody, 20-25 cm high, covered with leaf base. Leaves 12-15 x 1.5-2 cm, strap-shaped, recurved, unequally notched at apex. Flowers greyish-green, 4-5 x 3-3.5 cm, in 9-10 cm long leaf-opposed racemes; dorsal sepal obovate, obtuse, margins wavy, 7-veined; lateral sepals elliptic, subacute, obtuse, margins wavy, 9-veined; petals obovate, obtuse, margins wavy, 7-veined; lip 1.5-2 x 1.8-2 cm, 3-lobed; lateral lobes oblong, lanceolate, acute, curved downwards; midlobe fleshy, broadly ovate, truncate at apex; lobules obtuse; medianly grooved; 2 bilobed calli at the mouth of the spur; spur 1-1.2 x 0.4-0.6 cm, conical, inflated, keeled, rounded.

Flowering & Fruiting: September-April.

Distribution: South India and Sri Lanka. Occasional; in semi-evergreen forests. *RNMK 3861,* Banasurasagar dam area; *RNMK 1699*, Sughandhagiri.

Vanda spathulata (L.) Spreng., Syst. Veg. 3: 719.1828; Hook. f., Fl. Brit. India 6:50.1890; Fischer in Gamble, Fl. Pres. Madras 1444(1010). 1928; Abraham & Vatsala, Intr. Orch. 438. 1981. *Epidendrum spathulatum* L., Sp. Pl. 952. 1753. *Taprobanea spathulata* (L.) Christm., Lindleyana 7:88. 1992; Sathish & Manilal, Orchid Memories 225. 2004.

Epiphytes. Leaves 2-ranked, 4-6 x 1.2-1.5 cm, oblong, 2-lobed at apex, coriaceous, base sheathing, sessile. Racemes leaf opposed; flowers 6-8, ca. 4 cm across, yellow; sepals ca. 2.5 cm long, obovate, narrowed to the base; petals more or less similar to the sepals; lip 3-lobed, spur ca. 0.5 cm long.
Flowering & Fruiting:. August-December.
Distribution: South India and Sri Lanka. Occasional; in semi-evergreen forests.
RNMK 3845, Manikkunnumala.

XENIKOPHYTON Garay

Bot. Mus. Leafl. 23: 374 (1974).

Xenikophyton smeeanum (Rchb.f.) Garay, Bot. Mus. Leafl. Harvard Univ. 23:374.1974; Manilal, Fl. Silent Valley 308. 1988; Sathish & Manilal, Orchid Memories 230. 2004; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 187. 2009. *Saccolabium smeeanum* Rchb.f., Gard. Chron. ser. 3, 2: 214. 1887. *Rhynchostylis latifolia* Fischer, Bull. Misc. Inform. Kew 1927: 358. 1927; Fischer in Gamble, Fl. Pres. Madras 1440(1007). 1928. *Schoenorchis latifolia* (Fischer) Sald., J. Bombay Nat. Hist. Soc. 70: 414. 1974; Abraham & Vatsala, Introd. Orch. 475. 1981.

Erect epiphytes. Leaves 5-7.5 x 1.5-2.5 cm, oblong, apex unequally bilobed, channelled above. Raceme simple or branched 8-10 cm long; bracts ca. 2 mm long, ovate-lanceolate, acuminate; sepal and petal ovate-oblong, obtuse, lip obscurely 3-lobed, arched, base spurred, column short, pollinia 2.
Flowering & Fruiting: May-August.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests.
RNMK 3807, Chembra.

ZEUXINE Lindley

Collect. Bot. Append. n. 18. 1825.

Terrestrial herbs with a creeping rhizome. Leaves membranous, linear to ovate. Flowers in terminal spikes, white, yellow or orange. Sepals subequal; dorsal sepal and petals connated to form a hood; lateral sepals free, covering the base of the lip; lip saccate, with a gland inside, adnate with the base of the column, the lobules of lip squarish, `T' or `U' shaped; column short.

1. Lip thin; blades bilobulate, lobules oblique, irregularly toothed ..... **Z. longilabris**
1. Lip fleshy; blades bilobulate, lobules orbicular, entire ..... .**Z. gracilis**

Zeuxine gracilis (Breda) Bl., Fl. Java, n.s. 56, t.18,f.2. t.23D.1858; Abraham & Vatsala, Introd. Orch. 205. 1981; Manilal, Fl. Silent Valley 308. 1988; Vajr., Fl. Palghat Dist. 495.1990; Sivar. & P. Mathew, Fl. Nilambur 701.1997; Sathish & Manilal, Orchid Memories 231. 2004. *Psychechilos gracile* Breda., Gen. Sp. Orch. & Asc. t. 9. 1827. *Zeuxine blatteri* Fischer, Bull. Misc. Inform. Kew 1928: 76. 1928; Fischer in Gamble, Fl. Pres. Madras 1456(1018). 1928. **Plate 35j.**

Sacculent herbs, 25-30 cm long; stem brownish; flowering axis glandular pubescent. Leaves membranous, brownish, 4-5 x 2.5-3 cm, scape 25-30 cm

tall, lax flowered, 15-20 flowers. Ca. 1.5 x 0.5 cm; sepals greenish, pubescent; petals pale-pink; lip clawed, claw orange, limb white.
Flowering & Fruiting: February-May.
Distribution: India and Malesia. Occasional; in evegreen forests. *RNMK 3487,* Periya; *RNMK 3804*, Kurichiarmala.

Zeuxine longilabris (Lindl.) Benth. ex Hook. f., Gen. Sp. Pl. 3: 600. 1883; Hook. f., Fl. Brit. India 6: 107. 1890; Fischer in Gamble, Fl. Pres. Madras 1456(1018). 1928; Abraham & Vatsala, Introd. Orch. 202. 1981; Manilal & Sivar., Fl. Calicut 283. 1982; Ansari, Fl. Kasaragod Div. 375. 1985; Manilal, Fl. Silent Valley 308. 1988; V. S. Ramach. & V.J. Nair, Fl. Cannanore 464. 1988; Vajr., Fl. Palghat Dist. 495. 1990; Sivar. & P. Mathew, Fl. Nilambur 702. 1997; Sathish & Manilal, Orchid Memories 231. 2004; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 496. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 680. 2009. *Monochilus longilabris* Lindl., Gen. Sp. Orchid. Pl. 478. 1840. *Monochilus affine* Wight, Ic. t. 1728. 1858, non Lindl. 1840. **Plate 35k.**

Stem 25-30 cm tall, rhizome creeping, 5-10 cm long. Leaves 3-4.5 x 1-1.5 cm, ovate or elliptic, acute with sheathing base. Flowers white, in 15-25 cm long, lax spike; peduncle 10-18 cm long, hairy; bracts ca. 8 x 3 mm, ovate, acuminate, pubescent outside; dorsal sepal ovate, acute, 3-veined; lateral sepals ovate-lanceolate, slightly oblique, obtuse, 3-veined; petals subfalcate, oblong, elliptic, acute, 2-veined; lip 8-9 x 1.5-7 mm, saccate at base with, bilobed, backwardly curved glands inside; epichile 2-lobuled, each elliptic-oblong, falcate, with dentate margins.
Flowering & Fruiting: February-March.
Distribution: Indo-Malesia. Occasional; in evergreen forests. *RNMK 3892*, Periya; *RNMK 1859*, Sugandhagiri.

ZINGIBERACEAE Lindl.

Key Bot. 69. 1835.

1. Flowers in racemes or panicles ..... **Alpinia**
1. Flowers in spike 2
2. Leaves spirally alternating; strobilus bright red ..... **Costus**
2. Leaves distichous; strobilus otherwise 3
3. Bracts pouched, basally connate ..... **Curcuma**
3. Bracts not as above 4
4. Spike terminal on leafy stem 5
4. Spike lateral from the rhizome 7
5. Ovary unilocular with parietal placentation ..... **Globba**
5. Ovary trilocular with axile placentation 6
6. Inflorescence enclosed by leaf sheath; flowers few and exerted ..... **Boesenbergia**
6. Inflorescence not enclosed in leaf sheath; flowers many with distinct imbricating bracts ..... **Hedychium**
7. Anther connective broad crest-like ..... **Amomum**
7. Anther connective produced into long tail at apex ..... **Zingiber**

ALPINIA Roxburgh

Asiat. Res. 11: 350. 1810, *nom. cons.*

Herbs, rhizome perennial, branched, horizontal; leafy stem clumped, erect. Leaves distichous, elliptic to oblong, ligulate. Flowers in terminal raceme or panicle, rarely axillary; bracts absent; bracteoles tubular or spathaceous, covering the flowers bud; calyx tubular, shortly 3-toothed, corolla tube cylindrical, lobes 3, unequal; lip orbicular, clawed; lateral staminodes absent or very small; stamen 1, filaments flattened; anthers diverging at apex, not crested; ovary 3-celled, ovules few to many. Capsule globose; seeds angular, arillate.

1. Plants to 1.5 m tall; leaves linear-lanceolate; flowers in panicles ..... **A. calcarata**
1. Plants to 3 m tall; leaves oblong-lanceolate; flowers in racemes..... **A. malaccensis**

Alpinia calcarata Rosc., Trans. Linn. Soc. London 8: 347. 1807; Roxb., Fl. Ind. 1: 69. 1832; Wight, Ic. T. 2028. 1853; Baker in Hook. f., Fl. Brit. India 6: 254. 1892; Fischer in Gamble, Fl. Pres. Madras 1493(1043). 1928; Sabu, Taxonomic Phylogenetic Stud. Zingiberac. 108. 1991; Mangaly & Sabu, Rheedea 2: 41. 1992; Sivar. & P. Mathew, Fl. Nilambur 703. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 497. 2005; Sabu, Zingiberaceae and Costaceae of South India 50. 2006; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 680. 2009. *Alpinia cernua* Sims, Bot. Mag. 44: t. 1900. 1817. *Alpinia spicata* Roxb., Asiat. Res. 11: 356. 1810. *Languas calcarata* (Rosc.) Alston in Trimen, Handb. Fl. Ceylon 6: 282. 1931. *Alpinia erecta* Steud., Nomencl. Bot. (ed. 2) 62. 1840.

Herbs, 1-1.5 m tall. Leaves linear-lanceolate, 10-25 x 2-3 cm, base tapering, apex long acuminate, glaucous below, coriaceous. Panicle terminal, 7-10 cm long; bracts 1 or 2 flowered. Capsule globose; seed angular.

Flowering & Fruiting: January-April.

Distribution: Indo-Malesia. Occasional; in margins of plantations. *RNMK 1550,* Kalpetta.

Alpinia malaccensis (Burm. f.) Rosc., Trans. Linn. Soc. London 8: 345. 1807; Baker in Hook. f., Fl. Brit. India 6: 255. 1820; Fischer in Gamble, Fl. Pres. Madras 1493(1043). 1928; Rao & Verma, Bull. Bot. Surv. India 14: 140. 1972; Manilal, Fl. Silent Valley 309. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 465. 1988; Vajr., Fl. Palghat Dist. 497. 1990; Sabu, Taxonomic Phylogenetic Stud. Zingiberac. 116. 1991; Mangaly & Sabu, Rheedea 2: 45. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 457. 1996; Sivar. & P. Mathew, Fl. Nilambur 704. 1997; Mohanan & Sivad., Fl. Agasthyamala 705. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 497. 2005; Sabu, Zingiberaceae and Costaceae of South India 58. 2006. *Maranta malaccensis* Burm. f., Fl. Ind. 2. 1768. *Costus malaccensis* (Burm.f) Koenig in Retz., Obs. Bot. 3: 71. 1783. *Catimbium malaccensis* (Burm.f.) Holttum, Gard. Bull. Singapore 13: 152. 1950. *Alpinia nutans* Rosc. var. *sericea* Baker in Hook. f., Fl. Brit. India 6: 256. 1892.

Herbs, 2.5-3 m tall. Leaves oblong-lanceolate, 30-60 x 10-12 cm, base narrowed, pubescent below, apex acuminate. Racemes terminal, 40-50 cm long; bracts 1 or 2 flowered. Capsule globose, pubescent.
Flowering & Fruiting: March-April.
Distribution: Indo-Malesia. Occasional; in evergreen forests. *RNMK 1774,* Chanthanathodu.

AMOMUM Roxburgh
Fl. Ind. 1: 317. 1820, *nom. cons.*

Tall herbs, root stalk rhizomatous, perennial, branched. Leafy stem erect. Leaves 2-ranked, oblong-lanceolate; sheath rounded, open; ligule membranous, Flowers densely packed in cylindrical or ovoid spikes, arising directly from the rhizome; spikes sessile or pedunculate; bracts ovate, closely imbricate, carries a single flowers; bracteoles tubular, 2-3-toothed; calyx tubular, 3-lobed; corolla tube cylindric, lobes 3, equal, oblong, obtuse; lip entire or 3-lobed, lateral lobes smaller; stamen with broad filament, anthers divaricating towards the apex, crested or not; ovary 3-celled, ovules many; style slender; stigma sub-globose; hairy. Fruit globose, echinate or ribbed; seeds angular.

1. Peduncles more than 10 cm long; capsule muricate..... **A. muricatum**
1. Peduncles less than 2.5 cm long; capsule echinate ..... **A. cannicarpum**

Amomum cannicarpum (Wight) Benth. ex Baker in Hook.f., Fl. Brit. India 240. 1892; Fischer in Gamble, Fl. Pres. Madras 1487(1039). 1928; Manilal, Fl. Silent Valley 309. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 466. 1988; Vajr., Fl. Palghat Dist. 497. 1990; Sabu, Taxonomic Phylogenetic Stud. Zingiberac. 136. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 458. 1996; Mohanan & Sivad., Fl. Agasthyamala 706. 2002; Sabu, Zingiberaceae and Costaceae of South India 81. 2006. *Elettaria cannicarpa* Wight, Ic. t. 2007. 1853.

Leafy stem 2-3 m high, erect, straight, loosely clumped; rootstock horizontal, much branched, reddish outside, light pink inside. Leaves 40-50 x 6-8 cm, oblong-lanceolate, acuminate, glabrous, nearly sessile, lower leaves smaller; ligule ca. 1 cm long, orbicular, reddish. Spike 1-few, 14-16 cm long, obovoid; peduncles covered with imbricating bracts; basal empty bracts 3-3.5 cm long, ovate, obtuse, formed into sheath at base, reddish brown; bracteoles 2-2.5 cm long, tubular. Flowers one or two in a bract; calyx lobes obtuse; corolla lobes equal, 2-2.5 x 0.8-1 cm, obtuse, glabrous. Capsule 1.5-2 cm across, dark brown.
Flowering & Fruiting: March-May.
Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 3772,* Chandanathode.

Amomum muricatum Bedd., Madras J. Lit. Sci. ser. 3, 1: 59. 1864; Fischer in Gamble, Fl. Pres. Madras 1487(1039). 1928; Ansari, Fl. Kasaragod Div. 376. 1985; Manilal, Fl. Silent Valley 310. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 466. 1988; Sabu, Taxonomic Phylogenetic Stud. Zingiberac. 146. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 458. 1996; Sivar. & P. Mathew, Fl. Nilambur 704. 1997; Mohanan & Sivad., Fl. Agasthyamala 707. 2002; Sabu, Zingiberaceae and Costaceae of South India 88. 2006.

Leafy stem 1.5-3 m high, densely clumped, erect, straight. Leaves 25-30 x 6-7 cm, elliptic-oblong, acuminate, sessile, glabrous; ligule truncate, Spike 2-5-together, 14-15 cm long, shortly peduncled; floral bracts 3-3.5 x 1-1.5 cm, obovate, obtuse, ciliate; yellow with brown lines; bracteoles 2-2.5 cm long, lobes obtuse. Flowers densely packed; calyx tube 2.5-3 cm long, lobes obtuse, cuspidate; corolla tube 2.8-3 cm long, lobes unequal, oblong, obtuse, yellow with red lines; lip deeply 3-lobed, lateral lobes orbicular, yellow, with brown streaks and red glands. Capsule 1.5-2 cm across, brown, muricate.
Flowering & Fruiting: April-July.
Distribution: Endemic to southern Western Ghats. Occasional; in semi-evergreen forests. *RNMK 3452,* Manikkunnumala.

BOESENBERGIA O. Kuntze
Rev. Gen. Pl. 2: 685. 1891.

Boesenbergia pulcherrima (Wall.) O. Ktze., Rev. Gen. Pl. 2: 685. 1891; Mangaly & Swarup., Bull. Bot. Surv. India 23: 235. 1981; Ansari, Fl. Kasaragod Div. 377. 1985; Manilal, Fl. Silent Valley 310. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 467. 1988; Vajr., Fl. Palghat Dist. 498. 1990; Sabu, Taxonomic Phylogenetic Stud. Zingiberac. 186. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 458. 1996; Sivar. & P. Mathew, Fl. Nilambur 706. 1997; Sabu, Zingiberaceae and Costaceae of South India 12. 2006. *Gastrochilus pulcherrimus* Wall., Pl. Asiat. Rar. 1: 22,t.24. 1829; Baker in Hook. f., Fl. Brit. India 6: 217. 1890.

Sub-erect herbs, 15-25 cm long. Leaves few, scattered, 12-13 x 5-6 cm, broadly elliptic, acute at both ends, thinly tomentose beneath; petiole 2-2.5 cm long; sheath saccate. Spike 4-5 cm long, terminal, one sided; bracts obovate, obtuse; bracteoles tubular, deeply cleft to the base. Flowers solitary in each bracts; calyx tube short, truncate; corolla tube ca. 1.5 cm long; white with pink dots, lobes equal, oblong; lip ca. 2 x 1.5 cm, obovate, acute, white with brown spots; lateral staminodes ca. 1 x 0.5 cm obovate; anthers parallel, not crested; ovary 3-celled, oblong; ovules few; style filiform. Fruit an oblong capsule.
Flowering & Fruiting: August-September.
Distribution: Endemic to southern Western Ghats. Occasional; in semi-evergreen forests. *RNMK 3210,* Manikkunnumala.

COSTUS Linnaeus
Sp. Pl. 2. 1753.

Costus speciosus (Koenig) Smith, Trans. Linn. Soc. London 1: 249. 1791; Wight, Ic. t. 2014. 1853; Baker in Hook. f., Fl. Brit. India 6: 249. 1892; Fischer

in Gamble, Fl. Pres. Madras 1490(1041). 1928; Manilal & Sivar., Fl. Calicut 288. 1982; Ansari, Fl. Kasaragod Div. 380. 1985; Manilal, Fl. Silent Valley 311. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 467. 1988; Vajr., Fl. Palghat Dist. 498. 1990; Sabu, Taxonomic Phylogenetic Stud. Zingiberac. 85; Sasidh. & Sivar., Fl. Pl. Thrissur For. 459. 1996; Sivar. & P. Mathew, Fl. Nilambur 707. 1997; Mohanan & Sivad., Fl. Agasthyamala 708. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 497. 2005; Sabu, Zingiberaceae and Costaceae of South India 259. 2006; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 682. 2009. *Banksea speciosa* Koenig in Retz., Obs. Bot. 3: 75. 1783.

Stem 1-2 m tall, fleshy; rhizome horizontal, cylindrical. Leaves spiral, 20-25 x 5-6 cm, oblong, acute, sessile, glabrous. Spike strobilioid, terminal, 8-10 x 5-7 cm; bracts 2.5-3 cm long, oblong, mucronate, bright red. Flowers solitary in each bract, calyx 2-3 cm long, tubular; corolla 3-lobed, pinkish-white; lip 5-6 cm across, orbicular, white with yellow centre, entire; staminal filaments petalloid; anthers parallel. Capsule globose, reddish; seeds few, angled.

Flowering & Fruiting: July-October.

Distribution: Indo-Malesia. Common; in moist deciduous and semi-evergreen forests. *RNMK 3701,* Manikkunnumala; *RNMK 1044*, Pathiri.

CURCUMA Roxburgh

Asiat. Res. 11: 329. 1810, *nom. cons.*

Erect herbs, rootstock perennial, tuberous; roots usually ending in ovoid tubers. Leaves elliptic, ovate or oblong, sometimes appear after flowering; sheath open and clasping the stem; ligule membranous. Inflorescence an erect pedunculate spike with densely packed bracts, arising laterally or from the centre of leaves, fascicled; bracts recurved, terminal few sterile, variously coloured forming a corona. Flowers 2-5 in each bracts; calyx tubular, with short lobes; corolla funnel shaped, 3-lobed; lobes unequal; stamen 1, anthers spurred at base; lip entire or 2-lobed; lateral staminodes petalloid, connate with the broad filaments of stamen; ovary 3-celled, many-ovuled, style 1, slender; stigma 2-lipped, ciliate. Fruit a dehiscent capsule, globose; seeds arillate.

1. Flowering spike lateral, appearing before the leaves 1
1. Flowering spike rising in the centre of a previously formed tuft of leaves 4
2. Rootstock small, white inside ..... **C. neilgherrensis**
2. Rootstock large of large palmately branched tubers, yellow inside 3
3. Root fibres ending in smaller tubers; fertile bracts green tinged with red; flowers yellow ..... **C. zanthorrhiza**
3. Root fibres not ending in small tubers; fertile bracts pale-green; flowers pink .... **C. aromatica**
4. Rootstock small, white inside; tubers stalked..... **C. pseudomontana**
4. Rootstock large, yellow inside; tubers sessile 5
5. Tubers pale-yellow inside; lip elliptic 3-lobed ..... **C. amada**
5. Tubers bright-yellow inside; lip subentire ..... **C. oligantha**

Curcuma amada Roxb., Asiat. Res. 11: 341. 1810; Baker in Hook. f., Fl. Brit. India 6: 213. 1890; Fischer in Gamble, Fl. Pres. Madras 1483(1036). 1928; V.S. Ramach. & V.J. Nair, Fl. Cannanore 467. 1988; Vajr., Fl. Palghat Dist. 499. 1990; Sabu, Taxonomic Phylogenetic Stud. Zingiberac. 206. 1991; Mangaly & Sabu, Rheedea 3: 143. 1993; Sabu, Zingiberaceae and Costaceae of South India 138. 2006.

Erect herbs, 35-45 cm tall. Leaves 25-30 x 10-12 cm, oblong-lanceolate, acuminate, narrowed to the base; petioles 25-30 cm long; bracts 3-4 cm long, greenish white. Flowers 3-4 cm long, bright yellow, in terminal spikes.
Flowering & Fruiting: January-August.
Distribution: India. Common; in moist deciduous forests. *RNMK 1585,* Tholpetty.

Curcuma aromatica Salisb., Parad. Lond. t.96.1807; Baker in Hook. f., Fl. Brit. India 6:216.1890; Gamble, Fl. Pres. Madras 1483(1036). 1928; Manilal & Sivar., Fl. Calicut 286. 1982; Ansari, Fl. Kasaragod Div. 378. 1985; Manilal, Fl. Silent Valley 311.1988; Sabu, Taxonomic Phylogenetic Stud. Zingiberac. 209.1991; Mangaly & Sabu, Rheedea 3: 145. 1993; Mohanan & Sivad., Fl. Agasthyamala 709. 2002; Sabu, Zingiberaceae and Costaceae of South India 141. 2006.

Pseudostem with leaves 90-120 cm high; rhizome orange yellow inside. Leaves 55-65 x 16-20 cm, elliptic, acute at either ends; petiole 25-30 cm long; ligule membranous, obtuse. Spike 15-17 x 6-7 cm; crown purplish blue; bracts 4-5 x 2-3 cm, orbicular or obovate, yellowish green, tomentose. Flowers brownish-yellow; calyx 1.5-2 cm long, lobes obtuse, corolla lobes glabrous, brownish; anthers 4-6 mm long; lip yellowish, 1.5-2 x 1-1.5 cm, shallowly 3-lobed; midlobe emarginated.
Flowering & Fruiting: May-June.
Distribution: India, Sri Lanka and China. Occasional; in degraded forests and plantations. *RNMK 1933*, Kalpetta.

Curcuma neilgherrensis Wight, Ic. t. 2006. 1853: Gamble, Fl. Pres. Madras 1482(1036). 1928; Jose & Sabu, Rheedea 3:160. 1993; Sabu, Zingiberaceae and Costaceae of South India 169. 2006. *Curcuma angustifolia* sensu Dalz. & Gibs., Bombay Fl. 274. 1861, non Roxb.

Rhizomatous herbs; rhizome conical, white inside. Leaves 6-9, 15-18 x 7-8 cm, ovate-elliptic, acute, sparsely pubescent. Inflorescence lateral to 15 cm long; coma oblong-lanceolate, pink; flowers 4-5 cm long, yellow; labellum glandular hairy; style filiform, stigma bilipped; ovary 3-4 mm.
Flowering & Fruiting: April-June.
Distribution: Endemic to Western Ghats. Occasional; in grasslands. *RNMK 3481,* Chembra; *RNMK 1707,* Brahmagiri.

Curcuma oligantha Trimen, J. Bot. 23: 245. 1885; Baker in Hook. f., Fl. Brit. India 6: 215. 1890; V.S. Ramach. & V.J. Nair, Fl. Cannanore 468. 1988; Sabu,

Taxonomic Phylogenetic Stud. Zingiberac. 237. 1991; Mangaly & Sabu, Rheedea 3: 163. 1993; Sabu, Zingiberaceae and Costaceae of South India 174. 2006. *Curcuma cannanorensis* Ansari, V.J. Nair & N.C. Nair , Curr. Sci. 51: 293. 1982; Ansari, Fl. Kasaragod Div. 378. 1985. *Curcuma cannanorensis* Ansari, V.J. Nair & N.C. Nair var. *lutea* Ansari, V.J. Nair & N.C. Nair, Curr. Sci. 51: 294. 1981; Ansari, Fl. Kasaragod Div. 378. 1985. *Curcuma oligantha* Trimen var. *lutea* Bhat, Indian J. For. 10:68. 1987; V.S. Ramach. & V.J. Nair, Fl. Cannanore 468. 1988; Sabu, Taxonomic Phylogenetic Stud. Zingiberac. 241. 1991; Mangaly & Sabu, Rheedea 3: 163. 1993.

Tuberous herbs, 15-20 cm tall; tubers oblong-ellipsoid. Leaves 10-14 x 5-6 cm, ovate, elliptic, oblique at base, acuminate and apiculate; sheaths 6-8 cm long; bracts 2-3 x 1.5-2 cm, lanceolate, obtuse, recurved at apex, green.
Flowering & Fruiting: March-April.
Distribution: South India, Sri Lanka and Myanmar. Occasional; along margins of evergreen forests. *RNMK 3169,* Vythiri.

Curcuma pseudomontana Grah., Cat. Pl. Bombay 210. 1839; Fischer in Gamble, Fl. Pres. Madras 1483(1036). 1928; Manilal & Sivar., Fl. Calicut 287. 1982; Mangaly & Sabu, J. Econ. Tax. Bot. 10: 160. 1987; Vajr., Fl. Palghat Dist. 499. 1990; Sabu, Taxonomic Phylogenetic Stud. Zingiberac. 242. 1991; Mangaly & Sabu, Rheedea 3: 165. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 459. 1996; Sabu, Zingiberaceae and Costaceae of South India 175. 2006. *Curcuma ranadei* Prain, J. Bombay Nat. Hist. Soc. 11: 463. 1898. **Plate 35 l.**

Erect herbs; rhizome small, roots without tubers. Leave 25-30 cm long, oblong, acuminate, base narrowed. Spikes terminal, 10-14 cm long; bracts 4-5 cm long, ovate-oblong; flowers 3-5 cm long, yellow; calyx tube 1.5-2 cm long; corolla lobes lanceolate; lip brodly ovate, 2.5-3 cm long.
Flowering & Fruiting: July-August.
Distribution: Endemic to Peninsular India. Occasional; in grassy areas. *RNMK 1527,* Manikkunnumala.

Curcuma zanthorrhiza Roxb., Fl. Ind. 1: 25. 1820; Sabu, Zingiberaceae and Costaceae of South India 183. 2006. *Curcuma aromatica* auct. non Salisb.: Manilal, Fl. Silent Valley 311. 1988. *Curcuma zedoaria* auct. non (Christm.) Rosc.: Sabu, Taxonomic Phylogenetic Stud. Zingiberac. 251. 1991; Mangaly & Sabu, Rheedea 3:168. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 460. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 498. 2005. **Plate 36a.**

Erect herbs; rhizome orange yellow inside; tubers ellipsoidal. Leafy stem 50-80 cm high. Leaves 30-35 x 12-15 cm, elliptic, acute at both ends, deep blue patches along the midrib on both surfaces; petiole obscure; ligule membranous; sheath round. Spike lateral, 20-22 cm long, with a purple corona; peduncle 8-10 cm long; bracts 4-5 x 3-3.5 cm, obovate, obtusely acute, deep purple at apex, glabrous; crown with acute bracts; calyx 1.2-1.5 cm long, lobes obtuse; corolla lobes apiculate, pale yellow; lip ca. 1.5 x 1.5 cm, orbicular, emarginate.

Flowering & Fruiting: April-July.
Distribution: Cultivated and naturalised in Indo-Malaya. Occasional; in moist deciduous forests. *RNMK 1608,* Muthanga.

GLOBBA Linnaeus
Mant. 2: 170. 1771.

Erect slender herbs, rhizome creeping. Leaves distichous. Flowers in panicles or spikes, terminal on leafy stem, often with bulbils towards base of inflorescence. Calyx funnel-shaped, 3-lobed; corolla tube slender, longer than calyx; lateral staminodes petaloid. Lip linear, twice as long as corolla, deeply bifid, ciliate at apex; stamens with slender long filaments, 2 appendaged; anthers winged or spurred; style filiform, stigma turbinate. Fruit a dehiscent capsule.

1. Anthers with bifid wings; bracts persistent ..... **G. marantina**
1. Anthers not winged; bracts deciduous ..... **G. ophioglossa**

Globba marantina L., Mant. Pl. 2: 170. 1771; Baker in Hook. f., Fl. Brit. India 6: 206. 1890; Sabu, Taxonomic Phylogenetic Stud. Zingiberac. 167. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 462. 1996; Sivar. & P. Mathew, Fl. Nilambur 710. 1997; Sabu, Zingiberaceae and Costaceae of South India 106. 2006. *Globba bulbifera* Roxb., Asiat. Res. 11: 358. 1810; Baker in Hook. f., Fl. Brit. India 6: 206. 1890; Fischer in Gamble, Fl. Pres. Madras 1481(1035). 1928; Manilal, Fl. Silent Valley 312. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 469. 1988; Vajr., Fl. Palghat Dist. 500. 1990. *Globba marantinoides* Wight, Ic. 6: 15. t. 2001. 1853.

Erect rhizomatous herbs; stem 40-50 cm high, usually solitary, stem slender. Leaves bifarious, 17-20 x 4-5 cm, oblong-lanceolate, acute at apex, sessile, glabrous. Spike terminal, 7-10 cm long, often with bulbils towards the base; bracts 1-2 cm long, broadly ovate, greenish; bracteoles ca. 1 cm long, ovate. Flowers solitary in each bracts; calyx 5-6 mm long, funnel shaped, 3-lobed; corolla 1.4-1.6 cm long, tube slender, lobes short, yellow; lip as long as the corolla, deeply 2-lobed, yellow; anthers broadly winged; lateral staminodes oblong; ovary. Capsule oblong, glabrous, coarsely rugose.
Flowering & Fruiting: July-September.
Distribution: Indo-Malesia. Occasional; in moist deciduous forests. *RNMK 1654,* Muthanga; *RNMK 0084*, Tholpetty.

Globba ophioglossa Wight, Ic. 6: 16. t. 2002. 1853; Baker inHook. f., Fl. Brit. India 6: 202. 1890; Fischer in Gamble, Fl. Pres. Madras 1480(1035). 1928; Ansari, Fl. Kasaragod Div. 379. 1985; Manilal, Fl. Silent Valley 313. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 469. 1988; Sabu, Taxonomic Phylogenetic Stud. Zingiberac. 172. 1991; Vajr., Fl. Palghat Dist. 500. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 462. 1996; Sivar. & P. Mathew, Fl. Nilambur 712. 1997; Mohanan & Sivad., Fl. Agasthyamala 710. 2002; Anil Kumar, Sivad. &

N. Ravi, Fl. Pathanamthitta 499. 2005; Sabu, Zingiberaceae and Costaceae of South India 109. 2006.

Erect rhizomatous herbs, stem 55-60 cm tall. Leaves 15-18 x 5-6 cm, linear or ovate-lanceolate, caudate-acuminate, sparsely pubescent beneath. Spikes 7-9 cm long, terminal; corolla yellow, 1.5-2 cm long, tube narrow, lobes ovate-acute; lip obovate; filaments unappendangd.

Flowering & Fruiting: July-September.

Distribution: India to Thailand. Occasional; in evergreen and semi-evergreen forests. *RNMK 1332,* Vythiri; *RNMK 1875*, Manikkunnumala.

HEDYCHIUM Koenig

in Retzius, Observ. Bot. 3: 61. 1783.

Hedychium flavescens Carey ex Rosc., Monandr. t. 50. 1825; Wight, Ic. t. 2008. 1853; Fischer in Gamble, Fl. Pres. Madras 1485(1038). 1928; Manilal & Sivar., Fl. Calicut 288. 1982; Manilal, Fl. Silent Valley 313. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 469. 1988; Vajr., Fl. Palghat Dist. 501. 1990; Sabu, Taxonomic Phylogenetic Stud. Zingiberac. 264. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 462. 1996; Sabu, Zingiberaceae and Costaceae of South India 199. 2006. *Hedychium coronarium* Koenig var. *flavescens* Baker in Hook. f., Fl. Brit. India 6: 226. 1892. *Hedychium subditum* Turrill, Bull. Misc. Inform. Kew 1914: 370. 1914. *Hedychium coronarium* Koenig var. *subditum* (Turrill) Naik & Panigrahi, Bull. Bot. Surv. India 3: 71. 1961.

Perennial herbs withstout rhizome; stem 1-1.5 m high, robust, densely clumped. Leaves 40-50 x 6-8 cm, lanceolate, acuminate at apex, glabrous above; ligule acute, sparsely hairy. Spike 15-17 x 10-11 cm, ovoid; bracts 4-5 x 2-2.5 cm, closely imbricating. Flowers 2-6 in each bracts; calyx 4-4.5 cm long, split along one side; corolla tube 8-9 cm long, narrow, lobes linear oblong, 4-5 cm long, glabrous, filaments 5-6 cm long, narrow, anther curved; lip 5-6 x 5-6 cm, lobes emarginate, sulphur yellow; lateral staminodes 5-6 x 1.5-2 cm, glabrous.

Flowering & Fruiting: August-September.

Distribution: India and Sri Lanka. Occasional; in semi-evergreen forests and rocky grassy slopes. *RNMK 2465,* Chembra; *RNMK 2999*, Manikkunnumala.

ZINGIBER Boehmer apud Ludwig

Def. Gen. Pl. 89. 1760, *nom. cons.*

Rhizomatous perennial herbs. Stem erect, leafy. Leaves elliptic or lanceolate; sheath round clasping the stem; ligule ovate, membranous. Spike cylindrical, on long or short leafless peduncles arising from the rootstock; bracts imbricating. Flowers solitary in each bract; calyx tubular, shortly 2-3-lobed; corolla 3-lobed above; lobes elliptic, concave; stamen 1, filaments broad, short; anthers parallel, connective produced into a linear appendage; lip with short lateral lobes, broadly ovate, ovary 3-celled, ovules many; style slender; stigma cup-shaped. Fruit a 3-loculicidal capsule; seeds arillate.

1. Spikes produced directly from the rootstock..... **Z. roseum**
1. Spikes terminating elongate peduncles 2
2. Plant up to 70 cm long; capsule obovoid, pubescent, red .....**Z. neesanum**
2. Plant up to 1 m long; capsule subglobose, not pubescent, purple..... **Z. montanum**

Zingiber montanum (Koenig) Link ex A.Dietr., Sp. Pl. 1: 52. 1831; Vajr., Fl. Palghat Dist. 501. 1990; Sabu, Zingiberaceae and Costaceae of South India 231. 2006. *Amomum montanum* Koenig in Retz., Observ. Bot. 3: 51. 1783. *Zingiber purpureum* Rosc., Trans. Linn. Soc. London 8: 348. 1807; Ansari, Fl. Kasaragod Div. 379. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 470. 1988; Sabu, Taxonomic Phylogenetic Stud. Zingiberac. 307.1991. *Zingiber cassumunar* Roxb., Asiat. Res. 11: 347. t.5. 1810; Baker in Hook. f., Fl. Brit. India 6: 248. 1892; Fischer in Gamble, Fl. Pres. Madras 1490(1041). 1928.

Erect herbs, up to 1 m tall. Leaves 23-26 x 4-4.5 cm, lanceolate, acute, pubescent beneath; sheath pubescent; bracts 2-2.5 cm long, ovate. Flowers in terminal spikes, 7-10 cm long; calyx pale yellow.

Flowering & Fruiting: April-May.

Distribution: Native of India. Cultivated in tropical Asia. Occasional; in evergreen forests. *RNMK 1110,* Thirunelli.

Zingiber neesanum (Graham) Ramam. in Sald. & Nicols., Fl. Hassan Dist. 769. 1976; Manilal, Fl. Silent Valley 314. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 470. 1988; Sabu, Taxonomic Phylogenetic Stud. Zingiberac. 299. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 463. 1996; Sivar. & P. Mathew, Fl. Nilambur 713. 1997; Mohanan & Sivad., Fl. Agasthyamala 711. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 500. 2005; Sabu, Zingiberaceae and Costaceae of South India 235. 2006. *Alpinia neesiana* Grah., Cat Pl. Bombay 2-7. 1839. *Zingiber macrostachyum* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 4: 342. 1852; Baker in Hook. f., Fl. Brit. India 6: 247. 1892; Fischer in Gamble, Fl. Pres. Madras 1490(1041). 1928. **Plate 36b.**

Annual or perennial herbs. Leafy stem reddish-brown, 40-70 cm high, solitary or 2-4 together, erect. Leaves 25-35 x 3-3.5 cm, elliptic-oblong, acute at base, sessile; ligule 7-8 mm long, ovate. Spikes 20-25 cm long, enlarging in fruit, terete on erect peduncle of 30-35 cm long; floral bracts 3-4 x 1-1.5 cm, obtuse, reddish; flowers solitary in each bract; calyx 2-2.5 cm long, glabrous; corolla tube 2-2.5 cm long, lobes unequal; lip 3-lobed. Capsule 3-4 cm long, ellipsoid, smooth, red inside, 3-valved.

Flowering & Fruiting: July-September.

Distribution: Endemic to Western Ghats. Occasional; in semi-evergreen forests. *RNMK 1524,* Manikkunnumala.

Zingiber roseum (Roxb.) Rosc., Trans. Linn. Soc. London 8: 348. 1807; Baker in Hook.f., Fl. Brit. India 6:244.1892; Fischer in Gamble, Fl. Pres. Madras 1489 (1040). 1928; Ansari, Fl. Kasaragod Div. 380. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 470. 1988; Manilal, Fl. Silent Valley 314. 1988; Vajr., Fl. Palghat

Dist. 501. 1990; Sabu, Taxonomic Phylogenetic Stud. Zingiberac. 310. 1991; Sivar. & P. Mathew, Fl. Nilambur 714. 1997; Sabu, Zingiberaceae and Costaceae of South India 244. 2006. *Amomum roseum* Roxb., Fl. Corom. 2. t.126. 1815.

Erect herbs, leafy stem 70-80 cm tall. Leaves 23-25 x 5-6 cm, oblong-lanceolate, acuminate, sparsely pubescent beneath. Spikes terminal, 8-12 cm long; bracts 5-6 cm long, red, outer one broadly ovate, inner one linear-lanceolate. Flowers 3-3.5 cm long, red

Flowering & Fruiting: October-November.

Distribution: India and Sri Lanka. Occasional; in moist deciduous forests. *RNMK 3489,* Tholpetty; *RNMK 1691*, Nadavayal.

Curcuma longa L., **Elettaria cardamomum** L., **Kaempferia galanga** L., **Kaempferia rotunda** L., and **Zingiber officinale** Rosc. are commercially cultivated in all the areas of the district. **Zingiber zerumbet** (L.) J. E. Smith (**Plate 36e)** and **Hedychium coronarium** Koenig are often grown in gardens and seen in wild as an escape. **Costus pictus** D. Don ex Lindl. is now widely grown in the district as a medicinal plant.

MARANTACEAE Petersen

in Engler & Prantl Nat. Pflanzenfam. 2(6): 33. 1888.

SCHUMANNIANTHUS Gagnepain

Bull. Soc. Bot. France 51: 176. 1904.

Schumannianthus virgatus (Roxb.) Rolfe, J. Bot. 14: 244. 1907; Fischer in Gamble, Fl. Pres. Madras 1494(1043). 1928; Ansari, Fl. Kasaragod Div. 381. 1985; Manilal, Fl. Silent Valley 315. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 471. 1988; Vajr., Fl. Palghat Dist. 502. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 464. 1996; Sivar. & P. Mathew, Fl. Nilambur 717. 1997; Mohanan & Sivad., Fl. Agasthyamala 712. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 501. 2005. *Phrynium virgatum* Roxb., Asiat. Res. 11: 324. 1810. *Maranta virgata* (Roxb.) Wall. ex Wight, Ic. t. 2015. 1853. *Clinogyne virgata* (Roxb.) Benth. in Benth. & Hook. f., Gen. Pl. 3: 651. 1883; Baker in Hook. f., Fl. Brit. India 6: 258. 1892.

Erect shrubs, 3-4 m high; stem thickened at nodes. Leaves bifarious, 35-40 x 15-18 cm, ovate-oblong, cuspidate at apex, rounded at base. Panicle 40-50 cm long, branches slender, dichotomous; bracts 3-5 x 0.4-0.6 cm, lanceolate. Flowers paired in each bract; sepals small; corolla white, tube short; lobes oblong; stamens 1, outer staminodes petalloid, white, 1-1.5 cm long; inner staminodes smaller; ovary densely hairy, 3-celled, solitary in each cell, basal. Berry obovoid, rugose.

Flowering & Fruiting: June-March.

Distribution: South India and Sri Lanka. Common; in evergreen forests. *RNMK 1833,* Talimala; *RNMK 2408*, Thariodu.

Maranta arundinacea L. is often seen in wild as an escape from plantations.

MUSACEAE Juss.

Gen. Pl. 61. 1789.

ENSETE Bruce ex Horan

Prod. Monog. Scitam. 40. 1862.

Ensete superbum (Roxb.) Cheesm., Kew Bull. 1947: 100. 1948; Ansari, Fl. Kasaragod Div. 382. 1985; Vajr., Fl. Palghat Dist. 503. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 465. 1996; Sivar. & P. Mathew, Fl. Nilambur 718. 1997; Mohanan & Sivad., Fl. Agasthyamala 713. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 501. 2005.*Musa superba* Roxb., Pl. Corom. 3: 17. 1811; Wight, Ic. t. 2017. 1853; Baker in Hook. f., Fl. Brit. India 6:261.1892; Fischer in Gamble, Fl. Pres. Madras 1497(1046).1928. **Plate 36d.**

Erect shrubs with unbranched globose leafsheaths formed into a pseudostem of 50-95 cm diam. Leaves spirally arranged, 2.5-3 x 0.7-0.8 m, oblong, entire with channelled midrib; lateral nerves many, parallel from midrib. Spadix 50-90 cm long, with 3-5 spathes at base; bracts several, 16-20 x 12-14 cm, ovate, obtuse, brown. Flowers many on each bracts; unisexual, female flowers towards the base and male flowers above; sepals and 2 petals united into a sheath, 3-4 cm long, 5-lobed; third petals forms into a membranous sheath; stamens 5, perfect, anthers 2-2.5 cm long, linear-oblong, filaments free; ovary 3-celled, inferior; ovules several in each cell; style simple, stigma globose. Fruit oblong; seeds few, subglobose, black.

Flowering & Fruiting: Throughout the year.

Distribution: Endemic to Peninsular India. Occasional; in open rocky areas of evergreenforests and grasslands. *RNMK 0043,* Sughandhagiri; *RNMK 0125*, Palchuram.

Musa paradisiaca L., widely cultivated throughout the district.

HAEMODORACEAE R. Br.

Prodr. 299. 1810.

1. Staminal filaments united into a ring; leaves linear-elliptic, over 2.5 cm broad..... .....**Peliosanthes**
1. Staminal filaments free; leaves narrowly linear, under 1 cm broad.....**Ophiopogon**

OPHIOPOGON Ker-Gawler

Bot. Mag. t. 1063. 1807.

Ophiopogon intermedius D. Don, Prodr. Fl. Nepal. 48. 1825; Hook. f., Fl. Brit. India 6: 269. 1892; Fischer in Gamble, Fl. Pres. Madras 1499(1048). 1928; Manilal, Fl. Silent Valley 321. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 472. 1988; Vajr., Fl. Palghat Dist. 503. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 465. 1996; Mohanan & Sivad., Fl. Agasthyamala 714. 2002. *Ophiopogon indicus* Wight, Ic. t. 2050. 1853.

Densely tufted scapigerous perennial herbs; rootstock rhizomatous. Leaves clustered, 25-40 x 0.5-0.7 cm, linear-oblong, ribbed, narrowed to the base into a petiole. Scape 30-35 cm long. Flowers 4-10 in raceme, pedicel 5-7 mm long; tepals 6, white with pink shades, oblong, obtuse; stamens 6, filaments free, shorter than tepals; anthers sagittate at base; ovary 3-celled, inferior; ovules one in each cell; style one, slender; stigma terminal. Berry 7-9 mm across, globose, glabrous, blue; seeds 1-3, globose or trigonous.
Flowering & Fruiting: July-December.
Distribution: India. Occasional; in evergreen forests. *RNMK 2792,* Brahmagiri.

PELIOSANTHES Andrews
Bot. Repos. 10: t. 605 (1808)

Peliosanthes teta Andr. ssp. **humilis** (Andr.) Jessop, Blumea 23: 155. 1976; Ansari, Fl. Kasaragod Div. 383. 1985; Manilal, Fl. Silent Valley 321. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 472. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 466. 1996; Sivar. & P. Mathew, Fl. Nilambur 721. 1997; Mohanan & Sivad., Fl. Agasthyamala 715. 2002. *Peliosanthes humilis* Andr., Bot. Repos. 10, t. 634. 1808. *Peliosanthes neilgherrensis* Wight, Ic. t. 2052. 1853; Hook. f., Fl. Brit. India 6: 266. 1892; Fischer in Gamble, Fl. Pres. Madras 1498(1047). 1928. *Peliosanthes courtallensis* Wight, Ic. t. 2051. 1853; Hook. f., Fl. Brit. India 6: 266. 1892; Fischer in Gamble, Fl. Pres. Madras 1498(1047). 1928.

Scapigerous perennial herbs; stem solitary or loosely tufted, ca. 5 cm high, erect or oblique, covered with roots. Leaves few, clustered, 30-32 x 8-10 cm, elliptic, acute at either ends, plicate; petiole 35-38 cm long. Racemes 16-20 cm long, many-flowered; bracts 1-1.5 cm long, lanceolate. Flowers purple, many, 6-8 mm across, 1-few in each bract; tepals 6, oblong, connate at base; stamens 6, filaments shorter than tepals, united at base into a ring; ovary 3-celled, ovules paired in each cell; stigma 3-lobed. Berry top-shaped, glabrous, bluish black; seeds 1-3, globose.
Flowering & Fruiting: March-August.
Distribution: Indo-Malesia. Occasional; in evergreen forests. *RNMK 4008,* Chandanathode.

DIOSCOREACEAE R. Br.
Prodr. 294. 1810.

DIOSCOREA Linnaeus
Sp. Pl. 1032. 1753.

Twining shrubs with or without tendrils. Leaves opposite or alternate, simple or palmately 3-5 foliolate, usually ribbed from the base. Flowers unisexual, dioecious, in long or short drooping panicled spikes; male perianth 6-lobed, lobes shortly connate below; stamens 6, free, inserted on the base of the perianth lobes; filaments short, anthers orbicular; female perianth 6-

lobed, lobes free; staminodes 6, 3 or absent; ovary inferior, triquetrous, 3 celled; cell 2-ovuled, styles 3, free, short, stigmas entire or 2-fid. Fruit a 3-valved, 3-winged capsule; seeds compressed, winged.

1. Leaves simple..... 2
1. Leaves 3-7 foliolate 9
2. Stem twining to the left ..... **D. bulbifera**
2. Stem twining to the right 3
3. Stems glabrous 4
3. Stems densely pubescent, woody ..... **D. pubera**
4. Stems winged and angled; axis of male flowers zig-zag ..... **D. hamiltonii**
4. Stems not winged and angled; axis of male flowers not zig-zag 5
5. Leaf veins very prominent 6
5. Leaf veins not prominent..... 7
6. Leaves ovate-lanceolate, base cordate; 7-9 ribbed ..... **D. belophylla**
6. Leaves elliptic or oblong, base rounded; 3-ribbed ..... **D. intermedia**
7. Leaf base rounded or acute; capsule suborbicular..... **D. oppositifolia**
7. Leaf base cordate; capsule otherwise..... 8
8. Tubers growing directly from the base of the stem; stem prickly; male spikes panicled..... **D. wallichii**
8. Tubers arising from a woody knot; stem smooth; male spikes simple ..... **D. wightii**
9. Fertile stamens 6, staminodes 0..... **D. hispida**
9. Fertile stamens 3, staminodes 3.....10
10. Upper leaves simple, white tomentose ..... **D. tomentosa**
10. Upper leaves otherwise, rusty-hairy.....11
11. Stem glabrous, often with axillary bulbils; leaflets 3-5 ..... **D. pentaphylla**
11. Stem sparsely hirsute, without axillary bulbils; leaflets 5-7 ..... **D. kalkapershadii**

Dioscorea belophylla Voigt, Hort. Suburb. Calcutt. 653. 1845; Gamble, Fl. Pres. Madras 1512(1056). 1928. **Plate 36e.**

Stem unarmed, twining to the right, glabrous. Leaves 4-9 x 2-5 cm, simple, ovate-lanceolate apex tapering on an acute point, base cordate; 7-9 ribbed, veins regular, parallel. Spike axillary, 10-15 cm; stamens 6. Capsule 2-3 cm across, suborbicular, broader than long.

Flowering & Fruiting: November-January.

Distribution: India. Rare; in moist deciduous forests. *RNMK 3901,* Mutahnga.

Dioscorea bulbifera L., Sp. Pl. 1033. 1753; Hook. f., Fl. Brit. India 6:296. 1892; Gamble, Fl. Pres. Madras 1511 (1055). 1928(1055); Vajravelu, Fl. Palghat Dist. 507. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 468. 1996; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 692. 2009. *Dioscorea sativa* sensu Hook. f., Fl. Brit. India 6: 295. 1892, non L. 1753. **Plate 36f.**

Stem ridged, twining to left, glabrous. Leaves 12-20 x 7-15 cm, broadly ovate, apex acuminate, 11-ribbed, intercostae parallel; petiole 10-20 cm long; lower leaves much larger, 28-32 cm across. Spike 4-8 cm long, slender,

pendulous, 2-3 together or solitary; peduncle 17-20 cm long, axillary. Flowers distant; bracts lanceolate, subulate at apex; tepels oblong, acute, glabrous; stamens 6, free. Capsule quadrately oblong, 1.5-2 cm across.
Flowering & Fruting: November- January.
Distribution: Paleotropics. Common; in moist deciduous forests. *RNMK 3906,* Muthanga.

Dioscorea hamiltonii Hook.f., Fl. Brit. India 6: 295. 1892; Gamble, Fl. Pres. Madras 1512(1056). 1928; V. S. Ramach. & V. J. Nair, Fl. Cannanore 474. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 468. 1996. **Plate 36g.**

Stem angled, glabrous. Leaves 10-11 x 4.5 cm, ovate or lanceolate, acumiate base truncate or cordate, glabrous,; basally 7-ribbed, intercosate close and suscalariform; petiole 5-6 cm long; male flowers in slender axillary spikes, 8-12 cm long; flowers in verticils; perianth lobes ovate, 1.5-2 mm long, glabrous; stamens 6; female spikes to 2 cm long, rachis stout. Capsule orbicular, obcordate, 2-2.2 x 2.5-3 cm, glabrous.
Flowering & Fruiting: October-December.
Distribution: Indo-Myanmar. Occasional; in moist deciduous forests. *RNMK 3955,* Muthanga.

Dioscorea hispida Dennst., Schluss. Hort. Malab. 33. 1818; Gamble, Fl. Pres. Madras 1511(1055). 1928; Ansari, Fl. Kasaragod Div. 386. 1985; Vajr., Fl. Palghat Dist. 508. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 469. 1996; Sivar. & P. Mathew, Fl. Nilambur 723. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 504. 2005. *Dioscorea daemona* Roxb., Fl. Ind. 3: 805. 1832; Hook. f., Fl. Brit. India 6: 289. 1892. **Plate 36h.**

Stems twining to the left, glabrous. Leaflets subequal, 15-17 x 11-12 cm, obovate, abruptly sharply acuminate at apex, cuneate to the base, shortly petiolulate, ribs 5, prominent intercostae coarsely reticulate, thinly hispid; lateral leaflets gibbous at base; petiole 11-12 cm long. Panicles 40- 45 cm long, axillary; racemes fascicled, shortly peduncled, to 1 cm long. Capsule smooth, oblong.
Flowering & Fruiting: November-January.
Distribution: South and south-east Asia. Occasional; in moist deciduous forests. *RNMK 3910,* Muthanga.

Dioscorea intermedia Thw., Enum. Pl. Zeyl. 326.1864; Hook. f., Fl. Brit. India 6:297.1892; Gamble, Fl. Pres. Madras 1512(1056). 1928. *Dioscorea spicata* Hook.f. in Trimen, Handb. Fl. Ceylon IV: 277.1898, non Roth 1821. **Plate 36i.**

Unarmed palnts, twining to the right; stem terete, glabrous. Leaves alternate, 10-15 x 5-7 cm, 3-ribbed, elliptic or oblong, base rounded, acuminate; petiole 3-4 cm long. Spikes short, axillary. Capsule 2.5-3 cm across, oblong.

Flowering & Fruiting: October-January.
Distribution: South India and Sri Lanka. Rare; in moist deciduous forests. *RNMK 3913,* Muthanga.

Dioscorea kalkapershadii Prain & Burkill, J. Asiat. Soc. Bengal 10:30.1914; Gamble, Fl. Pres. Madras 1512 (1056). 1928.

Large climbers; stem prickly, hirsute. Leaves compound, 20-25 x 8-10 cm, Leaflets 5-7, obovate or elliptic, acuminate, base acute, pubescent below. Spike long, rusty tomentose; fertile stamens 3, staminodes 3. Capsule oblong, glabrous; seeds winged.
Flowering & Fruiting: August-November.
Distribution: Endemic to southern Western Ghats. Rare; in moist deciduous forests and plantations. *RNMK 3923,* Pulpally.

Dioscorea oppositifolia L., Sp. Pl. 1033. 1753; Hook. f., Fl. Brit. India 6: 292. 1892; Gamble, Fl. Pres. Madras 1512(1056). 1928; Ansari, Fl. Kasaragod Div. 386. 1985; Manilal, Fl. Silent Valley 316. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 474. 1988; Vajr., Fl. Palghat Dist. 508. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 469. 1996; Sivar. & P. Mathew, Fl. Nilambur 724. 1997; Mohanan & Sivad., Fl. Agasthyamala 718. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 504. 2005. *Dioscorea oppositifolia* L. var. *linnaei* Prain & Burkill, J. Asiat. Soc. Bengal 10: 30. 1914; Gamble, Fl. Pres. Madras 1512(1056). 1928. *Dioscorea oppositifolia* L. var. *dukhunensis* Prain & Burkill, J. Asiat. Soc. Bengal 10: 30. 1914; Gamble, Fl. Pres. Madras 1512(1056). 1928; Hook. f., Fl. Brit. India 6: 292. 1892. **Fig. 52.**

Stem terete, twining to right, glabrous. Leaves 8-15 x 2-5 cm, opposite, elliptic, ovate or oblong, rounded or acute at base, 3-5 nerved; margins coriaceous; petiole 2-3 cm long. Spike 2-6 cm long, slender, 3-6 together along the peduncle; peduncle 15-20 cm long; bracts lanceolate; male tepals ovate, obtuse; stamens 6; female flowers distant; tepals orbicular, glabrous. Capsule 2-3 cm across, glabrous.
Flowering & Fruiting: September-February.
Distribution: Peninsular India and Sri Lanka. Common; in semi-evergreen forests. *RNMK* 3927, Manikkunnumala.

Dioscorea pentaphylla L., Sp. Pl. 1032. 1753; Hook. f., Fl. Brit. India 6: 281. 1892; Gamble, Fl. Pres. Madras 1511(1056). 1928; Manilal & Sivar., Fl. Calicut 291. 1982; Manilal, Fl. Silent Valley 317. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 475. 1988; Vajr., Fl. Palghat Dist. 508. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 469. 1996; Sivar. & P. Mathew, Fl. Nilambur 725. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 693. 2009; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 504. 2005. *Botryosicyos pentaphyllus* (L.) Hochst., Flora 27: 3. 1844. *Dioscorea pentaphylla* L. var. *communis* Prain & Burkill., J. Asiat. Soc. Bengal 10: 23. 1914; Gamble, Fl. Pres. Madras

1512(1056). 1928; V. S. Ramach. & V. J. Nair, Fl. Cannanore 474. 1988. *Dioscorea pentaphylla* L. var. *linnaei* Prain & Burkill, J. Asiat. Soc. Bengal 10: 23. 1914; Gamble, Fl. Pres. Madras 1511(1056). 1928; V. S. Ramach. & V. J. Nair, Fl. Cannanore 475. 1988. *Dioscorea pentaphylla* L. var. *rheedei* Prain & Burkill, J. Asiat. Soc. Bengal 10: 23. 1914; Gamble, Fl. Pres. Madras 1511(1056). 1928; Vajr., Fl. Palghat Dist. 509. 1990. **Plate 36j.**

Stem twining to the left, terete, glabrous. Leaves 5-foliolate, alternate, middle leaflets larger, 9-10 x 3-4 cm, elliptic, acute at both ends, rusty tomentose or glabrous; petiole 6-7 cm long. Spike 10-30 cm long; bracts minute; female tepals acute, rusty tomentose; male spike slender, panicled; male flowers closely packed; tepals oblong; stamens 3. Capsule 2-2.5 cm, oblique at base, truncate at apex.

Flowering & Fruiting: September-January.

Distribution: Tropical Asia to Pacific. Common; in evergreen forests. *RNMK 3919,* Sughandhagiri.

Dioscorea pubera Bl., Enum. Pl. Jav. 1: 21. 1827. *Dioscorea anguina* Roxb., Fl. Ind. 3:803.1832; Hook. f., Fl. Brit. India 6:293.1872; Gamble, Fl. Pres. Madras 1513(1057). 1928.

Unarmed plants; stem pubescent, twining right. Leaves 7-15 x 3-6, broadly ovate or suborbicular, acuminate, base cordate, pubescent on the nerves below; petioles 2-5 cm long, pubescent. Spikes axillary, pubescent, 20-30 cm long. Capsule subcordate, glabrous.

Flowering & Fruiting: October-January.

Distribution: India, Nepal and Bhutan. Rare; in moist deciduous forests. *RNMK 3936,* Muthanga.

Dioscorea tomentosa Koenig ex Spreng., Pl. Min. Cogn. Pug. 2: 92. 1815; Hook. f., Fl. Brit. India 6: 289. 1892; Gamble, Fl. Pres. Madras 1511(1055). 1928; Manilal & Sivar., Fl. Calicut 291. 1982; Ansari, Fl. Kasaragod Div. 386. 1985; Manilal, Fl. Silent Valley 317. 1988; Vajr., Fl. Palghat Dist. 509. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 469. 1996; Sivar. & P. Mathew, Fl. Nilambur 725. 1997; Mohanan & Sivad., Fl. Agasthyamala 718. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 505. 2005. **Plate 36k.**

Stem twining to the left, terete, tomentose. Leaves 3-foliolate, leaflets subequal, 11-13 x 9-10 cm, broadly ovate, oblique at base, abruptly acuminate; petiole 15-18 cm long. Spikes 20-30 cm long, densely tomentose, distantly flowered fascicles at nodes on long peduncle; female flowers sessile; bracts ca. 4 mm long, ovate; tepals oblong, acute, hairy. Capsule 2-2.5 cm long, oblong, tomentose.

Flowering & Fruiting: October-May.

Distribution: Peninsular India and Sri Lanka. Common; in moist deciduous forests. *RNMK 3966*, Naikuppa.

Dioscorea wallichii Hook. f., Fl. Brit. India 6: 295. 1892; Gamble, Fl. Pres. Madras 1512(1056). 1928; Ansari, Fl. Kasaragod Div. 387. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 475. 1988; Vajr., Fl. Palghat Dist. 509. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 469. 1996; Sivar. & P. Mathew, Fl. Nilambur 726. 1997; Mohanan & Sivad., Fl. Agasthyamala 719. 2002.

Stem twining to the right, smooth or scarcely prickly towards the base. Leaves 10-12 x 11-12 cm, orbicular, bluntly acuminate, widely cordate at base; nerves 12 pairs from the base, glabrous, intercostae parallel; petiole 11-14 cm long. Spikes 7-10 cm long, 3-6 together at nodes on 30-40 cm long peduncle; bracts and bracteoles ovate, acuminate; male tepals ovate, acute; stamens 6. Capsule obovate, 2-3 cm wide.

Flowering & Fruiting: November-January.

Distribution: India, Myanmar and Thailand. Occasional; in moist deciduous forests. *RNMK 3939,* Muthanga.

Dioscorea wightii Hook.f., Fl. Brit. India 6: 291. 1892; Gamble, Fl. Pres. Madras 1512(1056). 1928; Mohanan & Sivad., Fl. Agasthyamala 719. 2002.

Stem slender, terete, twining to right. Leaves simple, 3-6 x 2-5 cm, ovate, acumiate at apex, cordate at base, 5-7 ribbed; male spikes simple, axillary, 3-6 cm long, 1-4 from a node; rachis slender; tepals 6; stamens 6; female spike simple, 6-12 cm long, drooping, lax; ovary 5-6 mm long. Capsule obcordate, 1-2 cm wide.

Flowering & Fruiting: July-November.

Distribution: Endemic to southern Western Ghats. Rare; in moist deciduous forests. *RNMK 3940,* Muthanga.

Dioscorea alata L., and **Dioscorea esculenta** (Lour.) Burkill are widely cultivated throughout the district and often run wild.

SMILACACEAE Vent.

Tabl. Regne Veg. 2: 146. 1799.

SMILAX Linnaeus

Sp. Pl. 1028. 1753.

Climbing shrubs, stem woody or prickly. Leaves alternate, entire, usually 3-many ribbed from base; petiole with tendriliferous stipules on either sides at base. Flowers unisexual, in axillary umbels; peduncles simple or branched; tepals 6, free, petalloid; stamens in male flowers 6, free; pistillode absent; ovary in female flowers 3-celled; ovules 1 or 2 in each cell; stigma 3, sessile, recurved. Fruit a globose berry; seeds 1 or 2, hemispherical.

1. Peduncles to 10 cm long; berry globose ..... **S. wightii**
1. Peduncles to 4 cm long; berry ovoid ..... **S. zeylanica**

Smilax wightii A. DC. in A. & C. DC., Monogr. Phan. 1: 174. 1878; Hook. f., Fl. Brit. India 6: 310. 1892; Fischer in Gamble, Fl. Pres. Madras 1519(1061).

1928; Manilal, Fl. Silent Valley 323. 1988; Mohanan & Sivad., Fl. Agasthyamala 726. 2002.

Branches terete, armed with prickles. Leaves 12-15 x 12-13 cm, broadly ovate, obtuse, cuspidate, cordate at base, 5-ribbed; petiole 1-3 cm long, sheath narrow, flagellate. Peduncle 8-10 cm long; umbels alternate, 2 or 3. Flowers many; pedicels 1.5-2 cm long, ca. 2 cm long in fruit. Berry 6-7 x 6-7 mm, globose.

Flowering & Fruiting: November-May.

Distribution: Endemic to southern Western Ghats. Occasional; in shoal margins. *RNMK 1883,* Kurichiarmala; *RNMK 2228*, Thalimala.

Smilax zeylanica L., Sp. Pl. 1029. 1753; Hook. f., Fl. Brit. India 6: 309. 1892; Fischer in Gamble, Fl. Pres. Madras 1518(1061). 1928; Manilal & Sivar., Fl. Calicut 292. 1982; Ansari, Fl. Kasaragod Div. 389. 1985; Manilal, Fl. Silent Valley 323. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 296. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 478. 1988; Vajr., Fl. Palghat Dist. 511. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 471. 1996; Sivar. & P. Mathew, Fl. Nilambur 730. 1997; Mohanan & Sivad., Fl. Agasthyamala 727. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 507. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 696. 2009. *Smilax macrophylla* Roxb., Fl. Ind. 3: 793. 1832; Hook. f., Fl. Brit. India 6: 310. 1892. *Cari-villandi* Rheede, Hort. Malab. 7:59-60, t.31. 1688.

Branchlets angular. Leaves 10-20 x 3-15 cm, ovate, oblong, orbicular, elliptic or lanceolate, acuminate, acute or obtuse. Umbels solitary or 2-3; peduncle 1-4 cm long; pedicels many, ca. 0.7 cm long. Drupes 7-8 x 5-6 mm, ovoid, acute, glabrous.

Flowering & Fruiting: July-January.

Distribution: Indo-Malesia. Common; along evergreen and semi-evergreen forest margins. *RNMK 1249,* Manikkunnumala.

Agave americana L. is often seen in open areas and along roadsides as an escape (AGAVACEAE).

DRACAENACEAE Salisbury

1. Leaves basal, thick fleshy, base terete or sub terete ..... **Sansevieria**
1. Leaves cauline, coriaceous, flat ..... **Dracaena**

DRACAENA Vandelli ex Linnaeus
Mant. 1: 63. 1767.

Dracaena terniflora Roxb., Fl. Ind. 2:159.1832; Hook. f., Fl. Brit. India 6:328.1892; Fischer in Gamble, Fl. Pres. Madras 1521(1062).1928; Ansari, Fl. Kasaragod Div. 384. 1985; Vajr., Fl. Palghat Dist. 506. 1990; V.S. Ramach. & V.J. Nair, Fl. Cannanore 477. 1988; Manilal, Fl. Silent Valley 323. 1988;

Sasidh. & Sivar., Fl. Pl. Thrissur For. 466. 1996; Sivar. & P. Mathew, Fl. Nilambur 722. 1997; Mohanan & Sivad., Fl. Agasthyamala 725. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 502. 2005. *Dracaena terminalis* Wight, Ic. t. 2054. 1853.

Stout perennial subshrubs; stem covered with annular leaf scars. Leaves spiral, closely packed, 22-24 x 5-5.5 cm, elliptic-lanceolate, acuminate; petiole 5-6 cm long, canaliculate, base expanded. Racemes terminal, 15-25 cm long, erect. Flowers many, closely packed; perianth lobes 6, biseriate, similar, united into a tube below, 2-3 cm long; stamens 6, free, epitepalous; anthers oblong; ovary 3-celled; ovules solitary in each cell; style 1, slender, stigma terminal. Fruit a berry. 1.5-2 cm across, 3-lobed.

Flowering & Fruiting: March-October. *Distribution*: India and South East Asia. Common in evergreen forests. *RNMK 1656* Sugandhagiri.

SANSEVIERIA Thunb.

Prodr. Pl. Cap.: 65 (1794), nom. cons.

Sansevieria roxburghiana Schult. f., Syst. Veg. 7: 357. Fl. 12. 1829; Hook. f., Fl. Brit. India 6: 271. 1892; Fischer in Gamble, Fl. Pres. Madras 1520(1061). 1928; Manilal & Sivar., Fl. Calicut 292. 1982; Binoj., J. Econ. Tax. Bot. 26: 458. 2002.

Stout herbs, stemless; rootstock creeping; leaves linear, deeply concave, channeled, green, transversely marked with a number of darker bars. Scape 40-60 cm; bracts membranous; flowers 4 in a cluster, white, pedicels jointed near the middle; perianth tube slender, lobes 6, narrow; stamens 6; filaments filiform; anthers dorsifixed; ovary 3-celled, ovule solitary in each cell; stigma simple. Seeds 1-3, globose.

Flowering & Fruiting: December-February.

Distribution: Coromandel coast. Occasional; in moist deciduous forests. *RNMK 1599,* Muthanga.

HYPOXIDACEAE R. Br.

in Flinders, Voy. Terra. Austr. 2: 576. 1814.

1. Flowers to 3; stamens perigynous ..... **Curculigo**
1. Flowers more than 5; stamens epigynous..... **Molineria**

CURCULIGO J. Gaertner

Fruct. 1: 63, t. 16, f. 11. 1788.

Curculigo orchioides Gaertn., Fruct. 1: 63. t. 16. f.11. 1788; Roxb., Pl. Corom. T. 13. 1795; Hook. f., Fl. Brit. India 6: 279. 1892; Fischer in Gamble, Fl. Pres. Madras 1502(1050). 1928; Manilal & Sivar., Fl. Calicut 290. 1982; Ansari, Fl. Kasaragod Div. 388. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 273. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 473. 1988; Vajr., Fl. Palghat Dist. 505. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 467.

1996; Sivar. & P. Mathew, Fl. Nilambur 720. 1997; Mohanan & Sivad., Fl. Agasthyamala 716. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 503. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 688. 2009. *Curculigo malabarica* Wight, Ic. t. 2043A.1853. *Nella-pana-kelengu* Rheede, Hort. Malab. 12:111, t.59. 1693.

Perennial herbs; rhizome oblong, 13-15 cm long, vertical. Leaves few, radical, to 13-15 x 1.5-2 cm, subsessile, elliptic-lanceolate, plicate, base sheathing, pilose. Flowers few, in small, axillary, short racemes; scape hidden among leaves underground; perianth yellow, 1.5-2 cm across; tube 3-4 cm long, narrow, sparsely pilose. Ovary villous. Capsule 1-2.5 cm long, ovoid.

Flowering & Fruiting: June-December.

Distribution: Indo-Malesia. Common; in all types of forests. *RNMK* 1710, Muthanga.

MOLINERIA Colla

Mem. Reale Accad. Sci. Torino 31

(Hortus Ripul. App. 2): 331. 1826**.**

Molineria trichocarpa (Wight) Balakr., J. Bombay Nat. Hist. Soc. 63: 330. 1966; Manilal, Fl. Silent Valley 316. 1988; Vajr., Fl. Palghat Dist. 505. 1990; Sivar. & P. Mathew, Fl. Nilambur 721. 1997; Mohanan & Sivad., Fl. Agasthyamala 716. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 503. 2005. *Hypoxis trichocarpa* Wight, Ic. t. 2045. 1853. *Hypoxis latifolia* Wight, Ic. t. 2044. 1853. *Hypoxis leptostachya* Wight, Ic. t. 2045. 1853. *Hypoxis pauciflora* Wight, Ic. t. 2046. 1853. *Molineria finlaysoniana* Baker, J. Linn. Soc. Bot. 17: 121. 1878; Gamble, Fl. Pres. Madras 1502(1049). 1928. *Curculigo finlaysoniana* (Baker) Wall. ex Hook. f., Fl. Brit. India 6: 279. 1892. *Curculigo trichocarpa* (Wight) Bennet & Raizada, Indian J. For. 4: 61. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 467. 1996.

Perennial herbs; rhizome 8-10 cm long, vertical, narrow. Leaves few, 20-30 x 2-6 cm, linear-elliptic, acuminate, glabrous; petiole 20-30 cm long, slender, woody. Racemes axillary, pubescent, 5-10 cm long; flowers 5-15, pedicels ca. 2 cm long, hispid; tepals lanceolate, yellow, hispid; filaments shorter than tepals, glabrous; ovary hispid; style straight, stigma capitate. Berry 2-2.5 x 0.6-0.7 cm, ellipsoidal, irregular; seeds black, longitudinally and closely ribbed, glabrous.

Flowering & Fruiting: August-April.

Distribution: Peninsular India and Sri Lanka. Occasional; in evergreen forests. *RNMK* 1*095,* Chandanathode.

AMRYLLIDACEAE J. St.-Hil.

Expos. Fam. Nat. 1: 134. 1805.

1. Flowers sessile; staminal filaments free..... **Crinum**
1. Flowers pedicelled; staminal filaments basally united .....**Pancratium**

CRINUM Linnaeus

Sp. Pl. 291. 1753.

Stout herbs; rootstock bulbous. Leaves fleshy. Scape solid. Flowers large, in umbels subtended by 2 spathaceous bracts. Perianth funnel or salver shaped, lobes 6; stamens 6, on the throat of the perianth, filaments free, anthers dorsifixed, versatile; ovary 3-celled, ovule few or many in each cell, style filiform, stigma minute. Fruit large, subglobose. Seeds few, testa thick.

1. Perianth salver-shaped, erect, lobes linear ..... **C. viviparum**
1. Perianth funnel-shaped, drooping, lobes oblong..... **C. latifolium**

Crinum latifolium L., Sp. Pl. 291. 1753; Hook. f., Fl. Brit. India 6: 283. 1892; Fischer in Gamble, Fl. Pres. Madras 1504(1051). 1928; Vajr., Fl. Palghat Dist. 504. 1990.

Perennial herbs; rootstock bulbous, 6-8 cm across. Leaves many, densely clustered, 30-45 x 7-8 cm, flat or widely channelled, oblong, curved, acute or obtuse; sheath closed, membranous. Flowers sessile, 12-16 together, on stout peduncled umbel; peduncle 50-60 cm high, thick; spathe membranous; perianth tube 7-8 cm long, narrow, lobes 6, 7-8 x 2-2.5 cm, oblong, acute, pinkish white, spreading or deflexed; stamens 6, filaments long, attached at the throat of perianth tube; anthers 1-1.2 cm long, linear; ovary 3-celled, ovules many, axile; style linear; stigma terminal. Capsule oblong; seeds many.
Flowering & Fruiting: March-June.
Distribution: Indo-Malesia and Africa. Rare; among rocks in grasslands. *RNMK 0985*, Aranamala.

Crinum viviparum (Lamk.) Ansari & V.J. Nair, J. Econ. Tax. Bot. 11: 205. 1987; Ansari, Fl. Kasaragod Div. 387. 1985. *Amaryllis vivipara* Lamk., Encycl. 1: 123. 1783. *Crinum defixum* Ker-Gawl., J. Sci. & Arts 3: 105. 1817; Hook. f., Fl. Brit. India 6: 281. 1892; Fischer in Gamble, Fl. Pres. Madras 1504(1051). 1928; Manilal & Sivar., Fl. Calicut 290. 1982; Joseph, Aquatic Angiosp. Malabar 268. 1991; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 688. 2009. *Crinum ensifolium* Roxb. ex Ker Gawl., J. Sci. Arts (London) 3: 106. 1817; Hook. f., Fl. Brit. India 6: 281. 1892. *Crinum viviparum* (Lamk.) Ansari & V.J. Nair var. *ensifolium* (Roxb.) Ansari & V.J. Nair, J. Econ. Tax. Bot. 11: 205. 1987; Ansari, Fl. Kasaragod Div. 388. 1985. *Crinum defixum* Ker-Gawl. var. *ensifolium* (Roxb.) Baker, Mand. Amaryllid. 76.1888; Fischer in Gamble, Fl. Pres. Madras 1504 (1051). 1928.

Large herbs; bulb ovoid, 3-5 cm across. Leaves linear, deeply channeled, obtuse, 30-50 cm long, margins smooth. Scape from the outer leaf axils, 6-12 flowered; bracts 4-7 cm long; pedicels short; perianth salver shaped, tube slender, lobes 6-9 cm long, linear; filaments shorter than the perianth lobes. Capsule 3-6 cm across.
Flowering & Fruiting: Throughout the year.
Distribution: India and Sri Lanka. Occasional; along stream sides. *RNMK 2996*, Kuruva.

PANCRATIUM Linnaeus

Sp. Pl. 290. 1753.

Pancratium triflorum Roxb., Fl. Ind. 2: 126. 1832; Hook. f., Fl. Brit. India 6: 285. 1892; Fischer in Gamble, Fl. Pres. Madras 1505(1051). 1928; Manilal & Sivar., Fl. Calicut 289. 1982; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 273. 1988; Vajr., Fl. Palghat Dist. 505. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 466. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 501. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 689. 2009. *Pancratium verecundum* Wight, Ic. t. 2023. 1853, non Ait. 1789; Hook. f., Fl. Brit. India 6: 286. 1892. *Cattulli-pola* Rheede, Hort. Malab. 11:77, t. 40. 1692. **Plate 37c.**

Herbs, rootstock a bulb formed by leaf sheaths, 4-5 cm across. Leaves clustered, 25-30 x 2-3 cm, linear-oblong, flat, acute, glabrous; sheath membranous. Flowers umbellate, on 30-35 cm long scape, 3-7 together, covered by a membranous spathe; pedicels 2-3 cm long; perianth funnel-shaped, tube 4-5 cm long, lobes 6, linear-oblong; stamens 6, inserted at the mouth of perianth tube, filaments webbed by membranous white corona; anthers linear; ovary 3-celled, inferior, ovules many, axile, style slender, long. Capsule subglobose; seeds many.

Flowering & Fruiting: March-May.

Distribution: India and Sri Lanka. Occasional; in rocky grassy slopes. *RNMK 1083,* Ambalavayal.

LILIACEAE Juss.

Gen. Pl. 48. 1789.

1. Cladodes present; leaves reduced to spines.....**Asparagus**
1. Cladodes absent; leaves normal 2
2. Climbers; leaf tip tendrilled.....**Gloriosa**
2. Scapigerous herbs; leaf tip not tendrilled 3
3. Undershrubs or stout herbs; flowers trumpet shaped .....**Lilium**
3. Herbs; flowers not trumpet shaped 4
4. Rootstock tuberous.....**Chlorophytum**
4. Rootstock bulbous or corm 6
5. Flowers many, racemose on a simple naked scape .....**Ledebouria**
5. Flowers solitary or few, corymbose; scape with a few leaves ..... **Iphigenia**

ASPARAGUS Linnaeus

Sp. Pl. 313. 1753.

Slender scandent or climbing herbs, roots tuberous; stem green, branchlets reduced to leaf-like green cladodes, acicular. Leaves reduced to minute spinescent scales. Flowers small, in axillary racemes; pedicels jointed; tepals 6, inserted on the bases of perianth lobes; anthers small; ovary 3-celled, ovules 2 or more in each cell; style one, stigmas 3. Fruit a berry, globose, 1-6-seeded.

1. Cladode 3-angled; perianth lobes dull yellow.....**A. racemosus**
1. Cladode flat; perianth lobes white .....**A. gonoclados**

Asparagus gonoclados Baker, J. Linn. Soc. Bot. 14:627.1875; Hook. f., Fl. Brit. India 6:318.1892; Fischer in Gamble, Fl. Pres. Madras 1517(1060). 1928; V.S. Ramach. & V.J. Nair, Fl. Cannanore 476. 1988; Vajr., Fl. Palghat Dist. 510. 1990; Mohanan & Sivad., Fl. Agasthyamala 721. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 505. 2005. *Protasparagus gonocladus* (Baker) Kamble, J.Econ. Tax. Bot. 15: 709. 1991.

Cladodes curved, acuminate, scale-leaf 0.7-1 cm long, lanceolate. Racemes ca. 7 cm long, fascicled; pedicels 0.5-0.7 cm long. Perianth lobes dull yellow, 0.5-0.6 cm long, obovate, obtuse; style very short; stigmas 3, curved. Berry ca. 1 cm across.

Flowering & Fruiting: August-October.

Distribution: Endemic to Western Ghats. Occasional; in moist deciduous forests. *RNMK 3333,* Tholpetty.

Asparagus racemosus Willd., Sp. Pl. 2: 152. 1799; Roxb., Fl. Ind.2.: 151. 1832; Wight, Ic. t. 2056. 1853; Hook. f., Fl. Brit. India 6: 316. 1892; Fischer in Gamble, Fl. Pres. Madras 1517(1060). 1928; Manilal & Sivar., Fl. Calicut 293. 1982; Manilal, Fl. Silent Valley 318. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 470. 1996; Sivar. & P. Mathew, Fl. Nilambur 727. 1997; Mohanan & Sivad., Fl. Agasthyamala 721. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 505. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 694. 2009. *Protasparagus racemosus* (Willd.) Oberm., S. Afr. J. Bot. 2: 244. 1983. *Schada-veli-kelangu* Rheede, Hort. Malab. 10:19-20, t.10. 1690.

Cladodes 3-angled, compressed, curved, 2-7 together; branches angled. Racemes 2-4 cm long; bracts minute, ovate; pedicel 0.4-0.5 cm long; tepals obovate, white. Berry 7-8 mm across, globose, smooth.

Flowering & Fruiting: July-August.

Distribution: Paleotropics. Occasional; in evergreen forests. *RNMK 2888,* Sughandhagiri.

CHLOROPHYTUM Ker-Gawler

Bot. Mag. t. 1071. 1807.

Perennial herbs with tuberous roots; stem absent. Leaves radical, clustered. Flowers in axillary racemes; bracts ovate-lanceolate; chartaceous; perianth lobes 6, petalloid; stamens 6, hypogynous, filaments free, anthers linear-oblong, versatile; ovary 3-celled, ovules 1-many in each cell; style stout; stigma terminal, capitate. Fruit 3-lobed capsules; seeds 3-many.

1. Racemes lax, paniculate..... **C. nimmonii**
1. Racemes dense, unbranched..... 2
2. Scape shorter than the leaves; filaments glabrous..... **C. malabaricum**
2. Scape as long as or longer than the leaves; filaments papillose ..... **C. indicum**

Chlorophytum indicum (Willd. ex Schult. & Schult.f.) Dress, Baileya 9: 43. 1961. *Ornithogalum indicum* Willd. ex Schult. & Schult.f. in Roemer & Schultes, Syst. Veg. 7: 535. 1829. *Phalangium attenuatum* Wight, Ic. t. 2037.

1853. *Chlorophytum attenuatum* (Wight) Baker, J. Linn. Soc. Bot. 15: 332. 1876; Baker in Hook. f., Fl. Brit. India 6: 335. 1892; Fischer in Gamble, Fl. Pres. Madras 1526(1066). 1928; Wight, Ic. t. 2037. 1853; Manilal, Fl. Silent Valley 318. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 476. 1988; Vajr., Fl. Palghat Dist. 510. 1990; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 506. 2005. **Plate 36 l.**

Tufted perennials. Leaves many, 40-50 x 0.7-1 cm, linear-lanceolate, acuminate, glabrous, with a white patch along the midrib. Raceme terminal, 25-30 cm long, slender, unbranched; flowers many, densely packed; bracts ovate, acute, glabrous; perianth lobes white, 7-8 x 2-3 mm, oblong, obtuse, spreading. Capsule 6-7 x 6-7 mm, obovoid, obtusely 3-winged, glabrous; seeds many, orbicular, flat, black.

Flowering & Fruiting: September-December.

Distribution: Endemic to Western Ghats. Common; in evergreenforests. *RNMK 340*6, Manikkunnumala; *RNMK 1744*, Chembra.

Chlorophytum malabaricum Baker, J. Linn. Soc. Bot. 15: 331. 1876; Baker in Hook. f., Fl. Brit. India 6: 335. 1892; Fischer in Gamble, Fl. Pres. Madras 1526(1066). 1928. **Plate 37a.**

Perennial herbs; roots fleshy and tuber like. Leaves radical, clustered, 15-25 cm long. Flowers in terminal racemes, scape shorter than the leaves, dense flowered; perianth segments 3 nerved; anthers shorter than the filaments. Capsule broadly obcordate; 2-5 seeded.

Flowering & Fruiting: July-November.

Distribution: Endemic to Peninsular India. Rare; in rocky slopes of grasslands. *RNMK 0087,* Chembra.

Chlorophytum nimmonii (Grah.) Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 2: 142. 1850; V.S. Ramach. & V.J. Nair, Fl. Cannanore 477. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 471. 1996. *Anthericum nimmonii* Grah., Cat. Pl. Bombay 220. 1839. *Chlorophytum orchidastrum* sensu Baker in Hook.f., Fl. Brit. India 6: 336. 1892p.p., non Lindl. 1824; Fischer in Gamble, Fl. Pres. Madras 1526(1066). 1928; Sivar. & P. Mathew, Fl. Nilambur 728. 1997. *Phalangium oligospermum* Wight, Ic. t. 2038. 1853.

Erect herbs, 50-60 m tall. Leaves 20-25 x 6-7 cm, acute. Flowers 2-2.5 cm long, paired, in 40-50 cm long panicles, terminal; bracts ca. 1 cm long, lanceolate. Capsule 2-lobed, 3 rd lobe aborted.

Flowering & Fruiting: August-November.

Distribution: Peninsular India and tropical Africa. Occasional; in evergreen forests. *RNMK 0819*, Periya Ghat.

GLORIOSA Linnaeus

Sp. Pl. 305. 1753.

Gloriosa superba L., Sp. Pl. 305. 1753; Roxb., Fl. Ind. 2: 143. 1832; Wight, Ic. t. 2047. 1853; Hook. f., Fl. Brit. India 6: 358. 1892; Fischer in Gamble, Fl.

Pres. Madras 1519(1061). 1928; Manilal & Sivar., Fl. Calicut 292. 1982; Ansari, Fl. Kasaragod Div. 389. 1985; Manilal, Fl. Silent Valley 320. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 295. 1988V.S. Ramach. & V.J. Nair, Fl. Cannanore 477. 1988; Vajr., Fl. Palghat Dist. 510. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 471. 1996; Sivar. & P. Mathew, Fl. Nilambur 729. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 507. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 695. 2009. *Mendoni* Rheede, Hort. Malab. 7:107-108. t. 57. 1688.

Climbing herbs, tuber horizontal. Leaves scattered, 17-20 x 3-4 cm, lanceolate, acuminate into a tendril. Flowers axillary, solitary; pedicels 13-15 cm long, reflexed at tip; tepals 6, similar, 6-7 cm long, oblong, petalloid, variegated with uneven margins, yellow at lower half, red above; stamens 6, filaments slender, spreading; anthers versatile; ovary 3-celled, ridged, ovules many; style filiform, deflexed, 3-fid at apex; stigmas 3. Capsule septicidal, many-seeded.

Flowering & Fruiting: July-December.

Distribution: Paleotropics. Occasional; in moist deciduous and semi-evergreen forests. *RNMK 0765*, Manikkunnumala; *RNMK 1151*, Muthanga; *RNMK 3210*, Nadavayal.

IPHIGENIA Kunth

Enum. 4: 212. 1843, *nom. cons.*

Iphigenia indica (L.) A. Gray ex Kunth, Enum. Pl. 4: 213. 1843; Hook. f., Fl. Brit. India 6: 357. 1892; Fischer in Gamble, Fl. Pres. Madras 1528(1067). 1928; Manilal, Fl. Silent Valley 320. 1988; Sivar. & P. Mathew, Fl. Nilambur 729. 1997. *Melanthium indicum* L., Mant. Pl. 2: 226. 1771.

Erect leafy herbs from a globose tuber, 10-25 cm high, stem slender. Leaves 16-18 x 1-1.5 cm, linear-lanceolate, glabrous; sheath closed. Flowers 1-6, in a leafy raceme; bracts lanceolate, 4-5 cm long; pedicel 1-1.5 cm long; tepals 6, lanceolate, brown, spreading; stamens 6, spreading; filaments flattened; anthers oblong; style absent; stigmas sessile, 3, recurved. Capsule 1.3-1.5 x 0.6-0.8 cm, obovoid; seeds many, orbicular, compressed, brown.

Flowering & Fruiting: August-November.

Distribution: Indo-Malesia to Australia. Occasional; in rocky grass slopes. *RNMK 3766,* Manikkunnumala; *RNMK 1689*, Sughandhagiri.

LEDEBOURIA Roth

Nov. Pl. Sp.: 194 (1821).

Ledebouria revoluta (L.f.) Jessop, J. S. African Bot. 36: 255. 1970. *Hyacinthus revolutus* L.f., Suppl. Pl. 204. 1782. *Ledebouria hyacinthina* Roth, Nov. Pl. Sp. 195. 1821. *Scilla hyacinthina* (Roth) Macbr., Contr. Gray Herb. 56: 14. 1918; Ansari, Fl. Kasaragod Div. 389. 1985; Vajr., Fl. Palghat Dist. 511. 1990. *Barnardia indica* Wight, Ic. t. 2041. 1853. *Scilla indica* (Wight) Baker in Sunders, Refug. Bot. 3: 12. 1870, non Roxb. 1832; Hook. f., Fl. Brit. India 6: 348. 1892; Gamble, Fl. Pres. Madras 1527(1067). 1928.

Herbs, bulbous perennial. Leaves 11-15 x 2-3 cm, radical. Scapes to 3, racemes 10-20 cm long, flexuous; peduncle, pink. Flowers 7-8 mm across, perianth deeply six lobed, lobes ca. 4 x 1 mm, oblong, obtuse, pink; pedicel pink, to 1.5 cm long; stamens 6, adnate to the base of the perianth; ovary 3-lobed. Capsule 6-7 x 3-4 mm, globose, loculicidal.
Flowering & Fruiting: January-July.
Distribution: India, Sri Lanka and Arabia. Rare; in moist deciduous forests. *RNMK 1650,* Chedalayam.

LILIUM Linnaeus
Sp. Pl. 302. 1753.

Lilium wallichianum Schult. & Schult. f. var. **neilgherrense** (Wight) Hara in Ohashi, Fl. East. Himal. 3: 132. 1975; Manilal, Fl. Silent Valley 320. 1988. *Lilium neilgherrense* Wight, Ic. tt. 2031, 2032. 1853; Hook. f., Fl. Brit. India 6: 350. 1892; Fischer in Gamble, Fl. Pres. Madras 1523(1064). 1928. *Lilium tubiflorum* Wight, Ic. tt. 2033, 2034. 1853. **Plate 37b.**

Erect unbranched herbs; Leaves scattered, 8-10 x 2-3 cm, lanceolate, sessile, acute at apex, glabrous. Flowers 1-3 together, terminal; pedicel 3-4 cm long, glabrous. Perianth 18-20 cm long, campanulate; lobes 6, ovate, acute, white, lower tubular; stamens 6, filaments 15-16 cm long, free; anthers linear-oblong, versatile; ovary oblong; ovules many; style 15-16 cm long constricted at base; stigma globose or 3-toothed. Capsule 3-valved; seeds many, compressed.
Flowering & Fruiting: October-December.
Distribution: Endemic to southern Western Ghats. Rare; in rocky slopes of grasslands. *RNMK 3406*, Chembra.

Aloe vera (L.) Burm. f. is often seen in open dry areas of the district as an escape from plantations.
Eleutherine bulbosa (Mill.) Urban is often running wild as an escape from garden (IRIDACEAE).

PONTEDERIACEAE Kunth
in Humboldt & *et al.*, Nov. Gen. Sp. 1, ed. 4: 265. 1816.

1. Petioles enlarged to form floats; anthers equal .....**Eichhornia**
1. Petioles not form floats; one anther longer than the rest ..... **Monochoria**

EICHHORNIA A. Richard
in Sagra, Hist. Fis. Cuba 11: 273. 1850.

Eichhornia crassipes (C. Martius) Solms-Laub. in A. DC., Monogr. Phan. 4:527.1883; Fischer in Gamble, Fl. Pres. Madras 1530(1069). 1928; Manilal & Sivar., Fl. Calicut 293. 1982; Ansari, Fl. Kasaragod Div. 390. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 478. 1988; Vajr., Fl. Palghat Dist. 512. 1990; Joseph, Aquatic Angiosp. Malabar 515. 1991; Anil Kumar, Sivad. & N.

Ravi, Fl. Pathanamthitta 508. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 697. 2009. *Pontederia crassipes* Mart., Nov. Gen. Sp. 1: 9. t. 4. 1823.

Aquatic free-floating or rooted herbs. Leaves radical, rosulate, broadly ovate-rhomboid, 5-10 x 4-9 cm, base cuneate, apex obtuse, nerves curved; petiole 6-30 cm long, spongy, swollen about the middle. Inflorescence of terminal spikes; flowers dense, irregular, blue with yellow median blotch; lobes 3+3; stamens 3+3, glandular pubescent; ovary 3-locular; stigma globose. Capsule ovoid, enveloped by perianth; seeds many, ribbed.

Flowering & Fruiting: November-February.

Distribution: South America; now naturalised in the Paleotropics. Common; in water boddies. *RNMK 0763*, Panamaram.

MONOCHORIA K. B. Presl

Rel. Haenk. 1: 127. 1827.

Monochoria vaginalis (Burm. f.) Presl, Reliq. Haenk. 1:128.1827; Fischer in Gamble, Fl. Pres. Madras 1529(1068). 1931; Manilal & Sivar., Fl. Calicut 293. 1982; Ansari, Fl. Kasaragod Div. 390. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 314. 1988V.S. Ramach. & V.J. Nair, Fl. Cannanore 479. 1988; Vajr., Fl. Palghat Dist. 512. 1990; Joseph, Aquatic Angiosp. Malabar 517. 1991; Sivar. & P. Mathew, Fl. Nilambur 731. 1997; Mohanan & Sivad., Fl. Agasthyamala 727. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 508. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 697. 2009. Pontederia vaginalis Burm. f., Fl. Ind. 80. 1768. *Carim-gola* Rheede, Hort. Malab. 11:91-92, t.44. 1692.

Marshy herbs; stems erect. Leaves few to several, lamina 5-6 x 3-4 cm, ovate, acute at apex, cordate to hastate at base; petiole 25-30 cm long. Flowers in racemes from upper nodes of emergent stems; bracts 1-1.5 cm long, lanceolate; perianth lobes 6, free, similar, petalloid, blue, ca. 1.5 cm long; stamens 6, one larger than others; anthers oblong; ovary ellipsoid; ovules many; style 1, filiform. Capsule 7-8 x 5-6 mm, oblong; seeds many, ribbed, dull brown.

Flowering & Fruiting: July-November.

Distribution: India to China, Malesia and Japan. Common; in marshy fields. *RNMK 1185*, Panamaram; *RNMK 1807*, Kottathara.

XYRIDACEAE C. Agardh

Aphorb. Bot. 158. 1823.

XYRIS Linnaeus

Sp. Pl.: 42 (1753)

Xyris pauciflora Willd., Phytogr. 1: 2, t.1. f.1. 1794; Hook. f., Fl. Brit. India 6: 365. 1892; Fischer in Gamble, Fl. Pres. Madras 1532(1070). 1928; Manilal & Sivar., Fl. Calicut 294. 1982; Ansari, Fl. Kasaragod Div. 391. 1985; Manilal,

Fl. Silent Valley 324. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 480. 1988; Joseph, Aquatic Angiosp. Malabar 526. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 472. 1996; Sivar. & P. Mathew, Fl. Nilambur 731. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 508. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 698. 2009.

Scapigerous herbs. Leaves 8-12 x 0.3-0.4 cm, linear, acuminate, pappillose. Scape 7-10 cm long, finely striate; heads ca. 0.7 cm across, globose or ovoid; bracts orbicular, brown, margins yellowish brown. Flowers yellow; sepals 3, obovate; petals 3, connate at base forming an elongated tube; stamens 3, alternating with petals, filiform. Capsule 3 valved, oblong.

Flowering & Fruiting: August-October.

Distribution: Indo-Malesia to Australia. Common; in swampy areas in moist deciduous forests. *RNMK 1209,* Thirunelli.

COMMELINACEAE R. Br.

Prodr. 268. 1810.

1. Epiphytic herbs; branchlets prostrate ..... **Belosynapsis**
1. Terrestrial herbs; branchlets erect 2
2. Flowers enclosed in spathes or bracteoles 3
2. Flowers not enclosed in spathes or bracteoles 4
3. Bracteoles in closely imbricating pairs; stamens 6 ..... **Cyanotis**
3. Bracteoles absent; stamens 3..... **Commelina**
4. Inflorescence dense; fertile stamens 6 ..... **Floscopa**
4. Inflorescence lax; fertile stamens 3 5
5. Flowers second; fruit indehiscent..... **Pollia**
5. Flowers not second; fruit dehiscent.....6
6. Panicle long peduncled, to 20 cm; flowers regular ..... **Dictyospermum**
6. Panicle shortly peduncled, to 5 cm; flowers irregular ..... **Murdannia**

BELOSYNAPSIS Hasskarl

Flora 4: 259. 1871.

Belosynapsis vivipara (Dalz.) Fischer, Bull. Misc. Inform. Kew 1928: 252. 1928 & Gamble, Fl. Pres. Madras 1551(1082). 1931; Manilal, Fl. Silent Valley 324. 1988; Vajr., Fl. Palghat Dist. 515. 1990; Mohanan & Sivad., Fl. Agasthyamala 732. 2002; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 36. 2009. *Cyanotis vivipara* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 226. 1851; Hook. f., Fl. Brit. India 6: 388. 1892.

Epiphytic herbs with creeping branches; 5-15 cm high; stem hirtus. leaves basal and cauline, basal larger, 8-10 x 1-1.5 cm, oblong-lanceolate, densely villous below, glabrous above; sheath tubular, densely hairy. Cymes sessile, few, along the creeping branches; bracteoles absent; flowers few together; sepals 3, free, elliptic, acute, hairy; petals 3, free, obovate, acute, pink; stamens 6, filaments beard; ovary obovate, hairy, 3-celled, 2-ovules in each cell. Capsule 6-seeded.

Flowering & Fruiting: August-December.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3206,* Kurichiarmala.

COMMELINA Linnaeus
Sp. Pl. 40. 1753.

Erect or procumbent herbs, usually rooting from lower nodes; stem fleshy, terete. Leaves ovate to lanceolate, sessile or petioled; sheath tubular, closed. Cymes peduncled, solitary or 2-5 together, usually terminal, 2-3-branched; bract funnel-shaped or complicate; bracteoles minute or absent. Flowers zygomorphic; sepals 3, free or connate at base, obovate to oblanceolate, glabrous; petals 3, orbicular, clawed, two larger and one smaller; stamens 3, free, filaments glabrous; anthers usually unequal; staminodes 2-3, 3-4-lobed; lobes globular; ovary oblong, 2 or 3-celled, each with 1-2 ovules; style coiled; stigma terminal. Fruit a septicidal capsule, 2-3-celled, each cell with 1-2 seeds; seeds pitted or smooth.

1. Fruit indehiscent ..... **C. indehiscens**
1. Fruit dehiscent 2
2. Spathe distinctly stalked 3
2. Spathe sessile ..... **C. paludosa**
3. Stem glabrous; spathe ovate or ovate-lanceolate, base cordate ..... **C. diffusa**
3. Stem pubescent; spathe funnel shaped ..... **C. benghalensis**

Commelina benghalensis L., Sp. Pl. 41. 1753; Hook. f., Fl. Brit. India 6: 370. 1892; Fischer in Gamble, Fl. Pres. Madras 1539(1075). 1931; V.S. Ramach. & V.J. Nair, Fl. Cannanore 481. 1988; Vajr., Fl. Palghat Dist. 516. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 473. 1996; Manilal & Sivar., Fl. Calicut 297. 1982; Sivar. & P. Mathew, Fl. Nilambur 734. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 511. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 702. 2009.

Stem creeping or erect, pubescent. Leaves 4-5 x 2-2.5 cm, ovate, acute or obtuse, rounded at base; sheath ca. 1 cm long, mouth with red bristles. Spathe ca. 1 x 1.5 cm, hairy; flowers 1-1.2 cm across; sepals 3-4 mm long, obovate, red-glandular; petals 5-6 mm long, blue; stamens 3, filaments glabrous; staminodes 2; ovary with two-ovuled 2 cells and one-ovuled 1 cell. Capsule 3-celled, seeds 4-5, oblong, smooth, brown.
Flowering & Fruiting: July-November.
Distribution: Africa, India, China, Japan and Malesia. Common; in moist deciduous and semi-evergreen forests, also in plantations. *RNMK 2069*, Muthanga; *RNMK 0163*, Manikkunnumala.

Commelina diffusa Burm. f., Fl. Ind. 18.1768; Manilal & Sivar., Fl. Calicut 298. 1982; Ansari, Fl. Kasaragod Div. 393. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 481. 1988; Vajr., Fl. Palghat Dist. 516. 1990; Sasidh. & Sivar.,

Fl. Pl. Thrissur For. 474. 1996; Mohanan & Sivad., Fl. Agasthyamala 733. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 512. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 703. 2009.

Diffuse or procumbent herbs; stems reddish, glabrous. Leaves 6-9 x 0.8-1.2 cm, lanceolate, acute, rounded at base; margin scabrid; sheath tubular, ca. 2 cm long, mouth ciliate, covered with red glands. Peduncle terminal, ca. 4 cm long; spathe 2.5-3 x 1.2-1.4 cm, ovate, cordate at base, margin ciliate; branches of cymes puberulus. Flowers 3-together; sepals 5-6 x 2-2.5 mm, free, red-glandular; petals 4-5 x 2-3 mm, blue with red glands; stamens 3, one anther longer, filaments glabrous; ovary oblong, pubescent, 3-celled. Seeds reticulate.
Flowering & Fruiting: July-September.
Distribution: Pantropical. Common; in open areas. *RNMK 2647*, Kalpetta; *RNMK 1361*, Tholpetty.

Commelina indehiscens Barnes, J. Bombay Nat. Hist. Soc. 46: 74. 1946; V.S. Ramach. & V.J. Nair, Fl. Cannanore 482.1988; Vajr., Fl. Palghat Dist. 516.1990.

Much branched prostrate herbs, 35-40 cm long. Leaves 5-6 x 1.5-2 cm, ovate to broadly lanceolate, acute or acuminate, rounded at base, bulbous based hairy; sheaths 1.5-2 cm long. Capsule 2-2.5 cm long, subglobose.
Flowering & Fruiting: November-January.
Distribution: Endemic to Peninsular India. Occasional; in semi-evergreen forests. *RNMK 1359,* Manikkunnumala.

Commelina paludosa Bl., Enum. Pl. Jav. 1:2.1827; V.S. Ramach. & V.J. Nair, Fl. Cannanore 482.1988; Manilal, Fl. Silent Valley 325.1988; Vajr., Fl. Palghat Dist. 517. 1990; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 512. 2005. *Commelina obliqua* Buch.-Ham. ex D.Don, Prodr. Fl. Nepal. 45. 1825, nom. illeg.; Hook. f., Fl. Brit. India 6: 372.1892; Fischer in Gamble, Fl. Pres. Madras 1539(1075). 1931. *Commelina polyspatha* Wight, Ic. Pl. Ind. Or. t. 2066. 1853.

Stout herbs, 35-45 cm tall. Leaves 12-15 x 3.5-4 cm, lanceolate or elliptic-lanceolate, acute or caudate-acuminate; sheaths 1.5-2 cm long, mouth bearded with rufous hairs. Spathes 2-3 cm long, solitary, funnel shaped, terminal; flowers blue. Capsule obovoid; seeds cylindric, smooth.
Flowering & Fruiting: November-December.
Distribution: Himalayas and India. Common; in evergreen forests. *RNMK 1448,* Chanthanathodu; *RNMK 3165*, Sughandhagiri.

CYANOTIS D. Don

Prodr. Fl. Nepal. 45. 1825, *nom. cons.*

Diffused or decumbent herbs with branched fleshy stem, rooting from the lower nodes. Leaves basal or cauline, ovate, lanceolate to linear, usually folded; sheath tubular or saccate, closed. Flowers in peduncled scorpioid cymes, axillary or terminal; bracts leafy, falcate smaller or larger than the cymes; bracteoles in two imbricating rows, ovate-falcate, acute, striate.

Flowers bisexual, regular; sepals 3, elliptic or lanceolate, free or connate below; petals 3, united into a tube, lobes spreading; stamens 6, filaments free, bearded on upper part; anthers oblong, dorsifixed; ovary obovate-oblong, pilose on upper half, 3-celled; ovules 2 in each cell; style -1 slender; stigma terminal, fusiform. Capsule oblong, loculicidal, 3-valved; seeds 2 in each cell, rarely one, rugose or pitted.

1. Inflorescence covered by leaf sheaths ..... **C. axillaris**
1. Inflorescence not covered by leaf sheaths 2
2. Flowers rose purple..... **C. cerifolia**
2. Flowers blue 3
3. Glabrous herbs; cymes solitary, deeply recurved..... **C. cristata**
3. Pubescent herbs; cymes clustered, straight or obscurely recurves..... .**C. pilosa**

Cyanotis axillaris (L.) D. Don, Prodr. Fl. Nepal. 46.1825; Hook. f., Fl. Brit. India 6:388.1892; Gamble, Fl. Pres. Madras 1550(1082). 1931. *Commelina axillaris* L., Sp. Pl. 42. 1753. *Tonningia axillaris* (L.) O. Ktze., Rev. Gen. Pl. 2: 722. 1891; V. S. Ramach. & V. J. Nair, Fl. Cannanore Dist. 488. 1988; Vajr., Fl. Palghat Dist. 524. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 478. 1996; Sivar. & P. Mathew, Fl. Nilambur 741. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 710. 2009. *Amischophacelus axillaris* (L.) Rao & Kammathy, J. Linn. Soc. Bot. 59. 306. 966; Manilal & Sivar., Fl. Calicut 299. 1982; Ansari, Fl. Kasaragod Div. 393. 1985; N. Mohanan & Sivad., Fl. Agasthyamala 729. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta Dist. 509. 2005.

Annuals, stems procumbent, terete, glabrous, succulent. Leaves 5-6 x 0.4-0.6 cm, lanceolate, acute to acuminate, glabrous; sheath closed, saccate, glabrous. Flowers axillary, solitary or 2-3 together, sessile, 6-8 mm across; sepals oblanceolate, base united, acute, keel winged and ciliate; petals united; lobes triangular, acute, bluish violet; stamens 6, filaments free, bearded at the tip; ovary oblong, densely hairy towards the apex. Capsule oblong, beaked, 3-celled; seeds 3 in each cells, oblong with scar at one end, pitted, dark brown.
Flowering & Fruiting: November-February.
Distribution: Indo-Malesia to Australia. Common; in evergreen forests. *RNMK 2506,* Chembra.

Cyanotis cerifolia Rao & Kammathy, J. Linn. Soc. Bot. 59: 306. 1966; V.S. Ramach. & Nair in J. Econ. Tax. Bot. 3: 660. 1982; V.S. Ramach. & V.J. Nair, Fl. Cannanore 483. 1988.

Prostrate, tomentose herbs, 40-50 cm tall; rooting at lower nodes. Leaves 4-5 x 2-3 cm, ovate-lanceolate, obtuse to subacute, densely pubescent; sheaths 2-3 cm long; bracts ovate, 2.5-3 cm long. Flowers rose purple.
Flowering & Fruiting: December-March.
Distribution: Endemic to southern Western Ghats. Occasional; in rocky slopes of evergreen forests margins. Common; in evergreen forests. *RNMK 1040,* Chembra.

Cyanotis cristata (L.) D. Don, Prodr. Fl. Nepal. 46. 1825; Hook. f., Fl. Brit. India 6: 385. 1892; Fischer in Gamble, Fl. Pres. Madras 1549(1081). 1931; Manilal & Sivar., Fl. Calicut 298. 1982; V.S. Ramach. & V.J. Nair, Fl. Cannanore 483. 1988; Vajr., Fl. Palghat Dist. 519. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 475. 1996; Sivar. & P. Mathew, Fl. Nilambur 736. 1997; Mohanan & Sivad., Fl. Agasthyamala 736. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 513. 2005 ; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 704. 2009. *Commelina cristata* L., Sp. Pl. 42. 1753.

Herbs; stem erect or decumbent, glabrous or pubescent on one side. Leaves 2-5 x 1-2 cm, ovate, acute or obtuse, cauline, cordate at base, ciliate along the margins, often reddish; sheath closed. Cymes 15-30-flowered, curved; bracts 2-5 x 1-2 cm, ovate, acute; bracteoles 1-1.5 cm long, falcate, glabrous or ciliate along the margins. Flowers sessile; sepals 4-5 mm long, oblanceolate, keeled; keel winged and ciliate; corolla tubular, tube ca. 1 cm long, lobes obtuse; filaments 1-1.2 cm long, bearded. Capsule glabrous with few apical hairs; seeds striate, with two pits on two faces, brownish black.

Flowering & Fruiting: July-October.

Distribution: Paleotropics. Common; in moist deciduous forests. *RNMK 3206*, Muthanga; *RNMK 3180*, Kuruva.

Cyanotis pilosa Schult. f., Syst. Veg. 7: 1155. 1830; Hook. f., Fl. Brit. India 6: 387. 1892; Fischer in Gamble, Fl. Pres. Madras 1549(1081). 1931; V.S. Ramach. & V.J. Nair, Fl. Cannanore 483. 1988; Vajr., Fl. Palghat Dist. 520. 1990; Mohanan & Sivad., Fl. Agasthyamala 737. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 514. 2005. *Tonningia pilosa* (Schult.f.) Kuntze, Rev. Gen. Pl. 2: 722. 1891. *Cyanotis wightii* Clarke in A. & C. DC., Monogr. Phan. 3: 250. 1881; Hook. f., Fl. Brit. India 6: 386. 1892. *Cyanotis longifolia* Wight, Ic. t. 2084. 1853.

Creeping herbs, 40-45 cm tall. Leaves 5-8 x 1.5-2 cm, linear or elliptic-lanceolate, base sub cordate, pubescent beneath; bracts 1-1.5 cm long, ovate-lanceolate. Flowers in terminal cymes, purplish; filament bearded. Capsule 3-4 mm long; seeds pyramidal, pitted.

Flowering & Fruiting: November-December.

Distribution: Peninsular India and Sri Lanka. Occasional; along the margins of evergreen forests. *RNMK* 0214, Chanthanathodu; *RNMK 0156*, Kunchome.

DICTYOSPERMUM Wight

Ic. 6: 29, tt. 2069 & 2071. 1853.

Annuals or perennials, erect or sub-scandent herbs. Leaves elliptic or lanceolate, none clustered at the base; sheath tubular. Panicle always terminal; branches usually hairy; flowers solitary or 2-3 together, regular; sepals ovate or oblong, obtuse at apex, 3-nerved; petals obovate, obtuse or rounded at apex, 9-11-nerved, glabrous; stamens 3, free or basely united, filaments glabrous, anthers oblong, obtuse, connective broad, staminodes

present or absent; ovary trigonous; style 1, linear; stigma terminal. Capsule broadly ellipsoid or globose, 3-celled; seeds solitary in each cell, planoconvex, rugose.

1. Leaves crowded below the panicle ..... **A. montanum**
1. Leaves scattered ..... **A. ovalifolium**

Dictyospermum montanum Wight, Ic. t. 2069. 1853; V.S. Ramach. & V.J. Nair, Fl. Cannanore 484. 1988. *Aneilema montanum* (Wight) Thw., Enum. Pl. Zeyl. 322. 1864; Hook. f., Fl. Brit. India 6:382.1892; Fischer in Gamble, Fl. Pres. Madras 1546(1079). 1931; Vajr., Fl. Palghat Dist. 513. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 472. 1996; Mohanan & Sivad., Fl. Agasthyamala 730. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 510. 2005.

Erect or subscandent herbs. Stems 30-70 cm long, glabrous. Leaves 15-18 x 3.5-4 cm, clustered towards the apex, elliptic-lanceolate, scabrid above; sheath 2-2.5 cm long, pubescent on one side; mouth truncate. Panicle very lax, 25-30 cm long; branches pubescent. Flowers 6-7 mm across, solitary, pedicelled; sepals oblong, obtuse, glabrous; petals white obovate, obtuse; filaments 4-5 mm long, glabrous. Capsule globose; seeds planoconvex, rugose, brown.

Flowering & Fruiting: July-October.

Distribution: Endemic to Peninsular India. Occasional; in evergreen forests. *RNMK 3036*, Sughandhagiri; *RNMK 1268*, Chanthanathodu.

Dictyospermum ovalifolium Wight, Ic. t. 2070. 1853; V.S. Ramach. & V.J. Nair, Fl. Cannanore 484. 1988. *Aneilema ovalifolia* (Wight) Hook.f. ex Clarke in A. & C. DC., Monogr. Phan. 3: 218. 1881; Hook. f., Fl. Brit. India 6: 328. 1892; Fischer in Gamble, Fl. Pres. Madras 1546(1079). 1934; Vajr., Fl. Palghat Dist. 514. 1990; Sivar. & P. Mathew, Fl. Nilambur 733. 1997; Mohanan & Sivad., Fl. Agasthyamala 731. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 510. 2005.

Herbs; erect or decumbent at base. Leaves 12-15 x 4-5 cm, scattered and upper ones verticillate, usually sessile, elliptic, acuminate, base acute, glabrous; sheath 2-3 cm long, glabrous; mouth oblique. Panicle pyramidal, congested; branches and pedicels recurved, puberulus; flowers in a group of 3-6; sepals obovate, obtuse, glabrous; petals pale blue with red nerves; stamens 3, filaments naked. Capsule globose.

Flowering & Fruiting: October-December.

Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 1225*, Chembra; *RNMK 2563*, Chanthanathodu.

FLOSCOPA Loureiro

Fl. Cochinch. 192. 1790.

Floscopa scandens Lour., Fl. Cochinch. 193. 1790; Hook. f., Fl. Brit. India 6: 390. 1892; Fischer in Gamble, Fl. Pres. Madras 1522(1083). 1931; Ansari, Fl.

Kasaragod Div. 394. 1985; Manilal, Fl. Silent Valley 326. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 485. 1988; Vajr., Fl. Palghat Dist. 521. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 475. 1996; Sivar. & P. Mathew, Fl. Nilambur 737. 1997; Mohanan & Sivad., Fl. Agasthyamala 737. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 514. 2005. *Dithyrocarpus rothii* Wight, Ic. t. 208. 1839.

Creeping or suberect marshy herbs; stem terete, pubescent along one line. Leaves scattered, 5-10 x 1-1.5 cm, elliptic-lanceolate, acuminate, acute at base, glabrous; sheath tubular, mouth oblique, hairy. Panicle 3-6 cm long; axis and branches pubescent; flowers many, 3-5 mm across, regular, bisexual; sepals ovate, pubescent; petals obovate, glabrous, rose coloured; stamens 6, filaments free, glabrous; anthers small, obtuse, with broad connective; ovary 3-celled; ovule solitary in each cell. Capsule broadly ovoid; seeds elliptic, wrinkled, grey.

Flowering & Fruiting: January-April.

Distribution: Indo-Malesia. Occasional in marshy areas in evergreen and moist deciduous forests. *RNMK 2687,* Vythiri; *RNMK 4114*, Tholpetty.

MURDANNIA Royle

Ill. Bot. Himalayan Mts. t. 95. 1839, *nom. cons.*

Erect or decumbent herbs, rooting from the base or near the base. Stem terete, solitary or loosely tufted. Leaves basal or cauline, ovate, elliptic, oblong, or linear-oblong, rounded or cordate at base; sheath tubular, with an oblique or split mouth. Panicles axillary or terminal or the flowers solitary; bracts and bracteoles not prominent; flowers regular, pedicelled, sepals 3, free, elliptic to oblong; petals 3, free, obovate, obtuse; stamens 2-3, filaments densely hairy or glabrous; anthers oblong; staminodes 3-4, usually 3-lobed; ovary ellipsoid, glabrous, 3-celled; ovules 2-few in each cell; style-1; slender, glabrous; stigma terminal. Capsule ellipsoid to oblong, usually beaked, glabrous, usually 3-celled; seeds 2-few in each cell, cubical to cylindrical, smooth, rugose or pitted.

1. Flowers dull yellow when fresh.....**M. lanuginose**
1. Flowers blue or white when fresh.....2
2. Seeds 1-seriate in each cell; mouth of the sheath oblique .....**M. dimorpha**
2. Seeds 2 or more seriate in each cell; mouth of the sheath not oblique.....3
3. Leaves amplexicaule at base; stamens 2 .....**M. nudiflora**
3. Leaves ovate at base; stamens 3 .....**M. japonica**

Murdannia dimorpha (Dalz.) Brueck. in Engl. & Prantl, Naturl. Pflanzenf. (ed. 2) 15a: 173. 1930; Manilal & Sivar., Fl. Calicut 296. 1982; Ansari, Fl. Kasaragod Div. 395. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 485. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 476. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 515. 2005. *Aneilema dimorpha* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 138. 1851; Hook. f., Fl. Brit. India 6: 377. 1892;

Fischer in Gamble, Fl. Pres. Madras 1545(1078). 1931. *Aneilema paniculata* Wight, Ic. t. 2075. 1853.

Erect annuals, stems 25-30 cm high, pubescent. Leaves 7-8 x 0.6-0.7 cm, lanceolate, acute at apex, cordate at base, glandular below, thinly pubescent above; sheath open, minutely hairy, pink. Cymes panicled, terminal; peduncle 5-8 cm long. Flowers 8-9 mm across; pedicel ca. 7 mm long, slender; sepals ovate, acute; petals obovate, glabrous; stamens 3, filaments bearded; staminodes 3-lobed, filaments naked. Capsule oblong, glabrous; seeds cubical, pitted.
Flowering & Fruiting: July-September.
Distribution: Peninsular India and Sri Lanka. Occasional; in semi-evergreen forests. *RNMK 2653,* Manikkunnumala; *RNMK 0199*, Thirunelli.

Murdannia japonica (Thunb.) Faden, Taxon 26: 142. 1977; V.S. Ramach. & V.J. Nair, Fl. Cannanore 486. 1988; Vajr., Fl. Palghat Dist. 522. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 476. 1996; Sivar. & P. Mathew, Fl. Nilambur 738. 1997; Mohanan & Sivad., Fl. Agasthyamala 739. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 516. 2005. *Commelina japonica* Thunb., Trans. Linn. Soc. London 2: 332. 1794. *Aneilema lineolatum* Kunth, Enum. Pl. 4: 69. 1843; Hook. f., Fl. Brit. India 6: 370. 1892; Fischer in Gamble, Fl. Pres. Madras 1544(1078). 1931. *Aneilema latifolium* Wight, Ic. t. 2072. 1853. *Murdannia elata* (Vahl) Brueck. in Engl. & Prantl, Naturl. Pflanzenf. (ed.2) 15a: 173. 1930. *Commelina elata* Vahl, Enum. Pl. 2: 178. 1805.

Obliquely erect stout herb; roots tuberous; stem rounded, smooth. Leaves 20-23 x 5.5-6 cm basal and cauline, ovate, acute at apex, cordate at base, glabrous, coriaceous, sessile; cauline leaves smaller. Panicle 17-20 cm long, terminal, lax. Flowers 1-1.2 cm across, solitary or 2-3 together, pedicelled; sepals oblong-obtuse, red-glandular; petals white, obovate, obtuse, pale blue or white; stamens 3, filaments bearded; staminodes 2-lobed, bearded. Capsule globose, beaked; seeds trigonous, with two round markings, tuberculate or reticulate, dark brown.
Flowering & Fruiting: July-September.
Distribution: Indo-Malesia. Occasional; in evergreen forests. Common; in evergreen forests. *RNMK 0159*, Kunchome; *RNMK 1361*, Chandanathode.

Murdannia lanuginosa (Wall. ex Clarke) Brueck. in Engl. & Prantl, Naturl. Pflanzenf. 15a: 173. 1930; V.S. Ramach. & V.J. Nair, Fl. Cannanore 486. 1988; Vajr., Fl. Palghat Dist. 522. 1990. *Aneilema lanuginosa* Wall. ex Clarke in A. & C. DC., Monogr. Phan. 3: 214. 1881; Hook. f., Fl. Brit. India 6: 380. 1892; Fischer in Gamble, Fl. Pres. Madras 1545(1079). 1931.

Erect herbs, 40-50 cm tall. Leaves 15-17 x 6-7 cm, acute, base cordate; sheaths 1.2-1.6 cm long. Flowers yellow when fresh, blue when dry. Capsule ca. 1 cm across, oblong-trigonous, long cuspidate.
Flowering & Fruiting: November-December.
Distribution: Endemic to Peninsular India. Occasional; in evergreen and moist deciduous forests. *RNMK 1044*, Kuruva; *RNMK 1001*, Thirunelli.

Murdannia nudiflora (L.) Brenan, Kew Bull. 1952: 189. 1952; Manilal & Sivar., Fl. Calicut 296. 1982; Ansari, Fl. Kasaragod Div. 395. 1985; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 283. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 486. 1988; Vajr., Fl. Palghat Dist. 522. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 477. 1996; Sivar. & P. Mathew, Fl. Nilambur 739. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 516. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 706. 2009. *Commelina nudiflora* L., Sp. Pl. 41. 1753. *Aneilema nudiflorum* (L.) R. Br., Prodr. 271. 1810; Hook. f., Fl. Brit. India 6: 378. 1892; Fischer in Gamble, Fl. Pres. Madras 1545(1078). 1931. *Tali-pullu* Rheede, Hort. Malab. 9:123, t. 58. 1688.

Creeping or decumbent herbs, rooting at lower nodes. Leaves 8-10 x 1-1.5 cm, linear-oblong, amplexicaule at base, glabrous; sheath rounded, open, ciliate along the margins. Cymes globose, long-peduncled, congested; flowers shortly pedicelled, 5-15 in each cyme; sepals oblong, obtuse; petals obovate, blue; stamens 2, filaments bearded; staminodes 4, 3-lobed. Capsule trigonously ovoid, 3-celled; seeds ovoid or cubical, glandular-puberulus with one circular and one oval markings on opposite sides.

Flowering & Fruiting: September-November.

Distribution: Indo-Malesia and Africa. Common; in semi-evergreen forests. *RNMK 3155,* Manikkunnumala.

POLLIA Thunberg

Nov. Gen. Pl. 1: 11 (1781).

Pollia secundiflora (Bl.) Bakh.f., Bl. 6:399.1950. *Commelina secundiflora* Bl., Enum. Pl. Jav. 1: 3. 1827. *Pollia sorzogonensis* (Mey ex Presl.) Steud., Nomencl. Bot. (ed. 2) 368. 1841; Hook. f., Fl. Brit. India 6: 368. 1892; Manilal, Fl. Silent Valley 328. 1988. *Pollia sorzogonensis* var. *indica* (Wight) Clarke in A. & C. DC., Monogr. Phan. 3: 127. 1881; Hook. f., Fl. Brit. India 6: 368. 1892; Fischer in Gamble, Fl. Pres. Madras 1533(1071). 1931. *Aclisia indica* Wight, Ic. t. 2068. 1853. *Aclisia secundiflora* (Bl.) Bakh.f. in Backer & Bakh.f., Fl. Java 3: 658. 1968; Ansari, Fl. Kasaragod Div. 392. 1985; Sivar. & P. Mathew, Fl. Nilambur 732. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 509. 2005.

Large branched herbs. Leaves 14-16 x 4-5 cm, linear or elliptic-lanceolate, caudate-acuminate, base rounded; bracts oblong, persistent. Flowers white, in terminal panicles; stamens 3 or 6; staminodes 0 or 3; ovary sessile, 3-locular; ovules 2-10 per locule. Capsule globose, blue; seeds compressed.

Flowering & Fruiting: November-December.

Distribution: Indo-Malesia and China. Occasional; in evergreen forests. *RNMK 1883,* Chandanathode.

JUNCACEAE Juss.

Gen. Pl. 43. 1789

JUNCUS Linneaus

Sp. Pl. 1: 325 (1753).

Juncus prismatocarpus R. Br. ssp. **leschenaultii** (Gay ex Laharpe) Kirschner, Preslia 74: 249. 2002. *Juncus leschenaultii* Gay ex Laharpe, Essai Monogr. Jonc. 49. 1825. *Juncus prismatocarpus* var. *leschenaultii* (Gay) Buchenau in Engl., Bot. Jahrb. Syst. 6: 205. 1885. *Juncus prismatocarpus* sensu Hook. f., Fl. Brit. India 6: 395. 1892p.p.; Fischer in Gamble, Fl. Pres. Madras 1553(1084). 1931; V.S. Ramach. & V.J. Nair, Fl. Cannanore 489. 1988; Manilal, Fl. Silent Valley 328. 1988.

Densely tufted herbs; leafy stem 25-30 cm high. Leaves 7-9 x 0.2-0.3 cm, lanceolate, acuminate, septate; sheath keeled, compressed. Panicles 8-10 x 7-8 cm; umbellule globose, peduncled. Flowers 3-6 together; bracts cuspidate; perianth lobes 3-4 x 1-3 mm, lanceolate, glabrous. Capsule lanceolate, acute; seeds obovoid, brown.

Flowering & Fruiting: February-March.

Distribution: Indo-Malesia to New Zealand. Occasional in marshy situations. *RNMK 1089,* Thirunelli.

ARECACEAE Schultz Sch.

Nat. Syst. Pflanzenr. 317. 1832.

1. Climbing palms; fruits covered with scales ..... **Calamus**
1. Erect palms; fruits not covered with scales 2
2. Leaves bipinnate ..... **Caryota**
2. Leaves simple pinnate 3
3. Lowest pairs of leaflets transformed into spines ..... **Phoenix**
3. None of the leaflets transformed into spines 4
4. Leaflets base obliquely auriculate ..... **Arenga**
4. Leaflets base not auriculate ..... **Pinanga**

ARENGA Labillardiere

Mem. Inat. Par. 4: 209. 1801, *nom. cons.*

Arenga wightii Griff., Calcutta J. Nat. Hist. 5: 475.1845; Becc. & Hook. f. in Hook. f., Fl. Brit. India 6:422.1892; Fischer in Gamble, Fl. Pres. Madras 1588(1087). 1931; V.S. Ramach. & V.J. Nair, Fl. Cannanore 489. 1988; Vajr., Fl. Palghat Dist. 526. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 478. 1996; Sivar. & P. Mathew, Fl. Nilambur 742. 1997; Renuka, Palms Kerala 15. 1999; Mohanan & Sivad., Fl. Agasthyamala 742. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 518. 2005. **Plate 37d.**

Monoecious palms; trunk 3-6 m tall, covered with persistent leafsheaths, caudex 10-15 m across. Leaves pinnatisect, 6-8 m long; leaflets 70-100 x 4-5 cm, linear, auricled at base, glaucous below; petiole 2.5-3 m long. Spadices to

1 m long, basipetal, male flowers and female flowers on separate spadices; male flowers: tepals 6, biseriate, orbicular; stamens many, free; female flowers: tepals 6, biseriate, accrescent; ovary 3-celled. Fruit globose, 2 or 3 seeded.
Flowering & Fruiting: July-September.
Distribution: Endemic to Western Ghats. Common; in evergreen forests. *RNMK 1208,* Vythiri; *RNMK 2882,* Vaduvanchal; *RNMK 1460*, Palchuram.

CALAMUS Linnaeus
Sp. Pl. 325. 1753.

Dioecious climbing shrubs, armed with hooked spines. Leaves alternate, pinnate; leaflets odd or even, linear-lanceolate, 1-few-ribbed, bristly or ciliate on the ribs and margins or naked; nervules transverse; leafsheaths cylindrical, spiny, ochreate, usually with an elongate lateral, clawed, flagellum. Inflorescence an axillary panicles, very elongate, usually ending with a clawed flagellum; spathes many, passing into bracts and bracteoles. Flowers few-many, unisexual, polygamodioecious, gathered into distichous or scorpioid spikelets, bracteolate; calyx cupular, 3-toothed; petals larger than calyx, free in male flowers, tubular in female flowers; stamens 6, filaments united; staminodes cupular; ovary incompletely 3-celled, covered with scales; style very short, stigmas 3. Fruit an oblong, ovoid or spherical drupe, covered with many polished scales.

1. Leaflets clustered on rachis 2
1. Leaflets not clustered on rachis 3
2. Stem with sheath to 6 cm across; capsule ellipsoid .....**C. thwaitesii**
2. Stem with sheath to 1 cm across; capsule globose .....**C. travancoricus**
3. Leaflets over 5 cm wide .....**C. vattayila**
3. Leaflets under 3 cm wide 4
4. Mouth of the sheath without large sheaths ..... **C. gamblei**
4. Mouth of the sheath with large spines.....5
5. Fruits stalked ..... **C. pseudotenuis**
5. Fruits sessile .....**C. hookerianus**

Calamus gamblei Becc. ex Becc. & Hook.f. in Hook. f., Fl. Brit. India 6: 453. 1893; Fischer in Gamble, Fl. Pres. Madras 1568(1093). 1931; Becc., Ann. Roy. Bot. Gard. Culcutta 11: 96, 316, t. 123. 1908; Sasidh. & Sivar., Fl. Pl. Thrissur For. 479. 1996; Renuka, Palms Kerala 24. 1999; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 519. 2005. *Calamus gamblei* Becc. var. *sphaerocarpa* Becc., Ann. Roy. Bot. Gard. (Calcutta) 11: 96, 316. 1908; Fischer in Gamble, Fl. Pres. Madras 1568(1094). 1931.

Clustering moderate sized cane; stems 25-30 m or more long; sheaths green, armed with spines, spines bulbous based, knee present. Leaves 80-120 cm long. Inflorescence flagellate, arising well above the mouth of the sheath; 5-6, to 90 cm long. Fruit ca. 2 cm across, spherical or slightly tapers at base; scales deeply channelled, pale yellow, shining.

Flowering & Fruiting: March-April.
Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 1776*, Vythiri.

Calamus hookerianus Becc., Ann. Roy. Bot. Gard. (Calcutta) 11: 83, 226. t. 70. 1908; Fischer in Gamble, Fl. Pres. Madras 1568(1094). 1931; Ansari, Fl. Kasaragod Div. 398. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 479. 1996; Sivar. & P. Mathew, Fl. Nilambur 743. 1997; Renuka, Palms Kerala 25. 1999; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 519. 2005. *Calamus borneensis* Becc., Rec. Bot. Surv. Ind. 2: 205. 1926, non Miq. 1868.

Clustering moderate sized canes; stems 7-10 m or more long, with sheaths to 4 cm diameter. Sheaths armed with spines; spines triangular; mouth of the sheath provided with long papery spines, 15-18 cm long. Leaves up to 2 m long; leaflets regular. Fruits 1-1.3 x 0.6-0.8 cm, subglobose; scales yellowish-brown with a dark brown boarder; endosperm not ruminate.
Flowering & Fruiting: October-April.
Distribution: Endemic to Western Ghats. Rare in evergreen forests. *RNMK 1235,* Kurichiarmala.

Calamus pseudotenuis Becc. ex Becc. & Hook.f., in Hook. f., Fl. Brit. India 6: 445. 1892; Fischer in Gamble, Fl. Pres. Madras 1567(1093). 1931; Manilal, Fl. Silent Valley 329. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 490. 1988; Vajr., Fl. Palghat Dist. 527. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 480. 1996; Renuka, Palms Kerala 30. 1999; Mohanan & Sivad., Fl. Agasthyamala 745. 2002.

Clustering moderate sized canes; stems 6-7 m or more in length, with sheaths 3-3.5 cm in diameter; sheath yellowish green, spines 3-3.5 cm long, intermingled with thin smaller spines, brown-tomentose; mouth of the sheath with 3-4 longer spines, 5-6 cm long; ocrea 10-12 cm long. Leaf upto 1.6 m long; leaflets *40*- 50 x 2-2.5 cm, regular, long-acuminate. Inflorescence 2.5-3 m long; partial inflorescence 65-70 cm long; rachillae 7-8 cm long. Fruit 1.5-1.7 x 0.6-0.8 cm, subovoid.
Flowering & Fruiting: October-March.
Distribution: South-west India and Sri Lanka. Occasional; in evergreen forests. *RNMK* 1*759,* Chembra.

Calamus thwaitesii Becc. ex Becc. & Hook.f., in Hook. f., Fl. Brit. India 6: 441. 1892; Sasidh. & Sivar., Fl. Pl. Thrissur For. 480. 1996; Renuka, Palms Kerala 32. 1999; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 520. 2005. *Calamus thwaitesii* Becc. var. *canaranus* Becc., Ann. Roy. Bot. Gard. (Calcutta) 11: 138. 1908; Fischer in Gamble, Fl. Pres. Madras 1567(1093). 1931; V.S. Ramach. & V.J. Nair, Fl. Cannanore 490. 1988; Vajr., Fl. Palghat Dist. 528. 1990; Sivar. & P. Mathew, Fl. Nilambur 744. 1997. **Plate 37e.**

Robust clustering and high climbing canes. Stems 17-20 m or more in length, with sheath 5-6 cm across; sheath armed with spines; spines arising from a raised rim-like surface, flat, black with yellow base; knee and ocrea absent; flagellum, petiole, rachis and sheath armed with stout spines in oblique whorls. Leaves 2-3 m long; leaflets grouped. Inflorescence 5-6 m long; spikelets closely arranged on the rachillae. Fruit stalked, ca. 2 x 1.3 cm, ovoid, scales in 12 vertical rows, with median grooves, yellow with brown margins; endosperm not ruminate.

Flowering & Fruiting: March-June.

Distribution: Endemic to southern Western Ghats. Rare; in semi-evergreen forests. *RNMK 1805,* Manikkunnumala.

Calamus travancoricus Bedd. in Hook. f., Fl. Brit. India 6: 452. 1893; Fischer in Gamble, Fl. Pres. Madras 1567(1093). 1931; Nair & Mohanan, J. Econ. Tax. Bot. 3: 575. 1982; Nicols., Suresh & Manilal, An Interpr. Hort. Malab.279. 1988; Renuka & Sasidh., RIC Bulletin 9: 4. 1990; Sivar. & P. Mathew, Fl. Nilambur 745. 1997; Renuka, Palms Kerala 33. 1999; Mohanan & Sivad., Fl. Agasthyamala 745. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 520. 2005. Katu-tsjurel, Hort. Malab. 12:121, t. 64. 1693.

Modertate sized canes, sheath green, spines ca. 0.5 cm long, mouth of sheath with long slender spines; ocrea papery. Leaves 40-45 cm long; rachis with claw like spines; leaflets grouped, 20-25 cm long. Male inflorescence up to 1 m long; partial inflorescence 8-10, 7-10 cm long; female inflorescence 35-40 cm long; partial inflorescence 3-4, 10-12 cm long. Capsule globose, ca. 1 cm long; scales in 27 rows.

Flowering & Fruiting: October-June.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3674*, Banasuramala.

Calamus vattayila Renuka, Curr. Sci. 56: 1012. 1987; Renuka & Sasidh., RIC Bulletin 9: 5. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 480. 1996; Renuka, Palms Kerala 34. 1999; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 520. 2005. **Plate 37f.**

Solitary or climbing canes; stems 25-30 m long, with sheaths 2-2.5 cm in diam; sheath dark green, sparingly spiny; knee conspicuous. Leaf up to 1 m long, leaflets alternate, 35-40 x 7-8 cm, elliptic, ciliate at apex, 6-veined; petiole 20- 25 cm long; spines erect, ca. 1 cm long; flagellum 3.5- 3-4 m long, with grouped recurved spines. Female inflorescence in heavy branches, up to 1 m long. Fruit ca. 2.5 x 0.8 cm, oblong, scales in 25-30 rows, longer than broad, chest nut brown.

Flowering & Fruiting: March-August.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3997,* Chembra.

CARYOTA Linnaeus

Sp. Pl. 1189. 1753.

Caryota urens L., Sp. Pl. 1189. 1753; Roxb., Fl. Ind. 3:625. 1832; Becc. & Hook.f., in Hook. f., Fl. Brit. India 6: 422. 1892; Blatter, Palms Brit. India 339. 1926; Fischer in Gamble, Fl. Pres. Madras 1560(1089). 1931; Manilal & Sivar., Fl. Calicut 300. 1982; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 280. 1988; Vajr., Fl. Palghat Dist. 529. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 480. 1996; Sivar. & P. Mathew, Fl. Nilambur 745. 1997; Renuka, Palms Kerala 35. 1999; Mohanan & Sivad., Fl. Agasthyamala 746. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 520. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 715. 2009. *Schunda-pana* Rheede, Hort. Malab. 1: 15-16, t. 11. 1678.

Large palms; stem 30-60 cm thick, annular; caudex lax. Leaves 5-6 x 3-4 m, spiral, bipinnate, leaflets 35-40 x 17-20 cm, cuneate, straight on sides, dentate at oblique apex, sessile, alternate or paired. Spadix 3-4 m long, axillary, formed basipetally along the stem, branches many, narrow, pendent. Flowers monoecious, solitary; male flowers 1.5-2 cm long; sepals 3, orbicular; petals 3, oblong, calycine; stamens many, filaments united at base; Fruit globose, 1-2-seeded; seeds planoconvex; endosperm ruminate.

Flowering & Fruiting: January-April.

Distribution: Indo-Malesia. Common; in evergreen and semi-evergreen forests and in plantations. *RNMK 1004,* Manikkunnumala; *RNMK 2669*, Vythiri; *RNMK 3440*, Sughandhagiri.

PHOENIX Linnaeus

Sp. Pl. 1188. 1753.

Phoenix loureirii Kunth, Enum. Pl. 3: 257. 1841; Vajr., Fl. Palghat Dist. 528. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 481. 1996; V.S. Ramach. & V.J. Nair, Fl. Cannanore 490. 1988; Sivar. & P. Mathew, Fl. Nilambur 746. 1997; Barrow, Kew Bull. 53: 561. 1998; Mohanan & Sivad., Fl. Agasthyamala 747. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 521. 2005. *Phoenix humilis* Royle ex Becc. var. *pedunculata* Becc. & Hook.f. in Hook.f., Fl. Brit. India 6:427. 1892; Fischer in Gamble, Fl. Madras 1560. 1931. *Phoenix hanceana* var. *formosana* Becc., Philipp. J. Sci. 3: 339. 1908. *Phoenix hanceana* var. *philippines* Becc., Philipp. J. Sci. 3: 339. 1908. *Phoenix pusilla* Lour., Fl. Cochinch. 614. 1790, non Gaertn. 1788.

Dioecious coarse bushy shrubs, 1.5-2 m tall, stem 20-25 cm thick, densely covered with leaf sheaths. Leaves in a dense caudex, up to 1 m long, 60-70 cm broad, pinnately compound; lower leaflets transformed into sharp spines; upper ones 4-8 together, 25-30 x 1-2 cm, linear-oblong, acuminate, folded. Spadix axillary, 20-30 cm across; branches spreading, 16-18 cm long; flowers sessile; perianth biseriate, outer smaller, connate, cupular; inner ovate, valvate; stamens 6, free; staminodes in female flowers 6; ovary of 3 free carpels, ovules solitary; stigma uncinate. Drupes 1-1.2 x 0.6-0.8 cm, obovoid, yellow.

Flowering & Fruiting: Throughout the year.
Distribution: India to south-east Asia. Occasional; in grasslands. RNMK 2705, Manikkunnumala; *RNMK 1661*, Brahmagiri.

PINANGA Blume
Rumphia 2: 76 (1839).

Pinanga dicksonii (Roxb.) Bl., Rumph. 2: 85. 1838; Becc. & Hook.f., in Hook. f., Fl. Brit. India 6:409.1892; Fischer in Gamble, Fl. Pres. Madras 1556(1086). 1931; Manilal, Fl. Silent Valley 329. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 491. 1988; Vajr., Fl. Palghat Dist. 529. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 481. 1996; Sivar. & P. Mathew, Fl. Nilambur 747. 1997; Renuka, Palms Kerala 40. 1999; Mohanan & Sivad., Fl. Agasthyamala 747. 2002. *Areca dicksonii* Roxb., Fl. Ind. 3: 616. 1832. **Plate 37g.**

Slender monoecious palms; stems 6-8 m tall, with annular leaf scar. Leaves 1-1.5 m long, confined towards the apex of the stem; leaflets linear-lanceolate, praemorse at apex, 40-50 x 3-4 cm, glabrous; sheath 25-30 cm long. Inflorescence 30-35 cm long; tepals 2–seriate, ovate, keeled; stamens many, staminodes 6; ovary 1-celled, ovule solitary. Drupe ellipsoid, pericarp fibrous.
Flowering & Fruiting: March-April.
Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 0802*, Naluketumchola; *RNMK 2010*, Periya Ghat.

Areca catechu L. and **Cocos nucifera** L. are widely cultivated and **Corypha umbraculifera** L. rarely seen in open areas.

PANDANACEAE R. Br.
Prodr. 340. 1810

PANDANUS S. Parkinson
J. Voyage South Seas 46. 1773.

Dioecious erect shrubs, sometimes with stilt root. Leaves spirally and closely arranged, sessile, ensiform, base sheathing, spiny along margins and midrib. Male inflorescence terminal; spadix branched, each branch with a spathe; tepals 0; stamens many; pistillodu 0; female inflorescence unbranched or branched; spathe fugacious; carpels naked, 1-celled; ovule solitary; stigma simple or branched. Fruit an aggregate of drupes or of phalanges.

1. Drupes club-shaped .....**P. canaranus**
1. Drupes cylindric ..... **P. thwaitesii**

Pandanus canaranus Warb. in Engl., Pflanzenr.4 (9): 75. f. 215. 1900; Fischer in Gamble, Fl. Pres. Madras 1570(1095). 1931; Manilal & Sivar., Fl. Calicut 301. 1982; V.S. Ramach. & V.J. Nair, Fl. Cannanore 491. 1988; Vajr., Fl. Palghat Dist. 529. 1990; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 718. 2009.

Large shrubs. Leaves long, linear, apex gradually attenuate; margins and keel below armed with short sharp forward pointing spinules. Male spathes

golden yellow and staminate inflorescence terminal; stamens umbellate at the apex of stemonophore. Drupes club-shaped.
Flowering & Fruiting: July-August.
Distribution: Endemic to Peninsular India. Occasional; along banks of streams. *RNMK 3945*, Kuruva.

Pandanus thwaitesii Mart., Bull. Soc. Bot. Ital. 369. 1904; Fischer in Gamble, Fl. Pres. Madras 1570(1095). 1931; Manilal, Fl. Silent Valley 330. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 481. 1996; Sivar. & P. Mathew, Fl. Nilambur 747. 1997; Mohanan & Sivad., Fl. Agasthyamala 748. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 521. 2005.

Dioecious shrubs with stilt roots. Leaves spiral close, 130-150 x 5-6 cm, 3-costate, linear-lanceolate, spiny along margins and costae, sessile, ash coloured below. Male spadix, terminal branched, each branch with a scape; male flowers densely packed; perianth absent; stamens many; female spadix branched; spathe oblong, 16-20 cm long; flowers closely arranged; perianth absent; ovary 1-celled; ovule solitary. Drupe 5-6 x 4.5-5 cm, cylindric, laterally connate with a hexagonal outer face.
Flowering & Fruiting: September-March.
Distribution: Endemic to south India. Occasional; in evergreen forests. *RNMK 1202*, Chembra.

Pandanus amaryllifolius Roxb. is often grown in the district as a medicinal shrub.

ARACEAE Juss.

Gen. Pl. 23. 1789.

1. Aquatic, free-floating herbs ..... **Pistia**
1. Terrestrial, epiphytic or marshy reverine rooted herbs 2
2. Climbers with nodular adventitious roots 3
2. Erect rhizomatous herbs or shrubs 4
3. All leaves entire; perianth 6 ..... **Pothos**
3. Leaves both dissented and entire; perianth absent ..... **Rhaphidophora**
4. Reverine or marshy herbs 5
4. Terrestrial or epiphytic herbs 7
5. Rootstock aromatic; leaves distichous ..... **Acorus**
5. Rootstock not aromatic; leaves simple 6
6. Leaves linear; pistillate flowers united ..... **Cryptocoryne**
6. Leaves oblong-elliptic; pistillate flowers free ..... **Lagenandra**
7. Leaves compound 8
7. Leaves simple 10
8. Rhizomatous herbs; spathe spirally twisted ..... **Anaphyllum**
8. Cormous herbs; spathe not spirally twisted 9

9. Leaves radiately, pedately compound; plants leafy during flowering ..... **Arisaema**
9. Leaves trichotomously compound; plants leafless during flowering..... **Amorphophallus**
10. Epiphytes with bulbiferous shoots; leafless during flowering..... **Remusatia**
10. Terrestrial or epiphytic without bulbiferous shoots; leafy during flowering.....11
11. Stem tuberous; leaves peltate 12
11. Stem cormous; leaves not peltate.....13
12. Spathe to 5 cm long, cymbiform ..... **Ariopsis**
12. Spathe to 20 cm long, lanceolate ..... **Colocasia**
13. Spadix included in the spathe; ovules basal and apical..... **Theriophonum**
13. Spadix exerted from the spathe; ovules basal..... **Typhonium**

ACORUS Linnaeus

Sp. Pl. 324. 1753.

Acorus calamus L., Sp. Pl. 324. 1753; Hook. f., Fl. Brit. India 6: 555. 1893; Fischer in Gamble, Fl. Pres. Madras 1577(1100). 1931; Manilal & Sivar., Fl. Calicut 306. 1982; Joseph, Aquatic Angiosp. Malabar 283. 1991; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 727. 2009.

Aromatic marshy herbs; root-stock creeping, aromatic. Leaves distichous, ensiform 20-40 cm long. Spathe continuing the ensiform peduncle, 15-50 cm long; spadix sessile, cylindric, dense flowered; perianth 6, orbicular; stamens 6; filaments linear, flat; ovary conical, 2-3 celled, ovules many, pendulous. Berries oblong; seeds pendent from the apex of the cells.

Flowering & Fruiting: April-July

Distribution: North temperate hemisphere and tropical Asia. Occasional; in swamps. *RNMK 4239,* Panamaram; *RNMK 3577*, Muthanga.

AMORPHOPHALLUS Blume ex Decaisne

Nouv. Ann. Mus. Hist. Nat. 3: 366. 1834 , *nom. cons*.

Herbs with thick cormous rootstock. Leaves usually seen after flowering, solitary, petiole trichotomously forked below the summit of lamina; blade much divided, leaflets sessile or shortly narrowed at base into a short petiole; lateral nerves many, parallel, forming an intramarginal vein. Spadix solitary on short or long erect peduncle; spathe globose to campanulate or tubular; spadix parted into 4, a basal portion with female flowers, an upper portion with male flowers, a middle portion with sterile flowers, and an uppermost sterile broad or narrow limb; male flowers many, naked, closely packed; female flowers many; ovary 1-4 locular, ovule solitary in each locule.

1. Spadix appendage ovoid, over 6 cm across..... **A. paeoniifolius** var. **paeoniifolius**
1. Spadix appendage narrowly cylindrical, under 3 cm across.....2
2. Corms cylindric-oblong; spadix slightly longer than the spathe..... **A. nicolsonianus**
2. Corms depressed globose; spadix as long as the spathe .....**A. commutatus**

Amorphophallus commutatus (Schott) Engl. in DC., Monogr. Phan. 2: 319. 1879; Hook. f., Fl. Brit. India 6: 515. 1893; Sasidh. & Sivar., Fl. Pl. Thrissur

For. 483. 1996; Sivar. & P. Mathew, Fl. Nilambur 750. 1997. *Conophalus commutatus* Schott, Bonplandia 7: 28. 1859 & Prodr. Syst. Aroid. 128. 1860.

Corms depressed globose, 6-7 cm across. Leaves tripartitely compound, leaflets elliptic, caudate-acuminate, base acute, glabrous; petiole 40-50 cm long, terete. Peduncle 1-1.5 m tall; spathe ovate-lanceolate, 40-45 x 16-18 cm; spadix terete, sterile appendage terete, narrowed towards apex, as long as the spathe.
Flowering & Fruiting: May-September
Distribution: Endemic to Western Ghats. Occasional; in moist deciduous forests. *RNMK 2871*, Muthanga.

Amorphophallus nicolsonianus Sivad., Pl. Syst. Evol. 153: 165. 1986; Manilal, Fl. Silent Valley 330. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 483. 1996; Mohanan & Sivad., Fl. Agasthyamala 752. 2002.

Corm oblong or subcylindrical. Leaves 25-30 cm long; leaflets 13-15 x 4-5 cm, ovate or oblong, acuminate, base acute or obtuse, glabrous, glossy above. Peduncle terete, 17-20 cm long, spathe ovate-lanceolate, acuminate, 8-10 x 2.5-3 cm, greenish-brown, basally convolute; spadix sessile, slightly longer than the spathe, flowers confined towards the base; sterile appendix narrowly cylindric, tapering to the apex.
Flowering & Fruiting: January-March
Distribution: Endemic to southern Western Ghats (Kerala). Rare; in evergreen forests. *RNMK 1662*, Chembra.

Amorphophallus paeoniifolius (Dennst.) Nicols., Taxon 26: 337. 1977, var. **paeoniifolius**: Sivad., Taxon 32: 128. 1983; Suresh, Sivad. & Manilal, Taxon 32(1): 128. 1983; Manilal & Sivar., Fl. Calicut 305. 1982; Ansari, Fl. Kasaragod Div. 401. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 484. 1996; Sivar. & P. Mathew, Fl. Nilambur 750. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 523. 2005. *Dracontium paeoniifolium* Dennst., Schluss. Hort. Malab. 13. 38. 1818. *Amorphophallus dubius* Bl., Rumphia 1: 142. 1837; Hook. f., Fl. Brit. India 6: 514. 1893; Fischer in Gamble, Fl. Pres. Madras 1587(1107). 1931. *Amorphophallus paeoniifolius* (Dennst.) Nicols., var. *campanulatus* (Decne.) Sivad. in Suresh *et al.*, Taxon 32: 130. 1983; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 720. 2009. **Plate 37h.**

Corm 16-20 cm across, depressed globose, tubercled, pale pink inside; petiole 40-50 cm long, 3-4 cm thick, green with brown patches; lamina 70-120 cm across; lobes 12-14 x 5-5.5 cm, ovate, acuminate, decurrent at base into a wing to the petiole; nerves impressed above. Peduncle 5-6 cm long, thick; spathe 36-38 cm across, 25-45 cm high, campanulate, undulate, dull greenish brown; spadix as long as spathe; 20-25 cm across, appendage obovoid, uneven, rugose, deep pink; flowers on the lower half of the spadix. Berry ca. 1.5 x 1 cm, oblong, obovoid, orange-red, glabrous.
Flowering & Fruiting: May-June
Distribution: India, Sri Lanka and Pacific Islands. Occasional; in evergreen forests. *RNMK 4391*, Vaduvanchal.

ANAPHYLLUM Schott

Gen. Aroid. t. 83. 1858.

Anaphyllum wightii Schott, Gen. Aroid. t. 83. 1858; Hook. f., Fl. Brit. India 6: 551. 1893; Fischer in Gamble, Fl. Pres. Madras 1589(1108). 1931; Manilal, Fl. Silent Valley 330. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 492. 1988; Vajr., Fl. Palghat Dist. 531. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 484. 1996; Sivar. & P. Mathew, Fl. Nilambur 751. 1997; Mohanan & Sivad., Fl. Agasthyamala 753. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 523. 2005. **Plate 37i.**

Tall herbs with a creeping rhizome. Leaves pinnatisect or pinnatipartite; lobes 3-8 pairs, 24-28 x 8-10 cm, usually narrower, elliptic to oblong, acute, sessile or petiolulate; petiole 60-150 cm long, erect, 5-10 cm thick, smooth or transversally rugose, brownish. Spadix 15-30 cm long, 5-8 cm broad, spathe open, deep brown, once or twice twisted; spikes 4.5-5 cm long, 8-9 mm thick; flowers bisexual, densely arranged, 3-6 mm across; perianth lobes 4, obovate, truncate; stamens 6, free, filaments broad; ovary 1-celled, ovule solitary; style short, stigma discoid. Fruit a globose achene.

Flowering & Fruiting: January-February

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 3549*, Chanthanathodu; *RNMK 2863,* Kanthanpara.

ARIOPSIS Nimmo

in J. Graham, Cat. Pl. Bombay 252. 1839.

Ariopsis peltata Nimmo in Graham, Cat. Pl. Bombay 252. 1839; Hook. f., Fl. Brit. India 6: 519. 1893; Fischer in Gamble, Fl. Pres. Madras 1580(1102). 1931; Manilal & Sivar., Fl. Calicut 304. 1982; Ansari, Fl. Kasaragod Div. 401. 1985; Manilal, Fl. Silent Valley 331. 1988; Vajr., Fl. Palghat Dist. 532. 1990; Sivar. & P. Mathew, Fl. Nilambur 751. 1997; Mohanan & Sivad., Fl. Agasthyamala 755. 2002.

Epiphytic or terrestrial annuals, rootstock globose, ca. 1 cm across. Leaves 1 or 2, peltate, lamina 5-9 cm across, orbicular, entire, membranous, glabrous; petiole 7-8 cm long, slender. Peduncle 2-5 cm long, solitary; spathe yellow or white, 3-4 cm long, cymbiform, open, tube absent; spike 2-2.5 cm long, cylindrical; female flowers 5-7, on one side of the spike towards the lower part; ovary ovoid, 4-ridged, 1-celled, ovules many, on 5-parietal placentas; stigma 4-lobed; male flowers sunken in upper fleshy part of spadix; stamens 3; anthers divaricate, pubescent.

Flowering & Fruiting: June-August

Distribution: India and western Malesia. Occasional; in evergreen forests. *RNMK 1693,* Chembra; *RNMK 1154*, Thariodu.

ARISAEMA Martius

Flora 14: 459. 1831.

Herbs with cormous root stocks. Leaves solitary or paired, appear along spadix, palmately divided; leaflets obovate to linear-elliptic, sessile or petioled;

lateral nerves many, form a narrow intramarginal vein. Spadix solitary, peduncled, peduncle arise from the petiole; spathe tubular at base, expanded into a broad and variously usually transversely folded limb; spadix unisexual or rarely monoecious, either female or male flowers at base, few to many, neuter flowers above, apex forms into a short or long narrow limb; staminate flowers with 2-5 stamens in a column; pistillate flowers with unilocular ovary, ovules 3-9.

1. Leaves 2; appendage of the spadix much longer than the spathe..... **A. tortuosum**
1. Leaves single; appendages of the spadix as long as or smaller than the spathe 2
2. Spadix to 22 cm long .....**A. leschenaultii**
2. Spadix less than 10 cm long 3
3. Spathe limb triangular with a long acuminate tip.....**A. attenuatum**
3. Spathe limb subtriangular with an acute tip .....**A. nilamburense**

Arisaema attenuatum Barnes & Fischer, Bull. Misc. Inform. 1936: 275. 1936; Chatterjee, Bull. Bot. Soc. Bengal 8: 121. 1959; Manilal, Fl. Silent Valley 331. 1988.

Corms ca. 25 cm across. Leaves solitary, radiatisect; leaflets 6-9, 10-16 x 3-6 cm, elliptic-lanceolate, apex acute, base cuneate, membranous; petiole 30-45 cm long, sheathing. Inflorescence with peduncle as long as or slightly shorter than the petiole; spathe 10-17 cm long, elongate-lanceolate, bright-green, stipe white outside, inner glossy, limb short, triangular, with a long-acuminate tip, dark green with 3 stripes; pistillate spadix with basal pistillate portion, pistil green, sub globose; staminate spadix with stamens in groups, sessile, purple coloured. Berry obovoid.

Flowering & Fruiting: May-July

Distribution: Endemic to southern Western Ghats (Kerala). Rare; in grasslands. *RNMK 1985*, Chembra.

Arisaema leschenaultii Bl., Rumphia 1: 93. 1836; Hook. f., Fl. Brit. India 6: 504. 1893; Fischer in Gamble, Fl. Pres. Madras 1585(1105). 1931; Chatterjee, Bull. Bot. Soc. Bengal 8: 127. 1959; Manilal, Fl. Silent Valley 332. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 493. 1988; Vajr., Fl. Palghat Dist. 532. 1990; Mohanan & Sivad., Fl. Agasthyamala 756. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 524. 2005. *Arisaema pulchrum* N. E. Br., J. Linn. Soc. Bot. 18: 252, t. 6. 1880; Hook. f., Fl. Brit. India 6:505.1893; Fischer in Gamble, Fl. Pres. Madras 1585(1105). 1931. *Arisaema convolutum* Fischer, Bull. Misc. Inform. Kew 1934: 167. 1934, non Nakai, 1929. *Arisaema tuberculatum* Fischer, Bull. Misc. Inform. Kew 1935: Chatterjee, Bull. Bot. Soc. Bengal 8: 137.1959; Manilal, Fl. Silent Valley 333. 1988. *Arisaema attenuatum* Barnes & Fischer, Bull. Misc. Inform. Kew 1936: 275. 1936; Chatterjee, Bull. Bot. Soc. Bengal 8: 121. 1959; Manilal, Fl. Silent Valley 331. 1988.

Corm 1-6 cm across, depressed globose. Leaf solitary; leaflets 7-12, 18-25 x 5-7 cm, lanceolate, acuminate; nerves many, close, parallel, forming an

intramarginal vein, prominent, glabrous; petiole 60-70 cm long, 1-3 cm thick, brownish. Spathe 10-22 cm long, tube 5-15 cm long, 1-3.5 cm broad, with thick greenish brown streaks; limb ovate, apex curved down, finely acuminate, green with brown streaks; spadix 11-15 cm long, clavate at apex; female flowers many at base, 1-3 cm long; neuter flowers filiform, simple or bifurcate, ca. 1 cm long. Berries orange red; seeds 2-3.
Flowering & Fruiting: July-September
Distribution: Endemic to southern Western Ghats. Common; in evergreen forests. *RNMK 3642,* Aranamala; *RNMK 1363,* Chembra.

Arisaema nilamburense Sivad., Aroideana 6: 37. 1983; Manilal, Fl. Silent Valley 332. 1988; Sivar. & P. Mathew, Fl. Nilambur 753. 1997. *Arisaema auriculatum* Barnes, Kew Bull. 1946: 44. 1946, non Buchet, 1911; nec Smith, 1914; Chatterjee, Bull. Bot. Soc. Bengal 8: 121. 1959.

Corms 2.5-3 cm across. Leaf solitary; leaflets sessile, 3-7, 25-28 x 9-10 cm, radiate, elliptic to elliptic obovate, upper surface light green; petiole 50-90 cm long, brownish pink mottles and tiny red spots. Inflorescence with peduncle shorter than the petiole; spathe with a narrow tubular to narrowly funnel-shaped portion and an upper broad subtriangular acute-tipped limb portion, mouth of the tube revolute, auricled; the pistillate spadix 6-8 cm long, flowers crowded, globose; staminate spadix with male flowers at the base, stamens in groups, globose, sessile.
Flowering & Fruiting: July- September.
Distribution: Endemic to southern Western Ghats (Kerala). Occasional; in evergreen forests. *RNMK 1080*, Kurichiarmala.

Arisaema tortuosum (Wall.) Schott in Schott & Endl., Melet. Bot. 1: 17. 1832; Hook. f., Fl. Brit. India 6: 502. 1893; Fischer in Gamble, Fl. Pres. Madras 1584(1105). 1931; Chatterjee, Bull. Bot. Soc. Bengal 8: 136. 1959; Ansari, Fl. Kasaragod Div. 402. 1985; Manilal, Fl. Silent Valley 332. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 493. 1988; 755; Sasidh. & Sivar., Fl. Pl. Thrissur For. 485. 1996; Mohanan & Sivad., Fl. Agasthyamala 757. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 524. 2005. *Arum tortuosum* Wall., Pl. Asiat. Rar. 2: 10, t. 114. 1830. **Plate 37j.**

Corms 2-3 cm across, globose. Leaves paired, pedatisect; leaflets 8-10, 10-12 x 3-4 cm, oblanceolate, abruptly acuminate, base acute, sparsely hispid below, petiolulate; petiole 32-35 cm long, 2-together. Spadix solitary; peduncle usually shorter than the petiole; spathe 8-12 cm long, green; limb ovate, acuminate, with white and purple streaks; tube 4-6 cm long; spadix 12-18 cm long, sigmoidally curved, appendage narrow. Berry orange-red, ca. 6 mm across, obovoid; seeds 1-2.
Flowering & Fruiting: May-June.
Distribution: Himalayas, south India and Sri Lanka. Common; in grasslands. *RNMK 1730,* Chembra.

COLOCASIA Schott

in Schott et Endlicher Melet. Bot. 18. 1832, *nom. cons.*

Colocasia esculenta (L.) Schott in Schott & Endl., Melet. Bot. 1: 18. 1832; Purseglove, Trop. Crops, Monocots 61. 1975; Manilal & Sivar., Fl. Calicut 304. 1982; Ansari, Fl. Kasaragod Div. 402. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 493. 1988; Joseph, Aquatic Angiosp. Malabar 294. 1991; Vajr., Fl. Palghat Dist. 533. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 485. 1996; Sivar. & P. Mathew, Fl. Nilambur 754. 1997; Anilkumar, Sivad. & N. Ravi, Fl. Pathanamthitta 524. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 722. 2009. *Arum esculentum* L., Sp. Pl. 965. 1753. *Arum colocasia* L., Sp. Pl. 965. 1753. *Colocasia antiquorum* Schott in Schott & Endl., Melet. Bot. 1: 18. 1832; Hook. f., Fl. Brit. India 6: 523. 1893; Fischer in Gamble, Fl. Pres. Madras 1580(1102). 1931.

Stout herbs; rhizome stoloniferous. Leaves few to many, peltate, 23-28 x 16-18 cm, ovate, cordate to sagittate at base, glabrous; nerves 6 pairs, united to form an intramarginal vein; lowest pair with lateral nerves of the basal lobes, intercostae curved; petiole 30-45 cm long, cylindrical, smooth. Peduncle solitary or few together, 10-20 cm long, stout; spathe 15-20 cm long, yellow, lanceolate, constricted above the base; limb acuminate; spadix 8-10 cm long, cylindrical, appendages terete, obtuse; male flowers above, 5-6 cm of the spadix, stamens 6; female flowers on lower, 2 cm of the spadix; ovary 1-celled, ovules many on 2-4 parietal placentas; neutral flowers many, peltate, between the female and male flowers. Fruit an aggregate of berries, globose.

Flowering & Fruiting: May-October. *Distribution*: Pantropical. Common; in marshy areas. *RNMK 1128*, Puthoorvayal.

CRYPTOCORYNE Fischer ex Wydler

Linnaea 5: 428. 1830.

Cryptocoryne retrospiralis (Roxb.) Kunth, Enum. Pl. 3: 12. 1841; Wight, Ic. t. 772. 1844; Hook. f., Fl. Brit. India 6: 493. 1893; Fischer in Gamble, Fl. Pres. Madras 1575(1098). 1931; Ansari, Fl. Kasaragod Div. 403. 1985; Vajr., Fl. Palghat Dist. 533. 1990; Joseph, Aquatic Angiosp. Malabar 278. 1991; Sivar. & P. Mathew, Fl. Nilambur 755. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 525. 2005. *Ambrosinia retrospiralis* Roxb., Fl. Ind. 3: 492. 1832. *Ambrosinia unilocularis* Roxb., Fl. Ind. 3: 493. 1832. *Cryptocoryne unilocularis* (Roxb.) Kunth, Enum. Pl. 3: 13. 1841. *Ambrosinia roxburghiana* Voigt, Hort. Suburb. Calcutt. 685. 1845. *Cryptocoryne dalzellii* Schott, Bonplandia 5: 221. 1857. *Cryptocoryne roxburghii* Schott, Prodr. Syst. Aroid. 18. 1860; Hook. f., Fl. Brit. India 6: 494. 1893. *Lagenandra dalzellii* (Schott) Rataj, Studie CSAV 3: 101. 1975. **Plate 37k.**

Stoloniferous marshy herbs. Leaves many, 12-16 x 0.7-0.8 cm, linear-oblong, acute, glabrous; sheath white, closed. Peduncle 2-3 cm long, slender, solitary; spathe 10-12 cm long, partitioned by a transverse diaphrum above the spadix; tube above the diaphrum ca. 6 cm long, limb ca. 3 cm long,

spirally twisted, acuminate, pale brown with deep brown spots; spadix 1.4-1.6 cm long, included in the chamber, slender at middle; female flowers 4 or 5, one-whorled at the base; ovaries connate, l-celled, ovules many, on parietal placentas; style short, curved; neutral flowers 4-6, above the female flowers as a whorl of appendages; male flowers many, in terminal globose clusters; stamens 1 or 2.

Flowering & Fruiting: November-March

Distribution: South and north-east India. Occasional; along streamsides. *RNMK 2783*, Attamala; *RNMK 3429,* Kuruva.

LAGENANDRA Dalzell

Hooker's J. Bot. Kew Gard. Misc. 4: 289. 1852.

Evergreen herbs; root stock procumbent or erect, rhizomatous, thick, cylindrical. Leaves few to many, entire, with cylindrical or shortly sheathing long petiole; lateral nerves not forming to intramarginal nerves. Spadix axillary, shortly peduncled; spathe 2-parted, basal part tubular, closed, upper part a closed limb, twisted spirally; spadix included in the basal chamber of the spathe, 3 parted, basal globose part with few to many female flowers; apical globose staminate portion hidden in the roof of the spathe and the middle narrow sterile part; pistillate flowers with unilocular ovary and few basal ovules; stigma peltate or discoid; staminate flowers many; stamens 1 or 2; anthers sessile. Fruits a group of berries.

1. Leaves to 35 cm; cataphylls not keeled ..... **L. toxicaria**
1. Leaves to 20 cm ; cataphylls 2-keeled ..... **L. meeboldii**

Lagenandra meeboldii (Engl.) Fischer in Gamble, Fl. Pres. Madras 1576(1099). 1931; Manilal & Sivar., Fl. Calicut 303. 1982; Manilal, Fl. Silent Valley 333. 1988; Vajr., Fl. Palghat Dist. 534. 1990; Joseph, Aquatic Angiosp. Malabar 289. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 486. 1996; Sivar. & P. Mathew, Fl. Nilambur 757. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 525. 2005. *Cryptocoryne meeboldii* Engl., Pflanzenr. Arac.-Aroid. & Pistioid. 234. 1920.

Annual or biennials, rhizome 0.5-1 cm thick, creeping; cataphylls elongate-conical with two abaxial keels. Leaves clustered; lamina 6-8 x 3-4 cm, ovate, acute, rounded at base; nerves numerous, regularly arching; petiole 5-10 cm long. Peduncle 2-2.5 cm long, concealed in the leaf sheath; spathe 8-10 x 1-1.5 cm, ellipsoidal, long-acuminate at apex, twisted once or twice, smooth, yellowish, purple, tubular part ca. 5 cm, closed chamber 2-3 cm long; spadix ca. 2 cm long, produced above into a cusp; female flowers in a clusters of 5-6 mm across; male flowers in a globose clusters; stamens 1 or 2. Berries 2-3 seeded.

Flowering & Fruiting: January-March.

Distribution: Endemic to Western Ghats. Occasional; in marshy areas in evergreen and moist deciduous forests. *RNMK 1678,* Chanthanathodu.

Lagenandra toxicaria Dalz. in Hooker, J. Bot. Kew. Gard. Misc. 4:289.1852 ; Hook. f., Fl. Brit. India 6:495.1893, p.p.; Fischer in Gamble, Fl. Pres. Madras 1889(1307). 1936; Manilal & Sivar., Fl. Calicut 302. 1982; V.S. Ramach. & V.J. Nair, Fl. Cannanore 494. 1988; Joseph, Aquatic Angiosp. Malabar 292. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 486. 1996; Sivar. & P. Mathew, Fl. Nilambur 757. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 526. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 723. 2009.

Aquatic herbs, 40-50 cm tall; rhizome slender, 3-3.5 cm across. Leaves 23-26 x 7-10 cm, elliptic to ovate, lanceolate, acuminate, cuneate to narrowly cordate at base; petiole 12-14 cm long. Spathe 10-14 cm long, greenish, purple outside; limb much longer than tube, caudate acuminate, smooth; spadix with a basal pistillate portion, a staminate portion and a terminal naked appendix; pistillate flowers subtruncate; staminate flowers form a sub-cylindric mass. Berries 3-5 seeded.

Flowering & Fruiting: Throughout the year.

Distribution: Endemic to southern Western Ghats. Occasional; along banks of streams. *RNMK 1332,* Kallady.

PISTIA Linnaeus

Sp. Pl. 963. 1753.

Pistia stratiotes L., Sp. Pl.963. 1753; Roxb., Pl. Corom. t.268. 1820 & Fl. Ind. 3:131; Hook.f., Fl. Brit. India 6: 497. 1893; Fischer in Gamble, Pres. Madras 1573. 1931; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 276. 1988; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 526. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 724. 2009. *Kodda-pail* Rheede, Hort. Malab.11: 63-64, t. 32. 1692.

Aquatic floating herbs. Leaves sessile, tufted, obovate, 2-10 x 1-4 cm, veins prominent, white soft pubescent. Spathe small, ca. 1 cm long, basal portion convoluted, upper portion expanded into an ovate-acute limb, pale yellow; spadix with pistillate portion adnate to the spathe; female and male flowers separated by a disc-like structure; male flowers with 4-6 anthers forming a synandrium; ovary 1-locular; ovules many. Berry small, ovoid.

Flowering & Fruiting: December-February.

Distribution: Tropics and subtropics. Locally abundant; in ponds. *RNMK 1915,* Kottathara.

POTHOS Linnaeus

Sp. Pl. 968. 1753.

Evergreen climbers with fibrous or woody stems and many adventitious roots from nodes. Leaves simple, entire, shortly petioled. Inflorescence solitary, axillary, peduncled; spathe open, orbicular to linear-oblong; spadix globose to cylindrical, densely flowered. Flowers bisexual, trimerous; tepals 6, biseriate, subequal; stamens 6, equal; pistil trilocular, with one sub-basal ovule in each locule.

1. Petiole winged; spadix globose..... **P. scandens**
1. Petiole not winged; spadix oblong or elongated..... **P. armatus**

Pothos armatus Fischer in Bull. Misc. Inform. Kew 1929:126.1929 & Gamble, Fl. Pres. Madras 1592(1110).1931; Sasidh. & Sivar., Fl. Pl. Thrissur For. 487. 1996; Mohanan & Sivad., Fl. Agasthyamala 759. 2002.

Armed climbers, spines 2-4 mm long, few at nodes. Lowers leaves ovate-orbicular with cordate base, upper leaves 16-18 x 4-4.5 cm, elliptic-oblong, acuminate at apex, acute at base; nerves many, irregular, prominent below; petiole ca. 1 cm long. Spadix on short lateral branchlets; peduncles 3-5 cm long with 3-4 cataphylls at base; spathe 1.5-2 cm long, oblong, acute; spadix 5-6 cm long, slender; flowers 1.5-2 mm across, in distant groups of 3-5 together; bracts orbicular, puberulus; stamens 6; ovary obovoid, truncate above.

Flowering & Fruiting: February-March.

Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1493,* Vaduvanchal.

Pothos scandens L., Sp. Pl. 968. 1753; Hook. f., Fl. Brit. India 6: 551. 1893; Fischer in Gamble, Fl. Pres. Madras 1592(1110). 1931; Manilal & Sivar., Fl. Calicut 302. 1982; Ansari, Fl. Kasaragod Div. 404. 1985; Manilal, Fl. Silent Valley 334. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 276. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 494. 1988; Vajr., Fl. Palghat Dist. 535. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 487. 1996; Sivar. & P. Mathew, Fl. Nilambur 758. 1997; Mohanan & Sivad., Fl. Agasthyamala 761. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 526. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 725. 2009. *Ana-paruva* Rheede, Hort. Malab. 11:63-64, t. 32. 1692.

Large climbers; stem angled, 2-4 mm thick. Leaf blade 7-9 x 2.5-3 cm, lanceolate, acuminate, nerves many, united to form 2-3 narrow ribs, glabrous; petiole 3-6 cm long, broadly winged, wing broaden above. Spadix axillary; peduncle 0.5-0.7 cm long, spathe ca. 5 mm across, orbicular, obtuse, concave, brown; spadix 3-5 mm across, globose; flowers densely packed; bracts 3-5, orbicular; stamens 6, free; ovary obovoid, stigma 3-toothed.

Flowering & Fruiting: October-November.

Distribution: India to Malesia and Madagascar. Common; in evergreen forests. *RNMK 1757,* Vythiri.

REMUSATIA Schott

in Schott et Endlicher, Melet. Bot. 18. 1832.

Remusatia vivipara (Roxb.) Schott in Schott & Endl., Melet. Bot. 18.1832; Hook. f., Fl. Brit. India 6:521.1893; Fischer in Gamble, Fl. Pres. Madras 1583(1104). 1931; Ansari, Fl. Kasaragod Div. 405. 1985; Manilal, Fl. Silent Valley 334. 1988; Nicols., Suresh & Manilal, An Interpr. Hort. Malab. 276. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 495. 1988; Vajr., Fl. Palghat Dist. 535. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 487. 1996; Sivar. & P. Mathew, Fl. Nilambur 759. 1997; Mohanan & Sivad., Fl. Agasthyamala 761.

2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 527. 2005; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 23. 2009. *Arum viviparum* Roxb., Hort. Bengal 65. 1814; Wight, Ic. t. 798. 1844. *Maravara-tsjembu* Rheede, Hort. Malab. 12:19-20, t.9. 1693.

Epiphytic or lithophytic herbs with erect bulbiferous slender shoots. Leaves 20-30 cm across, ovate, acute, cordate at base, glossy above; nerves prominent; petiole 35-40 cm long; spadix solitary, on erect, terminal peduncle, covered with large cataphylls; spathes obovate to rhomboid, spreading, yellowish white; tube short, ca. 5 cm long, ellipsoid, limb 8-10 x 6-7 cm, acute; spadix 5-6 cm long; female flowers many, ovary globose, 1-celled; ovules many, parietal, stigma 3-lobed, globose; male flowers many, on clavate above part of the spadix; stamens 6, united.

Flowering & Fruiting: February-April.

Distribution: Paleotropics. Common; in semi-evergreen and moist deciduous forests. *RNMK 1633,* Kuruva.

RHAPHIDOPHORA Hasskarl

Flora 25(2) Beibl. 1: 11. 1842.

Rhaphidophora pertusa (Roxb.) Schott, Bonplandia 5: 45. 1857; Hook. f., Fl. Brit. India 6: 546. 1893; Fischer in Gamble, Fl. Pres. Madras 1598(1109). 1931; Manilal & Sivar., Fl. Calicut 302. 1982; V.S. Ramach. & V.J. Nair, Fl. Cannanore 494. 1988; Vajr., Fl. Palghat Dist. 536. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 487. 1996; Sivar. & P. Mathew, Fl. Nilambur 759. 1997; Mohanan & Sivad., Fl. Agasthyamala 763. 2002; A. E. Shanavas Khan & Sivad., Epiphytes and Parasites of Kerala, India. 24. 2009. *Pothos pertusa* Roxb., Fl. Ind. 1: 455. 1820. *Monstera pertusa* (Roxb.) Schott, Wiener Z. Kunst. 1830: 781. 1830. *Scindapsus pertusus* (Roxb.) Schott in Schott & Endl., Melet. Bot. 21. 1832.

Stout perennial climbers, stem cylindrical, ca. 4 cm thick, fleshy. Leaves 30-35 x 28-30 cm, broadly ovate, pinnatisect or rarely entire, rounded at base, acute at apex; petiole 20-35 cm long, channelled. Spadix solitary, axillary; spathe 16-20 x 7-8 cm long, ovate-oblong, concave, acute, creamy white; spadix 10-12 cm long, ca. 2 cm thick; flowers unisexual, densely packed; female flowers basal; ovary obconical, truncate, 1-celled; ovule solitary; stigma knob-like; male flowers above; stamens 4-6, free.

Flowering & Fruiting: August-September.

Distribution: India and Sri Lanka. Common; in evergreen forests. *RNMK 2281*, Vythiri.

THERIOPHONUM Blume

Rumphia 1: 127. 1837 ('1835').

Theriophonum infaustum N.E. Br., J. Linn. Soc. Bot. 18: 260. 1881; Hook. f., Fl. Brit. India 6: 513. 1893; Gamble, Fl. Pres. Madras 1579(1102). 1931; Manilal & Sivar., Fl. Calicut 305. 1982; Vajr., Fl. Palghat Dist. 537. 1990;

Sasidh. & Sivar., Fl. Pl. Thrissur For. 488. 1996; Sivar. & P. Mathew, Fl. Nilambur 760. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta Dist. 527. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 725. 2009.

Cormous herbs. Leaves long-petioled, ovate, 6-12 x 3-6 cm, base hastate, apex acute; spathe tubular below, slightly cotricted at mouth, limb lanceate; spadix with female flowers at base, male flowers above separated from the female by a barren zone, few neuters just above the female flowers; ovary 1-locular; placentation basal and apical. Berries ovoid.

Flowering & Fruiting: July-September.

Distribution: Endemic to Peninsular India. Rare; in waste places. *RNMK 1855,* Panamaram

TYPHONIUM Schott

Wiener Z. Kunst. 1829 (3): 732. 1829.

Typhonium bulbiferum Dalz. in Hook.'s J. Bot. Kew. Gard. Misc. 4: 113. 1852; Hook. f., Fl. Brit. India 6: 511. 1893; Woodr., J. Bombay Nat. Hist. Soc. 13:428. 1901; Sasidh. & Sivar., Fl. Pl. Thrissur For. 488. 1996; Sivar. & P. Mathew, Fl. Nilambur 760. 1997.

Small herbs, corms 0.8-1 cm across. Leaves 2-3, triangular-ovate, acute, base cordate, sagittate, 5-6 x 3.5-4 cm; petiole 7-10 cm long, slender with a bulbil at apex. Spathe pale purple, limb linear-lanceolate, pale purple, 8-10 cm long; spadix as long as the spathe.

Flowering & Fruiting: March-May

Distribution: Endemic to Western Ghats. Rare; in moist deciduous forests. *RNMK 1641,* Chedalayam.

Alocasia macrorrhiza (L.) G. Don is often seen in open areas.

LEMNACEAE Gray

Nat. Arr. Brit. Pl. 2: 729. 1821.

1. Rootlet solitary; fronds flat.....**Lemna**
1. Rootlets several; fronds orbicular, thick..... **Spirodela**

LEMNA Linnaeus

Sp. Pl. 970. 1753.

Lemna perpusilla Torrey, Fl. New York 2: 245. 1843; Ansari, Fl. Kasaragod Div. 405. 1985; Vajr., Fl. Palghat Dist. 537. 1990; Joseph, Aquatic Angiosp. Malabar 435. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 489. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 528. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 728. 2009. *Lemna paucicostata* Hegelm., Lemnac. 139,t.8. 1868; Hook. f., Fl. Brit. India 6: 556. 1893; Fischer in Gamble, Fl. Pres. Madras 1593(1111). 1931. *Lemna eleanorae* McCann, J. Bombay Nat. Hist. Soc. 43: 154. 1942. *Lemna minor* sensu Hook.f., Fl. Brit. India 6: 556. 1893 p.p, non L.1753.

Minute floating herbs, roots from lower surface or margins of leaf. Fronds flat, in groups of 2 or 3, broadly ovate to suborbicular, asymmetric, base obtuse to subacute, apex obtuse-rounded, 3-nerved. Inflorescence spatheate with 1 female and 2 male flowers; perianth 0; stamens 1, anthers transversely dehiscent; ovary sessile, globose, 1-locular. Fruit an utricle; seeds ribbed.
Flowering & Fruiting: September-January.
Distribution: Cosmopolitan. Common; in still water in moist deciduous forests. *RNMK* 1*752,* Tholpetty.

SPIRODELA (L.) Schleid.
Linnaea 13: 391 (1839).

Spirodela polyrrhiza (L.) Schleid., Linnaea 13: 391. 1839; Vajr., Fl. Palghat Dist. 538. 1990; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 729. 2009. *Lemna polyrhiza* L., Sp. Pl. 970. 1753; Hook. f., Fl. Brit. India 6: 557. 1893; Gamble, Fl. Pres. Madras 1593(1111). 1931. *Lemna orbiculata* Roxb., Fl. Ind. 3: 565. 1832.

Floating herbs; rootlets several, tufted from the lower surface. Fronds thick, orbicular, flat above, slightly convex below, purple. Flowers enclosed in a marginal spathe; male flowers in pairs; stamens solitary, anthers 2-celled, globose; ovary solitary. Utricle many seeded.
Flowering & Fruiting: October-December.
Distribution: Cosmopolitan. Occasional; in still water. *RNMK 3997,* Tholpetty.

ALISMATACEAE Vent.
Tabl. Regne Veg. 2 : 157. 1799.

SAGITTARIA Linnaeus
Sp. Pl.: 993 (1753).

Sagittaria trifolia L., Sp. Pl. 993. 1753. *Sagittaria sagittifolia* L. ssp. *leucopetala* (Miq.) Hartog in Steenis, Fl. Males ser. I, Ill. Fl. Arch. Ind. 2: 49. 1870; V.S. Ramach. & V.J. Nair, Fl. Cannanore 496. 1988; Joseph, Aquatic Angiosp. Malabar 263. 1991. *Sagittaria sagittifolia* L. var. *leucopetala* Miq., Ill. Fl. Arch. 2: 49. 1870. *Sagittaria sagittata* Thunb., Fl. Jap. 242. 1784.

Aquatic herbs, 40-50 cm tall. Leaves hastate or sagittate, terminal lobes 5-6 x 1.3-1.5 cm, acute or obtuse, basal lobes 6-7 x 1-1.5 cm, acuminate; petioles trigonous, 13-15 cm long. Achenes ca. 1 cm across, obliquely obovate.
Flowering & Fruiting: March-April.
Distribution: India, Europe, north Asia and north America. Occasional in swampy areas. *RNMK 1308,* Manathavady.

HYDROCHARITACEAE Juss.
Gen. Pl. 67. 1789.

1. Stems present; leaves cauline, whorled ..... **Hydrilla**
1. Stems absent; leaves radical, other than whorled..... 2

2. Leaves sessile, linear.....**Blyxa**
2. Leaves petioled, ovate ..... **Ottelia**

BLYXA Noronha ex Thouars
Gen. Nova Madag. 4. 1806.

Submerged stemless, tufted, scapigerous herbs. Leaves linear, acute, entire or minutely serrulate. Flowers dioecious or 2-sexual, on long or short scapes; male flowers pedicelled, several in a tubular, 2-toothed spathe; sepals 3, linear; petals 3, linear; stamens 3-9, 1or more rudimentary; anthers narrow, erect; pistillodes 3; ovary very slender, beaked; style very short; stigmas 3, filiform. Fruit linear, included in the ribbed spathe; seeds numerous, oblong.

1. Seeds small, tubercled, shortly tailed at each end.....**B. octandra**
1. Seeds spinescent with a long tail at each end..... **B. aubertii** var. **echinosperma**

Blyxa aubertii L.C. Rich. var. **echinosperma** (Clarke) Cook & Lound, Aquat. Bot. 15: 14. 1983; Ansari, Fl. Kasaragod Div. 364. 1985; Sivar. & P. Mathew, Fl. Nilambur 674. 1997. *Blyxa aubertii* L.C. Rich., Mem. Cl. Sci. Math. Phys. Inst. France 12: 77. t.4.1812; Ansari, Fl. Kasaragod Div. 363. 1985; Manilal, Fl. Silent Valley 266. 1988; Vajr., Fl. Palghat Dist. 460. 1990; Sivar. & P. Mathew, Fl. Nilambur 673. 1997; Mohanan & Sivad., Fl. Agasthyamala 647. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 474. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 737. 2009. *Hydrotrophus echinospermus* Clarke, J. Linn. Soc. Bot. 14: 4. t.1. 1875. *Blyxa echinosperma* (Clarke) Hook. f., Fl. Brit. India 5: 661. 1888; Gamble, Fl. Pres. Madras 1397(978). 1928; Manilal & Sivar., Fl. Calicut 281. 1982; Vajr., Fl. Palghat Dist. 460. 1990; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 474. 2005. *Blyxa oryzetorum* (Decne.) Hook.f., Fl. Brit. India 5: 661. 1888. *Diplosiphon oryzetorum* Decne. in Jacq., Voy. 167. 1884. *Blyxa ceylanica* Hook.f., Fl. Brit. India 5: 661. 1888; Gamble, Fl. Pres. Madras 1397(978). 1928.

Submerged plants, stems absent. Leaves densely tufted, 10-20 cm long, 5-7 mm broad, linear-lanceolate, acuminate. Flowers dioecious on long scapes perianth lobes 3+3, ca. 5 mm long, oblong; stamens 3-9, free; ovary slender, 1-celled, many-ovuled; stigmas 3, linear. Fruit a linear capsule, to 4 cm long, ca. 2 mm broad; seeds many, ca. 3 mm long, ellipsoidal, echinate, tailed at both ends, white.

Flowering & Fruiting: Novembver-December.

Distribution: Cosmpolitan. Occasional; in still waters and paddy fields. *RNMK 3986*, Panamaram.

Blyxa octandra (Roxb.) Planch. ex Thw., Enum. Pl. Zeyl. 332. 1864; Gamble, Fl. Pres. Madras 1397(978). 1928; Manilal & Sivar., Fl. Calicut 281. 1982; Ansari, Fl. Kasaragod Div. 364. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 443. 1988; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 737. 2009.

Vallisneria octandra Roxb., Pl. Corom. 2: 34, t. 165. 1802. *Blyxa roxburghii* L.C.Rich., Mem. Inst. Paris. 12: 23-24, tt. t. 5. 1812; Hook. f., Fl. Brit. India 5: 660. 1888.

Stemless herbs, submerged. Leaves linear, 20-40 x 1-1.5 cm. Flowers dioecious; sepals linear; petals longer than sepal; stamens 8. Fruits 4-6 cm long; seeds tubercled, shortly tailed at both ends.

Flowering & Fruiting: July-November.

Distribution: Indo-Malesia to Australia. Occasional; in still water. *RNMK 3976*, Pookodu.

HYDRILLA L. C. Richard

Mem. Cl. Sci. Math. Inst. Natl. France 12(2): 9, 61, 76. 1814.

Hydrilla verticillata (L.f.) Royle, Illustr. Bot. Himal. t. 376. 1839; Hook. f., Fl. Brit. India 5: 659. 1888; Gamble, Fl. Pres. Madras 1396(977). 1928; Manilal & Sivar., Fl. Calicut 280. 1982; Ansari, Fl. Kasaragod Div. 365. 1985; Vajr., Fl. Palghat Dist. 460. 1990; Sivar. & P. Mathew, Fl. Nilambur 674. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 474. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 732. 2009. *Serpicula verticillata* L.f., Suppl. Pl. 416. 1781.

Profusely branched, submerged, tuberous, slender herbs; rooting at nodes. Leaves opposite or whorled, linear-oblong, margin entire or serrulate; spathes solitary, axillary. Flowers unisexual, solitary, minute; sepals 3, ovate; petals 3, oblong; stamens 3; femals flowers sessile; stigma fimbriate. Fruit subcylindric; seeds 2-6, minute.

Flowering & Fruiting: Throughout the year.

Distribution: Asia, Europe and Africa. Occasional; in water bodies. *RNMK 3969*, Panamaram.

OTTELIA Person

Syn. Pl. 1:400. 1805

Ottelia alismoides (L.) Pers., Syn. Pl. 1: 400. 1805; Hook. f., Fl. Brit. India 5: 662. 1888; Gamble, Fl. Pres. Madras 1398(978). 1928; Manilal & Sivar., Fl. Calicut 281. 1982; Vajr., Fl. Palghat Dist. 461. 1990; Sivar. & P. Mathew, Fl. Nilambur 675. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta Dist. 474. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 733. 2009. *Stratiotes alismoides* L., Sp. Pl. 535. 1753. *Damasonium indicum* Willd., Sp. Pl. 2: 276. 1799.

Flaccid, submerged, annual herbs. Submerged leaves narrow-oblong, tapering at base; floating leaves oblong, obtuse, cordate at base, margin undulate; spaths ovate-elliptic, with 5-10 wavy wings. Flowers solitary, sessile, white; sepals 3, oblong-lanceolate; petals 3, obovate with yellow base; stamens 6-9, filaments hairt. Fruits fleshy, oblong; seeds crowned by sepals.

Flowering & Fruiting: July-January.

Distribution: Indo-Malesia to Pacific Islands. Occasional; in water bodies. *RNMK 3987*, Pookodu.

NAJADACEAE Juss.

Gen. Pl. 18. 1789.

NAJAS Linnaeus

Sp. Pl. 1015. 1753.

Najas indica (Willd.) Cham., Linnaea 4: 501. 1829; Fischer in Gamble, Fl. Pres. Madras 1604(1119). 1931; Manilal, Fl. Silent Valley 335. 1988; Joseph, Aquatic Angiosp. Malabar 449. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 489. 1996; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 737. 2009. *Cauline indica* Willd., Mem. Acad. Roy. Sci. Hist. (Berlin) 89, t.1, f.3. 1801. *Najas fasciculata* Braun, J. Bot. 2: 278. 1864; Hook. f., Fl. Brit. India 6: 569. 1893; Fischer in Gamble, Fl. Pres. Madras 1604(1119). 1931. *Najas lacerata* Rendle, Trans. Linn. Soc. London 5: 416. 1899; Fischer in Gamble, Fl. Pres. Madras 1604(1119). 1931.

Submerged herbs; stems 8-10 cm long, slender. Leaves opposite and whorled, 1-2.5 x 0.1-0.2 cm, linear-oblong, entire or serrate, acute. Flowers monoecious, axillary, solitary, subtended by a spathe; spathe 1-2.5 mm long; deeply lobed; perianth absent; stamens 1; anthers 4-celled; ovary 1-celled; ovules solitary, style 1, stigmas 4, filiform. Fruit an achene, ca. 1 mm long, ellipsoidal, acute, white, reticulate in horizontal rows.

Flowering & Fruiting: August-December.

Distribution: Tropical Asia and Africa. Occasional; in stagnant water bodies. *RNMK 3893*, Tholpetty.

APONOGETONACEAE J. Agardh

Theoria Syst. Pl. 44. 1858.

APONOGETON Linnaeus

Suppl. Pl.: 32 (1782).

Aponogeton appendiculatus van Bruggen, Blumea 16: 264. 1968; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 733. 2009.

Submerged herbs; Tubers ca. 1 cm across, elongate, creeping. Leaves all submerged; lamina strap-shaped, 25-35 x 2-3 cm, undulate, base cuneate, with 2-4 pairs of lateral nerves; petiole 20-25 cm long. Spikes lax, 10-15 cm long, peduncle as long as or longer than petiole; flowers white; tepals 2, obovate, broader than long, 1 nerved; stamens 4-5; carpels 2-3, ovules 1-2 per cell. Follicle 1-1.2 x 0.6-0.8 cm, beak terminal.

Flowering & Fruiting: November-April.

Distribution: Endemic to southern Western Ghats. Rare; in water bodies. *RNMK 1271,* Banasurasagar dam.

ERIOCAULACEAE P. Beauv. ex Desv.

In Ann. Sci. Nat. (Paris) 13: 47. 1828.

ERIOCAULON Linnaeus

Sp. Pl. 87. 1753.

Annual marshy herbs, stem very short or absent. Leaves radical, oblong to lanceolate, many-nerved, glabrous; transverse nervules prominent; base sheathing. Flower unisexual, thickly packed in an involucrate head formed solitary on a peduncle. Peduncle solitary or several to many, usually ribbed, covered at the base by a tubular sheath with an oblique or truncate mouth and a limb. Heads globose, hemispherical or truncate with pilose or glabrous receptacle; bracts dimorphous, involucral bracts and floral bracts; involucral bracts 1-3-seriate at the periphery of the head, obovate, oblong to orbicular, floral bracts obovate to cuneate, carries a unisexual flowers on its axils; staminate flowers stipitate; sepals 2 or 3, free or united; petals 3, equal or unequal, very small, united into a tube; stamens 6, free, arising from the inner walls of petals, unequal; anthers globose, black or yellow. Female flowers sessile or stipitate; sepals 2 or 3, free; petals 3, free, oblong-oblanceolate to linear; ovary ellipsoid, 3-chambered with a single ovule in each; style one, linear; stigmas 3, linear. Fruit a loculicidal capsule, 3-chambered, with solitary seed in each; seeds ovoid to oblong, with numerous appendages formed from horizontal and vertical wall, black or brown.

1. Floral bracts regularly imbricating, closely appressed and concealing the flowers .... **E. sexangulare**
1. Floral bracts not regularly imbricating 2
2. Petals in female flowers unequal and larger than the floral bracts 3
2. Petals in female flowers equal and not larger than the floral bracts 4
3. Heads more than 1 cm across; floral bracts olive-grey ..... **E. robustum**
3. Heads less than 1 cm across; floral bracts black ..... **E. longicuspe**
4. Plants hairy; involucral bracts pubescent..... **E. robustobrownianum**
4. Plants and involucral bracts quite glabrous 5
5. Floral bracts glabrous; peduncles many ..... **E. truncatum**
5. Floral bracts pilose or distinctly pubescent; peduncles solitary 6
6. Involucral bracts lanceolate, much longer than the floral bracts and the flowers.... 7
6. Involucral bracts not longer than the floral parts 8
7. Floral bracts oblong-obovate; corolla lobes glabrous..... **E. xeranthemum**
7. Floral bracts obovate-cuneate; corolla lobes white hairy..... **E. heterolepis**
8. Heads hemispherical; calyx of female flowers spathaceous, 3-lobed .... **E. quinquangulare**
8. Heads conical with a flat base; calyx not spathaceous..... **E. conicum**

Eriocaulon conicum (Fyson) C.E.C. Fisch. in Gamble, Fl. Pres. Madras 1620(1128). 1931; Manilal & Sivar., Fl. Calicut 309. 1982; Ansari & Balakr.,

Eriocaulac. India 109. 1994. *Eriocaulon dianae* Fyson var. *conica* Fyson, J. Indian Bot. Soc. 2: 250. 1921.

Stems very short. Leaves 3-4 x 0.1-0.2 cm, linear, glabrous. Peduncles several, slender; head 2-3 x 2.5-3 mm, globose; involucral bracts 1.5-2 x 1-2 mm, elliptic, acute, hyaline; floral bracts 1.5-2 x 1-2 mm, cuneate, acuminate at apex; female sepals linear, glabrous, hyaline; petals linear, glabrous with a black gland at apex; male sepals 3, basally united, hyaline; petals 3, equal, glabrous, glandular at apex; anthers black. Appendages on seeds long, rectangular, one on each transverse wall

Flowering & Fruiting: September-December.

Distribution: Endemic to Peninsular India. Common in marshy areas. *RNMK 3608,* Kunchome.

Eriocaulon heterolepis Steud., Syn. Pl. Glum. 2: 271. 1855; Hook. f., Fl. Brit. India 6: 585. 1893; Ansari & Balakr., Eriocaulac. India 48. 1994; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 740. 2009. *Eriocaulon dianae* Fyson, J. Indian Bot. Soc. 2: 259, tt. 11,12. 1921; Gamble, Fl. Pres. Madras 1620(1128). 1931; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 530. 2005. *Eriocaulon dianae* Fyson var. *longibracteatum* Fyson, J. Indian Bot. Soc. 1:50.1919 & 2:259, Pl. 12.1921; Gamble, Fl. Pres. Madras 1620(1128). 1931; Manilal & Sivar., Fl. Calicut 308.1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 496.1988; Manilal & Sivar., Fl. Calicut 308. 1982; Ansari & Balakr., Eriocaulac. India 48. 1994.

Stem short. Leaves linear, 7-10 cm long, apex acute, peduncle slender, ribbed, 12-15 cm long; bracts obovate; capitule hemispheric, receptacles conical, pilose; male flowers lobes 3, small, papillose, inner tepals glandular at apex; outer petals of female flowers free, heteomerous, tip white hairy, inner tepals eglandular.

Flowering & Fruiting: July-November.

Distribution: Endemic to Western Ghats. Common in moist deciduous forests. *RNMK 3388*, Kattikulam.

Eriocaulon longicuspe Hook. f., Fl. Brit. India 6: 573. 1893; Ansari & Balakr., Eriocaulac. India 102. 1994. *Eriocaulon polycephalum* Hook. f., Fl. Brit. India 6: 573. 1893. *Eriocaulon longicuspis* Hook.f. var. *polycephala* (Hook. f.) Fyson, J. Indian Bot. Soc.2: 308. 1921; Gamble, Fl. Pres. Madras 1618(1127). 1921.

Small herbs; stem short. Leaves 4-5 x 0.3-0.4 cm, angustate, acute, glabrous. Peduncles 2-3, 16-20 cm long; head depressed-globose; receptacle pilose; involucral bracts obovate, obtuse, straw-coloured, glabrous; floral bracts cuneate, black, or grey. Female sepals linear, black, glabrous or thinly hairy; petals linear-oblong, thinly hairy, white; male sepals 3, free or basely connate, black; one petal larger, hairy; anthers black. Appendages on seeds short, rectangular bits on transverse walls.

Flowering & Fruiting: May-December.

Distribution: Peninsular India and Sri Lanka. Common in moist deciduous forests. *RNMK 2355,* Muthanga.

Eriocaulon quinquangulare L., Sp. Pl. 87.1753; Hook. f., Fl. Brit. India 5:582.1893; Gamble, Fl. Pres. Madras 1620(1128).1931; Manilal & Sivar., Fl. Calicut 309. 1982; Ansari, Fl. Kasaragod Div. 410. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore. 497. 1988; Vajr., Fl. Palghat Dist. 539. 1990; Joseph, Aquatic Angiosp. Malabar 411. 1991; Ansari & Balakr., Eriocaulac. India 104. 1994; Sivar. & P. Mathew, Fl. Nilambur 764. 1997; Anilkumar, Sivad. & N. Ravi., Fl. Pathanamthitta. 530. 2005.

Small herbs. Leaves 5-6 x 0.5-0.6 cm, falcate, acuminate, glabrous. Peduncles numerous, 10-30 cm high; sheath 4-5 cm long, limb small. Head ovoid; involucral bracts obovate, toothed at apex, straw-coloured; floral bracts cuneate, abruptly acuminate, black, glabrous; female sepals 3, equal, linear, sparsely hairy, black; petals linear-oblong, hairy, hyaline, glandulose; male sepals black, united into a split sheath, minutely hairy, lobes truncate; petal equal, hairy; anthers black. Seeds oblong, appendages entire or cut up into rectangular strips on transverse walls.

Flowering & Fruiting: August-November.

Distribution: South Asia. Common in moist deciduous forests. *RNMK 3777*, Muthanga.

Eriocaulon robustobrownianum Ruhland in Engl., Pflanzenreich Eriocaul. 77. 1903; Gamble, Fl. Pres. Madras 1619(1127). 1931; V. S. Ramach. & V.J. Nair, Fl. Cannanore 497. 1988; Ansari & Balakr., Eriocaulac. India 25. 1994. *Eriocaulon mysorense* Fyson, Bull. Misc. Inform. Kew 1914: 331. 1914.

Large herbs. Leaves 15-20 x 2-3 cm, linear or ligulate, apex attenuate, glabrous; peduncles twisted, 6-9 ribbed; sheath glabrous, mouth oblique. Heads globose; floral bracts obovate-cuneate, grey-green, apex white papillose-hairy; calyx in male flowers spathaceous, lobe 3, apex white hairy; corolla lobes triangular, apex with a black gland; petals in female flowers oblong, shortly clawed. Seeds subglobose, red-brown.

Flowering & Fruiting: February-March.

Distribution: Endemic to Peninsular India. Common in moist deciduous forests. *RNMK 3009,* Muthanga.

Eriocaulon robustum Steud., Syn. Pl. Glum. 2: 271. 1855; Hook. f., Fl. Brit. India 6: 572. 1893; Gamble, Fl. Pres. Madras 1618(1126). 1931; Ansari & Balakr., Eriocaulac. India 131.1994; Sivar. & P. Mathew, Fl. Nilambur 764.1997.

Robust herbs; stem short, silky woolly. Leaves 6-20 x 3-4 cm, ensiform, glabrous; peduncles solitary, glabrous, many ribbed; sheath lax, mouth oblique. Heads subglobose; floral bracts long acuminate, pilose in the upper half; male sepals free, dark green, spathulate-oblong; corolla lobes large, apex with a blck gland; anthers black; petals in female flowers unequal, spathulate-oblong, pilose.

Flowering & Fruiting: June-April.

Distribution: Endemic to southern Western Ghats. Occasional; in marshy areas in grasslands. *RNMK 2670,* Kurichiarmala.

Eriocaulon sexangulare L., Sp. Pl. 87. 1753; Hook. f., Fl. Brit. India 6: 580. 1893; Gamble, Fl. Pres. Madras 1618(1126). 1931; Manilal & Sivar., Fl. Calicut 309. 1982; Ansari, Fl. Kasaragod Div. 411. 1985; Manilal, Fl. Silent Valley 336. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 497. 1988; Ansari & Balakr., Eriocaulac. India 79. 1994; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 742. 2009. *Eriocaulon wallichianum* Mart. ex Wall., Pl. Asiat. Rar. 3: 26. 1832.

Leaves 5-6 x 0.4-0.5 cm, linear-lanceolate, acute. Peduncles few, 5-8 cm long, slender. Head depressed globose, involucral bracts broadly ovate, obtuse, black, glabrous; floral bracts obovate, obtuse, black, glabrous; female sepals 3, elliptic, concave, slightly clawed, black; petals linear-oblong, glabrous, white; male sepals oblanceolate, united into a close tube with 3 shallow teethes glabrous; petals glabrous, equal; anthers black. Seeds ellipsoid; appendages solitary on transverse walls in vertical rows.

Flowering & Fruiting: September-January.

Distribution: Indo-Malaya and Sri Lanka. Common; in moist deciduous forests. *RNMK 3454,* Muthanga.

Eriocaulon truncatum Bunch.-Ham. ex Mart. in Wall., Pl. Asiat. Rar. 3: 29. 1832; Hook. f., Fl. Brit. India 6: 578. 1893; Gamble, Fl. Pres. Madras 1619(1127). 1931; Manilal & Sivar., Fl. Calicut 310. 1982; Ansari, Fl. Kasaragod Div. 411. 1985; Manilal, Fl. Silent Valley 336. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 498. 1988; Vajr., Fl. Palghat Dist. 539. 1990; Joseph, Aquatic Angiosp. Malabar 414. 1991; Ansari & Balakr., Eriocaulac. India 118. 1994; Sivar. & P. Mathew, Fl. Nilambur 765. 1997; Mohanan & Sivad., Fl. Agasthyamala 767. 2002; Anilkumar, Sivad. & N. Ravi., Fl. Pathanamthitta 530. 2005. *Eriocaulon truncatum* var. *malaccense* Hook.f., Fl. Brit. India 6: 578. 1893.

Small herbs. Leaves 3-4 x 0.3-0.4 cm, lanceolate, acuminate at apex. Peduncles many, 12-15 cm long; heads hemispherical; involucral bracts oblong, obtuse, at apex, straw coloured; floral bracts oblanceolate, obtuse, pale brown, glabrous; female sepals 2, 1.5-2 mm long, linear, black; petals 3, linear, white, glabrous, glandulose; male sepals united, lobes shallow, black, glabrous; petals equal, glandulose. Seeds oblong.

Flowering & Fruiting: July-September.

Distribution: Indo-Malesia. Common; in marshes in grasslands. *RNMK 3555,* Chembra.

Eriocaulon xeranthemum Mart. in Wall., Pl. Asiat. Rar. 3:29.1832; Hook. f., Fl. Brit. India 6:584.1893; Gamble, Fl. Pres. Madras 1620 (1127). 1931; Manilal & Sivar., Fl. Calicut 308. 1982; Ansari, Fl. Kasaragod Div. 412. 1985; Ansari & Balakr., Eriocaulac. India 58. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 490. 1996; Sivar. & P. Mathew, Fl. Nilambur 766. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 531. 2005; C.N. Sunil & Sivad., Fl.

Alappuzha Dist. 744. 2009. *Eriocaulon pygmaeum* Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 281. 1851.

Leaves 0.8-2.5 x 0.15-0.2 cm, lanceolate, acuminate. Peduncles 1-few, 1-5 cm long; heads spreading, obconical; involucral bracts elliptic, acute, hyaline; floral bracts oblanceolate, truncate and hairy at apex, black; female sepals oblanceolate, one shorter and linear, brown; petals 3, oblong, hairy, glandulose; petals 3, subequal, glandulose. Seeds oblong, appendages 2-3 on the base, lobes truncate, black.

Flowering & Fruiting: August-December.

Distribution: India, Nepal and Myanmar. Occasional; in grasslands. *RNMK 3773*, Chembra.

CYPERACEAE Juss.

Gen. Pl. 26. 1789

1. Flowers unisexual 2
1. Flowers bisexual 3
2. Ovary enclosed in an utricle ..... **Carex**
2. Ovary not enclosed in an utricle ..... **Scleria**
3. Leaves reduced to sheaths 4
3. Leaves with well developed blades 5
4. Hypogynous bristles present; style base persistent ..... **Eleocharis**
4. Hypogynous bristles absent; style base deciduous ..... **Fimbristylis** *p.p*
5. Hypogynous bristles or scales present 6
5. Hypogynous scales or bristles 0 8
6. Nut with elongated beak; style-base dilated ..... **Rhynchospora**
6. Nut without elongated beak; style base not dialated 7
7. Leaves distant; glumes aristate ..... **Fuirena**
7. Leaves basal; glumes not aristate ..... **Lipocarpha**
8. Glumes spiral 9
8. Glumes distichous 10
9. Style deciduous, leaving a persistent bulbiform tumour on nut ..... **Bulbostylis**
9. Style-base persistent or if deciduous not leaving a tumour on nut . **Fimbristylis** *p. p*
10. Rachilla persistent 11
10. Rachilla deciduous ..... **Kyllinga**
11. Stigmas 3; nut trigonous; ..... **Cyperus**
11. Stigmas 2; nut biconvex ..... **Pycreus**

BULBOSTYLIS Kunth

Enum. Pl. 2: 205. 1837, *typ. cons.*

Bulbostylis barbata (Rottb.) Kunth ex Clarke in Hook. f., Fl. Brit. India 6: 651. 1893; Fischer in Gamble, Fl. Pres. Madras 1662(1153). 1931; Manilal & Sivar., Fl. Calicut 327. 1982; Ansari, Fl. Kasaragod Div. 413. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 499. 1988; Vajr., Fl. Palghat Dist. 540. 1990; Rejani,

Cyperac. Kerala 80.1991; Sivar. & P. Mathew, Fl. Nilambur 767. 1997; Mohanan & Sivad., Fl. Agasthyamala 769. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 532. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 746. 2009. *Scirpus barbatus* Rottb., Desc. Nov. Pl. 52. 1773. *Isolepis barbata* (Rottb.) R. Br., Prodr. 222. 1810. *Isolepis barbata* (Rottb.) R. Br. var. *capillaris* Nees in Wight, Contrib. 109. 1834. *Stenophyllus barbatus* (Rottb.) Cooke., Fl. Pres. Bombay 2: 887. 1908.

Densely tufted annual; culms 5-15 cm high, 5-6-ridged, smooth. Leaves 3-6 cm long, filiform, glabrous; sheath keeled, mouth with long-cilia. Umbels globose, 0.5-0.6 cm across, bracts 2-3, filiform with a broad base, surpass the head. Spikelets 3-5 mm long, sessile, clustered, 8-15 in an umbel, densely packed; glumes aristate, 6-12 in a spikelets, spirally disposed; arista curved out, scabrid. Nut trigonous, truncate at apex, thinly reticulate, pale brown.

Flowering & Fruiting: August-December.

Distribution: Paleotropics and southern USA. Common; in marshy areas. *RNMK 1521,* Mananthavady.

CAREX Linnaeus

Gen. Pl. ed. 1, 280. 1737.

Carex filicina Nees in Wight, Contrib. Bot. Ind. 123. 1834; Clarke in Hook. f., Fl. Brit. India 6: 717. 1894; Fischer in Gamble, Fl. Pres. Madras 1686(1169). 1931; Manilal, Fl. Silent Valley 337. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore Dist. 500. 1988; Vajr., Fl. Palghat Dist. 541. 1990; Rejani, Cyperac. Kerala 106. 1991; Sivar. & P. Mathew, Fl. Nilambur 769. 1997; Mohanan & Sivad., Fl. Agasthyamala 771. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 533. 2005. *Carex glaucina* Boeck., Linnaea 40: 353.1876; Rejani, Cyperac. Kerala 109. 1991; V.S. Ramach. & V.J. Nair, Fl. Cannanore 500. 1988. *Carex leptocarpa* Clarke in Hook. f., Fl. Brit. India 6: 719. 1893. *Carex filicina* Nees var. *leptocarpa* (Clarke) Kukenth. in Engl., Pflanzenr. 4, Fam. 20: 274. 1909; Rejani, Cyperac. Kerala 108. 1991.

Perennials, culms 90-20 cm tall, slender. Leaves 30-60 x 0.6-0.8 cm, scabrous. Sheath rounded, closed. Partial panicles 8-10 x 2-3 cm; bracts 27-30 cm long; bracteoles filiform. Spikelets 1.5-2 cm long; male portion 3-4 mm long, narrower; pistillate glumes reddish brown; utricle scabrid, blotched with red spots; beak deeply bifid; staminate glumes acute. Nuts trigonous, ellipsoid, apiculate.

Flowering & Fruiting: May-August.

Distribution: South and south-east Asia. Occasional; along margins of evergreen forests. *RNMK 2875,* Chanthanathodu.

CYPERUS Linnaeus

Sp. Pl. ed. 1, 1: 44. 1753.

Annuals or perennials; rhizome creeping, short or absent. Leaves usually basal or rarely along the stem, linear-lanceolate, 1 or 3-costate. Inflorescence

of compound or decompound umbel; bracts 3-9, radiating, lanceolate; rays 3-10, secondary and tertiary rays some times present. Spikelets compressed, ovate to oblong, acute, in elongate conjested racemes or spikes or umbels; rachilla persistent, winged along the margins or wingless; glumes all similar, many, distichous, basal two smaller, empty, upper ones carries a bisexual flower; stamens usually 3, sometimes 2 or 1; ovary oblong to obconical; styles 3, united at base, continuous with nut; stigmas 3. Nut 3-gonous, usually smooth.

1. Rachilla persistent 2
1. Rachilla disarticulating 8
2. Spikelets spicately arranged on a more or less elongated rachis 3
2. Spikelets digitate or stellately arranged on a much abbreviated rachis 7
3. Spikes cylindrical..... **C. exaltatus**
3. Spikes ovoid or obovoid..... 4
4. Rachilla broadly winged 5
4. Rachilla not or hardly winged..... 6
5. Rhizomes creeping with stolons; glumes closely imbricate..... **C. corymbosus**
5. Rhizomes not creeping; glumes scarcely imbricate ..... **C. distans**
6. Perennials with rhizomes; glumes rounded on the back ..... **C. pilosus**
6. Annuals with fibrous roots; glumes mucronate ..... **C. iria**
7. Connective of anthers with setulose appendage ..... **C. haspan**
7. Connective of anthers smooth..... **C. tenuispica**
8. Glumes with conspicuously spreading or recurved mucro..... 9
8. Glumes not with conspicuously spreading or recurved mucro.....10
9. Glumes oblong..... **C. paniceus**
9. Glumes elliptic with curved arista..... **C. maderaspatanus**
10. Spikelets many flowered; glumes not tightly clasping the nut 11
10. Spikelets few flowered; glumes tightly clasping the nuts ..... **C. cyperinus**
11. Stems densely papillose; spikelets turgid ..... **C. javanicus**
11. Stems not papillose; spikelets not turgid..... **C. compactus**

Cyperus compactus Retz., Obs. Bot. 5: 10. 1789; V.S. Ramach. & V.J. Nair, Fl. Cannanore 503. 1988. *Mariscus compactus* (Retz.) Boldingh, Zakfl. Landb. Java 77. 1916; Fischer in Gamble, Fl. Pres. Madras 1645(1143). 1931; Vajr., Fl. Palghat Dist. 554.1990; Rejani, Cyperac. Kerala 353.1991; Joseph, Aquatic Angiosp. Malabar 384. 1991; Sivar. & P. Mathew, Fl. Nilambur 792.1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 752. 2009. *Mariscus microcephalus* Presl, Reliq. Haenk. 1: 182. 1828; Clarke in Hook. f., Fl. Brit. India 6: 624. 1893.

Perennial herbs, 40-45 cm tall; stems subterete or trigonous. Leaves 5-7 cm broad, canaliculate at base; sheaths spongy, reddish brown. Spikelets ca. 1.5 x 0.1 cm, linear lanceolate, subterete, in subglobose spikes, ca. 2 cm across. Nuts linear-oblong, trigonous, deep brown.

Flowering & Fruiting: March-September.

Distribution: South and south-east Asia. Occasional; in moist deciduous forests. *RNMK 3241,* Tholpetty.

Cyperus corymbosus Rottb., Desc. Ic. Rar. 42. t.7, f.4. 1773; Clarke in Hook. f., Fl. Brit. India 6: 612. 1893; Fischer in Gamble, Fl. Pres. Madras 1641(1140). 1931; Ansari, Fl. Kasaragod Div. 418. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 504. 1988; Joseph, Aquatic Angiosp. Malabar 317. 1991; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 534. 2005. *Cyperus tagetiformis* Roxb. ex Kunth, Enum. Pl. 2: 56. 1837; Clarke in Hook. f., Fl. Brit. India 6: 612. 1893. *Cyperus enodis* var. *longispiculatus* O. Kuntze., Rev. Gen. 2: 749. 1891. *Cyperus corymbosus* Rottb. var. *longispiculatus* (O. Kuntze.) Kukenth. in Engler's Das Pflanzenr. Heft 101, 82. 1936; Rejani, Cyperac. Kerala 139. 1991.

Erect herbs, 60-80 cm tall; stem triquetrous. Leaves reduced to sheaths. Spikelets clustered, 4-6 together, linear, 3-4 x 0.1-0.2 cm, in compound heads; bracts 2-5. Nuts narrowly obovoid-ellipsoid, trigonous, apiculate, black.
Flowering & Fruiting: September-January.
Distribution: Pantropical. Common; in moist deciduous forests. *RNMK 1447,* Muthanga; *RNMK 3164,* Tolpetty.

Cyperus cyperinus (Retz.) Sur., Cyp. Mal. Arch. 154. t.6. f.10. 1898; Ansari, Fl. Kasaragod Div. 418. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 504. 1988. *Kyllinga cyperina* Retz., Obs. Bot. 6: 21. 1791. *Mariscus cyperinus* (Retz.) Vahl, Enum. Pl. 2: 377. 1805; Clarke in Hook. f., Fl. Brit. India 6: 621. 1893; Fischer in Gamble, Fl. Pres. Madras 1644(1143). 1931; Manilal & Sivar., Fl. Calicut 312. 1982; Rejani, Cyperac. Kerala 354. 1991; Joseph, Aquatic Angiosp. Malabar 386. 1991; Vajr., Fl. Palghat Dist. 554. 1990; C.N. Sunil, Fl. Pl. Alappuzha Dist. 1040. 2000; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 551. 2005. *Mariscus pictus* Nees in Wight, Contrib. 90. 1834; Clarke in Hook. f., Fl. Brit. India 6:621.1893; Fischer in Gamble, Fl. Pres. Madras 1645(1143). 1931. *Mariscus cyperinus* (Retz.) Vahl var. *pictus* (Nees) Karthik, Fl. Ind. Enum. 63. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 497. 1996.

Erect herbs, 35-40 cm tall; stem base thickened,triquetrous, ca. 0.5 cm thick. Leaves as long as stem or shorter. Inflorescence of simple umbels; spikes oblong; 4-5 cm long; bracts 4-8, foliaceous; spikelets linear, transversely spreading, 2-4 fid. Nut cylindric, angular; slightly curved.
Flowering & Fruiting: June-August.
Distribution: Tropics and subtropics. Common; in moist deciduous forests. *RNMK 2088,* Muthanga; *RNMK 1863*. Tolpetty.

Cyperus distans L. f., Suppl. Pl. 103. 1781; Clarke in Hook. f., Fl. Brit. India 6: 607. 1894; Fischer in Gamble, Fl. Pres. Madras 1640(1140). 1931; Manilal & Sivar., Fl. Calicut 315. 1982; Manilal, Fl. Silent Valley 338. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 505. 1988; Vajr., Fl. Palghat Dist. 544. 1990; Rejani, Cyperac. Kerala 161. 1991; Joseph, Aquatic Angiosp. Malabar 320. 1991; Sivar. & P. Mathew, Fl. Nilambur 773. 1997; Anil Kumar, Sivad. &

N. Ravi, Fl. Pathanamthitta 535. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 755. 2009. *Cyperus nutans* sensu Clarke in Hook.f., Fl. Brit. India 6: 607. 1893, p.p., non Vahl 1805. *Cyperus distans* L.f. var. *pseudonutans* Kukenth. in Engler's Das Pflanzenr. Heft 101, 140. 1936; Ansari, Fl. Kasaragod Div. 419. 1985; Manilal, Fl. Silent Valley 339. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 506. 1988; Vajr., Fl. Palghat Dist. 545. 1990; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 537. 2005.

Perennials; rhizome globose; culms 40-70 cm high, sharply 3-angled. Leaves 20-30 x 0.4-0.6 cm, linear, flat; sheath closed. Umbels 18-25 x 22-25 cm; bracts unequal, 30-35 x 0.4-0.6 cm; rays 5-7; secondary rays present; spikes 2-3 cm long; rachis red, glabrous; spikelets linear, 18-flowered, 15-20 in each spike; rachilla with white linear wings; glumes oblong, 1-nerved, red. Nut curved, grey-brown, smooth.

Flowering & Fruiting: October-November.

Distribution: Pantropical. Common; in open areas along streams. *RNMK 3051*, Manathavady.

Cyperus exaltatus Retz., Obs. Bot. 5: 11. 1789; Clarke in Hook. f., Fl. Brit. India 6: 617. 1893; Fischer Gamble, Fl. Pres. Madras 1642(1141). 1931; V.S. Ramach. & V.J. Nair, Fl. Cannanore 506. 1988; Vajr., Fl. Palghat Dist. 545. 1990; Rejani, Cyperac. Kerala 171. 1991; Joseph, Aquatic Angiosp. Malabar 321. 1991; Sivar. & P. Mathew, Fl. Nilambur 773. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 537. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 756. 2009.

Stout perennials; culms 60-130 cm tall, 0.8 cm thick, obtusely trigonous. Leaves 30-60 x 0.8-1.3 cm, flat or folded, canaliculate; sheath keeled, open. Umbels 25-35 x 15-18 cm; bracts 5-7, unequal; rays 5-10, to 25 cm long; spikes sessile and peduncled; spikelets ca. 8 x 2 mm, compressed, 16-22-flowered; wing of rachilla pale red; glumes broadly elliptic, cuspidate, 5-nerved, reddish brown; keel green. Nut white, obovoid to ellipsoid.

Flowering & Fruiting: August-December.

Distribution: Pantropical. Occasional; along banks of streams. *RNMK 3058*, Muthanga; *RNMK 0186*, Tolpetty.

Cyperus haspan L., Sp. Pl. 45. 1753; Roxb., Fl. Ind. 1:213. 1820; Clarke in Hook. f., Fl. Brit. India 6: 600. 1893; Fischer in Gamble, Fl. Pres. Madras 1640(1139). 1931; Manilal & Sivar., Fl. Calicut 315. 1982; Ansari, Fl. Kasaragod Div. 420. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 507. 1988; Rejani, Cyperac. Kerala 181. 1991; Joseph, Aquatic Angiosp. Malabar 324. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 492. 1996; Sivar. & P. Mathew, Fl. Nilambur 774. 1997; Mohanan & Sivad., Fl. Agasthyamala 774. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 537. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 756. 2009. *Cyperus juncoides* Lamk., Ill. Gen. 1: 147. 1791. *Cyperus haspan* L. var. *flaccidissimus* Kukenth. in Engl.,

Pflanzenr. 4, Fam. 20: 248. 1936. *Cyperus haspan* L. ssp. *juncoides* (Lamk.) Kukenth., Feddes Repert. 23: 184. 1926; Manilal & Sivar., Fl. Calicut 315. 1982; V.S. Ramach. & V.J. Nair, Fl. Cannanore 507. 1988; Rejani, Cyperac. Kerala 182. 1991; Joseph, Aquatic Angiosp. Malabar 325. 1991.

Annuals; rhizome creeping, brown, slender; culms 70-100 cm long, slender. Sheaths many at base, red-purple, bladeless. Umbels compound, rays 2-15, secondary rays also present; bracts few, smaller than the umbel, leafy; spikelets sessile, 0.2-1.5 cm long, ovate, acute, 3-15-flowered, 1-5 together in umbellules; glumes ovate, keeled, 1-nerved. Nut trigonous, white, smooth.
Flowering & Fruiting: Throughout the year.
Distribution: Pantropical. Occasional; along streams. *RNMK 3061,* Kuruva.

Cyperus iria L., Sp. Pl. 45. 1753; Roxb., Fl. Ind. 1:204. 1820; Clarke in Hook. f., Fl. Brit. India 6: 606. 1893; Fischer in Gamble, Fl. Pres. Madras 1640(1140). 1931; Manilal & Sivar., Fl. Calicut 318. 1982; Ansari, Fl. Kasaragod Div. 420. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 507. 1988; Vajr., Fl. Palghat Dist. 545. 1990; Rejani, Cyperac. Kerala 195. 1991; Joseph, Aquatic Angiosp. Malabar 327. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 492. 1996; Sivar. & P. Mathew, Fl. Nilambur 774. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 537. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 757. 2009. *Cyperus iria* L. var. *paniciformis* Clarke in Hook. f., Fl. Brit. India 6: 607. 1893; Rejani, Cyperac. Kerala 197. 1991.

Annual or perennial; culms 30-45 cm high, loosely tufted or solitary, acutely 3-angled. Leaves ca. 0.6 cm broad; sheath keeled, closed by a membrane. Umbels 14-16 x 9-10 cm; bracts unequal, 20-23 x 0.4-0.5 cm, linear-oblong; spikelets 3.5-4 x 2-3 mm, oblong, 6-8-flowered, 14-18 in a spike; glumes broadly ovate, obtuse, 1-nerved, keeled. Nut obovoid, dark brown, smooth.
Flowering & Fruiting: November-December
Distribution: Tropical Asia and east Africa; introduced in U.S.A and West Indies. Common; in marshy areas in moist deciduous forests. *RNMK 3144,* Muthanga; *RNMK 0193*, Baveli.

Cyperus javanicus Houtt., Nat. Hist. 2: 13. 1782; Ansari, Fl. Kasaragod Div. 420. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 507. 1988. *Mariscus javanicus* (Houtt.) Merr. & Metcalfe, Lingnan Sci. J. 21. 4. 1945; Rejani, Cyperac. Kerala 358. 1991; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 786. 2009. *Cyperus pennatus* Lamk., Ill. 1: 144. 1791. *Mariscus albascens* Guad. in Freyc., Voy. Bot. 415. 1826; Clarke in Hook. f., Fl. Brit. India 6: 623. 1893. *Mariscus pennatus* (Lamk.) Domin, Biblioth. Bot. 85: 440. 1915; Fischer in Gamble, Fl. Pres. Madras 1645(1143). 1931; Manilal & Sivar., Fl. Calicut 312. 1982.

Rhizome creeping, nodulose. Culms 70-95 cm tall. Leaves 50-70 x 1-2 cm; flat, coriaceous; sheath rounded, brown. Umbel 13-15 x 22-25 cm; bracts 4-6,

leaf-like, 60-70 cm long; rays 7-10, very long, secondary rays present. Spikes 4-5 x 1-2 cm, cylindric, peduncled. Spikelets ca. 1 x 0.2 cm, linear; rachilla winged; glumes ca. 2 x 1.2 mm, acute, distantly spaced, brown with white margins. Nut obovate, obtusely acute, brown.
Flowering & Fruiting: Throughout the year.
Distribution: Pantropical. Occasional; in marshy areas. *RNMK 0192,* Panamaram.

Cyperus maderaspatanus Willd., Sp. Pl. 1: 278. 1798; Ansari, Fl. Kasaragod Div. 421. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 508. 1988. *Mariscus maderaspatanus* (Willd.) Napper, J. E. Africa Nat. Hist. Soc. 28: 10. 1971; Rejani, Cyperac. Kerala 360. 1991. *Mariscus squarrosus* Clarke in Hook. f., Fl. Brit. India 6: 623. 1893 quoad spec.; Fischer in Gamble, Fl. Pres. Madras 1645(1143). 1931; Manilal & Sivar., Fl. Calicut 312. 1982; Vajr., Fl. Palghat Dist. 555. 1990; Rejani, Cyperac. Kerala 364. 1991; Joseph, Aquatic Angiosp. Malabar 387. 1991; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 786. 2009. *Cyperus squarrosus* auct. non L. in Torner, Cent. Pl. 2:6.1756; Ansari, Fl. Kasaragod Div. 424. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 512. 1988; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 761. 2009. *Mariscus aristatus* (Rottb.) Chermezon, Bull. Bot. Surv. France 85: 366. 1938. *Cyperus aristatus* Rottb., Desc. Nov. Pl. 22. t. 6, f. 1. 1773; Clarke in Hook. f., Fl. Brit. India 6: 606. 1893; Fischer in Gamble, Fl. Pres. Madras 1640(1140). 1931.

Culms 5-8 cm high, tufted, filiform. Leaves 5-10 x 0.1-0.2 cm, scabrid; whole plant red glandular. Umbel 3-5 x 2-3 cm; bracts 3-4 linear, 6-9 cm long; rays 1-5, secondary rays absent; spikes sessile, congested, head-like; spikelets 1-1.1 x 0.1-0.2 cm, compressed, linear oblong, 5-12 together in a spike; rachilla winged; glumes 2-3 x 1-2 mm, 3-nerved. Nut pale brown, oblong, acute.
Flowering & Fruiting: November-December.
Distribution: India, Sri Lanka and tropical Africa. Common; in swamps in moist deciduous and evergreen forests. *RNMK 1505,* Baveli; *RNMK 2878*, Kurichiarmala.

Cyperus paniceus (Rottb.) Boeck., Linnaea 36: 381. 1870. *Kyllinga panicea* Rottb., Desc. Nov. Pl. t. 4, f. 1. 15. 1773. *Mariscus paniceus* (Rottb.) Vahl, Enum. Pl. 2: 373. 1805; Clarke in Hook. f., Fl. Brit. India 6: 620. 1893; Fischer in Gamble, Fl. Pres. Madras 1644(1143). 1931; Manilal, Fl. Silent Valley 344. 1988; Vajr., Fl. Palghat Dist. 555. 1990; Rejani, Cyperac. Kerala 362. 1991; Mohanan & Sivad., Fl. Agasthyamala 789. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 552. 2005.

Culms 15-30 cm high, 3-angled, 2-broad and one narrow sided. Leaves 20-30 x 0.3-0.4 cm, 1-costate, glabrous. Umbel simple; spikes 3-6, each 1-1.5 x 0.6-0.8 cm; spikelets 3-4 x 0.5-0.6 mm, terete; glumes 4, lower two glumes smaller; third glume lanceolate; stamens 2. Nut ca. 2.5 mm long, brown.

Flowering & Fruiting: August-September.
Distribution: Indo-Malesia. Occasional; in marshy areas along streamsides. *RNMK 1325,* Panamaram.

Cyperus pilosus Vahl, Enum. Pl. 2: 354. 1805; Clarke in Hook. f., Fl. Brit. India 6: 609. 1893; Fischer in Gamble, Fl. Pres. Madras 1641(1140). 1931; Manilal & Sivar., Fl. Calicut 316. 1982; Ansari, Fl. Kasaragod Div. 422. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 509. 1988; Vajr., Fl. Palghat Dist. 547. 1990; Rejani, Cyperac. Kerala 201. 1991; Joseph, Aquatic Angiosp. Malabar 333. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 493. 1996; Sivar. & P. Mathew, Fl. Nilambur 777. 1997; Mohanan & Sivad., Fl. Agasthyamala 774. 2002. *Cyperus marginellus* Nees in Wight, Contrib. 83. 1834. *Cyperus obliquus* Nees in Wight, Contrib. 86. 1834. *Cyperus pilosus* Vahl var. *obliquus* (Nees) Clarke, J. Linn. Soc. Bot. 21: 151 & Hook. f., Fl. Brit. India 6: 610. 1893; Manilal & Sivar., Fl. Calicut 316. 1982; Rejani, Cyperac. Kerala 203. 1991. *Cyperus pilosus* Vahl var. *polyanthus* Clarke, J. Linn. Soc. Bot. 21: 148. 1884 & in Hook. f., Fl. Brit. India 6: 610. 1893; Rejani, Cyperac. Kerala 204. 1991.

Stoloniferous perennials; culms 40-70 cm high, acutely 3-angled. Leaves 20-40 x 1-2 cm, linear-lanceolate; sheath keeled, closed. Umbel 7-20 cm long, compound; bracts 3-4, unequal, 33-35 x 1-1.2 cm; rays 3-7, 18-20 cm long; spikes sessile or peduncled; spikelets linear-oblong, 15-30-flowered; glumes ca. 2 x 1.5 mm, broadly elliptic, obtuse, keel 5-nerved. Nut ellipsoid, dark brown, smooth.
Flowering & Fruiting: May-November.
Distribution: Tropical Asia, Australia and Tropical West Africa. Occasional; along streamsides. *RNMK 1385,* Tirunelli.

Cyperus tenuispica Steud., Syn. Pl. Glum. 2: 11. 1855; Fischer in Gamble, Fl. Pres. Madras 1640(1139). 1931; Manilal & Sivar., Fl. Calicut 318. 1982; Ansari, Fl. Kasaragod Div. 425. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 512. 1988; Vajr., Fl. Palghat Dist. 548. 1990; Rejani, Cyperac. Kerala 185. 1991; Joseph, Aquatic Angiosp. Malabar 340. 1991; Sivar. & P. Mathew, Fl. Nilambur 778. 1997; Mohanan & Sivad., Fl. Agasthyamala 776. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 538. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 763. 2009. *Cyperus flavidus* Clarke, J. Linn. Soc. Bot. 21: 22. 1884 & in Hook. f., Fl. Brit. India 6: 600. 1893, non Retz. 1789.

Densely tufted annuals; rhizome absent; culms 6-25 cm high, slender. Leaves 3-8 x 0.1-0.2 cm, linear, glabrous, usually basal. Umbel compound, rays 4-6; secondary rays rarely present; spikelets 3-15 together, digitate, 3-7 x 1-2 mm, oblong, 10-40-flowered; glumes ovate, obtuse, 1-nerved, keeled, margins red. Nut orbicular, white, rugose.
Flowering & Fruiting: Throughout the year.
Distribution: Tropical and subtropical Africa and Asia. Common; in marshy areas. *RNMK 1806,* Panamaram.

ELEOCHARIS R. Brown

Prodr. Fl. Nov. Holl. 224. 1810.

Annuals or rhizomatous perennials. Culms densely tufted, erect, terete, angled or ridged, green. Leaves reduced to round, tubular sheath, mouth oblique with a small appendages, usually pink or brown. Inflorescence a solitary, terminal spikelet, ovoid to linear-oblong, terete; bracts scale-like or absent; glumes many, broadly ovate or oblong; obtusely keeled or concave, spirally disposed, stamens 2 or 3; filaments free, glabrous; anthers oblong; hypogynous bristle 6-8, narrow, filiform, retrorsely barbed, ovary elliptic or oblong, style 1, glabrous, deciduous; stigmas linear, glabrous or puberulus, nut obovate, biconvex or 3-angled, broadly elliptic to obovate, smooth, white or dark brown; style base persistent as a knob above the nut.

1. Spikelets 20-30 flowered; nuts obtusely 3-angled.....**E. congesta**
1. Spikelets 3-8 flowered; nuts obovoid, truncate .....**E. retroflexa** ssp. **chaetaria**

Eleocharis congesta D. Don, Prodr. Fl. Nepal. 41. 1825; Clarke in Hook. f., Fl. Brit. India 6: 630. 1893; Fischer in Gamble, Fl. Pres. Madras 1648(1145). 1931; Rejani, Cyperac. Kerala 226. 1991. *Eleocharis ovata* sensu Thw., Enum. Pl. Zeyl. 351. 1864, non R. Br. 1810. *Scirpus ovatus* Thw., Enum. Pl. Zeyl. 434. 1864, non Roth 1821.

Tufted annuals; rhizome absent; culms 8-20 cm high, slender, 8-10-ridged, smooth. Sheath tubular, mouth oblique with small appendage, red glandular. Spikelets 4-6 x 3-4 mm, ovate, 20-40-flowered; bracts ca. 3 x 2 mm, ovate, acute; glumes acute, 1-nerved, upper margin red to pink, rest hyaline; bristles ca. 2 mm long, golden yellow. Nut 1-2 mm long, obtusely 3-angled, yellow.

Flowering & Fruiting: October-January.

Distribution: India, Nepal, Indo-China, China and Japan. Common; in marshy areas and common fields. *RNMK 2209,* Varadoor; *RNMK 2671*, Mananthavady.

Eleocharis retroflexa (Poir.) Urban ssp. **chaetaria** (Roem. & Schult.) Koyama, Bull. Nat. Sci. Mus. Tokyo 17: 68. 1974; Manilal & Sivar., Fl. Calicut 320. 1982; V.S. Ramach. & V.J. Nair, Fl. Cannanore 514. 1988; Rejani, Cyperac. Kerala 242. 1991; Joseph, Aquatic Angiosp. Malabar 351. 1991; Sivar. & P. Mathew, Fl. Nilambur 779. 1997; Mohanan & Sivad., Fl. Agasthyamala 777. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 540. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 767. 2009. *Scirpus retroflexus* Poir. in Lamk., Encycl. 6: 753. 1805. *Eleocharis chaetaria* Roem. & Schult., Syst. Veg. 2: 154. 1817; Clarke in Hook. f., Fl. Brit. India 6: 629. 1893; Fischer in Gamble, Fl. Pres. Madras 1648(1145). 1931.

Tufted annuals; culms 2.5-15 cm high, slender, filiform. Sheath and culms coated with red glands. Spikelets ca. 3 x 3 mm, broadly ovate, 3-8-flowered; glumes ovate, obtuse, keeled, 2-4-nerved, reddish brown; nerves green; bristles as long as or longer than nut, filiform. Nut obovoid, truncate, trabeculate; style base spread and decurrent on the nut.

Flowering & Fruiting: October-November.
Distribution: Paleotropics. Occasional; along streamsides. *RNMK 1762, Ch*embra.

FIMBRISTYLIS Vahl

Enum. Pl. 2: 285. 1806, *nom. cons.*

Annual or perennial herbs; rhizome sometimes present. Culms tufted, erect, smooth. Leaves linear-lanceolate to narrow and filiform, sometimes reduced to sheaths. Inflorescence a simple or compound umbel; bracts short, filiform or leaf-like; rays 2-10, spreading; secondary rays rarely present; spikelets ovate, acute; glumes many, ovate, acute or obtuse, keeled, glabrous; stamens 1-3, filaments free, glabrous, anthers oblong, obtuse; ovary elliptic to obovate, glabrous; style one; stigma 2 or 3, linear, puberulus. Nut obovoid, obtusely trigonous or biconvex.

1. Leaves absent; nut linear-cylindric ..... **F. tetragona**
1. Leaves present; nut otherwise 2
2. Styles bifid ..... **P. aestivalis**
2. Styles trifid 3
3. Leaves spiral; midrib not keeled 4
3. Leaves distichous, folded; midrib strongly keeled 5
4. Spikelets many ..... **F. eragrostis**
4. Spikelets upto 6 ..... **F. tenera**
5. Flowering stems leafy; glumes distichous throughout ..... **F. pseudonarayanii**
5. Flowering stem leafless; glumes all spiral ..... **F. quinquangularis**

Fimbristylis aestivalis (Retz.) Vahl, Enum. Pl. 2: 288. 1805; Clarke in Hook. f., Fl. Brit. India 6: 637. 1893; Manilal & Sivar., Fl. Calicut 326. 1982; V.S. Ramach. & V.J. Nair, Fl. Cannanore 515. 1988; Vajr., Fl. Palghat Dist. 549. 1990; Rejani, Cyperac. Kerala 299. 1991; Sivar. & P. Mathew, Fl. Nilambur 780. 1997; Mohanan & Sivad., Fl. Agasthyamala 778. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 541. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 770. 2009. *Fimbristylis trimeni* Hook. f. in Trimen, Handb. Fl. Ceylon 5 (Suppl.): 52. 1900. *Fimbristylis aestivalis* (Retz.) Vahl ssp. *major* (Trimen) Koyama, Bot. Mag. (Tokyo) 87: 325. 1974 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 313. 1985; Rejani, Cyperac. Kerala 300. 1991.

Densely tufted annuals; culms 15-20 cm high, obtusely 5-angled. Leaves 10-20 x 0.1-0.2 cm, filiform, gland-dotted, scabrid. Umbel 3-6 x 3-4 cm, globose; bracts 3-4, leaf-like; rays 4-6, erect; spikelets few to many, 3-4 x 1-1.5 mm, acute, solitary, peduncled; glumes ovate, acute, 1-nerved. Nut obovoid, smooth, dull brown.

Flowering & Fruiting: January-April.

Distribution: Asia and Australia. Common; in moist deciduous forests. *RNMK 1448,* Muthanga.

Fimbristylis eragrostis (Nees & Meyen) Hance, J. Linn. Soc. Bot. 13: 132. 1873; V.S. Ramach., J. Econ. Tax. Bot. 3: 660. 1982; V.S. Ramach. & V.J. Nair, Fl. Cannanore 516. 1988; Mohanan & Sivad., Fl. Agasthyamala 781. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 776. 2009. *Abildgaardia eragrostis* Nees & Meyen in Wight, Contrib. 95. 1834; Rejani, Cyperac. Kerala 72. *Fimbristylis nigrobrunnea* Thw., Enum. Pl. Zeyl. 434. 1884; Clarke in Hook. f., Fl. Brit. India 6: 648. 1893; Fischer in Gamble, Fl. Pres. Madras 1659(1151). 1931.

Perennials; rhizome vertical, 1-3 cm long, clothed with leaf sheaths; culms 15-30 cm high, solitary, slender, tetragonous. Leaves 17-20 x 0.2-0.3 cm, flat, blunt at apex, glabrous. Umbels ca. 3 x 3 cm, dense, globose; bracts 3, unequal, 1-3 cm long; rays 3-6, each with 1 or 2 spikelets; spikelets 7-9 x 3-4 mm, oblong, acute; glumes 15-20 in a spikelet, ca. 3 x 2 mm, acute, 1-nerved, brown. Nut obovate, obtuse, trabeculate; style base depressed globose.
Flowering & Fruiting: September-October
Distribution: Indo-Malesia to Australia, China and Formosa. Occasional in evergreen forests. *RNMK 1505,* Kurichiarmala; *RNMK 1799*, Chanthanathodu.

Fimbristylis pseudonarayanii Ravi & Anil Kumar, Rheedea 3 (2) : 111. 1992 : Mohanan & Sivad., Fl. Agasthyamala 782. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 545. 2005.

Tufted annual herbs. Rhizome nil. Roots fibrous. Culms slender, smooth, more or less quadrangular. Leaves basal, lowest 1 or 2 sheathing, acuminate or with a reduced blade, others foliaceous ; sheath membranous, glabrous, mouth truncate, up to 2 cm long ; blade linear-flattened. Inflorescence a simple umbel of 3-5 spikelets ; bracts 2-5, glumaceous ; spikelets compressed, ellipsoid to lanceolate ; rachilla zig-zig, winged ; glumes distichous, up to 30, closely imbricating at maturity, strongly keeled on the back, keel sharply angled ; stamens 3 ; style glabrous, brownish gland-dotted. Nut trogonous, prominently ridged at angles, white to pale yellowish-brown.
Flowering & Fruiting : November-February.
Disrtibution : Endemic to southern Western Ghats. Occasional; in marshy areas in grasslands. *RNMK 1733,* Pookodu.

Fimbristylis quinquangularis (Vahl) Kunth, Enum. Pl. 2: 229. 1807; Clarke in Hook. f., Fl. Brit. India 6: 644. 1893; Fischer in Gamble, Fl. Pres. Madras 1659(1151). 1931; Manilal & Sivar., Fl. Calicut 325. 1982; Rejani, Cyperac. Kerala 284. 1991. *Scirpus quinquangularis* Vahl, Enum. Pl. 2: 279. 1805. *Trichelostylis quinquangularis* (Vahl) Nees in Wight, Contrib. 104. 1834. *Scirpus miliaceus* L., Syst. Nat. (ed. 10) 868. 1759, nom. rejic. *Fimbristylis miliacea* (L.) Vahl, Enum. Pl. 2: 287. 1805, nom. rejic.; Clarke in Hook. f., Fl. Brit. India 6: 644. 1893; Fischer in Gamble, Fl. Pres. Madras 1660(1152). 1931; Manilal & Sivar., Fl. Calicut 325. 1982; Ansari, Fl. Kasaragod Div. 429. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 517. 1988; Vajr., Fl. Palghat

Dist. 551. 1990; Rejani, Cyperac. Kerala 279. 1991; Joseph, Aquatic Angiosp. Malabar 366. 1991; Sivar. & P. Mathew, Fl. Nilambur 782. 1997; Mohanan & Sivad., Fl. Agasthyamala 781. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 544.2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 780.2009.

Tufted annuals, 30-40 cm tall; stem 4-5 angled; flowering stem leafless or with a solitary basal leaves. Leaves flat, filiform, margins cartilaginous. Spikelets ovoid, subterete or angular, in decompound umbels; bracts ca. 0.5 cm long, foliaceous. Nuts narrowly obovate-trigonous, stramineous.

Flowering & Fruiting: October-November.

Distribution: Tropical Africa, Iraq to tropical and subtropical Asia and north Australia. Occasional; in moist deciduous forests. *RNMK 1344,* Begur; *RNMK 1299*, Kuruva.

Fimbristylis tenera Schult., Syst. Veg. 2: 57. 1824; Clarke in Hook. f., Fl. Brit. India 6: 642. 1893; Fischer in Gamble, Fl. Pres. Madras 1660(1152). 1931; Manilal & Sivar., Fl. Calicut 326. 1982; V.S. Ramach. & V.J. Nair, Fl. Cannanore 517. 1988; Vajr., Fl. Palghat Dist. 551. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 495. 1996; Sivar. & P. Mathew, Fl. Nilambur 784. 1997. *Fimbristylis glabra* Steud., Syn. Pl. Glum. 2: 111. 1855. *Fimbristylis oxylepis* Steud., Syn. Pl. Glum. 2: 110. 1855. *Fimbristylis tenera* Schult. var. *oxylepis* (Steud.) Clarke in Hook. f., Fl. Brit. India 6:642. 1893; Ansari, Fl. Kasaragod Div. 430. 1985.

Slender short annuals; rhizome very short; culms 5-10 cm, very slender, loosely tufted. Leaves 3-8 cm long, linear; sheath rounded, hairy. Umbel simple, ca. 1.5 x 1.5 cm; spikelets 1-5, mostly peduncled, terete, acuminate; glumes few to many, keeled, brown. Nut obovoid, dull grey, verruculose.

Flowering & Fruiting: July-January.

Distribution: Tropical Africa and Pakistan. Common; along streams in moist deciduous forests. *RNMK 1592,* Baveli; *RNMK 1953*, Kuruva.

Fimbristylis tetragona R. Br., Prodr. 226. 1810; Clarke in Hook. f., Fl. Brit. India 6: 631. 1893; Fischer in Gamble, Fl. Pres. Madras 1658(1150). 1931; Manilal & Sivar., Fl. Calicut 324. 1982; Ansari, Fl. Kasaragod Div. 430. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 517. 1988; Rejani, Cyperac. Kerala 291. 1991; Joseph, Aquatic Angiosp. Malabar 370. 1991; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 545. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 783. 2009.

Erect herbs, 35-40 cm tall; stem tetragonous. Leaves reduced to membranous sheaths, 2-3. Spikelets 1.5-1.8 x 0.5-0.6 cm, solitary, terminal, ovoid globose; rachilla narrowly winged; glumes ovate to cuneate; keel 3-nerved; stamens 2. Nut terete, vertically ridged, tuberculate.

Flowering & Fruiting: October-December.

Distribution: Tropics. Common; in open marshy areas near streams. *RNMK 2279,* Mananthavady; *RNMK 2681*, Muthanga.

FUIRENA Rottboel

Descript Icon. Nov. Pl. 70. 1773.

Annuals or perennials; rhizome horizontal, creeping. Culms clustered, trigonous or ribbed. Leaves scattered along the stem, lanceolate, 1-3-costate; sheath closed, rounded or angled. Inflorescence an interrupted panicle; partial panicles supported by leafy bracts; spikelets sessile, ovate to oblong, clustered; glumes many, oblong or ovate, aristate, 3-nerved, obtusely keeled; stamens 3; filaments free, glabrous, anthers oblong, acute; hypogynous bristles similar or dissimilar, all setaceous or inner broader. Nut broadly ellipsoid, acuminate to cuspidate, triquetrous, stalked, smooth; style-1; stigma 3, linear, puberulus.

1. Densely pubescent annuals; spikelet-clusters congested at the tips of stem..... 2
1. Glabrous perennials; spikelet-clusters scattered all along thestem..... **F. umbellata**
2. Nuts ovoid, whitish ..... **F. ciliaris**
2. Nuts obovoid, pale brown..... **F. uncinata**

Fuirena ciliaris (L.) Roxb., Fl. Ind. 1: 184. 1820; Manilal & Sivar., Fl. Calicut 322. 1982; Ansari, Fl. Kasaragod Div. 431. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 518. 1988; Rejani, Cyperac. Kerala 318. 1991; Joseph, Aquatic Angiosp. Malabar 376. 1991; Sivar. & P. Mathew, Fl. Nilambur 785. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 547. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 786. 2009. *Scirpus ciliaris* L., Mant. Pl. 2: 182. 1771. *Fuirena glomerata* Lamk., Tabl. Encycl. 1: 150. 1791; Clarke in Hook. f., Fl. Brit. India 6: 666. 1893; Fischer in Gamble, Fl. Pres. Madras 1669(1158). 1931. *Scirpus pilosus* Retz., Obs. Bot. 6: 19. 1791.

Annual erect herbs, 35-40 cm tall. Leaves ca. 0.4 cm wide, pubescent, 5-7 nerved. Spikelets ovoid or oblong, in capitate cluster; glumes oblong-obovate, pilose; bristles 4-6, filiform; scales 3, quadrate, 3-ridged. Nut narrowly or broadly ovoid, cuspidate, shortly stalked, trigonous, whitish, smooth.

Flowering & Fruiting: January-March.

Distribution: Pantropical. Common; in paddy fields. *RNMK 2993,* Mananthavady.

Fuirena umbellata Rottb., Desc. Nov. Pl. 70. t.19, f. 3. 1773; Clarke in Hook. f., Fl. Brit. India 6: 666. 1893; Fischer in Gamble, Fl. Pres. Madras 1669(1158). 1931; Manilal & Sivar., Fl. Calicut 322. 1982; Ansari, Fl. Kasaragod Div. 431. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 518. 1988; Rejani, Cyperac. Kerala 320. 1991; Joseph, Aquatic Angiosp. Malabar 378. 1991; Sivar. & P. Mathew, Fl. Nilambur 785. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 547. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 786. 2009.

Stout perennials; rhizome creeping. Culms 40-70 cm high, ca. 0.8 cm thick, ribbed. Leaves 13-18 x 1-2 cm, ciliate along the margins; nerves scabrid;

sheath rounded, pubescent; ligule thick, collar like. Panicle 8-10 x 2.5-3 cm, with 2-5 partial panicles; bracts 2-5, leaf-like, 2-7 x 0.2-0.8 cm; spikelets 10-25 in each cluster, 4-6 x 3-4 mm, ovoid; glumes ovate-oblong, emarginate at apex, cuspidate, glabrous, brown, outer bristle retrorsely barbed; inner bristle obovate, truncate. Nut obovoid, triquetrous.
Flowering & Fruiting: July-December.
Distribution: Pantropical. Occasional; in paddy fields. *RNMK 1093,* Nadavayal; *RNMK 2875*, Kottathara.

Fuirena uncinata (Willd.) Kunth, Enum. Pl. 2: 184. 1837; Clarke in Hook. f., Fl. Brit. India 6: 666. 1893; Fischer in Gamble, Fl. Pres. Madras 1669(1158). 1931; Manilal & Sivar., Fl. Calicut 322. 1982; V.S. Ramach. & V.J. Nair, Fl. Cannanore 519. 1988. *Scirpus uncinatus* Willd., Sp. Pl. 1:300.1798. *Scirpus capitatus* Burm.f., Fl. Ind. 21. 1768, non L. 1753. *Fuirena capitata* (Burm.f.) Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 153. 1985; Rejani, Cyperac. Kerala 316. 1991; Joseph, Aquatic Angiosp. Malabar 375. 1991; Sivar. & P. Mathew, Fl. Nilambur 784. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 785. 2009.

Annual pubescent herbs, 23-26 cm tall. Leaves ca. 0.4 cm wide. Spikelets ovoid, crowded in capitate heads. Nuts obovoid, sharply trigonous, acuminate, shortly stalked, smooth, pale brown.
Flowering & Fruiting: August-September.
Distribution: Peninsular India and Sri Lanka. Common; in marshy areas along streams. *RNMK 1733,* Kuruva.

KYLLINGA Rottboel

Descript. Icon. Nov. Pl. 12. 1773, *nom. cons.*

Annuals or perennials, rhizome short or creeping. Culms solitary or densely tufted, terete or trigonous, smooth. Leaves linear, lanceolate, usually confined to the base; spikelets sessile, numerous, densely packed on a solitary terminal spike; bracts 3, leaf-like; glumes 4; lower two sterile, 3rd glume bisexual or barren, upper most glume bisexual, male or empty, all ovate, acute to aristate, keeled. stamens 2 or 3, free, filaments glabrous, nut biconvex, obtuse or truncate, shortly or distinctly apiculate, style 1; stigma linear, glabrous.

1. Glumes winged on keel.....**K. nemoralis**
1. Glumes not winged on keel.....2
2. Rhizome densely tufted; spike conical .....**K. bulbosa**
2. Rhizome not tufted; spike globose .....**K. melanosperma**

Kyllinga bulbosa Beauv., Fl. Oware 1: 11. 1805; Rejani, Cyperac. Kerala 334. 1991; C.N. Sunil, Fl. Pl. Alappuzha Dist. 1033. 2000; Mohanan & Sivad., Fl. Agasthyamala 785. 2002. *Kyllinga triceps* Rottb., Desc. Nov. Pl. 14. t. 4, f.6. 1773, nom. illeg.; Clarke in Hook. f., Fl. Brit. India 6: 587. 1893; Fischer in Gamble, Fl. Pres. Madras 1623(1130). 1931; Sasidh. & Sivar., Fl. Pl. Thrissur

For. 496. 1996; Vajr., Fl. Palghat Dist. 553. 1990; Sivar. & P. Mathew, Fl. Nilambur 789. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 550. 2005. *Cyperus triceps* (Rottb.) Endl., Cat. Hort. Acad. Uindb. 1: 94. 1842; Manilal, Fl. Silent Valley 341. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 513. 1988. *Kyllinga tenuifolia* Steud., Syn. Pl. Glum. 2: 69. 1855; Manilal & Sivar., Fl. Calicut 311. 1982.

Culms 5-10 cm high, densely tufted. Leaves 2-6 x 0.1-0.2 cm, scabrid along margin and costa. Vertical spike 0.5-0.7 x 0.4-0.5 cm, conical, lateral shorter; bracts foliar. Spikelets 2-3 mm long, lanceolate; lower glumes smaller, upper glumes acute, nerves greenish white. Nut oblique, truncate at apex, yellowish brown.

Flowering & Fruiting: August-December.

Distribution: Paleotropics. Common; in marshy areas in moist deciduous forests. *RNMK 2706,* Kuruva; *RNMK 2984*, Tholpetty.

Kyllinga melanosperma Nees in Wight, Contrib. 91. 1834; Clarke in Hook. f., Fl. Brit. India 6: 588. 1893; Fischer in Gamble, Fl. Pres. Madras 1624(1130). 1931; Vajr., Fl. Palghat Dist. 552. 1990; Rejani, Cyperac. Kerala 336. 1991; Sivar. & P. Mathew, Fl. Nilambur 788. 1997; Mohanan & Sivad., Fl. Agasthyamala 786. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 549. 2005. *Cyperus melanospermus* (Nees) Sur., Cyp. Mal. Arch. 50: t. 2, 8. 1898; Manilal, Fl. Silent Valley 340. 1988.

Rhizome creeping, woody. Culms 25-45 cm tall, triquetrous at apex. Leaves 6-8 x 0.3-0.5 cm, rigid, serrulate. Spike ca. 0.7 x 0.7 cm, globose; bracts foliar; spikelets ca. 3 x 1 mm, lanceolate, curved; glumes aristate, 7-nerved, nerves red. Nut oblong, obtuse, dark brown.

Flowering & Fruiting: April-May.

Distribution: Tropical and subtropical Asia and Africa. Common; in marshy areas in grasslands. *RNMK 3297,* Chembra.

Kyllinga nemoralis (Forster f.) Dandy ex Hutch. & Dalz., Fl. W. Trop. Africa 2: 486,487. 1936; Manilal & Sivar., Fl. Calicut 311. 1982; Vajr., Fl. Palghat Dist. 552. 1990; Rejani, Cyperac. Kerala 338. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 496. 1996; Sivar. & P. Mathew, Fl. Nilambur 789. 1997; Mohanan & Sivad., Fl. Agasthyamala 786. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 549. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 789. 2009. *Thryocephalon nemoralis* J. R & G. Forst., Char. Gen. 129. t. 130. 1776. *Kyllinga monocephala* Rottb., Desc. Nov. Pl. 13. t. 4, f. 4. 1773, non Roxb. 1820; Clarke in Hook. f., Fl. Brit. India 6: 588. 1893; Fischer in Gamble, Fl. Pres. Madras 1624(1130). 1931. *Cyperus kyllinga* Endl., Cat. Hort. Acad. Vindob. 1: 94. 1842; Ansari, Fl. Kasaragod Div. 421. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 508. 1988.

Rhizome slender, culms 30-35 cm tall, closely arranged. Leaves 25-30 x 0.2-0.3 cm, linear. Spikes 3-4 x 5-7 mm, globose, white; bracts 9-10 cm long.

Spikelets ca. 4 mm long, compressed, elliptic, densely packed; lower glumes linear, upper glumes concave, mucronulate, keel arcuate. Nut biconvex, yellowish.
Flowering & Fruiting: July-November.
Distribution: Pantropical. Occasional; in marshy areas in evergreen forests. *RNMK 3590,* Chanthanathodu.

LIPOCARPHA R. Brown
in Tucky, Narr. Exped. Congo, Append. 459. 1818, *nom. cons*.

Marshy herbs; rhizome oblique. Culms 2-3 together, erect, triquetrous. Leaves few, basal, lanceolate, 1-costate; sheath keeled, open, glabrous. Inflorescence a terminal cluster of 3-12 sessile, cylindric, spikelets; bracts 2-3, unequal, similar to the leaves, rachilla cylindric glabrous, glumes spiral many, densely packed, oblanceolate or deltoids clawed; stamens 1-2, filaments free, glabrous; hypogynous scales 2, broadly oblong, glabrous, hyaline, usually covering the nut. Nut oblong, triquetrous, acute or shortly apiculate, minutely muriculate; style-1; stigma glabrous.

1. Culms to 65 cm high; glumes obtusely acute ..... **L. chinensis**
1. Culms to 30 cm high; glumes long aristate ..... **L. squarrosa**

Lipocarpha chinensis (Osbeck) Kern, Blumea, Suppl. 4: 167. 1958; Manilal, Fl. Silent Valley 343. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 519. 1988; Vajr., Fl. Palghat Dist. 553. 1990; Rejani, Cyperac. Kerala 344. 1991; Joseph, Aquatic Angiosp. Malabar 380. 1991; Sivar. & P. Mathew, Fl. Nilambur 790. 1997; Mohanan & Sivad., Fl. Agasthyamala 788. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 550. 2005. *Scirpus chinensis* Osbeck, Dago. Ostind. Resa. 220. 1757. *Lipocarpha argentea* (Vahl) R. Br., Narr. Exp. Congo Appen. 477. 1818; Clarke in Hook. f., Fl. Brit. India 6: 667. 1893; Fischer in Gamble, Fl. Pres. Madras 1670(1158). 1931 *Hypaelytrum argenteum* Vahl, Enum. Pl. 2: 283. 1805.

Annuals. Culms 40-65 cm high, ca. 2 mm thick. Leaves 10-20 x 0.4-0.5 cm, stiff; margins scabrid towards the apex; bracts 6-8 cm long. Spikelets 0.5-1 x 0.3-0.5 cm, obtuse; glumes obtusely acute, keeled, yellow or pale brown. Nut obtuse, hardly triquetrous, brown.
Flowering & Fruiting: October-November.
Distribution: Pantropical. Common; in marshy areas. *RNMK 2559,* Manathavady; *RNMK 3755*, Panamaram.

Lipocarpha squarrosa (L.) Goetgh., Wageningen Agric. Univ. Pap. 89: 71. 1989. *Scirpus squarrosus* L., Mant. Pl. 2: 181.1771; Clarke in Hook. f., Fl. Brit. India 6:663.1893; Fischer in Gamble, Fl. Pres. Madras 1666(1156). 1931; Ansari, Fl. Kasaragod Div. 435. 1985. *Isolepis squarrosa* (L.) Roem. & Schult., Syst. Veg. 2: 111. 1817. *Rikliella squarrosa* (L.) Raynal, Adansonia 13: 154. 1973; Manilal & Sivar., Fl. Calicut 328. 1982; Rejani, Cyperac. Kerala 411.

1991; Joseph, Aquatic Angiosp. Malabar 392. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 498. 1996; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 802. 2009.

Densely tufted annuals; rhizome zero. Culms 5-28 cm high, filiform, smooth. leaves 1-2 cm long, basal, 2-3 for each culm, filiform, glabrous; sheath closed. Inflorescence of 1-4 sessile spikelets, placed ca. 2 cm below the apex of stem, 0.5-0.7 x 0.3-0.4 cm, cylindrical, squarrose; glumes 1-nerved, long aristate, yellow brown, spirally disposed; stamens 1 or 2, filaments free, short; anthers yellow. Nut obovate, obtusely trigonous, dark brown, minutely muriculate.

Flowering & Fruiting: September-December.

Distribution: South Asia. Occasional; in marshy areas in evergreen forests. *RNMK 2020,* Kurichiarmala.

PYCREUS P. Beauvois

Fl. d'Oware & Benin 2: 48, t. 86. 1807.

Annual or perennials, tufted or solitary. Leaves usually collected at the base; linear-lanceolate, 1-costate; margins and midrib scabrid towards the apex; sheath rounded, closed, glabrous. Inflorescence a simple or compound umbel; bracts 2-7, usually surpassing the umbel, leaf-like; rays 3-10; bracteoles tubular, protect the base of peduncles, pink. spikelets densely arranged in sessile or peduncled spikes, ovate to linear-oblong, acute; rachilla straight or zig-zag, winged or wingless, glumes many, ovate, keeled, glabrous; stamens 1-3; filaments free, glabrous, anthers oblong, obtuse; ovary elliptic to oblong, glabrous, stigma 2 linear, glabrous. Nut elliptic or oblong, truncate or obtuse at apex.

1. Nuts wrinkled with wavy or broken transverse ridges..... **P. stramineus**
1. Nuts not wrinkled 2
2. Rachilla winged..... 3
2. Rachilla not winged..... **P. flavidus**
3. Rachilla red glandular; glumes 5-7 nerved ..... **P. sanguinolentus**
3. Rachilla not glandular; glumes 1 or 3 nerved 4
4. Rachilla zig-zag; glumes 3 nerved; nuts oblong, obtuse ..... **P. polystachyos**
4. Rachilla not zig-zag; glumes 1 nerved; nuts truncate ..... **P. pumilus**

Pycreus flavidus (Retz.) Koyama, J. Jap. Bot. 51: 316. 1976 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 222. 1985; Vajr., Fl. Palghat Dist. 556. 1990; Rejani, Cyperac. Kerala 374. 1991; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 552. 2005. *Cyperus flavidus* Retz., Obs. Bot. 5: 13. 1788; Manilal & Sivar., Fl. Calicut 314. 1982; Manilal, Fl. Silent Valley 340. 1988. *Pycreus globosus* (All.) Rchb., Fl. Germ. Excurs. 1: 140. 1830; Fischer in Gamble, Fl. Pres. Madras 1627(1132). 1931. *Cyperus globosus* All., Fl. Pedem. Auct. 49: 1789, non illeg.; V.S. Ramach. & V.J. Nair, Fl. Cannanore 506. 1988. *Pycreus capillaris* (Koenig ex Roxb.) Nees ex Clarke in Hook. f., Fl. Brit. India 6: 591. 1893. *Cyperus capillaris* Koenig ex Roxb., Fl. Ind. 1: 194. 1820.

Culms 30-45 cm tall. Leaves 10-20 x 0.1-0.2 cm, glabrous, mouth of sheath with two truncate flaps. Umbel 7-8 x 6-8 cm; bracts 2-3, 16-18 cm long; rays spreading. Spikelets 1.2-1.6 x 0.2-0.3 cm oblong, obtuse, 12-15 in a spike; glumes 30-40 in a spikelets, 3-5-nerved; keel curved, green. Nut biconvex, distinctly cuspidate, minutely muriculate, dark brown.
Flowering & Fruiting: April-May.
Distribution: South Europe, Africa and Central and south Asia. Occasional; along stremsides. *RNMK 2907,* Tirunelli.

Pycreus polystachyos (Rottb.) P. Beauv., Pl. Oware 2: 48. t.86. f.2. 1807; Clarke in Hook. f., Fl. Brit. India 6: 592. 1893; Vajr., Fl. Palghat Dist. 557. 1990; Rejani, Cyperac. Kerala 382. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 498. 1996; Sivar. & P. Mathew, Fl. Nilambur 795. 1997; Mohanan & Sivad., Fl. Agasthyamala 790. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 553. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 798. 2009. *Cyperus polystachyos* Rottb., Desc. Nov. Pl. 39. t. 11, f. 1. 1773; Ansari, Fl. Kasaragod Div. 423. 1985; Manilal, Fl. Silent Valley 340. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 510. 1988. *Pycreus odoratus* Urban, Symb. Antill. 2: 164. 1900; Fischer in Gamble, Fl. Pres. Madras 1627(1132). 1931.

Culms 10-30 cm high, terete, tufted. Leaves 3-10 x 0.3-0.4 cm, lanceolate, scabrid along margins; sheath closed, mouth truncate. Umbel 3-5 x 5-6 cm, spreading; bracts 2-7, longest one 7-8 cm long; rays 3-5 or absent. Spikelets ca. 1.5 x 0.2 cm, oblong, pedicelled; rachilla zig-zag, winged; glumes ovate, obtuse, 3-nerved, yellow brown, 26-34 in a spikelets. Nut oblong, obtuse, cuspidate, dark brown.
Flowering & Fruiting: Throughout the year.
Distribution: Widely distributed in the tropical and subtropical regions. Common; in moist deciduous forests. *RNMK 3406,* Tholpettty; *RNMK 2565*, Tirunelli.

Pycreus pumilus (L.) Nees, Hook. f., Fl. Brit. India 6: 591. 1893; Fischer in Gamble, Fl. Pres. Madras 1627(1132). 1931; Vajr., Fl. Palghat Dist. 557. 1990; Rejani, Cyperac. Kerala 386. 1991; Sivar. & P. Mathew, Fl. Nilambur 795. 1997; Mohanan & Sivad., Fl. Agasthyamala 791. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 553. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 799. 2009. *Cyperus pumilus* L., Cent. Pl. 2: 6. 1756; Ansari, Fl. Kasaragod Div. 423. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 510. 1988. *Pycreus nitens* (Retz.) Nees, Nov. Acta Phys. Med. Acad. Caes. Leop. Carol. Nat. Cur.19, Suppl 1: 53. 1843; Clarke in Hook. f., Fl. Brit. India 6: 591. 1893.

Culms 10-18 cm tall, slender, terete. Leaves 19-21 x 0.1-0.2 cm, linear, serrulate along the margins. Umbel 3-4 x 5-6 cm, spreading; bracts 4, unequal, longest 10-12 x 0.15 cm; rays 3-5, up to 2.5 cm long. Spikelets ca.

1.2 x 0.3 cm, linear oblong; glumes aristate, keeled, 1-nerved, 26-34 in each spikelets. Nut truncate, cuspidate, glabrous, dark brown.
Flowering & Fruiting: Throughout the year.
Distribution: South and south-east Asia. Occasional; in marshy areas. *RNMK 3355,* Sughandhagiri.

Pycreus sanguinolentus (Vahl) Nees ex Clarke in Hook. f., Fl. Brit. India 6: 590. 1893; Fischer in Gamble, Fl. Pres. Madras 1627(1132). 1931; Rejani, Cyperac. Kerala 392. 1991; Sivar. & P. Mathew, Fl. Nilambur 796. 1997. *Cyperus sanguinolentus* Vahl, Enum. Pl. 2: 351. 1805; V.S. Ramach. & V.J. Nair, Fl. Cannanore 511. 1988.

Culms 15-30 cm high, decumbent, rooting from lower nodes. Leaves 5-15 x 0.2-0.35 cm flat; sheath 3 cm long, closed, mouth truncate. Umbel 1.5-6 cm long, simple; bracts 3-5, unequal; longest one 12 cm long; rays 2-6, spreading. Spikelets 0.7-1.5 x 0.2-0.3 cm, compressed, acute, sessile; rachilla narrowly winged, red glandular; glumes obtuse, keeled, 5-7 nerved, 16-22 in each spikelets. Nut biconvex, minutely reticulate, dark brown.
Flowering & Fruiting: March-October.
Distribution: Tropical Asia and Africa. Occasional; along stream sides. *RNMK 3464,* Thirunelli.

Pycreus stramineus Clarke in Hook. f., Fl. Brit. India 6: 589. 1893; Fischer in Gamble, Fl. Pres. Madras 1627(1132). 1931; Vajr., Fl. Palghat Dist. 557. 1990; Rejani, Cyperac. Kerala 396. 1991; Sivar. & P. Mathew, Fl. Nilambur 797. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 553. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 800. 2009. *Cyperus stramineus* Nees in Wight, Contrib. 74. 1834, nom. illeg.; Ansari, Fl. Kasaragod Div. 424. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 512. 1988. *Cyperus substramineus* Kukenth. in Engl., Pflanzenr. Cyperac.-Scirp.Cyp. 398. 1936, nom. illeg.

Culms 10-40 cm high, terete. Leaves 10-23 x 0.1-0.15 cm glabrous; sheath closed, mouth split. Umbel 2-7 cm long; bracts 2-4, unequal, 18-20 cm long; rays 0-2. Spikelets 1-2.5 x 0.3-0.5 cm, compressed, sessile, digitate; rachilla quadrangular, glabrous; glumes ovate obtuse, keeled, 2-5-nerved, reddish brown; stamens 2, filaments persistent. Nut apiculate, deep grey.
Flowering & Fruiting: August-December.
Distribution: Indo-Malesia. Common; in moist deciduous forests. *RNMK 1804,* Kuruva; *RNMK 1452*, Muthanga.

RHYNCHOSPORA Vahl

Enum. Pl. 2: 229. 1806, *orth. cons.*

Rhynchospora corymbosa (L.) Britton, Trans. New York Acad. Sci. 11: 84. 1892; Fischer in Gamble, Fl. Pres. Madras 1672(1160). 1931; V.S. Ramach. & V.J. Nair, Fl. Cannanore 520. 1988; Rejani, Cyperac. Kerala 408. 1991; Mohanan & Sivad., Fl. Agasthyamala 791. 2002; Anil Kumar, Sivad. & N. Ravi,

Fl. Pathanamthitta 554. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 801. 2009. *Scirpus corymbosus* L., Cent. Pl. 2: 7. 1756. *Rhynchospora aurea* Vahl, Enum. Pl. 2: 229. 1805; Clarke in Hook. f., Fl. Brit. India 6: 670. 1893.

Rhizome globose, covered with spongy leaf sheaths. Culms 80-150 cm high. Leaves 60-90 x 0.8-1.5 cm; sheath sharply keeled, become spongy when old. Panicle 20-35 cm long; spikelets 7-8 x 2-2.5 mm, clustered; all sessile; glumes 4, lower 3 sterile, uppermost one bisexual, ca. 7.5 x 4 mm, shortly aristate, keeled with brown streaks, anthers ca. 2.5 mm long, apiculate. Nut truncate, wrinkled with brown spots; style base conical with longitudinal depression on either sides, hypogynous bristle 8.

Flowering & Fruiting: August-January.

Distribution: Pantropical. Occasional; in marshy areas along stream sides. *RNMK 2146,* Mananthavady; *RNMK 3450*, Kuruva.

SCHOENOPLECTIELLA (Reichenbach) Palla

Sitzber. Zool. Bot. Ges. Wein 38: 49. 1888, *nom. cons.*

Schoenoplectiella lateriflora (Gmel.) Lye, Lidia 6: 25. 2003. *Scirpus lateriflorus* Gmel., Syst. Nat. 2, 1: 127. 1791; Ansari, Fl. Kasaragod Div. 434. 1985. *Schoenoplectus supinus* (L.) Palla, Sitzber. Zool.-Bot. Ges. Wien. 38: 49. 1888, ssp. *lateriflorus* (Gmel.) Koyama in Hara *et al.,* Enum. Fl. Pl. Nepal 1: 119. 1978 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 158. 1985; Rejani, Cyperac. Kerala 424. 1991; Joseph, Aquatic Angiosp. Malabar 401. 1991; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 804. 2009. *Schoenoplectus lateriflorus* (Gmel.) Lye, Bot. Notiser 124: 290. 1971; Manilal & Sivar., Fl. Calicut 320. 1982; V.S. Ramach. & V.J. Nair, Fl. Cannanore 520. 1988. *Scirpus supinus* L. ssp. *laterifolius* (Gmel.) Koyama in Hara, Fl. East Himalaya 393. 1966.

Tufted erect herbs, 17-20 cm tall; stems terete. Leaves reduced to sheaths. Spikelets ovoid, 3-12, in sessile clusters; bracts 8-10 cm, canaliculated. Nuts globosely obovoid, trigonous, sharply transversely ridged, black.

Flowering & Fruiting: August-December.

Distribution: Paleotropics. Occasional; along stream sides. *RNMK 3692,* Kuruva.

SCLERIA Bergius

Kongl. Vetensk. Acad. Handl. 26: 142, 1765.

Scleria terrestris (L.) Fassett, Rhodora 26: 159. 1924; Kern in Blumea 11: 170. 1961; Manilal, Fl. Silent Valley 345. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 521. 1988; Vajr., Fl. Palghat Dist. 559. 1990; Verma & Veena, Bull. Bot. Surv. India 32: 68. 1990; Rejani, Cyperac. Kerala 439. 1991; Sivar. & P. Mathew, Fl. Nilambur 800. 1997; Mohanan & Sivad., Fl. Agasthyamala 793. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 556. 2005. *Zizania terrestris* L., Sp. Pl. 2: 991. 1753. *Diaphora cochinchinensis* Lour., Fl. Cochinch. 578. 1790. *Scleria radula* Hance., Ann. Sci. Nat. Bot. ser. 4, 18: 232. 1862; Clarke in Hook. f., Fl. Brit. India 6: 691. 1894. *Scleria elata* Thw.,

Enum. Pl. Zeyl. 353. 1864; Clarke in Hook. f., Fl. Brit. India 6: 690. 1894. *Scleria melanostoma* Nees ex Boeck., Linnaea 38: 514. 1874; Clarke in Hook. f., Fl. Brit. India 6: 692. 1894. *Scleria rinkiana* Boeck., Cyper. Nov. 2: 30. 1890; Clarke in Hook. f., Fl. Brit. India 6: 694. 1894. *Scleria chinensis* var. *biauriculata* Clarke in Hook. f., Fl. Brit. India 6: 690. 1894. *Scleria cochinchinensis* (Lour.) Druce, Bot. Exch. Club. Brit. Isles Rep. 4: 646. 1917; Fischer in Gamble, Fl. Pres. Madras 1678(1163). 1931.

Perennials, rhizome horizontal. Culms 90-150 cm high, 0.6-0.8 cm thick, 2-4 together. Leaves 30-60 x 1-1.2 cm, 3-costate; mouth of sheath with a hemispherical dark brown flap. Panicle 15-20 cm long; partial panicle one or two, hirtus; bracts leaf-like; female spikelets 5-6 x 3-3.5 mm, broadly ovate; glumes 4; the upper most ovate, aristate, dark brown, carries nut; male spikelets pedicelled, shorter than female ones; glumes oblong; stamens 3. Nut obtuse, scrobiculate, minutely hispid, lobes of disc obtuse.

Flowering & Fruiting: February-December.

Distribution: Tropical and subtropical Asia and northern Australia. Occasional; in moist deciduous forests. *RNMK 1508*, Kuruva; *RNMK 2894*, Muthanga.

POACEAE (R. Br.) Burnhart

Bull. Torrey Bot. Club 22: 7. 1895

1. Spikelets unisexual, dissimilar..... **Coix**
1. Spikelets bisexual, similar or dissimilar 2
2. Stamens 6 or more..... 3
2. Stamens 3 or less 9
3. Large perennial shrubs or small trees; leaves with transverse nervules 4
3. Annual herbs; leaves without transverse nervules..... 8
4. Lower nodes with branches..... 5
4. Lower nodes without branches..... 6
5. Spikelets in globose heads; basal node with spinaceous root..... **Dendrocalamus**
5. Spikelets not in globose heads; basal node with fibrous roots ..... **Bambusa**
6. Stamens more than 16; fruit fleshy..... **Ochlandra**
6. Stamens 6; fruit not fleshy..... 7
7. Staminal filaments free ..... **Teinostachyum**
7. Staminal filaments united in to a tube ..... **Oxytenanthera**
8. Glumes absent; nodes hairy..... **Leersia**
8. Glumes present; nodes glabrous ..... **Oryza**
9. Glumes persistent; spikelets 1-many-flowered 49
9. Glumes deciduous along with the entire spikelets; spikelets strictly 2-flowered.....10
10. Spikelets usually laterally compressed, often in pairs, one sessile and one pedicelled, usually dissimilar and awned 11
10. Spikelets usually dorsally compressed, often solitary, similar and usually awnless.. 34
11. Inflorescence of densely packed globose clusters of spikelets in cylindrical mass ... . **Elytrophorus**
11. Inflorescence a panicle or digitate or subdigitate racemes 12

12. Inflorescence a panicle.....13
12. Inflorescence of 1-many, digitate or subdigitate racemes 22
13. Spikelets in groups of 3, one sessile and two pedicelled 14
13. Spikelets paired or rarely solitary 16
14. Inflorescence much contracted, densely covered with long silky hairs .... **Spodiopogon**
14. Inflorescence lax; not covered with long silky hairs 15
15. One of the pedicelled spikelets reduced to broad pedicel; panicles interrupted by spathes..... **Apluda**
15. Both pedicelled spikelets developed; panicles not interrupted by spathes..... ..... **Chrysopogon**
16. Panicles densely covered with long silky hairs; spikelets awnless.....17
16. Panicles not covered by long silky hairs spikelets awned or awnless 18
17. Glumes covered with long hairs; panicles cylindrical, spiciform .....**Imperata**
17. Glumes glabrous; panicles lax ..... **Saccharum**
18. Spikelets awnless; branches of panicle whorled .....**Sorghum**
18. Spikelets awned; branches of panicle not as above 19
19. Aromatic grasses; panicles of paired racemes, one sessile and one peduncled..... ..... **Cymbopogon**
19. Plants not fragrant; panicles not as above 20
20. Panicles interrupted by spathes.....21
20. Panicles not interrupted by spathes.....**Capillipedium**
21. Sessile spikelets with two pedicelled spikelets; racemes with two pairs of involucral spikelets at base.....**Themeda**
21. Sessile spikelets with one pedicelled spikelets; racemes without two pairs of involucral spikelets at base.....**Pseudanthistiria**
22. Spikelets solitary, similar.....**Dimeria**
22. Spikelets paired, dissimilar or rarely similar 23
23. Raceme solitary 24
23. Racemes 2-many 29
24. Second lemma of sessile spikelets awned.....25
24. Second lemma of sessile spikelets awnless 27
25. Lower spikelets of the raceme awnless; awns of upper spikelets twisted together.... .....**Heteropogon**
25. All spikelets of the raceme awned; awns not as above 26
26. Upper glumes awned; spikelets similar .....**Pogonatherum**
26. Upper glumes not awned; spikelets dissimilar ..... **Dichanthium** (*D. oliganthum*)
27. Racemes breaking up at nodes; lower glume of sessile spikelets smooth.....28
27. Racemes not braking up at nodes; lower glume of sessile spikelets rugose or with hooks ..... **Glyphochloa**
28. Pedicelled spikelets as large as slightly smaller than the sessile ..... **Rottboellia**
28. Pedicelled spikelets rudimentary, sessile spikelets sunk in opposite cavities..... .....**Mnesithea**
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29. Racemes more than 2 on each peduncle 31

30. Lower glume of sessile spikelets truncate at apex ..... **Apocopis**
30. Lower glume of sessile spikelets acute or acuminate at apex, not truncate..... ..... **Ischaemum**
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31. Spikelets of each pair dissimilar 32
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32. Lower glume of sessile spikelets not pitted; joints and pedicels opaque 33
33. Second lemma of sessile spikelets deeply cleft and awned at the back ... **Arthraxon**
33. Second lemma reduced to form the hyaline base of the awn..... **Dichanthium**(p. p.)
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34. Spikelets not awned or aristate 38
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ALLOTEROPSIS J. S. Presl, ex C. B. Presl
Rel. Haenk. 1: 343. 1830.

Alloteropsis cimicina (L.) Stapf in Prain, Fl. Trop. Africa 9: 487. 1919; Fischer in Gamble, Fl. Pres. Madras 1766(1223). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 276. 1960; Manilal & Sivar., Fl. Calicut 339. 1982; Ansari, Fl. Kasaragod Div. 444. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 525. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 214. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 502. 1996; Sivar. & P. Mathew, Fl.

Nilambur 831. 1997; Mohanan & Sivad., Fl. Agasthyamala 799. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 560. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 816. 2009. *Milium cimicinum* L., Mant. Pl. 2: 184. 1771. *Axonopus cimicinus* (L.) P. Beauv., Ess. Agrost. 154. 1812; Hook. f., Fl. Brit. India 7: 64. 1896.

Annuals, culms 15-45 cm high, 3-5-together; nodes hairy. Leaves 5-7 x 1-1.2 cm, lanceolate, cordate at base; margin ciliate; sheath rounded, hairy; ligule a row of hairs. Racemes 6-8, digitate, 12-15 cm long; rachis triquetrous, serrulate; spikelets similar, ovate, acuminate, pedicelled; pedicels unequal; lower glume acuminate 3-nerved; upper acute, 5-nerved, ciliate along margins; lower floret male, upper bisexual; first lemma ovate, obtuse, 5-nerved; palea hyaline, oblong; second lemma ovate, aristate, 3-nerved; palea 2-nerved; stamens 3, free; ovary oblong; styles 2, free; stigmas feathery.

Flowering & Fruiting: July-November.

Distribution: Paleotropics. Common; along wayside. *RNMK 4302,* Puthoorvayal.

ANDROPOGON Linnaeus

Sp. Pl. 2: 1045. 1753.

Andropogon lividus Thw., Enum. Pl. Zeyl. 367. 1864; Hook. f., Fl. Brit. India 7: 209. 1896; Fischer in Gamble, Fl. Pres. Madras 1753(1215). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 91. 1960; Manilal, Fl. Silent Valley 345. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 29. 1991. *Cymbopogon lividus* (Thw.) Willis, Rev. Cat. Pl. Ceylon 110. 1911.

Perennials; culms 20-70 cm high; nodes glabrous. Leaves 6-20 x 0.3-0.5 cm, linear lanceolate, usually clustered at base, glabrous; sheaths keeled; ligules membranous. Racemes 1-3 together, purplish, stout, sparsely villous; sessile spikelets elliptic-lanceolate, callus shortly bearded; lower glume elliptic-lanceolate, mucronate at apex, 3-5 nerved; upper glume boat shaped, 3-nerved, margins infolded; first lemma of upper bisexual floret lanceolate, margins infolded, ciliate; second lemma notched, 3-nerved; awns 1-1.5 cm long, geniculate, bristles scabrid; palea with 2-3 long hairs at the tip; stigmas feathery; pedicelled spikelets elliptic-lanceolate, margins ciliate; lower glume 13-15 nerved; awn reduced to a mucron.

Flowering & Fruiting: August-February.

Distribution: India and Sri Lanka. Occasional; in grasslands. *RNMK 4331,* Chembra.

APLUDA Linnaeus

Sp. Pl. 82. 1753.

Apluda mutica L., Sp. Pl. 82. 1753; Fischer in Gamble, Fl. Pres. Madras 1750(1212). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 93. 1960; Manilal & Sivar., Fl. Calicut 344. 1982; Ansari, Fl. Kasaragod Div. 444. 1985; Manilal, Fl. Silent Valley 346. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 525. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 32. 1991; Sasidh. & Sivar.,

Fl. Pl. Thrissur For. 502. 1996; Sivar. & P. Mathew, Fl. Nilambur 803. 1997; Mohanan & Sivad., Fl. Agasthyamala 800. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 560. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 817. 2009. *Apluda mutica* var. *aristata* (L.) Hack. ex Backer, Handb., Fl. Java 2: 54. 1928. *Apluda varia* Hack. ssp. *aristata* (L.) Hack. in A. & C. DC., Monogr. Phan. 6: 196. 1889; Hook. f., Fl. Brit. India 7: 151. 1896; Vajr., Fl. Palghat Dist. 563. 1990. *Apluda aristata* L., Amoen. Acad. 4: 303. 1759; Fischer in Gamble, Fl. Pres. Madras 1950(1212). 1934. *Apluda varia* Hack. in A. & C. DC., Monogr. Phan. 6: 196. 1889; Hook. f., Fl. Brit. India 7: 150. 1896.

Perennials; culms 30-150 cm high, erect, 2-5-together. Leaves 10-30 x 1-1.2 cm, linear-lanceolate, narrowed to the base; ligule membranous. Panicle lax; raceme enclosed by a boat shaped spathe; 1 sessile spikelets and 2 pedicelled spikelets in each raceme; glumes subequal, lanceolate; first lemma oblong, chartaceous, 3-nerved, paleate containing 3 stamens; second lemma 2-cleft and awned at the sinus, hyaline; awn 1-1.5 cm long; palea oblong, 2-keeled, hyaline; stamens 3; ovary oblong; styles 2; stigmas plumose; pedicelled spikelets reduced to empty glumes or carries a male floret.

Flowering & Fruiting: October-November.

Distribution: Tropical Asia and Australia. Occasional; in grasslands. *RNMK 1738,* Attamala.

APOCOPIS Nees

Proc. Linn. Soc. London 1: 93. 1841.

Annual or perennial herbs. Leaves flat. Racemes terminal, solitary or 2-3; rachis not readily disarticulating. Spikelets second, closely imbricate, compressed, solitary, sessile; glumes 2, chartaceous or membranous; lower broadly cuneiform, nearly flat, truncate, rounded or emarginated; upper narrower, usually laterally 2-keeled; lemmas hyaline; lower oblong, upper very narrow, entire or shortly 2-lobed with a geniculate awn; palea much shorter, wrapped round a female or bisexual floret; lodicules 0; stamens 2 or 3; styles 2, free. Grain linear or fusiform.

1. Racemes less than 3 cm long; lower glume oblanceolate.....**A. mangalorensis**
1. Racemes more than 5 cm long; lower glume obovate .....**A. courtallumensis**

Apocopis mangalorensis (Hochst.) Henrard, Blumea 4: 523. 1941; Ansari, Fl. Kasaragod Div. 445. 1985; Sur, J. Econ. Tax. Bot. 11: 394. 1987; Sreek. & V.J. Nair, Fl. Kerala Grasses 33. 1991; Manilal & Sivar., Fl. Calicut 332. 1982; Sasidh. & Sivar., Fl. Pl. Thrissur For. 503. 1996; Mohanan & Sivad., Fl. Agasthyamala 801. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 818. 2009. *Amblyachyrum mangalorense* Hochst., Flora 39. 26. 1856.

Annuals; culms 30-45 cm high, tufted; nodes glabrous. Leaves 2-6 x 0.2-0.7 cm ovate-lanceolate, base rounded, densely covered with bulbous based hairs; sheath keeled, densely hairy; ligule membranous. Racemes 2, ca. 2 cm long, compressed; spikelets similar obovate, dorsiventrally compressed, brown;

callus hairs brown; lower glume oblanceolate, 9-nerved; upper glume oblong, 2-keeled, 3-nerved; lower floret empty, upper bisexual; first lemma oblong, hyaline; palea oblong, hyaline; second lemma bifid at apex and awned; palea ciliate along the margins; stamens 3; ovary oblong; styles 2, free; stigmas plumose.
Flowering & Fruiting: October-February.
Distribution: Endemic to Peninsular India. Occasional; in moist deciduous forests. *RNMK 2730,* Manjappara

Apocopis courtallumensis (Steud.) Henrard, Blumea 4: 524. 1941; Ansari, Fl. Kasaragod Div. 445. 1985; Sur, J. Econ. Tax. Bot. 11: 393. 1987; Vajr., Fl. Palghat Dist. 563. 1990. *Andropogon courtallumensis* Steud., Syn. Pl. Glum. 1: 377. 1854. *Apocopis wightii* Nees ex Thw. Enum. Pl. Zeyl. 365. 1864; Hook. f., Fl. Brit. India 7: 142. 1896; Fischer in Gamble, Fl. Pres. Madras 1725(1196). 1934.

Annuals; culms densely tufted, 6-40 cm high. Leaves 2-5 x 0.3-0.4 cm, densely imbricate, with bulbous based hairs. Racemes 2, 6-7 cm long; rachis and pedicels rufous hairy; lower glume obovate, truncate, yellow with red-brown tip, glabrous; awn geniculate. Grain linear.
Flowering & Fruiting: September-December.
Distribution: India, Sri Lanka and Myanmar .Common; in moist deciduous forests. *RNMK 4322,* Muthanga

ARISTIDA Linnaeus
Sp. Pl. 82. 1753.

Annual or perennial, tufted herbs. Leaves flat or more often convolute, very narrow. Panicles branched, contracted or effuse; spikelets all alike, 1-flowered, articulated on the short or long pedicels; rhachilla very short, disarticulating above the upper glume; glumes narrow, keeled, 3-nerved, lower shorter, frequently aristate, sometimes 2-toothed; lemma with a more or less bearded callus, terminated by an awn; palea very narrow, embraced by the lemma; lodicules 2-3; stamens 3; styles 2, free. Grain narrowly cylindric or ellipsoid.

1. Panicles effuse, spreading, often as broad as long..... **A. hystrix**
1. Panicles contracted, longer than broad.....**A. setacea**

Aristida hystrix L. f., Suppl. Pl. 113. 1781; Hook. f., Fl. Brit. India 7: 225. 1896; Fischer in Gamble, Fl. Pres. Madras 1809(1252). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 410. 1960; Sreek. & V.J. Nair, Fl. Kerala Grasses 326. 1991.

Annuals or perennials; culms 30-60 cm high, tufted, geniculate, nodes glabrous. Leaves 5-10 x 0.1-0.2 cm, narrow, glabrous; sheath rounded, glabrous; ligule a row of hairs. Panicle 10-15 x 6-7 cm, lax; branches filiform, glabrous; spikelets similar, 7-8 mm long, lanceolate, solitary, pedicelled; lower

glume 1-nerved, glabrous; upper glume acuminate, 1-nerved, keeled; floret one; lemma 7-8 mm long, lanceolate, 3-nerved, awned; awns 1-1.5 cm long; palea minute, hyaline; stamens 3; ovary elliptic; styles 2, free; stigma plumose. Grains linear, terete.
Flowering & Fruiting: October-January.
Distribution: India and Sri Lanka. Rare; in rocky areas of moist deciduous forests. *RNMK 4303,* Thirunelly.

Aristida setacea Retz., Obs. Bot. 4: 22. 1786; Hook. f., Fl. Brit. India 7: 225. 1896; Gamble, Fl. Pres. Madras 1809(1252). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 412. 1960; Ansari, Fl. Kasaragod Div. 446. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 526. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 328. 1991; Mohanan & Sivad., Fl. Agasthyamala 801. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 561. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 819. 2009.

Perrenials; culms tufted about 1 m high; nodes glabrous. Leaves linear-lanceolate, acuminate; base rounded, ca. 25 x 0.4 cm. Panicles flabelliform, contracted, 10-50 cm long; spikelets lanceolate, 1-1.5 cm long; lower glume aristate, 1- nerved; upper glume lanceolate; lemma linear, 3 awned, 5-4 cm long, bright yellow.
Flowering & Fruiting: Throughout the year.
Distribution: Indo-Malesia. Common; along roadsides. *RNMK 3583*, Chooralmala.

ARTHRAXON P. Beauvois

Ess. Agrost. 111. 1812.

Annual or perennials. Culms geniculate. Leaves ovate, lanceolate, base rounded or cordate; sheath rounded, hairy or glabrous. Racemes 2-6, sub-digitate; joints and pedicel usually ciliate; spikelets dissimilar, sessile and pedicelled; sessile spikelets lanceolate, acuminate; lower glume lanceolate, rounded or two-keeled; upper glume boat-shaped, 3-nerved and strongly keeled; florets 2, lower empty; upper bisexual; first lemma oblong, linear, hyaline, epaleate; second lemma deeply notched, curved and awned from very near the base; palea oblong, delicate; stamens 2 or 3; ovary ellipsoid; styles 2, free; stigma plumose; pedicelled spikelets developed or reduced, lanceolate; lower glume lanceolate; upper boat-shaped, 1-keeled; flowers 2, lower barren; upper male; second lemma cleft at apex, not awned.

1. Joints and pedicels glabrous ..... **A. nudus**
1. Joints and pedicels hairy or ciliate 2
2. Pedicelled spikelets reduced to minute hook-like pedicel. ..... **A. hispidus**
2. Pedicelled spikelets well dveloped ..... .**A. lancifolius**

Arthraxon hispidus (Thunb.) Makino, Bot. Mag. Tokyo 26:214.1912; Ansari, Fl. Kasaragod Div. 446. 1985; Manilal, Fl. Silent Valley 346. 1988. *Phalaris*

hispida Thunb., Fl. Japan 44. 1784. *Arthraxon ciliaris* P. Beauv., Ess. Agrost. 111. t.11. f. 6. 1812; Hook. f., Fl. Brit. India 7: 146. 1896. *Arthraxon quartinianus* (A. Rich.) Nash, N. Amer. Fl. 17: 99. 1912; Fischer in Gamble, Fl. Pres. Madras 1728(1198). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 102. 1960; Manilal & Sivar., Fl. Calicut 334. 1982; Sreek. & V.J. Nair, Fl. Kerala Grasses 41. 1991; Mohanan & Sivad., Fl. Agasthyamala 802. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 562. 2005. *Alectoridia quartiniana* A. Rich., Tent. Fl. Abyss. 2: 448. t.99. 1851.

Culms 10-50 cm tall, geniculate, or creeping; nodes bearded. Leaves 1-5 cm long, ovate-lanceolate; base amplexicaule; margin ciliate; sheath keeled, glabrous; ligule a fimbriate membrane. Raceme 2-6, each 1-3 cm long, sub-digitate; sessile spikelets ca. 3.5 x 1 mm; lower glume ovate, glabrous, 5-nerved; upper glume lanceolate, not keeled; first lemma hyaline, 1-nerved; second lemma epaleate; awn 7-8 mm long.

Flowering & Fruiting: September-March.

Distribution: India, Sri Lanka and Myanmar. Common; along roadsides and open areas. *RNMK 2200,* Meppady.

Arthraxon lancifolius (Trin.) Hochst., Flora 39: 188. 1856; Fischer Gamble, Fl. Pres. Madras 1729(1198). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 100. 1960; Manilal & Sivar., Fl. Calicut 334. 1982; Manilal, Fl. Silent Valley 347. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 38. 1991; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 562. 2005. *Andropogon lancifolius* Trin., Mem. Acad. Sci. Petersb. ser. 6, 2: 271. 1833.

Annuals; culms procumbent; lower nodes rooting, nodes hairy. Leaves 1.5-4 x 0.5-1 cm, ovate, acute, margins minutely serrulate, glabrous, base rounded with few long hairs; ligule a row of hairs. Racemes digitate, 4-8 in number, up to 0.5-2 cm long sessile spikelets greenish-yellow, 2.5-3 mm long, lanceolate, acuminate; lower glume 2-3 mm long, shortly bifid, smooth; upper glume shorter, aristate; first lemma oblong, glabrous; second lemma deeply notched, awned, awn 6-8 mm long, geniculate, from the base of second lemma.

Flowering & Fruiting: October-January.

Distribution: Tropical Africa, India and Malesia. Common; along hill slopes. *RNMK 2206,* Manikkunnumala

Arthraxon nudus (Steud.) Hochst., Flora 39: 188. 1856; Bor, Grass. Burma, Ceylon, India & Pakistan 101. 1960; Manilal, Fl. Silent Valley 347. 1988; Vajr., Fl. Palghat Dist. 564. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 39. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 503. 1996. *Andropogon nudus* Steud., Syn. Pl. Glum. 1: 383. 1854. *Arthraxon hispidus* Fischer in Gamble, Fl. Pres. Madras 1728(1198). 1934, non Makino 1912. *Arthraxon ciliaris* sensu Hook. f., Fl. Brit. India 7: 145. 1896. p.p.,non P. Beauv.1812.

Annuals; culms 30-45 cm high, geniculate; nodes bearded. Leaves 3-4 x 1-1.5 cm, cordate at base, margin ciliolulate; sheath sparsely hairy, margin

ciliate; ligule membranous. Racemes 3-6, 5-6 cm long, glabrous; sessile spikelets ca. 4 mm long; lower glume 7-9 nerved, hirtus along the nerves; keel ciliate on the upper half; awn 8-9 mm long; pedicelled spikelets reduced to a naked pedicel.

Flowering & Fruiting: October-December.

Distribution: Central and south Asia. Occasional; in open areas in evergreen forests. *RNMK 2174,* Kadachikkunnu; *RNMK* 1*174,* Vythiri.

ARUNDINELLA Raddi

Agrost. Brass. 36, t. 1, f. 3. 1823.

Annuals or perennials, tufted, erect. Leaves lanceolate, usually densely covered with bulbous based hairs. Sheath round. Inflorescence a dense or lax panicle; rachis and branches scabrid or covered with bulbous based hairs; spikelets similar, solitary, pedicelled, lanceolate; lower glume ovate-lanceolate, 3-5-nerved; upper glume similar, but larger than the lower, 5-nerved; florets 2; lower male or barren, upper bisexual; first lemma lanceolate, 3-5-nerved, glabrous; palea oblong, obtuse, 2-nerved; second lemma ovate, shortly bifid at apex, awned; palea oblong, obtuse, 2-nerved; stamens 3, ovary ellipsoid; styles 2, free; stigmas 2, plumose.

1. Second lemma with seta on either side of the awn ..... **A. mesophylla**
1. Second lemma without seta.....2
2. Spikelets 1.5-2 mm long; panicles effuse .....**A. pumila**
2. Spikelets over 2 mm long; panicles contracted.....3
3. Annual; nodes bearded; glumes covered with bulbous based hairs .....**A. ciliata**
3. Perennials; nodes glabrous; glumes glabrous 4
4. Leaves rounded at base, often at the base of the plant; panicles often contracted .... **A. purpurea**
4. Leaves otherwise; panicles often very effuse.....5
5. Spikelets distinctly awned; base of the upper lemma bearded.....6
5. Spikelets not awned; base of the upper lemma glabrous..... .**A. leptochloa**
6. Culms glabrous below the panicles; pedicel often longer.....**A. metzii**
6. Culms puberulous below the panicle; pedicels much shorter.....**A. nepalensis**

Arundinella ciliata (Roxb.) Nees ex Miq. in Verh., Kon. Nederl. Inst. 3: 30. 1851; Bor, Grass. Burma, Ceylon, India & Pakistan 421. 1960; Manilal, Fl. Silent Valley 348. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 526. 1988; Vajr., Fl. Palghat Dist. 564. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 335. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 504. 1996; Sivar. & P. Mathew, Fl. Nilambur 816. 1997; Mohanan & Sivad., Fl. Agasthyamala 803. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 562. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 819. 2009. *Holcus ciliatus* Roxb., Fl. Ind. 1: 321. 1820. *Arundinella holcoides* sensu Fischer in Gamble, Fl. Pres. Madras 1801(1247). 1934, non Trin. 1836. *Arundinella agrostoides* sensu Hook. f., Fl. Brit. India 7: 71. 1896, non Trin. 1836.

Densely tufted annuals; culms 15-60 cm high; nodes bearded. Leaves 5-18 x 0.5-1 cm, ovate-lanceolate, rounded at base, glabrous; sheath rounded, covered with bulbous based hairs; ligule a fimbriate membrane. Panicle 5-25 cm long, congested; rachis and axis covered with bulbous based hairs; spikelets ca. 4 x 1 mm, lanceolate, pedicelled; glumes similar, ovate, acuminate, 5-nerved; first lemma lanceolate, 3-nerved, empty; second lemma hyaline; awn ca. 5 mm long.
Flowering & Fruiting: October-November;
Distribution: Endemic to Peninsular India. Common; in open grasslands. *RNMK 1936,* Manikkunnumala*, RNMK 2163,* Attamala.

Arundinella leptochloa (Nees ex Steud.) Hook. f., Fl. Brit. India 7: 76. 1890; Fischer in Gamble, Fl. Pres. Madras 1802(1247). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 423. 1960; Manilal & Sivar., Fl. Calicut 346. 1982; Ansari, Fl. Kasaragod Div. 447. 1985; Vajr., Fl. Palghat Dist. 565. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 336. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 504. 1996; Mohanan & Sivad., Fl. Agasthyamala 804. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 819. 2009. *Panicum leptochloa* Nees ex Steud., Syn. Pl. Glum. 1: 62. 1854. *Arundinella lawsonii* Hook.f., Fl. Brit. India 7:76.1896.

Perennials; culms 30-120 cm high, tufted; nodes sparsely hairy. Leaves 7-30 x 0.5-0.8 cm, linear, densely tubercled hairy; sheaths rounded, hairy, ligule a narrow fimbriate membrane. Panicle 5-20 cm long, dense; axis and branches tubercled hairy; spikelets pedicelled, 3-3.5 mm long, long; glumes glabrous; lower ovate, acute; upper ovate, acuminate; first lemma ovate-lanceolate, 5-nerved, second lemma ovate, obtuse, 2-fid at apex, awnless.
Flowering & Fruiting: Throughout the year.
Distribution: Peninsular India and Sri Lanka. Occasional; in grasslands. *RNMK 2153,* Manikkunnumala.

Arundinella mesophylla Nees ex Steud., Syn. Pl. Glum. 1: 115. 1854; Hook. f., Fl. Brit. India 7: 69. 1896; Fischer in Gamble, Fl. Pres. Madras 1801(1246). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 423. 1960; Manilal & Sivar., Fl. Calicut 346. 1982; Ansari, Fl. Kasaragod Div. 448. 1985; Manilal, Fl. Silent Valley 348. 1988; Vajr., Fl. Palghat Dist. 565. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 337. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 504. 1996; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 563. 2005.

Tufted perennials; culms 30-70 cm high; nodes glabrous. Leaves 4-8 x 0.4-0.6 cm, ovate-lanceolate, rounded at base; sheath rounded, glabrous, ciliate along margins; ligule a row of hairs. Panicle 3-10 cm long, branches 5-10, racemiform; axis, rachis and glumes covered with bulbous based hairs; spikelets 4-5 mm long, densely packed; glumes similar, 4-5 mm long; lower 3-nerved; upper 5-nerved; first lemma lanceolate, acute, reddish brown; palea smaller, hyaline; second lemma subcoriaceous, with seta on either sides of the awn; awn 5-6 mm long.

Flowering & Fruiting: October-January.
Distribution: Endemic to Peninsular India. Common; along grasslands. *RNMK 2264,* Aranamala

Arundinella metzii Hochst. ex Miq. in Verh. Koni. Nederl. Inst. 3: 31. 1851; Hook. f., Fl. Brit. India 7: 72. 1896; Fischer in Gamble, Fl. Pres. Madras 1801(1247). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 423. 1960; Manilal & Sivar., Fl. Calicut 346. 1982; Ansari, Fl. Kasaragod Div. 448. 1985; Sreek. & V.J. Nair, Fl. Kerala Grasses 339. 1991. *Arundinella pygmaea* Hook.f., Fl. Brit. India 7: 72. 1896; Fischer in Gamble, Fl. Pres. Madras 1801(1247). 1934.

Annuals. Culms 20-90 cm long, creeping; nodes sparsely bearded. Leaves 3-12 x 0.4-1 cm, lanceolate, rounded or shallowly cordate at base, tubercled hairy; ligules membranous. Panicles lax, 5-30 cm long; spikelets ovate-lanceolate; lower glume ovate, 3-nerved; upper glume 5-nerved; lower floret male or neuter; first lemma 3-5 nerved; second lemma awned, awn 4-7 mm long.
Flowering & Fruiting: October-January.
Distribution: Endemic to Peninsular India. Occasional; in grasslands. *RNMK 3584,* Sughandhagiri

Arundinella nepalensis Trin., Gram. Pan. 92. 1826; Fischer in Gamble, Fl. Pres. Madras 181(1247). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 423. 1960; Sreek. & V.J. Nair, Fl. Kerala Grasses 341. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 505. 1996. *Arundinella braziliensis* sensu Hook.f., Fl. Brit. India 7: 73. 1896, non Rendle 1823.

Slender annuals; culms 60-75 cm tall, tufted, nodes glabrous. Leaves lanceolate, rounded at base, tubercle-based hairy, 12-15 x 0.7-0.8 cm; ligules ovate, membranous. Panicles 25-30 cm long, pubescent; spikelets elliptic-lanceolate, 3-4 x 2-4 mm; awn 5-6 mm long.
Flowering & Fruiting: September-November.
Distribution: Indo-Malesia. Occasional; in grassy slopes. *RNMK 2153,* Attamala

Arundinella pumila (Hochst. ex A. Rich.) Steud., Syn. Pl. Glum. 1: 114. 1854; Fischer in Gamble, Fl. Pres. Madras 1801(1247). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 424. 1960; Ansari, Fl. Kasaragod Div. 448. 1985; Manilal, Fl. Silent Valley 348. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 527. 1988; Vajr., Fl. Palghat Dist. 565. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 342. 1991; Sivar. & P. Mathew, Fl. Nilambur 817. 1997. *Acratherum pumilum* Hochst. ex A. Rich., Tent. Fl. Abyss. 2: 414. 1851. *Arundinella tenella* Nees ex Steud., Syn. Pl. Glum. 1: 115. 1854; Hook. f., Fl. Brit. India 7: 71. 1896.

Slender annuals; culms 15-30 cm high, erect, few together or solitary; nodes hairy. Leaves 4-15 x 0.5-1 cm, linear-elliptic, densely hairy; sheath

rounded, covered with bulbous based hairs; ligule a fimbriate membrane, ca. 1.5 mm long. Panicle effuse, 7-25 cm long; axis & branches tubercled hairy, slender; spikelets many, 1-2 mm long, lanceolate, glabrous; glumes similar, ovate, acute; first lemma similar to upper glume; second lemma lanceolate; awn 2.5-3 mm long.
Flowering & Fruiting: July-December.
Distribution: Tropical Africa and Asia. Occasional; in grasslands. *RNMK 3577*, Manikkunnumala

Arundinella purpurea Hochst. ex Steud., Syn. Pl. Glum. 1: 115. 1854; Bor, Grass. Burma, Ceylon, India & Pakistan 424. 1960; Manilal, Fl. Silent Valley 349. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore Dist. 527. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 343. 1991; Mohanan & Sivad., Fl. Agasthyamala 804. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 563. 2005. *Arundinella fuscata* sensu Hook.f., Fl. Brit. India 7: 74. 1896 non Nees ex Buese 1854; Fischer in Gamble, Fl. Pres. Madras 1802(1247). 1934.

Perennials, culms tufted, 30-60 cm high; nodes glabrous. Leaves 5-20 x 0.5-1 cm, linear, round or cordate at base, densely hairy; sheath rounded, hairy; ligule membranous. Panicle congested, 5-12 cm long, branches angled; spikelets 3-4 mm long; lower glume elliptic, scabrid along the nerves, 3-nerved; upper glume acuminate, 5-nerved; first lemma empty; second lemma ovate, tuberculate on the upper half; awn 3-3.5 mm long.
Flowering & Fruiting: August-December.
Distribution: Endemic to southern Western Ghats. Occasional; in margins of evergreen forests. *RNMK 4311,* Chanthanathodu

AXONOPUS Palisot de Beauvois
Essai Agrost. 12, 154. 1812.

Axonopus compressus (Sw.) P. Beauv., Ess. Agrost. 12: 154. 1812; Bor, Grass. Burma, Ceylon, India & Pakistan 278. 1960; Ansari, Fl. Kasaragod Div. 449. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore Dist. 527. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 216. 1991; Mohanan & Sivad., Fl. Agasthyamala 805. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 563. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 820. 2009. *Milium compressum* Sw., Prodr. 24. 1788.

Tufted perennials; culms 20-45 cm high, decumbent at base, sometimes flattened or compressed, nodes glabrous. Leaves 2-25 x 0.5-1.2 cm; ovate-lanceolate, acute or obtuse, hairy along the margins; sheath keeled, glabrous; ligule a narrow membrane; racemes 3-5, 5-8 cm long, sub-digitate, on a slender axis, narrow; rachis triquetrous, smooth; spikelets 2-2.5 mm long, solitary, sessile, in two rows along the rachis; lower glume absent; upper glume 5-7 nerved, glabrous; flowers two, lower empty or staminate, upper bisexual; first lemma ovate, acute, 3-nerved, epaleate; second lemma oblong, hyaline; palea oblong; stamens 3.

Flowering & Fruiting: Throughout the year.
Distribution: Tropics and subtropics. Common; in open areas. *RNMK 3122,* Puthoorvayal.

BAMBUSA Schreber
Gen. Pl. ed. 8, 1: 236. 1789, *nom cons.*

Bambusa bambos (L.) Voss in Vilmorin, Blumengartn. 1:1189.1896; Nicola., Suresh & Manilal, An Interpr. Hort. Malab. 306. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 505. 1996; Seethalakshmi & Muktesh, Bamboos of India 40. 1998; Mohanan & Sivad., Fl. Agasthyamala 805. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 564. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 821. 2009. *Arundo bambos* L., Sp. Pl. 81. 1753. *Bambusa bambos* (L.) var. *gigantea* (Bahadur & Jain) Bennet & Gaur, Thirty Seven Bamboos Inida 21. 1990; Seethalakshmi & Muktesh, Bamboos of India 46. 1998. *Bambusa arundinacea* (Retz.) Willd., Sp. Pl. 2: 245. 1799; Hook. f., Fl. Brit. India 7: 395. 1896; Fischer in Gamble, Fl. Pres. Madras 1859(1286). 1934; Ansari, Fl. Kasaragod Div. 449. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 528. 1988; Manilal & Sivar., Fl. Calicut 350. 1982; Vajr., Fl. Palghat Dist. 566. 1990; Sivar. & P. Mathew, Fl. Nilambur 818. 1997. *Bambusa arundinacea* (Retz.) Willd. var. *gigantea* Bahadur & Jain, Indian J. For. 4: 283. 1981. *Illy*, Rheede, Hort. Malab. 1:25-26, t. 16. 1678.

Large shrubs or trees with branched rhizome; culms 15-25 m high, 7-14 cm across, thorny, cylindric, hollow; branches from each node, clustered, horizontal. Culm sheaths glabrous; margin hairy; blade triangular, 12-15 x 8-10 cm, thickly hairy within. Leaves 16-20 cm long, oblong-lanceolate, serrate along the margins; sheath rounded, ligule membranous; contraligule present; panicle 30-35 cm long, terminal and axillary; branches spreading; spikelets 1-1.8 cm long, crowded, glabrous; glumes 2, subequal, ovate, acute; florets many; lower lemmas ovate, acute, empty; upper lemmas similar to lower, bisexual; palea coriaceous, 2 keeled; hairy along the keels; stamens 4-6, free; anthers 3-4 mm long; styles 2, free; stigma plumose.
Flowering & Fruiting: July-February.
Distribution: India and Sri Lanka. Common; in moist deciduous forests. *RNMK 3144,* Kuruva.

BOTHRIOCHLOA O. Kuntze
Rev. Gen. Pl. 2: 762. 1891.

Bothriochloa insculpta (Hochst. ex A. Rich.) A. Camus, Ann. Soc. Linn. Lyon 76:165. 1931; Sreek. & V.J. Nair, Fl. Kerala Grasses 51. 1991. *Andropogon insculptus* Hochst. ex A. Rich., Tent. Fl. Abyss. 2: 458. 1851. *Andropogon pertusus* (L.) Willd. var. *insculptus* (Hochst. ex A. Rich.) Hack. in A. & C. DC., Monogr. Phan. 6: 482. 1889; Hook. f., Fl. Brit. India 7: 174. 1896. *Amphilophis insculpta* (Hochst. ex A. Rich.) Stapf in Prain, Fl. Trop. Africa 9: 176. 1917; Fischer in Gamble, Fl. Pres. Madras 1732(1200). 1934. *Dichanthium insculptum* (Hochst. ex A. Rich.) Clayton, Kew Bull. 32: 3. 1977.

Stoloniferous perennials; culms tufted, 20-100 cm tall; nodes bearded. Leaves 5-12 x 0.2-0.4 cm, linear-lanceolate, glabrous; sheath keeled, ligule membranous. Raceme 2-8, each 3-5 cm long; sessile spikelets 3.5 x 1-2 mm; callus hairy; lower glume equaling the spikelets, glabrous, 1-4 pitted; upper glume hyaline; first lemma oblong; awn ca. 1.5 cm long; pedicelled spikelets ca. 5 x 2 mm; lower glume 1-3 pitted.
Flowering & Fruiting: September-January.
Distribution: Tropical Asia, Africa and Australia. Common; in grassy slopes and along road cuttings. *RNMK 4310*, Chembra

BRACHIARIA (Trinius) Grisebach
in Ledebour, Fl. Rossica 4: 469. 1853.

Annuals or perennials, culms creeping or erect, rooting at lower nodes. Leaves ovate-lanceolate, rounded at base; sheath rounded or keeled. Inflorescence of 2-10 racemes, distantly or closely disposed on an axis; spikelets densely packed in the racemes, oblong-lanceolate; lower glume broadly ovate, 1-3-nerved; upper glume ovate, acute, coriaceous, 5-7-nerved; florets 2, lower barren; upper bisexual; first lemma similar to the upper glume; palea hyaline; second lemma ovate to oblong, concave, coriaceous, obtuse, transversely rugose; palea ovate to oblong, flat; stamens 3; ovary elliptic; style 2; stigma plumose.

1. Nodes hairy; rachis triquetrous 2
1. Nodes glabrous; rachis flat. 3
2. Leaves densely pubescent; rachis covered with glassy bristles ... **B. semiverticillata**
2. Leaves glabrous; rachis not as above ..... **B. ramosa**
3. Leaves pubescent; spikelets ca. 5 mm long..... .**B. brizantha**
3. Leaves glabrous; spikelets ca. 3 mm long 4
4. Racemes 2 or rarely 3; peduncles softly hairy below the raceme ..... **B. distachya**
4. Racemes 3-8; peduncles puberulous or glabrous..... **B. miliiformis**

Brachiaria brizantha (Hochst. ex A. Rich.) Stapf in Prain, Fl. Trop. Africa 9: 531. 1919; Manilal & Sivar., Fl. Calicut 343. 1982; Sajeev *et al.*, J. Econ. Tax. Bot. 22: 491. 1998. *Panicum brizanthum* Hochst. ex A. Rich., Tent. Fl. Abyss. 2: 363. 1851.

Annuals; culms 50-60 cm high; nodes glabrous. Leaves 10-30 x 1-2 cm, pubescent. Panicles 10-20 cm long; racemes 5-6, each 4-5 cm long; rachis flat, spikelets in two rows, each ca. 5 x 2 mm; lower floret male; upper bisexual.
Flowering & Fruiting: October-January.
Distribution: Tropical Africa. Rare; in bunds of paddy fields. *RNMK 1966,* Palavayal.

Brachiaria distachya (L.) Stapf in Prain, Fl. Trop. Africa 9: 565. 1919; Fischer in Gamble, Fl. Pres. Madras 1769(1226). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 281.1960; Ansari, Fl. Kasaragod Div. 451.1985; V.S.Ramach.

& V.J. Nair, Fl. Cannanore 528. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 219. 1991; Sivar. & P. Mathew, Fl. Nilambur 832. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 823. 2009. *Panicum distachyon* L., Mant. Pl. 2: 183. 1771.

Perennials; culm straggling, 15-50 cm long; rooting at the nodes, nodes glabrous. Leaves flat, elliptic-lanceolate, 1-4 x 0.3-0.6 cm, rounded at base; sheaths softly hairy, ciliate along one margin; ligule a tuft of hairs or fimbriate. Racemes 2 or rarely 3, 1-3 cm long; rachis flat, ; spikelets 3-4 mm long, solitary; pedicels triquetrous; lower glume 7-9 nerved; upper glume broadly ovate 5-7 nerved; lower floret empty; upper floret bisexual; first lemma 5 nerved; second lemma ovate, rugulose; palea 2 keeled, elliptic.

Flowering & Fruiting: May-June.

Distribution: Africa, India, Sri Lanka and Thailand. Common; in moist deciduous forests. *RNMK 3576,* Baveli.

Brachiaria miliiformis (J.S. Presl ex C.B. Presl) A. Chase, Contrib. U.S. Nat. Herb. 22: 35. 1920; Fischer in Gamble, Fl. Pres. Madras 1769(1226). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 220. 1960; Vajr., Fl. Palghat Dist. 567. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 220. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 505. 1996; Mohanan & Sivad., Fl. Agasthyamala 806. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 824. 2009. *Panicum miliforme* J. Presl ex C. Presl, Reliq. Haenk. 1: 300. 1830; Hook. f., Fl. Brit. India 7: 37. 1896.

Annual erect herbs; culms 35-50 cm long, decumbent, rooting at lower nodes, nodes glabrous. Leaves linear-lanceolate, base rounded, 7-10 x 0.8-1 cm; sheath glabrous, ciliate along margins. Racemes 3-8, 5-6 cm long; spikelets elliptic-obovate, apiculate; lower glumes 9-11 nerved.

Flowering & Fruiting: July-October.

Distribution: Indo-Malesia. Occasional; in moist deciduous forests. *RNMK 3116,* Muthanga.

Brachiaria ramosa (L.) Stapf in Prain, Fl. Trop. Africa 9:542. 1919; Fischer in Gamble, Fl. Pres. Madras 1770(1226). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 284. 1960; Manilal & Sivar., Fl. Calicut 343. 1982; Ansari, Fl. Kasaragod Div. 451. 1985; Sreek. & V.J. Nair, Fl. Kerala Grasses 223. 1991; Sivar. & P. Mathew, Fl. Nilambur 832. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 825. 2009. *Panicum ramosum* L., Mant. Pl. 1: 29. 1767; Hook. f., Fl. Brit. India 7: 36. 1896.

Annuals; culms 40 cm high, loosely tufted; nodes hairy. Leaves 10-15 x 0.5-1.3 cm, lanceolate, glabrous; sheath keeled; ligule a fimbriate membrane. Raceme 10-15, 7-8 cm long; rachis triquetrous, scabrous; spikelets distant, paired, 2-2.5 x 1-2 mm, ovate; lower glume orbicular, 7-nerved; upper glume ovate, thinly pubescent; second lemma coriaceous, rugose, 5-nerved.

Flowering & Fruiting: September-January.

Distribution: Africa and Tropical Asia. Common; along the bunds of paddy fields. *RNMK 4321,* Palavayal.

Brachiaria semiverticillata (Rottl.) Alston in Trimen, Handb. Pl. Ceyl. 6. Suppl. 318.1931; Fischer in Gamble, Fl. Pres. Madras 1770(1226). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 286. 1960; V.S. Ramach. & V.J. Nair, Fl. Cannanore 529. 1988. *Panicum semiverticillatum* Rottl. in Ainslie Mat. Med. Hindost. 1: 219. 1813; Hook. f., Fl. Brit. India 7: 38. 1896.

Perennials; culms robust, 60-90 cm long. Leaves ensiform, broadly lanceolate, rounded at base, finely acuminate. Racemes 6-8 cm long; spikelets elliptic or elliptic-oblong, distant on the rachis; rachis triquetrous.

Flowering & Fruiting: July-August.

Distribution: Peninsular India and Sri Lanka. Common; in moist deciduous forests. *RNMK 3575,* Chedalayam

CAPILLIPEDIUM Stapf

in Prain, Fl. Trop. Africa 9: 169. 1917.

Perennials or annuals. Leaves lanceolate, base narrowed; sheath glabrous or hairy; ligule membranous, ciliate. Inflorescence panicled, branches racemose; spikelets one sessile and other pedicellate, similar; rachis and pedicels longitudinally grooved; glumes subequal; lemmas dissimilar; upper stipitate with geniculate awn from the tip, enclosing bisexual florets; palea small or 0; lodicules 2; stamens 3; styles 2; stigma 2, plumose; pedicelled spikelets without awn.

1. Culms slender, filiform, decumbent or trailing; leaves up to 1 cmlong ....**C. filiculme**
1. Culms stout, erect and robust; leaves more than 5 cm long..... 2
2. Panicle contractd; pedicel terete .....**C. huegelii**
2. Panicle lax; pedicel not terete .....**C. assimile**

Capillipedium assimile (Steud.) A. Camus in Lecomte, Fl. Indo-Chine 7: 314. 1922; Bor, Grass. Burma, Ceylon, India & Pakistan 110. 1960; Sreek. & V.J. Nair, Fl. Kerala Grasses 55. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 506. 1996; Mohanan & Sivad., Fl. Agasthyamala 807. 2002. *Andropogon assimilis* Steud. in Zoll., Syst. Verz. 58. 1854; Hook. f., Fl. Brit. India 7: 179. 1896. *Capillipedium glaucopsis* Stapf in Hook., Ic. Pl. t. 3085. 1922; Fischer in Gamble, Fl. Pres. Madras 1730(1199). 1934.

Annuals, culms 30-60 cm high, nodes bearded. Leaves 5-20 x 0.5-1.2 cm, lanceolate, scabrid; sheath keeled, glabrous; ligule membranous, hairy around. Panicles 8-10 cm long, effuse; axils of racemes with long hairs; joints densely villous; sessile spikelets 2.5-3 x 1-1.5 mm, oblong; lower glume ovate, 5-nerved, ciliate along margins; upper glume ovate, keeled, 3-nerved; lower floret empty, upper bisexual; first lemma ovate, obtuse; second lemma forms the base of the awn; paleas absent; stamens 3; pedicelled spikelets 2.5-3 x 1-1.5 mm; pedicels glabrous; lower glume 8-nerved; upper glume hyaline; first lemma oblong, hyaline; stamens 3; upper floret absent.

Flowering & Fruiting: October-November.

Distribution: India, Myanmar and China to Japan. Occasional; in moist deciduous forests. *RNMK 4329*, Muthanga.

Capillipedium filiculme (Hook.f.) Stapf in Hooker's, Ic. Pl. t. 3085.1922; Fischer in Gamble, Fl. Pres. Madras 1730(1199). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 111. 1960; Ansari, Fl. Kasaragod Div. 451. 1985; Sreek. & V.J. Nair, Fl. Kerala Grasses 57. 1991; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 565. 2005. *Andropogon filiculmis* Hook.f., Fl. Brit. India 7: 181. 1896. *Dichanthium filiculme* (Hook.f.) Jain & Deshpande, Bull. Bot. Surv. India 20: 134. 1978(1979).

Annual herbs; culms weak, decumbent and trailing, much geniculately branched; rooting from lower nodes, nodes sparingly hairy. Panicles 2-5 cm long; pedicels terete; callus of sessile spikelet densely villous; lower glume sparsely hairy below the middle; awns ca. 1.5 cm long.

Flowering & Fruiting: December-March.

Distribution: Endemic to Peninsular India. Common; in grassy slopes. *RNMK 2066,* Chembra.

Capillipedium huegelii (Hack.) Stapf in Hook., Ic. Pl. t. 3085. 1922; Fischer in Gamble, Fl. Pres. Madras 1730(1199). 1934; Ansari, Fl. Kasaragod Div. 452. 1985; Vajr., Fl. Palghat Dist. 567. 1990; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 565. 2005. *Andropogon huegelii* Hack. in A. & C. DC., Monogr. Phan. 6: 492. 1889. *Andropogon schmidii* Hook.f., Fl. Brit. India 7: 180. 1896. *Dichanthium huegelii* (Hack.) Jain & Deshpande, Bull. Bot. Surv. India 20: 135. 1978(1979).

Annuals; culms robust, erect, sparingly branched, nodes densely bearded. Panicles contracted, pedicels terete; callus of sessile spikelet densely villous, lower glume usually villous all over or only below the middle, rarely glabrous, awns 1.2-2.5 cm long.

Flowering & Fruiting: December-March.

Distribution: Endemic to Peninsular India. Rare; in grasslands. *RNMK 3596*, Chembra.

CENTOTHECA Desvaux

Nouv. Bull. Soc. Philom. Paris 2: 189. 1810, *orth. cons.*

Centotheca lappacea (L.) Desv., Nouv. Bull. Soc. Philom. 2: 189. 1810; Hook. f., Fl. Brit. India 7: 332. 1896; Fischer in Gamble, Fl. Pres. Madras 1848(1279). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 457. 1960; Ansari, Fl. Kasaragod Div. 452. 1985; Manilal, Fl. Silent Valley 349. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 529. 1988; Vajr., Fl. Palghat Dist. 567. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 354. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 507. 1996; Mohanan & Sivad., Fl. Agasthyamala 807. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 565. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 828. 2009. *Cenchrus lappaceus* L., Sp. Pl. (ed. 2) 1488. 1763. *Holcus latifolius* Osbeck, Dagb. Ostind. Resa 247. 1757. *Centotheca latifolia* (Osbeck) Trin., Fund. Agrost. 141. 1820; Sivar. & P. Mathew, Fl. Nilambur 821. 1997.

Tufted perennials; culms 30-70 cm high, robust, densely tufted, erect; nodes glabrous. Leaves 5-15 x 0.5-2.5 cm, elliptic-oblong, cuneate at base, glabrous; sheath keeled, glabrous; ligule a fimbriate membrane. Panicles 15-25 cm long, effuse, branches distant; spikelets 5-6 mm long, elliptic, clustered; glumes similar, distichous, 5-nerved, keeled; florets 2-3, similar; lemma lanceolate, obtuse, mucronate, 7-nerved, densely bristled along the dorsal surface; palea 2-nerved, 2-keeled; stamens 2; ovary elliptic; styles 2, free; stigmas plumose; the terminal floret usually reduced to a rachilla only.
Flowering & Fruiting: October-February.
Distribution: Asia and Africa. Common; in moist deciduous forests. *RNMK 2171*, Tholpetty.

CHRYSOPOGON Trinius
Fund. Agrost. 187. 1820, *nom.cons.*

Perennials; culms erect or rarely decumbent; nodes glabrous. Leaves lanceolate to linear-lanceolate; sheath keeled, usually glabrous. Panicle commonly effuse with whorled branches; callus hairy; spikelets in groups of 3; sessile spikelets oblong, acute; lower glumes oblong-lanceolate, rounded or flat on dorsal surface, usually aristate and coriaceous; upper glume linear-oblong, coriaceous; lower floret empty; upper bisexual; first lemma oblong, hyaline, epaleate; second lemma oblong-lanceolate, awned; palea usually absent; stamens 3, free; ovary oblong; styles 2, free; stigmas 2, plumose; pedicelled spikelets lanceolate; glumes subequal, lanceolate, acute or awned, lower floret empty upper male.

1. Leaves 1-5 cm long; sessile spikelets awnless ..... **C. aciculatus**
1. Leaves more than 10 cm long; sessile spikelets distinctly awned ..... **C. hackelii**

Chrysopogon aciculatus (Retz.) Trin., Fund. Agrost. 181. 1820; Fischer in Gamble, Fl. Pres. Madras 1738(1205). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 115. 1960; Ansari, Fl. Kasaragod Div. 453. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore Dist. 530. 1988; Vajr., Fl. Palghat Dist. 568. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 59. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 507. 1996; Sivar. & P. Mathew, Fl. Nilambur 805. 1997; Mohanan & Sivad., Fl. Agasthyamala 808. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 566. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 829. 2009. *Andropogon aciculatus* Retz., Obs. Bot. 5: 22. 1789; Hook. f., Fl. Brit. India 7: 188. 1896.

Perennials; culms decumbent or creeping, 25-30 cm long; nodes glabrous. Leaves 4-5 x 0.5-0.6 cm, oblong, lanceolate, acute, serrulate along the margins; sheath keeled, ligule obscure. Panicles 5-10 cm long, contracted, branches filiform; sessile spikelets 3-4 mm long, lanceolate, brownish; lower glume lanceolate, 2-fid at apex; upper glume similar, mucronate; second lemma lanceolate, arista 5-8 mm long; pedicelled spikelet ca. 5 mm long, lanceolate, muticous; pedicels glabrous.

Flowering & Fruiting: June-October.
Distribution: Tropical Asia and Australia. Occasional; in grasslands. *RNMK 1298,* Kurichiarmala, *RNMK 3593*, Ambalavayal.

Chrysopogon hackelii (Hook.f.) Fischer in Gamble, Fl. Pres. Madras 1739(1205). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 117. 1960; V.S. Ramach. & V.J. Nair, Fl. Cannanore 530. 1988; Vajr., Fl. Palghat Dist. 568. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 62. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 508. 1996; Mohanan & Sivad., Fl. Agasthyamala 809. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 567. 2005. *Andropogon hackelii* Hook. f., Fl. Brit. India 7: 194. 1896.

Robust perennials; culms 80-150 cm high, nodes glabrous. Leaves 15-40 x 0.4-1 cm, linear-lanceolate, glabrous; sheath strongly keeled; ligule a tuft of hairs. Panicle 10-20 cm long, pyramidal; sessile spikelets ca. 5 x 1.5 mm, lanceolate; lower glume glabrous, aristate, arista ca. 5 mm long; upper glume linear-oblong; first lemma hyaline, ciliate along margins; second lemma oblong; awn ca. 2 cm long; pedicelled spikelets 4-5 mm long, acute, awnless.
Flowering & Fruiting: October-January.
Distribution: Endemic to Peninsular India. Occasional; in grasslands. *RNMK 4330,* Kurichiarmala.

CHLORIS O**.** Swartz
Prodr. 1:25. 1788.

Chloris barbata Sw., Fl. Ind. Occ. 1: 200. 1797; Hook. f., Fl. Brit. India 7:292.1896; Fischer in Gamble, Fl. Pres. Madras 1838(1272).1934; Bor, Grass. Burma, Ceylon, India & Pakistan 465. 1960; Manilal & Sivar., Fl. Calicut 338. 1982; Ansari, Fl. Kasaragod Div. 453. 1985; Sreek. & V.J. Nair, Fl. Kerala Grasses 357. 1991; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 566.2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 828. 2009.

Annuals or perennials; culms tufted, 10-40 cm high; nodes glabrous. Leaves 5-15 x 0.2-0.6 cm, glabrous; sheath keeled; ligule a narrow fimbriate membrane. Racemes 3-5 cm long, digitate; spikelets 3-4 mm long, obovate, truncate; callus hairy; lower glume 1-nerved; upper glume lanceolate, 1-nerved; lower floret bisexual, upper barren; first lemma obovate, 3-nerved, awn 5-6 mm long; palea oblanceolate, 2-nerved; stamens free; ovary elliptic; styles free; stigmas plumose; sterile lemmas obovate, truncate, 3-nerved, epaleate; awn 4-8 mm long. Grain trigonous
Flowering & Fruiting: August-January.
Distribution: Tropical and south-east Asia. Common; along wayside. *RNMK 3585,* Thirunelly.

COELACHNE R. Brown
Prodr. 1: 187. 1810.

Coelachne simpliciuscula (Wight & Arn. ex Steud.) Benth., J. Linn. Soc. Bot. 19: 93. 1881; Bor, Grass. Burma, Ceylon, India & Pakistan 576. 1960; V.S.

Ramach. & V.J. Nair, Fl. Cannanore Dist. 531. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 415. 1991. *Panicum simpliciusculum* Wight & Arn. ex Steud., Syn. Pl. Glum. 1: 96. 1854. *Coelachne pulchella* R. Br. var. *simpliciuscula* (Wight & Arn. ex Steud.) Hook.f., Fl. Brit. India 7: 271. 1896; Fischer in Gamble, Fl. Pres. Madras 1804(1249). 1934.

Aquatic or marshy annuals; culms 10-25 cm high, erect or decumbent; nodes bearded. Leaves 2-5 x 0.2-0.5 cm, ovate-lanceolate, glabrous, rounded at base; sheath keeled, glabrous, ligule a row of hairs. Panicle 2-7 cm long, contracted, cylindrical, glabrous; spikelets similar, ca. 2 x 1 mm, ovate, glabrous; glumes similar, ovate-orbicular, 3-nerved; florets 2; lower bisexual, upper barren or with a rudimentary ovary; first lemma ovate, acute, hyaline; palea elliptic; stamens 3, free; ovary elliptic; stigma plumose; upper floret exerted.
Flowering & Fruiting: September-February.
Distribution: South-east Asia, China and Madagascar. Common; in marshy places in semi-evergreen forests. *RNMK 3038,* Thirunelli.

COIX Linnaeus
Sp. Pl. 972. 1753.

Coix lacryma-jobi L., Sp. Pl. 972. 1753; Hook. f., Fl. Brit. India 7: 100. 1896; Fischer in Gamble, Fl. Pres. Madras 1705(1182). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 264. 1960; Sreek. & V.J. Nair, Fl. Kerala Grasses 207. 1991. 1992; Manilal & Sivar., Fl. Calicut 331. 1982; Ansari, Fl. Kasaragod Div. 454. 1985; Manilal, Fl. Silent Valley 350. 1988; Vajr., Fl. Palghat Dist. 569. 1990; Joseph, Aquatic Angiosp. Malabar 460. 1991; Sreek. & V.J. Nair, Fl. Kerala Grasses 207. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 508. 1996; Sivar. & P. Mathew, Fl. Nilambur 805. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 567. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 830. 2009.

Tufted perennials; culms 25-100 cm tall, robust; nodes glabrous. Leaves 10-60 x 1-3.5 cm, lanceolate, scabrous; sheath rounded; ligule a fimbriate membrane. Inflorescence a false panicle with groups of peduncled racemes; spikelets dissimilar, unisexual; female spikelet 3-9 mm long, solitary at the base of the raceme, globose, enclosed in a white shiny case; lower glume oblong; upper ovate; lower floret barren; upper floret female; male spikelets 2-4 in each raceme, lanceolate; lower glume lanceolate; upper glume oblong; lower floret male, upper empty, first lemma hyaline; palea delicate; stamens 3, free.
Flowering & Fruiting: July-March.
Distribution: Tropical Africa; introduced elsewhere. Rare; in marshy areas in evergreen forests. *RNMK 3415,* Sughandhagiri.

CHRYSOPOGON Trin.
Fund. Agrost. 187 (1820).

Chrysopogon asper (Heyne ex Hook.f.) Blatt. & McCann., Bombay Grass. 68. 1935; Fischer in Gamble, Fl. Pres. Madras 1738(1205). 1934; Bor, Grass.

Burma, Ceylon, India & Pakistan 276. 1960; Sreek. & V.J. Nair, Fl. Kerala Grasses 61. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 508. 1996. *Andropogon asper* Heyne ex Hook. f., Fl. Brit. India 7: 189. 1896.

Perennials; culms 50-90 cm high, erect, stout; nodes glabrous. Leaves 10-20 x 0.3-0.8 cm, linear, rounded at base, glabrous; sheath keeled, glabrous; ligule a fimbriate membrane. Panicle 10-15 cm long, lax; sessile spikelets 6-7 mm long, oblong; lower glume oblong, round along back, apex hirtus, brownish; upper glume similar to lower, awned; awn ca. 1.5 cm long; first lemma hyaline, epaleate; second lemma delicate; awn ca. 7 cm long; pedicelled spikelets 0.9-1 cm long; glumes similar, awned.

Flowering & Fruiting: September-December.

Distribution: Endemic to Peninsular India. Rare; in grassland margins. *RNMK 4308*, Aranamala.

CYMBOPOGON Sprengel

Pl. Pugill. 2: 14. 1815.

Perennials, culms usually tufted, erect; nodes glabrous. Leaves lanceolate to linear-lanceolate, acuminate; sheath rounded; ligule membranous. Panicles lax or contracted, interrupted with leafy spathes; racemes paired; rachis and pedicels ciliate or densely hairy. Spikelets dissimilar, sessile and pedicelled; sessile spikelets oblong-ovate-lanceolate; lower glume oblong, acute, 3-nerved; upper glume boat-shaped, keeled, 3-nerved; lower floret empty, upper bisexual; first lemma oblong, hyaline, epaleate; second lemma 2-cleft to the middle with narrow lobes, awned at the sinus; stamens 3, free; ovary ellipsoid; styles 2, free; stigmas plumose; pedicelled spikelets lanceolate; lower glume 9-11-nerved; upper glumes 3-nerved; lower floret empty, upper male; second lemma awnless.

1. Pedicel of the lowest pedicelled spikelet in the sessile raceme swollen.....2
1. Pedicel of the lowest pedicelled spikelet in the sessile raceme not swollen ...**C. flexuosus**
2. Panicles contracted .....**C. martinii**
2. Panicles very effuse .....**C. travancorensis**

Cymbopogon flexuosus (Nees ex Steud.) Wats. in Atkins., Gaz. N. W. Prov. Ind. 392. 1882; Fischer in Gamble, Fl. Pres. Madras 1756(1216). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 127. 1960; Ansari, Fl. Kasaragod Div. 454. 1985; Vajr., Fl. Palghat Dist. 569. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 71. 1991; 809; Sasidh. & Sivar., Fl. Pl. Thrissur For. 509. 1996; Sivar. & P. Mathew, Fl. Nilambur 806. 1997; Mohanan & Sivad., Fl. Agasthyamala 809. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 568. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 831. 2009. *Andropogon flexuosus* Nees ex Steud., Syn. Pl. Glum. 1: 388. 1854. *Andropogon nardus* L. var. *flexuosus* (Nees ex Steud.) Hack. in A. & C. DC., Monogr. Phan. 6: 603. 1889; Hook. f., Fl. Brit. India 7: 207. 1896.

Perennials; culms 60-300 cm tall, robust; nodes glabrous. Leaves 15-60 x 1-2 cm, linear-lanceolate; upper ones rounded at base, glaucous. Panicle 20-

75 cm long, lax, reddish with drooping racemes; racemes 1.5–3 cm long slender, joints and pedicels hairy; sessile spikelets lanceolate; lower glume oblong, winged at apex, margins infolded; first lemma hyaline; second lemma with filiform lobes; awn ca. 1.2 cm long; pedicelled spikelets ca. 4 mm long; pedicels hairy.
Flowering & Fruiting: November-January.
Distribution: Indo-Malesia. Common; in moist deciduous forests. *RNMK 4338,* Naikuppa.

Cymbopogon martinii (Roxb.) Wats. in Atkins., Gaz. N.W. Prov. Ind. 392. 1882; Fischer in Gamble, Fl. Pres. Madras 1756(1217). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan129. 1960; V.S. Ramach. & V.J. Nair, Fl. Cannanore 531. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 72. 1991. *Andropogon martinii* Roxb., Fl. Ind. 1: 280. 1820. *Andropogon schoenanthus* L. var. *martinii* (Roxb.) Hook.f., Fl. Brit. India 7: 204. 1896.

Perennials; culms 60-250 cm high; nodes glabrous. Leaves lanceolate-acuminate, tapering at apex, 10-40 x 0.5-1.5 cm, cordate at base. Panicles narrow, 5-15 cm long, reddish brown; racemes densely villous; sesile spikelets elliptic; lower glume with a slit like groove in the lower half; margins infolded; upper glume margins ciliate; second lemma awned, awns 1-1.5 cm long; pedicelled spikelets glabrous; pedicels densely villous; lower glume 10-12 nerved; upper glume margins ciliate.
Flowering & Fruiting: November-December.
Distribution: Endemic to Peninsular India. Occasional; along hill slopes. *RNMK 4361,* Sughandhagiri-amba.

Cymbopogon travancorensis Bor, J. Bombay Nat. Hist. Soc. 52: 174. 1954; Sreek. & V.J. Nair, Fl. Kerala Grasses 74. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 509. 1996.

Perennials; culms 60-300 cm high, robust, loosely tufted. Leaves 30-60 cm long, linear, narrowing to the base, with white broad midrib; margins scabrid; sheath rounded, glabrous; ligule 8-9 mm long, membranous. Panicle 15-50 cm long, lax, leaves intermixed with partial panicles; sessile spikelets 3.5-4 mm long; lower glume 4-nerved, 2-keeled; margins incurved; upper glume boat shaped, 1-nerved; first lemma hyaline, oblong; second lemma awn 6-9 mm long; pedicelled spikelets 3 mm long, elliptic; pedicels hairy along the margins.
Flowering & Fruiting: October-January.
Distribution: Endemic to southern Western Ghats. Occasional; in grasslands. *RNMK 2128,* Kurichiarmala.

CYNODON Richard
in Persoon, Syn. Pl. 1: 85. 1805, *nom. cons.*

Perennial creeping grasses with erect culms. Leaves narrow, flat or complicate. Inflorescence of 2-8 fascicled or umbellate spikes ; rachis slender;

spikelets all alike, sessile, laterally compressed, alternately 2-seriate, imbricate, 1-flowered; glumes 2, thin, keeled, acute or mucronate, persistent or seperately deciduous; lemmas broader than the glumes, membranous, boat shaped, 3-nerved, keel ciliate, awnless ; paleas 2-keeled, containing a bisexual florest; lodicules 2, minute; stamens 3; styles 2, free. Grain oblong, free within the lemma and palea.

1. Plant rhizomatous ; racemes up to 6 cm long ..... **C. dactylon**
1. Plant not rhizomatous; racemes 6-10 cm long ..... **C. arcuatus**

Cynodon arcuatus J. Presl ex C. Presl, Rel. Haenk. 1: 290. 1830; Bor, Grass. Burma, Ceylon, India & Pakistan 469. 1960; Ansari, Fl. Kasaragod Div. 455. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 532. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 359. 1991. *Cynodon dactylon* (L.) Pers. var. *intermedius* (Rang. & Tadul.) Fischer in Gamble, Fl. Pres. Madras 1835(1270). 1934. *Cynodon intermedius* Rang. & Tadul., J. Bombay Nat. Hist. Soc. 26:304. 1918.

Perennials; erect culms 30-50 cm tall, creeping and geniculate, without rhizome, rooting at nodes. Leaves 2-14 x 0.1-0.5 cm, linear-lanceolate, shallowly cordate at base; sheaths slightly keeled. Racemes 4-8, digitate, 5-8 cm long; spikelets elliptic-lanceolate; lower glume 1-nerved; lemma boat shaped, pubescent with clavate hairs; palea keeled, 1-2 nerved.

Flowering & Fruiting: March-September.

Distribution: Indo-Malesia to Australia. Occasional; along stremsides. *RNMK 4327,* Kuruva.

Cynodon dactylon (L.) Pers., Syn. Pl. 1: 85. 1805; Hook. f., Fl. Brit. India 7: 288. 1896; Fischer in Gamble, Fl. Pres. Madras 1835(1270). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 469. 1960; Manilal & Sivar., Fl. Calicut 339. 1982; Ansari, Fl. Kasaragod Div. 455. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 532. 1988; Vajr., Fl. Palghat Dist. 570. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 360. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 510. 1996; Sivar. & P. Mathew, Fl. Nilambur 823. 1997; Mohanan & Sivad., Fl. Agasthyamala 810. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 569. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 831. 2009. *Panicum dactylon* L., Sp. Pl. 58. 1753.

Perennials; culms 5-30 cm long, stoloniferous; nodes glabrous. Leaves 2-5 x 0.2-0.7 cm, ovate-lanceolate, glabrous, rounded at base; sheath keeled, glabrous; ligule a fimbriate membrane. Racemes 3-6 cm long, digitate; rachis flat, glabrous, with two rows of spikelets; spikelets similar, ca. 2.5 mm long, ovate-lanceolate, glabrous; lower glume 1-nerved; upper glume 1-nerved; floret one; lemma 1-nerved, strongly keeled; keel ciliate; palea 2-nerved, curved; stamens 3, free; ovary elliptic; styles 2, free; stigmas 2, plumose.

Flowering & Fruiting: March-October.

Distribution: Tropical and warm temperate regions of the world. Common; in open areas. *RNMK 3586,* Kalpetta.

CYRTOCOCCUM Stapf
in Prain, Fl. Trop. Africa 9: 15. 1917.

Annuals or perennials. Culms creeping, rooting at lower nodes. Leaves ovate-lanceolate; base narrow or cuneate; sheath keeled, ciliate along one margin. Panicle effuse, lax or contracted. Spikelets similar, ovate, gibbous to one side, usually pedicelled; lower glume ovate, acute, 3-nerved; upper glume similar to lower glume, larger, 3-nerved; florets 2, lower empty, upper bisexual; first lemma ovate, 3-nerved, epaleate; second lemma strongly concave, gibbous; 3-nerved, crustaceous; palea ovate, acute, 2-nerved, crustaceous; stamens 3, free; ovary oblong; styles 2, free; stigma plumose.

1. Upper glume and lower lemma with glochidiate hairs ..... **C. muricatum**
1. Upper glume and lower lemma without glochidiate hairs 2
2. Sheath ciliate along one margins 3
2. Sheath glabrous along the margins ..... **B. longipes**
3. Panicles contracted; pedicels shorter than the spikelets 4
3. Panicles lax, effuse; pedicels longer than the spikelets..... **C. patens**
4. Nodes bearded; leaves up to 5 cm long ..... **C. trigonum**
4. Nodes glabrous; leaves up to 15 cm long ..... **C. oxyphyllum**

Cyrtococcum longipes (Wight & Arn. ex Hook.f.) A. Camus, Bull. Mus. Hist. Nat. Paris 27: 118. 1921; Fischer in Gamble, Fl. Pres. Madras 1786(1237). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 291. 1960; Manilal, Fl. Silent Valley 351. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 533. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 229. 1991; Mohanan & Sivad., Fl. Agasthyamala 811. 2002. *Panicum longipes* Wight & Arn. ex Hook. f., Fl. Brit. India 7: 58. 1896.

Perennials; culms 50-120 cm long, geniculate or trailing; nodes glabrous. Leaves 10-25 x 0.7-1.5 cm, linear-lanceolate, narrowed to the base, membranous, glabrous; sheath keeled, glabrous; ligule membranous. Panicle 10-30 cm long, drooping; branches filiform, smooth; spikelets ca. 2 x 1 mm; glumes subequal, upper one cuspidate; first lemma ovate, epaleate; second lemma concave, crustaceous, 3-nerved; palea oblong, 2-nerved.
Flowering & Fruiting: November-March.
Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 3133,* Chandanathode.

Cyrtococcum muricatum (Retz.) Bor, Grass. Bur. Cey. Ind. Pak. 291.1960; Ansari, Fl. Kasaragod Div. 456. 1985; Sreek. & V.J. Nair, Fl. Kerala Grasses 230. 1991; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 569. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 832. 2009. *Panicum muricatum* Retz., Obs. Bot. 4: 18. 1786.

Annuals; culms 10-35 cm high, erect or creeping, rooting at lower nodes; nodes glabrous. Leaves 2-5 x 0.5-1.3 cm, ovate-lanceolate, hairy below; sheath keeled, margins hairy; ligule membranous. Panicle 10-20 cm long, erect;

racemes 1-2 cm long, arranged distantly on an axis, rachis angled, smooth; spikelets few in each raceme; lower glume cuspidate; upper glume curved, glochidiate hairy; first lemma paleate; second lemma ovate, acute, 3-nerved; palea ovate, acute, 2-nerved.
Flowering & Fruiting: Throughout the year.
Distribution: Pantropics. Common; along margins of evergreen forests. *RNMK 3582,* Thalimala.

Cyrtococcum oxyphyllum (Steud.) Stapf in Hook., Ic. Pl. t. 3096. 1922; Fischer in Gamble, Fl. Pres. Madras 1786(1237). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 291. 1960; Ansari, Fl. Kasaragod Div. 456. 1985; Manilal, Fl. Silent Valley 351. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 533. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 231. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 510. 1996; Sivar. & P. Mathew, Fl. Nilambur 835. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 569. 2005. *Panicum oxyphyllum* Steud., Syn. Pl. Glum. 1: 65. 1854. *Panicum pilipes* Nees & Arn. ex Buese in Miq., Pl. Jungh. 3: 376. 1854; Hook. f., Fl. Brit. India 7: 57. 1896.

Perennials or annuals; culms 20-50 cm high, slender, trailing or erect, rooting from lower nodes; nodes glabrous. Leaves 5-15 x 0.2-1.5 cm, lanceolate, cuneate at base, hairy along the margins; sheath keeled, margin ciliate; ligule membranous, truncate. Panicle contracted, erect; spikelets ca. 1.5 x 1 mm, with smaller pedicels; glumes sub-equal, lower one ovate, glabrous, upper larger; first lemma epaleate; second lemma 3-nerved; palea 2-nerved.
Flowering & Fruiting: August-March.
Distribution: Indo-Malesia and China. Common; in open grassy areas in evergreen forests. *RNMK 3578,* Chandanathode.

Cyrtococcum patens (L.) A. Camus, Bull. Mus. Hist. Nat. Paris 27: 118. 1921; Fischer in Gamble, Fl. Pres. Madras 1786(1237). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 292. 1960; V.S. Ramach. & V.J. Nair, Fl. Cannanore 533. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 231. 1991; Mohanan & Sivad., Fl. Agasthyamala 812. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 832. 2009. *Panicum patens* L., Sp. Pl. 58. 1753. *Cyrtococcum radicans* (Retz.) Stapf in Hook., Ic. Pl. t. 3096. 1922; Fischer in Gamble, Fl. Pres. Madras 1786(1237).1934. *Panicum radicans* Retz., Obs. Bot. 4: 18. 1786.

Annuals; culms 20-30 cm high, creeping, rooting from nodes; nodes sparsely hairy. Leaves 3-7 x 1-1.5 cm, elliptic, cuneate at base, glabrous; sheath keeled, ciliate along margin; ligule membranous. Panicle 10-25 x 5-12 cm, lax; rachis and pedicels filiform; spikelets ca. 1.5 x 1 mm; glumes equal, concave, acute; first lemma ovate, acute, 3-nerved; second lemma ovate, acute, crustaceous, 3-nerved palea, oblong, subcoriaceous.
Flowering & Fruiting: May-June.
Distribution: Tropical Asia. Common; in evergreen forests. *RNMK 4336,* Thirunelli

Cyrtococcum trigonum (Retz.) A. Camus, Bull. Mus. Hist. Nat. Paris 27: 118. 1921; Fischer in Gamble, Fl. Pres. Madras 1785(1237). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 292. 1960; Manilal & Sivar., Fl. Calicut 348. 1982; V.S. Ramach. & V.J. Nair, Fl. Cannanore 534. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 232. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 510. 1996; Sivar. & P. Mathew, Fl. Nilambur 835. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 833. 2009. *Panicum trigonum* Retz., Obs. Bot. 3: 9. 1783; Hook. f., Fl. Brit. India 7: 56. 1896.

Annuals; culms 5-30 cm long, creeping or decumbent; nodes bearded. Leaves 2-5 x 0.3-0.6 cm, lanceolate, pubescent below; sheath ciliate along one margins, ligule membranous, ovate. Panicle 2-5 cm long, contracted; branches angled, smooth; spikelets ca. 2 x 1 mm; glumes subequal, lower ovate, glabrous, keeled; upper concave, hairy; first lemma 3-nerved; second lemma 3-nerved; crustaceous; palea crustaceous.

Flowering & Fruiting: September-October.

Distribution: South-east Asia, Sri Lanka and Peninsular India. Common; in evergreen forests and forest plantations. *RNMK 4353,* Thirunelli, *RNMK 4368*, Kattikulam.

DACTYLOCTENIUM Willdenow

Enum. Pl. Hort. Berol. 1029. 1809.

Dactyloctenium aegyptium (L.) P. Beauv., Ess. Agrost. 10. 1812; Fischer in Gamble, Fl. Pres. Madras 1840(1273). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 489. 1960; Manilal & Sivar., Fl. Calicut 337. 1982; Ansari, Fl. Kasaragod Div. 456. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 534. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 367. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 511. 1996; Sivar. & P. Mathew, Fl. Nilambur 824. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 570. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 834. 2009. *Cynosurus aegyptius* L., Sp. Pl. 72. 1753.

Tufted annuals. culms 10-40 cm high, suberect or decumbent; nodes glabrous. Leaves 5-20 x 0.5-0.7 cm, oblong-lanceolate, rounded at base, glabrous; ligule a fimbriate membrane. Racemes 3-6, digitate, each 1-3 cm long; rachis flat, scabrid, ends in a sharp point; spikelets similar, ca. 4 x 2.5 mm, ovate, acute; lower glume ovate, 1-nerved; upper glume ovate, aristate, 1-nerved; keeled; florets 3-4; lemmas 3-nerved, keeled, mucronate; palea ovate, 2-nerved, 2-keeled; stamens 3, free; ovary oblong; styles 2, free; stigmas plumose.

Flowering & Fruiting: Throughout the year.

Distribution: Native of south America, naturalised in Paleotropics. Common; in moist deciduous forests. *RNMK 3594,* Begur.

DENDROCALAMUS Nees

Linnaea 9: 476. 1835.

Dendrocalamus strictus (Roxb.) Nees, Linnaea 9: 476. 1834; Hook. f., Fl. Brit. India 7: 404. 1897; Fischer in Gamble, Fl. Pres. Madras 1858(1286).

1934; Manilal & Sivar., Fl. Calicut 350. 1982; V.S. Ramach. & V.J. Nair, Fl. Cannanore 534. 1988; Sivar. & P. Mathew, Fl. Nilambur 819. 1997; Seethalakshmi & Muktesh, Bamboos India 129. 1998. *Bambos stricta* Roxb., Pl. Corom. 1: 58, t. 80. 1798.

Perennials; culms 10-15 m tall, sheaths with sparse hairs. Leaves 20-25 x 2.5-3 cm, linear-lanceolate, acuminate at apex and rounded at base. Spikelets pale green, ovate, in dense globose heads, 4-5 cm across. Fruit 0.6-0.8 cm long, ovoid.

Flowering & Fruiting: December-January.

Distribution: Indian subcontinent and Java. Occasional; in evergreen forests. *RNMK 3600*, Talimala.

DICHANTHIUM Willemet

Ann. Bot. (Usteri) 18: 11. 1796.

Annuals or perennials. Culms tufted, erect. Leaves lanceolate to linear-lanceolate; sheath keeled or rounded; ligule membranous. Racemes 1-15, sub-digitate; rachis and pedicels thickly ciliate; spikelets dissimilar, sessile and pedicelled; sessile spikelets ovate, oblong or lanceolate; lower glume oblong, acute, 5-13-nerved; upper glume 1-3- nerved, keeled; lower floret barren, upper bisexual; first lemma oblong, hyaline, epaleate; second lemma forms the base of the awn; palea absent; stamens 3, free; ovary oblong to ellipsoid; styles 2, free; stigma plumose; pedicelled spikelets oblong or lanceolate; glumes subequal, oblong-lanceolate; florets absent or rarely with one male floret.

1. Perennials; leaves up to 20 cm long..... .**D. caricosum**
1. Annuals; leaves up to 10 cm long..... **D. oliganthum**

Dichanthium caricosum (L.) A.Camus, Bull. Mus. Hist. Nat. Paris 27: 549. 1921; Fischer in Gamble, Fl. Pres. Madras 1741(1206). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 134. 1960; V.S. Ramach. & V.J. Nair, Fl. Cannanore 535. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 76. 1991. *Andropogon caricosus* L., Sp. Pl. (ed.2) 1480. 1763; Hook. f., Fl. Brit. India 7: 196. 1896.

Tufted perennial herbs; culms 10-90 cm long, sheath with sparse hairs. Leaves lanceolate, 2-20 x 0.2-0.4 cm, rounded at base. Racemes usually solitary, 2-6 cm long, pale green; sessile spikelets obovate, 3-3.5 mm long; callus hairy; lower glume obtuse, 7-9 nerved, margins ciliate; second lemma stipitate, awned, awn 1.4-2 cm long; pedicelled spikelets obovate, unawned.

Flowering & Fruiting: February-May.

Distribution: Indo-Malesia. Occasional; in moist deciduous forests. *RNMK 4337,* Begur.

Dichanthium oliganthum (Hochst. ex Steud.) Cope, Kew Bull. 35: 703. 1980; Sreek. & V.J. Nair, Fl. Kerala Grasses 79. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 511. 1996. *Andropogon oliganthus* Hochst. ex Steud., Syn. Pl.

Glum. 1: 368. 1854; Hook. f., Fl. Brit. India 7: 201. 1896. *Indochloa oligantha* (Hochst. ex Steud.) Bor, Kew Bull. 1954: 79. 1954. *Heteropogon oliganthus* (Hochst. ex Steud.) Blatt. & McCann, J. Bombay Nat. Hist. Soc. 32: 623. 1928; Fischer in Gamble, Fl. Pres. Madras 1744(1208). 1934.

Annuals; culms 5-25 cm high, tufted; nodes glabrous. Leaves 2-7 x 0.5-0.8 cm, ovate-lanceolate; rounded at base, tomentose, ciliate along the margins; sheath keeled, ligule ca. 2 mm wide, membranous. Raceme solitary, terminal, 2-4 cm long; sessile spikelets ca. 4 x 1.5 mm, glabrous; lower glume margins incurved, coriaceous; upper glume similar, 1-nerved; awn 4-4.5 cm long; pedicelled spikelets 6-7 mm long; glumes subequal, truncate to obtuse, 13-nerved; florets absent.

Flowering & Fruiting: September-November.

Distribution: Endemic to southern Western Ghats. Common; in moist deciduous forests. *RNMK 2280,* Begur.

DIGITARIA Heister ex Fabricus

Enum. 207. 1759.

Annuals or perennials. Culms tufted, erect or geniculate; nodes glabrous. Leaves lanceolate to linear-lanceolate, acute; sheath rounded, glabrous or hairy; ligule membranous; truncate. Racemes 2-20, digitate, sub-digitate or verticillate; rachis flat or trigonous; spikelets in pairs, one sessile and one pedicelled, similar; lower glume absent or reduced to a minute scale; upper glume lanceolate, glabrous or ciliate, 3-7-nerved; florets 2, lower barren and upper bisexual; first lemma elliptic, hairy or glabrous, 5-9-nerved, epaleate; second lemma lanceolate, 3-nerved, coriaceous, stamens 3, free; ovary oblong; styles 2, free; stigma plumose.

1. Rachis triquetrous, not winged ..... **D. griffithii**
1. Rachis winged 2
2. Hairs on the spikelets verrucose; lower glume absent 3
2. Hairs on the spikelets not verrucose; lower glume usually present 4
3. Culms slender, creeping; racemes 2 or 3 ..... **D. longiflora**
3. Culms stout, erect; racemes 3-25 in number ..... **D. violascens**
4. Lower glume absent or reduced to a rim ..... **D. setigera**
4. Lower glume a triangular scale ..... **D. ciliaris**

Digitaria ciliaris (Retz.) Koeler, Descr. Gram. 27. 1802; Manilal & Sivar., Fl. Calicut 335. 1982; Ansari, Fl. Kasaragod Div. 458. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 535. 1988; Vajr., Fl. Palghat Dist. 571. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 237. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 511. 1996; Sivar. & P. Mathew, Fl. Nilambur 836. 1997; Mohanan & Sivad., Fl. Agasthyamala 813. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 571. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 835. 2009. *Panicum ciliare* Retz., Obs. Bot. 4. 16. 1786. *Digitaria marginata* Link, Enum. Hort. Berol. 1: 102. 1821; Fischer in Gamble, Fl. Pres. Madras 1764(1222). 1934. *Paspalum sanguinale* (L.) Lamk. var. *rottleri* Hook. f., Fl. Brit. India 7: 15. 1896.

Annuals or perennials; culms 30-60 cm high; lower nodes rooting. Leaves 10-20 x 0.5-0.8 cm, linear-lanceolate, glabrous or hairy; margins scabrid; sheath bulbous based hairy or not; ligule membranous, ca. 5 mm wide. Racemes few to many, 8-20 cm long; rachis flat, scabrid; spikelets paired, similar, 3-3.5 mm long; lower glume minute; upper glume oblong, 7-nerved; first lemma lanceolate, ciliate along margins, empty; second lemma margins folded; palea 2 keeled, lanceolate.
Flowering & Fruiting: July-November.
Distribution: Paleotropics. Open grassy slopes in evergreen forests. *RNMK 1895,* Kurichiarmala.

Digitaria griffithii (Hook.f.) Henrard, Blumea 1: 100. 1934; Fischer in Gamble, Fl. Pres. Madras 1765(1222). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 301. 1960; V.S. Ramach. & V.J. Nair, Fl. Cannanore 536. 1988; Vajr., Fl. Palghat Dist. 571. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 238. 1991; Sivar. & P. Mathew, Fl. Nilambur 837. 1997. *Paspalum sanguinale* (L.) Lamk. var. *griffithii* Hook. f., Fl. Brit. India 7: 15. 1896.

Annuals or perennials; culms 30-120 cm high, stout and erect; nodes glabrous. Leaves 15-30 x 1-2 cm, linear lanceolate, margins and nerves scabrid; sheath slightly keeled; ligule 4-5 mm broad, membranous. Racemes 3-15 together, 5-20 cm long, sub-digitate; rachis triquetrous, scabrid; spikelets with unequal pedicels, brown; lower glume minute; upper glume brown, ciliate along the nerves; first lemma similar to upper glume, glabrous, epaleate, second lemma ovate, nerves obscure; palea similar to lemma.
Flowering & Fruiting: August-September.
Distribution: Peninsular India and Sri Lanka. Common; in moist deciduous forests. *RNMK 4370,* Begur.

Digitaria longiflora (Retz.) Pers., Syn. Pl. 1: 85. 1805; Fischer in Gamble, Fl. Pres. Madras 1765(1223). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 302. 1960; Manilal & Sivar., Fl. Calicut 335. 1982; Ansari, Fl. Kasaragod Div. 458. 1985; Manilal, Fl. Silent Valley 351. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 536. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 239. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 512. 1996; Sivar. & P. Mathew, Fl. Nilambur 837. 1997; Mohanan & Sivad., Fl. Agasthyamala 813. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 571. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 836. 2009. *Paspalum longiflorum* Retz., Obs. Bot. 4: 15. 1786; Hook. f., Fl. Brit. India 7: 17. 1896.

Slender annuals; culms 20-30 cm high, creeping and geniculate, rooting from nodes. Leaves 1.5-5 x 0.4-0.7 cm, ovate-lanceolate, cordate at base, glabrous; sheath rounded. Racemes paired, 4-5 cm long, slender, on erect axis; spikelets ca. 1.5 x 0.5 mm; lower glume absent; upper glume ovate, glabrous; first lemma elliptic, 9-nerved, epaleate; second lemma and palea similar, ovate, coriaceous.

Flowering & Fruiting: July-November.
Distribution: Paleotropics. Common; in semi-evergreen forests margins. *RNMK 1895,* Chooralmala.

Digitaria setigera Roth in Roem. & Schult., Syst. Veg. 2: 474. 1817; Bor, Grass. Burma, Ceylon, India & Pakistan 305. 1960; Manilal, Fl. Silent Valley 352. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 536. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 241. 1991; Sivar. & P. Mathew, Fl. Nilambur 838. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 572. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 837. 2009. *Paspalum sanguinale* (L.) Lamk. var. *extensum* Hook. f., Fl. Brit. India 7: 17. 1896.

Annuals; culms 40-70 cm high, erect or decumbent, rooting from the lower nodes, nodes glabrous. Leaves 5-15 x 0.2-0.8 cm, linear-lanceolate, glabrous, narrowed to the base; sheath covered with bulbous based hairs; ligule ovate, membranous, 4-5 mm long. Racemes 3-10 together, 4-10 cm long; rachis flat; spikelets 2.5-3 mm long, glabrous; upper glume ovate, first lemma 5-nerved, epaleate; second lemma and palea similar, lanceolate, 3-nerved, coriaceous.
Flowering & Fruiting: May-June.
Distribution: Pantropics. Common; in moist deciduous forests. *RNMK 4385,* Kuruva.

Digitaria violascens Link, Enum. Hort. Berol. 1: 229. 1827; Bor, Grass. Burma, Ceylon, India & Pakistan 307. 1960; Sreek. & V.J. Nair, Fl. Kerala Grasses 242. 1991. *Digitaria chinensis* (Nees) A. Camus, Not. Syst. 4: 48. 1923, non Hornem. 1819; Fischer in Gamble, Fl. Pres. Madras 1765(1223). 1934. *Paspalum chinense* Nees in Hook. & Arn., Bot. Beech. Voy. 231. 1841. *Paspalum longiflorum* Hook. f., Fl. Brit. India 7: 17. 1896, non Retz. 1786.

Annuals; culms 14-50 cm long, nodes glabrous. Leaves 3-20 x 0.2-0.6 cm, lanceolate; sheaths keeled. Racemes 3-25 in number; rachis flat, winged, margins serrulate; spikelets broadly elliptic, pubescent, ca. 2 mm long; lower glume absent; upper glume ovate-lanceolate, 5 nerved, pubescent; first lemma 5-7 nerved, pubescent; second lemma brownish; palea elliptic, 2 keeled, 2 nerved.
Flowering & Fruiting: July-November.
Distribution: Paleotropics. Common; in grassy slopes. *RNMK 2250,* Aranamla.

DIMERIA R. Brown

Prodr. 204. 1810.

Tufted annuals, erect and straight. Leaves lanceolate to linear-lanceolate, glabrous or hairy; sheath slightly keeled or rounded; ligule membranous. Racemes 1-2; rachis flat or triquetrous; callus with white hairs; spikelets similar, sessile, solitary, oblong to lanceolate; lower glume oblong, acute; upper glume elliptic, acuminate, 3-nerved, keeled; florets 2; lower empty, upper bisexual; first lemma oblanceolate, 1-nerved, hyaline, epaleate; second lemma 2-clefted at apex and awned in the sinus; palea absent; stamens 3; stigmas plumose.

1. Raceme solitary 2
1. Racemes 2-6. 3
2. Upper glume winged along the keel .....**D. lawsonii**
2. Upper glume wingless. .....**D. thwaitesii**
3. Perennials; racemes 2-6. 4
3. Annuals; racemes 2-3.....5
4. Leaves 20-40 cm long; racemes 2 .....**D. copeana**
4. Leaves 16-20 cm long; racemes 3-6 ..... **D. fuscescens**
5. Rachis angular 6
5. Rachis flat 7
6. Racemes 3; spikelets 1-3 mm long..... **D. ornithopoda**
6. Racemes usually 2; spikelets 4-5 mm long .....**D. idukkiensis**
7. Leaves to 35 cm long; spikelets 5-6 mm long.....**D. mooneyi**
7. Leaves to 13 cm long; spikelets 2-4 mm long.....8
8. Upper glume winged along the the keel 9
8. Upper glume wingless .....**D. deccanensis**
9. Spikelets up to 5 mm long; anthers 1.5-2 mm long..... **D. connivens**
9. Spikelets up to 3.5 mm long; anthers up to 1 mm long.....**D. bilata**

Dimeria bialata Fischer, Bull. Misc. Inform. Kew 1933:351.1933 & Gamble, Fl. Pres. Madras 1713(1188).1934; Bor, Grass. Burma, Ceylon, India & Pakistan 140. 1960;Sreek. & V.J. Nair, Fl. Kerala Grasses 83. 1991.

Annuals; culms erect, 20-50 cm high, nodes bearded. Leaves lanceolate, 2-6 x 0.2-0.5 cm, covered with tubercle-based hairs. Racemes 2, 5-8 cm long; rachis flat; spikelets oblong; callus shortly bearded; lower glume lanceolate, narrowly winged and ciliate; upper glume broadly winged, ciliate; second lemma awned, awn 7-9 mm long.

Flowering & Fruiting: September-December.

Distribution: Endemic to southern western Ghats. Occasional; in rocky grassy slopes. *RNMK 2738,* Manikkunnumala.

Dimeria connivens Hack. in A. & C. DC., Monogr. Phan. 6: 689. 1889; Hook. f., Fl. Brit. India 7: 104. 1896; Bor, Grass. Burma, Ceylon, India & Pakistan 140. 1960; Sreek. & V.J. Nair, Fl. Kerala Grasses 86. 1991.

Annuals; culms 40-50 cm high; nodes hairy. Leaves 5-13 x 0.2-0.4 cm, linear- lanceolate, narrowed to the base, sparsely hairy. Racemes 4-6 cm long; rachis flat, ca. 1 mm broad, margins densely ciliate; spikelets 4-5 x 2-3 mm, shortly pedicelled; callus hairy; lower glume oblanceolate, acute; upper glume oblanceolate-oblong, winged along the keel, keel thinly hairy; second lemma cleft at the apex, awned; stamens 2.

Flowering & Fruiting: October-December.

Distribution: Endemic to Peninsular India. Rare; in grasslands. *RNMK 2147,* Manikkunnumala.

Dimeria copeana Sreek., V.J. Nair & N.C. Nair, J. Bombay Nat. Hist. Soc. 78: 577. 1981; Sreek. & V.J. Nair, Fl. Kerala Grasses 87. 1991; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 840. 2009.

Tufted, stoloniferous, perennial herbs; culms 2-40 cm, capillary; nodes bearded. Leaves 20-40 x 0.1-0.2 cm, linear, acuminate, sparsely villous on upper surface. Racemes 2, 8-10 cm long, slender; rachis trigonous, zig-zag, winged; spikelets 3.5-5 mm long, 2-flowered, oblanceolate, hairy; lemma of upper bisexual floret oblong, awns 7-9 mm long.

Flowering & Fruiting: December-March.

Distribution: Endemic to southern Western Ghats (Kerala). Occasional; in grasslands. *RNMK 2741,* Pookodu.

Dimeria deccanensis Bor, Kew Bull. 1952: 578. 1953; Manilal, Fl. Silent Valley 352. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 89. 1991.

Annuals; culms 30-40 cm tall, densely tufted; nodes hairy. Leaves to 8-10 x 0.3-0.4 cm, linear-lanceolate, glabrous; sheath keeled, glabrous, ligule membranous, ca. 1.5 mm broad. Racemes paired, 4-8 cm long; rachis flat; margins scabrid; spikelets 3.5-4 mm long; callus hairy; lower glume linear-oblong, keeled, keel not winged, slightly ciliate; upper glume keeled, wingless or winged just below the tip only; first lemma hyaline; awn 7-9 mm long; styles basely united.

Flowering & Fruiting: October-December.

Distribution: Endemic to southern Western Ghats. Occasional; in rocky grassy slopes. *RNMK 2741,* Manikkunnumala.

Dimeria fuscescens Trin., Mem. Acad. Sci. Petersb. ser. 6, 2: 335. 1833; Hook. f., Fl. Brit. India 7: 105. 1896; Sajeev *et al.*, J. Econ. Tax. Bot. 22: 492. 1998.

Perennial herbs, densely tufted, culms 60-75 cm high, nodes glabrous. Leaves 16-20 x 0.4-0.5 cm, linear-lanceolate, acuminate, glabrous; sheath keeled, glabrous, ligule membranous. Racemes 3-7 together, 10-12 cm long, rachis triangular, zig-zag, glabrous; spikelets 5-7 mm long, glumes acute, lower glume winged along the keel, keel ciliate, scabrid; awn ca. 1 cm long.

Flowering & Fruiting: November-January.

Distribution: India and Sri Lanka. Occasional; in rocky grasslands. *RNMK 4400,* Pookodu.

Dimeria idukkiensis Ravi & Anil Kumar, Rheedea 2: 104. 1992; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta Dist. 573. 2005.

Annuals. Leaves scattered, linear-lanceolate, 5-6.5 cm long, tuberculate-pilose, membranous or chartaceous. Racemes usually 2, rarely 1; spikelets elliptic-oblong, 4-5 mm long; rachis 3-gonous, ca. 0.5 mm wide; lower glume linear-elliptic, narrowly keeled; upper glume winged; upper lemma elliptic-lanceolate, lower lemma oblanceolate, apex acute.

Flowering & Fruiting: September-December.
Distribution: Endemic to southern Western Ghats. Rare; in grasslands. *RNMK 4399,* Pookodu.

Dimeria lawsonii (Hook.f.) Fischer in Gamble, Fl. Pres. Madras 1713(1188). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 142. 1960; Sreek. & V.J. Nair, Fl. Kerala Grasses 97. 1991; Mohanan & Sivad., Fl. Agasthyamala 815. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 573. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 841. 2009. *Dimeria pusilla* Thw. var. *lawsonii* Hook.f., Fl. Brit. India 7: 103. 1896.

Annuals; culms 30-35 cm tall, densely tufted; nodes bearded. Leaves 10-12 x 0.5-0.6 cm, linear-lanceolate, acuminate, sparsely hairy; sheath slightly keeled, glabrous, ligule membranous, narrow. Raceme solitary, 5-7 cm long; rachis flat, densely ciliate along margins; spikelets 4-6 mm long; callus hairy; lower glume lanceolate, acuminate, keeled, winged along the keel, wings ciliate; upper glume elliptic, acuminate, aristate, first lemma oblanceolate, hyaline; second lemma hyaline; awn ca. 9 mm long; stamens 2.
Flowering & Fruiting: October-March.
Distribution: South India and Sri Lanka. Rare; in rocky grasslands. *RNMK 3597,* Manikkunnumala.

Dimeria mooneyi Raizada in Mooneyi, Suppl. Bot. Bihar & Orissa 263. 1950; Bor, Grass. Burma, Ceylon, India & Pakistan 142. 1960; Mohanan & Sivad., Fl. Agasthyamala 816. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 573. 2005. **Plate 37 l.**

Culms 50-75 cm tall, nodes bearded. Leaves 15-35 x 0.3-0.6 cm, tapering to the base, bulbous based hairy along the midrib below; sheath covered with bulbous based hairs. Racemes 5-10 cm long; rachis ciliate, hairy; lower glume winged along the keels; margin of wing ciliate; upper glume oblanceolate, broadly winged along the keels; wing ciliate along margins; first lemma oblong, hyaline, ciliate along the margins, epaleate; second lemma cleft at apex; awn ca. 1.2 cm long; stamens 2; anthers brown; ovary glabrous.
Flowering & Fruiting: September-December.
Distribution: Endemic to southern Western Ghats. Occasional; in grasslands. *RNMK 2108,* Manikkunnumala; *RNMK 4398*, Pookodu.

Dimeria ornithopoda Trin., Fund. Agrost. 167. t.14. 1820; Hook. f., Fl. Brit. India 7: 104. 1896; Fischer in Gamble, Fl. Pres. Madras 1713(1188). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 142. 1960; Ansari, Fl. Kasaragod Div. 459. 1985; Manilal, Fl. Silent Valley 352. 1988; Vajr., Fl. Palghat Dist. 571. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 98. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 512. 1996; Mohanan & Sivad., Fl. Agasthyamala 816. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 574. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 841. 2009.

Annuals, culms 40-50 cm high, tufted, slender, nodes sparsely bearded. Leaves 5-6 x 0.3-0.4 cm, linear lanceolate, sparsely hairy. Racemes paired, 1-5 cm long, spreading; rachis triquetrous, glabrous; spikelets ca. 2 mm long; lower glume ca. 2 mm long, linear-lanceolate, wingless or shortly winged below the apex; upper glume similar; lower floret empty; upper floret bisexual; awn 0.5-1.2 cm long.
Flowering & Fruiting: August-December.
Distribution: Endemic to south India. Common; in grasslands. *RNMK 2124,* Sughandhagiri; *RNMK 4397*, Pookodu.

Dimeria thwaitesii Hack. in A. & C. DC., Monogr. Phan. 6: 78. 1889; Fischer in Gamble, Fl. Pres. Madras 1713(1188). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 144. 1960; Sreek. & V.J. Nair, Fl. Kerala Grasses 100. 1991; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 574. 2005. *Dimeria pusilla* Thw. var. *pallida* Thw. ex Hook. f., Fl. Brit. India 7: 103. 1896.

Culms 30-45 cm tall, tufted; nodes bearded. Leaves 3-6 x 0.3-0.4 cm, glabrous. Raceme 3-4.5 cm long, solitary or paired; rachis flat, straight; margins ciliate; spikelets 4-5.5 mm long; callus hairs ca. 1 mm long; lower glume hairy along the keel; upper glume aristate, keels with long hairs; first lemma 1-nerved; second lemma awned; awn 0.9-1.1 cm long; stamens 2.
Flowering & Fruiting: September-December.
Distribution: India and Sri Lanka. Rare; in grasslands. *RNMK 4396,* Pookodu.

ECHINOCHLOA Palisot de Beauvois
Essai Agrost. 53. 1812, *nom. cons.*

Tufted annuals, erect or geniculate, usually rooting from the lower nodes; nodes glabrous. Leaves lanceolate or linear-lanceolate, glabrous; sheath keeled, glabrous. Racemes 3-17, scattered on a central axis; rachis flat or angled with 4 rows of spikelets; spikelets similar, ovate, awnless, 2-flowered; lower glume broadly ovate, 5-nerved; upper glume ovate, acute to acuminate, 5-nerved; first lemma lanceolate, acuminate or awned, 7-nerved; palea ovate-oblong, hyaline, 2-nerved; second lemma ovate-concave, crustaceous, 5-nerved; palea 2-nerved; stamens 3, free; ovary oblong; styles 2, free; stigma plumose, white.

1. Spikelets acute, 2-2.5 mm long ..... **E. colonum**
1. Spikelets acuminate, or awned, 4-5 mm long 2
2. Ligule a row of hairs; rachis covered with glassy bristles ..... **E. stagnina**
2. Ligule absent; rachis smooth ..... **E. crus-galli**

Echinochloa colonum (L.) Link, Enum. Hort. Berol., 2: 209. 1833; Fischer in Gamble, Fl. Pres. Madras 1776(1230). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 380. 1960; Manilal & Sivar., Fl. Calicut 342. 1982; Ansari, Fl. Kasaragod Div. 459. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 537. 1988; Vajr., Fl. Palghat Dist. 572. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses

245. 1991; Joseph, Aquatic Angiosp. Malabar 465. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 513. 1996; Sivar. & P. Mathew, Fl. Nilambur 839. 1997; Mohanan & Sivad., Fl. Agasthyamala 817. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 843. 2009. *Panicum colonum* L., Syst. Nat. (ed. 10) 870. 1759; Hook. f., Fl. Brit. India 7: 32. 1896.

Annuals; culms 20-50 cm high, sub-erect; nodes glabrous. Leaves 3-10 x 0.3-0.5 cm, linear-lanceolate, glabrous; sheath keeled; ligule absent. Racemes 3-8, each 1-1.5 cm long; rachis triquetrous; spikelets ovate, densely packed; lower glume broadly ovate, acute, 5-nerved; margin ciliate; upper glume hirtus; first lemma shortly cuspidate; palea oblong, hyaline, 2-keeled; second lemma ovate, acute; palea hyaline.

Flowering & Fruiting: Throughout the year.

Distribution: Tropical Asia and Africa. Common; in moist deciduous forests. *RNMK 4503,* Tholpetty, *RNMK 3592*, Chedalayam.

Echinochloa crus-galli (L.) P. Beauv., Ess. Agrost. 53: 161. 1812; Fischer in Gamble, Fl. Pres. Madras 1777(1231). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 310. 1960; V.S. Ramach. & V.J. Nair, Fl. Cannanore 537. 1988; Vajr., Fl. Palghat Dist. 572. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 246. 1991; Joseph, Aquatic Angiosp. Malabar 466. 1991; Sivar. & P. Mathew, Fl. Nilambur 839. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 843. 2009. *Panicum crusgalli* L., Sp. Pl. 56. 1753; Hook. f., Fl. Brit. India 7: 30. 1896.

Tufted annuals; culms 60-100 cm high, erect, robust. Leaves 10-40 cm long, linear-lanceolate, glabrous; sheath keeled; ligule absent. Racemes 5-8 together, each 1-2 cm long; rachis angled; spikelets in 4 rows, ca. 4 mm long; lower glume broadly ovate, bulbous based hairy along the nerves; upper glume ovate, acuminate; first lemma ovate, awned; awn 6-8 mm long; second lemma concave, smooth, crustaceous; palea similar to lemma, 2-nerved.

Flowering & Fruiting: March-September.

Distribution: India, south-east Asia and Africa. Common; in paddy fields. *RNMK 1962,* Panamram, *RNMK 3591*, Mananthavady.

Echinochloa stagnina (Retz.) P. Beauv., Ess. Agrost. 53: 162. 1812; Fischer in Gamble, Fl. Pres. Madras 1777(1231). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 311. 1960; V.S. Ramach. & V.J. Nair, Fl. Cannanore Dist. 537. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 248. 1991; Joseph, Aquatic Angiosp. Malabar 467. 1991; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 575. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 844. 2009. *Panicum stagninum* Retz., Obs. Bot. 5: 7. 1788. *Panicum crusgalli* sensu Hook. f., Fl. Brit. India 7: 30. 1896, non L. 1753.

Tufted annuals; culms 30-60 cm high, erect. Leaves 5-15 x 0.4-0.7 cm, linear-lanceolate, rounded at base; ligule a row of hairs. Racemes 3-8, 2-5 cm long; rachis with glassy bristles; spikelets ca. 5 mm long, arranged in 4 rows; lower glume broadly ovate, thinly hairy; upper glume ovate, tubercled hairy

along the nerves; first lemma lanceolate, aristate, arista ca. 2 mm long; palea 2-keeled, carries a male floret; second lemma ovate, concave, coriaceous; palea 2-keeled.

Flowering & Fruiting: March-September.

Distribution: Tropical Asia and Africa. Common; in paddy fields. *RNMK 4395,* Thrissylery.

ELEUSINE Gaertner

Fruct. 1: 7. 1788.

Eleusine indica (L.) Gaertn., Fruct. 1: 8. 1789; Hook. f., Fl. Brit. India 7: 293. 1896; Fischer in Gamble, Fl. Pres. Madras 1839(1273). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 493. 1960; Manilal & Sivar., Fl. Calicut 340. 1982; Ansari, Fl. Kasaragod Div. 459. 1985; Manilal, Fl. Silent Valley 353. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 538. 1988; Vajr., Fl. Palghat Dist. 572. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 371. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 513. 1996; Sivar. & P. Mathew, Fl. Nilambur 824. 1997; Mohanan & Sivad., Fl. Agasthyamala 817. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 575. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 846. 2009. *Cynosurus indicus* L., Sp. Pl. 72. 1753.

Tufted annuals, erect; culms round or compressed, 20-30 cm high; nodes glabrous. Leaves 20-30 x 0.6-1 cm, linear-lanceolate, rounded at base, glabrous; sheath keeled; ligule a narrow membrane. Racemes 2-6, sub-digitate, each 7-9 cm long; rachis flat, serrulate; spikelets 6-8 mm long, ovate, compressed, glabrous; lower glume ovate, keeled, 1-nerved; upper glume 6-nerved, keeled; florets 5-8, all bisexual, lemmas keeled; palea 2-nerved, 2-keeled; stamens 3, free; ovary elliptic; styles 2, free; stigmas plumose; violet.

Flowering & Fruiting: Throughout the year.

Distribution: Pantropical. Common; in open areas. *RNMK 2723,* Puthoorvayal.

ELYTROPHORUS P. Beauvisage

Ess. Agrostogr. t. 14. f. 2. 67. 1812.

Elytrophorus spicatus (Willd.) A.Camus in Lecomte, Fl. Indo-Chine 7: 547. 1923; Fischer in Gamble, Fl. Pres. Madras 1843(1275). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 493. 1960; V.S. Ramach. & V.J. Nair, Fl. Cannanore 538. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 372. 1991. *Dactylis spicata* Willd., Ges. Naturf. Freunde Berlin Neue Schriften 3: 416. 1801. *Elytrophorus articulatus* P.Beauv., Ess. Agrost. 67. t.14, f. 2. 1812; Hook. f., Fl. Brit. India 7: 306. 1896.

Erect annuals; culms creeping, stoloniferous, 2-25 cm tall; nodes glabrous. Leaves linear, 0.5-20 x 0.1-0.5 cm, rounded at base; sheaths slightly keeled. Spikes narrow, cylindric, 0.5-15 cm long; spikelets 4-6 flowered; lower glumes elliptic-lanceolate, 1-nerved; upper glume margins ciliate, 1 nerved; lemmas ovate-lanceolate, caudate acuminate, 3-nerved; paleas obovate, 3-6 lobed at apex, delicate; stamens 3. Grains elliptic or ellipsoid.

Flowering & Fruiting: December-February.
Distribution: Paleotropics. Common; in paddy fields. *RNMK 4394,* Panamaram.

ERAGROSTIS N. M. Wolf
Gen. Pl. 23. 1776.

Annuals or perennials erect, tufted; stems nodes glabrous. Leaves lanceolate, glabrous. Sheath rounded, glabrous. Inflorescence a lax or contracted panicle; branches filiform, smooth; spikelets compressed, ovate, oblong or lanceolate, 3-many-flowered; glumes similar, ovate, acute, keeled, 1-nerved, glabrous; lemmas similar, ovate, acute; palea oblong, usually curved, 2-nerved, 2-keeled; stamens 3, free; ovary elliptic, styles 2, free; stigmas 2, plumose.

1. Spikelets breaking up from above downwards 2
1. Spikelets breaking up from below upwards.....3
2. Panicle effuse, up to 10 cm long ..... **E. tenella**
2. Panicles contracted, spiciform, up to 50 cm long ..... **E. japonica**
3. Lemmas up to 1.5 mm long; paleas deciduous ..... **E. gangetica**
3. Lemmas over 2 mm long; paleas not deciduous 4
4. Spikelets grey or black 5
4. Spikelets purplish or olive-green.....7
5. Pedicels of the spikelets with glandular bands ..... **E. tenuifolia**
5. Pedicels without glandular bands 6
6. Leaves green; spikelets often black ..... **E. nigra**
6. Leaves glaucous; spikelets grey ..... **E. atrovirens**
7. Spikelets broadly ovate or oblong–obtuse ..... **E. unioloides**
7. Spikelets oblong-lanceolate, acute ..... **E. cumingii**

Eragrostis atrovirens (Desf.) Trin. ex Steud., Nomencl. Bot. (ed. 2) 1: 562. 1840; Bor, Grass. Burma, Ceylon, India & Pakistan 503. 1960; Manilal, Fl. Silent Valley 353. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 539. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 377. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 513. 1996; Sivar. & P. Mathew, Fl. Nilambur 825. 1997; Mohanan & Sivad., Fl. Agasthyamala 818. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 848. 2009. *Poa atrovirens* Desf., Fl. Atlant. 1: 73. t. 14. 1798.

Tufted perennials; culms 30-80 cm high, erect; nodes glabrous. Leaves 5-30 x 0.2-0.6 cm, linear-lanceolate; sheath rounded; ligule a narrow membrane. Panicle 5-30 cm long, contracted; spikelets many, ca. 9 mm long, ovate-oblong, grey, 15-40-flowered; glumes ovate, acute, 1-nerved; lemma ovate, acute, 3-nerved, grey; palea curved, keel scabrid; stamens 3.
Flowering & Fruiting: Throughout the year.
Distribution: Africa and Indo-Malesia. Occasional; in margins of evergreen forests. *RNMK 1121,* Sughandhagiri.

Eragrostis cumingii Steud., Syn. Pl. Glum. 1: 266. 1854; Bor, Grass. Burma, Ceylon, India & Pakistan 507. 1960; Mohanan *et al.,* J. Econ. Tax. Bot. 3: 447.

1982; V.S. Ramach. & V.J. Nair, Fl. Cannanore 539. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 380.1991; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 849.2009.

Annuals; culms erect. 10-20 cm tall; nodes glabrous. Leaves 3-8 x 0.1-0.2 cm, linear-lanceolate, acuminate; sheaths much longer than the inter nodes, bearded at mouth with long silky hairs. Panicles 5-12 cm long, branches angular; spikelets 2-8, oblong-lanceolate, greenish,; glumes ovate-lanceolate, 1 nerved, scabrid along the nerves; lemmas 3 nerved, coriaceous; paleas slightly curved, minutely ciliate along the keels, persistant.

Flowering & Fruiting: July-February.

Distribution: Malesia to Australia. Rare; in open areas in evergreen forests. *RNMK 3590,* Chanthanathode.

Eragrostis gangetica (Roxb.) Steud., Syn. Pl. Glum. 1: 266. 1854; Fischer in Gamble, Fl. Pres. Madras 1826(1264). 1994; Bor, Grass. Burma, Ceylon, India & Pakistan 508. 1960; Ansari, Fl. Kasaragod Div. 461. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 540. 1988; Vajr., Fl. Palghat Dist. 574. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 380. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 514. 1996; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 849. 2009. *Poa gangetica* Roxb., Fl. Ind. 1: 341. 1820. *Eragrostis stenophylla* Hochst. ex Miq., Verh. Kon. Nederl. Inst. 3:39. 1851; Hook. f., Fl. Brit. India 7: 318. 1896, p.p.

Tufted annual herbs; culms 10-60 cm high; nodes glabrous. Leaves lanceolate, 2-15 x 0.1-0.5 cm, acute, rounded or cordate at base. Panicles elliptic, 4-15 cm long, lax, grey; spikelets oblong-lanceolate, 5-20 flowered, grey; lower glume 1 nerved; lemmas ovate-lanceolate, 3 nerved; paleas elliptic-lanceolate, 2 keeled, 2 nerved, keels scabrid.

Flowering & Fruiting: June-December.

Distribution: Paleotropics. Common; in marshy areas in moist deciduous forests. *RNMK 4393,* Muthanga.

Eragrostis japonica (Thunb.) Trin., Mem. Acad. Sci. Petersb. ser. 6, 1: 405. 1830; Bor, Grass. Burma, Ceylon, India & Pakistan 509. 1960; Manilal & Sivar., Fl. Calicut 348. 1982; Sreek. & V.J. Nair, Fl. Kerala Grasses 382. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 514. 1996; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 850. 2009. *Poa japonica* Thunb., Fl. Jap. 51. 1784. *Eragrostis interrupta* Lamk., Encycl. Tabl. 1: 185. 1791; Hook. f., Fl. Brit. India 7: 316. 1896. *Eragrostis diarrhena* (Schult.) Steud., Syn. Pl. Glum. 1: 266. 1854; Fischer in Gamble, Fl. Pres. Madras 1820(1264). 1934; V.S. Ramach. & V.J. Nair, Fl. Cannanore 540. 1988; Vajr., Fl. Palghat Dist. 574. 1990. *Poa diarrhena* Schult., Mant. 2: 616. 1824. *Diandrochloa diarrhena* (Schult.) Henry, Bull. Bot. Surv. India 9: 290. 1967 (1968). *Diandrochloa japonica* (Thunb.) Henry, Bull. Bot. Surv. India 9: 290. 1967 (1968).

Annual herbs; culms tufted, 15-120 cm tall; nodes glabrous. Leaves 5-35 x 0.2-0.6 cm high, rounded or cordate at base, flat; sheaths keeled; Panicle linear or linear-lanceolate, 10-60 cm long, branches verticillate; spikelets

oblong-lanceolate, 5-12 flowered; lower glume ovate, 1 nerved; upper glume ovate-acute; lemmas 3 nerved; paleas 2 keeled, 2 nerved, keels scabrid.
Flowering & Fruiting: November-May.
Distribution: Pantropical. Occasional; in moist deciduous forests. *RNMK 3589,* Thirunelli.

Eragrostis nigra Nees ex Steud., Syn. Pl. Glum. 1: 267. 1854; Hook. f., Fl. Brit. India 7: 324. 1896; Fischer in Gamble, Fl. Pres. Madras 1827(1265). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 511. 1960; V.S. Ramach. & V.J. Nair, Fl. Cannanore 541. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 384. 1991.

Tufted perennials; culms 30-50 cm high, erect; nodes glabrous. Leaves 15-25 x 0.2-0.6 cm, linear, base rounded with a tuft of long hairs; sheath slightly keeled, ciliate towards the mouth; ligule a fimbriate membrane. Panicle 15-30 cm long, lax, branches and pedicels smooth; spikelets many, pedicelled, 5-6 x 2-3 mm, oblong, black; glumes similar, 1-nerved, keeled; florets 5-8, all bisexual; lemma ovate, acute, 3-nerved; palea oblong, curved, keels smooth.
Flowering & Fruiting: July-September.
Distribution: Sri Lanka, India to China. Common; in moist deciduous forests. *RNMK 3146,* Begur, *RNMK 1121*, Muthanga.

Eragrostis tenella (L.) P. Beauv. ex Roem. & Schult., Syst. Veg. 2: 576. 1817; Bor, Grass. Burma, Ceylon, India & Pakistan 513. 1960; Manilal & Sivar., Fl. Calicut 348. 1982; Ansari, Fl. Kasaragod Div. 461. 1985; V. S. Ramach. & V. J. Nair, Fl. Cannanore 541. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 390. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 514. 1996; Mohanan & Sivad., Fl. Agasthyamala 819. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 576. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 850. 2009. *Poa tenella* L., Sp. Pl. 69. 1753 p.p. *Eragrostis plumosa* (Retz.) Link, Enum. Hort. Berol. 1: 192. 1827; Fischer in Gamble, Fl. Pres. Madras 1826(1264). 1934. *Poa plumosa* Retz., Obs. Bot. 4: 20. 1786. *Eragrostis tenella* (L.) P. Beauv. var. *plumosa* (Retz.) Stapf in Hook.f., Fl. Brit. India 7: 315. 1896.

Annuals, culms tufted. Leaves 8-10 x 0.4-0.5 cm, lanceolate, base obtuse; sheath ca. 3 cm long, ciliate, with a tuft of hairs at the mouth. Panicles pyramidal, 15-20 cm long, branchlets slender; spikelets 4-10 flowered, sometimes more, ca. 2.5 mm long, oblong; lower glume ovate-lanceolate, 1-nerved, upper glume oblong, 1-nerved; lemma oblong, 3-nerved, acute at apex, upper lemma aristate, 2 keeled, 2-nerved.
Flowering & Fruiting: December-February.
Distribution: Paleotropics. Common; along wayside and bunds of paddy fields. *RNMK 4392,* Puthoorvayal.

Eragrostis tenuifolia (A. Rich.) Hochst. ex Steud., Syn. Pl. Glum. 1: 268. 1854; Hook. f., Fl. Brit. India 7: 322. 1896; Fischer in Gamble, Fl. Pres.

Madras 1827(1265). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 276. 1960; Manilal, Fl. Silent Valley 353. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 541. 1988; Vajr., Fl. Palghat Dist. 575. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 391. 1991; Sivar. & P. Mathew, Fl. Nilambur 826. 1997. *Poa tenuifolia* A. Rich., Tent. Fl. Abyss. 2: 425. 1851.

Annuals or perennials; culms tufted, 20-60 cm high, erect. Leaves 15-25 x 0.2-0.5 cm, linear; base rounded; sheath rounded; ligule a rim of membrane. Panicle 10-20 cm long, effuse, glabrous; spikelets 0.5-1.3 cm long, linear-oblong, serrate; glumes similar, ovate-lanceolate, 1-nerved; florets 10-18, all bisexual; lemmas broadly ovate, mucronate, greyish black; palea curved, truncate at apex, persistent.

Flowering & Fruiting: March-September.

Distribution: Tropical Africa and south India. Occasional; in open areas in moist deciduous forests. *RNMK 4391,* Tholpetty.

Eragrostis unioloides (Retz.) Nees ex Steud., Syn. Pl. Glum. 1:264.1854; Fischer in Gamble, Fl. Pres. Madras 1826(1264). 1934; Hook. f., Fl. Brit. India 7: 317.1896; Manilal & Sivar., Fl. Calicut 347. 1982; Ansari, Fl. Kasaragod Div. 462. 1985; Manilal, Fl. Silent Valley 354. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 542. 1988; Vajr., Fl. Palghat Dist. 575. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 392. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 514. 1996; Sivar. & P. Mathew, Fl. Nilambur 827. 1997; Mohanan & Sivad., Fl. Agasthyamala 820. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 576. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 851. 2009. *Poa unioloides* Retz., Obs. Bot. 5: 19. 1788; Bor, Grass. Burma, Ceylon, India & Pakistan 515. 1960. *Eragrostis amabilis* sensu Stapf in Hook.f., Fl. Brit. India 7: 317. 1896, non Wight & Arn. ex Nees 1838.

Annuals or perennials; culms 25-40 cm high, tufted. Leaves 5-15 x 0.3-0.7 cm, linear, base rounded with a tuft of hairs; ligule a rim of membrane. Panicle 10-25 cm long, very lax, effuse, glabrous; spikelets few to many, 5-17 x 3-4 mm, ovate to oblong, purplish black; glumes subequal, ovate-lanceolate; floret 20-60, similar; lemmas ovate, acute; palea curved, keel scabrid.

Flowering & Fruiting: Throughout the year.

Distribution: South-east Asia, India and Africa. Common; in moist deciduous forests. *RNMK 3146,* Muthanga.

EULALIA Kunth

Revis. Gram. 1: 160. 1829.

Eulalia trispicata (Schult.) Henr., Blumea 3: 453. 1940; Bor, Grass. Burma, Ceylon, India & Pakistan 157. 1960; Manilal & Sivar., Fl. Calicut 334. 1982; Sur, J. Econ. Tax. Bot. 6: 183. 1985; Ansari, Fl. Kasaragod Div. 463. 1985; Manilal, Fl. Silent Valley 354. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 543. 1988; Vajr., Fl. Palghat Dist. 575. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 104. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 514. 1996; Sivar. &

P. Mathew, Fl. Nilambur 806. 1997; Mohanan & Sivad., Fl. Agasthyamala 822. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 576. 2005. *Andropogon trispicatus* Schult., Syst. Veg. 2: 452. 1824. *Eulalia tristachya* (Roxb.) O. Kuntze., Rev. Gen. Pl. 2: 775. 1891; Fischer in Gamble, Fl. Pres. Madras 1715(1189). 1934. *Pollinia argentea* Trin., Acad. Sci. Petersb. ser. 6, 1: 71. 1836; Hook. f., Fl. Brit. India 7: 11. 1896.

Perennials or annuals; culms 50-100 cm high, erect, pinkish, loosely tufted. Leaves 10-45 x 0.2-1 cm, linear, glabrous, drying purplish; sheath rounded, ligule a membrane. Racemes 3-15, 12-15 cm long, reddish or purple; joints and pedicels hairy; spikelets many, densely packed, ca. 4 mm long, oblong; lower glume oblong, truncate, hairy, brown, margins incurved; upper glume acute; first lemma oblong; second lemma awned, epaleate; anthers yellow.
Flowering & Fruiting: October-March.
Distribution: Central and south-east Asia. Common; in grasslands. *RNMK 3459,* Chembra; *RNMK 3588*, Kurichiarmala.

GARNOTIA Brongniart
in Duperrey, Voy. Coq. Bot. Phan. 2: 132, t. 21. 1832.

Annuals or perennials, erect or geniculate, usually tufted. Leaves lanceolate to linear-lanceolate, flat or canaliculate; sheath keeled or rounded, glabrous or hairy. Panicle effuse, usually lax; branches angled and scabrid, rarely smooth and filiform; spikelets similar, pedicelled, lanceolate, 1-flowered; glumes subequal, lanceolate, keeled, 1-nerved; lemma lanceolate, acuminate, usually awned; palea oblong, 2-nerved; stamens 3, free; ovary oblong glabrous; styles 2, free; stigmas feathery.

1. Leaves oblanceolate, flat, rigid; spikelets awnless .....**G. exaristata**
1. Leaves not as above; spikelets awned 2
2. Leaf-blades broadly lanceolate, acuminate, tip filiform .....**G. arundinacea**
2. Leaf-blades narrowly linear, without filiform tip.....3
3. Robust perennials; leaf-blades and sheaths mostly collected at the base of the culms .....**G. elata**
3. Slender annuals; leaf-blades not basal 4
4. Panicles up to 30 cm long; lower glume aristate .....**G. tenella**
4. Panicles up to 15 cm long; lower glume acute.....5
5. Culms densely tufted, stiff; axis of the panicles and branches verybroad.....
.....**G. puchiparensis**
5. Culms loosely tufted, weak; axis of the panicles and branches narrow .....
.....**G. courtallensis**

Garnotia arundinacea Hook. f., Fl. Brit. India 7: 243. 1896; Fischer in Gamble, Fl. Pres. Madras 1812(1255). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 567. 1960; V.S. Ramach. & V.J. Nair, Fl. Cannanore 543. 1988; Vajr., Fl. Palghat Dist. 576. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 409. 1991.

Perennials; culms 40-90 cm tall, robust, geniculate; nodes thickened & bearded. Leaves 10-18 x 1.5-2 cm, ovate-oblong, rounded at base, terminating into a filiform tip, ciliate along the margins; sheath rounded, ligule a membrane. Panicle 5-15 cm long, congested, branches angled, scabrid; spikelets pedicelled; glumes equal, aristate, 3-nerved, scabrid along the nerves; lemma similar to glumes, bifid at tip, awned; awn 7-8 mm long; palea oblong.
Flowering & Fruiting: October-February.
Distribution: Endemic to southern Western Ghats. Common; in grasslands. *RNMK 1288,* Pookodu.

Garnotia courtallensis (Arn. & Nees) Thw., Enum. Pl. Zeyl. 363. 1864; Hook. f., Fl. Brit. India 7: 244. 1896; Fischer in Gamble, Fl. Pres. Madras 1812(1255). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 567. 1960; Manilal, Fl. Silent Valley 355. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 409. 1991; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 577. 2005. *Miquelia courtallensis* Arn. & Nees, Nov. Act. Nat. Cur. 19, Suppl. 1:179. 1843.

Annuals; culms slender, 15-40 cm high, erect, loosely tufted; nodes bearded. Leaves 2-8 x 0.5-0.8 cm, lanceolate, rounded at base, glabrous; sheath rounded; ligule a membrane. Panicle 5-20 cm long; spreading, rachis and branches broadened or slightly winged; spikelets many, ca. 4 mm long, lanceolate; glumes subequal, acute, 3-nerved; upper glume larger; lemma elliptic, brown; awn 4-5 mm long; palea oblong, 2-nerved; stamens 3.
Flowering & Fruiting: November-December.
Distribution: South India and Sri Lanka. Common; in grasslands. *RNMK 1077,* Sughandhagiri.

Garnotia elata (Arn. ex Miq.) Janowsky, Fedd. Repert. 17: 86. 1921; Bor, Grass. Burma, Ceylon, India & Pakistan 567. 1960; Sreek. & V.J. Nair, Fl. Kerala Grasses 410. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 515. 1996. *Berghausia elata* Arn. ex Miq., Verh. Kon. Nederl. Inst. 3: 32. 1851. *Garnotia scoparia* Stapf ex Hook. f., Fl. Brit. India 7: 42. 1896, non Thw. 1864; Fischer in Gamble, Fl. Pres. Madras 1812(1254). 1934. *Garnotia tenuiglumis* Stapf ex Hook.f., Fl. Brit. India 7: 242. 1896.

Perennials; culms 100-140 cm high, robust; nodes glabrous. Leaves 50-60 x 0.4-0.5 cm, linear, channelled, glabrous; sheath keeled; ligule a tuft of hairs. Panicle 40-60 cm long, lax; branches filiform, glabrous; spikelets ca. 4 mm long, glabrous; glumes subequal, lanceolate, acute, 3-nerved, lower larger; lemma lanceolate; awn 4-5 mm long; palea hyaline, 2-nerved.
Flowering & Fruiting: October-January.
Distribution: Endemic to Peninsular India. Rare; on rocky hill slopes. *RNMK 1081,* Aranamala.

Garnotia exaristata Gould, Kew Bull. 27: 558. 1972; Bor, Grass. Burma, Ceylon, India & Pakistan 567. 1960; Sreek. & V.J. Nair, Fl. Kerala Grasses

410. 1991. *Garnotia tectorum* Hook. f., Fl. Brit. India 7: 242. 1896 (excl. syn.), nom. illeg.; Fischer in Gamble, Fl. Pres. Madras 1812(1255). 1934. *Garnotia mutica* sensu Bor, Grass. Bur. Cey. Ind. Pak. 568. 1960, non (Munro) Druce 1916.

Stout perennials; culms 40-200 cm high, 8-9 mm thick; nodes glabrous. Leaves 20-60 x 0.6-2.5 cm, lanceolate, flat, rounded at base, glabrous; sheath keeled; ligule a narrow membrane. Panicle 20-50 cm long, effuse, branches filiform; spikelets ca. 6 mm long, lanceolate; glumes equal, acuminate, 1-nerved; lemma oblong, acute; palea oblong, 2-nerved.

Flowering & Fruiting: August-December.

Distribution: India and Sri Lanka. Occasional; in grasslands. *RNMK 2138,* Pookodu.

Garnotia puchiparensis Bor, Indian For. Rec. 4: 234. 1941; Ved Prakash & Jain in Fasc. Fl. Ind. 3: 11. 1979; Sreek. & V.J. Nair, Fl. Kerala Grasses 411. 1991; Mohanan & Sivad., Fl. Agasthyamala 823. 2002.

Annuals; culms 30-35 cm tall; prostrate; rooting at nodes; nodes bearded. Leaves lanceolate, 2-5 x 0.3-1 cm, acute, hirsute; sheaths softly hairy. Panicles 7-10 cm long; spikelets lanceolate, 3-4 mm long; lower glume lanceolate; upper glume oblong-lanceolate, chartaceous; lemmas oblong-lanceolate, awned; awn 4-6 mm long.

Flowering & Fruiting: September-December.

Distribution: Endemic to south India. Occasional; in grasslands. *RNMK 2245,* Sugandhagiri.

Garnotia tenella (Arn. ex Miq.) Jan., Feddes Repert. 17:86.1921; Ansari, Fl. Kasaragod Div. 464. 1985; Manilal, Fl. Silent Valley 355. 1988; Vajr., Fl. Palghat Dist. 576. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 413. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 515. 1996; Sivar. & P. Mathew, Fl. Nilambur 827. 1997; Mohanan & Sivad., Fl. Agasthyamala 823. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 577. 2005. *Berghausia tenella* Arn. ex Miq., Verh. Kon. Nederl. Inst. 3: 34. 1851. *Garnotia stricta* sensu Hook.f., Fl. Brit. India 7: 243. 1896, non Brongn. 1832; Fischer in Gamble, Fl. Pres. Madras 1812(1255). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 569. 1960.

Annuals or perennials; culms 10-50 cm high, tufted; nodes bearded. Leaves 10-18 x 0.2-0.6 cm, lanceolate, scabrid along the margins; sheath rounded, ligule membranous. Panicle 5-30 cm long, effuse, branches angled; spikelets 3.5 x 1-2 mm, lanceolate, glabrous; glumes subequal, aristate, 3-nerved; lemma lanceolate, 3-nerved; palea hyaline; stamens 3.

Flowering & Fruiting: May-December.

Distribution: South-east Asia and India. Occasional; in grasslands. *RNMK 2241,* Kurichiarmala.

GLYPHOCHLOA W. D. Clayton
Kew Bull. 35(4): 814. 1981.

Annual or perennial herbs; culms tufted and branched. Leaves narrow, conduplicate, ultimately flat. Racemes solitary, terminal, compressed; rachis fragile; spikelets 2, one sessile; sessile spikelets dorasally compressed; glumes dissimilar, lower coriaceous, smooth or rugose, muricate or spinulose, upper half 2-keeled and winged, 1-2 awned; upper membranous and 1-keeled, boat shaped; lemmas hyaline, lower empty or containing male floret, upper containing bisexual floret. Lodicules 2; stamens 3; pedicelled spikelets as long as the sessile. Grain oblong.

1. Lower glume with 4-5 conspicuous annular transverse ridges .....**G. acuminata**
1. Lower glume without annular transverse ridges.....**G. forficulata**

Glyphochloa acuminata (Hack.) W.D. Clayton, Kew Bull. 35: 815. 1981; Ansari, Fl. Kasaragod Div. 464. 1985; Sreek. & V.J. Nair, Fl. Kerala Grasses 106. 1991. *Rottboellia acuminata* Hack. in DC., Monogr. Phan. 6:291.1889; Hook. f., Fl. Brit. India 7:155.1896. *Manisuris acuminata* (Hack.) O.Kuntze., Rev. Gen. Pl. 2: 779. 1891; Fischer in Gamble, Fl. Pres. Madras 1761(1220). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 101. 1960.

Annuals; culms 5-25 cm tall; nodes glabrous. Leaves 0.5-4 x 0.2-0.5 cm, lanceolate. Racemes 1-6 cm long, joints flat; sessile spikelets ovate-lanceolate, 3-5 mm long; callus glabrous; lower glume ovate-lanceolate, awned, 7-9 nerved, with 4-5 transverse ridges, winged along the margins; upper glume 3 nerved; second palea 2 keeled, 2 nerved, oblong-lanceolate.
Flowering & Fruiting: October-February.
Distribution: Endemic to Peninsular India. Occasional; along margins of evergreen forests. *RNMK 3579,* Periya.

Glyphochloa forficulata (Fischer) W. D. Clayton, Kew Bull. 35: 815. 1981; Sreek. & V.J. Nair, Fl. Kerala Grasses 109. 1991. *Manisuris forficulata* Fischer, Bull. Misc. Inform. Kew 1933: 353. 1933 & Gamble, Fl. Pres. Madras 1761(1220). 1934; Vajr., Fl. Palghat Dist. 581. 1990. *Rottboellia divergens* Hook.f., Fl. Brit. India 7: 155. 1896, non Hack. 1889.

Tufted annuals; culms 5-10 cm high, erect; nodes bearded. Leaves 4-5 x 0.2-0.3 cm, linear, acuminate, ciliate along the margins; sheath keeled, covered by tubercle based hairs; ligule membranous. Raceme solitary, ca. 2.5 cm long; joints clavate, glabrous; spikelets paired, dissimilar; sessile spikelets ca. 5 mm long, ovate-oblong; lower glume ovate, 2-clefted and broadly winged on upper half; lower half with coriaceous tubercles and marginal hooks; wings terminated into awns; upper glume oblong, chartaceous; lower floret empty; upper bisexual; first lemma oblong, acuminate, smooth; palea oblong, acuminate; second lemma oblong, obtuse; stamens 3, free; ovary elliptic; styles 2, basely united; stigmas 2, feathery.
Flowering & Fruiting: September-December.
Distribution: Endemic to Peninsular India. Occasional; in moist deciduous forests. *RNMK 2277,* Kattikulam; *RNMK 1157*, Muthanga.

HETEROPOGON Persoon

Syn. Pl. 2: 533. 1807.

Heteropogon contortus (L.) P. Beauv. ex Roem. & Schult., Syst. Veg. 2: 836. 1817; Fischer in Gamble, Fl. Pres. Madras 1743(1208). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 163. 1960; Manilal & Sivar., Fl. Calicut 332. 1982; Ansari, Fl. Kasaragod Div. 464. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 543. 1988; Vajr., Fl. Palghat Dist. 577. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 112. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 516. 1996; Sivar. & P. Mathew, Fl. Nilambur 807. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 578. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 855. 2009. *Andropogon contortus* L., Sp. Pl. 1045. 1753; Hook. f., Fl. Brit. India 7: 199. 1896.

Densely tufted perennials; culms 25-50 cm high, erect or decumbent; nodes glabrous. Leaves 5-15 x 0.2-0.6 cm, linear-lanceolate, rounded at base, glabrous or sparsely hairy; sheath keeled, ligule a fimbriate membrane. Raceme solitary, terminal; spikelets dissimilar, paired, sessile and pedicelled; lower sessile spikelets 8-9 mm long, lanceolate; lower glume many-nerved, winged along the margins, ciliate; upper glume 3-nerved; lower floret empty, upper male; first lemma oblong, hyaline, epaleate; second lemma smaller; stamens 3; lower pedicelled spikelets 8 mm long, similar to sessile spikelets; lower glume winged on one side; upper sessile spikelets 5-8 mm long, oblong; glumes similar, truncate at apex, crustaceous, brown; second lemma forms the hyaline base of the awn, awn 7-8 cm long, twisted each other at ends; ovary oblong; styles 2; stigmas plumose.

Flowering & Fruiting: October-December.

Distribution: Cosmopolitan. Common; in grasslands. *RNMK 2244,* Chembra ; *RNMK 1232*, Kurichiarmala; *RNMK 1280*, Banasuramala; *RNMK 1506*, Brahmagiri.

IMPERATA Cyrillo

Pl. Rar. Neapol. 2: 26, t. 11. 1792.

Imperata cylindrica (L.) Raeusch., Nomencl. Bot. (ed.3) 10. 1797; Bor, Grass. Burma, Ceylon, India & Pakistan 170. 1960; Sreek. & V.J. Nair, Fl. Kerala Grasses 114. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 516. 1996; Mohanan & Sivad., Fl. Agasthyamala 825. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 857. 2009. *Lagurus cylindricus* L., Syst. Nat. (ed.10) 878. 1759. *Imperata cylindrica* (L.) Raeusch. var. *koenigii* Dur. & Schinz., Consp. Fl. Africa 5: 694. 1894; Fischer in Gamble, Fl. Pres. Madras 1708(1184). 1934. *Imperata arundinacea* Cyrillo, Pl. Rar. Neap. 2: 26. 1792; Hook. f., Fl. Brit. India 7: 106. 1896. *Imperata cylindrica* (L.) Raeusch. var. *major* (Nees) C.E. Hubb. ex Hubb. & Vaughan, Grass. Maur. 96. 1940; Ansari, Fl. Kasaragod Div. 465. 1985; Manilal, Fl. Silent Valley 355. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 544. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 114. 1991; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 578. 2005.

Perennials; culms 20-150 cm high, tufted; nodes bearded. Leaves 15-70 x 0.8-2 cm, lanceolate, narrowed towards the base, glabrous; sheath rounded, glabrous; ligule membranous. Panicle 27-30 x 1-1.5 cm, cylindrical; rachis glabrous; spikelets ca. 4 x 1 mm, similar, lanceolate, pedicelled; callus with long hairs; glumes equal, lanceolate, with long silky white hairs on dorsal surface; lower floret empty, upper bisexual; first lemma oblong, hyaline, epaleate; second lemma hyaline, 3-lobed, paleate; stamens 2, free; ovary oblong, styles 2, free; stigma plumose.
Flowering & Fruiting: March-July.
Distribution: Paleotropics. Common; in grasslands. *RNMK 1428,* Manikkunnumala.

ISACHNE R. Brown
Prodr. 196. 1810.

Annuals or perennials; stems tufted, geniculate or trailing. Leaves ovate to lanceolate, often with white cartilaginous margins; sheath rounded or rarely keeled; ligule a row of hairs. Inflorescence an erect terminal panicle; spikelets pedicelled, ovate to lanceolate, strictly with two flowers; glumes subequal, usually deciduous exposing the florets; lemmas chartaceous or coriaceous, concavo-convex, indurate; paleas similar to lemmas; stamens 3; styles 2, free; stigmas plumose.

1. Glumes setose with tubercle-based hairs.....**I. setosa**
1. Glumes sparsely hairy or glabrous 2
2. Nodes glabrous; pedicels often with glandular bands.....**I. dispar**
2. Nodes bearded; pedicels without glandular bands ..... **I. miliacea**

Isachne dispar Trin., Sp. Gram. 1: t.86. 1828; Hook. f., Fl. Brit. India 7: 26. 1896; Fischer in Gamble, Fl. Pres. Madras 1797(1244). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 580. 1960; Ansari, Fl. Kasaragod Div. 465. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 544. 1988.

Annual herbs; culms erect, rooting at base, 25-30 cm tall. Leaves flat, ovate-lanceolate. Panicles dense; spikelets puberulous on the margins.
Flowering & Fruiting: February-March
Flowering & Fruiting: February-March.
Distribution: Indo-Malesia to Australia. Occasional; in moist deciduous forests. *RNMK 3581,* Thirunelli.

Isachne miliacea Roth, Nov. Pl. Sp. 58. 1821; Hook. f., Fl. Brit. India 7: 25. 1896; Fischer in Gamble, Fl. Pres. Madras 1797(1244). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 582. 1960; Manilal, Fl. Silent Valley 356. 1988;; Sreek. & V.J. Nair, Fl. Kerala Grasses 424. 1991; Joseph, Aquatic Angiosp. Malabar 477. 1991; Sivar. & P. Mathew, Fl. Nilambur 829. 1997; Mohanan & Sivad., Fl. Agasthyamala 826. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 857. 2009.

Annual herbs; culms 10-50 cm long; nodes bearded. Leaves ovate-lanceolate, 1-5 x 0.5-2 cm, rounded at base; sheaths tubercle based hairy; panicles lax, 1-10 cm long; spikelets obovoid. 1.5-2 mm long.
Flowering & Fruiting: Throughout the year.
Distribution: India, China and south-east Asia. Common; in marshy fields. *RNMK 2279,* Panamaram.

Isachne setosa Fischer, Bull. Misc. Inform. Kew 1932: 247. 1932; Fischer in Gamble, Fl. Pres. Madras 1797(1244). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 580. 1960; Sreek. & V.J. Nair, Fl. Kerala Grasses 425. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 517. 1996; Mohanan & Sivad., Fl. Agasthyamala 827. 2002.

Tufted annuals; culms slender, 10-35 cm high; nodes hairy. Leaves 0.7-3 x 0.8-0.9 cm, ovate-lanceolate, cordate at base, hairy below; sheath round; ligule a row of hairs. Panicle 3-8 x 1-4 cm; branches smooth; spikelets 2-2.5 mm long; glumes similar, ovate, acuminate, setose; lower floret empty; first lemma ovate-oblong, hyaline; palea similar, 2-nerved; second lemma coriaceous, hirtus; palea ovate, 2-keeled; stamens 3.
Flowering & Fruiting: October-December.
Distribution: Endemic to Western Ghats. Occasional; in open areas in evergreen forests. *RNMK 1062,* Thirunelli.

ISCHAEMUM Linnaeus
Sp. Pl. 1049. 1753.

Annuals or perennials; culms erect, trailing, or geniculate. leaves ovate to linear-lanceolate, sometimes petiolate, acuminate at apex, flat; sheaths rounded or keeled towards the mouth; ligule a membrane. Inflorescence usually a pair of racemes, rarely a collection of racemes, terminal; spikelets paired along either sides of the raceme, one pedicelled and one sessile, usually dissimilar, rarely similar; lower glume of sessile spikelets ovate to oblong, smooth or nodulose to rugose, winged or wingless, coriaceous; upper glume boat shaped, sub-coriaceous; florets 2, lower usually male, upper florets bisexual; first lemma ovate or oblong, awnless; palea hyaline; stamens 3; second lemma deeply lobed, awned in the sinus; palea hyaline; stamens 3; ovary oblong; styles 2, free; stigmas plumose; pedicelled spikelets similar or dissimilar to sessile ones; lower glumes much compressed, usually winged; lemmas much reduced, awned or awnless, carries sterile lemmas or male florets.

1. Racemes 3-10, paniculate. ..... **I. nilagiricum**
1. Racemes usually paired, rarely solitary or 3, digitate 2
2. Margins of the lower glume of the sessile spikelets expanded in the lower half.....3
2. Margins of the lower glume of the sessile spikelets narrowly and evenly expanded from base to apex 5
3. Lower glume of the sessile spikelets winged on both sides towards apex...**I. indicum**
3. Lower glume of the sessile spikelet not winged towards apex.....4

4. Joints of racemes with a tooth-like projection on inner side; glumes glabrous .....
..... **I. zeylanicolum**
4. Joints of racemes without a tooth-like projection; glumes pilose.....**I. timorense**
5. Base of the lower leaves rounded or shallowly cordate.....**I. mangaluricum**
5. Base of the lower leaves usually sagittate or deeply cordate 6
6. Lower leaves sessile.....**I. wayanadense**
6. Lower leaves petiolate..... 7
7. Pedicels of spikelets more than one-third the length of sessile spikelets . **I. malabaricum**
7. Pedicels of spikelets less than one-third the length of the sessile spikelets.....
..... **I. rangacharianum**

Key to the varieties and sub-varieties of *I. indicum*

1. Lower glume of the sessile spikelet scrobiculate.....
.....var. **indicum** sub-var. **scrobiculatum**
1. Lower glume of the sessile spikelet smooth towards apex, acuminate .....
.....var. **indicum** sub-var. **indicum**

Ischaemum indicum (Houtt.) Merr. var. **indicum** sub-var. **indicum**, J. Arnold Arbor. 19: 320. 1938; Bor, Grass. Burma, Ceylon, India & Pakistan 180. 1960; V.S. Ramach. & V.J. Nair, Fl. Cannanore Dist. 545. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 137. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 517. 1996; Sivar. & P. Mathew, Fl. Nilambur 809. 1997; Sur, J. Econ. Tax. Bot. 25: 419. 2001; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 860. 2009. *Phleum indicum* Houtt., Nat. Hist. 3:198, t.90. f.2. 1782. *Ischaemum aristatum* Fischer in Gamble, Fl. Pres. Madras 1721(1193). 1934, non L. 1753. *Ischaemum ciliare* Retz., Obs. Bot. 6: 36. 1791; Hook. f., Fl. Brit. India 7: 133. 1896.

Perennials; culms geniculate or trailing; nodes bearded. Leaves scattered, elliptic-lanceolate, rounded at base; ligule membranous. Racemes paired; rachis & pedicels thinly hairy; sessile spikelets ovoid; lower glume ovate, two winged at apex, aristate; first lemma oblong, acute, 1-nerved; second lemma cleft to the middle; awn geniculate; stamens 3; pedicelled spikelets ovoid or lanceolate; lower glume winged along the keel on upper half; florets 2; second lemma awned.

Flowering & Fruiting: October-November.

Distribution: Peninsular India and south-east Asia. Common; in grasslands. *RNMK 2168,* Chembra; *RNMK 1136*, Kurichiarmala

Ischaemum indicum (Houtt.) Merr. var. **indicum** sub-var. **scrobiculatum** (Nees) Bor, Grass. Burma, Ceylon, India & Pakistan 180. 1960; Sreek., J. Econ. Tax. Bot. 15: 353. 1991; Sreek. & V.J. Nair, Fl. Kerala Grasses 138. 1991. *Spodiopogon scrobiculatus* Nees ex Steud., Syn. Pl. Glum. 1: 373. 1854. *Ischaemum ciliare* Retz. var. *scrobiculatum* (Nees ex Steud.) Hack. in A. & C. DC., Monogr. Phan. 6: 226. 1889; Hook. f., Fl. Brit. India 7: 134. 1896.

Perennials; culms 20-50 cm high; nodes bearded. Leaves 5-10 x 0.5-0.8 cm, elliptic-lanceolate, rounded at base, glabrous; ligule membranous. Racemes 3-

5 cm long; rachis and pedicels thinly hairy; sessile spikelets 4-5 mm long; lower glume two winged at apex, glabrous, aristate; first lemma oblong, acute, 1-nerved; second lemma cleft to the middle; awn 7-9 mm long; stamens 3; pedicelled spikelets ca. 4 x 2 mm; lower glume winged along the keel on upper half; florets 2; second lemma awned.
Flowering & Fruiting: October-February.
Distribution: South India and Sri Lanka. Common; in moist deciduous forests. *RNMK 2258,* Muthanga

Ischaemum malabaricum Sreek., V.J. Nair & N.C. Nair, Kew Bull. 39: 743. 1984; Ansari, Fl. Kasaragod Div. 467. 1985; Sreek. & V.J. Nair, Fl. Kerala Grasses 144. 1991.

Annuals; culms week, creeping and geniculate; upper nodes villous. Leaves triangular, ovate-lanceolate, base deeply cordate or sagittate. Racemes 2, 3-6 cm long, enclosed in a spathe, villous towards base; sessile spikelets awned; lower glume smooth, thin, 9-11 nerved, dorsally covered with long white hairs; upper glume boat shaped; lemma 3-5 nerved, hairy along margins; palea 2 keeled, 2-nerved; lemma of bisexual flowers awned, 1-1.5 cm long.
Flowering & Fruiting: October-December.
Distribution: Endemic to southern Western Ghats. Occasional; in grasslands. *RNMK 2298,* Pookodu.

Ischaemum mangaluricum (Hack.) Stapf ex Fischer in Gamble, Fl. Pres. Madras 1723(1194). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 180. 1960; Ansari, Fl. Kasaragod Div. 467. 1985; Sreek. & V.J. Nair, Fl. Kerala Grasses 147. 1991; Manilal & Sivar., Fl. Calicut 333. 1982; Joseph, Aquatic Angiosp. Malabar 479. 1991; Sur, J. Econ. Tax. Bot. 25: 422. 2001; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 860. 2009. *Ischaemum aristatum* sensu Hack. ssp. *imberbe* var. *mangaluricum* Hack. in A. & C. DC., Monogr. Phan. 6: 204. 1889; Hook. f., Fl. Brit. India 7: 127. 1896.

Perennials; culms tufted, 40-50 cm high; nodes glabrous. Leaves 4-15 x 0.2-0.8 cm, lanceolate, rounded at base, glabrous, shortly petiolate, glabrous; ligule membranous. Racemes 2-4 cm long, terminal and axillary; sessile spikelets 5-6 mm long; lower glume oblong, flat with 2-3 obscure side nodules; apex winged on one side; upper glume acuminate; lower floret male; first lemma hyaline, 3-nerved; second lemma 2-cleft; awn attached far below the cleft; pedicelled spikelets 5-6 mm long; lower glume flat, winged on one side; second lemma awnless, carries a male floret.
Flowering & Fruiting: September-December.
Distribution: India and Sri Lanka. Occasional; in marshy areas. *RNMK 1539,* Karalad lake area.

Ischaemum nilagiricum Hack., Oesterr. Bot. 51: 150. 1901; Fischer in Gamble, Fl. Pres. Madras 1722(1194). 1934; Bor, Grass. Burma, Ceylon, India

& Pakistan 183. 1960; Manilal, Fl. Silent Valley 357. 1988; Vajr., Fl. Palghat Dist. 579. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 153. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 517. 1996; Sur, J. Econ. Tax. Bot. 25: 426. 2001. *Ischaemum hirtum* sensu Hook. f., Fl. Brit. India 7: 135. 1896, non Hack. 1889. **Plate 38a.**

Densely tufted perennials; culms 30-100 cm tall, rigid; nodes glabrous. Leaves 10-20 x 1-1.5 cm, linear, pubescent; sheath keeled; ligule a narrow membrane with a tuft of hairs. Racemes 9-12 cm long, densely hairy; sessile spikelet 4.5 x 1-2 mm; lower glume bifid at apex, hairy; upper glume aristate; lower floret male, upper bisexual; first lemma 3-nerved, paleate; second lemma bifid and awned in the sinus; palea nerveless, hyaline; pedicelled spikelets similar to sessile spikelets.

Flowering & Fruiting: December-March.

Distribution: Endemic to southern Western Ghats. Rare; in rocky areas in streams. *RNMK 1783*, Kallady river.

Ischaemum rangacharianum Fischer, Bull. Misc. Inform. Kew 1933: 352. 1933 & Gamble, Fl. Pres. Madras 1722(1194). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 184. 1960; Vajr., Fl. Palghat Dist. 579. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 155. 1991; Sivar. & P. Mathew, Fl. Nilambur 809. 1997; Sur, J. Econ. Tax. Bot. 25: 427. 2001. *Ischaemum aristatum* sensu Rang. & Tadul., Handb. South Indian Grass. 151. t. 130. 1921, non L. 1753.

Annuals; culms 20-80 cm long;, creeping and rooting at the nodes, pinkish; nodes glabrous. Leaves lanceolate or elliptic-lanceolate, 1-12 x 0.4-1.2 cm, acuminate, upper ones rounded or shallowly cordate at base, covered with tubercle-based hairs; sheaths slightly keeled. Racemes 2, adpressed together and appears as solitary, 2-6 cm long; joints clavate-turbinate, densely ciliate in two rows along one angle; sessile spikelets lanceolate, awned, purplish; lower glume oblong-lanceolate; upper glume sprinkled with wart-like growths on dorsal side; anthers yellow; second lemma notched, awned; pedicelled spikelets awnless.

Flowering & Fruiting: September-December.

Distribution: South India and Sri Lanka. Common; in grasslands. *RNMK 2127,* Manikkunnumala.

Ischaemum timorense Kunth, Rev. Gram. 1: 369. 1830; Hook. f., Fl. Brit. India 7136. 1896; Fischer in Gamble, Fl. Pres. Madras 1722(1193). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 185. 1960; Vajr., Fl. Palghat Dist. 580. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 164. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 518. 1996; Sivar. & P. Mathew, Fl. Nilambur 811. 1997; Sur, J. Econ. Tax. Bot. 25: 432. 2001; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 579. 2005.

Tufted annuals; culms 20-50 cm tall; nodes bearded. Leaves 4-8 x 0.4-0.7 cm, lanceolate, narrowed to the base, glabrous; ligule membranous. Racemes

2-3 cm long; spikelets similar, 3.5-4 x 1-2 mm; lower glume ovate, broaden below, bicuspidate at apex, densely hairy; upper glume aristate, thickly hairy; first lemma 1-nerved, hyaline; second lemma cleft above the middle, awned in the sinus. pedicelled spikelets smaller.
Flowering & Fruiting: September-December.
Distribution: Indo-Malesia. Occasional; in grasslands. *RNMK 2242*, Pookodu.

Ischaemum wayanadense Ravi, Mohanan & Shaju, Bot. Bull. Acad. Sin. 42: 223. 2001.

Perennials; culms tufted, 30-40 cm high; nodes glabrous. Leaves 3-12 x 0.2-0.8 cm, lanceolate, rounded at base, shortly petiolate, glabrous; ligule membranous. Racemes 3-5 cm long, terminal and axillary; sessile spikelets 4-5 mm long; lower glume elliptic; apex winged on one side; upper glume acute; lower floret male; first lemma hyaline, 3-nerved; second lemma 2-cleft; awned; pedicelled spikelets 4-5 mm long; lower glume flat, winged on one side.
Flowering & Fruiting: Decemer-February.
Distribution: Endemic to southern Western Ghats (Kerala). Occasional; in bunds of abandoned paddy fields. *RNMK 1783,* Panamaram.

Ischaemum zeylanicolum (Hack.) Bor, Grass. Burma, Ceylon, India & Pakistan 186. 1960; V.S. Ramach. & V.J. Nair, Fl. Cannanore 545. 1988; Ansari, Fl. Kasaragod Div. 468.1985; Sreek. & V.J. Nair, Fl. Kerala Grasses 169. 1991; Sur, J. Econ. Tax. Bot. 25: 434. 2001; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 864. 2009. *Ischaemum timorense* Kunth var. *zeylanicolum* Hack. in A. & C. DC., Monogr. Phan. 6: 230. 1889; Hook. f., Fl. Brit. India 7: 136. 1896.

Annuals or perennials; culms 30-100 cm high; nodes glabrous. Leaves 5-10 x 8-10 cm, elliptic, petiolate, narrowed to the base, glabrous; sheath keeled, villous at mouth; ligule membranous. Racemes 4-6 cm long; joints with tooth-like projections inside, hairy; sessile spikelets 4.5 x 2-3 mm; lower glume bicuspidate at apex, 9-nerved; upper glume aristate, 5-nerved; first lemma oblong; stamens 3; awn 8-9 mm long; palea 2-keeled; pedicelled spikelets similar, smaller.
Flowering & Fruiting: October-February.
Distribution: South India and Sri Lanka. Common; in grasslands. *RNMK 2165,* Chembra.

JANSENELLA N. L. Bor
Kew Bull. 10: 96. 1955.

Jansenella griffithiana (C. Muell.) Bor, Kew Bull. 1955: 98. 1955; Manilal, Fl. Silent Valley 357. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore Dist. 546. 1988; Vajr., Fl. Palghat Dist. 580. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 348. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 518. 1996; Mohanan & Sivad., Fl. Agasthyamala 830. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 579. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 865.

2009. *Danthonia griffithiana* C. Muell., Bot. 2. 14. 347. 1856. *Arundinella avenacea* Munro ex Thw., Enum. Pl. Zeyl. 362. 1864; Hook. f., Fl. Brit. India 7: 69. 1896; Fischer in Gamble, Fl. Pres. Madras 1801(1246). 1934.

Tufted annuals; culms 7-30 cm high, rooting from the lower nodes; nodes glabrous. Leaves 3-7 x 0.5-0.7 cm, lanceolate. Panicles 2-3 cm long, conjected; rachis and branches hairy; spikelets similar, densely packed, 5-7 mm long; lower glume lanceolate, keeled, 3-nerved, keel ciliate; upper glume acuminate, 5-nerved; florets 2; lower empty; upper bisexual; first lemma elliptic, acute cuspidate, 3-nerved; palea oblong, obtuse; second lemma oblong, densely ciliate towards the bifid apex, awned in the sinus; awn 8-9 mm long; palea oblanceolate, hairy at apex, 2-keeled; stamens 3; ovary elliptic; styles 2, free; stigmas plumose.

Flowering & Fruiting: October-December.

Distribution: Indian and Sri Lanka. Common; in grasslands. *RNMK 1078,* Sughandhagiri; *RNMK 2123*, Banasuramala; RNMK *1292*, Chembra.

LEERSIA Swartz

Prodr. 21. 1788, *typ. cons.*

Leersia hexandra Sw., Prodr. 21. 1788; Hook. f., Fl. Brit. India 7: 94. 1896; Fischer in Gamble, Fl. Pres. Madras 1845(1277). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 599. 1960; Ansari, Fl. Kasaragod Div. 468. 1985; Joseph, Aquatic Angiosp. Malabar 485. 1991; Sreek. & V.J. Nair, Fl. Kerala Grasses 430. 1991; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 580. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 866. 2009.

Perennials; culms trailing, erect or geniculate, slender, 30-100 cm high; nodes hairy. Leaves 5-15 x 0.3-1 cm, lanceolate, glabrous; sheath keeled, glabrous; ligule membranous. Panicle 5-10 x 3-4 cm, terminal, effuse; branches angled, glabrous; spikelets all similar, few to many, compressed, ca. 4 x 1.5 mm, oblong; pedicelled; glumes absent; florets one; lemma obovate, laterally compressed, 5-nerved, keeled; keel ciliate; palea oblong, laterally compressed, 3-nerved, keeled; stamens 6, free; ovary ellipsoid; styles 2, free.

Flowering & Fruiting: August-February.

Distribution: Pantropical. Occasional; in moist deciduous forests. *RNMK 1540,* Muthanga

LEPTOCHLOA P. Beauvisage

Ess. Agrostogr. t. 15. f. 1. 71. 1812.

Leptochloa uniflora Hochst. ex A. Rich., Tent. Fl. Abyss. 2: 409. 1851; Hook. f., Fl. Brit. India 7: 297. 1896; Fischer in Gamble, Fl. Pres. Madras 1820(1260). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 517. 1960; Sreek. & V.J. Nair, Fl. Kerala Grasses 396. 1991.

Annuals; culms creeping or geniculate, rooting from lower nodes, glabrous. Leaves 6-7 x 1.5-2 cm, ovate, acute, cordate at base, glabrous; sheath rounded, glabrous; ligule a fimbriate membrane. Panicle 25-30 cm long, with

40-50 racemes scattered along a central axis; rachis trigonous, scabrid; spikelets ca. 2.5 mm long, similar, lanceolate; glumes similar, lanceolate, 1-nerved, glabrous; floret one; lemma 3-nerved, nerves hairy; palea linear-oblong; stamens 3, free; long; ovary ovoid; styles 2; stigma plumose.
Flowering & Fruiting: October-January.
Distribution: India, Sri Lanka and Tropical Africa. Occasional; in bunds of paddy fields. *RNMK 1266*, Manivayal.

MNESITHEA Kunth
Révis. Gramin. 1: 153. 1830.

Mnesithea laevis (Retz.) Kunth, Rev. Gram. 1: 154. 1829; Fischer in Gamble, Fl. Pres. Madras 1761(1220). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 344. 1960; Sreek. & V.J. Nair, Fl. Kerala Grasses 175. 1991. *Rottboellia laevis* Retz., Obs. Bot. 3: 11. 1783. *Rottboellia perforata* Roxb., Pl. Corom. 2: 43, t. 182. 1798; Hook. f., Fl. Brit. India 7: 158. 1896.

Perennials; culms 20-150 cm tall, rhizomatous; nodes glabrous. Leaves oblong-lanceolate, 2-50 x 0.2-0.8 cm, flat, blunt or shortly acute at apex; spikes terminal and axillary, 3-20 cm long, ending with narrow tails of almost berren spikelets; joints 4-6 mm long, hollow, with a pair of sessile spikelets at each node; spikelets all sessile, awnless, sunken in cavities of rachis; stamens 3; ovary oblanceolate.
Flowering & Fruiting: August-January.
Distribution: Afghanistan to Malesia through India. Occasional; in grassy slopes. *RNMK 1479,* Periya.

OCHLANDRA Thwaites
Enum. Pl. Zeyl. 376. 1864.

Woody shrubs. Culms erect, internode rather long, thin walled. Leaves many-veined, margins cartilaginous; sheaths fringed. Inflorescence terminating leafy branches; spikelets verticelled, sterile and fertile, 1- flowered; glumes 2-5, mucronate; paleas membranous, not keeled. Lodicules many; stamens 6-120, anthers mucronate; ovary narrow; style long; stigmas 4-6. Grain large, ovoid, long beaked. Pericarp very thick, fleshy.

1. Spikelets up to 3 cm long; filaments free 2
1. Spikelets more than 5 cm long; filaments united ..... **O. travancorica**
2. Spikelets glabrous ..... **O. scriptoria**
2. Spikelets hirsute ..... **O. beddomei**

Ochlandra beddomei Gamble, Ann. Roy. Bot. Gard. (Calcutta) 7: 124. t. 110. 1896; Hook. f., Fl. Brit. India 7: 419. 1899; Fischer in Gamble, Fl. Pres. Madras 1863(1289). 1934; Sivar. & P. Mathew, Fl. Nilambur 819. 1997; Seethalakshmi & Muktesh, Bamboos India 178. 1998.

Large shrubs. Culm-sheaths attenuate into a needle like blade; mouth of sheaths with a rounded bristly auricle decurrent on either side. Leaves 15-25

cm long. Spikelets covered with scattered, stiff, bulbous-based, spreading brown hairs; glume ca. 1.5 cm long; lemmas ca. 3 cm long.
Distribution: Endemic to southern Western Ghats. Rare; in evergreen forests. *RNMK 1560,* Thariodu.

Ochlandra scriptoria (Dennst.) Fischer in Gamble, Fl. Pres. Madras 1863(1289). 1934; V.S. Ramach. & V.J. Nair, Fl. Cannanore 546. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 519. 1996; Seethalakshmi & Muktesh, Bamboos India 182. 1998; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 581. 2005. *Bambusa scriptoria* Dennst., Schluss. Hort. Malab. 31. 1818. *Ochlandra rheedei* (Kunth) Benth. & Hook.f. ex Gamble, Ann. Roy. Bot. Gard. (Calcutta) 7: 121, t.107. 1896; Hook. f., Fl. Brit. India 7: 418. 1896. *Bheesha rheedei* Kunth, Enum. Pl. 1: 434. 1833. 'rheedii'.

Large woody shrubs; culms erect, 7-10 m tall, 2-2.5 cm across; culm sheaths thin, ligule trigonous, auricled at base, hairy inside. Leaves linear-lanceolate, 13-15 x 1-1.5 cm; sheath ciliate along margins; ligule with few bristles; spikelets 2-2.5 cm long; fertile glume mucronate; stamens about 16; lodicules 6-8, linear-oblong.
Flowering & Fruiting: July-February.
Distribution: Endemic to southern Western Ghats. Occasional; along banks of river. *RNMK 3587,* Pookodu.

Ochlandra travancorica (Bedd.) Benth. ex Gamble, Ann. Roy. Bot. Gard. (Calcutta) 7: 125. t.111. 1896 & Hook. f., Fl. Brit. India 7: 419. 1896; Fischer in Gamble, Fl. Pres. Madras 1863(1289). 1934; Sivar. & P. Mathew, Fl. Nilambur 820. 1997; Seethalakshmi & Muktesh, Bamboos India 191. 1998; Mohanan & Sivad., Fl. Agasthyamala 831. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 580. 2005. *Bheesha travancorica* Bedd., Fl. Sylv. t.324. 1891 ; Nicols., Suresh & Manilal, An interpr. Hort. Malab. 311. 1988. *Ochlandra travancorica* Benth. ex Gamble var. *hirsuta* Gamble, Ann. Roy. Bot. Gard. (Calcutta) 7: 126. 1896 & Gamble, Fl. Pres. Madras 1863(1290). 1934; Seethalakshmi & Muktesh, Bamboos India 196. 1998. *Ochlandra sivagiriana* (Gamble) Camus, Les Bambusees 181. 1913; Seethalakshmi & Muktesh, Bamboos India 188. 1998. *Ochlandra soderstromiana* Muktesh & Stephen, Rheedea 9: 33. 1999. *Nola-ily* Rheede, Hort. Malab. 5: 119. 1685.

Tall reed-like grasses; rootstock rhizomatous, branched; culms 4-5 m tall, densely clumped, hollow, covered with culm sheaths; culm sheaths with small limbs. Leaves scattered, 20-40 x 5-10 cm, oblong-lanceolate, base truncate, or cuneate, glabrous; sheaths tubular, mouth with stiff bristles; ligule short. Panicles large, spicate; spikelets in verticils, 3-9 together, sessile, 5-6 cm long; glumes 2-5, unequal, 4-5 cm long, lanceolate, mucronate, smooth; florets one, bisexual; lemmas ca. 5 cm long, elliptic-oblong, muticous; palea membranous, stamens 20-40, filaments monadelphous; style long; stigma 4-6; fruit ovoid, 2-3 x 1.2-1.5 cm, beaked, smooth.

Flowering & Fruiting: November-May.
Distribution: Endemic to southern Western Ghats. Occasional; in evergreen forests. *RNMK 1576,* Chooralmala.

OPLISMENUS Palisot de Beauvois
Fl. Oware 2: 14, 1809, *nom. cons.*

Annuals. Culms creeping or trailing, rooting from lower nodes, nodes glabrous. Leaves lanceolate, cuneate at base. Sheath round, ciliate along one margin; ligule membranous. Racemes few, arranged on an elongated axis, spikelets lanceolate, similar, glabrous; lower glume ovate-lanceolate, awned or aristate; upper glume ovate, 5-7-nerved; florets 2; lower empty, upper bisexual; first lemma lanceolate; second lemma lanceolate, 3-nerved, awnless; palea lanceolate, 2-nerved, hyaline; stamens 3; ovary ellipsoid; styles 2, stigmas plumose.

1. Awns pale yellow; lower lemma aristate ..... **O. burmannii**
1. Awns purplish; lower lemma acute, not aristate ..... **O. compositus**

Oplismenus burmannii (Retz.) P. Beauv., Ess. Agrost. 54. 168. 1812; Hook. f., Fl. Brit. India 7: 68. 1896; Fischer in Gamble, Fl. Pres. Madras 1778(1232). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 256. 1960; Manilal & Sivar., Fl. Calicut 341. 1982; Ansari, Fl. Kasaragod Div. 470. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 547. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 256. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 519. 1996; Sivar. & P. Mathew, Fl. Nilambur 840. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 581. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 867. 2009. *Panicum burmannii* Retz., Obs. Bot. 3: 10. 1783.

Annuals; culms 30-40 cm long, nodes sparsely hairy. Leaves 5-6 x 1.3-1.5 cm, elliptic, acuminate. Inflorescence 7-10 cm long; rachis triquetrous, densely villous; spikelets 2-2.5 mm long, elliptic; pedicels bristly; lower glume awned; upper glume scabrid; anthers pale yellow.
Flowering & Fruiting: September-November.
Distribution: Pantropical. Occasional; in moist deciduous forests. *RNMK 3518*, Muthanga.

Oplismenus compositus (L.) P. Beauv., Ess. Agrost. 54. 168. 1812; Hook. f., Fl. Brit. India 7: 66. 1896; Fischer in Gamble, Fl. Pres. Madras 1778(1231). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 317. 1960; Manilal & Sivar., Fl. Calicut 341. 1982; Ansari, Fl. Kasaragod Div. 470. 1985; Manilal, Fl. Silent Valley 358. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore. 547. 1988; Vajr., Fl. Palghat Dist. 581. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 257. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 520. 1996; Sivar. & P. Mathew, Fl. Nilambur 841. 1997; Mohanan & Sivad., Fl. Agasthyamala 832. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 581. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 867.2009. *Panicum compositum* L., Sp. Pl. 57.1753.

Annuals; culms 20-70 cm tall, erect or trailing, rooting from lower nodes. Leaves 8-16 x 1-2.5 cm, elliptic, base cuneate, covered with bulbous based hairs; sheath rounded; ligule a fimbriate membrane. Panicle 15-25 cm long; racemes 5-10, 4-6 cm long; rachis triquetrous; spikelets ca. 4 mm long; lower glume awned; awn ca. 4 mm long; upper glume 7-nerved, awnless; first lemma 9-11-nerved; awnless; palea oblong; second lemma lanceolate, 3-nerved; palea hyaline; stigma plumose.

Flowering & Fruiting: Throughout the year.

Distribution: Pantropical. Common; along hill slopes. *RNMK 2272,* Manikkunnumala.

ORYZA Linnaeus

Sp. Pl. 333. 1753.

Erect annuals; nodes glabrous. Leaves lanceolate or linear-lanceolate, narrowed to the base, glabrous; sheath keeled, glabrous; ligule membranous. Inflorescence a panicle. Spikelets similar, oblong, pedicelled, one-flowered; glumes much smaller than the lemmas; lemma broadly ovate, strongly keeled, laterally compressed and 5-nerved; palea oblong, 3-nerved, margin hyaline; stamens 6, free; ovary oblong; styles 2, free; stigmas plumose.

1. Panicles with spreading branches; lemmas awned..... **O. rufipogon**
1. Panicles without spreading branches; lemmas awnless...**O. meyeriana** ssp. **granulate**

Oryza meyeriana (Zoll. & Mor. ex Steud.) Baill. ssp. **granulata** (Nees & Arn. ex Watt) Tateoka, Bot. Mag. (Tokyo) 75: 460. 1962; Sreek. & V.J. Nair, Fl. Kerala Grasses 431. 1991; Mohanan & Sivad., Fl. Agasthyamala 833. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 582. 2005. *Oryza granulata* Nees & Arn. ex Watt, Dic. Econ. Prod. Ind. 5:500.1891; Hook. f., Fl. Brit. India 7:93.1896; Bor, Grass. Burma, Ceylon, India & Pakistan 604. 1960; Sivar. & P. Mathew, Fl. Nilambur 829. 1997. *Oryza meyeriana* sensu Fischer in Gamble, Fl. Pres. Madras 1845(1276). 1934, non Baill. 1894.

Perennials; culms 40-90 cm high, loosely tufted or solitary, erect. Leaves 10-25 x 1-2 cm, lanceolate, glabrous; sheath with long hairs at mouth; ligule 1-3 mm long, membranous. Panicle 5-10 cm long, scarcely branched; branches angled, smooth; spikelets few, 5-6 x 2-2.5 mm; glumes similar, reduced to very minute scales; lemma broadly ovate, granulate crustaceous; palea oblong, 3-nerved, margins hyaline.

Flowering & Fruiting: July-February.

Distribution: Indo-Malesia. Occasional; in water-logged areas in moist deciduous forests. *RNMK 2692*, Tholpetty.

Oryza rufipogon Griff., Notul. Pl. Asiat. 3: 5. 1851; Vajr., Fl. Palghat Dist. 582. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 432. 1991; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 869. 2009.

Annuals; culms 40-80 cm high, erect, loosely tufted. Leaves 15-35 x 0.3-0.8 cm, narrowed to the base; ligule 0.8-1.5 cm long, acuminate. Panicle 5-15 cm long; branches scabrous; spikelets ca. 7 x 2.5 mm; lower glume ovate, acute; upper glume keeled; keel scabrous; lemma obtuse, 3-5-nerved, awned; awn 3-4 cm long; palea crustaceous, awnless, hirtus; stigma deep pink.
Flowering & Fruiting: September-March.
Distribution: India, Sri Lanka and tropical Australia. Rare; in moist deciduous forests. *RNMK 1773,* Muthanga.

OTTOCHLOA Dandy
J. Bot. 69: 54. 1931.

Ottochloa nodosa (Kunth) Dandy, J. Bot. 69: 55. 1931; Fischer in Gamble, Fl. Pres. Madras 1778(1232). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 560. 1960; Sreek. & V.J. Nair, Fl. Kerala Grasses 258. 1991; Sivar. & P. Mathew, Fl. Nilambur 841. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 870. 2009. *Panicum nodosum* Kunth, Enum. Pl. 1: 97. 1833; Hook. f., Fl. Brit. India 7: 43. 1896.

Annuals or perennials, rooting from lower nodes; nodes glabrous; culms 30-60 cm high. Leaves 12-13 x 1.3-1.5 cm, lanceolate, cordate and oblique at base, with short bristles along the nerves below; sheath keeled, ciliate along the margins; ligule membranous. Panicle 10-25 cm long, with bifarious branches; spikelets ca. 3.5 x 1 mm, lanceolate, glabrous; lower glume lanceolate, 5-nerved. upper glume similar, 7-nerved; florets 2; lower barren, upper bisexual; first lemma ovate-lanceolate, 4-9-nerved, epaleate; second lemma elliptic, crustaceous, 3-nerved, margins incurved; palea ovate; stamens 3; ovary ellipsoid; styles 2; stigma purple.
Flowering & Fruiting: July-December.
Distribution: India, Sri Lanka and south-east Asia. Common; in open marshy areas. *RNMK 3237,* Palavayal.

OXYTENANTHERA Munro
Trans. Linn. Soc. London 26: 126. 1868.

Oxytenanthera monadelpha (Thw.) Alston in Trimen, Handb. Fl. Ceylon 6 (Suppl.) 342. 1931; Fischer in Gamble, Fl. Pres. Madras 1861(1288). 1934. *Dendrocalamus monadelphus* Thw., Enum. Pl. Zeyl. 376. 1864. *Pseudoxytenanthera monadelpha* (Thw.) Sodestrom & Ellis, Smiths. Contrib. Bot. 72: 52. 1988; Seethalakshmi & Muktesh, Bamboos India 224. 1998. *Oxytenanthera thwaitesii* Munro, Trans. Linn. Soc. London 26: 129. 1868; Hook. f., Fl. Brit. India 7: 402. 1896.

Culms 5-10 m tall, scandent, smooth; culm sheath glabrous. Culm sheath blade 5-10 x 0.5-1.5 cm, glabrous; base rounded with thick ring of callus and strong bristles. Leaves 20-40 x 2-5 cm, petiolate; sheath glabrous; spikelets 0.8-1.2 cm long, lanceolate, compressed; glumes 2; lower larger, acute, glabrous; florets 3; lower lemmas sterile, lanceolate, epaleate; upper most one

fertile, lanceolate, glabrous; palea oblong, 2-keeled; keels glabrous; staminal tube long.
Flowering & Fruiting: February-January.
Distribution: South India and Sri Lanka. Occasional; in evergreen forests. *RNMK 1270,* Vythiri.

PANICUM Linnaeus
Sp. Pl. 55. 1753.

Annuals or perennials. Culms erect or decumbent; nodes glabrous or hairy. Leaves ovate-lanceolate, usually rounded at base; sheath rounded, glabrous. Panicle lax, effuse or conjested. Spikelets similar, solitary, pedicelled; glumes dissimilar; lower smaller, 1-5-nerved; upper glume more than 3/4 of spikelet; florets 2; lower empty or male; upper bisexual; first lemma ovate, acute, 5-7-nerved; palea oblong, 2-nerved; second lemma ovate-oblong; obtuse, smooth or rugose; palea oblong, 2-nerved; stamens 3, free; ovary ellipsoid, glabrous; styles 2, free; stigmas plumose.

1. Leaves broadly ovate, acuminate, ampexicaul; spikelets slightly gibbous . **P. brevifolium**
1. Leaves narrowly elliptic, lanceolate, rounded or shallowly cordate 2
2. Lower glume less than half the length of the spikelet..... 3
2. Lower glume more than half the length of the spikelets 6
3. Lower glume longer than broad; spikelets widely gaping..... **P. trypheron**
3. Lower glume broader than long; spikelets not gaping..... 4
4. Lower glume orbicular, obtuse..... 5
4. Lower glume broadly ovate, acute..... **P. sumatrense**
5. Culms tough, rhizomatous; spikelets opening at maturity ..... **P. repens**
5. Culms spongy, not rhizomatous; spikelets opening at maturity ..... .**P. paludosum**
6. Spikelets less than 2 mm long; upper glume 5-nerved..... **P. humidorum**
6. Spikelets more than 3 mm long; upper glume not 5-nerved 7
7. Leaves ovate-lanceolate, cordate at base..... **P. notatum**
7. Leaves linear-lanceolate, narrow or rounded at base.....**P. antidotale**

Panicum antidotale Retz., Obs. Bot. 4: 17. 1786; Hook. f., Fl. Brit. India 7: 2. 1896; Fischer in Gamble, Fl. Pres. Madras 1783(1235). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 322. 1960; Ansari, Fl. Kasaragod Div. 472. 1985; Sreek. & V.J. Nair, Fl. Kerala Grasses 260. 1991; Sivar. & P. Mathew, Fl. Nilambur 842. 1997.

Perennials; culms 50-100 cm high, robust. Leaves 15-35 x 0.5-1 cm, linear, ciliate along the margin, tomentose on upper surface, base rounded; sheath rounded, sparsely hairy, ligule a row of hairs. Panicle 15-30 cm long; branches scabrid; spikelets ca. 3 x 2 mm, in groups of three; lower glume broadly ovate, 5-nerved; upper glume 9-nerved; first lemma ovate, acute, 7-nerved, palea 2-nerved; second lemma ovate, coriaceous, shiny; palea margins folded.
Flowering & Fruiting: May-December.
Distribution: India and Australia. Occasional; in grassy slopes. *RNMK 2241,* Pookodu.

Panicum brevifolium L., Sp. Pl. 59. 1753; Fischer in Gamble, Fl. Pres. Madras 1783(1235). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 364. 1960; Manilal & Sivar., Fl. Calicut 349. 1982; V.S. Ramach. & V.J. Nair, Fl. Cannanore 548. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 263. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 521. 1996; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 872. 2009. *Panicum ovalifolium* Poir. in Lamk., Encycl. Suppl. 4: 279. 1816; Hook. f., Fl. Brit. India 7: 44. 1896.

Annuals; culms 20-40 cm tall, erect or decumbent; Leaves 5-6 x 2.5-3 cm, bulbous based hairy along margins; sheath keeled, glabrous, ciliate along one margin; ligule a membrane. Panicle effuse, 10-15 cm high; branches filiform; spikelets 1.5-2 mm long, elliptic; lower glume lanceolate, 1-nerved; upper glume ovate, 3-nerved; lower floret male, upper bisexual; first lemma 5-nerved, acute, paleate; second lemma 3-nerved; palea similar, flat, 2-nerved; stamens 3.
Flowering & Fruiting: October-January.
Distribution: Paleotropics. Common; along the margins of forests. *RNMK 3148,* Sughandhagiri.

Panicum humidorum Buch.-Ham. ex Hook.f., Fl. Brit. India 7: 53. 1896; Bor, Grass. Burma, Ceylon, India & Pakistan 326. 1960; V.S. Ramach. & V.J. Nair, Fl. Cannanore 548. 1988; V.S. Ramach. *et al.*, J. Econ. Tax. Bot. 5: 1009. 1984; Sreek. & V.J. Nair, Fl. Kerala Grasses 265. 1991.

Perennials; culms 30-150 cm tall; nodes glabrous. Leaves 5-20 x 0.4-1 cm, linear-lanceolate, base rounded or shallowly cordate; panicles 10-40 x 2-20 cm, branches angular; spikelets ovate, acute, green; lower glume ovate-lanceolate, 3 nerved; upper glume 5 nerved, glabrous; palea absent.
Flowering & Fruiting: February-March.
Distribution: India and Myanmar. Occasional; along stremsides. *RNMK 2157,* Thirunelly.

Panicum notatum Retz., Obs. Bot. 4: 18. 1786; Bor, Grass. Burma, Ceylon, India & Pakistan 701. 1960; Ansari, Fl. Kasaragod Div. 472. 1985; Sreek. & V.J. Nair, Fl. Kerala Grasses 267. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 521. 1996; Sivar. & P. Mathew, Fl. Nilambur 842. 1997; Mohanan & Sivad., Fl. Agasthyamala 835. 2002; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 873. 2009. *Panicum montanum* Roxb., Fl. Ind. 1: 315. 1820; Hook. f., Fl. Brit. India 7: 53. 1896; Fischer in Gamble, Fl. Pres. Madras 1783(1235). 1934; Vajr., Fl. Palghat Dist. 583. 1990.

Perennials; culms 80-150 cm high; nodes glabrous. Leaves 5-25 x 1-3.5 cm, ovate-oblong, cordate, ciliate; margin of sheath ciliate; ligule a membrane. Panicle 20-30 x 5-20 cm, lax; branches smooth; spikelets 2.5-3 x 1-2 mm, ellipsoid, glabrous; glumes almost equal, ovate, 3-nerved; first lemma similar to upper glume, epaleate; second lemma coriaceous, shining; palea similar, flat, 2- nerved.
Flowering & Fruiting: September-October.
Distribution: South and south-east Asia. Common along the margins of forests. *RNMK 1037,* Vythri.

Panicum paludosum Roxb., Fl. Ind. 1: 310. 1820; Fischer in Gamble, Fl. Pres. Madras 1783(1235). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 329. 1960; Manilal & Sivar., Fl. Calicut 349. 1982; Ansari, Fl. Kasaragod Div. 472. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 548. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 268. 1991; Joseph, Aquatic Angiosp. Malabar 496. 1991; Sivar. & P. Mathew, Fl. Nilambur 843. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 873. 2009. *Panicum proliferum* sensu Hook.f., Fl. Brit. India 7: 50. 1896, non Lamk. 1797.

Perennials, often aquatic; culms 30-70 cm long; rooting at the lower nodes. Leaves linear, 2-20 x 0.3-1 cm, acute, subcordate at base, flat, glabrous; ligule a ring of white hairs. Panicles ovate, 6-25 x 4-15; pedicels angular; spikelets elliptic-lanceolate, 3-4 mm long, parallel to the branches, greenish.

Flowering & Fruiting: March-December.

Distribution: Paleotropics. Occasional; in marshes and still water bodies in moist deciduous forests. *RNMK 4329,* Tholpetty; *RNMK 2586*, Muthanga.

Panicum repens L., Sp. Pl. (ed. 2) 87. 1762; Hook. f., Fl. Brit. India 7: 49. 1896; Fischer in Gamble, Fl. Pres. Madras 1783(1235). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 330. 1960; Manilal & Sivar., Fl. Calicut 349. 1982; Ansari, Fl. Kasaragod Div. 473. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 549. 1988; Joseph, Aquatic Angiosp. Malabar 494. 1991; Sreek. & V.J. Nair, Fl. Kerala Grasses 271. 1991; Mohanan & Sivad., Fl. Agasthyamala 835. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 582. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 874. 2009.

Perennials with branching rhizome; culms 10-30 cm high, erect; nodes glabrous. Leaves bifarious, 5-20 x 0.5-0.8 cm, linear-oblong, hairy below; sheath rounded, ciliate along margins. Panicle 5-20 x 5-15 cm, effuse; branches and pedicels scabrid; spikelets ca. 3 x 1 mm, lanceolate; lower glume broadly ovate, 5-nerved; upper glume lanceolate, 13-nerved; first lemma similar to upper glume, paleate, empty; second lemma ovate, concave; palea oblong.

Flowering & Fruiting: July-September.

Distribution: Tropics and sub-tropics of both hemispheres. Common; in abandoned paddy fields. *RNMK 1538,* Palavayal.

Panicum sumatrense Roth ex Roem. & Schult., Syst. Veg. 2: 434. 1817; Veldkamp *et al.,* Blumea 34: 82. 1989; Bor, Grass. Burma, Ceylon, India & Pakistan 701. 1960; Manilal, Fl. Silent Valley 359. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 549. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 272. 1991. *Panicum psilopodium* Trin., Gram. Panic. 217. 1826; Hook. f., Fl. Brit. India 7: 46. 1896; Fischer in Gamble, Fl. Pres. Madras 1782(1234). 1934; Manilal & Sivar., Fl. Calicut 349. 1982; Sivar. & P. Mathew, Fl. Nilambur 843. 1997. *Panicum psilopodium* Trin. var. *coloratum* Hook. f., Fl. Brit. India 7: 47. 1896; V.J. Nair *et al.*, J. Econ. Tax. Bot. 3: 271. 1982; Ansari, Fl. Kasaragod

Div. 472. 1985; Sreek. & V.J. Nair, Fl. Kerala Grasses 269. 1991. *Panicum miliare* sensu Hook.f., Fl. Brit. India 7: 46. 1896, non Lamk. 1791; Fischer in Gamble, Fl. Pres. Madras 1782(1234). 1934.

Annuals or perennials; culms 20-60 cm high; nodes glabrous. Leaves 25-30 x 1.3-1.5 cm, linear-lanceolate, base rounded, glabrous; ligule a fimbriate membrane. Panicle 25-30 cm long, contracted; spikelets ca. 3 x 1.5 mm, ellipsoid; lower glume broadly ovate, 3-nerved; upper glume ovate, 13-nerved; lower floret empty; first lemma similar to upper glume; palea hyaline; second lemma ovate, coriaceous; palea coriaceous, margins folded; stamens 3.
Flowering & Fruiting: May-June.
Distribution: Pantropical. Occasional; in marshy paddy fields. *RNMK 3148,* Panamaram.

Panicum trypheron Schult., Mant. 2: 244. 1824; Hook. f., Fl. Brit. India 7: 47. 1896; Fischer in Gamble, Fl. Pres. Madras 1783(1235). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 331. 1960; Vajr., Fl. Palghat Dist. 583. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 273. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 521. 1996; Sivar. & P. Mathew, Fl. Nilambur 844. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 875. 2009.

Tufted annuals, culms 20-70 cm tall, erect. Leaves 8-16 x 1-2.5 cm, lanceolate, yellowish when dry, covered with bulbous based hairs; ligule a fimbriate membrane. Panicle 15-25 cm long, lax, scabrid; spikelets ca. 4 mm long, ovoid; lower glume cuspidate; upper glume 7-nerved, awnless; lower floret empty; first lemma similar to upper glume; 9-11-nerved; awnless; palea oblong; second lemma 3-nerved; palea margins folded, hyaline.
Flowering & Fruiting: August-November.
Distribution: China, Indian subcontinent and south-east Asia. Occasional; along margins of evergreen forests.*RNMK 1937,* Talimala.

PASPALIDIUM Stapf.

Prain, Fl. Trop. Africa 9: 582 (1920).

Paspalidium flavidum (Retz.) A. Camus in Lecomte, Fl. Indo-Chine 7: 419. 1922; Fischer in Gamble, Fl. Pres. Madras 1774(1229). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 333. 1960; Manilal & Sivar., Fl. Calicut 343. 1982; V. S. Ramach. & V. J. Nair, Fl. Cannanore 549. 1988; Vajr., Fl. Palghat Dist. 583. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 278. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 521. 1996; Sivar. & P. Mathew, Fl. Nilambur 844. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 876. 2009. *Panicum flavidum* Retz., Obs. Bot. 4: 15. 1786; Hook. f., Fl. Brit. India 7: 28. 1896.

Annuals; culms 20-80 cm high; nodes glabrous. Leaves 5-25 x 0.5-0.8 cm, linear, glabrous; sheath rounded, glabrous; ligule a row of hairs. Racemes 3-10, distantly arranged on a central axis; each 1-1.5 cm long with two rows of spikelets; spikelet 2.5-3 x 2-3 mm; ovate, acute; lower glume orbicular, obtuse, 5-nerved; upper glume 7-nerved, acute, florets 2, lower empty or male;

upper bisexual; first lemma ovate, acute, 5-nerved; palea oblong, 2-keeled; second lemma ovate, acute, 5-nerved, crustaceous; palea oblong, 2-nerved.
Flowering & Fruiting: July-December.
Distribution: Tropical Asia. Common; along the bunds of paddy fields. *RNMK 2150,* Nadavayal.

PASPALUM Linnaeus
Syst. Nat. ed. 10, 2: 855. 1759.

Annuals or perennials; culms usually tufted, erect or decumbent. Leaves ovate, linear or lanceolate, base rounded or cordate; sheath keeled, glabrous or hairy; ligule membranous or obscure. Inflorescence of 2-15 racemes arranged digitately or scattered on a peduncle; rachis flat; spikelets in two rows on each raceme, broadly ovate, obtuse or acute, compressed; lower glume absent or much reduced; upper glume oblong or orbicular, 3-5- nerved, obtuse or acute; florets 2, lower empty, upper bisexual; fist lemma similar to upper glume, epaleate; second lemma broadly ovate or orbicular, acute or obtuse, flat with curved margins, coriaceous; palea similar, coriaceous; stamens 3, free; ovary oblong - obovoid, glabrous; styles 2, free; stigmas plumose.

1. Spikelets with a ciliate fringe from the margins of the upper glume 2
1. Spikelets without a ciliate fringe 3
2. Culms creeping; racemes usually 2. ..... **P. conjugatum**
2. Culms erect; racemes 3-8. ..... **P. dilatatum**
3. Plants densely covered with tubercle based hairs; leaves cordate; ligule obscure .....
..... **P. canarae** var. **fimbriatum**
3. Plants glabrous; leaves not cordate; ligule membranous 4
4. Culms creeping; spikelets acute, lower glume a minute scale ..... **P. distichum**
4. Culms erect; spikelets obtuse; lower glume absent 5
5. Glume and barren lemma puberulous ..... **P. longifolium**
5. Glume and lemmas glabrous ..... **scrobiculatum**

Paspalum canarae (Steud.) Veldk. var. **fimbriatum** (Bor) Veldk., Blumea 21: 72. 1973; V.S. Ramach. & V.J. Nair, Fl. Cannanore 550. 1988; V. S. Ramach. *et al.,* J. Econ. Tax. Bot. 1: 97. 1980; Sreek. & V.J. Nair, Fl. Kerala Grasses 283. 1991. *Paspalum compactum* sensu Hook. f. var. *fimbriatum* Bor, Grass. Burma Ceylon India Pakistan 336. 1960.

Annuals. Culms 10-30 cm long; nodes villous. Leaves oblong-elliptic, 1-5 x 0.2-1 cm, decurrent at base, tubercle based hairy. Racemes 3-16; rachis winged, hairy; spikelets ovate-acute, covered with dense hairs; lower glume absent; upper glume obovate, acute, 3-5 nerved.
Flowering & Fruiting: November-December.
Distribution: Endemic to southern Western Ghats. Common; in marshy areas. *RNMK 2279,* Karlad.

Paspalum conjugatum Berg., Act. Helv. Phys. Math. 7: 129. 1772; Hook. f., Fl. Brit. India 7: 11. 1896; Fischer in Gamble, Fl. Pres. Madras 1772(1228). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 336. 1960; Manilal & Sivar., Fl. Calicut 337. 1982; Ansari, Fl. Kasaragod Div. 474. 1985; Manilal, Fl. Silent Valley 359. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 550. 1988; Vajr., Fl. Palghat Dist. 584. 1990; Joseph, Aquatic Angiosp. Malabar 503. 1991; Sreek. & V.J. Nair, Fl. Kerala Grasses 285. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 522. 1996; Sivar. & P. Mathew, Fl. Nilambur 845. 1997; Mohanan & Sivad., Fl. Agasthyamala 837. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 583.2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 878.2009.

Annuals or perennials; culms 20-60 cm high, tufted; nodes glabrous. Leaves 5-12 x 0.5-1.2 cm, lanceolate, ciliate along the margins; sheath keeled, glabrous; ligule a membrane. Racemes 2, 10-12 cm long; sikelets 1.5-2 x 1-1.2 mm, broadly ovate, acute, in two rows along the raceme; upper glume 12-nerved; lower florets empty; first lemma similar to upper glume, ovate, epaleate, hairy along the margins; second lemma obtuse, 1-nerved, coriaceous; palea similar to lemma, 2-nerved; stamens 3.

Flowering & Fruiting: Throughout the year.

Distribution: Pantropical. Common; in moist shady places. *RNMK 3142,* Kurichiarmala.

Paspalum dilatatum Poir. in Lamk., Encycl. 5: 35. 1804; Fischer in Gamble, Fl. Pres. Madras 1772(1228). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 338. 1960; Sreek. & V.J. Nair, Fl. Kerala Grasses 285. 1991.

Perennials; culms 30-70 cm high; nodes glabrous. Leaves lanceolate, 5-25 x 0.5-1 cm, acuminate, rounded or cordate at base; sheaths keeled. Racemes 3-8, alternate, villous at the nodes; spikelets broadly ovate, greenish yellow; lower glume absent; upper glume ovate, 7-nerved, ciliate along margins; second lemma orbicular; palea 2-keeled, margins inflexed and auriculate at base; stigma violet.

Flowering & Fruiting: June-August.

Distribution: Native of south America. Occasional; in tea plantations. *RNMK 0181,* Meppady.

Paspalum distichum L., Syst. Nat. (ed. 10) 2: 855. 1759; Hook. f., Fl. Brit. India 7: 12. 1896; Bor, Grass. Burma, Ceylon, India & Pakistan 338. 1960; Ansari, Fl. Kasaragod Div. 474. 1985; Sreek. & V.J. Nair, Fl. Kerala Grasses 286. 1991; Joseph, Aquatic Angiosp. Malabar 504. 1991; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 583. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 878. 2009. *Paspalum paspaloides* (Michx.) Scribn., Mem. Torr. Bot. Club. 5: 29. 1894; Manilal & Sivar., Fl. Calicut 337. 1982. *Digitaria paspaloides* Michx., Fl. Borr. Amer. 1: 46. 1803.

Annuals or perennials; culms creeping or rarely erect. Leaves 1-5 x 0.2-0.5 cm, long hairy below; sheath keeled. Racemes 2, 1-3 cm long; spikelets ca. 2.5 x 1 mm, oblong, acute, in two rows; lower glume reduced into a scale; upper

glume oblong, acute; lower floret empty; first lemma 3-nerved, acute, epaleate; second lemma oblong; palea similar; margins incurved.
Flowering & Fruiting: August-February.
Distribution: Tropics and subtropics of the world. Common; along margins of paddy fields. *RNMK 3147,* Manivayal

Paspalum longifolium Roxb., Fl. Ind. 1: 283. 1820; Fischer in Gamble, Fl. Pres. Madras 1772(1227). 1934; Mohanan & Sivad., Fl. Agasthyamala 837. 2002. *Paspalum scrobiculatum* L. var. *longifolium* (Roxb.) Domin, Biblioth. Bot. 85: 287. 1915. *Paspalum scrobiculatum* sensu Hook.f., Fl. Brit. India 7: 11. 1896, p. p., non L. 1767.

Perennials; culm erect, 80-130 cm high. Leaves 20-30 x 0.5-0.7 cm, linear-lanceolate. Inflorescence racemose spikes, 5-9, arranged alternately on the peduncle; racemes 4-7 cm long; spikelets 0.5-1 mm long, suborbicular, arranged in 4 rows on the broad flat rachis; lower glume 0; upper ovate-orbicular, as large as spikelets; lemma dissimilar; lower floret empty; upper bisexual; stamens 3; styles 2.
Flowering & Fruiting: June-August.
Distribution: Tropical Asia and Australia. Occasional; along grassy slopes. *RNMK 3104,* Banasuramala.

Paspalum scrobiculatum L., Mant. Pl. 1: 29. 1767; Hook. f., Fl. Brit. India 7: 10. 1896; Fischer in Gamble, Fl. Pres. Madras 1772(1227). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 340. 1960; Manilal & Sivar., Fl. Calicut 337. 1982; Ansari, Fl. Kasaragod Div. 474. 1985; Manilal, Fl. Silent Valley 360. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 551. 1988; Vajr., Fl. Palghat Dist. 584. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 287. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 522. 1996; Sivar. & P. Mathew, Fl. Nilambur 845. 1997; Mohanan & Sivad., Fl. Agasthyamala 838. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 583. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 821. 2009. *Paspalum orbiculare* Forst., Fl. Ins. Aust. Prodr. 7. 1786; Fischer in Gamble, Fl. Pres. Madras 1772(1227). 1934.

Annuals; culms 30-50 cm high, tufted. Leaves 10-25 x 0.5-0.8 cm, lanceolate, glabrous; sheath keeled; ligule membranous. Racemes 3-5 together, 2-8 cm long; rachis flat, smooth; spikelets ca. 2.5 x 2 mm, obtuse; upper glume orbicular, 3-nerved; lower floret empty; first lemma similar to upper glume, epaleate; second lemma 3-nerved, crustaceous; palea ca. 1.5 x 1.5 mm, lower half expanded and incurved.
Flowering & Fruiting: Throughout the year.
Distribution: India and Sri Lanka. Common; along the bunds of paddy fields. *RNMK 2181,* Kottavayal.

PENNISETUM L.C. Richard ex Persoon
Syn. Pl. 1: 72. 1805.

Densely tufted perennials, erect; nodes glabrous. Leaves linear-lanceolate, acuminate, rounded at base; sheath keeled or rounded; ligule a row of hairs.

Inflorescence of a cylindrical raceme with densely packed spikelets; rachis angular or ribbed, not winged. Spikelets elliptic-lanceolate, surrounded by a ring of bristles; lower glume orbicular or ovate, without nerves; upper glume ovate, 3-5-nerved; florets 2; lower barren; upper bisexual; first lemma lanceolate, epaleate; second lemma elliptic-lanceolate, 3-6-nerved; palea lanceolate, 2-nerved; stamens 3, free; ovary elliptic, glabrous; styles 2, connate at base; stigmas 2, plumose.

1. Lemmas similar, lower ot 3-lobed; rachis without winged ribs .....**P. hohenackeri**
1. Lemmas dissimilar, lower of 3-lobed; rachis with prominently winged ribs 2
2. Spikelets pedicelled; bristles densely wooly plumose..... **P. pedicellatum**
2. Spikelets sessile; inner bristles plumose, but not woolly..... **P. polystachyon**

Pennisetum hohenackeri Hochst. ex Steud., Syn. Pl. Glum. 1: 102. 1854; Fischer in Gamble, Fl. Pres. Madras 1792(1241). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 344. 1960; V.S. Ramach. & V.J. Nair, Fl. Cannanore 551. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 289. 1991. *Pennisetum alopecuros* Nees ex Steud., Syn. Pl. Glum. 1:102.1854; Hook. f., Fl. Brit. India 7: 84. 1896.

Perennials; culms 30-100 cm high, erect. Leaves 10-70 x 0.7-0.8 cm, linear-lanceolate, prominently channelled, hairy above; sheath keeled; ligule a tuft of hairs. Raceme 10-20 cm long; rachis ribbed; bristles unequal, glabrous, 0.3-2 cm long; spikelets ca. 8 mm long, solitary in the involucre; lower glume orbicular, nerveless; upper glume ovate, obtuse, 3-nerved; lower floret empty; first lemma obtuse, 9-nerved; second lemma similar, 5-6-nerved; palea 2-nerved.

Flowering & Fruiting: March-April.

Distribution: Tropical Africa, Madagascar and west India, Pakistan. Occasional; along bunds of paddy fields and on river beds. *RNMK 1158,* Manivayal.

Pennisetum pedicellatum Trin., Mem. Acad. Sci. Petersb. ser. 6, 3: 184. 1834; Fischer in Gamble, Fl. Pres. Madras 1792. 1934; Hook. f., Fl. Brit. India 7:86. 1896; Bor, Grass. Burma, Ceylon, India & Pakistan 346. 1960; Vajr., Fl. Palghat Dist. 585. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 290. 1991; Sivar. & P. Mathew, Fl. Nilambur 846. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 880. 2009.

Annuals; culms 30-150 cm high; nodes glabrous. Leaves 5-25 x 0.3-1 cm, rounded at base, linear-lanceolate, acuminate. Panicles 5-15 cm long, white or purplish; rachis puberulous; pedicels villous; spikelets lanceolate, 4-6 mm long; lower glume ovate-lanceolate, 1-3 nerved, silky villous; upper glume 5 nerved; first lemma ovate, 3 lobed at apex.

Flowering & Fruiting: September-December.

Distribution: West Africa and India. Common; in grassy slopes. *RNMK 2113,* Sughandhagiri.

Pennisetum polystachyon (L.) Schult., Syst. Veg. 2: 146. 1824; Fischer in Gamble, Fl. Pres. Madras 1792(1241). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 346. t. 39. 1960; Manilal & Sivar., Fl. Calicut 340. 1982; Ansari, Fl. Kasaragod Div. 475. 1985; Manilal, Fl. Silent Valley 360. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 551. 1988; Vajr., Fl. Palghat Dist. 585. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 291. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 522. 1996; N. Mohanan & Sivad., Fl. Agasthyamala 838. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 584. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 880. 2009. *Panicum polystachyon* L., Syst. Nat. (ed. 10) 2:870.1759. *Pennisetum setosum* (Sw.) L.C. Rich. in Pers., Syn. Pl. 1:72. 1805; Hook.f., Fl. Brit. India 7:87.1896. *Cenchrus setosus* Sw., Prodr. 26.1788.

Densely tufted perennials; culms 50-200 cm high, stout, nodes thickened. Leaves 20-60 x 0.6-1.5 cm, linear, shallowly channelled, densely hairy. Raceme 10-20 cm long; rachis angular, glabrous; bristles hairy, equal; spikelets ca. 5 mm long, solitary in the involucre; lower glume minute; upper glume ovate, acute, 5-nerved, puberulus; lower floret barren; first lemma 3-nerved, puberulus, epaleate; second lemma 3-5-nerved, glabrous; palea 2-nerved.

Flowering & Fruiting: April-December.

Distribution: Paleotropics. Common; in open rocky slopes. *RNMK 1058,* Ambukuthimala.

PEROTIS Aiton

Hort. Kew. ed. 1, 1: 85. 1789.

Perotis indica (L.) O. Kuntze., Rev. Gen. Pl. 2: 787. 1891; Fischer in Gamble, Fl. Pres. Madras 1814(1256). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 611. 1960; Manilal & Sivar., Fl. Calicut 336. 1982; Ansari, Fl. Kasaragod Div. 475. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 552. 1988; Vajr., Fl. Palghat Dist. 585. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 434. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 523. 1996; Mohanan & Sivad., Fl. Agasthyamala 839. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 584. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 880. 2009. *Anthoxanthum indicum* L., Sp. Pl. 28. 1753. *Perotis latifolia* Ait., Hort. Kew (ed. 1) 1: 85. 1789; Hook. f., Fl. Brit. India 7: 98. 1796.

Tufted perennials; culms 10-30 cm long, creeping and ascending; nodes glabrous. Leaves 2-4 x 0.4-0.8 cm, ovate, acute, cordate at base, margin, coriaceous, ciliate; sheath rounded, glabrous; ligule a narrow membrane. Inflorescence a solitary, cylindrical raceme, 8-20 cm long; spikelets ca. 3 mm long, similar, pedicelled; glumes equal, lanceolate, 1-nerved, ciliate along the margins, awned; awn 8-9 mm long; floret one; lemma oblong, hyaline; palea lanceolate, 2-nerved; stamens 3, free; ovary oblong; styles 2, free; stigma plumose.

Flowering & Fruiting: Throughout the year.

Distribution: Indo-Malesia. Occasional; in moist deciduous forests. *RNMK 2727,* Muthanga.

POGONATHERUM P. Beauvois

Ess. Agrost. 56. 1812.

Slender annual or perennial erect herbs; culms branching. Leaves flat, narrow, suberect. Spikelets 2, one sessile, the other pedicelled, 1-2 flowered; callus bearded with fine hairs; glumes membranous; lower truncate, rounded on the back; upper usually longer, keeled, 2-fid with a long slender awn from the sinus; lemmas hyaline; lower usually absent from the pedicelled spikelet; upper 2-fid, with a slender awn; palea broad with bisexual flowers; lodicules 0; stamens 2, free, short. Grain oblong, free.

1. Lower floret male; upper floret with 2 stamens; awns 1-1.5 cm long..... **P. paniceum**
1. Lower floret empty; upper floret with 1 stamen; awns 2-3 cm long..... **P. crinitum**

Pogonatherum crinitum (Thunb.) Kunth, Enum. Pl. 1: 476. 1833; Hook. f., Fl. Brit. India 7: 141. 1896; Bor, Grass. Burma, Ceylon, India & Pakistan 2000. 1960; Sur, J. Econ. Tax. Bot. 6: 665. 1985; Ansari, Fl. Kasaragod Div. 476. 1985; Manilal, Fl. Silent Valley 360. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 176. 1991; Sivar. & P. Mathew, Fl. Nilambur 812. 1997; Mohanan & Sivad., Fl. Agasthyamala 840. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 584. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 884. 2009. *Andropogon crinitum* Thunb., Fl. Jap. 40. 1784. *Pogonatherum paniceum* auct. Non (Lamk.) Hack. 1906; Fischer in Gamble, Fl. Pres. Madras 1714(1188).

Tufted annuals; culms 20-30 cm high, erect; nodes glabrous. Leaves 4-5 x 0.3-0.4 cm, elliptic-lanceolate, acute at both ends, glabrous; sheath keeled, hairy at the mouth; ligule a fimbriate membrane. Raceme solitary, 2-3 cm long; rachis with long hairs; spikelets paired; one sessile and one pedicelled; sessile spikelets ca. 1.5 mm long; glumes awned; awn 2-3 mm long; florets 2; lower empty; upper bisexual; first lemma oblong, obtuse, epaleate; second lemma ovate, acuminate, awned; palea oblong, truncate at apex; stamen one; ovary elliptic; style 2, connate at base; stigmas 2, plumose.

Flowering & Fruiting: February-March.

Distribution: Indian subcontinent and Japan. Occasional; on rocky cuttings in evergreen forests. *RNMK 1830,* Vythiri Ghat.

Pogonatherum paniceum (Lamk.) Hack., Allg. Bot. Z. Syst. 12: 178. 1906; Fischer in Gamble, Fl. Pres. Madras 1714(1256). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 202. 1960; Sur, J. Econ. Tax. Bot. 6: 666. 1985; Manilal, Fl. Silent Valley 361. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 552. 1988; Vajr., Fl. Palghat Dist. 586. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 178. 1991; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 885. 2009. *Saccharum paniceum* Lamk., Encycl. 1: 595. 1785. *Pogonatherum saccharoideum* P. Beauv., Ess. Agrost. 176,177. 1812; Hook. f., Fl. Brit. India 7: 141. 1896.

Perennials; Culms 15-50 cm tall, tufted with a woody rootstock. Leaves 2-8 x 0.1-0.3 cm, linear-lanceolate. Racemes solitary, 1-4 cm long, yellowish;

joints densely ciliate along angles; sessile spikelets lanceolate, 2.5-3 mm long, awned; pedicelled spikelets lanceolate, awned; pedicels linear-turbinate, ciliate along angles.

Flowering & Fruiting: November-December.

Distribution: Indo-Malesia. Common; along banks of streams. *RNMK 1186,* Chooralmala.

PSEUDANTHISTIRIA J. D. Hooker

Fl. Brit. India 7: 219. 1896.

Pseudanthistiria umbellata (Hack.) Hook. f., Fl. Brit. India 7: 220. 1896; Fischer in Gamble, Fl. Pres. Madras 1749(1212). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 204. 1960; Manilal & Sivar., Fl. Calicut 336. 1982; Ansari, Fl. Kasaragod Div. 476. 1985; Manilal, Fl. Silent Valley 361. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 181. 1991; Sivar. & P. Mathew, Fl. Nilambur 812. 1997; Mohanan & Sivad., Fl. Agasthyamala 840. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 585. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 885. 2009. *Andropogon umbellatus* Hack. in A. & C. DC., Monogr. Phan. 6: 401. 1889.

Creeping or geniculate annuals; culms rooting from lower nodes. Leaves 4-5 x 0.5-0.6 cm, lanceolate, rounded at base; sheath rounded; ligule a fimbriate membrane. Panicle lax, interrupted by spathes; racemes 2-together; spikelets dissimilar, paired, one sessile and one pedicelled; sessile spikelets ca. 5 mm long, oblong, lanceolate, 2 in each raceme; callus hairy; lower glume oblong, truncate; upper glume oblong, acute, 3-nerved; lower floret absent; second lemma reduced to form the base of the awn; awn 2-2.5 cm long; stamens 3, free; ovary oblong; styles 2, free; stigmas 2, plumose; pedicelled spikelet 5-7 mm long, lanceolate, awnless; floret one, male.

Flowering & Fruiting: November-December.

Distribution: Peninsular India and Sri Lanka. Common; in grassy slopes. *RNMK 3158,* Aranamala.

PSEUDECHINOLAENA Stapf

in Prain, Fl. Trop. Africa 9: 494. 1919.

Pseudechinolaena polystachya (H.B.K.) Stapf in Prain, Fl. Trop. Africa 9: 495. 1919; Fischer in Gamble, Fl. Pres. Madras 1766(1224). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 352. 1960; Manilal, Fl. Silent Valley 362. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 553. 1988; Vajr., Fl. Palghat Dist. 587. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 293. 1991; Sivar. & P. Mathew, Fl. Nilambur 847. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 585. 2005. *Echinolaena polystachya* H.B.K., Nov. Gen. Sp. 1: 119. 1816. *Panicum uncinatum* Raddi, Agrost. Bass. 41: 1823; Hook. f., Fl. Brit. India 7: 58. 1896.

Annuals; culms 15-70 cm long, rooting at the lower nodes. Leaves oblong-lanceolate, 1-7 x 0.5-1.5 cm, acute, cuneate at base, margins scarious.

Panicles 5-25 cm long, racemes 4-8; rachis triquetrous; spikelets ovate-lanceolate, slightly gibbous; upper glume with glandular based hairs; first lemma boat shaped, 5-7 nerved; palea 2-keeled; second lemma ovate-lanceolate, 3-5 nerved; stigmas white.
Flowering & Fruiting: September-December.
Distribution: Paleotropics. Occasional; along the margins of evergreen forests. *RNMK 3474,* Kurichiarmala.

RHYNCHELYTRUM Nees
in Lindley, Intr. Nat. Syst. Bot. ed. 2. 446. 1836.

Rhynchelytrum repens (Willd.) Hubbard, Bull. Misc. Inform. Kew 1934:110.1934; Bor, Grass. Burma, Ceylon, India & Pakistan 355. 1960; Sreek. & V.J. Nair, Fl. Kerala Grasses 297. 1991; Sivar. & P. Mathew, Fl. Nilambur 847. 1997; Mohanan & Sivad., Fl. Agasthyamala 841. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 585. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 887. 2009. *Saccharum repens* Willd., Sp. Pl. (ed. 4) 322. 1798. *Rhynchelytrum villosum* (Parl) Chisu in Annuar R. Inst. Bot. Roma 8: 310. 1908; Fischer in Gamble, Fl. Pres. Madras 1791(1240). 1934. *Monachyron villosum* Parl. in Hook., Niger Fl. 191. 1849. *Tricholaena wightii* Nees & Arn. ex Steud., Syn. Pl. Glum. 1: 93. 1854 pro syn; Hook. f., Fl. Brit. India 7: 65. 1896.

Loosely tufted annuals; culms 15-50 cm high; nodes hairy. Leaves 5-20 x 0.2-0.5 mm, lanceolate, acuminate; sheath rounded, covered with bulbous based hairs; ligule a tuft of hairs. Panicle 5-10 cm long; spikelets 5-6 mm long, similar, pedicelled, densely silky hairy; lower glume oblong, obtuse; upper glume aristate, 5-nerved; florets 2; lower floret male, upper bisexual; first lemma similar to upper glume, keeled; palea lanceolate, 2-keeled; second lemma 3-nerved, hyaline; stamens 3; ovary elliptic; styles 2, free; stigma plumose.
Flowering & Fruiting: March-August.
Distribution: Africa and drier parts of India. Common; in moist deciduous forests. *RNMK 1329,* Muthanga.

ROTTBOELLIA Linnaeus
Suppl. Pl. 13, 114. 1781, *nom. cons.*

Rottboellia cochinchinensis (Lour.) Clayton, Kew Bull. 35: 817. 1981; Ansari, Fl. Kasaragod Div. 477. 1985; Vajr., Fl. Palghat Dist. 587. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 183. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 524. 1996; Mohanan & Sivad., Fl. Agasthyamala 842. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 586. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 887. 2009. *Stegosia cochinchinensis* Lour., Fl. Cochinch. 51. 1790. *Rottboellia exaltata* L. f., Suppl. Pl. 114.1781, non L.f. 1779; Hook. f., Fl. Brit. India 7: 156. 1896; Fischer in Gamble, Fl. Pres. Madras 1759 (1219). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 206. 1960; Manilal & Sivar., Fl. Calicut 332. 1982; Sivar. & P. Mathew, Fl. Nilambur 813. 1997.

Annuals; culms 45-50 cm high; nodes glabrous. Leaves 10-25 x 0.8-1 cm, glabrous; sheath keeled, pubescent, ligule a fimbriate membrane. Raceme 1-few, 10-15 cm long, produced into a tail of reduced spikelets; joints crustaceous, hollow; spikelets dissimilar; sessile spikelet 3-4 mm long, ovate, seated deeply in the cavities of spike; lower glume crustaceous, 13-nerved; upper glume concave; florets 2; lower male, upper bisexual; lower lemmas 3; palea ovate, 2-nerved; second lemma keeled; palea lanceolate, hyaline; stamens 3, free; ovary oblong; styles 2; stigma plumose; pedicelled spikelets oblong.

Flowering & Fruiting: July-December.

Distribution: Paleotropics. Occasional; in moist deciduous forests. *RNMK 1575,* Kuruva.

SACCIOLEPIS Nash

in Britton, Man. Fl. N. States ed. 1, 89. 1901.

Annuals. Culms loosely tufted, decumbent; nodes glabrous, rooting from lower ones. Leaves linear-lanceolate, rounded at base; sheath keeled; ligule membranous. Panicle cylindrical, spiciform; spikelets densely packed, ovate, acute, 2-flowered, glabrous; lower glume ovate, 3-5-nerved; upper floret ovate-lanceolate, 7-9-nerved; lower floret male or empty, upper bisexual; first lemma ovate or lanceolate, acute, 5-9-nerved; palea ovate to oblong, 2-nerved; second lemma ovate, nerves obscure; palea similar to lemma; stamens 3, free; ovary elliptic; styles 2, free; stigmas 2, plumose.

1. Leaves to 1 cm broad; spikelets 4-5 mm long..... **S. interrupta**
1. Leaves to 0.6 cm broad; spikelets 3-3.5 mm long..... .2
2. Panicles 10-20 cm long; lower glume 3-nerved ..... **S. myosuroides**
2. Panicles 7-8 cm long; lower glume 5-nerved ..... **S. indica**

Sacciolepis indica (L.) A. Chase, Proc. Biol. Soc. Wash. 21: 8. 1908; Fischer in Gamble, Fl. Pres. Madras 1787(1238). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 357. 1960; Manilal & Sivar., Fl. Calicut 341. 1982; Ansari, Fl. Kasaragod Div. 478. 1985; Manilal, Fl. Silent Valley 362. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 553. 1988; Vajr., Fl. Palghat Dist. 588. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 298. 1991; Joseph, Aquatic Angiosp. Malabar 508. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 525. 1996; Sivar. & P. Mathew, Fl. Nilambur 848. 1997; Mohanan & Sivad., Fl. Agasthyamala 843. 2002. *Aira indica* L., Sp. Pl. 1753; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 891. 2009. *Panicum indicum* L., Mant. Pl. 2: 184. 1771; Hook. f., Fl. Brit. India 7: 41. 1896.

Slender annuals; culms 15-35 cm high, loosely tufted; nodes glabrous. Leaves 5-15 x 0.2-0.5 cm, linear, sparsely hairy; sheath compressed; ligule a membrane. Panicle 1-8 x 0.5-0.7 cm, cylindrical; spikelets densely packed, 1.5-3.5 mm long, compressed; lower glume acute, 5-nerved; upper glume 9-nerved; lower floret barren; first lemma thinly hairy; palea similar to lemma.

Flowering & Fruiting: June-February.
Distribution: Tropical Asia, Australia and introduced in Africa and America. Common; in paddy fields. *RNMK 2103,* Patavayal.

Sacciolepis interrupta (Willd.) Stapf in Prain, Fl. Trop. Africa 9:757.1920; Fischer in Gamble, Fl. Pres. Madras 1787(1238). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 358. 1960; Manilal & Sivar., Fl. Calicut 341. 1982; Ansari, Fl. Kasaragod Div. 478. 1985; Vajr., Fl. Palghat Dist. 589. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 299. 1991; Joseph, Aquatic Angiosp. Malabar 510. 1991; Sivar. & P. Mathew, Fl. Nilambur 849. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 892. 2009. *Panicum interruptum* Willd., Sp. Pl. (ed. 4) 341. 1798; Hook. f., Fl. Brit. India 7: 40. 1896.

Marshy annuals; culms 30-65 cm high, decumbent, rooting at lower nodes; lower internodes spongy. Leaves 10-30 x 0.2-1 cm, linear-lanceolate, glabrous. Panicle cylindrical, interrupted; spikelets 4-5 mm long, ovate-lanceolate; lower glume broadly ovate; upper glume 9-nerved; lower floret male; first lemma 9-nerved; palea oblong; second lemma ovate, acute; palea similar to lemma.
Flowering & Fruiting: Throughout the year.
Distribution: Tropics of south-east Asia and Africa. Common; in marshy areas. *RNMK 2066,* Panamaram.

Sacciolepis myosuroides (R. Br.) A. Camus in Lecomte, Fl. Indo-Chine 7: 460. 1922; Fischer in Gamble, Fl. Pres. Madras 1787(1238). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 358. 1960; Sreek. & V.J. Nair, Fl. Kerala Grasses 300. 1991; Mohanan & Sivad., Fl. Agasthyamala 843. 2002. *Panicum myosuroides* R. Br., Prodr. 189. 1810; Hook. f., Fl. Brit. India 7: 42. 1896.

Annuals; culms 40-70 cm high, rooting at lower nodes. Leaves 10-25 x 0.2-0.5 cm, linear, base rounded, glabrous; sheath keeled; ligule a membrane. Panicle 10-20 x 0.4-0.5 cm, narrow, cylindrical, interrupted at the base; spikelets ca. 1.5 x 1 mm; lower floret barren; upper bisexual; first lemma 5-nerved; palea linear; second lemma nerves faint; palea smaller; stamens 3; stigmas 2.
Flowering & Fruiting: October-January.
Distribution: Tropics of Asia and Africa. Occasional; in marshy areas in moist deciduous forests. *RNMK 1760,* Muthanga.

SACCHARUM Linnaeus
Sp. Pl. 1: 54. 1753.

Saccharum spontaneum L., Mant. Pl. 2: 183. 1771; Hook. f., Fl. Brit. India 7: 118. 1896; Fischer in Gamble, Fl. Pres. Madras 1709(1185). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 214. 1960; Manilal & Sivar., Fl. Calicut 345. 1982; Ansari, Fl. Kasaragod Div. 478. 1985; Vajr., Fl. Palghat Dist. 588. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 185. 1991; Sivar. & P. Mathew, Fl. Nilambur 813. 1997; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 889. 2009.

Perennials; culms 100-300 cm, tufted, erect; nodes glabrous. Leaves 30-100 x 1-1.5 cm, linear-lanceolate, acuminate, rounded at base, glabrous; sheath rounded; ligule membranous, 3-6 mm long. Panicle 25-30 cm long, densely silky hairy; spikelets similar, paired, covered with white hairs; lower glume oblong, chartaceous; upper glume ovate-lanceolate, chartaceous, keeled, 1-nerved; florets 2; lower empty; upper bisexual; first lemma 3-nerved, epaleate; second lemma linear-lanceolate; palea membranous; stamens 3, free; style basely connated; stigmas 2, plumose.

Flowering & Fruiting: November-May.

Distribution: Paleotropics. Common; along the banks of streams. *RNMK 1469,* Thrikaipatta.

SETARIA P. Beauvois

Ess. Agrost. 51, 178, t. 13, f. 3. 1812.

Annuals or perennials. Stem erect or decumbent; Leaves elliptic or lanceolate; sheath keeled, glabrous. Panicle lax, conjested or spiciform; branches hairy or scabrid; spikelets subtended by one-few bristles, ovate to oblong, acute, similar, 2-flowered; lower glume broadly ovate, acute, 3-5-nerved; upper glume ovate-lanceolate, 5-7-nerved; lower floret male or barren, upper bisexual; first lemma ovate or elliptic, 3-5-nerved; palea oblong, hyaline; second lemma ovate, crustaceous, concave, transversely rugose; palea ovate, obtuse, coriaceous; stamens 3, free; ovary oblong; styles 2, free; stigmas feathery.

1. Leaves flat, not folded; inflorescence contracted, narrow, lobed or cylindric 2
1. Leaves plicately folded; inflorescence lax, widely spreading..... .3
2. Inflorescence a cylindric, false spike ..... **S. pumila**
2. Inflorescence a narrow, lobed panicle ..... **S. intermedia**
3. Leaves plicately folded from base to apex..... 4
3. Leaves plicately folded only at base 5
4. Bristles below the spikelet about twice as long as the spikelet; palea of the lower floret rudimentary, triangular ..... **S. palmifolia**
4. Bristles below the spikelet up to five times as long as the spikelet; palea of the lower floret well-developed, lanceolate ..... **S. paniculifera**
5. Panicles compact, densely spiculate; lower floret male or barren ..... **S. barbata**
5. Panicle lax, loosely spiculate; lower floret barren ..... **S. homonyma**

Setaria barbata (Lamk.) Kunth, Rev. Gram. 1: 47. 1829; V.J. Nair *et al.,* J. Econ. Tax. Bot. 3: 271. 1982; Sreek. & V.J. Nair, Fl. Kerala Grasses 303. 1991; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 893. 2009. *Panicum barbatum* Lamk., Tab. Encycl. 1: 171. 1791. *Panicum flavescens* sensu Hook.f., Fl. Brit. India 7: 56. 1896, non Sw. 1788.

Annuals; culms 30-50 cm high, slender. Leaves 5-15 x 0.5-1.5 cm, lanceolate, covered with bulbous based hairs; sheath keeled, ligule a row of hairs. Panicle of congested racemes; bristles few, 4-6 mm long, atrorsely

barbed; spikelets ca. 2.5 x 1.5 mm, ovate; lower glume ovate, 3-nerved; upper glume 7-nerved; lower floret male; first lemma 7-nerved; palea hyaline; second lemma ovate, 3-nerved; palea margins incurved.
Flowering & Fruiting: September-March.
Distribution: Tropical Asia and Africa. Common; in grasslands. *RNMK 1201,* Banasuramala.

Setaria homonyma (Steud.) Chiov. in Nuovo Giorn. Bot. Ital. n.s. 26: 78. 1919; Bor, Grass. Burma, Ceylon, India & Pakistan 361. 1960; Karthik, Bull. Bot. Surv. India 13: 178. 1971; Ansari, Fl. Kasaragod Div. 479. 1985; Sreek. & V.J. Nair, Fl. Kerala Grasses 305. 1991. *Panicum homonymum* Steud., Syn. Pl. Glum. 1: 48. 1854. *Panicum rhachitrichum* sensu Hook.f., Fl. Brit. India 7: 56. 1896, non Hochst. 1844.

Annuals; culms 20-70 cm long, creeping; nodes softly bearded. Leaves 2-15 x 0.5-2.5 mm, elliptic-lanceolate, acuminate, rounded or narrowed at base; ligule a row of hairs. Panicles pyramidal, 5-12 cm long, lax; racemes sparsely spiculate; spikelets ovate-oblong; lower glume ovate, 3-5 nerved; upper glume 5-7 nerved; palea 2-keeled, 2 nerved; second lemma elliptic-lanceolate.
Flowering & Fruiting: September-January.
Distribution: India and tropical Africa. Common; in wetlands. *RNMK 2129,* Palavayal.

Setaria intermedia Roem. & Schult., Syst. Veg. 2:489.1817; Hook. f., Fl. Brit. India 7:79.1896; Fischer in Gamble, Fl. Pres. Madras 1789(1239). 1934; Vajr., Fl. Palghat Dist. 589. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 306. 1991; Joseph, Aquatic Angiosp. Malabar 512. 1991. *Setaria tomentosa* (Roxb.) Kunth, Rev. Gram. 1: 47. 1829; Bor, Grass. Burma, Ceylon, India & Pakistan 365. 1960. *Panicum tomentosum* Roxb. Fl. Ind. 1: 303. 1820.

Trailing or erect annuals; culms 40-50 cm high; nodes glabrous. Leaves 10-2 x 0.3-1 cm, linear, flat, glabrous; ligule a row of hairs. Panicle spiciform, interrupted; bristles 2-6 mm long, atrorsely barbed; spikelets ca. 2 x 1.5 mm, broadly elliptic; lower glume 1-nerved; upper glume elliptic, obtuse; lower floret empty; first lemma acute, 5-nerved; palea ovate; second lemma ovate, coriaceous; palea faintly rugate.
Flowering & Fruiting: September-December.
Distribution: India, Myanmar and Sri Lanka. Common; in paddy fields. *RNMK 1082,* Panamaram.

Setaria palmifolia (Koenig) Stapf, J. Linn. Soc. Bot. 42. 186. 1914; Fischer in Gamble, Fl. Pres. Madras 1789(1239). 1936; Bor, Grass. Burma, Ceylon, India & Pakistan 363. 1960; Manilal, Fl. Silent Valley 362. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore Dist. 554. 1988; Vajr., Fl. Palghat Dist. 590. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 307. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 525. 1996; Sivar. & P. Mathew, Fl. Nilambur 849. 1997;

Mohanan & Sivad., Fl. Agasthyamala 844. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 587. 2005. *Panicum palmaefolium* Koenig, Naturf. 23:208.1788. *Panicum plicatum* Willd., Enum. Pl. 1033. 1809; Hook. f., Fl. Brit. India 7: 55. 1896,p.p. non Lamk. 1791.

Robust perennials; culms loosely tufted, 30-100 cm high; nodes glabrous. Leaves 20-50 x 2-5 cm, elliptic, erect, plicately folded, narrowed to the base, thinly pubescent, scabrid along the nerves. Panicle 10-30 cm long, narrow, lax; spikelets ca. 3 mm long, pedicelled, crowded on small branches; lower glume ca. 1.5 mm across, orbicular, obtuse, 5-nerved; upper glume 7-nerved; lower floret barren; palea oblong; second lemma acute; palea ovate, acute.
Flowering & Fruiting: August-November.
Distribution: Paleotropics; introduced in America. Occasional; in evergreen forest fringes. *RNMK 3234*, Talimala.

Setaria paniculifera (Steud.) Fourn. ex Hemsl., Bot. Centr. Amer. Bot. 3: 505.1855; Bor, Grass. Burma, Ceylon, India & Pakistan 363. 1960; Sreek. & V.J. Nair, Fl. Kerala Grasses 308. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 526. 1996. *Panicum paniculiferum* Steud., Syn. Pl. Glum. 1: 54. 1854.

Perennials; culms few together, 60-200 cm high, robust; nodes sparsely bearded. Leaves 15-40 x 0.5-2.5 cm, linear-elliptic, plicately folded; sheath strongly keeled; ligule a fimbriate membrane. Panicle 15-25 cm long, lax; spikelets ca. 3 x 1 mm; lower glume ovate, obtuse, 3-nerved; upper glume ovate, obtuse, 7-nerved; lower floret barren; first lemma ovate, 5-nerved, acute; palea lanceolate; second palea subcoriaceous.
Flowering & Fruiting: September-November.
Distribution: Native of tropical America; introduced as a fodder. Common; in evergreen forest. *RNMK 3129,* Vythiri.

Setaria pumila (Poir.) Roem. & Schult., Syst. Veg. 2: 891. 1817; Ansari, Fl. Kasaragod Div. 479. 1985; Manilal, Fl. Silent Valley 363. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 554. 1988; Vajr., Fl. Palghat Dist. 590. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 309. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 526. 1996; Sivar. & P. Mathew, Fl. Nilambur 851. 1997; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 587. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 893. 2009. *Panicum pumilum* Poir. in Lamk., Encycl. Suppl. 4: 273. 1816. *Setaria pallida-fusca* (Schum.) Stapf & C.E.Hubb., Bull. Misc. Inform. Kew 1930: 259. 1930; Fischer in Gamble, Fl. Pres. Madras 1789(1239). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 363. 1960; Manilal & Sivar., Fl. Calicut 340. 1982. *Setaria glauca* Hack., Bot. Soc. Brot. 3: 135. 1884, non P. Beauv. 1812. *Panicum pallida*-fuscum Schum., Beskr. Guin. Pl. 58. 1827.

Tufted annuals; culms 10-100 cm high, decumbent or erect; nodes glabrous. Leaves 10-40 x 0.3-0.6 cm, linear, scabrid; sheath keeled, ligule a fimbriate membrane. Panicle 2-20 cm, cylindric; bristles 5-9 mm long, in

clusters; spikelets 2-2.5 mm long, sessile, acute; lower glume 3-nerved; upper glume 5-nerved; lower floret barren; first lemma ca. 2.5 mm long, 3-nerved, paleate; second lemma coriaceous, rugose.
Flowering & Fruiting: July-October.
Distribution: Paleotropics. Common in wetlands. *RNMK 3495,* Panamaram.

SORGHUM Moench
Methodus (Moench) 207. 1794.

Sorghum nitidum (Vahl) Pers., Syn. Pl. 1: 101. 1805; Fischer in Gamble, Fl. Pres. Madras 1735(1203). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 276. 1960; Sreek. & V.J. Nair, Fl. Kerala Grasses 192. 1991. *Holcus nitidus* Vahl, Symb. Bot. 2: 102. 1791. *Andropogon serratus* Thunb., Fl. Jap. 41. 1784; Hook. f., Fl. Brit. India 7: 185. 1896. *Sorghum serratum* (Thunb.) O. Ktze., Rev. Gen. Pl. 2: 792. 1891.

Perennials; culms 80-200 cm high; nodes bearded. Leaves 15-40 x 0.5-1 cm, linear, lanceolate, narrowed to the base, scabrid; sheath keeled, glabrous; ligule membranous. Panicle 15-25 cm long, pyramidal; branches whorled; spikelets in pairs, dissimilar; sessile spikelets ca. 4 x 2 mm, oblong; callus with long hairs; lower glume oblong, 5-nerved, dark brown; upper glume ovate, acute, 3-nerved, dark brown; lower floret empty; upper bisexual; first lemma broadly ovate, hyaline; palea absent; stigmas plumose; lower glume coriaceous; upper chartaceous; lower floret male; upper floret absent.
Flowering & Fruiting: October-January.
Distribution: India, Indo-China and Australia. Occasional; along forests fringes. *RNMK 3011,* Aranamala.

SPODIOPOGON Trinius
Fund. Agrost. 192, t. 17. 1920.

Spodiopogon rhizophorus (Steud.) Pilger in Engl. & Prantl, Naturl. Pflanzenf. (ed. 2) 14e: 119. 1940; Bor, Grass. Burma, Ceylon, India & Pakistan 246. 1960; Manilal & Sivar., Fl. Calicut 344. 1982; V.S. Ramach. & V.J. Nair, Fl. Cannanore 555. 1988; Vajr., Fl. Palghat Dist. 591. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 193. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 526. 1996; Sivar. & P. Mathew, Fl. Nilambur 814. 1997; Mohanan & Sivad., Fl. Agasthyamala 845. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 587. 2005. *Andropogon rhizophorus* Steud., Syn. Pl. Glum. 1: 381. 1854. *Spodiopogon albidus* Benth., J. Linn. Soc. Bot. 19: 66. 1881; Hook. f., Fl. Brit. India 7: 108. 1896; Fischer in Gamble, Fl. Pres. Madras 1710(1186). 1934.

Annuals; culms 40-50 cm high; nodes glabrous. Leaves 13-15 x 1.3-1.5 cm, elliptic, acuminate at either ends, glabrous; sheath keeled, glabrous; ligule membranous. Panicle 12-15 cm long, congested; rachis glabrous; pedicels with long hairs; spikelets in groups of three; one sessile and two pedicelled; sessile spikelets 5-8 mm long, lanceolate; glumes subequal, 12-nerved, lower florets male; upper bisexual; first lemma oblong-acuminate, 1-nerved, chartaceous; palea lanceolate, 2-nerved; second lemma elliptic, notched and

awned from the sinus; awn ca. 7 mm long; palea obovate, truncate; stamens 3; ovary elliptic, styles 2, basely united; stigmas 2, plumose.
Flowering & Fruiting: November-January.
Distribution: Endemic to southern Western Ghat. Occasional; in grassy slopes. *RNMK 2132*, Kurichiarmala.

SPOROBOLUS R. Brown
Prodr. 169. 1810.

Annuals or perennials; culms erect or creeping, usually tufted. Leaves few to many, elliptic to linear-lanceolate, flat or convolute; sheath rounded or keeled; ligule a fimbriate rim. Inflorescence a narrow or cylindrical panicle. Spikelets small, similar, 1-flowered; pedicels unequal; glumes similar, membranous, lower glume smaller, upper glume as long as the spikelets; lemmas similar to upper glume, awnless, 1-nerved; palea 2-nerved, hyaline; stamens 1-3; styles 2, free, stigmas plumose.

1. Inflorescence a solitary raceme. ..... **S. piliferus**
1. Inflorescence an effuse panicle 2
2. Lower glume much shorter than the spikelets; panicle lax. ..... **S. indicus**
2. Lower glume as long as the spikelets; panicle contracted ..... **S. tenuissimus**

Key to the varieties of Sporobolus indicus:

1. Stamens 2 ..... var. **diander**
1. Stamens 3 ..... var. **fertilis**

Sporobolus indicus (L.) R. Br. var. **diander** (Retz.) Jovet & Guedes, Taxon 22: 163. 1973; Sreek. & V.J. Nair, Fl. Kerala Grasses 437. 1991; Mohanan & Sivad., Fl. Agasthyamala 846. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 588. 2005 ; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 895. 2009. *Agrostis diandra* Retz., Obs. Bot. 5: 19. 1788. *Sporobolus diander* (Retz.) P. Beauv., Ess. Agrost. 26:147.1812; Fischer in Gamble, Fl. Pres. Madras 1817 (1258). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 629.1960; Manilal, Fl. Silent Valley 364. 1988; Sivar. & P. Mathew, Fl. Nilambur 852. 1997.

Annuals or perennials; culms 30-80 cm high; nodes glabrous. Leaves 15-40 x 0.2-0.6 cm, linear, glabrous; sheath keeled; ligule a narrow membrane. Panicles 10-30 cm long, lax; axis and branches filiform; spikelets ca. 1.5 x 0.5 mm, lanceolate, glabrous; lower glume very small, hyaline, ovate, obtuse; upper glume hyaline, 1-nerved; lemma ovate-lanceolate, nerves not clear; palea oblong, stamens 2.
Flowering & Fruiting: March-September.
Distribution: Indo-Malesia to Australia. Common; along wayside. *RNMK 1784,* Puthoorvayal.

Sporobolus indicus (L.) R. Br. var. **fertilis** (Steud.) Jovet & Guedes, Taxon 22:164.1973; Sreek. & V.J. Nair, Fl. Kerala Grasses 438. 1991. *Agrostis fertilis*

Steud., Syn. Pl. Glum. 1: 170. 1854. *Sporobolus fertilis* (Steud.) W.D. Clayton, Kew Bull. 19: 291. 1965. *Sporobolus indicus* sensu Hook. f., Fl. Brit. India 7: 247. 1896; Fischer in Gamble, Fl. Pres. Madras 1817(1258). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 630. t. 76.1960.

Slender annuals; culms tufted, 20-40 cm high, nodes glabrous. Leaves 5-12 x 0.2-0.5 cm, lanceolate, flat; margins with tubercled hairs; one margin of sheath hairy; ligule a fimbriate membrane. Panicle 10-15 x 0.6-0.8 cm, contracted; branches filiform; spikelets ca. 2.5 x 1 mm, pedicelled, lanceolate, glabrous; lower glume acute; upper glume 1-nerved; lemma hyaline; palea similar to lemma; stamens 3.

Flowering & Fruiting: June-December.

Distribution: Pantropical. Occasional; in moist deciduous forests. *RNMK 2689,* Tholpetty.

Sporobolus piliferus (Trin.) Kunth, Enum. Pl. 1: 211. 1833; Fischer in Gamble, Fl. Pres. Madras 1817(1258). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 632. 1960; Manilal & Sivar., Fl. Calicut 350. 1982; Ansari, Fl. Kasaragod Div. 481. 1985; Manilal, Fl. Silent Valley 365. 1988; Vajr., Fl. Palghat Dist. 591. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 438. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 527. 1996; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 895. 2009. *Vilfa pilifera* Trin., Diss. Bot. 157. 1824.

Tufted annuals; culms 10-25 cm high; nodes glabrous. Leaves 2-5 x 0.2-0.5 cm, bifarious, lanceolate, base rounded, glabrous or ciliate along the margins; sheath rounded, margins glandular hairy. Raceme narrow, un-branched with many spikelet on all sides; spikelets ca. 1.5 x 0.5 mm, lanceolate, acute; glumes hyaline; lower glume narrowly lanceolate, acute; upper glume slightly larger 1-nerved; lemma 3-nerved; palea similar to lemma, 2-nerved; stamens 2.

Flowering & Fruiting: September-December.

Distribution: India, Sri Lanka and east Africa. Common; along waysides and moist situations. *RNMK 2731,* Manikkunnumala.

Sporobolus tenuissimus (Schrank) O. Kuntze., Rev. Gen. Pl. 3:369.1893; Bor, Grass. Burma, Ceylon, India & Pakistan 633.1960; Manilal & Sivar., Fl. Calicut 350. 1982; Sreek. & V.J. Nair, Fl. Kerala Grasses 440. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 527. 1996. *Panicum tenuissimum* Schrank in Denkschr., Bot. Ges. Regensb. 2: 26. 1822. *Sporobolus minutiflorus* (Trin.) Link, Enum. Hort. Berol. 1:88.1827; Hook. f., Fl. Brit. India 7:248.1896; Fischer in Gamble, Fl. Pres. Madras 1816(1258).1934. *Vilfa minutiflora* Trin., Diss. Bot. 158.1824.

Annuals; culms 20-100 cm high; nodes glabrous. Leaves 5-25 x 0.4-0.5 cm, linear-lanceolate; ligules membranous with rim of hairs. Panicles 5-30 cm long, grayish; lower glume oblong; upper glume 1 nerved; lemma ovate-oblong, 1 nerved; palea 2-nerved, elliptic; anthers violet.

Flowering & Fruiting: September-December.

Distribution: Pantropics. Occasional; in marshy areas. *RNMK 3267,* Panamaram.

TEINOSTACHYUM Munro

Trans. Linn. Soc. London 26(1): t. 3. 142. 1868.

Teinostachyum wightii Bedd., Fl. Sylv. t. 323. 1874; Hook. f., Fl. Brit. India 7: 410. 1896. *Teinostachyum beddomei* Fischer in Gamble, Fl. Pres. Madras 1860(1287). 1934. *Schizostachyum beddomei* (Fischer) R.B. Majumdar in Karthik. *et al.*, Fl. Indian Enum. Monocot 281. 1989.

Perrenials, culms semi-scandent, ends of branches pendulous; culm-sheaths papery. Leaves oblong-lanceolate. Panicles large on leafy branches, terminal, drooping, branches spiciform; spikelets 2-3 cm long, many flowered; glume solitary, ovate-mucronate. Grain ovoid, acuminate, beaked.

Flowering & Fruiting: December-March.

Distribution: Endemic to Western Ghats. Occasional; in evergreen forests. *RNMK 1432,* Banasuramala.

THEMEDA Forsskal

Fl. Aegypt.- Arab. 178. 1775.

Annuals or usually perennials; culms densely tufted, thickened at nodes. Leaves scattered, linear-oblong to lanceolate; sheath keeled; ligule membranous or coriaceous. Inflorescence of large panicle, interposed with large bracts; racemes subtended by spathes, with 2 steps of spikelets; lower set with 2-4 involucral spikelets, usually with male or empty flowers; upper set with 2 pedicelled spikelets and one or two sessile spikelets; sessile spikelets 2-flowered, terete; lower glume oblong, coriaceous, obtuse; lower floret reduced to a hyaline lemma; upper floret bisexual; lemma ovate, passing into a long or short awn; palea smaller; stamens 3; styles 2, free; stigmas plumose; pedicelled and involucral spikelets empty or with male florets; lemmas awnless.

1. Sessile spikelets 3.5-4 mm long; involucral spikelets at different levels..... 2
1. Sessile spikelets 6-9 mm long; involucral spikelets at same or different levels ....**T. triandra**
2. Leaves rounded at base; sessile spikelets 2 in each race; pedicelled spikelet covered with tubercle-based hairs ..... **T. tremula**
2. Leaves narrowed towards the base; sessile spikelet one in a raceme; pedicelled spikelets glabrous ..... .**T. cymbaria**

Themeda cymbaria (Roxb.) Hack. in A. & C. DC., Monogr. Phan. 6:668.1889; Fischer in Gamble, Fl. Pres. Madras 1746(1210). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 251. 1960; Manilal, Fl. Silent Valley 365. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 196. 1991; Mohanan & Sivad., Fl. Agasthyamala 847. 2002. *Anthistiria cymbaria* Roxb., Fl. Ind. 1: 255. 1820.

Perennials; culms 60-250 cm high, stout, densely tufted. Leaves up to 120 x 2 cm, linear- lanceolate, nerves and margins sharply scabrous; sheath acutely keeled, glabrous; ligule membranous. Panicle 30-80 cm long, lax, bracts brown, boat-shaped; racemes 5-8 mm long, clustered; involucral spikelets ca.

4 x 1 mm, at different levels; glumes subequal, glabrous; containing a male florets; sessile bisexual spikelets 4-5 x 1-2 mm, with dense white callus hairs; lower glumes lanceolate, hirtus, coriaceous; first lemma oblong, chartaceous; second lemma awned; awn ca. 2 cm long.
Flowering & Fruiting: November-January.
Distribution: Endemic to Peninsular India. Common; in grasslands. *RNMK 3158,* Kurichiarmala.

Themeda tremula (Nees ex Steud.) Hack. in A. & C. DC., Monogr. Phan. 6: 667. 1889; Fischer in Gamble, Fl. Pres. Madras 1746(1210). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 254. 1960; Ansari, Fl. Kasaragod Div. 481. 1985; V.S. Ramach. & V.J. Nair, Fl. Cannanore 555. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 198. 1991; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 588. 2005. *Anthistiria tremula* Nees ex Steud., Syn. Pl. Glum. 1:401.1855; Hook. f., Fl. Brit. India 7:214.1896.

Perennials; culms tufted, 60-100 cm high, slender, pinkish. Leaves 10-20 x 0.4-1 cm, lanceolate, cordate at base, glabrous; sheath keeled, covered with tubercled hairs; ligule ca. 4 mm long, membranous. Panicle 10-25 cm long; spathes brown, covered with bulbous based hairs; racemes clustered; involucral spikelets 4, 7-9 mm long; glumes covered with bulbous based hairs; pedicelled spikelets 3 in a raceme, similar to involucral spikelets; bisexual spikelets ca. 4 x 1 mm, lanceolate; lower glume with a longitudinal slit on dorsal surface, apex truncate; second lemma epaleate, awned, awn up to 3 cm long.
Flowering & Fruiting: September-December.
Distribution: South India and Sri Lanka. Common; in grasslands. *RNMK 2266,* Chembra.

Themeda triandra Forssk., Fl. Aeg.-Arab. 178. 1775; Fischer in Gamble, Fl. Pres. Madras 1746(1209). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 254. 1960; Manilal & Sivar., Fl. Calicut 336. 1982; Manilal, Fl. Silent Valley 366. 1988; V.S. Ramach. & V.J. Nair, Fl. Cannanore 555. 1988; Vajr., Fl. Palghat Dist. 591. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 202. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 527. 1996; Sivar. & P. Mathew, Fl. Nilambur 815. 1997; Mohanan & Sivad., Fl. Agasthyamala 848. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 589. 2005; C.N. Sunil & Sivad., Fl. Alappuzha Dist. 897. 2009 *Anthistiria imberbis* Retz., Obs. Bot. 3: 11. 1783; Hook. f., Fl. Brit. India 7: 211. 1896.

Densely tufted perennials; culms 30-200 cm high, white or yellowish white. Leaves 10-60 x 0.4-1.2 cm, rounded at base, margins rarely ciliate; sheath sharply keeled, mouth with long bulbous based hairs; ligule 5-8 mm long, coriaceous. Panicle 20-75 cm long; racemes in dense clusters; involucral spikelets in same or different levels, 7-9 x 2-3 mm; lower glume ca. 8 mm long, winged along one side; upper glume oblong, 3-nerved; bisexual spikelets, 6-9 mm long, solitary in a raceme, callus with brown hairs; lower glume 5-9 mm,

brown, thinly pubescent; upper glume hirtus; first lemma oblong, brown; second lemma stipitate, awn 5-9 cm long.
Flowering & Fruiting: October-January.
Distribution: Paleotropics. Common; in grasslands. *RNMK 2300,* Manikkunnumala.

TRIPOGON Roemer & Schultes
Syst. Veg. 2: 34, 600. 1817.

Annuals or perennials, densely tufted; culms many together. Leaves linear to filiform; sheath rounded or keeled; ligule obscure or a small rim only. Spikelets few to many, in two rows on long or short terminal raceme, ovate to oblong, compressed; glumes sub-equal, 1-nerved, lower shorter; flowers many, bisexual, similar; lemmas ovate-lanceolate, entire or notched at apex, awned, or lobes aristate; palea oblanceolate, 2-keeled; stamens 3, styles 2, free, stigmas plumose.

1. Lemmas cleft into 2 lobes; awns several times as long as the lemmas... **T. capillatus**
1. Lemmas cleft into 4 lobes; awns not more than twice as long as lemmas..... 2
2. Ligules thin, membranous; keels of the paleas ciliate .....**T. narayanii**
2. Ligules inconspicuous; keels of the paleas scabrid..... **T. bromoides**

Tripogon bromoides Roem. & Schult., Syst. Veg. 600. 1817; Fischer in Gamble, Fl. Pres. Madras 1834(1269). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 521. 1960; Manilal, Fl. Silent Valley 366. 1988; Vajr., Fl. Palghat Dist. 592. 1990; Sreek. & V.J. Nair, Fl. Kerala Grasses 399. 1991; Mohanan & Sivad., Fl. Agasthyamala 849. 2002; Anil Kumar, Sivad. & N. Ravi, Fl. Pathanamthitta 589. 2005.

Densely tufted perennials; culms 10-35 cm high; nodes glabrous. Leaves usually basal, 5-30 x 0.1-0.3 cm, linear, base rounded, sparsely hairy above; mouth of sheath with long hairs; ligule a rim only. Raceme 10-30 cm long; spikelets 0.5-1 cm long, oblong, glabrous, sessile; lower glume 1-nerved, keeled; upper glume notched below the apex on one side, 3-nerved; flowers 10-16; lemma 4-lobed at apex, 3-awned; one median and two laterals; median one twice the length of laterals; palea scabrid along the keels.
Flowering & Fruiting: August-March.
Distribution: South India and Nepal. Common; in evergreen forests. *RNMK 2278,* Kurichiarmala.

Tripogon capillatus Jaub. & Spach, Ill. Fl. Or. 4: t.332. 1851; Hook. f., Fl. Brit. India 7: 285. 1896; Fischer in Gamble, Fl. Pres. Madras 1833(1269). 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 521. 1960; Sreek. & V.J. Nair, Fl. Kerala Grasses 401. 1991.

Annuals, culms slender, to 30 cm high, loosely tufted or solitary; nodes glabrous. Leaves filiform, 8-10 x 0.1-0.2 cm, glabrous, sheath rounded; ligule membranous. Racemes 15-20 cm long, slender; spikelets linear-lanceolate, 3-

4-flowered, lower glume 3-lobed at apex, awned; awn 2-2.5 cm long, capillary; paleas elliptic, 2-keeled; stamens 3.
Flowering & Fruiting: October-January.
Distribution: Endemic to southern Western Ghats. Rare; in rocky grasslands. *RNMK 2160,* Ambalavayal.

Tripogon narayanii Sreek., V.J. Nair & N.C. Nair, J. Bombay Nat. Hist. Soc. 80: 196. 1983; Sreek. & V.J. Nair, Fl. Kerala Grasses 401. 1991.

Densely tufted perennial herbs; culms 10-20 cm high, odes glabrous. Leaves 10-25 x 0.2-0.3 cm, linear, flat, densely villous on upper surface; ligule a thin membrane; sheaths villous. Racemes 6-12 cm long, contracted; rachis smooth; spikelets 0.5-1 cm long, greenish yellow, 4-6 florets; lower glume ovate-lanceolate; upper glume 1 nerved; lemmas 3 nerved and 3 awned.
Flowering & Fruiting: August-September.
Distribution: Endemic to southern Western Ghats. Occasional; in grasslands. *RNMK 2240,* Kurichiarmala.

ZENKERIA Trinius
Linnaea 11: 150. 1837.

Zenkeria jainii N.C. Nair, Sreek. & V.J. Nair, J. Bombay Nat. Hist. Soc. 78: 352. 1981; Sreek. & V.J. Nair, Fl. Kerala Grasses 364. 1991.

Perennial herbs; culms 45-60 cm long, nodes glabrous. Leaves 15-50 x 0.8-1.5 cm, linear-lanceolate, tapering at both ends, sparsely villous on the upper surface. Panicles 15-20 cm long, densely flowered; spikelets 5-6 mm long, each 2 flowered; pedicels villous; rachlla bearded; glumes subequal, ovate-lanceolate, 1 nerved; lemmas 5 nerved, long ciliate below the middle; paleas 2-keeled, notched at apex, long ciliate along the keels; stamens 3; anthers purple; stigmas feathery, white.
Flowering & Fruiting: August-December.
Distribution: Endemic to southern Western Ghats (Kerala). Occasional; in the crevices of moist rocks in grasslands. *RNMK 1388,* Chembra.

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APPENDICES

Annexure 1: Rare and threatened plants

Critically endangered plants (CR)

Sl.No.	Species name	Habit	Habitat	Endemism
1.	*Adenosma malabaricum*	H	EVN	SWG
2.	*Aglaia malabarica*	MT	EVN, SEVN	SWG/K
3.	*Conchidium nanum*	EP	EVN	SWG
4.	*Dioscorea wightii*	CL	MDF	SWG
5.	*Eugenea argentea*	ST	EVN	SWG/K/W
6.	*Hedyotis wynaadensis*	SH	EVN	SWG/K/W
7.	*Hopea erosa*	LT	EVN	SWG
8.	*Meteoromyrtus wynaadensis*	ST	EVN	SWG/K/W
9.	*Pavetta wightii*	SH	EVN	SWG
10.	*Syzygium travancoricum*	MT	EVN	SWG/K

Endangered plants (EN)

Sl.No.	Species name	Habit	Habitat	Endemism
11.	*Ardisia amplexicaulis*	SH	EVN	SWG
12.	*Atuna indica*	T	EVN	PI
13.	*Cynometra beddomei*	MT	EVN, SEVN	SWG
14.	*Cynometra travancorica*	MT	EVN, SEVN	SWG
15.	*Dalbergia beddomei*	CS	EVN	SWG
16.	*Desmos lawii*	L	EVN	SWG
17.	*Euonymus paniculatus*	ST	EVN	SWG
18.	*Garnotia puchiparensis*	H	GLS	SWG
19.	*Grewia gamblei*	CS	MDF, EVN	SWG
20.	*Habenaria barnesii*	TRH	GSL	SWG
21.	*Hopea ponga*	LT	EVN, SEVN	WG
22.	*Hydnocarpus macrocarpa*	MT	EVN	SWG
23.	*Ipsea malabarica*	TRH	GSL	SWG
24.	*Ixora lawsonii*	SH	SHL	SWG
25.	*Kingiodendron pinnatum*	LT	EVN	SWG

26.	*Lasianthus obovatus*		EVN	SWG
27.	*Litsea beddomei*	ST	EVN	SWG
28.	*Litsea oleoides*	LT	EVN, SEVN	WG
29.	*Memecylon flavescens*	ST	EVN, SHL	SWG
30.	*Nothopegia beddomei*	ST	EVN	SWG
31.	*Peucedanum anamallayense*	H	EVN	SWG
32.	*Syzygium stocksii*	MT	EVN	SWG
33.	*Valeriana hookeriana*	H	GSL	SWG
34.	*Xylosma longifolia*	ST	EVN	SWG

Threatened plants (T)

Sl.No.	Species name	Habit	Habitat	Endemism
35.	*Bulbophyllum fuscopurpureum*	EPH	SHL	SWG
36.	*Impatiens acaulis*	SCH	GSL	SWG, SL
37.	*Impatiens lucida*	H	GSL	PI
38.	*Isachne setosa*	H	GLS	WG
39.	*Ochlandra beddomei*	SH	OPEN	SWG

Rare plants (R)

Sl No.	Species name	Habit	Habitat	Endemism
40.	*Actinodaphne malabarica*	LT	EVN, SEVN	SWG
41.	*Aglaia barberi*	MT	EVN	WG
42.	*Aglaia lawii*	MT	EVN	IM
43.	*Albizia lebbeck*	LT	DF	SWG
44.	*Allophylus concanicus*	SS	EVN, SHL	WG
45.	*Ampelocissus indica*	CS	SEVN	PI, SL
46.	*Beilschmiedia wightii*	LT	EVN, SEVN	SWG
47.	*Bulbophyllum mysorense*	EPH	SEVN	SWG
48.	*Capparis rheedei*	LS	SEVN	WG
49.	*Ceropegia decaisneana*	C	MDF	WG
50.	*Ceropegia metziana*	H	EVN, SEVN	SWG
51.	*Corymborkis veratrifolia*	TRH	MSA	PI
52.	*Crotalaria bidiei*	EH	OPN	WG
53.	*Cyclea fissicalyx*	HC	SEVN, EVN	SWG
54.	*Dalbergia congesta*	CS		SWG

55.	*Dendrobium jerdonianum*	EPH	EVN	PI
56.	*Dendrobium microbulbon.*	EPH	EVN	SWG
57.	*Epithema carnosum.* var. *hispida*	H	EVN	WG
58.	*Eria albiflora*	EPH	EVN	SWG
59.	*Eulophia cullenii*	TRH	MDF	SWG
60.	*Eulophia flava*	TH	GL	SWG
61.	*Glycosmis macrocarpa*	ST	EVN	SI, SL
62.	*Grewia heterotricha*	CS	EVN	WG
63.	*Holigarna grahamii*	LT	EVN	WG
64.	*Impatiens crenata*	H	EP	SWG
65.	*Impatiens dasysperma*	EH	EVN	SWG
66.	*Impatiens viscosa*	H	SHL, GL	SWG
67.	*Indigofera constricta*	SH	SEVN	PI, SL
68.	*Kunstleria keralensis*	CS	EVN, SEVN	SI
69.	*Lasianthus capitulatus*	SH	SHL	SWG
70.	*Lasianthus jackianus*	SH	EVN	SWG
71.	*Litsea mysorensis*	MT	SEVN	WG
72.	*Memecylon gracile*	SSH	EVN	SWG
73.	*Miquelia dentata*	CS	EVN, SEVN	SWG
74.	*Neanotis monosperma*	H	EVN	PI
75.	*Neanotis rheedei*	H	EVN	WG
76.	*Oberonia brachyphylla*	EPH	EVN	SWG
77.	*Ochlandra setigera*	SCSH	OPEN	SWG
78.	*Pavetta travancorica*	SH	EVN	SWG
79.	*Pogostemon gardneri*	H	GLS	SWG
80.	*Premna glaberrima*	SS	EVN	SWG
81.	*Premna villosa*	CSH	SEVN, MDF	SWG
82.	*Rubia cordifolia*	CS	EVN	SWG
83.	*Salacia beddomei*	CS	SEVN, EVN	SWG
84.	*Salacia macrosperma*	CS	SEVN, EVN	SWG
85.	*Salacia malabarica*	CS	SEVN, EVN	SWG
86.	*Smilax wightii.*	CSH	MDF	SWG
87.	*Solenocarpus indicus*	ST	EVN	SWG
88.	*Sonerila sahyadrica*	H	EVN	SWG
89.	*Sonerila versicolor* var. *axillaris*	H	EVN	SWG

90.	*Swertia beddomii*	EH	GL	SWG
91.	*Tarenna canarica.*	SH	EVN	SWG
92.	*Vepris bilocularis*	MT	EVN, SEVN	SWG
93.	*Vernonia bourneana*	SH	SHL	SWG
94.	*Vicoa indica*	USH	GL	SWG

Lower Risk Near Threatened (LRNT)

Sl.No.	Species Name	Habit	Habitat	Endemism
95.	*Aglaia edulis*	ST	EVN	IM
96.	*Aglaia simplicifolia*	ST	EVN	IM
97.	*Bulbophyllum aureum*	EPH	EVN, SEVN	SWG
98.	*Casearia rubescens*	T	EVN	SWG
99.	*Elaeocarpus munronii*	MT	SEVN, EVN	SWG
100.	*Gluta travancorica*	LT	EVN	SWG
101.	*Goniothalamus wynaadensis*	ST	EVN	SWG
102.	*Knoxia sumatrensis*	H	DDF	SWG
103.	*Nothopegia heyneana*	ST	EVN	PI
104.	*Ophiorhiza brunonis*	EH	EVN	SWG
105.	*Phaeanthus malabaricus*	ST	EVN	SWG
106.	*Semecarpus auriculata*	ST	EVN	SWG
107.	*Tabernaemontana gamblei*	SH	EVN	SWG

H - Herb; MT - Medium tree; EP - Epiphyte; CL - Climber; ST - Small tree; LT - Large tree; SH - Shrub; L - Lianas; TRH - Terrestrial herb; SCH - Scapigerous herb; EVN - Evergreen; SEVN - Semi-evergreen; MDF - Moist deciduous; GSL - Grassland; SHL - Shola; SWG - Southern Western Ghat; WG - Western Ghat; PI - Peninsular India; K - Kerala; W - Wayanad; SL - Sri Lanka; IM - Indo-Malesia

Annexure 2: Wild plants used as vegetables by Paniya and Kattunaikka

Sl. No.	Scientific name	Local name	
		Paniya	**Kattunaikka**
1.	*Abelmoschus angulosus* var. *angulosus*	Kattuvenda	-
2.	*Abrus precatorius*	Kunni	-
3.	*Achyranthes aspera*	Valiyakadaladi	-
4.	*Achyranthes bidentata*	Kozhivalan	-
5.	*Adenia hondala*	Koombichapu	-
6.	*Allmania nodiflora*	-	Hallukeerai
7.	*Alternanthera bettzickiana.*	Cherucheera	-
8.	*Alternanthera brasiliana*	Choracheera	Chorakkerai
9.	*Alternanthera pungens*	Minnamkkanni	-
10.	*Alternanthera sessilis*	Ponnamkkanni	Honkalasoppu
11.	*Amaranthus caudatus*	Kattucheera	-
12.	*Amaranthus spinosus*	Mullancheera	Mullankkeerai
13.	*Amaranthus viridis*	Kuppacheera	Valakkeerai
14.	*Antidesma acidum*	Noolithali	-
15.	*Arenga wightii*	Njetipanakumpu	-
16.	*Bacopa monnieri*	Brahmichappu	-
17.	*Bambusa bambos*	Kayalkkalli	Kattaekalli
18.	*Basala alba*	Vasalachapu	-
19.	*Bauhinia purpuria*	Kattumandaram	-
20.	*Begonia malabarica*	Malampuli	-
21.	*Begonia floccifera*	Malampuli	-
22.	*Bidens biternata*	Alanchappu	Uthransoppu
23.	*Blumea barbata*	-	Kadukucheera
24.	*Boerhaavia diffusa*	Thazhuthama	-
25.	*Bombax ceiba*	Poola	-
26.	*Canavalia cathartica*	Kattupayar	-
27.	*Capparis brevispina*	-	Maradasoppu
28.	*Capsicum frutescens*	Cheenaparangi, chappu	Koorimanasu
29.	*Caryota urens*	Panamchapu	Panasoppu
30.	*Cassia occidentalis*	Poninthavara	-
31.	*Cassia tora*	Thavara	Thakattasoppu

32.	*Catunaregam spinosa*	Kara	-
33.	*Catunaregam uliginosa*	-	Hinnisan kaya
34.	*Centella asiatica*	Muthilila	Muthil
35.	*Ceropegia metziana*	-	Palankeera
36.	*Chenopodium album*	-	Parippukkera
37.	*Cissus discolor*	Vallimaruma	Thadavasopu
38.	*Cleome viscose*	Naikkadugu	-
39.	*Colocasia esculenta*	Kollithalu	Henchichebu
40.	*Commelina bengalensis*	-	Kannisoppu
41.	*Costus speciosus*	Unnithandu	-
42.	*Crotalaria laevigata*	-	Koovilisoppu
43.	*Cryptocoryne retrospiralis*	Panchithalu	-
44.	*Cucumis porphetarum*	Attanga	-
45.	*Cyathula prostrata*	Cherukadaladi	-
46.	*Dillenia indica*	Malampunna	-
47.	*Diplazium esculentum*	Churuli	Surulisoppu
48.	*Diplocyclos palmatus*	Kuniyanchappu	Uvakandansoppu
49.	*Dryopteris coculata*	Parachava	-
50.	*Embelia tsjeriam-cottam*	-	Marakkeera
51.	*Emilia sonchifolia*	Muyalcheviyan	Muyalkivi
52.	*Erythrina stricta*	Murikkinchapu	Murikkusoppu
53.	*Euphorbia hirta*	Palcheera	-
54.	*Gmelina arborea*	Kumbil	-
55.	*Hibiscus hispidissimus*	Paruthiyila	-
56.	*Hygrophila schulli*	Kozhimullan	-
57.	*Justicia nilgherrensis*	-	Hattakkerai
58.	*Laportea interrupta*	Choriyanam	-
59.	*Leea indica*	-	Idavasoppu
60.	*Lycianthes laevis*	Kattumudunga	-
61.	*Marselia quadrifolia*	Vattachappu	-
62.	*Momordica dioica*	Kattukaipaka	-
63.	*Momordica subangulata*	Kattupaval	Kattuhakhila
64.	*Monochoria vaginalis*	Karinkoovalam	-
65.	*Mucuna monosperma*	Kattupayar	-
66.	*Mukia maderaspatana*	Mukkapeera	-
67.	*Nymphaea nouchali*	Ambal	-
68.	*Ophioglossum reticulatum*	Nakkuneeti	-
69.	*Oxalis corniculata*	Puliyarila	Pulielai
70.	*Passiflora calcarata*	Kattuthakkali	-

71.	*Phoenix sylvestris*	Kattueenthu	-
72.	*Phyllanthus urinaria*	-	Keezharnelli
73.	*Physalis minima*	Motampuli	-
74.	*Persicaria chinensis*	Chorakam	-
75.	*Persicaria glabra*	Pulichapu	-
76.	*Portulaca oleracea*	Kozhuppacheera	Kozhuppasoppu
77.	*Pteridium aquilinum*	-	Thaivasoppu
78.	*Remusatia vivipara*	Marachembu	Marachebu
79.	*Solanum nigrum*	Mudungachapu	Ganagasopu
80.	*Sonerila rheedei*	Kundimaruma	-
81.	*Talinum cuneifolium*	Sambarcheera	-
82.	*Thespesia populnea*	Poovarasu	-
83.	*Waltheria indica*	Maracheera	-
84.	*Zehneria maysorensis*	Aliyanchappu	Katusoppu

Annexure 3: Wild fruits & seeds consumed by Paniya, Kattunaikka and Kuruma tribe

Sl. No.	Local name	Botanical name	Socio-cultural groups
1.	Athypazham	*Ficus racemosa*	K, P
2.	Arinjaval	*Syzygium densiflorum*	P, K
3.	Ayanichakka	*Artocarpus hirsutus*	K, Ku, P
4.	Chadachikkaya	*Grewia tiliifolia*	P, K
5.	Chakadahannu	*Schleichera oleosa*	K
6.	Chalir	*Flacourtia montana*	P Ku, K
7.	Chammikkaya	*Aponogeton appendiculatus*	P
8.	Chekkipazham	*Ixora coccinia*	K, P, K
9.	Deprahannu	*Diospyros melanoxylon*	K
10.	Eachil	*Aporosa lindleyana*	P
11.	Edavahannu	*Lea indica*	K
12.	Eenthukaya	*Cycas circinalis*	P, K
13.	Elanchipazham	*Mimusops elengi*	P
14.	Geruhannu	*Buchanania axillaris*	K
15.	Hallaekaya	*Grewia hirsute*	K
16.	Kalanthatta	*Sterculia foetida*	P
17.	Kandakarichunda	*Solanum xanthocarpum*	P, K, Ku
18.	Karinjavel	*Syzygium gardneri*	P, K
19.	Karuvachakka	*Solena amplexicaulis*	P, K
20.	Kattambazham	*Spondias indica*	P
21.	Kattubarli	*Coix lacryma-jobi*	P
22.	Kattuchakka	*Artocarpus heterophyllus*	K, Ku, P
23.	Kattujadikka	*Myristica malabarica*	P
24.	Kattukariveppu	*Clausena heptaphylla*	P, K
25.	Kattukodampuli	*Garcinia gummi-gutta*	P, K
26.	Kattumanga	*Mangifera indica*	P, K, Ku
27.	Kattumundhiri	*Rubus fulvus*	P, K
28.	Kattunjaval	*Syzygium laetum*	P, K
29.	Kattuthakkali	*Passiflora calcarata*	P
30.	Kirinda	*Scleropyrum pentandrum*	P
31.	Kongini	*Lantana camara*	P, Ka
32.	Koovalam	*Aegle marmelos*	P
33.	Kottamullu	*Zizyphus jujube*	P
34.	Kottapazham	*Zizyphus oenoplia*	P, Ku, K
35.	Kottilampazham	*Elaeocarpus tuberculatus*	P, K
36.	Mulayari	*Bambusa bambos*	P, K, Ku
37.	Kurukkanchunda	*Solanum ferox*	P, Ku, K

38.	Motampuli	*Physalis minima*	P, K, Ku
39.	Mottilthoory	*Baccaurea courtallensis*	P
40.	Mudungakaya	*Solanum nigrum*	P, Ku
41.	Mukayani	*Bridelia retusa*	P
42.	Mulluvalli	*Toddalia asiatica*	P
43.	Neelipazham	*Bischofia javanica*	P, K
44.	Nelli	*Phyllanthus emblica*	K, Ku, P
45.	Nendravally	*Bridelia scandens*	P
46.	Njarapazham	*Syzygium cumini*	P, K, Ku
47.	Njarapazham	*Syzygium caryophyllatum*	P
48.	Njenumkaya	*Gnetum ula*	P
49.	Njotanjodian	*Physalis mouritiana*	P
50.	Palakkai	*Palaquium ellipticum*	P, K
51.	Panlpazham	*Glycosmis pentaphylla*	P
52.	Pillandi	*Melastoma malabathricum*	P
53.	Pindichakka	*Tamilnadia uliginosa*	K, Ku, P
54.	Poochapazham	*Syzygium zeylanicum*	P
55.	Poodapazham	*Passiflora foetida*	P, K
56.	Putharichunda	*Solanum torvum*	P, K, Ku
57.	Thanikkuru	*Terminalia bellirica*	P, H
58.	Thodali	*Ziziphus rugosa*	P, Ku, K
59.	Tholnjaval	*Syzygium hemisphericum*	P, K
60.	Undanjaval	*Syzygium mundagam*	P, K

P - Paniya; K - Kattunaikka; Ku - Kuruma

Annexure 4: Wild Dioscorea species consumed by Kattunaikka tribe

Sl. No.	Scientific name	Local name	Available landscapes/ Habitat
1.	*Dioscorea hispida*	Kottunoora	Moist deciduous forests
2.	*Dioscorea hamiltonii*	Kaluvenni	Evergreen and moist deciduous forests
3.	*Dioscorea belophylla*	Hekku	Moist deciduous forests
4.	*Dioscorea wallichii*	Narra	Wayside bushes
5.	*Dioscorea oppositifolia*	Kavalakalasu	Evergreen and moist deciduous forests
6.	*Dioscorea wightii*	Erekalasu	Rocky grasslands
7.	*Dioscorea intermedia*	Shoddikalasu	Dry deciduous forests
8.	*Dioscorea pubera*	Boojikavala	Marshy areas
9.	*Dioscorea pentaphylla*	Noorakorana	Wayside bushes
10.	*Dioscorea tomentosa*	Salu	Moist deciduous forests
11.	*Dioscorea kalkapershadii*	Nara	Plantation & waysides
12.	*Dioscorea bulbifera*	Henderidae	Plantation & waysides

Annexure 5. Medicinal plants seen in and around paddy fields (used by Paniya and Kurichya tribe)

Sl.No.	Scientific name	Local name	Useful Parts
1.	*Cynodon dactylon*	Karuka	Whole plant
2.	*Curculigo orchioides*	Nilappana	Whole plant
3.	*Cyathula prostrata*	Cherukadaladi	Leaves
4.	*Biophytum sensitivum*	Mukutti	Leaves
5.	*Achyranthes aspera*	Valiyakadaladi	Whole plant
6.	*Hygrophila schulli*	Vayalchulli	Leaves
7.	*Boerhaavia diffusa*	Thazhuthama	Leaves
8.	*Emilia sonchifolia*	Muelchevi	Whole plant
9.	*Eclipta prostrata*	Kayyoonni	Whole plant
10.	*Vernonia cinerea*	Poovamkurunthala	Whole plant
11.	*Centella asiatica*	Kudakan /Muthil	Whole plant
12.	*Cyperus rotundus*	Muthanga Pullu	Root
13.	*Amaranthus spinosus*	Mullencheera	Whole plant
14.	*Phyllanthus amarus*	Kizharnelli	Whole plant
15.	*Bacopa monnieri*	Nirbrahmi	Whole plant
16.	*Solanum nigrum*	Kadumudunga	Whole plant
17.	*Alternanthera sessilis*	Ponnankanni	Leaves
18.	*Amaranthus viridis*	Kaalicheera	Whole plant
19.	*Waltheria indica*	Vayalcheera	Whole plant
20.	*Cassia tora*	Ponnanthakara	Leaves
21.	*Spilanthes calva*	Palluvedanachedi	Whole plant
22.	*Glinus oppositifolius*	Kaippanjira	Whole plant
23.	*Ageratum conyzoides*	Kattappa	Leaves/ flowers
24.	*Mollugo pentaphylla*	Vayalpullu	Whole plant
25.	*Crotalaria quinquefolia*	Kutharicha/ Komankuthiru	Leaves
26.	*Smithia conferta*	Thavalayila	Whole plant
27.	*Portulaca oleracea*	Pulinchappu	Whole plant
28.	*Lindernia anagallis*	Vattakopia	Whole plant
29.	*Persicaria chinensis*	Pillandi	Leaves
30.	*Scoparia dulcis*	Kallurukki	Whole plant
31.	*Bidens biternata*	Kandonakuthi	Leaves
32.	*Cleome monophylla*	Uppucheera	Leaves
33.	*Mimosa pudica*	Thottavadi	Whole plant
34.	*Grangea maderaspatana*	Mookkuvetti	Leaves

35.	*Euphorbia thymifolia*	Parpudam	Leaves
36.	*Colocasia esculenta*	Chembu	Whole part
37.	*Cardiospermum halicacabum*	Uzhinja	Whole plant
38.	*Sida rhombifolia*	Kurunthotti	Leaves
39.	*Hedyotis diffusa*	Vayalnelli	Leaves
40.	*Mukia maderaspatana*	Uyalamkochi	Whole plant
41.	*Ludwigia hyssopifolia*	Vayalpoovu	Whole plant
42.	*Drymaria cordata*	Uzhavu	Whole plant
44.	*Oxalis corniculata*	Puliyarila	Whole plant
45.	*Leucas aspera*	Thumba	Leaves

Annexure 6: Wild edible plants used as medicine by Paniya, Kuruma and Kattunaikka tribe

Sl.No.	Scientific name	Useful part	Other uses
1.	*Portulaca oleracea*	Leaves	For curing stomach ache
2.	*Achyranthes aspera*	Roots	For curing yellow colouration of skin among children
3.	*Aegle marmelos*	Leaves	Leaf extract used against nerve pains
4.	*Aerva lanata*	Leaves/petioles	Leaves together with thulasi used against cough
5.	*Alternanthera sessilis*	Leaves	Leaves extract used against snakebite
6.	*Amaranthus spinosus*	Leaves/petioles	Against stomach ailment extract of plant is used
7.	*Anacardium occidentale*	Fruits	Leaf chewed against mouth ulcer
8.	*Arisaema tortuosum*	Leaves	Leaf extract is used to prepare hair oil
9.	*Artocarpus heterophyllus*	Leaves	Leaf used against stomach ache
10.	*Artocarpus hirsutus*	Leaves	Leaf extract used against cough and against itching in children
11.	*Azadirachta indica*	Leaves	Against wasp stings leaf extract is used
12.	*Bacopa monnieri*	Whole plant	To cure cracks on leg
13.	*Bambusa bambos*	Fruits	Used against stomach pain
14.	*Bidens biternata*	Leaves	Leaf extract is given to pregnant women for easy delivery
15.	*Boerhavia diffusa*	Leaves	Leaf extract is used against intermittent fever
16.	*Capsicum frutescens*	Seeds /tender leaves	Stem peelings used against wounds and leaves to cure stomach problems after delivery
17.	*Caryota urens*	Stem	Stem fiber is used for cleaning purpose

18.	*Cassia fistula*	Leaves	Leaf extract used against boils. Root flour together with milk is used as a remedy to increase lactation in women
19.	*Centella asiatica*	Leaves	Leaf extract used against swellings
20.	*Cleome viscosa*	Fruits/leaves	Leaf extract is used against burning and intermittent fever
21.	*Coccina grandis*	Fruits /leaves	Leaf extract is used against pimple
22.	*Commelina benghalensis*	Leaves	Against dysentery leaf extract is used
23.	*Curculigo orchioides*	Root tuber	Root powder used as a flavoring agent. It is used against urinary infection
24.	*Cyperus bifax*	Leaves /fruits	Whole plant used against kidney stone and against headache leaf extract is used
25.	*Dioscorea esculenta*	Leaf /petiole	Leaf extract used against cough
26.	*Eclipta prostrate*	Whole plant	Against Jaundice powdered roots is used. Also used against discoloration of skin
27.	*Ficus racemosa*	Leaves /fruits	Leaf is used to cure muscle pain
28.	*Garcinia gummi-gutta*	Fruits	Fruit extract is used against wound. Leaf extract is applied on fore head against headache
29.	*Glinus oppositifolius*	Whole plant	Whole plant is used against kidney stone
30.	*Hemidesmus indicus*	Leaves	Leaf extract is used for washing hairs
31.	*Hygrophilla spinosa*	Leaves	Leaf extract used against jaundice
32.	*Leucas aspera*	Leaves	Leaf extract used to cure skin irritation together with curcuma.
33.	*Luffa acutangula*	Flowers	Flowers for 'Pooja' purposes in Temples.

34.	*Maranta arundinacea*	Tuber	Tuber extract used against burning cholera & dysentery
35.	*Mimosa pudica*	Leaves	Leaves used against itching of skin
36.	*Momordica subangulata*	Leaves / fruits /flowers	Extract applied on forehead against headache
37.	*Monochoria vaginalis*	Leaves	Leaf extract used against stomach pain
38.	*Moringa oleifera*	Leaves	Leaf extract used against wounds
39.	*Mussaenda frondosa*	Fruits & plant Juice	Itching is cured by the use of plant's milky juice
40.	*Nymphaea stellata*	Leaves	Leaf extract used against wounds
41.	*Oxalis corniculata*	Leaves	Leaf extract used to cure wounds
42.	*Persicaria chinensis*	Leaves / petioles	Leaf juice used against ulcer
43.	*Phyllanthus emblica*	Leaves	Leaf extract used against boil
44.	*Physalis minima*	Fruits	Shade dried powdered fruits used against diabetes
45.	*Asparagus racemosus*	Leaves	The leaves extract used against dysentery
46.	*Senna tora*	Leaves	The plant extract induces urination
47.	*Sida rhombifolia*	Leaves	Leaves used for preparing medicine against swelling in joint
48.	*Solanum indicum*	Fruits	Dried fruits are used against throat pain
49.	*Solanum nigrum*	Leaves	Leaf extract used against wounds
50.	*Tamarindus indica*	Leaves	Leaves used against wounds
51.	*Waltheria indica*	Roots	Plant root is used against rheumatism

Annexure 7. List of publications

- **Ratheesh Narayanan M.K**., Balakrishnan, V. & Anil Kumar N. 2002. *Coping role of wild edibles- a case study from Paniya tribes of Wayanad District, India*. Agro Biodiversity Source Book, Philippines.
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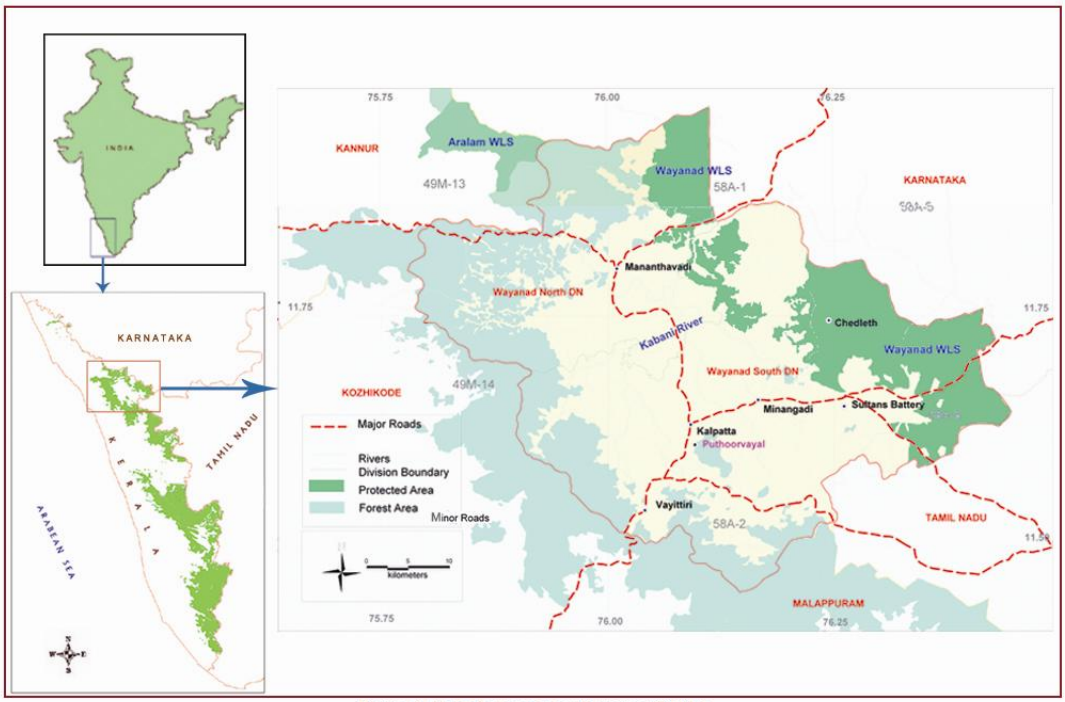


Figure 1. Map of study area: Wayanad District



a. Shola forest - Chembra peak

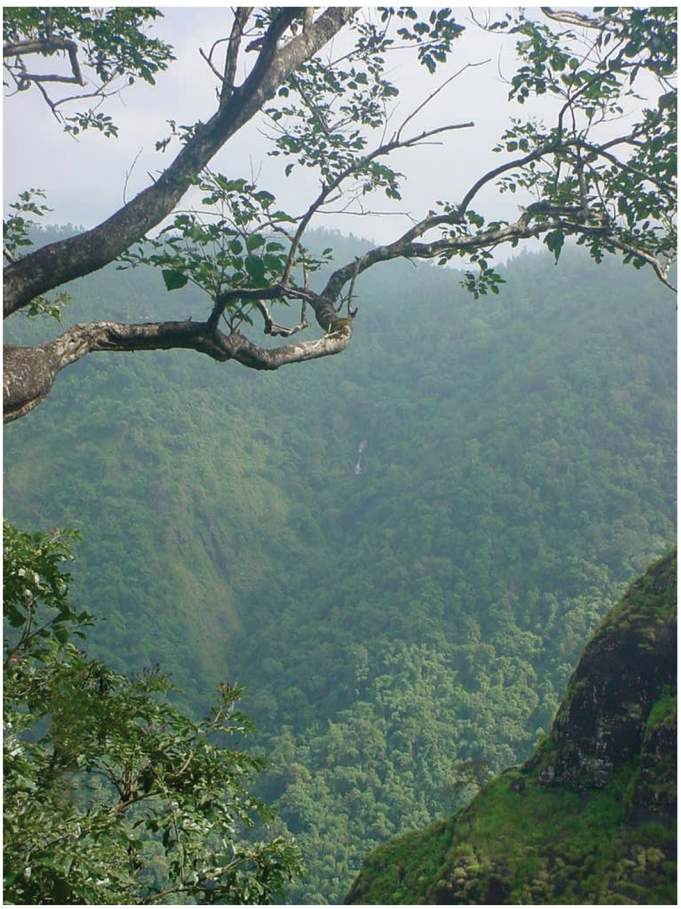


b. Shola forest with rolling grasslands - Chembra hills

PLATE 1



a. Evergreen Forest - Kurichiarmala



b. Evergreen forets - Soojipara

PLATE 2



a. Dry deciduous forest - Muthanga



b. Moist deciduous forest - Tholpetty

PLATE 3



a. Marshes inside the evergreen forest - Kurichiarmala



b. Grasslands - Chembra

PLATE 4



a. Banasuramala



b. Banasurasagar dam site

PLATE 5



a. Brahmagiri hills



b. Bamboo breakes - Muthanga

PLATE 6



a. Natural lake - Pookodu



b. Riparian vegetation - Kuruva Island

PLATE 7



a. Vegetation at Edakal rocks



b. Tea estate - Meppady

PLATE 8



a. *Artabotrys zeylanicus* Hook.f. & Thoms.



b. *Cyathocalyx zeylanica* Champ. ex Hook. f. & Thoms.



c. *Desmos lawii* (Hook. f. & Thoms.) Safford



d. *Goniothalamus cardiopetalus* (Dalz.) Hook.f.& Thoms.



e. *Goniothalamus wynaadensis* (Bedd.) Bedd.



f. *Miliusa gokhalae* Ratheesh *et al.*



g. *Miliusa nilagirica* Bedd.



h. *Miliusa wayanadica* Ratheesh *et al.* - Flower



i. *Miliusa wayanadica* Ratheesh *et al.* - Fruits



j. *Orophea erythrocarpa* Bedd.



k. *Orophea sivarajanii* Sasidh.



l. *Phaeanthus malabaricus* Bedd.



a. *Polyalthia coffeoides* Hook.f. & Thoms.



b. *Capparis moonii* Wight



c. *Capparis rheedei* DC.



d. *Casearia rubescens* Dalz.



e. *Casearia tomentosa* Roxb.



f. *Casearia wynadensis* Bedd.



g. *Hydnocarpus macrocarpa* (Bedd.) Warb.



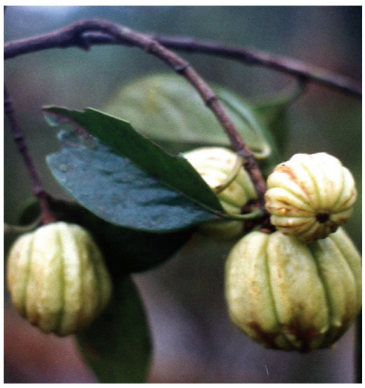
h. *Hydnocarpus pentandra* (Buch.-Ham.) Oken



i. *Calophyllum austroindicum* Kosterm. ex Stevens



j. *Calophyllum calaba* L.



k. *Garcinia gummi-gutta* (L.) Robson



l. *Garcinia morella* (Gaertn.) Desv.



a. *Mesua thwaitesii* Planch. & Triana



b. *Poeciloneuron indicum* Bedd.



c. *Hopea ponga* (Dennst.) Mabb.



d. *Vateria indica* L.



e. *Ancistrocladus heyneanus* Wall. ex Graham



f. *Abelmoschus angulosus* Wall. ex Wight & Arn. var. *grandiflorus* Thw.



g. *Decaschistia crotonifolia* Wight & Arn.



h. *Cullenia exarillata* Robyns



i. *Pterospermum reticulatum* Wight & Arn.



j. *Pterospermum rubiginosum* Heyne ex Wight & Arn.



k. *Grewia gamblei* Drumm. ex Dunn



l. *Elaeocarpus tuberculatus* Roxb.



a. *Elaeocarpus munronii* (Wight) Mast.



b. *Erythroxylum moonii* Hochr.



c. *Aspidopterys canarensis* Dalz.



d. *Impatiens gardneriana* Wight



e. *Impatiens parasitica* Bedd.



f. *Aglaia malabarica* Sasidh.



g. *Atalantia monophylla* (L.) DC.



h. *Atalantia racemosa* Wight



i. *Atalantia wightii* Tanaka



j. *Dysoxylum malabaricum* Bedd.



k. *Luvunga eleutherandra* Dalz.



l. *Paramignya beddomei* Tanaka



a. *Apodytes dimidiata* Meyer ex Arn.



b. *Euonymus angulatus* Wight



c. *Euonymus indicus* Heyne ex Roxb.



d. *Glyptopetalum grandiflorum* Bedd. - Flowers



e. *Glyptopetalum grandiflorum* Bedd. - Fruit



f. *Nothapodytes nimmoniana* (Graham) Mabberly



g. *Salacia beddomei* Gamble



h. *Salacia macrosperma* Wight



i. *Sarcostigma kleinii* Wight & Arn.



j. *Leea guineensis* G. Don



k. *Otonephelium stipulaceum* (Bedd.) Radlk.



l. *Buchanania lanzan* Spreng. - Bark

PLATE 13



a. *Buchanania lanzan* Spreng. - Fruit



b. *Gluta travancorica* Bedd.



c. *Semecarpus anacardium* L. - Bark



d. *Semecarpus auriculata* Bedd.



e. *Solenocarpus indicus* Wight & Arn.



f. *Cajanus lineatus* (Wight & Arn.) van der Maesen



g. *Crotalaria nana* Burm.f.



h. *Derris brevipes* (Benth.) Baker



i. *Kunstleria keralensis* Mohanan & Nair



j. *Mucuna gigantea* (Willd.) DC.



k. *Spatholobus purpureus* Benth.



l. *Tephrosia purpurea* (L.) Pers.



a. *Vigna vexillata* (L.) A. Rich.



b. *Bauhinia malabarica* Roxb.



c. *Bauhinia phoenicea* Wight & Arn.



d. *Caesalpinia spicata* Dalz.



e. *Cynometra beddomei* Prain - Flowers



f. *Cynometra beddomei* Prain - Fruits



g. *Cynometra travancorica* Bedd.



h. *Entada rheedei* Spreng.



i. *Humboldtia brunonis* Wall.



j. *Kingiodendron pinnatum* (Roxb. ex DC.) Harms



k. *Rubus ellipticus* Smith



l. *Rubus niveus* Thunb.



a. *Parnassia mysorensis* Heyne ex Wight & Arn.



b. *Atuna indica* (Bedd.) Kosterm.



c. *Kalanchoe grandiflora* Wall.



d. *Drosera burmannii* Vahl



e. *Drosera indica* L.



f. *Drosera peltata* Smith



g. *Myriophyllum oliganthum* (Wight & Arn.) F. v. Muell.



h. *Quisqualis malabarica* Bedd.



i. *Terminalia travancorensis* Wight & Arn.



j. *Eugenia argentea* Bedd.



k. *Meteromyrtus wynaadensis* (Bedd.) Gamble - Flower



l. *Meteoromyrtus wynaadensis* (Bedd.) Gamble - Fruit

PLATE 16



a. *Lagerstroemia microcarpa* Wight



b. *Syzygium calophyllifolium* Walp.



c. *Syzygium densiflorum* Wall. ex Wight & Arn.



d. *Syzygium gardneri* Thw.



e. *Syzygium grande* (Wight) Walp.



f. *Syzygium hemisphericum* (Wight) Alston



g. *Syzygium laetum* (Buch.-Ham.) Gandhi



h. *Syzygium lanceolatum* (Lamk.) Wight & Arn.



i. *Syzygium mundagam* (Bourd.) Chithra.



j. *Syzygium munronii* (Wight) Chandr.



k. *Syzygium stocksii* (Duthie) Gamble



l. *Syzygium travancoricum* Gamble



a. *Medinilla beddomei* Clarke in Hook. f.



b. *Medinilla malabarica* Bedd.



c. *Memecylon gracile* Bedd.



d. *Memecylon lawsonii* Gamble



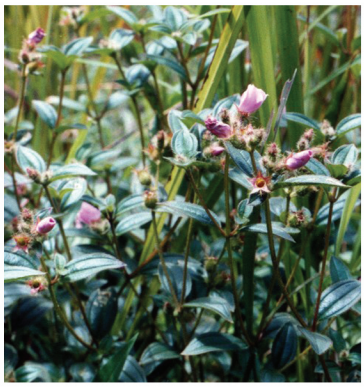
e. *Memecylon randerianum* S.M. & M. R. Almeida



f. *Memecylon sisparense* Gamble



g. *Osbeckia cupularis* D.Don ex Wight & Arn.



h. *Osbeckia muralis* Naud.



i. *Osbeckia wynaadensis* Clarke



j. *Sonerila rheedei* Wight & Arn.



k. *Sonerila rotundifolia* Bedd.



l. *Sonerila versicolor* Wight var. *axillaris* (Wight) Gamble

PLATE 18



a. *Rotala rosea* (Poir.) Cook.



b. *Diplocyclos palmatus* (L.) Jeffrey



c. *Momordica subangulata* Blume



d. *Solena amplexicaulis* (Lam.) Gandhi



e. *Trichosanthes nervifolia* L. - ripened fruit



f. *Trichosanthes nervifolia* L. - fruit



g. *Zehneria maysorensis* (Wight & Arn.) Arn. var. *maysorensis*



h. *Begonia malabarica* Lamk.



i. *Argostemma courtallense* Arn.



j. *Canthium angustifolium* Roxb.



k. *Canthium neilgherrense* Wight



l. *Canthium rheedei* DC.



a. *Canthium travancoricum* (Bedd.) Hook. f.



b. *Haldina cordifolia* (Roxb.) Ridsd.



c. *Hedyotis leschenaultiana* DC. var. *leschenaultiana*



d. *Hedyotis neesiana* Arn.



e. *Hedyotis wynaadensis* (Gamble) Rao & Hemadri



f. *Hymenodictyon obovatum* Wall.



g. *Ixora brachiata* Roxb. ex DC.



h. *Ixora elongata* Heyne ex G. Don



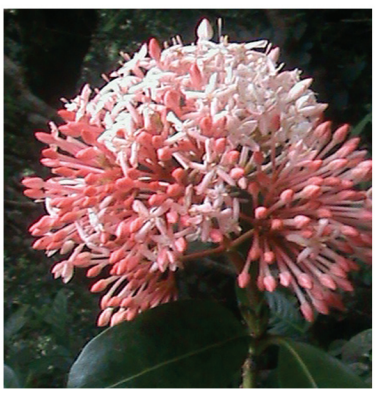
i. *Ixora lawsonii* Gamble



j. *Ixora nigricans* R. Br. ex Wight & Arn.



k. *Ixora polyantha* Wight



l. *Ixora sivarajiana* Pradeep



a. *Lasianthus jackianus* Wight



b. *Mussaenda frondosa* L.



c. *Neanotis monosperma* (Wall. ex Wight & Arn.) Lewis



d. *Neurocalyx calycinus* (R. Br. ex Bennett) Robinson



e. *Ochreinauclea missionis* (Wall. ex G. Don) Ridsdale



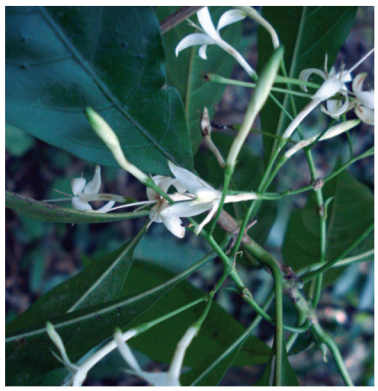
f. *Ophiorrhiza hirsutula* Wight ex Hook. f.



g. *Oxyceros rugulosus* (Thw.) Tirveng.



h. *Pavetta indica* L.



i. *Pavetta travancorica* Bremek



j. *Psilanthus travancorensis* (Wight & Arn.) Leroy



k. *Saprosma glomeratum* (Gard.) Bedd.



l. *Tamilnadia uliginosa* (Retz.) Triveng. & Sastry - Flower



a. *Tamilnadia uliginosa* (Retz.) Triveng. & Sastry - Fruit



b. *Tarenna nilagirica* (Bedd.) Bremek.



c. *Ardisia amplexicaulis* Bedd.



d. *Ardisia pauciflora* Heyne ex Roxb.



e. *Ardisia solanacea* Roxb.



f. *Embelia tsjeriam-cottam* (Roem. & Schult.) DC.



g. *Isonandra lanceolata* Wight



h. *Madhuca longifolia* (Koenig) J.F. Macbr.



i. *Palaquium ellipticum* (Dalz.) Baill.



j. *Vernonia arborea* Buch.-Ham.



k. *Diospyros nilagirica* Bedd.



l. *Diospyros peregrina* (Gaertn.) Gurke



a. *Symplocos wynadense* (O.Ktze.) Nooteb.



b. *Jasminum coarctatum* Roxb.

c. *Jasminum flexile* Vahl



d. *Jasminum malabaricum* Wight



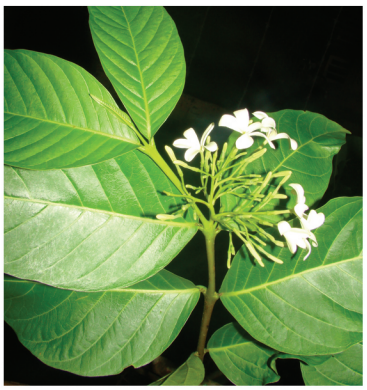
e. *Schrebera swietenioides* Roxb.



f. *Beaumontia jerdoniana* Wight



g. *Carissa inermis* Vahl



h. *Holarrhena pubescens* (Buch.-Ham.) Wall. ex G. Don.



i. *Kammetia caryophyllata* (Roxb.) Nicols. & Suresh



j. *Rauvolfia verticillata* (Lour.) Baill.



k. *Tabernaemontana alternifolia* L.



l. *Ceropegia metziana* Miq.



a. *Gymnema sylvestre* (Retz.) R. Br. ex Schult.



b. *Hoya wightii* Hook. f.



c. *Hemidesmus indicus* (L.) R. Br. var. *pubescens* (Wight & Arn.) Hook. f.



d. *Strychnos colubrina* L.



e. *Canscora perfoliata* Lamk.



f. *Exacum tetragonum* Roxb.



g. *Cordia wallichii* G. Don



h. *Argyreia cuneata* (Willd.) Ker-Gawl.



i. *Argyreia elliptica* (Roth) Choisy



j. *Argyreia hirsuta* Wight & Arn.



k. *Erycibe paniculata* Roxb.



l. *Aeginetia pedunculata* Wall.



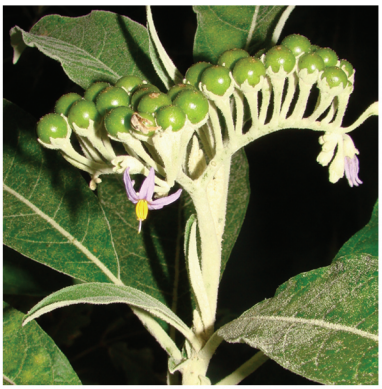
a. *Aeginetia pedunculata* Wall.



b. *Lycianthes laevis* (Dunal) Bitter



c. *Solanum giganteum* Jacq. - Flowers



d. *Solanum giganteum* Jacq. - Fruit



e. *Aeschynanthus perrottetii* A.DC.



f. *Jerdonia indica* Wight



g. *Dolichandrone arcuata* (Wight) Clarke



h. *Radermachera xylocarpa* (Roxb.) K. Schum.



i. *Barleria courtallica* Nees



j. *Eranthemum capense* L.



k. *Justicia santapaui* Bennet



l. *Callicarpa tomentosa* (L.) Murray



a. *Premna coriacea* Clarke



b. *Premna tomentosa* Willd.



c. *Anisomeles indica* (L.) O. Ktze.



d. *Colebrookea oppositifolia* Smith



e. *Leucas beddomei* (Hook. f.) Sunojkumar & Mathew



f. *Gomphostemma heyneanum* Benth. var. *heyneanum*



g. *Gomphostemma heyneanum* Benth. var. *heyneanum*



h. *Pogostemon rotundatus* Benth.



i. *Indobanalia thyrsiflora* (Moq.) Henry & Roy



j. *Lepianthes umbellata* (L.) Rafin.



k. *Peperomia tetraphylla* (G.Forst.) Hook. & Arn.



l. *Piper mullesua* Buch.-Ham. ex D. Don

PLATE 26



a. *Cinnamomum malabatrum* (Burm. f.) Blume



b. *Knema attenuata* (Hook. f. & Thoms.) Warb.



c. *Myristica beddomei* King ssp. *beddomei* de Wilde



d. *Myristica malabarica* Lamk.



e. *Balanophora fungosa* J. R. & G. Forst. ssp. *indica* (Arn.) Hansen



f. *Agrostistachys indica* Dalz.



g. *Antidesma alexiteria* L.



h. *Baccaurea courtallensis* (Wight) Muell.-Arg.



i. *Briedelia stipularis* (L.) Blume



j. *Croton malabaricus* Bedd.



k. *Daphniphyllum neilgherrense* (Wight) K. Rosenth.



l. *Homonoia riparia* Lour.

PLATE 27



a. *Paracroton pendulus* (Hassk.) Miq. ssp. *zeylanicus* (Thw.) Balakr. & Chakrab.



b. *Phyllanthus indofischeri* Bennet



c. *Phyllanthus indofischeri* Bennet



d. *Dendrocnide sinuata* (Blume) Chew



e. *Dorstenia indica* Wall. ex Wight



f. *Ficus laevis* Blume var. *macrocarpa* (Miq.) Corner



g. *Acanthephippium bicolor* Lindl.



h. *Aerides crispa* Lindl.



i. *Aerides ringens* (Lindl.) Fischer



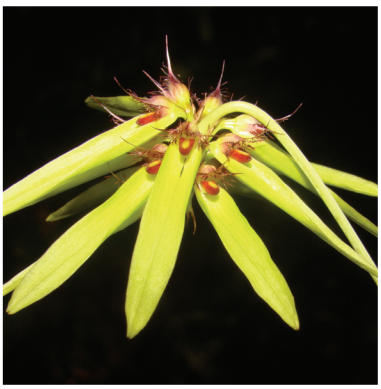
j. *Brachycorythis iantha* (Wight) Summerh.



k. *Bulbophyllum acutiflorum* A. Rich.



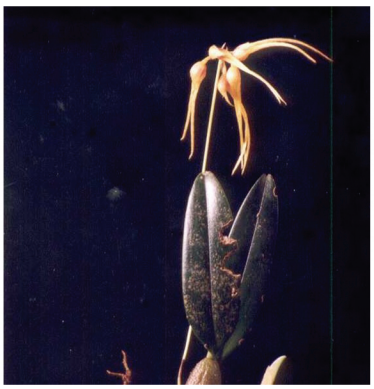
l. *Bulbophyllum aureum* (Hook. f.) J.J. Smith



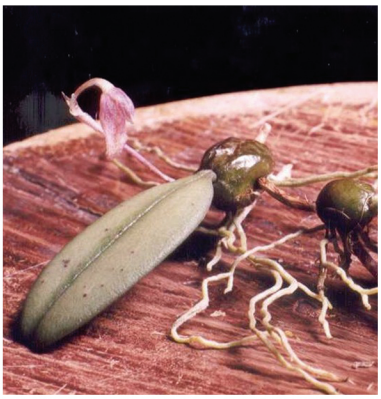
a. *Bulbophyllum fimbriatum* (Lindl.) Rchb. f.



b. *Bulbophyllum fischeri* Seidenf.



c. *Bulbophyllum kaitense* (Wt.) Reichb.f.



d. *Bulbophyllum rheedei* Manilal & Sathish



e. *Bulbophyllum silentvalliensis* Sharma & Srivastava



f. *Bulbophyllum sterile* (Lamk.) Suresh



g. *Bulbophyllum tremulum* Wight



h. *Calanthe sylvatica* (Thouars) Lindl.



i. *Chiloschista fasciata* (Muell.) Seidenf. & Ormerod



j. *Cleisostoma tenuifolium* (L.) Garay



k. *Coelogyne breviscapa* Lindl.



l. *Coelogyne nervosa* A. Rich.



a. *Conchidium braccatum* (Lindl.) Brieger



b. *Conchidium filiforme* (Wight) Rauschert



c. *Conchidium nanum* (A.Rich.) Brieger



d. *Cymbidium bicolor* Lindl.



e. *Dendrobium aphyllum* (Roxb.) Fischer



f. *Dendrobium aqueum* Lindl.



g. *Dendrobium crepidatum* Lindl.



h. *Dendrobium haemoglossum* Thw.



i. *Dendrobium herbaceum* Lindl.



j. *Dendrobium heterocarpum* Lindl.



k. *Dendrobium heyneanum* Lindl.



l. *Dendrobium microbulbon* A. Rich.



a. *Dendrobium nutans* Lindl.



b. *Dendrobium ovatum* (L.) Kranz.



c. *Dendrobium peguanum* Lindl.



d. *Epipogium roseum* (D. Don) Lindl.



e. *Eria albiflora* Rolfe.



f. *Eria exilis* Hook. f.



g. *Eria mysorensis* Lindl.



h. *Eria polystachya* A. Rich.



i. *Eria tiagii* Manilal *et al.*



j. *Eulophia epidendraea* (Koenig) Schltr.



k. *Eulophia pulchra* (Thouars) Lindl.



l. *Eulophia spectabilis* (Dennst.) Suresh



a. *Gastrochilus acaulis* (Lindl.) O. Kuntze.



b. *Gastrochilus flabelliformis* (Blatt. & McCann) Sald.



c. *Gastrochilus obliquus* (Lindl.) Kuntze



d. *Habenaria brachyphylla* (Lindl.) Aitch.



e. *Habenaria crinifera* Lindl.



f. *Habenaria heyneana* Lindl..



g. *Habenaria longicorniculata* Graham



h. *Habenaria longicornu* Lindl.



i. *Habenaria perrottetiana* A. Rich.



j. *Habenaria rariflora* A.Rich.



k. *Habenaria roxburghii* (Pers.) Nicols.



l. *Ipsea malabarica* (Rchb.f.) Hook.f.



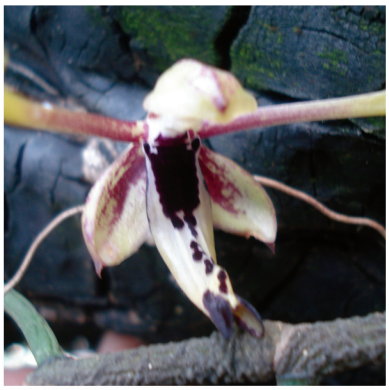
a. *Kingidium mysorensis* (Sald.) Sathish



b. *Liparis caespitosa* (Lam.) Lindl.



c. *Luisia birchea* (A. Rich.) Blume



d. *Luisia evangelinae* Blatt. & McCann



e. *Luisia macrantha* Blatt. & Mc Cann.



f. *Oberonia bicornis* Lindl.



g. *Oberonia brachyphylla* Blatt. & McCann



h. *Oberonia brunoniana* Wight



i. *Oberonia chandrasekharanii* V.J. Nair *et al.*



j. *Oberonia ferruginea* Parish ex Hook.f.



k. *Oberonia forcipata* Lindl.



l. *Oberonia josephii* Saldanha



a. *Oberonia mucronata* (D. Don) Ormerod & Seidenf.



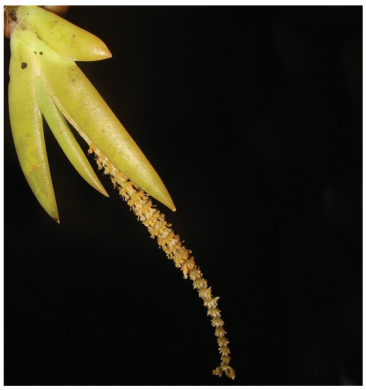
b. *Oberonia santapaui* Kapad.



c. *Oberonia swaminathanii* Ratheesh *et al.*



d. *Oberonia tenuis* Lindl.



e. *Oberonia verticillata* Wight



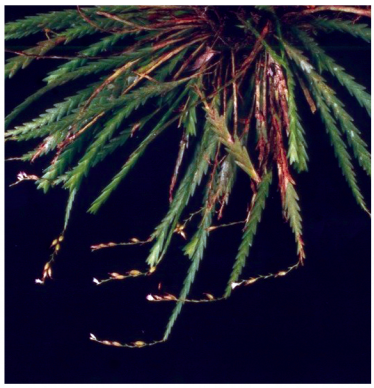
f. *Papilionanthe cylindrica* (Lindl.) Seidenf.



g. *Peristylus goodyeroides* (D. Don) Lindl.



h. *Pholidota imbricata* Hook.



i. *Podochilus malabaricus* Wight



j. *Pteroceras leopardinum* (Parish & Rchb. f.) Seidenf. & Smitin.



k. *Robiquetia gracilis* (Lindl.) Garay



l. *Seidenfia densiflora* (A. Rich.) Szlach.



a. *Seidenfia intermedia* (A. Rich.) Szlach.



b. *Sirhookera lanceolata* (Wight) O. Kuntze



c. *Tainia bicornis* (Lindl.) Rchb.f.



d. *Thelasis pygmaea* (Griff.) Lindl.



e. *Thrixspermum walkeri* Seidenf. & Ormerod



f. *Trias stocksii* Benth. ex Hook. f.



g. *Trichoglottis tenera* (Lindl.) Rchb.f.



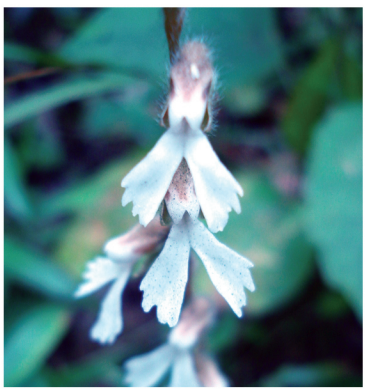
h. *Vanda testacea* (Lindl.) Rchb.f.



i. *Vanda thwaitesii* Hook. f.



j. *Zeuxine gracilis* (Breda) Blume



k. *Zeuxine longilabris* (Lindl.) Benth. ex Hook. f.



l. *Curcuma pseudomontana* Graham

PLATE 35



a. *Curcuma zanthorrhiza* Roxb.



b. *Zingiber neesanum* (Graham) Ramam.



c. *Zingiber zerumbet* (L.) J.E. Smith



d. *Ensete superbum* (Roxb). Cheesm.



e. *Dioscorea belophylla* Voigt



f. *Dioscorea bulbifera* L.



g. *Dioscorea hamiltonii* Hook.f.



h. *Dioscorea hispida* Dennst. - Tuber



i. *Dioscorea intermedia Thw.*



j. *Dioscorea pentaphylla* L. - Tuber



k. *Dioscorea tomentosa* Koenig ex Spreng. - Tuber



l. *Chlorophytum indicum* (Willd. ex Schult. & Schult.f.) Dress

PLATE 36



a. *Chlorophytum malabaricum* Baker



b. *Lilium wallichianum* Schultes & Schultes f.



c. *Pancratium triflorum* Roxb.



d. *Arenga wightii* Griff.



e. *Calamus thwaitesii* Becc.



f. *Calamus vattayila* Renuka



g. *Pinanga dicksonii* (Roxb.) Blume



h. *Amorphophallus paeoniifolius* (Dennst.) Nicols.



i. *Anaphyllum wightii* Schott



j. *Arisaema tortuosum* (Wall.) Schott



k. *Cryptocoryne retrospiralis* (Roxb.) Kunth



l. *Dimeria mooneyi* Raizada ex Mooney

PLATE 37

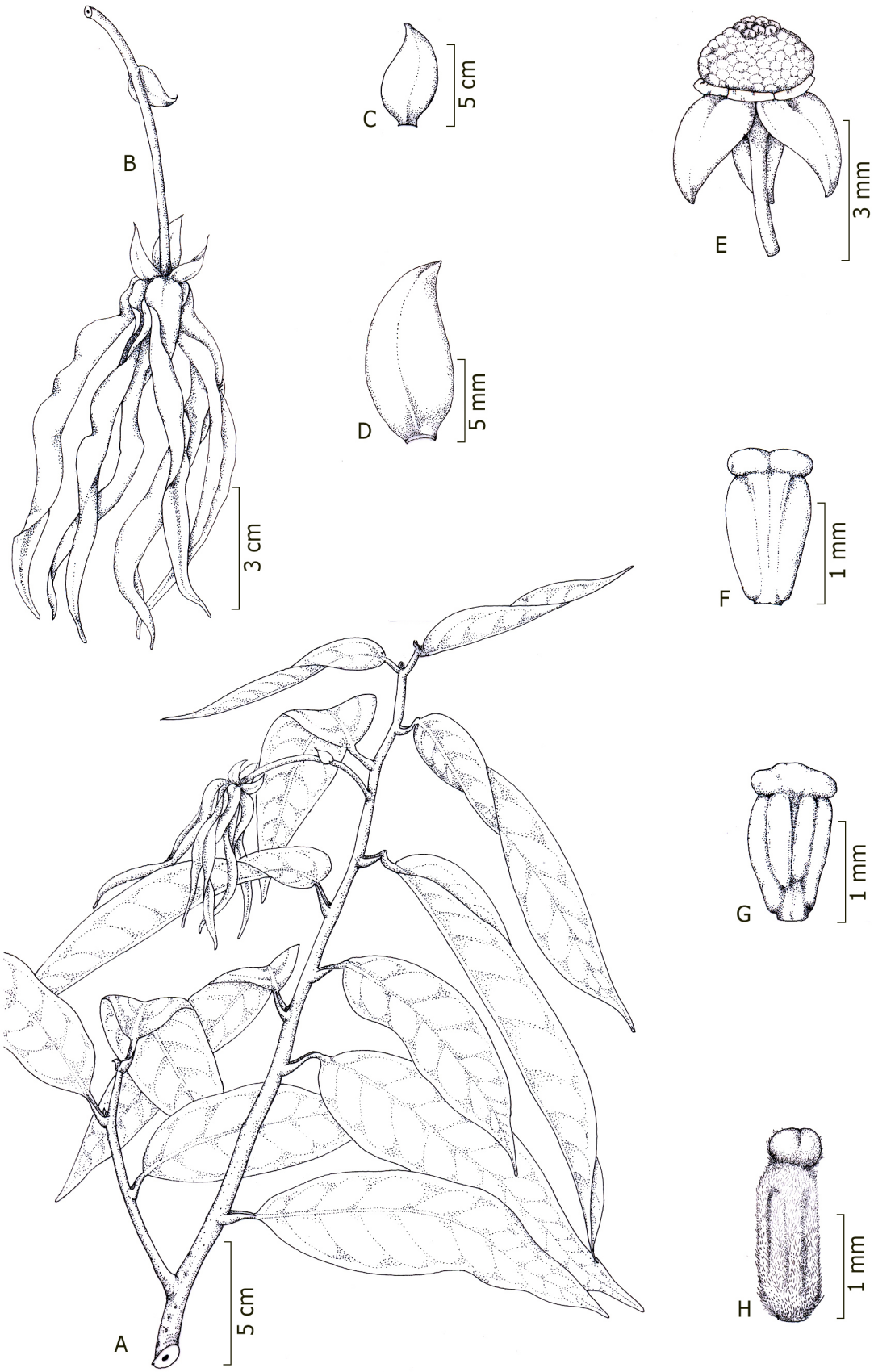


Figure 9. *Desmos lawii* (Hook. f. & Thoms.) Safford: A. Flowering twig; B. Flower; C. Calyx; D. Outer petal; E. Flower with inner petals removed showing stamens and carpels; F. Stamen - adaxial view; G. Stamen - abaxial view; Stamen; H. Single pistil

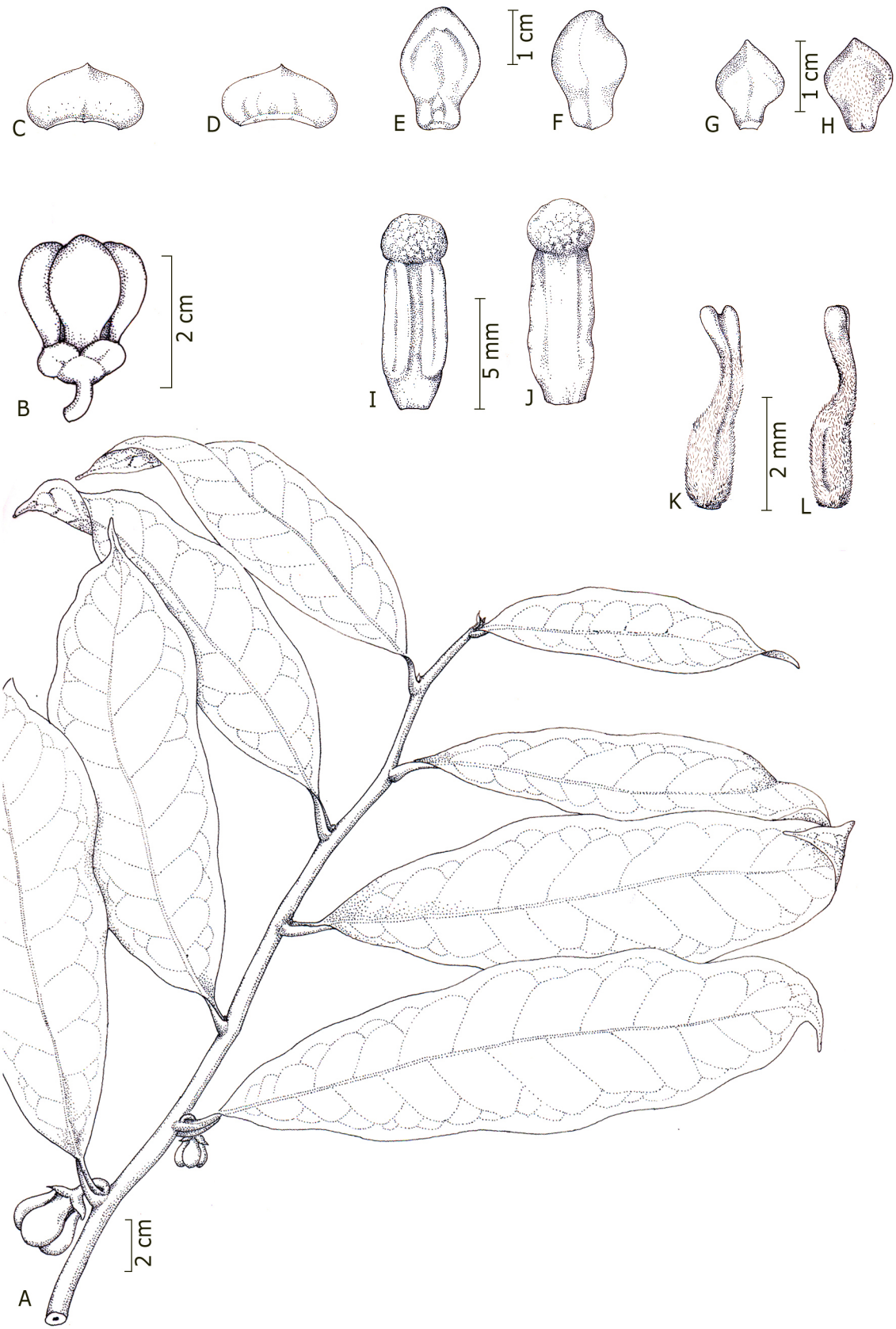


Figure 10. *Goniothalamus cardiopetalus* (Dalz.) Hook. f. & Thoms.: A. Flowering twig; B. Flower; C. Sepal - abaxial view; D. Sepal - adaxial view; E. Outer petal - abaxial view; F. Outer petal - adaxial view; G. Inner petal - abaxial view; H. Inner petal - adaxial view; I. Stamen - abaxial view; J. Stamen - adaxial view; K. Pistil - abaxial view; L. Pistil - adaxial view

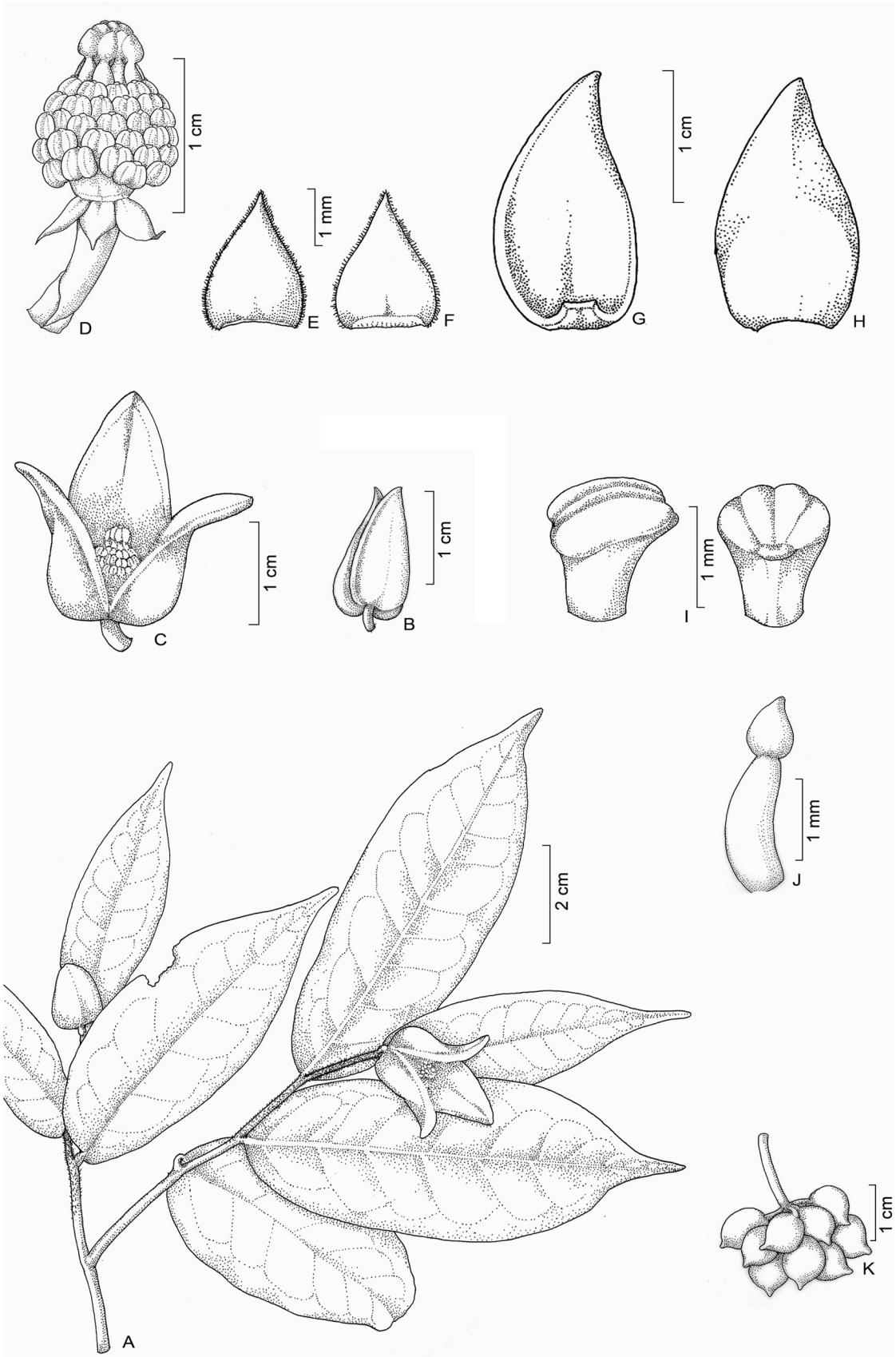


Figure 11. *Miliusa gokhalae* Ratheesh, Sujanapal, Anil Kumar & Sivad.: A. Flowering twig; B. Flower bud; C. Flower; D. Flower with outer petals removed showing stamens and carpels; E. Sepal - dorsal view; F. Sepal - ventral view; G. Inner petal - dorsal view; H. Inner petal - ventral view; I. Stamen; J. Single pistil; K. Fruits



Figure 12. *Miliusa nilagirica* Bedd.: A. Flowering twig; B. Flower bud; C. Flower; D. Inner petal; E. Flower with inner petals removed showing stamens and carpels; F. Stamen - abaxial view; G. Stamen - adaxial view; H. Single pistil

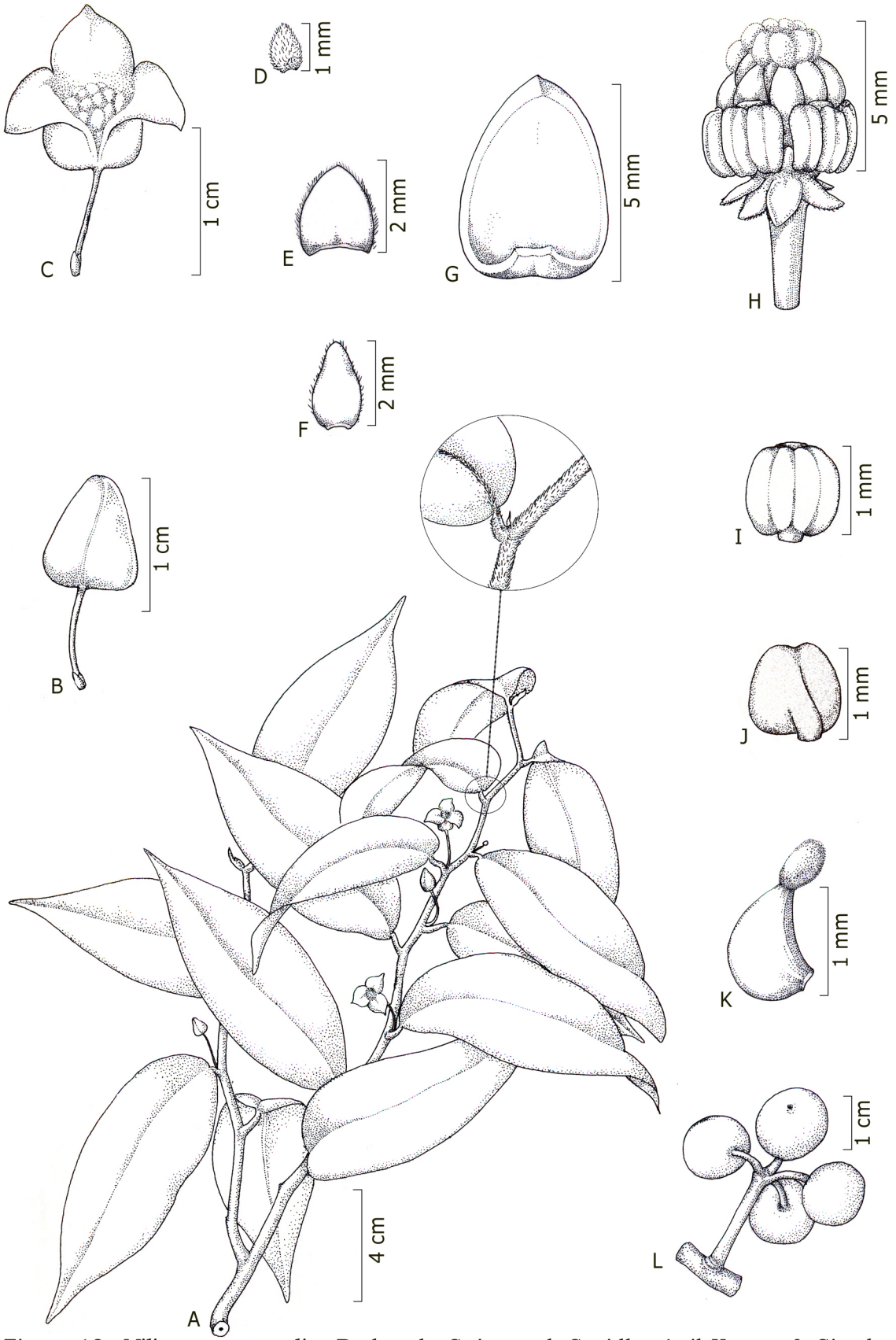


Figure 13. *Miliusa wayanadica* Ratheesh, Sujanapal, Sasidh., Anil Kumar & Sivad.: A. Flowering twig; B. Flower bud; C. Flower; D. Bract; E. Sepal; F. Outer petal; G. Inner petal; H. Flower with inner petals removed showing stamens and carpels; I. Stamen - abaxial view; J. Stamen - adaxial view; K. Single pistil; L. Fruit

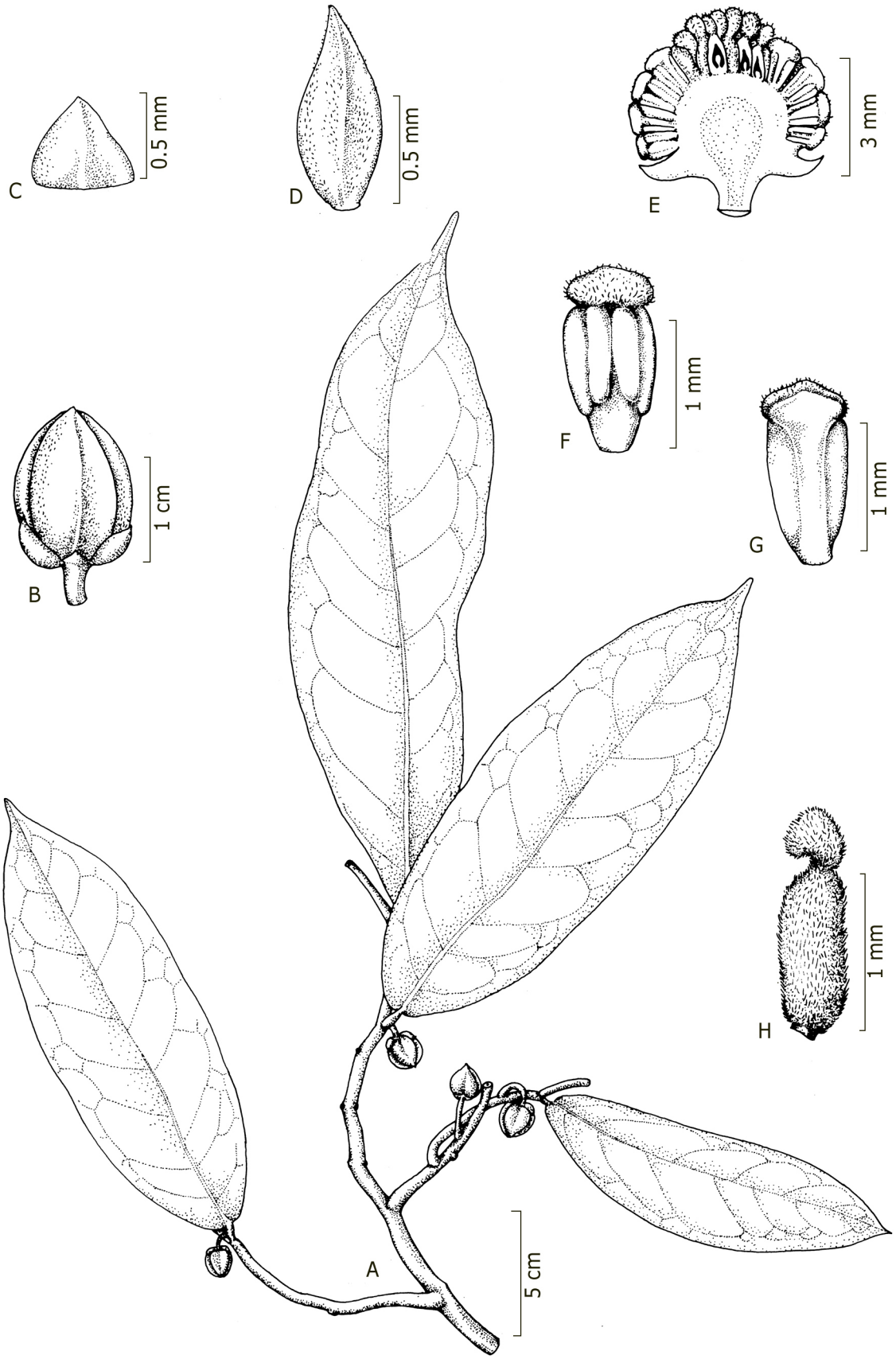


Figure 14. *Phaeanthus malabaricus* Bedd.: A. Flowering twig; B. Flower; C. Sepal; D. Petal; E. L. S. through torus with carpels and stamens; F. Stamen - abaxial view; G. Stamen - adaxial view; H. Single pistil

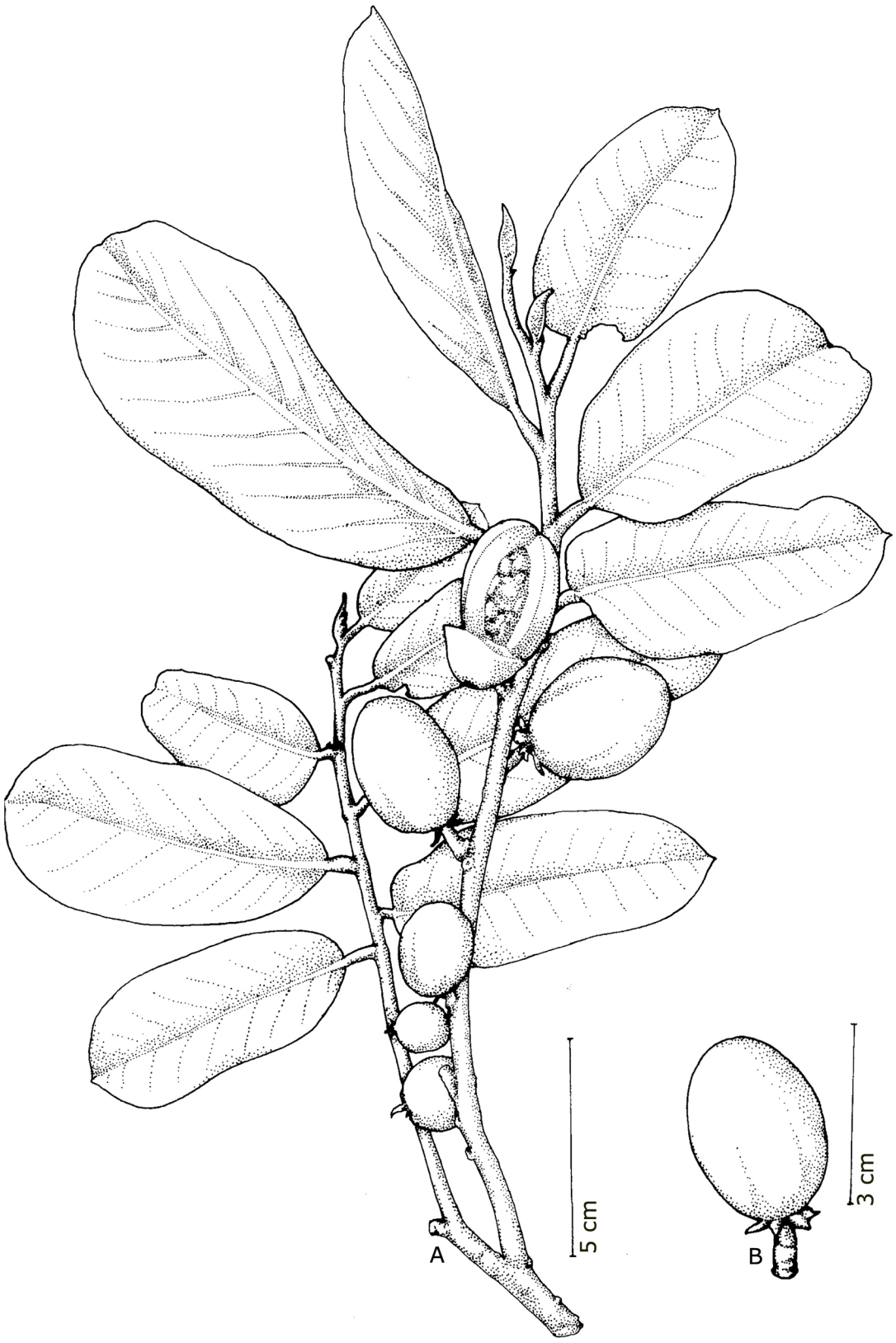


Figure 15. *Casearia wynadensis* Bedd.: A. Fruiting twig; B. Single fruit

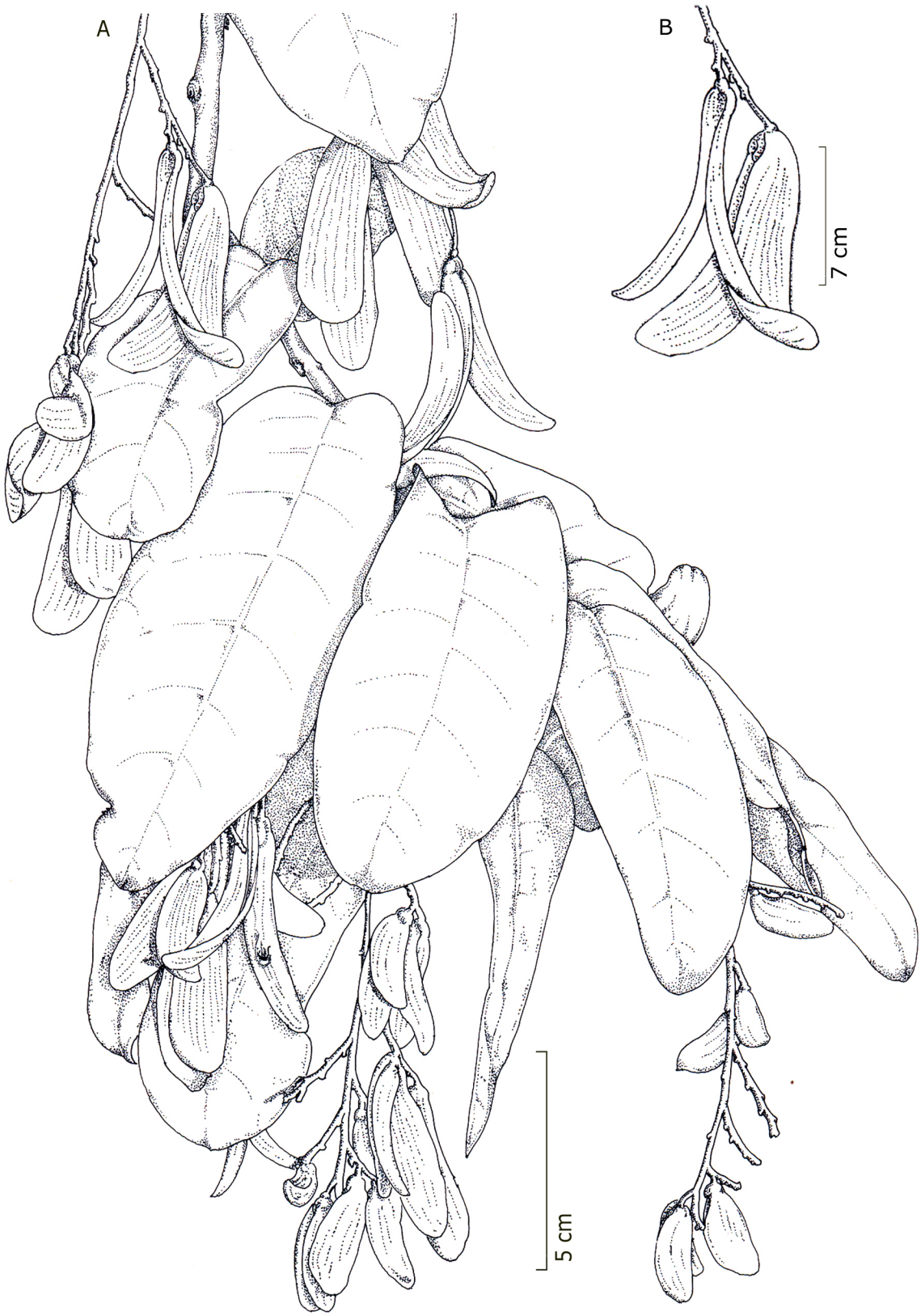


Figure 16. *Hopea ponga* (Dennst.) Mabb.: A. Fruiting twig; B. Fruits

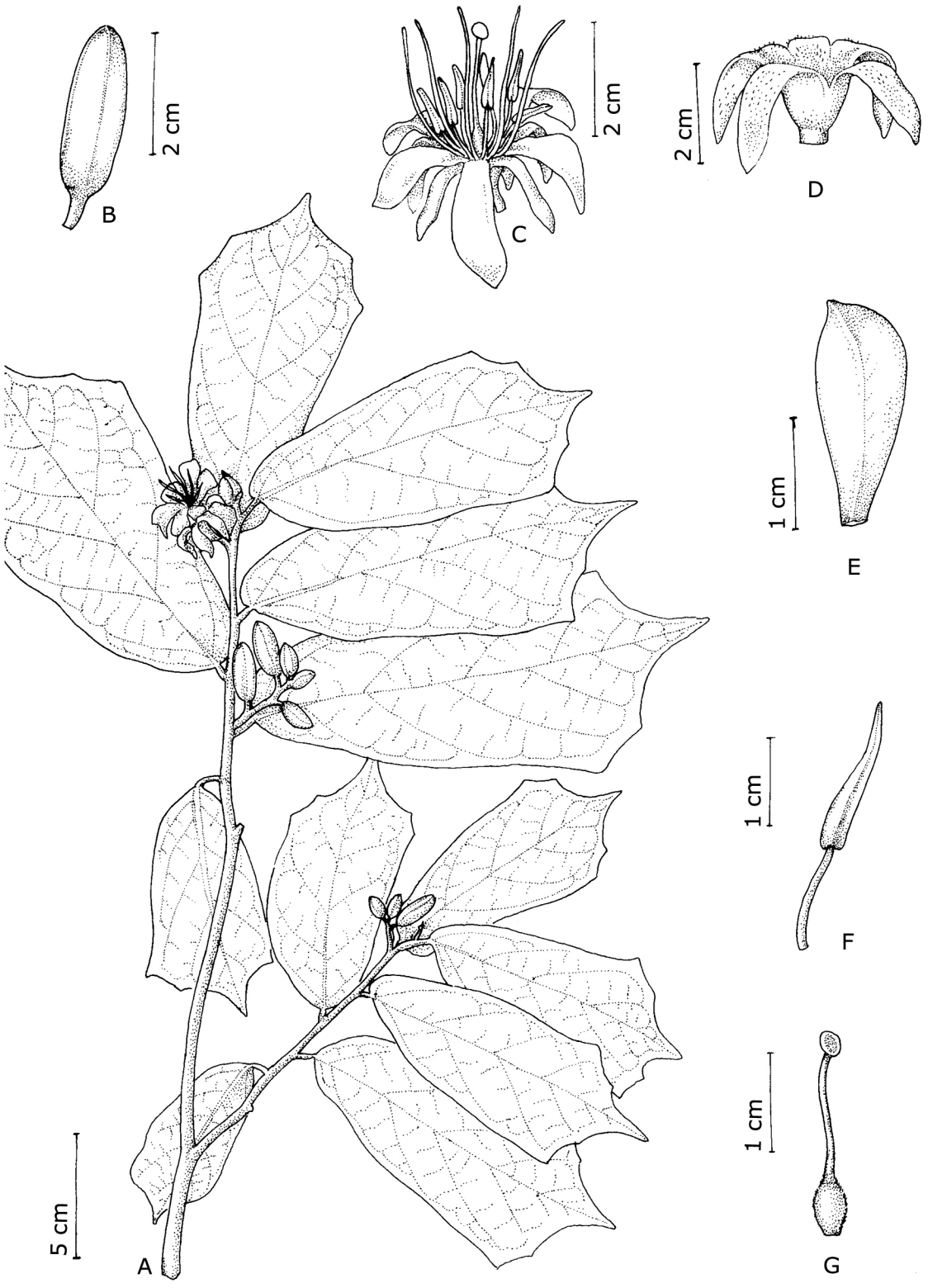


Figure 17. *Pterospermum reticulatum* Wight & Arn.: A. Flowering twig; B. Flower bud; C. Flower; D. Calyx; E. Petal; F. Stamen; G. Pistil

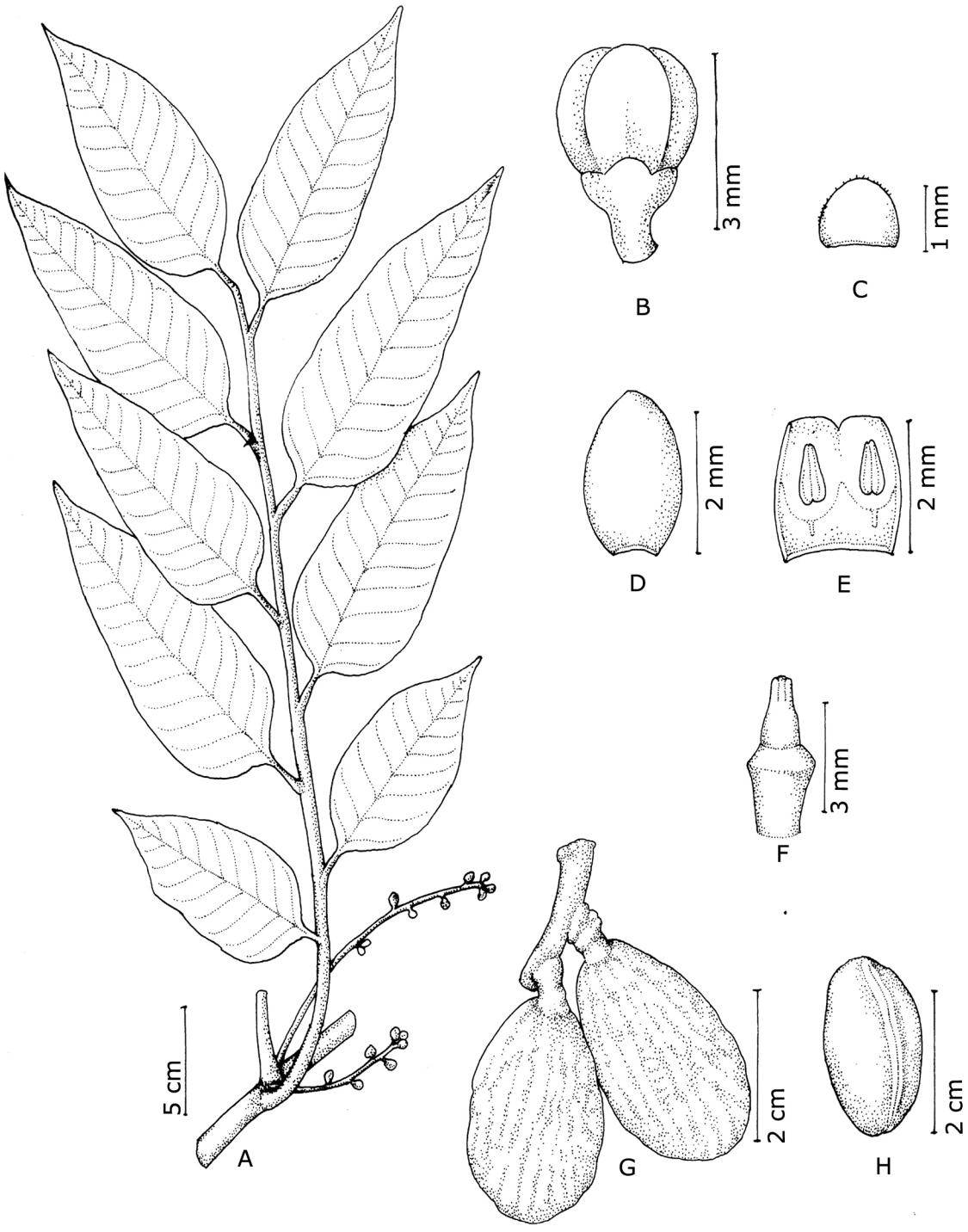


Figure 18. *Aglaia malabarica* Sasidh.: A. Flowering twig with female flowers; B. Male flower; C. Sepal; D. Petal; E. Portion of staminal tube and stamens; F. Pistil; G. Fruit; H. Seed

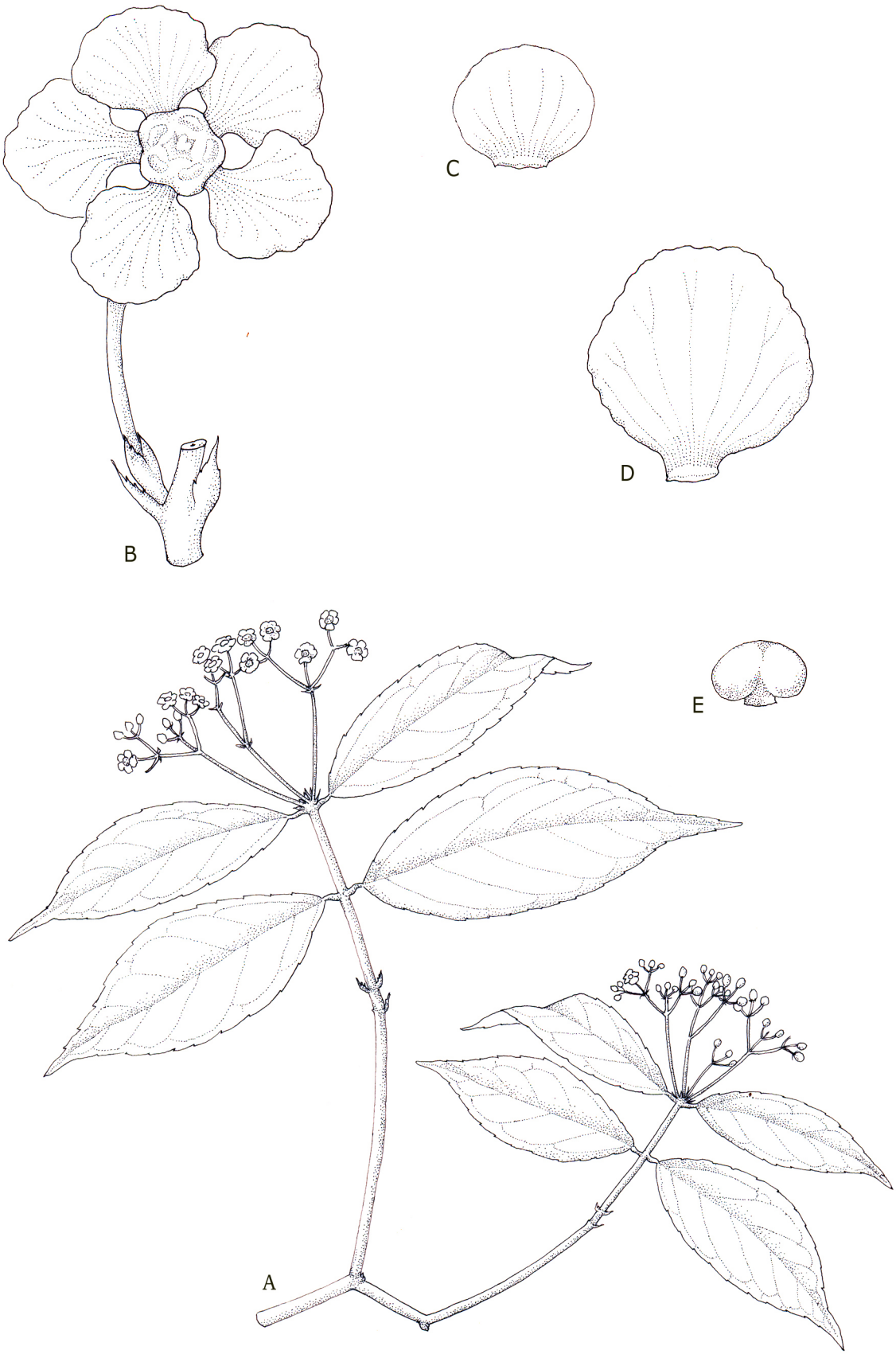


Figure 19. *Euonymus serratifolius* Bedd. A. Flowering twig; B. Flower; C. Sepal; D. Petal; E. Stamen

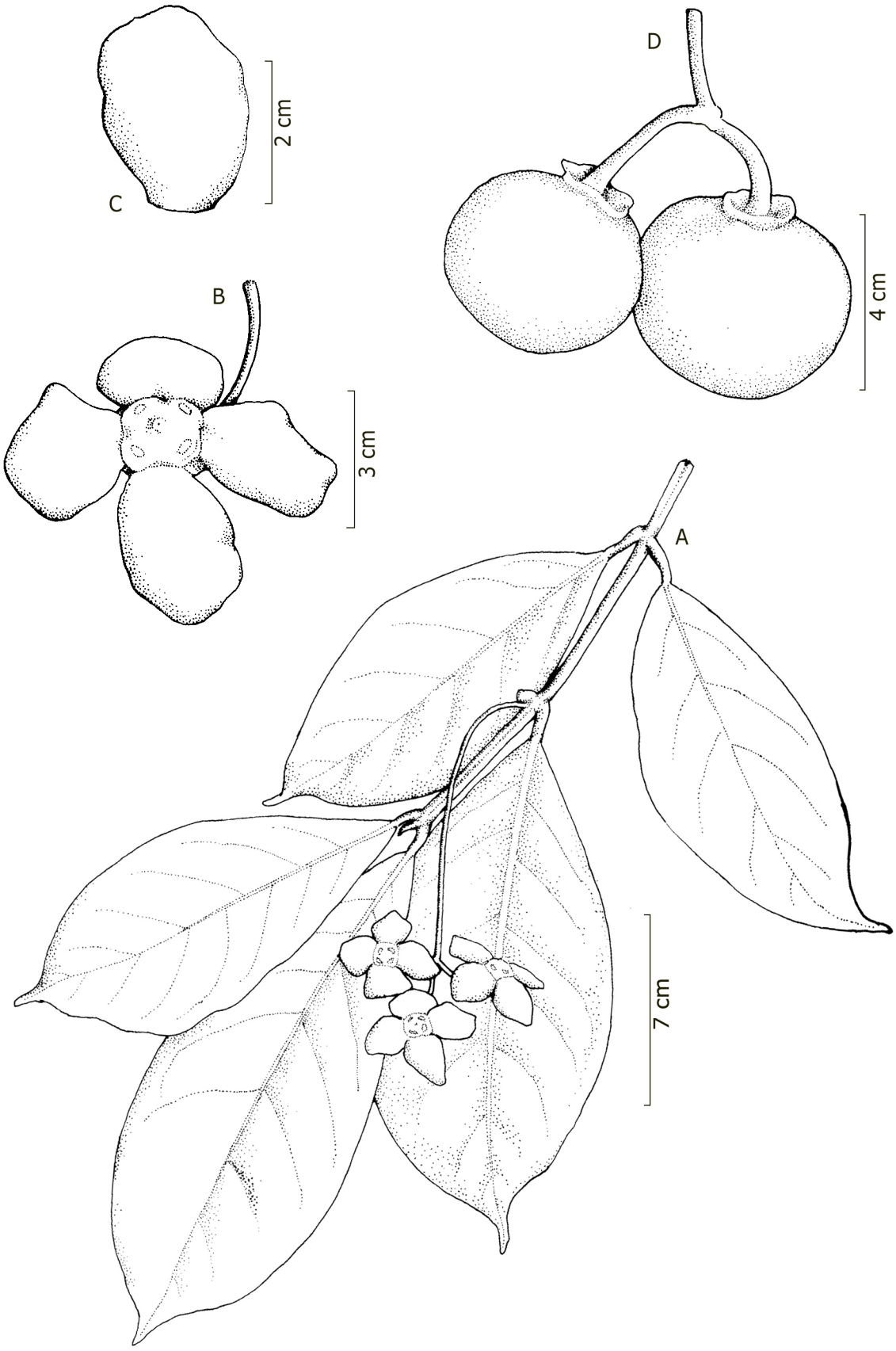


Figure 20. *Glyptopetalum grandiflorum* Bedd.: A. Flowering twig; B. Flower; C. Petal; D. Fruits

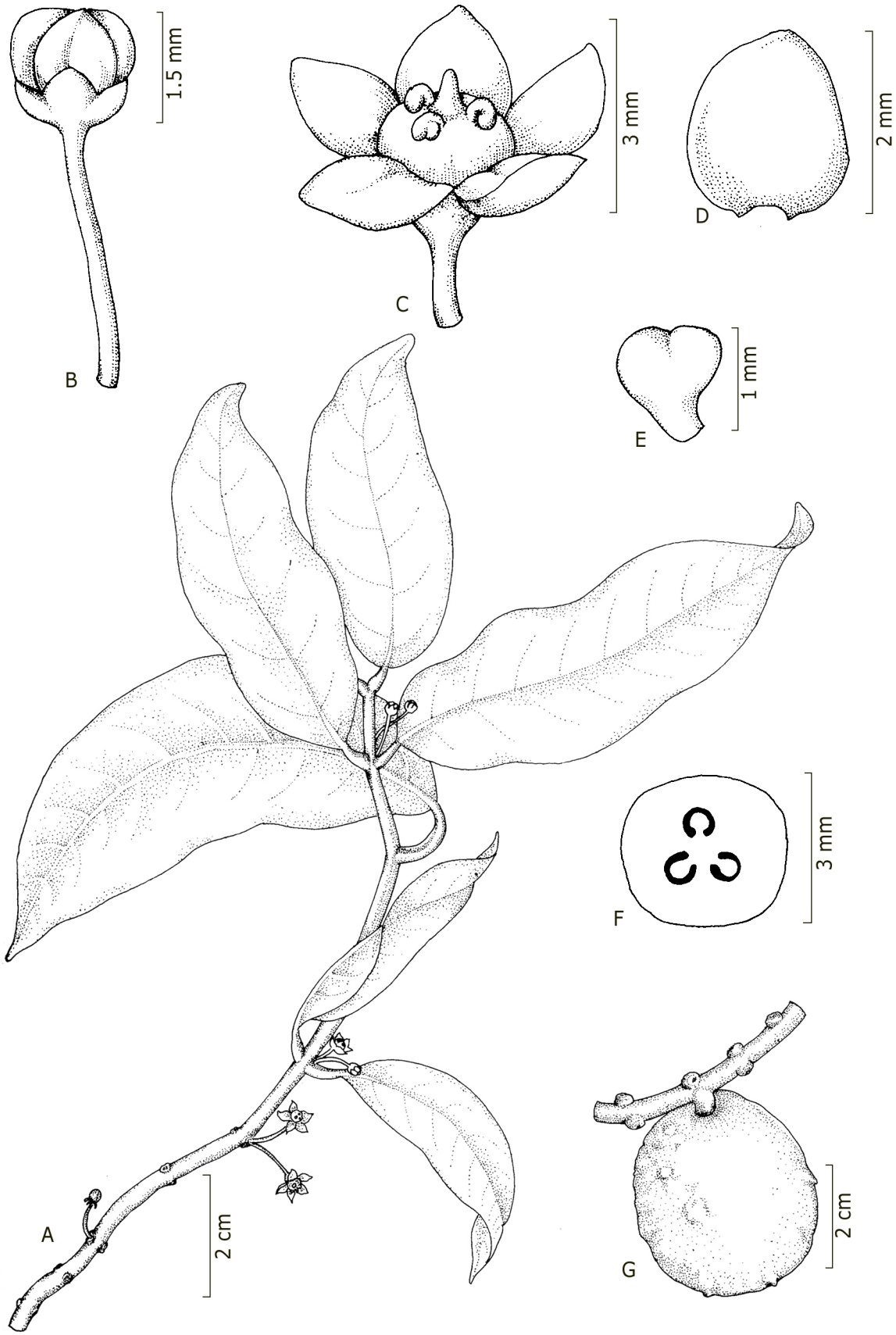


Figure 21. *Salacia beddomei* Gamble: A. Flowering twig; B. Flower bud; C. Flower; D. Petal; E. Stamen; F. Ovary - L. S.; G. Fruit

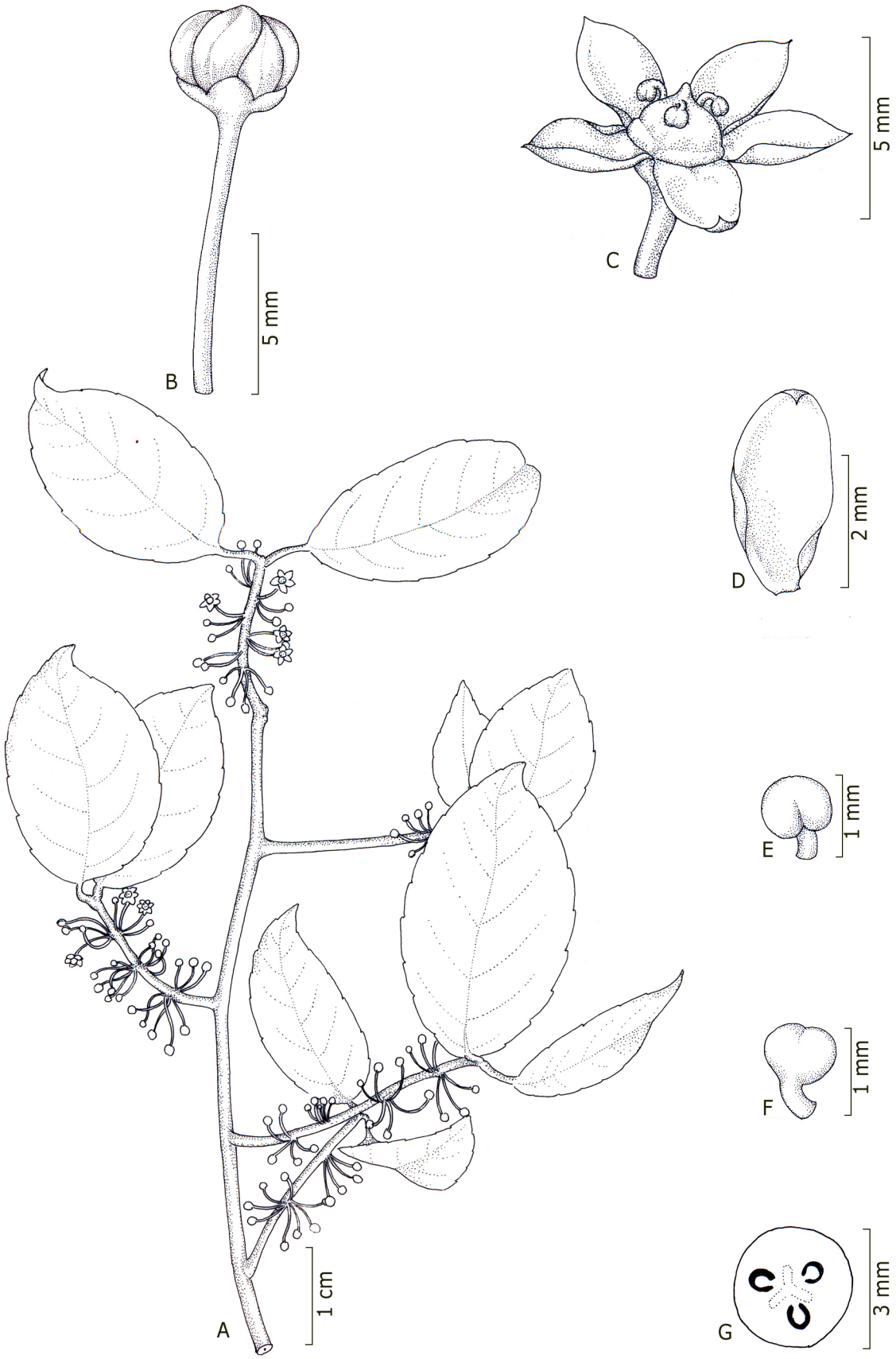


Figure 22. *Salacia malabarica* Gamble: A. Flowering twig; B. Flower bud; C. Flower; D. Petal; E. Stamen - abaxial view; F. Stamen - adaxial view; G. Ovary - L. S.

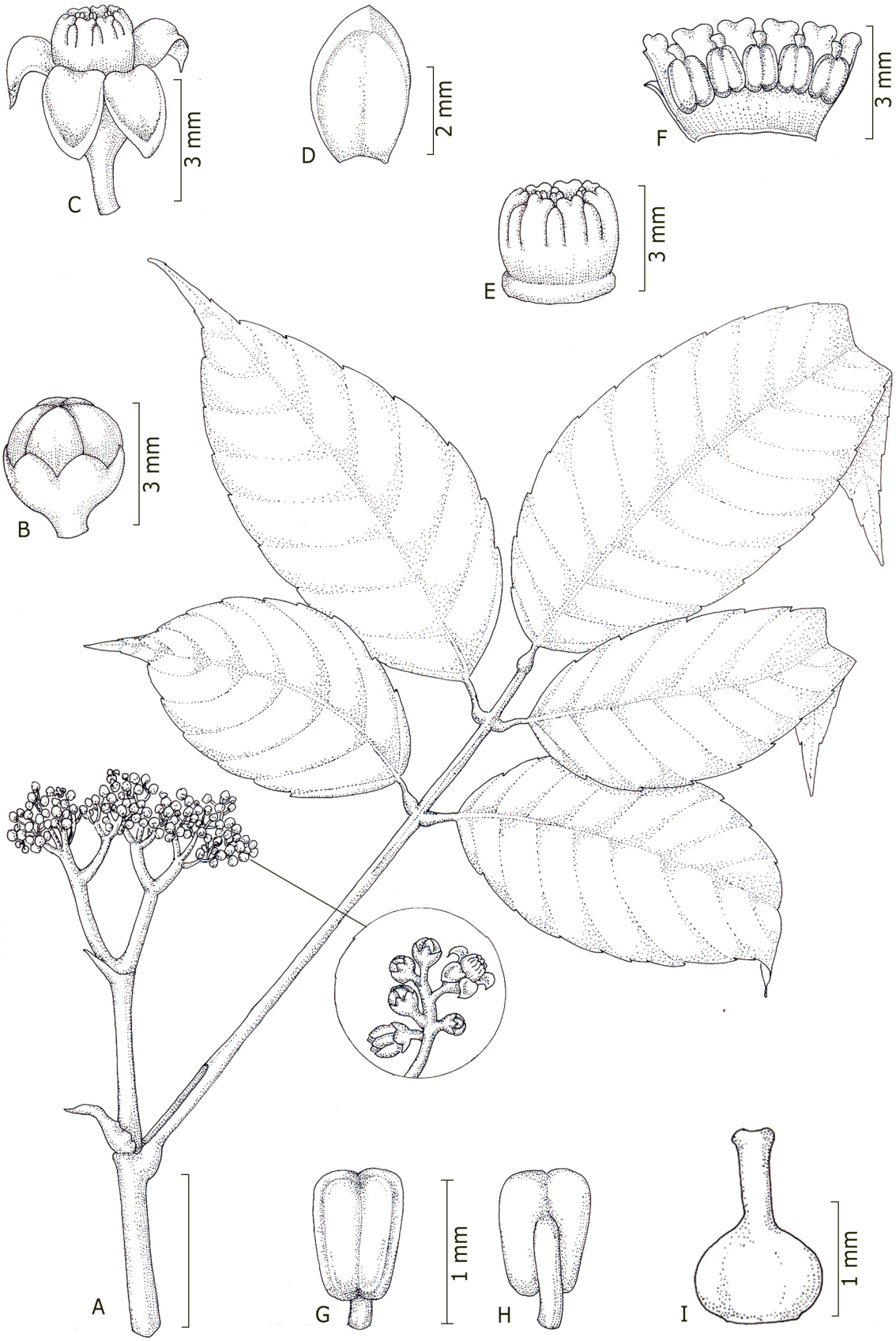


Figure 23. *Leea guineensis* G. Don: A. Flowering twig; B. Flower bud; C. Flower; D. Petal; E. Staminal tube; F. Staminal tube split open; G. Stamen - adaxial view; H. Stamen - abaxial view; I. Pistil

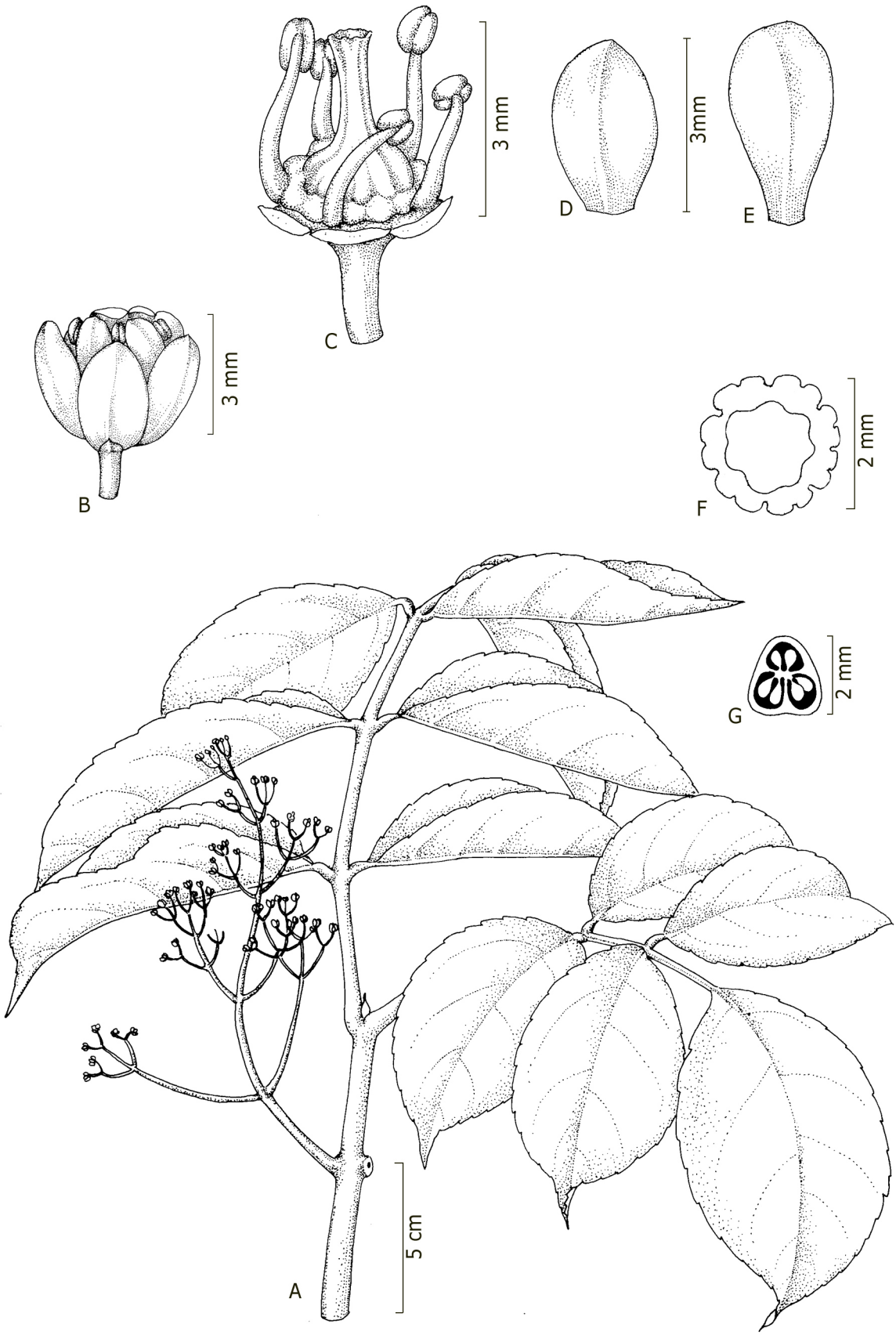


Figure 24. *Turpinia malabarica* Gamble: A. Flowering twig; B. Flower; C. Flowers without petals; D. Sepal; E. Petal; F. Disc - T. S.; G. Ovary - L. S.

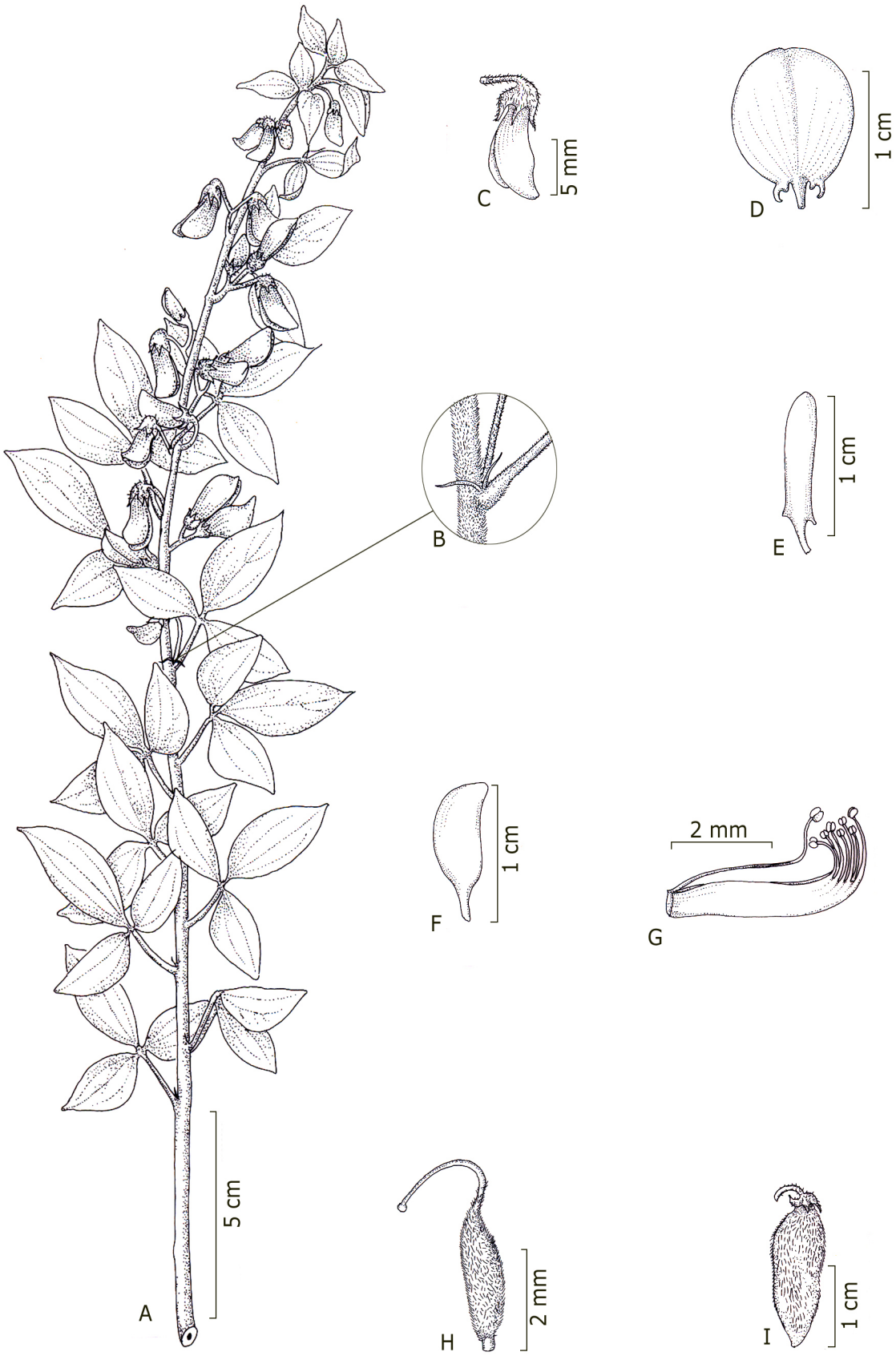


Figure 25. *Cajanus lineatus* (Wight & Arn.) van der Maesen: A. Twig; B. A portion of shoot showing node; C. Flower; D. & E. Wing petal; F. Keel petal; G. Staminal column; H. Pistil; I. Fruit

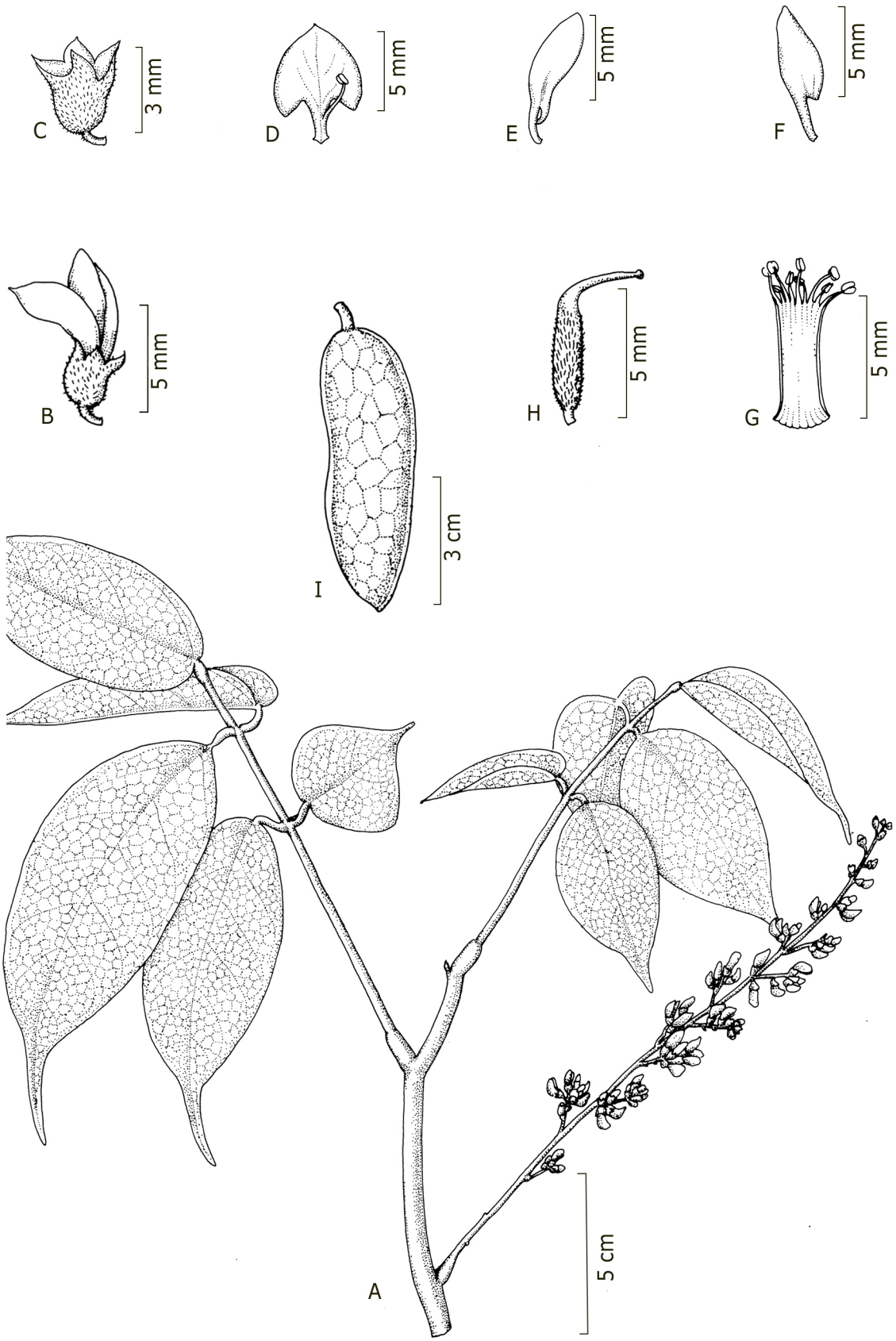


Figure 26. *Kunstleria keralensis* C. N. Mohanan & N.C. Nair: A. Flowering twig; B. Flower; C. Calyx; D. Standard petal with vexillary adnate stamen; E. Wing petal; F. Keel petal; G. Staminal column; H. Pistil; I. Pod

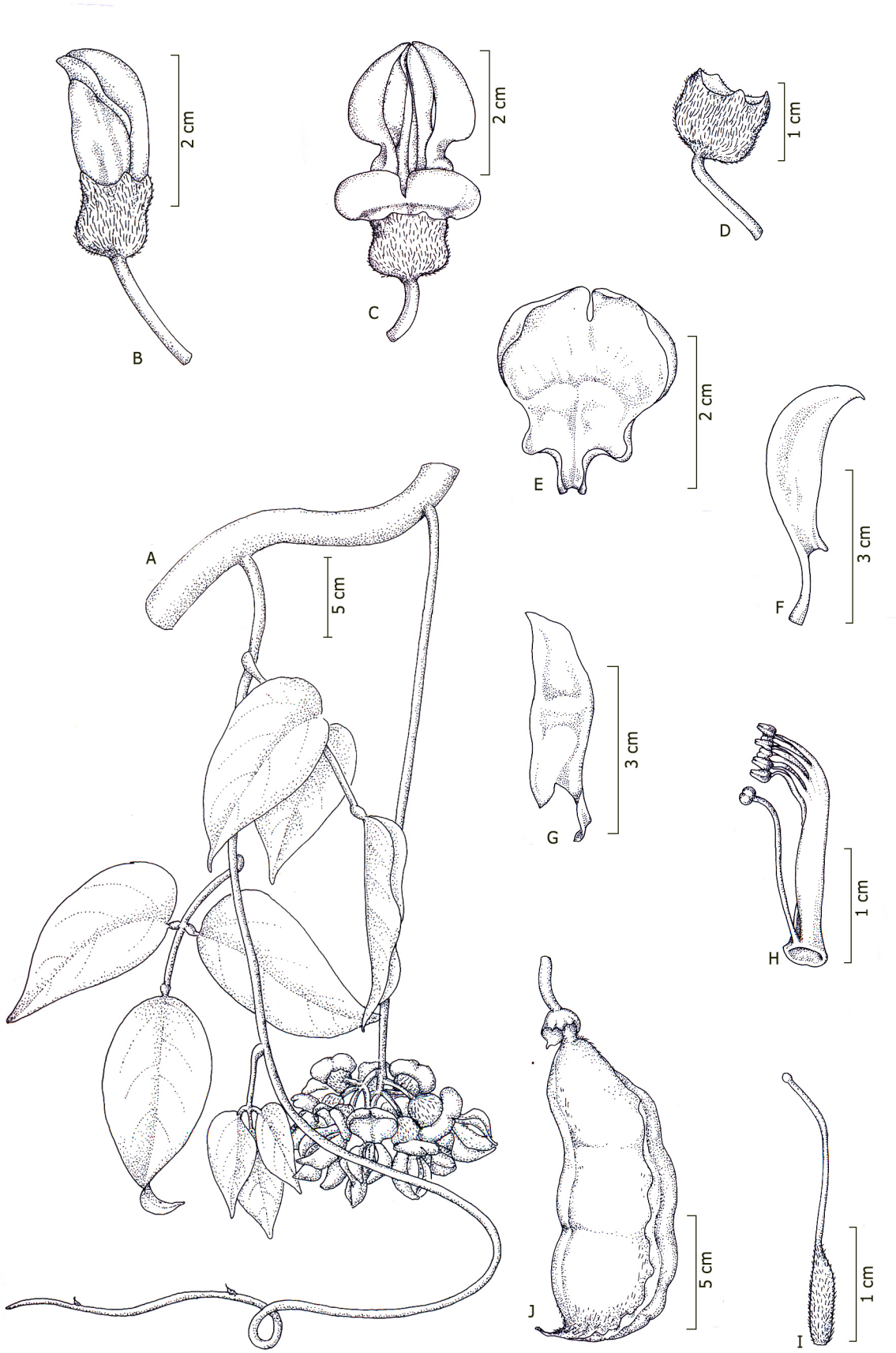


Figure 27. *Mucuna gigantea* (Willd.) DC.: A. Flowering twig; B. Flower bud; C. Flower; D. Calyx; E. Standard petal; F. Wing petal; G. Keel petal; H. Staminal column; I. Pistil; J. Pod

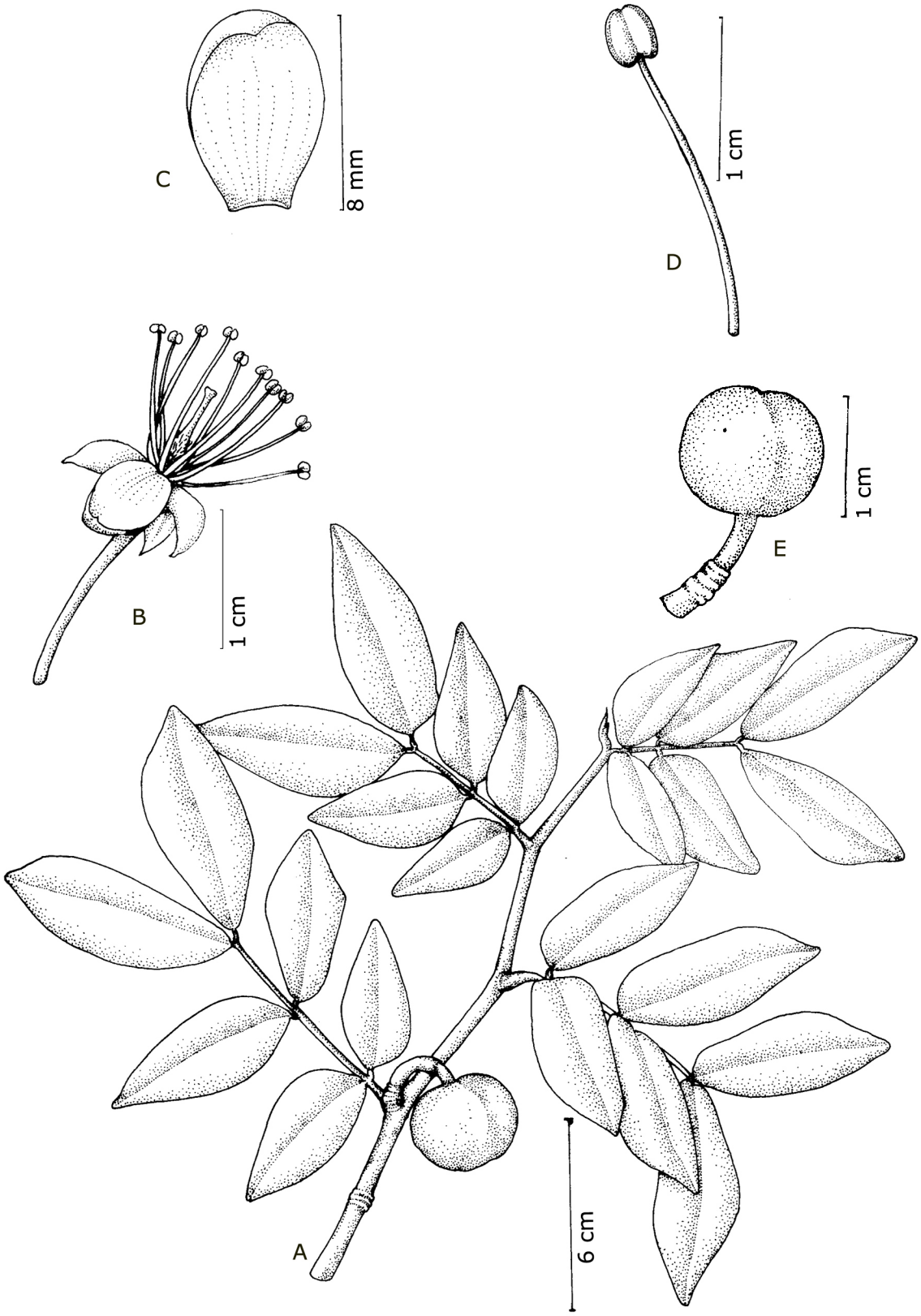


Figure 28. *Cynometra beddomei* Prain.: A. Fruiting twig; B. Flower; C. Petal; D. Stamen; E. Fruit.

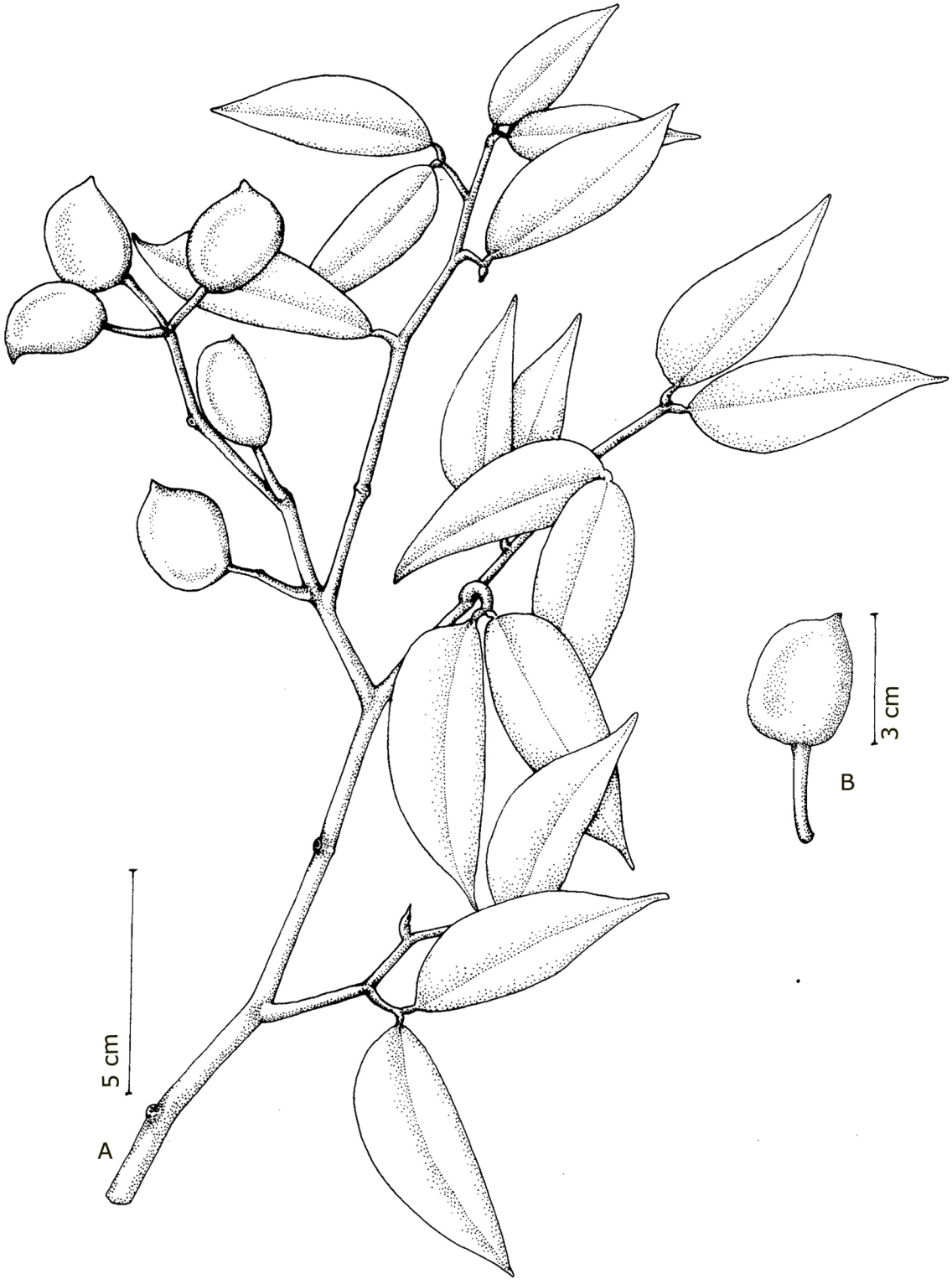


Figure 29. *Cynometra travancorica* Bedd.: A. Fruiting twig; B. Fruit

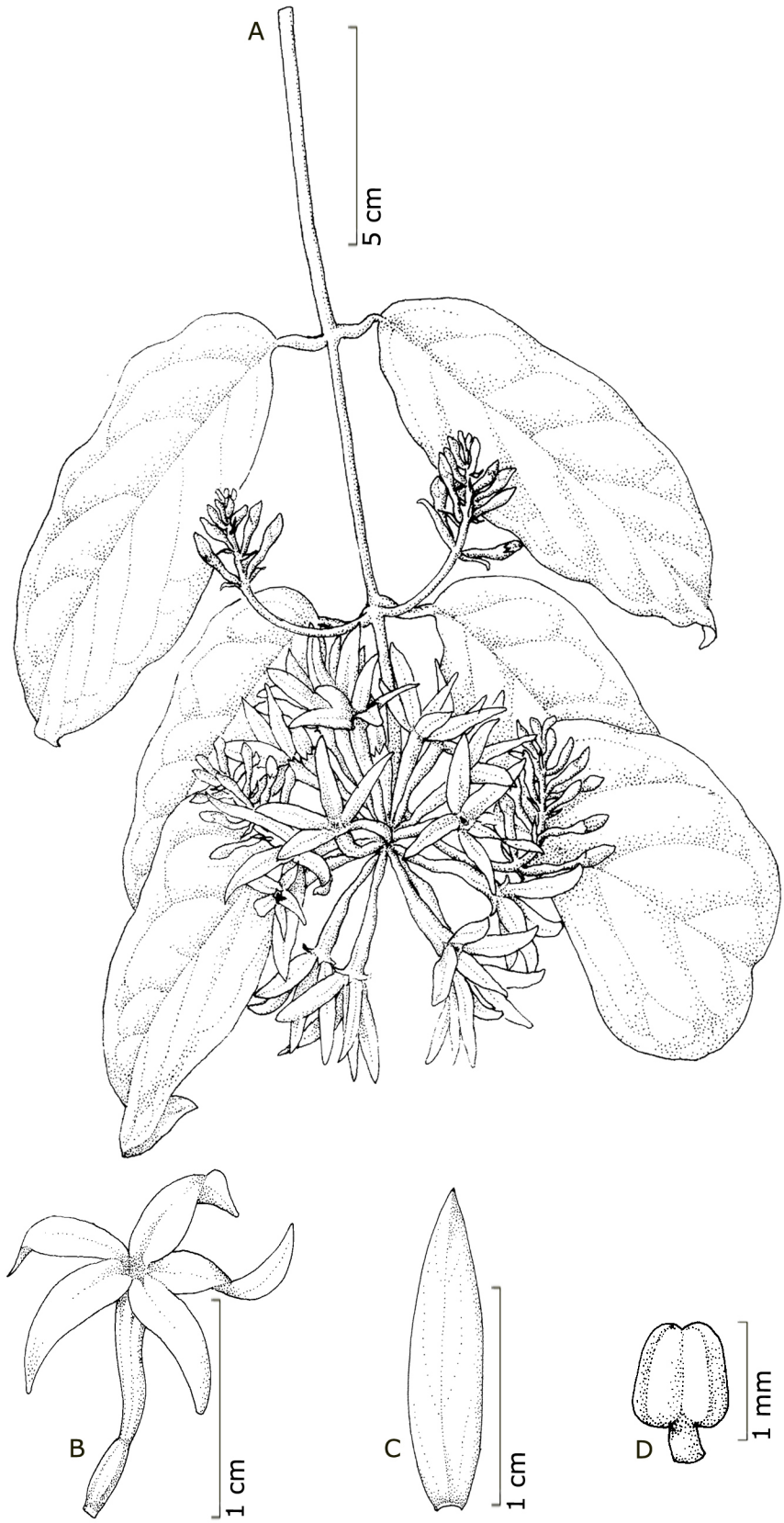


Figure 30. *Quisqualis malabarica* Bedd.: A. Flowering twig; B. Flower; C. Corolla lobe; D. Stamen

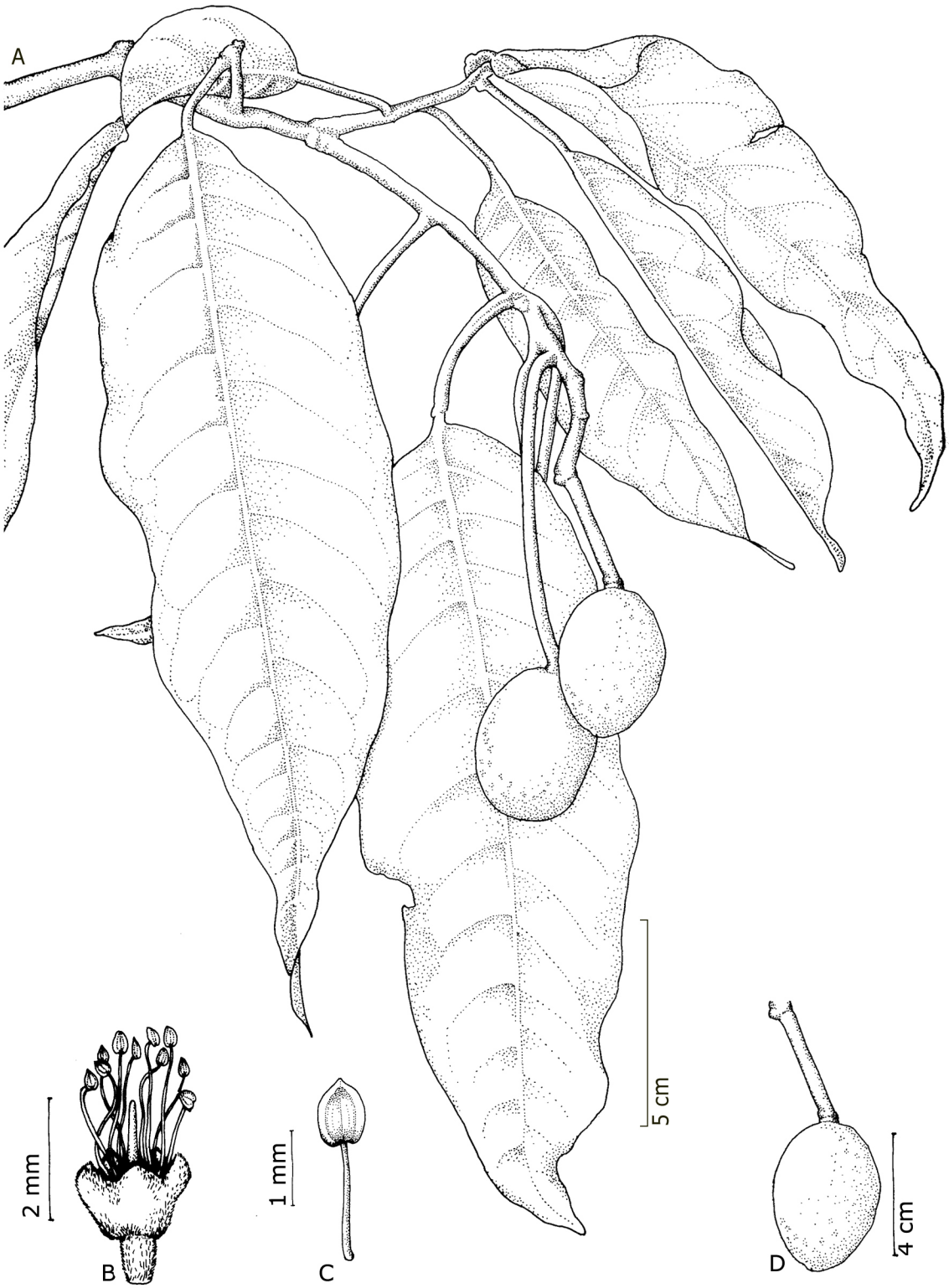


Figure 31. *Terminalia travancorensis* Wight & Arn.: A. Fruiting twig; B. Flower; C. Stamen; D. Fruit.

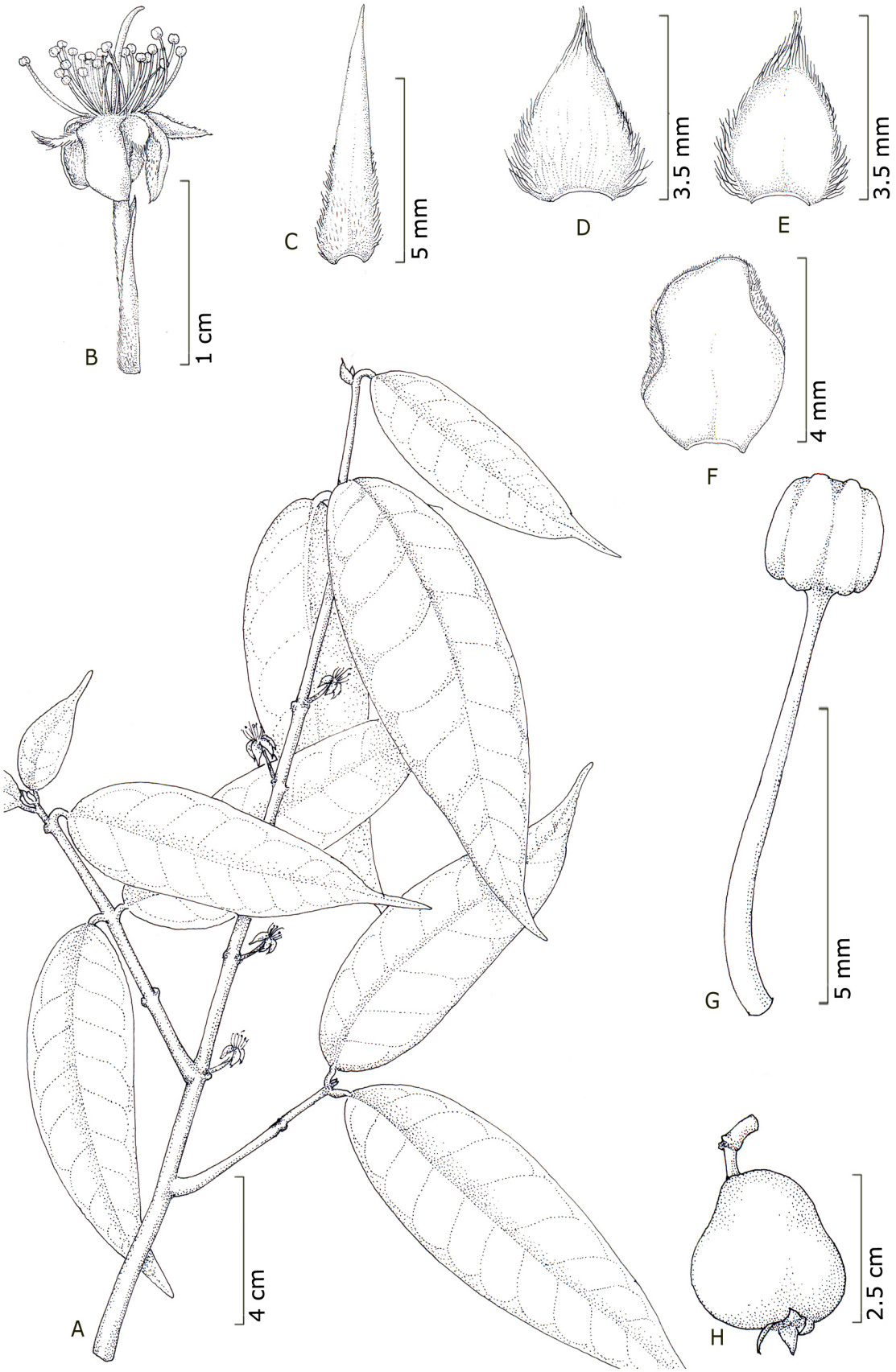


Figure 32. *Eugenia argentea* Bedd.: A. Flowering twig; B. Flower; C. Bract; D. Sepal - abaxial view; E. Sepal - adaxial view; F. Petal; G. Stamen; H. Fruit

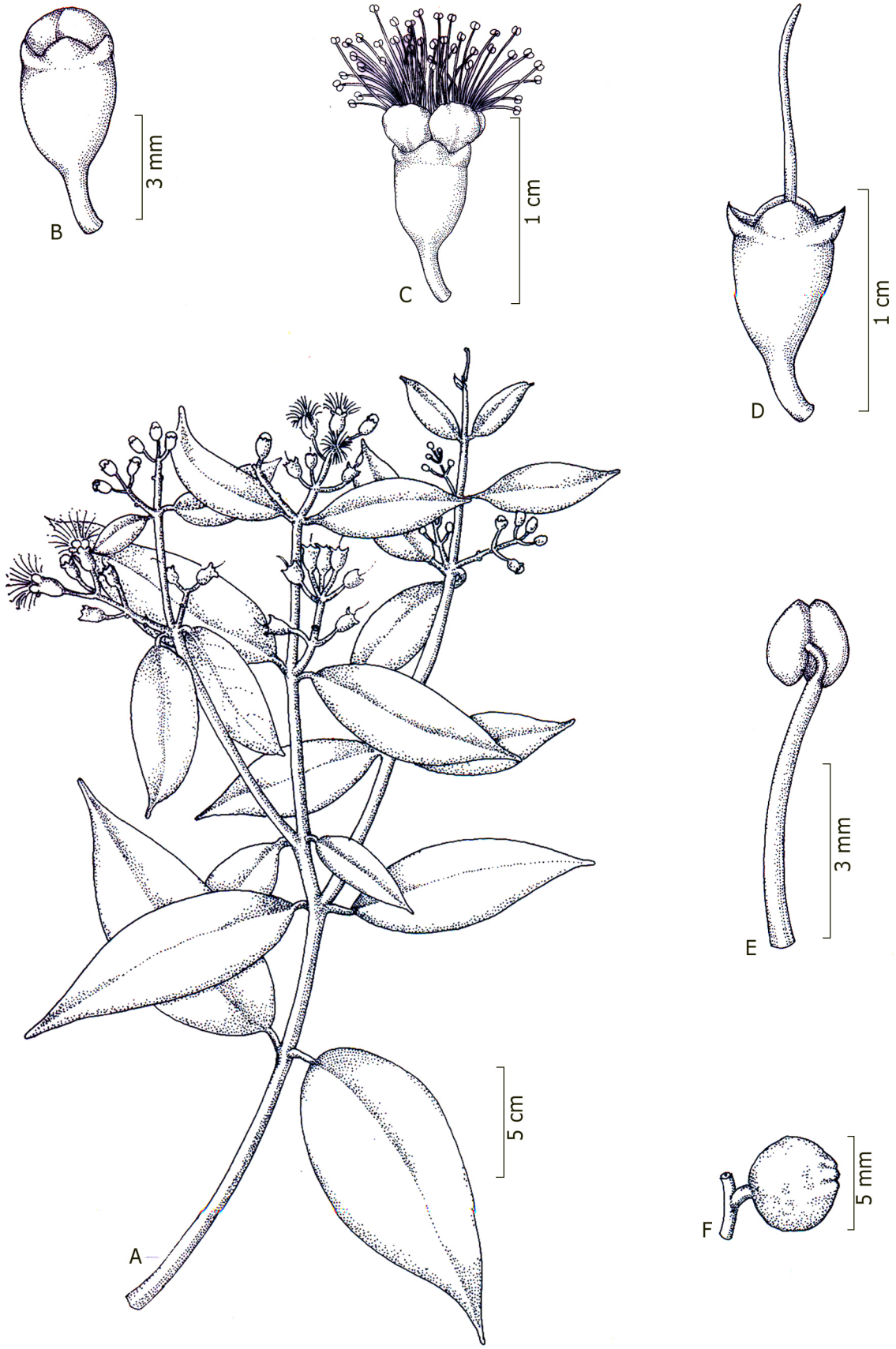


Figure 33. *Syzygium zeylanicum* (L.) DC.: A. Flowering twig; B. Flower bud; C. Flower; D. Flower without petals and stamens; E. Stamen; F. Fruit

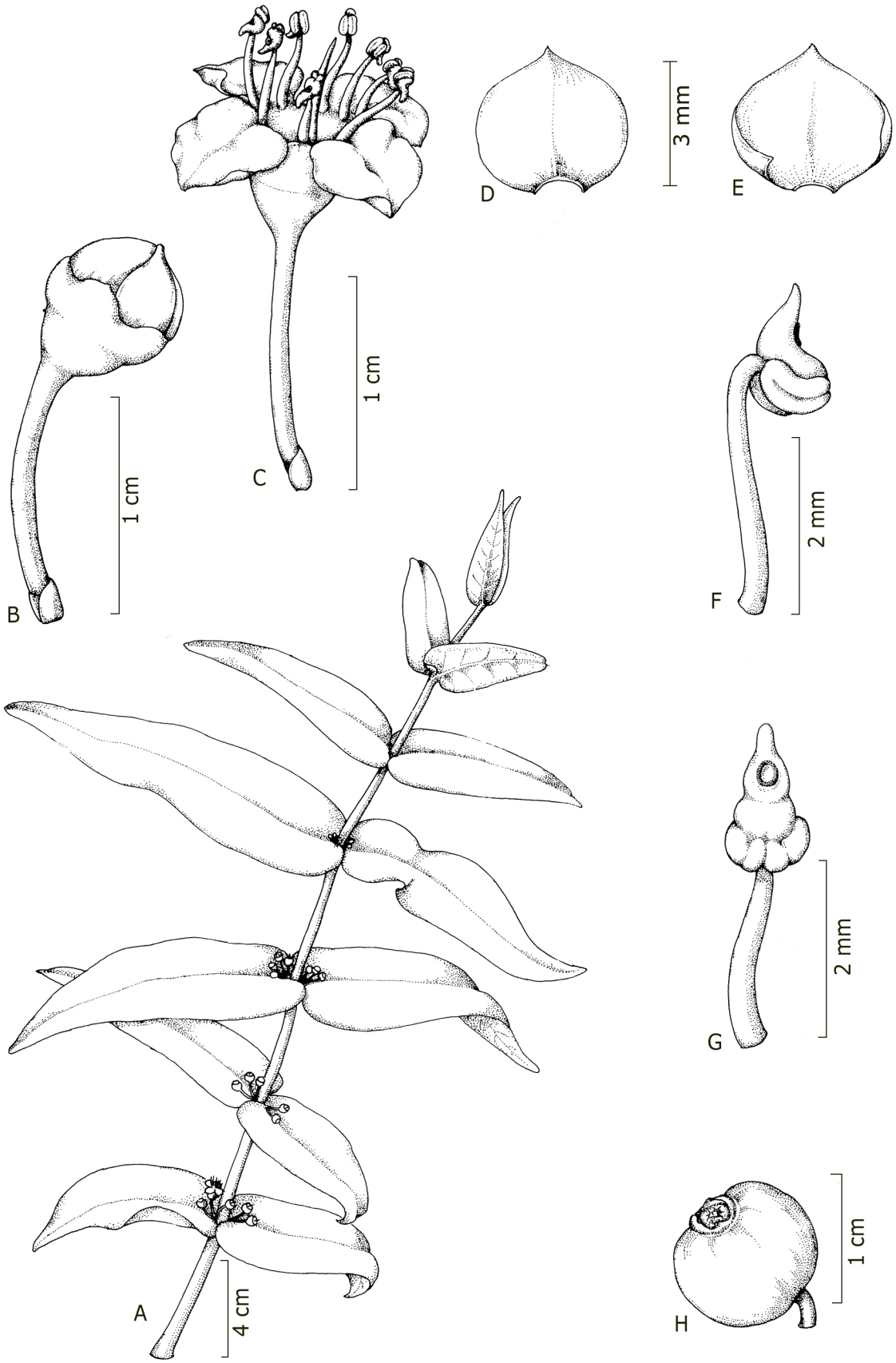


Figure 34. *Memecylon randerianum* S.M. & M.R. Almeida: A. Flowering twig; B. Flower bud; C. Flower; D. Petal - adaxial view; E. Petal - abaxial view; F. Stamen - side view; G. Stamen - front view; H. Fruit

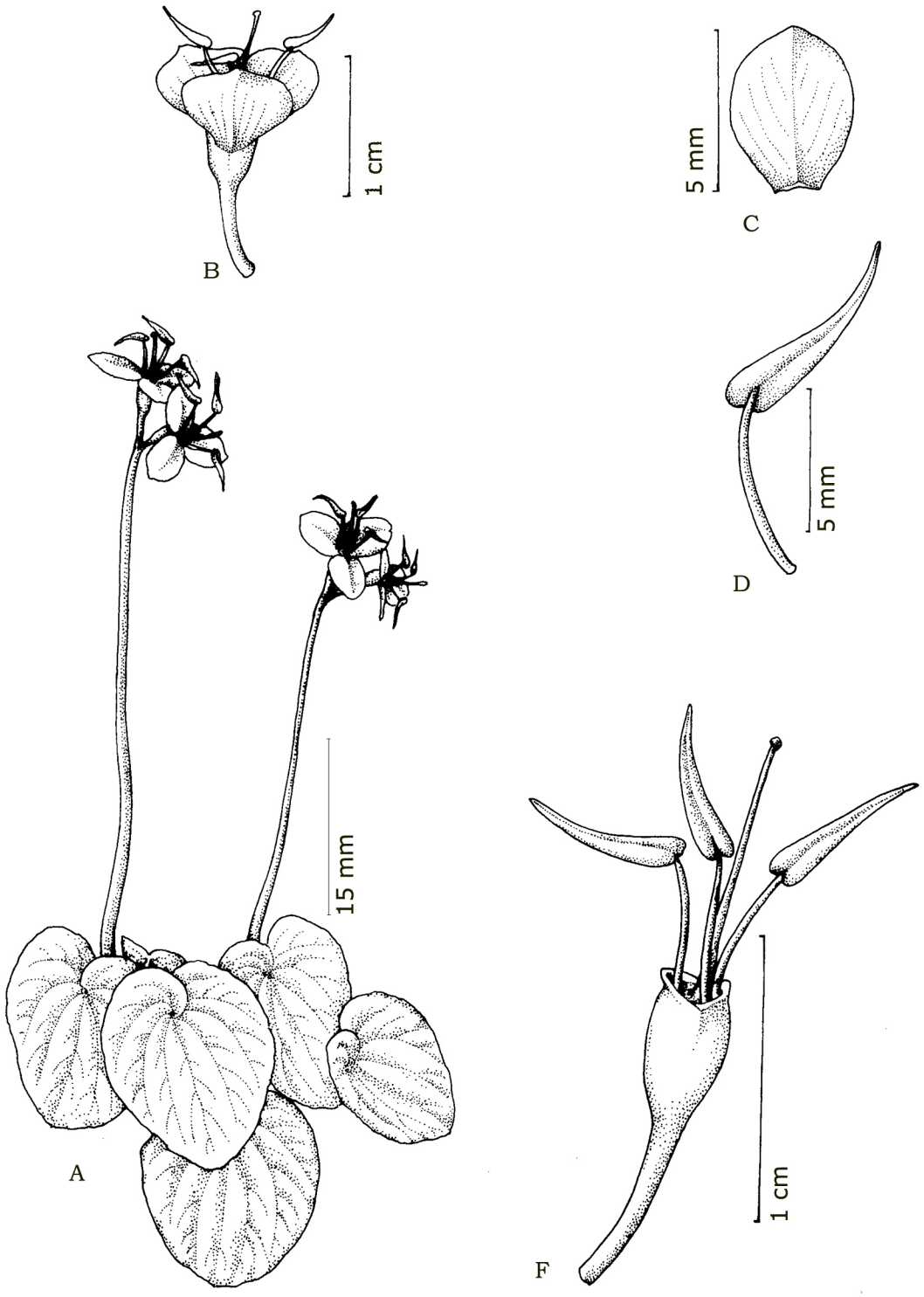


Figure 35. *Sonerila rotundifolia* Bedd.: A. Habit; B. Flower; C. Petal; D. Stamen; E. Flower - petals removed.

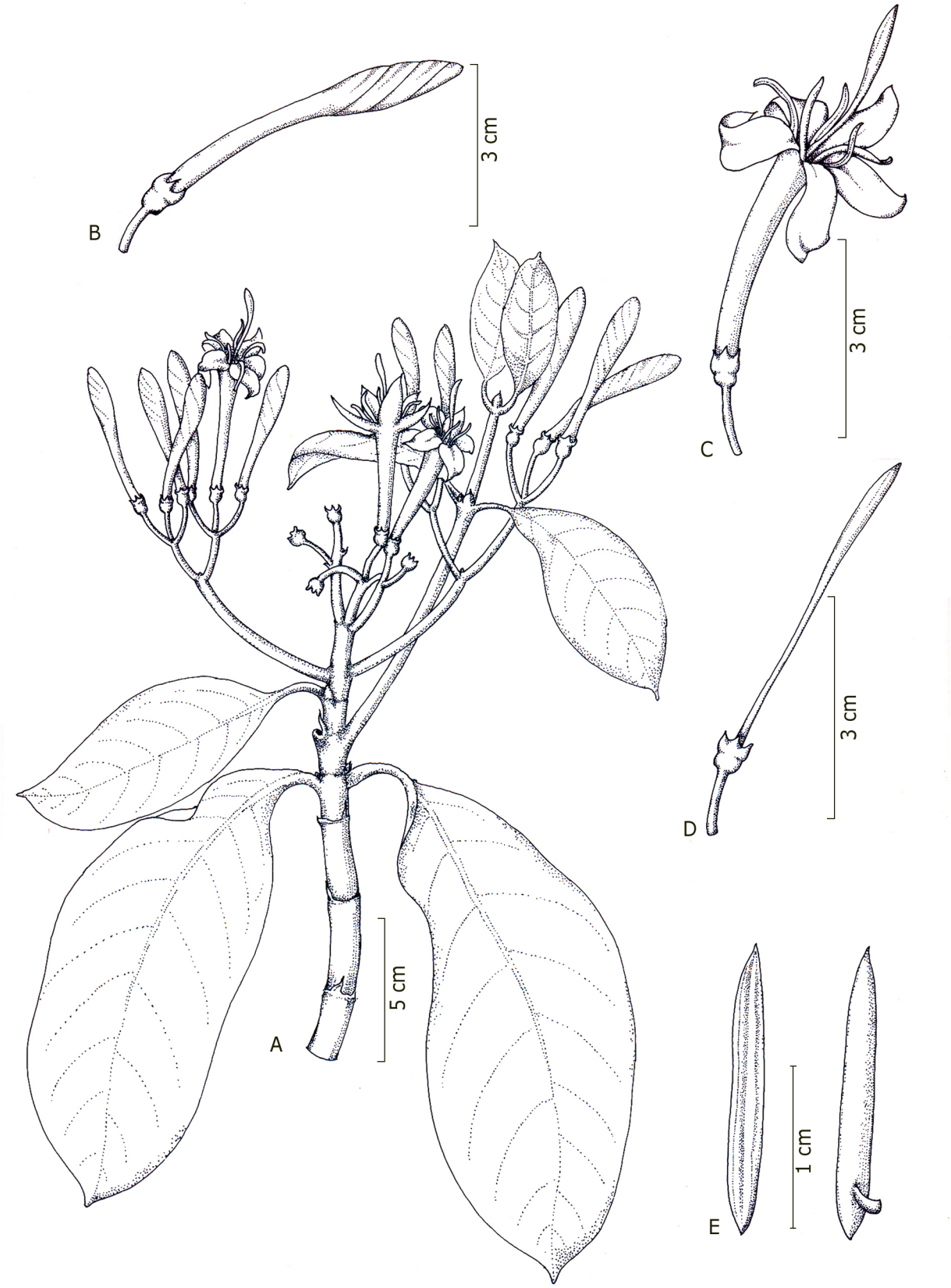


Figure 36. *Tarenna canarica* (Bedd.) Bremek.: A. Flowering twig; B. Flower bud; C. Flower; D. Calyx and pistil; E. Anthers

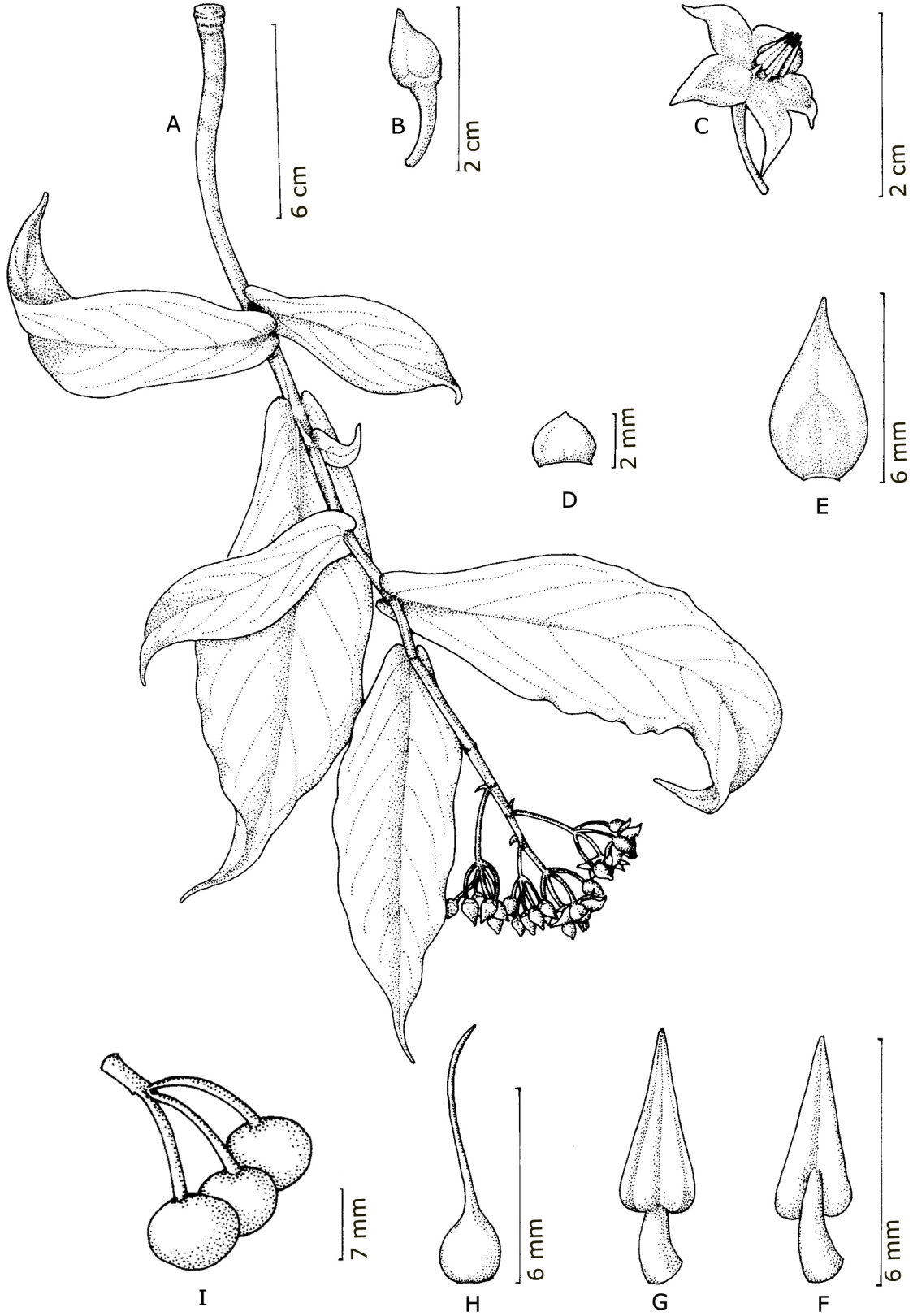


Figure 37. *Ardisia amplexicaulis* Bedd.: A. Flowering twig; B. Flower bud; C. Flower; D. Sepal; E. Petal; F. Stamen - dorsal view; G. Stamen - Ventral view; H. Pistil; I. Fruits

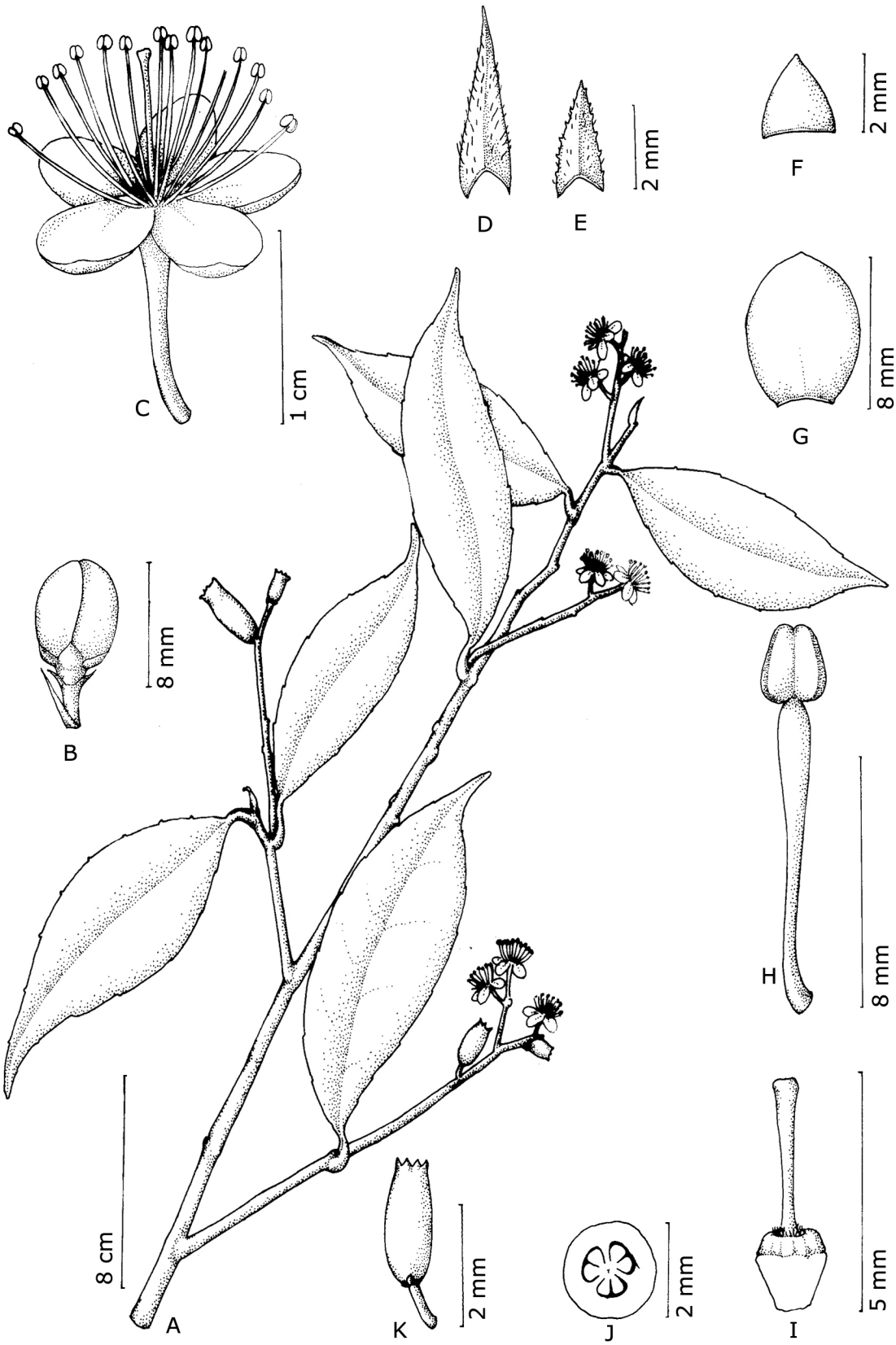


Figure 38. *Symplocos wynadense* (O. Ktze.) Nooteb.: A. Flowering twig; B. Flower bud; C. Flower; D. Bract; E. Bracteole; F. Sepal; G. Petal; H. Stamen; I. Pistil; J. Ovary - C.S.; K. Fruit.



Figure 39. *Parsonsia inodora* (Lour.) M. R. & S. M. Almeida: A. Flowering branch; B. Flower bud; C. Flower; D. Stamens

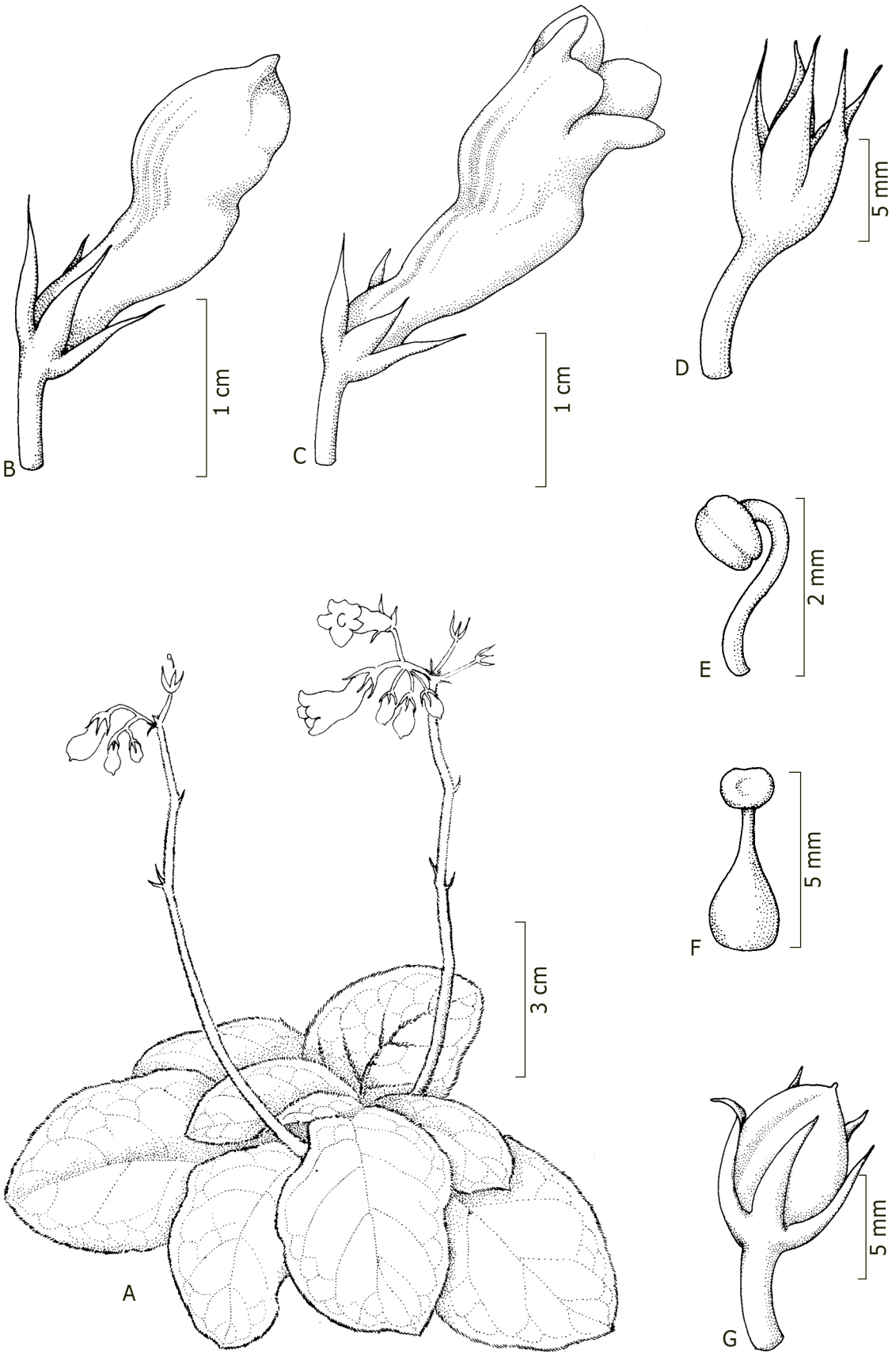


Figure 40. *Jerdonia indica* Wight: A. Habit; B. Flower bud; C. Flower; D. Calyx; E. Stamen; F. Pistil; G. Fruit

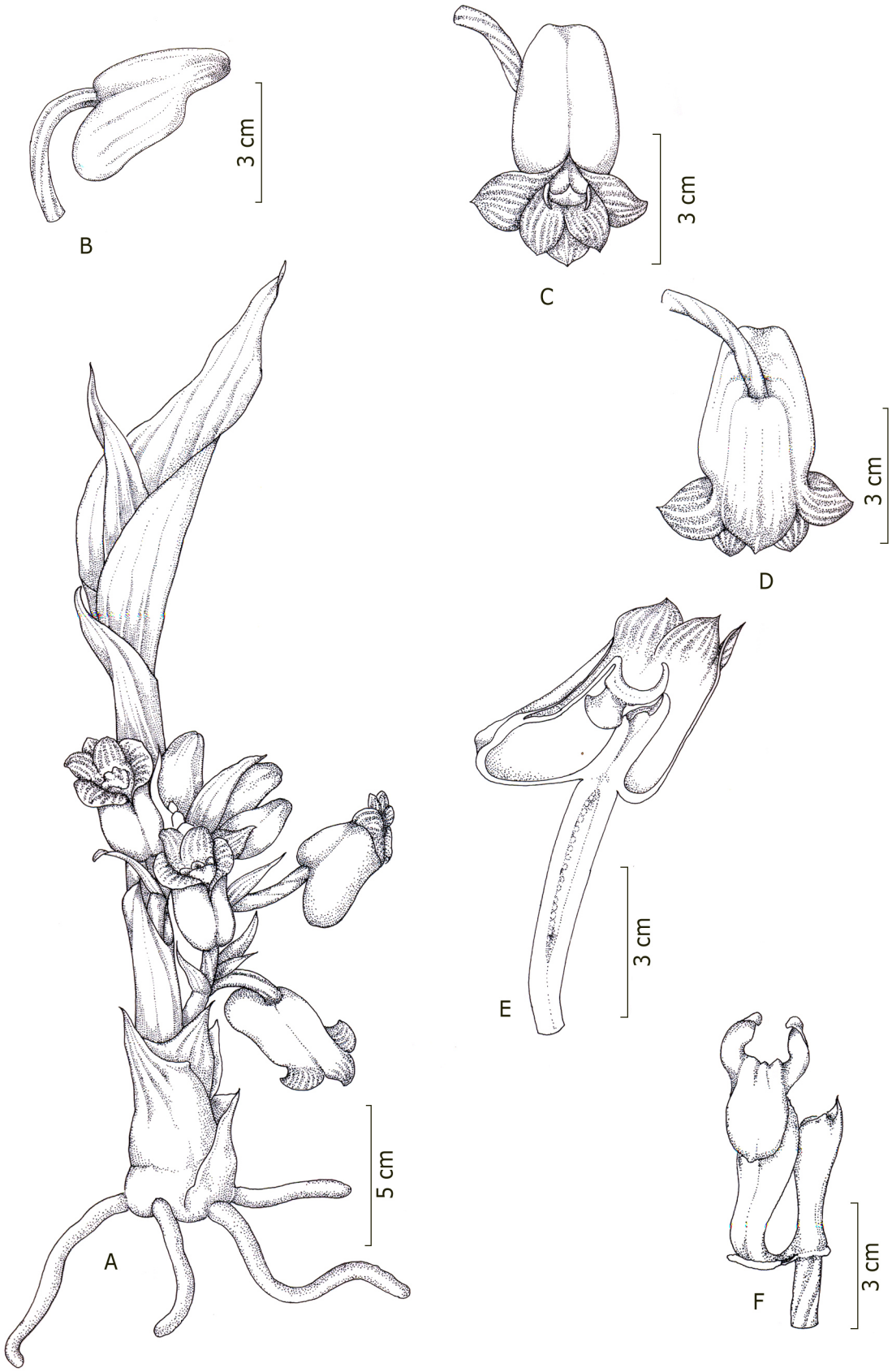


Figure 41. *Acanthephippium bicolor* Lindl.: A. Habit; B. Flower bud; C. Flower - front view; D. Flower - back view; E. Flower - L. S.; F. Column with a portion of ovary

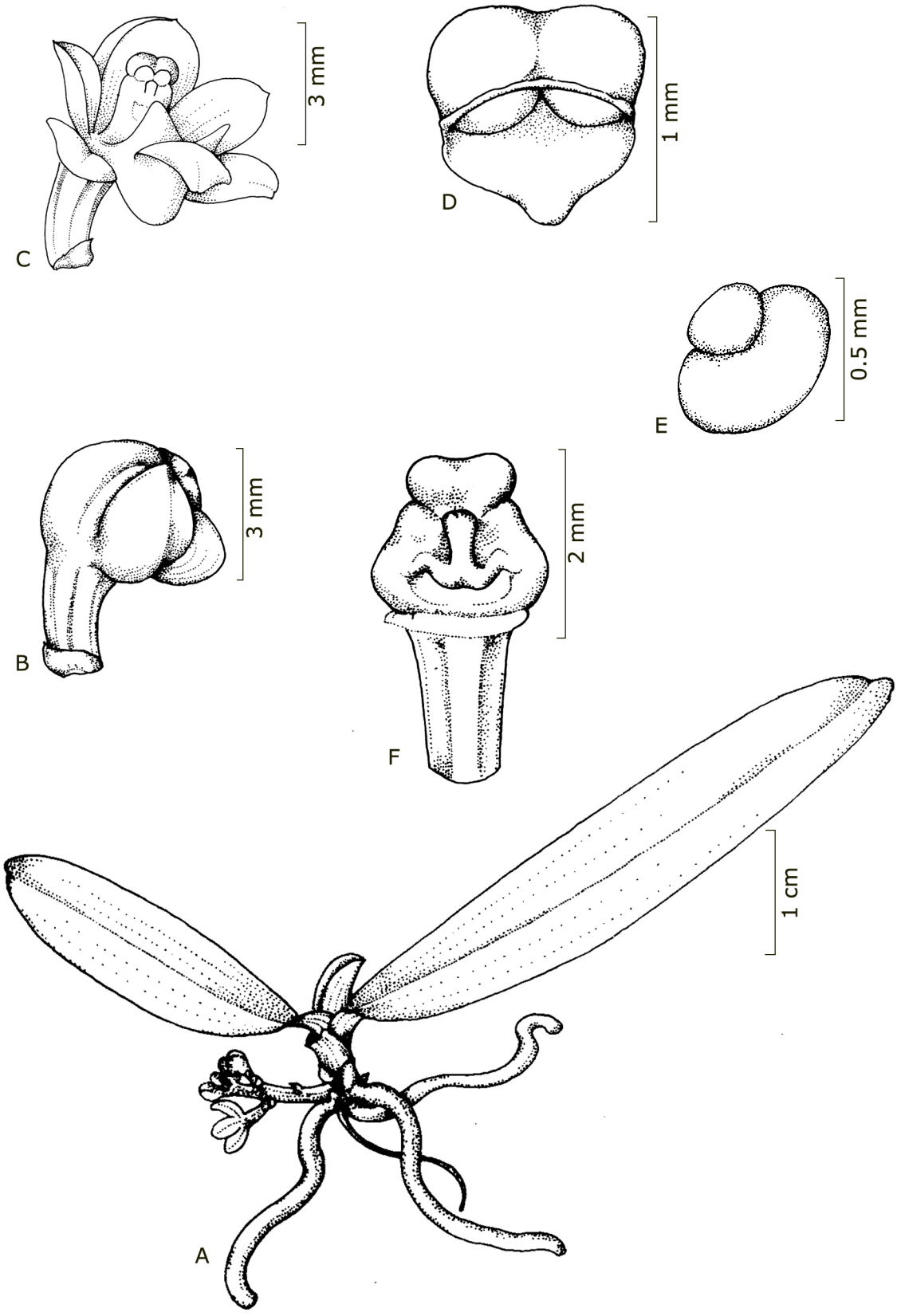


Figure 42. *Gastrochilus flabelliformis* (Blatt. & McCann) Saldanha: A. Habit; B. Flower bud; C. Flower; D. Pollinarium; E. Pollinium; F. Column

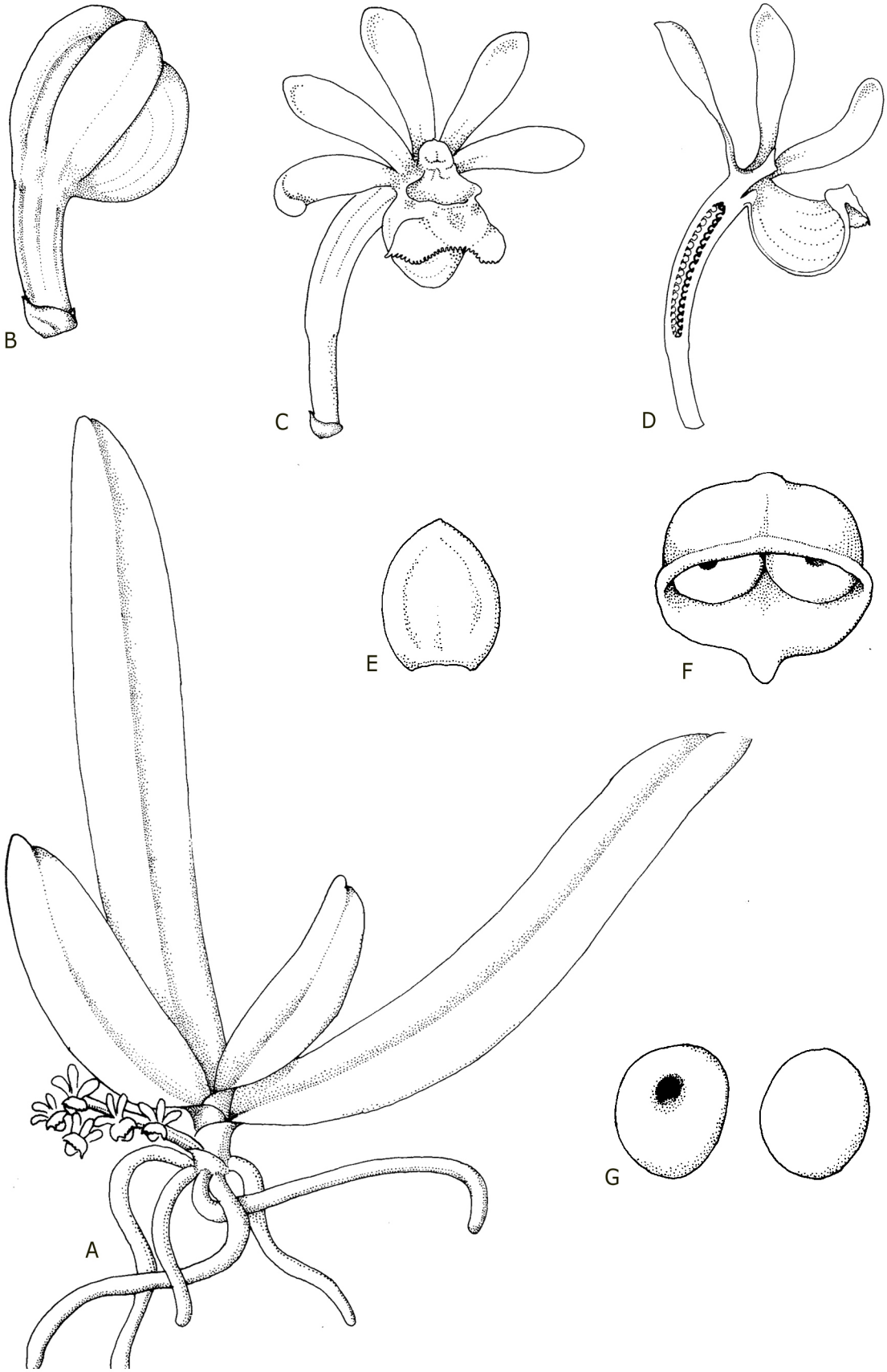


Figure 43. *Gastrochilus obliquus* (Lindl.) Kuntze: A. Habit; B. Flower bud; C. Flower; D. Flower - L. S.; E. Sepal; F. Pollinarium; G. Pollinia

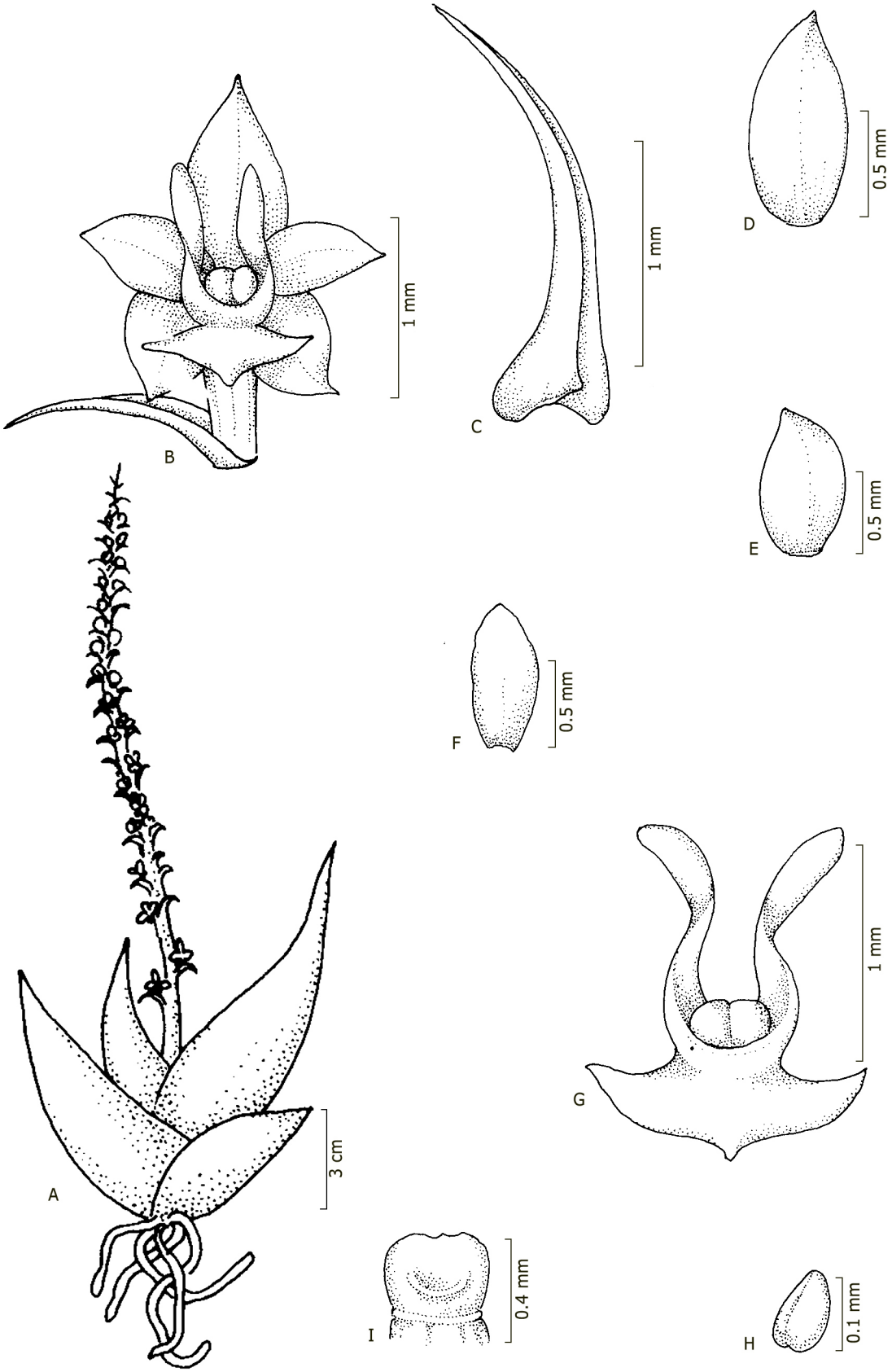


Figure 44. *Oberonia bicornis* Lindl.: A. Habit; B. Flower; C. Bract; D. & E. Sepals; F. Petal; G. Lip; H. Pollinium; I. Column

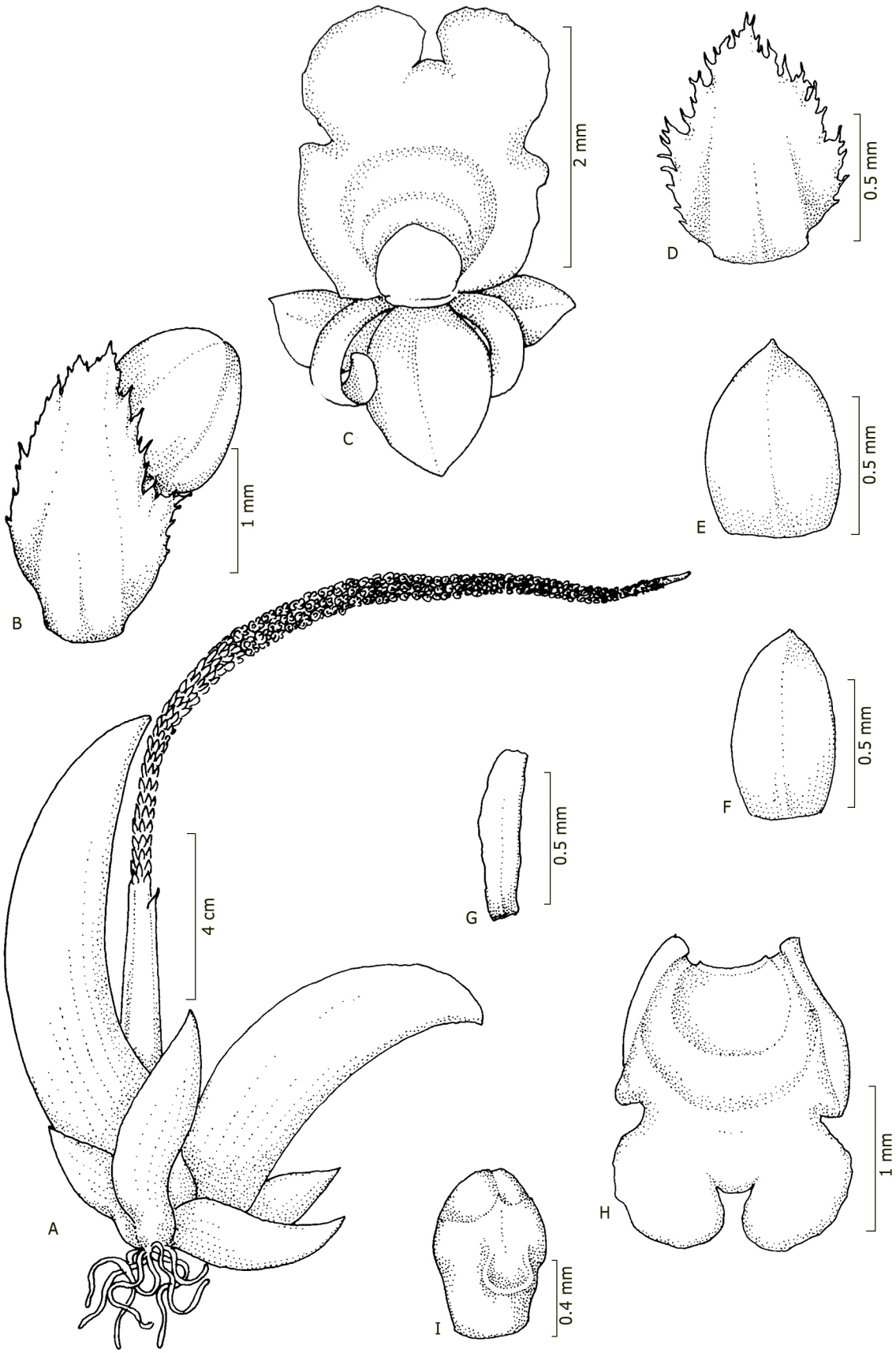


Figure 45. *Oberonia brunoniana* Wight; A. Habit; B. Flower bud; C. Flower; D. Bract; E. & F. Sepals; G. Petal; H. Lip; I. Column

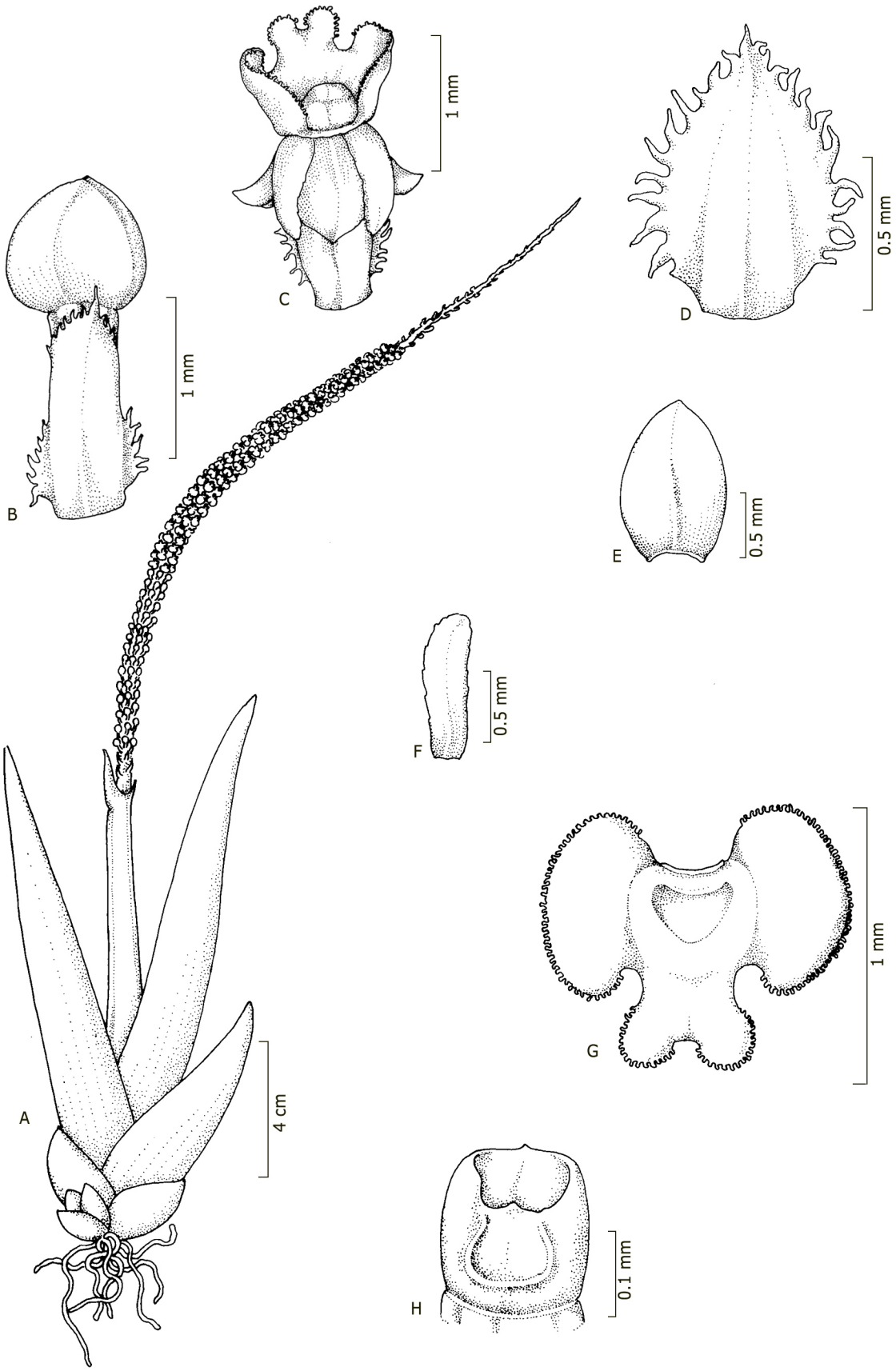


Figure 46. *Oberonia chandrasekharanii* V.J. Nair, V.S. Ramach. & R. Ansari: A. Habit; B. Flower bud; C. Flower; D. Bract; E. Sepal; F. Petal; G. Lip; H. Column

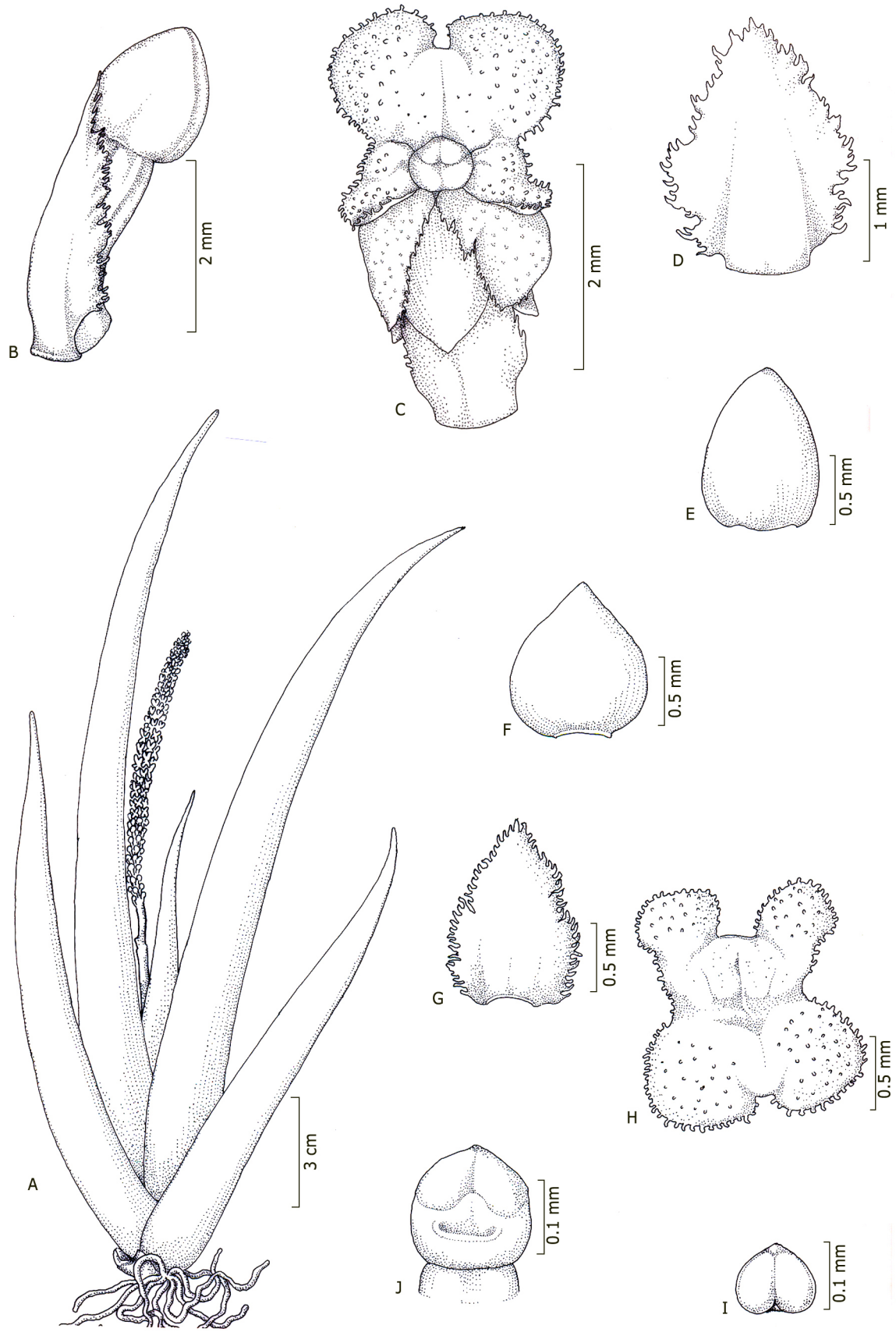


Figure 47. *Oberonia ferruginea* Parish ex Hook.f.: A. Habit; B. Flower bud; C. Flower; D. Bract; E. & F. Sepals; G. Petal; H. Lip; I. Pollinium; J. Column

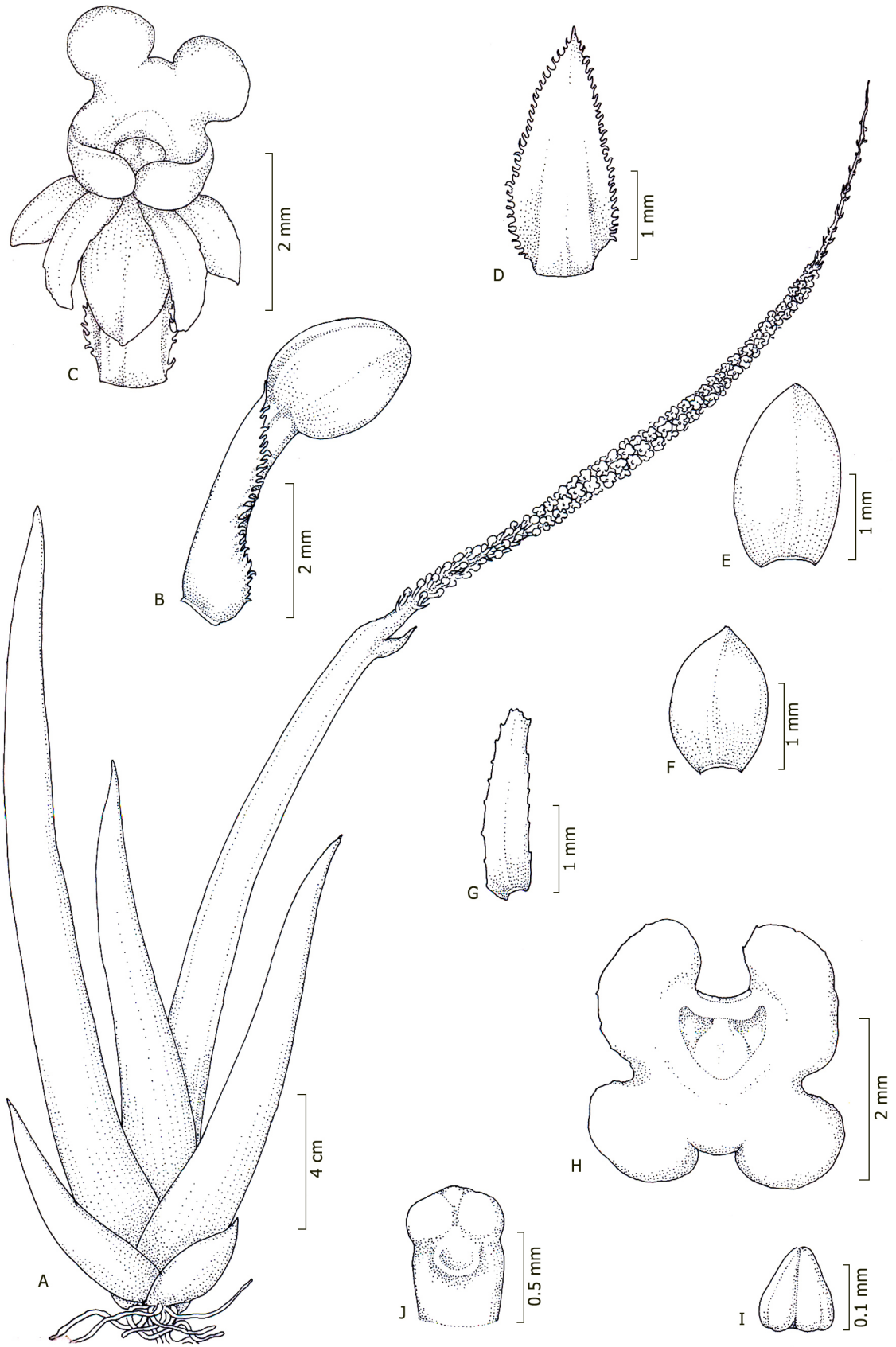


Figure 48. *Oberonia josephii* Saldanha: A. Habit; B. Flower bud; C. Flower; D. Bract; E. & F. Sepals; G. Petal; H. Lip; I. Pollinium; J. Column

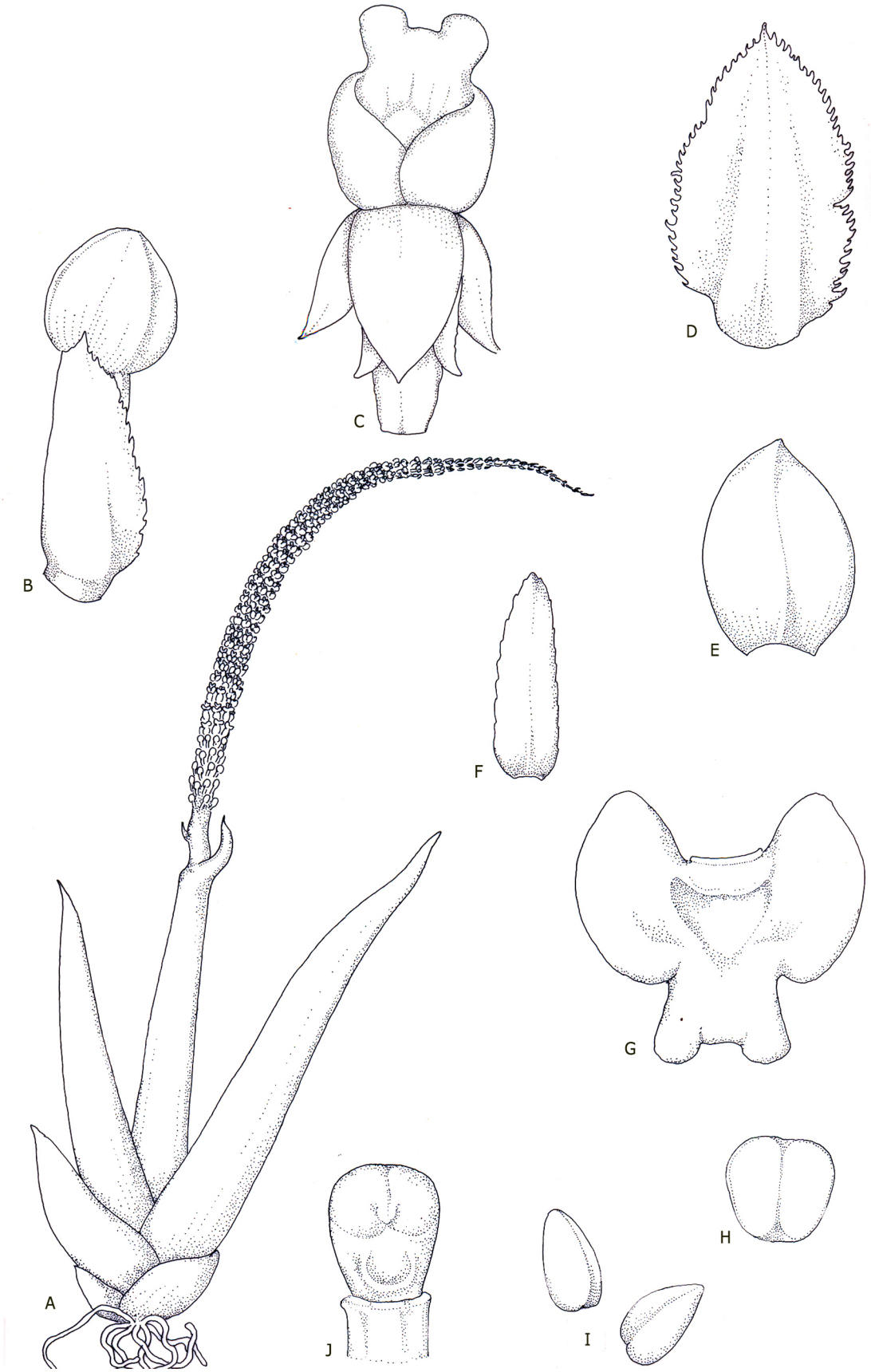


Figure 49. *Oberonia swaminathanii* Ratheesh, Manudev, Sujanapal, Anil Kumar & Sivad. *et al.*: A. Habit; B. Flower bud; C. Flower; D. Bract; E. Sepal; F. Petal; G. Lip; H. Pollinarium; I. Pollinia; J. Column

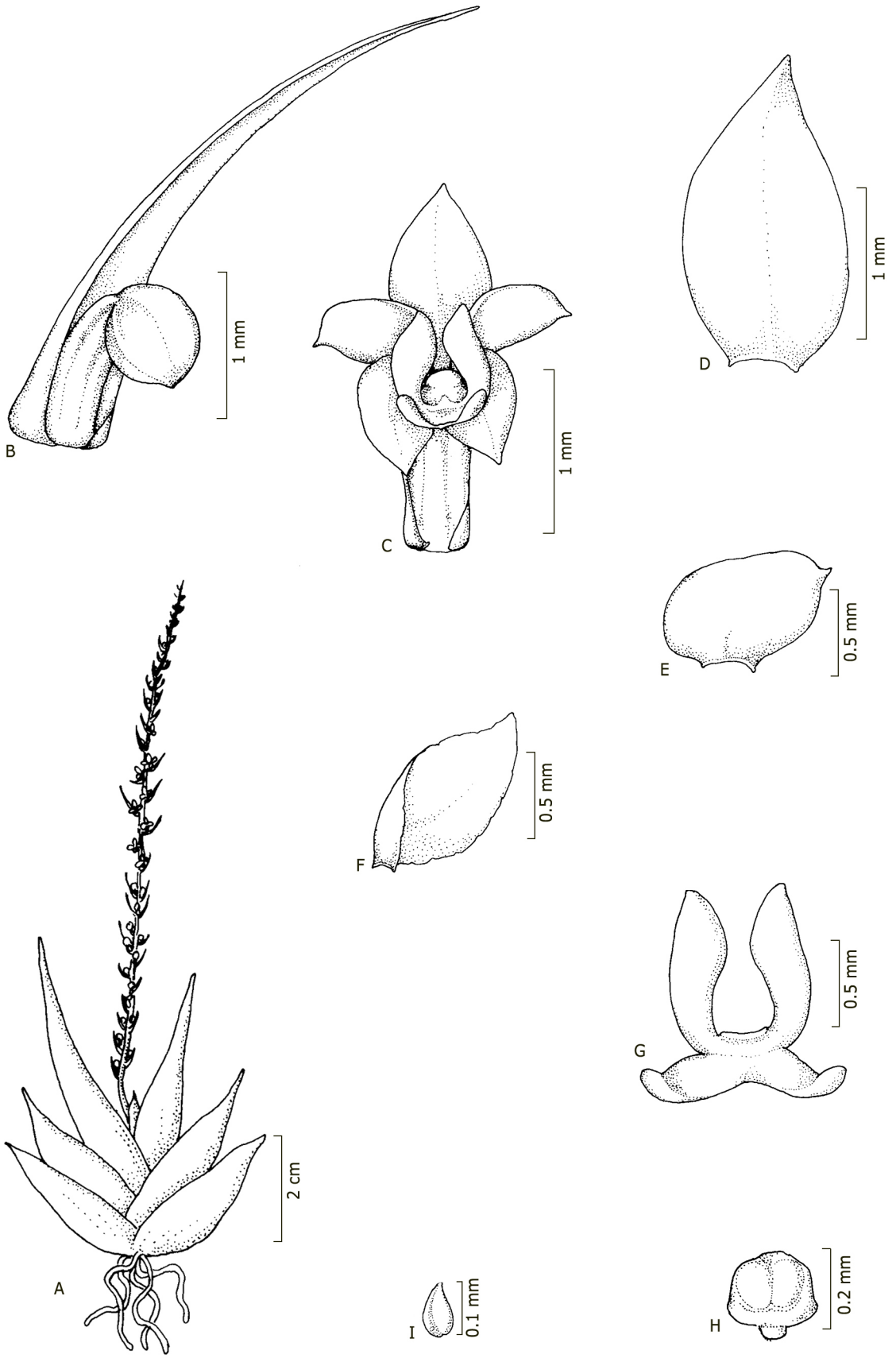


Figure 50. *Oberonia tenuis* Lindl.: A. Habit; B. Flower bud with bract; C. Flower; D. & E. Sepals; F. Petal; G. Lip; H. Pollinarium; I. Pollinium

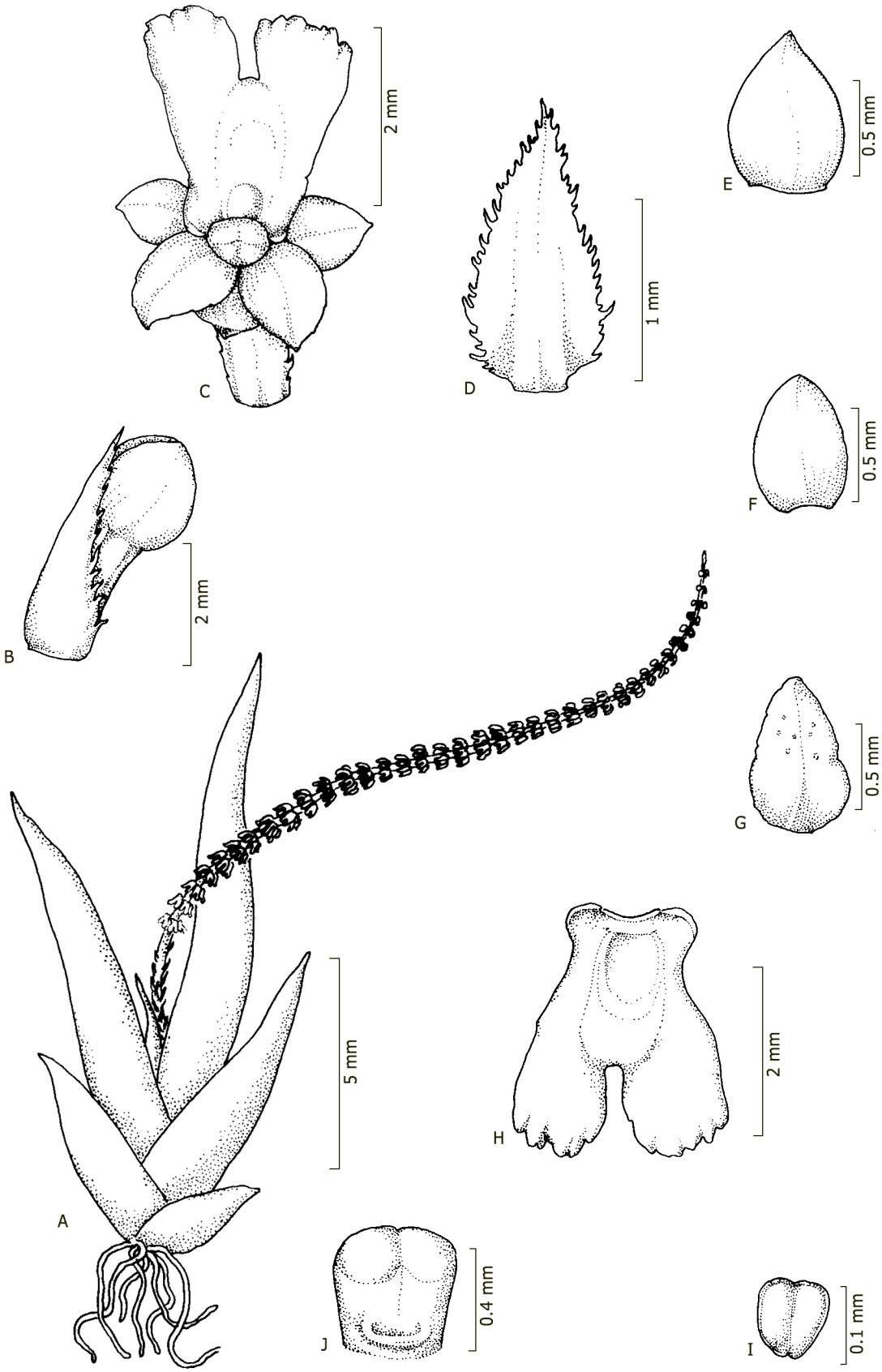


Figure 51. *Oberonia verticillata* Wight: A. Habit; B. Flower bud with bract; C. Flower; D. Bract; E. & F. Sepals; G. Petal; H. Lip; I. Pollinia; J. Column

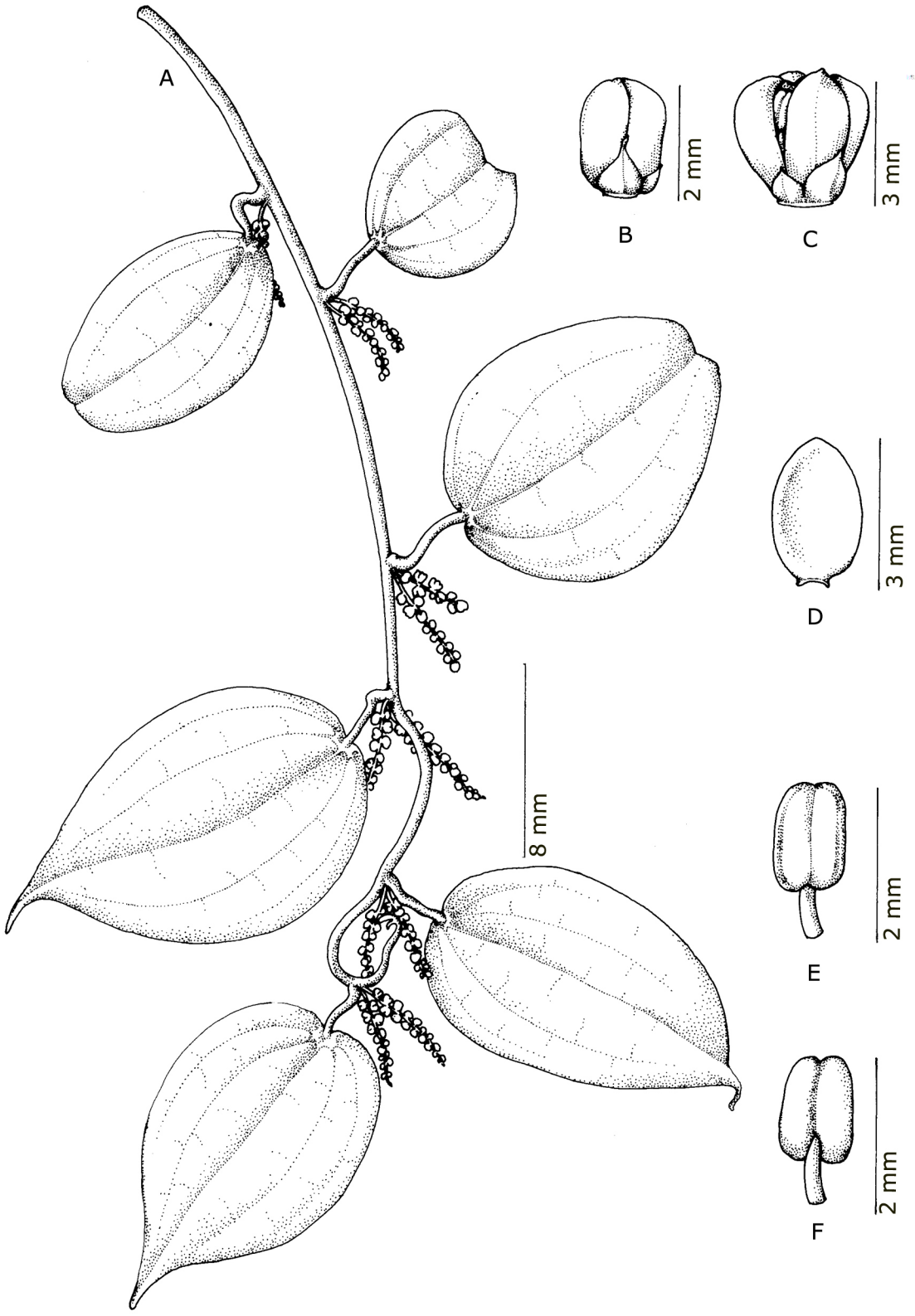


Figure 52. *Dioscorea oppositifolia* L.: A. Flowering twig; B. Male flower bud; C. Male flower; D. Petal; E. Stamen - dorsal view; F. Stamen - ventral view