# FLORISTIC AND ETHNOBOTANICAL STUDIES OF PERIYAR TIGER RESERVE

**THESIS**

submitted to the

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in partial-fulfilment of the

requirements for the degree of

**DOCTOR OF PHILOSOPHY**

by

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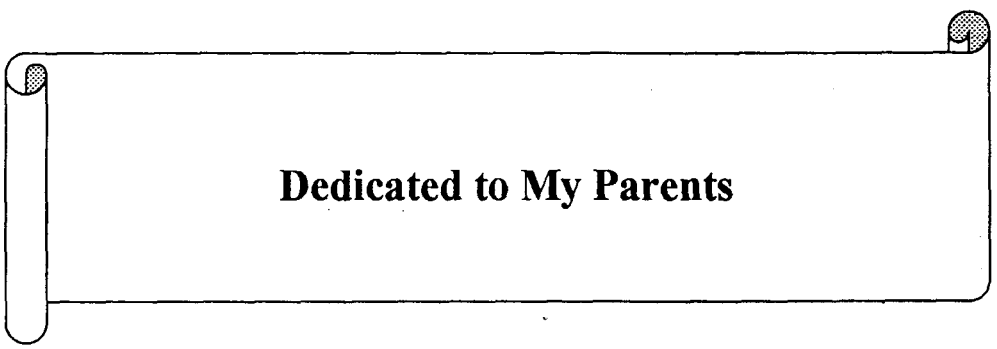
Dedicated to My Parents

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This is to certify that the thesis entitled **"Floristic and Ethnobotanical Studies of Periyar Tiger Reserve"** submitted by **Mr. Jomy Augustine** 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. Jomy Augustine has successfully completed the Qualifying Examination prescribed by the University of Calicut as part of the Ph.D. programme.

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# DECLARATION

I hereby declare that the thesis entitled "**Floristic And Ethnobotanical Studies of Periyar Tiger Reserve**" submitted by me in partial-fulfilment of the requirements for the degree of Doctor of Philosophy of the University of Calicut incorporates the results of the work done by me. This thesis has not been submitted by me to any other University for the award of any other degree or diploma, and it represents the original work done by me.

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# INTRODUCTION

Jomy Augustine “Floristic and ethnobotanical studies of Periyar tiger reserve” Thesis. Department of Botany, University of Calicut, 2000

# INTRODUCTION

The study of floristics is one among the prime subjects since man became conscious about his environment and the usefulness of the plants to the society. But during the middle of the present century plant taxonomy has been dominated by various modern branches of botany like phytochemistry, bio-technology, etc., but there is a rapid rejuvenation for this basic science since the Eleventh technical meeting of the IUCN held in India in 1969. This resurrection, however, is primarily for the conservation of Biodiversity especially of the Tropical Forests. The tropical forests are under the pressure of various kinds of anthropogenic activities and are undergoing rapid destruction, or conversion for various purposes like urbanisation, agriculture, large scale plantation, etc. during the second half of the present century. The tropical forests harbour about 70% of living organisms of the whole world, of which 49,955 plant species (roughly 20% of the total) are confined as exclusive endemics in 18 areas throughout the tropical forests (Myers, 1988). These areas represent around 0.5 % of the total land area of the world and are under the threat of habitat destruction ("Hot Spots"). It is estimated that around 7500 species of organisms are becoming extinct every year (Chatterjee, 1995) which include many unknown species also. So many plant and animal species have become extinct even before entering the scientific literature. International Union for Conservation of Nature and Natural Resources (IUCN) has estimated that around 10% of the world flora are in danger of extinction.

## Floristic aspects

India with 329 million hectares of land area under Indo-Malaysian subkingdom of world floristic classification is not an exception to the present conditions of the Tropical forests (Wood, 1974). With a senile topography and being shielded off from the rest of Asia by the Himalayan uplift this subcontinent has a general kind of Tropical monsoon climate. The Flora and Fauna of this nation are well affected by Pleistocene glaciation in the past and by strong monsoon currents in the present. The monsoon in India is well influenced by the formation of hill ranges like Western Ghats and Eastern Ghats in the peninsular part and Himalayas in the northern boarder.

Along with the geological and climatic factors human activities like rising of large civilisations added with influx of civilised races from north-west which caused fast urbanisation and introduction of many exotic plants, severely affected the natural habitats of India especially in the peninsular part. Most of the low land fertile parts became the agricultural land due to the population explosion and now the natural forests are confined to the hill tops and some protected areas. Large scale plantation for pepper, cardamom, coffee, tea, teak, eucalyptus and rubber converted vast areas of evergreen forests to mono-culture plantations. Presently the flora of India is a relict of only what was dominating before the dawn of civilisations in India (Mani, 1974). Warner (1982) estimated that 80% of the geographical area of India were under forest cover in 3000 BC which is now left with 19.1% of the total land area.

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 genetical stock of the Bio-diversity of the W. Ghats is the most attractive for both evolutionists and ecologists. The W. Ghats being the separating barrier of the two geographical regions of Peninsular India namely, the Malabar coast and the Deccan (Hooker, 1904; Chatterjee, 1939), has both the Deccan flora along the leeward side and Malabar coast flora along the windward side. The heavy annual input (250-500 cm) of South-West monsoon and North-East monsoon along the windward side of the Western Ghats favours a typical tropical rain forest.

The state of Kerala in which the present study area lies is a beautiful rain-fed area along the southern most part of the W. Ghats and is flanked by the Arabian ocean along the western side and has an area of 38863 km.$^2$

The Periyar Tiger Reserve, one among the 12 protected forest areas in Kerala is located in the Idukki Revenue District of the State. The Tiger Reserve with an area of 777 km$^2$ is the largest protected area in Kerala. The Periyar lake was created in 1895 by building a dam across the Mullaperiyar river. The lake has an area of 26 km$^2$. The forest around the lake was declared as Reserved Forest in 1899 and later in 1933 into a sanctuary, the **Nellikkampetty** Game Sanctuary. The sanctuary was brought under 'Project Tiger' in 1977 (Asari, 1985).

The Tiger Reserve is well known for its rich wildlife and scenic beauty. The management practices followed were with more emphasis on wildlife. Except for occasional collection of specimens by the Scientists of Botanical Survey of India, which resulted in finding some interesting taxa, the Tiger Reserve has not been subjected to detailed floristic study. Due to the varied climatic conditions, the Tiger Reserve possesses rich and diverse flora. Major part of the

Tiger Reserve comes under the Anamalai-High Ranges, one of the centres in the Western Ghats with a high percentage of endemism (Nayar, 1997). The project for studying the flora was taken up with the co-operation and financial support from the Wildlife Wing of Kerala Forest Department.

## Ethnobotanical aspects

The knowledge acquired through hundreds of generations and through numerous experiences and practices are found more reliable and if the use of such knowledge to humankind is less expensive it would be readily accepted by the society. The role of Ethnobotany plays here to bring many hidden use of many plants, practised by local ethnic groups for thousands of years. The conservative use of the natural resources for meeting needs of primitive men helped him to maintain the stable relationship between man and the surroundings. When he turned towards the modern facilities for immediate benefits he started to forget the way through which he could exploit the nature without hurting the sable equilibrium. This is much related to the loss of habitat where the useful plants or animals are seen. The transfer of knowledge through generations is not by any written form but by various occasional applications of each resources. But due to various forest policy changes and due to conversion of large tracts of forests lands to agricultural purposes many resources became unavailable to these ethnic populations. In India the Ethnobotanical studies are much relevant because of the inhabitation of 53 millions of tribal men and more than 40,000 plants. These Tribal men are belonging to 550 ethnic communities ( Binu *et al.*, 1992) living in a variety of habitats ranging from hot deserts to moist tropical evergreen forests of temperate climates like the Todas of Nilgiris (Abraham, 1981). The Tribal people are said to use about 6,000 indigenous flowering plants (Bull. FRLHT., 1991).

# AREA OF STUDY

## Location

The study area, Periyar Tiger Reserve is located in Idukki District, the largest district of Kerala with an area of 4998 km$^2$. It lies between 9$^0$16' and 9$^0$36' North latitude and 76$^0$57' and

77°25' East longitude (Fig. 1). The Reserve has an area of 777 km$^2$ including the Periyar Lake having an area of 26 km$^2$. The boundaries are Madurai and Ramanadhapuram districts of Tamil Nadu on the east, Kottayam district on the west, Pathanamthitta district on the south and the rest of the Idukki district on the north. The name of the tiger reserve is after the longest river in Kerala, the Periyar River, which flows across the reserve.

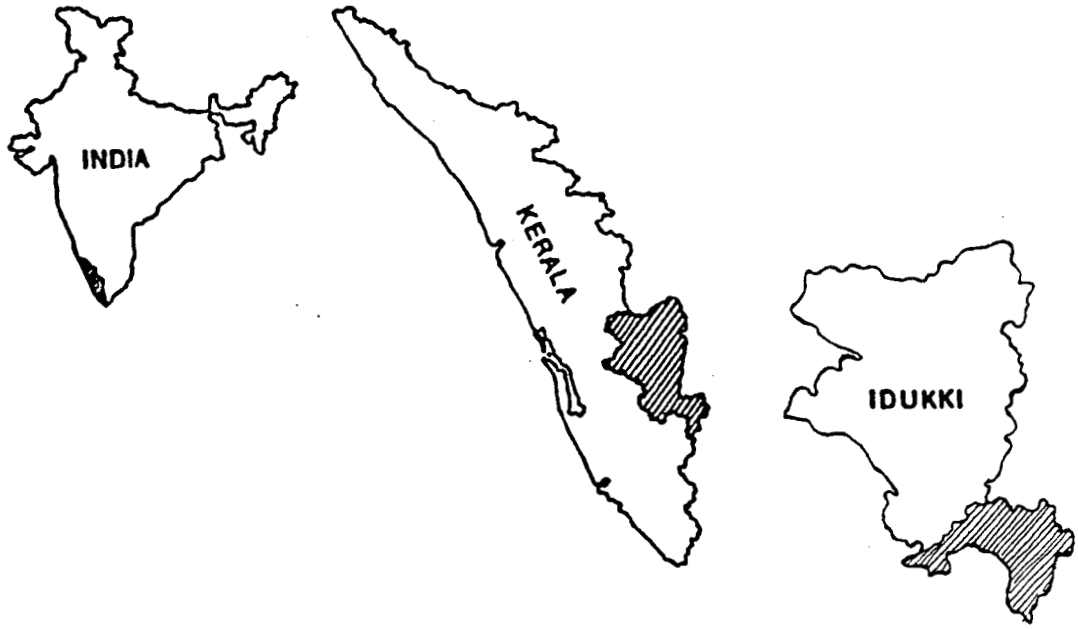
## Topography

Periyar Tiger Reserve has a much undulated terrain ranging in altitude from 100 m (Pambavalley) to 2016m (Vellimala) above sea level. The prominent peaks are Pachayarmala, Vellimala, Kottamala, Sunderamala, Chokkampettimala and Karimala. The Periyar River originating from Chokkampettimala flows towards the north. It joins with its two major tributaries, Mullayar at Mullakkudy and Churakkottayar at Thannikkudy. The lake Periyar extends up to Thannikkudy in the upstream at maximum flood level (MFL). The Western part of the Reserve (Mount Plateau) is drained by Pamba and Azhutha rivers which form the boundary of the Reserve.

Topographically the Reserve can be divided into two parts, the South-eastern part and the Western part. The South-astern part (Thekkady Range) which is the water shed area to Periyar lake, is bordered with two hill ranges: (a) the *Chokkampetti–Vellimala–Eravangalar–Mangaladevi hill range* along the eastern border forming the state boundary between Tamil Nadu and Kerala, is with a western aspects of vegetation and (b) the *Odamala–Sundaramala–Melmala hill range* along the western boundary of the Tiger reserve with an eastern aspects of vegetation; the latter is with more thickets of reeds. The Western part (Vallakkadavu range) is with a single ridge, the *Chenthamara - Uppupara - Arjunankotta ridge* lying in east-west direction. The historic pilgrim centre, the Sabarimala temple, is situated on the southern side of this ridge. Northern side is with extensive tracts of grasslands.

## Geology, rock and soil

The underlying rock formations consist mainly of granites and gneisses. Laterite occurs at the lower reaches of the Reserve. The soil is of Thekkady Series belonging to the Red and Laterite Soil Region (Murthy *et al.*, 1982). It is formed on complex rock formations of different



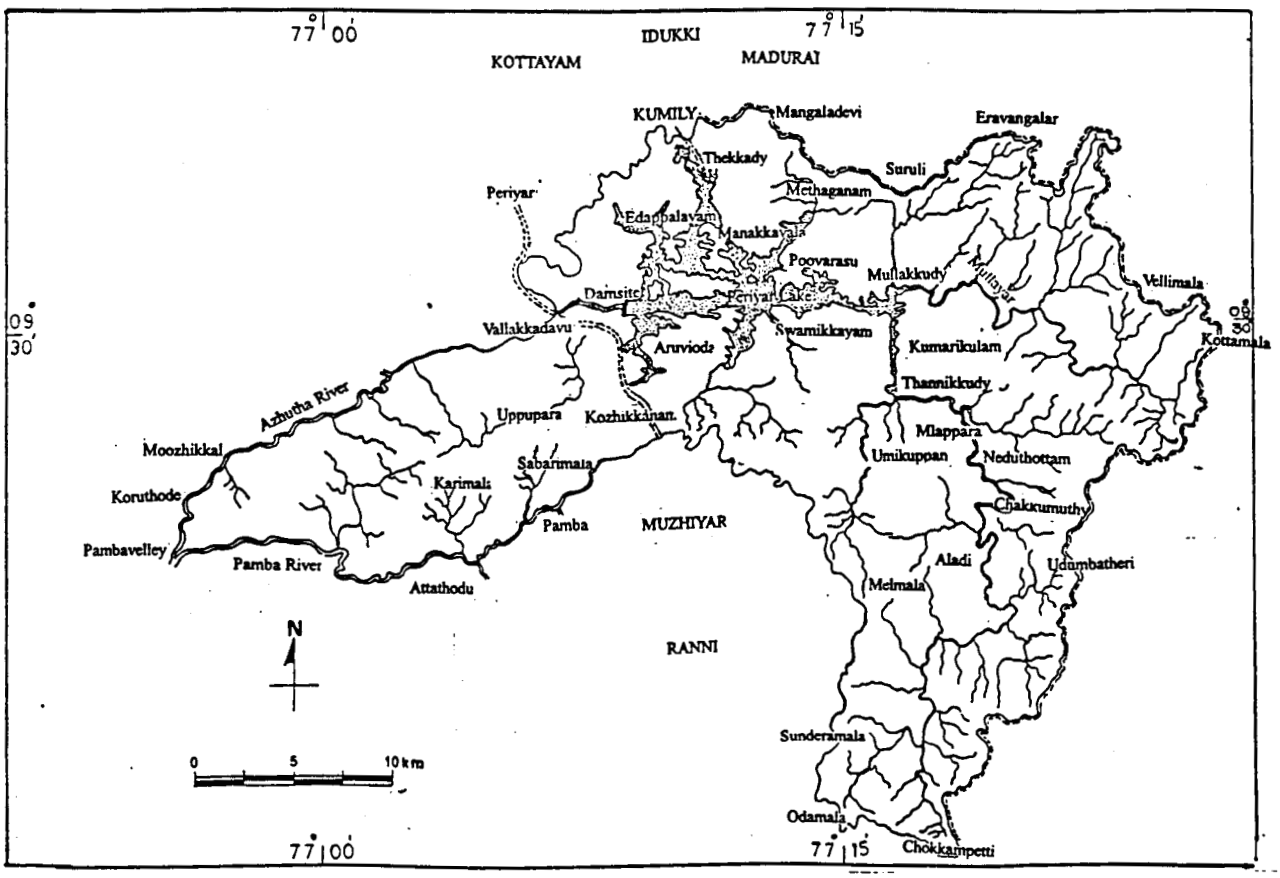




Fig. 1. Geographical map of Periyar Tiger Reserve showing various localities.

geological periods dating from Archaean times. They are developed on gneiss and occur on moderately slopping hills and are deep clayey, well drained and median to strongly acidic. The Cation Exchange Capacity (CEC) ranges from 6-16 meq per 100g. of soil. The Available Water-holding Capacity (AWC) is medium to high (Murthy *et al.*, 1982).

## Climate

The climate of Peninsular India is well influenced by the Western Ghats, and South India is unique in having a considerable contribution of rainfall from post monsoon period, the North-East monsoon. Periyar Tiger Reserve belongs to the climatic regions of India where the rainfall is above 250 cm per year and has a humid climate without much seasonal variations. The temperature varies between 15°C and 31°C with April-May being the hottest months and December-January the coolest. The area receives both the South-West and the North-East monsoons, the former during June-September and the latter during October-November months, with maximum rainfall in July and minimum in January. The average rainfall is 4434 mm per year and the average monthly rainfall during the period from 1978 to 1999 is represented in the Fig. 3. Average rainy days per year is 121.

## Vegetation

The Tiger Reserve is enriched with an equatorial type of vegetation, not much different from other windward side forests of the Western Ghats (Fig. 2).

According to the classification of Chandrasekharan (1962), and Champion and Seth (1968), the vegetation of the Tiger Reserve can be classified into the following types :

1. West coast tropical evergreen forests (evergreen)
2. West coast semi-evergreen forests (semi-evergreen)
3. Southern moist mixed deciduous forests (moist deciduous)
4. Southern hill-top tropical evergreen forests (hill-top evergreen)
5. Southern montane wet temperate forests (shola)
6. South Indian sub-tropical hill savannahs (savannah)
7. Southern wet montane grasslands (grassland)

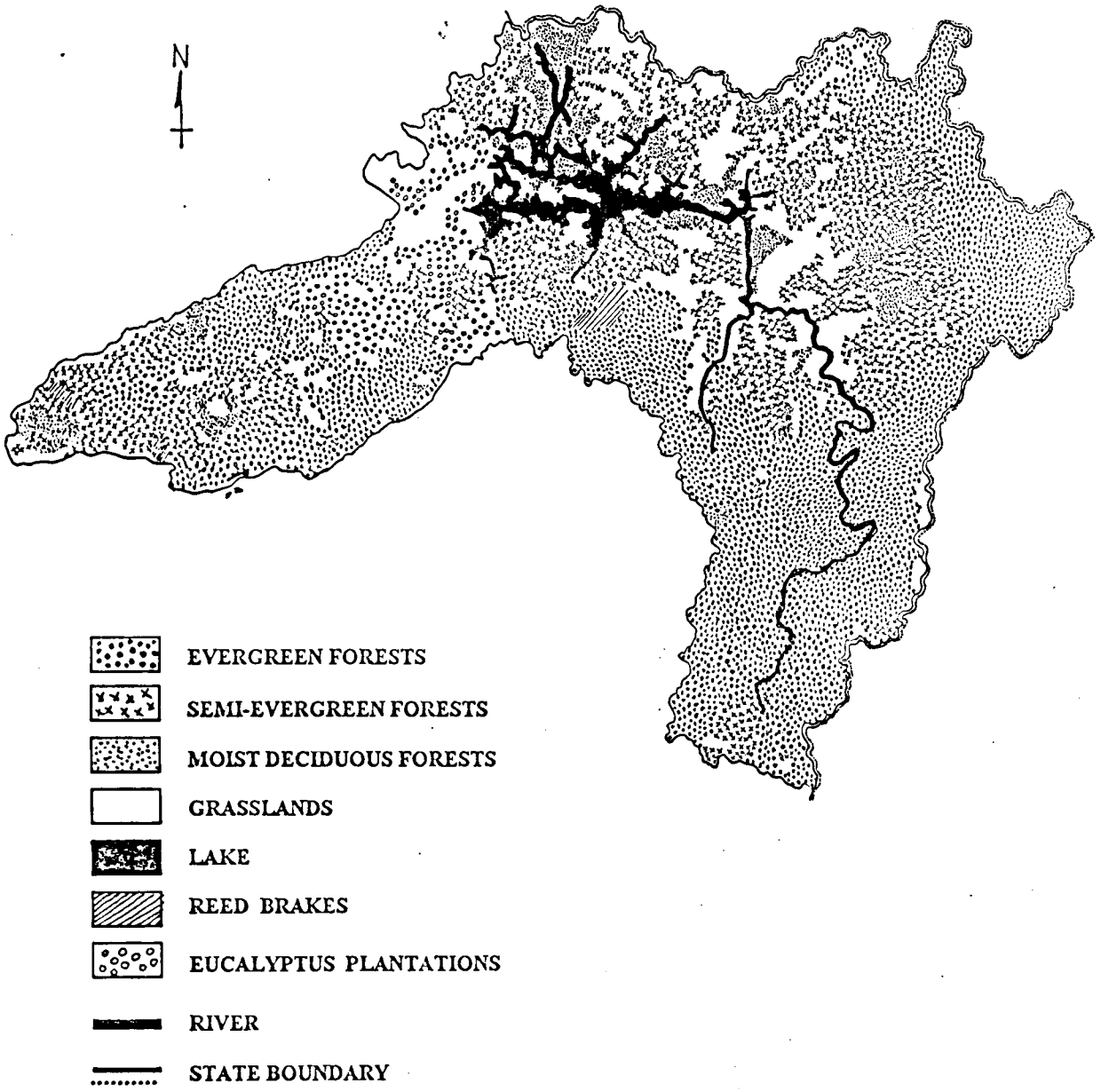
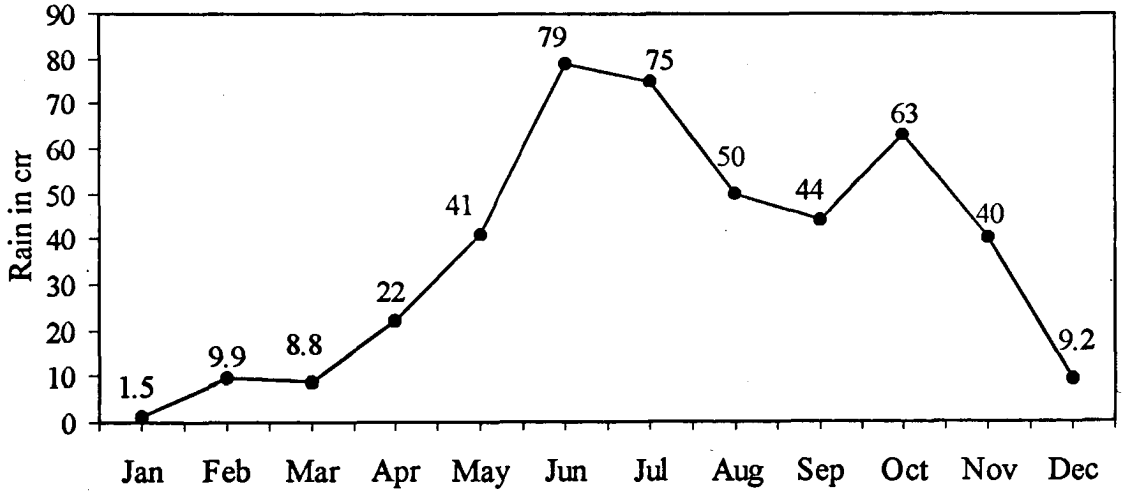


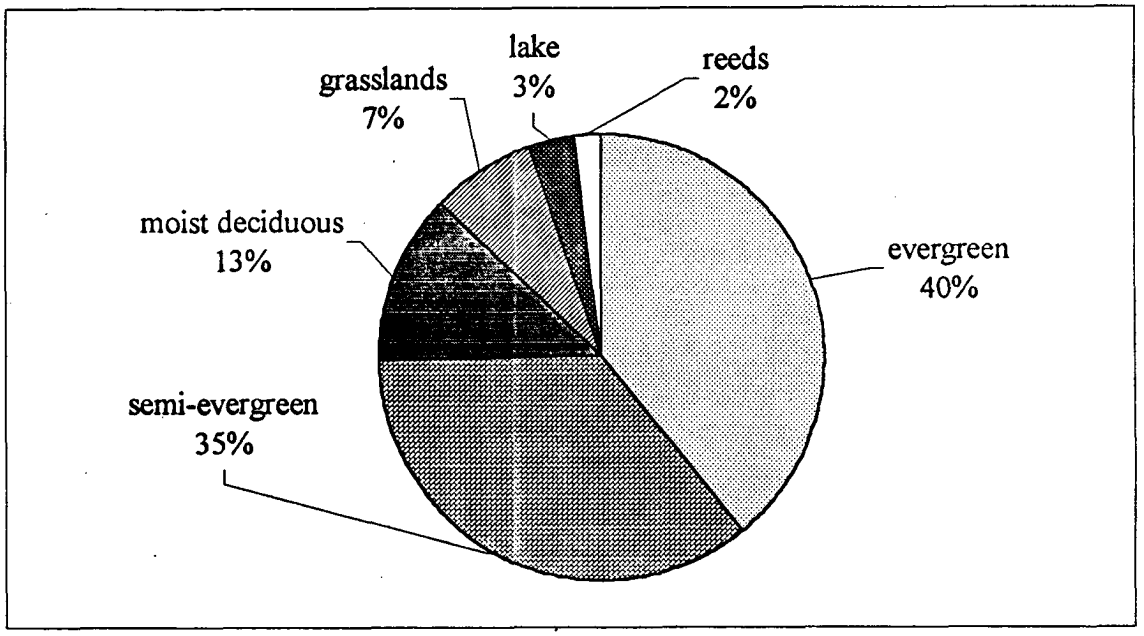

Fig. 2. Periyar Tiger Reserve - Vegetation map showing the distribution of different types of forests

**Fig. 3. Average monthly rainfall (in cm) during 1978-1999**




Relative percentage of area occupied by each type of forest including the area occupied by the lake of the study area are represented in Figure 4.

**Fig. 4. Relative percentage of area of various forest types and the lake of PTR**




## West coast tropical evergreen forests

This forest type is found in Mount Plateau (Vallakkadavu Range) especially in Koruthode-Sabarimala-Poonkavanam areas where the altitude ranges from 100 to 1300 m (Fig. 5 A & B).

The evergreen forests of this altitude have a canopy height of 35 to 50m. Comparatively taller trees with straight trunks are found in these evergreen forests. 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** association, **Hopea-Dipterocarpus-Vateria** association and **Polyalthia-Myristica-Calophyllum** association. The top canopy species are *Hopea parviflora* (Fig. 6 A), *Dipterocarpus indicus, D. bourdillonii, Polyalthia coffeoides, Palaquium ellipticum, Pterygota alata, Vateria indica, Calophyllum polyanthum, Antiaris toxicaria, Artocarpus hirsuta, Mesua thwaitesii, Holigarna grahamii, Diospyros buxifolia, Lophopetalum wightianum, Myristica dactyloides, Kingiodendron pinnatum, Dysoxylum malabaricum, Tetrameles nudiflora, Elaeocarpus tuberculatus, Sageraea grandiflora* (Fig. 6 B), etc.

The trees of the middle canopy are *Diospyros bourdillonii, D. candolleana, D. paniculata, Drypetes elata, D. malabarica, Humboldtia vahliana, Garcinia morella, G. spicata, Hydnocarpus pentandra, Semecarpus travancorica, S. auriculata, Knema attenuata, Baccaurea courtallensis, Aglaia lawii, A. barberi, Otonephelium stipulaceum, Dimocarpus longan,* etc.

The lower storey trees are *Orophea uniflora, O. erythrocarpa, Meiogyne ramarowii, M. pannosa, Goniothalamus rhynchantherus, Aphanamixis polystachya*, etc.

The shrubby plants are mainly *Psychotria* spp., *Glycosmis macrocarpa, Amomum muricatum, Strobilanthes warreensis, S. heyneanus,* etc. Major climbers are *Combretum ovalifolium, Gnetum ula, Strychnos colubrina, Entada rheedei, Loeseneriella bourdillonii,* etc. Canes like *Calamus thwaitesii, C. pseudo- tenuis,* etc. were found common here.

The two rivers namely, **Pampa** and **Azhutha,** bordering the Tiger Reserve are associated with a more or less defined riparian flora. Trees like *Lophopetalum wightianum, Syzygium cumini, Humboldtia valhiana, Syzygium heyneanum S. occidentalis, Hydnocarpus pentandra, Ixora brachiata, Neolamarckia cadamba, Neonauclea purpurea, Rotula aquatica, Madhuca neriifolia, Homonoia retusa,* etc. are common along the banks of these rivers. The traditional forest way to the famous pilgrimage centre Sabarimala goes through these forest (Fig 10 A).

## West coast semi-evergreen forests

This forest type covers an area of around 190 $km^2$ of the Tiger Reserve. It is found in Thekkady, Swamikkayam and Vallakkadavu areas (Fig. 7 A). The three tier structure of the tree canopy is evident in this forest type also.

The top canopy is composed of trees like *Terminalia bellirica, Myristica dactyloides, Ficus drupacea, F. nervosa, F. virens, Bischofia javanica, Syzygium hemisphericum, S. gardneri, Mangifera indica, Tetrameles nudiflora, Toona ciliata, Elaeocarpus tuberculatus, Filicium decipiens, Bombax ceiba, Chukrasia ciliata, Litsea oleoides, L. glabrata, Actinodaphne bourdillonii*, etc.

The middle canopy trees are *Syzygium cumini, Litsea floribunda, L. deccanensis, Dimocarpus longan, Harpullia arborea, Diospyros ovalifolia, D. candolleana, Mallotus tetracoccus, M. philippensis, Mastixia arborea* var. *meziana, Otonephelium stipulaceum, Pterospermum reticulatum, Cinnamomum* spp., *Vitex altissima, Viburnum punctatum, Chionanthus mala-elengi, Croton malabaricus, Trewia nudiflora, Turpinia malabarica, Phoebe lanceolata*, etc.

The lower storey trees are *Clausena indica, Aidia gardneri, Ixora brachiata, Archidendron monadelphum, Memecylon talbotianum, M. edule, Syzygium mundagam, Croton laccifer, Scleropyrum wallichianum, Aglaia barberi*, etc.

The shrubs consist mainly of *Cipadessa baccifera, Elatostema lineolatum, Aporusa acuminata, Turraea villosa, Psychotria* spp., *Gomphandra coriacea, Allophylus cobbe, A. concanicus, Strobilanthes anceps, S. pulneyensis*, etc. Major lianas are *Entada scandens, Gnetum ula, Reissantia indica*, etc. Major climbers are *Toddalia asiatica, Luvunga eleutherandra, Derris brevipes*, etc. Few grasses namely, *Oplismenus undulatifolius, Cyrtococcum muricatum, C. oxyphyllum, Isachne* spp. were also found in these forests.

## Southern moist mixed deciduous forests

Around 100 km$^2$ of the Reserve is under this forest type (Fig. 7 B). In Periyar Tiger Reserve this forest type is found even up to an altitude of 1200 m and is again peculiar in having scattered evergreen tree species viz., *Litsea coriacea, Olea dioica*, etc. The trees shed their leaves during hot months and the burnt out appearance may last for 6-8 weeks. This forest is found at Thaannikkudy, Mullakkudy, Edappalayam, Pambavalley and Methaganam areas. The three tier canopy structure is discernible in this forests also.

The upper canopy trees are *Pterocarpus marsupium, Tectona grandis, Terminalia paniculata, T. crenulata, Bombax ceiba, Tetrameles nudiflora, Actinodaphne malabaricum, Dalbergia lanceolaria, D. sissoides, Grewia tiliifolia, Stereospermum colais, Lagerstroemia*

Fig. 5 **A**. & **B**. Views of evergreen forests at Koruthode

Fig. 6. A. *Hopea parviflora* Bedd.
B. *Sageraea grandiflora* Dunn

Fig. 7. **A**. Semi-evergreen forests at Thekkady
**B**. Moist deciduous forests at Kokkara

*microcarpa, Diospyros montana, Sterculia villosa,* etc. In Pambavalley (below 100 m) this forest is characterised by **Xylia–Adina–Terminalia** association where the major trees are *Xylia xylocarpa, Adina cordifolia, Terminalia elliptica, T. paniculata, Lannea coromandelica, Bridelia airy-shawii,* etc.

Middle canopy trees are *Olea dioica, Litsea coriacea, Careya arborea, Dillenia pentagyna, Buchanania lanzan, Phyllanthus emblica, Glochidion ellipticum, G. tomentosum,* etc.

The lower storey trees are *Wrightia tinctoria, Helicteres isora, Catunaregam spinosa, Clausena dentata,* etc.

The shrubby layer is composed of *Maesa indica, Solanum torvum, S. anguivi, Lantana camara, Ixora malabarica, Pavetta tomentosa, Desmodium pulchellum, Flemingia strobilifera, Desmodium triangulare, Chromolaena odorata,* etc. Climbers like *Spatholobus purpureus, Combretum ovalifolium, Calycopteris floribunda, Combretum ovalifolium, Cissus repens,* etc. are very common in these forests. Many exotic weeds like *Mikania cordifolia, Mimosa diplotricha* (Fig. 75 A), etc. were also found gregariously growing in these forests.

## Southern hill-top tropical evergreen forests

This type of forest is found in places south of Mlappara, east of Mullakkudy and Thaannikkudy, where the altitude is between 1300 and 1700 m (Thekkady range). Two types of associations were found in this forest type:

(a) **Dysoxylum-Palaquium-Cullenia** association is found in places above Mullakkudy and Thaannikkudy. This forest is more dense than the West-coast Tropical evergreen forests and the trees are not with huge clean-bole trunks. The upper storey trees in these areas are *Dysoxylum binectariferum, Palaquium ellipticum, Cullenia exarillata, Mesua ferrea, Acrocarpus fraxinifolius, Meliosma pinnata* var. *arnottiana, Syzygium gardneri, Litsea oleoides, Cassine paniculata,* etc.

The trees of middle canopy are *Casearia rubescens, C. ovata, Litsea glabrata, L. insigne, Hydnocarpus alpinia, Diospyros ovalifolia, D. neilgherrense, Bhesa indica, Elaeocarpus glandulosum, Coffea crassifolia, Drypetes wightii, Lepisanthes tetraphylla, Agrostistachys borneensis, Scolopia crenata, Chionanthus ramiflorus,* etc.

The lower storey trees are *Goniothalamus wightii, Meiogyne pannosa, Microtropis stocksii, Aporusa fusiformis, Antidesma menasu, Glochidion ellipticum, G. ceylanicum, Epiprinus*

*mallotiformis, Aglaia simplicifolia, Acronychia pedunculata, Erythroxylum monogynum,* and *Meliosma simplicifolia.*

The shrubby plants are mainly *Strobilanthes* spp., *Lasianthus* spp., *Dendrocnide sinuata, Psychotria* spp., *Euonymus crenulatus, Dichapetalum gelonioides, Saprosma foetida, Tabernaemontana gamblei, Amomum muricatum, Elatostema lineolata, Pellionia heyneana,* etc.

Evergreen forests south of Mlappara along Aladi-Chokkampetti Hills are with **Cullenia-Mesua-Acrocarpus** association. Top canopy trees are *Cullenia exarillata, Mesua ferrea, Acrocarpus fraxinifolius, Syzygium hemisphericum, S. zeylanicum, Elaeocarpus tuberculatus, Myristica dactyloides, Canarium strictum, Drypetes oblongifolius,* etc.

Middle canopy trees are mainly *Coffea crassifolia, Gordonia obtusa, Lepisanthes tetraphylla, Dysoxylum beddomei, Hydnocarpus alpina, Agrostistachys borneensis, Ternstroemia japonica, Chrysophyllum roxburghianum,* etc.

The lower storey trees are *Aporusa ficiforme, Meiogyne pannosa, Microtropis stocksii, Litsea ligustrina, Diospyros ovalifolia, Isonandra lanceolata,* etc.

Shrubby plants are mainly *Saprosma foetida, Strobilanthes* spp., *Lasianthus* spp., *Octotropis travancorica, Ardisia pauciflora, Agrostistachys indica, Excoecaria robusta, Tabernaemontana gamblei,* etc. Viable populations of *Nageia wallichiana*, the only indigenous South Indian conifer are also seen towards south of Mlappara. The regeneration of this conifer was found to be of viable proportion as indicated by many seedlings. The slender cane, *Calamus brandisii*, was found at various places of the area.

## Southern montane wet temperate forests

This forest type is characteristic at and above 1500 m altitude, and is essentially a stunted evergreen forest (Fig. 8 A). It is found in Vellimala, Kottamala, Uppermanalar, Pachayarmala, Sunderamala, Chokkampettimala, Mangaladevi and Kalvarimala of the Tiger Reserve where there is folding of hills and very high velocity wind. 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. The canopy stratification is not found in this forest type. The major component trees are *Garcinia cowa, Syzygium parameswaranii, S. rubicundum, Eugenia discifera, Cinnamomum wightii, Phoebe wightii, Bhesa indica, Actinodaphne campanulata, Alseodaphne semecarpifolia, Vernonia travancorica, V. arborea, Litsea wightiana, Cryptocarya*

*stocksii, Neolitsea fischeri, Xantolis tomentosa, Ternstroemia japonica, Rhododendron arboreum* (found in Kottamala only), *Casearia sp., Rapanea capitellata,* etc.

Shrubby plants include *Mallotus muricatus, Symplocos pulchra, S. macrophylla, S. monantha, Rauvolfia verticillata, Elaeagnus conferta, Calamus brandisii, Strobilanthes anceps, S. pulneyensis, S. luridus, S. micranthus, S. homotropus, S. foliosa, S. gracilis,* etc. A number of epiphytic orchids namely, *Bulbophyllum fusco-purpureum, B. fischeri, B. elegantulum, Dendrobium anamalayanum, Diplocentrum congestum, D. recurvum, Eria nana, E. pseudoclavicaulis, E. reticosa, Oberonia* spp. *Papilionanthe subulata, Robiquetia josephiana, Seidenfadeniella chrysantha, Trichoglottis tenera,* etc., were also found specific to this forest.

## South Indian subtropical hill savannahs

Large tracts of savannahs are found at Thaannikkudy, Edappalayam, Manakkavala and Kavalappara areas. Major trees found in this forest types are *Terminalia paniculata, T. chebula, Careya arborea, Pterocarpus marsupium, Phyllanthus emblica, Buchanania lanzan, Dalbergia sissoides, Dillenia pentagyna, Anogeissus latifolia,* etc. Shrubs include *Ziziphus rugosus, Helicteres isora, Desmodium pulchellum, Vernonia divergens, V. indica,* etc. The dominant grasses are *Themeda cymbaria, Chrysopogon hackelii, Cymbopogon flexuosus, Apluda mutica, Panicum* spp., *Ischaemum timorense, I. indicum, Eulalia trispicata, Capillipedium assimile,* etc. The herbaceous flora of the savannahs are very rich with a number of herbaceous leguminous plants like *Desmodium* spp., *Alysicarpus* spp., etc. and many terrestrial orchids like *Habenaria* spp., *Pecteilis gigantea,* etc. In most of the areas the savannahs merge with grasslands or moist deciduous forests.

## Southern montane wet grasslands

Extensive open grasslands are found in Arjunankotta, Uppupara, Kavalappara, Mangaladevi, Kumarikulam, Palkachimala, Kathiramudi, Swamikkayam mala and Kalvarimala where the altitude is above 1200 m. About 57 $km^2$ area is dominated with grass growth. Major part of the grassland was converted into Eucalyptus plantations in the past and now about 5,000 ha. are under Eucalyptus plantation. Among the savannahs and grasslands, there are patches of marshy areas where a mixed growth of grasses like *Panicum* spp., *Leersia hexandra, Eragrostis* spp., *Isachne kunthiana, Pseudoraphis spinescens* along with a rich populations of sedges are found.

Major grasses are *Chrysopogon zeylanicum, Themeda cymbaria, Tripogon bromoides, Arundinella ciliata, A. mesophylla, A. leptochloa, A. purpurea, Dimeria lawsonii, D. thwaitesii, Heteropogon contortus, Apocopis mangalorensis, Eulalia trispicata, Ischaemum commutatus,* etc. Apart from grasses, shrubs like *Phoenix humilis, Strobilanthes kunthianus, Indigofera pulchella, I. wightii, Lilium wightianum, Hypericum mysorense, Thalictrum japonicum,* etc. are also seen along with a rich herbaceous population.

The grasslands of Periyar Tiger Reserve can be divided into 3 categories: Grasslands of hill top, Grasslands of hill slops, and Grasslands fringing the lake shores. The first kind is with short but densely tufted grasses like *Tripogon* spp., *Chrysopogon* spp., *Heteropogon contortus, Arundinella* spp., etc. while the second kind is characterised by tall grasses like *Themeda cymbaria, Cymbopogon flexuosus*, etc., and the third kind of grassy areas are with *Panicum repens, Brachiaria* spp., *Cynodon dactylon, Axonopus compressus, Eragrostis* spp., and numerous sedges like *Cyperus* spp., *Lipocarpha* spp., *Fuirena* spp., etc. The vegetation along the lakeshores are of marshy grasses and herbs like *Stachytarpheta indica, Cassia mimosoides, Mimosa pudica, Conyza bonariensis*, etc. Many ephemeral herbs like *Fimbristylis dipsacea, Torenia lindernioides*, etc. appear along the lake shores when water recedes.

The grasslands support a very rich herbaceous flora which include *Exacum* spp., *Justicia* spp., *Lobelia* spp., *Lindernia* spp., *Pedicularis zeylanica, Sopubia delphiniifolia, S. trifida, Anaphalis* spp., and many terrestrial tuberous orchids namely, *Satyrium nepalense, Habenaria* spp., *Disperis neilgherrense, Spiranthes sinensis, Peristylus goodyeroides, Pecteilis gigantea, Malaxis acuminata, Liparis* spp., *Eulophia* spp., etc.

Extensive tracts of reed-brakes are met along the eastern sides of the Periyar River, especially at Melmala, Manikkamala and Odamala areas (Fig. 8 B). Major components of these reed-brakes are *Pseudoxytenanthera monadelpha, P. bourdillonii and Ochlandra travancorica.* Gregarious growth of *Bambusa arundinacea* is seen along the rocky river banks at Thaannikkudy and Mullakkudy areas.

Four abandoned Cardamom plantations are also found in the Tiger Reserve. They are **Lakshmippara, Mlappara, Naduthottam** and **Umikuppan** estates. These were abandoned during 1985 for natural forest regeneration. Cashew (*Anacardium occidentale*) is raised in plantations of few hectares at **Koruthode**. Planting of indigenous tree species like *Acrocarpus fraxinifolius, Toona ciliata, Bombax ceiba, Xylia xylocarpa, Artocarpus hirsuta* were practised at certain localities like **Methaganam** in side the Reserve areas. Exotic weeds like *Clidemia*

Fig. 8. **A**. Grasslands with evergreen shola forests at Arjunankotta.
**B**. View from thick reed growth at Koruthode

*hirta* (Fig. 75 B), *Mikania cordata, Lantana camara* and *Chromolaena odorata* have established in disturbed forest areas and plantations.

## Aboriginal Ethnic groups of the study area

There are 5 tribal groups in Periyar Tiger Reserve. They are **Mannan, Paliyan, Urali, Malampandaram** and **Mala Arayan.** Except Malampandaram all the rest are now settled in 5 permanent settlements outside the Tiger reserve, though frequently they go into the forests for collecting fuel wood, minor forest produce (MFP), fishing, etc. The five settlements are **Mannakkudy** and **Paliyakkudy** at Anavachal near Kumily for Mannan and Paliyan respectively, **Vanchivayal** near Vallakkadavu for Urali and **Moozhickal** and **Attathodu** near Koruthode for Mala Arayan.

**Malampandarams** are still residing inside the forests and are consisting of only two groups each with around 35 members. One group was found in Arjunankotta and the other group in Chenthamara kokka. They live among rocky beds along the hilly streams, the Kallar and Sabarimalathode. They shift from one place to another place usually after a period of 2-3 weeks. The houses are not permanently built but made of the leaves of *Arenga wightii* . Two or three leaves of this wild palm, still attached with the plant, are tied together below which these people sleep during summer, and during rainy season they reside in large crevices and caves of rocks by the side of the river. Occasionally they prepare small temporary huts with the leaves of *Arenga wightii* and 2-3 poles. Two or three leaves of the palm are cut and leaned towards 1-3 poles or trees (Fig. 9 A ). Such many huts could be found in the areas where these people lived and left for other places. Their complexion is moderate and they speak Malayalam. Their main occupation is honey-collection and basket-making using canes, a few of them are engaged in hunting of small animals and birds like Jungle fowl. They occasionally come out of the forests for selling the honey and cane products and for buying rice, clothes and other necessary items and usually travel along rocky hill-streams. A few Malampandaram are residing in permanently built thatched houses near Moozhickal (Fig. 9 B).

**Mannans** with a population of 832 members in 265 families (Table 1) are residing at Mannakkudy near Kumily. The total area of settlement is 150 acres and average land for each family is about 60 cents. They are settled here since 1945 and till 1985 most of them were engaged in various labours in cardamom plantations at Mlappara, Naduthottam, Umikuppan and



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Lakshmippara estates. Now they are settled agriculturists and their major items of cultivation are pepper, paddy, and a little cardamom (Fig. 11 A). The houses are thatched or with tile roofing. In addition to agriculture they are also engaged with firewood-collection, honey-collection, bamboo pole-collection, thelly (dried resinous exudates of *Canarium strictum*) collection (Fig. 10B) and fishing in the Periyar lake and river (Fig. 12 A,B & Table 1). They speak Mannan language which is a mixed form of Tamil and Malayalam and is without a script.

**Paliyan** with a small population of 341 members are residing at Paliyakkudy near the Mannakkudy at Anavacchal near Kumily. The total area of settlement is 62 acres (Table 1). There are 119 families and their history is more or less similar to that of Mannan. They are also settled agriculturists with pepper, paddy and cardamom cultivation. They are also engaged in firewood-collection, honey collection, thelly collection, channa leaf (*Schumannianthus virgatus*) collection and fishing. The method of fishing is different from Mannans, ie., Mannans use fishing nets whereas Paliyans catch fish by angling.

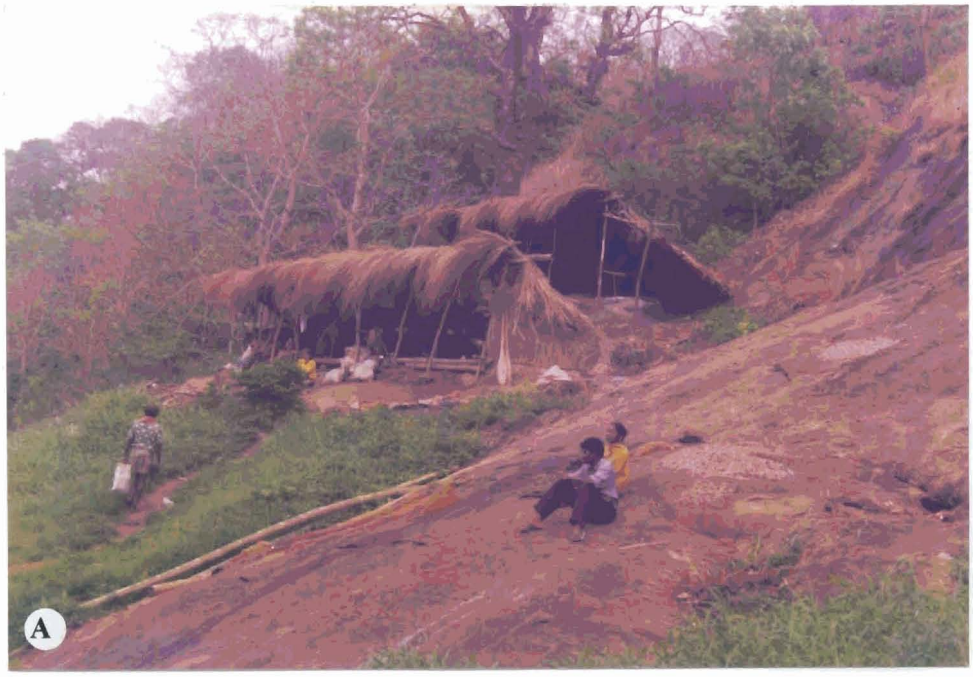
**Uralis** at Vanchivayal tribal colony are much civilised agriculturists. The area of settlement is 50 acres and there are 47 families. The population is 197 (Table 1). Most of the families have their own land with an average of one acre for each family. Average income from this land for each family is about Rs. 52,000 per year. The main cultivation is of cardamom, pepper, coffee, plantain and coconut (Fig. 11 B). Besides the agriculture, they are engaged in hunting, fishing, thelly collection and honey collection (Table 1). Since their major cultivation is cardamom they are protecting various wild trees like *Artocarpus integrifolius, A. hirsuta, Pterocarpus marsupium, Terminalia paniculata, Elaeocarpus tuberculatus, Syzygium cumini, S. gardneri, Persia macrantha, Myristica beddomei, Calophyllum calaba, Bischofia javanica, Dalbergia sissoides, Vernonia travancorica, Lagerstroemia microcarpa, Gmelina arborea, Croton malabaricus, Grewia tiliifolia, Haldina cordifolia, Melicope lunu-ankenda, Prunus zeylanicus, Toona ciliata, Acrocarpus fraxinifolius, Canarium strictum, Hydnocarpus pentandra, etc.*

**Mala Arayans** are also much civilised and are well settled agriculturists. The settlement is at Moozhikkal near Koruthode and has an area of 495 acres. The population is 761 and the number of families is 221 (Table 1). The colony members are much organised and many of them are active members of a tribal association *viz.*, the *Akhila Thiruvithankoor Mala Araya Maha Sabha.* The main cultivations are rubber, tapioca, coffee, pepper and plantain. Besides the cultivation, they are engaged in the collection of Minor Forest Produce (MFP) like kulavu oil

Fig. 9. A. Malampandaram in their original habitat
B. One family of Malampandaram in their new settlements outside the Tiger Reserve.

Fig. 10. A. Disturbed evergreen forest along the 'Ayyappan thara' – view from Mukkuzhi.
B. Dead tree of *Canarium strictum* due to the extraction of resinous exudates (thelly)

Fig.11. A. Settlement areas of Mannan;
B. Cultivation of various crops in the settlement area of Urali



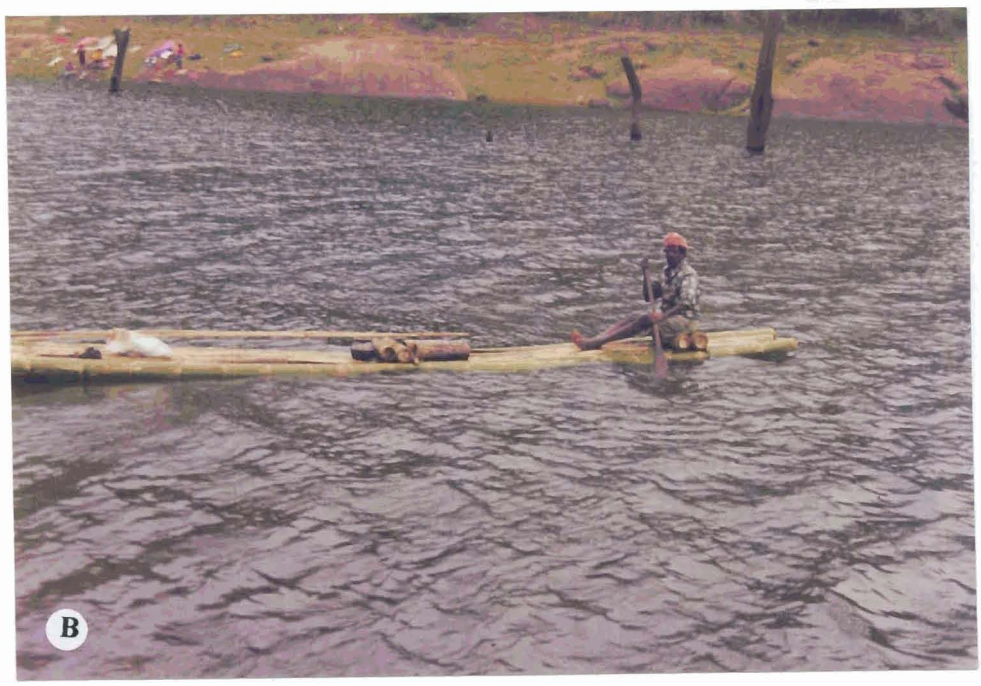
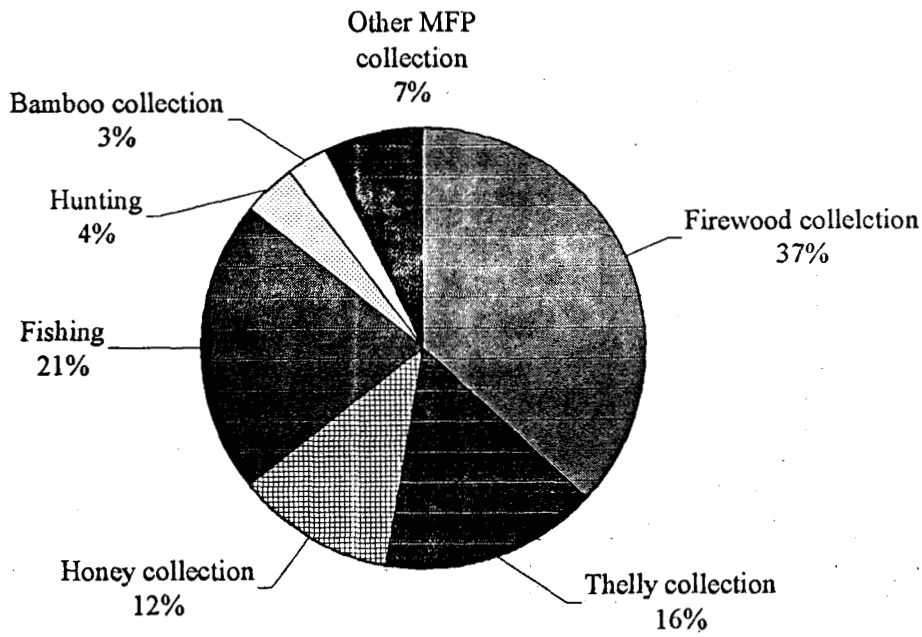




Fig. 12 **A**. Temporary hut of Mannan built for fishing.
**B**. A tribe man rowing a country raft made of bamboo for fishing

(*Kingiodendron pinnatum*), thelly (*Vateria indica*), pain poo (*Myristica beddomei*), bamboo, honey, etc.

**Fig. 12 C. Percentage of tribals employed in various jobs other than agriculture**




A relative percentage of tribal people of the study area engaged in various jobs other than agriculture is represented in the Fig.12 C.

**Table 1. Strength of the tribes in Periyar Tiger Reserve***

| Name of the tribes | Total population | Families | Area of the settlement |
|---|---|---|---|
| Mannan | 832 | 265 | 150 |
| Mala-arayan | 761 | 221 | 495 |
| Paliyan | 341 | 119 | 62 |
| Urali | 197 | 47 | 49.6 |
| Malam pandaram | 35** | | |

* data obtained from eco-development microplans – Periyar Tiger Reserve, 1999.

** correct data are not available



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# REVIEW OF EARLIER WORKS

Jomy Augustine “Floristic and ethnobotanical studies of Periyar tiger reserve” Thesis. Department of Botany, University of Calicut, 2000

# REVIEW OF EARLIER WORKS

## Floristic Study

The Tropical Rain Forests in India, part of Indo-Malayan Rain forests, though not well extended, has its own uniqueness. The floristic richness was first recognised not by a well trained taxonomist but a Dutch Governor, van Rheede, who prepared beautiful diagrams of plants of Malabar coast and published in a book **Hortus Indicus Malabaricus.** This was far before the history of Taxonomy started in Europe (Manilal, 1980). But systematic works on the flora of India especially Southern parts were started only after the arrival of Europeans especially the British. It was R. Wight, with 28 publications, who started the systematic floristic studies in S. India. His major publications are **Illustrations of Indian Botany** (1840) and **Icones Plantarum Indiae Orientalis** (1838-1853). Wight and Arnott published a monumental work, **Prodromus Florae Peninsulae Indiae Orientalis** (1834) which included many plants of Peninsular India.

R. H. Beddome comes next to Wight regarding the floristic studies in Peninsular India. His publications are **The Flora Sylvatica of South India** (1869-1874) in which many South Indian trees are described, and **Icones Plantarum Indiae Orientalis** (1868-1874).

A systematic work added with phytogeographical information was started in India when Hooker and Thomson (1855) divided the flora of India into 17 botanical provinces and he started the preparation of **Flora of British India** which was completed within a span of 25 years (1872-1897). Around the same period the Botanic Survey of India was started by Sir George King in1890. Subsequent floras are **Flora of the Presidency of Bombay** (Cooke, 1901-1908) and **Flora of the Presidency of Madras** (Gamble, 1915-1936). Other notable works on the flora of South India are **Flowering Plants of Travancore** ( Rama Rao, 1914), **Flora of Anamalais** (Fischer, 1921), **Flora of South Indian Hill Stations** (Fyson, 1932). Other famous works on South Indian flora are by Aiyar (1932), Champion (1935), Bor (1938, 1953, 1960), Meherhomji (1967, 1969, 1978), Blasco (1970), Rao and Razi (1981), Joseph (1982), etc. Karthikeyan *et al.*, (1983) compiled the names of new taxa and new records published since the publication of the Flora of the Presidency of Madras. The Botanical Survey Of India launched a scheme to prepare the District floras of various botanical rich districts and several districts floras have been worked out. **Flora of Hassan District , Karnataka** was prepared by Saldanha

and Nicolson (1976) and **Flora of Tamilnadu Carnatic** was prepared by Matthew (1983). In Kerala notable district floras published are : **Flora of Calicut** (Manilal & Sivarajan, 1982), **Flora of Cannanore** (Ramachandran & Nair, 1988), **Flora or Silent Valley** (Manilal, 1988), **Flora of Palghat** (Vajravelu, 1990), **Flora of Thiruvananthapuram District** (Mohanan & Henry, 1992), and **Flowering Plants of Thrissur Forests** (Sasidharan & Sivarajan, 1996). Sreekumar and Nair (1991) published the **Flora of Kerala: Grasses.**

Unlike other districts of Kerala the flora of Idukki has not yet been completely explored and the available scattered and fragmentary floristic studies of the Idukki district are not enough to elucidate the actual picture of the floristic structure of the highly undulating area. The first botanical collection from the district was made by Beddome in 1882 from Peermade and adjacent Anamudi, which were part of the erstwhile princely state of Travancore (Vivekananthan, 1981). Barnes, Beddome, Bourdillon, Meebold and Venkoba Rao made collections in the late 19$^{th}$ century and early 20$^{th}$ century and their collections were cited by Hooker (1872-1897) and Gamble (1915-1936). Barnes (1939) had studied the Gesneriaceae of High Ranges. Rama Rao (1914) cited various places of this area. Iyppu (1960) and Chandrasekharan (1962) have studied the forest types of Idukki district. Sebastine and Vivekananthan (1967), and Shetty and Vivekananthan (1971) published brief accounts on the flora of Anamudi and Devikulam. Vivekananthan (1978) studied the vegetation of Periyar Tiger Reserve and also enumerated 12 rare and threatened plants of the area. Studies by Shetty and Vivekananthan (1968, 1969, 1970, 1973, 1975), Sharma *et al.* (1974), Nayar (1974), Sreekumar *et al.* (1983a, 1983b), Nair and Sreekumar (1985), and Pandurangan and Nair (1995) resulted in the discovery of several new taxa from the district. Among the new taxa, *Cassia intermedia* and *Gomphostemma keralensis* were from the Periyar Tiger Reserve. Shetty and Vivekananthan (1972) reported the occurrence of some rare and little known taxa. Nagendran *et al.* (1976-77) and Bhaskar and Razi (1978) made collections and studied Podostemaceae and Balsaminaceae respectively. Mohanan *et al.* (1984) reported some rare and interesting plants from the Idukki Hydro-electric Project Area. Balasubramanyam *et al.* (1989) in their ecological studies of the proposed Pooyamkutty Hydro-electric Project Area listed out some rare and interesting plants.

A thorough survey of literature revealed that the flora of the Periyar Tiger Reserve has not been studied in detail when compared to other parts of the district. Blatter (1928) reported 34 orchids from the High-Wavy Mountains of Madurai district which is contiguous to the Periyar Tiger Reserve. These include 3 new species viz., *Chrysoglossum halberghii, Eria*



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*pseudoclavicaulis* and *Odontochilus rotundifolius* and a new variety, *Dendrobium nutans* var. *rubrolabris*. *Odontochilus rotundifolius* was later transferred to the genus *Aenhenrya* (Sathish Kumar and Rasmussen, 1997). Except for *Chrysoglossum halberghii,* which is considered as extinct, all the other orchids of the High Wavy Mountains are reported from the Periyar Tiger Reserve also (Sasidharan *et al.*, 1997). Sharma and Rathakrishnan (1978) reported *Acampe ochracea, Gastrochilus dalzellianus* and *Oberonia gammiei* from the Tiger Reserve as new records for Kerala. Srivastava *et al.* (1994) reported 64 species of grasses from the Tiger Reserve. Recently Thothathri and Ravikumar (1997) described a new variety viz., *Mucuna pruriens* var. *thekkadiensis* from the area.

## Ethnobotanical studies

Ethnobotanical studies have been started in India quite early as evidenced by works like **A Catalogue of Indian Medicinal Plants and Drugs** (Fleming, 1810) and **Indigenous Drugs of India** (Chopra, 1933). Various regional offices of the Botanical Survey of India have intensified the ethnobotanical works since 1960 (Binu, 1992). Jain with his four famous publications *viz.*, **Glimpses of Indian Ethnobotany** (1981), **Bibliography of Ethnobotany** (1984), **A Manual of Ethnobotany** (1987) and **Methods and approaches in Ethnobotany** (1987), have laid milestones in Indian Ethnobotany. Ministry of Environment and Forests, Govt. of India launched a large project entitled "*All India Co-ordinated Research Project on Ethnobiology*" which yielded the documentation of large number of wild plants used by tribals for meeting their needs. Over 9500 species of plants were found used by these tribes of which more than 2000 are new information to the scientific community (AICRPE Status Report, 1993).

In Kerala systematic works on Ethnobotany have been started only very recently by the work of Manilal (1981) on the rice (*Oryza Sativa*) varieties used by tribes of Malabar. He reported 26 varieties of rice of tribal use. This is followed by the work of Ramachandran and Nair (1981) on ethnobotanical survey of Cannanore district, Nagendra Prasad and Abraham (1984) on the ethnobotany of Nayadis of North Kerala, Pushpangadan and Atal (1984) on the ethnobotany of seven tribes of Western Ghats etc.

There are 2,61,475 tribesmen belonging to 26 ethnic groups in Kerala which form 1.03 % of the total population of the state. Idukki district stands second in the number of tribesmen with 50,269, of which 24,005 still dwell inside the forests (Census, 1991).

# METHODOLOGY

Jomy Augustine “Floristic and ethnobotanical studies of Periyar tiger reserve” Thesis. Department of Botany, University of Calicut, 2000

# METHODOLOGY

Repeated field trips were made to all areas of the Tiger reserve. Few remote areas were left with one or two visits due to the difficulties faced in reaching there. The field work has extended over a period of 5 years. A total of 4200 plant specimens were collected. Repeated collections were made of certain tree specimens to get all essential parts of the plant. Usually 4 specimens of each species were collected from all available habitats to study the range of variations. The help of an expert tree climber (Mr. Nediya Raju) was availed of for the collection of tall trees. All the field data like the height, pattern of branching, colour and nature of bark (inside and outside), presence and colour of latex and other exudates, presence of buttress, odour and colour of vegetative and floral parts wherever applicable, were carefully recorded in the field book. Separate collections were made for dioecious plants, and when parasites were collected the details of the host plants were recorded. Special attention were given when the collection of delicate materials like *Impatiens* spp., were made. Some flowerless specimens of orchids like *Nervilia* and aroids like *Amorphophallus* were brought alive to the botanical garden of the Kerala Forest Research Institute (KFRI) and were grown to flowering stage.

The collected plant specimens were preserved by wet method for 2-5 days, and more days in the case of collections from remote areas where the team could reach by 5-10 days of walk. For wet preservation a 5% solution of formaldehyde or 70 % methylated ethyl alcohol was used. The herbarium specimens were prepared as per standard procedure (Fosberg & Sachet, 1965; Bridson & Forman, 1991). Large fruits were dried and poisoned separately to keep the shape unchanged. Flowers of all the flowering specimens except Poaceae, Cyperaceae, Eriocaulaceae, Juncaceae and Palmae were preserved in Kew mixture (9 parts of 70 % ethyl alcohol, ½ part of 40% Formaldehyde and ½ part of conc. acetic acid) for further studies. A set each of herbarium specimens are deposited in KFRI and CALI.

The specimens were critically studied and identifications were made initially with the help of the **Flora of the Presidency of Madras** (Gamble, 1915-1936), **Flora of Hassan District** (Saldanha & Nicolson, 1976), **Flora of Tamil Nadu Carnatic** (Matthew, 1983), **A Revised Handbook to the Flora of Ceylon** (Dassanayake & Fosberg, 1980-1995) and **Flora of British India** (J. D. Hooker, 1872-1897). Available monographs and revisions were also consulted.

Available literature on phytogeographical studies were referred to get the world distribution of each species. Specimens whose identifications were doubtful were taken to the Madras Herbarium (MH) at Coimbatore and the Calicut University Herbarium (CALI) for verification and confirmation of identification. Some specimens for which authentic specimens were not available at MH, were sent to the Central National Herbarium (CAL), Calcutta, for identification. Those which needed further confirmation were referred to experts in the concerned groups in India as well as abroad. Apart from those collected during the study period, specimens collected earlier from the study area by others and available at MH, CALI and the herbarium of the Kerala Forest Research Institute (KFRI) were also referred to for the present study.

## Methodology for ethnobotanical studies

All the five settlements were frequently visited and field trackers were selected from these settlements. Mostly elder people were selected for assistance in the field work as well as for familiarising the plants of their use. Sometimes plants which the tribes use were brought from interior of forests and shown to them for knowing and recording the local names and uses. Parts of the plants of tribal use were also collected and kept un-poisoned for showing them to tribal and village physicians. Most often the herbarium preparation and processing were assisted by these tribes and while seeing the specimens they used to tell the uses of the species. Tribe physicians namely, Narayanan, Poomala Nangan, Vellayan, Raju, Pandyan, Mohan (Mannan), Kuttan and Raman (Mala Arayan), Ravi (Malampandaram) and Arjun (Paliyan) and village physicians namely Mathew, Thomas Paikada and Cheruvallathu Chettai were also consulted. The details of history and population of the tribals and that of the settlements were collected from Divisional Forest Office, Thekkady. The data collection from the tribe Malampandaram was found much difficult. Since they usually shift from one place to another place after two-four weeks it was not practical to select tracker from the group. So we stayed with the small colony of Malampandaram inside the forest for several days.

## Format of the Flora

In this work the families of Phanerogams are arranged according to the classification of Bentham & Hooker (1862-1883) with necessary modifications according to Hutchinson(1926,

1934, 1959 & 1973) and in accordance with their current status (ICBN,1994). An artificial diagnostic key is provided for the identification of families. 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 alphabetical sequence. Full name of the authors and citation of the original publication of the family name and generic name are also given. Generic description of all the genera with more than one species are provided and the description include all the salient vegetative as well as reproductive features of the included species. The keys for identification of infraspecific taxa are given after the description of the respective species. All the keys are strictly dichotomous bracketed type.

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. Basionyms, 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, 1915-1936), **Flora of Hassan District** (Saldanha & Nicolson, 1976), **Flora of Tamil Nadu, Carnatic** (Matthew, 1983), **Flora of Silent Valley** (Manilal,1988) and **Flowering Plants of Thrissur Forests** (Sasidharan, 1996). Citations of **A Revised Handbook to the Flora of Ceylon** (Dassanayake & Fosberg, 1980-1995) and **Flora Malesiana** (van Steenis, 1948-58, 1972-1976) wherever applicable are also made. Citations of **Icones** of Wight (1838-1853) and Beddome (1868-1874) are also given. Synonyms relevant to Indian Flora only are given and are written in bold italics. All the relevant monographs and revision works are also cited. The local names used by the tribesmen inhabiting around the periphery of the Tiger Reserve are given in bold Roman at the end of the nomenclature citations; the name of the Tribe who use the name is also given in parenthesis. The detailed description of each species is given after the nomenclature citations. The characters already given in the identification keys are not given under the species description, and the description is in following sequence : 'Habit; branchlets. Leaves. Inflorescence. Flowers; calyx; corolla; stamens; ovary. Fruit and seed'. The flowering (*Fl.*) and fruiting (*Fr.*) periods are given after the 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 name of the locality followed by the name of the collector(s) and collection number are given in a single separate paragraph.

Ethnobotanical use, taxonomic and/or nomenclatural notes and conservation or distribution aspects, if any, are also given at the end of the above details of each species.



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## Abbreviations used in the thesis

| | | |
|---|---|---|
| **ca.** | - | about |
| **CALI** | - | Calicut University Herbarium |
| **cm** | - | centimeter/s |
| **diam.** | - | diameter |
| **distr.** | - | distribution |
| **Fl.** | - | flowering |
| **Fr.** | - | fruiting |
| **KFRI** | - | Kerala Forest Research Institute Herbarium |
| **m** | - | meter |
| **MH** | - | Madras Herbarium, Coimbatore |
| **mm** | - | millimetre/s |
| **JA** | - | Jomy Augustine |
| **KPR** | - | K.P. Rajesh |
| **NS** | - | N. Sasidharan |
| **0** | - | absent |

# SYSTEMATIC TREATMENT

## Artificial diagnostic key to the families of Phanerogams

1. Ovules naked (Gymnosperms)..... .....193
1. Ovules placed inside the chamber(s) (Angiospermae) ..... .....2
2. Leaf venation reticulate; flowers usually 4 or 5-merous (except Annonaceae, Myristicaceae, *Sonerila*, *Lagerstroemia*); embryo with 2 cotyledons (Dicotyledons) ..... .....3
2. Leaf venation parallel (except Araceae, Dioscoreaceae); flowers 3-merous; embryos with one cotyledon (Monocotyledons). ..... .....171
3. Perianth absent or uniseriate (Monochlamydeae) .....131
3. Perianth always biseriate..... .....4
4. Inner perianth lobes (petals) free.....5
4. Inner perianth lobes (petals) united.....86
5. Perianth lobes indistinguishable; thalamus elongate, spicate..... .....**3. Magnoliaceae**
5. Perianth lobes distinguishable into sepals and petals; thalamus not elongate and spicate.....6
6. Ovary superior; flowers hypogynous or perigynous .....7
6. Ovary inferior; flowers epigynous..... .....74
7. Carpels free..... .....8
7. Carpels united..... .....12
8. Stems prickled, straggler..... .....**49. Rosaceae** (p.p.) (*Rubus*)
8. Stem not prickled..... .....9
9. Flowers unisexual..... .....**5. Menispermaceae** (p.p.)
9. Flowers bisexual.....10
10. Flowers trimerous..... ..... .....**4. Annonaceae**
10. Flowers 4 or 5-merous..... .....11
11. Ovules solitary in each carpel.....**1. Ranunculaceae** (p.p.)
11. Ovules 2-many in each carpel.....**2. Dilleniaceae**
12. Stamens 15 or less..... .....13
12. Stamens more than 15.....60
13. Flowers zygomorphic.....14
13. Flowers actinomorphic.....20
14. Ovary 1-locular.....15
14. Ovary 2-many-locular.....16

15. Stamens 8; fruit a drupe..... **12. Polygalaceae** (*Xanthophyllum*)

15. Stamens 9 or 10, fruit a legume or pod..... **48. Fabaceae** (p.p.)

16. Placentation parietal..... **8. Violaceae**

16. Placentation axile..... 17

17. Fruit elastically opening; stamens confluent above..... **29. Balsaminaceae**

17. Fruit and stamens otherwise..... 18

18. Leave pinnate; parts of inflorescence produced into tendril..... **44. Sapindaceae** (*Cardiospermum*)

18. Leaves simple; parts of inflorescence not as above..... 19

19. Ovary 5-celled; capsule twisting; seeds not carunculate..... **22. Sterculiaceae** (*Helicteres*)

19. Ovary 2-celled; capsule not twisting; seeds carunculate..... **12. Polygalaceae** (*Polygala*)

20. Placentation parietal..... 21

20. Placentation otherwise..... 28

21. Stamens tetradynamous..... **6. Brassicaceae**

21. Stamens equal..... 22

22. Gynandrophore present..... 23

22. Gynandrophore absent..... 24

23. Tendrillate climbers; flower with 3-5 whorls of corolline corona..... **60. Passifloraceae** (p.p.)

23. Erect shrubs or non tendrillate climbers; corolline corona absent..... **7. Capparaceae** (p.p.)

24. Insectivorous plants; leaves covered with sticky hairs..... **51. Droseraceae**

24. Non insectivorous plants; leaves otherwise..... 25

25. Flowers unisexual..... **10. Flacourtiaceae** (p.p.)

25. Flowers bisexual..... 26

26. Stamens antipetalous..... **10. Flacourtiaceae** (p.p.)

26. Stamens alternipetalous..... 27

27. Fruit a globose capsule; trees or shrubs..... **11. Pittosporaceae**

27. Fruit a linear capsule; herbs..... **7. Capparaceae** (p.p.)

28. Ovary 1-celled..... 29

28. Ovary 2-many-celled..... 38

29. Ovules free-central..... 30

29. Ovules not free-central..... 31

30. Sepals 2; fruit a circumscissile capsule..... **14. Portulacaceae**

30. Sepals 5; fruit not as above..... **13. Caryophyllaceae**

31. Disc present below the ovary..... 32

31. Disc absent..... 34

32. Flowers polygamous; disc intra-staminal.....**46. Anacardiaceae** (p.p.)

32. Flowers all bisexual; disc extra staminal.....33

33. Stamens antipetalous.....**34. Olacaceae**

33. Stamens alternipetalous.....**36. Icacinaceae**

34. Calyx lobes persistent on the wings of the fruit; branches with hooks.....**19. Ancistrocladaceae**

34. Calyx not as above; branches without hooks.....35

35. Flowers with few sterile carpels and one fertile carpel.....**47. Connaraceae**

35. Flowers with fertile carpels only.....36

36. Fruit a pod or legume.....**48. Fabaceae** (Mimosaceae)

36. Fruit a capsule or drupe.....37

37. Herbs; flowers unisexual.....**52. Haloragaceae** (*Laurembergia* )

37. Trees; flowers bisexual.....**49. Rosaceae** (p.p.)

38. Flowers perigynous, *i.e.*, perianth tube present.....39

38. Flowers hypogynous; perianth tube absent.....40

39. Leaves strongly ribbed from base; anthers attenuate to the apex.....**57. Melastomataceae** (p.p.)

39. Leaves not or slightly 3-ribbed from base; anthers orbicular to ovoid.....**58. Lythraceae** (p.p.)

40. Staminal filaments united into a staminal tube.....41

40. Staminal filaments free or united only at base.....44

41. Leaves simple; disc below the ovary absent.....42

41. Leaves usually pinnate; disc present.....43

42. Plants not mucilaginous; fruit 1-seeded drupe.....**26. Erythroxylaceae**

42. Plants mucilaginous; fruit many-seeded.....**22. Sterculiaceae** (p.p.)

43. Anthers 5; base of the petiole sheathing; lateral nerves of leaf blade always opposite.....**42. Leeaceae**

43. Anthers 4-12; base of the petiole not sheathing; lateral nerves of leaf blade not opposite.....**32. Meliaceae**

44. Flowers strictly unisexual; ovary 3-celled.....**119. Euphorbiaceae** (p.p.)

44. Flowers bisexual or rarely polygamous; ovary 1-5-celled.....45

45. Disc below the ovary intra-staminal or absent.....46

45. Disc below the ovary extrastaminal.....59

46. Stamens opposite to petals.....47

46. Stamens alternate to petals.....51

47. Plants tendrillate climbers.....48

47. Plants without tendrils.....49

48. Fruits 3-winged, capsule..... **40. Rhamnaceae** (*Gouania*)

48. Fruit a wingless berry or drupe..... **41. Vitaceae**

49. Sepals valvate..... **40. Rhamnaceae** (p.p.)

49. Sepals imbricate.....50

50. Petals 3; disc annular..... **45. Sabiaceae**

50. Petals 5; disc 5-glandular..... **33. Dichapetalaceae**

51. Stamens 3 only, filaments curved out..... **39. Hippocrateaceae**

51. Stamens 5-10; filaments erect.....52

52. Leaves gland-dotted..... **30. Rutaceae**

52. Leaves not gland-dotted.....53

53. Leaves pinnate or palmate.....54

53. Leaves simple.....56

54. Stamens 10; flowers umbellate..... **28. Oxalidaceae**

54. Stamens 5 or 6; flowers in panicles.....55

55. Petals 3; stamens 6..... **31. Burseraceae**

55. Petals 5; stamens 5..... **43. Staphyleaceae**

56. Stamens equal to the number of sepals.....57

56. Stamens double the number of sepals..... **27. Malpighiaceae**

57. Disc very prominent; stamens seen standing on the disc..... **38. Celastraceae**

57. Disc not prominent; stamens free from disc.....58

58. Flowers unisexual..... **37. Aquifoliaceae**

58. Flowers bisexual..... **25. Linaceae**

59. Carpels 3-fertile..... **44. Sapindaceae** (p.p.)

59. Carpels only one fertile..... **46. Anacardiaceae** (p.p.)

60. Flowers strictly unisexual.....61

60. Flowers bisexual or polygamous.....62

61. Ovary 3-celled; styles 3, linear..... **119. Euphorbiaceae** (p.p.)

61. Ovary 4-10-celled; styles short or absent..... **16. Clusiaceae** (Garcinia)

62. Leaves opposite.....63

62. Leaves alternate.....64

63. Petals twisted; leaves decussate, small shrubs or herbs..... **15. Hypericaceae**

63. Petals imbricate; leaves bifarious; large trees with yellow or green juice..... **16. Clusiaceae**

64. Placentation parietal.....65

64. Placentation axile or basal.....67

65. Seed covered by long cottony hairs.....**9. Cochlospermaceae**

65. Seeds not as above.....66

66. Gynandrophore present.....**7. Capparaceae** (p.p.)

66. Gynandrophore absent.....**10. Flacourtiaceae** (p.p.)

67. Petals slightly united at base.....**Theaceae(Ternstroemiaceae)**

67. Petals not as above.....68

68. Hypanthium cup present.....**49. Rosaceae**

68. Hypanthium cup absent.....69

69. Two sepals larger and persistent.....**18. Dipterocarpaceae** (p.p.)

69. Sepals equal.....70

70. Staminal filaments produced into a long staminal tube.....71

70. Stamens free or if united not produced into a staminal tube.....72

71. Sepals free; anther cells with 2-chambers.....**22. Sterculiaceae** (p.p.)

71. Sepals united; anther cells with one chamber.....**20. Malvaceae**

72. Sepals united; stamens combined at base.....**21. Bombacaceae**

72. Sepals and stamens free.....73

73. Petals fimbriate above.....**24. Elaeocarpaceae**

73. Petals entire.....**23. Tiliaceae**

74. Stamens numerous, more than twice the number of sepals.....75

74. Stamens equal to pr twice the number of sepals.....77

75. Leaves opposite, gland dotted.....**55. Myrtaceae**

75. Leaves alternate, not gland-dotted.....76

76. Flowers unisexual; sepals unequal.....**63. Begoniaceae**

76. Flowers bisexual; sepals equal.....**56. Lecythidaceae**

77. Leaves sheathing at base.....78

77. Leaves not sheathing at base.....79

78. Shrubs or trees; fruit a drupe.....**66. Araliaceae**

78. Herbs or small shrubs; fruit a cremocarp with longitudinal ridges.....**65. Apiaceae**

79. Tendrillate climbers; placentation parietal.....**61. Cucurbitaceae** (p.p.)

79. Not tendrillate plants; placentation not parietal.....80

80. Parasitic epiphytes with haustoria; calyx a truncate rim.....**115. Loranthaceae** (p.p.)

80. Non parasitic; haustoria absent; calyx not as above.....81

81. Flowers polygamous.....**54. Combretaceae** (p.p.)

81. Flowers all bisexual.....82

82. Leaves opposite.....83

82. Leaves alternate.....84

83. Petals smaller than sepals.....**53. Rhizophoraceae**

83. Petals larger than sepals.....**57. Melastomataceae** (p.p.)

84. Ovules many in each cell; petals caducus; flowers axillary, solitary.....**59. Onagraceae**

84. Ovules few; petals not as above; flowers in clusters.....85

85. Stamens twice the number of sepals ; flowers axillary fascicles.....**67. Alangiaceae**

85. Stamens equal to the number of sepals; flowers in terminal or axillary panicles.....**68. Cornaceae**

86. Flowers epigynous.....87

86. Flowers hypogynous.....94

87. Parasitic epiphytes with haustoria; calyx rim like, truncate.....**115. Loranthaceae** (p.p.)

87. Non-parasitic; haustoria absent; calyx not as above.....88

88. Ovules parietal.....322. **Cucurbitaceae** (p.p.)

88. Ovules basal or axile.....89

89. Stamens 10 or more.....90

89. Stamens 5 or equal to the calyx lobes.....91

90. Stamens 10; ovules many in each cell.....**73. Vacciniaceae**

90. Stamens more than 15; ovules few in each cell.....**80. Symplocaceae**

91. Ovary 1-celled; sepals modified into small spines or long cottony bristles (pappus) .....**71 . Asteraceae**

91. Ovary 2-many-celled; sepals not modified as above.....92

92. Leaves alternate; flowers zygomorphic (except *Asyneuma* and *Wahlenbergia*).....**72. Campanulaceae**

92. Leaves opposite; flowers actinomorphic.....93

93. Interpetiolar stipule present.....**70. Rubiaceae**

93. Interpetiolar stipule absent.....**69. Caprifoliaceae**

94. Flowers zygomorphic.....95

94. Flowers actinomorphic.....107

95. Scapigerous plants with insect catching bladders; sepals 2.....**93. Lentibulariaceae**

95. Non scapigerous plants; insect catching bladders absent; sepals 4 or 5.....96

96. Leaves alternate or rosetted .....97

96 Leaves opposite or absent.....99

97. Placentation parietal.....**94. Gesneriaceae** (p.p.)

97. Placenta axile.....98

98. Base of the petiole with 2 sessile glands.....**96. Pedaliaceae**

98. Base of the petiole eglandular.....**91. Scrophulariaceae** (p.p.)

99. Leaves pinnately compound..... **95. Bignoniaceae**

99. Leaves simple, rarely palmately 3-5-foliolate (*Vitex*) or absent..... 100

100. Leafless root parasites..... **92. Orobanchaceae**

100. Leafy, non-parasites or semi-parasites..... 101

101. Ovules solitary in each cell of the ovary..... 102

101. Ovules 2-many in each cell of the ovary..... 104

102. Clusters of flowers surrounded by radiate involucral bracts..... **99. Verbenaceae** (p.p.)

102. Clusters of flowers not surrounded by involucral bracts..... 103

103. Style gynobasic; fruits of 4 nutlets..... **99. Lamiaceae**

103. Style not gynobasic; fruit not of 4 nutlets..... **99. Verbenaceae** (p.p.)

104. Placentation parietal..... 105

104. Placentation not parietal..... 106

105. Anthers united in pairs..... **94. Gesneriaceae** (p.p.)

105. Anthers not united in pairs..... **86. Gentianaceae** (p.p.)

106. Placenta thick; anthers usually joined in pairs..... **91. Scrophulariaceae**

106. Placenta thin; anthers free..... **97. Acanthaceae**

107. Carpels free..... 108

107. Carpels united..... 110

108 Carpels 4 or 5; latex absent..... **50. Crassulaceae**

108. Carpels 2; latex present..... 109

109. Styles 2; staminal corona present..... **83. Asclepiadaceae**

109. Styles 1; staminal corona absent..... **82. Apocynaceae**

110. Leaves alternate..... 111

110. Leaves opposite..... 123

111. Ovules parietal..... 112

111. Ovules not parietal..... 113

112. Aquatic herbs..... **87. Menyanthaceae**

112. Tendrillate climbers..... **60. Passifloraceae** (*Adenia*)

113. Flowers strictly unisexual..... **79. Ebenaceae**

113. Flowers bisexual, rarely polygamous..... 114

114. Ovary 1-celled..... 115

114. Ovary 2-5-celled..... 119

115. Ovule solitary..... 116

115. Ovules few-many..... 117

116. Four-lobed disc present below the ovary..... **35. Opiliaceae**

116. Disc absent..... **75. Plumbaginaceae**

117. Stamens alternate to petals; leaves rosetted..... **100. Plantaginaceae**

117. Stamens opposite to petals; leaves not rosetted..... 118

118. Fruit a circumscissile or valvular capsule; small herbs..... **76. Primulaceae**

118. Fruit a drupe or berry; shrubs, trees or climbers..... **77. Myrsinaceae**

119. Stamens double the number of sepals or more..... 120

119. Stamens equal to the number of calyx..... 121

120. Ovules many in each cell of the ovary..... **74. Ericaceae**

120. Ovules solitary in each cell of the ovary..... **78. Sapotaceae**

121. Ovules solitary in each cell of the ovary..... 122

121. Ovules many in each cell of the ovary..... **90. Solanaceae**

122. Style gynobasic; stamens equal..... **88. Boraginaceae (p.p.)**

122. Style terminal; stamens unequal..... **89. Convolvulaceae**

123. Stamens 2..... **81. Oleaceae**

123. Stamens 4 or 5..... 124

124. Ovules solitary in each cell of the ovary..... 125

124. Ovules few-many in each cell of the ovary..... 127

125. Plants covered with stiff trichomes..... **88. Boraginaceae (*Trichodesma*)**

125. Plants not as above..... 126

126. Corolla valvate..... **84. Loganiaceae (p.p.)**

126. Corolla imbricate..... **99. Verbenaceae**

127. Ovules parietal..... **94. Gesneriaceae (p.p.)**

127. Ovules not parietal..... 128

128. Calyx tube usually winged..... **86. Gentianaceae**

128. Calyx tube wingless..... 129

129. Placenta very thick..... **91. Scrophulariaceae (p.p.)**

129. Placenta thin..... 130

130. Fruit a capsule..... **85. Buddlejaceae**

130. Fruit a berry..... **84. Loganiaceae (p.p.)**

131. Aquatic herbs in flowing waters..... **106. Podostemaceae**

131. Terrestrial or epiphytes..... 132

132. Leafless root-parasites..... **117. Balanophoraceae**

132. Leafy plants or epiphytic parasites..... 133

133. Ovary inferior or half inferior.....134

133. Ovary superior.....138

134. Parasitic epiphytic herbs with haustoria.....**115. Loranthaceae** (*Viscum*)

134. Not parasitic; haustoria absent.....135

135. Ovary half inferior; rim of the calyx with fleshy petalike appendages.....**116. Santalaceae**

135. Ovary inferior; calyx-cup without appendages.....136

136. Ovary 1-celled; perianth calyx-like.....137

136. Ovary 3-6-celled; perianth tubular, petal-like.....**107. Aristolochiaceae**

137. Ovules many.....**62. Datiscaceae**

137. Ovules few.....**54. Combretaceae** (p.p.)

138. Flowers bisexual.....139

138. Flowers unisexual.....157

139. Carpels free.....**1. Ranunculaceae**

139. Carpels united.....140

140. Anthers opening by valves.....**111. Lauraceae** (p.p.)

140. Anthers opening otherwise.....141

141. Disc present.....142

141. Disc absent.....143

142. Leaves 3-ribbed; fruit a drupe.....**40. Rhamnaceae**

142. Leaves 1-ribbed.....**44. Sapindaceae**

143. Perianth tubular.....144

143. Perianth not tubular.....147

144. Flowers in terminal heads; perianth break transversally.....**113. Thymeleaceae**

144. Flowers not in terminal heads; perianth not break as above.....145

145. Flowers supported by 5 sepals-like bracts at base.....**101. Nyctaginaceae**

145. Flowers not supported by bracts as above.....146

146. Under-surface of leaves covered with coppery or silvery scales; fruit covered with the persistent fleshy perianth.....**114. Elaeagnaceae**

146. Under-surface of leaves not as above; fruits not covered with fleshy perianth; perianth splitting at maturity.....**112. Proteaceae**

147. Base of the petiole form of a closed tubular sheath (Ochrea).....**105. Polygonaceae**

147. Base of the petiole not forming a sheathing closed tube.....148

148.Leaves pinnate.....**44. Sapindaceae** (p.p.)

148. Leaves simple.....149

149. Flowers collected in with yellow coloured bracts; xylem vessels absent.....**109. Chloranthaceae**

149. Flowers not collected in with coloured bracts; vessels present.....150

150. Cells of ovary 3 or more.....151

150. Cells of ovary 1.....154

151. Ovules solitary in each cell; leaves alternate.....**104. Phytolaccaceae**

151. Ovules few-several in each cell of the ovary; leaves opposite in verticillate.....152

152. Perianth united.....**58. Lythraceae** (p.p.)

152. Perianth free.....153

153. Flowers terminal.....**64. Molluginaceae**(*Mollugo*)

153. Flowers axillary.....**64. Molluginaceae**(*Glinus*)

154. Perianth chaffy.....**102. Amaranthaceae**

154. Perianth not chaffy or absent.....155

155. Inflorescence linear spikes; erect or climbing plants.....156

155. Inflorescence cymes or racemes; erect plants.....**103. Chenopodiaceae**(p.p.)

156. Perisperm persistent.....**.108. Piperaceae**

156. Perisperm absent.....**103. Chenopodiaceae** (*Basella*)

157. Anthers open by valves.....**111. Lauraceae** (p.p.)

157. Anthers open not by valves.....158

158. Flowers inside a closed fleshy chamber (Hypanthodium).....**123. Moraceae** (p.p.)

158. Flowers not as above.....159

159. Carpels elevated on a gynophore.....**22. Sterculiaceae** (p.p.)

159. Carpels not elevated as above.....160

160. Pistil 1-celled.....161

160. Pistil 2-many-celled.....172

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175. Flowers dense on terminal heads on erect leafless scape.....**145. Eriocaulaceae**

175. Flowers not as above.....176

176. Aquatic submerged herbs; carpel - 1.....**144. Najadaceae**

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177. Fruit a woody syncarp.....**142. Pandanaceae**

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178. Flowers unisexual, arranged in simple or branched spadix; leaves not grass like.....179

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179. Spadix unbranched.....**143. Araceae**

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180. Perianth lobes similar.....181

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181. Flowers bisexual, not in umbels.....182

182. Ovules solitary, in each cell of the ovary; perianth tubular below..... .....**133. Agavaceae**

182. Ovules 2-many in each cell of the ovary; perianth free to the base.....183

183. One stamen larger than others; marshy or aquatic herbs..... .....**138. Pontederiaceae**

183. All stamens equal; terrestrial herbs..... ..... .....**136. Liliaceae**

184. Pollen grains collected in pollinia; seeds very minute..... .....**127. Orchidaceae**

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186. Leafy plants..... ..... ..... .....187

187. Flower unisexual..... ..... ..... .....188

187. Flowers bisexual..... ..... . .....189

188. Aquatic herbs..... ..... ..... ....**125. Hydrocharitaceae**

188. Terrestrial or climbing shrubs..... ..... .....**135. Dioscoreaceae**

189. Flowers in umbels on erect scapes ..... .....**132. Amaryllidaceae**

189. Flowers in racemes or panicles..... ..... .....190

190. Ovules 1-seriate in each cell of the ovary..... ..... ....**131. Haemodoraceae**

190. Ovules 2-seriate in each cell of the ovary..... ..... .....**134. Hypoxidaceae**

191. Stamens 5, perfect with two anther lobes..... ..... ..... ...**130. Musaceae**

191. Stamens 1, the perfect or with only one anther lobe..... ..... ..... .....192

192. Ovules many in each cell of the ovary; anther lobes 2..... .....**128. Zingiberaceae**

192. Ovules solitary in each cell of the ovary; anther lobe one.....**129. Marantaceae**

193. Leaves pinnate, collected at apex of the caudex.....**148. Cycadaceae**

193. Leaves simple, not collected at apex of the caudex..... ..... ..... .....194

194. Climbers; vessels present in secondary wood; ovules arranged in definite whorls in elongate strobilus.....**150. Gnetaceae**

194. Erect trees; vessels absent; ovules solitary or paired, not in cones.....**149. Podocarpaceae**

# 1. RANUNCULACEAE

Juss., Gen. Pl. : 13, 14. 1829

1. Petals present.....2
1. Petals absent.....3
2. Leaves opposite, compound, terminal leaflet often modified into tendrils.....**Naravelia**
2. Leaves alternate, simple or lobed, not tendrillate.....**Ranunculus**
3. Style feathery, elongated in fruit; leaflet-margin crenate; climbing shrubs.....**Clematis**
3. Style glabrous, not elongated in fruit; leaflet-margin entire or serrulate; woody herbs.....**Thalictrum**

## CLEMATIS Linnaeus

Sp. Pl. 543. 1753.

Climbers without tendrils. Leaves opposite, simple or pinnately compound; petioles looping; leaflets 3-5-ribbed, petiolulate. Flowers many, in axillary cymes or panicles, pedicelled; sepals 4 or 5, free, petalloid, valvate; petals absent; stamens many, free, anthers linear, connectives produced above the anthers; carpels many, distinct; ovule solitary in each carpel; ovary and style cottony hairy. Achenes ovoid, compressed, with long feathery style.

1. Sepals 4, each ca. 7 mm long; flowers many, in axillary panicles.....**C. gouriana**
1. Sepals 5, each above 15 mm long; flowers few, in lax axillary cymes.....2
2. Flowers erect; sepals 15-20 mm long.....**C. smilacifolia**
2. Flowers drooping; sepals 30-35 mm long.....**C. munroiana**

**Clematis gouriana** Roxb. ex DC., Syst. Nat. 1: 138. 1817; Roxb., Fl. Ind. 2: 670. 1832; Wight, Ic. tt. 933 & 934. 1845; Hook. f. & Thoms., Fl. Ind. 8. 1855 & in Hook. f., Fl. Brit. India 1: 4. 1872; Dunn in Gamble, Fl. Pres. Madras 3. 1915; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 62. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 1. 1983; Manilal, Fl. Silent Valley 1. 1988; Rau in Sharma *et al.*, Fl. India 1: 64.1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 24. 1996.

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, 1 cm across; sepals 7 x 4 mm, oblong, obtuse, pubescent; stamens many, filaments 8 mm long, glabrous; carpels 10-15, pubescent. Achenes 3 x 1 mm, ovoid, hairy; style persistent, *ca.* 30 mm long.

*Fl. & Fr.* : December-April

*Distr.* : Indo-Malesia, Philippines and New Guinea. Common; in savannahs and moist deciduous forests. Methaganam, *NS & JA 13048*.

**Clematis munroiana** Wight, Ill. 1: 5, t. 1. 1831; Dunn in Gamble, Fl. Pres. Madras 3. 1915; Rau in Sharma *et al.*, Fl. India 1: 71.1993. ***C. smilacifolia*** auct. non Wall., 1820: Hook. f. & Thoms. in Hook.f., Fl. Brit. India 1: 3. 1872, p.p.

Climbing herbs; stem ridged, glabrous. Leaflets 1-3, to 12 x 7 cm, broadly ovate, cordate at base, acute at apex, glabrous; petioles to 10 cm long; petiolule smaller, glabrous. Flowers pedicelled, few to many , to 8 cm across; pedicels to 10 cm long; sepals oblong, acute, purplish brown; stamens many, filaments unequal, inner smaller, to 3 cm long, connective produced into a whip; carpels many, densely hairy; hairs erect white. Achenes 4 x 3 mm, ovoid, pubescent; style 5-6 cm long, feathery.

*Fl. & Fr.* : December-April

*Distr.*: Endemic to Western Ghats. Rare; in evergreen forests above 1500 m. Odamala, *JA 17797.*

**Clematis smilacifolia** Wall., Asiat. Res. 13: 402. 1820; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 3. 1872; Gamble, Fl. Pres. Madras 3.1912; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 62. 1976; Rau in Sharma *et al.*, Fl. India 1: 75.1993.

Woody climbers; branchlets glabrous. Leaves 1-3-foliolate; leaflets to 18 x 14 cm, broadly ovate, acute at apex, cordate at base, glabrous, purplish beneath; nerves 7-9; petioles 2-15 cm long, twining. Cymes 3-few flowered, trichotomous; peduncles 4-5 cm long, dark brownish hairy; bracts to 2 x 0.5 cm; pedicels to 15 cm long, ribbed. Flowers 35 mm across, creamy-white; sepals ovate, greenish-brown. Achenes to 11 x 5 mm, hairy; stigma persistent, 7 cm long.

*Fl. & Fr.* : December-May

*Distr.* : India. Rare; in evergreen forests. Koruthode, *JA* 18610.

## NARAVELIA Adanson

Fam. Pl. 2: 460, 581. 1763; *orth. cons.*

**Naravelia zeylanica** (L.) DC., Syst. Nat. 1: 167. 1817; Hook. f. & Thoms., Fl. Ind. 3. 1855; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 7. 1872; Dunn in Gamble, Fl. Pres. Madras 3. 1915; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 63. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 2. 1983; Manilal, Fl. Silent Valley 1. 1988; Rau in Sharma *et al.*, Fl. India 1: 106. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 24. 1996. ***Atragene zeylanica*** L., Sp. Pl. 542. 1753. **Vathakkodi** (Mannan).

Climbing tomentose shrubs. Leaves 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 cm long. Inflorescence a terminal or axillary panicles, 5-15 cm across. Flowers many, greenish white, pedicels 2.5 cm long; sepals 4, 6 x 6 mm, ovate, pubescent outside; petals 10, 7 mm long, clavate, green; stamens many, filaments flat, connective produced beyond the anthers; carpels 8, densely hairy. Achenes few, 7 x 1 mm, stalked ellipsoid, with long feathery stigma, to 5 cm long.

*Fl. & Fr.* : December-March

*Distr.* : South and South-East Asia. Common; in moist deciduous forests. Methaganam, *NS & JA 13046.*

*Ethnobotanical use* : Roots are beaten and packed in conically folded leaf with a small hole at the narrow end, close the leaf at the broad end and place the hole close to nose and inhale. This cures sinusitis.

## RANUNCULUS Linnaeus

Sp. Pl. 548. 1753.

**Ranunculus wallichianus** Wight & Arn., Prodr. 4. 1834; Wight, Ic. t. 937. 1845; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 20. 1872; Dunn in Gamble, Fl. Pres. Madras 5. 1915; Rau in Sharma *et al.*, Fl. India 1: 131. 1993.

Prostrate perennial herbs, rooting at nodes. Leaves pinnately 3-5-dissected; leaflets 6 x 3 cm, obovate, 3-5-lobed, serrate, pubescent; petiole 5-18 cm long, sheathing at base. Flowers 10 mm across, solitary, leaf-opposed; pedicels 2 cm long ; sepals 5, free, 4 x 2 mm, oblong, hirsute; petals 5, yellow, 5 x 3 mm, obovate, obtuse; stamens many, filaments 4 mm long, glabrous; carpels many; style glabrous. Achenes 4 mm long, ellipsoid, shortly tubercled, beak short.

*Fl. & Fr.* : Throughout the year

*Distr.*: Endemic to southern Western Ghats. Common; along the margins of evergreen forests above 1300 m. Melmanalar, *JA 12970.*

## THALICTRUM Linnaeus

Sp. Pl. 545. 1753.

**Thalictrum javanicum** Blume, Bijdr. 2. 1825; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 13. 1872; Dunn in Gamble, Fl. Pres. Madras 4. 1915; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 63. 1976; Rau in Sharma *et al.*, Fl. India 1: 136. 1993. ***T. glyphocarpum*** Wight & Arn., Prodr. 2. 1834; Wight, Ic. t. 48. 1838.

Erect perennial herbs, to 50 cm high; stem glabrous. Leaves alternate, bipinnate; leaflets 5-9, 1.5 x 2 cm, obovate, rounded at base, crenate, glabrous, palmately nerved; petioles and petiolules

filiform, glabrous; stipule auricled. Flowers 7 mm across, in terminal panicled cymes; pedicels to 5 cm long, filiform; sepals 4, to 3 x 2 mm, ovate, obtuse, white with woolly hairs at apex; stamens many, free, filaments glabrous. Achenes few, to 5 x 2 mm, ellipsoid, sessile, 9-ribbed, glabrous, black, with hooked style.

*Fl. & Fr.* : Throughout the year

*Distr.* : India and Java. Common; in grasslands. Grambikokka, *JA 12430.*

## 2. DILLENIACEAE

Salisb., Parad. Lond. 2: ad. t. 73. 1807

1. Scapigerous herbs.....**Acrotrema**
1. Climbers or trees.....2
2. Climbing shrubs; anthers oblique, filaments broadened above.....**Tetracera**
2. Trees; anthers straight, filaments uniform in width.....**Dillenia**

### ACROTREMA W. Jack

Mal. Misc. 1 (5): 36. 1820

**Acrotrema arnottiana** Wight, Ill. 1: t. 3. 1840; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 32. 1872; Dunn in Gamble, Fl. Pres. Madras 6. 1915; Majumdar, Fasc. Fl. India 2: 2. 1979 & in Sharma *et al.*, Fl. India 1: 151. 1993. **Nilum punna** (Mala Arayan)

Herbs; stem very short, densely hispid. Leaves radical, rosetted, to 35 x 15 cm, obovate obtuse, distantly toothed, very hispid, nerves many, regular, parallel; petiole 3-8 cm long, stipules wing-like, adnate to petiole. Flowers 12 mm across, in axillary raceme; pedicel 5 cm long, hispid; sepals 5, 6 x 3 mm, obovate, obtuse, hairy outside; petals 5, 8 x 5 mm, obovate, glabrous, yellow; stamens many, filaments as long as anthers; anthers obovate; carpels 3, jointed along the inner edges; ovules many on parietal placentation; styles 3, recurved. Fruit of 3 follicles, 5 x 5 mm, coherent along the innersides; seeds many, triangular.

*Fl. & Fr.* : November-February

*Distr.* : Endemic to Southern Western Ghats. Occasional; in evergreen forests and reedbrakes at low elevation. Attathodu, *JA 12755.*

### DILLENIA Linnaeus

Sp. Pl. 535. 1753.

**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. 1915; Hoogland, Blumea 7(1): 117. 1952;

Gandhi in Sald. & Nicols., Fl. Hassan Dist. 114. 1976; Majumdar, Fasc. Fl. India 2: 7. 1979 & in Sharma *et al.*, Fl. India 1: 157 1993; Manilal, Fl. Silent Valley 2. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 25. 1996. **Vazha punna** (Mala Arayan).

Medium to large trees; branchlets stout. Leaves alternate, 20-50 x 8-25 cm, obovate, obtuse, serrulate; nerves 40-60 pairs, regular, parallel; petiole 6 cm long, sheathing at base. Flowers fascicled on old branches, each 3 cm across; pedicel 4 cm long; sepals 5, 10 mm long, obovate, glabrous; petals yellow, 10-15 x 7-12 mm, obovate, obtuse; stamens many, filaments unequal, to 9 mm long, yellow; carpels 6-10, united; ovules many. Fruit 1.5 cm across, fleshy, globose, yellow, subtended by persistent sepals; seeds many, 5 x 3 mm, angular.

*Fl. & Fr.* : February-May

*Distr.*: Tropical Asia. Common; in Savannahs. Thekkady, *JA 13550.*

## TETRACERA Linnaeus

Sp. Pl. 533. 1753.

**Tetracera akara** (Burm. f.) Merr., Philipp. J. Sci. 19: 366. 1921; Hoogland, Reinwardtia 2: 208. 1953; Majumdar, Fasc. Fl. India 2: 10. 1979 & in Sharma *et al.*, Fl. India 1: 158. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 25. 1996. ***Calophyllum akara*** Burm. f., Fl. Ind. 121. 1768. ***T. rheedii*** DC., Syst. 1: 402. 1817; Wight, Ic. t. 70. 1838. ***Tetracera laevis*** auct. non Vahl, 1794: Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 31. 1872; Dunn in Gamble, Fl. Pres. Madras 7. 1915. **Kozhikkattadinayakam** (Mala Arayan)

Lianas; branchlets sparsely hairy. Leaves alternate, to 12 x 3.5 cm, elliptic, entire, abruptly acuminate, often folded, nerves 6 pairs, regular, hispid; petiole 5 mm long. Flowers 2 cm across, in terminal panicles on lateral branchlets; pedicel 1 cm long, hairy; sepals 5, 12 x 10 mm, free, orbicular, emarginate, white; petals 5, 12 x 7 mm, obovate, white with blue shade; stamens many, free, anthers separated by broad connectives; carpels 4, free; ovules many in each carpel. Fruit a capsule, 12 mm across; seeds few, 4 x 4 mm, globose, with fimbriate aril.

*Fl. & Fr.* : June-July

*Distr.*: Indo-Malesia. Rare; in evergreen and semi-evergreen forests at low elevations. Sabarimala, *JA 15457.*

*Ethnobotanical use* : The fresh roots are cooked along with rice and eaten for muscle pain. Mala Arayan believe that this is effective in rainy season only.

## 3. MAGNOLIACEAE

Juss., Gen. Pl. : 280. 1789

### MICHELIA Linnaeus

Sp. Pl. 536. 1753.

Trees. Leaves simple, alternate, entire, bifarious, penninerved, stipulate. Flowers bisexual, axillary, solitary, bisexual; perianth lobes 9-15, in 3 or more whorled, ovate to oblong; stamens many, multiseriate, filaments free, flat, shorter than the anthers; anthers linear, introrse; carpels many on elongated torus, free; ovules 2 or more in each carpel, style absent or very short, stigma decurrent. Fruit of many capsules arranged on an elongated spike like torus; seeds 1-4 in each capsule.

1. Leaves to 23 x 7 cm, glabrous or midrib hairy beneath.....**M. champaca**
1. Leaves to 13 x 5 cm, velutinous tomentose beneath.....**M. nilagirica**

**Michelia champaca** L., Sp. Pl. 536. 1753; Roxb., Fl. Ind. 2: 656. 1832; King, Ann. Roy. Bot. Gard. Calcutta 3: 216, t. 64. 1891; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1:42. 1872; Dunn in Gamble, Fl. Pres. Madras 9. 1915; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 34. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 3. 1983; Raju in Sharma *et al.*, Fl. India 1: 175. 1993.

Trees, to 30 m high; branchlets hairy. Leaves elliptic-lanceolate, acuminate at apex, acute at base, minutely hairy below, glabrous above, nerves 12-18 pairs; petiole 2.5 cm long; stipule 1-2.5 cm long, ovate, tomentose. Flowers 8-9 cm across, pedicels 16 mm long, stout; bracts 2.5 cm long, spathaceous, silky tomentose; perianth lobes 45 x 12 mm, oblanceolate, acute inner smaller; anthers 6 mm long, connective produced into a small appendage; carpels many, ovoid, densely hairy. Capsule 1.5 x 1 cm; oblong, 2-4-seeded; torus elongated to 8 cm long.

*Fl. & Fr.* : April-August

*Distr.*: Indo-Malesia. Occasional; in evergreen forests. Thaannikkudy, *JA 18442.*

**Michelia nilagirica** Zenk., Pl. Ind. 21, t. 20. 1835; Wight, Ic. t. 938. 1845; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 44. 1872; Dunn in Gamble, Fl. Pres. Madras 9. 1915; Raju in Sharma *et al.*, Fl. India 1: 179. 1993.

Small to medium sized trees, 20-30 m high; branchlets tomentose. Leaves elliptic-obovate, abruptly acuminate, acumen twisted, acute at base; lateral nerves 13-15 pairs, glabrous above; petiole 1.5 cm long; stipule 1.5 cm long, tomentose, scar oblique. Flowers 7-10 cm across;

pedicel 8 mm long, pubescent; bracts 2.5 cm long, spathaceous, densely pubescent; perianth lobes 12, 4.5 x 1.2 cm, obovate, obtuse, inner smaller; anthers 5 mm long, connective shortly produced, 0.5 mm long; carpels ovoid, pubescent. Capsule 0.8 x 0.8 cm, globose; seed one, globose, glabrous.

*Fl. & Fr.* : March-May

*Distr.* : Confined to South India and Sri Lanka. Common; in evergreen forests above 1500 m. Uppermanalar, *JA 13708, JA 13958.*

## 4. ANNONACEAE

Juss., Gen. Pl. : 283. 1789

1. Petals equal or subequal.....2
1. Petals unequal.....7
2. Plants climbers.....3
2. Plants erect trees or shrubs.....5
3. Flowers on hooked peduncles; inner petals constricted at base.....**Artabotrys**
3. Flowers not on hooked peduncles; inner petals not constricted at base.....4
4. Flowers terminal; petals obovate..... **Uvaria**
4. Flowers axillary; petals linear..... **Desmos**
5. Petals orbicular, imbricate..... **Sageraea**
5. Petals ovate or oblong, valvate..... 6
6. Flowers sessile; fruitlets 2 or more seeded.....**Meiogyne**
6. Flowers pedicelled; fruitlets 1-seeded..... **Polyalthia**
7. Connectives widened above the anthers .....8
7. Connectives not widened, apiculate.....9
8. Inner petals shorter than the outer ; lateral nerves of leaf lamina looping into an intramarginal vein .....**Goniothalamus**
8. Inner petals larger than the outer; lateral nerves of leaf lamina not looping into an intramarginal vein.. .....**Phaeanthus**
9. Inner petals clawed, with nectaries.....**Orophea**
9. Inner petals not clawed, without nectaries.....**Miliusa**

### ARTABOTRYS R. Brown ex Ker-Gawler

Bot. Reg. 5: 423. 1820.

**Artabotrys zeylanicus** Hook. f. & Thoms. in Fl. Ind. 128. 1855; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 54. 1872; Bedd., Ic. t. 48. 1868-1874; Dunn in Gamble, Fl. Pres. Madras 14.

1915; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 35. 1976; Manilal, Fl. Silent Valley 2. 1988; Debika Mitra in Sharma *et al.*, Fl. India 1: 253. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 26. 1996.

Woody climbers; stems glabrous. Leaves to 18 x 7 cm, oblong, acute at both ends, nerves 10-12 pairs; petiole striate. Flowers 1-few, on hooked axillary peduncles; 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 0.7 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.

*Fl. & Fr.* : August-November

*Distr.*: Confined to South India and Sri Lanka. Common; in semi-evergreen forests. Pachakkanam, *JA 12266*; Sivaloda, *JA 12519*.

## DESMOS Loureiro

Fl. Cochinch. 1: 352. 1790.

Woody climbers; branches lenticellate. Leaves alternate, bifarious, ovate to oblong, penninerved, with glandular base. Flowers usually axillary, solitary, rarely in fascicles; bracts ovate to orbicular, inserted at the middle of the pedicel; sepals 3, ovate, valvate, spreading; petals 6, similar, ovate-oblong to linear-oblong, glabrous or hairy; stamens numerous, free, connective produced above concealing the anthers; carpels few to several, free, ovules 2-many, stigma capitate. Fruitlets moniliform, 1-3-seeded.

1. Petals 0.5 cm broad, glabrous.....**D. lawii**
1. Petals 1.2 cm broad, hispid.....**D. viridiflorus**

**Desmos lawii** (Hook. f. & Thoms.) Safford, Bull. Torrey Bot. Club 39: 506. 1912; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 37. 1976; Debika Mitra in Sharma *et al.*, Fl. India 1: 261. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 27. 1996. ***Unona lawii*** Hook. f. & Thoms., Fl. Ind. 132. 1855 & in Hook. f., Fl. Brit. India 1: 59. 1872; Bedd., Ic. t. 73. 1868-1874; Dunn in Gamble, Fl. Pres. Madras 15. 1915.

Large climbers, young shoots sericeus tomentose. Leaves to 12 x 4 cm, ovate-oblong, acute at apex, rounded at base with two glands, glaucous below, nerves 8 pairs, hairy below. Flowers solitary, axillary; pedicels 4 cm long, slender, bracteate; sepals 9 x 6 mm, obovate, pubescent; petals 6, biseriate, similar, 5 x 0.5 cm, linear-oblong, pubescent; stamens many, 1 mm long,

connectives produced above concealing the anthers; ovaries many, densely hairy, stigma globose, red. Fruitlets 7 x 6 mm, globose-oblong, stipitate, beaked; seeds 1-3, globose; stipe 1 cm long, slender.

*Fl. & Fr.* : March-September

*Distr.* : Peninsular India and Sri Lanka. Occasional; in evergreen forests. Sabarimala, *JA 12367*; Koruthode, *JA 13491*.

**Desmos viridiflorus** (Bedd.) Safford, Bull. Torrey Bot. Club 39: 506. 1912; Debika Mitra in Sharma *et al.*, Fl. India 1: 262. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 27. 1996. *Unona viridiflora* Bedd., Ic. t. 158. 1868-1874; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 60. 1872; Dunn in Gamble, Fl. Pres. Madras 15. 1915 [Fig. 13A].

Young shoots rufous. Leaves ovate-lanceolate, acuminate, base rounded or cordate, 7-15 x 3 cm; petiole 0.6-0.8 cm long. Flowers solitary, pedicels 2-4 cm long, slender; bracts 1.5-2 cm across, ovate, cordate at base, attached a little below in middle on pedicel; sepals ovate-lanceolate, 2 x 1.2 cm, dark green; outer petals 4.5 x 1.5 cm; inner petals narrower, silky pubescent, green. Fruits not seen.

*Fl.* : March

*Distr.* : Southern Western Ghats. Endemic. Rare; in evergreen forests. Karimala, *JA 18479*.

*Note* : This endemic species, first reported from the Anamalais, was considered as extinct due to habitat destruction (Nayar & Sastry, 1987). Recently it has been recollected from Sholayar, Thrissur District (Sasidharan & Sivarajan, 1996). In the present locality also the population is very sparse.

## GONIOTHALAMUS J. D. Hooker & Thomson,
Fl. Ind. 105. 1855

Trees or shrubs. Leaves alternate, simple, penninerved. Flowers solitary or fascicled, axillary; bracts many, basal; sepals 3, broadly ovate; petals 6, biseriate, dissimilar, outer larger, clawed, spreading; inner smaller, cohering in a vault over the stamens and ovary; stamens many, anthers oblong, concealed by the broad connective; ovaries many, style simple or bifid, ovule 1, 2 or 4. Fruit of many 1-seeded fruitlets.

1. Pedicels 2.5 cm long; outer petals glabrous; style subulate.....**G. rhynchantherus**
1. Pedicels 0.7 cm long; outer petals pubescent; style bilobed.....**G. wightii**

**Goniothalamus rhynchantherus** Dunn, Kew Bull. 1914: 182. 1914 & in Gamble, Fl. Pres. Madras 19. 1915; Debika Mitra in Sharma *et al.*, Fl. India 1: 253. 1993 [Fig. 14].

Small trees; bark smooth, black. Leaves to 22 x 6 cm, oblong, acute at both ends, glabrous, lateral nerves faint. Flowers solitary, 2.5 cm across; peduncles stout, glabrous, with 4 distichous bracts at base; sepals 8 x 9 mm, broadly ovate, pubescent; outer petals 2 x 1 cm, ovate, acute, sparsely pubescent; inner petals 8 x 6 mm, obovate, obtuse, sparsely pubescent; stamens 2 mm long, anthers septate, connectives pubescent, produced into a beak.; ovaries ribbed, pubescent. Fruitlets 15 x 8 mm, obovoid, glabrous; seed-1.

*Fl. & Fr.* : December-April

*Distr.*: Tamil Nadu and Kerala, Endemic. Common; in evergreen forests up to 700 m altitudes. Arjunankotta, *JA 13169*.

**Goniothalamus wightii** Hook. f. & Thoms., Fl. Ind. 106. 1855; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 76. 1872; Bedd., Ic. t. 63. 1868-1874; Dunn in Gamble, Fl. Pres. Madras 18. 1915; Debika Mitra in Sharma *et al.*, Fl. India 1: 240. 1993 [Fig. 13B & 15].

Small trees; bark black, smooth. Leaves to 15 x 4 cm, ovate-oblong, glabrous; lateral nerves united forming an intramarginal nerve. Flowers solitary, axillary; pedicel 7 mm long, stout, pubescent with 4 distichous bracts at base; sepals broadly ovate, pubescent; outer petals 12 x 7 mm, ovate, acute, pubescent; inner petals 6 x 5 mm, ovate, pubescent; stamens 1.5 mm long; anthers septate; ovaries densely hairy. Fruitlets 2 x 1 cm, ellipsoid, glabrous.

*Fl. & Fr.* : January-August

*Distr.* : Tamil Nadu and Kerala, Endemic. Common; in evergreen forests. Pachakkanam, *JA 12317*; Mlappara, *JA 13316*.

## MEIOGYNE Miquel

Ann. Mus. Bot. Lugd.-Bat. 2: 12. 1865.

Shrubs or small trees, branches radiating. Leaves ovate to oblong. Flowers solitary, axillary or leaf-opposed, sessile or pedicelled; sepals 3, broadly ovate, free; petals 6, biseriate, similar, ovate; 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. Leaves to 17 x 7 cm, oblong; petals 5 x 0.8 cm.....**M. ramarowii**
1. Leaves to 7 x 3.5 cm, ovate; petals 3 x 1.4 cm.....**M. pannosa**

**Meiogyne pannosa** (Dalz.) Sinclair, Sarawak Mus. J. 5: 604. 1951; Debika Mitra in Sharma *et al.*, Fl. India 1: 266. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 27. 1996. ***Unona pannosa***

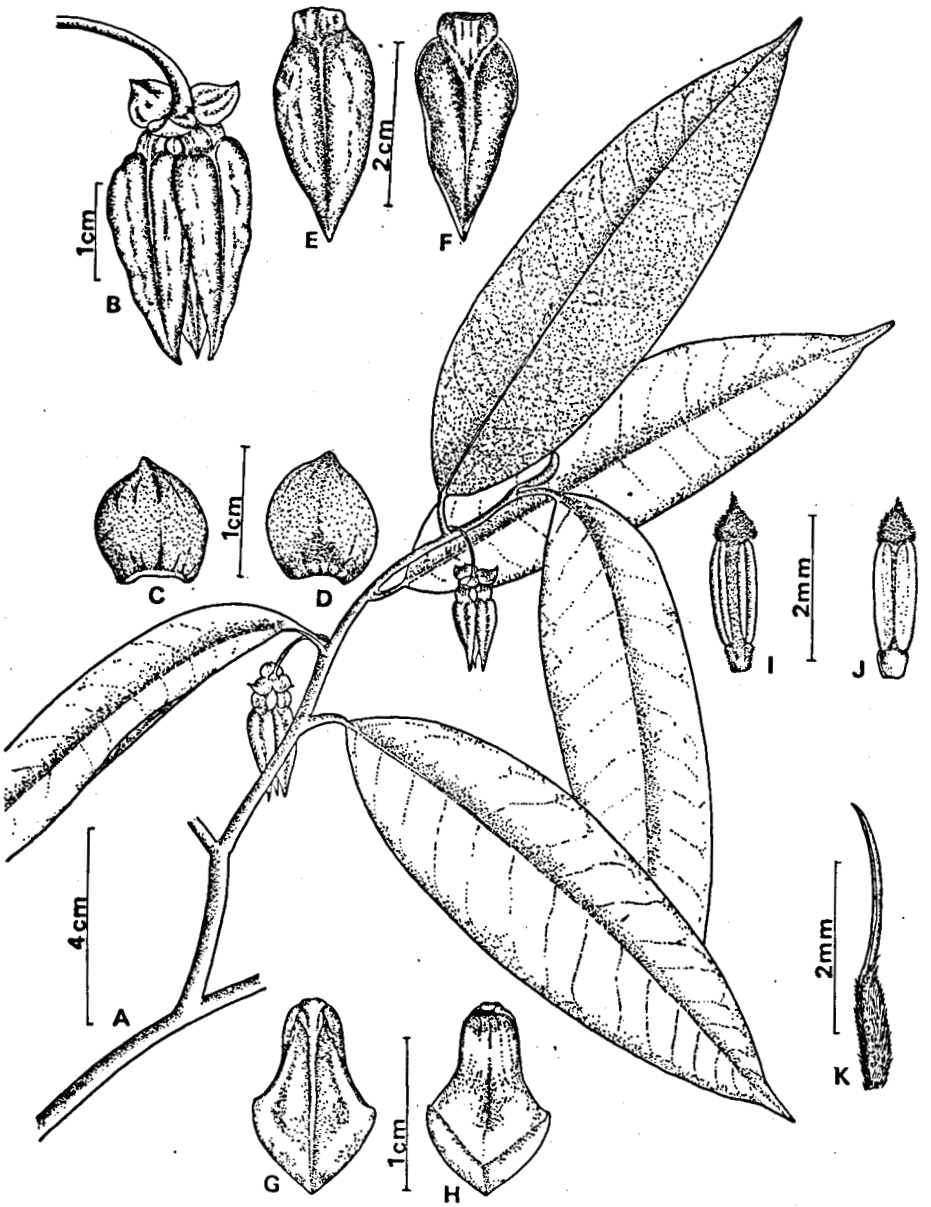



Fig. 14. *Goniothalamus rhynchantherus* Dunn: **A.** flowering twig; **B.** flower; **C.** & **D.** sepal - inner and outer views; **E.** & **F.** outer petal - outer and inner views; **G.** & **H.** inner petal - inner and outer views; **I.** & **J.** stamen dorsal and ventral views; **K.** carpel.

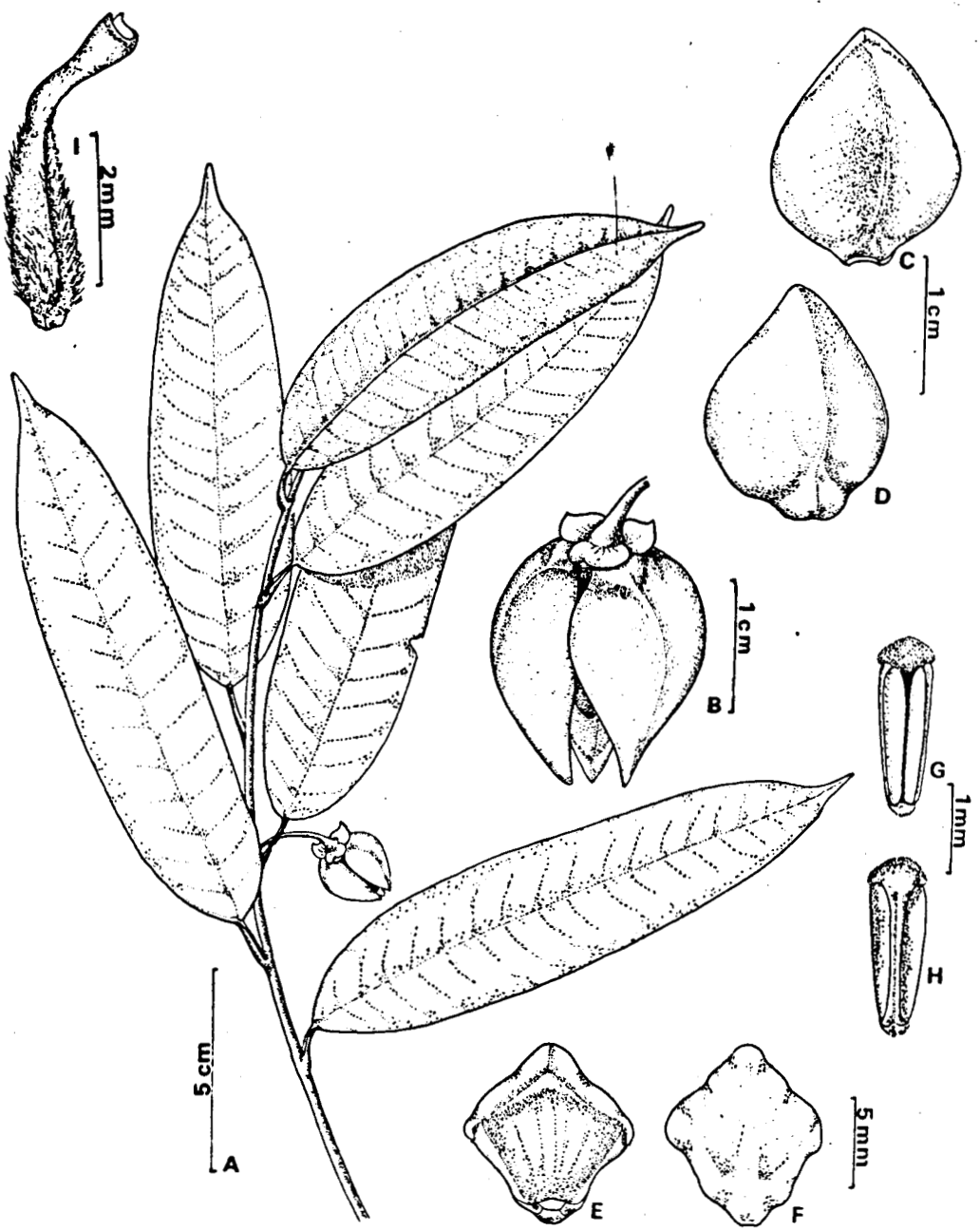



Fig. 15. *Goniothalamus wightii* Hook. f. & Thoms.: **A.** flowering twig; **B.** flower; **C.** & **D.** inner and outer views of outer petal; **E.** & **F.** inner and outer views of inner petal; **G.** & **H.** dorsal and ventral views of stamen; **I.** carpel.

Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 207. 1851; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 58. 1872; Bedd., Ic. t. 52. 1868-1874; Dunn in Gamble, Fl. Pres. Madras 14. 1915. **Panthal Maram** (Mannan).

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

*Fl. & Fr.* : July-December

*Distr.*: Endemic to Southern Western Ghats. Common; in evergreen forests. Deviar, *JA 12133*; Vellimala, *JA 14037*.

**Meiogyne ramarowii** (Dunn) Gandhi in Sald. & Nicols., Fl. Hassan Dist. 38. 1976; Debika Mitra in Sharma *et al.*, Fl. India 1: 266. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 27. 1996. ***Unona ramarowii*** Dunn, Kew Bull. 1914: 183. 1914 & in Gamble, Fl. Pres. Madras 15. 1915. ***Desmos ramarowii*** (Dunn) Das, Bull. Bot. Surv. India 5: 42. 1963. **Panthal Maram** (Mannan)

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

*Fl. & Fr.* : December-March

*Distr.* : Endemic to Southern Western Ghats. Rare; in evergreen forests. Koruthode, *JA 14702*; Anakuthivayal, *JA 17758*.

MILIUSA Leschenault ex Alph. de Candolle

Mem. Soc. Phys. Geneve 5: 213. 1832.

Shrubs or trees. Leaves thick, bifarious. Flowers solitary or fascicled, axillary or lateral, pedicelled; sepals 3, small, ovate, acute; petals 3 + 3, unequal, outer smaller, sepal like, inner larger, ovate to lanceolate, cohering by margins; stamens many, filaments short, thick, connectives not produced above the anthers; ovaries many, curved, pubescent, ovules 2, style oblong. Fruit of 1-2-seeded carpels arranged in a ring, globose or oblong, stalked.

1. Pedicels 4-6 cm long; inner petals 15 x 9 mm..... **M. tomentosa**

1. Pedicels 0.7 cm long; inner petals 27 x 11 mm..... **M. indica**

**Miliusa indica** Lesch. ex A. DC., Mem. Soc. Phys. Geneve 5: 213, t. 3. 1832; Hubber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 45. 1985; Debika Mitra in Sharma *et al.,* Fl. India 1: 217. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 28. 1996. ***M. montana*** Gard. ex Hook. f. & Thoms. Fl. Ind. 148. 1855; Bedd., Ic. t. 84. 1868-1874; Dunn in Gamble, Fl. Pres. Madras 22. 1915; Manilal, Fl. Silent Valley 3. 1988. ***M. 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 to 9 x 4 cm, ovate, acute at apex, rounded to subcordate at base, pubescent; nerves 8-10 pairs. Flowers solitary or paired; pedicel 7 mm long, slender; sepals 2 x 1.5 mm, ovate, ciliate; outer petals 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. Fruits not seen.

*Fl.* : April

*Distr.*: India and Sri Lanka. Rare; in evergreen forests. Uppermanalar, *JA 13730.*

**Miliusa tomentosa** (Roxb.) Sinclair, Gard. Bull. Singapore 14: 378. 1955; Debika Mitra in Sharma *et al.,* Fl. India 1: 253. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 28. 1996. ***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; Bedd., Ic. t. 49. 1868-1874; Dunn in Gamble, Fl. Pres. Madras 22. 1915.

Trees to 20 m high; twigs tomentose. Leaves to 14 x 6 cm, ovate, apex acute, base rounded, nerves 8-10 pairs; petiole 5 mm long, hispid. Flowers in axillary fascicles; pedicels 6 mm long; sepals 3, 5 x 1.5 mm, lanceolate, hispid; outer petals 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 cm across, globose, glabrous; stipe 2-3 cm long.

*Fl. & Fr.* : December-May

*Distr.*: India, Nepal and Sri Lanka. Rare; in moist deciduous forests. Thekkady, *JA 16972.*

## **OROPHEA** Blume

Bijdr. 18. 1825.

Trees. Leaves alternate, petiolate. Flowers axillary, solitary , fascicled or racemose; 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. Twigs pubescent; flowers in cymes.....**O. erythrocarpa**

1. Twigs glabrous; flowers in fascicles..... **O. uniflora**

**Orophea erythrocarpa** Bedd., Madras J. Lit. Sci. 22: 71. 1861 & Ic. t. 68. 1868-1874; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 91. 1872; Dunn in Gamble, Fl. Pres. Madras 24. 1915; Kessler, Blumea 33: 47. 1988; Debika Mitra in Sharma *et al.*, Fl. India 1: 224. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 29. 1996.

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

*Fl. & Fr.* : December-February

*Distr.* : Tamil Nadu and Kerala, Endemic. Common; in evergreen forests up to 700 m altitudes. Arjunankotta, *JA 13160*.

**Orophea uniflora** Hook. f. & Thoms., Fl. Ind. 111. 1855 & in Hook. f., Fl. Brit. India 1: 90. 1872; Bedd., Ic. t. 69. 1868-1874; Dunn in Gamble, Fl. Pres. Madras 24. 1915; Kessler, Blumea 33: 63. 1988; Debika Mitra in Sharma *et al.*, Fl. India 1: 229. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 32. 1996.

Large shrubs to small trees; bark black. Leaves to 9 x 3 cm, ovate, acuminate at apex, glabrous, pale below, nerves 7-10 pairs, faint; petiole 4 mm long, tomentose. Flowers 8-10 mm across, in axillary fascicles; pedicels 3-5 mm long, tomentose; sepals 1.5 mm across, orbicular, ciliate; outer petals 5 mm across, orbicular, ciliate; inner petals 9 x 4 mm, rhomboid, glabrous; stamens 9-12, glabrous; ovaries 6, glabrous. Fruitlets 8 mm across, globose, glabrous; seed one.

*Fl. & Fr.* : February-May

*Distr.* : Endemic to Southern Western Ghats. Common; in evergreen forests. Arjunankotta, *JA 13373*; Kottamala, *JA 13775*.

## PHAEANTHUS J. D. Hooker & Thomson

Fl. Ind. 1: 146. 1855

**Phaeanthus malabaricus** Bedd., Ic. t. 76. 1868-1874; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 72. 1872; Dunn in Gamble, Fl. Pres. Madras 17. 1915; Mohanan *et al.*, J. Econ. Tax.

Bot. 5(2): 399. 1984; Nair & Sastry, Red Data Book Indian Plants 3: 16. 1990; Debika Mitra in Sharma *et al.*, Fl. India 1: 230. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 32. 1996.

Small trees or large shrubs, branchlets sparsely tomentose. Leaves to 16 x 4.5 cm, oblong, shortly acuminate at apex, rounded to subcordate at base, glabrous; nerves 6-10 pairs, looping below the margin, reticulate. Flowers axillary, solitary or in fascicles; pedicels 1.5 cm long, hispid.; sepals 3 x 3 mm, ovate, acute, hispid; petals unequal; outer petals 9 x 5 mm, elliptic, acute, hirtus; inner 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.

*Fl. & Fr.* : February-May

*Distr.* : Endemic to Kerala, rare. Rare; in evergreen forests up to 700 m altitudes. Koruthode, *JA 14795*.

*Note* : This species is so far recorded to have a distribution in Northern Kerala (Nayar & Sastry, 1990). The Present collection indicates the extended range of distribution towards South. The population of the species in the present locality is very rare.

## POLYALTHIA Blume

Fl. Jav. Annonac. 68. 1830.

Tall trees. Leaves alternate with many parallel lateral nerves. Flowers solitary or fascicled, 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.

1. Flowers in axillary racemes; berry irregularly wrinkled, pubescent..... **P. fragrans**
1. Flowers on tubercles on old wood; berry smooth, glabrous.....**P. coffeoides**

**Polyalthia coffeoides** (Thw. ex Hook. f. & Thoms.) Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 62. 1872; Bedd., Ic. t. 53. 1868-1874; Dunn in Gamble, Fl. Pres. Madras 16. 1915; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 34. 1985; Manilal, Fl. Silent Valley 3. 1988; Debika Mitra in Sharma *et al.*, Fl. India 1: 270. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 33. 1996. ***Guatteria coffeoides*** Hook. f. & Thoms., Fl. Ind. 141. 1855.

Trees to 20 m tall, bark black; young parts glabrous. Leaves to 20 x 7 cm, ovate-oblong, apex acuminate, base acute, nerves 15 pairs, regular, nervules parallel; petiole 1 cm long, stout. Flowers few together; pedicels 3 cm long, stout; sepals 2 x 5 mm, suborbicular, glabrous; petals

5 x 1 cm, oblong, acuminate, hispid, greenish-yellow; stamens 1 mm long. Berry 2.5 x 1.5 cm, obovoid, puberulus, smooth.

*Fl. & Fr.* : December-May

*Distr.* : South India and Sri Lanka. Rare; in evergreen forests to 1000 m altitudes. Chenthamara, *JA & KPR 17090.*

**Polyalthia fragrans** (Dalz.) Bedd., Fl. Sylv. t. 74. 1871; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 63. 1872; Bedd., Ic. t. 54. 1868-1874; Dunn in Gamble, Fl. Pres. Madras 16. 1915; Debika Mitra in Sharma *et al.*, Fl. India 1: 271. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 33. 1996. ***Guatteria fragrans*** Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 200. 1851. Nedunar (Mala Arayan)

Tall trees; bark grey; branches to all sides; young parts pubescent. Leaves to 24 x 9 cm, elliptic, apex acute, base rounded, nerves 17 pairs. Pedicels stout, bracteate above the middle. Sepals 4 x 5 mm, orbicular, pubescent; petals 6, 5.5 x 0.5 cm, linear-oblong, with a broad, curved base, acuminate, greenish-yellow; ovaries hairy; stamens many, connective forms a truncate hood. Berry 2.5 cm across, globose, long-stalked.

*Fl. & Fr.* : January-May

*Distr.* : Endemic to Peninsular India. Common; in evergreen forests up to 1000 m altitudes. Koruthode, *JA 13517.*

## SAGERAEA Dalzell

in Hook.'s Kew Journ. 3: 207. 1851.

**Sageraea grandiflora** Dunn, Kew Bull. 1914: 182. 1914 & in Gamble, Fl. Pres. Madras 12. 1915; Nair & Sastry, Red Data Book Indian Plants 3: 30. 1987; Debika Mitra in Sharma *et al.*, Fl. India 1: 282. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 33. 1996 [Fig. 16].

Medium sized trees; bark black, smooth . Leaves to 35 x 12 cm, oblong, acute at apex and base, coriaceous, shining above, glabrous, nerves 10-14 pairs, irregular, faint; petioles 2 cm long. Flowers fascicled, 10-30-together, axillary or on woody tubercles; pedicels to 2.5 cm long; sepals 3, 3 x 5 mm, orbicular, ciliate; outer petals yellow, 13 x 8 mm, orbicular, concave; inner petals similar but smaller than the outer, glabrous; stamens 12, anthers oblong, connectives produced, not concealing the anthers. Carpels 3-6, glabrous, ovules few; style absent; stigma globose. Fruitlets 3.5 cm across, globose, smooth.; seed one.

*Fl. & Fr.* : February-June

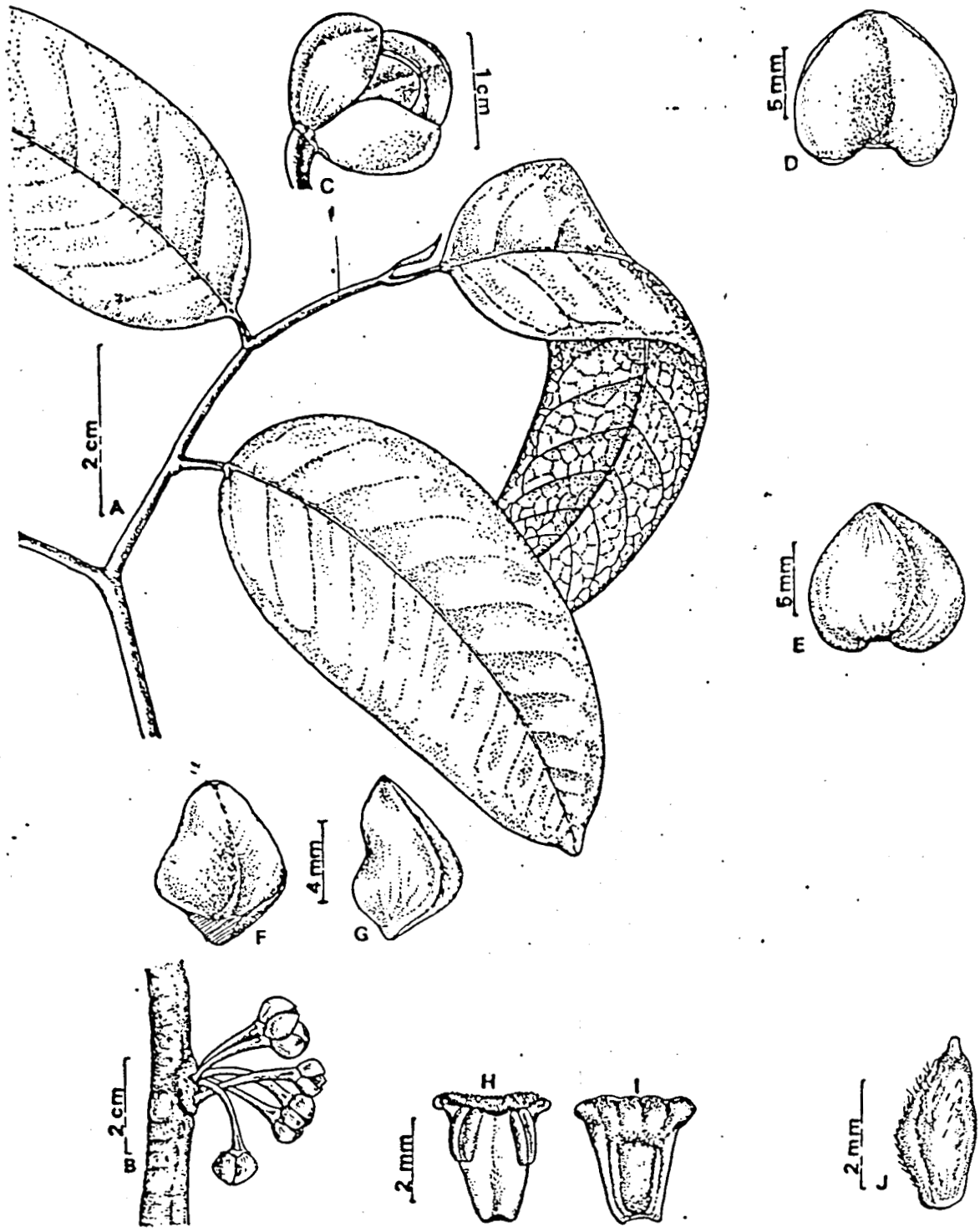



Fig. 16. *Sageraea grandiflora* Dunn: **A.** leafy twig; **B.** flowering portion of twig; **C.** flower; **D.** & **E.** inner and outer views of outer petal; **F.** & **G.** inner and outer views of inner petal; **H.** & **I.** ventral and dorsal views of stamen; **J.** carpel.

*Distr.* : Kerala, Endemic. Common; in evergreen forests. Koruthode, *JA 13391*; Kallidamkunnu, *JA 16230*; Puthussery, JA & *KPR 17069*.

*Note* : This species was first collected from Kulathurpuzha, the type locality by Bourdillon in 1894, and was not relocated until it was found in Shenduruny Wildlife Sanctuary (Sasidharan, 1997), a neighbor place of the type locality. The present collection of this species from the study area shows its extended range of distribution towards North. And in the present locality it is with a moderate population.

UVARIA Linnaeus

Sp. Pl. 536. 1753.

**Uvaria hookeri** King, Ann. Roy. Bot. Gard. Calcutta 4: 28, t. 22. 1893; Manilal, Fl. Silent Valley 3. 1988; Debika Mitra in Sharma *et al.*, Fl. India 1: 291. 1993. ***U. narum*** Wallich ex Hook. f. & Thoms. var. ***macrophylla*** Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 50. 1872.

Climbers; branchlets glabrous. Leaves to 16 x 5 cm, oblong, acute to acuminate at both ends; nerves 14-16 pairs, regular; petiole 1 cm long, rugose. Flowers solitary, terminal, 2.2-2.8 cm across; pedicels 5-8 mm long, stellate hairy; sepals 3, 5 x 5 mm, orbicular, acute, hairy; outer petals 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.

*Fl. & Fr.* January-May.

*Distr.* : Endemic to South India. Occasional; in evergreen forests to moist deciduous forests. Mangaladevi, *JA 17197*.

## 5. MENISPERMACEAE

Juss., Gen. Pl. : 284. 1789

1. Female flowers 3-6 together in the axils of large orbicular bracts..... .....**Cissampelos**
1. Female flowers not as above..... 2
2. Petals absent.....**Anamirta**
2. Petals present.....3
3. Stamens free; leaves not peltate.....4
3. Stamens united into a column with a peltate disc; leaves peltate.....6
4. Flowers in racemes; leaves deeply cordate.....**Tinospora**
4. Flowers in panicles; leaves acute or shallowly cordate.....5

5. Anthers dehisce horizontally; petiole more than the length of lamina.....**Diploclisia**

5. Anthers dehisce vertically; petiole less than the length of lamina.....**Cocculus**

6. Flowers in peduncled, solitary or umbellate heads; petals free.....**Stephania**

6. Flowers in panicles; petals connate.....**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. 1915; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 17. 1983; Pramanik & Gangopadhyay in Sharma *et al.*, Fl. India 1: 311. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 35. 1996. ***Menispermum cocculus*** L., Sp. Pl. 340. 1753. **Kaipalathumka, Pechumaram** (Mala Arayan).

Large climbers; stem smooth. Leaves alternate, to 25 x 19 cm, broadly ovate, acute at apex, truncate at base, 5-ribbed, coriaceous; petiole to 13 cm long. Flowers unisexual, many, in large drooping panicles on old branches; sepals 6 in 2 rows, ovate, 3 x 2 mm, 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, 1 cm across, obliquely ovoid, gibbous, black, smooth; seeds 1, black, glabrous.

*Fl. & Fr.* : August-October

*Distr.* : Indo-Malesia. Common; in evergreen forests. Koruthode, *JA 12261*.

*Ethnobotanical use*: Fresh bark of the stem is beaten and the juice is used externally for easing childbirth; fruits are used for fish poisoning (Mala Arayan)

## CISSAMPELOS Linnaeus

Sp. Pl. 1031. 1753.

**Cissampelos pareira** L., Sp. Pl. 1031. 1753; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 103. 1872; Dunn in Gamble, Fl. Pres. Madras 30. 1915, var. **hirsuta** (Buch.-Ham. ex DC.) Forman, Kew Bull. 22: 356. 1968; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 18. 1983; Manilal, Fl. Silent Valley 4. 1988; Pramanik & Gangopadhyay in Sharma *et al.*, Fl. India 1: 317. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 35. 1996. ***C. hirsuta*** Buch.-Ham. ex DC., Syst. 1: 535. 1817. ***C. convolvulacea*** var. ***hirsuta*** (Buch.-Ham. ex DC.) Hassk., Pl. Jav. Rar. 171. 1848. **Mala thangi** (Paliyan from Chokkam petti)

Slender climbers; stems pubescent. Leaves to 4 x 6 cm, broadly ovate, obtuse or emarginate at apex, cuspidate, cordate at base, petiole 5 cm long. Male flowers in axillary cymes, sessile, 3 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 in the axial of each bract; bracts 1 x 1 cm, orbicular, pubescent; sepals 2; petals absent; ovary densely hairy; styles 3. Fruit a globose drupe, 3 mm across, glabrous; seeds 1, black.

*Fl. & Fr.* : August-October

*Distr.* : Indo-Malesia. Occasional; in moist deciduous forests. Thekkady, *JA 15311 & 16362.*

## COCCULUS A. P. de Candolle

Syst. Nat. 1: 515. 1817

**Cocculus laurifolius** DC., Syst. Nat. 1: 530. 1817; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 101. 1872; Dunn in Gamble, Fl. Pres. Madras 29. 1915; Pramanik & Gangopadhyay in Sharma *et al.*, Fl. India 1: 319. 1993.

Large shrubs to small trees with drooping branches. Leaves to 11 x 3.5 cm, oblanceolate, 3-ribbed, abruptly acuminate at apex, glabrous, shining above. Flowers unisexual, in axillary panicles; sepals 4, 1.2 x 1 mm, ovate, obtuse; petals 4, 2 x 1.5 mm, broadly ovate, obtuse, glabrous; stamens 6 in male flowers, free, anthers ovate, dehiscence horizontal; staminodes 12 in female flowers, 2-seriate, outer staminodes ovate, trilobed, with a small middle-lobe; inner smaller, cup-shaped; staminodes 6 in male flowers, broadly ovate, with incurved margins; ovaries 5-6, free, curved, 1-ovuled; stigma sessile, curved out. Drupes 5 mm across, globose, glabrous; seeds 1, ovoid, depressed at either ends, tubercled.

*Fl. & Fr.* : November

*Distr.* : Indo-China to Malesia. Common; in evergreen forests. Maddalakottithode, *JA 13733;* Vellimala, *JA 12993.*

## CYCLEA Arnott ex R. Wight

Ill. Indian Bot. 1: 22. 1840

Twining herbs with tuberous roots. Leaves peltate, entire, rounded or shallowly cordate at base. 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 compressed, obovoid; seeds tubercled along concentric lines.

1. Leaves glabrous.....**C. fissicalyx**
1. Leaves variously hairy.....2

2. Leaves ciliate along margins; panicles sparsely hairy.....**C. arnottii**

2. Leaves not ciliate along margins; panicles densely hairy.....**C. peltata**

**Cyclea arnottii** Miers, Ann. Mag. Nat. Hist. ser. 3, 18: 19. 1866; Dunn in Gamble, Fl. Pres. Madras 31. 1915. *C. peltata* sensu Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 104. 1872, non Hook.f. & Thoms., 1855.

Leaves to 18 x 7.5 cm, ovate-oblong, acuminate at apex, widely cordate at base, pubescent below, pilose along the nerves above; petiole to 6.5 cm long, glabrous. Panicle 14 x 5 cm, drooping, branches adpressed hairy; flowers many-together, pedicels 1 mm long, sparsely hispid; sepals 1 mm long, obtuse, densely hairy; petals glabrous; ovary sparsely hairy. Drupe 5.5 x 4.5 mm, obovoid, glabrous, brown.

*Fl. & Fr.* : March-April

*Distr.* : Peninsular India. Rare; in evergreen forests. Puthussery, *JA 13504*; Sabarimala, *JA & KPR 14997.*

**Cyclea fissicalyx** Dunn in Gamble, Fl. Pres. Madras 31. 1915 & in Kew Bull. 1916: 60. 1916; Manilal, Fl. Silent Valley 5. 1988; Pramanik & Gangopadhyay in Sharma *et al.*, Fl. India 1: 324. 1993. *C. peltata* sensu Miers, Contrib. Bot. 3: 236. 1871, non Hook. f. & Thomson, 1855.

Glabrous twiners; stem striate. Leaves to 10 x 5 cm, ovate, sharply long acuminate, truncate at base, 5-nerved, reticulate; petiole 2.5 cm long. Flowers 2 mm across, in large drooping panicles, glabrous, shortly pedicelled; peduncles slender; bracts foliar; calyx campanulate, glabrous. Fruit not seen.

*Fl.* April

*Distr.* : Endemic to Kerala. Occasional; in openings of evergreen forests. Vellimala, *JA 13750.*

*Ethnobotanical use* : Tying the twines around the waist or leg relieve from muscle pain after long and continuous walk.

**Cyclea peltata** (Poir.) 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. 1915; Sant. & Janardh., Bull. Bot. Surv. India 10: 369. 1969; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 19. 1983; Manilal, Fl. Silent Valley 5. 1988; Pramanik & Gangopadhyay in Sharma *et al.*, Fl. India 1: 325. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 36. 1996. *Menispermum peltatum* Poir. in Lam., Encycl. 4: 96. 1797. *Cyclea burmannii* Hook. f. & Thoms., Fl. India 201. 1885. **Padakkishangu, Kurunthan** (Mannan, Mala Arayan), **Pattichevian** (Malam pandaram)

Young branches pubescent. Leaves to 15 x 8 cm, ovate, acute-acuminate at apex, base round to smoothly cordate, pubescent below, glabrous above, palmately 11-nerved. Panicles axillary, to 20 x 7 cm, rachis pubescent. Flowers densely packed towards the branch tips, sessile, densely hairy; male flowers 1.5 mm across; sepals hairy outside; petals glabrous; stamens 4-5-6. Female flowers smaller; sepal-1, hairy; petal-1, hairy; ovary-1, densely hairy. Drupe 4.5 x 4 mm, subglobose, white, pilose; seeds 4.5 x 4 mm, subglobose, tubercled along striated lines, black .

*Fl. & Fr.* : March

*Distr.* : Peninsular India and Sri Lanka. Fairly common; in semi-evergreen and evergreen forests. Vallakkadavu, *JA 13484.*

*Ethnobotanical use*: The Leaves are ground in coconut oil or oil extracted from **Madhuca neriifolia** and is applied externally on legs to prevent leech bite. The leaves are ground in cold water and is given for diarrhea.

## DIPLOCLISIA Miers

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

**Diploclisia glaucescens** (Bl.) Diels in Engl., Pflanzenr. 46: 226. 1910; Dunn in Gamble, Fl. Pres. Madras 28. 1915; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 20. 1983; Manilal, Fl. Silent Valley 6. 1988; Pramanik & Gangopadhyay in Sharma *et al.*, Fl. India 1: 327. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 36. 1996. ***Cocculus glaucescens*** Bl., Bijdr. 25. 1825. ***C. macrocarpa*** Wight & Arn., Prodr. 13. 1834.

Lianas, glabrous; old stem with 4-6 concentric rings of secondary wood. Leaves 6 x 6 cm, broadly ovate to orbicular, obtuse at apex, truncate at base, glaucous below, membranous; nerves few from the base; petiole to 12 cm long. Flowers unisexual, in large drooping panicles on old branches, bright yellow; sepals 6 in two whorls, 3 mm long, obovate; petals 6, smaller than sepals concave with incurved margins, 2 mm long, obovate, emarginate; stamens 6 in male flowers, staminodes absent; carpels 3 in female flowers, free; style cylindric. Drupe compressed, curved, tubercled.

*Fl. & Fr.* : February-April

*Distr.* : Indo-China and Malesia. Common; in evergreen forests. Chokkampetti, *JA 13449.*

*Ethnobotanical use* : The cooked leaves and stems are eaten for strengthening nerves.

## STEPHANIA Loureiro

Fl. Cochinch. 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. Female flowers: sepals and petals 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) 13: 14. 1866; Dunn in Gamble, Fl. Pres. Madras 29. 1915; Forman, Kew Bull. 11: 49. 1956; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 22. 1983; Manilal, Fl. Silent Valley 6. 1988; Pramanik & Gangopadhyay in Sharma *et al.*, Fl. India 1: 325. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 37. 1996. ***Menispermum japonicum*** Thunb., Fl. Japan 193. 1784. ***Stephania hernandifolia*** sensu Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 103. 1872, *p.p.*, non Walp., 1842. ***Cyclea hernandifolia*** Wight & Arn., Prodr. 14. 1834; Wight, Ic. t. 939. 1845.

Twining herbs. Leaves to 9 x 7 cm, truncate to cordate at base, acute at apex, palmately 9-nerved; petiole to 9 cm long. Umbel peduncled, axillary; peduncle 3-5 cm long, erect, slender; flowers many, 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.

*Fl. & Fr.* : October-December

*Distr.* : Indo-Malesia and Sri Lanka. Common; in evergreen forests. Mlappara, *JA 12570.*

**Stephania wightii** (Arn.) Dunn in Gamble, Fl. Pres. Madras 74. 1915; Manilal, Fl. Silent Valley 7. 1988; Pramanik & Gangopadhyay in Sharma *et al.*, Fl. India 1: 328. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 37. 1996. *Cyclea wightii* Arn. in Wight, Ill. 1: 22. 1840. ***Stephania rotundus*** sensu Hook. f. & Thoms., Fl. India 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 8 cm long, slender. Peduncle to 2 cm long, erect; pedicel 3 mm long; male flowers densely packed in heads,; female flowers 3 mm across, in pedunculate cymes; sepals 5, ovate acute glabrous; petals ovate, greenish yellow. Drupe 8 x 5 mm, oblique, stalked, with 4 rows of tubercles along the margins.

*Fl. & Fr.* : October-January

*Distr.* : Endemic to Tamil Nadu and Kerala. Common; in evergreen and semi-evergreen forests. Chokkampetti, *JA & KPR 14480.*

## TINOSPORA Miers

Ann. Mag. Nat. Hist. 7: 35, 38. 1851

**Tinospora sinensis** (Lour.) Merr., Sunyatsenia 1: 139. 1934 & in Trans. Am. Phil. Soc. Philadelphia. 24: 158. 1935; Forman, Kew Bull. 36: 386. 1981; Pramanik & Gangopadhyay in Sharma *et al.*, Fl. India 1: 349. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 39. 1996. ***Campylus sinensis*** Lour., Fl. Cochinch. 113. 1790. ***Menispermum malabaricum*** Lam., Encycl. Meth 4: 96. 1797. ***Cocculus tomentosa*** Coleb., Trans. Linn. Soc. Lond. 13: 56. 1822. ***Tinospora malabarica*** (Lam.) Hook. f. & Thoms., Fl. India 183. 1855 & in Hook. f., Fl. Brit. India 1: 96. 1872; Subha Rao & Kumari, Bull. Bot. Surv. India 9(1-4): 186. 1967. *T. tomentosa* (Colcb.) Hook. f. & Thoms., Fl. Ind. 183. 1855 & in Hook. f., Fl. Brit. India 1: 96. 1872. **Amruthu.**

Small climbing shrubs; stem succulent. Leaves to 14 x 11 cm, broadly ovate, cordate at base, 5-7-nerved from base, scabrous above, densely white tomentose below. Flowers in racemes on old leafless branches, precocious, dioecious; raceme 10-25 cm long. Flowers 3-5 together, pedicelled; sepals 6 in 2 whorls, outer smaller, inner 2 x 1.5 mm, obovate; petals 6 smaller; stamens 6, free, anthers orbicular. Female flowers: sepals and petals similar to male flowers; carpels 3; stigma bilobed; staminodes 6, clavate. Drupe 8 mm long, 1 or 2 together, ovoid, red, glabrous.

*Fl. & Fr.* : February-April

*Distr.* : India Sri Lanka, China to Cambodia. Common; in evergreen forests at low elevations. Pamba, *JA 17151, JA 17168.*

## 6. BRASSICACEAE

Burnett, Outl. Bot. : 854, 1123. 1835; *nom. alt.* **Cruciferae**

1. Fruit 2-seeded.....2
1. Fruit many-seeded.....3
2. Segments of leaves 1 mm broad; capsule biglobular, indehiscent.....**Coronopus**
2. Leaves shallowly lobed, oblanceolate; capsule flat, dehiscent.....**Lepidium**
3. Leaves 3-7-foliolate; pods compressed.....**Cardamine**
3. Leaves simple, lobed or entire; pods terete.....**Brassica**

### BRASSICA Linnaeus

Sp. Pl. 666. 1753.

**Brassica juncea** (L.) Czern. & Cosson, Bull. Soc. Bot. France 6: 609. 1859; Hook. f., Fl. Brit. India 1: 157. 1872; Gamble, Fl. Pres. Madras 38. 1915; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3(1): 32. 1983. *Sinapis juncea* L., Sp. 668. 1753.

Small herbs. Leaves alternate, lyrate, to 15 x 7 cm, glabrous. Flowers many, 8 mm across, in terminal racemes; sepals 4, oblong, glabrous; petals 4, yellow; stamens 6, free; ovary stipitate, ovules 10-20, style short, stigma capitate. Fruit a subterete siliqua.

*Fl. & Fr.* : Throughout the year

*Distr.* : Asia; now cultivated all over the world. Running wild as an escape along lake shores and riverbeds. Thekkady, *JA 14900.*

## 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. trichocarpa**

**Cardamine africana** L., Sp. Pl. 655. 1753; Hook. f. & T. Anders. in Hook. f., Fl. Brit. India 1: 137. 1872; Dunn in Gamble, Fl. Pres. Madras 38. 1915; Hajra & Chaudhar. in Sharma & Balakr., Fl. India 2: 109. 1993; Philcox in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 9: 5. 1995. *C. borbonica* Pers., Syn. 2: 195. 1806; Wight, Ic. t. 941. 1845.

Weak herbs to 15 cm high, branches scarce. Leaflets 4 x 2 cm, lyrate, glabrous above, sparsely hairy below; petiole 5 cm long, slender. Raceme terminal, few-flowered. Flowers 8 mm across, pedicellate; sepals linear; petals 5 mm long, clawed; stamens 6, tetradynamous, filaments glabrous. Pod 4 cm long; seeds 2 x 0.5 mm, narrowly oblong, smooth.

*Fl. & Fr.* : Throughout the year

*Distr.* : Africa India, Sri Lanka and Indonesia. Common; in evergreen forests at all elevation. Anakuthivayal, *JA 17763.*

**Cardamine trichocarpa** Hochst. ex A. Rich., Tent. Fl. Abyss. 1: 18. 1847; Dunn in Gamble, Fl. Pres. Madras 38. 1915; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 33. 1983; Hajra & Chaudhar. in Sharma & Balakr., Fl. India 2: 117. 1993. *C. subumbellata* Hook. ex Hook. f. & T. Anders. in Hook. f., Fl. Brit. India 1: 138. 1872.

Diffuse branched herbs; stem sparsely hairy. Leaves to 5 cm long; leaflets orbicular, deeply crenate, sparsely hairy. Flowers white, in terminal racemes, 3 mm across, pedicels 6 mm long;

sepals 4, oblong; stamens 4. Pod 2.5 x 0.15 cm, flat; seeds 1-seriate, 2 x 1 mm, oblong, smooth, brown.

*Fl. & Fr.* : January-May

*Distr.* : Peninsular India and Sri Lanka. Occasional; in disturbed forests areas at high elevation. Uppermanalar, *JA 17904.*

## CORONOPUS *Zinn*

Cat. Pl. Gott. 325. 1757.

**Coronopus didymus** (L.) Smith, Fl. Britain 2: 691. 1800; Fyson, Fl. S. Ind. Hill. Stat. 24. 1932; Matthew, Rec. Bot. Surv. India 20: 41. 1969 & Fl. Tamil Nadu Carnatic 3(1): 33. 1883; Bhaumik in Sharma & Balakr., Fl. India 2: 192. 1993; Philcox in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 9: 13. 1995. ***Lepidium didymum*** L., Mant. Pl. 92. 1767. ***Senebiera didyma*** (L.) Pers., Syn. 2: 185. 1800; Dunn in Gamble, Fl. Pres. Madras 39. 1915.

Procumbent herbs to 30 cm long; branches pilose. Leaves alternate, 1.5-3 cm long, deeply lobed; lobes 1 mm broad, oblong, entire, glabrous. Racemes terminal or axillary, 1-3 cm long. Flowers 1.5 mm across, greenish white, many in each raceme; pedicels 2 mm long, slender; sepals 4, orbicular; petals absent; stamens 4, filaments free, slender, included; ovary 2-celled, one ovule in each. Capsule 1.2 x 2 mm, biglobular; seed one in each cell, oblong, pitted, mucilaginous when wet.

*Fl. & Fr.* : Throughout the year

*Distr.* : Cosmopolitan. Occasional; in disturbed forests areas. Vallakkadavu, *JA 16333.*

## LEPIDIUM Linnaeus

Sp. Pl. 643. 1753.

**Lepidium sativum** L., Sp. Pl. 644. 1753; Hook. f., Fl. Brit. India 1: 159. 1872; Gamble, Fl. Pres. Madras 39. 1915; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3(1): 34. 1983.

Herbs, trailing or decumbent. Leaves pinnatifid to 3 cm long; leaflets 1-2 mm broad, glabrous. Flowers small, 0.5 mm across, in axillary racemes; sepals 4, orbicular; petals 4, white, orbicular; stamens 6, free. Fruit a bilobed capsule, 1 x 1 mm, rugose; seeds one in each lobe, mucilaginous when wet.

*Fl. & Fr.* : Throughout the year

*Distr.* : Egypt and West Asia, introduced and widely cultivated in other countries. Running wild as an escape in disturbed forest areas. Thekkady, *JA 16333*

## 7. CAPPARACEAE

Juss., Gen. Pl. : 242. 1789

1. Slender annuals; ovary sessile.....**Cleome**
1. perennial shrubs or trees ; ovary stalked.....2
2. Usually thorny shrubs; leaves simple.....**Capparis**
2. Trees; leaves 3-foliolate.....**Crateva**

### CAPPARIS Linnaeus

Sp. Pl. 503. 1753.

Shrubs, erect or scandent. Leaves alternate, entire, penninerved; stipules usually modified into short or large 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. Diffuse shrubs; berry 6 mm across; leaves to 4 x 3 cm.....**C. parviflora**
1. Erect or scandent shrubs; berry above 2 cm thick; leaves more than 10 cm long.....2
2. Flowers in axillary fascicles; pedicel 1 cm long in fruit; berry ellipsoid.....**C. fusifera**
2. Flowers in terminal cymes or solitary; pedicel 8 cm long in fruit; berry globose.....**C. moonii**

**Capparis fusifera** Dunn, Kew Bull. 1914: 377. 1914 & in Fl. Pres. Madras 45. 1915; Joseph & Chandras., Bull. Bot. Surv. India 20(1-4):156. 1978; Sund.-Ragh. in Sharma & Balakr., Fl. India 2: 271. 1993. *C. tomentella* Dunn in Gamble, Fl. Pres. Madras 46. 1915. *C. parviflora* sensu Bedd., Ic. t. 276. 1868-1874, non Hook. f. & Thoms., 1872.

Erect much branched shrubs, slightly puberulus; spines very small on either sides of. the petiole. Leaves to 18 x 7 cm, elliptic, acute at either ends, coriaceous, glabrous, lateral nerves 8-10 pairs; petiole 0.5 cm, stout. Flowers solitary or 2-3 together; petals white, 15 mm long, obovate, obtuse. Berry 4 x 2 cm, ellipsoid, rind hard; pedicel 7 mm in fruit; gynandrophore 0.8-1 cm long, thick.

*Fl. & Fr.* : March-April

*Distr.* : Southern Western Ghats. Occasional; in semi-evergreen forests. Thekkady, *JA 13535.*

**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. 1915; Jacobs, Blumea 12: 472. 1965; Sund.-Ragh. in Sharma & Balakr., Fl. India 2: 277. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 40. 1996.

Scandent shrubs; stem glabrous, spines, conical, slightly recurved, with white decurrent base on either side of petiole. Leaves to 12 x 4 cm, elliptic-oblong, acute at both ends, glabrous, shining above; petiole 1.5 cm long, slender. Flowers 8-10 cm across, solitary or 3-5 together, terminal or in axils of upper leaves, spreading; sepals 1.8 cm across, orbicular, puberulus; petals to 5 x 3 cm, obovate, white, cottony hairy; filaments 7.5 cm long, glabrous. Berry 6-8 cm across, globose, glabrous; gynandrophore 4-10 cm long, stout.

*Fl. & Fr.* : January-May

*Distr.* : South India and Sri Lanka. Occasional; in evergreen forests. Chenthamarakokka, *JA & KPR 15124.*

**Capparis shevaroyensis** Sund.-Ragh., Kew Bull. 37: 72. 1982 & in Sharma & Balakr., Fl. India 2: 290. 1993; ***Capparis parviflora*** Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 176. 1872; Dunn in Gamble, Fl. Pres. Madras 46. 1915.

Spreading shrubs, branches glabrous; spines small, recurved. Leaves ovate, acute or obtuse at apex, tip emarginate; base acute and extreme base cordate, glabrous, nerves 3 pairs; petiole 3 mm long. Umbel sessile, terminal 5-10-flowered; pedicel 10 mm long, 5-10 together. Flowers 10-12 mm across; sepals 4 x 4 mm, orbicular, concave, puberulus outside; petals dull white, 6 x 2.5 mm, obovate, obtuse, entire, glabrous; stamens 20, filaments 10 mm long; gynophore 6 mm long; style very short. Berry 8 mm across, globose, smooth; fruiting pedicel 2 cm long.

*Fl. & Fr.* : March-May

*Distr.* : Southern Western Ghats. Occasional; in disturbed moist deciduous forests. Thekkady, *KPR & JA 15304, 17909.*

*Note* : Sundara Raghavan (1993) commended this species restricted to Silent Valley in Kerala and Tirunelveli in Tamil Nadu. The present collection is a third locality of the species. For the details of the nomenclature problem see Sundara Raghavan (1993).

## 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 1-foliolate; seeds rugose, sparsely hairy.....**C. monophylla**

1. Leaves 3-5-foliolate; seeds striate ridged, glabrous.....2

2. Plants glabrous; capsule 4 cm long; petals pink to violet.....**C. rutidosperma**

2. Plants glandular hairy; capsule 6-8 cm long; petals yellow.....**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. 1915; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 48. 1983; Sund.-Ragh. in Sharma & Balakr., Fl. India 2: 312. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 42. 1996.

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

*Fl. & Fr.* : November-February

*Distr.* : Tropical Africa and India. Occasional; in disturbed moist deciduous forests. Kumily, *JA 15320.*

**Cleome rutidosperma** DC., Prodr. 1:241.1824; Mukherjee, Indian Forest. 95: 237.1969; Sund.-Ragh. in Sharma & Balakr., Fl. India 2: 313. 1993. ***Cleome burmannii*** auct. non Wight & Arn., Prodr. 22. 1834: Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 170. 1872; Dunn in Gamble, Fl. Pres. Madras 41. 1915.

Prostrate or diffuse herbs. Leaves 3-foliolate, leaflets 2.5 x 1.5 cm, elliptic, acute or obtuse, glabrous; petiole 2.5 cm long. Flowers in terminal leafy racemes; pedicel 3 cm long, slender; sepals 2 mm long, lanceolate; petals light pink or violet, 8 mm long, oblanceolate; stamens 8, filaments 8-10 mm long. Capsule 4 cm long glabrous; seeds 1.5 x 1.5 mm, ridged, not striate.

*Fl. & Fr.* : Throughout the year

*Distr.* : India and South East Asia. Occasional; in disturbed forests areas. Koruthode, *KPR & JA 14742.*

**Cleome viscosa** L., Sp. Pl. 672. 1753; Wight, Ic. t. 2. 1838; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 170. 1872; Dunn in Gamble, Fl. Pres. Madras 41. 1915; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 : 49. 1983; Sund.-Ragh. in Sharma & Balakr., Fl. India 2: 317. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 42. 1996.

Herbs to 50 cm high. Leaves 3-5-foliolate; leaflets 2.5 x 1.5 cm, obovate, acute at apex and base, glandular hairy; petiole 3 cm long. Flowers axillary, solitary; pedicels 1.5 cm long; sepals 4 mm long, oblong, glandular hairy; petals yellow, 7 mm long, obovate; stamens 12-18, filaments straight. Capsule 6-8 cm long terete; seeds 1.2 x 1.2 mm, striate-ridged along the margins.

*Fl. & Fr.* : May-December

*Distr.* : Old World Tropics. Occasional; in disturbed forests areas at all elevations. Vellimala, *JA & KPR 15331.*

**CRATEVA** Linnaeus

Sp. Pl. 444. 1753.

**Crateva magna** (Lour.) DC., Prodr. 1: 243. 1824; Jacob in Steenis, Fl. Males. 1, 7: 822. 1978; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 51. 1983; Sund.-Ragh. in Sharma & Balakr., Fl. India 2: 324. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 42. 1996. ***Capparis magna*** Lour., Fl. Cochinch. 1: 330. 1790. ***Crataeva nurvala*** Buch.-Ham., Trans. Linn. Soc. London 15: 121. 1827; Jacobs, Blumea 12: 194. 1964. ***Crataeva religiosa*** auct. non G. Forst., 1786: Bedd., Fl. Sylv. t. 116. 1871; Dunn in Gamble, Fl. Pres. Madras 47. 1915. **Neermathalam** (Mala Arayan)

Small trees; bark white. Leaves alternate, digitately 3-foliolate, leaflets to 11 x 5 cm, ovate, acute at apex, acute or rounded at base, glabrous. Flowers in terminal corymbs; pedicel to 5 cm long; sepals 4, free, 3 mm long, oblong, adnate to the disc; petals long-clawed, limb 2 x 1.8 cm, orbicular, white, claw 1 cm long, slender; stamens many, filaments 3.3 cm long, free; gynophore 4.5 cm long, slender; ovary 1-2-celled; stigma sessile, capitate. Fruit a globular drupe, 2-2.5 cm across, rough, puberulus.

*Fl. & Fr.* : February-May

*Distr.* : India, China eastward to Malesia. Occasional; along riverbanks in semi-evergreen forests. Vallakkadavu, *JA 13426.*

## 8. VIOLACEAE

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

1. Stems very short or absent; petals equal ..... **Viola**

1. Stems elongated; petals unequal ..... **Hybanthus**

## HYBANTHUS N. J. Jacquin

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

**Hybanthus enneaspermus** (L.) F. Muell., Fragm. 10: 81. 1876; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 165. 1976; Matthew, Fl. Tamil Nadu Carnatic 3(1): 53. 1983.*Viola ennaesperma* L., Sp. Pl. 937. 1753. *Viola suffruticosa* L., Sp. Pl. 937. 1753. *Ionidium suffruticosum* (L.) Ging. ex DC., Prodr. 1: 311. 1824; Wight, Ic. t. 308. 1840; Gamble, Fl. Pres. Madras 49.1915. *Hybanthus suffruticosum* (L.) Baillon, Bot. Med. 2: 841. 1884.

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; petiole short of absent. Flowers solitary, axillary; pedicels 1-1.5 cm long, slender, smooth; sepals 5, subequal, to 3 mm long; petals 5, pale pink, unequal, lower petal long clawed, 3 mm long, saccate at base; upper petals to 5 mm long; stamens 5, filaments dialated at base; anthers connate; ovary 1-celled, globose, ovules many, parietal; Fruit a 3-valved capsule, 5 mm across; seeds many.

*Fl. & Fr.* : May to September.

Distr.: Africa to Australia. Occasional; in Grasslands at high elevations. Vellimala, JA 15392.

## VIOLA Linnaeus

Sp. Pl. 933. 1753.

**Viola hamiltoniana D.** Don, Prodr. Pl. Nepal. 206. 1825; Banar. & Pramanik, Fasc. Fl. India 12: 23. 1983; Banerjee & Pramanik in Sharma & Balakr., Fl. India 2: 363. 1993. *Viola arcuata* Bl., Bijdr. 58. 1825. *V. distans* Wall., Trans. Med. Soc. Calcutta 7: 227. 1885; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 183. 1872; Dunn in Gamble, Fl. Pres. Madras 48. 1915.

Herbs; stem very short or absent. Leaves radical, 4.5 x 5.5 cm, ovate, acute at apex, cordate at base, crenate; petiole to 15 cm long, slender. Flowers axillary, solitary, long-pedicelled; pedicel 15-18 cm long; sepals ovate, 6 mm long, glandular, serrate; petals white, lower petals 11 x 5 cm, spurred at base; other petals smaller, obovate, obtuse; stamens 5, anthers connate, lowers two anthers with spurred connectives; filaments broad; ovary 1-celled, ovules many, parietal; style 1. Capsule 5 x 3 mm, ampulliform, glabrous; seeds, many, black, rugose.

*Fl. & Fr.* : Throughout the year

*Distr.* : India, Java and Sri Lanka. Common; along margins of forests at high altitudes. Melmanalar, *JA 12969.*

## 9. COCHLOSPERMACEAE

Planch., London J. Bot. 6: 305. 1847.

### COCHLOSPERMUM Humboldt, Bonpland et Kunth

Nova Gen. Sp. 5: 297. 1822, *nom. cons.*

**Cochlospermum religiosum** (L.) Alston in Trimen, Handb. Fl. Ceylon 6 (Suppl.): 14. 1931; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 56. 1983; Paul & Nayar, Fl. India Fasc. 19: 16. 1988; Balakr. in Sharma & Balakr., Fl. India 2: 383. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 43. 1996. ***Bombax religiosum*** L., Sp. Pl. 512. 1753. ***Cochlospermum gossypium*** DC., Prodr. 1: 527. 1824; Bedd., Fl. Sylv. t. 171. 1872; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 90. 1872; Dunn in Gamble, Fl. Pres. Madras 50. 1915.

Small trees; bark white. Leaves alternate, 20 cm across, palmately 5-7-lobed, lobes elliptic, acute to acuminate, densely tomentose below; petiole to 18 cm long, densely hairy. Flowers in terminal cymes, subsessile, 3-7 together; calyx 5-partite, lobes 2.5 x 1.5 cm, obtuse, densely tomentose; petals yellow, 5, 5 x 3 cm, obovate; stamens many, free; filaments 2.2 cm long; ovary 1-celled, ovules many, 3-5-parietal; style-1, filiform. Capsule 8 x 5.5 cm, obovoid, 5-angled, many-ridged, 3-5-valved; seeds many, globose, with woolly hairs.

*Fl. & Fr.* : January-May

*Distr.* : India, Sri Lanka and Malesia. Occasional; along margins of grasslands in deciduous forests. Mangaladevi, *JA 17193.*

## 10. FLACOURTIACEAE

Rich. ex DC., Prodr. 1: 255. 1824

1. Petals present.....2
1. Petals absent.....4
2. Flowers all bisexual in racemes or panicles.....3
2. Flowers unisexual, in axillary fascicles.....**Hydnocarpus**
3. Stamens 4; ovary half inferior.....**Homalium**
3. Stamens numerous; ovary superior .....**Scolopia**
4. Flowers bisexual; staminodes present.....**Casearia**
4. Flowers unisexual; staminodes absent.....**Flacourtia**

### 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. Capsule globose or oblong, not ribbed.....2
1. Capsule ovoid, ribbed.....**C. championii**
2. Leaves obovate; ovules 4.....**C. thwaitesii**
2. Leaves elliptic, acuminate; ovules 9-12.....3
3. Pedicels hairy; ovules 9; lateral nerves of leaf lamina ca. 15 pairs.....**C. rubescens**
3. Pedicels glabrous; ovules 12; lateral nerves of leaf lamina 7 or 8 pairs.....**C. zeylanica**

**Casearia championii** Thw., Enum. Pl. Zeyl. 19. 1858 ; Mitra in Sharma & Balakr., Fl. India 2: 391. 1993. *C. esculenta* auct. non Roxb., 183: Clarke in Hook.f., Fl. Brit. India 2: 592. 1879. *C. bourdillonii* Mukh., Bull. Bot. Soc. Bengal 19: 109. 1965, p.p.; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 161. 1976; Manilal, Fl. Silent Valley 8. 1988. *C. varians* Bedd., Fl. Sylv. t. 208. 1872, non Thw., 1864; Dunn in Gamble, Fl. Pres. Madras 521. 1919.

Trees to 10 m high; bark greyish, smooth, reddish brown inside; young shoot glabrous. Leaves oblanceolate, abruptly acuminate at apex, attenuate at base, nerves 10-12 pairs, prominent beneath. Flowers 3-9 together, axillary, 5 mm across; pedicels hairy; sepals 3 mm across, ciliate along the margins, greenish yellow; anthers with connectives produced into a small beak. Capsule 18 mm long, ribs not prominent, yellow; seeds many, trigonous, red.

*Fl. & Fr.* : August-January

*Distr.* : Southern Western Ghats, endemic. Occasional; in evergreen forests. Koruthode, *JA 12249, JA 13174.*

**Casearia rubescens** Dalz., Hook.'s J. Bot. Kew Gard. Misc. 4: 108. 1852; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 2: 593. 1879; Dunn in Gamble, Fl. Pres. Madras 520. 1919; Sasidh. & Sivar., Fl. Pl. Thrissur For. 44. 1996.

Medium sized trees, branchlets lenticellate. Leaves to 14 x 6 cm, oblong, rounded at base, acute or obtuse at apex, glabrous, nerves ca. 15 pairs, midrib; nerves and petiole reddish; petiole 1.5 cm long. Flowers 2-6 together, 5 mm across; pedicel 3.5 mm long, tomentose; sepals 2 x 1.5 mm, ovate obtuse, tomentose outside, ciliate; stamens 10, filaments 1 mm long, sparsely hairy; staminodes 0.6 x 1 mm, triangular, sparsely hairy at base; ovary 2 x 2 mm, globular, ovules 9; stigma hardly wider than style. Capsule 15 x 8 mm, ellipsoidal, smooth, narrowly 3-furrowed, not prominently ridged, glabrous.

*Fl. & Fr.* : April-May.

*Distr.* : South India, endemic. Common; in evergreen forests at higher elevations. Eravangalar, *JA & KPR 15258.*

**Casearia thwaitesii** Briq., Ann. Cons. Jard. Bot. Geneve 62. 1898; Alston in Trimen, Handb. Fl. Ceyl. 6 (Suppl.): 131. 1931; Mitra in Sharma & Balakr., Fl. India 2: 313. 1993; *C. coriacea* sensu Thw., Enum. Pl. Zeyl. 20. 1858, non Vent. 1803: Hook. f. & Thoms. in Hook. f., Fl. Brit. India 2: 592. 1879; Dunn in Gamble, Fl. Pres. Madras 521. 1919; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 1: 17. 1983.

Small trees, branches lenticellate. Leaves to 9 x 4.5 cm, obovate, obtusely acute at apex or obtuse, cuneate at base, glaucous below, nerves 5 pairs, prominent below. Flowers 5 mm across, 3-6 together; pedicel 5 mm long; sepals obovate, obtuse, ciliate; stamens 8, filaments 1.5 mm long, pubescent; ovary terete; ovules 4, on 2 parietal placentas. Capsule 17 x 12 mm, ovoid, smooth, greenish yellow.

*Fl. & Fr.* : March-May

*Distr.* : South India and Sri Lanka. Common; in evergreen forests. Uppermanalar, *JA 13760.*

**Casearia zeylanica** (Gaertn.) Thw., Enum. Pl. Zeyl. 19. 1858; Alston in Trimen, Handb. Fl. Ceyl. 6 (Suppl.): 131. 1931; Mitra in Sharma & Balakr., Fl. India 2: 399. 1993. *Vareca zeylanica* Gaertn., Fruct. 290, t. 60. 1788. *Casearia ovata* (Lam.) Willd., Sp. Pl. 2: 629. 1799; Mukh., Bull. Bot. Soc. Bengal 14: 629. 1972; Sasidh. & Sivar., Fl. Pl. Thrissur For. 44. 1996. *Anavinga ovata* Lam., Encycl. 1: 148. 1789. *C. esculenta* Roxb., Fl. Ind. 2: 422. 1832; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 2: 592. 1879; Dunn in Gamble, Fl. Pres. Madras 521. 1919; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 162. 1976.

Small trees. Leaves to 12 x 6 cm, broadly elliptic, abruptly acuminate, attenuate at base, drying yellowish, nerves 8 pairs, prominent. Flowers in fascicles; pedicels 2-3 mm long; sepals 3 x 3 mm, orbicular; stamens 8, filaments 1.2 mm long, pubescent; staminodes tufted hairy at apex; ovules 12; style short; stigma capitate. Capsule 13 mm long, ellipsoidal, smooth, slightly ribbed.

*Fl. & Fr.* : March-May

*Distr.* : India and Sri Lanka. Common; in evergreen and semi-evergreen forests. Thekkady, *JA 13537*; Uppermanalar, *JA 13744.*

**FLACOURTIA** Commerson ex L' Heritier de Brutelle

Stirp. Nov. 59. 1786.

**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. 1915; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 163. 1976; Manilal, Fl. Silent Valley 10. 1988; Mitra in Sharma & Balakr., Fl. India 2: 406. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 44. 1996. **Charal Pazham** (Mannan), **Pai nellicka** (Malam pandaram).

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

*Fl. & Fr.* : March-May

*Distr.* : South-Western India, endemic. Common; in semi-evergreen and evergreen forests. Kaduvathala, *JA 13463.*

*Ethnobotanical use* : The fruits are edible when fully ripe. Mala Arayan press the fruits and the juice is taken as soft drink.

**HOMALIUM** N. J. Jacquin

Enum. Pl. Carib. 5. 1760.

**Homalium ceylanicum** (Gard.) Benth., J. Linn. Soc. Bot. 4: 35. 1860, *zeylanicum;* Bedd., Fl. Sylv. t. 210. 1872; Clarke in Hook. f., Fl. Brit. India 2: 596. 1879; Dunn in Gamble, Fl. Pres. Madras 522. 1915; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 163. 1976; Manilal, Fl. Silent Valley 10. 1988; Mitra in Sharma & Balakr., Fl. India 2: 410. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 45. 1996. ***Blackwellia zeylanica*** Gard., Calcutta J. Nat. Hist. 7: 452. 1847. ***H. tetrandra*** Wight, Ic. t. 1851. 1852.

Medium trees; branchlets puberulus. Leaves to 14 x 7 cm, broadly elliptic abruptly acuminate, crenate, membranous; nerves 8 pairs; petiole to 2 cm long. Racemes 10-25 cm long, solitary or 2-3 together, axillary, drooping, slender. Flowers clustered, pedicellate, 5 mm across; sepals 4, ovate-lanceolate, pubescent; petals 4, oblanceolate, pubescent; stamens 4, antipetalous; staminodes globular; ovary 1-celled; ovules few; style 4. Capsule globose, 2-4-valved; seeds few.

*Fl. & Fr.* : March-May

*Distr.* : South Western India, endemic. Very common; in evergreen forests. Chenthamarakokka, *JA 13447.*

## HYDNOCARPUS Gaertner

Fruct. 1: 288, t. 60, f. 3. 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. Tender leaves reddish, entire; berry smooth; scale 1/2 as long as petals.....**H. alpina**
1. Tender leaves green, serrate; berry rugose, uneven; scale as long as petals.....**H. pentandra**

**Hydnocarpus alpina** Wight, Ic. t. 942. 1845; Bedd., Fl. Sylv. t. 77. 1871; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 197. 1872; Dunn in Gamble, Fl. Pres. Madras 52. 1915; Manilal, Fl. Silent Valley 11. 1988; Mitra in Sharma & Balakr., Fl. India 2: 418. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 45. 1996.

Medium trees; bark black; branchlets puberulus. Leaves to 15 x 6 cm, ovate, acute at apex, acute or round at base, nerves 7-10 pairs; young sprouts reddish. Flowers 15 mm across in axillary peduncled cymes; pedicel 1.5-2 cm long, deflexed, pubescent; sepals 8 mm long, oblong, pubescent; petals 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 7 cm across, densely tomentose, dark brown.

*Fl. & Fr.* : January-May

*Distr.* : South India and Sri Lanka. Common; in evergreen forests. Koruthode, *JA 13396*; Inchippara, *JA 13551.*

**Hydnocarpus pentandra** (Buch.-Ham.) Oken, Allg. Naturf. 3(2). 1381. 1841; Mukh., Bull. Bot. Soc. Bengal 14: 183. 1972; Mitra in Sharma & Balakr., Fl. India 2: 422. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 46. 1996. ***Chilmoria pentandra*** Buch.-Ham., Trans. Linn. Soc. London 13: 501. 1822. ***Munnicksaia laurifolia*** Dennst., Schlues. Hort. Ind. Malab. 27. 1818, *nom nud. H. **laurifolia*** (Dennst.) Sleum., Bot. Jahrb. 69: 33. 1938; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 164. 1976. **Marotti** (Mala Arayan)

Medium sized trees; bark white; branchlets puberulus. Leaves to 17 x 8 cm, elliptic, acuminate at apex, acute or obtuse at base , nerves 8 pairs, prominent. Flowers 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; 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.

*Fl. & Fr.* : February-October

*Distr.* : South-Western India, endemic. Fairly common; in semi-evergreen forests. Inchippara, *JA 12584*; Koruthode, *JA 13406.*

*Ethnobotanical use* : Mala Arayan extract the oil from the seeds by pressing and is used as mild insect repellent.

### SCOLOPIA Schreber

Gen. 335. 1789.

**Scolopia crenata** (Wight & Arn.) Clos, Ann. Sci. Nat. Bot. 4, 8: 250. 1857; Bedd., Fl. Sylv. t. 78. 1871; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 191. 1872; Dunn in Gamble, Fl. Pres. Madras 52. 1915; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 164. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 61. 1983; Manilal, Fl. Silent Valley 12. 1988; Mitra in Sharma & Balakr., Fl. India 2: 430. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 46. 1996. *Phoberos crenatus* Wight & Arn., Prodr. 29. 1834.

Small to medium sized trees; 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 6 mm long, puberulus; sepals 6, 3 x 2 mm, obovate; petals 6, smaller, orbicular, white; stamens numerous, free; anthers 1 mm long, oblong, connective produced into a reddish hood. Ovary 1-celled, few ovuled; style 4 mm long, thick; stigma 3-fid. Capsule 10 x 8 mm, globose, with persistent style; seeds few.

*Fl. & Fr.* : March-July

*Distr.* : S. Asia, eastward to Malesia. Common; along margins of evergreen forests. Eravangalar, *JA & KPR 15247;* Chenthamara, *JA 15128.*

## 11. PITTOSPORACEAE

R. Brown in Flinders, 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. Leaves pseudoverticillate; branchlets densely pubescent; petals 10 mm long.....**P. tetraspermum**
1. Leaves alternate, scattered; branchlets glabrous; petals to 7 mm long.....2
2. Leaves oblanceolate; capsule 5 x 5 mm..... .....**P. wightii**
2. Leaves elliptic; capsule 14 x 15 mm..... .**P. neelgherrense**

**Pittosporum wightii** Mukh. J. Econ. Tax. Bot 5(1): 50. 1984. ***Pittosporum floribundum*** Wight & Arn., Prodr. 154. 1834; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 199. 1872; Dunn in Gamble, Fl. Pres. Madras 55. 1915; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 63. 1983. ***Pittosporum napaulense*** sensu Nayar & Giri, Fl. India Fasc. 6: 8. 1980, non (DC.) Redher & Wilson, 1916.

Trees, to 6 m high. Leaves crowed towards the branch-tips, to 14 x 4 cm, acute, obscurely 6-7-nerved; petiole 2 cm long. Panicle to 5 x 5 cm, branches puberulus. Flowers in clusters of 5-12; pedicels 3 mm long; sepals 2 x 1 mm, oblong, obtuse, ciliate; petals creamy white, 5 x 1.5 mm long, oblong, obtuse, glabrous; filaments erect, glabrous; ovary sparsely hairy. Capsule globose, glabrous; seeds 6.

*Fl. & Fr.* : July-December

*Distr.* : South India, endemic. Occasional; in moist deciduous forests. Thaannikkudy, *JA 12070, JA 12361.*

*Note* : Wight and Arnott (1834) described *Pittosporum floribundum* on South Indian specimen. Hooker f. l.c., made the description on two sets of specimens, one is *P. floribundum* of Wight and Arnott and the other is *Senacia napaulensis* of DC.(Prodr. 1: 347. 1824). Redher and Wilson (1916) separated the Himalayan specimen from Peninsular Indian specimen and the former was given the new combination *Pittosporum napaulense*. Nayar and Giri (1980) merged *P. floribundum* and *P. neelgherrense* Wight & Arnott with *P. napaulense*. Mukherjee (1984) compared the two sets of specimens (Himalayan and South Indian) and found morphological differences and treated as three distinct species. Since the name *Pittosporum floribundum* became the later homonym of *P. napaulense* the South Indian specimen was left without a valid name and the new name *Pittosporum wightii* was applied by Mukherjee.

**Pittosporum neelgherrense** Wight & Arn., Prodr. 154. 1834; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 198. 1872, "*nilghirensis*"; Dunn in Gamble, Fl. Pres. Madras 55. 1915; Nayar &

Giri, Fl. India Fasc. 6: 8. 1980; Manilal, Fl. Silent Valley 14. 1988; Nayar & Giri in Sharma & Balakr., Fl. India 2: 446. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 47. 1996.

Shrubs to 1.5 m high. Leaves to 12 x 3 cm, elliptic, acuminate at apex, acute at base, nerves indistinct; petiole 2 cm long, hirtus. Racemes 2-5-together, terminal, 2-3 cm long, stout; pedicel 5 mm long, glabrous. Capsule globose, rugulose, brown; seeds 7-10, shining.

*Fl. & Fr.* : July-December

*Distr.* : South India, endemic. Common; along stream banks in moist deciduous forest. Vallakkadavu, *JA & KPR 16386.*

**Pittosporum tetraspermum** Wight & Arn., Prodr. 154. 1834; Wight, Ic. t. 971. 1845; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 198. 1872; Dunn in Gamble, Fl. Pres. Madras 55. 1915; Nayar & Giri, Fl. India Fasc. 6: 11. 1980 & in Sharma & Balakr., Fl. India 2: 399. 1993; Manilal, Fl. Silent Valley 14. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 47. 1996. **Anali vetham, Anali vegam** (Oorali)

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 1 cm long. Flowers in terminal sessile umbels, pedicels 5 mm long; sepals 2.5 x 1.5 mm, ovate, obtuse, pubescent; petals creamy-white, 12 x 3 mm, oblanceolate, clawed; filaments 6 mm long; ovary densely hairy; style 4 mm long, glabrous. Capsule 8 x8 mm, globose, smooth, black.

*Fl. & Fr.* : July-March

*Distr.* : South India and Sri Lanka. Common; along stream sides in moist deciduous forests. Vallakkadavu, *JA 13436.*

*Ethnobotanical use* : The thick bark of old stem is pungent smelling and is used for snake bites. The bark (fresh) is made into a paste and tied around the wound formed by the bite. A small amount is also given orally. Urali believe that the bark is useful only if it is cut by stones and not by knives. They believe that planting this tree near the houses will keep off snakes. And, it was also said that usually skeletons of snakes could be found below this tree.

## 12. POLYGALACEAE

R. Brown in Flinders, Voy. Terra Austr. 2: 542. 1814.

1. Stamens free; fruit a drupe; trees ..... **Xanthophyllum**
1. Stamens united; fruit a capsule; herbs or rarely shrubs ..... **Polygala**

## 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, one higher than the other; seeds oblong , carunculate; caruncle lobed.

1. Shrubs; leaves over 10 cm long..... **P. arillata**
1. Herbs; leaves to 5 cm long.....2
2. Flowers blue..... **P. sibirica**
2. Flowers not blue.....3
3. Caruncle covers 3/4 of the seed..... **P. jacobii**
3. Caruncle covers 1/4 to 1/2 of the seed.....4
4. Leaves covered with bulbous based hairs..... **P. bolbothrix**
4. Leaves glabrous.....5
5. Inner sepals orbicular..... **P. persicariifolia**
5. Inner sepals ovate, acuminate..... **P. rosmarinifolia**

**Polygala arillata** Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 199. 1825; Bennet in Hook. f., Fl. Brit. India 1: 200. 1872; Dunn in Gamble, Fl. Pres. Madras 58. 1915; Sumithra. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 303. 1987; Banerjee in Sharma & Balakr., Fl. India 2: 457. 1993.

Shrubs to 1.5 m high. Leaves to 17 x 5 cm, elliptic, acuminate at apex, acute at base; nerves to 15 pairs; petiole 1 cm long. Racemes to 10 cm long. Flowers yellow; pedicels 5 mm long; outer sepals 5 x 4 mm, ovate, obtuse; inner sepals 14 x 8 mm, oblong, emarginate; petals 14 mm long, crest dichotomous; wings decurrent at base. Capsule 8 x 14 mm long, compressed, glabrous, striate; seeds oblong 7 x 4 mm, biconvex; caruncle reddish.

*Fl. & Fr.* : Throughout the year

*Distr.* : India, China and Sri Lanka. Common; in evergreen forests above 1200 m altitude. Mlappara, *JA 12598*; Vellimala, *JA 12953.*

**Polygala bolbothrix** Dunn in Gamble, Fl. Pres. Madras 58. 1915; Chandrab. & Nair, Proc. Indian Acad. Sci. (Plant Sci.) 90: 120. 1981; Matthew & Britto in Matthew, Fl. Tamil Nadu

Carnatic 3 (1): 66. 1983; Manilal, Fl. Silent Valley 15. 1988; Banerjee in Sharma & Balakr., Fl. India 2: 462. 1993.

Diffuse herbs; whole plant with bulbous based hairs. Leaves to 15 x 8 mm, obovate, obtuse, petiole 1 mm long; racemes 2 cm long, 2-4-flowered; pedicels 4 mm long. Flowers yellow; outer sepals 2 x 1 mm, ovate, acute, densely hairy; inner sepals 3.5 x 2 mm, ovate, acuminate, dorsal petal 3 x 2 mm; crest 2 mm long, dichotomous. Stamens 8; sheath cleft at apex. Capsule 3.5 x 3 mm, densely bulbous based hairy along the margins; seeds 3 x 1.5 mm oblong, black hairy; caruncle 1.5 long, with 2 long and one short .

*Fl. & Fr.* : July-December

*Distr.* : Endemic to peninsular India. Common; in grasslands. Mangaladevi, *JA 12036*; Vallakkadavu, *JA 12796.*

**Polygala jacobii** Chandrab., Bull. Bot. Surv. India 9: 288, ff. 1-7. 1967; Chandrab. & Nair, Proc. Indian Acad. Sci. (Plant. Sci.) 90: 114. 1981; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 68. 1983; Banerjee in Sharma & Balakr., Fl. India 2: 472. 1993. ***P. dunnii*** Panigrahi, Kew Bull. 29: 655. 1974.

Perennial herbs, branches radiating, hispid. Leaves 6-18 x 3-7 mm, ovate, oblong, obtuse, scabrid. Racemes 1-3 cm long, 3-10-flowered; bracts ovate, keeled, ciliate. Flowers 7-8 mm long, inner sepals 7 x 3.5 mm, ovate, acute, strongly mucronate, ciliate; wing petals 6 x 5 mm, obovate to orbicular, dorsal petal 7 x 7 mm, orbicular, clawed, crest dichotomously branched, staminal sheath 4 mm long, ciliate at base. Capsule 5 x 5 mm, compressed, slightly winged along the margins, seeds 3.5 x 2 mm, obovoid, sparsely hispid, caruncle 2.5 mm long, obovate.

*Fl. & Fr.* : December-May

*Distr.* : Peninsular India. Rare; in the openings of evergreen forests above 1500 m. Kottamala, *JA & KPR 15388.*

**Polygala persicariifolia** DC., Prodr. 1: 326. 1824; Hook. f., Fl. Brit. India 1: 202. 1872 "*persicariaefolia*"; Dunn in Gamble, Fl. Pres. Madras 58. 1915; Chandrab. & Nair, Proc. Indian Acad. Sci. (Plant. Sci.) 90: 115. 1981; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 72. 1983; Manilal, Fl. Silent Valley 15. 1988; Banerjee in Sharma & Balakr., Fl. India 2: 480. 1993.

Erect herbs to 35 cm high. Leaves to 5 x 0.8 cm, linear-lanceolate, acuminate, glabrous. Racemes to 5 cm long, slender, pubescent, many-flowered. Flowers pink; inner sepals 6 x 6 mm, orbicular, white; outer sepals 3 x 2 mm, ovate; wing petals 2 mm long, cordate at base, hairy,

dorsal petal 6 x 4 mm, obovate, glabrous, crest fimbriate, 2-lobed. Capsule 4 x 3 mm, glabrous; seeds 3 x 1 mm, pubescent, caruncle 1/2 as long as the seed.

*Fl. & Fr.* : July-December

*Distr.* : Africa, Asia and Malesia. Common; in grasslands. Mangaladevi, *JA 12460.*

**Polygala rosmarinifolia** Wight & Arn., Prodr. 37. 1834; Bennet in Hook. f., Fl. Brit. India 1: 204. 1872; Dunn in Gamble, Fl. Pres. Madras 58. 1915; Chandrab. & Nair, Proc. Indian Acad. Sci. (Plant Sci.) 90: 122. 1981; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 72. 1983; Sumithra. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 308. 1987; Banerjee in Sharma & Balakr., Fl. India 2: 480. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 47. 1996.

Erect herbs, glabrous. Leaves to 2.5 x 0.3 cm, linear-oblong, acute, scabrous. Racemes 1.5 cm long, axillary, 3-5-flowered. Flowers yellow; pedicels 2 mm long, outer sepals 1.5 x 1 mm, ovate, obtuse, ciliate, inner sepals 5 x 2 mm, curved, ciliate; wing petals 2.5 x 2 mm, oblong; dorsal petal 2 x 3 mm; erect, stalked, forked. Capsule 4.5 x 3 mm, pubescent; seeds 3 x 1 mm, oblong, pubescent, black.

*Fl. & Fr.* : July-December

*Distr.* : Peninsular India and Sri Lanka. Common; in grasslands. Mangaladevi, *JA 12459*; Thaannikkudy, *JA 14127.*

**Polygala sibirica** L., Sp. Pl. 702. 1753; Bennet in Hook. f., Fl. Brit. India 1: 205. 1872; Dunn in Gamble, Fl. Pres. Madras 58. 1915; Chandrab. & Nair, Proc. India Acad. Sci. (Plant Sci.) 90: 113. 1981; Manilal, Fl. Silent Valley 16. 1988; Banerjee in Sharma & Balakr., Fl. India 2: 481. 1993.

Diffuse herbs, glabrous. Leaves to 15 x 7 mm, oblong, acute at apex, glabrous. Racemes 5-10 mm long, axillary. Flowers densely packed, blue; outer sepals broadly ovate, unequal; inner sepals 3 x 1.5 mm, elliptic, acuminate, glabrous; wing petals 3 mm long, obovate, dorsal petal 4 mm long; crest fimbriate, branched. Capsule 2 x 2 mm, orbicular, glabrous, seeds 1.5 x 1 mm, hairy, caruncle-lobes equal.

*Fl. & Fr.* : July-December

*Distr.* : Endemic to Peninsular India. Common; in grasslands at high altitudes. Vellimala, *JA 15543.*

## XANTHOPHYLLUM Roxburgh

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

**Xanthophyllum arnottianum** Wight, Ill. 1: 50, t. 23. 1840; Meyiden, Leiden Bot. Ser. 7: 79. 1982; Manilal, Fl. Silent Valley 16. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 48. 1996. *X.*

*flavescens* auct. non Roxb., 1814: Bennet in Hook. f., Fl. Brit. India 1: 209. 1874; Dunn in Gamble, Fl. Pres. Madras 59. 1915; Banerjee & Balakr. in Sharma & Balakr., Fl. India 2: 497. 1993. **Madukka** (Mala Arayan)

Small trees; bark smooth; branchlets puberulus. Leaves alternate, simple, to 15 x 7 cm, ovate, lanceolate, acuminate at apex, glabrous, drying to yellow; nerves 5-7 pairs; petiole 0.5 cm long. Flowers in terminal or axillary panicled racemes; sepals 5, subequal, to 3 x 2 mm, ovate, acute; petals yellow, unequal, lower one boat-shaped, pubescent; others ovate, to 10 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, 2 cm across, globose, rugose, 1-seeded.

*Fl. & Fr.* : December-June

*Distr.* : Southern Western Ghats. Common; along the margins of evergreen forests. Kumarikulam, *JA 13001.*

## 13. CARYOPHYLLACEAE

Juss., Gen. Pl. 299. 1789

1. Leaves 3-5 at each node; petals entire..... **.Polycarpon**
1. Leaves opposite; petals 2-5-fid.....2
2. Prostrate herbs; leaves orbicular, cordate, stipulate.....**Drymaria**
2. Erect herbs; leaves ovate, acute at base; stipule absent.....**Stellaria**

### DRYMARIA Willdenow ex J. A. Schultes

in J.J. Roemer et J. A. Schultes, Syst. Veg. 5: 31, 406. 1819-1820.

**Drymaria cordata** (L.) Roem. ex Schult. in L., Syst. Veg. (ed. 16) 5: 1820; Wight & Arn., Prodr. 359. 1834; Edgeworth & Hook. f. in Hook. f., Fl. Brit. India 1: 244. 1874; Dunn in Gamble, Fl. Pres. Madras 63. 1915. ssp. **diandra** (Bl.) Duke, Ann. Missouri Bot. Gard. 48: 253. 1961; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 76. 1983; Manilal, Fl. Silent Valley 17. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 49. 1996. ***Holosetum cordatum*** L., Sp. Pl. 88. 1753. ***Drymaria diandra*** Bl., Bijdr. 6. 1825; Majumdar in Sharma & Balakr., Fl. India 2: 533. 1993.

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

*Fl. & Fr.* : Throughout the year.

*Distr.* : Paleotropic. Common; in open forests areas. Thekkady, *JA 18413.*

## POLYCARPON Linnaeus

Syst. ed. 10. 881, 1360. 1759

**Polycarpon prostratum** (Forsk.) Asch. & Schweinf. in Oesterr. Bot. Z. 39: 128. 1889; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 99. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 78. 1983; Majumdar in Sharma & Balakr., Fl. India 2: 553. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 49. 1996. ***Alsine prostrata*** Forsk., Fl. Aeg.-Arab. 207. 1775. ***Hapalosa loeflingiae*** Wall. ex Wight & Arn., Prodr. 358. 1834. ***Polycarpon loeflingiae*** (Wall. ex Wight & Arn.) Benth. ex Edgew. & Hook. f. in Hook. f., Fl. Brit. India 1: 245. 1874; Dunn in Gamble, Fl. Pres. Madras 64. 1915.

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

*Fl. & Fr.* : January-May

*Distr.* : Tropical. Common; along lake banks and riverbeds, when water recedes. Koruthode, *JA 14760*; Thekkady, *JA & KPR 15056.*

## STELLARIA Linnaeus

Sp. Pl. 421. 1753.

**Stellaria media** (L.) Vill., Hist. Pl. Dauph. 3: 615. 1789; Wight, Ic. t. 947. 1845; Edgeworth & Hook. f. in Hook. f., Fl. Brit. India 1: 230. 1874; Dunn in Gamble, Fl. Pres. Madras 62. 1915; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 79. 1983; Majumdar in Sharma & Balakr., Fl. India 2: 585. 1993. ***Alsine media*** L., Sp. Pl. 272. 1753.

Erect or diffuse herbs; stem tomentose. Leaves opposite, to 2 x 1.5 cm, ovate, acute, glabrous, lateral nerves form a clear intramarginal vein; petioles 2-3 mm long. Flowers solitary; axillary and terminal; pedicel 1.5 cm long; sepals 3 x 1 mm, oblong, hairy outside; petals 5, 1.3 mm long, 2-fid to base, white; stamens 10, free; ovary 1-celled, ovules few, basal; styles 3, curved, tubercled. Capsule 3 mm long, ovoid; seeds 4-8, 1.2 x 1.2 mm, reniform, tuberculate.

*Fl. & Fr.* : Throughout the year

*Distr.* : India and North Temperate countries. Occasional; in forests openings at higher elevations. Vellimala, *JA & KPR 14058*; Eravangalar, *JA 15262.*

## 14. PORTULACACEAE

Juss., Gen. Pl. 312. 1789.

### PORTULACA Linnaeus

Sp. Pl. 445. 1753.

Succulent herbs. Leaves alternate or whorled, entire. Flowers axillary or in terminal cymes, sessile; sepals 2, connate below, concave; petals 5, obovate, obtuse, twisted; stamens few-many, filaments free, slender; ovary 1-celled, half inferior; many-ovuled; style 3-8-fid; stigma globose. Fruit a circumscissile capsule; seeds many, reniform.

1. Stem glabrous at nodes; leaves ca. 10 mm broad, obovate, spathulate.....**P. oleracea**
1. Stem bearded at nodes; leaves ca. 2 mm broad, linear.....**P. pilosa**

**Portulaca oleracea** L., Sp. Pl. 445. 1753; Dyer in Hook. f., Fl. Brit. India 1: 246. 1874; Dunn in Gamble, Fl. Pres. Madras 66. 1915; Sivar., J. Bombay Nat. Hist. Soc. 78: 257. 1981; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3(1): 81. 1983; Manilal, Fl. Silent Valley 17. 1988; Rao in Sharma & Sanj., Fl. India 3: 4. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 50. 1996.

Erect or prostrate herbs. Leaves to 2 x 1 cm, obovate, obtuse, puberulus, alternate or pseudo-whorled. Flowers terminal and axillary, solitary or 2-3 together; sepals 5 x 5 mm, ovate, acute, glabrous; petals 6 x6 mm, obovate, obtuse, white or yellow; stamens 12, filaments hairy at base. Capsule 7 x7 mm, ovoid, glabrous; seeds many reniform, tubercled, black.

*Fl. & Fr.* : Throughout the year

*Distr.* : Throughout the Tropics. Occasional; in disturbed forests areas. Thekkady, *JA & KPR 15325.*

**Portulaca pilosa** L., Sp. Pl. 445. 1753, Geesink, Blumea 17(2): 295. 1969; Viswanath. & Sharma, J. Econ. Tax. Bot. 4(1): 289. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 1: 24. 1987; Rao in Sharma & Sanj., Fl. India 3: 6. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 50. 1996. ***P. tuberosa*** Roxb., Fl. Ind. 2: 464. 1832; Dyer in Hook. f., Fl. Brit. India 1: 247. 1874; Dunn in Gamble, Fl. Pres. Madras 66. 1915; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 83. 1983.

Spreading prostrate herbs; stem densely long-hairy at nodes. Leaves to 12 x 2 mm, linear, subterete, acute, scabrous, densely arranged. Flowers terminal, 3-5 together; sepals 6 x 4 mm,

acute, glabrous, membranous; petals 8 x 8 mm, obovate, red; stamens many, anthers yellow. Capsule 8 x 6 mm, ovoid, glabrous; seeds many, black, shining.

*Fl. & Fr.* : January-February

*Distr.* : India and Sri Lanka. Occasional; in disturbed forests areas. Thekkady, *JA & KPR 14582.*

## 15. 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 an axile placentation; style 3 or 5, free. Fruit a dehiscent capsule; seeds many.

1. Stout shrubs; flowers 5 cm across; styles 5.....**H. mysorense**
1. Slender herbs; flowers to 1 cm across; styles 3.....2
2. Leaves sagittate at base, ribbed from base; seeds ribbed.....**H. japonicum**
2. Leaves rounded at base; penninerved; seeds not ribbed.....3
3. Sepals glandular ciliate along the margins.....**H. wightianum**
3. Sepals entire.....**H. humifusum**

**Hypericum humifusum** L., Sp. Pl. 785. 1753; Dyer in Hook. f., Fl. Brit. India 1: 255. 1874; Dunn in Gamble, Fl. Pres. Madras 70. 1915; Biswas in Sharma & Sanj., Fl. India 3: 67. 1993.

Diffuse herbs; stems reddish. Leaves to 12 x 7 mm, oblong, obtuse at apex, rounded at base, purplish coloured; nerves 2-3 pairs. Flowers in terminal cymes, 2 or 3 together; sepals 4 x 2.5 mm, oblong, acute; petals yellow, 5 mm long, obovate, obtuse; stamens 3-adelphous; ovary glabrous, styles 3, 3 mm long. Capsule 4.5 x 3 mm, ellipsoid; seeds 0.8 x 0.4 mm, oblong, not ribbed, epidermal cells transversally oblong in vertical rows.

*Fl. & Fr.* : Throughout the year

*Distr.* : Europe and Africa . Rare; in grasslands at higher elevations. Vellimala, *JA & KPR 15345.*

*Note*: Abraham and Mehrotra (1982) commented that the population of this species in India is confined to Doddabatta Reserve Forest of Nilgiris. The present collection from the study area is a record of its additional locality in India.

**Hypericum japonicum** Thunb. ex Murr. in L., Syst. Veg. 702. 1784; Dyer in Hook. f., Fl. Brit. India 1: 256. 1874; Dunn in Gamble, Fl. Pres. Madras 70. 1915; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 92. 1983; Manilal, Fl. Silent Valley 18. 1988; Biswas in Sharma & Sanj., Fl. India 3: 69. 1993.

Herbs to 20 cm high. Leaves to 10 x 3 mm, lanceolate, auricled at base, 3-ribbed, glabrous. Flowers in terminal cymes or solitary, axillary; pedicels 5 mm long; sepals 3 x 1 mm, oblong, obtuse, many-ribbed; petals yellow, 4 x 1.5 mm, oblong; stamens many, free; ovary 1-celled, ellipsoid, styles 3, 1 mm long. Capsule 3 x 2 mm, 3-valved, smooth; seeds many, 0.5 x 0.3 mm, oblong 7-ribbed.

*Fl. & Fr.* : November-January

*Distr.* : India to Malesia and Sri Lanka. Common; in water-logged areas in grasslands. Kavalappara, *JA & KPR 14545*; Thaannikkudy, *KPR & JA 14831.*

**Hypericum mysorense** Heyne ex Wight & Arn., Prodr. 99. 1834; Dyer in Hook. f., Fl. Brit. India 1: 253. 1874; Dunn in Gamble, Fl. Pres. Madras 70. 1915; Manilal, Fl. Silent Valley 18. 1988; Biswas in Sharma & Sanj., Fl. India 3: 71. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 51. 1996.

Shrubs. Leaves to 2.5 x 0.7 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 1 cm long, lanceolate; petals 2.5 x 1 cm, obovate, obtuse, glabrous; stamens arranged in 5 bundles; filaments 1 cm long; ovary 5-celled; styles 5, 10 mm long. Capsule 15 mm long, 5-valved, glabrous.

*Fl. & Fr.* : October-December

*Distr.* : Peninsular India and Sri Lanka. Common; in grasslands. Kumarikulam, *JA 13003.*

**Hypericum wightianum** Wall. ex Wight & Arn., Prodr. 99. 1834; Dunn in Gamble, Fl. Pres. Madras 70. 1915; Biswas in Sharma & Sanj., Fl. India 3: 78. 1993. ***H. napaulense*** sensu Dyer in Hook. f., Fl. Brit. India 1: 256. 1874, non Choisy, 1824.

Diffuse herbs. Leaves to 12 x 6 mm, obovate, obtuse, petiolate, membranous. Flowers terminal and axillary; sepals 4 x 2 mm, ovate, acute, margin ciliate with gland-tipped hairs; petals yellow, 6 x 3 mm, obovate, obtuse. Capsule 4 x 3 mm; seeds many, epidermal cells transversally oblong in vertical rows.

*Fl. & Fr.* : Throughout the year

*Distr.* : Indo-China. Rare; in grasslands at higher elevations. Vellimala, *JA 15261.*

## 16. CLUSIACEAE

Lind., Intr. Nat. Syst. Bot., ed. 2: 74. 1836; *nom.alt.* **Guttiferae**

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.....3
3. Styles 2; ovary 1-celled.....**Poeciloneuron**
3. Style 1; ovary 2-celled.....**Calophyllum**

### CALOPHYLLUM Linnaeus

Sp. Pl. 513. 1753.

Small or large trees, with white exudation; 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. Petals absent; leaves obovate, emarginate.....**C. calaba**
1. Petals 4; leaves elliptic, acute.....**C. polyanthum**

**Calophyllum calaba** L., Sp. Pl. 514. 1753; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 95. 1980; Nicols. *et al.*, Interp. Hort. Malab. 81. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 51. 1996. *C. apetalum* Willd., Ges. Naturf. Freunde Berlin Mag. Nuest. 5: 79. 1811; Mahes., Bull. Bot. Surv. India 2: 143. 1960; Singh in Sharma & Sanj., Fl. India 3: 88. 1993. *C. decipiens* Wight, Ic. t. 106. 1839; Dunn in Gamble, Fl. Pres. Madras 76. 1915. **Punna**

Trees, to 10 m high; bark with deep fissures, reddish brown inside; branchlets quadrangular. Leaves to 9 x 4 cm, obovate, acute, emarginate at tip, attenuate at base. Flowers in axillary panicles, pedicelled; sepals white, 8 x 5 mm, obovate, obtuse; filaments 6 mm long, slender. Drupe 8 x 4 mm, obovoid, obtuse, glabrous.

*Fl. & Fr.* : October-January

*Distr.* : Endemic to Southern Western Ghats. Common; along river banks in evergreen forests up to 100 m. Vallakkadavu, *NS & JA 12703*; Attathodu, *NS & JA 12757.*

**Calophyllum polyanthum** Wall. ex Choisy, Descr. Guttif. Ind. 43. 1849; Mahes., Bull Bot. Surv. India 2: 144. 1960; Manilal, Fl. Silent Valley 19. 1988; Singh in Sharma & Sanj., Fl. India

3: 94. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 52. 1996. *C. elatum* Bedd., Fl. Sylv. t. 2. 1869; Dunn in Gamble, Fl. Pres. Madras 76. 1915. *C. tomentosum* auct. non Wight, 1839: Anderson in Hook. f., Fl. Brit. India 1: 274. 1874. **Virimaram** (Mannan), **Punnappa, Cherupunna**.

Tall trees, to 35 m high; trunk straight, round; bark white, reddish brown inside . Leaves to 10 x 5 cm, elliptic, acute at either ends, petiole 2 cm long. Flowers 1.2 cm across, in axillary racemes; peduncle puberulus; pedicel 1.5 cm long; sepals 3 mm across, orbicular; petals 5 mm across, orbicular, white; stamens polyadelphous. Drupe 10 x 6 mm, ellipsoid, smooth.

*Fl. & Fr.* : February-April

*Distr.* : Southern Western Ghats, endemic. Fairly common; in evergreen forests. Sabarimala, *JA 17708.*

## 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. Flowers 5-merous, axillary, 20-50 together.....**G. spicata**
1. Flowers 4-merous, axillary or terminal, up to 10 together.....2
2. Ovary not ribbed or grooved.....3
2. Ovary ribbed or grooved.....4
3. Large shrubs; leaves lanceolate, acuminate.....**G. wightii**
3. Trees; Leaves broadly elliptic.....**G. morella**
4. Ovary 4-5-celled; staminodes in 4 bundles.....**G. cowa**
4. Ovary 6-12-celled; staminodes in irregular ring.....**G. gummi-gutta**

**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. 1915; Mahes., Bull. Bot. Surv. India 6(2-4): 131. 1964; Singh in Sharma & Sanj., Fl. India 3: 108. 1993 [Fig. 17A].

Small trees; bark smooth, black; branchlets 4-angled. Leaves to 14 x 5 cm, elliptic-oblong or oblanceolate, obtuse at apex, cuneate at base, nerves 15-21 pairs, arching and forms an

intramarginal vein; petiole 8-10 mm long. Flowers 1-3 in terminal clusters; sepals 7 x 5 mm, thick, greenish-yellow; petals larger, 10 x 6 mm, ovate, obtuse, yellow to red. Capsule 5 x 5 cm, elliptic to globose, beaked, ridged.

*Fl. & Fr.* : December-January

*Distr.* : India. Rare; in evergreen forests above 1400 m. Vellimala, *JA 12902.*

**Garcinia gummi-gutta** (L.) Robs., Brittonia 20: 103. 1968; Kosterm., Ceylon J. Sci. Biol. 12: 55. 1976; Manilal, Fl. Silent Valley 19. 1988; Singh in Sharma & Sanj., Fl. India 3: 109. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 52. 1996. ***Cambogia gummi-gutta*** L., Gen. Pl. (ed. 5) 522. 1754. ***Mangostana cambogia*** Gaertn., Fruct. 2: 106. 1790. ***Garcinia cambogia*** (Gaertn.) Desv. in Lam., Encycl. 3: 701. 1792; Anderson in Hook. f., Fl. Brit. India 1: 261. 1874; Dunn in Gamble, Fl. Pres. Madras 73. 1915; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 94. 1983; Mahes., Bull. Bot. Surv. India 6(2-4): 129. 1964. **Kudam puli**

Trees, to 20 m high; bark black, yellow inside; twigs glabrous. Leaves 10-13 x 5-8 cm, elliptic, acute at either ends, nerves 10-12 pairs, oblique. Flowers terminal, umbellate; sepals 7 x 6 mm, obtuse, thick; petals larger, 9 x 7 mm, 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.

*Fl. & Fr.* : March-April

*Distr.* : India. Common; in evergreen forests at all elevations. Vallakkadavu, *JA 13431*; Puthusseriyar, *JA 13502.*

*Ethnobotanical use* : The dried fruits are added in the preparation of fish curries.

**Garcinia morella** (Gaertn.) Desv. in Lam., 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. 1915; Mahes., Bull. Bot. Surv. India 6(2-4): 132. 1964; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 77. 1980; Manilal, Fl. Silent Valley 20. 1988; Singh in Sharma & Sanj., Fl. India 3: 119. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 52. 1996. ***Mangostana morella*** Gaertn., Fruct. 2: 106. 1790.

Medium trees; branchlets quadrangular, glabrous. Leaves to 12 x 10 cm, broadly ovate, acute at both ends, nerves 10-12 pairs. Flowers axillary, solitary or 2-4 together, sessile; sepals 4, 3 x 3 mm, orbicular, thick glabrous; petals 5.5 x 4 mm, orbicular; stamens in male flowers 10-12, combined into a central column; anthers transverse; ovary in female flowers 4-celled; stigma radiating; staminodes 10-12, basely united. Berry 2 x 1.5 cm, smooth, light pink.

*Fl. & Fr.* : April-July

*Distr.* : South India and Sri Lanka. Common; in evergreen forests up to 800 m altitude. Vallakkadavu, *JA 13652.*

**Garcinia spicata** (Wight & Arn.) Hook. f., J. Linn. Soc. Bot. 14: 486. 1875; Dunn in Gamble, Fl. Pres. Madras 74. 1915; Mahes., Bull. Bot. Surv. India 6(2-4): 112. 1964; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 84. 1980; Singh in Sharma & Sanj., Fl. India 3: 125. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 53. 1996. ***Xanthochymus spicatus*** Wight & Arn., Prodr. 102. 1834. ***Garcinia ovalifolia*** Hook. f. var. ***spicata*** (Wight & Arn.) Anders. in Hook. f., Fl. Brit. India 1: 209. 1874.

Trees, to 25 m high; branchlets quadrangular, glabrous. Leaves 10-15 x 4-6 cm, oblong, obtuse at apex, acute at base; intramarginal vein indistinct, very close to margin; petiole 1 cm long. Male flowers in dense axillary spikes; sepals 3 x 4 mm, orbicular; petals 8 x 8 mm, concave; stamens adelphous in 5 phalanges around a pistillode; pistillode clavate, smooth. Female flowers few, larger than male flowers; ovary globose, terete, 4-celled; stigma 3 or 4, globose, sessile. Capsule 4 cm across, smooth.

*Fl. & Fr.* : January-March

*Distr.* : South India and Sri Lanka. Common; in evergreen forests at low elevations. Pamba, *JA 17162.*

**Garcinia wightii** Anders. in Hook. f., Fl. Brit. India 1: 205. 1874; Dunn in Gamble, Fl. Pres. Madras 74. 1915; Mahes., Bull. Bot. Surv. India 6: 134. 1964; Singh in Sharma & Sanj., Fl. India 3: 129. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 53. 1996.

Large shrubs or small trees; bark black; branchlets 4-angled. Leaves to 12 x 3 cm, lanceolate, acuminate, glabrous; nerves 10-12 pairs. Flowers axillary, solitary or paired, sessile; sepals and petals similar, 3 x 3 mm, orbicular, yellow; staminodes connate into a ring or tube; ovary 4-celled, terete; stigma shortly stalked, peltate. Berry 2 cm across, smooth, light pink, not ribbed; fruiting calyx larger.

*Fl. & Fr.* : September-November

*Distr.* : Southern Western Ghats . Common; along stream banks in evergreen forests at low elevations. Attathodu, *JA 12746.*

## 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 one, long; stigma peltate. Fruit a woody capsule, subtended by coriaceous sepals; seeds 2-4.

1. Leaves 16-22 cm long, oblong; flowers 8-10 cm across.....**M. thwaitesii**

1. Leaves 5-7 cm long, elliptic; flowers 2-5 cm across.....**M. ferrea var. coromandeliana**

**Mesua ferrea** L., Sp. Pl. 515. 1753; Anderson in Hook. f., Fl. Brit. India 1: 277. 1874; Dunn in Gamble, Fl. Pres. Madras 77. 1915 var. **coromandeliana** (Wight) Singh in J. Econ. Tax. Bot. 10: 203. 1987 & in Sharma & Sanj., Fl. India 3: 137. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 53. 1996. ***M. coromandelica*** Wight, Ic. t. 117. 1839; Bedd., Fl. Sylv. 1: 64. 1870. ***M. ferrea*** L. subsp. ***pulchella*** Vesque var. ***coromandeliana*** (Wight) Mahes., Bull. Bot. Surv. India 5: 336. 1964. ***M. speciosa*** Choisy in DC., Prodr. 1: 52. 1824; Wight, Ic. t. 901. 1845. **Kili nangu** (Mannan)

Tall trees to 30 m high; bark grey. Leaves elliptic, acuminate at apex, attenuate at base; nerves many, closely placed; petiole 1 cm long. Flowers solitary, axillary; pedicels 5 mm long, slender; sepals 6 mm across, orbicular, obtuse, puberulus; petals white, 2 x 1.5 cm, obovate, obtuse; stamens polyadelphous. Capsule 2 cm across, ellipsoid, acute, glabrous, seeds plano-convex.

*Fl. & Fr.* : May & October

*Distr.* : India to Malesia. Very common; in evergreen forests. Vallakkadavu, *JA 15434.*

**Mesua thwaitesii** Planch. & Triana, Ann. Sci. Nat. Bot. ser. 4, 15: 305. 1861; Anderson in Hook. f., Fl. Brit. India 1: 278. 1874; Singh in Sharma & Sanj., Fl. India 3: 143. 1993. ***M. ferrea*** L., Sp. Pl. 515. 1753. var. ***thwaitesii*** (Planch. & Triana) Vesque in DC., Monogr. Phan. 8: 634. 1893; Mahesh., Bull. Bot. Surv. India 5: 339. 1964. **Nangu** (Mannan)

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

*Fl. & Fr.* : March-June

*Distr.* : South India and Sri Lanka. Common; in evergreen forests. Poonkavanam, *JA 14958.*

## POECILONEURON Beddome

Journ. Linn. Soc. 8: 267. 1865.

**Poeciloneuron indicum** Bedd., J. Linn. Soc. Bot. 8: 267, t. 17. 1865 & in Fl. Sylv. t. 3. 1869; Anderson in Hook. f., Fl. Brit. India 1: 278. 1874; Dunn in Gamble, Fl. Pres. Madras 77. 1915; Manilal, Fl. Silent Valley 22. 1988; Singh in Sharma & Sanj., Fl. India 3: 144. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 54. 1996.

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

*Fl. & Fr.* : October-January

*Distr.* : South India and Sri Lanka. Rare; in evergreen forests. Koruthode, *JA 16910.*

## 17. THEACEAE (TERNSTROEMIACEAE)

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; berry ca. 5 mm across.....**Eurya**

2. Leaf tip obtuse, margin entire; stamens numerous; berry above ca. 10 mm across.....**Ternstroemia**

## EURYA Thunberg

Nova Gen. Pl. 67. 1783.

**Eurya nitida** Korth. in Temminck, Verh. Nat. Gesch. Bot. 3: 115, t. 17. 1840; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 97. 1983; Manilal, Fl. Silent Valley 22. 1988; Chauhan & Paul in Sharma & Sanj., Fl. India 3: 184. 1993. ***E. japonica*** Thunb. var. ***thunbergia*** Thw., Enum. Pl. Zeyl. 41. 1858; Dyer in Hook. f., Fl. Brit. India 1: 284. 1874; Bedd., Fl. Sylv. t. 92. 1871; Dunn in Gamble, Fl. Pres. Madras 79. 1915.

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

*Fl. & Fr.* : July-December

*Distr.* : India, China and Malesia. Common; the margins of Savannahs. Deviar, *JA 12102*; Pachakkanam, *JA 12307.*

## GORDONIA Ellis

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

**Gordonia obtusa** Wall. ex Wight & Arn., Prodr. 87. 1834; Wight, Ill. 1: t. 39. 1840; Dyer in Hook. f., Fl. Brit. India 1: 291. 1874; Dunn in Gamble, Fl. Pres. Madras 791. 1915; Manilal, Fl. Silent Valley 22. 1988; Chauhan & Paul in Sharma & Sanj., Fl. India 3: 162. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 54. 1996. **Karikkova** (Mannan)

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

*Fl. & Fr.* : January-May

*Distr.* : Endemic to W. Ghats. Common; in evergreen forests above 1,000 m altitude, Vallakkadavu, *JA 15408.*

*Ethnobotanical use* : Young fruits are used in angling as a bait.

## TERNSTROEMIA Mutis ex Linnaeus f.

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

**Ternstroemia gymnanthera** (Wight & Arn.) Beddome, Fl. Sylv. 91, t. 91. 1871; Chauhan & Paul in Sharma & Sanj., Fl. India 3: 190. 1993. ***Cleyera gymnanthera*** Wight & Arn., Prodr. 87. 1834; Wight, Ic. t. 47. 1838. ***Cleyera japonica*** Thunb., Fl. Jap. 224. 1784. ***Ternstroemia japonica*** (Thunb.) Thunb., Trans. Linn. Soc. London 2: 335. 1794; Dyer in Hook. f., Fl. Brit. India 1: 280. 1874; Dunn in Gamble, Fl. Pres. Madras 78. 1915; Manilal, Fl. Silent Valley 23. 1988.

Trees to 15 m high; branchlets reddish, glabrous. Leaves alternate, to 7 x 2.5 cm, obovate, obtuse at apex, cuneate at base; petiole reddish. Flowers solitary, axillary; pedicel 8-10 mm long, stout; sepals 5, 6 mm long, orbicular, outer most one much smaller, green; petals 5, 6 mm across, obovate, yellow, basely 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; ovule 2 in each cell; stigmas 3, sessile. Berry 1 cm across, globose.

*Fl. & Fr.* : February-May

*Distr.* : South East Asia and China. Common; in evergreen forests above 1,200 m. altitude. Pachanpallam, *JA 13568*; Chokkampetta, *JA 13611*.

## 18. DIPTEROCARPACEAE

Blume, Bijdr. Fl. Ned. Ind. : 222. 1825.

1. Sepals equal in fruit; drupe not covered with sepals.....**Vateria**
1. Sepals unequal in fruit; drupe completely covered with sepals.....2
2. Stipules amplexicaule; panicles lax; calyx gamosepalous.....**Dipterocarpus**
2. Stipules not amplexicaule; panicles dense; calyx polysepalous.....**Hopea**

### DIPTEROCARPUS Gaertner f.

De Fructibus 3: 50, t. 187, 188. 1805.

Large trees; trunk round, smooth. Leaves alternate, lateral nerves many, parallel, connected with transverse nervules; stipules amplexicaule, leaving a scar when fall. Flowers in axillary loose panicles, drooping; calyx gamosepalous, lobes 5; petals 5, twisted, pubescent; stamens many, anthers long, connective produced into a tail; ovary 5-celled with 2-3 ovules in each; style slender; stigma terminal. Fruit a 1-2-seeded nut enclosed in accrescent, smooth or winged calyx tube.

1. Branches glabrous; leaves undulate along the margins; calyx tube smooth.....**D. indicus**
1. Branches tomentose; leaves entire; calyx tube winged.....**D. bourdillonii**

**Dipterocarpus bourdillonii** Brandis in Hook., Ic. Pl. t. 2403. 1911; Dunn in Gamble, Fl. Pres. Madras 81. 1915; Janardh. & Prak., J. Econ. Tax. Bot. 3: 488. 1982; Janardh. in Sharma & Sanj., Fl. India 3: 210. 1993. **Thellymaram.**

Very large trees; branchlets stellate pubescent. Leaves to 25 x 16 cm, obovate, acute at both ends, rounded at extreme base, stellate hairy beneath along the nerves, nerves to 14 pairs, parallel, nervules parallel. Flowers pedicelled, in lax axillary drooping panicles; larger calyx lobes 2 x 0.7 cm, to 10 x 2 cm in fruit, oblong coarsely reticulate; petals 3.5-5 cm long, brown, pubescent; style pubescent. Nut 1.5 x 1 cm ovoid, acute, glabrous.

*Fl. & Fr.* : February-April

*Distr.* : Southern W. Ghats (Kerala) . Rare; in evergreen forests at low elevation. Koruthode, *JA 13419.*

*Ethnobotanical use* : Mala Arayans are collecting the dried resinous exudates from the bark and marketing it for making varnishes. Tribes smoke this in their houses to repel mosquitoes.

**Dipterocarpus indicus** Bedd., Fl. Sylv. t. 94. 1871; Dunn in Gamble, Fl. Pres. Madras 81. 1915; Janardh. & Prak., J. Econ. Tax. Bot. 3: 488. 1982; Janardh. in Sharma & Sanj., Fl. India 3: 214. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 55. 1996. ***D. turbinatus*** sensu Dyer in Hook. f., Fl. Brit. India 1: 295. 1874, p.p. Arayangili (Mala Arayan)

Trees to 40 m high; bark smooth, grey inside. Leaves to 15 x 8 cm, ovate, acute; lateral nerves 15 pairs; stipule 2 x 1 cm, ovate, glabrous. Flowers pedicellate; pedicels 3 cm long; larger sepals 0.8 x 0.3 cm, oblong, to 12 x 2.5 cm in fruit, oblong, obtuse, cordate at base, reticulate; petals 2.5-3 cm long, brown; anthers 5 mm long. Nut 1.5-2 cm long, ellipsoid.

*Fl. & Fr.* : February-April

*Distr.* : Endemic to Southern Western Ghats. Common; in evergreen forests at low elevation. Chenthamarakokka, *JA 13444.*

## 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 15 cm long; inflorescence glabrous.....**H. ponga**
1. Leaves to 8 cm long; inflorescence pubescent.....**H. parviflora**

**Hopea parviflora** Bedd., Fl. Sylv. t. 7. 1869; Dyer in Hook. f., Fl. Brit. India 1: 308. 1874; Dunn in Gamble, Fl. Pres. Madras 82. 1915; Janardh. & Prak., J. Econ. Tax. Bot. 3: 488. 1982; Janardh. in Sharma & Sanj., Fl. India 3: 228. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 56. 1996. **Thambakam** (Mala Arayan)

Very large trees; bark splitting into elongated pieces. Leaves to 8 x 5 cm, ovate, obtuse, rounded to truncate at base; nerves to 8 pairs; petiole 1 cm long. Panicle 15 cm across, terminal and upper axillary; branchlets 1-sided. Flowers pedicelled; sepals 3 mm long, hairy outside;

petals 6 mm long, oblong, glabrous, fimbriate at apex; anthers orbicular, appendage 1 mm long. Nut 8x 5 mm, terete, glabrous; wings 6 x 1.8 cm, oblong, 8-10-nerved, glabrous.

*Fl. & Fr.* : February-May

*Distr.* : Endemic to Southern Western Ghats. Common; in evergreen forests at low elevations. Koruthode, *JA & KPR 14806.*

**Hopea ponga** (Dennst.) Mabber., Taxon 28: 587. 1979; Janardh. in Sharma & Sanj., Fl. India 3: 230. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 56. 1996. ***Artocarpus ponga*** Dennst., Schluess. Hort. Ind. Malab. 15, 18, 30. 1818. ***Hopea wightiana*** Wall. ex Wight & Arn., Prodr. 85. 1834; Bedd., Fl. Sylv. t. 96. 1871; Dyer in Hook. f., Fl. Brit. India 1: 309. 1874; Dunn in Gamble, Fl. Pres. Madras 82. 1915.

Medium sized trees; twigs glabrous. Leaves 18 x 4 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 8 mm long, oblong, pubescent; style stout, pubescent. Nut 8 x 6 mm, ovoid, acute; wings of fruiting calyx 5 x 1.3 cm, oblong, obtuse, glabrous, 8-nerved, red.

*Fl. & Fr.* : October-May

*Distr.* : Endemic to Southern Western Ghats. Common; along the river banks in evergreen forests. Thaannikkudy, *JA 12070, 13787.*

## 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. 1915; Manilal, Fl. Silent Valley 24. 1988; Janardh. in Sharma & Sanj., Fl. India 3: 245. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 56. 1996. ***Vateria malabarica*** Bl., Mus. Bot. 2: 29. 1852; Bedd., Fl. Sylv. t. 84. 1871. **Vella thelly** (Mannan, Oorali & Mala Arayan)

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 3 cm across, pedicellate; sepals 5, free, 1 cm long, lanceolate, covered with stellate hairs; petals white, 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 3 x 1.5 cm, oblong, obtuse, coarsely puberulus brown.

*Fl. & Fr.* : March-July

*Distr.* : Endemic to Southern Western Ghats. Common; along the margins of evergreen forests. Vallakkadavu, *JA 13476.*

*Ethnobotanical use* : The resinous exudates from the bark (thelly) is collected and marketed for medicinal purpose. Tribes smoke this in their houses to repel insects.

## 19. 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. tt. 1987 & 1988.1853; Dyer in Hook. f., Fl. Brit. India 1:299. 1874; Dunn in Gamble, Fl. Pres. Madras 86. 1915; Nair & Henry, Fl. Tamil Nadu. Ser. 1, 1: 31. 1983; Manilal, Fl. Silent Valley 24. 1988; Das in Sharma & Sanj., Fl. India 3: 254.1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 57. 1996.

Climbing shrubs with hooked branches; twigs glabrous. Leaves crowded at the apex of branchlets, each to 20 x 6 cm, oblanceolate, attenuate at base, sessile. Flowers 1 cm across, bisexual, sessile on terminal lax panicles; sepals 5, unequal, connate into a tube and adnate to the ovary, lobes 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; style 3, free. Fruit a nut covered with large wing like sepals; wings unequal, to 5 x 2 cm, obovate, obtuse, reticulate, glabrous

*Fl. & Fr.* : March-May

*Distr.* : Endemic to Western Ghats. Common; in evergreen forests. Chanthamarakokka, *JA 13455.*

## 20. MALVACEAE

Juss., Gen. Pl. 271. 1789

1. Involucral bracts absent.....2
1. Involucral bracts present.....3
2. Mericarps 1-seeded.....**Sida**
2. Mericarps 2-5-seeded.....**Abutilon**
3. Mericarps 1-seeded.....4
3. Mericarps many-seeded.....6

4. Involucral bracts 9-11, linear, ciliate.....**Pavonia**

4. Involucral bracts 3-5, ovate or spathulate, not ciliate.....5

5. Mericarps glochidiate hairy; flowers pink.....**Urena**

5. Mericarps otherwise; flowers yellow.....**Malvastrum**

6. Capsule glabrous.....**Thespesia**

6. Capsule pubescent or bristly hairy.....7

7. Calyx spathaceous, split on one side, deciduous.....**Abelmoschus**

7. Calyx 5-lobed, not split on one side, persistent.....**Hibiscus**

## ABELMOSCHUS Medikus

Malvenfam. 45. 1787.

Shrubs; 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, much shorter than capsule.....**A. moschatus**

1. Involucral bracts 4-6, equal to or longer than the capsule.....2

2. Involucral bracts acute at base; capsule 5-6 cm long.....**A. manihot**

2. Involucral bracts rounded or cordate at base; capsule to 3 cm long.....**A. angulosus**

**Abelmoschus angulosus** Wall. ex Wight & Arn., Prodr. 53. 1834; Wight, Ic. t. 951. 1845; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 103. 1983; Manilal, Fl. Silent Valley 25. 1988; Paul & Nayar, Fl. India Fasc. 19: 68. 1988; Sivar. & Pradeep, Malv. South. Pen. India 52. 1996. *Hibiscus angulosus* (Wight & Arn.) Steud., Nom. (ed. 2) 1: 758. 1840; Fl. Brit. India 1: 341. 1874; Dunn in Gamble, Fl. Pres. Madras 97. 1915.

Shrubs, to 2.5 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 30 x 12 mm, ovate, acute, pubescent; corolla 7 cm across, white with purple centre. Capsule densely hispid with yellow hairs; seeds 3 mm across, muriculate.

*Fl. & Fr.* : October-January

*Distr.* : India, Sumatra and Java. Common; in moist deciduous and semi-evergreen forests at low elevations. Koruthode, *JA & KPR 16916.*

**Abelmoschus manihot** (L.) Medik., Malv. 46. 1787; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 104. 1983; Paul & Nayar, Fl. India Fasc. 19: 74. 1988; Sivar. & Pradeep, Malv. Pen. India 67. 1996. ***Hibiscus manihot*** L., Sp. Pl. 696. 1753; Mast. in Hook. f., Fl. Brit. India 1: 341. 1874; Dunn in Gamble, Fl. Pres. Madras 97. 1915.

Shrubs, to 2 m tall; whole plant hirtus with stiff hairs. Leaves to 15 x 12 cm, 3-5 lobed, lobes acute, crenate-serrate; petiole to 15 cm long; stipule 1 cm long, lanceolate. Flowers in terminal raceme; pedicel 7 cm long; involucral bracts 30 x 17 mm, ovate, acute, densely hairy; calyx membranous, glabrous; petals white, changing to pink, to 6 x 4 cm, obovate, glabrous. Capsule 5-6 x 2 cm, oblong, acute, densely yellow hispid; seeds many, reniform, hispid along concentric lines.

*Fl. & Fr.* : November-January

*Distr.* : Indo-China, Malesia and Australia. Common; along evergreen forests margins at higher elevations. Uppermanalar, *NS & JA 12981*; Anakuthivayal, *JA & KPR 17740.*

**Abelmoschus moschatus** Medik., Malv. 46. 1787; Paul & Nayar, Fl. India Fasc. 19: 77. 1988; Sivar. & Pradeep, Malv. Pen. India 70. 1996. ***Hibiscus abelmoschus*** L., Sp. Pl. 696. 1753; Mast. in Hook. f., Fl. Brit. India 1: 342. 1874; Dunn in Gamble, Fl. Pres. Madras 87. 1915.

Subshrubs, 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 8 mm long, ovate. Flowers axillary, solitary, pedicel 7 cm long; involucral bracts 15 x 2 mm, free, hispid; calyx 30 mm long, minutely stellate hairy; corolla 9 cm across, yellow with purple centre. Capsule 7-8 cm long, hairy.

*Fl. & Fr.* : October- January

*Distr.* : India, Malaya and Indonesia. Common; in moist deciduous forests. Thaannikkudy, *JA & KPR 16866.*

## ABUTILON P. Miller

Gard. Dict. ed. 4, 23. 1754.

**Abutilon ramosum** (Cav.) Guill. & Perr., Fl. Seneg. Tent. 1: 68. 1831; Mast. in Hook. f., Fl. Brit. India 1: 328. 1874; Dunn in Gamble, Fl. Pres. Madras 91. 1915; Paul & Nayar, Fl. India Fasc. 19: 93. 1988.

Erect shrubs, sparsely tomentose. Leaves distant, alternate, 10 cm across, broadly ovate, cordate at base, acuminate at apex, crenate, densely softly tomentose below. Flowers in subterminal and terminal panicles; pedicels 5-6 cm long, jointed towards the end; sepals ovate,

obtuse, cuspidate, connate at base into a short campanulate tube, pubescent outside; petals 2 x 0.9 cm, yellow, obovate, obtuse; stamens many; filaments combined into a tube. Ovary 7-celled, ovules many in each; styles as many as the carpels; stigma terminal. Fruit a capsule, 15 x15 mm, truncate at apex; mericarps beaked, seeds many, reniform, 2.5 mm across, glabrous, grey.

*Fl. & Fr.* : August-January

*Distr.* : India and Tropical Africa. Common; in disturbed forest areas. Mlappara, *JA 13530.*

## 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. Branches with prickles.....2
1. Branches with stellate hairs.....3
2. Stipule ovate-orbicular, sub-sagittate.....**H. surattensis**
2. Stipule lanceolate.....**H. hispidissimus**
3. Annual herbs; flowers ca. 2 cm across.....**H. lobatus**
3. Shrubs or trees; flowers more than 3.5 cm across.....4
4. Trees; leaves entire.....**H. tiliaceus**
4. Herbs or shrubs; leaves lobed.....5
5. Capsule depressed globose; large shrubs.....**H. platanifolius**
5. Capsule ovoid or oblong; subshrubs or herbs.....**H. lunariifolius**

**Hibiscus hispidissimus** Griff., Not. Pl. Asiat. 4: 521. 1854; Sivar. & Pradeep, Malv. Pen. India 106. 1996. ***H. furcatus*** Roxb. ex DC., Prodr. 1: 448. 1824; Roxb., Fl. India 3: 204. 1832; Mast. in Hook. f., Fl. Brit. India 1: 335. 1874; Dunn in Gamble, Fl. Pres. Madras 97. 1915; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 113. 1983. **Panachi puli** (Mala Arayan), **Panichan** (Malam pandaram).

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 5 cm long, prickled; involucral bracts 10-12, bifurcate, hairy; calyx 23 mm long, 10-costate, 5-lobed at apex, lobes acuminate, bristled; corolla 8 cm across, yellow with brown centre. Capsule 4 x 2 cm, ovate, acute, hirsute.

*Fl. & Fr.* : October-February

*Distr.* : Tropical Africa Indo-china and Sri Lanka. Frequent; in moist deciduous forests and Savannahs, Vallakkadavu, *JA & KPR 16895.*

*Ethnobotanical use*: The fresh leaves are made into a paste and mixed with fish, roasted, and eaten (Mannan). Leaves are pressed and the juice extracted is given orally for fever (Malam pandaram). Leaves are ground with lime and is used to remove stain from clothes (Mala Arayan)

**Hibiscus lobatus** (Murr.) O. Ktze., Rev. Gen. Pl. 3, 2: 19. 1898; Borss., Blumea 14. 77. 1966; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 114. 1983; Manilal, Fl. Silent Valley 26. 1988; Paul & Nayar, Fl. India Fasc. 19: 133. 1988; Sivar. & Pradeep, Malv. Pen. India 125. 1996. ***Solandra lobata*** Murr., Comm. Soc. Reg. Sc. Gott. 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. 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 to 1 cm long, lobes deep, glabrous; petals white, 10 x 8 mm, obovate, obtuse, glabrous. Capsule 12 mm long, ovoid, acute, hispid; seeds 2 mm diam., trigonous, hispid.

*Fl. & Fr.* : August-January

*Distr.* : India and Tropical Africa. Frequent; in moist deciduous forests. Thekkady, *JA & KPR 16370.*

**Hibiscus lunariifolius** Willd., Sp. Pl. 3: 811. 1800; Wight, Ic. t. 6. 1838; Mast. in Hook. f., Fl. Brit. India 1: 338. 1874; Dunn in Gamble, Fl. Pres. Madras 98. 1915; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 114. 1983; Manilal, Fl. Silent Valley 26. 1988; Paul & Nayar, Fl. India Fasc. 19: 135. 1988; Sivar. & Pradeep, Malv. Pen. India 138. 1996.

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 25 x 3 mm, linear-lanceolate; calyx 15 mm long, campanulate, lobes acuminate; corolla 7-10 cm across, yellow with brown eye. Capsule 2 x 1.5 cm, ovoid, obtuse, cuspidate, stellate-hairy; seeds 2.5 x 2 mm, rugose.

*Fl. & Fr.* : October-January

*Distr.* : India Malesia and Tropical Africa. Common; along margins of all types of forests. Koruthode, *JA & KPR 16913*; Thekkady, *JA 16958.*

**Hibiscus platanifolius** Sweet, Hort. Brit. 2: 51. 1827; Dunn in Gamble, Fl. Pres. Madras 98. 1915; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 116. 1983; Paul & Nayar, Fl. India Fasc. 19: 143. 1988; Sivar. & Pradeep, Malv. Pen. India 128. 1996. ***H. collinus*** Roxb., Fl. Ind. 3: 198. 1832; Mast. in Hook. f., Fl. Brit. India 1: 338. 1874.

Trees, to 8 m tall; branchlets stellate-hairy. Leaves 6-12 x 5-12 cm, shallowly 3-5-lobed, cordate at base, lobes acuminate, densely hairy; petiole 5-8 cm long. Flowers axillary, solitary; pedicels 6 cm long; involucral bracts 8-11, 20 x 6 mm, lanceolate; calyx 3 cm long, lobes oblong, acute; corolla 7-8 cm across, pink with dark eye. Capsule 2.5 x 3.5 cm, globose, densely setose; seeds many, 5 x 5 mm, glabrous.

*Fl. & Fr.* : November-April

*Distr.* : India and Sri Lanka. Rare; in evergreen forests above 1300 m. Vellimala, *JA 14810.*

**Hibiscus surattensis** L., Sp. Pl. 696. 1753; Roxb., Fl. Ind. 3: 205. 1832; Wight, Ic. t. 197. 1839; Mast. in Hook. f., Fl. Brit. India 1: 334. 1874; Dunn in Gamble, Fl. Pres. Madras 97. 1915; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 118. 1983; Paul & Nayar, Fl. India Fasc. 19: 153. 1988; Sivar. & Pradeep, Malv. Pen. India 119. 1996.

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 5 cm long, slender; stipules 10-15 x 3-5 mm, lanceolate. Flowers axillary; pedicels to 7 cm long, prickled; involucral bracts 20-25 x 2-3 mm, bifurcate, pubescent, lobes unequal, ciliate; calyx to 10 mm long, 10-costate, 5-lobed; corolla 6 cm across, yellow with brown centre.

*Fl. & Fr.* : November-February

*Distr.* : Asia, South Africa and Australia. Common; in moist deciduous forest at low elevations. Koruthode, *JA & KPR 16904.*

**Hibiscus tiliaceus** L., Sp. Pl. 694. 1753; Mast. in Hook. f., Fl. Brit. India 1: 343. 1874; Dunn in Gamble, Fl. Pres. Madras 98. 1915; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 118. 1983; Paul & Nayar, Fl. India Fasc. 19: 157. 1988; Sivar. & Pradeep, Malv. Pen. India 91. 1996.

Trees, to 15 m tall; branchlets softly stellate-tomentose. Leaves 10-20 x 9-18 cm, orbicular, abruptly acuminate, truncate or cordate at base, stellate-hairy below, glabrous above; petiole 5 cm long. Flowers axillary, solitary; pedicel 1-3 cm long; involucral bracts 12 mm long, cupular, 7-10-lobed, lobes acuminate, tomentose; calyx 2 cm long, 2 cm broad, campanulate, 5-lobed,

lobes ovate, acute; corolla 6-8 cm across, 6 cm long, yellow, changing to pink, softly stellate-tomentose.

*Fl. & Fr.* : October-February

*Distr.* : Widely disturbed in Tropical countries. Occasional; along stream sides at low elevations. Pambavalley, *JA 14811.*

## MALVASTRUM A. Gray

Mem. Amer. Acad. Arts. Scr. 2, 4: 21. 1849, *nom. cons.*.

**Malvastrum coromandelianum** (L.) Garcke, Bonplandia 5; 295. 1857; Dunn in Gamble, Fl. Pres. Madras 88. 1915; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 121. 1983; Paul & Nayar, Fl. India Fasc. 19: 180. 1988; Sivar. & Pradeep, Malv. Pen. India 219. 1996. ***Malva coromandeliana*** L., Sp. Pl. 687. 1753. ***Malvastrum tricuspidatum*** A. Gray, Smithsonian Contrib. 3: 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; pedicels 1-1.5 cm long. Flowers axillary, solitary or 2-3 together; involucral bracts 5, to 10 mm long, ovate, acuminate; calyx 10 mm long, 5-lobed, lobes triangular, hispid; corolla 13-16 mm 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. Mericarps 10-12, trigonous; 3-awned, pubescent above.

*Fl. & Fr.* : Almost throughout the year

*Distr.* : Tropical countries. Common; in disturbed areas in moist deciduous forests. Thekkady, *JA & KPR 14595.*

## PAVONIA Cavanilles

Diss. 2: (unpaged addendum) 1786; 3: 132.1787, *nom. cons.*

**Pavonia odorata** Willd., Sp. Pl. 3: 837. 1800; Mast. in Hook. f., Fl. Brit. India 1: 331. 1874; Dunn in Gamble, Fl. Pres. Madras 93. 1915; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 123. 1983; Paul & Nayar, Fl. India Fasc. 19: 193. 1988; Sivar. & Pradeep, Malv. Pen. India 171. 1996.

Sub-shrubs, viscid tomentose. Leaves to 5 x 5 cm, orbicular, 3-5-angled, cordate at base, 3-7-nerved from base, densely hairy beneath; petiole 1-3 cm long. Flowers axillary, solitary, long-pedicelled; involucral bracts 10-12, 7-8 mm long, linear, ciliate; calyx 5-lobed, 2 mm long, ovate; corolla to 25 mm across, yellow; staminal tube short, oblique, anthers with long filaments; ovary

5-celled, ovule 1 in each cell, style 10-fid above; stigma capitate. Mericarps 5, 3 x 2 mm, trigonous, smooth.

*Fl. & Fr.* : October-January

*Distr.* : India Sri Lanka and Africa. Occasional; in drier areas. Mangaladevi, *JA 17185.*

## SIDA Linnaeus

Sp. Pl. 683. 1753.

Perennial branched 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. Awns of mericarps retrorsely hairy.....**S. cordifolia**
1. Awns of mericarps atrorsely hairy or absent.....2
2. Leaves distinctly cordate at base; mericarps awnless or with two small awns .....3
2. Leaves acute, truncate or slightly cordate at base; mericarps awned, rugose.....4
3. Stem prostrate; mericarps with 2 small awns.....**S. cordata**
3. Stem erect; mericarps awnless.....**S. mysorensis**
4. Mericarps 5; leaves and branches distichous.....**S. acuta**
4. Mericarps 7-10; leaves and branches not as above.....5
5. Awns of mericarps acuminate, stellate hairy..... 6
5. Awns of mericarps short, obtuse, glabrous.....7
6. All leaves acute at apex, rhomboid; awns of mericarps divergent.....**S. scabrida**
6. Leaves obtuse or emarginate at apex; awns of mericarps not divergent..... **S. fryxellii**
7. Lower leaves obovate, emarginate at apex; mericarps dehiscent..... **S. alnifolia**
7. Lower leaves rhomboid, acute at apex; mericarps indehiscent..... .....**S. rhomboidea**

**Sida acuta** Burm. f., Fl. Ind. 147. 1768; Wight, Ic. t. 95. 1838; Paul & Nayar, Fl. India Fasc. 19: 202. 1988; Dunn in Gamble, Fl. Pres. Madras 90. 1915; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 127. 1983; Manilal, Fl. Silent Valley 28. 1988; Sivar. *et al.*, J. Taiwan Mus. 45(1): 69. 1992; Sivar. & Pradeep, Malv. Pen. India 238. 1996.

Subshrubs. Leaves to 8 x 4 cm, lanceolate, serrate, rounded at base, glabrate; petiole 5 mm long; stipule 1 x 0.5 cm, lanceolate. Flowers solitary or paired, axillary, on short lateral branchlets; pedicels 5 mm long; calyx 5-6 mm across, lobes subulate, ciliate; corolla 10 mm across, petals obovate. Mericarps 3 x 2 mm, trigonous, reticulate.

*Fl. & Fr.* : August-January

*Distr.* : Throughout the tropical countries. Common; in moist deciduous forests. Thekkady, *JA 12413.*

**Sida alnifolia** L., Sp. Pl. 684. 1753; Wight & Arn., Prodr. 1: 58. 1834; Sivar. & Pradeep, Sida 16(1): 69. 1994 & Malv. Pen. India 241. 1996. ***Sida retusa*** L., Sp. Pl. ed. 2, 961. 1763. ***Sida rhombifolia*** Roxb. ex Fleming var. ***retusa*** (L.) Mast. in Hook. f., Fl. Brit. India 1: 324. 1874; Sivar. *et al.*, J. Taiwan Mus. 45(1): 68. 1992.

Woody erect herbs; branches bluish, minutely stellate-hairy. Leaves to 4 x 3 cm, obovate, obtuse or acute, emarginate, crenate on the upper half, densely tomentose below; petiole 5 mm long, stipules filiform. Flowers 12 mm across, yellow, axillary or in terminal racemes; pedicels 6 mm long; calyx 8 mm across, lobes acute. Mericarps trigonous, with a pair of short mucro at apex; seeds black.

*Fl. & Fr.* : September-December

*Distr.* : Peninsular India. Very common; in moist deciduous forest and savannahs. Thekkady, *JA 12491.*

**Sida cordata** (Burm. f.) Borss., Blumea 14: 182. 1966; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 128. 1983; Paul & Nayar, Fl. India Fasc. 19: 206. 1988; Sivar. *et al.*, J. Taiwan Mus. 45(1): 67. 1992; Sivar. & Pradeep, Malv. Pen. India 266. 1996. ***Melochia cordata*** Burm. f., Fl. India 143. 1768. ***Sida veronicaefolia*** Lam., Encycl. 1: 5. 1783; Dunn in Gamble, Fl. Pres. Madras 89. 1915. ***Sida humilis*** var. ***veronicaefolia*** (Lam.) Mast. in Hook. f., Fl. Brit. India 1: 322. 1874.

Prostrate herbs; branches slender, pilose. Leaves to 7 x 6 cm, orbicular, abruptly acuminate, cordate at base, serrate, pubescent; petiole 1.5 cm long, slender, stipule 3 mm long, deflexed. Flowers 10 mm across, solitary, axillary; pedicels 3-4 cm long; calyx 5 mm long, widely campanulate, lobes ovate, acute; petals 6 x 4 mm, obovate, ciliate at base. Mericarps 3 x 2 mm, smooth.

*Fl. & Fr.* : September-January

*Distr.* : Tropical countries. Occasional; in savannahs and moist deciduous forest. Thekkady, *JA 12421.*

**Sida cordifolia** L., Sp. Pl. 684. 1753; Mast. in Hook. f., Fl. Brit. India 1: 324. 1874; Dunn in Gamble, Fl. Pres. Madras 89. 1915; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3

(1): 123. 1983; Paul & Nayar, Fl. India Fasc. 19: 207. 1988; Sivar. *et al.*, J. Taiwan Mus. 45(1): 68. 1992; Sivar. & Pradeep, Malv. Pen. India 256. 1996.

Erect woody herbs, densely velvet-tomentose. Leaves to 4 x 3 cm, ovate, obtuse, cordate at base, acute or obtuse at apex, crenate; petiole to 3 cm long. Flowers axillary, solitary or paired; pedicels 1.5 cm long, stout; calyx 8 mm long, densely hairy, lobes acute; petals 8 mm long, obovate, glabrous; style 10, free. Mericarps 10, 3.5 x 2 mm long, coarsely and transversely rugose, awned; awn 4 mm long.

*Fl. & Fr.* : Throughout the year

*Distr.* : Tropical countries. Fairly common; in moist deciduous forests. Kokkara, *JA 12006.*

**Sida fryxellii** Sivar. & Pradeep, Kew Bull. 45: 725. 1990 & in Malv. Pen. India 259. 1996; Sivar. *et al.*, J. Taiwan Mus. 45(1): 68. 1992.

Subshrubs; stem densely tomentose. Leaves to 5 x 7 cm, dimorphic, orbicular, obtuse or emarginate at apex, rounded at base, pubescent below, nerves 5 pairs, erose, petiole to 1 cm long; stipule 7 mm long, filiform. Flowers 12 mm across, axillary, solitary; pedicels 1.5 cm long, calyx 6 mm across, 10-ribbed. Mericarps 8-10, trigonous with long hairy awns.

*Fl. & Fr.* : Throughout the year

*Distr.* : India, China and Malesia. Occasional; in disturbed evergreen forests. Poonkavanam, *JA & KPR 14966.*

**Sida mysorensis** Wight & Arn., Prodr. 59. 1834; Mast. in Hook. f., Fl. Brit. India 1: 322. 1874; Borss., Blumea 14: 180. 1966; Paul & Nayar, Fl. India Fasc. 19: 209. 1988; Sivar. *et al.*, J. Taiwan Mus. 45(1): 68. 1992. ***S. glutinosa*** Roxb., Fl. Ind. 172. 1832, non Cav., 1785; Dunn in Gamble, Fl. Pres. Madras 89. 1915.

Erect herbs. Leaves to 7 x 5 cm, ovate, acute, crenate, membranous, tomentose; petiole 4-6 cm long. Flowers 12 mm across, solitary, axillary or in short racemes; pedicels 5-8 mm long, slender; calyx 5 mm long, ribbed, lobes shorter than tube, acute; petals yellow. Mericarps 5, 2.5 x 1 mm, trigonous, smooth.

*Fl. & Fr.* : November-January

*Distr.* : India China and Malesia. Occasional; in moist deciduous forests. Thekkady, *JA & KPR 14591, JA 16818.*

**Sida rhomboidea** Roxb. ex Fleming, Asiat. Res. 11: 178. 1810; Dunn in Gamble, Fl. Pres. Madras 90. 1915; Manilal, Fl. Silent Valley 28. 1988; Sivar. & Pradeep, Sida 16(1): 73. 1994 &

Malv. Pen. India 246. 1996. ***S. rhombifolia*** var. ***rhomboidea*** (Roxb. ex Fleming) Mast. in Hook. f., Fl. Brit. India 1: 324. 1874. ***S. rhombifolia*** sensu Borss., Blumea 14: 193. 1966, *p.p.*; Sivar. *et al.*, J. Taiwan Mus. 45(1): 73. 1992, non L., 1753.

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 5 mm long, lanceolate. Flowers axillary, solitary; pedicels 8 mm long, slender; calyx 10 mm across, lobes ovate, acuminate; corolla 15 mm across, petals emarginate at apex; staminal tube stellate-pubescent. Mericarps 2 x 1 mm , trigonous, transversely ridged on distal faces, awned; awn 1 mm long.

*Fl. & Fr.* : September-December

*Distr.* : Peninsular India. Fairly common; in moist deciduous forests. Thekkady, *JA 12412.*

**Sida scabrida** Wight & Arn., Prodr. 57. 1834; Sivar. *et al.*, J. Taiwan Mus. 45(1): 68. 1992; Sivar. & Pradeep, Sida 16(1): 75. 1994 & Malv. Pen. India 250. 1996. ***S. rhombifolia*** var. ***scabrida*** (Wight & Arn.) Mast. in Hook. f., Fl. Brit. India 1: 324. 1874; Paul & Nayar, Fl. India Fasc. 19: 214. 1988.

Subshrubs; stem purplish, stellate hairy. Leaves 6-8 x 4 cm, rhomboid, acuminate at apex, rounded at base, coarsely serrate on upper half; petiole 8 mm long,; stipule 8 mm long, filiform. Flowers axillary; pedicels 8 mm long, slender; calyx 7 mm across, lobes triangular, acute; corolla 15 mm across. Mericarps 3 x 3 mm, awns 2, sharp, acuminate, divergent.

*Fl. & Fr.* : September-January

*Distr.* : Peninsular India. Occasional; in moist deciduous forest. Thekkady, *JA 12490.*

## THESPESIA Solander ex Correa

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

**Thespesia lampas** (Cav.) Dalz. & Gibs., Bombay Fl. 19. 1861; Mast. in Hook. f., Fl. Brit. India 1: 345. 1874; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 133. 1983; Manilal, Fl. Silent Valley 29. 1988; Paul & Nayar, Fl. India Fasc. 19: 222. 1988; Sivar. & Pradeep, Malv. Pen. India 40. 1996. *Hibiscus lampas* Cav., Diss. 3: 156, t. 56. 1787; Wight, Ic. t. 5. 1838; Dunn in Gamble, Fl. Pres. Madras 98. 1915.

Shrubs, to 1.5 m tall; stems glabrous. Leaves to 15 x 14 cm; 3-5-lobed or entire, ovate, cordate or truncate at base, lobes acute, densely stellate pubescent beneath; petioles 3-8 cm long. Flowers axillary, solitary or in terminal racemes,, pedicels 2-6 cm long jointed above the middle; involucellar bracts 4-7, subulate, deciduous; calyx cupular, 12 mm across, stellate hairy; corolla

6-8 cm across, rose-yellow. Capsule 25 x 20 mm, ellipsoid, glabrous, 5- valved; seeds many, 5 x 3 mm, trigonous, glabrous, brown.

*Fl. & Fr.* : November-January

*Distr.* : South East Asia and East Africa. Fairly common; in moist deciduous forests and Savannahs. Koruthode, *JA & KPR 16911.*

## URENA Linnaeus

Sp. Pl. 692. 1753.

Subshrubs. 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**

1. Leaves deeply sinuate; lobes narrowed to the centre.....**U. sinuata**

**Urena lobata** L., Sp. Pl. 692. 1753; Mast. in Hook. f., Fl. Brit. India 1: 329. 1874; Dunn in Gamble, Fl. Pres. Madras 92. 1915; Borss., Blumea 14: 140. 1966; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 134. 1983; Paul & Nayar, Fl. India Fasc. 19: 228. 1988. Manilal, Fl. Silent Valley 29. 1988; Sivar. & Pradeep, Malv. Pen. India 181. 1996.

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 25 mm across, petals obovate, stellate-tomentose. Schizocarp 12 mm across, black.

*Fl. & Fr.* : September-January

*Distr.* : India. Common; in disturbed areas in all types of forests. Thekkady, *JA 12410*; Methaganam, *NS & JA 13047.*

**Urena sinuata** L., Sp. Pl. 692. 1753; Mast. in Hook. f., Fl. Brit. India 1: 329. 1874; Dunn in Gamble, Fl. Pres. Madras 92. 1915; Sivar. & Pradeep, Malv. Pen. India 184. 1996. ***U. lobata*** subsp. ***sinuata*** (L.) Borss., Blumea 14: 142. 1966; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 135. 1983; Paul & Nayar, Fl. India Fasc. 19: 230. 1988.

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

*Fl. & Fr.* : September-January

*Distr.* : India. Common; in disturbed forests. Thekkady Dam site, *JA 16945.*

## 21. BOMBACACEAE

Kunth, Malvac. Buttner., Tiliac. : 5. 1822.

1. Leaves digitately compound; fruit elliptic-oblong, not spiny..... **Bombax**
1. Leaves simple; fruit globose; spiny.....**Cullenia**

### BOMBAX Linnaeus

Sp. Pl. 511.1753.

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; petals ca. 10 cm long..... **B. ceiba**
1. Leaflets sessile; petals ca. 15 cm long..... **B. scopulorum**

**Bombax ceiba** L., Sp. Pl. 511. 1753; Nicols., Taxon 28: 370. 1979; Robyns in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 64: 1980; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 136. 1983; Manilal, Fl. Silent Valley 30. 1988; Nayar & Biswas in Sharma & Sanj., Fl. India 3: 398. 1993. ***B. malabarica*** DC., Prodr. 1: 479. 1824; Wight, Ill. t. 29. 1840; Mast. in Hook. f., Fl. Brit. India 1: 349. 1874; Dunn in Gamble, Fl. Pres. Madras 99. 1915. ***Salmalia malabarica*** (DC.) Schott & Endl., Melet. Bot. 35. 1832.

Large trees, to 40 m high. Leaflets 18 x 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 3 x 3 cm, campanulate, densely villous within, lobes obtuse; petals reddish, 10 x 3.5 cm, oblong, obtuse, stellate-hairy outside; filaments 5.5 cm long, minutely hairy. Capsule 12 x 3 cm, terete, downy tomentose; seeds 4 mm diam., black.

*Fl. & Fr.* : January-May

*Distr.* : India. Common; in evergreen and semi-evergreen forests. Koruthode, *JA 18407.*

**Bombax scopulorum** Dunn in Gamble, Fl. Pres. Madras 100. 1915; Nayar & Biswas in Sharma & Sanj., Fl. India 3: 399. 1993. ***B. insigne*** sensu Bourd., For. Trees Travancore 45. 1908, non Wall., 1830.

Small trees to 10 m tall; prickles in groups. Leaflets 15 x 4 cm, lanceolate, acuminate, nerves to 16 pairs, sessile; petiole to 22 cm long. Flowers solitary or 2 or 3 together; calyx 3 x 4 cm, lobes ovate, acute, densely villous inside; petals yellowish pink, to 15 x 4.5 cm, oblong, obtuse, densely stellate-hairy; staminal filaments to 7.5 cm long. Capsule to 12 x 3 cm, oblong, 5-angled, glabrous.

*Fl. & Fr.* : December-March

*Distr.* : South India and Andamans Nicobar Islands. Common; in rocky areas. Koruthode, *JA 16917.*

## CULLENIA R. Wight

Icon. Pl. Ind. Or. 5(1): 22, tt. 1761 & 1762. 1851.

**Cullenia exarillata** Robyns, Bull. Jard. Bot. Nat. Belg. 40: 249. 1970; Manilal, Fl. Silent Valley 30. 1988; Nayar & Biswas in Sharma & Sanj., Fl. India 3: 402. 1993. ***C. excelsa*** Wight, Ic. tt. 1761, 1762. 1851, *p.p.*; Mast. in Hook. f., Fl. Brit. India 1: 350. 1874; Dunn in Gamble, Fl. Pres. Madras 101. 1915. **Mullan chakka, Vediplavu, Alanki** (Mannan).

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, 16 x 6 cm, oblong, acute, nerves not visible, shining above, brownish below. Flowers densely clustered on tubercles on old branches; pedicels 3 cm long, jointed; bracteoles tubular, 1.5 cm long, 4-5-toothed at apex; petals absent; staminal tube 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.

*Fl. & Fr.* : December-May

*Distr.* : Endemic to Southern Western Ghats. Very common; in evergreen forests. Chokkampetti, *JA 14481.*

*Ethnobotanical use* : The immature seeds are grilled and eaten.

## 22. STERCULIACEAE

(DC.) Bartl., Ord. Nat. Pl. : 225. 1830.

1. Flowers unisexual; petals absent....2
1. Flowers bisexual; petals present.... 5
2. Fruit winged, 1-seeded, indehiscent.... **Heritiera**
2. Fruit not winged, 2-many seeded, dehiscent.... 3
3. Calyx tubular, 5-toothed; follicle 2-seeded, compressed....**Firmiana**
3. Calyx widely campanulate, 5-lobed or 5-partite; follicle many-seeded, obovoid .... 4
4. Branches glabrous; seeds winged.... **Pterygota**
4. Branches tomentose; seeds wingless....**Sterculia**
5. Follicle spirally twisted; petals unequal.... **Helicteres**
5. Follicle not spirally twisted; petals equal.... 6
6. Ovary 1-celled; capsule 1-seeded.... **Waltheria**
6. Ovary 5-celled; capsule many-seeded....7
7. Herbs; stamens 5; seeds wingless .... **Melochia**
7. Shrubs or trees; stamens numerous; seeds winged.... .8
8. Staminal tube conical with stamens on its outer surface.... **Eriolaena**
8. Staminal tube adnate to the gymnophore; stamens along the rim....**Pterospermum**

### ERIOLAENA A. P. de Candolle

Mem. Mus. Hist. Nat. 10: 102. 1823.

**Eriolaena quinquelocularis** (Wight & Arn.) Wight, Ic. t. 882. 1844; Mast. in Hook. f., Fl. Brit. India 1: 371. 1874; Dunn in Gamble, Fl. Pres. Madras 110. 1915; Malick in Sharma & Sanj., Fl. India 3: 418. 1993.

Large shrubs or small trees; branchlets tomentose. Leaves to 9 x 9 cm, broadly ovate, widely cordate at base, acuminate at apex, 5-nerved from base, densely pubescent below. Flowers in terminal or axillary peduncled cymes; bracteoles laciniate; calyx 2.5 cm long, stellate-tomentose outside, simple-tomentose within, lobes deflexed; petals yellow, 25 x 7 mm, oblanceolate, tomentose below; staminal column 15 mm long, stamens numerous, anthers oblong; ovary 5-celled, stellate-hairy; ovules many; style-1, 5-fid at apex. Capsule 20 x 15 mm, ellipsoid; seeds many, winged.

*Fl. & Fr.* : July-December.

*Distr.* : India. Common; in Savannahs and grasslands. Kokkara, *JA 12004*; Kumarikulam, *KPR 14852.*

FIRMIANA Marsili

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

**Firmiana colorata** (Roxb.) R. Br. in Bennet & Brown, Pl. Jav. Rar. 235. 1844; Dunn in Gamble, Fl. Pres. Madras 107. 1915; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 142. 1983; Manilal, Fl. Silent Valley 31. 1988; Malick in Sharma & Sanj., Fl. India 3: 420. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 65. 1996. ***Sterculia colorata*** Roxb., Pl. Corom. t. 25. 1795; Mast. in Hook. f., Fl. Brit. India 1: 359. 1874.

Medium sized trees. Leaves to 16 x 25 cm, 3-lobed, cordate at base, 7-ribbed, lobes acuminate; petiole to 20 cm long. Flowers unisexual, in terminal panicled racemes; calyx 2 cm long, tubular, reddish, tomentose outside; gynophore 25 mm 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.

*Fl. & Fr.* : February-April.

*Distr.* : India and Andamans. Occasional; in evergreen forests at low elevations. Sabarimala, *JA & KPR 17706.*

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 167. 1915; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 144. 1983; Manilal, Fl. Silent Valley 31. 1988; Malick in Sharma & Sanj., Fl. India 3: 426. 1993.

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

*Fl. & Fr.* : Almost throughout the year.

*Distr.* : South East Asia and Australia. Fairly common; in moist deciduous forests. Pachakkanam, *JA 12339.*

HERITIERA W. Aiton

Hort. Kew. ed. 1, 3: 546. 1789.

**Heritiera papilio** Bedd., Fl. Sylv. t. 218. 1872; Mast. in Hook. f., Fl. Brit. India 1: 363. 1874; Dunn in Gamble, Fl. Pres. Madras 104. 1915; Manilal, Fl. Silent Valley 32. 1988; Malick in Sharma & Sanj., Fl. India 3: 430. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 66. 1996.

Medium sized trees. Leaves alternate, to 9 x 4 cm, ovate, acute at apex, rounded or cordate at base, entire, 3-nerved from base, densely white scaly below. Flowers unisexual, in axillary panicles; peduncle tomentose; calyx 4 mm long, widely campanulate, 5-lobed, lobes acute; stamens 5; anthers 5, sessile on tip of staminal column; carpels 5-6, free, ovules 1-2 in each; styles recurved; stigmas globose. Fruit of 5 distinct winged 1-seeded samaras, 5-6 cm long.

*Fl. & Fr.* : December-April

*Distr.* : India and Bangladesh. Common; in evergreen forests. Uppermanalar, *JA & KPR 14444*; Poonkavanam, *JA 14981.*

## 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. 1915; Malick in Sharma & Sanj., Fl. India 3: 413. 1993.

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

*Fl. & Fr.* : Throughout the year

*Distr.* : Pantropical. Occasional; in openings in moist deciduous forests. Thekkady, *JA & KPR 16951.*

## 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; leaves toothed at apex; sepals ca. 4 cm long..... **P. reticulatum**
2. Capsule acutely angled; leaves entire; sepals ca. 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. 1915; Malick in Sharma & Sanj., Fl. India 3: 449. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 67. 1996.

Medium sized trees; bark greyish brown. Leaves to 26 x 15 cm, oblong, abruptly acuminate at apex, cordate at base; nerves 12 pairs, intercostae parallel, prominent; petiole 1.5 cm long. Flowers axillary, solitary; pedicel 1.5 cm long; sepals 10 x 1 cm, oblong, pubescent outside; petals to 8 x 1 cm, oblong, glabrous, white. Capsule to 18 cm long, 5-angled; smooth; seeds 8-11 in each cell.

*Fl. & Fr.* : October-February.

*Distr.* : India and Malesia. Common; in evergreen forests at low elevations. Pambavalley, *JA 17081.*

**Pterospermum reticulatum** Wight & Arn., Prodr. 69. 1834; Mast. in Hook. f., Fl. Brit. India 1: 368. 1874; Dunn in Gamble, Fl. Pres. Madras 108. 1915; Malick in Sharma & Sanj., Fl. India 3: 451. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 67. 1996.

Medium sized tree. Leaves to 15 x 10 cm, obovate; 3-7-toothed at apex; cordate at base, white-tomentose below; nerves 6 pairs, prominent. Flowers in terminal or axillary fascicles; bracts laciniate; sepals 4.5 x 0.5 cm, oblong, densely stellate-tomentose; petals 4 x 1.5 cm, obovate, densely stellate-hairy within; stamens 15, staminodes 5. Capsule 7 x 3 cm, oblong, acute, stalked, densely rugose, tomentose; seeds solitary, winged.

*Fl. & Fr.* : December-March.

*Distr.* : Endemic to Southern Western Ghats . Common; in evergreen forests at low elevations. Pamba, *JA 17085.*

**Pterospermum rubiginosum** Heyne ex Wight & Arn., Prodr. 68. 1834; Bedd., Fl. Sylv. t. 106. 1871; Mast. in Hook. f., Fl. Brit. India 1: 368. 1874; Dunn in Gamble, Fl. Pres. Madras 109. 1915; Malick in Sharma & Sanj., Fl. India 3: 451. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 68. 1996.

Large trees. Leaves to 10 x 3 cm, ovate-lanceolate, oblique at base, acuminate at apex, densely tomentose below; nerves 5 pairs. Flowers axillary, 2-3 together; pedicels 1.5 cm long; sepals 4 cm long, linear oblong, densely tomentose; petals 3 cm long, linear-oblong, white; stamens 10, filaments 3 cm long, united at base into a tube; ovary tomentose; style 4-5 cm long. Capsule 4 x 2 cm, angular.

*Fl. & Fr.* : January-March.

*Distr.* : Peninsular India. Common; in evergreen forest at low elevations. Koruthode, *JA & KPR 14757.*

## PTERYGOTA Schott & Endlicher

Melet. Bot. 32. 1832.

**Pterygota alata** (Roxb.) R. Br. in Bennet & Brown, Pl. Jav. Rar. 234. 1844; Dunn in Gamble, Fl. Pres. Madras 104. 1915; Malick in Sharma & Sanj., Fl. India 3: 455. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 69. 1996. ***Sterculia alata*** Roxb., Pl. Corom. t. 287. 1820; Mast. in Hook. f., Fl. Brit. India 1: 360. 1874. **Kudatthanni** (Malam pandaram)

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 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 13 x 8 cm, obovoid, oblique, 2-valved; seeds 6 x 3 cm, oblong, winged.

*Fl. & Fr.* : March-December

*Distr.* : India and Andamans. Common; in evergreen forests at low elevations. Puthussery, *JA 13699.*

## STERCULIA Linnaeus

Sp. Pl. 1007. 1753.

Trees. Leaves alternate, entire or lobed. 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. Leaves lobed nearly to the midrib.....**S. villosa**
2. Leaves lobed to half of the blade.....**S. urens**

**Sterculia guttata** Roxb. ex DC., Prodr. 1: 482. 1824; Wight, Ic. t. 487. 1841; Bedd., Fl. Sylv. t. 105. 1871; Mast. in Hook. f., Fl. Brit. India 1: 355. 1874; Dunn in Gamble, Fl. Pres. Madras 106. 1915; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 152. 1983; Manilal, Fl. Silent Valley 33. 1988; Malick in Sharma & Sanj., Fl. India 3: 462. 1993. **Aanathondi maram** (Mannan), **Narukorumban** (Malam pandaram).

Large trees; branchlets tomentose. Leaves 22 x 13 cm, obovate, abruptly acuminate at apex, rounded at base, stellate-tomentose below, nerves 10 pairs. Panicles to 20 cm across, terminal

Flowers pedicelled; calyx 15 mm across, campanulate, lobes acuminate, densely hairy; stamens 10, column hairy at apex. Capsule 5 x 3 cm, curved-obovoid, tomentose, reddish; seeds few, 8 x 6 mm, ovoid, smooth, shining.

*Fl. & Fr.* : January & May

*Distr.* : Western Ghats and Sri Lanka. Occasional in evergreen, semi-evergreen and moist deciduous forests. Swamikkayam, *JA 13102.*

*Ethnobotanical use* : The stem-bark is beaten and strong fibers are extracted, and chiefly used as rope for tying bamboos for making rafts.

**Sterculia urens** Roxb., Pl. Corom. t. 24. 1795; Mast. in Hook. f., Fl. Brit. India 1: 355. 1874; Dunn in Gamble, Fl. Pres. Madras 106. 1915; Malick in Sharma & Sanj., Fl. India 3: 470. 1993.

Medium sized trees; bark yellowish-white, smooth. Leaves 5-30 cm across, orbicular, deeply cordate at base, lobes ovate, acuminate, penninerved, pubescent below; petiole to 18 cm long. Flowers greenish yellow, in terminal and upper axillary panicles; calyx 13 mm diam., lobes oblong, curved outside; staminal column 8 mm long, curved. Follicles 4-5 cm long, oblong, sessile, bristly; seeds few, 6 x 4 mm, black.

*Fl. & Fr.* : December-April

*Distr.* : India Sri Lanka and Malesia. Common; in moist deciduous forests. Mangaladevi, *JA 18470.*

**Sterculia villosa** Roxb. ex DC., Prodr. 1: 483. 1824; Mast. in Hook. f., Fl. Brit. India 1: 355. 1874; Dunn in Gamble, Fl. Pres. Madras 106. 1915; Malick in Sharma & Sanj., Fl. India 3: 472. 1993. **Vakkanarumaram** (Mannan).

Medium sized trees; bark pale brown, fibrous. Leaves to 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 cm across, greenish brown; pedicels 5 mm long; calyx 8 mm long, lobes oblong, tomentose outside, stamens 10, anthers along the rim of staminal column.; column hairy at apex; staminodes 10 in female flowers. Follicles 2-7, to 5 cm long, oblong, tomentose; seeds black, smooth.

*Fl. & Fr.* : February-April

*Distr.* : India, Nepal and Myanmar. Fairly common; in moist deciduous forests. Swamikkayam, *JA 13102.*

*Ethnobotanical uses* : Bark fibers of this plant is very strong and is widely used as cordage(Mannan).

## WALTHERIA Linnaeus

Sp. Pl. 673. 1753.

**Waltheria indica** L., Sp. Pl. 673. 1753; Mast. in Hook. f., Fl. Brit. India 1: 374. 1874; Dunn in Gamble, Fl. Pres. Madras 111. 1915; Malick in Sharma & Sanj., Fl. India 3: 473. 1993; Verdcourt in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 9: 418. 1995.

Herbs, to 70 cm high, densely tomentose. Leaves to 5 x 3 cm, ovate, obtuse, crenate; petiole 1.5 cm long. Flowers 3-10-together, in axillary or terminal heads, sessile; calyx 4 mm long, tubular, lobes subulate; petals yellow, 4 mm long, obovate, stamens 5, monadelphous; ovary 1-celled, 2-ovuled, pubescent; style lateral. Capsule 2-valved; 1-seeded, hairy at apex.

*Fl. & Fr.* : Throughout the year

*Distr.* : Pantropical. Occasional; in the openings of moist deciduous forests. Thekkady, *JA & KPR 16359.*

# 23. TILIACEAE

Juss., Gen. Pl. 289. 1789

1. Drupe densely glochidiate hairy; petals more than half the length of sepals.....**Triumfetta**
1. Drupe not glochidiate hairy; petals less than half the length of sepals.....**Grewia**

## 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.....2
1. Leaves 3-ribbed from base..... 3
2. Drupe glabrous; leaves obliquely cordate at base, not lobed at apex; trees.....**G. tiliifolia**
2. Drupe pubescent; leaf base rounded, equal, toothed or lobed at apex; shrubs.....**G. abutilifolia**
3. Peduncle shorter or equal to the petiole.....4
3. Peduncle longer than the petiole.....5
4. Peduncle stout; lateral nerves from midrib not very oblique.....**G. barberi**
4. Peduncle slender; lateral nerves from midrib very oblique.....**G. lanceaefolia**
5. Drupe divided into 2-4 distinct drupelets.....6
5. Drupe obscurely lobed or unlobed.....7

6. Peduncle many-flowered; drupelets 4; leaves oblong, stellate hairy.....**G. umbellifera**

6. Peduncle 3-flowered; drupelets 2; leaves lanceolate, glabrous.....**G. glabra**

7. Sepals ca. 25 x 4 mm; drupe unlobed; glabrous.....**G. laevigata**

7. Sepals ca. 7 x 2 mm; drupe obscurely 4-lobed; pilose.....**G. hirsuta**

**Grewia abutilifolia** Vent. ex Juss., Ann. Mus. Nat. Hist. 4: 92. 1804; Mast. in Hook. f., Fl. Brit. India 1: 390. 1874; Daniel & Chandrab. in Sharma & Sanj., Fl. India 3: 493. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 71. 1996. *G. aspera* Roxb., Fl. Ind. 2: 591. 1832; Dunn in Gamble, Fl. Pres. Madras 119. 1915.

Shrubs, branches densely stellate-tomentose. Leaves 15 x 10 cm, orbicular, 3-5-toothed at apex, serrate, stellate-tomentose below; petiole 1.5 cm long. Peduncle 3-5 mm long, 3-5 together; sepals 11 x 2 mm, oblong, stellate-pubescent outside; petals white, 3.5 x 1 mm, oblong, gland 1.5 x 1 mm, pubescent; gynandrophore glabrous. Drupe 13 x 10 mm, obscurely 4-lobed.

*Fl. & Fr.* : May-September

*Distr.* : India to Malesia. Common; in Savannahs and moist deciduous forests. Thaannikkudy, *JA 12350.*

**Grewia barberi** Drumm. in Gamble, Fl. Pres. Madras 118. 1915; Henry *et al.,* Fl. Tamil Nadu Ser. 1, 1: 43. 1983.

Scandent shrubs; branches softly spreading-tomentose. Leaves to 15 x 6 cm, ovate-lanceolate, sharply acuminate,. tomentose along the nerves below, ribs prominent, midrib with 6 lateral nerves; petiole 6-8 mm long. Peduncle 8-10 mm long, stout, few-flowered; pedicels 8 mm long, enlarging in fruit; sepals 20 x 4 mm, oblong, densely tomentose outside; petals 6 x 4 mm, oblong, obtuse, white. Drupe 20 x 20 mm, depressed; 2-4 lobed, fulvous spreading-hairy.

*Fl. & Fr.* : April-November

*Distr.* : Peninsular India. Rare; in evergreen forests. Koruthode, *JA 18457.*

**Grewia glabra** Bl., Bijdr. 115. 1825; Henry *et al.,* Fl. Tamil Nadu Ser. 1, 1: 43. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 72. 1996. ***G. disperma*** sensu Dunn in Gamble, Fl. Pres. Madras 118. 1915, non Rottl. ex Spreng., 1825. ***G. laevigata*** sensu Mast. in Hook. f., Fl. Brit. India 1: 389. 1874, non Vahl, 1790.

Erect shrubs, branchlets slender, glabrous. Leaves to 13 x 4 cm, elliptic, sharply acuminate, serrate, petiole 6 mm long. Peduncle 2.5 cm long, slender, glabrous; pedicel 2 cm long, sparsely stellate hairy; sepals 19 x 4 mm, oblong, tomentose outside; petals 3.5 x 3 mm, ovate, white; gynandrophore densely hairy; stigma fimbriate. Drupelets 5 x 5 mm, globose, glabrous.

*Fl. & Fr.* : Throughout the year

*Distr.* : Tropical Asia. Fairly common; in moist deciduous forests. Mullakkudy, *JA 13853.*

**Grewia hirsuta** Vahl, Symb. Bot. 1: 34. 1790; Wight, Ic. t. 76. 1836; Mast. in Hook. f., Fl. Brit. India 1: 391. 1874; Dunn in Gamble, Fl. Pres. Madras 119. 1915; Andre & Willem in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 407. 1991; Daniel & Chandrab. in Sharma & Sanj., 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 mm long. Peduncle 10 mm long, hirsute; pedicels 10 mm long, slender; sepals 7 x 3 mm, oblong, 3-ribbed; petals 3 x 1 mm, oblong, obtuse, gland 1 x 1 mm, orbicular, hairy; filaments 1.5 mm long, anthers below the level of ovary; ovary densely hairy; style 2 mm long; stigma globose. Drupe 10 x 10 mm, obscurely 4-lobed, pilose.

*Fl. & Fr.* : Throughout the year

*Distr.* : India Bangladesh and Sri Lanka. Rare; along the margins of grasslands. Mangaladevi, *JA 16360.*

*Note* : This species has not been reported so far from Kerala

**Grewia laevigata** Vahl, Symb. Bot. 1: 34. 1790; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 1: 44. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 72. 1996. ***G. bracteata*** sensu Mast. in Hook. f., Fl. Brit. India 1: 389. 1874 non Heyne ex Roth, 1821. ***G. wightiana*** Drumm. in Gamble, Fl. Pres. Madras 115. 1915.

Scandent shrubs. Leaves to 8 x 4 cm, ovate-oblong, acute, subcordate at base, midrib with 4 lateral nerves, thickly stellate-hairy on nerves; petiole 5-7 mm long. Peduncle 10 mm long, 3-flowered; pedicel 10 mm long, hairy; sepals 25 x 4 mm, 3-ridged; petals 8 x 4 mm, emarginate at apex, gland 4 x 3 mm, thick, with brownish tomentose margins; gynandrophore 8 mm long, tomentose; filaments 9 mm long, style 10 mm long; stigma 4-lobed. Drupe 12 mm across, globose.

*Fl. & Fr.* : May-November

*Distr.* : Peninsular India and Sri Lanka. Rare; in evergreen forests at high elevations. Uppermanalar, *JA 13748, KPR & JA 15251.*

**Grewia lanceaefolia** Roxb., Fl. Ind. 2: 586. 1824; Dunn in Gamble, Fl. Pres. Madras 118. 1915; Daniel & Chandrab. in Sharma & Sanj., Fl. India 3: 502. 1993. ***G. diplocarpa*** Thw., Enum. Pl. Zeyl. 31. 1858; Mast. in Hook. f., Fl. Brit. India 1: 390. 1874.

Shrubs, branchlets mixed-hairy. Leaves to 9 x 3 cm, elliptic, acuminate, densely stellate-hairy below; petiole 9 mm long. Peduncle 9 mm long, 3-flowered, stellate-hairy; sepals 12 x 2 mm, oblong, acute, hairy; petals 2 x 1.5 mm, ovate, ciliate, gland 1.5 x1.5 mm, orbicular; gynandrophore 2 mm long, hairy at the base; filaments 7 mm long; style pubescent below; stigma peltate, lobed.

*Fl. & Fr.* : May-August

*Distr.* : India Pakistan and Bangladesh. Rare; in evergreen forests above 1500 m. Kottamala, *JA 13781.*

**Grewia tiliifolia** Vahl, Symb. Bot. 1: 35. 1790; Bedd., Fl. Sylv. t. 108. 1871; Mast. in Hook. f., Fl. Brit. India 1: 386. 1874, "*tiliaefolia*", Dunn in Gamble, Fl. Pres. Madras 118. 1915; Daniel & Chandrab. in Sharma & Sanj., Fl. India 3: 511. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 72. 1996. **Unnam** (Mannan).

Large trees; bark greyish-brown, rough. Branchlets stellate-tomentose. Leaves to 18 x 12 cm, broadly ovate, acute at apex, crenate-serrate, hoary tomentose below; petiole 2 cm long. Peduncle axillary, 7 mm long; sepals 7 mm long, hairy at base inside; petals yellow, 3 x 1 mm, densely tomentose outside; filaments 3 mm long; stigma 2-3-lobed, recurved. Drupelets 1-4, to 5 mm diam., globose, reddish

*Fl. & Fr.* : April-June

*Distr.* : India Sri Lanka and Tropical East Africa. Very common; in moist deciduous forests. Thekkady, *JA 14848.*

*Ethnobotanical use* : The fruits are edible and eaten (Malam pandaram).

**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. 1915; Daniel & Chandr. in Sharma & Sanj., Fl. India 513. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 72. 1996.

Scandent shrubs. Leaves to 12 x 6 cm, ovate-oblong, abruptly acuminate, shortly cordate at base, stellate hairy along nerves; petiole 8 mm long. Peduncle 4 cm long, many-flowered; pedicels 12 mm long, slender; sepals 15 mm long, tomentose outside; petals 6 mm long, obtuse; gynophore densely hairy, stigma 4-lobed. Drupelets 9-10 mm across, globose.

*Fl. & Fr.* : September-December

*Distr.* : Endemic to Western Ghats. Common; in evergreen forests. Pamba, *JA 12382*; Puthussery, *JA 13514.*

## 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. Glochidiate bristle of capsule densely hairy; capsule 25 mm across; sepals not cuspidate.....**T. pilosa**
1. Glochidiate bristles of capsule glabrous; capsule to 12 mm across; sepals cuspidate..... 2
2. Stem glabrous; capsule 12 mm across.....**T. annua**
2. Stem densely stellate hairy; capsule 6 mm across.....**T. rhomboidea**

**Triumfetta annua** L., Mant. Pl. 1: 73. 1767; Mast. in Hook. f., Fl. Brit. India 1: 396. 1874; Dunn in Gamble, Fl. Pres. Madras 120. 1915; Daniel & Chandrab. in Sharma & Sanj., Fl. India 3: 518. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 732. 1996.

Slender erect herbs, to 1.5 m tall. Leaves 5-10 x 2-5 cm, ovate-lanceolate, rounded at base, acuminate at apex, serrate, sparsely hairy; petiole 2-8 cm long, slander. Flowers 3-9-together; bracteoles bristled; sepals 3 mm long, oblong, glabrous; petals yellow, 3 mm long, obovate, obtuse. Capsule 12 mm across, bristles glabrous, black.

*Fl. & Fr.* : Throughout the year

*Distr.* : India Malesia and Tropical Africa. Occasional; in margins of evergreen forests at higher elevations. Uppermanalar, *JA 12979.*

**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. 1915; Andre & Willem in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 431. 1991; Daniel & Chandrab. in Sharma & Sanj., Fl. India 3: 519. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 732. 1996.

Shrubs, to 2 m high; branches stellate-hairy. Leaves to 16 x 10 cm, ovate, rounded at base, acuminate at apex, serrate, densely stellate-hairy below, 5-nerved from base. Flowers 3-10-together; pedicel 3 mm long; sepals 10 x 1 mm, hairy outside; petals yellow, 7 x 2 mm, oblanceolate, hairy at base; stamens 10, filaments 7 mm long. Capsule densely glochidiate-bristled.

*Fl. & Fr.* : October-January

*Distr.* : South East Asia and Tropical. Common; in moist deciduous forests and Savannahs, Thaannikkudy, *NS & JA 12626*; Uppupara, *JA 13182.*

**Triumfetta rhomboidea** Jacq., Enum. Pl. Carib. 22. 1760; Mast. in Hook. f., Fl. Brit. India 1: 395. 1874; Dunn in Gamble, Fl. Pres. Madras 120. 1915; Andre & Willem in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 433. 1991; Daniel & Chandrab. in Sharma & Sanj., Fl. India 3: 520. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 73. 1996.

Shrubs or herbs. Leaves to 7 x 7 cm, ovate to rhomboid, 3-lobed, cordate or rounded at base, acuminate at apex, densely stellate-tomentose below, 3-5-ribbed from base; petiole to 3 cm long. Flowers 3-15 together; pedicels 5 mm long; sepals 7 x 1 mm, sparsely stellate-hairy; petals 6 x 2 mm, oblanceolate, with two tufts of hairs at base. Capsule with stiff bristles

*Fl. & Fr.* : Throughout the year

*Distr.* : Pantropical. Fairly common; in disturbed moist deciduous forests and semi-evergreen forest. Thaannikkudy, *JA & KPR 16867.*

## 24. 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 to 9 x 4 cm, crenate, glabrous; drupe oblong.....**E. munronii**
2. Leaves to 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; Murti, J. Econ. Tax. Bot. 17(2): 288. 1993 & in Sharma & Sanj., Fl. India 3: 539. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 74. 1996. ***E. oblongus*** sensu Wight, Ic. t. 48. 1838, non Gaertn., 1788; Mast. in Hook. f., Fl. Brit. India 1: 403. 1874; Dunn in Gamble, Fl. Pres. Madras 124. 1915.

Large trees with broad buttresses. Leaves to 15 x 7 cm, elliptic-oblong, abruptly acuminate with emarginate tip, base rounded, 6-8 nerved, punctuate, domatia glandular. Racemes to 8 cm

long; pedicel 3 mm long, glabrous; sepals 7 mm long, minutely pubescent outside, glandular inside; petals white, 7 mm long, fimbriate, glandular; stamens many, anthers 1.5 mm long, puberulus; ovary densely hairy. Drupe 2.5 x 2 cm oblong.

*Fl. & Fr.* : August-December

*Distr.* : South Asia. Common; in evergreen forests at low elevations. Koruthode, *JA 12227*; Sabarimala, *JA 13376.*

**Elaeocarpus munronii** (Wight) Mast. in Hook. f., Fl. Brit. India 1: 407. 1874; Dunn in Gamble, Fl. Pres. Madras 124. 1915, "*munroii*"; Murti, J. Econ. Tax. Bot. 17(2): 290. 1993 & in Sharma & Sanj., Fl. India 3: 546. 1993. ***Monocera munroii*** Wight, Ill. Ind. Bot. 1: 83. 1840 & Ic. t. 952. 1845.

Large trees; branchlets slender. Leaves to 9 x 4 cm, ovate-lanceolate, acuminate, rounded at base, crenate, 5-nerved, petiole 3 cm long, glabrous. Racemes to 5 cm long, axillary, glabrous; pedicel 1 cm long, erect; sepals 8 mm long, thinly tomentose; petals 9 mm long, white with reddish lines at base, densely tomentose; anthers 3 mm long, bristle 1 mm long. Drupe 15 x 9 mm, terete, glabrous, glaucous.

*Fl. & Fr.* : August-March

*Distr.* : Western Ghats. Common; along the margins of evergreen forests above 1000 m. Pachakkanam, *JA 12293*; Aladi, *JA 13555.*

**Elaeocarpus serratus** L., Sp. Pl. 515. 1753; Mast. in Hook. f., Fl. Brit. India 1: 401. 1874; Dunn in Gamble, Fl. Pres. Madras 124. 1915; Murti, J. Econ. Tax. Bot. 17(2): 291. 1993 & in Sharma & Sanj. Fl. India 553. 1993; Willem in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 9: 82. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 74. 1996. ***E. oblongus*** Gaertn., Fruct. Pl. 1: 202. t. 43. 1788.

Large trees; twigs glabrous. Leaves to 9 x 4 cm, obovate, acute, narrowed to the base, serrate, 3-4-nerved; domatia glandular; petiole 1.5 cm long, glabrous. Raceme to 8 cm long; glabrous; pedicel 5 mm long, slender. Flowers greenish white; sepals 7 mm long,, densely glandulose; petals 7 mm long, glabrous; anthers 2.2 mm long, puberulus, bristles 3 or 4; ovary densely tomentose, 3-celled. Drupe 2.5 cm across, ovoid to oblong; pyrene tubercled.

*Fl. & Fr.* : October-February

*Distr.* : South East Asia. Common; in evergreen forests and semi-evergreen forests. Pamba, *JA 12381*; Pachakkanam, *NS & JA 12659.*

**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. 1915; Murti, J. Econ. Tax. Bot. 17(2): 292. 1993 & in Sharma & Sanj. Fl. India 3: 559. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 74. 1996. **Karamaram** (Mannan).

Large trees, prominently buttressed; bark white; branchlets stout. Leaves to 22 x 15 cm, obovate, obtuse, entire, 14-16-nerved, glabrous above; petiole 1.5 cm long, stout. Raceme to 12 cm long, ferrugineous tomentose; pedicel 2 cm long deflexed. Flowers facing downwards; sepals 15 x 3 mm, lanceolate; petals white, 18 mm long,, fimbriate, fulvous tomentose, anthers 5 mm long, thinly tomentose, bristle 3 mm long; ovary densely hairy; style 10 mm long, tomentose. Drupe 3 x 2.5 cm, ferrugineous tomentose.

*Fl. & Fr.* : September-February

*Distr.* : India and Malesia. Very common; in evergreen forests often along stream banks. Pachakkanam, *JA 12319*; Vallakkadavu, *NS & JA 12704.*

## 25. LINACEAE

DC. ex Gray, Nat. Arr. Brit. Pl. 2: 622. 1821.

### LINUM Linnaeus

Sp. Pl. 277. 1753.

**Linum mysorense** Heyne ex Benth. in Edward's Bot. Reg. 16: sub. t. 1326. 1830; Hook. f., Fl. Brit. India 1: 411. 1874, "*mysorense*"; Fyson, Fl. South Indian Hill St. 2: t. 44. 1932; Dunn in Gamble, Fl. Pres. Madras 125. 1915; Hajra, Fl. India Fasc. 13 : 7. 1983 & in Sharma & Sanj., Fl. India 3: 578. 1993.

Annual herbs, erect, usually unbranched. Leaves alternate, to 2 x 0.5 cm, elliptic, acute, glabrous, sessile. Flowers yellow, in terminal panicled cymes, sepals 5, 3 x 1.5 mm, ovate, acute; petals 2.5 x 1.5 mm, obovate, emarginate; stamens 5, filaments united at base into a short tube, anthers ovate; ovary 5-celled, depressed globose; ovule 1 in each cell; styles 5, free, 2 mm long. Fruit a dehiscent capsule, 3 mm across, depressed globose, glabrous; seeds many, 1 x 0.5 mm, biconvex.

*Fl. & Fr.* : August-December

*Distr.* : India and Sri Lanka, Common; in grasslands. Mangaladevi, *JA 12682, JA 14205.*

NB4313 581.734095483 JOM/H

## 26. ERYTHROXYLACEAE

Kunth, in Humboldt *et al.*, Nov. Gen. Sp. 5, ed. 4: 175. 1822.

### ERYTHROXYLUM P. Browne

Civ. Nat. Hist. Jamaica 278. 1756.

**Erythroxylum monogynum** Roxb., Pl. Corom. t. 88. 1798; Hook. f., Fl. Brit. India 1: 414. 1874; Dunn in Gamble, Fl. Pres. Madras 127. 1915; Chatterj. & Sharma in Sharma & Sanj., Fl. India 3: 590. 1993. ***Sethia indica*** DC., Prodr. 1: 576. 1824. ***E. indicum*** (DC.) Bedd., Fl. Sylv. t. 81. 1871.

Glabrous shrubs; branchlets compressed. Leaves alternate, to 6 x 2 cm, oblanceolate to obovate, obtuse, entire; petiole 5 mm long; stipulate. Flowers solitary, axillary; pedicels 1 cm long; sepals 5, 2 mm long, ovate, acute, glabrous; petals 5, white, 0.8 cm long, oblong with 2 appendages inside; stamens 10, monadelphous; ovary 3-4-celled; ovules 1 in each cell, styles 3-4, united at base; stigma 3-4, capitate. Fruit a 2-seeded drupe, 12 x 4 mm, ellipsoid, ridged, glabrous, reddish.

*Fl. & Fr.* : June-August

*Distr.* : India and Sri Lanka. Common; along riversides in evergreen forests. Thaannikkudy, *JA 12071*; Mlappara, *JA 12139.*

## 27. MALPIGHIACEAE

Juss., Gen. Pl. 252. 1789.

1. Calyx tube with large sessile glands; petals fimbriate.....**Hiptage**
1. Calyx tube eglandular; petals entire.....**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; Dunn in Gamble, Fl. Pres. Madras 129. 1915; Srivas., J. Econ. & Tax. Bot. 6: 62. 1985 & in Hajra *et al.*, Fl. India 4: 3. 1997; Nayar & Sastry, Red Data Book Indian Pl. 1: 194. 1987.

Woody climbers; stems green. Leaves opposite, to 9 x 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 1.5 cm long; sepals 5, free, 2 x 1 mm, oblong; petals 5, 4 x 2 mm, oblong, yellow,

imbricate; stamens 10, free; ovary 3-celled, glabrous; styles 3, free; stigmas capitate. Fruit of 1-3-winged samaras.

*Fl. & Fr.* April-June

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Aladi, *JA 13557.*

HIPTAGE J. Gaertner

Fruct. 2: 169. 1790, *nom. cons.*

**Hiptage benghalensis** (L.) Kurz, J. Asiat. Soc. Bengal 43: 136. 1874; Jacobs in Steenis, Fl. Males. I, 5: 132. 1955; Harriman in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 395. 1991; Srivas. in Hajra *et al.*, Fl. India 4: 14 1997. ***Banisteria benghalensis*** L., Sp. Pl. 427. 1753. ***Hiptage madablota*** Gaertn., Fruct. 2: 109, t. 116. 1791; Dunn in Gamble, Fl. Pres. Madras 128. 1915. **Pongapoo** (Mannan), **Njarambodal** (Mala Arayan) [Fig. 17 B].

Woody climbers. Leaves opposite, to 16 x 7 cm, elliptic, acuminate at apex, rounded at base, nerves 7 pairs, intercostae reticulate, green when dried; petiole 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, 13 x 10 mm, obovate, obtuse, fimbriate; stamens 10, free; ovary densely hairy; style 1, 12 mm long. Wings of fruit 5 x 1.5 cm, elliptic to obovate; seeds 6 mm across, compressed.

*Fl. & Fr.* : January-May

*Distr.* : Indo-Malesia. Common; in evergreen forests. Koruthode, *JA 17983.*

*Ethnobotanical use* : The fruit of this climber is used as bait in fishing (angling). The leaves, usually 7 leaves for 1 kg, is cooked with rice and eaten for body pain.

## 28. OXALIDACEAE

R. Brown 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

Fig. 17. **A.** *Garcinia cowa* Roxb. ex DC.
**B.** *Hiptage benghalensis* (L.) Kurz

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.....**B. intermedium**
2. Sepals equal or bigger than capsule.....**B. reinwardtii**
2. Sepals smaller than capsule.....**B. sensitivum** var. **candolleanum**

**Biophytum intermedium** Wight, Ill. 1: 162. 1840; Edgew. & Hook. f., in Hook.f., Fl. Brit. India 1: 438. 1874; Gamble, Fl. Pres. Madras 133. 1915; Henry *et al.*, Fl. Tamil Nadu Ser.1, 1: 50. 1983; Manna in Hajra *et al.*, Fl. India 4: 232. 1997.

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 to 7 x 2.5 mm, obovate-oblong, truncate at base, apiculate. Flowers yellow, 4-8-together in an umbel; peduncles 2-3 cm long; sepals 5 x 0.3 mm, linear, villous; petals 7 x 4 mm, obovate. Seeds ellipsoid, tubercled ridged.

*Fl. & Fr.* : Throughout the year

*Distr.* : South India and Sri Lanka. Occasional; along stream-sides in evergreen forests. Kottamalapallam, *JA 13796*; Kottamala, *KPR 15120, JA 17777.*

**Biophytum reinwardtii** (Zucc.) Klotzsch in Peters, Reise Mossamb. Bot. 1:85. 1862; Edgeworth & Hook. f., in Hook. f., Fl. Brit. India 1: 437. 1874; Gamble, Fl. Pres. Madras 133. 1915; Sasidh. & Sivar., Fl. Pl. Thrissur For. 76. 1996; Manna in Hajra *et al.*, Fl. India 4: 236. 1997. ***Oxalis reinwardtii*** Zucc., Abh. Malth.-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 4 x 1 mm, ovate-lanceolate, acute, brown; petals yellow, 7 x 2 mm, oblanceolate, with a red line in the middle.

*Fl. & Fr.* : July-December

*Distr.* : India, China and Japan. Common; in moist deciduous forests and grasslands. Mangaladevi, *JA 12479, 12698;* Pachakkanam, *JA 12661*; Vallakkadavu, *JA 16981.*

**Biophytum sensitivum** (L.) DC., Prodr. 1: 690. 1824. var. **candolleanum** (Wight)Edgew. & Hook. f., in Hook. f., Fl. Brit. India 1: 437. 1874; Manna in Hajra *et al.*, Fl. India 4: 238. 1997. ***Biophytum candolleanum*** Wight, Ill. 1: 161, t. 62. 1840; Gamble, Fl. Pres. Madras 133. 1915.

Stem simple, to 15 to 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 1.8 x 0.5 mm, ovate, acute, villous; bracteoles 2 x 0.2 mm, linear, villous; sepals to 5 x 1 cm, linear, lanceolate, strigose. Seeds 1 x 0.3 mm, ovoid, tubercled.

*Fl. & Fr.* : April-August

*Distr.* : Peninsular India & Sri Lanka. Common; in grasslands. Mangaladevi, *JA 13861;* Chenthamarakokka, *JA & KPR 15127.*

## 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 herb; flowers violet.....**O. dehradunensis**

**Oxalis corniculata** L., Sp. Pl. 435. 1753; Wight, Ic. t. 18. 1838; Edgeworth & Hook. f. in Hook. f., Fl. Brit. India 1: 436. 1874; Gamble, Fl. Pres. Madras 132. 1915; Matthew, Fl. Tamil Nadu Carnatic 3 (1): 190. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 76. 1996; Manna in Hajra *et al.*, Fl. India 4: 242. 1997. ***O. 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, to 1.5 x 1.6 cm; petiole 2-4 cm long, slender. Flowers yellow, 6 mm across, 2-many-together, in peduncled umbels; peduncles 3-7 cm long; pedicels 2 cm long, slender; sepals lanceolate, obtuse at apex; petals 7 mm long, oblong. Capsule oblong, acuminate, to 1.5 cm long; seeds 5-10 per cell, flattened to ovoid, transversely ridged.

*Fl. & Fr.* : Throughout the year

*Distr.* : Cosmopolitan. Common; along the margins of moist deciduous forests. Thekkady, *JA 13835.*

**Oxalis dehradunensis** Raiz., Suppl. Fl. Upp. Gang. Plain 37-38. 1976; Manna in Hajra *et al.*, Fl. India 4: 242. 1997. ***O. latifolia*** auct. non H. B. K., 1821: Calder, Rec. Bot. Surv. India 6(8): 335. 1919; Fyson, Fl. S. Indian Hill. St. 2: t. 51. 1932; Matthew, Rec. Bot. Surv. India 20: 57. 1969 & Fl. Tamil Nadu Carnatic 3: 1, 191. 1983.

Erect bulbous herbs, to 25 cm high; stem short or absent. Leaves few, erect; leaflets obconical, 3 x 5 cm, base acute, apex retuse; petiole to 20 cm long. Flowers few, violet, pedicellate, 3-5 together in long-peduncled umbels; sepals green, 4 x 1 mm, oblong; petals 10 x 5 mm, violet with yellowish base; stamens 10; filaments alternatively long and short.

*Fl. & Fr.* : Throughout the year

*Distr.* : Native of Mexico and West Indies, widely spread to other tropical countries. Common; along road cuttings in evergreen forests. Mangaladevi, *JA 13955.*

## 29. 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. Flowers on leafless scape from the base.....2
1. Flowering stem leafy.....5
2. Wings 3-lobed.....3
2. Wings 2-lobed.....**I. acaulis**
3. Spur of the lip shorter than the wings.....4
3. Spur of the lip equal to or longer than the wings.....**I. scapiflora**

4. Sepals oblique at base; spur of lip curved.....**I. levingei**

4. Sepals not oblique at base; spur of lip straight.....**I. modesta**

5. Epiphytic herbs.....6

5. Terrestrial herbs.....7

6. Lip green; spur of lip one coiled at tip.....**I. viridiflora**

6. Lip red; spur of lip curved but not coiled at tip.....**I. parasitica**

7. Seeds hairy or hirtus.....8

7. Seeds glabrous or rugose.....18

8. Leaves whorled.....9

8. Leaves opposite or alternate.....10

9. Flowers binate, axillary; lobes of wings equal.....**I. lucida**

9. Flowers in peduncled umbels, axillary or terminal; lobes of wings unequal.....**I. verticillata**

10. Leaves all alternate.....11

10. Leaves alternate and opposite on same plants.....16

11. Flowers solitary or binate, axillary.....12

11. Flowers racemose or umbellate, peduncled.....14

12. Capsule pubescent; pedicels solitary.....**I. trichocarpa**

12. Capsule glabrous; pedicels solitary or binate.....13

13. Seeds hairy; spur of lip ca. 3 cm long.....**I. flaccida**

13. Seeds hirtus; spur of lip 1.5-2 cm long.....**I. dasysperma**

14. Flowers umbellate; large shrubs.....**I. grandis**

14. Flowers racemose; herbs.....15

15. Dorsal auricle of lip linear; leaves acute or rounded at base, not cordate.....**I. verecunda**

15. Dorsal auricle of lip obscure; leaves cordate at base.....**I. cordata**

16. Spur of lip inflated at middle; rachis and pedicels viscid-glandular.....**I. viscosa**

16. Spur of lip not inflated; rachis and pedicels not glandular.....17

17. Flowers solitary or binate in the axils, wings 2-lobed; standard sharply cuspidate.....**I. cuspidata**

17. Flowers racemose; wings 3-lobed; standard shortly or not cuspidate.....**I. goughii**

18. Leaves alternate.....19

18. Leaves opposite.....24

19. Lobes of wing equal or subequal; large shrubs.....**I. hensloviana**

19. Lobes of wing unequal; herbs or small shrubs.....20

20. Flowers solitary or binate in leaf axils.....21

20. Flowers racemose or umbellate.....22

21. Standard densely hairy; capsule tomentose.....**I. balsamina**

21. Standard glabrous; capsule not as above.....**I. pulcherrima**

22. Flowers scattered throughout the elongated rachis of raceme; shrubs.....**I. maculata**

22. Flowers confined to the tip of the peduncle; herbs.....23

23. Inflorescence an umbel; standard cuspidate; spur shorter than limb of lip.....**I. campanulata**

23. Inflorescence a raceme; standard not cuspidate; spur longer than the limb of lip.....**I. leptura**

24. Spur of the lip obscure.....25

24. Spur of the lip long.....26

25. Lip, sepals and standard glabrous; leaves to 1.5 cm broad.....**I. inconspicua**

25. Lip, sepals and standard pubescent; leaves to 0.5 cm broad.....**I. herbicola**

26. Capsule linear, deflexed; leaves with two sessile globular glands at the base of the lamina.....**I. minor**

26. Capsule ellipsoid, not deflexed; leaves eglandular.....27

27. Leaves scabrid, margins incurved; dorsal auricle of wings absent.....**I. rupicola**

27. Leaves glabrous, margins flat; dorsal auricle of wings 5 mm long.....**I. chinensis**

**Impatiens acaulis** Arn., Comp. Bot. Mag. 1: 325. 1836; Hook. f., Fl. Brit. India 1: 443. 1874; Gamble, Fl. Pres. Madras 138. 1915; Nair & Henry, Fl. Tamil Nadu I, 1: 52. 1983; Wilson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 82. 1985; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 111. 1997.

Stemless herbs. Leaves to 9 x 9 cm, orbicular, obtuse, cordate at base, glabrous, margins distantly crenate or entire; nerves 4 pairs. Scape 20 cm long, many-flowered. Flowers white, 2-3 cm across, confined to the apex of the scape; bracts 4 mm long, ovate; pedicels 2.5 cm long, solitary; lip 8 mm long, broadly ovate, concave, acute; spur 3.5 cm long, slender, glabrous; lateral sepals 3 x 2 mm, ovate, acute, green; standard pink, 8 x 8 mm, orbicular, emarginate, not cuspidate; wings equally lobed, lobes 25 mm long, oblong, obtuse. Capsule 6-10 mm long, ellipsoid, acute, glabrous.

*Fl. & Fr.* : September-November

*Distr.* : South India and Sri Lanka. Rare; on moist rocks in grasslands. Vallakkadavu, *JA 17862.*

*Note* : This species has not been so far reported from Kerala. Wilson (1985) commended that the population of this species in Sri Lanka, where is it common and that in South India (Shimoga, Karnataka) is different. Due to the want of Sri Lankan materials for comparative study I treat the present specimen as *I. acaulis.*

**Impatiens balsamina** L., Sp. Pl. 938. 1753; Hook. f., Fl. Brit. India 1: 453; Gamble, Fl. Pres. Madras 142. 1915; Sald. & Nicols., Fl. Hassan Dist. 400. 1967; Nair & Henry, Fl. Tamil Nadu I, 1: 52. 1983; Wilson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 117. 1985; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 123. 1997 [Fig. 18 A].

Stem 30-40 cm high, glabrous. Leaves to 8 x 0.8 cm, narrowly lanceolate, acute at either ends, serrate; petiole 1.5 cm long. Flowers solitary, axillary; pedicels 8-10 mm long; lip 8 x 4

mm, saccate, cuspidate, densely hairy; spur 10 mm long, curved, densely hairy; sepals minute; standard 6.5 x 8 mm, orbicular, emarginate and cuspidate, hairy, cusp 4-5 mm long; wings 14 x 8 mm, 2-lobed, basal lobe 5 x 4 mm, rounded; terminal lobe notched at apex. Capsule ellipsoid, acute, tomentose; seeds few, rugulose, brown.

*Fl. & Fr.* : September-December

*Distr.* : South East Asia. Rare; along cuttings in grasslands. Kumarikulam, *JA & KPR 16859.*

**Impatiens campanulata** Wight, Madras J. Lit. Sci. Ser.1, 5: 11. 1837; Hook. f., Fl. Brit. India 463. 1874; Gamble, Fl. Pres. Madras 143. 1915; Nair & Henry, Fl. Tamil Nadu I, 1: 52. 1983; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 130. 1997.

Erect herbs, 35 cm high, stem terete. Leaves to 8 x 4 cm, ovate, acute at either ends, crenulate, glandular towards the base, glabrous; petiole to 5 cm long. Peduncles 6 cm long, few flowered. Flowers umbellate; pedicels 3 cm long; bracts broadly ovate; lip boat-shaped; spur short, straight; sepals orbicular, acute; standard orbicular, cuspidate, keeled; wings unequally two-lobed; lower lobe smaller. Capsule glabrous; seeds many, compressed, glabrous.

*Fl. & Fr.* : Throughout the year.

*Distr.* : South India. Common; in thick evergreen forests. Chokkampetti, *JA & KPR 17858.*

**Impatiens chinensis** L., Sp. Pl. 738. 1753; Hook. f., Fl. Brit. India 1: 444. 1874; Gamble, Fl. Pres. Madras 139. 1915; Sald. & Nicols., Fl. Hassan Dist. 402. 1967; Nair & Henry, Fl. Tamil Nadu I, 1: 52. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 78. 1996; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 131. 1997. ***Impatiens fasciculata*** Lam., Dict. 1: 359. 1873; Wight, Ic. t. 748. 1844.

Unbranched herbs, stems 40 cm high, reddish. Leaves to 10 x 1 cm, linear-oblong, cordate at base, distantly crenate, glabrous. Flowers binate, axillary, pedicelled; lip 8 mm long, acuminate and curved back at apex; spur 15 mm long, slender; standard 4 x 6 mm, orbicular, emarginate; terminal lobe of wing 14 mm long, ovate, obtuse, pink; basal lobe 4 mm long; dorsal auricle 4.5 mm long, slender. Capsule 10 mm long, glabrous.

*Fl. & Fr.* : July-December

*Distr.* : Peninsular India. Common; in marshy grasslands. Pachakkanam, JA *17865.*

**Impatiens cordata** Wight, Madras J. Lit. Sci. 5: 10. 1837; Hook. f., Fl. Brit. India 1: 462; Gamble, Fl. Pres. Madras 144. 1915; Nair & Henry, Fl. Tamil Nadu I, 1: 52. 1983; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 135. 1997 [Fig. 18B].

Procumbent herbs, 20-35 cm long. Leaves to 5 x 3.5 cm, ovate, cordate at base, acute at apex, crenate, glabrous; petioles to 8 cm long. Peduncle 6-8 cm long. Flowers 2-2.5 cm across, light pink; pedicels 1.5 cm long; lip 8 x 8 mm, concave, obtuse; spur 35 mm long, curved; sepals 5 x 4 mm, ovate, cordate at base, mucronate; standard 10 x 7 mm, oblong, emarginate at apex, round at base; wings 17 x 10 mm, two-lobed; lower lobe 5 x 3 mm, orbicular, vaulting over the anthers, reddish. Capsule 15 x 5 mm, curved-ellipsoid, glabrous; seeds 2 x 1 mm, ovoid, densely hairy along the margins, dark-brown.

*Fl. & Fr.* : September-December

*Distr.* : Southern Western Ghats (Kerala and Tamil Nadu). Common; in evergreen forests near water source. Inchippara, *JA 12594*; Uppermanalar, *NS & JA 12965.*

**Impatiens cuspidata** Wight & Arn., Comp. Bot. Mag. 1: 321. 1821; Wight, Ic. t. 741. 1844; Gamble, Fl. Pres. Madras 142. 1915; Nair & Henry, Fl. Tamil Nadu I, 1: 53. 1983; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 137. 1997. ***I. latifolia*** sensu Hook. f., Fl. Brit. India 1: 450. 1874, p.p., non L., 1753.

Shrubs, 60-150 cm high; stems branching, reddish, glabrous. Leaves alternate and opposite, crowding towards the apex of branches, 8-10 x 3 cm, elliptic, acute at both ends, crenate-serrate, glabrous; petiole 3-6 cm long, glandular. Flowers 2.5 cm across, axillary, 2-5-together, pedicels 4-8 cm long; lip funnel-shaped, cuspidate; spur 2.5 cm long, glabrous; sepals 5 mm long, linear; standard 10 x 17 mm, orbicular, bilobed above, strongly cuspidate; cusp 6 mm long, curved; wings 14 mm long, 2-lobed, lobes unequal, obtuse, rose. Capsule 25 x 9 mm, ellipsoid, acute, glabrous; seeds 6-9, 4.5 x 3 mm, rugose, hairy, dark-brown.

*Fl. & Fr.* : Throughout the year

*Distr.* : Southern Western Ghats (Kerala and Tamil Nadu). Common; in the opening of evergreen forests at higher elevations. Sunderamala, *JA 13599.*

**Impatiens dasysperma** Wight, Madras J. Lit. Sci. Ser.1, 5: 7. 1837; Wight, Ic. t. 742. 1844; Hook. f., Fl. Brit. India 1: 457. 1874; Gamble, Fl. Pres. Madras 143. 1915; Nair & Henry, Fl. Tamil Nadu I, 1: 53. 1983; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 139. 1997 [Fig. 18 C].

Erect herbs, 30 cm high. Leaves to 11 x 3.5 cm, elliptic, acuminate at apex, acute at base, crenate, hairy below; petiole 4 cm long. Flowers 20 mm across, solitary or binate, axillary; pedicels 3 cm long; lip 7 x 4 mm, acuminate, glabrous; spur 17 mm long, narrow, minutely hairy; sepals small, ovate, acute, hairy; standard 9 x 6 mm, obovate, emarginate at apex, sharply

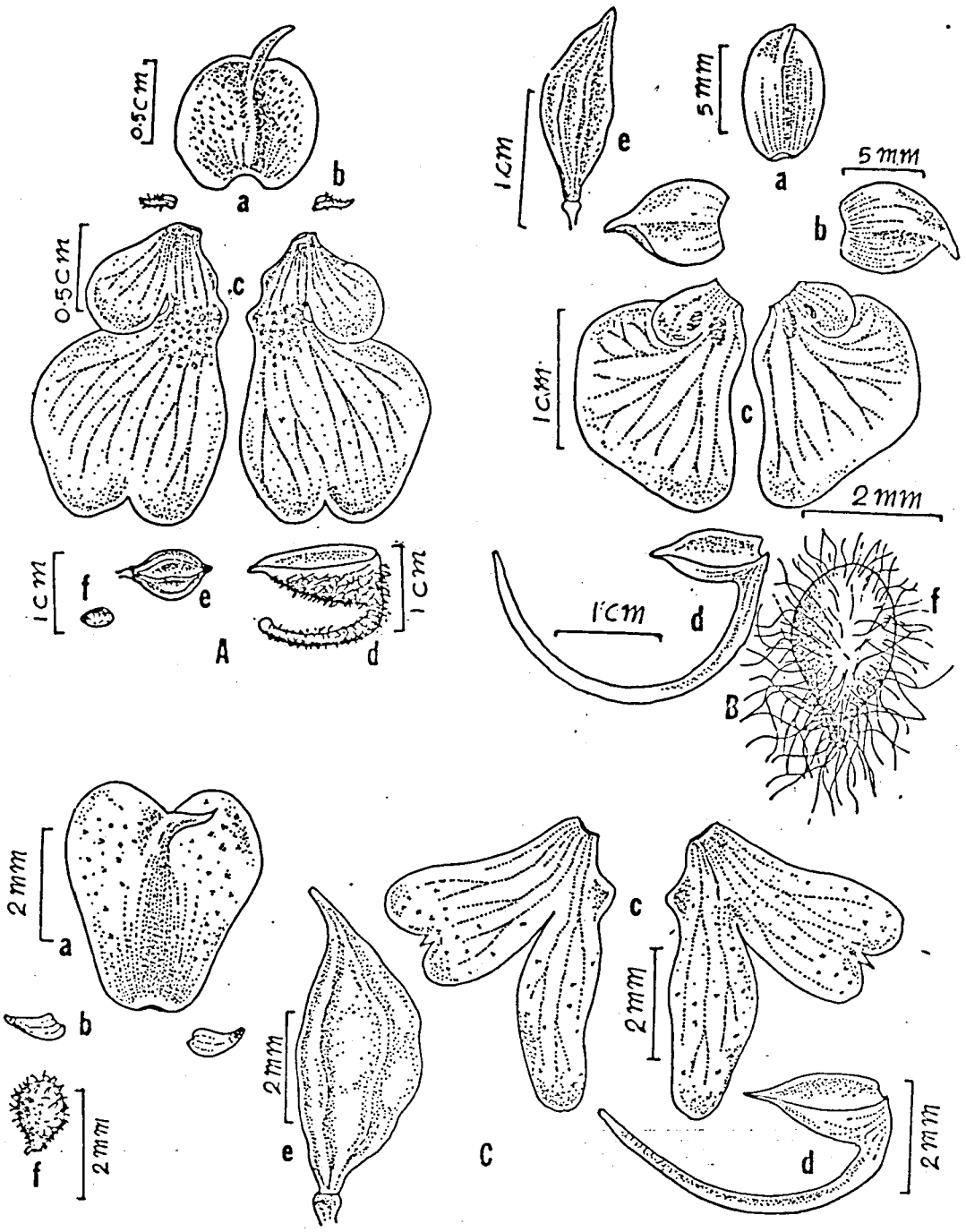



Fig. 18. Floral parts of *Impatiens* : **A**. *Impatiens balsamina* L.;
**B**. *Impatiens cordata* Wight; **C**. *Impatiens dasysperma* Wight;
**a**. standard; **b**. lateral sepals; **c**. wing petals; **d**. lip; **e**. capsule; **f**. seed.

cuspidate, keeled, keel ciliate; wings 9 x 10 mm, equally 2-lobed, lobes obovate, obcordate. Capsule 12 x 6 mm, glabrous; seeds 1.5 mm ovoid, minutely hirtus.

*Fl. & Fr.* : August-November

*Distr.* : Southern Western Ghats. Rare; in the evergreen forests at higher elevations. Kalvarimala, *JA 13912*; Vallakkadavu, *KPR & JA 17839.*

**Impatiens flaccida** Arn. in Hook., Comp. Bot. Mag. 1: 322. 1836; Hook. f., Fl. Brit. India 1: 457. 1874; Gamble, Fl. Pres. Madras 143. 1915; Wilson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 104. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 78. 1996; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 146. 1997.

Erect herbs; stem 25-40 cm high, glabrous. Leaves 5-7 x 1.5-3 cm, elliptic, acute at either ends, crenate, eglandular, glabrous; nerves 10 pairs; petiole 2-3 cm long. Flowers solitary or paired, axillary; pedicels to 5 cm long; lip 6 x 3.5 cm, acute; spur 2.8-3 cm long, slender, glabrous; sepal 2 x 1 mm, ovate, acute; standard 8-10 mm long, broadly oblong, emarginate at apex, keeled; lobes of wings equal, 13 mm long, obtuse, pink, dorsal auricle short, obtuse. Capsule 12 x 5 mm, ellipsoid, glabrous; seeds minutely hairy.

*Fl. & Fr.* : August-December

*Distr.* : South India and Sri Lanka. Common; in moist deciduous forests. Vallakkadavu, *KPR & JA 17870.*

**Impatiens goughii** Wight, Ill. 1: 160. 1840 & Ic. t. 1603. 1844; Hook. f., Fl. Brit. India 1: 452. 1874; Gamble, Fl. Pres. Madras 144. 1915; Nair & Henry, Fl. Tamil Nadu I, 1: 53. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 78. 1996; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 152. 1997. ***I. anamallayensis*** Bedd., Ic. t. 150. 1868-1874.

Herbs, stems 10-30 cm high, reddish, glabrous. Leaves opposite, 2-5 x 2-3 cm, elliptic, acute at either ends, serrate, with stalked glands towards base, glabrous; petiole 1-3 cm long, glabrous. Peduncles 4-6 cm long, glabrous. Flowers in racemes; lip boat-shaped, acute, cuspidate; spur 8-10 mm long, cylindric, curved, acute; sepals ovate, acute; standard 3-4 x 3 mm, orbicular; wings 10 mm long, 3-lobed, lobes shallow, equal; dorsal auricle slender, produced into the spur. Capsule 6 x 4 mm, ellipsoid, acute, glabrous.

*Fl. & Fr.* : June-November

*Distr.* : South Western Ghats. Common; among wet rocks in grasslands. Vallakkadavu, *KPR & JA 16394.*

**Impatiens grandis** Heyne ex Wall. in Roxb., Fl. Ind. 2: 465. 1824; Bedd., Ic. t. 153. 1868-1874; Hook. f., Fl. Brit. India 1: 463. 1874; Gamble, Fl. Pres. Madras 143. 1915; Nair & Henry, Fl. Tamil Nadu I, 1: 54. 1983; Wilson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 86. 1985; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 153. 1997. ***I. hookeriana*** Arn. in Hook. Comp. Bot. Mag. 1: 324. 1834; Hook. f., Fl. Brit. India 1: 463. 1874.

Shrubs, 2 m high, stem thick, succulent, glabrous. Leaves alternate, to 22 x 8 cm, elliptic, acute at either ends, crenate, glabrous, with a pair of stalked glands at the base; petiole 6-11 cm long. Flowers 5 cm across, umbellate, 3-7-together; peduncle to 15 cm long; lip 15 mm long, produced into a broad, funnel shaped spur of 45 mm long; standard 2 x 2 mm, orbicular, notched at apex; wings 2-lobed, lobes sub-equal, 20 mm long, obovate, obtuse, white, streaked with red lines. Capsule 25 x 7 mm, glabrous; seeds many, orbicular, glandular-pubescent, brown.

*Fl. & Fr.* : September-December

*Distr.* : South India and Sri Lanka. Common; in evergreen shola forests. Mangaladevi, *JA 12538*; Vellimala, *NS & JA 12935.*

**Impatiens hensloviana** Arn. in Hook., Comp. Bot. Mag. 1: 322. 1836; Hook. f., Fl. Brit. India 1: 458. 1874; Gamble, Fl. Pres. Madras 143. 1915; Nair & Henry, Fl. Tamil Nadu I, 1: 54. 1983; Wilson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 87. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 78. 1996; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 155. 1997. ***I. albida*** Wight, Madras J. Lit. Sci. 5: 7. 1837 & Ic. t. 743. 1844.

Shrubs, young stems ribbed. Leaves alternate, clustered towards the apex, to 15 x 6 cm, elliptic, acute at either ends, pubescent above and below; petiole to 10 cm long, pubescent. Flowers 4 cm across, solitary or paired, axillary; pedicels to 10 cm long, hairy; lip 12 mm long, funnel-shaped; spur 4.5 cm long; tomentose; sepals 8 x 4 mm, elliptic, acuminate; standard 14 mm long, broadly ovate, keeled; wings 20 mm long, 2-lobed; lobes subequal, obovate, white with red lines, glabrous. Capsule 2.5-3 cm, ellipsoid, acute; seeds many, 3 x 2 mm, ovate, acute, brown, rugose.

*Fl. & Fr.* : September-December

*Distr.* : South India and Sri Lanka. Common; along road cuttings in evergreen at higher elevations. Kottamala, *NS & JA 12912.*

**Impatiens herbicola** Hook. f., Kew Bull. 1911: 354. 1911; Gamble, Fl. Pres. Madras 141. 1915; Sald. & Nicols., Fl. Hassan Dist. 402. 1967; Nair & Henry, Fl. Tamil Nadu I, 1: 54. 1983; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 156. 1997 [Fig. 20 A].

Branched glabrous herbs, 25 cm high, erect. Leaves opposite, to 4.5 x 0.5 cm, linear-oblong, nearly entire, young ones pubescent above. Flowers paired, axillary; pedicels 1.5 cm long, pubescent on one side along a line. Lip 5 x 2 mm, boat-shaped, cuspidate, hairy; spur inconspicuous; sepals 4.5 mm long, linear, pubescent; standard 3 x 3.5 mm, obovate; keel ciliate, produced into a short cusp; wings 5 x 2 mm, 2-lobed; basal lobe shorter, dorsal auricle minute. Capsule 7-10 mm long, glabrous; seeds many, glabrous, dark-brown.

*Fl. & Fr.* : September-November

*Distr.* : South Western Ghats. Common; in grasslands. Varayattumudi, *JA 12431.*

**Impatiens inconspicua** Benth. ex Wight & Arn., Prodr. 139. 1834; Wight, Ic. t. 970. 1845; Hook. f., Fl. Brit. India 1: 447. 1874; Sald. & Nicols., Fl. Hassan Dist. 403. 1967; Nair & Henry, Fl. Tamil Nadu I, 1: 54. 1983; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 158. 1997. ***I. pusilla*** Heyne ex Hook. f., & Thoms., J. Linn. Soc. Bot. 4: 122. 1859; Gamble, Fl. Pres. Madras 140. 1915.

Profusely branched herbs, 20-50 cm high. Leaves 4-5 x 1.5 cm, elliptic to linear-oblong, cordate at base, glabrous; petiole to 1 cm long; upper leaves narrower with smaller petioles. Pedicel binate, 2 cm long, pubescent along one line. Lip 4 x 2.5 mm, saccate near the base, spurless; sepals 4 x 0.5 mm, linear; standard 4 x 4 mm, obtusely acute at apex; keel ciliate; wings 6.5 x 3 mm, 2-lobed, lobes unequal, lower lobe smaller, glabrous, yellowish-blue. Capsule 12 x 4 mm, glabrous; seeds few, 2 x 1.5 mm, globose, black, shining.

*Fl. & Fr.* : July-October

*Distr.* : South Western Ghats. Very common; in grasslands. Kalvarimala, *JA 13894*; Vallakkadavu, JA *16317.*

**Impatiens leptura** Hook. f., Fl. Brit. India 1: 467. 1875; Fischer, Bull. Misc. Inform. 391-393. 1934; Fischer in Gamble, Fl. Pres. Madras 1871. 1936; Nair & Henry, Fl. Tamil Nadu I, 1: 54. 1983; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 173. 1997 [Fig. 19 A].

Erect herbs; stems to 30 cm high, erect, glabrous. Leaves alternate, to 10 x 4 cm, acute at base, acuminate at apex, glabrous, crenate, crenations apiculate, lower margin with stalked glands. Peduncle 4-5 cm long, hirsute, 3-5-flowered towards the tip. Flowers 40 mm across; pedicels 2-3 cm long, hairy; lip 12 x 8 mm, saccate, acute; spur 3 cm long, slender; sepals 7.5 x 7 mm, obtusely acute, rounded at base, glabrous; standard 7 x 7 mm, orbicular, emarginate; wings 2.7 x 1.7 mm, 2-lobed; lower lobe 5 x 5 mm, orbicular, obtuse, pink; terminal lobe 21 x 17 mm, obovate, rounded, rose-pink. Capsule 10 x 3 mm, fusiform, glabrous; seeds 3 x 2 mm, oblong, glabrous, dark-brown.

*Fl. & Fr.* : October- December

*Distr.* : Southern Western Ghats (Kerala). Rare; in evergreen forests near water source. Inchipparathode, *JA 12589.*

**Impatiens levingei** Gamble ex Hook. f., Rec. Bot. Surv. India 4: 45 1906; Gamble, Fl. Pres. Madras 138. 1915; Nair & Henry, Fl. Tamil Nadu I, 1: 55. 1983 [Fig. 19 B].

Small epiphytic herbs; stem very small or absent. Leaves few, to 5 x 6 cm, broadly ovate, deeply cordate at base, acute at apex, distantly serrate, glabrous; petiole to 11 cm long. Scape 15-18 cm long, 1-3-together. Flowers few, white, confined towards the apex of the scape; pedicel 1.5 cm long, filiform, glabrous; bracts 2 mm long, ovate; lip 4.5 x 3 mm, ovate, concave, acute; spur 5 mm long, cylindrical, straight, glabrous; wings 9 mm long, lobes obtuse. Capsule 6-8 mm long; seeds 1.2 x 0.6 mm, glandular-hairy, reddish brown.

*Fl. & Fr.* : July-October

*Distr.* : Southern Western Ghats (Kerala). Common; along road cuttings in evergreen sholas. Kalvarimala, *JA 13872.*

**Impatiens lucida** Heyne ex Hook. f., Fl. Brit. India 1: 451. 1874, excl. syn. *I. latifolia* Wight & Arn.; Gamble, Fl. Pres. Madras 142. 1915; Barnes, J. Indian Bot Soc. 18: 101. 1939; 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 8 mm long, acuminate; spur 20-30 mm long, slender, straight, glabrous; sepals 8 mm long, broadly ovate, pubescent; standard 12 x 15 mm, obcordate, cuspidate, strongly keeled; wings 2-lobed; lobes equal, 13 mm long, emarginate. Capsule 12-15 mm long, ellipsoid, glabrous; seeds obovoid, densely hairy, dull brown.

*Fl. & Fr.* : September-November

*Distr.* : Southern Western Ghats (Kerala). Rare; in grasslands. Koruthode, *JA 17167.*

**Impatiens maculata** Wight, Madras J. Lit. Sci. 5: 12. 1837; Brit. India 1: 465. 1874; Gamble, Fl. Pres. Madras 145. 1915; Nair & Henry, Fl. Tamil Nadu I, 1: 55. 1983; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 177. 1997 [Fig. 19 C].

Large herbs, to 1-1.5 high; stems blotched with brown spots, ribbed. Leaves scattered, 10-15 x 3-6 cm, elliptic, acute at either ends, crenate-serrate, pubescent; petiole to 7 cm long; upper part of the petiole and base of the lamina with stalked glands. Racemes to 17 cm long, axillary;

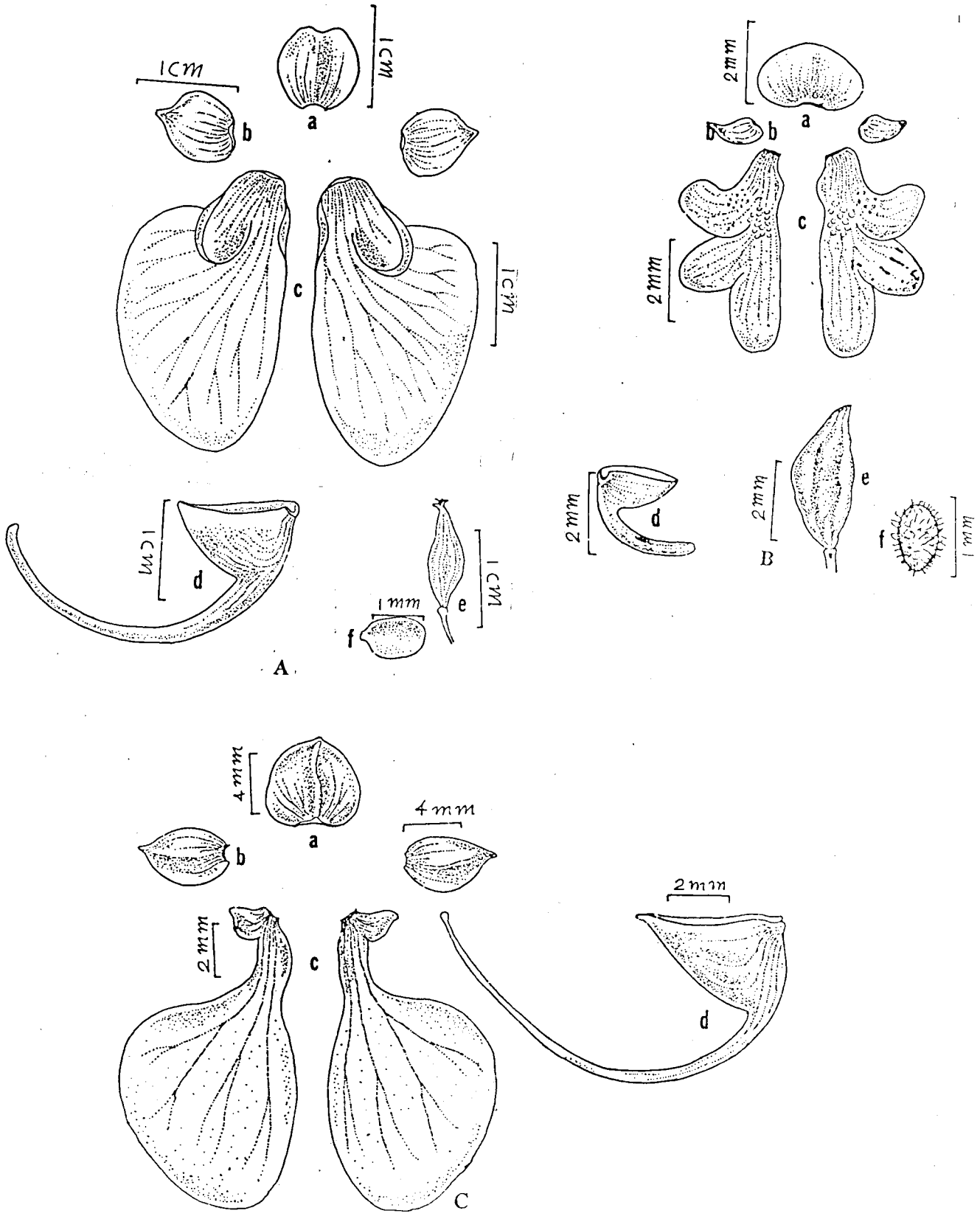



Fig. 19. Floral parts of *Impatiens* : **A**. *Impatiens leptura* Hook., f.; **B.** *Impatiens levengii* Gamble ex Hook. f.; **C**. *Impatiens maculata* Wight **a**. standard; **b**. lateral sepals; **c**. wing petals; **d**. lip; **e**. capsule; **f**. seed.

pedicels to 3 cm long. Flowers 3 cm across, solitary at nodes; lip 10 mm long, cuspidate; spur 15 mm long, tubular; sepals 6 x 3.5 mm, ovate; standard 5 x 6 mm, orbicular; wings 15-17 mm long; lower lobe very small, rose coloured; upper lobe 15-17 x 10-11 mm, obovate, obtuse. Capsule 8 x 6 mm, bulged to one side, glabrous; seeds many, ovoid, smooth, brown. .

*Fl. & Fr.* : July-December

*Distr.* : Southern Western Ghats (Kerala and Tamil Nadu). Common; in evergreen forests near water courses. Mlappara, *JA 12113.*

**Impatiens minor** (DC.) Benn., Indian J. For 2: 283. 1979; Sasidh. & Sivar., Fl. Pl. Thrissur For. 78. 1996; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 181. 1997. ***Balsamina minor*** DC., Prodr. 1: 686. 1824. ***Impatiens kleinii*** Wight, & Arn., Prodr. 140. 1834; Wight, Ic. t. 884. 1844; Hook. f., Fl. Brit. India 1: 445. 1874; Gamble, Fl. Pres. Madras 140. 1915; Sald. & Nicols., Fl. Hassan Dist. Dist. 403. 1967; Nair & Henry, Fl. Tamil Nadu I, 1: 55. 1983.

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 15 mm long, deflexed in fruit; lip 4 x 1.5 mm, acute; spur 10 mm long, straight, slender; sepals 4 mm long, ovate; standard 5 x 4 mm, concave, acute; wings 8 x 3 mm, unlobed, obovate, stalked, white to pink. Capsule 13 x 2 mm, linear, glabrous; seeds few, 1.5 mm long, biconvex, dark-brown.

*Fl. & Fr.* : August-November

*Distr.* : Peninsular India. Very common; in moist deciduous forests. Koruthode, *JA 16233.*

**Impatiens modesta** Wight, Madras J. Lit. Sci. 5: 13. 1837 & Ic. t. 968. 1844; Hook f., Fl. Brit. India 1: 442. 1874; Gamble, Fl. Pres. Madras 138. 1915; Nair & Henry, Fl. Tamil Nadu I, 1: 55. 1983; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 182. 1997 [Fig. 21 B].

Stemless herbs. Leaves 4-5 x 5 cm, broadly ovate, acute at apex, cordate at base, serrate, pubescent below; petiole to 10 cm long, 2-5-together. Scapes 20 cm long. Flowers 8-9 mm across, confined to the tip of the scape; bracts ovate, cordate at base; pedicels 1.5 cm long; lip 4 x 2.5 mm, ovate, obtuse; spur 4 mm long, straight, cylindrical, obtuse; sepals 2 x 1 mm, ovate; standard 3.5 x 4 mm, broadly ovate, obtuse, glabrous, entire; wings 6.5 mm long, lobes subequal, oblong, obtuse.

*Fl. & Fr.* : May-October

*Distr.* : Southern Western Ghats (Kerala). Common; as lithophyte or epiphyte in evergreen forests at higher elevations. Kottamala, *JA & KPR 15348.*

**Impatiens parasitica** Bedd., Madras J. Lit. Sci. 20: 66, t. 7, f. 2. 1859 & Ic. t. 140. 1868-1874; Gamble, Fl. Pres. Madras 139. 1915; Nair & Henry, Fl. Tamil Nadu. I, 1: 56. 1983; 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 [Fig. 20B].

Epiphytic herbs; stems succulent, unevenly thickened, reddish. Leaves to 5 x 2.5 cm, elliptic, acute at either ends, serrate, collected towards the apex, glabrous; petiole to 1.5 cm long. Cymes 2-4- flowered, axillary; peduncle 2 cm long, glabrous. Flowers 2 cm long; pedicels to 1.5 cm long; lip greenish at mouth, rest scarlet; spur 13 x 7 mm, reddish, striate, broad, obtuse; sepals 3 mm long, linear, green, acute; standard 12 x 14 mm, green with yellow margins, with a strong midrib; wings 7 x 7 mm, 2-lobed, lower lobe larger, flat, enter into the spur of the lip, red.

*Fl. & Fr.* : September-December

*Distr.* : Southern Western (Kerala and Tamil Nadu). Rare; in evergreen shola forests. Uppupara, *JA 12390.*

**Impatiens pulcherrima** Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 2: 37. 1850; Hook. f., Fl. Brit. India 1: 458. 1874; Gamble, Fl. Pres. Madras 143. 1915; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 198. 1997 [Fig. 21 A].

Herbs or subshrubs; 40-70 cm high. Leaves alternate, to 10 x 3 cm, elliptic, acuminate at apex, acute at base, serrate, glabrous; petiole 3 cm long. Flowers axillary, solitary or paired; pedicels 3.5 cm long, slender; lip 10 x 5 mm, boat-shaped, acuminate, keeled; spur 12-14 mm long, slender, curved; sepals minute; standard 8 x 10 mm, notched at apex, cuspidate from back, keeled, glabrous; wings 16 mm long, 2-lobed; lobes subequal, oblong, obtuse, light-pink. Capsule 10 x 3 mm, glabrous; seeds few, 1.5 x 1 mm, obovoid, rugose.

*Fl. & Fr.* : October-December

*Distr.* : Southern Western Ghats (Kerala and Karnataka). Common; in evergreen forests at higher elevations. Brook's peak, *JA 17017.*

**Impatiens rupicola** Hook. f., Kew Bull. (Misc. Inform.) 1910: 292. 1910; Gamble, Fl. Pres. Madras 140. 1915; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 206. 1997. ***I. rivulicola*** Hook. f., Kew Bull. (Misc. Inform.) 1911: 354. 1911; Gamble, Fl. Pres. Madras 140. 1915. ***I. chinensis*** L. var. ***rupicola*** (Hook.f.) Bhaskar, Indian J. For. 1: 172. 1978 [Fig. 21 C].

Fleshy herbs; stems 30-55 cm high, usually unbranched, reddish, young parts pubescent. Leaves opposite, 5-6 x 0.5 cm, linear-oblong, rounded at base, acute at apex, serrulate, scabrous above, pubescent below; stipules filiform, deflexed. Pedicels 2cm long, axillary, binate,

pubescent. Flowers pink; lip 8 x 4 mm, saccate, acuminate, hairy; spur 8 mm long, slender, hairy, slightly inflated; sepals 5-8 mm long, glabrous; standard 10 mm long, broadly ovate, shortly cuspidate, hairy; wings 10 mm long, very unequally 2-lobed. Capsule 8-10 x 3 mm, glabrous; seeds few, 2 x 1.5 mm, orbicular, dark-brown.

*Fl. & Fr.* : July-October

*Distr.* : Southern Western Ghats. Common; in marshy areas in grasslands. Nellipparakandom, *JA 12153.*

*Note* : The present collection is a new record for Kerala

**Impatiens scapiflora** Heyne ex Roxb., Fl. Ind. 2: 464. 1824; Hook. f., Fl. Brit. India 1: 443. 1874; Gamble, Fl. Pres. Madras 138. 1915; Sald. & Nicols., Fl. Hassan Dist. 403. 1967; Nair & Henry, Fl. Tamil Nadu I, 1: 56. 1983; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 208. 1997. ***I. rivalis*** Wight, Ic. t. 751. 1844.

Stemless herbs. Leaves to 13 x 8 cm, ovate, obtuse, cordate at base, glabrous; petiole 10-20 cm long. Scape to 35 cm long. Flowers 4 cm across, confined towards the apex; bracts 5-8 mm long, ovate, acute; pedicels 4-5 cm long; lip ovate, obtuse, spur 4-5 cm long, glabrous; sepals 4 x 3 mm, ovate, acute; standard concave at base, obtuse at apex; lobes of wings subequal, oblong, obtuse. Capsule 1.2 cm long, ellipsoid, glabrous; seeds glandular-hairy.

*Fl. & Fr.* : July-December

*Distr.* : Western Ghats. Common; on wet rocks in evergreen forests and grasslands. Chanthamarakokka, *JA 12288*; Vallakkadavu, *JA 14091.*

**Impatiens trichocarpa** Hook. f., in Hook,. Ic. t. 2914. 1913; Gamble, Fl. Pres. Madras 142. 1915; Sald. & Nicols., Fl. Hassan Dist. 404. 1967; Nair & Henry, Fl. Tamil Nadu I, 1: 56. 1983; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 218. 1997.

Herbs, stems to 35 cm high, terete. Leaves alternate, to 5 x 3 cm, ovate, acuminate, rounded at base, crenate, glabrous; petiole to 5 cm long. Flowers axillary, solitary; pedicels 3-7 cm long, glabrous; lip 6 x 3 mm, ovate, long-acuminate; spur 20 mm long, slender; sepals minute; standard 6 x 6 mm, emarginate and cuspidate, keeled, keel ciliate; wings 8-9 mm long, subequally 2-lobed; dorsal auricle rounded. Capsule 10 x 6 mm, puberulus; seeds many, obovate, hirtus, brown.

*Fl. & Fr.* : August-November

*Distr.* : Southern Western Ghats. Rare; among rocks in grasslands. Vallakkadavu, *KPR & JA 16808.*

Fig. 20. **A**. *Impatiens herbicola* Hook. f.

**B**. *Impatiens parasitica* Bedd.

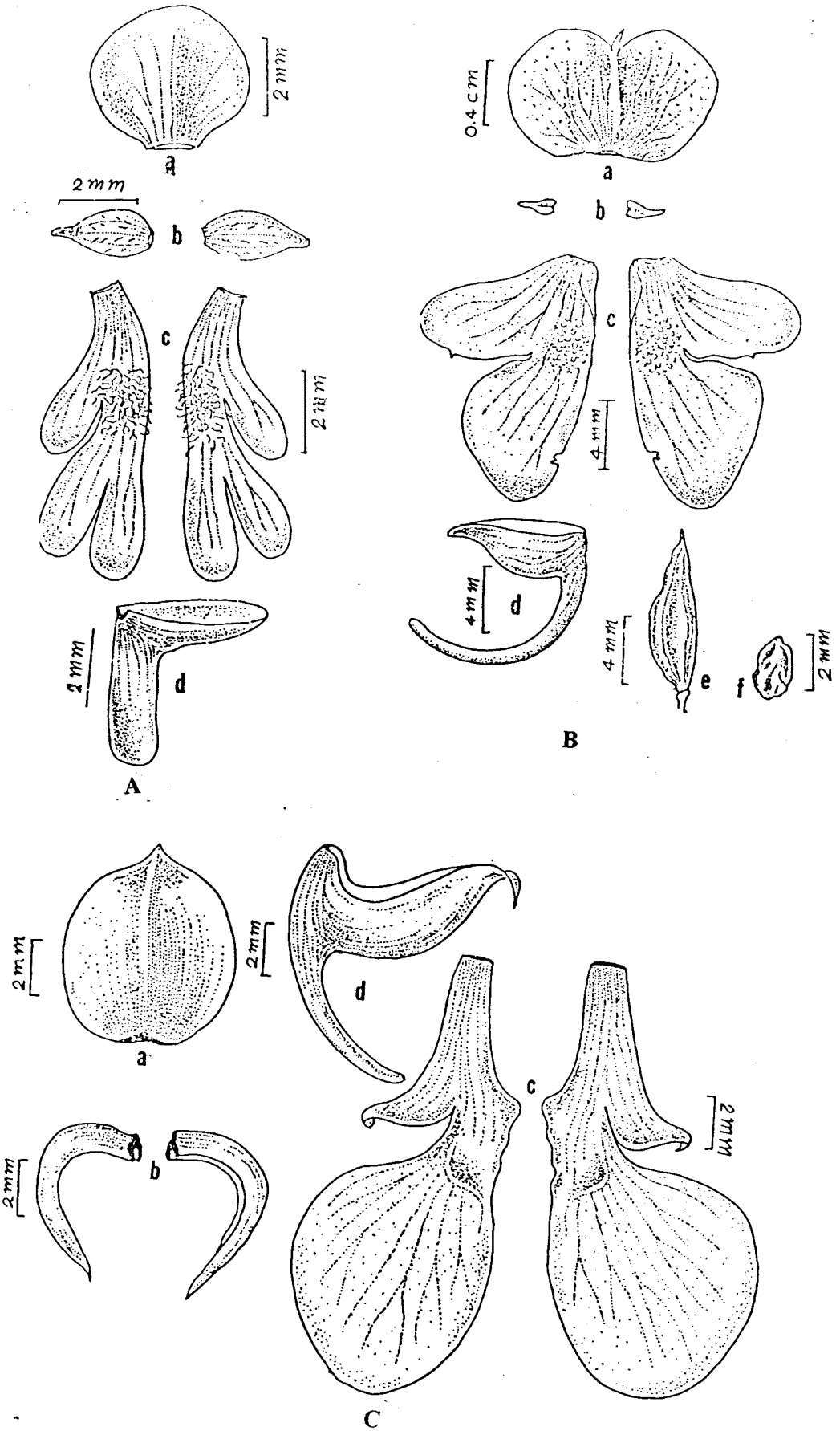



Fig. 21. Floral parts of *Impatiens*: **A**. *Impatiens modesta* Wight; **B**. *Impatiens pulcherrima* Dalz.; **C**. *Impatiens rupicola* Hook.f.; **a**. standard; **b**. lateral sepals; **c**. wing petals; **d**. lip; **e**. capsule; **f**. seed.

**Impatiens verecunda** Hook. f., Kew Bull. (Misc. Inform.) !911: 356. 1911; Gamble, Fl. Pres. Madras 145. 1915; Henry *et al.*, J. Bombay Nat. Hist. Soc. 75(3): 686. 1979; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 224. 1997 [Fig. 22 A].

Stems 15-30 high, glabrous. Leaves alternate, to 3 x 1.5 cm, elliptic, acute at apex, rounded at base, serrate, glabrous with stalked glands at base; petioles to 1 cm long. Peduncles 8-9 cm long, axillary. Flowers confined to the apex of peduncle; pedicels to 2 cm long, slender; lip 5 x 2 mm, boat shaped, cuspidate; spur 9 mm long, slender, glabrous, slightly curved, glabrous; sepals 2 x 0.75 mm, ovate, oblique at base; standard 2.5 x 2.5 mm, oblong, obtuse, glabrous; wings 10 x 5 mm, unequally 2-lobed; basal lobe 1.5 x 1 mm, acute, dorsal auricle 6-7 mm long, filiform, produced into the spur; terminal lobe stalked; stalk with three obtuse projections. Capsule 6 x 3 mm, glabrous; seeds many, pubescent, brown.

*Fl. & Fr.* : September-October

*Distr.* : Southern Western Ghats (Kerala). Rare; on wet rocks among grasslands. Vallakkadavu, *JA & KPR 14161.*

*Note*: The present collection is the first one after the type collection made by Meebold.

**Impatiens verticillata** Wight, Madras J. Lit. Sci. 5: 15. 1837; Hook. f., Fl. Brit. India 1: 452. 1874; Gamble, Fl. Pres. Madras 144. 1915; Nair & Henry, Fl. Tamil Nadu I, 1: 57. 1983; Wilson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 118. 1985; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 225. 1997 [Figs. 22 B & 23 A].

Erect branching herbs, 30-45 cm high; stems reddish, glabrous. Leaves whorled, 10-14 x 1-2 cm, narrowly elliptic, acute at either ends, serrate, glabrous; petiole 1.5 cm long. Peduncle 5 cm long, few-flowered. Flowers orange-red; pedicels 3.5 cm long, slender; lip 12 x 5 mm, curved, aristate; spur 35 mm long, curved, slender; sepals 12 x 3 mm, falcate; standard 12 x 10 mm, orbicular, cuspidate; wings 30 mm long, stalked, unequally two lobed. Capsule 20 mm long, glabrous; seeds many, 3 mm across, obovoid, densely hairy.

*Fl. & Fr.* : October-January

*Distr.* : South India and Sri Lanka. Common; on rocks along the river bed. Inchipparathode, *JA 12595*; Kozhikkanam, *JA 14382.*

**Impatiens viridiflora** Wight, Madras J. Lit. Sci. 5: 9. 1837; Bedd., Ic. t. 141. 1868-1874; Hook. f., Fl. Brit. India 5: 460. 1864; Gamble, Fl. Pres. Madras 139. 1915; Nair & Henry, Fl. Tamil Nadu I, 1: 57. 1983; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 226. 1997.

Stems succulent, cylindrical, reddish or greenish coloured. Leaves 3-5 x 2-3 cm, elliptic, acute at either ends, glabrous, usually collected towards the tip of the stem; petiole 1-2 cm long. Cymes

1-4 flowered, axillary or terminal; pedicels drooping. Flowers scarlet-green; lip 1 cm broad at mouth, produced into the spur, scarlet or pink, glabrous; sepals 8 x 2 mm, ovate, green and pink; standard broad, reddish; wings 12 mm long, 2-lobed; lobes orbicular, obtuse, red, glabrous.

*Fl. & Fr.* : October-December

*Distr.* : Southern Western Ghats (Kerala and Tamil Nadu). Common; in evergreen forests at higher elevations. Uppermanalar, *NS & JA 12967.*

**Impatiens viscosa** Bedd., Madras J. Lit. Sci.10: 66. t. 7. f. 7. 1859; Hook. f., Fl. Brit. India 1: 453. 1864. Gamble, Fl. Pres. Madras 144. 1915; Nair & Henry, Fl. Tamil Nadu I, 1: 57. 1983; Vivek. *et al.* in Hajra *et al.*, Fl. India 4: 228. 1997. ***I. ballardii*** Bedd., Ic. t. 192. 1868-74; Hook. f., Fl. Brit. India 1: 482. 1864 [Figs. 22 C & 23 B].

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 cm long, slender; lip 7 x 4 mm, ovate, acuminate; spur 15 mm long, ensiform, acute; sepals ovate, acute; standard 4 x 4 mm, rounded at apex; wings 15 x 8 mm, 2-lobed; lower lobe very small; dorsal auricle filiform, 10 mm long, produced into the spur. Capsule 10 x 4mm, glabrous; seeds many, 1 x 0.5 mm, densely hairy, dark-brown.

*Fl. & Fr.* : September-November

*Distr.* : Southern Western Ghats (Kerala). Very common; along the margins of sholas and grasslands. Ennakkapally, *JA 12447*; Vallakkadavu, *JA 17838.*

## 30. RUTACEAE

Juss., Gen. Pl. 296. 1789.

1. Leaves 1-foliolate.....2
1. Leaves 3-many-foliolate.....4
2. Leaves opposite.....**Acronychia**
2. Leaves alternate.....3
3. Leaves thick, veins invisible.....**Pamburus**
3. Leaves thin, veins visible.....**Atalantia**
4. Stamens equal to the number of sepals.....5
4. Stamens twice the number of sepals.....7
5. Leaves opposite; unarmed trees.....**Melicope**
5. Leaves alternate; armed climbers or shrubs.....6
6. Styles 4, free; fruit a capsule.....**Zanthoxylum**
6. Style 1; fruit a berry.....**Toddalia**

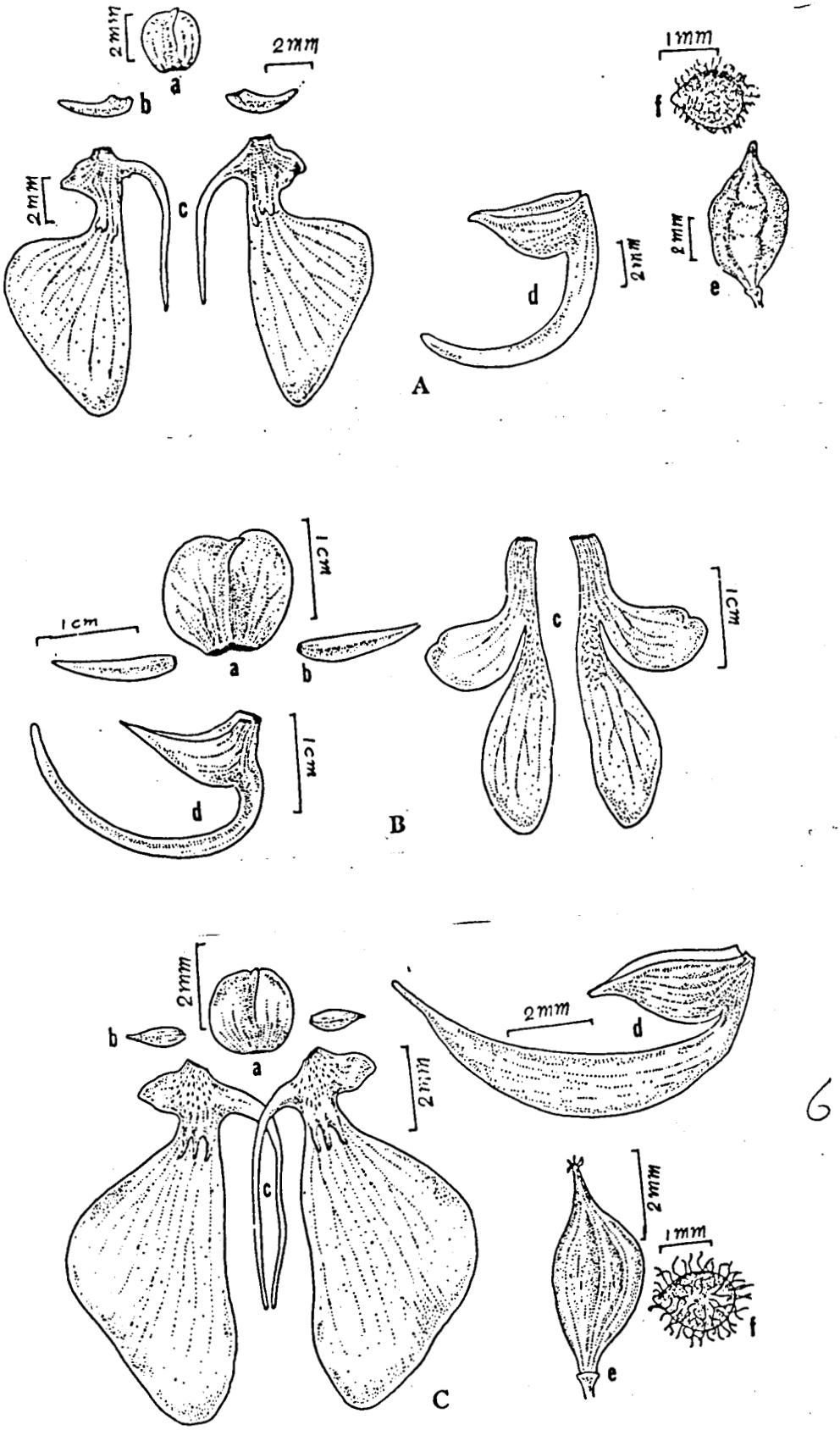



Fig. 22. Floral parts of *Impatiens* : **A**. *Impatiens verecunda* Hook.f.; **B**. *Impatiens verticillata* Wight; **C**. *Impatiens viscosa* Bedd.; **a**. Standard; **b**. lateral sepals; **c**. wing petals; **d**. lip; **e**. capsule; **f**. seed.

Fig. 23 : **A**. *Impatiens verticillata* Wight
**B**. *Impatiens viscosa* Bedd.

7. Rachis winged.....**Naringi**

7. Rachis wingless.....8

8. Thorny climbers.....**Luvunga**

8. Shrubs or trees, unarmed.....9

9. Large dioecious trees.....**Vepris**

9. Shrubs or small trees; flowers bisexual.....10

10. Style persistent.....**Glycosmis**

10. Style deciduous.....11

11. Flowers 8 mm across; petals clawed; filaments subulate.....**Murraya**

11. Flowers 5 mm across; petals not clawed; filaments dialated below.....**Clausena**

## ACRONYCHIA J. R. Forster & J. G. A. Forster

Charact. Gen. 53, t. 27. 1776, *nom. cons.*

**Acronychia pedunculata** (L.) Miq., Fl. Ind. Bat. Suppl. 532. 1861; Sald. & Nicols., Fl. Hassan Dist. 381. 1967; Stone in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 412. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 80. 1996; Nair & Nayar in Hajra *et al.*, Fl. India 4: 392. 1997. ***Jambolifera pedunculata*** L., Sp. Pl. 349. 1753. ***Acronychia laurifolia*** Bl., Cat. Gew. Buitenz. 63. 1823 & Bijdr. 245. 1825; Hook. f., Fl. Brit. India 1: 498. 1875; Gamble, Fl. Pres. Madras 152. 1915.

Small to medium sized trees; branchlets stout, terete, glabrous. Leaves 9-15 x 3-6 cm, obovate to oblong, obtusely acute at apex, acute at base; nerves to 13 pairs, strongly reticulate. Panicle 5-8 cm across, axillary; peduncle to 6 cm long. Flowers bisexual, many, pedicelled; sepals 4, 1.5 mm long, ovate, obtuse; petals 4, 6 x 2 mm, oblong, densely hairy within; stamens 8, 2-seriate; filaments unequal, densely reflexed-hairy; anthers oblong; ovary 4-celled, tomentose; style 1, 3 mm long. Drupe 10 mm across, globose, obtusely 3-angled.

*Fl. & Fr.* : July-August

*Distr.* : India, Sri Lanka & Taiwan. Very common; in semi-evergreen and evergreen forests. Mangaladevi, *JA 12029*; Vellimala, *JA 13991*; Kottamalapallam, *JA 15217.*

## ATALANTIA Correa

Ann. Mus. Natl. Hist. Nat. 6: 383. 1805, *nom. cons.*

Shrubs or small trees, usually unarmed. 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. Stamens monadelphous; flower buds globosa.....**A. racemosa**

1. Stamens free; flowers buds oblong.....**A wightii**

**Atalantia racemosa** Wight & Arn., Prodr. 91. 1834; Hook. f., Fl. Brit. India 1: 512. 1875; Gamble, Fl. Pres. Madras 159. 1915; Stone in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 419. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 80. 1996; Nair & Nayar in Hajra *et al.*, Fl. India 4: 271. 1997. ***Sclerostylis parviflora*** Wight, Ic. t. 71. 1838.

Small trees, branchlets glabrous. Leaves to 13 x 5 cm, elliptic-oblong, acute at either ends, retuse; nerves many, obtuse; petiole to 1 cm long. Raceme 1-3 cm long, axillary. Flowers 5 mm across; pedicels 2 mm long; sepals orbicular, ciliate; petals white, 3.5 x 3 mm, orbicular, ciliate at apex; staminal tube 1 mm long; anthers 1.5 mm long, cordate at base; ovary 2-celled; style short or absent; stigma clavate.

*Fl.* January-March

*Distr.* : South India and Sri Lanka. Common; in evergreen forests. Koruthode, *JA 13393.*

**Atalantia wightii** Tanaka, Bull. Soc. Bot. France 75: 714. 1928; Sald. & Nicols., Fl. Hassan Dist. 382. 1967; Sasidh. & Sivar., Fl. Pl. Thrissur For. 80. 1996; Nair & Nayar in Hajra *et al.*, Fl. India 4: 274. 1997. ***A. ceylanica*** sensu Hook. f., Fl. Brit. India 1: 512. 1875, non (Arn.) Oliver, 1861: Gamble, Fl. Pres. Madras 160. 1915.

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 5 mm long, hispid. Flowers 12 mm across; sepals 2 mm long, ovate, acute, ciliate, petals white, 9 x 2 mm, oblong, obtuse; stamens 8, filaments 4 mm long, inner ones smaller; style 5 mm long. Fruits not seen.

*Fl.* : January

*Distr.* : Western Ghats. Endemic. Rare; in evergreen forests. Thaannikkudy, *JA 13065.*

## 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. Leaves 7-foliolate; leaflets 12-15 cm long, white beneath; small shrubs.....**C. austroindica**

1. Leaves 12 or more-foliolate; leaflets to 7 cm long; large shrubs or small trees.....2

2. Leaflets serrate, acuminate; flowers 4-merous.....**C. anisata**

2. Leaflets entire, acute; flowers 5-merous.....**C. indica**

**Clausena anisata** (Willd.) Hook.f. ex Benth. in Hook., Niger Fl. 256. 1849; Nair & Nayar in Hajra *et al.*, Fl. India 4: 321. 1997. ***Amyris anisata*** Willd., Sp. Pl. ed. 4(2): 337. 1799. ***Amyris dentata*** Willd., Sp. Pl. 2: 337. 1799. ***Clausena willdenowii*** Wight & Arn., Prodr. 96. 1834; Wight, Ic. t. 14. 1838; Hook. f., Fl. Brit. India 1: 506. 1875; Gamble, Fl. Pres. Madras 155. 1915. ***Clausena dentata*** (Willd.) Roem., Syn. Hesper. 1: 44. 1846; Stone in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 435. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 81. 1996. **Kattumunthiri** (Mannan).

Shrubs to small trees; bark brown; twigs puberulus. Leaves to 25 cm long; leaflets 7-9 pairs, sub-opposite, to 6 x 3 cm; ovate, acute, nerves 9 pairs, pubescent below. Panicles to 10 cm long, axillary. Flowers pedicelled; 8-10 mm across; sepals 4, 1 mm long, oblong, obtuse; petals 5 mm long, obovate, concave; stamens 8, filaments unequal, glabrous. Berry 8 mm across, globose, glandular; seeds few, seated in yellow pulp.

*Fl. & Fr.* : March-June

*Distr.* : India, China & Sri Lanka. Common; in evergreen forests. Thekkady, *JA 17931.*

*Ethnobotanical use* : The fruits are eaten.

**Clausena austroindica** Stone & Nair, Nordic J. Bot. 14: 491. 1994; Nair & Nayar in Hajra *et al.*, Fl. India 4: 322. 1997. ***Amyris heptaphylla*** Roxb., Fl. Ind. 2: 248. 1832. ***C. heptaphylla*** (Roxb.) Wight & Arn., Prodr. 95. 1834; Hook. f., Fl. Brit. India 1: 504. 1875; Gamble, Fl. Pres. Madras 155. 1915; Sasidh. & Sivar., Fl. Pl. Thrissur For. 81. 1996.

Shrubs to 1.5 m high, fragrant. Leaf 20-40 cm long, 7 or 8 foliolate; leaflets to 15 x 6 cm, elliptic, acute at apex, attenuate at base, glaucous below; lateral nerves to 13 pairs, prominent below; petiolule 5 mm long. Panicle 20 x 5 cm, terminal. Flowers shortly pedicelled, 4 mm across; sepals 4 or 5, very small, ovate, acute; petals yellow, 3 x 2 mm, concave, glabrous; filaments shorter than anthers, thickened at base; ovary depressed, globose; style constricted at base. Berry 10 x 7 mm, ovoid; seeds 1, ovoid, rugulose.

*Fl. & Fr.* : August-January

*Distr.* : India and Burma. Common; in evergreen forests. Koruthode, *JA 12234; JA & KPR 14729.*

**Clausena indica** (Dalz.) Oliver, J. Linn. Soc. Bot. 5: 36. 1861; Hook. f., Fl. Brit. India 1: 505. 1875; Gamble, Fl. Pres. Madras 155. 1915; Stone in Dassan. & Fosb., Rev. Handb. Fl. Ceylon

5: 436. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 81. 1996; Nair & Nayar in Hajra *et al.*, Fl. India 4: 328. 1997. ***Piptostylis indica*** Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 33, t. 2. 1851. **Kattu kariveppu** (Mannan).

Small trees; branchlets puberulus. Leaves to 23 x 10 cm, 12-16-foliolate; leaflets alternate, 7 x 4 cm, ovate, oblique at base, acute or obtuse at apex; lateral nerves 5 pairs; petiolule 3 mm long. Panicle to 10 cm across, terminal or subterminal, branches puberulus. Flowers sessile, 3 mm across; sepals ovate, acute, ciliate; petals greenish white, 2.5 x 1.5 mm, ovate, glabrous; stamens 10, filaments glabrous, Berry 8 mm across, globose, dark blue; seeds 1-4, biconvex, glabrous.

*Fl. & Fr.* : July-August

*Distr.* : India and Sri Lanka. Common; in semi-evergreen forests. Kokkara, *JA 12018.*

*Ethnobotanical use* : The leaves are added to curries as a flavouring condiment.

## GLYCOSMIS Correa

Ann. Mus. Natl. Hist. Nat. 6: 384. 1805, *nom. cons.*

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 one in each cell; style short; stigma capitate. Fruit a berry, 1-3-seeded; seeds globose.

1. Leaves to 1.5 cm broad; flowers ca. 2 mm across.....**G. angustifolia**
1. Leaves 6-7 cm broad; flowers 4-5 mm across.....2
2. Sepals ciliate; berry ca. 8 mm across; leaves with 12-14 pairs of nerves.....**G. mauritiana**
2. Sepals glabrous; berry ca. 15 mm across; leaves with 8 pairs of nerves.....**G. macrocarpa**

**Glycosmis angustifolia** Lindl. ex Wight & Arn., Prodr. 93. 1834; Narayanaswami, Rec. Bot. Surv. India 14(2): 64. 1941; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 60. 1983; Stone in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 443. 1985; Nair & Nayar in Hajra *et al.*, Fl. India 4: 333. 1997. ***G. pentaphylla*** Correa var. ***angustifolia*** (Lindl. ex Wight & Arn.) Oliver in Hook. f., Fl. Brit. India 1: 500. 1875.

Large shrubs, to 2.5 m high; branchlets slender. Leaves 3-5-foliolate; leaflets 5.5 x 1.5 cm, elliptic-lanceolate, obtusely acute at apex, acute at base, glabrous, nerves 10 pairs, reticulate; petiolule 2 mm long. Panicle 1 cm across, shortly peduncled or sessile, axillary. Flowers few, 2 mm across; sepals triangular, ciliate; petals 1.5 x 1 mm, glabrous; anthers sparsely hairy; style obconical. Berry 5 mm across, globose.

*Fl. & Fr.* : June-August

*Distr.* : South India and Sri Lanka. Rare; in evergreen forests at high elevations. Deviar, *JA 12099.*

**Glycosmis macrocarpa** Wight, Ill. 1: 109. 1840; Subram. & Henry, Bull. Bot. Surv. India 12: 3. 1970; Nair & Henry, Fl. Tamil Nadu Ser. 1, 1: 60. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 82. 1996; Nair & Nayar in Hajra *et al.*, Fl. India 4: 339. 1997. ***G. pentaphylla*** Hook. f., var. ***macrocarpa*** (Wight) Hook. f., Fl. Brit. India 1: 500. 1875.

Shrubs, to 2 m high; leaflets 3-7, to 22 x 7 cm, elliptic, obtusely acuminate at apex, acute at base, pale beneath, nerves 8 pairs; petiolule 5 mm long. Panicle 4 x 3 cm, terminal, congested; peduncle to 3 cm long. Flowers 4 mm across, densely packed; sepals triangular, acute, spreading; petals 2 x 1 mm, ovate, obtuse; stamens 10, filaments equal to anthers in length; ovary 3-celled. Berry globose, greenish-red.

*Fl. & Fr.* : August-February

*Distr.* : South India. Endemic. Common; in evergreen forests. Sabarimala, *JA 12369, JA & KPR 14923*; Kurisumala, *JA 13051.*

**Glycosmis mauritiana** (Lam.) Tanaka, Bot. Not. 1928: 159. 1928; Nair & Henry, Fl. Tamil Nadu Ser. 1, 1: 60. 1983; Stone in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 446. 1985; Nair & Nayar in Hajra *et al.*, Fl. India 4: 340. 1997. ***Limonia mauritiana*** Lam., Encycl. 3: 517. 1792. ***Glycosmis pentaphylla*** sensu Narayanaswami, Rec. Bot. Surv. India. 14(2): 12. 1941, non DC., 1824.

Shrubs to 1.5 m high; stem reddish, glabrous or puberulus. Leaves 5-foliolate, leaflets to 18 x 7 cm, obovate, obtuse at apex, acute at base, nerves 10-12 pairs, reticulate beneath. Panicle to 10 x 5 cm, ferrugineous tomentose. Flowers 4 mm across, sessile; sepals triangular, ciliate, petals white, 3 x 2 mm, obovate, obtuse, glandular; stamens 10; filaments shorter than anthers. Berry pale pink, glabrous.

*Fl. & Fr.* : August-February

*Distr.* : South East Asia to Malesia. Common; along margins of evergreen forests. Koruthode, *JA & KPR 14737.*

## LUVUNGA Buchanan-Hamilton ex Wight & Arnott

Prodr. 90. 1834.

**Luvunga eleutherandra** Dalz. in Hook. f., Fl. Brit. India 1: 509. 1875; Gamble, Fl. Pres. Madras 157. 1915; Sasidh. & Sivar., Fl. Pl. Thrissur For. 83. 1996; Nair & Nayar in Hajra *et*

*al.*, Fl. India 4: 296. 1997. ***Triphasia sarmentosa*** Bl., Bijdr. 1: 132. 1825. ***Luvunga sarmentosa*** (Bl.) Kurz. in J. Asiat. Soc. Bengal 39: 69. 1870; Sald. & Nicols., Fl. Hassan Dist. 386. 1967; Nair & Henry, Fl. Tamil Nadu Ser. 1, 1: 61. 1983. **Kezhakomban mullu** (Mannan).

Large woody climbing shrubs, thorns axillary, 2 cm long, recurved. Leaves 3-foliolate; leaflet to 12 x 4 cm, oblong, acute or obtuse at apex, acute at base, shining above; nerves obscure; petiole 6 cm long; petiolule 8 mm long, thick. Cymes axillary, 3 cm across, sessile or shortly pedunculate. Flowers 1 cm across, shortly pedicelled; calyx cupular, shallowly 4-lobes; petals 4, 8 x 3 mm, oblong; stamens 8, filaments 4 mm long; anthers cleft at base, oblong; ovary 4-celled; ovules paired in each cell; style stout; stigma terminal, capitate. Fruit a berry, 2.5 x 2 cm, globose-oblong, smooth; seeds 1-4-oblong, covered with mucilaginous pulp.

*Fl. & Fr.* : March-August

*Distr.* : Indo-Malesia. Occasional; in evergreen and semi-evergreen forests. Karadikkavala, *JA 12049*; Arjunankotta, *JA 14917.*

*Ethnobotanical use* : The stem of this climber is occasionally used for making baskets (Mannan)

## MELICOPE J. R. Forster & G. Forster

Charact. Gen. 55. 1776

**Melicope lunu-ankenda** (Gaertn.) T. Hartley in Sandakania 4: 61. 1994; Nair & Nayar in Hajra *et al.*, Fl. India 4: 392. 1997. ***Fagara lunu-ankenda*** Gaertn., Fruct. 1: 334, t. 68. f. 9. 1788. ***Zanthoxylum triphyllum*** Wight, Ic. t. 204. 1839. ***Euodia roxburghiana*** Benth., Fl. Hong. 59. 1861; Hook. f., Fl. Brit. India 1: 487. 1875. ***E. lunu-ankenda*** (Gaertn.) Merr. in Philipp. J. Sci. 7: 378. 1912; Gamble, Fl. Pres. Madras 148. 1915; J. R. & G. Forst., J. Econ. Tax. Bot. 13(1): 197. 1989; Nair & Henry, Fl. Tamil Nadu Ser. 1, 1: 60. 1983; Stone in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 440. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 82. 1996.

Medium size trees; bark brown, smooth; branchlets minutely pubescent. Leaves opposite, 3-foliolate; leaflets to 18 x 8 cm, elliptic, abruptly acuminate at apex, acute at base; nerves 16-22 pairs, parallel; petiole 10 cm long. Panicle 15 x 5 cm, axillary, densely pubescent. Flowers unisexual, polygamous, 3 mm across; sepals 4, 1 mm long, ovate, acute, tomentose; petals 4, 2 mm long, ovate; stamens 4, free; ovary deeply 4-lobed, 4-celled; ovules 2 in each cell; stigma 4-lobed. Fruit 4 1-seeded cocci, 3 mm diam.; seeds globose, rugose.

*Fl. & Fr.* : August-December

*Distr.* : South India and Sri Lanka. Very common; in semi-evergreen and moist deciduous forests. Thaannikkudy, *JA 18448.*

MURRAYA J.G.Koenig ex Linnaeus,

Mant. 2: 554, 563. 1771 *nom. cons.*

**Murraya paniculata** (L.) Jack., Malayan Misc. 1: 31. 1820; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 61. 1983; Stone in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 459. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 83. 1996; Nair & Nayar in Hajra *et al.*, Fl. India 4: 352. 1997. *Chalcas paniculata* L., Mant. Pl. 563. 1767. *Murraya exotica* L., Mant. Pl. 563. 1771; Wight, Ic. t. 96. 1838; Hook. f., Fl. Brit. India 1: 502. 1875; Gamble, Fl. Pres. Madras 155. 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 5,1 mm long, ovate, acute; petals white, 17 x 6 mm, oblanceolate, clawed, imbricate; stamens 10, 2-seriate, filaments 8 mm long, inner smaller; anthers ovate; ovary 2-celled; oblong, glabrous; style slender; stigma capitate. Berry 15 x 7 mm, oblong, reddish; seeds planoconvex, densely white-woolly.

*Fl. & Fr.* : May-October

*Distr.* : South Asia & Australia. Common; in semi-evergreen forests. Mangaladevi, *JA 12536*; Thaannikkudy, *JA 13789*; Sabarimala, *KPR 14964.*

**NARINGI** Adanson

Fam. 2: 341. 1763.

**Naringi crenulata** (Roxb.) Nicolson in Sald. & Nicols., Fl. Hassan Dist. 387. 1976; Nair & Henry, Fl. Tamil Nadu Ser. 1, 1: 61. 1983; Stone in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 462. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 84. 1996; Nair & Nayar in Hajra *et al.*, Fl. India 4: 302. 1997. *Limonia crenulata* Roxb., Pl. Corom. t. 86. 1798; Gamble, Fl. Pres. Madras 157. 1915. *L. acidissima* auct. non L., 1762: Hook. f., Fl. Brit. India 1: 507. 1875.

Large shrubs or small trees, armed with axillary erect spines; branchlets angled, white. Leaves 3-7-foliolate; leaflets opposite, to 5 x 2 cm, elliptic-obovate, obtuse or obtusely acute, crenate; rachis winged. Flowers 6-8 mm across, 3-6 together in axillary cymes; pedicel 10 mm long; sepals 4, free or united at base; petals 4, 4 x 2 mm, oblong, white; stamens 8, filaments equal; anthers sagitate at base; ovary globose, 4-celled; style stout; stigma capitate. Berry 8 mm across, globose; seeds 1-3, ovoid, dull yellow, smooth.

*Fl. & Fr.* : February-May

*Distr.* : South-west China & southward to Sri Lanka. Occasional; in semi-evergreen forests. Koruthode, *JA 14752.*

## PAMPURUS Swingle

J. Washington Acad. Sci. 6: 336. 1916.

**Pamburus missionis** (Wall. ex Wight) Sw., J. Washington Acad. Sci. 6: 338. 1916 & Citrus Ind. 1: 263. 1967; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 61. 1983; Nair & Nayar in Hajra *et al.*, Fl. India 4: 304. 1997. ***Limonia missionis*** Wight, Ic. t. 175. 1839. ***Atalantia missionis*** Oliv., J. Linn. Soc. 5 (Suppl.): 25. 1861; Hook. f., Fl. Brit. India 1: 513. 1875.

Large shrubs; branchlets minutely hispid. Leaves alternate, to 13 x 7.5 cm, ovate, acute, retuse or rounded at apex; rounded at base; nerves 7-8 pairs, reticulate, glabrous; petiole 8 mm long. Flowers 8 mm across, in axillary cymes; pedicels glabrous; bracts ovate, ciliate; sepals 4, 1 mm long, triangular, acute; petals 4, white, 5 x 2 mm, obovate, obtuse; stamens 8, filaments 2.5 mm long, stout; anthers cordate at base, obtuse at apex; disc annular; ovary 4-celled, smooth; ovules paired in each cell; style 2 mm long; stigma capitate. Fruits not seen.

*Fl.* March

*Distr.* : Southern Western Ghats. Rare; in semi-evergreen forests. Umikuppan, *JA 14885.*

## TODDALIA A. L. Jussieu

Gen. 371. 1789, *nom. cons.*

**Toddalia asiatica** (L.) Lam., Tabl. Encycl. 2: 116. 1797; Gamble, Fl. Pres. Madras 150. 1915; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 62. 1983; Nicols. in Sald. & Nicols., Fl. Hassan Dist. 388. 1967; Sasidh. & Sivar., Fl. Pl. Thrissur For. 84. 1996; Nair & Nayar in Hajra *et al.*, Fl. India 4: 403. 1997. ***Paullinia asiatica*** L., Sp. Pl. 365. 1753. ***Scopolia aculeata*** Smith, Ic. ined. 2: t. 34. 1790. ***Toddalia aculeata*** (Smith) Pers., Syn. Pl. 1: 249. 1805; Hook. f., Fl. Brit. India 1: 497. 1875. **Kottam** (Mannan)

Erect or climbing shrubs, usually armed with prickles. Leaves 3-foliolate; leaflets to 9 x 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 2 in each cell; style absent, stigma capitate, sessile. Berry 7 x10 mm, depressed-globose; seeds 1-4, ovoid, in fleshy pulp.

*Fl. & Fr.* : December-August

*Distr.* : India, Sri Lanka and Malesia. Common; in evergreen forests. Deviar, *JA 12103, 13199*; Uppermanalar, *13705;* Vavalala, *JA 14425, NS 5239.*

*Note*: A highly polymorphic species which shows variations in habit and leaf-shape. The bark is given to mother after childbirth.

VEPRIS Commerson ex A. Jussieu

Mem. Mus. Hist. Nat. Paris 12: 509. 1825.

**Vepris bilocularis** (Wight & Arn.) Engl. in Engl. & Prantl, Pflanzenfam. 3(4): 178. 1896; Gamble, Fl. Pres. Madras 151. 1915; Nicols. in Sald. & Nicols., Fl. Hassan Dist. 388. 1967; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 62. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 85. 1996; Nair & Nayar in Hajra *et al.*, Fl. India 4: 405. 1997. ***Toddalia bilocularis*** Wight & Arn., Prodr. 149. 1834; Bedd., Ic. t. 167. 1874; Hook. f., Fl. Brit. India 1: 497. 1875.

Medium sized trees, bark white corky; branchlets glabrous. Leaves 3-foliolate; leaflets to 19 x 7 cm, obovate-oblanceolate, abruptly acuminate, entire; nerves many, closely parallel, joining into an intramarginal vein; petiole to 7 cm long. Panicles 6 x 5 cm, terminal. Flowers 4 mm across, polygamous; pedicels 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, 15 x 12 mm, 2-4 celled; seeds planoconvex.

*Fl. & Fr.* : March-July

*Distr.* : South Western India. Common; in evergreen forests. Koruthode, *JA 12254.*

**ZANTHOXYLUM** Linnaeus

Sp. Pl. 270. 1753.

Climbing shrubs or rarely small trees; armed with many prickles. Leaves alternate, pinnately 3-many-foliolate; leaflets opposite or alternate, entire or crenate. Flowers polygamous, in paniculate cymes; sepals 3-5, united below; petals 3-5, obovate, imbricate, small in female flowers, anthers cleft at base, glandular at apex; ovary 4-celled, glabrous; ovules 2 in each cell; style 4, free or connate, recurved. Fruit a capsule, 4-lobed, dehiscent; seeds oblong or globose.

1. Unarmed shrubs; leaves 3-foliolate.....**Z. ovalifolium**

1. Prickly climbers or trees; leaves pinnate.....2

2. Climbers; fruits 4-lobed .....**Z. tetraspermum**

2. Trees; Fruits globose, entire..... **Z. rhetsa**

**Zanthoxylum ovalifolium** Wight, Ill. 1: 169. 1840; Bedd., Fl. Sylv. t. 6, f. 3. 1871; Hook. f., Fl. Brit. India 1: 492. 1875; Gamble, Fl. Pres. Madras 150. 1915; Babu, Bull. Bot. Surv. India 16(1-4): 63. 1974; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 62. 1983; Nair & Nayar in Hajra *et al.*, Fl. India 4: 384. 1997.

Erect shrubs; stem brownish, smooth; leaflets digitate, to 12 x 4.5 cm, elliptic-obovate, abruptly acuminate, glabrous, nerves 15-18 pairs with an irregular intramarginal vein; petioles 5-10 cm long. Panicle 3 x 2 cm, axillary, puberulus. Flowers few; male flowers 2-3 mm long; sepals 4, triangular; petals 2-3 mm long, white; stamens 4; female flowers 3-4 mm long; staminodes 4, filiform; pedicels 5 mm long. Capsule 6 mm across, globose, dark brown, seed 1, globose, shining.

*Fl. & Fr.* : December-January

*Distr.* : Endemic to South India. Rare; in evergreen forests at high elevations. Vellimala, *JA 12951.*

**Zanthoxylum rhetsa** (Roxb.) DC., Prodr. 1: 728. 1824; Hook. f., Fl. Brit. India 1: 495. 1875; Gamble, Fl. Pres. Madras 150.1925; Hartley, J. Arnold Arbor. 51:424.1970; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 389. 1976. ***Fagara rhetsa*** Roxb., Fl. Ind. 1: 438. 1820. ***F. budrunga*** Roxb., Fl. Ind. 1: 437. 1820. ***Zanthoxylum budrunga*** (Roxb.) DC., Prodr. 1: 728. 1824.

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, to 12 x 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, 3 mm across.

*Fl. & Fr.:* December-August

Distr. : Indo-Malesia. Occasional; in moist deciduous forests. Koruthode, *JA 18603*

**Zanthoxylum tetraspermum** Wight & Arn., Prodr. 148. 1834; Hook. f., Fl. Brit. India 1: 494. 1875; Gamble, Fl. Pres. Madras 150. 1915; Babu, Bull. Bot. Surv. India 16(1-4): 63. 1974; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 62. 1983; Stone in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 476. 1985; Nair & Nayar in Hajra *et al.*, Fl. India 4: 389. 1997.

Scandent woody climbers, prickles short, recurved. Leaves 5-9-foliolate; leaflets 10 x 5 cm, ovate, acuminate, rounded at base, crenate; nerves to 24 pairs, subparallel, reticulate at margin; petiole prickly. Panicle 5-8 x 3 cm, axillary, hirtus. Flowers 5 mm across, 4-merous; sepals 1 mm long, ovate, acute; petals 3 x 2 mm, ovate, obtuse; stamens 4, anthers cleft at base, with a sessile gland at apex; pistillodes 4, free with subulate tips; style 4, free, recurved. Capsule 8 mm across, 4-lobed.

*Fl. & Fr.* : April-May

*Distr.* : South India and Sri Lanka. Rare; in evergreen forests at high elevations. Eravangalar, *JA & KPR 15249*; Kottamala, *JA & KPR 15295.*

*Note* : The present collection is the first report of this species from Kerala.

## 31. BURSERACEAE

Kunth, Ann. Sci. Nat. (Paris) 2: 346. 1824.

### CANARIUM Linnaeus

Amoen. Acad. 4: 121. 1759.

**Canarium strictum** Roxb., Fl. Ind. 3: 138. 1832; Bedd., Fl. Sylv. t. 128. 1871; Benn. in Hook. f., Fl. Brit. India 1: 534. 1875; Gamble, Fl. Pres. Madras 172. 1915; Leenh., Blumea 9: 414. 1959; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 64. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 86. 1996; Chithra & Henry in Hajra *et al.*, Fl. India 4: 440. 1997. **Thellymaram** (Mannan, Thevan & Paliyan).

Large trees, bark white, peeling, exuding a resin; branchlets dark-fulvous-tomentose. Leaves alternate, imparipinnate, 30-60 cm long; leaflets 9-11 pairs, 16 x 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 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, 3.5 x 1.5 cm, ellipsoid, dark blue, 1-3-celled; seeds 1-3.

*Fl. & Fr.* : March-August

*Distr.* : India and Burma. Common; in evergreen forests. Uppupara, *JA 13479.*

*Ethnobotanical use* : The resinous exudate is collected and marketed, it is commercially used in making varnishes (Mannan, Thevan & Paliyan). The tribes smoke the solidified resin in their houses to repel mosquitoes.

## 32. MELIACEAE

Juss., Gen. Pl. 263. 1789.

1. Young parts covered with stellate hairs or fimbriate scales.....**Aglaia**
1. Young parts not covered with stellate hairs or fimbriate scales.....2
2. Leaves simple; flowers ca. 5 cm long.....**Turraea**
2. Leaves compound; flowers to 3 cm long.....3
3. Petiole winged; small herbs.....**Naregamia**
3. Petiole not winged; shrubs or trees.....4
4. Seeds many, winged.....5
4. Seeds to 10, wingless.....6
5. Stamens free.....**Toona**
5. Stamens monadelphous.....**Chukrasia**

6. Leaves 3-foliolate..... **Walsura**

6. Leaves 5-many-foliolate.....7

7. Sepals oblanceolate, foliaceous; small shrubs or large herbs..... **Munronia**

7. Sepals otherwise; large shrubs or trees.....8

8. Staminal filaments free above the middle.....9

8. Staminal filaments united throughout .....10

9. Fruit a drupe; leaflets toothed..... **Cipadessa**

9. Fruit a 3-valved capsule; leaflets entire..... **Trichilia**

10. Panicles longer than the leaves, drooping; petals 3..... **Aphanamixis**

10. Panicles shorter than the leaves, erect; petals 5..... **Dysoxylum**

## 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. Twigs covered with stellate hairs..... **A. tomentosa**

2. Twigs covered with scales.....3

3. Anthers 5.....4

3. Anthers 10..... **A. lawii**

4. Leaflets 9-11, ca. 6 cm broad; panicle to 40 x 20 cm ..... **A. perviridis**

4. Leaflets 3-7, to 3 cm broad; panicle to 15 cm long.....5

5. Leaves with peltate fimbriate scales more towards the midrib; flowers 5-merous..... **A. apiocarpa**

5. Leaves with no or very few scales; flowers 4-merous ..... **A. barberi**

**Aglaia apiocarpa** (Thw.) Hiern in Hook. f., Fl. Brit. India 1: 555. 1875; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 65. 1983; Pannell, Taxo. Monogr. *Aglaia* 173-175. 1992 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 9: 259. 1995; Jain & Benn. in Hajra *et al.*, Fl. India 4: 450. 1997. *Milnea apiocarpa* Thw., Enum. Pl. Zeyl. 60. 1858.

Trees to 20 m high; younger parts and leaves densely covered with dark brown fimbriate scales. Leaves to 16 cm long, 5-foliolate; leaflets to 10 x 3 cm, oblanceolate, acute at apex, nerves 6-8 pairs, indistinct; scales more towards the midribs. Panicle 8 x 4 cm, axillary. Flowers

yellow, 3 mm across; calyx obtusely 5-lobed, scaly; petals 2 x 1.5 mm, obovate, obtuse, concave; stamens 5. Berry 1.5 x 1.3 cm, obovoid, ridged, densely scaly.

*Fl. & Fr.* : December-March

*Distr.* : South India and Sri Lanka. Fairly common; in evergreen forests. Uppermanalar, *JA 12962, JA 12963; JA & KPR 14461; JA 15024.*

**Aglaia barberi** Gamble, Kew Bull. 1915: 346. 1915 & Fl. Pres. Madras 180. 1915; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 65. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 88. 1996; Jain & Benn. in Hajra *et al.*, Fl. India 4: 457. 1997. ***Milnea edulis*** Roxb., Hort. Beng. 18. 1814. ***Aglaia edulis*** (Roxb.) Wall., Calc. Gard. Rep. 26. 1840; Hiern in Hook. f., Fl. Brit. India 1: 556. 1875; Pannell, Taxo. Monogr. *Aglaia* 229-236. 1992. **Chuvanna akil** (Mannan).

Small to medium sized trees; bark reddish brown, smooth. Leaves to 20 cm long, 7-foliolate; leaflets to 10 x 3 cm, elliptic-oblong, acuminate, glabrous, nerves to 15 pairs; petiolule 3 mm long. Panicles to 15 x 6 cm, axillary, densely scaly. Flowers 1.5 mm across, globose; calyx rim ciliate; petals 4, 1 x 1 mm, orbicular; staminal tube i mm long; anthers 5, ovate. Berry 2.5 cm across, globose, brownish puberulus.

*Fl. & Fr.* : January-July

*Distr.* : Endemic to Southern Western Ghats. Common; in evergreen forests. Koruthode, *JA 12251;* Mullakkudy, *JA 13117.*

**Aglaia lawii** (Wight) Sald. in Sald. & Nicols., Fl. Hassan Dist. 392. 1976; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 66. 1983; Pannell, Taxo. Monogr. *Aglaia* 97-108. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 88. 1996. Jain & Benn. 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. 1915.

Trees; branchlets and younger parts covered with light brown fimbriate scales. Leaves 6-8 foliolate; leaflets to 15 x 7 cm, elliptic-oblong, abruptly acuminate at apex, oblique at base, densely scaly; nerves 7-9 pairs, nervules indistinct; petiole 1 cm long. Panicle to 10 x 8 cm, axillary. Flowers 5 mm across; calyx 3 mm across, cupular, lobes obscure; petals 4 x 4 mm, orbicular, concave, glabrous, not spreading; staminal tube 3 mm long, globose; anthers 10. Berry 2 x 1.5 cm, obovoid, obtuse, smooth, brown.

*Fl. & Fr.* : February-July

*Distr.* : Indo-Malesia to Polynesia. Common; in evergreen forests. Karadikkavala, *JA 12048*, Arjunankotta, *JA 13166, JA 15076;* Thekkady, *JA 13541*; Sabarimala, *JA & KPR 14931.*

**Aglaia perviridis** Hiern in Hook. f., Fl. Brit. India 1: 556. 1875; Pannell, Taxo. Monogr. Aglaia 198-201. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 91. 1996; Jain & Benn. in Hajra *et al.*, Fl. India 4: 473. 1997. ***Aglaia canarensis*** Gamble, Fl. Pres. Madras 180. 1915.

Trees, branchlets covered with reddish scales. Leaves to 45 cm long, 9-11-foliolate; leaflets to 17 x 6 cm, ovate-oblong, acute at apex, scales on midrib only; nerves to 17 pairs, irregular; petiolule 8 mm long. Panicles 40 x 20 cm, axillary, sparsely scaly. Flowers 2.5 mm across, 5-merous; calyx lobes obtuse, ciliate; petals 2 mm long, obovate; staminal tube 1.5 mm long; anthers 5. Berry 2 x 1.5 cm, ovoid, brownish-red.

*Fl. & Fr.* : March-August

*Distr.* : Endemic to India. Common; in evergreen forests. Koruthode, *JA 12209, 13492*; Sabarimala, *JA & KPR 14927, 15489.*

**Aglaia simplicifolia** (Bedd.) Harms in Engl. & Prantl., Pflanzenfam. ed. 2, 19b. 1: 146. 1940; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 66. 1983; Pannell, Taxo. Monogr. *Aglaia* 306-310. 1992; Jain & Benn. 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, incl. vars.; Gamble, Fl. Pres. Madras 184. 1915.

Small trees or large shrubs; branchlets stellate hairy. Leaves to 13 x 5 cm, elliptic, shortly acuminate, nerves 10-12 pairs, nervules parallel; petiole 2 cm long, jointed above the middle. Panicle 5 cm across, very hairy. Flowers 6 mm across, 5-6-merous; calyx-lobes obtuse, densely hairy; petals 3 x 3 mm orbicular, dull white, glabrous; anthers 5; ovary stellate hairy. Drupe 3 x 2 cm; obovoid, acute at apex, dark brown, stellate hairy many ridged.

*Fl. & Fr.* : February-August

*Distr.* : Indo-Malesia. Common; in evergreen forests. Chokkampetti, *JA 13345;* Chenthamara, *JA 12285.*

**Aglaia tomentosa** Teijsm. & Binn., Nat. Tijdsch. Ned. Ind. 27: 43. 1864; Pannell, Taxo. Monogr. *Aglaia* 331-336. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 91. 1996. ***Aglaia minutiflora*** Bedd., Ic. t. 1: 44, t. 193. 1874; Hiern in Hook. f., Fl. Brit. India 1: 557. 1875; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 66. 1983. ***A. minutiflora*** Bedd. var. ***travancorica*** Hiern in Hook. f., Fl. Brit. India 1: 557. 1875. ***A. cordata*** Hiern in Hook. f., Fl. Brit. India 1: 557. 1875. ***Aglaia exstipulata*** auct. non (Griff.) Theobald 1883: Balakr. in J. Bombay Nat. Hist. Soc. 67: 57. 1970; Jain & Bennet in Hajra *et al.*, Fl. India 4: 465. 1997.

Small to medium sized trees, bark brown; young shoots densely brown-tomentose. Leaves to 50 cm long; leaflets 11-13 pairs, to 20 x 6 cm, oblong-lanceolate, acuminate, base rounded,

densely brown-tomentose below; lateral nerves to 20 pairs, parallel; petiolule 5 mm long; rachis angled. Panicle 40 x 20 cm, densely stellate-hairy; pedicels 2 mm long. Flowers 1.5 mm diam.; sepals ovate, obtuse; petals 4, orbicular, glabrous; staminal tube 1 mm long.

*Fl. & Fr.* : January

*Distr.* : Indo-Malesia & Australia. Occasional; in evergreen forests. Kurisumala, *JA 13052*; Melmala, *JA & KPR 14459.*

*Note*: Pannell (1992) treated *A. minutiflora* Bedd. var. *travancorica* Hiern as the synonym of *A. tomentosa* Teijm, and *A. minutiflora* Bedd. var. *griffithii* Hiern. as the synonym of *A. exstipulata* (Griffith) Theobald. The former is seen in India and the latter is not found in India (Pannell, 1992). Jain and Bennet (1997) erroneously assigned the name *A. exstipulata* (Griffith) Theobald to the Indian specimens.

## APHANAMIXIS Blume

Bijdr. 165. 1825.

**Aphanamixis polystachya** (Wall.) Parker, Indian For. 57: 486. 1931; Mabber., Taxon 26: 528.1977, Blumea 31: 136. 1985 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 9: 250. 1995; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 67. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 94. 1996. Jain & Benn. in Hajra *et al.*, Fl. India 4: 477. 1997. ***Aglaia polystachya*** Wall. in Roxb., Fl. Ind. 2: 429. 1824. ***Andersonia rohituka*** Roxb., Fl. Ind. 2 : 213. 1832. ***Amoora rohituka*** (Roxb.) Wight & Arn. in Wight, Cat. 24. 1833 & Prodr. 119. 1834; Bedd., Fl. Sylv. t. 132. 1871; Hiern in Hook. f., Fl. Brit. India 1: 559. 1875; Gamble, Fl. Pres. Madras 181. 1915.

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 5 mm long. Panicle to 70 cm long, drooping, many-flowered; pedicels 6 mm long. Flowers 8 mm across; sepals 5, orbicular, thick; petals 3, orbicular; staminal tube 4 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.

*Fl. & Fr.* : July-February

*Distr.* : Indo-Malesia. Common; in evergreen forests. Kokkara, *JA 12025*, Thekkady, *JA 12504, 13814*; Vellimala, *JA 12924*, Lakshmipara, *JA 13306.*

## CHUKRASIA A. Jussieu

Mem. Mus. Hist. Nat. 19. 251. 1830.

**Chukrasia tabularis** A. Juss., Mem. Mus. Hist. Nat. 19: 251, t. 22. 1830; Bedd., Fl. Sylv. t. 9. 1869; Hiern in Hook. f., Fl. Brit. India 1: 568. 1875; Gamble, Fl. Pres. Madras 186. 1915; Nair

& Henry, Fl. Tamil Nadu Ser. 1, 1: 67. 1983; Mabber. in Dassan., Rev. Handb. Fl. Ceylon 9: 250. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 94. 1996; Jain & Benn. in Hajra *et al.*, Fl. India 4: 481. 1997.

Tall trees; branchlets glabrous or velvety hairy. Leaves to 30 cm long, imparipinnate; leaflets alternate, to 13 x 6 cm, ovate, acute, sharply unequal at base, glabrous or hairy; petiolule 1 cm long. Panicle to 20 cm across, terminal; bracts lanceolate. Flowers bisexual, yellowish-white, calyx campanulate, 6 mm across, 3 mm long, hairy or glabrous; petals 5-6, 10 mm 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, 5 x 4 cm, 4-5-valved, glabrous; seeds many, winged.

*Fl. & Fr.* : February-December

*Distr.* : Indo-Malesia. Common; in evergreen forests. Thekkady, *JA 13542, JA & KPR 16959;* Thaannikkudy, *13066.*

## CIPADESSA Blume.

Bijdr. 162. 1825.

**Cipadessa baccifera** (Roth) Miq., Ann. Mus. Bot. Lugd.-Bat. 4: 6. 1868; Gamble, Fl. Pres. Madras 176. 1915; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 67. 1983; Mabber. in Dassan., Rev. Handb. Fl. Ceylon 9: 270. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 95. 1996; Jain & Benn. in Hajra *et al.*, Fl. India 4: 482. 1997. ***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 to 30 cm long, 7-9-foliolate; leaflets to 10 x 5 cm, elliptic, acute, serrate, hispid along the nerves below; nerves *ca.* 15 pairs. Flowers 5 mm across, in long peduncled axillary cymes; calyx cupular, 5-lobed; petals 3.5 x 1 mm, 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 mm across, reddish, glabrous; seeds 1 or 2, angled.

*Fl. & Fr.* : Almost throughout the year

*Distr.* : South East Asia. Common; in evergreen forests. Karimala, *JA 13688*; Ambari, *13766*; Thaannikkudy, *13789.*

## DYSOXYLUM Blume

Bijdr. 172. 1825.

Trees. Leaves alternate, pinnate; leaflets 5-many, opposite or subopposite, rarely alternate, entire. Flowers in axillary, short or large panicles, bisexual, calyx cup entire or shallowly lobed;

petals 4 or 5, oblong, spreading, valvate; staminal tube cylindrical, mouth 5-10-fid; anthers 8-10 sessile, inserted below the apex of staminal tube; ovary 2-5-celled; ovules one or two in each cell; style very short; stigma simple, capitate or lobed. Fruit a capsule 2-5-celled; seeds 2-5, pyriform.

1. Leaves alternate; ovary 2-celled.....**D. beddomei**
1. Leaflets opposite or subopposite; ovary 3-5-celled.....2
2. Domesial glands present; flowers in axillary racemes; calyx deeply lobed.....**D. malabaricum**
2. Domesial glands absent; flowers in short panicles; calyx lobes only shallowly lobed or entire.....3
3. Ovary densely hairy; staminal tube ca. 7 mm long.....**D. ficiforme**
3. Ovary minutely hispid; staminal tube ca. 10 mm long.....**D. binectariferum**

**Dysoxylum beddomei** Hiern., Hook. f., Fl. Brit. India 1: 548. 1875; Gamble, Fl. Pres. Madras 178. 1915; Sasidh., Fl. Pl. Thrissur For. 95. 1996; Jain & Benn. in Hajra *et al.*, Fl. India 4: 485. 1997.

Small trees; branchlets minutely densely hispid. Leaves to 25 cm long; leaflets 5-9, alternate, to 13 x 5 cm, elliptic-oblong, acute at both ends, nerves to 20 pairs, parallel; petiolule 1 cm long. Panicle 1-1.5 cm across, axillary. Flowers few; calyx 4 mm across, cupular, sub-entire, hispid; petals 4, 5 x 2.5 mm, oblong, hispid outside; staminal tube hispid along 4 vertical lines outside; disc toothed. Capsule 8 x 6 cm, obovoid, stalked, acute at apex, vertically ridged, coarsely rugose.

*Fl. & Fr.* : September-February

*Distr.* · Endemic to Southern Western Ghats (Kerala). Rare; in evergreen forests. Thaannikkudy, *JA 12347;* Mlappara, *JA 12582.*

**Dysoxylum binectariferum** (Roxb.) Hook. f., ex Bedd., Trans. Linn. Soc. London 25: 212. 1866; Hiern in Hook. f., Fl. Brit. India 1: 546. 1875; Gamble, Fl. Pres. Madras 178. 1915 Sald. & Nicols., Fl. Hassan Dist. 394. 1967; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 67. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 95. 1996; Jain & Benn. in Hajra *et al.*, Fl. India 4: 486. 1997. *Akil* (Mannan).

Tall trees, branchlets glabrous. Leaves to 35 cm long; 8-foliolate; leaflets 9-16 x 4-6.5 cm, elliptic, acute; nerves 9-12 pairs, prominently reticulate; petiolule to 1 cm long. Panicle 5-15 x 3-6 cm, axillary. Flowers 10 mm across; calyx tube 3 mm high, 5 mm across, subentire; petals 10 x 3 mm, oblong, minutely puberulus; staminal tube 1 cm long; disk 3.5 mm long, tubular, distantly toothed at apex; style 4 mm long. Capsule 8 x 6 cm, obovoid; depressed at apex, reddish, smooth; seeds 4, 5 x 2.5 cm, oblong, smooth.

*Fl. & Fr.* : February-May

*Distr.* : South Western India. Occasional; in evergreen forests. Uppermanalar, *JA 13726, 13727*; Eravangalar, *JA & KPR 15253.*

**Dysoxylum ficiforme** (Wight) Gamble, Fl. Pres. Madras 178. 1915; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 67. 1983; Mabber. in Dassan., Rev. Handb. Fl. Ceylon 9: 246. 1995; Jain & Benn. in Hajra *et al.*, Fl. India 4: 487. 1997. ***Amoora ficiforme*** Wight, Ill. 1: 47. 1840; Hiern in Hook. f., Fl. Brit. India 1: 546. 1875. **Akil** (Mala Arayan).

Tall trees, branchlets densely yellowish-white puberulus. Leaves to 35 cm long, 10-foliolate; leaflets to 14 x 5 cm, ovate-oblong, abruptly acuminate; nerves 9-11 pairs, pale; petiolule 6 mm long. Panicle to 10 x 3 cm, axillary, densely puberulus. Flowers many; calyx 6 mm long, lobes 4, 2 mm long, puberulus outside; petals 8 mm long, oblong, minutely pubescent; staminal tube 8 mm long, toothed at apex; ovary densely hairy; style 3 mm long. Fruits not seen.

*Fl.*: March

*Distr.* : South India and Sri Lanka. Rare; in evergreen forests. Koruthode, *JA 13486.*

**Dysoxylum malabaricum** Bedd. ex Hiern in Hook. f., Fl. Brit. India 1: 548. 1875; Gamble, Fl. Pres. Madras 178. 1915; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 67. 1983; Sasidh., Fl. Pl. Thrissur For. 95. 1996; Jain & Benn. in Hajra *et al.*, Fl. India 4: 489. 1997.

Tall trees; bark corky-lenticellate; branchlets densely hispid. Leaves to 40 x 20 cm; 10-foliolate. Leaflets to 19 x 7 cm, ovate-oblong, acute, rounded at base, nerves 17-19 pairs, prominent below; petiolule 8 mm long. Raceme 15-20 cm long, axillary. Flowers shortly pedicellate; calyx 1.5 mm long, deeply lobed; petals 9 x 3 mm, oblong, acute; staminal tube 7 mm long; disk hispid at rim; style 5 mm long. Fruits not seen.

*Fl.* : February

*Distr.* : Endemic to Southern Western Ghats. Rare; in evergreen forests. Koruthode, *JA & KPR 14719*

## MUNRONIA Wight

Ic. Pl. Ind. Or. 1(5): 1. 1838.

**Munronia pinnata** (Wall.) Harms, Ber. Deutsch. Bot. Ges. 35: 78. 1917; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 68. 1983; Mabber. in Dassan., Rev. Handb. Fl. Ceylon 9: 237. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 97. 1996; Jain & Benn. in Hajra *et al.*, Fl. India 4: 497. 1997. ***Turraea pinnata*** Wall., Pl. Asiat. Rar. 2:21,t.119.1829. ***Munronia wallichii*** Wight, Ill. 1: t. 54. 1840; Hiern in Hook. f., Fl. Brit. India 1: 543. 1875; Gamble, Fl. Pres. Madras 175. 1915.

Shrubs, younger parts villous. Leaves to 30 cm long, imparipinnate; leaflets 10-14, opposite, to 13 x 5.5 cm, ovate-lanceolate, rounded or cordate at base, hispid, below. Flowers few, in axillary short cymes; pedicel 1 cm long; calyx tubular, lobes 8 x 3 mm, oblanceolate, leafy; petals 5, white, 3 cm long, spathulate, partly cohering below; staminal tube 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 cm across, depressed globose, hispid; seeds 5, 7 x 5 mm, oblong, smooth.

*Fl. & Fr.* : November-December

*Distr.* : South East Asia. Occasional; in evergreen forests. Kumarikulam, *JA 12777.*

## 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. 1915; Nair & Henry, Fl. Tamil Nadu Ser. 1, 1: 68. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 98. 1996; Jain & Benn. in Hajra *et al.*, Fl. India 4: 498. 1997.

Glabrous herbs. Leaves 3-foliolate, petiole winged; leaflets 5 x 3 cm, elliptic, crenate, obtuse, sessile. Flowers 1-3-together, in axillary fascicles, pedicellate; calyx 3 mm long campanulate, lobed half way down, tomentose; petals 5, white, 3 cm long, oblanceolate; staminal tube 2.5 cm long, slender; anthers 10; ovary 3-celled, glabrous; ovules paired; style filiform, 2 cm long; stigma capitate. Capsule 6 x 6 mm, depressed globose; seeds solitary, ellipsoid, transversally rugose.

*Fl. & Fr.* : January-August

*Distr.* : Peninsular India. Common; in moist deciduous forests. Koruthode, *JA 12441*, Pamba, *JA 17170.*

## TOONA (Endlicher) M. Roemer

Fam. Nat. Syn. Monogr. 1: 131. 1846.

**Toona ciliata** Roem., Syn. Hesper. 139. 1846; Sald. & Nicols., Fl. Hassan Dist. 395. 1967; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 68. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 98. 1996; Jain & Benn. in Hajra *et al.*, Fl. India 4: 504. 1997. ***Cedrela toona*** Roxb. ex Rottl. & Willd. in 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. 1915. **Chanthanavembu** (Mannan).

Tall trees. Leaves to 60 cm long, imparipinnate, 12-16-foliolate; leaflets alternate, 15 x 6 cm, ovate, acuminate, glabrous; petiolules 8 mm long. Panicle to 30 x 15 cm, terminal. Flowers 7 mm across, sessile; calyx cupular, 5-toothed, tomentose; petals dull yellow, 5 x 3 mm, oblong, spreading; stamens 5, free; disk pubescent; ovary 5-celled, densely hairy, style 3 mm long, stigma discoid. Capsule 2.5 x 1.5 cm; seeds many, winged at both ends.

*Fl. & Fr.* : January-February

*Distr.* : Indo-Malesia to Australia. Common; in semi-evergreen forests. Thaannikkudy, *JA 13067*; Mlappara, *JA 13313*; Thekkady, *JA & KPR 17034.*

## TRICHILIA P. Browne

Civ. Nat. Hist. Jamaica 278. 1756, *typ. cons.*

**Trichilia connaroides** (Wight & Arn.) Bentvelzen in Acta Bot. Neerl. 11: 13. 1962; Nair & Henry, Fl. Tamil Nadu Ser. 1, 1: 69. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 99. 1996; Jain & Benn. in Hajra *et al.*, Fl. India 4: 515. 1997. ***Zanthoxylum connaroides*** Wight & Arn., Prodr. 148. 1834, "*Zanthoxylon*". ***Heynea trijuga*** sensu 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. 1915.

Small trees. Leaves alternate, to 35 cm long, imparipinnate; leaflets 7-9, opposite, to 15 x 7 cm, ovate, abruptly acuminate, unequal at base; petiolules 15 mm long. Panicle axillary; peduncle to 25 cm long, erect. Flowers 5 mm across, many; calyx gamosepalous, 5-toothed; petals 3 x 1 mm, oblong, greenish white; staminal tube 3 mm long, divided to the middle, pubescent; anthers 10; ovary 3-celled, ovule 2 in each cell, style thickened above, stigma 2-toothed. Capsule 1 cm across, globose, glabrous, pinkish; seeds 1-3, arillate.

*Fl. & Fr.* : February-October

*Distr.* : Indo-Malesia. Common; in evergreen forests. Umikuppan, *JA 12646;* Uppermanalar, *JA 12977;* Vallakkadavu, *JA 13434, JA 15246.*

## TURRAEA Linnaeus

Mant. 2: 150. 1771.

**Turraea villosa** Benn., 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. 1915; Nair & Henry, Fl. Tamil Nadu Ser. 1, 1: 69. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 99. 1996; Jain & Benn. in Hajra *et al.*, Fl. India 4: 515. 1997.

Shrubs, densely villous. Leaves simple, alternate, to 13 x 8 cm, broadly ovate, abruptly acuminate, rounded at base, entire. Flowers 2-3-together in axillary fascicles; pedicel 3 cm long; sepals 5, ovate, connate at base; petals 50 x 3 mm, linear-oblong, spathulate at apex; white, partially connate; staminal tube 4 cm long, slender, toothed; anthers 10, projected above, disk tubular, 4 mm long; ovary 5-celled, ovules solitary in each cell; style 4 cm long, slender, bulged below the stigma. Capsule 10 mm across, depressed globose, seeds 5, reddish.

*Fl. & Fr.* : February-April

*Distr.* : India to Malesia. Common; in evergreen forests. Arjunankotta, *JA 13388*; Sabarimala, *JA 14925.*

**WALSURA** Roxburgh

Fl. Ind. ed. 2, 2: 386. 1832.

**Walsura trifoliata** (A. Juss.) Harms in Engl. & Prantl, Pflanzenfam. ed. 2. 19 b: 119, 177. 1940; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 69. 1983; Mabber. in Dassan., Rev. Handb. Fl. Ceylon 9: 265. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 99. 1996; Jain & Benn. in Hajra *et al.*, Fl. India 4: 522. 1997. ***Heynea trifoliata*** A. Juss. in Mem. Mus. Natl. Hist. Nat. 19: 235. 1830. ***Walsura piscidia*** Roxb., Fl. Ind. 2: 387. 1832; Wight, Ill. 1: t. 55. 1840; Hiern in Hook. f., Fl. Brit. India 1: 564. 1872; Gamble, Fl. Pres. Madras 183. 1915.

Small trees. Leaves trifoliolate, leaflets 10 x 4 cm, elliptic, entire, acute, glaucous below; petiolules 1 cm long. Panicle axillary, 5-10 cm across; peduncle 6 cm long. Flowers sessile, 4 mm across; calyx gamosepalous, tomentose; petals 5, white, 2.5 x 1 mm, oblong, hairy; stamens 10, filaments connate at base, pubescent; anthers ovate-cuspidate; ovary densely hairy, 3-celled; ovule 2 in each cell; style short; stigma obconical. Fruit 1.5 x 1 cm, obovoid, obtuse, brown-tomentose. Fruits not seen.

*Fl. & Fr.* : October-January

*Distr.* : India and Sri Lanka. Rare; in evergreen forests. Koruthode, *JA & KPR 16908.*

## 33. DICHAPETALACEAE

Baill. in Martius, Fl. Bras. 12(1): 365. 1886.

**DICHAPETALUM** Thouars

Gen. Nov. Madaga. 23. 1806.

**Dichapetalum gelonioides** (Roxb.) Engl. in Engl. & Prantl, Pflanzenfam. 3(4): 348. 1891; Gamble, Fl. Pres. Madras 188. 1915; Leenh. in Steenis, Fl. Males. 1, 5: 310. 1957; Nair &

Henry, Fl. Tamil Nadu Ser.1, 1: 69. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 100. 1996; Nair in Hajra *et al.*, Fl. India 4: 528. 1997. ***Moacurra gelonioides*** Roxb., Fl. Ind. 2: 69. 1832. ***Chailletia gelonioides*** (Roxb.) Bedd., Fl. Sylv. Anal. Gen. pl. 9, f. 1. 1871; Hiern in Hook. f., Fl. Brit. India 1: 570. 1875. **Kattu kappikkuru** (Mannan).

Shrubs, branchlets slender. Leaves alternate, to 10 x 3 cm, elliptic, caudate-acuminate, entire. Flowers unisexual, in axillary short peduncled cymes, densely villous; bracts lanceolate; sepals 5, 1.5 mm long, ovate; petals 1.5 mm long, 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, 10 mm across, compressed, rugose; seeds arillate.

*Fl. & Fr.* : July-November

*Distr.* : Indo-Malesia. Common; in evergreen forests. Chenthamara, *JA 12282;* Inchippara, *JA 12600.*

## 34. OLACACEAE

Mirb. ex DC., Prodr. 1: 531. 1824.

1. Large trees; staminodes absent.....2
1. Climbers; staminodes present.....3
2. Ovary adnated to the calyx tube; bark with uneven surface.....**Strombosia**
2. Ovary free from the calyx; bark not as above.....**Anacolosa**
3. Tendril climbers; petals ovate; leaves peltate at base.....**Erythropalum**
3. Tendrils absent; petals oblong; leaves not peltate.....**Olax**

### ANACOLOSA Blume

Mus. Bot. Lugd.-Bat. 1: 250. 1850.

**Anacolosa densiflora** Bedd., Madras J. Lit. Sci. Ser. 3, 1: 38. 1864 & Fl. Sylv. t. 138. 1871; Mast. in Hook. f., Fl. Brit. India 1: 580. 1875; Gamble, Fl. Pres. Madras 192. 1915; Sleumer, Blumea 26(1): 149. 1980; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 70. 1983. **Kalmanikkam** (Mala Arayan).

Large trees, branchlets glabrous; bark black, smooth. Leaves alternate, 9-13 x 4-5 cm, elliptic, acute or abruptly acuminate at apex, narrowed to the base; nerves 4 or 5 pairs. Flowers in axillary fascicles; pedicel 5 mm long, 5-20 together; calyx cupular, 3 mm across, truncate; petals 5, 6 x 1 mm, oblong-lanceolate, apex recurved, puberulus outside, densely tomentose within; stamens 5, filaments glabrous, straight; ovary surrounded by a cupular disc,

hemispherical, flat above, 1-celled, ovules 2, style straight 1.5 mm long, pointed. Fruit a drupe, 15 mm long, obovoid; fruiting calyx 10 mm long, obconical, glabrous.

*Fl. & Fr.* : August-February

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Pachakkanam, *JA 12278*; Vallakkadavu, *JA & KPR 15437.*

## ERYTHROPALUM Blume

Bijdr. 921. 1826.

**Erythropalum scandens** Bl., Bijdr. 922. 1826; Sleumer, Blumea 26(1): 156. 1980; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 71. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 100. 1996. ***Mackaya populifolia*** Arn., Mag. Zool. Bot. 2: 550. 1838. ***Erythropalum populifolium*** (Arn.) Mast. in Hook. f., Fl. Brit. India 1: 578. 1875; Gamble, Fl. Pres. Madras 190. 1915.

Weak tendrillate climbers. Leaves alternate, to 15 x 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, 6 x 2 mm, 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, 8 x 6 mm, orange-red, glabrous; seed 1, black, aril red.

*Fl. & Fr.* : July-January

*Distr.* : Indo-Malesia to Philippines and China. Common; in evergreen forests. Deviar, *JA 12131*; Koruthode, *JA 13178.*

## OLAX Linnaeus

Sp. Pl. 34. 1753.

**Olax imbricata** Roxb., Fl. Ind. 169. 1820; Sleumer, Blumea 26(1): 156. 1980; Sasidh. & Sivar., Fl. Pl. Thrissur For. 101. 1996. ***Olax wightiana*** Wall. ex Wight & Arn., Prodr. 89. 1834; Bedd., Fl. Sylv. Anal. Gen. pl. 9, f. 2. 1871; Mast. in Hook. f., Fl. Brit. India 1: 575. 1875; Gamble, Fl. Pres. Madras 190. 1915; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 70. 1983.

Straggler or climber. Leaves alternate, to 13 x 6 cm, ovate-oblong to lanceolate, entire, rounded at base; nerves 8-9 pairs. Flowers white, in short axillary cymes or panicles, pedicellate; calyx a truncate rim, accrescent in fruit; petals 5, 13 x 2 mm, oblong, acute, recurved; stamens 5, 3 fertile; staminodes 5, 2-lobed; filaments adnate to petals; anthers oblong; ovary globose, 3-celled; style 4 mm long; stigma 3-fid. Berry 2.2 x 1.8 cm, yellow, smooth.

*Fl. & Fr.* : April-June

*Distr.* : Indo-Malesia. Common; in evergreen and semi-evergreen forests. Manaloda, *JA 13618*; Thekkady, *JA 13808.*

### STROMBOSIA Blume

Bijdr. 1154. 1826

**Strombosia ceylanica** Gard., Calcutta J. Nat. Hist. 6: 350. 1846; Bedd., Fl. Sylv. t. 137. 1871; Mast. in Hook. f., Fl. Brit. India 1: 579. 1875; Gamble, Fl. Pres. Madras 191. 1915; Sleumer, Blumea 26(1): 163. 1980; Nair & Henry, Fl. Tamil Nadu Ser. 1, 1: 70. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 101. 1996.

Large trees, bark uneven, light pink inside; branchlets glabrous. Leaves to alternate, 18 x 6 cm, lanceolate, rounded at base, acute at apex; nerves 6 pairs, glabrous. Flowers many, fascicled in axillary or lateral tubercles; pedicels 1.5 mm long; calyx 1 mm long, 2 mm across, campanulate, lobes 5, acute, petals 2.5 x 1 mm, lanceolate, tomentose inside; stamens 5, antipetalous, erect; ovary 1-celled. Berry 10 x 8 mm, obovoid, smooth, truncate at apex; seed 1.

*Fr. & Fr.* : March-May

*Distr.* : South India and Sri Lanka. Occasional; in evergreen forests. Pamba, *JA 13458.*

## 35. OPILIACEAE

(Benth.) Valeton, Crit. Overz. Olacin. : 136. 1886.

### CANSJERA A. Jussieu

Gen. 448. 1789, *nom.cons.*

**Cansjera rheedii** Gmel., Syst. 1: 280. 1791; Wight, Ic. t. 1861. 1852; Mast. in Hook. f., Fl. Brit. India 1: 582. 1875; Gamble, Fl. Pres. Madras 193. 1915; Matthew, Fl. Tamil Nadu Carnatic 3 (1): 248. 1983.

Climbing shrubs. Leaves alternate, to 11 x 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, 4 mm long, 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.

*Fl. & Fr.* : September-December

*Distr.* : India, Malaya and Northern Australia. Occasional; in dry areas of moist deciduous forests. Thekkady, *JA 16364.*

## 36. ICACINACEAE

(Benth.) Miers, Ann. Mag. Nat. Hist. ser. 2, 8: 174. 1851.

1. Climbers....2
1. Erect shrubs or trees....3
2. Flowers in peduncled heads; leaves dentate....**Miquelia**
2. Flowers in elongated pendulous spikes; leaves entire....**Sarcostigma**
3. Petals connate into a tube; flowers in axillary cymes....**Gomphandra**
3. Petals free; flowers in terminal panicles....4
4. Petals densely hairy within; filaments adnate to corolla....**Nothapodytes**
4. Petals glabrous; filaments free....**Apodytes**

### APODYTES E. Meyer ex Arnott

Hooker's J. Bot. 3: 155. 1840.

**Apodytes dimidiata** E. Meyer ex Arn., Hook. J. Bot. 3: 155. 1840; Sleumer, Blumea 17: 185. 1969 & in Steenis, Fl. Males. I, 7: 48. 1971; Matthew, Fl. Tamil Nadu Carnatic 3 (1): 251. 1983. ***Apodytes beddomei*** Mast. in Hook. f., Fl. Brit. India 1: 588. 1875; Gamble, Fl. Pres. Madras 195. 1915.

Trees, to 20 m high. Leaves alternate, to 10 x 4 cm, oblong, alternate at base; nerves 6 or 7 pairs; petiole 1.5 cm long. Flowers in terminal, 3-5 cm across panicle, shortly pedicelled; calyx cupular, 5-toothed; petals 5 x 1.5 mm, 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.

*Fl. & Fr.* : March-May

*Distr.* : Africa, eastward to Asia and Australia. Common; in evergreen and semi-evergreen forests. Uppermanalar, *JA 13544;* Thekkady, *JA 13707; 14032.*

### 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. Cymes axillary; leaves membranous....**G. tetrandra**
1. Cymes leaf-opposed; leaves coriaceous....**G. coriacea**

**Gomphandra coriacea** Wight, Ill. 1:103. 1840; Bedd., Ic. t. 61. 1868-1874; Gamble, Fl. Pres. Madras 195. 1915; Sleumer, Blumea 17:206. 1969; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 71. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 102. 1996. ***G. polymorpha*** Wight, Ill. 1:103. 1840, p.p. & Ic. tt. 953, 954. 1843; Mast. in Hook. f., Fl. Brit. India 1:586. 1875.

Small trees; branchlets brown. Leaves to 12 x 5 cm, elliptic, abruptly acuminate; nerves obscure, 6 pairs; petiole 1.5 cm long. Cymes peduncled, extra-axillary. Flowers 5-9 together; calyx cup truncate; corolla 4 mm long; lobes acute; pistillode in male flowers pubescent. Drupe 15 x 8 mm, oblong, terete.

*Fl. & Fr.* : August-November

*Distr.* : Endemic to Western Ghats. Common; in evergreen forests above 1200 m altitude, Inchippara, *JA 12599*; Melmanalar, *JA 13959.*

**Gomphandra tetrandra** (Wall.) Sleumer, Notizbl. Bot. Gart. Berlin-Dahlem 15:238. 1940 & Blumea 17:204. 1969; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 71. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 102. 1996. ***Lasianthera tetrandra*** Wall. in Roxb., Fl. Ind. 2:238. 1824. ***Gomphandra polymorpha*** Wight, Ill. 1:103. 1840, p.p.; Gamble, Fl. Pres. Madras 195. 1915. ***G. axillaris*** Wall. ex Bedd., Fl. Sylv. t. 61. 1870; Mast. in Hook. f., Fl. Brit. India 1:586. 1875.

Shrubs, to 2 m high; branchlets green. Leaves to 16 x 4.5 cm, oblong, acute at base, acuminate at apex, nerves to 9 pairs. Cymes peduncled; peduncle 10 mm long. Flowers 3-10 together; calyx 1 mm long, cupular; corolla 6 mm long, lobes cuspidate; filaments 8 mm long, connate. Drupe 13 x 6 mm, obovate, acute.

*Fl. & Fr.* : August-December

*Distr.* : South India and Sri Lanka. Common; in evergreen forests. Koruthode, *JA 12219; JA & KPR 14715*; Pamba, *JA 13460.*

## MIQUELIA Meissner

Gen. 1: 152. 1838, *nom. cons*

**Miquelia dentata** Bedd., Madras J. Lit. Sci. Ser. 3, 1: 38. 1864; Mast. in Hook. f., Fl. Brit. India 1:593. 1875; Gamble, Fl. Pres. Madras 197. 1915; Sleumer, Blumea 17:230. 1969; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 71. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 102. 1996.

Glabrous slender climbers. Leaves to 16 x 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, 3 mm long, oblong; stamens 4 or

5, in male flowers; ovary 1-celled, 4-angled; style absent; stigma 4-angled; ovules 2, pendulous. Drupe 2 x 1 cm, 3-8 together, ovoid, sessile, yellow; seeds 1.5 x 1 cm, stalked, pitted.

*Fl. & Fr.* : April-January

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Mavadi, *JA 13037*; Sabarimala, *JA 14942.*

## NOTHAPODYTES Blume

Mus. Bot. Lugd.-Bat. 1: 248. 1850.

**Nothapodytes nimmoniana** (Grah.) Mabber. in Manilal, Bot. Hist. Hort. Malab. 88. 1980; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 71. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 104. 1996. ***Premna nimmoniana*** Grah., 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; Mast. in Hook. f., Fl. Brit. India 1:589. 1875; Gamble, Fl. Pres. Madras 196. 1915. ***Nothapodytes foetida*** (Wight) Sleumer, Notizbl. Bot. Gart. Berlin-Dahlem 15:247. 1940 & Blumea 17:232. 1969. **Peenari (Mannan).**

Small trees; branchlets prominently lenticellate. Leaves to 17 x 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, 1 mm long, 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 8 x 4 mm, oblong, reddish-brown, glabrous.

*Fl. & Fr.* : August-January

*Distr.*: Indo-Malesia and China. Common; in moist deciduous forests. Pachakkanam, *JA 12304.*

## SARCOSTIGMA Wight & Arnott

Edinburgh New Philos. J. 14: 299. 1833.

**Sarcostigma kleinii** Wight & Arn., Edinburgh New Philos. J. 14: 299. 1833; Wight, Ic. t. 1854. 1852; Mast. in Hook. f., Fl. Brit. India 1: 594. 1875; Gamble, Fl. Pres. Madras 199. 1915; Sleumer, Blumea 17:254. 1969; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 71. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 104. 1996.

Large climbers, branchlets glabrous. Leaves to 22 x 12 cm, ovate, acute at base and apex; lateral nerves 8 pairs, reticulate; petiole 5-15 cm long. Spikes to 35 cm long, slender, from old branches. Flowers 3-6 together; calyx cupular, 2 mm across, 5-toothed; petals 3-5 mm long,

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 3 x 1.5 cm, ovoid, orange, glabrous.

*Fl. & Fr.* : November-March

*Distr.* : Indo-Malesia. Common; in evergreen forests at low elevations. Pambavalley, *JA 12730;* Puthussery, *JA 13515.*

## 37. AQUIFOLIACEAE

Bartl., Ord. Nat. Pl. : 228. 1830.

### ILEX Linnaeus

Sp. Pl. 125. 1753

Trees or large shrubs. Leaves alternate, simple, entire or serrate. Flowers unisexual, dioecious, in axillary fascicles; calyx cupular, 4 or 5-lobed; petals 4-5 or 6, free, valvate, connate below; stamens as many as petals, alternipetalous; filaments subulate, anthers dorsifixed; ovary 4-6 celled; ovules one in each cell; style absent; stigma discoid. Fruit a drupe; seeds 2-6.

1. Flowers 4-merous; leaves serrate.....**I. denticulata**
1. Flowers 5 or 6-merous; leaves entire.....2
2. Leaves to 6 cm long; flowers 5-merous.....**I. gardneriana**
2. Leaves to 9 cm long; flowers 6 merous.....**I. malabarica**

**Ilex denticulata** Wall. ex Wight, Ill. 2: t. 142. 1850; Hook. f., Fl. Brit. India 1: 600. 1875; Gamble, Fl. Pres. Madras 200. 1915; Matthew, Fl. Tamil Nadu Carnatic 3 (1): 252. 1983.

Medium sized trees; branchlets glabrous. Leaves to 7.5 x 3 cm, elliptic, acuminate, nerves 7 pairs, faint; petiole 8 mm long. Flowers 2-5 together, pedicels 9 mm long, tomentose, jointed above the base, bracteolate; calyx cupular, lobes obtuse; petals white, 4 x 2 mm, ovate, obtuse, glabrous; filaments 2 mm long; anthers sagitate at base; stigma 4-lobed, radiating. Fruits not seen.

*Fl.* : February

*Distr.* : Peninsular India and Sri Lanka. Rare; in evergreen forests. Ezhanakkuzhi, *JA 13325.*

**Ilex gardneriana** Wight, Ic. t. 1217. 1848; Hook. f., Fl. Brit. India 1: 603. 1875; Gamble, Fl. Pres. Madras 200. 1915; Henry *et al.,* J. Bombay Nat. Hist. Soc. 75(3): 687. 1979; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 72. 1983.

Trees, branchlets terete, glabrous. Leaves 6.5 x 4 cm, broadly elliptic to obovate, acuminate at apex, acute or rounded at base, pale below, glabrous, nerves 10 pairs, prominent; petiole 1 cm long. Flowers in sessile or peduncled umbel; pedicel 2-3 mm long; sepals 5, 1.5 x 1 mm, triangular, acute. Berry 4.5 x 3 mm, yellowish, glabrous. Fruits not seen.

*Fr.* : May

*Distr.* : Endemic to South India. Rare; in evergreen forests at higher elevations. Kottamala, *JA 15380.*

**Ilex malabarica** Bedd., Fl. Sylv. t. 143. 1871; Hook. f., Fl. Brit. India 1: 600. 1875; Gamble, Fl. Pres. Madras 200. 1915; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 1: 72. 1983.

Small tress; branches glabrous. Leaves to 9 x 3.5 cm, elliptic-oblong, acuminate, acumen twisted, nerves 7 or 8 pairs; petiole 18 mm long. Flowers in shortly peduncled cymes or umbels; pedicels 7 mm long; sepals 1.5 x 1.5 mm, ovate; petals 2 x 1 mm, oblong, obtuse, greenish; anthers sagitate at base; ovary 4-celled; stigma stipitate. Berry 4 x 3 mm, globose with knot like persistent stigma.

*Fl. & Fr.* : March-May

*Distr.* : Southern Western Ghats. Rare; in evergreen forests at high elevations. Uppermanalar, *JA 13759*; Kottamala, *JA 13782.*

## 38. CELASTRACEAE

R. Brown in Flinders, Voy. Terra. Austr. 2: 571. 1814.

1. Fruit an indehiscent drupe.....2
1. Fruit a dehiscent capsule.....3
2. Leaves closely many-nerved; drupe oblique-obovate, white.....**Pleurostylia**
2. Leaves distantly few-nerved; drupe oblong, brown or grey.....**Cassine**
3. Capsule obcordate, emarginate at apex; leaves usually ternate.....**Euonymus**
3. Capsule not as above; leaves opposite or alternate.....4
4. Capsule 15-20 cm long, compressed; cells of ovary many-ovuled.....**Lophopetalum**
4. Capsule not more than 3 cm long, not compressed; cells of ovary less than 4-ovuled.....5
5. Flowers sessile or shortly peduncled, many together, axillary; corolla gamopetalous; leaves opposite.....**Microtropis**
5. Flowers panicled or racemose, terminal; petals free; leaves alternate.....6
6. Capsule deeply 2-lobed; leaves 12-15-nerved; trees.....**Bhesa**
6. Capsule entire; leaves to 8-nerved; climbers.....**Celastrus**

BHESA Hamilton ex Arnott

Edinburgh New Philos. J. 16: 315. 1834.

**Bhesa indica** (Bedd.) Ding Hou, Blumea Suppl. 4: 152. 1958; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 72. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 105. 1996. ***Trochisandra indica*** Bedd., Fl. Sylv. t. 120. 1872. ***Kurrimia bipartita*** Lawson in Hook. f., Fl. Brit. India 1: 622. 1875. ***K. indica*** (Bedd.) Gamble, Fl. Pres. Madras 209. 1918. ***K. paniculata*** sensu Lawson in Hook. f., Fl. Brit. India 1: 622. 1875 p.p., non Wall., 1832.

Trees, to 25 m tall; bark striate. Leaves to 22 x 12 cm, ovate, abruptly acuminate, entire, nerves 12-15 pairs, parallel, prominent; petiole 5 cm long, thickened above. Flowers 5 mm across, in terminal panicles, pedicelled; sepals 5, free; petals 3 x 1 mm, oblong, deflexed; stamens 5, filaments long, united at base; ovary 2-celled, ovules 2 in each cell; styles 2, free; disk 5-lobed, stigma capitate. Capsule 2 x 1.5 cm, deeply 2-lobed, brown; seeds 1 in each lobe, aril brown.

*Fl. & Fr.* : March-September

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Vellimala, *JA 18 412.*

CASSINE Linnaeus

Sp. Pl. 268. 1753

**Cassine paniculata** (Wight & Arn.) Lobr.-Callen, Adansonia Ser. 2, 15: 220. 1976; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 318. 1976; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 72. 1983; Kosterman, Gard. Bull. Sing. 39(2): 178. 1986. ***Elaeodendron paniculatum*** Wight & Arn., Prodr. 157. 1834; Gamble, Fl. Pres. Madras 212. 1918. ***E. glaucum*** sensu Lawson in Hook. f., Fl. Brit. India 1: 623. 1875.

Large trees, branchlets terete, slender. Leaves opposite, to 8 x 4 cm, elliptic-oblong, crenate, membranous, reddish-black; petiole 12 mm long. Inflorescence a dichaesial cyme, dichotomously branched, 3-6 cm across; peduncle 5.5 cm long, slender; pedicels 7 mm long. Flowers 11 mm across; sepals 9, unequal, orbicular; petals 5 x 3 mm, oblong, greenish yellow; disk 4 x 4 mm, thick, spreading, glabrous; stamens 5, filaments short along the margin of the disk; anthers 0.5 mm across, orbicular; ovary 2-5-celled, surrounded by disk; ovules 2 in each cell; style very short, as a small conical projection above the disk. Fruits not seen.

*Fl.* : May

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Maddalakottithode, *JA 13734.*

## CELASTRUS Linnaeus

Sp. Pl. 196. 1753

**Celastrus paniculatus** Willd., Sp. Pl. 1: 1125. 1797; Wight, Ic. t. 158. 1839; Lawson in Hook. f., Fl. Brit. India 1: 617. 1875; Gamble, Fl. Pres. Madras 208. 1918; Matthew, Fl. Tamil Nadu Carnatic 3 (1): 255. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 105. 1996.

Large climbers; stem lenticellate. Leaves alternate, to 12 x 7 cm, broadly ovate, abruptly acuminate, membranous, crenulate; petiole 6 mm long. Panicle to 15 x 8 cm, terminal, axillary, oblong; pedicel 6 mm long. Flowers many, 6 mm across; sepals 5, small, imbricate, ciliate; petals white, 2.5 x 2 mm, ovate, obtuse; stamens 5, erect, anthers sagitate at base; ovary 3-celled, ovules 2 in each cell; stigmas 3, recurved. Capsule 1 x 1 cm, loculicidal, 3-celled, yellow; seeds 3, aril reddish.

*Fl. & Fr.* : July-August

*Distr.* : Asia and Australia. Common; in semi-evergreen and moist deciduous forests. Kalvarimala, *JA 13889.*

## 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. Leaves obovate-orbicular, obtuse or obtusely acuminate, emarginate.....**E. crenulatus**
1. Leaves elliptic-lanceolate, acuminate.....2
2. Flowers 1-3 in an axil; branchlets slender.....**E. indicus**
2. Flowers 3-12 in an axil; branchlets stout.....3
3. Cymes many from a stout axillary peduncle; nerves obscure.....**E. paniculatus**
3. Cymes few directly on the leaf axils; nerves clear, 4-5 pairs.....**E. serratifolius**

**Euonymus crenulatus** Wall. ex Wight & Arn., Prodr. 161. 1834; Wight, Ic. t. 973. 1845; Lawson in Hook. f., Fl. Brit. India 1: 608. 1875; Gamble, Fl. Pres. Madras 230. 1918; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 1: 73. 1983.

Shrubs; branchlets terete, greenish. Leaves 5.5 x 4 cm, broadly elliptic-obovate or orbicular, emarginate or obtuse, crenulate towards apex; nerves 4 or 5 pairs slender; petiole 2-3 mm long.

Peduncle 2.5 cm long, slender, glabrous. Flowers 3-together; pedicels 5 mm long; sepals 5, 3 x 3 mm, ovate, ciliate; petals 5 x 5 mm, orbicular, dark purple.

*Fl.* March-April

*Distr.* : Southern Western Ghats. Rare; in evergreen forests at high elevation. Sunderamala, *JA 13614.*

**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. 1918; Matthew, Fl. Tamil Nadu Carnatic 3 (1): 256. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 106. 1996. ***E. goughii*** Wight, Ic. t. 215. 1839.

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 7 mm long. Peduncle 6-8 mm long, stout; pedicel 8 mm long, stout. Flowers 10 mm across; sepals 3 x 3 mm, orbicular, dark pink; petals 5 x 4 mm, ciliate, dark purple. Capsule 1 x 1.5 cm, obcordate, dark purple; seeds 7 x 6 mm, oblong, reddish, with yellow aril.

*Fl. & Fr.* : March-April

*Distr.* : Peninsular India. Rare; in evergreen forests. Anakuthivayal, *JA 17753.*

**Euonymus paniculatus** Wight ex Lawson in Hook. f., Fl. Brit. India 1: 609. 1875; Gamble, Fl. Pres. Madras 203. 1918; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 1: 73. 1983. ***E. crenulatus*** Wall. ex Wight & Arn. var. ***laxiflora*** Wight, Ic. t. 214. 1839.

Large shrubs; branchlets grey. Leaves to 8 x 2.5 cm, lanceolate, acuminate, serrulate along upper half, attenuate to the base; petiole 7 mm long, grey. Cymes broad, on short axillary peduncle; secondary peduncle, 2 cm long, slender, trichotomously branched, spreading, 6-12 flowered. Flowers 6 mm across; sepals entire, orbicular, green; petals entire, orbicular, deep purple, glabrous. Fruits not seen.

*Fl.* : April

*Distr.* : Peninsular India. Common; in evergreen forests. Poonkavanam, *NS & JA 14961.*

**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. 1918; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 1: 73. 1983.

Shrubs; branchlets slender terete, yellow. Leaves to 9 x 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 7 mm long. Capsule 1.5 x 2 cm, obcordate, deep red; seeds 10 x 6 mm, oblong, dark reddish-brown, smooth.

*Fr.* December

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Thaannikkudy, *JA & KPR 14500.*

## LOPHOPETALUM Wight ex Arnott

Ann. Nat. Hist. 3: 150. 1839.

**Lophopetalum wightianum** Arn. in 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. 1918; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 319. 1976; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 73. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 106. 1996.

Large trees, branches terete, brown. Leaves opposite, 9-20 x 3-5 cm, oblong, acute, many-nerved, entire; petiole 1 cm long. Flowers 15 mm across, in lax axillary cymes; peduncle 2-5 cm long, dichotomously branched, glabrous; sepals 5, orbicular; petals 5, 7 mm diam., 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.

*Fl. & Fr.* : March-May

*Distr.* : Indo-Malesia. Common; in evergreen forests near stream. Vallakkadavu, *JA 13432.*

## MICROTROPIS Wallich ex Meissner

Gen. 1: 68. 1837, *nom cons.*

Shrubs or trees. Leaves opposite, entire, petiolate. Flowers in axillary sessile clusters or cymes; sepals 5, free; petals 5, free, obovate, acute, basely united; stamens 5, filaments inserted on the disk; ovary 2-3-celled, ovules 2 in each cell; style short; stigma 2-4-toothed. Fruit a 1-celled, 2-valved capsule; seed 1, oblong, arillate.

1. Leaves oblanceolate, attenuate to base; branches quadrangular.....**M. wallichiana**
1. Leaves elliptic, acute or cuneate at base; branches terete.....**M. stocksii**

**Microtropis stocksii** Gamble in Kew Bull. 1916: 132. 1916 & Fl. Pres. Madras 206. 1918; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 322. 1976; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 75. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 107. 1996.

Large shrubs; branchlets brown. Leaves 10 x 5 cm, elliptic, obtusely acuminate, attenuate at the base, margins folding, green or yellow when dried; petiole 0.8 cm long, yellow. Flowers 2 mm across, few in axillary clusters; sepals ovate, obtuse; petals 2 x 1 mm, ovate, obtuse, white, glabrous. Capsule 13 x 8 mm, brown, aril red.

*Fl. & Fr.* : December-February

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Vellimala, *JA 12945*; Manaloda, *JA 13357.*

**Microtropis wallichiana** Wight ex Thw., Enum. Pl. Zeyl. 71. 1858; Lawson in Hook. f., Fl. Brit. India 1: 613. 1875; Gamble, Fl. Pres. Madras 206. 1918; Henry et al., Fl. Tamil Nadu Ser. 1, 1: 75. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 107. 1996.

Small trees. Leaves to 11 x 5 cm, elliptic, abruptly obtusely acuminate, nerves *ca.* 10 pairs, slender; petiole to 1 cm long, black. Cluster of flowers 8 mm across, sessile, axillary. Flowers 3 mm across, many together; sepals obovate, obtuse; petals 2.5 x 1 mm, obovate, obtuse, white with brown lines.

*Fl. & Fr.* : March-April

*Distr.* : Peninsular India. Common; in evergreen forests. Manaloda, *JA 13357, JA 13619.*

**PLEUROSTYLIA** Wight & Arnott

Prodr. 157. 1834.

**Pleurostylia opposita** (Wall.) Alston in Trimen, Handb. Fl. Ceylon 6: (Suppl.) 48. 1931; Matthew, Fl. Tamil Nadu Carnatic 3 (1): 261. 1983. ***Celastrus opposita*** Wall. in Roxb., Fl. Ind. 2: 398. 1824. ***Pleurostylia wightii*** Wight & Arn., Prodr. 157. 1834; Wight, Ic. t. 155. 1839; Lawson in Hook. f., Fl. Brit. India 1: 617. 1875; Gamble, Fl. Pres. Madras 211. 1918.

Trees to 10 m high; bark white-corky, vertically shallowly fissured. Leaves opposite, 7 x 3 cm, elliptic to oblanceolate, glabrous, entire, many-nerved. Flowers in axillary cymes, shortly peduncled; pedicels 3 mm long; sepals 5, ovate, free; petals pale yellow or white, 2.5 mm long, oblong, spreading, stamens 5, filaments curved; ovary 1-celled; ovules 2; stigma subsessile, peltate. Drupe 5 x 4 mm, obliquely obovate, white, smooth.

*Fl. & Fr.* : July-May

*Distr.* : Peninsular India, Sri Lanka and Madagascar. Common; in evergreen forests near rivers. Naduthottam, *JA 12141*; Vellimala, *JA 13800.*

## 39. HIPPOCRATEACEAE

Juss., Ann. Mus. Natl. Hist. Nat. 18: 486. 1811.

1. Seeds not winged.....**Salacia**

1. Seeds winged.....2

2. Petals laciniate; flowers in axillary panicles.....Reissantia

2. Petals entire; flowers in axillary or terminal cymes.....Loeseneriella

## LOESENERIELLA A. C. Smith

Amer. J. Bot. 28: 438. 1941

Woody climbers with looping branches. Leaves opposite, entire, exstipulate, penninerved. Flowers in cymes or panicles, axillary, pedicellate; sepals 5, free, spreading; petals 5, ovate, spreading; stamens 3, free, filaments broaden at base, inserted inside the disk; ovary 3-celled, sunken in the disk; style short; stigma 1-3, ovule 2-10 in each cell. Fruit a winged samara.

1. Branchlets quadrangular; leaves oblong, base subcordate.....**L. bourdillonii**

1. Branchlets terete; leaves ovate-lanceolate, base acute.....**L. obtusifolia**

**Loeseneriella bourdillonii** (Gamble) Ramam. in Sald. & Nicols., Fl. Hassan Dist. 315. 1976; Sasidh. & Sivar., Fl. Pl. Thrissur For. 108. 1996. ***Hippocratea bourdillonii*** Gamble, Kew Bull. 1916: 132. 1916 & Fl. Pres. Madras 213. 1918.

Climbing shrubs, branchlets 4-angled, glabrous. Leaves to 13 x 6 cm, oblong, abruptly acuminate, nerves 7-9 pairs, obscure, margins recurved. Flowers in pedunculate cymes, peduncle to 5 cm long, quadrangular; sepals 1.5 mm long, ovate, acute, pubescent; petals 6 x 2 mm, lanceolate, acute, pubescent outside; disk densely hairy along the rim; filaments 1.5 mm long; ovary projected above the disk. Fruits not seen.

*Fl.* : February

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Arjunankotta, *JA 13372.*

**Loeseneriella obtusifolia** (Roxb.) A. C. Smith, Amer. J. Bot. 28: 440. 1941; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 262. 1983; Manilal, Fl. Silent Valley 56. 1988. ***Hippocratea obtusifolia*** Roxb., Fl. Ind. 1: 166. 1820; Wight, Ic. t. 963. 1845; Lawson in Hook. f., Fl. Brit. India 1: 623. 1875; Gamble, Fl. Pres. Madras 213. 1918.

Climbing shrubs, branchlets stout looped. Leaves to 14 x 5 cm, ovate, acute at apex and base, greenish when dry; nerves 5 pairs, irregular. Panicles 8 x 6 cm, puberulus. Flowers many, 10 mm across; pedicel 3 mm long, slender, puberulus; sepals ovate, hairy outside; petals 3.5 x 2 mm, ovate, acute, hairy outside. Fruits not seen.

*Fl.* : January-April

*Distr.* : South Asia, Australia and Tropical Africa. Common; in evergreen forests. Koruthode, *JA 13400*, Puthussery, *JA 13713.*

## REISSANTIA Halle

Bull. Mus. Hist. Nat. (Paris) Ser. 2, 30: 466. 1958.

**Reissantia indica** (Willd.) Halle in Mem. Inst. Franc. Afrique Noire 64: 85. 1962; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 315. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 264. 1983. ***Hippocratea indica*** Willd., Sp. Pl. 1: 193. 1797; Roxb., Pl. Corom. t. 130. 1797; Lawson in Hook. f., Fl. Brit. India 1: 624. 1875; Gamble, Fl. Pres. Madras 213. 1918.

Woody climbers with looping branchlets. Leaves opposite, to 12 x 7 cm, obovate, obtusely acute, attenuate to the base; nerves 4 or 5 pairs, ascending; petiole 1 cm long. Flowers in axillary drooping panicles, pedicellate; sepals 5, ovate, acute, glabrous; petals 5, 3 x 1 mm, oblong, curved, glabrous; stamens 3, filaments short curved out; ovary 3-celled, sunken in the disk; ovules 2-10 in each cell. Fruit a winged samara.

*Fl. & Fr.* : February-March

*Distr.* : Africa and South-East Asia. Common; in evergreen forests. Thekkady, *JA 13540*; Koruthode, *JA & KPR 14714;* Pamba, *JA 17161.*

## 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. Flowers fascicled.....2
1. Flowers in cymes.....3
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**
3. Leaves acuminate at apex; branchlets black; peduncles slender.....**S. fruticosa**
3. Leaves acute or obtuse at apex; branchlets reddish, peduncle stout.....**S. oblonga**

**Salacia beddomei** Gamble, Kew Bull. 1916: 133. 1916 & Fl. Pres. Madras 1: 155. 1957; Henry, *et al.*, J. Bombay Nat. Hist. Soc. 75(3): 687. 1979.

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 1 cm long, slender; sepals 1.5 mm long, triangular; petals 2.5 x 1.5 mm, ovate, acute, glabrous, yellow with white margins; filaments 0.5 mm long, curved. Berry 3 cm across, obovoid, coarsely rugose. Fruits not seen.

*Fl.* : February

*Distr.* : Southern Western Ghats. Rare; in evergreen forests at low elevations. Koruthode, *JA & 14704.*

**Salacia fruticosa** Heyne ex Laws. in Hook. f., Fl. Brit. India 1: 628. 1875; Gamble, Fl. Pres. Madras 215. 1918; Nair & Ramachandran, Indian J. For. 5: 331. 1982; Sasidh. & Sivar., Fl. Pl. Thrissur For. 108. 1996. **Pon karandi pazham** (Mala Arayan)

Climbing shrubs; branchlets looped with circular lenticels. Leaves to 13 x 4 cm, oblong, acuminate at apex, rounded at base; nerves 9 pairs, regular; petiole 4 mm long. Cymes 3-9-flowered; peduncle 5-7 mm long, slender. Flowers 3 mm across, sepals 0.5 x 1 mm, orbicular, with white margins; petals orbicular; filaments 0.5 mm long; ovary not exserted above the disk. Berry to 5 x 4 cm, reddish; seeds 2.5 x 1.5 cm, ovoid, tuberculate.

*Fl. & Fr.* : January-March

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Koruthode, *JA 14814.*

*Ethnobotanical use* : The tubers are boiled and cooked in water and the water is orally given to diabetic patients.

**Salacia macrosperma** Wight, Ic. t. 962. 1845; Lawson in Hook. f., Fl. Brit. India 1: 628. 1875; Gamble, Fl. Pres. Madras 215. 1918; Ramam. in Sald. & Nicols. Fl. Hassan Dist. 316. 1976; Manilal, Fl. Silent Valley 57. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 109. 1996.

Stout climbers; branchlets stout, black, densely lenticellate. Leaves to 11 x 4 cm, elliptic, acute at apex and base, crenulate; petioles to 8 mm long. Flowers many, on large axillary or extra-axillary tubercles; pedicels 5-7 mm long, slender; sepals 1.5 mm long, ovate, acute; petals 2 mm long, ovate, acute, pink. Berry 3 cm across, globose.

*Fl. & Fr.* : January-March

*Distr.* : Southern Western Ghats. Common; in evergreen forests at high elevations. Kottamala, *JA 13801, JA & KPR 15293.*

**Salacia malabarica** Gamble, Kew Bull. 1916: 133. 1916 & Fl. Pres. Madras. 215. 1918.

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 to 1 cm long, black, channelled. Flowers 2-6 together on slightly elevated receptacle, axillary; pedicels 6-8 mm long, slender, smooth; sepals 1mm long, ovate; petals greenish, longer than sepals, ovate, acute. Fruits not seen.

*Fl.* : January.

Distr.: Endemic to Southern Western Ghats (Kerala). Very rare; evergreen forests at low altitudes. Koruthode, *JA 14704.*

*Note:* M. P. Nayar (1997) Commented this species as critically endangered, and the type specimen only was found at MH.

**Salacia oblonga** Wall. ex Wight & Arn., Prodr. 106. 1834; Wight, Ic. t. 962. 1845; Lawson in Hook. f., Fl. Brit. India 1: 628. 1875; Gamble, Fl. Pres. Madras 215. 1918; Sasidh. & Sivar., Fl. Pl. Thrissur For.109.1996.

Stout climbers, branchlets densely lenticellate, lenticels elongate. Leaves to 21 x 8 cm, oblong, acute or obtuse at apex, acute at base, green when dry; nerves 8-10 pairs; petiole 1 cm long. Peduncle short, stout, many-flowered. Flowers many, greenish yellow; sepals 1.5 mm across, orbicular; petals 2.5 mm long, ovate. Berry *ca.* 4 cm across, orange-red, smooth.

*Fl. & Fr.* : March-May

*Distr.* : India and Sri Lanka. Common; in evergreen forests. Pachakkanam, *JA 15164;* Arjunankotta, *JA 13454.*

## 40. RHAMNACEAE

Juss., Gen. Pl. 376. 1789.

1. Fruit winged; plants unarmed.....2
1. Fruit wingless; plants armed.....3
2. Tendrils present; fruit with 3 wings.....**Gouania**
2. Tendrils absent; fruit with one elongate wing.....**Ventilago**
3. Leaves 3-5-ribbed from base; thorns axillary and extra axillary, short.....**Ziziphus**
3. Leaves penninerved; thorns axillary, large and deflexed.....**Sageretia**

### 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. 1918; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 351. 1976;

Manilal, Fl. Silent Valley 57. 1988; Nayar, Thoth. & Sanj., Fl. India Fasc. 20: 40. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 109. 1996.

Large tendrillate climbers; branchlets tomentose. Leaves 10-15 x 5 cm, ovate, acuminate, rounded or cordate at base, fulvous hairy below; nerves 5 pairs, prominent, regular. Inflorescence a terminal panicle, to 25 x 20 cm, tomentose. Flowers 4 mm across, 3-6 together; pedicels 1.5 mm long; sepals 5, 1.5 x 1.5 mm, triangular, densely hairy; petals 1.5 x 1 mm, obovate, curved, concave; stamens 5, free, filaments 1 mm long; ovary 3-celled, hairy; ovules one in each cell; style short; stigma capitate. Capsule 7 x 10 mm, 3-winged, yellowish, septicidal; seeds 3, 2.5 x 2.5 mm, obovoid, compressed, dark-brown.

*Fl. & Fr.* : March-May

*Distr.* : Peninsular India and Sri Lanka, Java. Occasional; in evergreen forests. Sabarimala, *JA 17720.*

## SAGERETIA A. T. Brongniart

Ann. Sci. Nat. 10: 359. 1827.

**Sageretia hamosa** Brongn. in Ann. Sci. Nat. Bot. Ser. 1, 10: 360. 1827; Lawson in Hook. f., Fl. Brit. India 1: 641. 1875; Gamble, Fl. Pres. Madras 223. 1918; Ramachandr., Nair & Nair, J. Econ. Tax. Bot. 5(1): 139. 1984; Nair & Henry, Fl Tamil Nadu Ser. 1, 1: 77. 1983; Nayar, Thoth. & Sanj., Fl. India Fasc. 20: 63. 1990 .

Climbing or scandent shrubs. Leaves opposite, to 13 x 7 cm, ovate-oblong, bluntly acuminate, rounded at base, serrulate; nerves 4-7 pairs; petiole 1.5 cm long; thorns 2.5 cm long, deflexed, alternate. Panicle to 10 x 6 cm, axillary, scarcely branched, alternate with thorn, pubescent. Flowers 2.5 mm across, sessile, bracts and bracteoles similar, ovate; sepals 5, 2 x 1 mm, ovate, connate at base; petals 5, 1 x 0.5 mm, ovate, concave and clawed, greenish white; stamens 5, free; disk annular; ovary 3-celled, ovule one in each cell; style stout; stigma capitate. Drupe 6 mm across, globose, glabrous.

*Fl. & Fr.* : August-January.

*Distr.* : Peninsular India and Formosa. Occasional; in semi-evergreen forests. Karadikkavala, *JA 13919.*

## VENTILAGO J. Gaertner

Fruct. 1: 223. 1788.

**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. 1918; Sasidh. & Sivar., Fl. Pl.

Thrissur For. 110. 1996. ***Smythea bombaiensis*** (Dalz.) Banerjee & Mukerjee, Ind. For. 96: 214. 1970; Manilal, Fl. Silent Valley 57. 1988; Nayar, Thoth. & Sanj., Fl. India Fasc. 20: 75. 1990 [Fig. 24 A].

Large unarmed climbers; stems ribbed; branchlets looping. Leaves to 9 x 4 cm, elliptic-oblong, acute at either ends, crenulate; nerves 6 pairs, nerve-axils hairy, nervules parallel. Flowers 4 mm across, 20-30 together, in axillary clusters; pedicels to 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, 6.5 cm long.

*Fl. & Fr.* : January-March

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Pachakkanam, *JA 13040;* Puthussery, *JA 13501;* Vallakkadavu, *JA 13656.*

## 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. Petals absent; fruit white; leaves to 7 cm broad.....**Z. rugosa**
1. Petals present; fruit black; leaves to 3 cm broad.....**Z. oenoplia**

**Ziziphus oenoplia** (L.) Mill., Gard. Dict. ed. 8, 3. 1768; Roxb., Fl. Ind. 2: 360. 1824; Lawson in Hook. f., Fl. Brit. India 1: 634. 1875; Gamble, Fl. Pres. Madras 220. 1918; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 354. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 272. 1983; Nayar, Thoth. & Sanj., Fl. India Fasc. 20: 103. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 110. 1996. ***Rhamnus oenoplia*** L., Sp. Pl. 194. 1753.

Large rambling climbers, thorns many, stout, strong, recurved; branchlets densely silky hairy. Leaves 4-6.5 x 2-3 cm, ovate, acuminate, oblique at base 3-4-ribbed from the base, densely fulvous hairy, sessile or shortly petioled. Flowers 3 mm across, shortly pedicelled, 6-25 in dense axillary clusters; sepals triangular, hispid outside; petals clawed, concave, greenish yellow; disk flat, glabrous. Drupe globose, 6 x 6 mm, black.

*Fl. & Fr.* : May-June

*Distr.* : Tropical Asia and Australia. Common; in disturbed forests areas. Sabarimala, *JA 15481.*

**Ziziphus rugosa** Lam., Encycl. 3: 319. 1789; Wight, Ic. t. 339. 1840; Lawson in Hook. f., Fl. Brit. India 1: 636. 1875; Gamble, Fl. Pres. Madras 221. 1918; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 354. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 273. 1983; Manilal, Fl. Silent Valley 58. 1988; Nayar, Thoth. & Sanj., Fl. India Fasc. 20: 108. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 110. 1996. **Kottamullu, Malamthudali, Thudalippazham** (Mannan).

Scandent shrubs, thorns to 6 mm long, recurved. Leaves to 12 x 7 cm, ovate-orbicular, acute, unequally cordate at base, fulvous-tomentose beneath, coriaceous, crenulate; petiole 1 cm long. Flowers 6-20 together; subsessile, 5 mm across; sepals densely tomentose outside; disk flat, glabrous; ovary densely tomentose, 2-celled; styles 2, curved out. Drupe 8 mm across, white, glabrous.

*Fl. & Fr.* : January-March

*Distr.* : India and Sri Lanka. Common; in grasslands with scattered trees. Koruthode, *JA 14800*; Kumarikulam, *14844.*

*Ethnobotanical use* : The fruits are eaten.

## 41. VITACEAE

Juss., Gen. Pl. 267. 1789.

1. Flowers pentamerous ..... **Parthenocissus**
1. Flowers tetramerous ..... 2
2. Stem tuberculate; flowers polygamous; seeds two-furrowed on face ..... **Tetrastigma**
2. Stem not tuberculate; flowers bisexual; seeds one-furrowed or smooth on face ..... 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**

### 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. Leaflets sessile, glabrous ..... **C. mollissima**
1. Leaflets petiolulate, glabrous or hairy ..... 2

2. Leaflets 5-9-foliolate, 10-nerved, serrate.....**C. pedata**

2. Leaflets 3-foliolate, 5-nerved, crenate.....**C. carnosa**

**Cayratia carnosa** (Wall. ex Wight & Arn.) Gagnep. in Lecomte, Notul. Syst. (Paris) 1: 347. 1911; Gamble, Fl. Pres. Madras 237. 1918; Nair & Henry, Fl Tamil Nadu Ser. 1, 1: 79. 1983. *Vitis carnosa* (Lam.,) Wall., Cat. n. 6018. 1831-32; Wight, Ic. t. 171. 1839; Lawson in Hook. f., Fl. Brit. India 1: 654. 1875.

Creeper or climber; stem hispid; tendrils 3-fid. Leaflets 6 x 4 cm, broadly elliptic to obovate, obtuse, densely hispid, crenate; nerves 5 pairs; lateral leaflets smaller, with rounded base; petiolule to 8 mm long, of terminal leaflet larger; petiole to 5 cm long. Peduncle to 8 cm long, axillary; cymes 3 cm across, hispid. Flowers 2 mm across, greenish-yellow; pedicels 6 mm long, stout; petals 1.5 mm long, obtuse, densely hispid. Fruits not seen.

*Fl.* : August

*Distr.* : India, Sri Lanka, Burma and Malacca. Occasional; in semi-evergreen forests. Thekkady, *JA & KPR 16356.*

**Cayratia mollissima** (Wall.) Gagnep. in Lecomte, Notul. Syst. (Paris) 1: 345. 1911; Gamble, Fl. Pres. Madras 237. 1918; Manilal, Fl. Silent Valley 58. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 112. 1996. *Vitis mollissima* Wall. in 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 or 5 pairs, glabrous; petiole 4 cm long. Peduncle 1.5 cm long, extra-axillary, trichotomous cymes 2 x 3 cm. Flowers greenish-yellow; calyx a membranous cup, 2 mm across, entire; petals 2 x 1 mm, oblong. Berry 6 mm across, obovoid, glabrous; seeds pitted on sides

*Fl. & Fr.* : January-February

*Distr.* : India and Malaya. Common; in semi-evergreen forests at low elevations. Pamba, *NS, JA & KPR 17178.*

**Cayratia pedata** (Lam.) Juss. ex Gagnep. in Lecomte, Notul. Syst. (Paris) 1: 346. 1911; Fyson, Fl. South Indian Hill. St. 2: t. 97. 1932; Gamble, Fl. Pres. Madras 236. 1915; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 358. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 279. 1983; Mabber. in Dassan & Fosb., Rev. Handb. Fl. Ceylon 9: 453. 1995. *Cissus pedata* Lam., Encycl. 1: 31. 1783. *Vitis pedata* (Lam.) Wall. ex Wight, Cat. 26. 1833 & Wight & Arn., Prodr. 128. 1834; Lawson in Hook. f., Fl. Brit. India 1: 661. 1872.

There are two varieties in the study area

Key to the varieties :

1. Stems and leaves glabrous ..... **C. pedata var. glabra**

1. Stem and leaves hispid tomentose ..... **pedata. var. pedata**

**Cayratia pedata** (Lam.) Juss. ex Gagnep. in Lecomte, Notul. Syst. (Paris) 1: 346. 1911 var. **glabra** Gamble, Fl. Pres. Madras 236. 1918; Nair & Henry, Fl Tamil Nadu Ser. 1, 1: 80. 1983; Manilal, Fl. Silent Valley 59. 1988. ***Cissus pedata*** Lam., Encycl. 1: 31. 1783.

Climbers, stems glabrous. Leaves pedately 5-foliolate or sometimes 3-foliolate; leaflets 11 x 5 cm, elliptic, crenate, abruptly acuminate at apex, acute to round at base, nerves 7 pairs; rachis 9 cm long; petiolule of terminal leaflets 15 mm long, of lateral ones smaller. Peduncle 5 cm long, slender; cymes 3 x 3 mm, puberulus. Flowers 1.5 mm across, greenish; calyx 4-lobed, lobes acute; ovary tomentose; style 1 mm long; stigma lobed. Fruits not seen.

*Fl.* : April.

*Distr.* : Southern Western Ghats. Occasional; in evergreen forests at low elevation. Puthussery, *JA 13691.*

**Cayratia pedata** (Lam.) Juss. ex Gagnep. in Lecomte, Notul. Syst. (Paris) 1: 346. 1911, var. **pedata.**

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 9 cm long; petiolule 1 cm long, of terminal leaflet 3.5 cm long. Cymes 7 x 8 cm, hispid; peduncle 3 cm long. Flowers 6 mm across, greenish; petals 3 x 2 mm, ovate, acute; disk a fleshy rim. Berry 1 x 1 cm, 2-4 lobed, rusty tomentose; seed 6 x 6 mm, faces rugose.

*Fl. & Fr.* : August

*Distr.* : Tropical Asia and Western pacific. Common; in margins and evergreen forests at high elevations. Kalvarimala, *JA 13877*; Melmala, *JA & KPR 14469.*

## CISSUS Linnaeus

Sp. Pl. 117. 1753

Climbing shrubs; tendrils leaf-opposed. Flowers bisexual, in leaf opposed umbellate cymes with ultimate branches umbellules; calyx cupular, 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.....**C. glyptocarpa**

1. Stem terete or 4-angled, not winged.....2

2. Leaves 25 cm across, orbicular; transverse nervules parallel.....**C. latifolia**

2. Leaves to 16 cm across, ovate; transverse nervules reticulate.....3

3. Stems quadrangular; leaves oblong, pink or variegated beneath.....**C. discolor**

3. Stems terete; leaves glaucous or green beneath.....4

4. Cymes with orbicular bracts at dichotomies; petals ca. 3.5 mm long; leaves spinous serrate...**C. repens**

4. Cymes without orbicular bracts at dichotomies; petals to 2 mm long; leaves crenate.....**C. heyneana**

**Cissus discolor** Bl., Cat. Gew. Buitenz. 39. 1823; Gamble, Fl. Pres. Madras 235. 1918; Manilal, Fl. Silent Valley 59. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 112. 1996. *Vitis discolor* (Bl.) Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 2: 39. 1850; Lawson in Hook. f., Fl. Brit. India 1: 647. 1875. **Aaron puli** (Mala Arayan).

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 cm across, reddish; peduncle 1 cm long. Flowers pedicelled; calyx 2 mm across, rim white; petals reddish, 1.5 mm long; disk pubescent. Berry 4 x 3 mm, oblique-obovoid, smooth; seeds pitted.

*Fl. & Fr.* : Throughout the year

*Distr.* : India and Java. Very common; in evergreen and semi-evergreen forests. Chokkampetti, *JA 12486*; Vellimala, *JA & KPR 16903.*

*Ethnobotanical use* : The tubers are ground in water and the paste is placed over the wound to take out the thorns.

**Cissus glyptocarpa** (Thw.) Planch. in DC., Monogr. Phan. 5: 477. 1887; Gamble, Fl. Pres. Madras 235. 1918; Nair & Henry, Fl Tamil Nadu Ser. 1, 1: 80. 1983; Manilal, Fl. Silent Valley 60. 1988; Mabber. in Dassan., Rev. Handb. Fl. Ceylon 9: 475. 1995. ***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 to 10 x 7 cm, ovate, acuminate at apex, cordate at base, serrate, puberulus, nerves 4-7 pairs; petiole to 3 cm long. Cymes 3 x 3 cm, extra- axillary, peduncled. Flowers many, 1.5 mm long, greenish; pedicels 10 mm long; petals 2 mm long, oblong, green. Fruits not seen.

*Fl.* : March

*Distr.* : South India and Sri Lanka. Rare; in moist deciduous forests. Poonkavanam, *JA 14922, JA 14973.*

**Cissus heyneana** (Wall. ex Lawson) Planch in DC., Monogr. Phan. 5: 476. 1887; Gamble, Fl. Pres. Madras 234.1918; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3(1):281. 1983; Mabber. in Dassan., Rev. Handb. Fl. Ceylon 9: 467. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 113. 1996. *Vitis heyneana* Wall. ex Lawson in Hook. f., Fl. Brit. India 1: 647. 1875.

Weak climbers; stems terete, glaucous. Leaves to 9 x 7 cm, ovate, acuminate, cordate at base, 6-nerved, glabrous; petiole 1-2 cm long. Cymes 10 cm long, axillary, thinly hairy; peduncle 3-6 cm long, dichotomous; pedicels 3 mm long. Flowers 3 mm across, greenish; calyx tube 1 mm long, entire; petals ovate, bulged at base. Berry 8 x 6 mm, obovoid, white, smooth.

*Fl. & Fr.* : February-April

*Distr.* : South India and Sri Lanka. Rare; in evergreen forests. Vallakkadavu, *JA 13415,* Chenthamara, *JA 15146.*

**Cissus latifolia** Lam., Encycl. 1: 30. 1783; Shetty and Singh, Taxon 37: 172. 1988; Mabber. in Dassan., Rev. Handb. Fl. Ceylon 9: 469. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 113. 1996. ***G. glauca*** sensu Gamble, Fl. Pres. Madras 234. 1918, non Roxb., 1820. ***Vitis glauca*** (Roxb.) Wight & Arn., Prodr. 126. 1834; Lawson in Hook. f., Fl. Brit. India 1: 645. 1875.

Weak climbers; stem glaucous; tendrils bifid. Leaves ovate-orbicular, sharply and abruptly acuminate, deeply cordate at base, spineus serrate; nerves 8 pairs, lowest pair with strong secondary nerves, hairy beneath; petiole to 13 cm long. Cymes 5 cm long, pubescent; peduncle 6 cm long, dichotomous. Flowers 2.5 mm across, pedicels 5-7 mm long; petals 1.5 mm long, ovate, obtuse, puberulus; disk hairy. Fruits not seen.

*Fl.* : June

*Distr.* : South India and Sri Lanka. Common; in evergreen forests at low elevations. Sabarimala, *JA & KPR 15461.*

**Cissus repens** Lam., Encycl. 1: 31. 1783; Gamble, Fl. Pres. Madras 233. 1918; Nair & Henry, Fl Tamil Nadu Ser. 1, 1: 81. 1983; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 282. 1983. *Vitis repens* (Lam) 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 6 cm long; junctions with orbicular bracts; pedicels 5-8 together, 1 cm long. Flowers many; calyx obtusely lobed, ciliate; petals 1.5 mm long, reddish, disk glabrous. Drupe 4 x 3 mm, oblique-obovoid, smooth

*Fl. & Fr.* : September-January.

*Distr.* : India and Java. Occasional; in evergreen forests and semi-evergreen forests. Swamikkayam, *JA 12482*; Karadikkavala, *JA 13918*.

## PARTHENOCISSUS Planchon

in Alph. de Candolle et A C de Candolle, Monogr. Phan. 5: 447. 1887, *nom. cons.*

**Parthenocissus neilgherriensis** (Wight) Planch. in DC., Monogr. Phan. 5: 2. 1887; Gamble, Fl. Pres. Madras 231.1918; Nair & Henry, Fl Tamil Nadu Ser. 1, 1:81.1983; Manilal, Fl. Silent Valley 60. 1988. ***Vitis neilgherriensis*** Wight, Ic. t. 965. 1845. ***V. anamalayana*** Bedd. in Trans. Linn. Soc. London 25: 213. 1865-1866; Lawson in Hook. f., Fl. Brit. India 1: 656. 1875. ***V. himalayana*** Brandis, For. Fl. 100. 1874; Lawson in Hook. f., Fl. Brit. India 1: 655. 1875. p.p.

Large climber; stem lenticellate. Leaves 3-foliolate; leaflets to 17 x 10 cm, ovate, acuminate, rounded at base, coriaceous, spinous serrate, 9-nerved; lateral leaflets oblique at base; petiolule 0.5-1 cm long; rachis to 11 cm long. Cymes 9 cm across, terminal, peduncled. Flowers bisexual, pedicellate, densely packed; calyx cupular, 5-teethed; petals 4 mm long, oblong; stamens 5, filaments straight; disc obscure; ovary obovoid, truncate, 2-celled; stigma capitate on short style. Fruit a berry; seed 1.

*Fl. & Fr.* : August-December

*Distr.* : India. Occasional; along the margins of evergreen forests. Pachakkanam, *JA 12311*; Uppermanalar, *JA 13751*.

## 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. Leaflets to 18 x 7 cm, 13-15 nerved.....**T. sulcatum**
1. Leaflets to 8 cm, 3-5 nerved; nerves obscure.....**T. nilagiricum**

**Tetrastigma nilagiricum** (Miq.) Shetty, Kew Bull. 44: 477. 1989; Mabber. in Dassan., Rev. Handb. Fl. Ceylon 9: 480. 1995. ***Cissus nilagirica*** Miq., Linnaea 26: 221. 1854. ***Tetrastigma***

*leucostaphylum* sensu Ramam. in Nair & Henry, Fl. Tamil Nadu Ser. 1, 1: 82. 1983, non (Dennst.) Alston, 1931; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 285. 1983; Manilal, Fl. Silent Valley 60. 1988. *Vitis muricata* sensu Wight & Arn., Prodr. 128. 1834, non Wall., 1832: Wight, Ic, t. 740. 1844. *V. lanceolaria* sensu Lawson in Hook. f., Fl. Brit. India 1: 660. 1875 p. p., non Wall., 1932. *Tetrastigma muricatum* sensu Gamble, Fl. Pres. Madras 229. 1918, based on *Vitis muricata* sensu Wight & Arn., nom. illeg.; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 360. 1976.

Stout climbers; stem slender, densely muriculate. Leaves 3-5 foliolate, leaflets oblanceolate, narrowed to base, serrate; rachis 3 cm long; petiolule 5 mm long. Peduncle 2 cm long, tuberculate. Cymes 3 cm across, trichotomous; pedicels rusty tomentose. Flowers many, greenish; calyx obscurely 5-toothed, rusty tomentose; petals 2 mm long; style bulged at base. Berry 1 cm across, obovoid.

*Fl. & Fr.* : April-June.

*Distr.* : South India and Sri Lanka. Occasional; along the margins of evergreen forests. Kottamala, *JA & KPR 15354.*

**Tetrastigma sulcatum** (Lawson) Gamble, Fl. Pres. Madras 229. 1918; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 286. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 113. 1996. *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 4 cm long. Peduncle 1-2 cm long, dichotomous, glabrous. Flowers 5 mm across; sepals ovate, acute; petals 3 mm long, oblong, obtuse. Berry 2-2.5 cm across, white, glabrous; seeds 4, 10 x 5 mm, brownish.

*Fl. & Fr.* : February-April

*Distr.* : Peninsular India. Common; in evergreen and semi-evergreen forests. Udumbatheri, *JA 13428*; Vallakkadavu, *JA & KPR 15435.*

## 42. 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 crenate, glabrous; cymes sessile.....**L. indica**

2. Leaves serrate, pubescent; cymes peduncled.....**L. robusta**

**Leea guineensis** G. Don, Gen. Syst. 712. 1831; Ridsd., Blumea 22: 92. 1974 & in Steenis, Fl. Males. 1, 7: 777. 1976; Sasidh. & Sivar., Fl. Pl. Thrissur For. 114. 1996. ***L. wightii*** Clarke, J. Bot. 19: 105. 1881; Gamble, Fl. Pres. Madras 239. 1918.

Glabrous shrubs. Leaves bipinnate; leaflets 17 x 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 to 23 cm long; stipules obovate, *ca.* 4 cm long. 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.

*Fl. & Fr.* : April-December

*Distr.* : India, South-East Asia and Tropical Africa. Common; in evergreen forests. Koruthode, *JA 12252*; Pambavalley, *JA 13417.*

*Note* : This species is easily distinguished from other related species by its reddish inflorescence.

**Leea indica** (Burm. f.) Merr., Philipp. J. Sci. 14. 245. 1919; Ridsd., Blumea 22: 95. 1974; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 287. 1983; Manilal, Fl. Silent Valley 61. 1988; Harriman in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 392. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 114. 1996. ***Staphylea indica*** Burm. f., Fl. Ind. 75, t. 23, f. 2. 1768. ***Leea sambucina*** Willd., Sp. Pl. 1: 1177. 1798; Wight, Ic. t. 78. 1838; Lawson in Hook. f., Fl. Brit. India 1: 666. 1875; Gamble, Fl. Pres. Madras 240. 1918. **Njakku** (Mala Arayan & Malam pandaram).

Shrubs to small trees. Leaves 2 or 3-pinnate; leaflets to 14 x 5 cm, oblong or elliptic-lanceolate, caudate-acuminate, serrate-dentate; lateral nerves 12-15 pairs, intercostae parallel, curved; stipules obovate-obtuse, 5 x 4 cm. Young leaves bright-red. Cymes 6 x 8 cm; peduncles

3-4 cm long, paired, axillary. Flowers greenish-white. Staminal tube shortly lobed at apex, anthers combined. Berry purple, *ca.* 6 mm across; seeds densely red-glandular.

*Fl. & Fr.* : February-August

*Distr.* : Indo-Malesia, Australia and China. Fairly common; in moist deciduous to evergreen forests. Arjunankotta, *JA 15109.*

**Leea robusta** Roxb., Fl. Ind. 2: 468. 1824; Lawson in Hook. f., Fl. Brit. India 1: 667. 1875; Gamble, Fl. Pres. Madras 240. 1918; Mathew & Umadevi, Rheedea 2: 67. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 114. 1996. ***L. venkobarowii*** Gamble, Kew Bull. 1917: 26. 1917 & Fl. Pres. Madras 240. 1918.

Large shrubs. Leaves 1-pinnate; leaflets 5 or 7, to 28 x 12 cm, oblong, acute, rounded at base, serrate, pubescent along nerves; nerves 14 pairs, nervules parallel; petiolule 3 cm long. Cymes axillary, 10 cm across; peduncle to 12 cm long; branches hirtus. Flowers green, 5 mm across; calyx lobes ovate, acute; petals 2 mm long, puberulus outside. Capsule 6 mm across, black.

*Fl. & Fr.* : July-December

*Distr.* : Indo-Malaya. Fairly common; in semi-evergreen forests. Thekkady, *JA 16237.*

## 43. 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. Leaflets 15 x 9 cm, nerves 3-5 pairs; berry 2-2.5 cm across.....**T. malabarica**

1. Leaflets 10 x 5 cm, nerves 8-10 pairs; berry 0.5 cm across.....**T. nepalensis**

**Turpinia malabarica** Gamble, Kew Bull. 1917: 135. 1916. & Fl. Pres. Madras 241. 1918; Merr. & Perry, J. Arnold. Arbor. 22: 547. 1941; Manilal, Fl. Silent Valley 62. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 115 1996. **Alunku maram** (Mannan).

Trees to 20 m tall; branchlets brown. Leaves to 40 cm long; leaflets broadly elliptic, crenate, acuminate at apex; petiolule 0.7-2 cm long. Panicles 20 x 15 cm, glabrous, axillary; peduncle to 10 cm long. Flowers greenish yellow, pedicelled; sepals 3 mm long, ovate, slightly connate at base, obtuse, ciliate; filaments villous; style 3-fid at apex. Berry globose, brown, rough.

*Fr. & Fr.* : July-December.

*Distr.* : Southern Western Ghats. Common; in semi-evergreen forests. Kokkara, *JA 12021.*

*Ethnobotanical use* : The fruits are used for fishing as bait.

**Turpinia nepalensis** Wall. ex Wight & Arn., Prodr. 156. 1834; Wight, Ic. t. 972. 1845; Gamble, Fl. Pres. Madras 241. 1918; Nair & Henry, Fl Tamil Nadu Ser. 1, 1: 86. 1983. *T. pomifera* sensu Hiern in Hook. f., Fl. Brit. India 1: 698. 1895 p.p., non (Roxb.) DC., 1825. ***Turpinia cochinchinensis*** Merr., J. Arnold Arbor. 19: 43. 1938; Manilal, Fl. Silent Valley 62. 1988.

Small trees, branchlets white. Leaves to 20 cm long; leaflets 3-5, to 10 x 5 cm, elliptic, acuminate at apex, crenate-serrate; petiolule 0.7 cm long. Panicles 5 cm long, axillary or terminal; peduncle to 10 cm long. Flowers 5 mm across, shortly pedicelled; sepals 1.5 mm long, ovate, obtuse, ciliolulate; petals 3 mm long, ovate, acute; filaments glabrous. Berry globose, glabrous with a knot at apex

*Fl. & Fr.* : February-April

*Distr.* : India, China and Sri Lanka. Common; in evergreen forests at high altitudes. Chokkampetti, *JA 13564*; Uppermanalar, *JA 13702.*

## 44. SAPINDACEAE

Juss., Gen. Pl. 246. 1789.

1. Petals absent ..... 2
1. Petals present ..... 4
2. Leaves simple ..... **Dodonaea**
2. Leaves compound ..... 3
3. Fruit 2-3-lobed; densely muricate; lower leaflets stipulaceous ..... **Otonephelium**
3. Fruit undivided; sparsely muricate; lower leaflets not as above ..... **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 pubescent ..... 3
2. Leaflets entire; domatia present; raceme 15-20 cm long, branched ..... **A. concanicus**
2. Leaflets sharply serrate; domatia absent; raceme to 4.5 cm long, unbranched ..... **A. serratus**
3. Flowers 1-3 together; nerves of the leaves regular; branches brownish tomentose ..... **A. cobbe**
3. Flowers 3-6 together; nerves of the leaves irregular; branchlets yellowish tomentose ..... **A. rheedei**

**Allophylus cobbe** (L.) Raeusch., Nomencl. Bot. ed. 3. 108. 1797; Lawson in Hook. f., Fl. Brit. India 1: 673. 1875 p.p.; Mukh., Indian For. 495. 1972 & J. Econ. Tax. Bot. 1: 79. 1980; Manilal, Fl. Silent Valley 62. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 116. 1996. ***Rhus cobbe*** L., Sp. Pl. 267. 1753. ***Allophylus serrulatus*** Radlk., Rec. Bot. Surv. India 3: 341. 1907; Gamble, Fl. Pres. Madras 246. 1918.

Erect shrubs. Leaflets to 11 x 5.5 cm, obovate, abruptly acuminate, deep brown when dried, sharply serrulate, pale white-tomentose beneath; nerves 9 pairs; petiole to 7.5 cm long. Raceme to 26 cm long, slender, hispid, 1-3-branched. Flowers 2 mm across, 1-3 together, shortly pedicelled or sessile; sepals orbicular, glabrous; ovary densely hairy. Drupe 3 x 2 mm, densely hairy

*Fl. & Fr.* : July-December

*Distr.* : Peninsular India. Common; in semi-evergreen forests. Kokkara, *JA 12009.*

**Allophylus concanicus** Radlk., Sitzungsber. Math.-Phys. Cl. Koenigl. Bayer. Akad. Wiss. Muenchen 20: 230.1890; Gamble, Fl. Pres. Madras 246. 1918; Nair & Henry, Fl Tamil Nadu Ser. 1, 1: 83. 1983.; Mukh., Indian For. 496. 1972 & J. Econ. Tax. Bot. 1: 79. 1980.

Stragglers, branchlets brownish, lenticellate. Leaflets to 13 x 6 cm, ovate, acuminate, cuspidate; 6-nerved, serrate towards the apex, black above when dried; midrib pubescent; domatia hairy. Raceme branched, hispid. Flowers solitary or paired, 2 mm across; pedicel 1 mm long; sepals orbicular, ciliate; petals 5 mm across, densely white hairy within; filaments hairy, reddish, connective broad; disk lobes 4, globular.

*Fl. & Fr.* : October-December

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Mangaladevi, *JA 12689.*

**Allophylus rheedii** (Wight) Radlk. in Engl. & Prantl, Pflanzenf. 3(5): 313. 1895; Gamble, Fl. Pres. Madras 246. 1918; Mukh., Indian For. 495. 1972 & J. Econ. Tax. Bot. 1: 79. 1980. ***Schmidelia rheedii*** Wight, Ic. t. 964. 1845. **Mukkannan pezhu** (Mannan).

Erect shrubs; branches sometimes drooping. Leaflets to 15 x 9 cm, ovate or elliptic, acuminate, 7-8 nerved, deep brown or black when dried; irregularly sharply serrate; domatia distinct; petiolule 5-7 mm long; petiole 8-10 cm long. Racemes to 30 cm long, slender, hispid; pedicel 1.5 mm long, slender. Flowers 2.5 mm across, white.

*Fl. & Fr.* : March-June

*Distr.* : Peninsular India. Common; in moist deciduous forests. Thekkady, *JA & KPR 14910*; Vallakkadavu, *JA 15446.*

**Allophylus serratus** (Roxb.) Kurz, J. Asiat. Soc. Bengal 44: 185. 1876; Fyson, Fl. South India Hill St. 2: t. 99. 1932; Gamble, Fl. Pres. Madras 246. 1918. Mukh., Indian For. 494. 1972 & J. Econ. Tax. Bot. 1: 79. 1980; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 290. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 116. 1996. ***Ornitrophe serrata*** Roxb., Pl. Corom. t. 61. 1796. ***A. cobbe*** Raeusch. forma ***serratus*** (Roxb.) Hiern in Hook. f., Fl. Brit. India 1: 673. 1875.

Straggling shrubs; branchlets lenticellate. Leaflets to 18 x 9 cm, ovate, acuminate at apex, attenuate at base; nerves *ca.* 13 pairs; petiolule 3-7 mm long; petiole 8-10 cm long. Flowers 3-5-together, 4 mm across; pedicel 3 mm long, jointed; sepals 1.5 mm diam., orbicular; petals 2 x 1 mm, spathulate; lobes of disc orbicular. Drupe 4 mm across, puberulus.

*Fl. & Fr.* : January-March

*Distr.* : Peninsular India and Bengal. Common; in evergreen forests and forest margins. Pamba, *JA & KPR 17169.*

## 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. 1918; Mukh., J. Econ. Tax. Bot. 1: 80. 1980; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 292. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 116. 1996.

Tendrillate climbers. Leaves bipinnate, 10 x 10 cm, 3-7-foliolate; leaflets to 4 x 2.5 cm, pinnatifid. Tendril trichotomous, middle one forms the cymes. Flowers 3 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, saccate, 1.5 x 2 cm, obcordate; seeds 3, 3 x 3 mm, globose, shining.

*Fl. & Fr.* : Throughout the year

*Distr.* : Peninsular India. Common; in disturbed moist deciduous forests. Thekkady, *JA 12420.*

## DIMOCARPUS Loureiro

Fl. Cochinch. 233. 1790.

**Dimocarpus longan** Lour., Fl. Cochinch. 233. 1790; Leenh., Blumea 19(1): 125. 1971; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 293. 1983; Manilal, Fl. Silent Valley 63. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 117. 1996. ***Euphoria longana*** Lam., Encycl. 3: 574. 1792, *nom. illeg.*; Bedd., Fl. Sylv. t. 156. 1871. ***Nephelium longana*** (Lam.) Camp. in Mem. Mus. Hist. Nat. 18: 30. 1829; Hiern in Hook. f., Fl. Brit. India 1: 688. 1875; Gamble, Fl. Pres. Madras 252. 1918. Chempoovam (Mannan).

Trees, to 25 m high. Leaves paripinnate, leaflets 4-10 pairs, 10-18 x 2.5 cm, elliptic-oblong, glaucous beneath, nerves *ca.* 20 pairs, petiolulate. Panicle to 30 cm long, terminal. Flowers pedicelled, polygamous, 6 mm across; sepals 3 x 2 mm, hairy outside; petals 3 x 1 mm, 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, each 1.3 x 1 cm, oblong, densely rugose, tubercled, brown.

*Fl. & Fr.* : January-March

*Distr.* : Indo-Malesia. Common; in all types of forests. Ambari, *JA 13795*; Koruthode, *KPR 14780.*

*Ethnobotanical use* : The fruits are used for fishing as bait.

## DODONAEA P. Miller

Gard. Dict. Abr. ed. 4. 28. 1754.

**Dodonaea angustifolia** L.f., Suppl. Pl. 218. 1782; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3(1): 294. 1983. ***D. viscosa*** auct. non Jacq., 1760: Hiern in Hook. f., Fl. Brit. India 1: 697. 1875; Fyson, Fl. South Indian Hill St. 2: t. 100. 1932; Gamble, Fl. Pres. Madras 253. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 367. 1976; Mukh., J. Econ. Tax. Bot. 1: 80. 1980; Leenh., Blumea 28(2): 285. 1983.

Large shrubs. Leaves alternate, simple, 8.5 x 2 cm, oblanceolate, glandular, nerves many, close. Panicle terminal, 6 x 2 cm, pilose. Flowers polygamous, 5 mm across; pedicel 10 mm long, covered with viscid glands; sepals 4, 4 x 3 mm, ovate, acute, glandular; stamens 10, anthers sessile, 3 mm long, curved, connective produced into a short cusp; disk absent; ovary 3-celled; ovule 2 in each cell; pistillode clavate. Capsule 13 x 15 mm, membranous, 3-angled and 3 winged; seeds 4 x 3 mm, biconvex, black.

*Fl. & Fr.* : November-March

*Distr.* : Pantropical. Common; along the margins of evergreen forests at high elevations. Vellimala, *JA 14063, JA 14306.*

## 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; Hiern in Hook. f., Fl. Brit. India 1: 539. 1875; Gamble, Fl. Pres. Madras 249. 1918; Mukh., J. Econ. Tax. Bot. 1: 80. 1980; Nair & Henry, Fl Tamil Nadu Ser. 1, 1: 84. 1983; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 295. 1983. ***Rhus decipiens*** Wight & Arn., Prodr. 172. 1834. **Irumbarakki** (Mannan).

Large trees, branchlets angular. Leaves imparipinnate; leaflets 6-8 pairs, 9 x 2 cm, elliptic-oblong, many-nerved; rachis winged. Panicle axillary and terminal, to 18 x 5 cm; branches glandular. Flowers polygamous, 4 mm across; sepals 2 x 1 mm, 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 8 x 5 mm, obovoid, glabrous, brown; seeds 1 or 2.

*Fl. & Fr.* : November-January

*Distr.* : Southern Western Ghats (Tamil Nadu & Kerala). Common; in semi-evergreen forests. Karadikkavala, *NS & JA 12696.*

*Ethnobotanical use* : The fruits are used for fishing as bait (Mannan).

## HARPULLIA Roxburgh

Fl. Ind. 2: 441. 1824.

**Harpullia arborea** (Blanco) Radlk., Sitzungsber. Math.-Phys. Cl. Koenigl. Bayer. Akad. Wiss. Muenchen 16: 404. 1890; Leenh. & Vente, Blumea 28(2): 11. 1982; Sasidh. & Sivar., Fl. Pl. Thrissur For. 117. 1996. *Ptelea arborea* Blanco, Fl. Filip. ed. 1, 63. 1837. *Octonychium imbricatum* Bl., Rumphia 3: 180. 1849. *Harpullia imbricata* (Bl.) Thw., Enum. Pl. Zeyl. 56. 1858; Gamble, Fl. Pres. Madras 253. 1918. *H. cupanoides* sensu Hiern in Hook. f., Fl. Brit. India 1: 692. 1875 p. p., non Roxb. 1832: Bedd., Fl. Sylv. t. 158. 1871.

Small to medium sized trees; branchlets fulvous tomentose. Leaves paripinnate, leaflets 5 pairs, 16 x 6 cm, elliptic-oblong, abruptly acuminate, membranous, oblique at base. Flowers in loose axillary panicle; pedicels to 4 cm long, slender; sepals 5 x 2.5 mm, obovate, hairy; petals yellow, 8 x 3 mm, oblong, clawed; stamens 5; filaments 9 mm long, free; ovary 2-celled; one ovule in each cell; style elongate. Capsule 5 x 7 cm, 2-lobed, inflated, saccate, red; seeds black, shining.

*Fl. & Fr.* : March-January

*Distr.* : South East Asia. Common; in evergreen and semi-evergreen forests. Thekkady, *JA 13168*; Arjunankotta, *JA 13545.*

## 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. Capsule 1-3 lobed; panicles little or not branched; shrubs.....**L. erecta**
1. Capsule 3-angled; panicle branched; trees.....**L. tetraphylla**

**Lepisanthes erecta** (Thw.) Leenh., Blumea 17: 69. 1969; Manilal, Fl. Silent Valley 64. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 118. 1996. *Nephelium erectum* Thw., Enum. Pl. Zeyl. 57. 1858. *Sapindus erecta* (Thw.) Hiern in Hook. f., Fl. Brit. India 1: 683. 1872, "*erectus*". *Thraulococcus erectus* (Thw.) Radlk., Sitzungsber. Math.-Phys. Cl. Koenigl. Bayer. Akad. Wiss. Muenchen 8: 300. 1878; Gamble, Fl. Pres. Madras 251. 1918.

Shrubs. Leaves 35-50 cm long; leaflets 4 pairs, 20-25 x 5-9 cm, oblong, acute at either ends, nerves 10-13 pairs; petiolule 5 mm long, smooth. Panicle 20 x 5 cm, terminal, erect. Flowers clustered, subsessile; sepals 5 x 3 mm, ovate, obtuse, pubescent outside; petals 6 x 4 mm, obovate, broadly clawed; scale oblong, not lobed, hairy; filaments hairy above. Capsule 1.5 x 1 cm, oblong, obtuse, minutely fulvous-tomentose.

*Fl. & Fr.* : January-March

*Distr.* : Southern Western Ghats. Occasional; in semi-evergreen forests. Cheriyakanam, *NS & JA 13069.*

**Lepisanthes tetraphylla** (Vahl) Radlk., Sitzungsber. Math.-Phys. Cl. Koenigl. Bayer. Akad. Wiss. Muenchen 8: 276. 1878; Gamble, Fl. Pres. Madras 247. 1918; Mukh., J. Econ. Tax. Bot. 1: 80. 1980; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 296. 1983; Manilal, Fl. Silent Valley 64. 1988; Leenh., Fl. Males. Ser. 1, 11(3): 630. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 118. 1996. ***Sapindus tetraphylla*** Vahl, Symb. Bot. 3: 1794. ***Molinaea canescens*** Roxb., Pl. Corom. t. 60. 1796 & Fl. Ind. 2: 243. 1832. ***Hemigyrosa canescens*** (Roxb.) Bl., Rumphia 3: 166. 1849; Bedd., Fl. Sylv. t. 151. 1871; Hiern in Hook. f., Fl. Brit. India 1: 671. 1875.

Trees, 5-9 m high. Leaves to 30 cm long; leaflets 2-4 pairs, sub-opposite, to 15 x 5 cm, oblong-lanceolate; nerves 11 pairs, prominent; petiolule 5 mm long, transversally rugose. Panicle terminal or subterminal, erect or spreading, 35 x 20 cm, branches fulvous-tomentose. Flowers crowded; sepals 4 x 4 mm, orbicular, hairy outside; petals dull white, 7 x 4 mm, oblanceolate, clawed; scale 2-lobed, hairy. Capsule 2 x 1.5 cm, obovoid, obtusely trigonous, densely fulvous tomentose, apiculate.

*Fl. & Fr.* : December-May

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Chenthamara, *JA 13446.*

## OTONEPHELIUM Radlkofer

Sitzungsber Math.-Phy. Cl. Konigl. Bayar Akad. Wiss. Munchen 20: 253, 288. 1890.

**Otonephelium stipulaceum** (Bedd.) Radlk., Sapindac. Holl. Ind. 71. 1879; Mukh., J. Econ. Tax. Bot. 1: 81. 1980; Sasidh. & Sivar., Fl. Pl. Thrissur For. 118. 1996. ***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. 1918.

Trees to 20 m high; branchlets glabrous. Leaves paripinnate, 6-8 foliolate, leaflets to 20 x 7 cm, elliptic, acuminate at either ends, glaucous below; lowest pair small, reniform; nerves 11

pairs. Panicle 15 x 8 cm, terminal or axillary. Flowers 3 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 x 1.4 cm, oblong, densely soft-prickled.

*Fl. & Fr.* : March-May

*Distr.* : Southern Western Ghats (Tamil Nadu & Kerala). Common; in evergreen forests. Aruvioda, *JA 13643*; Arjunankotta, *JA & KPR 15099.*

## SAPINDUS Linnaeus

Sp. Pl. 367. 1753

Small trees. Leaves paripinnate, leaflets 2-3 pairs, entire. Flowers in terminal panicles, polygamous; sepals 5, free, imbricate; petals 5, free, with 2 scales inside; stamens 8, inside the disk; filaments hairy; disk lobed; ovary 3-lobed, 3-celled, densely hairy; style long; stigma pointed. Fruit 1-3 fleshy drupelets; seeds 1-3, globose.

1. Leaves acuminate, glabrous below.....**S. laurifolius**
1. Leaves emarginate at apex, densely hairy below .....**S. emarginatus**

**Sapindus emarginatus** Vahl, Symb. Bot. 3: 54. 1794; Bedd., Fl. Sylv. t. 154. 1871; Gamble, Fl. Pres. Madras 250. 1918; Mukh., J. Econ. Tax. Bot. 1: 81. 1980; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 299. 1983; Ved Prakash, J. Econ. Tax. Bot. 14(1): 76. 1990. *S. trifoliata* sensu Hiern in Hook. f., Fl. Brit. India 1: 682. 1875 p. p., non L., 1753.

Trees, to 5 m high. Leaves 4-foliolate; leaflets 9 x 4 cm, obovate-oblanceolate, nerves 10 pairs; petiolule 6 mm long. Panicles 15 x 10 cm, spreading, tomentose. Flowers 6 mm across, pedicellate; sepals 3 x 2 mm, obovate, tomentose; petals greenish white, 3 x 1.5 mm, oblong, scales hairy; filaments tomentose. Fruits not seen.

*Fl.* : December-May

*Distr.* : Tamil Nadu, Kerala and Karnataka. Rare; in margins of grasslands. Brandippara, *JA 16961.*

**Sapindus laurifolius** Vahl, Symb. Bot. 3: 54. 1794; Gamble, Fl. Pres. Madras 250. 1918; Mukh., J. Econ. Tax. Bot. 1: 81. 1980. *S. trifoliata* sensu Hiern in Hook. f., Fl. Brit. India 1: 682. 1875 p. p., "*trifoliatus*", non L., 1753; Sasidh. & Sivar., Fl. Pl. Thrissur For. 119. 1996. **soappunka** (Urali, Mala Arayan & Malampandaram).

Trees to 10 m high; branchlets lenticellate. Leaves 2-3-foliolate; leaflets to 13 x 4.5 cm, elliptic-lanceolate; nerves 14 pairs. Panicles to 15 x 20 cm, spreading, densely branched,

puberulus. Flowers 3-5 together; sepals 3 x 2.5 mm, ovate, obtuse; petals 4 x 2 mm, oblong; scales densely hairy; filaments densely hairy. Drupelets 15 x 15 mm, globose, densely hairy, with sticky pulp inside.

*Fl. & Fr.* : December-May.

*Distr.* : Peninsular India. Common; in evergreen forests. Koruthode, *JA 14766.*

*Ethnobotanical use* : The fruits are used as soap; and young and mature fruits are crushed with sand and used fish poison (Urali*)*.

### SCHLEICHERA Willdenow

Sp. Pl. 4: 1096. 1806, *nom. cons.*

**Schleichera oleosa** (Lour.) Oken, Allg. Naturgesch. 3(2): 1341. 1841; Mukh., J. Econ. Tax. Bot. 1: 81. 1980; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 299. 1983; Manilal, Fl. Silent Valley 64. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 119. 1996. ***Pistacia oleosa*** Lour., Fl. Cochinch. 2: 615. 1790. ***Schleichera trijuga*** Willd., Sp. Pl. 4: 1096. 1805; Bedd., Fl. Sylv. t. 119. 1871; Hiern in Hook. f., Fl. Brit. India 1: 681. 1875; Gamble, Fl. Pres. Madras 248. 1915. **Poovam** (Malampandaram & Mala Arayan).

Large trees; bark white; branchlets puberulus. Leaves paripinnate; leaflets 3-5 pairs, to 19 x 8 cm, sessile, oblong, acute, tomentose along the nerves below; nerves 20 pairs. Flowers polygamodioecious, 3 mm across, in terminal or axillary panicles; sepals 5, ovate, acute; petals absent; stamens 8, free, filaments 6 mm long, glabrous; ovary ovoid, 3-celled, with solitary ovule in each. Fruit 2 x 2cm, ovoid, globose, spiny, glabrous; seeds 3, 1.5 x 1 cm, hemispheric, smooth.

*Fl. & Fr.* : January-March

*Distr.* : Peninsular India. Common; in evergreen forests. Vallakkadavu, *JA 13412*; Sabarimala, *JA & KPR 17715.*

*Ethnobotanical use* : The wood, roots and leaves are used in medicines (Malampandaram.). The fruits are edible

## 45. SABIACEAE

Blume, Mus. Bot. 1: 368. 1851.

### MELIOSMA Blume

Cat. Buitensorg 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.....**M. simplicifolia**
1. Leaves imparipinnate.....**M. pinnata** var. **barbulata**

**Meliosma pinnata** (Roxb.) Maxim., Diagn. Pl. Nov. Jap. Mandsh. 4 & 5: 263. 1867. subsp. **barbulata** (Cufod.) Beus. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 384. 1981; Manilal, Fl. Silent Valley 65. 1988; Nayar, Thoth. & Sanj., Fl. India Fasc. 20: 120. 1990. ***Meliosma rhoifolia*** Maxim. ssp. ***barbulata*** Cufod., Oest. Bot. Zeit. 88: 254. 1939. ***M. arnottiana*** (Wight) Beus., Blumea 19: 499. 1971; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 301. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 120. 1996. ***Millingtonia pinnata*** Roxb., Fl. Ind. 1: 103. 1820. ***M. arnottiana*** Wight, Ill. t. 53. 1840. ***Meliosma arnottiana*** (Wight) Walp., Repert. 1: 423. 1842; Bedd., Fl. Sylv. t. 160. 1871; Fl. Brit. India 2: 6. 1876; Gamble, Fl. Pres. Madras 256. 1918.

Medium sized trees, branchlets thickly tomentose. Leaves 10-16-foliolate; leaflets opposite, to 13 x 3.5 cm, elliptic, acuminate, densely hairy, petiolulate; rachis bulged at base. Panicles terminal, 30 cm across, densely tomentose. Flowers 4 mm across, sessile; sepals ovate, hairy; petals orbicular, pale yellow; ovary densely hairy. Drupe 7 mm across, globose

*Fl. & Fr.* : May-August

*Distr.* : South East Asia. Common; in evergreen forests. Kottamala, *JA 15229.*

**Meliosma simplicifolia** (Roxb.) Walp. Rep. 1: 103. 1842; Hook. f., Fl. Brit. India 2: 5. 1876; Gamble, Fl. Pres. Madras 256. 1918; Beus., Blumea 19. 462. 1971 & in Rev, Handb. Fl. Ceylon 3: 380. 1981; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 302. 1983; Manilal, Fl. Silent Valley 65. 1988; Nayar, Thoth. & Sanj., Fl. India Fasc. 20: 122. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 120. 1996. ***Millingtonia simplicifolia*** Roxb., Pl. Corom. 3: 50, t. 254. 1820. **Chenthanam** (Mannan).

Small trees; branchlets glabrous. Leaves to 30 x 10 cm, oblanceolate, acute at apex, glabrous; nerves 16 pairs, regular, scabrid, young leaves crimson- red; petiole to 5 cm long. Flowers 2 mm across, in large axillary panicles; sepals 5, free, ovate, ciliate, petals 3, white, imbricate, glabrous. Drupe 5 mm across, ampulliform, glabrous.

*Fl. & Fr.* : March-October

*Distr.* : Indo-China and Sri Lanka. Common; in all forests types. Vallakkadavu, *JA 14131*; Thaannikkudy, *KPR 14840.*

*Ethnobotanical use* : Some ladies of Mannan like to eat fish eggs after the childbirth; then they eat the stem bark of this plant and eat the fish eggs.

## 46. 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. Carpels 5, free.....**Buchanania**
6. Carpels united.....7
7. Styles 3; all stamens fertile.....**Semecarpus**
7. Style 1; fertile stamens 1 or 2.....**Mangifera**

### BUCHANANIA Sprengel

J. Bot. (Schrader) 1800 (2): 234. 1802.

**Buchanania lanzan** Spreng., J. Bot. (Schr.) 2: 234. 1800; Gamble, Fl. Pres. Madras 258. 1918; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 374. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 303. 1983. ***B. latifolia*** Roxb., Fl. Ind. 2: 385. 1832; Bedd., Fl. Sylv. t. 165. 1871; Hook. f., Fl. Brit. India 2: 23. 1876.

Small trees; branchlets stout, rusty tomentose. Leaves simple, to 20 x 12 cm, oblong, obtuse at apex, round at base, coriaceous, densely hairy below, nerves 19 pairs, prominent; petiole 1 cm long, stout. Panicle to 15 x 25 cm, terminal, branches stout, densely rusty-tomentose. Flowers many, clustered, bisexual, 6 mm across, sessile; sepals 5, free, ovate; petals 5, 2 x 1 mm, ovate-oblong, glabrous; fertile stamen 1, sterile ones 4; disk densely hairy; fertile carpel 1, sterile carpels 4; style short. Drupe 1 x 0.8 cm, oblong, dark, glabrous.

*Fl. & Fr.* : January-March

*Distr.* : India and Burma. Common; in savannahs. Kavalappara, *JA 14547.*

## HOLIGARNA Hamilton ex Roxburgh

Pl. Coromandel 3: 79. 1820, *nom. cons.*

Tall trees; sap black, acrid. Leaves simple, alternate, nerves many, parallel; petiole bristled. Flowers polygamodioecious, 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 1.

1. Leaves 30-40 cm long, up to 30-nerved, tomentose below; bristles on petiole 2-3 pairs.....**H. grahamii**
1. Leaves to 20 cm long, up to 12-nerved, glabrous; bristles on petiole 1 pair, deciduous or absent.....2
2. Leaves obtusely acute at apex; drupe with a tuft of brown hairs at apex.....**H. arnottiana**
2. Leaves emarginate at apex; drupe without tuft of hairs at apex.....**H. ferruginea**

**Holigarna arnottiana** Hook. f., Fl. Brit. India 2: 36. 1876; Gamble, Fl. Pres. Madras 268. 1918; Nair & Henry, Fl. Tamil Nadu I, 1. 87. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 121. 1996. *H. longifolia* auct. non Roxb., 1820: Wight & Arn., Prodr. 169. 1834; Bedd., Fl. Sylv. t. 167. 1871.

Trees to 20 m high; branches stout, glabrous. Leaves to 20 x 6 cm, oblanceolate, obtusely acute at apex, attenuate at base, nerves 12 pairs, brown beneath; petiole 1 cm long, pubescent; bristle one on either side. Panicle 10 x 10 cm. Flowers yellowish white, many; branches and pedicels puberulus; petals 5, ovate, acute, hirsute outside. Drupe 1.5 x 1 cm, obovoid-oblong, apex with a crown of golden brown hairs.

*Fl. & Fr.* : January-April

*Distr.* : Endemic to Western Ghats. Common; along riversides. Koruthode. *JA 17996.*

**Holigarna ferruginea** Marchand, Rev. Anacard. 171. 1868; Hook. f., Fl. Brit. India 2: 37. 1876; Gamble, Fl. Pres. Madras 268. 1918; Sald. & Nicols., Fl. Hassan Dist. 375. 1976; Nair & Henry, Fl. Tamil Nadu I, 1. 87. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 121. 1996 **Cheru** (Mannan).

Trees, to 25 m or more high; bark white, smooth. Leaves to 15 x 5 cm, oblanceolate, obtuse, to emarginate, olive brown below when dried; nerves 7-10 pairs; petiole 2.5 cm long, Bristles 1or 2, short. Panicles 10 x 10 cm, terminal; branches thick, dark purple-tomentose. Flowers 3 mm across, densely dark purple-tomentose; petals rose, ovate, obtuse. Drupe 2.5 x 1 cm, obovoid, obtuse, narrowed to the base, glabrous.

*Fl. & Fr.* : March-May

*Distr.* : Endemic to Southern Western Ghats. Common; in evergreen forests. Vallakkadavu, *JA 13477*, Poonkavanam, *JA 14921.*

**Holigarna grahamii** (Wight) Kurz, J. Asiat. Soc. Bengal 42: 305. 1872; Hook. f., Fl. Brit. India 2: 37. 1876; Gamble, Fl. Pres. Madras 268. 1918; Sald. & Nicols., Fl. Hassan Dist. 375. 1976; Nair & Henry, Fl. Tamil Nadu I, 1. 87. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 121. 1996. ***Semecarpus grahamii*** Wight, Ic. t. 235. 1839. ***Holigarna wightii*** Balakr., J. Bombay Nat. Hist. Soc. 63: 327. 1966. *Vellacheru* (Mannan).

Trees, to 30 m high; sap very acrid; branchlets stout; densely fulvous-tomentose. Leaves to 40 x 20 cm, oblanceolate, suddenly widening above the middle, glabrous above, densely golden brown tomentose below, nerves more then 30 pairs, prominent, regular, parallel. Panicle 20 x 35 cm, terminal, densely fulvous-hairy. Flowers many, sessile; sepals cupular, 4 or 5-toothed; petals dull white, 2.5 x 1.5 mm, densely hairy; filaments 3 mm long, glabrous. Fruits now seen.

*Fl.* : November

*Distr.* : Southern Western India. Occasional; in evergreen forests. Vallakkadavu, *JA 14181.*

*Note* : The juice of this species usually produce burns or allergies to skin.

## 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; Sald. & Nicols., Fl. Hassan Dist. 376. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 307. 1983; Meijer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 21. 1983; Manilal, Fl. Silent Valley 66. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 122. 1996. ***Dialium coromandelicum*** Houtt., Nat. Hist. Ser. 2, 2: 39, t. 5, f. 2. 1774. ***Odina wodier*** Roxb., Fl. Ind. 2: 293. 1832; Wight, Ic. t. 60. 1838; Hook. f., Fl. Brit. India 2: 29. 1876; Gamble, Fl. Pres. Madras 263. 1918. **Udi, Uthi** (Mannan); **Kalasu** (Mala Arayan).

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 to 15 x 15 cm, terminal, stellate-hairy. Flowers clustered, unisexual, monoecious, 4 mm across; sepals 4, ovate, acute, spreading; petals 4, 2 x 1 mm, obovate, obtuse; stamens 8-10 in male flowers, free, all fertile; filaments glabrous; ovary 1-celled, ovule solitary. Fruit a drupe, 10 x 6 mm, ovoid, glabrous.

*Fl .& Fr.* : January-April.

*Distr.* : South Asia and Malesia. Common; in evergreen forests. Koruthode, *JA 14797.*

*Ethnobotanical use* : The bark is boiled with fishing net to stain the net so as to change the white colour to dull brown because they believe the white colour often frighten the fish(Mannan). The bark along with bark of *Terminalia catapa* and *Vitex altissima* are boiled in water and this water is used for bathing of ladies, after childbirth.

## MANGIFERA Linnaeus

Sp. Pl. 200. 1753

**Mangifera indica** L., Sp. Pl. 200. 1753; Roxb., Fl. Ind. 1: 641. 1832; Bedd., Fl. Sylv. t. 162. 1781; Hook. f., Fl. Brit. India 2: 13. 1876; Gamble, Fl. Pres. Madras 259. 1918; Sald. & Nicols., Fl. Hassan Dist. 376. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 308. 1983; Manilal, Fl. Silent Valley 67. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 122. 1996.

Trees, to 20 m high; bark rough with vertical fissures. Leaves alternate, usually clustered towards the apex, to 22 x 5 cm, oblong, acute at either ends, coriaceous; nerves 30, parallel; petiole to 2 cm long. Panicles usually terminal, to 20 x 10 cm or larger, densely hispid. Flowers many, unisexual, 8 mm across; sepals 2 x 1.5 mm, triangular; petals dull yellow, 4 x 1.5 mm, oblong, curved; fertile stamens 1; ovary 1-celled, ovule solitary; style lateral. Drupe 5 x 3 cm, oblong, mesocarp fleshy; endocarp fibrous; seed sub-reniform.

*Fl. & Fr.* : April-May

*Distr.* : Pantropical. Common; in evergreen forests. Pachakkanam, *JA 15188.*

*Ethnobotanical use* : The fruits are edible and are eaten.

## 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 to 32 cm long, oblanceolate ..... **N. racemosa**
1. Leaves under 15 cm long, elliptic or oblong ..... 2
2. Leaves membranous, inrolled when dried ..... **N. beddomei**
2. Leaves coriaceous, not inrolled ..... 3
3. Branchlets, petioles and pedicels ferrugineous hispid, intercostae regular parallel ..... **N. travancorica**
3. Branchlets, petiole and pedicels not ferrugineous hispid, intercostae reticulate ..... 4
4. Leaves obtuse at apex, 2 cm broad; branchlets ashy-puberulus ..... **N. heyneana**
4. Leaves obtusely acuminate at apex, 4 cm broad; branchlets lenticellate ..... **N. colebrookeana**

**Nothopegia beddomei** Gamble, Kew Bull. 1918: 227. 1918 & Fl. Pres. Madras 265. 1918; Sald. & Nicols., Fl. Hassan Dist. 377. 1976; Meijer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon

4: 19. 1983; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 309. 1983; Manilal, Fl. Silent Valley 67. 1988. *N. colebrookeana* sensu Bedd., Fl. Sylv. t. 164. 1871, non Bl., 1851; Hook. f., Fl. Brit. India 2: 40. 1876, p.p.

Small trees; bark dull brown, branchlets slender, black. Leaves to 15 x 4 cm, oblong, caudate-acuminate, tip rounded, attenuate at base, nerves 20-25 pairs, regular, shining above, greenish brown beneath; petiole 1 cm long. Flowers few, in short lateral racemes. Drupe 0.8 x 0.8 cm, globose, obtuse, striate, dark. Fruits not seen.

*Fr.* : January

*Distr.* : Southern Western India and Sri Lanka. Rare; in semi-evergreen forests. Pamba, *JA 17160.*

**Nothopegia colebrookeana** (Wight) Bl., Mus. Bot. Lugd.-Bat. 1: 203. 1850; Hook. f., Fl. Brit. India 2: 40. 1876, p. p.; Gamble, Fl. Pres. Madras 265. 1918; Sasidh. & Sivar., Fl. Pl. Thrissur For. 124. 1996. ***Pegia colebrookiana*** Wight, Ic. t. 230. 1839.

Trees to 5 m high; branchlets dark, lenticellate. Leaves to 12 x 4 cm, obovate, attenuate at base, shining above, pale white beneath; nerves 19-21 pairs, regular; petiole 1 cm long. Panicle 5 x 2 cm, conjested, rusty tomentose. Flowers 2 mm across, densely rusty-tomentose; sepals 4, ovate, acute; petals oblong, puberulus inside, densely tomentose outside; stamens 4, filaments glabrous. Drupe 9 x 6 mm, ovoid, acute, black.

*Fl. & Fr.* : December-January

*Distr.* : Peninsular India. Common; in evergreen forests near grasslands. Kumarikulam, *NS & JA 13012*; Thaannikkudy, *JA 13029.*

**Nothopegia heyneana** (Hook. f.) Gamble, Fl. Pres. Madras 265. 1918; Sald. & Nicols., Fl. Hassan Dist. 377. 1976. *N. colebrookeana* (Wight) Bl. var. ***heyneana*** Hook. f., Fl. Brit. India 2: 40. 1876.

Shrubs, branchlets slender. Leaves to 9 x 2 cm, oblong, acute at apex and base, brown when dried; nerves *ca.* 20 pairs; intercostae irregular; petiole 5 mm long. Raceme 1 cm long, axillary. Flowers 5-6 mm across; sepals 4, triangular, glabrous; petals 4 x 1.5 mm, oblong, acute, glabrous; stamens 4, filaments 1 mm long, erect; ovary conical; stigma capitate. Fruits not seen.

*Fl.* : June

*Distr.* : Peninsular India. Occasional; in evergreen forests. Vallakkadavu, *JA & KPR 15414.*

**Nothopegia racemosa** (Dalz.) Ramam. in Sald. & Nicols., Fl. Hassan Dist. 377. 1976. ; Manilal, Fl. Silent Valley 67. 1988 ***Glycycarpus racemosus*** Dalz., J. Asiat. Soc. Bombay 3: 69.

1849; Hook., Ic. Pl. t. 892. 1852. ***Nothopegia dalzellii*** Gamble, Fl. Pres. Madras 265. 1918. *N. 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 to 32 x 10 cm, oblanceolate, abruptly long-acuminate at apex; nerves 30-44 pairs, very prominent below, intercostae regular, brown beneath, grey above; petiole 2 cm long. Panicles 2 x 1 cm, congested. Flowers subsessile, 6 mm across; sepals triangular; petals 3 x 1.5 mm, obovate, white with reddish nerves; stamens 4, filaments hairy. Fruits not seen.

*Fl.* : March

*Distr.* : Southern Western India. Rare; in evergreen forests. Kunnar, *JA 13462.*

**Nothopegia travancorica** Bedd. ex Hook. f., Fl. Brit. India 2: 40. 1876; Gamble, Fl. Pres. Madras 265. 1918; Sald. & Nicols., Fl. Hassan Dist. 377. 1976; Sasidh. & Sivar., Fl. Pl. Thrissur For. 124. 1996.

Shrubs; branchlets lenticellate, ferrugineous tomentose. Leaves to 14 x 4 cm, elliptic-oblong, obtusely acuminate at apex, nerves 15 pairs, prominent; yellow; intercostae regular, closely parallel; petiole 1 cm long, curved. Flowers in axillary fascicles, 2-3 together; calyx ferrugineous tomentose; petals 1.5 mm long, ovate, acute, hairy inside, ciliate. Fruits not seen.

*Fl.*: January

*Distr.* : South India. Rare; in evergreen forests. Pamba, *JA & KPR 17179.*

## SEMECARPUS Linnaeus f.

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 auricled at base, to 9 cm broad, oblanceolate.....**S. auriculata**
1. Leaves acute at base, to 20 cm broad, elliptic or obovate.....**S. travancorica**

**Semecarpus auriculata** Bedd., Ic. t. 187. 1868-1874; Hook. f., Fl. Brit. India 2: 32. 1876; Gamble, Fl. Pres. Madras 267. 1918; Nair & Henry, Fl Tamil Nadu Ser. 1, 1: 89. 1983.

Trees to 20 m high. Leaves to 30 x 9 cm, oblanceolate, obtusely acuminate at apex, attenuate to the base; nerves 20 pairs, brown beneath. Panicles to 18 x 10 cm, axillary, glabrous. Flowers 5 mm across; pedicels 8 mm long; sepals cupular, shallowly 4 or 5-angled; petals ovate, acute, glabrous; filaments glabrous. Drupe 13 x 12 mm, compressed; pseudocarp 10 mm long, brown.

*Fl. & Fr.* : January-February

*Distr.* : South India. Common; in evergreen forests at low elevations. Puthussery, *JA 13509*; Koruthode, *JA & KPR 14708.*

**Semecarpus travancorica** Bedd., Fl. Sylv. t. 232. 1872; Hook. f., Fl. Brit. India 2: 31. 1876; Gamble, Fl. Pres. Madras 267. 1918; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 377. 1976; Sasidh. & Sivar., Fl. Pl. Thrissur For. 124. 1996.

Trees, to 30 m high; bark dull brown. Leaves 20-40 x 12-20 cm, obovate, obtuse or acute at apex and base, coriaceous; nerves to 16 pairs, prominent, regular; petioles 5 cm long. Panicle 30 x 5 cm, axillary, glabrous. Flowers many, 1.5 mm across; sepals ovate, ciliate; petals white, oblong, acute, glabrous. Drupe 2.5 x 1.5 cm, compressed; pseudocarp 1.5 x 1 cm, globose, brown, striate.

*Fl. & Fr.* : February-August

*Distr.* : Endemic to Southern Western Ghats. Occasional; in semi-evergreen forests. Pachakkanam, *JA 12306*; Arjunankotta, *JA 13375.*

## SOLENOCARPUS Wight & Arnott

Prodr. 171. 1834.

**Solenocarpus indica** Wight & Arn., Prodr. 172. 1834; Bedd., Fl. Sylv. t. 233. 1874; Hook. f., Fl. Brit. India 2: 27. 1876; Gamble, Fl. Pres. Madras 262. 1918; Kosterm., Found. Useful Pl. Asia 1: 73. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 125. 1996. ***Spondias indica*** (Wight & Arn.) Airy Shaw & Forman, Kew Bull. 21: 16. 1967; Manilal, Fl. Silent Valley 68. 1988.

Small trees, sometimes epiphytic; bark brown, rough; branchlets slender. Leaves pinnately compound; leaflets 6 pairs, opposite or subopposite, 6-7 x 2-3 cm, ovate-lanceolate, acuminate, sessile, many-nerved, base obliquely cordate. Panicle to 20 x 20 cm, axillary or terminal, spreading. Flowers many, bisexual, 3 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 8 x 5 mm, obovoid, smooth.

*Fl. & Fr.* : November-March

*Distr.* : Western Peninsular India. Occasional; in evergreen forests. Attathodu, *JA 12750;* Arjunankotta, *JA 15097.*

## SPONDIAS Linnaeus

Sp. Pl. 371. 1753

**Spondias pinnata** (L. f.) Kurz, Prelim. Rep. For. & Veg. Pegu Append. A. 44. & B. 42. 1875; Sald. & Nicols., Fl. Hassan Dist. 379. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu

Fig. 24. **A.** *Ventilago bombaiensis* Dalz.

**B.** *Connarus monocarpus* L.

Carnatic 3 (1): 311. 1983; Meijer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 23. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 125. 1996. ***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. 1918. **Kattambazham** (Mannan).

Trees, to 30 m high; bark yields a gum; branchlets stout, white. Leaves pinnate; leaflets 10 x 4 cm, opposite, oblong-acuminate; many-nerved, nerves parallel, forming an intramarginal vein. Panicle to 25 x 20 cm, terminal, glabrous. Flowers 6 mm across, sessile; sepals 5, triangular; petals 5, 3 x 1 mm, oblong, glabrous; fertile stamen 1, staminodes 9; ovary 4-5-celled; ovule 1 in each cell; styles 4 or 5. Drupe 4 x 2.5 cm, ovoid-oblong, smooth.

*Fl. & Fr.* : November-March

*Distr.* : Tropical Asia. Common; in evergreen and semi-evergreen forests. Attathodu, *JA 12750*; Arjunankotta, *JA & KPR 15097.*

*Note* : The fruits seems edible with their smell, but are sour in taste. Mannan seldom eat it.

## 47. CONNARACEAE

R. Brown in Tuckey, Narr. Exped. Zaire : 431. 1818.

### 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 follicles; seeds one, arillate at base.

1. Leaves 7-foliolate.....**C. wightii**
1. Leaves 5-foliolate.....2
2. Leaflets with venation prominently reticulate, glabrous.....**C. sclerocarpus**
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. 1918; Tirveng. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 283. 1980; Sasidh. & Sivar., Fl. Pl. Thrissur For. 126. 1996 [Fig. 24 B].

Large climbing shrubs; branchlets glabrous. Leaflets 9 x 4 cm, ovate, obtusely acuminate; nerves 5-7 pairs, reddish brown beneath; petiole 8 mm long. Panicles to 15 x 10 cm, terminal,

branches fulvous-tomentose. Flowers many; pedicels hispid; sepals 4 x 1.5 mm, oblong, obtuse, hispid outside; petals 8 x 2 mm, acute, hispid outside; filaments glandular-hairy; ovary densely hairy. Capsule 5 x 2.5 cm, biconvex, stipitate, reddish, glabrous inside; seeds polished.

*Fl. & Fr.* : May-December

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Uppermanalar, *JA 12968*; Kottamala, *JA & KPR 15358.*

**Connarus sclerocarpus** (Wight & Arn.) Schellenb., Candollea 2: 98. 1925; Gamble, Fl. Pres. Madras 273. 1918; Nair & Henry, Fl Tamil Nadu Ser. 1, 1: 90. 1983. ***Rourea ? sclerocarpa*** Wight & Arn., Prodr. 262. 1839.

Large climbers. Leaflets 6-8 x 2-3.5 cm, elliptic, acute at base and apex; nerves 3 or 4 pairs, basal pair opposite, rib like; petiole 5 mm long. Panicles 10 x 10 cm, terminal, densely brown tomentose. Flowers light pink; pedicels very short; sepals yellow, 3 x 1.5 mm, densely tomentose outside; petals 7 x 2 mm, oblanceolate, obtuse, densely hairy; style 5 mm long, densely tomentose. Fruits not seen.

*Fl.* : March

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Anakuthivayal, *JA 17748.*

**Connarus wightii** Hook. f., Fl. Brit. India 2: 51 1876; Gamble, Fl. Pres. Madras 272. 1918; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 363. 1976. ***Connarus ritchiei*** Hook. f., Fl. Brit. India 2: 51. 1876; Gamble, Fl. Pres. Madras 273. 1918.

Large climbing shrubs. Leaflets 15 x 5 cm, elliptic-oblong, abruptly acuminate, rounded at base; nerves 5 or 6 pairs, reticulate; petiole 6 mm long, transversally rugose. Panicle 18 x 12 cm, axillary on old branches, ferrugineous hairy. Flowers subsessile, few-together; sepals 2.5 mm long, hispid; petals 4.5 x 1.5 mm, oblanceolate, puberulus outside; filaments unequal; fertile one 2 mm long; ovary densely hairy.

*Fl. & Fr.* : March-April

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Pachakkanam, *JA 15163.*

## 48. FABACEAE

Lindl., Intr. Nat. Syst. Bot., ed. 2:148.1836. *nom. alt.* **Leguminosae, Papilionaceae**

Key to the subfamilies

1. Flowers irregular.....2

1. Flowers regular.....Mimosoideae

2. Petals papilionaceous; stamens united (**Ormosia**) ..... **Faboideae**

2. Petals not papilionaceous; stamens free ..... **Caesalpinioideae**

## Subfamily : **FABOIDAE**

1. Stamens all free..... **Ormosia**

1. Stamens variously united ..... 2

2. Anthers dimorphic..... 3

2. Anthers uniform..... 7

3. Leaves bifoliolate..... **Zornia**

3. Leaves 1 or 3-foliolate..... 4

4. Climbers; standard petals smaller than wings and keel ..... **Mucuna**

4. Herbs or shrubs; standard larger than wings and keel..... 5

5. Flowers axillary, solitary..... **Goniogyna**

5. Flowers terminal or axillary, cymose or umbellate..... 6

6. Pods jointed, flat..... **Stylosanthes**

6. Pods not jointed, turgid..... **Crotalaria**

7. Stamens 9 + 1; vexillary stamen always free..... 8

7. Stamens monadelphous or isodiadelphous (9, 10 or 5 + 5)..... 32

8. Plants covered with laterally adnated hairs..... **Indigofera**

8. Plants not covered with laterally adnated hairs..... 9

9. Calyx bilabiate; petals much shorter than the calyx..... **Paracalyx**

9. Calyx not bilabiate; petals larger than the calyx..... 10

10. Leaves more than 3-foliolate..... 11

10. Leaves 1-3-foliolate..... 16

11. Fruits samaroid, winged on either ends..... **Kunstleria**

11. Fruits not samaroid, winged along the margins or not ..... 12

12. Leaflets alternate; pods covered with glochidiate papillae..... **Ormocarpum**

12. Leaflets opposite; pods not covered with glochidiate papillae..... 13

13. Shrubs or herbs, not climbing; leaves break along lateral nerves only ..... **Tephrosia**

13. Climbers; leaves not cut as above..... 14

14. Pods broadly winged on either margins..... **Aganope**

14. Pods narrowly winged on one margin or not winged..... 15

15. Pods indehiscent; flowers white..... **Derris**

15. Pods dehiscent; flowers pink..... **Millettia**

16. Pods turgid..... 17

16. Pods not turgid..... 18

17. Trailing herbs; seeds many.....**Pycnospora**

17. Erect shrubs; seeds 2.....**Flemingia**

18. Pods twisted so as the joints face each other.....**Uraria**

18. Pods not as above.....19

19. Pods 1-seeded with a broad wings on one end.....**Spatholobus**

19. Pods 2-many seeded, not winged as above.....20

20. Leaves 1-foliolate.....21

20. Leaves 3-foliolate.....22

21. Joints of pods turgid.....**Alysicarpus**

21. Joints of pods flat.....**Desmodium**

22. Leaves digitately 3-foliolate; trailing herbs.....**Parochetus**

22. Leaves pinnately 3-foliolate; climbers or erect shrubs.....23

23. Keel petal twisted; stigma oblique.....**Vigna**

23. Keel petal not twisted; stigma terminal.....24

24. Calyx truncate; lobes obscure.....**Dumasia**

24. Calyx not as above.....25

25. Climbers.....26

25. Erect shrubs or herbs.....30

26. Pods 1 or 2-seeded.....**Rhynchosia**

26. Pods few, many-seeded.....27

27. Margins of pods thickened; flowers umbellate.....**Centrosema**

27. Margins of pods not as above; flowers not umbellate.....28

28. Pods falcate.....**Dolichos**

28. Pods straight.....29

29. Pods membranous, not depressed between seeds.....**Shuteria**

29. Pods coriaceous, depressed between seeds.....**Atylosia**

30. Pods viscid-glandular hairy.....**Pseudarthria**

30. Pods not viscid-glandular hairy.....31

31. Leaves digitately 3-foliolate; pods transversely furrowed between seeds.....**Atylosia** (p.p.)

31. Leaves pinnately 3-foliolate; pods jointed.....**Desmodium** (p.p.)

32. Standard smaller than wings; stem armed.....**Erythrina**

32. Standard equal to or larger than wings; stems unarmed.....33

33. Stamens isodiadelphous.....34

33. Stamens monadelphous.....37

34. Herbs or subshrubs.....35

34. Trees or climbers.....36

35. Pods twisted so as to face the joints together.....**Smithia**

35. Pods straight.....**Aeschynomene**

36. Pods orbicular; anthers versatile.....**Pterocarpus**

36. Pods oblong; anthers terminal.....**Dalbergia**

37. Leaves more than 3-foliolate.....38

37. Leaves 3-foliolate.....39

38. Leaflets opposite; fruit not winged; seeds red, globose or ovoid.....**Abrus**

38. Leaflets alternate; fruits winged; seeds not red, compressed.....**Dalbergia**

39. Erect herbs; leaflets to 1.5 cm long.....**Rothia**

39. Climbing shrubs; leaflets more than 5 cm long.....40

40. Flowers white, densely packed; pods deflexed, depressed between seeds.....**Neonotonia**

40. Flowers pink; loosely packed; pods erect continuous.....**Canavalia**

## ABRUS Adanson

Fam. 2: 327, 511. 1763

**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. 1918 ssp. **pulchellus** Verdcourt, Kew Bull. 24: 246. 1970; Rudd in Dassan & Fosb., Rev. Handb. Fl. Ceylon 1: 446. 1980; Sanj., Leg. India 74. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 129. 1996. ***Abrus fruticulosus*** Bret., Blumea 10: 612. 1960, p.p.

Twining herbs, glabrous. Leaves paripinnate, leaflets opposite, to 11 pairs, to 3 x 1 cm, oblong, obtuse, chartaceous, terminal leaflets larger; stipule lanceolate, deflexed. Flowers crowded in short tubercles, on long axillary raceme; calyx cupular, truncate; petals to 1 cm long, mauve, standard obovate; wings falcate, clawed; keel oblong; stamens monadelphous; ovary densely hairy. Pods 7 x 1 cm, oblong, slightly curved, compressed, glabrous; seeds many, 6 x 4 mm, dark red.

*Fl. & Fr.* :November-February

*Distr.* : Tropical Asia and Africa. Common; in moist deciduous forests. Koruthode, *JA & KPR 14767; JA 16915.*

## AESCHYNOMENE Linnaeus

Sp. Pl. 713. 1753

**Aeschynomene indica** L., Sp. Pl. 713. 1753; Wight, Ic. t. 405. 1840; Baker in Hook. f., Fl. Brit. India 2: 151. 1876; Gamble, Fl. Pres. Madras 313. 1918; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 335. 1983; Rudd in Dassan. & Fosb. Rev. Handb. Fl. Ceylon 7: 163. 1991.

Erect glabrous herbs; stems slender, woody. Leaves 1-pinnate; leaflets 20-30 pairs, 3 x1 mm, oblong, obtuse, glabrous, sessile; stipule 5 mm long, scarious. Flowers 2-3-together in short lateral racemes; bracts ovate; calyx 5 mm long, lobes oblong, obtuse; petals pink; standard 7 x 5 mm, obovate; wings clawed; keels 4 mm long, acute; stamens 5 + 5; ovary stalked, 2-10-ovuled. Pods 5 x 0.4 cm, flat, 8-12-jointed; joints square, glabrous; seeds many, brown.

*Fl. & Fr.* :October-January

*Distr.* : Old World Tropics & South America. Occasional; in moist deciduous forests. Pambavalley, *JA 16981.*

## AGANOPE Miquel

Fl. Ind. Bat. Amsterdam 1: 151. 1855.

**Aganope thyrsiflora** (Benth.) Polhill Kew Bull. 25:270.1971, var. **eualata** (Bedd.) Thoth. & Das, Rheedea 2: 63. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 129. 1996. ***Millettia thyrsiflora*** Benth. in Miq., Pl. Jungh. 269. 1852. ***Derris thyrsiflora*** (Benth.) Benth., J. Linn. Soc. 4(Suppl.): 114. 1860, var. ***eualata*** (Bedd.) Thoth., Bull. Bot. Surv. India 3: 195. 1961. ***D. eualata*** Bedd., Ic. t. 186. 1874; Gamble, Fl. Pres. Madras 388. 1918. ***D. platyptera*** Baker in Hook. f., Fl. Brit. India 2: 245. 1878.

Stout climbers, branches densely lenticellate. Leaves pinnately 5-9-foliolate; leaflets to 10.5 x 6 cm, ovate-oblong, abruptly acuminate, acute or rounded at base, nerves 6-8 pairs, narrow; petioles 8-10 mm long, minutely hispid. Panicle 20 x 7 cm, branches hairy. Flowers many; pedicels 3 mm long; calyx 3 mm long, cupular, lobes obscure, thinly tomentose; petals white, standard 9 x 8 mm, orbicular, retuse; wings 10 x 2.5 mm, auricled; keel 10 x 4 mm, obovate; stamens 9 + 1, staminal sheath 6 mm long; ovary densely hairy; ovules few; style 3 mm long. Pod samaroid, 7 x 3.5 cm, oblong, compressed, flat, broadly winged along one margin.

*Fl. & Fr.* : December-March

*Distr.* : Throughout the Western Ghats; Endemic. Rare; in evergreen forests at low elevations. Pamba, *JA 17142.*

## ALYSICARPUS Necker ex Desvaux

J. Bot. Agric. 1: 120. 1813, *nom. cons.*

Erect or prostrate herbs. Leaves 1-foliate, petioled, stipulate, stipel filiform. 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 5 mm long; leaves ovate to orbicular.....**A. vaginalis** var. **vaginalis**
1. Calyx 1 cm long; leaves oblong to lanceolate.....2
2. Joints of pods not moniliform; stipule ca. 2 cm long; racemes not interrupted.....**A. heterophyllus**
2. Joints of pods moniliform; stipule to 1 cm long; racemes interrupted.....**A. bupleurifolius**

**Alysicarpus bupleurifolius** (L.) DC., Prodr. 2: 352. 1825, var. **bupleurifolius** Baker in Hook. f., Fl. Brit. India 2: 158. 1876; Gamble, Fl. Pres. Madras 338. 1918; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 336. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 130. 1996. ***Hedysarum bupleurifolium*** L., Sp. Pl. 745. 1753; Roxb., Fl. Ind. 3: 346. 1832.

Erect herbs. Leaves to 4 x 0.9 cm, oblong, acute, cordate or rounded at base, ciliate; petiole 3 mm long; stipule 1 cm long. Racemes 10-15 cm long, interrupted; bracts 7 x 5 mm, chaffy. Flowers grouped; calyx 10 mm long, lobes ciliate at apex; petals bluish violet. Pods 2 cm long; joints reticulate, smooth.

*Fl. & Fr.* : November-January

*Distr.* : Peninsular India. Occasional; in grasslands, Kalvarimala, *NS & JA 12799.*

**Alysicarpus heterophyllus** (Benth. ex Baker.) Jafri & Ali, Biologia Lahore 12: 33. 1966. *A. **vaginalis*** (L.) DC. var. ***heterophyllus*** Benth. ex Baker in Hook. f., Fl. Brit. India 2: 312. 1869.

Procumbent herbs; stem strigose along one line. Leaves to 6 x 0.5 cm, linear-oblong, acute, minutely hairy below, base rounded; petiole 5 mm long; stipule 2 x 0.3 cm, lanceolate, acuminate, straw-coloured. Raceme to 5 cm long, terminal; bracts 7 x 4 mm, ovate, acute; calyx 10 mm long, lobes strongly ciliate at apex; standard pink, 8 mm long.

*Fl. & Fr.* : October-December

*Distr.* : Peninsular India. Common; in grasslands. Mangaladevi, *NS & JA 12686.*

**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. 1918; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 338. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 130. 1996. ***Hedysarum vaginalis*** L., Sp. Pl. 746. 1753. ***Alysicarpus vaginalis*** (L.) DC. *var.* ***nummularifolius*** Miq., Fl. Ind. Bat. 1: 232. 1855; Baker in Hook. f., Fl. Brit. India 2: 158. 1876; Gamble, Fl. Pres. Madras 1: 238. 1957. ***Hedysarum nummularifolium*** sensu Willd., Sp. Pl. 3: 1173. 1803, non L., 1753.

Procumbent herbs, stem glabrous. Leaves to 3 x 1.5 cm, ovate, obtuse, cordate at base, thinly villous below; petiole 1 cm long; stipule 10 x 2 mm, lanceolate. Racemes 3-6 cm long, terminal; bract 4 mm long, glabrous. Flowers paired; pedicels 2 mm long, slender; standard 5 mm long, pink. Pods 2 x 0.2 cm, jointed, joints 7, rectangular, minutely hooked-hairy.

*Fl. & Fr.* : August-December

*Distr.* : Paleotropical. Common; in grasslands and savannahs. Thaannikkudy, *JA 13831;* Thekkady, *JA 16344; KPR 16955.*

## ATYLOSIA R. Wight & Arnott

Prodr. 257. 1834.

Erect shrubs or climbing herbs. Leaves 3-foliolate; leaflets glandular, dotted beneath, stipulate. Flowers in short axillary racemes or umbels, bracts ovate, acute; bracteoles absent; calyx campanulate, lobes unequal; lowest the longest; upper two connate into higher level; corolla yellow or pinkish yellow; standard erect, orbicular, auricled at base; wings curved-oblong; keel obovate, obtuse; stamens diadelphous, vexillary stamen free; anthers uniform; ovary oblong, many-ovuled, sessile; style slender, incurved; stigma capitate. Pod oblong, septate, transversely depressed between seeds.

1. Racemes 2-flowered; erect shrubs.....2
1. Racemes more than 2-flowered; climbers.....3
2. Standard 30 x 25 mm; leaves yellowish brown-hairy, to 6 cm long.....**A. trinervia** var. **major**
2. Standard 15 x 13 mm; leaves white-tomentose, to 3.5 cm long.....**A. lineata**
3. Calyx 15 mm long; leaves sharply acute at apex, to 9 cm long.....**A. goensis**
3. Calyx to 7 mm long; leaves obtuse at apex, to 4 cm long.....4
4. Leaves rugose above.....**A. rugosa**
4. Leaves not rugose above.....5
5. Pedicels 0.5 cm long; flowers on stout racemes; petiole 6 cm long.....**A. albicans**
5. Pedicels 2.5 cm long; flowers along slender lateral branches; petiole 1-2 cm long.....**A. scarabaeoides**

**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. 1918; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 341. 1983; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 352. 1991. ***Cantharospermum albicans*** Wight & Arn., Prodr. 256. 1834, p.p.

Climbers; stem grey-tomentose, ridged. Leaflets to 4 x 3.5 cm, obovate, obtuse, bluish-grey, tomentose, 3-ribbed from base; petiole to 6 cm long. Racemes few-flowered. Flowers 8 mm long;

pedicels 5 mm long; calyx 4 mm long, lobes triangular, short; standard 5 x 4 mm, orbicular. Pods 4 x 1.1 cm, oblong, deeply impressed between seeds, densely dark-brown tomentose; seeds 7, 6 x 4 mm, dark brown.

*Fl. & Fr.* : December-January

*Distr.* : South India and Sri Lanka. Rare; in grasslands. Swamikkayam, *JA 13134.*

**Atylosia goensis** (Dalz.) Dalz., J. Linn. Soc. Bot. 13: 186. 1873; Gamble, Fl. Pres. Madras 369. 1918. ***Cajanus goensis*** Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 2: 265. 1850. ***Atylosia barbata*** Baker in Hook. f., Fl. Brit. India 2: 216. 1876.

Climbers; stem villous. Leaflets to 9 cm across, broadly ovate to deltoid, subglabrous, stipellate; petiole to 8 cm long; stipule ovate, acute. Racemes to 20 cm long, densely villous. Flowers many; bracts 1.5 x 1 cm, ovate, acuminate; calyx lobes lanceolate, densely villous; standard 20 x 20 mm, orbicular, yellow with red lines; wings clawed, ovate; keel glabrous. Pods to 4 x 1 cm, impressed between seeds, densely hairy.

*Fl. & Fr.* : November-January

*Distr.* : Indo-Malesia and China. Occasional; in moist deciduous forests. Koruthode, *JA 17127.*

**Atylosia lineata** Wight & Arn., Prodr. 258. 1834; Baker in Hook. f., Fl. Brit. India 2: 213. 1876; Gamble, Fl. Pres. Madras 368. 1918; Manilal, Fl. Silent Valley 69. 1988. ***A. lawii*** Wight, Ic. t. 93. 1838.

Erect shrubs, to 2 m high; stem terete, densely white-tomentose. Leaflets 3.5 x 1.5 cm, obovate, acute, 3-ribbed from base, tomentose; petiole 1 cm long. Flowers paired, in axillary umbels; pedicel 10 mm long; calyx 7 mm long, lobes unequal, lanceolate; standard 15 x 13 mm, obovate, retuse, yellow; wings 15 mm long, oblong; keel 13 x 6 mm, oblong. Pods 2 x 0.8 cm, oblique-oblong, densely hairy; seeds 3.

*Fl. & Fr.* : November-January

*Distr.* : Southern Western Ghats. Common; in grasslands and savannahs. Pachakkanam, *JA 12649, JA & KPR 14391;* Vallakkadavu, *NS & JA 12705.*

**Atylosia rugosa** Wight & Arn., Prodr. 257. 1834; Baker in Hook. f., Fl. Brit. India 2: 215. 1876; Gamble, Fl. Pres. Madras 369. 1918; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 341. 1983; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 354. 1991.

Climbers; stems ridged, tomentose. Leaflets 3.5 x 3 cm, obovate, acute at base, reticulate below, densely tomentose on both sides; petiole 3-4 cm long. Raceme to 4 cm long, peduncled.

Flowers 3-5, yellow; calyx 7 mm long, lobes ovate, acute, densely hairy outside; standard 10 x 8 mm, retuse, auricled, yellow with red lines; wings 8 x 3 mm, obovate; keel 9 mm long, gibbous to one side.

*Fl. & Fr.* : November-January

*Distr.* : South India and Sri Lanka. Rare; in grasslands. Mangaladevi, *NS & JA 12679.*

**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. 1918; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 342. 1983; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 355. 1991. ***Dolichos scarabaeoides*** L., Sp. Pl. 726. 1753.***Canthospermum pauciflorum*** Wight & Arn., Prodr. 255. 1834.

Slender climbers; stem puberulus. Leaflets 2 x 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 2.5 cm long, jointed and bracteate at middle; calyx 5 mm long, 4-lobed, lobes ovate; standard 9 x 7.5 mm, yellow; wings 8 x 3 mm; keel 8 mm long, clawed. Pods 24 x 7 mm, compressed, mucronate; seeds 4, 2 mm across, black, velutinus hairy.

*Fl. & Fr.* : November-December

*Distr.* : Tropical Asia. Rare; in grasslands. Mangaladevi, *JA 14183.*

**Atylosia trinervia** (DC.) Gamble, Fl. Pres. Madras 368.1918, var. **major** (Wight & Arn.) Prain in J. Asiat. Soc. Bengal 66: 45. 1897; Gamble, Fl. Pres. Madras 368. 1918; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 163. 1991. ***Collaea trinervia*** DC., Mem. Leg. 247, t. 41. 1824. ***A. major*** Wight & Arn., Prodr. 247. 1834.

Erect subshrubs, to 1 m tall. Stem densely yellowish-hairy. Leaflets to 6 x 2.5 cm, obovate, obtuse or obtusely acute, mucronate, 3-ribbed from base; petiole 2 cm long. Flowers paired, peduncled; bracts 1.3 cm across, orbicular; pedicels 7 mm long; calyx 17 mm long, lobes acuminate, densely hairy; standard obovate, emarginate, auricled, claw 5 mm long; wings 28 mm long; keel 26 x 12 mm, clawed, yellowish pink. Pods to 30 x 12 mm, densely hairy; seeds 3 or 4, black.

*Fl. & Fr.* : November-January

*Distr.* : India and Sri Lanka. Rare; in evergreen forests at high elevations. Vellimala, *JA 12944, JA & KPR 14401.*

## CANAVALIA A. P. de Candolle

Prodr. 2: 403. 1825, *nom. cons.*

**Canavalia mollis** Wight & Arn., Prodr. 253. 1834; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 348. 1983; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 163. 1991. ***Canavalia ensiformis*** DC. var. ***mollis*** (Wight & Arn.) Baker in Hook. f., Fl. Brit. India 2: 196. 1876. ***C. virosa*** (Roxb.) Wight & Arn. var. ***mollis*** (Wight & Arn.) Gamble, Fl. Pres. Madras 359. 1918.

Climbing shrubs; stem densely hairy. Leaves 3-foliolate; leaflets 13 x 8 cm, ovate, acuminate, rounded at base, densely hairy below; petiole 6 cm long; stipules lanceolate. Racemes 8 cm long, 10-flowered. Flowers 4 cm long; calyx 12 mm long, 2-lipped, upper lip emarginate, lower lip 3-lobed; standard 33 mm diam., orbicular, pink, auricled at base; wings 25 x 7 cm, oblong, obtuse; keel 18 x 7 mm, stalked; stamens monadelphous; staminal sheath 25 mm long; ovary densely hairy; ovules 4-6; style curved, stigma capitate. Pods 13 x 2.5 cm, compressed, thickened along upper suture; seeds 5, biconvex.

*Fl. & Fr.* : December-January

*Distr.* : India and Sri Lanka. Occasional; in moist deciduous forests. Vavalala, *JA 14414.*

## CENTROSEMA (A. P. de Candolle) Bentham

Comentat. Legum. Gener. 53. 1837, *nom. cons.*

**Centrosema pubescens** Benth., Ann. Wiener Mus. Naturgesch. 2: 119. 1839; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 349. 1983; Manilal, Fl. Silent Valley 70. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 303. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 132. 1996. **Kattu payar** (Mannan)

Twining herbs; stem covered with hooked hairs. Leaves 3-foliolate; leaflets to 7.5 x 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 6 mm long, campanulate, toothed; standard 3 cm across, violet-pink, hairy on back; wings obovate, clawed; keel curved, acute; stamens monadelphous. Pods to 14 x 0.6 cm, sessile, glabrous, compressed with thick margins, cuspidate. Seeds many, grey, mottled with green.

*Fl. & Fr.* :Throughout the year

*Distr.* : Pantropical. Occasional; in disturbed forest areas. Thekkady, *JA 12401.*

## 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 5-7-foliolate.....**C. grahamiana**
1. Leaves 1-3-foliolate.....2
2. Leaves simple.....3
2. Leaves 3-foliolate.....**C. pallida**
3. Pods to 1 cm long.....4
3. Pods 1.5 cm or more long.....6
4. Flowers arranged in umbellate heads.....**C. nana var. umbellata**
4. Flowers not as above.....5
5. Leaves to 1.5 cm long, cuneate.....**C. albida**
5. Leaves ca. 2.5 cm or more long, not cuneate.....**C. humifusa**
6. Stipules decurrent into the wings on the stem.....7
6. Stipules not as above or absent.....8
7. Leaves to 3.5 cm long; nerves 2-4 pairs.....**C. scabrella**
7. Leaves 8-10 cm long; nerves 8 pairs.....**C. wightiana**
8. Pods glabrous.....9
8. Pods hairy or at least minutely pubescent when mature.....15
9. Leaves glabrous above.....10
9. Leaves hairy above.....13
10. Leaves to 1 cm broad, linear-lanceolate, glabrous below.....**C. peduncularis**
10. Leaves above 1 cm broad, pubescent below.....11
11. Stipules 1.5 cm long, suborbicular to lunate.....**C. semperflorens**
11. Stipules smaller or absent, not as above.....12
12. Petals included or as long as the calyx; leaves densely hairy below.....**C. calycina**
12. Petals longer than calyx; leaves minutely hairy below.....**C. retusa**
13. Pods included in the calyx.....**C. mysorensis**
13. Pods not included in the calyx.....14

14. Pods 4.5 x 1.3 cm; calyx lobes linear.....**C. barbata**
14. Pods 5.5-6 x 2.5 cm; calyx lobes falcate.....**C. salicifolia**
15. Pods to 1.7 cm long; prostrate herbs.....**C. evolvuloides**
15. Pods over 2 cm long; erect or scandent plants.....16
16. Flowers in panicles.....**C. shevaroyensis**
16. Flowers in racemes.....17
17. Leaves oblong; low scandent herbs.....18
17. Leaves elliptic, ovate or orbicular; erect or scandent shrubs.....19
18. Stem 4-angled; leaves ca. 1.3 cm broad.....**C. clarkei**
18. Stem 3-angled; leaves to 0.7 cm broad.....**C. triquetra**
19. Wing petals blue.....**C. walkeri**
19. Wing petals yellow.....20
20. Calyx ca. 8 mm long; pods to 3.5 cm long.....21
20. Calyx ca. 2 cm long; pods to 5.5 cm long.....**C. obtecta var. glabrescens**
21. Pods ca. 2 cm long, densely hairy.....**C. fysonii var. glabra**
21. Pods ca. 3.5 cm long, minutely hispid.....**C. heyneana**

**Crotalaria albida** Heyne ex Roth, Nov. Pl. Sp. 333. 1821; Baker in Hook. f., Fl. Brit. India 2: 71. 1876; Gamble, Fl. Pres. Madras 295. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 241. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 335. 1983.

Diffuse herbs; branches radiating from a perennial stout root stock. Leaves to 1.5 x 0.5 cm, oblanceolate, obtuse, hairy below. Racemes to 6 cm long, terminal; bracts and bracteoles minute. Flowers 10 mm long, yellow; calyx 9 mm long; lobes unequal; standard 8 mm across, orbicular, hairy on back; wings 8 x 3 mm, rugose; keel glabrous. Pods 9 x 3 mm, obovate, glabrous; seeds few.

*Fl. & Fr.* : December-January

*Distr.* : South East Asia and Malesia. Common; in grasslands. Kumarikulam, *JA 13019, JA & KPR 14872.*

**Crotalaria barbata** Graham ex Wight & Arn., Prodr. 181. 1834; Wight, Ic. t. 980. 1845; Baker in Hook. f., Fl. Brit. India 2: 76. 1876; Gamble, Fl. Pres. Madras 294. 1918; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 95. 1983.

Shrubs, to 2 m high; stems terete, densely adpressed hairy. Leaves to 12 x 4 cm, elliptic to oblanceolate, obtuse at apex, densely hairy below; petiole 5 mm long. Racemes to 20 cm long, terminal. Flowers 3-7 in a racemes; pedicels 2 cm long; bracts ovate; calyx 15 mm long, lobes linear, densely hairy; standard 2 cm across, orbicular, tomentose along back; wings 1.5 cm long;

keel densely tomentose along the margins. Pods 45 x 13 mm, glabrous; seeds many, 4.5 x 4 mm, black.

*Fl. & Fr.* : December-February

*Distr.* : Peninsular India. Occasional; in moist deciduous forests. Sabarimala, *JA 17724.*

**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. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 241. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 335. 1983.

Low shrubs with scandent branches; stems adpressed hairy. Leaves 7 x 1.5 cm, elliptic, densely hairy below, stipule subulate. Racemes terminal, many-flowered; bracts 1.5 cm long, lanceolate; bracteoles similar. Flowers distant; calyx 2.5 cm long, deeply lobed; lobes linear, densely hairy without; standard 15 mm long, yellow, hairy on back. Pods 2 cm long, oblong, glabrous.

*Fl. & Fr.* : August-December

*Distr.* : Paleotropics. Common; in grasslands. Thaannikkudy, *JA 12633;* Mangaladevi, *JA 14191.*

**Crotalaria clarkei** Gamble, Kew Bull. 1917: 27. 1917 & Fl. Pres. Madras 296. 1918; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 96. 1983; Ramachandran & Nair, J. Econ. Tax. Bot. 5(1): 136. 1984.

Suberect herbs; stem quadrangular, pilose. Leaves to 4 x 1.3 cm, oblong, obtuse, subcordate at base, hairy below; petiole 1 mm long; stipule 5 x 3 mm, ovate, oblique. Raceme 6-10 cm long, terminal or axillary; bracts 4 x 3 mm, ovate, cordate. Flowers few; calyx 1 cm long, lobes acuminate, densely fulvous; standard 10 x 3 cm, hairy without; wings 9 x 3 mm, obtuse; keel 10 mm long, ciliate. Pods 25 x 9 mm, oblong.

*Fl. & Fr.* : November-January

*Distr.* : Southern Western Ghats. Occasional; in grasslands. Kalvarimala, *JA & NS 12798.*

*Note* : Ramachandran and Nair (1984) collected this species after a lapse of 100 years. In the present locality also this species is very rare.

**Crotalaria evolvuloides** Wight ex Wight & Arn., Prodr. 188. 1834, excl. syn., var. **evolvuloides**; Baker in Hook. f., Fl. Brit. India 2: 68. 1876; Gamble, Fl. Pres. Madras 292. 1918; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 364. 1983; Ansari, J. Econ. Tax. Bot. 15(2): 455. 1991; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 201. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 134. 1996.

Prostrate herbs; stem pubescent. Leaves to 4 x 2 cm, ovate, obtuse, mucronate, unequal at base, pubescent below; stipule 3 mm long, deflexed. Racemes erect, 3-4 cm long; bracts 3 x 2 mm, cordate at base. Flowers 3-7 in a raceme; calyx 10 mm long, lobes lanceolate; standard 8 x 7 mm, orbicular; wings 6 x 3 mm, clawed; keel glabrous. Pods 15 x7 mm, hairy.

*Fl. & Fr.* : August-December-

*Distr.* : South India and Sri Lanka. Common; in grasslands. Mangaladevi, *JA 14188;* Anchuruli, *KPR 14279.*

**Crotalaria fysonii** Dunn, Kew Bull. 1914: 26. 1914, var. **glabra** Gamble, Fl. Pres. Madras 292. 1918; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 97. 1983; Ansari, J. Econ. Tax. Bot. 16(1): 162. 1992 [Fig. 25 A].

Erect herbs, to 30 cm high; stem villous. Leaves to 2.5 x 1.5 cm, ovate, obtuse, rounded at base, adpressed pubescent below; stipule filiform, hispid. Racemes 2-4-flowered, axillary; pedicels 5 mm long, hispid. Flowers 1 cm long; calyx 8 mm long, lobes acuminate, hispid; standard 8 x 6 mm, obovate, glabrous; wings 7 x 3 mm; keel 10 mm long, glabrous. Ovary dark brown-villous. Pods 2 x 0.7 cm, oblong, densely fulvous hairy, sessile.

*Fl. & Fr.* : November-December

*Distr.* : Southern Western Ghats. Rare; in grasslands. Thaannikkudy, *JA & KPR 14238.*

**Crotalaria grahamiana** Wight & Arn., Prodr. 194. 1834; Baker in Hook. f., Fl. Brit. India 2: 85. 1876; Gamble, Fl. Pres. Madras 301. 1918; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 97. 1983.

Stout subshrubs, to 1 m tall; stems terete, villous. Leaf 5-8-foliolate; leaflets to 7 x 2 cm, digitate, oblanceolate, obtuse, glabrous above; petiole to 10 cm long. Racemes to 30 cm long, terminal; bracts 18 x 2 mm, linear-lanceolate, hairy. Flowers many, densely packed. Calyx 12 mm long, lobes equal, ovate, acute, glabrous; standard 2.5 x 2 mm, obovate, glabrous; wings 20 x 8 mm, verrucose; keel densely hairy along the margins. Pods 6 x 1.8 cm, glabrous.

*Fl. & Fr.* : October-December

*Distr.* : Southern Western Ghats. Rare; in grasslands. Thaannikkudy, *JA 16851.*

**Crotalaria heyneana** Graham ex Wight & Arn., Prodr. 187. 1834; Baker in Hook. f., Fl. Brit. India 2:78.1876; Gamble, Fl. Pres. Madras 297.1918; Manilal, Fl. Silent Valley 71. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 134. 1996 [Fig. 25 B].

Erect shrubs; stem 3-angled, villous. Leaves to 9 x 7 cm, ovate, obtuse, cuneate at base, minutely hairy below; stipule 7 mm broad, semi-lunar. Raceme to 20 cm long, terminal; bracts

deflexed. Flowers numerous; pedicels 6-7 mm long, bracteolate at middle; calyx 8 mm long, lobes ovate, acuminate, thinly hairy; petals white or bluish white; standard 12 x 8 mm, glabrous; wings 10 x 6 mm; keel glabrous. Pods 35 x 13 mm, minutely hispid, clawed.

*Fl. & Fr.* : October-January

*Distr.* : South-West India. Common; in moist deciduous, semi-evergreen and evergreen forests. Methaganam, *JA 12984;* Chokkampetti, *JA & KPR 14487;* Koruthode, *JA 14705.*

**Crotalaria humifusa** Graham ex Benth., London J. Bot. 2: 476. 1843; Baker in Hook. f., Fl. Brit. India 2: 67. 1876; Gamble, Fl. Pres. Madras 292. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 242. 1976; Manilal, Fl. Silent Valley 72. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 134. 1996.

Prostrate herb; stem villous. Leaves to 5 x 3.5 cm, ovate, obtuse, pubescent, petiolate; stipule filiform. Raceme axillary, 6-12 cm long, peduncled. Flowers 5-10; pedicels 5 mm long; bracts and bracteoles filiform; calyx 6 mm long, lobes equal, densely fulvous hairy; standard 5 x 3 mm, obovate; wings 4 x 2 mm, oblanceolate; keel glabrous. Pods to 7 x 3 mm, oblong, glabrous.

*Fl. & Fr.* : October-December

*Distr.* : Southern Western Ghats. Common; in grasslands. Vallakkadavu, *JA 12726.*

**Crotalaria mysorensis** Roth., Nov. Pl. Sp. 338. 1821; Baker in Hook. f., Fl. Brit. India 2: 70. 1876; Gamble, Fl. Pres. Madras 295. 1918; Ansari, J. Econ. Tax. Bot. 15(2): 455. 1991; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 370. 1983; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 200. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 134. 1996.

Shrubs to 1 m high; stem terete, densely long-hairy. Leaves to 5.5 x 0.7 cm, linear-oblong, obtuse, densely fulvous hairy, stipule 1 cm long, oblong, erect. Raceme to 20 cm long, velutinous hairy. Flowers distant; pedicels 1 cm long; bracts 1.5 cm long, lanceolate; calyx 18 mm long, densely hairy; standard 17 x 12 cm, obovate, fulvous hairy on back; wings 12 x 4 mm, rugose; keel 15 mm long, densely pubescent on margins. Pods 2.2 x 1 cm, obovoid, glabrous.

*Fl. & Fr.* : November-January

*Distr.* : South-East Asia and Malesia. Occasional; in moist deciduous forests. Thekkady, *JA 16962.*

**Crotalaria nana** Burm. f., Fl. Ind. 156. 1768, var. **umbellata** (Wight ex Wight & Arn.) Ansari, J. Econ. Tax. Bot. 15(2): 455. 1991. ***Crotalaria umbellata*** Wight ex Wight & Arn., Prodr. 191. 1834; Gamble, Fl. Pres. Madras 294. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 244. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 368. 1983; Manilal, Fl. Silent Valley 73. 1988.

Fig. 25 **A.** *Crotalaria fysonii* Dunn;
**B.** *Crotalaria heyneana* Graham ex Wight & Arn.

Erect herbs, to 30 cm high; stem fulvous. Leaves to 3 x 0.8 cm, oblong, acute or obtuse, densely hairy. Flowers 16-30-together, in terminal sessile conjested umbel; bracts 5 mm long, filiform; calyx lobes lanceolate, densely hairy; standard 5 x 3 mm, obovate, yellow; wings 4 x 2 mm, verrucose; keel ciliate along the margins. Pods 5 x 4 mm, globose, glabrous, 6-10-seeded.

*Fl. & Fr.* : November-January

*Distr.* : Southern Western Ghats. Common; in grasslands. Arjunankotta, *JA 17995.*

**Crotalaria obtecta** Graham ex Wight & Arn., Prodr. 185. 1834, var. **glabrescens** (Benth.) Baker in Hook. f., Fl. Brit. India 2: 79. 1876; Gamble, Fl. Pres. Madras 297. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 242. 1976; Manilal, Fl. Silent Valley 72. 1988. ***C. glabrescens*** Benth., London J. Bot. 3: 563. 1844.

Erect shrubs, to 2 m high; stem pilose. Leaves to 7.5 x 3.5 cm, obovate, obtuse, acute at base, thinly golden brown hairy; petiole 5 mm long; stipule filiform. Raceme to 26 cm long, terminal. Flowers *ca* 20 in a raceme; pedicels 8 mm long, bracteolate at middle; bracts lanceolate; calyx 2 cm long, lobes falcate, densely dark brown hairy; standard 2.5 cm across, yellow with pink tomentose lines on back; wings 2 x 1.2 cm, clawed; keel 22 mm long, densely tomentose along margins. Pods 5.5 x 1.6 cm, oblong, densely dark brown, hairy.

*Fl. & Fr.* : November-January

*Distr.* : Southern Western Ghats. Common; in grasslands. Kumarikulam, *JA 12779;* Kottamala, *JA 12918;* Arjunankotta, *JA 13153.*

**Crotalaria pallida** Dryand. in Ait., Hort. Kew. ed. 1. 3: 20. 1789; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 358. 1983; Manilal, Fl. Silent Valley 72. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 211. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 135. 1996. ***C. striata*** DC., Prodr. 2: 131. 1825; Baker in Hook. f., Fl. Brit. India 2: 84. 1876; Gamble, Fl. Pres. Madras 301. 1918. ***C. striata*** DC. var. ***acutifolia*** Trimen, Handb. Fl. Ceylon 2: 19. 1984; Gamble, Fl. Pres. Madras 301. 1918.

Shrubs, to 2 m tall; stem terete, minutely hairy. Leaves 3-foliolate; leaflets to 10 x 4.5 cm, elliptic, acute or obtuse, mucronate, thinly hairy below; petiole to 6 cm long; stipule absent. Raceme terminal, to 25 cm long; bracts filiform. Flowers to 15 mm long; pedicels to 2 mm long; calyx 8 mm long; lobes acuminate; standard 12 x 6 mm, orbicular, yellow; wings 11 mm long, falcate; keel 15 mm long, glabrous. Pods to 4.5 cm long; thinly hairy.

*Fl. & Fr.* : Throughout the year

*Distr.* : Pantropical. Common; in disturbed forest areas. Thekkady, *JA 12512.*

**Crotalaria peduncularis** Graham ex Wight & Arn., Prodr. 186. 1834; Baker in Hook. f., Fl. Brit. India 2: 74. 1876; Gamble, Fl. Pres. Madras 293. 1918; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 99. 1983; Ansari, J. Econ. Tax. Bot. 16(1): 163. 1992. ***C. elegans*** Bedd., Madras J. Lit. Sci. 19: 178. 1858 & Ic. t. 106. 1868-1874.

Undershrubs, to 1 m tall, glabrous; stems striate. Leaves to 17 x 1 cm, glabrous, stipule absent. Racemes terminal, many-flowered; bracts 10 mm long, ovate, shortly decurrent along the rachis. Flowers distant; pedicels 2.5 cm long; calyx 10 mm long, lobes acute; standard 15 mm across; pale yellow; wings 10 x 5 mm, verrucose; keel ciliate along the margins. Pods 6 x 1.5 cm, stalked; seeds dull yellow, shining.

*Fl. & Fr.* : November-January

*Distr.* : Southern Western Ghats. Rare; in moist deciduous forests and savannahs. Mangaladevi, *JA & KPR 14187;* Kavalappara, *JA 14550.*

**Crotalaria retusa** L., Sp. Pl. 715. 1753; Baker in Hook. f., Fl. Brit. India 2: 75. 1876; Gamble, Fl. Pres. Madras 293. 1918; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 365. 1983; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 192. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 135. 1996.

Erect shrubs; stems glabrous, terete. Leaves to 12 x 3 cm, oblanceolate, obtuse to retuse; petiole to 1 cm long; stipule minute, filiform. Raceme terminal, many-flowered; bracts and bracteoles filiform. Flowers yellow; pedicels 1 cm long, deflexed; calyx 12 mm long, lobes ovate, acute, thinly hairy; standard 2.5 x 3 cm, orbicular, retuse, glabrous; wings 2 cm long, verrucose; keel tomentose along the margins. Pods 5 x 1.3 cm, oblong, tomentose.

*Fl. & Fr.* : October-January

*Distr.* : Pantropical. Common; in grasslands and savannahs. Attathodu, *JA 12758;* Uppupara, *JA & KPR 15004;* Koruthode, *JA 16933; JA 17007.*

**Crotalaria salicifolia** Heyne ex Wight & Arn., Prodr. 182. 1834; Baker in Hook. f., Fl. Brit. India 2: 77. 1876; Gamble, Fl. Pres. Madras 294. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 244. 1976; Sasidh. & Sivar., Fl. Pl. Thrissur For. 135. 1996.

Shrubs; stems villous. Leaves to 7 x 2.5 cm, elliptic, obtuse at apex, acute at base, densely fulvous tomentose; nerves 5-7 pairs; stipules absent. Raceme terminal; bracts 7 mm long, lanceolate, hairy. Flowers many, calyx 2 cm long, lobes slightly falcate, densely hairy; petals yellow; standard 25 mm across, tomentose along the midrib; wings 20 mm long; keel densely tomentose along the margins . Pods 5.6 x 2.5 cm, oblong, shortly stalked, glabrous.

*Fl. & Fr.* : October-January

*Distr.* : Southern Western Ghats. Rare; in savannahs. Pachakkanam, *JA 12665.*

**Crotalaria scabrella** Wight & Arn., Prodr. 181. 1834; Gamble, Fl. Pres. Madras 291. 1918; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 100. 1983; Ansari, J. Econ. Tax. Bot. 15(2): 455. 1991; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 190. 1991. ***C. rubiginosa*** Willd. var. ***scabrella*** (Wight & Arn.) Baker in Hook. f., Fl. Brit. India 2: 70. 1876.

Erect densely pubescent herbs, to 60 cm high. Leaves 3.5 x 2 cm, obovate, obtuse, mucronate, nerves 2-4 pairs, prominent below; stipules decurrent, 1.2 cm broad, flat above. Flowers 1-3 together in axillary racemes; bracts 6 x 3 mm, ovate; bracteoles 8 x 2 mm, lanceolate; calyx 12 mm long, lobes acuminate, standard 10 mm across; wings 10 mm long, oblong; keel 10 mm long, glabrous. Pods 3.5 x 1 cm, oblong.

*Fl. & Fr.* : September-December

*Distr.* : South India and Sri Lanka. Rare; in grasslands. Mangaladevi, *JA 12463.*

**Crotalaria semperflorens** Vent., Descr. Nouv. Jard. Cels. t. 17. 1800; Baker in Hook. f., Fl. Brit. India 2: 78. 1876; Gamble, Fl. Pres. Madras 297. 1918; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 376. 1983. ***C. wallichianum*** Wight & Arn., Prodr. 187. 1834; Wight, Ic. t. 982. 1845.

Shrubs, to 1.5 m high; stems stout, minutely hispid. Leaves to 16 x 2 cm, obovate, obtuse at apex, acute at base, pubescent below; nerves to 10 pairs; petiole 1.5 cm long; stipule 1.5 x 1 cm, lunate. Raceme to 25 cm long; bracts lanceolate, 1 cm long. Flowers many; calyx 2 cm long, lobes lanceolate, hispid; standard 3 x 2 cm, glabrous, yellow; wings 2 x 1 cm, verrucose; keel glabrous. Pods 6 x 2.5 cm, obovate, clawed.

*Fl. & Fr.* : November-January

*Distr.* : Peninsular India and Malesia. Rare; in grasslands. Kumarikulam, *JA 13120.*

**Crotalaria shevaroyensis** Gamble, Kew Bull. 1917: 28. 1917 & Fl. Pres. Madras 298. 1918; Fyson, Fl. S. Indian Hill St. 151. 1932; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 378. 1983.

Shrubs; stem brownish-tomentose. Leaves to 7.5 x 2.5 cm, elliptic, obtuse at apex, acute at base, hairy; nerves 4-6 pairs; petiole 2 mm long, stipules absent. Panicle terminal, to 30 cm long; bracts ovate, cordate at base, sometimes paired, opposite; deflexed. Flowers yellow; pedicels 1 cm long, bracteolate at middle; calyx 13 mm long, lobes ovate-lanceolate, golden brown hairy; standard 25 mm across; densely fulvous hairy on back, wings 17 x 8 mm, clawed; keel tomentose along the margins. Pods 4 cm long, minutely tomentose; stalk to 8 mm long.

*Fl. & Fr.* : November-January

*Distr.* : Peninsular India. Rare; in grasslands. Kumarikulam, *JA 13017;* Vavalala, *JA & KPR 14410.*

**Crotalaria triquetra** Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 2: 34. 1850; Baker in Hook. f., Fl. Brit. India 2: 71. 1876; Gamble, Fl. Pres. Madras 296. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 244. 1976; Manilal, Fl. Silent Valley 73. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 201. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 135. 1996.

Suberect herbs; stems pilose, 3-angled. Leaves to 3 x 0.7 cm, oblong, subcordate at base, hairy below, stipule 3 x 1 mm, lanceolate, erect. Racemes 10-12 cm long, axillary. Flowers few, yellow; bracts cordate at base; calyx 10 mm long, lobes lanceolate; standard orbicular, hairy outside. Pods 22 x 6 mm, oblong, densely hairy.

*Fl. & Fr.* : November-January

*Distr.* : South India and Sri Lanka (probably introduced to Sri Lanka). Rare; in grasslands. Thaannikkudy, *JA & KPR 14565.*

**Crotalaria walkeri** Arn., Nov. Actorum Acad. Caes. Leop.-Carol. Nat. Cur. 18: 328. 1840; Gamble, Fl. Pres. Madras 297. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 244. 1976; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 195. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 136. 1996. *C. semperflorens* Vent. var. *walkeri* (Arn.) Baker in Hook. f., Fl. Brit. India 2: 78. 1876.

Scandent shrubs; stems thinly hairy. Leaves to 7 x 2.5 cm, lanceolate, acute, apiculate, rounded at base, scabrous along the nerves; stipules 5 mm long, ovate; acuminate, deflexed. Raceme 10-20-flowered, terminal; bracts 6 x 4 mm, ovate-cordate at base, deflexed; bracteoles at the middle of the pedicel. Flowers 3 cm long, standard orbicular, yellow with pink lines, wings and keels smaller. Pods 4 x 2.3 cm, oblong.

*Fl. & Fr.* : October-January

*Distr.* : South India and Sri Lanka. Rare; in grasslands. Mangaladevi, *NS & JA 12699.*

**Crotalaria wightiana** Graham ex Wight & Arn., Prodr. 181. 1834; Gamble, Fl. Pres. Madras 291. 1918; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 189. 1991; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 101. 1983. *C. rubiginosa* Willd. var. *wightiana* (Graham ex Wight & Arn.) Baker in Hook. f., Fl. Brit. India 2: 70. 1876; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 360. 1983.

Shrubs, to 1.5 m high; stem terete, densely hairy. Leaves to 10 x 7 cm, obovate, obtuse to retuse at apex, acute at base; densely fulvous hairy; nerves glandular; stipules decurrent, broadened into a triangular upper part. Raceme 3-5-flowered, axillary; bracts ovate; bracteoles larger. Flowers 25 mm long; calyx 25 mm long, lobes lanceolate, unequal, hairy; standard 17 mm

across, orbicular, thinly pubescent along back; keel pubescent along the margins. Pods 4.5 x 1.3 cm, oblong, glabrous.

*Fl. & Fr.* : November-January

*Distr.* : South India and Sri Lanka. Rare; in along the margins of evergreen sholas. Swamikkayam, *JA 13104.*

## DALBERGIA Linnaeus f.

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. Climbing shrubs.....2
1. Erect trees .....3
2. Leaves glabrous below; flowers blue .....**D. volubilis**
2. Leaves fulvous-hairy below; flower greenish yellow .....**D. beddomei**
3. Leaflets 13-20 pairs, oblong.....**D. lanceolaria**
3. Leaflets 6-11 pairs, obovate or elliptic.....4
4. Leaflets emarginate at apex.....**D. latifolia**
4. Leaflets acute at apex.....**D. sissoides**

**Dalbergia beddomei** Thoth., Proc. Indian Acad. Sci. (Pl. Sci.) 92: 23. 1983 & Rev. Dalberg. India 83. 1987.

Stout climbers; stems hispid. leaves 5-foliolate; leaflets to 8.5 x 4.5 cm, elliptic-oblong, acutely obtuse at apex and base, densely fulvous-hairy below. Panicles to 4 cm long, axillary. Flowers to 8 mm long; calyx 5 mm long, lobes truncate, densely hairy; standard orbicular, greenish yellow, reflexed. Pods linear-oblong, 3 x 0.8 cm, compressed, glabrous, long-stalked; seeds 1-3.

*Fl. & Fr.* : October-March

*Distr.* : Southern Western Ghats. Locally abundant; in evergreen forests at high elevations. Mlappara, *JA 13323.*

**Dalbergia lanceolaria** L. f., Suppl. Pl. 316. 1781; Baker in Hook. f., Fl. Brit. India 2: 235. 1876; Gamble, Fl. Pres. Madras 383. 1918; Britto and Matthew in Matthew, Fl. Tamil Nadu

Carnatic 3(1): 384. 1983; Thoth., Rev. Dalberg. India 135. 1987; Manilal, Fl. Silent Valley 74. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 137. 1996. ***D. frondosa*** Roxb., Fl. Ind. 3: 226. 1832; Wight, Ic. t. 266. 1840. **Velleetti** (Mannan)

Trees, to 25 m tall; bark white. Leaflets 12-20 pairs, 2-5 x 1-2 cm, oblong, obtuse, glabrous, nerves many, close. Panicles 15 x 8 cm, yellowish-hirsute. Flowers greenish white; calyx 3 mm long, lobes ovate, acute, hirsute; petals white; standard 10 x 7 mm, orbicular, glabrous; wings 8 mm long, curved; keel glabrous. Pods to 9 x 2.5 cm, elliptic-oblong, glabrous, acute at apex, narrowed to the base, 1-3 seeded; stalk very long.

*Fl. & Fr.* : May-September

*Distr.* : Peninsular India and Sri Lanka. Occasional; in moist deciduous forests. Thekkady, *JA 12559, JA & KPR 16363.*

**Dalbergia latifolia** Roxb., Pl. Corom. 2: 7, t. 113. 1799; Baker in Hook. f., Fl. Brit. India 2: 231. 1876; Gamble, Fl. Pres. Madras 383. 1918; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 384. 1983; Thoth., Rev. Dalberg. India 46. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 137. 1996. ***D. emarginata*** Roxb., Fl. Ind. 3: 224. 1832.

Tall trees, to 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 mm long. Panicles to 10 x 4 cm, axillary, glabrous. Flowers 10 mm long, creamy white; calyx 5 mm long, glabrous; standard 8 mm across, clawed; wings curved; keel glabrous. Pods to 10 x 2 cm, oblong, obtuse, glabrous, 1-6-seeded; stalk short.

*Fl. & Fr.* : March-September

*Distr.* : Indo-Malesia. Common; in moist deciduous forests. Thekkady, *JA 12561, JA & KPR 16367.*

**Dalbergia sissoides** Grah. ex Wight & Arn., Prodr. 1: 265. 1834; Baker in Hook. f., Fl. Brit. India 2: 231. 1876; Gamble, Fl. Pres. Madras 383. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 246. 1976; Thoth., Rev. Dalberg. India 53. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 137. 1996.

Tall trees, to 25 m tall. Leaves 6-9-foliolate; leaflets to 7 x 4 cm, obovate, acute at the apex and base; petiolule 6 mm long. Panicle 5-15 cm across, terminal or upper axillary, glabrous. Flowers 8 mm long, greenish yellow; pedicels 6 mm long, slender; calyx 4 mm long, lobes obtuse, glabrous; standard 7 x 5 mm, greenish yellow; keel glabrous. Pods to 8 x 1.5 cm, elliptic-oblong, acute at apex, attenuate into a long stalk at base.

*Fl. & Fr.* : March-June

*Distr.* : South-West India. Common; in moist deciduous forests. Methaganam, *JA 13637, JA 16213;* Kumarikulam, *JA & KPR 14846.*

**Dalbergia volubilis** Roxb., Pl. Corom. 2: 48. t. 191. 1805; Baker in Hook. f., Fl. Brit. India 2: 235. 1876; Gamble, Fl. Pres. Madras 384. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 247. 1976; Thoth., Rev. Dalberg. India 163. 1987; Manilal, Fl. Silent Valley 75. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 137. 1996.

Climbers; stem softly hairy. Leaves 8-10-foliolate; leaflets to 3 x 1.5 cm, obovate-oblong, obtuse at apex, glabrous. Panicle 25 x 10 cm, terminal. Flowers 10 mm across, blue; calyx 5 mm long, lobes ovate, acute, hairy; standard 8 mm across, reflexed; keel 5 x 3 mm, glabrous; stamens isodiadelphous. Pod to 3.5 x 1.5 cm, elliptic, obtuse at apex, shortly cuspidate, stalked, glabrous; seed solitary.

*Fl. & Fr.* : March-June.

*Distr.* : India, Burma & Sri Lanka. Rare; along the river banks at low elevations. Vallakkadavu, *JA 13410.*

## 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. Pods bulged at seeds, acute.....**D. benthamii**

1. Pods compressed and flat, obtuse.....**D. brevipes**

**Derris benthamii** (Thw.) Thw., Enum., Pl. Zeyl. 413. 1864; Gamble, Fl. Pres. Madras 387. 1918; Thoth., Bull. Bot. Surv. India 3: 186. 1961; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 247. 1976; Manilal, Fl. Silent Valley 75. 1988. ***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 to 4 x 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 4 mm long, oblique at mouth, densely hispid outside, lobes short; standard 10 x 6 mm, clawed, concave, white; keel 10 x 3 mm, oblong, clawed. Pods 3.5 x 2 cm, 1.5 cm thick, densely brown hispid, acute and hooked at apex, acute at base; seeds 1 or 2.

*Fl. & Fr.* : December-May

*Distr.* : South India and Sri Lanka. Locally abundant; in evergreen forests. Kottamala, *JA 13776.*

**Derris brevipes** (Benth.) Baker in Hook. f., Fl. Brit. India 2: 244. 1878; Gamble, Fl. Pres. Madras 388. 1918; Thoth., Bull. Bot. Surv. India 3: 184. 1961; Manilal, Fl. Silent Valley 75. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 138. 1996. ***D. heyneana*** Benth. var. ***brevipes*** Benth., J. Linn. Soc. 4(Suppl.): 110. 1860. **Mullamaram, Mulla** (Mannan); **Nanchuvalli** (Urali).

Stout climber; branchlets slender, glabrous. Leaves 3-9-foliolate; leaflets to 12 x 5 cm, obovate-oblong, abruptly acuminate at apex, retuse, acute at base. Panicles 10 x 10 cm, axillary, rusty tomentose. Flowers 14 mm long; calyx cupular, 4 mm long, hispid, black, lobes obtuse; standard 11 x 7 mm, obovate, emarginate, white, clawed; wing 9 x 3 mm, oblong; keel glabrate; stamens monadelphous; ovary densely hairy. Pods 5 x 2.5 cm, ovate, obtuse at either ends, densely dark brown-hispid; seeds 2.

*Fl. & Fr.* : March-August

*Distr.* : Peninsular India. Common; in evergreen forests. Thaannikkudy, *JA 12342;* Chenthamara, *13456;* Damsite, *15114.*

*Ethnobotanical use* : The bark of the stems are beaten and the juice is used for fish poisoning

## 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.

*Note* : Ohashi (1973) have split up the genus *Desmodium* in to several genera, but in the present work I treat my collections within the broad circumscription of the genus by Desvaux (1813) with the incorporation of *Alysicarpus parviflorus* Dalz.

1. Leaves 1-foliolate.....2
1. Leaves 3-foliolate.....6
2. Petioles winged; stem sharply 3-angled.....**D. triquetrum**
2. Petiole not winged; stem not sharply 3-angled.....3
3. Joints of pods 3-4 times longer than broad.....**D. zonatum**
3. Joints at most 2 times longer than broad.....4
4. Leaves to 3.5 cm across, orbicular, cordate at base; stragglers.....**D. styracifolium**
4. Leaves 12 cm or more long, ovate, acute at base; erect shrubs.....5
5. Petiole ca. 2 cm long; leaves glabrous above; stipules lanceolate, not cordate at base.....**D. gangeticum**
5. Petiole ca. 4 cm long; leaves thinly velutinus above; stipules cordate at base.....**D. velutinum**
6. Terminal leaflets 6 times longer than lateral leaflets; pods dehiscent continuously along the sutures.....**D. motorium**
6. Terminal leaflets not more than 3 times as long as laterals; pods breaks up into 1-seeded joints.....7
7. Terminal leaflet to 1 cm long.....8
7. Terminal leaflets more than 1.5 cm long.....9
8. Flowers in axillary fascicles; prostrate herbs, rooting at nodes.....**D. triflorum**
8. Flowers in slender terminal racemes; suberect herbs not rooting at nodes.....**D. microphyllum**
9. Flowers protected by pairs of orbicular foliar leaves.....**D. pulchellum**
9. Flowers not protected as above.....10
10. Joints of pods lunar or crescentic, acute at either ends.....11
10. Joints of pods square rectangular or semicircular.....13
11. Leaflets to 16 cm long; green throughout.....12
11. Leaflets to 6 cm long; green with white at centre.....**D. uncinatum**
12. Joints of pod concave at apex.....**D. laxum**
12. Joints of pod straight at apex.....**D. repandum**
13. Flowers in axillary fascicles.....**D. triangulare**
13. Flowers in racemes.....14
14. Pods covered with hooked hairs; joints oblong.....**D. laxiflorum**
14. Pods not covered with hooked hairs; joints not oblong.....15
15. Joints of pods 9-12; leaves white tomentose beneath; erect shrubs.....**D. ferrugineum**
15. Joints of pods 2-7; leaves not as above; low herbs.....16
16. Terminal leaflet to 4 cm long; trailing or decumbent herbs.....17
16. Terminal leaflet 5-8 cm long; erect herbs or shrubs.....18
17. Racemes terminal, 25-50-flowered; pods turgid.....**D. alysicarpoides**
17. Racemes axillary, 2 or 3-flowered; pods flat.....**D. heterophyllum**

18. Pods densely ciliate on both sutures; petiole 2 cm long.....**D. heterocarpon** var. **strigosum**

18. Pods glabrous; petiole 4 cm long..... .**D. pryonii**

**Desmodium alysicarpoides** van Meeuwen, Reinwardtia 6: 246. 1961; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 392. 1983; Manilal, Fl. Silent Valley 76. 1988. ***Alysicarpus parviflorus*** Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 211. 1851; Gamble, Fl. Pres. Madras 339. 1918. ***Desmodium parviflorum*** (Dalz.) Baker in Hook. f., Fl. Brit. India 2: 172. 1876, non Mart & Galeotti, 1843.

Erect or suberect herbs, to 30 cm high; stem villous. Leaflets 4.5 x 2 cm, elliptic acute at apex, rounded at base, tomentose below; laterals much smaller. Racemes to 30 cm long, terminal; pedicels 2 or 3-together. Flowers blue; calyx 4.5 mm long, lobes linear-lanceolate, densely hairy, standard 3 x 2.5 mm, glabrous. Pods curved, 6-jointed, joint 2 x 1.5 mm, straight along one suture, glabrous.

*Fl. & Fr.* : September-January

*Distr.* : Indo-Malesia. Common; in grasslands. Vallakkadavu, *NS & JA 12727.*

**Desmodium ferrugineum** Wall. ex Thw., Enum. Pl. Zeyl. 87. 1859; Ohashi, Ginkgoana 1: 206. 1973; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3(1): 393. 1983.

Key to the subspecies

1. Terminal leaflet to 4.5 cm long..... ssp. **ferrugineum**

1. Terminal leaflet over 6 cm long..... ssp. **wynaadense**

**Desmodium ferrugineum** Wall. ex Thw., ssp. **ferrugineum** Ohashi, Ginkgoana 1: 206. 1973; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3(1): 393. 1983. ***Desmodium rufescens*** sensu Wight, Ic. t. 284. 1840, non DC., 1825; Baker in Hook. f., Fl. Brit. India 2: 156. 1876; Gamble, Fl. Pres. Madras 336. 1918.

Large shrubs; stems white tomentose. Leaflets to 3 x 2 cm, obovate, obtuse, mucronate, rounded at base, glabrous above; petiole 1 cm long. Racemes to 20 cm long, terminal; pedicels 20 mm long, paired. Flowers blue; calyx 4 mm long, lobes ovate, acute, standard 12 x 12 mm, emarginate, clawed; wings 8 mm long, obovate. Pods 5 x 0.4 cm, 10-12-jointed, straight along the sutures, glabrous when mature.

*Fl. & Fr.* : October-January

*Distr.* : Peninsular India and Sri Lanka. Common; along the road cuttings in grasslands. Mangaladevi, *JA 12474, JA 12542;* Uppupara, *NS & JA 12713.*

**Desmodium ferrugineum** Wall. ex Thw., ssp. **wynaadense** (Bedd. ex Gamble) Ohashi, Ginkgoana 1: 206. 1973; Manilal, Fl. Silent Valley 76. 1988. ***Desmodium wynaadense*** Bedd. ex Gamble, Fl. Pres. Madras 346. 1918.

Shrubs; stem fulvous hairy. Leaflets subequal, to 8 x 3 cm, elliptic oblong, acute at either ends, glabrous above, tawny villous below; stipules 12 mm long, lanceolate, subulate above. Racemes to 20 cm long, axillary; rachis spreading-villous; pedicels 10 mm long, slender; bracts 10 mm long, ovate, acute. Flowers many, bluish pink; calyx 5 mm long, lobes unequal, hairy; standard 8 mm across, pink; wings 7 mm long, blue. Pods 2-3 x 0.5 cm, entire on either sutures; joints 8-10, reticulate, glabrous.

*Fl. & Fr.* : November-December

*Distr.* : Southern Western Ghats. Common; along the margins of evergreen forests. Vellimala, *JA 12940;* Vavalala, *JA & KPR 14430;* Pachakkanam, *JA 17040.*

**Desmodium gangeticum** (L.) DC., Prodr. 2: 327. 1825; Wight, Ic. t. 271. 1840; Baker in Hook. f., Fl. Brit. India 2: 168. 1876 incl. var. **maculatum** (L) Hook.f., Fl. Brit. India 2: 168. 1876; Gamble, Fl. Pres. Madras 345. 1918; Ohashi, Ginkgoana 1: 184. 1973; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 394. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 139. 1996. ***Hedysarum gangeticum*** L., Sp. Pl. 746. 1753. ***H. maculatum*** L., Sp. Pl. 1051. 1753. ***Desmodium collinum*** Wight, Ic. t. 272. 1840.

Erect subshrubs, stem hispid, 3-angled. Leaves to 12 x 8 cm, ovate, acute at apex, rounded or truncate at base, glabrous above, densely tomentose below; nerves prominent beneath. Racemes to 30 cm long, axillary, villous; pedicels 2-5 together, 3 mm long. Flowers pale blue; calyx 2 mm long, lobes acute; standard 3.5 x 3 mm, acute at base, retuse at apex. Pods straight, 8-jointed; joints 2.5 x 2.5 mm, moniliform, glabrous, black.

*Fl. & Fr.* : November-March

*Distr.* : Tropical Asia, Africa and Australia. Common; in moist deciduous forests. Karadikkavala, *JA 12149;* Koruthode, *JA 14801.*

**Desmodium heterocarpon** (L.) DC., Prodr. 2: 337. 1825, var. **strigosum** van Meeuwen, Reinwardtia 6: 95. 1961 & 251. 1962; Ohashi, Ginkgoana 1: 215. 1973; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 396. 1983; Manilal, Fl. Silent Valley 76. 1988; Sanj., Leg. India 155. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 139. 1996. ***Hedysarum heterocarpon*** L., Sp. Pl. 474. 1753. ***H. polycarpon*** Poir., in Lamk., Encycl. 6: 13. 1805. ***Desmodium polycarpon*** (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. 1918. ***D. patens*** Wight, Ic. t. 407. 1840.

Erect herbs; stem strigose. Leaflets to 7 x 3.5 cm, elliptic, obtuse at apex, rounded at base, pubescent below, glaucous, nervules parallel; stipules 18 mm long, lanceolate, subulate above. Raceme to 20 cm long, axillary, densely adpressed-strigose. Flowers densely arranged; bracts 4-8 x 3-5 mm, ovate, acuminate; calyx 2 mm long, lobes ovate, acute, standard 4 x 2.5 mm, obovate, pink. Pods 2 x 0.3 mm, 6-8 jointed; joints squarish, pubescent.

*Fl. & Fr.* : October-December

*Distr.* : India and Malesia. Common; in moist deciduous forests. Attathodu, *JA 12745;* Thaannikkudy, *JA & KPR 14210;* Koruthode, *KPR 16932.*

**Desmodium heterophyllum** (Willd.) DC., Prodr. 2: 334. 1825; Gamble, Fl. Pres. Madras 347. 1918; van Meeuwen, Reinwardtia 6: 251. 1962; Ohashi, Ginkgoana 1: 239. 1973; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 250. 1976; Sanj., Leg. India 155. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 140. 1996. ***Hedysarum heterophyllum*** Willd., Sp. Pl. 3: 1201. 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 2.5 x 1.2 cm, elliptic, obtuse, glabrous above; petiole 1.5 cm long; lateral leaflets smaller, stipule 6 x 3 mm, lanceolate, ciliate. Racemes axillary, 1-3-flowered; pedicel 1.3 cm long, slender, villous. Flowers blue; calyx 3 mm long, lobes long-ciliate; standard 5 mm across; stamens diadelphous. Pods 2 x 0.4 cm, joints strongly reticulate, thinly pubescent.

*Fl. & Fr.* : July-December

*Distr.* : Indo-Malesia and China. Common; in grasslands. Kokkara, *JA 12059;* Vallakkadavu, *JA 16375.*

**Desmodium laxiflorum** DC., Ann. Sci. Nat. (Paris) Ser. 1(4): 100. 1825 & Prodr. 2: 335. 1825; Baker in Hook. f., Fl. Brit. India 2: 164. 1876; Gamble, Fl. Pres. Madras 344. 1918; Ohashi, Ginkgoana 1: 101. 1973; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 396. 1983; Manilal, Fl. Silent Valley 77. 1988; Sanj., Leg. India 156. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 140. 1996. ***D. diffusum*** DC., Ann. Sci. Nat. (Paris) Ser. 1(4): 100. 1825, non (Willd.) DC., Nov. 1825. ***Hedysarum recurvatum*** Roxb., Fl. Ind. 3: 358. 1832. ***D. recurvatum*** (Roxb.) Graham ex Wight & Arn., Prodr. 226. 1834; Wight, Ic. t. 374. 1840.

Erect herbs, to 35 cm high; stems angled, adpressed-hairy. Terminal leaflet to 13 x 10 cm, ovate, acute at apex, rounded at base, densely hairy below, glabrate above; petiole 4 cm long; stipules 8 mm long, lanceolate; stipels filiform. Racemes to 35 cm long, axillary or terminal;

rachis hairy. Flowers solitary or paired, pink; calyx 2 mm long, hairy; standard 6 x 3 mm, emarginate. Pods 6-9 jointed; joints 4 x 1.25 mm, oblong, longitudinally striate.

*Fl. & Fr.* : November-January

*Distr.* : Indo-Malesia. Common; in moist deciduous forests. Thekkady, *JA 12499;* Karadikkavala, *14174;* Puthussery, *KPR 17067.*

**Desmodium laxum** DC., Ann. Sci. Nat. (Paris) 4: 102. 1825 & Prodr. 2: 336. 1825; Gamble, Fl. Pres. Madras 345. 1918; Ohashi, Ginkgoana 1: 134. 1973; Manilal, Fl. Silent Valley 77. 1988. ***D. podocarpum*** var. ***laxum*** (DC.) Baker in Hook. f., Fl. Brit. India 2: 165. 1876. ***D. gardneri*** sensu Baker in Hook. f., Fl. Brit. India 2: 165. 1876, p.p., non Benth.,1852.

Erect herbs, to 60 cm tall; stems thinly hairy. Leaflets to 16 x 7 cm, ovate, acuminate; petiole 10 cm long; petiolule 6 mm long; stipules 10 mm long, lanceolate. Raceme lax, to 30 cm long, few-flowered, on long peduncles. Flowers red, 1 cm across; pedicels 1 cm long; standard 8 mm across, pubescent on back. Pods 3-jointed, stalked; joints 18 x 6 mm, broadened above, apex concave, densely covered with minute hooked-hairs.

*Fl. & Fr.* : July-December

*Distr.* : Peninsular India. Common; in evergreen forests. Mlappara, *JA 12125, 12602.*

**Desmodium microphyllum** (Thunb.) DC., Prodr. 2: 337. 1825; Ohashi, Ginkgoana 1: 241. 1973. ***Hedysarum microphyllum*** Thunb., Fl. Jap. 284. 1784. ***Desmodium parvifolium*** DC., Prodr. 2: 334. 1825; Baker in Hook. f., Fl. Brit. India 2: 174. 1876; Gamble, Fl. Pres. Madras 348. 1918.

Trailing herbs; branches slender, filiform, pilose. Leaflets to 6 x 3 mm, obovate, emarginate, cuspidate, villous below; petiolule to 3 mm long, slender; stipules 4 mm long, lanceolate. Racemes to 4 cm long, axillary, up to 10-flowered; covered with curved hairs. Flowers pale blue, bracts lanceolate, acuminate, hairy; pedicels to 8 mm long, slander; standard 4 x 4 mm, retuse; keel spurred at base, glabrous; stamens monadelphous. Pods 12 x 3 mm, crenate along both sutures, hispid.

*Fl. & Fr.* : July-December

*Distr.* : India, China to Malesia. Common; in grasslands and savannahs. Kumarikulam, *JA & KPR 14255.*

**Desmodium motorium** (Houtt.) Merr., J. Arnold Arbor. 19: 345. 1938; van Meeuwen, Reinwardtia 6: 254. 1962; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 250. 1976; Manilal, Fl.

Silent Valley 78. 1988; Sanj., Leg. India 158. 1992. ***Hedysarum motorium*** Houtt., Nat. Hist. ed. 2. 10: 246. 1779. ***H. gyrans*** L. f., Suppl. Pl. 332. 1781. ***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. 1918. ***Codariocalyx motorium*** (Houtt.) Ohashi, J. Jap. Bot. 40: 367. 1965 & Ginkgoana 1: 46. 1973; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 351. 1983. **Thozhukanni** (Mannan).

Shrubs to 1.5 m tall. Terminal leaflets 7 x 2.5 cm, elliptic-oblong, obtuse at either ends, glabrous above, tomentose below; nerves to 8 pairs, regular; lateral leaflets to 1.5 x 0.3 cm, oblong, folding. Raceme to 20 cm long, axillary and terminal; bracts ovate, acute. Flowers 10 mm across, shortly pedicelled, pink; standard 12 x12 mm, orbicular; wings curved; keel glabrous. Pods 4 x 0.6 cm, oblong, slightly curved, 6-8 jointed, minutely pubescent.

*Fl. & Fr.* : November-January

*Distr.* : Indo-Malesia. Common; in moist deciduous forests. Thaannikkudy, *JA 13059.*

**Desmodium pryonii** DC., Prodr. 2: 334. 1825, *"pryonii"*; Ohashi, Ginkgoana 1: 190. 1973. ***D. wightii*** Graham ex Wight & Arn., Prodr. 266. 1834; Baker in Hook. f., Fl. Brit. India 2: 169. 1876; Gamble, Fl. Pres. Madras 346. 1918.

Erect shrubs; stems angled, villous. Leaflets to 7 x 3.5 cm, rhomboid, acuminate at apex, densely hairy below; stipule 1 cm long, broad at base, subulate above. Racemes to 23 cm long, slender; pedicel 2-4-together, 8 mm long. Flowers pink, 3 mm across; calyx 2 mm long, lobes acute, hairy; standard orbicular, not clawed. Pods 6-jointed, deeply crenate on ventral sutures, shallowly along dorsal sutures; joints 3 x 2.5 mm, glabrous.

*Fl. & Fr.* : July-January

*Distr.* : Southern Western Ghats and Sri Lanka. Common; in moist deciduous forests. Mangaladevi, *JA 17191.*

**Desmodium pulchellum** (L.) Benth., Fl. Hongk. 83. 1861; Baker in Hook. f., Fl. Brit. India 2: 162. 1876; Gamble, Fl. Pres. Madras 344. 1918; van Meeuwen, Reinwardtia 6: 256. 1962; Ohashi, Ginkgoana 1: 276. 1973; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 251. 1976; Sanj., Leg. India 747. 1992. ***Hedysarum pulchellum*** L., Sp. Pl. 747. 1753. ***Phyllodium pulchellum*** (L.) Desv., J. Bot. Ser. 2, 1: 124, t. 5, fig. 24. 1813; Ohashi, Ginkgoana 1: 276. 1973; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 440. 1983.***Dicerma pulchellum*** (L.) DC., Ann. Sci. Nat. (Paris) 4: 236. 1825 & Prodr. 2: 339. 1825; Wight, Ic. t. 418. 1841.

Erect shrubs, to 1.5 m tall; stems and branches arching. Leaflets 10 x 6 cm, obovate, obtuse at apex, acute at base, thinly hairy above, densely below. Racemes panicled, terminal or

subterminal, to 30 cm long; floral leaves bifarious, to 12 mm across, orbicular, hispid, with one filiform appendage at base. Flowers 1-3 together; bracts and bracteoles minute; standard 4-5 mm long, pale blue, glabrous. Pods 2-jointed, 7 mm long, joints orbicular, glabrous.

*Fl. & Fr.* : October-January

*Distr.* : India and Australia. Common; in moist deciduous forests. Karadikkavala, *NS & JA 12697.*

**Desmodium repandum** (Vahl) DC., Prodr. 2: 334. 1825; Ohashi, Ginkgoana 1: 160. 1973; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3(1): 398. 1983; Manilal, Fl. Silent Valley 78. 1988; Sanj., Leg. India 161. 1992. ***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. 1918.

Undershrubs; branches slender. Leaves few; leaflets to 20 x 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, to 25 cm long; calyx 4-lobed, campanulate; standard to 10 mm across, reddish, orbicular, retuse at apex. Joints of pod 2 or 3, to 1.5 x 0.6 cm, falcate, densely covered with hooked hairs.

*Fl. & Fr.* : November-February

*Distr.* : Africa, eastward to Asia and Australia. Common; in evergreen forests. Mlappara, *JA 12125.*

**Desmodium styracifolium** (Osbeck) Merr., Amer. J. Bot. 3: 580. 1916; Ohashi, Ginkgoana 1: 224. 1973; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 107. 1983. ***Hedysarum styracifolium*** Osbeck, Dagbok. Ostind. Resa 247. 1757. ***Hedysarum retroflexum*** L., Mant. Pl. 103. 1767. ***Desmodium retroflexum*** (L.) DC., Prodr. 2: 336. 1825; Baker in Hook. f., Fl. Brit. India 2: 170. 1876; Gamble, Fl. Pres. Madras 347. 1918.

Weak straggling shrubs; stems slender, villous. Leaves 1-foliolate, to 3.5 cm across, orbicular, chartaceous sparsely hairy below, glabrous above; petiole 2 cm long; stipule 8 mm long, lanceolate, acuminate. Raceme 5-20 cm long, axillary, slender; pedicels 1.5 cm long, paired; bracts ovate. Flowers pink; calyx 5 mm long, lobes filiform, villous; standard 6 x 5 mm, not clawed; keel yellowish white; ovary glabrous. Pods 13 x 2.5 mm, 5-7-jointed, curved, thinly villous.

*Fl. & Fr.* : March-October

*Distr.* : India, South East Asia and China. Common; in moist deciduous forests. Uppupara, *JA 13531;* Mangaladevi, *14185.*

**Desmodium triangulare** (Retz.) Merr., J. Arnold Arbor. 23: 170. 1942; van Meeuwen, Reinwardtia 6: 261. 1962; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 251. 1976; Manilal, Fl. Silent Valley 78. 1988; Sanj., Leg. India 162. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 141. 1996. ***Hedysarum triangulare*** Retz., Obs. Bot. 3: 40. 1783. ***Desmodium congestum*** Wall. ex Wight & Arn., Prodr. 224. 1834; Wight, Ic. t. 209. 1839. ***D. cephalotes*** Roxb. var. ***congestum*** (Wight & Arn.) Prain, J. Asiat. Soc. Bengal 66: 389. 1898; Gamble, Fl. Pres. Madras 344. 1918. ***Dendrolobium triangulare*** (Retz.) Schindler in Fedde. Rep. 20: 274. 1924; Ohashi, Ginkgoana 1: 77. 1973.

Shrubs; branchlets triangulare, adpressed hairy. Leaflets subequal, to 9 x 4 cm, elliptic, acuminate, hairy when young; nerves 8-10 pairs, regular; petiole 3 mm long; stipules 1 cm long, ovate, acuminate. Flowers many-together, in axillary clusters; upper calyx lobes united and longer than the others; petals white; standard to 8 mm across, orbicular, glabrous; wings 6 mm long, obovate; keels glabrous. Pods to 2.5 cm long, curved, crenate; joints 4-6, adpressed tomentose.

*Fl. & Fr.* : August-December

*Distr.* : Indo-Malesia and China. Common; in moist deciduous forests. Pachakkanam, *JA 18472.*

**Desmodium triflorum** (L.) DC., Prodr. 2: 334. 1825; Wight, Ic. t. 292. 1839; Baker in Hook. f., Fl. Brit. India 2: 173. 1876; Gamble, Fl. Pres. Madras 347. 1918; van Meeuwen, Reinwardtia 6: 261. 1962; Ohashi, Ginkgoana 1: 245. 1973; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 251. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 399. 1983; Manilal, Fl. Silent Valley 79. 1988; Sanj., Leg. India 163. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 141. 1996. ***Hedysarum triflorum*** L., Sp. Pl. 249. 1753. **Nilumpulladi** (Mala Arayan)

Prostrate herbs; branches trailing, slender, pilose. Leaflets 4-6 x 4-5 mm, orbicular, obtuse to retuse, pubescent below; stipule 4 mm long, ovate. Flowers 3 mm across, 3-5 in short axillary raceme; calyx 2 mm long, 5-lobed; standard 3 mm across, orbicular, pink; wings obovate; keel glabrous. Pod to 1 cm long, straight; joints 4-6, squarish, hooked-pubescent.

*Fl. & Fr.* : December-February

*Distr.* : India Malesia to Australia. Occasional; in disturbed forest areas. Koruthode, *JA 18471.*

**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. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 252. 1976; Manilal, Fl. Silent Valley 79. 1988; Sanj., Leg. India 163. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 141. 1996. ***Hedysarum triquetrum*** L., Sp. Pl. 746. 1753. ***Tadehagi triquetrum*** (L.) Ohashi, Ginkgoana 1: 290. 1973.

Erect subshrubs, to 1.5 m tall, sparsely branched; stem scabrous, triquetrous. Leaves to 11 x 3 cm, oblong, acuminate, cordate at base, pubescent; petiole 1.5 cm long, wing 8 mm broad; stipule 2 cm long, lanceolate. Raceme to 40 cm long, terminal, rarely branched at base; bracts 1 cm long, lanceolate. Flowers subsessile; calyx 5 mm long, lobes very unequal; petals pink, standard 7 mm across, clawed; keel spurred, pink. Pod 2 x 0.6 cm, oblong, scabrous, straight.

*Fl. & Fr.* : September-February

*Distr.* : Indo-Malesia & China. Common; in grasslands and moist deciduous forests especially along cuttings. Thaannikkudy, *NS & JA 12625;* Karadikkavala, *JA 14175.*

**Desmodium uncinatum** (Jacq.) DC., Prodr. 2: 331. 1825; Backer & Bakhuizen, Fl. Java 1: 606. 1963; Thulin, Opera Botanica 68: 114. 1983; Sasidh., Rheedea 6: 71. 1996. ***Hedysarum uncinatum*** Jacq., Hort. Schoenb. 3: 27. 1798.

Herbs; stem covered with hooked hairs. Leaves few; leaflets to 8 x 3 cm, ovate, acute, cuspidate, pubescent, with a pale silvery marking along the midrib above; petiole to 7 cm long. Racemes to 20 cm long, lax; calyx hairy; petals pink, standard 1 cm long, pink, glabrous. Pods 2-3.5 x 0.4 cm, deeply indented along the ventral suture; joints 3-10, hooked-hairy.

*Fl. & Fr.* : November-January

*Distr.* : Tropical Africa and Asia. Occasional; in disturbed forest areas. Thekkady, *JA 18473.*

**Desmodium velutinum** (Willd.) DC., Prodr. 2: 328. 1825; van Meeuwen, Reinwardtia 6: 264. 1962; Ohashi, Ginkgoana 1: 192. 1973; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 400. 1983; Manilal, Fl. Silent Valley 80. 1988; Sanj., Leg. India 165. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 142. 1996. ***Hedysarum velutinum*** Willd., Sp. Pl. 3: 1174. 1802. ***H. latifolium*** Roxb. ex Ker., Bot. Reg. 5: t. 355. 1819. ***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. 1918.

Shrubs, to 1.5 m high; stem ferrugineous-tomentose. Leaves to 13 x 10 cm, broadly ovate, acute or obtuse at apex, rounded at base, densely velutinus below; nerves 6-8 pairs, regular, prominent below; stipules 3 mm long, cordate at base, white; stipel minute, filiform. Raceme terminal, panicled, to 30 cm long. Flowers 4 mm across, pink; calyx 1.5 mm long, lobes ovate, acute, hairy; standard 3 x 3 mm. Pods 2 cm long, crenate along ventral suture; joints 8-10, each 3 x 3 mm, roundish, hirsute

*Fl. & Fr.* : October-January

*Distr.* : India to Malesia. Common; in moist deciduous forests. Koruthode, *JA 16924.*

**Desmodium zonatum** Miq., Fl. Ind. Bat. 1(1): 250. 1855; Ohashi, Ginkgoana 1: 107. 1973; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 108. 1983. ***D. ormocarpoides*** auct. non DC., 1825: Baker in Hook. f., Fl. Brit. India 2: 164. 1876; Gamble, Fl. Pres. Madras 345. 1918.

Erect herbs, to 30 cm tall. Leaves to 10 x 4 cm, ovate, acute to acuminate, rounded at base, glabrous above, densely hairy below; nerves to 8 pairs; petiole to 2 cm long; stipule 10 mm long, lanceolate, ciliate. Raceme to 20 cm long, terminal; pedicels 1 cm long, slender. Flowers white, 5 mm long; calyx 1.5 mm long, lobes ovate, acute; standard 5 mm across, orbicular, white. Pods fragile, 6-8-jointed; joints 15 x 3 mm, elliptic-oblong, densely covered with viscid hooked-hairs.

*Fl. & Fr.* : July-December

*Distr.* : Peninsular India and Sri Lanka. Common; in all types of forests. Kokkara, *JA 12014.*

## DOLICHOS Linnaeus

Sp. Pl. 725. 1753

**Dolichos trilobus** L., Sp. Pl. 726. 1753; Verdc., Taxon 17: 173. 1968; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 401. 1983; Manilal, Fl. Silent Valley 80. 1988. ***D. falcatus*** Klein ex Willd., Sp. Pl. 3: 1047. 1802; Baker in Hook. f., Fl. Brit. India 2: 211. 1876; Gamble, Fl. Pres. Madras 366. 1918.

Slender climbers, stems strigose. Leaves 3-foliolate; leaflets unequal, to 7 x 5.5 cm, broadly deltoid-ovoid, hairy, stipellate; petiole to 6 cm long. Racemes 4 cm long, 2-flowered; bracts ovate, acuminate. Flowers yellow; calyx 6 mm long, upper 2 lobes connate, hispid; petals yellow; standard 15 mm broad, orbicular, retuse; wings 15 x 10 mm, obovate, spurred at base; keel 14 x 5 mm, oblong, beaked; stamens 9+1; ovary oblong; style densely bearded above. Pods 5.5 x 0.8 cm, curved, compressed, 6-8-seeded.

*Fl. & Fr.* : July-December

*Distr.* : Africa and Asia. Common; in grasslands and savannahs. Thekkady, *JA 13841;* Thaannikkudy, *JA & KPR 14222.*

## 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; Baker in Hook. f., Fl. Brit. India 2: 183. 1876; Gamble, Fl. Pres. Madras 351. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 252. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 402. 1983; Manilal, Fl. Silent Valley 81. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 300.1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 142. 1996.

Twining herbs; stem retrorsely hispid. Leaves 3-foliolate; leaflets to 7 x 5 cm, rhomboid, acute or obtuse, adpressed-hairy, stipellate; petiole to 7 cm long; stipule 7 mm long, lanceolate. Racemes axillary, to 5 cm long; bracts and bracteoles subulate. Flowers many, yellow; calyx 12 mm long, tubular, black, glabrous; corolla yellow; standard erect, 20 mm long, obovate, clawed; wings 15 mm long, obovate, long-clawed; keel brown at apex; stamens 9+1; anthers uniform; ovary villous, many-ovuled. Pods 4 x 0.6 cm, oblong, sub-terete, acute, stalked, glabrous; seeds 3-5, 3 x 2 mm, black.

*F. & Fr.* December-January

*Distr.* : East Africa, India & Sri Lanka. Occasional; in evergreen forests along the margins. Uppupara, *NS & JA 12716.*

## ERYTHRINA Linnaeus

Sp. Pl. 706. 1753

**Erythrina stricta** Roxb., Fl. Ind. 3: 251. 1832; Bedd., Fl. Sylv. t. 175. 1872; Baker in Hook. f., Fl. Brit. India 2: 189. 1876; Gamble, Fl. Pres. Madras 354. 1918; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 405. 1983; Manilal, Fl. Silent Valley 81. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 142. 1996.

Tall trees; bark corky; branchlets densely prickled. Leaves 3-foliolate; leaflets to15 x 12 cm, broadly obovate-deltoid, 3-7-nerved from the base, glabrous; petiole to 20 cm long. Flowers 6 cm long, in stout axillary racemes; calyx 1 cm long, spathiform, split on one side; petals red, standard 5 x 2.5 cm, elliptic, acute; wings 8 x 4 mm, obovate; keel 2 x 2 cm; stamens 10, monadelphous, vexillary stamens free above; anthers uniform; ovary stalked, many-ovuled; style curved. Pods 15 x 1 cm, oblong, cylindrical, acuminate at apex; seeds 3-6.

*Fl. & Fr.* : March-May

*Distr.* : India, South East Asia and China. Occasional; in moist deciduous forests. Vallakkadavu, *JA 13657.*

## 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 1-foliolate.....2
1. Leaves 3-foliolate.....3
2. Leaves cordate at base, to 7.5 x 3.5 cm; floral leaves pubescent.....**F. bracteata**
2. Leaves rounded or acute at base, to 15 x 6 cm; floral leaves glabrous.....**F. strobilifera**
3. Petiole prominently winged.....**F. semialata**
3. Petiole not winged.....4
4. Leaflets to 23 cm long, black glandular beneath.....**F. macrophylla**
4. Leaflets to 10 cm long, not black glandular beneath.....5
5. Bracts ca. 8 mm long; calyx covered with yellow glands; leaves obovate.....**F. wallichii**
5. Bracts ca. 3 mm long; calyx covered with red glands; leaves ovate.....**F. grahamiana**

**Flemingia bracteata** (Roxb.) Wight, Ic. t. 268. 1840; Gamble, Fl. Pres. Madras 378. 1918; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 109. 1983. ***Hedysarum bracteatum*** Roxb., Fl. Ind. 3: 351. 1832. ***Flemingia strobilifera*** R. Br. ex Ait. var. ***bracteata*** (Roxb.) Baker in Hook. f., Fl. Brit. India 2: 227. 1876.

Shrubs, to 1 m tall; branchlets hispid. Leaves 7.5 x 3.5 cm, ovate, acute, punctate and minutely pubescent below; nerves 6 pairs, not prominent; petiole 5 mm long; stipule 12 mm long, lanceolate. Racemes to 20 cm long, curved, axillary; floral leaves 2 x 3.5 cm, orbicular, emarginate at apex, hispid. Flowers 3-5 in the axils of bracts; calyx 4 mm long, hispid, lobes subequal; standard 6 mm across, orbicular, emarginate; wings 4 mm long, pinkish.

*Fl. & Fr.* :October-January

*Distr.* : India & Burma. Occasional; in grasslands. Mangaladevi, *JA 18432.*

**Flemingia grahamiana** Wight & Arn., Prodr. 242. 1834; Baker in Hook. f., Fl. Brit. India 2: 228. 1876; Gamble, Fl. Pres. Madras 378. 1918; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 109. 1983.

Shrubs, stem scabrous. Leaflets 10 x 5 cm, obovate, obtusely acute, grey-tomentose beneath; nerves to 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 3 x 2 mm, ovate. Flowers densely arranged, shortly pedicelled; calyx 8 mm long, densely red-glandular, lobes lanceolate; standard 9 x 6 mm, obovate, acute; wings 8 x 1.5 mm, linear-oblong; ovary densely hairy.

*Fl. & Fr.* : December-February

*Distr.* : Endemic to southern Western Ghats. Occasional; in evergreen and semi-evergreen forests. Kalvarimala, *NS & JA 12793.*

**Flemingia macrophylla** (Willd.) Prain ex Merr., Philip. J. Sc. 5: 130. 1910; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 254. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 408. 1983; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 109. 1983; Manilal, Fl. Silent Valley 82. 1988. ***Crotalaria macrophylla*** Willd., Sp. Pl. 3: 982. 1802. ***Flemingia congesta*** Roxb. ex Ait., Hort. Kew. ed. 2, 4: 349. 1812; Baker in Hook. f., Fl. Brit. India 2: 228. 1876; Gamble, Fl. Pres. Madras 378. 1918.

Shrubs, to 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 to 4 cm long, axillary, densely hairy; bracts 4 mm long, ovate. Flowers densely packed; calyx 9 mm long, hairy, black-glandular, standard 9 x 5 mm, ovate; wings 7 x 2 mm, clawed; keel 9 x 3 mm, obovate. Pods 12 x 8 mm, oblong, hispid; seeds 4 x 3 mm, dark brown.

*Fl. & Fr.* : December-January

*Distr.* : India, Sri Lanka, Malesia, China and Philippines. Occasional; in evergreen and semi-evergreen forests. Koruthode, *JA 14703*; Thekkady, *JA 16995.*

**Flemingia semialata** Roxb., Fl. Ind. 3: 340. 1832; Wight, Ic. t. 326. 1840; Gamble, Fl. Pres. Madras 378. 1918; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 109. 1983; Manilal, Fl. Silent Valley 82. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 143. 1996. ***F. congesta*** Roxb. var. ***semialata*** (Roxb.) Baker in Hook. f., Fl. Brit. India 2: 229. 1876, p.p.

Shrubs to 1.5 m tall, stem minutely villous. Leaflets to 15 x 7 cm, elliptic, acuminate at apex, scabrous along the nerves; nerves, to 7 pairs, similar to midrib; petiole to 8 cm long, winged. Racemes 15-20 cm long, terminal, panicled, densely velutinus; bracts 5 x 1 mm, acuminate. Flowers many, closely packed, calyx 10 mm long, lobes lanceolate, densely hairy; petals light pink; standard 9 x 4.5 mm, emarginate; wing to 7 x 1.5 mm, curved, verrucose; keel 9 x 3 mm, long-clawed. Pods 14 x 8 mm, obovoid.

*Fl. & Fr.* : November-January

*Distr.* : Tropical Asia. Frequent; in evergreen forests. Sabarimala, *NS & JA 12719, JA & KPR 14991, JA 17912.*

**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. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 255. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 408. 1983; Manilal, Fl. Silent Valley 83. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 143. 1996. ***Hedysarum strobiliferum*** L., Sp. Pl. 746. 1753.

Shrubs, to 2.5 m high. Leaves 1-foliolate, 15 x 6 cm, ovate-lanceolate, acuminate, glabrate; nerves 8 pairs, lowest pair rib-like; nervules parallel; petiole 1 cm long. Racemes to 20 cm long, axillary, axis zig-zag, tomentose; floral leaves 25 x 4 mm, orbicular, cuspidate, ciliolate. Flowers included, 3-6-together in short cymes, pedicelled; calyx 6 mm long, hairy, one lobe larger; standard 5 x 6 mm, orbicular, pinkish; wings 4.5 x 1 mm, white; keel 6.5 x 2 mm, clawed.

*Fl. & Fr.* : December-January.

*Distr.* : Tropical Asia and America. Common; along the margins of evergreen shola forests. Kumarikulam, *JA 13013.*

**Flemingia wallichii** Wight & Arn., Prodr. 242. 1834; Baker in Hook. f., Fl. Brit. India 2: 229. 1876; Gamble, Fl. Pres. Madras 379. 1918; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 110. 1983.

Shrubs; branches ribbed, thinly pubescent. Leaflets to 8 x 4 cm, obovate, acute, coriaceous, hispid along nerves below; nerves 5 pairs, nervules prominent; petiole 3-4 cm long, slightly winged. Racemes 3-6 cm long, axillary, hispid; bracts 8 x 2 mm, lanceolate, acuminate. Flowers densely packed, shortly pedicelled; calyx 8 mm long, lobes densely hairy, yellow-glandular; petals light pink, standard 8 mm long, obovate, emarginate; wings 7 x 1 mm, oblong, transversely verrucose; keel 10 mm long; ovary hairy.

*Fl. & Fr.* :December-March

*Distr.* : Peninsular India. Rare; in evergreen forests. Vellimala, *JA 17993.*

## GONIOGYNA A. P. de Candolle

Ann. Sci. Nat. (Paris) 4: 91. 1825

**Goniogyna hirta** (Willd.) Ali., Taxon 16: 463. 1967; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 412. 1983. ***Hallia hirta*** Willd., Sp. Pl. 3: 1169. 1802. ***Heylandia latebrosa*** sensu Baker in Hook. f., Fl. Brit. India 2: 65. 1876, non (L.) DC., 1825: Gamble, Fl. Pres. Madras 280. 1918.

Diffuse herbs, densely hispid. Leaves simple, to 1.5 cm across, ovate to orbicular, cordate at base. Flowers small, axillary, solitary, shortly pedicelled about concealed by leaves; calyx tube 2 mm long, lobes 5, lanceolate, upper 2 lobes united; petals pale yellow, standard 5 x 3 mm, obovate; wings 4 x 1 mm, oblong, keel 4 mm long; stamens 10, monadelphous, alternately smaller and larger; anthers dimorphous; ovary densely hairy. Pods 6 x 3 mm, oblong, turgid, hairy, 1-seeded.

*Fl. & Fr.* : July-December

*Distr.* : India and Sri Lanka. Fairly Common; on grasslands. Thekkady, *JA 18437.*

## 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-foliate.....**I. trifoliata**
1. Leaves imparipinnate.....2
2. Diffuse or creeping herbs.....3
2. Erect shrubs or subshrubs.....4
3. Leaflets ca. 8 x 5 mm; seeds viscid.....**I. linnaei**
3. Leaflets ca. 30 x 10 mm; seeds not viscid.....**I. astragalina**
4. Plants covered with viscid-glandular hairs.....**I. colutea**
4. Plants not covered with viscid-glandular hairs.....5
5. Leaflets ca. 6 x 2 mm; stem striate.....**I. wightii**
5. Leaflets over 1 cm long; stem not striate.....6
6. Pods glabrous; leaflets 10-12 pairs.....**cassioides**
6. Pods hairy; leaflets to 8 pairs.....7
7. Leaflets ca. 4 cm long; pods 5-7 cm long.....**I. galegoides**
7. Leaflets to 2 cm long; pods smaller.....8
8. Stipules ca. 1 cm long; leaflets sessile; racemes to 12 cm long.....**I. spicata**
8. Stipules minute; leaflets petiolulate; racemes to 6 cm long.....**I. tinctoria**

**Indigofera astragalina** DC., Prodr. 2: 228. 1825 ; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 111. 1983. Sanj., Fl. India Fasc. 21: 20. 1995. ***I. hirsuta*** sensu Baker in Hook. f., Fl. Brit. India 2: 98. 1876 p.p., non L., 1753: Gamble, Fl. Pres. Madras 312. 1918.

Densely hairy herbs; stems woody. Leaflets 7-9 pairs, to 3 x 1 cm, elliptic, acute, stipules lanceolate; stipels filiform. Racemes to 4 cm long, axillary. Flowers densely arranged, 8 mm long, shortly pedicelled; calyx 8 mm long, lobes linear; petals pink, glabrous. Pods 1.5 x 0.3 cm, 4-angular, densely hairy; seeds cubical, black, pitted.

*Fl. & Fr.* : October-January

*Distr.* : Pantropical. Common; in open grasslands. Thaannikkudy, *JA 12622.*

**Indigofera cassioides** Rottl. ex. DC., Prodr. 2: 225. 1825; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 257. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 416. 1983; Ingrid & Thijs., Blumea 30(1): 113. 1984; Sanj., Fl. India Fasc. 21: 29. 1995. ***I. pulchella*** auct. non Roxb., 1832: Baker in Hook. f., Fl. Brit. India 2: 101. 1876; Gamble, Fl. Pres. Madras 313. 1918.

Erect shrubs, to 1.5 m tall. Leaves to 13 cm long; leaflets to 10 pairs, to 2 x 1 cm, obovate, emarginate, cuspidate; stipule lanceolate. Racemes 5-15 cm long, axillary, many-flowered; bracts lanceolate, subulate above. Flowers 13 mm long, pink; calyx 3.5 mm long, lobes acuminate, hairy; standard 10 x 7 mm, obovate, glabrous; wings 11 mm long, oblanceolate; keel ciliate at apex. Pods 30 x 5 mm, oblong, compressed, glabrous, cuspidate, many-seeded.

*Fl. & Fr.* : July-January

*Distr.* : India and Thailand. Common; in grasslands along hilltops. Mangaladevi, *JA 12043, 17189.*

**Indigofera colutea** (Burm. f.) Merr., Philipp. J. Sci. 19: 355. 1921; Gillet., Kew Bull. 24: 484. 1970; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 418. 1983; Ingrid & Thijs., Blumea 30(1): 115. 1984; Sanj., Fl. India Fasc. 21: 39. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 144. 1996. ***Galega colutea*** Burm. f., Fl. Ind. 172. 1768. ***Indigofera viscosa*** Lam., Encycl. 3: 247. 1789; Wight, Ic. t. 404. 1840; Baker in Hook. f., Fl. Brit. India 2: 95. 1876; Gamble, Fl. Pres. Madras 311. 1919.

Erect perennial herbs. Leaves 6 cm long; leaflets 7 pairs, 12 x 7 mm, obovate, obtuse, cuspidate, hairy; stipules lanceolate. Racemes 5 cm long, axillary, slender. Flowers 5 mm long; calyx-lobes linear; petals exserted, glabrous, pink. Pods 21 x 2 mm, terete, densely glandular hairy; seeds 1.5 x 1.5 mm, cubical, smooth.

*Fl. & Fr.* : August-January

*Distr.* : Tropical Africa to Asia and Australia. Occasional; in moist deciduous forests. Thekkady, *JA 13948.*

**Indigofera galegoides** DC., Prodr. 2: 225. 1825; Baker in Hook. f., Fl. Brit. India 2: 100. 1876; Gamble, Fl. Pres. Madras 313. 1918; Ingrid & Thijs., Blumea 30(1): 118. 1984; Sanj., Fl. India Fasc. 21: 60. 1995.

Shrubs; branches glabrous. Leaves to 12 cm long, leaflets 4 x 2 cm, ovate, acute, mucronate, adpressed-hairy below, glabrous above. Racemes to 6 cm long, axillary; pedicels 5 mm long.

Pods 50 x 4 mm, oblong, compressed, tomentellus, cuspidate, uneven; seeds 5 x 2.5 mm, oblong, uneven, dark brown.

*Fl. & Fr.* : December-May

*Distr.* : Indo-Malesia. Occasional; in evergreen forests. Anakuthivayal, *JA 17737.*

**Indigofera linnaei** Ali, Bot. Not. 111(3): 549. 1958; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 257. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 421. 1983; Sanj., Fl. India Fasc. 21: 96. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 145. 1996. ***I. enneaphylla*** L., Mant. Pl. 2: 272. 1771; Wight, Ic. t. 403. 1840; Baker in Hook. f., Fl. Brit. India 2: 94. 1876; Gamble, Fl. Pres. Madras 309. 1918.

Creeping herbs; stem tomentose. Leaves to 4 cm long; leaflets 7-10 pairs, 8 x 5 mm, obovate, obtuse, tomentose, shortly petioled. Racemes to 1 cm long, oblong to globose, very dense. Flowers 2 mm long, densely packed, 20-25 together in a raceme; calyx lobes hairy; petals pink, glabrous. Pods 3 x 1.5 mm, oblong, acute, hairy; seeds 2-3, angular.

*Fl. & Fr.* : November-January

*Distr.* : India, South-East Asia and Australia. Occasional; in grasslands. Thekkady, *JA 16963*

**Indigofera spicata** Forsk., Fl. Aeg.-Arab. 138. 1775; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 258. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 427. 1983; Ingrid & Thijs., Blumea 30(1): 132. 1984; Sanj., Fl. India Fasc. 21: 123. 1995. ***I. endecaphylla*** Jacq., Ic. Pl. Rar. 3(3): t. 570. 1789, "*hendecaphylla*"; Baker in Hook. f., Fl. Brit. India 2: 98. 1876; Gamble, Fl. Pres. Madras 311. 1918.

Undershrubs. Leaves 4 cm long; leaflets 8-10 pairs, 20 x 6 mm, oblanceolate, obtuse, shortly mucronate, sessile; stipules 1 cm long, subulate. Racemes 12 cm long, slender. Flowers 6 mm long; calyx lobes subulate; standard pink, hispid outside. Pods 20 x 2 mm, compressed, marginate, rugose, seeds 5-10.

*Fl. & Fr.* : August-December

*Distr.* : South Africa to Malaya. Rare; in disturbed forests areas. Vellimala, *JA 14044.*

**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. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 258. 1976; Ingrid & Thijs., Blumea 30(1): 136. 1984; Sanj., Fl. India Fasc. 21: 133. 1995. ***I. sumatrana*** Gaertn., Fruct. 2: 317, t. 148, f. 4. 1791; Gamble, Fl. Pres. Madras 312. 1918. **Neela amari** (Mala Arayan).

Erect subshrubs. Leaves 4 cm long; leaflets 4-6 pairs, to 15 x 7 mm, obovate, obtuse, glaucous below, glabrous. Racemes axillary, many-flowered. Flowers 7 mm long, pedicelled; calyx 4 mm long, lobes subulate; petals violet-blue, exserted, glabrous. Pods to 25 x 2 mm, minutely hispid, terete; seeds many, 2 mm long, oblong, greenish.

*Fl. & Fr.* : October-December

*Distr.* : Pantropical. Occasional; in old tribal settlements. Koruthode, *JA 16957.*

**Indigofera trifoliata** L., Cent. Pl. 2: 29. 1756; Wight, Ic. t. 314. 1840; Baker in Hook. f., Fl. Brit. India 2: 96. 1876; Gamble, Fl. Pres. Madras 310. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 258. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 428. 1983; Ingrid & Thijs., Blumea 30(1): 137. 1984; Manilal, Fl. Silent Valley 83. 1988; Sanj., Fl. India Fasc. 21: 138. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 145. 1996. ***I. prostrata*** Willd., Sp. Pl. 3: 1226. 1803; Gamble, Fl. Pres. Madras 310. 1918.

Prostrate herbs with radiating branches; stem slender, reddish, glabrous; leaflets 15 x 6 mm, obovate, obtuse; petiole 15 mm long. Flowers 3 mm long, in axillary fascicles, 2-4 together; calyx lobes ovate, acuminate, hairy; standard hispid outside, pink. Pods 11 x 1 mm, linear-oblong, deflexed, compressed; seeds 6-8, 1.3 x 0.5 mm, oblong, deep brown, smooth.

*Fl. & Fr.* : October-December

*Distr.* : India, South-East Asia to Australia. Rare; in grasslands, Mangaladevi, *JA 12480.*

**Indigofera wightii** Graham ex Wight & Arn., Prodr. 202. 1834; Baker in Hook. f., Fl. Brit. India 2: 99. 1876; Gamble, Fl. Pres. Madras 313. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 258. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 430. 1983; Ingrid & Thijs., Blumea 30(1): 141. 1984; Sanj., Fl. India Fasc. 21: 155. 1995.

Erect silvery white shrubs, to 1 m tall; densely covered with adpressed hairs. Leaves 3-5 cm long; leaflets 6-8 pairs, 6 x 2 mm, oblanceolate, obtuse, apiculate at apex, ashy white, densely, hairy below; petiolule 1 mm long; stipule 1 mm long, ovate, hairy. Racemes 2-4 cm long, slender, axillary, 30-40 flowered. Flowers 6 mm long; calyx 1.5 mm long, lobes ovate, acuminate; standard 4 x 2.5 mm, obovate, obtuse, cuspidate, hairy outside; wings 4 x 1.5 mm, oblong; keel 5 x 2.5 mm, obovate, obtuse, hispid outside. Pods to 2.5 x 0.3 cm, oblong, terete, sessile, densely covered with adpressed hairs; seeds 1 x 1 mm, cubical, glabrous, dark brown.

*Fl. & Fr.* : November-January

*Distr.* : India, South-East Asia. Occasional; in grasslands, Mangaladevi, *JA 12047.*

## KUNSTLERIA Prain

in King, J. Asiat. Soc. Bengal Pt. 2. Nat. Hist. 66(2): 109. 1897.

**Kunstleria keralensis** Mohanan & Nair, Proc. Indian Acad. Sci. (B) 90: 207. 1981; Manilal, Fl. Silent Valley 82. 1988; Sanj., Leg. India 199. 1992; Ridder-Numan & Kornet, Blumea 38: 474-476. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 146. 1996.

Large climbers; stems slender. Leaves imparipinnate; leaflets opposite, 9-11 to 16 x 5 cm, ovate-oblong, acuminate, rounded at base, membranous; nerves 4 pairs, reticulate; rachis to 25 cm long. Flowers in terminal and axillary panicles, branches slender, rusty tomentose; bracts and bracteoles minute. Flowers distantly packed; calyx 3 mm long, campanulate, rusty tomentose; petals brownish, 5 mm across; standard orbicular, glabrous; stamens 9 + 1; anthers uniform; ovary sessile, few-ovuled. Pods 11 x 2 cm, flat, oblong obtuse, prominently reticulate; seed 1, oblong.

*Fl. & Fr.* : February-April

*Distr.* : Endemic to Southern Western Ghats (Kerala). Rare; in evergreen forests. Koruthode, *JA 13683;* Sabarimala, *JA & KPR 15454.*

## MILLETTIA R. Wight & Arnott

Prodr. 263. 1834, *nom. cons.*

**Millettia rubiginosa** Wight & Arn., Prodr. 263. 1834; Wight, Ic. t. 207. 1839; Baker in Hook. f., Fl. Brit. India 2: 104. 1876; Gamble, Fl. Pres. Madras 322. 1918; Sasidh. & Sivar., Fl. Pl. Thrissur For. 146. 1996.

Large woody climbers; stem yellow pubescent. Leaves pinnately 3-5-foliolate; leaflets to 20 x 8 cm, ovate-oblong, acuminate at apex; minutely golden brown hairy, petiole to 10 cm long; stipule ovate; stipel filiform. Flowers in axillary simple or branched racemes; bracts ovate; calyx campanulate, 3 mm long, minutely lobed, standard 13 x 10 mm, obovate, emarginate, densely fulvous hairy on back; wings 10 mm long, oblong, with two patches of golden hairs; keel similar to wings; stamens 9 + 1; anthers uniform; ovary sessile, few-ovuled. Pods *ca.* 8 x 4.5 cm, obovate, compressed, woody, densely hairy; seeds 1-3, compressed, ovoid.

*Fl. & Fr.* : December-February

*Distr.* : Endemic to Southern Western Ghats (Kerala & Tamil Nadu). Common; in evergreen forests. Mlappara, *JA 13315;* Poonkavanam, *JA 17818.*

## 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. Pods linear-oblong; seeds many; flowers purplish-brown ..... **M. hirsuta**
1. Pods orbicular-ovate; seeds 1-4; flowers greenish-white ..... 2
2. Seeds solitary; leaves hispid ..... **M. monosperma**
2. Seeds 2-4; leaves glabrous ..... **M. atropurpurea**

**Mucuna atropurpurea** DC., Prodr. 2: 406. 1825; Baker in Hook. f., Fl. Brit. India 2: 186. 1876; Gamble, Fl. Pres. Madras 355. 1918; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 434. 1983; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 115. 1983; Wilmot, Kew Bull. 42(1): 34. 1987.

Large twining shrubs, stem minutely hispid. Leaflets 7 x 3.5 cm, ovate, acute at base and apex, nerves 3 pairs; petiole 3-4 cm long. Flowers in stout axillary drooping panicles. Pods to 10 x 5 cm, broadly oblong, woody, transversely obliquely ridged, covered with reddish bristles; seeds reddish, polished.

*Fl. & Fr.* : December-April

*Distr.* : India and Sri Lanka. Occasional; in evergreen forests. Uppermanalar, *NS & JA 15038.*

**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. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 259. 1976; Wilmot, Kew Bull. 42(1): 28. 1987

Stout climbers; stems terete. Leaflets to 11 x 6.5 cm, ovate, abruptly acuminate, rounded to subcordate at base, hispid below; nerves 4-6 pairs; petiole 7 cm long; stipules ovate, densely hispid. Racemes to 10 cm long, drooping. Flowers few, greenish white; calyx 15 mm long, lobes lanceolate, hairy, standard 1 cm across, orbicular; wings 3 cm long, linear-oblong, curved. Pods 6.5 x 6 cm, woody, compressed, winged along the margins, transversely ridged on sides, densely covered with strong reddish-brown bristles.

*Fl. & Fr.* : March-April

*Distr.* : India, Sri Lanka and Burma. Common; in evergreen forests. Uppupara, *JA 13482.*

**Mucuna hirsuta** Wight & Arn., Prodr. 254. 1834; Baker in Hook. f., Fl. Brit. India 2: 187. 1876; Gamble, Fl. Pres. Madras 355. 1918; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 116. 1983.

Herbaceous climbers, stem densely hispid. Leaflets to 13 x 8.5 cm, broadly ovate, acute at base and apex, fulvous-tomentose; nerves 8 pairs; lateral leaflets inequilateral; petiole 12.5 cm long, hispid, stipule lanceolate. Racemes 17 x 10 cm, densely hispid. Flowers 3-together, 4.5 cm long; calyx 1.5 cm long, lobes ovate, densely hispid; standard 22 m across, wings 40 x 13 mm, oblong; keel 43 x 5 mm, linear-oblong, curved, acute at apex. Pods 7 x 1.5 cm, compressed, densely covered with black bristles.

*Fl. & Fr.* : October-February

*Distr.* : Southern Western Ghats. Common; in semi-evergreen and moist deciduous forests. Mlappara, *JA 12579;* Anchuruli, *JA 17117.*

## NEONOTONIA Lackey

Phytologia 37: 210. 1977

**Neonotonia wightii** (Grah. ex Wight & Arn.) Lackey, Phytologia 37: 209. 1977; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3(1): 436. 1983. ***Notonia wightii*** Grah. ex Wight & Arn., Prodr. 208. 1834. ***Glycine javanica*** auct. non L., 1753: Baker in Hook. f., Fl. Brit. India 2: 183. 1876; Gamble, Fl. Pres. Madras 351. 1918. ***G. wightii*** (Grah. ex Wight & Arn.) Verdc., Taxon 15: 35. 1966.

Stout climbers. Leaves 3-foliolate; leaflets equal, 8 x 6 cm, ovate, acute, pubescent. Racemes erect, to 25 cm long, axillary. Flowers 8 mm long, densely clustered; bracts and bracteoles striate; calyx 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 x 0.6 cm, oblong, deflexed, densely hairy, depressed between seeds; seeds 5 x 4 mm, oblong.

*Fl. & Fr.* : October-January

*Distr.* : India, Sri Lanka, Java and Malaya. Common; in moist deciduous and semi-evergreen forests. Vavalala, *JA & KPR 14409;* Thekkady, *JA 16937;* Pachakkanam, *JA 17047.*

## ORMOCARPUM Palisot de Beauvois

Fl. Oware 1: 95. 1810, *nom. cons.*

**Ormocarpum cochinchinensis** (Lour.) Merr., Philipp. J. Sci. 5: 76. 1910; Sanj., Leg. India 222. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 148. 1996. ***Diphaca cochinchinensis*** Lour., Fl. Cochinch. 454. 1790. ***Hedysarum sennoides*** Willd., Sp. Pl. 3: 1207. 1802. ***Ormocarpum sennoides*** (Willd.) DC., Prodr. 2: 375. 1825; Wight, Ic. t. 297. 1840; Baker in Hook. f., Fl. Brit. India 2: 152. 1876; Gamble, Fl. Pres. Madras 332. 1918; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 437. 1983.

Erect subshrubs. Leaves pinnately 10-13-foliolate; leaflets alternate, 2-3 x 1.2 cm, obovate-oblong, obtuse; petiole slender; stipule ovate. Flowers in slender axillary, 6-10 cm long, racemes; bracts ovate; calyx 6 mm long, lobes ovate, acute, hairy; corolla 8 mm, long, pink; standard clawed, wings 5 x 4 mm, 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.

*Fl. & Fr.* : February-March

*Distr.* : Peninsular India and Sri Lanka. Rare; in evergreen forests. Karimala, *JA 17994.*

## ORMOSIA Jackson

Trans. Linn. Soc. 10: 360. 1811, *nom. cons.*

**Ormosia travancorica** Bedd., Fl. Sylv. t. 45. 1870; Baker in Hook. f., Fl. Brit. India 2: 253. 1878; Gamble, Fl. Pres. Madras 390. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 260. 1976; Sasidh. & Sivar., Fl. Pl. Thrissur For. 148. 1996.

Medium to large trees. Leaves imparipinnate, 9-11-foliolate; leaflets opposite, to 11 x 4 cm, ovate-oblong, acuminate at apex, pale below; petiole 5 cm long. Flowers in axillary racemes, densely arranged; calyx campanulate, lobes unequal; corolla 1 cm long; standard orbicular, wings obovate, keel obovate, white with red patches; stamens 10, free; ovary glabrous, 2-ovuled; style revolute; stigma oblique. Pods 4 x 3 cm, obovate, biconvex, woody glabrous; seeds 1 or 2, 1.5 cm across, biconvex, scarlet.

*Fl. & Fr.* : September-December

*Distr.* : Southern Western Ghats (Karnataka and Kerala). Rare; in evergreen forests. Melmala, *JA 14438.*

## PARACALYX S. I. Ali

Univ. Stud. Karachi 5: 95. 1968.

**Paracalyx scariosa** (Roxb.) Ali in Univ. Studies Karachi 5: 95. 1968; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 260. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 438.

1983. *Cylista scariosa* Roxb., Pl. Corom. 1: 64, t. 92. 1795; Wight, Ic. t. 1597. 1850; Baker in Hook. f., Fl. Brit. India 2: 219. 1876; Gamble, Fl. Pres. Madras 371. 1918.

Twining shrubs; stem densely villous. Leaves 3-foliolate; leaflets 4 x 2.5 cm, ovate, acute, densely hispid below, petiole 4 cm long; stipules ovate. Racemes to 10 cm long, axillary, many-flowered. Flowers 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 17 x 12 mm, obovate, deeply auricled at base, hispid, yellow; wings 13 mm long, oblong; keel 13 x 8 mm, obovate, clawed. Stamens 9+1; ovary sessile, hispid, 1-ovuled; style hairy at base, swollen at middle. Pods falcate-ovate, hairy.

*Fl. & Fr.* : December-February

*Distr.* : Peninsular India. Rare; in moist deciduous forests. Thekkady, *JA 17928.*

## PAROCHETUS Buchanan-Hamilton ex D. Don

Prodr. Fl. Nep. 240. 1825.

**Parochetus communis** Buch.-Ham. ex Don, Prodr. Fl. Nep. 240. 1825; Baker in Hook. f., Fl. Brit. India 2: 86. 1876; Gamble, Fl. Pres. Madras 303. 1918; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 117. 1983.

Trailing herbs, rooting at nodes. Leaves digitately 3-foliolate; leaflets to 15 x 20 mm, obcordate, pubescent below; petiole 3-4 cm long, erect; stipule ovate. Flowers solitary or 2-3-together, on axillary erect peduncles; bracts and bracteoles similar, ovate; calyx 6 mm long, 5-lobed; upper two lobes connate; standard 13 x 13 mm, obovate, blue; wings 10 mm long, obovate, long-spurred at base; keel not spurred; stamens 9 + 1; ovary glabrous, many-ovuled. Pods 2 x 0.5 cm, oblong; seeds many, globose.

*Fl. & Fr.* : October-January

*Distr.* : South-East Asia and Africa. Rare; in grasslands at high elevations. Uppermanalar, *JA 13126.*

## 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. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 261. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 442. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 149. 1996. ***Hedysarum viscidum*** L., Sp. Pl. 747. 1753.

Erect subshrubs, viscid pubescent. Leaves 3-foliolate, leaflets 10 x 7 cm, broadly ovate, acute, rounded at base, stipellate; petiole 7 cm long; stipule lanceolate. Flowers in terminal or axillary raceme; bracts minute; calyx 2-lipped, 2 mm long, lobes lanceolate; petals red; standard 6 mm diam., orbicular, retuse; wings 3 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.

*Fl. & Fr.* : November-January

*Distr.* : Peninsular India and Sri Lanka. Common; in moist deciduous forests. Mangaladevi, *JA 12672, 14198;* Koruthode, *JA & KPR 14777.*

## PTEROCARPUS N. J. Jacquin

Sel. Strip. Amer. Hist. 283. 1763, *nom. cons.*

**Pterocarpus marsupium** Roxb., Pl. Corom. t. 116. 1799; Bedd., Fl. Sylv. t. 21. 1869; Baker in Hook. f., Fl. Brit. India 2: 239. 1876; Gamble, Fl. Pres. Madras 385. 1918; Rojo, Pterocarpus 58. 1972; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 445. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 149. 1996.

Large trees; bark rough, black, reddish inside, red exudate. Leaves pinnate, leaflets 3-13, alternate, to 10 x 7 cm, ovate-oblong, obtuse to retuse at apex, nerves many, close. Panicles to 20 cm across, terminal, rusty tomentose; bracts ovate. Flowers many, 15 mm long; calyx 5 mm long, 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 cm across, compressed, orbicular, stalked, winged.

*Fl. & Fr.* : June-September

*Distr.* : India and Sri Lanka. Common; in moist deciduous forests. Thekkady, *JA 16210.*

## PYCNOSPORA R. Brown ex R. Wight & Arnott

Prodr. 197. 1834.

**Pycnospora lutescens** (Poir.) Schind., J. Bot. 64: 145. 1926; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 262. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 447. 1983; Manilal, Fl. Silent Valley 85. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 150. 1996. ***Hedysarum lutescens*** Poir. in Lam., Encycl. 6: 417. 1805. . ***Pycnospora nervosa*** Wight & Arn., Prodr. 197. 1834. ***P. hedysaroides*** R. Br. ex Baker in Hook. f., Fl. Brit. India 2: 153. 1876; Gamble, Fl. Pres. Madras 333. 1918

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 5 x 3 mm, ovate, acuminate; calyx 3 mm long, lobes lanceolate, upper two lobes connate, petals pink; standard 5 mm long, orbicular, clawed; wings obliquely oblong, adnate to the keel; stamens 9 + 1; ovary hairy, many-ovuled; style reflexed. Pods 10 x 5 mm, oblong, turgid, hispid, maturing black; seeds many, reniform, smooth, black.

*Fl. & Fr.* :November-February

*Distr.* : Africa, to India, Malesia and Australia. Fairly Common; in grasslands. Thaannikkudy, *JA 12364;* Mangaladevi, *12462;* Vallakkadavu, *JA 12724.*

## RHYNCHOSIA Loureiro

Fl. Cochinch. 425, 460. 1790, *nom. cons.*

Erect or climbing shrubs. leaves 3-foliolate; leaflets subequal, stipellate. Flowers in axillary racemes or paired in axils; bracts ovate, acute; calyx lobe subequal, connate at base; petals exserted, yellow; standard orbicular, auricled at base; wings linear, clawed; keel obovate; clawed; stamens 9 + 1, anthers uniform; ovary sessile, 1 or 2-ovuled; style slender, incurved; stigma capitate. Pod oblong or round, compressed; seeds 1 or 2.

1. Pods to 7 mm long; seeds black; erect undershrubs with trailing branches.....**R. rufescens**
1. Pods to 18 x 8 mm; seeds deep blue; climbers.....**R. hirta**

**Rhynchosia hirta** (Andrews) Miekle & Verdcort, Taxon 16: 462. 1967; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 450. 1983. ***Dolichos hirtus*** Andrews, Bot. Repos. 7: t. 446. 1807. ***Cylista albiflora*** Sims, Bot. Mag. t. 1859. 1816. ***Cyanospermum tomentosum*** Wight & Arn., Prodr. 260. 1834. ***Rhynchosia albiflora*** (Sims) Alston in Trimen, Handb. Fl. Ceylon 6 (Suppl.): 85. 1931. ***Rhynchosia cyanosperma*** Benth. in Oliver, Fl. Trop. Africa 2: 218. 1871; Baker in Hook. f., Fl. Brit. India 2: 222. 1876; Gamble, Fl. Pres. Madras 375. 1918.

Climbers, densely fulvous hairy. Leaflets to 13 x 9 cm, broadly ovate, shortly acuminate, rounded at base; petiole to 6 cm long; stipules ovate; stipels filiform. Racemes to 15 cm long, axillary, hispid; bracts 25 x 15 mm, ovate, acuminate. Flowers 2 cm long, densely arranged; pedicels 8 mm long; calyx 2 cm long, lobes oblong, densely hispid; petals included, yellow; standard 15 x 10 mm, emarginate; wings 12 x 5 mm, oblong, spurred; keel glabrous. Pods 18 x 8 mm, oblong, acute at apex, impressed between seeds; seeds 5 x 5 mm, smooth, shining.

*Fl. & Fr.* : December-February

*Distr.* : South-West India, Sri Lanka and Australia. Common; in moist deciduous and semi-evergreen forests. Methaganam, *NS & JA 13642, 13645.*

**Rhynchosia rufescens** (Willd.) DC., Prodr. 2: 387. 1825; Baker in Hook. f., Fl. Brit. India 2: 220. 1876; Gamble, Fl. Pres. Madras 373. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 262. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 454. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 151. 1996.

Subshrubs with trailing branches, glandular-hairy. Leaflets 6.5 x 2.5 cm, ovate, acute, rounded at base; petiole 4-5 cm long; stipules ovate. Flowers in short racemes; calyx 8 mm long, lobes oblong, obtuse; petals included, yellow; standard 7 mm diam., orbicular, glabrous; wings 5 mm long, oblong. Pods 7 x 5 mm, ovoid, turgid, minutely hispid; seed-1, black.

*Fl. & Fr.* : October-January

*Distr.* : Indo-Malesia. Common; in grasslands and moist deciduous forests. Mangaladevi, *JA 12454, 17929.*

## ROTHIA Persoon

Syn. Pl. 2: 638 et corrig. 1807.

**Rothia indica** (L.) Druce, Bot. Exch. Club Soc. Brit. Isles 3: 423. 1914; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 262. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 456. 1983. ***Trigonella indica*** L., Sp. Pl. 778. 1753. ***Dillwynia trifoliata*** Roth, Cat. 3: 71.1806. ***Rothia trifoliata*** (Roth) Pers., Syn. 2: 302. 1807; Wight, Ic. t. 199. 1839; Baker in Hook. f., Fl. Brit. India 2: 63. 1876; Gamble, Fl. Pres. Madras 279. 1918.

Erect woody herbs, densely hispid. Leaves 3-foliolate; leaflets subsessile, 1.5 x 0.5 cm, obovate, obtuse, densely hairy; petiole to 7 mm long; stipules 3 mm long, obovate. Flowers 8 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 5 x 0.3 cm, linear-oblong, compressed, densely hairy; seeds many, cubical.

*Fl. & Fr.* : August-December

*Distr.* : Peninsular India and Sri Lanka. Common; in disturbed moist deciduous forests. Thekkady, *JA 13949.*

## SHUTERIA R. Wight & Arnott

Prodr. 207. 1834, *nom. cons.*

**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. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 263. 1976; Manilal, Fl. Silent Valley 86. 1988.

Slender twiners, stem villous. Leaves 3-foliolate, leaflets unequal, to 4.5 x 2.5 cm, ovate, obtuse, rounded at base, chartaceous, villous; petiole to 6 cm long, stipules lanceolate, striate with a tuft of hairs at base. Racemes to 20 cm long, axillary; bracts and bracteoles similar. Flowers many, white, deflexed; calyx 4 mm long, lobes acuminate; petals white; standard 7 x 5 mm, orbicular, wings 8 m long, spurred at base; keel 8 x 3 mm, oblong; stamens 9 + 1; ovary many-ovuled, densely hairy. Pods 4 x 0,5 cm, oblong, flat, densely hispid; seeds many, cubical.

*Fl. & Fr.* : November-March

*Distr.* : South-East Asia. Common; in evergreen and semi-evergreen forests. Vellimala, *JA 12934;* Vavalala, *14411;* Vallakkadavu, *JA & KPR 15189.*

## 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. Flowers blue, in terminal globose heads.....**S. capitata**
1. Flowers yellow, not in terminal globose heads.....2
2. Leaflets 2-2.5 cm long, glabrous.....**S. venkobarowii**
2. Leaflets to 1.4 cm long, variously hairy or bristled.....3
3. Flowers 15-30, in terminal dense racemes; calyx hairy with dark bulbous bases.....**S. hirsuta**
3. Flowers 1-8, in axillary loose racemes; calyx not hairy as above.....4
4. Stems villous; leaflets 2-3 pairs.....**S. racemosa**
4. Stems glabrous; leaflets 5-8 pairs.....5
5. Racemes 1 or 2-flowered; leaflets bristly on the midrib below.....**S. conferta**
5. Racemes 3-5-flowered; leaflets hairy below.....**S. sensitiva**

**Smithia capitata** Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 208. 1851; Bedd., Ic. t. 244. 1868-1874; Baker in Hook. f., Fl. Brit. India 2:150. 1876; Gamble, Fl. Pres. Madras 330. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 264. 1976; Manilal, Fl. Silent Valley 87. 1988.

Erect herbs, to 30 cm high. Leaflets 9-11 pairs, 7 x 2.5 mm, oblong, obtuse, glabrous above, serrulate, sparingly hairy below; rachis 3 cm long, hairy, terminate into a bristle; stipules 18 mm long, acuminate above, 2-lobed below, glabrous. Head 2-2.5 cm across, globose. Flowers many, bracts and bracteoles 7 mm long, ciliate; calyx 9 x 8 mm, cucullate, strongly bristled; standard 8 x 4 mm, obtuse, mucronate, wings 6.5 x1.5 mm, oblong; keel 7 x 2 mm auricled. Joints of pods 2 x 1.5 mm; seeds reniform, dark brown.

*Fl. & Fr.* : August-December

*Distr.* : South India. Rare; in grasslands with dripping rocks. Mangaladevi, *JA 14195;* Kumarikulam, *JA & KPR 14245.*

**Smithia conferta** Sm. in Rees, Cyclop. 33: n. 2. 1819; Gamble, Fl. Pres. Madras 329. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 264. 1976. ***S. geminiflora*** Roth, Nov. Pl. Sp. 352. 1821; Baker in Hook. f., Fl. Brit. India 2: 149. 1876, incl. var. ***conferta*** (Sm.) Baker; Gamble, Fl. Pres. Madras 329. 1918.

Erect or scandent herbs; stems glabrous. Leaflets 5 or 6 pairs, 7-13 x 2-4 mm, oblong, acute, strongly bristled along margins and midribs below; rachis terminate into a bristle; stipule 13 mm long, ovate above, 2-lobed below. Flowers solitary or paired, pedicelled; bracts 7 mm long, ovate, cuspidate. Calyx 8 x 5 mm, lobes undivided; petals yellow with red lineole.

*Fl. & Fr.* : June-January

*Distr.* : South India and Sri Lanka. Common; in marshy grasslands. Pachakkanam, *JA 12669*; Kavalappara, *JA & KPR 14553*; Thaannikkudy, *JA 14834.*

**Smithia hirsuta** Dalz. in, Hook., Kew J. 3: 135. 1851; Gamble, Fl. Pres. Madras 330. 1918. ***S. blanda*** 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 3 mm, serrulate, obtuse, oblique at base, ciliate along margins and midribs; stipules 9 mm long, acuminate, bristled along the margins. Racemes to 1.5 cm long; rachis densely villous. Flowers pedicelled; calyx 5 mm long, 2-lipped, densely bristled; standard petals 6 x 5 mm, obovate, emarginate, mucronate, clawed, yellow with red lines on either half; wings petals 5 x 1.5 mm, yellow; keel spurred; anthers dimorphus. Pods 8-10-jointed; joints 2 x 2 mm, orbicular, biconvex, minutely, mucronate, dark brown.

*Fl. & Fr.* : July-November

*Distr.* : India and Sri Lanka. Rare; in marshy grasslands. Mangaladevi, *JA 14184.*

**Smithia racemosa** Heyne ex Wight & Arn., Prodr. 221. 1834; Gamble, Fl. Pres. Madras 330. 1918; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 461. 1983; Sanj., Leg. India 248. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 153. 1996. ***Smithia blanda*** Wall. ex Wight & Arn., Prodr. 221. 1834, var. ***racemosa*** (Heyne ex Wight & Arn.) Baker in Hook. f., Fl. Brit. India 2: 151. 1876, p.p.

Straggling herbs. Leaflets 8-14 x 4-6 mm, obovate, obtuse, glabrous above, sparsely bristly below, ciliate, stipule 10 x 1.5 mm, acuminate at either ends, densely bristly. Racemes paired, 4-8-flowered; peduncles 2-3 cm long, villous; pedicel 4 mm long. Flowers yellow; calyx 4 mm long, smooth; standard 8 x 7 mm, emarginate, clawed; wings 8 x 3 mm, obovate; keel deeply auricled at base.

*Fl. & Fr.* : June-December

*Distr.* : India and Sri Lanka. Common; grasslands, in marshy areas. Pachakkanam, *NS & JA 12658;* Mangaladevi, *JA 14182;* Kumarikulam, *JA 14244;* Vallakkadavu, *JA & KPR 16899.*

**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. 1918; Nair & Henry, Fl. Tamil Nadu Ser.1, 1: 121. 1983.

Scandent herbs. Leaflets 6 pairs, 10 x 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 9 x 4 mm, entire; lower lip 4 x 3 mm, 3-lobed; standard 8 x 6 mm, obovate, emarginate, yellow; wings 6 x 2 mm, shortly clawed; keel 6 x 2.5 mm, auricled to one side at base. Joints of pods 1.5 x 1.5 mm, biconvex, papillose, dark brown.

*Fl. & Fr.* : October-December

*Distr.* : India and Sri Lanka. Occasional; in marshy grasslands. Thaannikkudy, *JA 12623.*

**Smithia venkobarowii** Gamble, Fl. Pres. Madras 330. 1918. & Kew Bull. 1919: 223. 1919; Sanj., Leg. India 248. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 153. 1996 [Fig. 27 A].

Erect subshrubs, to 70 cm high; stem white, yellowish villous. Leaflets 2-4 pairs 2-2.5 x 0.5 cm, oblong, obtuse, mucronate, glaucous beneath, glabrous, rachis hairy; stipules 12 mm long, 2-lobed at base; glabrous. Racemes 2 cm across; congested; bracts deciduous; bracteoles 3 x 1.5 mm, obovate, bristled. Flowers few; calyx 7 mm long, lips similar, obtuse, sparsely ciliate; standard 1 cm across, yellow. Joints of pods 3 x 2.5 mm, orbicular, strongly reticulate, smooth, 5-7 together.

*Fl. & Fr.* : November-January

*Distr.* : Southern Western Ghats (Kerala). Abundant; along road cutting in grasslands. Vallakkadavu, *JA 16893, JA 16902.*

## 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.

*Note* : Ridder-Numan and Wiriandinata (1985) have treated this genus distinct from *Butea* Roxb. ex Willd. Rudd (1991) agrees with the former authors. Blatter (1929) treated Spatholobus as a section of the genus *Butea*. In the present work I also agree with Ridder-Numan and Wirindinata (1985).

1. Leaflets 25 x 14 cm; pods velvety tomentose.....**S. parviflora**

1. Leaflets 12 x 7 cm; pods glabrous.....**S. purpurea**

**Spatholobus parviflorus** (Roxb. ex DC.) O. Ktze., Rev. Gen. Pl. 1: 205. 1891; Ridder-Numan & Wiriadinata, Reinwardtia 10: 87. 1985; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 268. 1991; Sanj., Leg. India 251. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 154. 1996; ***Butea parviflora*** Roxb., Fl. Ind. 3: 248. 1832; Wight, Ic. t. 210. 1839; Manilal, Fl. Silent Valley 70. 1988. ***Spatholobus roxburghii*** Benth. in Miq., Jungh. 238. 1852; Baker in Hook. f., Fl. Brit. India 2: 193. 1876; Gamble, Fl. Pres. Madras 358. 1918; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 268. 1991.

Large climbers; branches puberulus. Leaflets ovate, obtusely acute at apex, rounded at base, densely hairy below, lateral nerves 8 pairs; nervules parallel; petiole 3-6 cm long. Panicles 20 x 15 cm, axillary, densely hispid. Flowers 9 mm long, 8 mm across; calyx 4 mm long, densely villous inside; standard 8 x 6 mm, glabrous, pale-pink; wings 6 mm long, long-clawed; keel 9 mm long, obovoid. Pods 14 x 4.5 cm, stalked; stalk 3 cm long.

*Fl. & Fr.* : October-January

*Distr.* : India and Sri Lanka. Common; in evergreen and moist deciduous forests. Koruthode, *JA 12435, JA 14723, JA & KPR 16243.*

**Spatholobus purpureus** Benth. ex Baker in Hook. f., Fl Brit. India 2: 194. 1876; Gamble, Fl. Pres. Madras 359.1918; Sanj., Leg. India 252. 1992; Sasidh. & Sivar., Fl. Pl . Thrissur For. 154. 1996. ***Butea purpurea*** (Benth. ex Baker) Blatter, J. Indian Bot. Soc. 8: 137. 1929.

Large climbers; stems puberulus. Leaflets ovate-oblong, abruptly acuminate, rounded at base, glabrous, lateral nerves 6 pairs, regular; petiole 7 cm long. Panicles 18 x 10 cm, terminal, rusty puberulus; pedicels 4 mm long, slender. Flowers many, light pink; calyx 2.5 mm long, lobes obtuse; standard 8 x 5 mm, obovate; wings 6 mm long, slightly pubescent; keel glabrous. Pods 10 x 2.5 cm, oblong, narrowed at both ends, compressed and thin.

*Fl. & Fr.* : January-April

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Chenthamara, *JA 13681;* Koruthode, *JA & KPR 14759.*

## STYLOSANTHES O. Swartz

Prodr. 7: 108. 1788.

**Stylosanthes fruticosa** (Retz.) Alston in Trimen, Handb. Fl. Ceylon, 6. (Suppl.): 77. 1931; Nooteb., Reinwardtia 5: 449. 1961; Verdc., Kew Bull. 24: 59. 1970; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 462. 1983; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 265. 1976. ***Arachis fruticosa*** Retz., Obs. Bot. 5: 26. 1789. ***Stylosanthes mucronata*** Willd., Sp. Pl. 3: 1166. 1802; Bedd., Ic. t. 294; 1868-1874; Baker in Hook. f., Fl. Brit. India 2: 148. 1876; Gamble, Fl. Pres. Madras 326. 1918.

Coarse subshrubs. Leaves 3-foliolate; leaflets 2-3 x 0.6 cm, lanceolate, coriaceous, mucronate, glabrous or pubescent, strongly nerved; stipules 2 cm long, lanceolate, long-mucronate. Flowers in terminal or axillary cymes, covered with trilobed bracts and bracteoles; calyx 5 mm long, tubular; lobes obtuse, ciliate; petals pink; standard 6mm diam., orbicular; wings curved-oblong; keel petals incurved; stamens 10, monadelphous, anthers dimorphus; ovary sessile, ovules 3. Pods 3 mm long, oblong, glabrous; seeds compressed.

*Fl. & Fr.* : Throughout the year

*Distr.* : Tropical Africa, India and Sri Lanka. Common; along lake shores and river banks. Manakkavala, *JA 15174;* Koruthode, *JA & KPR 16931.*

## 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. Pods to 4 cm long, glabrous; leaflets to 2.5 cm long.....**T. purpurea**
1. Pods to 8 cm long, tomentose; leaflets 4-6 cm long.....2
2. Leaves 20-26-foliolate; standard petal ca. 18 x 12 mm.....**T. tinctoria**
2. Leaves 5-9-foliolate; standard petal ca. 10 x 8 mm.....**T. pulcherrima**

**Tephrosia pulcherrima** (Wight ex Baker) Drumm., Gamble, Fl. Pres. Madras 319. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 266. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 468. 1983; Sanj., Leg. India 257. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 155. 1996. ***T. tinctoria*** Pers. var. ***pulcherrima*** Wight ex Baker in Hook. f., Fl. Brit. India 2: 112. 1876. **Kalakkozhuppa** (Mala Arayan)

Shrubs; stem densely erect-hairy. Leaflets 5, to 6 x 2 cm, elliptic-oblong, obtuse, mucronate, glabrous above; stipule 10 x 4 mm, ovate. Racemes axillary; peduncle 8 cm long, stout. Flowers red; calyx 4 mm long, lobes hairy; standard 10 x 8 mm, densely hairy on back, clawed; wings 10 x 5 mm, dark pink at apex, verrucose; keel 10 mm long, yellowish-pink. Pods to 7 x 0.5 cm, oblong, densely hairy.

*Fl. & Fr.* : November-February

*Distr.* : Peninsular India. Common; in savannahs and moist deciduous forests. Uppupara, *JA 13184.*

*Ethnobotanical use* : The leaves are ground and the juice is mixed with coconut oil in 4:1 proportion. Rind of one fruit each of *Terminalia chebula* and *Piper nigrum* are powdered and add to the above preparation. One drop of the above, when placed between teeth is effective for any tooth ache.

**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. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 266. 1976; Bosman & Haas, Blumea 28: 464. 1983; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 470. 1983; Sanj., Leg. India 258. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 155. 1996. ***Cracca purpurea*** L., Sp. Pl. 752. 1753. ***Tephrosia hamiltonii*** Drumm. in Gamble, Fl. Pres. Madras 320. 1918.

Shrubs, stem minutely scabrous. Leaflets 15-17, to 2.5 x 0.7 cm, oblanceolate, obtuse, mucronate, glabrous above, stipule 6 mm long, subulate, deflexed. Raceme to 12 cm long, axillary. Flowers lax; pedicels 6 mm long, slender; calyx 7 mm long, one lobe much smaller than

others; standard red, 10 x 10 mm, clawed, glabrous; wings 10 x 4 mm, curved; keel 7 mm long, clawed. Pods 4 x 0.4 cm, minutely velutinus; seeds 7 or 8, 4 x 3 mm, rectangular, dark-brown.

*Fl. & Fr.* : Throughout the year

*Distr.* : Old World Tropics. Common; in moist deciduous forests and grasslands. Thekkady, *JA 13804.*

**Tephrosia tinctoria** Pers., Syn. 2: 329. 1807; Wight, Ic. t. 388. 1840; Baker in Hook. f., Fl. Brit. India 2: 111. 1876; Gamble, Fl. Pres. Madras 319. 1918; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 473. 1983; Manilal, Fl. Silent Valley 88. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 146. 1991; Sanj., Leg. India 259. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 155. 1996.

Erect shrubs; stems densely retrorse-hairy. Leaflets to 4.5 x 1.3 cm, oblong, obtuse, mucronate, acute at base, glabrous above; densely white-tomentose below. Racemes axillary; peduncle 10 cm long; bracts 6 mm long, lanceolate. Flowers red; calyx 6 mm long, lobes lanceolate; standard glabrous, narrowed to the base; wings to 17 x 5 mm; keel 14 x 6 mm, obovate, glabrous; Pods 7 x 0.5 cm, oblong, slightly curved, minutely hirsute, many-seeded.

*Fl. & Fr.* : October-January

*Distr.* : South India and Sri Lanka. Common; along shola margins. Uppupara, *JA 14143.*

## 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. Racemes to 30 cm long; flowers distant; lateral nerves of the leaves 12 pairs ..... **U. rufescens**
1. Racemes 4-8 cm long; flowers densely packed; lateral nerves of leaves 6-8 pairs..... **U. lagopodioides**

**Uraria lagopodioides** (L.) Desv. in DC., Prodr. 2: 324. 1825, "*lagopoides*"; Wight, Ic. t. 289. 1840; Baker in Hook. f., Fl. Brit. India 2: 150. 1876; Gamble, Fl. Pres. Madras 336. 1918.

Trailing subshrubs; stems hispid. leaflets to 5 x 2.5 cm, ovate-oblong, obtuse, mucronate, hispid below, subcordate at base; petiole 1.5 cm long; stipule 12 mm long, filiform. Racemes 2 cm broad; bracts 8 x 5 mm, ciliate. Flowers many, pedicelled; calyx lobes 10 mm long, bristled,

upper lobes smaller; standard 7 x 5 mm, acute to the base; wings 5 x 2 mm, clawed; keel 6 mm long, auricled. Joints of pods 3.5 x 2.5 mm, reticulate, shining.

*Fl. & Fr.* : August-December

*Distr.* : Indo-Malesia and China. Common; in moist deciduous forests. Thaannikkudy, *JA 12159.*

**Uraria rufescens** (DC.) Schind. in Fedde. Repert. 21: 14. 1925; van Meeuwen, Reinwardtia 5: 453. 1961; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 476. 1983; Manilal, Fl. Silent Valley 88. 1988; Sanj., Leg. India 268. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 156. 1996. ***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. 1918.

Erect subshrubs; stems triquetrous, hispid. Leaflets to 8.5 x 4.5 cm, elliptic, acute or obtuse at apex and base, hispid below; petiole 1-2.5 cm long; stipules 12 mm long, acuminate; stipel subulate. Flowers distant; bracts 7 mm long, hispid; calyx 3 mm long, glabrous; standard 6 x 8 mm, orbicular, cuneate at base, pinkish; wings 5 x 3 mm, oblique, auricled at base; keel 6 x 3 mm, shortly spurred near the base. Joints of pods 6-8, each 2 x 2 mm, hispid, black.

*Fl. & Fr.* : November-February

*Distr.* : Indo-Malesia and China. Common; in moist deciduous forests. Thaannikkudy, *JA 12628;* Mangaladevi, *JA 14186;* Koruthode, *KPR & JA 14722.*

## 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. Bracts peltate; pods glabrous.....**V. umbellata**
1. Bracts not peltate; pods densely hairy.....2
2. Leaflets shallowly lobed; stem with reflexed hairs.....**V. radiata** var. **sublobata**
2. Leaflets entire; stem with erect hairs.....**V. vexillata**

**Vigna radiata** (L.) Wilczek., Fl. Congo Belge. 6: 386. 1954, var. **sublobata** (Roxb.) Verdc., Kew Bull. 24: 559. 1970; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 478. 1983; Babu *et al.*, Bull. Bot. Surv. India 27(1-4): 20. 1985; Manilal, Fl. Silent Valley 89. 1988. ***Phaseolus radiatus*** L., Sp. Pl. 725. 7153. ***Phaseolus sublobatus*** Roxb., Fl. Ind. 3: 288. 1832; Gamble, Fl. Pres. Madras 363. 1918. ***P. trinervius*** Heyne ex Wight & Arn., Prodr. 245. 1834; Baker in Hook. f., Fl. Brit. India 2: 203. 1876.

Slender climbers. Leaflets to 45. x 3 cm, laterals smaller, ovate, acute or obtuse at apex, sparsely hispid; petiole 4 cm long; stipule 8 x 5 mm, deltoid. Flowers densely packed, sessile; calyx lobes obtuse, ciliate. Pods 3-5 x 0.5 cm, densely brown-strigose; seeds 3 x 2.5 mm, rectangular, longitudinally rugose.

*Fl. & Fr.* : November-January

*Distr.* : Pantropical, introduced. Common; in disturbed forest areas. Vellimala, *JA 12941.*

**Vigna umbellata** (Thumb.) Ohwi & Ohashi, Jap. J. Bot. 44: 31. 1969; Verdc., Kew Bull. 24: 560. 1970; Babu *et al.*, Bull. Bot. Surv. India 27(1-4): 23. 1985; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 337. 1991; Sanj., Leg. India 276. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 158. 1996. ***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. 19183. **Kattuzhunnu** (Mannan).

Slender twiners; stems reflexed hairy. Leaflets 10 x 5 cm, ovate, acuminate, hispid; petiole 10 cm long, slender, stipule 8 mm long, ovate, decurrent at base. Flowers in short axillary racemes, 2-3-together; calyx 3 mm long, lobes ovate; petals yellow; standard 10 x 15 mm, strongly auricled at base; wings 8 x 6 mm, orbicular; keel 7 x 6 mm, incurved to one turn, spurred to one side. Pods 7 x 0.5 cm, compressed, many-seeded.

*Fl. & Fr.* : November-December

*Distr.* : India, South-East Asia and Sri Lanka. Common; in grasslands. Mangaladevi, *JA 14189.*

*Ethnobotanical use* : The fruits and seeds are eaten.

**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. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 268. 1976; Babu *et al.*, Bull. Bot. Surv. India 27(1-4): 26. 1985; Manilal, Fl. Silent Valley 89. 1988; Sanj., Leg. India 278. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 158. 1996. ***Phaseolus vexillatus*** L., Sp. Pl. 724. 1753.

Slender climbers. Leaflets to 4.5 x 2 cm, ovate, acute at apex, rounded at base, strigose hairy; petiole 4 cm long; stipule cordate at base. Flowers solitary or 2-3 together; calyx 9 mm long,

strigose hairy; lobes lanceolate; petals yellow; standard 3 x 3 cm, orbicular, wings 25 x 12 mm, auricled at base; keel 25-30 mm long, strongly spurred on lateral side. Pods 5.5 x 0.5 cm, densely brown-hispid.

*Fl. & Fr.* : November-February

*Distr.* : Pantropical. Common; in moist deciduous forests and grasslands. Kumarikulam, *JA 14265;* Thekkady, *JA 17916.*

## ZORNIA J. F. Gmelin

Syst. Nat. 2: 1076, 1096. 1792.

**Zornia gibbosa** Span., Linnaea 15: 192. 1841; Mohenbrock, Webbia 16: 112. 1961; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 268. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 482. 1983; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 175. 1991; Sanj., Leg. India 280. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 158. 1996. ***Z. diphylla*** auct. non (L.) Pers., 1807: Baker in Hook. f., Fl. Brit. India 2: 147. 1876, p.p.; Gamble, Fl. Pres. Madras 325. 1918.

Diffuse herbs, glabrous. Leaves bifoliolate, leaflets 4 x 6 m, lanceolate, gibbous at one side, acute, sessile; stipule peltate, acuminate; petiole 1 cm long. Flowers sessile in terminal racemes; bracts paired, 15 x 5 mm, peltate, acuminate; calyx lobes unequal, 2 upper connate, lateral ones smaller; corolla yellow, 4 mm long; standard orbicular, auriculated at base, clawed; wings oblong, clawed; keel obovate; stamens monadelphous; staminal tube 1.5 x 2 mm, cleft above. Pods 2-5-jointed; joints moniliform, covered with retrorsely hispid bristles.

*Fl. & Fr.* : Throughout the year

*Distr.* : South Asia and Australia. Common; in savannahs, Thannikkudy, *JA 12343, 13830.*

## Subfamily : CAESALPINIOIDEAE

1. Leaves simple, 2-lobed.....**Bauhinia**
1. Leaves pinnate.....2
2. Leaves 1-pinnate.....3
2. Leaves 2-pinnate.....5
3. Petals absent; resinous trees.....**Kingiodendron**
3. Petals present; non-resinous trees or shrubs.....4
4. Stamens 5.....**Humboldtia**
4. Stamens 10.....**Cassia**

5. Stamens 5; tall unarmed trees.....**Acrocarpus**

5. 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; Wight, Ic. t. 254. 1840; Baker in Hook. f., Fl. Brit. India 2: 292. 1878; Gamble, Fl. Pres. Madras 397. 1919. **Kurangattii** (Mannan).

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, to 25 cm long. Flowers 2.5 cm long, deflexed, densely packed; calyx 10 mm long, tubular below, lobes ovate, obtuse, densely hairy; petals 5, each 7 x 2 mm, oblong, obtuse, erect, yellowish pink; stamens 5, free; filaments erect, 15 mm long, pink; ovary stipitate, many-ovuled, style short, recurved. Pods 15 x 2 cm, compressed, oblong, winged, 10-seeded, glabrous.

*Fl. & Fr.* : January-April

*Distr.* : India and Sumatra. Common; in evergreen and semi-evergreen forests. Anchuruli, *JA 17113.*

## 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; petals crimson in colour.....**B. phoenicea**

1. Trees; petals creamy yellow in colour.....**B. malabarica**

**Bauhinia malabarica** Roxb., Fl. Ind. 2: 321. 1832; Baker in Hook. f., Fl. Brit. India 2: 227. 1878; Gamble, Fl. Pres. Madras 407. 1919; Sanj., Leg. India 4. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 159. 1996. ***Piliostigma malabaricum*** (Roxb.) Benth. in Miq. Pl. Jungh. 261. 1852.

Trees, to 10 m high, bark black, red inside. Leaves to 10 x 13 cm, orbicular, bilobed above; lobes obtuse, cordate at base, 9-ribbed, nervules reticulate; petiole 4 cm long; panicles axillary, 5 cm across. Flowers 2 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 x 2 cm, compressed, longitudinally striate; seeds many, oblong.

*Fl. & Fr.* : September-February

*Distr.* : India and Burma. Common; in evergreen forests at low elevations. Koruthode, *JA 12231, JA & KPR 14731, JA 16272.*

**Bauhinia phoenicea** Wight & Arn., Prodr. 296. 1834; Baker in Hook. f., Fl. Brit. India 2: 283. 1878; Gamble, Fl. Pres. Madras 408. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 217. 1976; Manilal, Fl. Silent Valley 89. 1988; Sanj., Leg. India 3. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 159. 1996. ***Phanera phoenicea*** (Wight & Arn.) Benth. in Miq., Pl. Jungh. 262. 1851. ***Bauhinia benthamii*** Bedd., Ic. t. 107. 1868-1874.

Large climbing shrubs. Leaves to 10 cm across, orbicular, deeply bifid above, lobes acute, cordate at base, 9-ribbed from base, nervules parallel. Flowers in extra-axillary racemes, axis 10-20-flowered; pedicel 3 cm long; calyx tube short, lobes 2 cm long, oblong, puberulus outside; petals 5, 4 x 0.8 cm, long-clawed, spreading; stamens 4 or 5, exserted, anthers linear, 6 mm long; style slender; stigma peltate. Pods to 16 x 2.5 cm, oblong, broaden above, densely rusty, pubescent, many-seeded.

*Fl. & Fr.* : October-February

*Distr.* : Throughout the Western Ghats. Common; in evergreen forests at low elevations. Koruthode, *JA 12446.*

## 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. Leaflets to 1.5 cm long; pods not winged or spiny.....2
1. Leaflets over 3 cm long; pods winged or spiny.....3
2. Pods minutely bristled; leaflets 14-18 pairs.....**C. mimosoides**
2. Pods glabrous; leaflets 9-11 pairs.....**C. decapetala**
3. Pods winged, not spiny; filaments unequal, 1-sided; leaflets 3 pairs.....**C. cucullata**
3. Pods not winged, spiny, filaments equal, not 1-sided; leaflets 8 pairs, to 5 x 3 cm.....**C. bonduc**

**Caesalpinia cucullata** Roxb., Fl. Ind. 2: 358. 1832; Hattink, Reinwardtia 9(1): 22. 1974; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 490. 1983; Manilal, Fl. Silent Valley 90. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 48. 1991; Sanj., Leg. India 9. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 161. 1996. ***Mezoneuron cucullatum*** (Roxb.) Wight & Arn., Prodr. 283. 1834; Baker in Hook. f., Fl. Brit. India 2: 258. 1878; Gamble, Fl. Pres. Madras 395. 1919.

Stout climbers; old stem covered with strong thorns with clavate thick base. Leaves to 45 cm long; pinnules 5 or 6 pairs; leaflets 3 pairs, to 10 x 4 cm, ovate, acuminate, glabrous; rachis with strong curved thorns. Racemes to 25 cm long, clustered. Flowers 2 cm across, irregular, cucullate; sepals unequal, lobes obtuse, glabrous; petals unequal, orbicular; filaments glabrate. Pods 10 x 2.5 cm, flattened, oblong, obtuse, glabrous.

*Fl. & Fr.* : December-January

*Distr.* : Indo-Malesia, Philippines and China. Common; in evergreen forests. Ambari, *JA & KPR 16894*; Puthussery, *JA & KPR 17064*; Pamba *JA 17154.*

**Caesalpinia decapetala** (Roth.) Alston in Trimen, Handb. Fl. Ceylon 6 (Suppl.): 89. 1931; Hattink, Reinwardtia 9(1): 24. 1974; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 218. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 490. 1983; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 51. 1991. ***Richardia decapetala*** Roth., Nov. Pl. Sp. 212. 1821. ***Caesalpinia sepiaria*** Roxb., Fl. Ind. 2: 360. 1832; Wight, Ic. t. 37. 1838; Baker in Hook. f., Fl. Brit. India 2: 256. 1878; Gamble, Fl. Pres. Madras 394. 1919.

Rambling shrubs; branchlets tomentose. Leaves to 30 x 20 cm, bipinnate; leaflets to 15 x 6 mm, oblong, obtuse, densely hispid. Racemes terminal, to 25 cm long. Flowers many, 2.5 cm across; bracts 7 x 3 mm, lanceolate; sepals 10 x 4 mm, oblong, obtuse; petals yellow, equal, orbicular; filaments 12 mm long, densely bearded. Pods to 7 x 2.2 cm, elliptic-oblong, flat, glabrous, 2 or 3-seeded.

*Fl. & Fr.* : January-February

*Distr.* : Indo-Malesia and China. Common; in disturbed forests. Kurisumala, *JA 13054*; Melmala, *JA & KPR 14447.*

**Caesalpinia bonduc** (L.) Roxb., Fl. Ind. 2: 362. 1832; Hattink, Reinwardtia 9(1): 17. 1974; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 488. 1983; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 48. 1991; Sanj., Leg. India 9. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 161. 1996. ***Guilandina bonduc*** L., Sp. Pl. 381. 1753. ***G. bonducella*** L., Sp. Pl.

ed. 2, 545. 1762. ***Caesalpinia bonducella*** (L.) Flem., Asiat. Res. 11: 159. 1810; Baker in Hook. f., Fl. Brit. India 2: 254. 1878. ***C. crista*** auct. non L., 1753: Gamble, Fl. Pres. Madras 393. 1919. **Kazhanchikkuru** (Malaarayan)

Climbing shrubs, rusty, tomentose. Leaves to 70 x 40 cm, pinnules 8 pairs, leaflets 8 pairs, 5 x 3 cm, ovate, abruptly acuminate, rachis armed with recurved spines. Racemes to 30 cm long, axillary, tomentose. Flowers yellow, 1.8 cm across; sepals oblong, obtuse, tomentose; petals 10 mm long, obovate with wavy margins. Pods 12 x 5 cm, obovate-oblong, densely spiny, 2-3-seeded.

*Fl. & Fr.* : January-March

*Distr.* : South India, Sri Lanka, China and South East Asia. Rare; in evergreen forests. Poonkavanam, *JA 16996*; Koruthode, *JA 17908.*

*Ethnobotanical use* : The seeds are grilled and powered, mixed with milk and given for stomach ache.

**Caesalpinia mimosoides** Lam., Encycl. 1: 452. 1785; Wight, Ic. t. 392. 1840; Baker in Hook. f., Fl. Brit. India 2: 256. 1878; Gamble, Fl. Pres. Madras 394. 1919; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 492. 1983; Manilal, Fl. Silent Valley 90. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 55. 1991; Sanj., Leg. India 12. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 161. 1996.

Rambling shrubs, densely prickly, pungent smelling when cut; stem tomentose. Leaves 30-40 x 25 cm; pinnules 10-14 pairs; leaflets 10 x 4 mm, oblong inequilateral, obtuse. Raceme to 40 cm long, axillary or terminal, densely prickly, pedicels solitary, 2 cm long. Flowers 3 cm across; sepals 8 x 4 mm, oblong, obtuse; petals yellow, to 1.5 cm long, orbicular, wavy along the margins. Pods 5 x 2.5 cm, compressed, brown, 1 or 2 seeded.

*Fl. & Fr.* : December-January

*Distr.* : Peninsular India and Sri Lanka. Common; in disturbed forests. Koruthode, *JA & KPR 14764*; Pamba, *JA 17087.*

## CASSIA Linnaeus

Sp. Pl. 376. 1753.

Herbs, shrubs or small trees. Leaves paripinnate, rachis glandular or not, leaflets opposite, estipellate. Flowers in axillary or terminal racemes or panicles, bracteate; bracteoles smaller; sepals 5, united into a short tube at base; petals yellow, subequal, imbricate; stamens 10, various, 3-5 are usually reduced to staminodes or absent; anthers unequal, dehiscing by apical pore; ovary

curved-oblong, stalked or sessile, many-ovuled; style incurved; stigma terminal. Pod oblong, terete or compressed; seeds many, compressed.

1. Pods cylindrical, to 40 cm long ..... **C. fistula**
1. Pods compressed, to 20 cm long ..... 2
2. Leaflets ca. 0.4 cm long, 40-60 pairs ..... **C. mimosoides**
2. Leaflets over 2 cm long, to 20 pairs ..... 3
3. Pods 4-winged; flowers in terminal stout racemes; leaflets to 8.5 cm broad ..... **C. alata**
3. Pods not 4-winged; flowers not in terminal stout raceme; leaflets narrower ..... 4
4. Leaves not glandular at the base or in between leaflets on rachis ..... 5
4. Leaves glandular at the base or in between leaflets on rachis ..... 7
5. Leaflets to 2 pairs; pods to 4.5 cm long ..... **C. absus**
5. Leaflets 10-25 pairs; pods 10-15 cm long ..... 6
6. Pods hispid; leaflet tip acute ..... **C. siamea**
6. Pods glabrous; leaflet tip obtuse ..... **C. timorensis**
7. Stem, leaves and pods densely hirsute ..... **C. hirsuta**
7. Stem, leaf and pods glabrous ..... 8
8. Leaflets obtuse at apex ..... **C. tora**
8. Leaflets acute at apex ..... 9
9. Flowers paired in axillary umbels; leaflets 3-5 pairs ..... **C. occidentalis**
9. Flowers many on axillary or terminal panicles; leaflets 6-10 pairs ..... **C. sophera**

**Cassia absus** L., Sp. Pl. 376. 1753; Baker in Hook. f., Fl. Brit. India 2: 255. 1878; Gamble, Fl. Pres. Madras 403. 1919; de Wit, Webbia 11: 279. 1955; Pandey, J. Bombay Nat. Hist. Soc. 68(2): 317. 1971; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 496. 1983; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 86. 1991; Sanj., Leg. India 14. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 163. 1996. ***Senna absus*** (L.) Roxb., Fl. Ind. 2: 340. 1832.

Scabrid herbs. Leaves to 6 cm long; leaflets 3.5 x 1.6 cm, ovate, acute, hispid; stipule lanceolate, deflexed. Flowers in terminal racemes, 6 mm across, shortly pedicelled; sepals oblong, obtuse; petals yellow, obovate, obtuse; stamens unequal; anthers dimorphic. Pods 4.5 x 0.7 cm, oblong, flat, hispid, oblique at base; seeds 6, biconvex.

*Fl. & Fr.* : September-January

*Distr.* : Paleotropics. Common; in riversides in evergreen forests. Thaannikkudy, *JA 12358, JA & KPR 14503.*

**Cassia alata** L., Sp. Pl. 378. 1753; Wight, Ic. t. 253. 1840; Baker in Hook. f., Fl. Brit. India 2: 264. 1878; Gamble, Fl. Pres. Madras 404. 1919; Pandey, J. Bombay Nat. Hist. Soc. 68(2): 314.

1971; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 497. 1983; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 69. 1991.

Erect stout shrubs; branchlets 3 cm thick. Leaves 50-70 cm long; leaflets 9 pairs, to 14 x 8.5 cm, oblong-obovate, obtuse, glabrous. Racemes terminal, to 30 cm long; bracts 2.5 x 2 cm, obovate, obtuse. Flowers many, densely packed; sepals obovate, obtuse, glabrous; petals 2 x 1.5 cm, obovate, yellow with brown lines; two stamen only with fertile anthers. Pods 17 x 1.5 cm, 4-winged, glabrous.

*Fl. & Fr.* : September-December

*Distr.* : Native of Tropical America. Occasional; along river sides in moist deciduous forests. Koruthode, *JA 16918.*

**Cassia fistula** L., Sp. Pl. 377. 1753; Baker in Hook. f., Fl. Brit. India 2: 201. 1878; Gamble, Fl. Pres. Madras 400. 1919; de Wit, Webbia 11: 279. 1955; Pandey, J. Bombay Nat. Hist. Soc. 68(2): 313. 1971; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 219. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 400. 1983; Manilal, Fl. Silent Valley 91. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 62. 1991; Sanj., Leg. India 15. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 163. 1996.

Small to medium sized trees. Leaves to 30 cm long; leaflets 4-8 pairs, 10 x 4 cm, ovate, acute, eglandular. Racemes to 40 cm long, axillary, drooping; pedicels to 4 cm long. Flowers 4 cm across; bracts minute; sepals ovate, obtuse, green; petals to 2 x 2 cm, orbicular, concave; filaments unequal, to 3.5 cm long, anthers dimorphic. Pods to 40 cm long, septate, glabrous; seeds transverse, orbicular.

*Fl. & Fr.* : March-June

*Distr.* : South-East Asia. Common; in semi-evergreen and moist deciduous forests. Koruthode, *JA 13518.*

**Cassia hirsuta** L., Sp. Pl. 378. 1753; Baker in Hook. f., Fl. Brit. India 2: 263. 1878; Gamble, Fl. Pres. Madras 401. 1919; de Wit, Webbia 11: 250. 1955; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 220. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 501. 1983; Manilal, Fl. Silent Valley 91. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 76. 1991; Sanj., Leg. India 15. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 163. 1996.

Densely hispid shrubs, to 1.5 m tall. Leaves 25 cm long; leaflets 4 pairs, to 7 x 3 cm, ovate-lanceolate, acute, glandular at the base of the petiole. Flowers 3-7-together, on axillary umbel, 3

cm across; sepals 6 x 4 mm, obovate, hispid; petals 12 x 8 mm, obovate, entire, glabrous; two stamens only with fertile anthers. Pods 15 x 0.5 cm, terete, falcate, densely hispid.

*Fl. & Fr.* : September-December

*Distr.* : Paleotropical, Introduced. Common; in moist deciduous forests. Thekkady, *JA 12411.*

**Cassia mimosoides** L., Sp. Pl. 379. 1753; Baker in Hook. f., Fl. Brit. India 2: 266. 1878; Gamble, Fl. Pres. Madras 403. 1919; de Wit, Webbia 11: 283. 1955; Pandey, J. Bombay Nat. Hist. Soc. 68(2): 317. 1971; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 220. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 502. 1983; Manilal, Fl. Silent Valley 92. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 89. 1991; Sanj., Leg. India 17. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 163. 1996. **Theemullu** (Mannan).

Erect subshrubs, to 60 cm high, hirsute. Leaves to 8 cm long, leaflets 4 x 1 mm, oblong, inequilateral, hirsute; stipule to 1 cm long, lanceolate, subulate at apex. Flowers axillary, solitary or paired, 1 cm across; sepals lanceolate, acuminate, hairy; petals obovate, yellow; all stamens with fertile anthers, filaments equal. Pods 6 x 0.6 cm, oblong, sparsely hairy; seeds many.

*Fl. & Fr.* : September-January

*Distr.* : Paleotropic. Common; along lake shores, Vallakkadavu, *JA 17316.*

**Cassia occidentalis** L., Sp. Pl. 377. 1753; Baker in Hook. f., Fl. Brit. India 2: 262. 1878; Gamble, Fl. Pres. Madras 401. 1919; de Wit, Webbia 11: 256. 1955; Pandey, J. Bombay Nat. Hist. Soc. 68(2): 316. 1971; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 220. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 505. 1983; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 75. 1991; Sanj., Leg. India 19. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 163. 1996.

Glabrous shrubs, to 1 m tall. Leaves to 22 cm long, glandular at the base of petiole; leaflets 6 pairs, to 7 x 2 cm, lanceolate, ciliate, shortly petiolulate. Flowers 3 cm across, pedicelled, in axillary two flowered umbel turning to terminal racemes; pedicels to 1.5 cm long; sepals orbicular, green; petals yellow, obovate, clawed; 3 stamens with larger anthers, 4 stamens with short anthers, 3 staminodes. Pods 11 x 8 cm, oblong, curved, compressed, marginate, long-cuspidate.

*Fl. & Fr.* : July-December

*Distr.* : Paleotropical. Introduced weed. Common; in moist deciduous forests. Thekkady, *JA 12414.*

**Cassia siamea** Lam., Encycl. 1: 648. 1785; Baker in Hook. f., Fl. Brit. India 2: 264. 1878; Gamble, Fl. Pres. Madras 402.1919; Pandey, J.Bombay Nat. Hist. Soc. 68(2):312.1971; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 221. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 508. 1983; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 71. 1991.

Large shrubs or small trees; branchlets slender, hispid. Leaves to 30 cm long, eglandular; leaflets to 25 pairs, to 4.2 x 1.2 cm, oblong, obtuse, emarginate at apex, hispid. Raceme axillary, to 7 cm long. Flowers 3 cm across, pedicelled; bracts ovate, acute; bracteoles orbicular; sepals orbicular, brown; petals yellow; 7 stamens antheriferous, 3 staminodes. Pods 7-15 x 1.25 cm, oblong, flat, transversely, sinuate.

*Fl. & Fr.* : November-January

*Distr.* : India to Malesia. Rare; along riverbanks, Koruthode, *JA 12738; JA 16927.*

**Cassia sophera** L., Sp. Pl. 379. 1753; Baker in Hook. f., Fl. Brit. India 2: 262. 1878; Gamble, Fl. Pres. Madras 401. 1919; Pandey, J. Bombay Nat. Hist. Soc. 68(2): 317. 1971; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 74. 1991.

Shrubs, to 1 m tall. Leaves to 20 cm long; leaflets 8 pairs, 5 x 1.5 cm, lanceolate, acute, rounded at base; petiole with a stalked gland at base. Panicles 10 x 6 cm, glabrous. Flowers 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 x 0.5 cm, compressed, many-seeded, glabrous.

*Fl. & Fr.* : October-December

*Distr.* : Pantropical. Introduced weed. Common; along roadsides in grasslands. Vallakkadavu, *JA 16897.*

**Cassia timorensis** DC., Prodr. 2: 499. 1825; Baker in Hook. f., Fl. Brit. India 2: 263. 1878; Gamble, Fl. Pres. Madras 402. 1919; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 72. 1991.

Shrubs, to 3 m high. Leaves to 35 cm long; leaflets 4 x 1.2 cm, oblong, acute, mucronate, hispid. Racemes few, to 35 cm long, terminal; bracts 15 x 13 mm, ovate, acute. Flowers 4.5 cm across; sepals orbicular, black; petals yellow, obovate, clawed; three stamens with large anthers, four stamens with smaller anthers, 3 staminodes. Pods 10 x 2 cm, oblong, flat, transversally ridged, cuspidate.

*Fl. & Fr.* : September-December

*Distr.* : Malesia, Indonesia, introduced. Occasional; in moist deciduous forests. Thekkady, *JA 16358.*

**Cassia tora** L., Sp. Pl. 376. 1753; Baker in Hook. f., Fl. Brit. India 2: 263. 1878; Gamble, Fl. Pres. Madras 401. 1919; de Wit, Webbia 11: 276. 1955; Pandey, J. Bombay Nat. Hist. Soc. 68(2): 316. 1971; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 221. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 510. 1983; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7:83. 1991; Sanj., Leg. India 22. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 164. 1996.

Glabrous shrubs. Leaves to 12 cm long; rachis glandular between leaflets; leaflets 2-4 pairs, to 5 x 3 cm, obovate, obtuse. Flowers 3 cm across, in axillary fascicles, pedicellate; calyx ovate, acute, hispid; petals obovate, not clawed; 7 stamens antheriferous, 3 staminodes, anthers subequal. Pods to 17 x 0.3 cm; terete, glabrous.

*Fl. & Fr.* : August-December

*Distr.* : Pantropical, introduced weed. Common; along roadside in moist deciduous forests. Thekkady, *JA 18428.*

## HUMBOLDTIA Vahl

Symb. Bot. 3: 106. 1794, *nom. cons.*

Small tree, leaves 1-pinnate; leaflets opposite; nerves looped below the margins, estipellate. Flowers racemose, on upper axils, branches or on old stems, irregular; bracts and bracteoles large and persistent; calyx tube narrow or turbinate; lobes 4, subequal; petals 3 or 5, spathulate, clawed, spreading; stamens 5, exserted, free; staminodes 5, minute; ovary stipitate, many-ovuled; style slender; stigma capitate. Pod curved-oblong, compressed, woody; seeds transverse.

1. Racemes clustered on tubercle on old branches or on trunk; rachis of leaves flattened...**H. bourdillonii**
1. Racemes solitary on upper leaf axils; rachis terete.....**H. vahliana**

**Humboldtia bourdillonii** Prain., J. Asiat. Soc. Bengal 73: 200. 1904; Gamble, Fl. Pres. Madras 411.1919; Sanj., Blumea 31(2):332.1986; Sasidh., Ind. J.For.8(Addl.Ser.10):211.1998 [Fig. 26].

Medium sized trees, bark smooth, reddish brown. Leaflets 10-20 x 2-5 cm, oblong to linear-lanceolate, acuminate, glabrous; lateral nerves 6-8 pairs; rachis winged; stipule 2.5-3 x 1.5 cm, ovate, falcate. Cymes cauliflorus, 5-7 cm long, tomentose. Flowers many, pedicelled; pedicels 1.5 mm long; bracts 4 x 1.7 mm, ovate; bracteoles connate. Calyx tube 6 mm long; lobes 4, 8-10 mm long, oblong, tomentose; petals unequal, larger ones 8-9 x 6 mm, white; filaments 2 cm long, pilose; ovary densely pilose, 4-6-ovuled. Pods 10-13 x 3-4.5 cm, velvety pubescent.

*Fl. & Fr.* : December-July

*Distr.* : Endemic to Southern Western Ghats(Kerala). Rare; in evergreen forests, along stream banks. Arjunankotta, *JA 13378.*

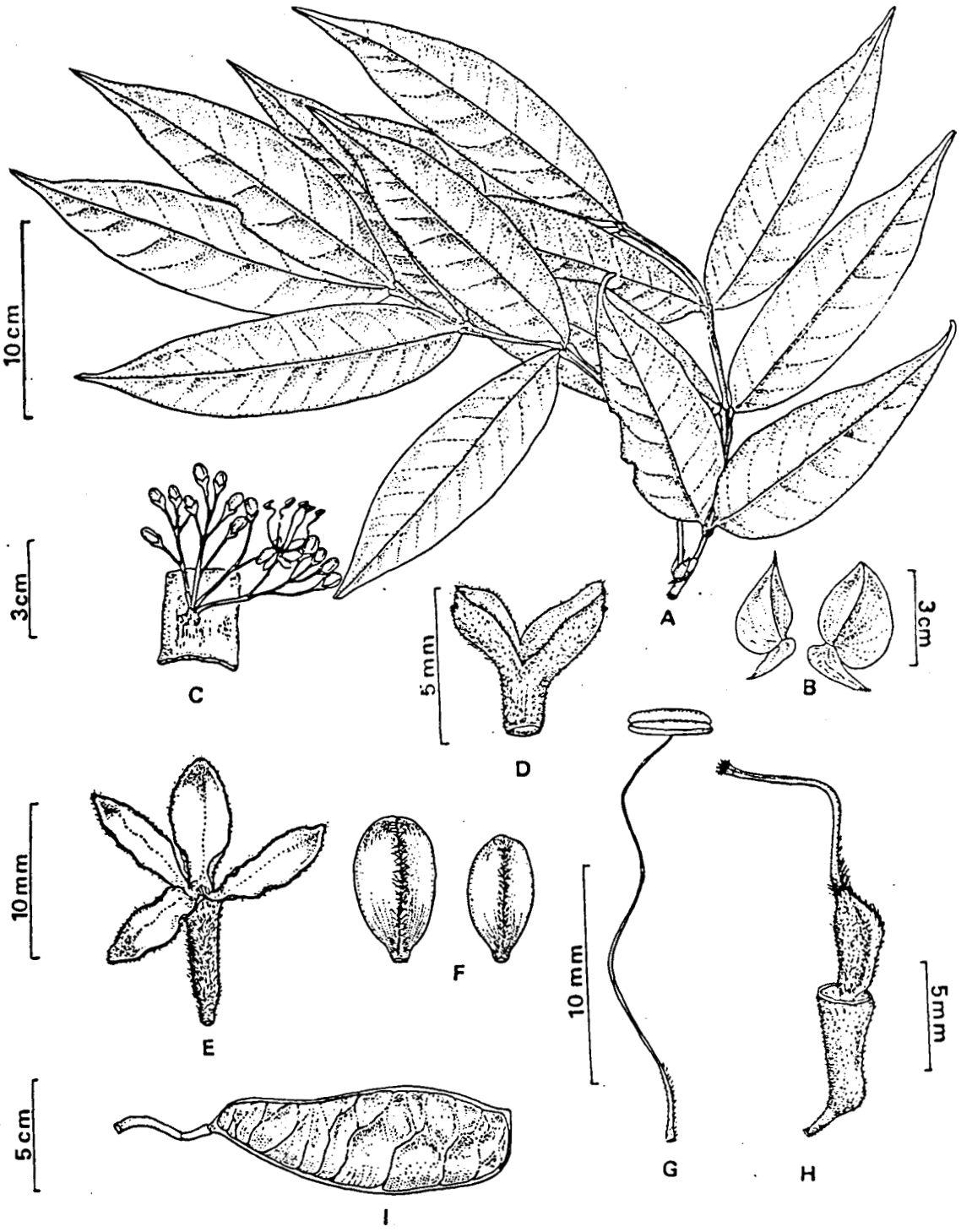



Fig. 26. *Humboldtia bourdillonii* Prain **A.** leafy twig, **B.** stipules, **C.** inflorescence, **D.** bracteoles, **E.** calyx, **F.** petals, **G.** stamen, **H.** pistil, **I.** fruit.

**Humboldtia vahliana** Wight, Ic. tt. 1607, 1608. 1850; Baker in Hook. f., Fl. Brit. India 2: 274. 1878; Gamble, Fl. Pres. Madras 411. 1919; Sanj., Blumea 31(2): 338. 1986 & Leg. India 30. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 165. 1996.

Small trees. Leaflets 3 pairs, 21 x 6 cm, oblong, acute; nerves 8 pairs, reticulate. Racemes erect, axillary, to 18 cm long; bracts ovate, obtuse, densely tomentose; bracteoles similar, paired. Flowers pedicelled; sepals 7 x 3 mm, oblong, obtuse; petals 9 x 5 mm, obovate, clawed; stamens 5, filaments glabrous; ovary densely hairy. Pods 13-20 x 3-5 cm, compressed, oblong, acute at base and apex, rusty tomentose.

*Fl. & Fr.* : January-April

*Distr.* : Southern Western Ghats (Kerala & Tamil Nadu). Common; in along riverbanks in evergreen forests at low elevations. Koruthode, *JA 13403.*

## KINGIODENDRON H. A. T. Harms

in Engl. & Prantl, Pflanzenf. Nachtr. 1: 194. 1897.

**Kingiodendron pinnatum** (Roxb. ex DC.) Harms in Engl. & Prantl, Pflanzenf. 1: 194. 1897; Gamble, Fl. Pres. Madras 412. 1919; Nayar & Sastry, Red Data Book Indian Pl. 3: 142. 1990; Sanj., Leg. India 32. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 165. 1996. ***Hardwickia pinnata*** Roxb. ex DC., Prodr. 2: 487. 1825; Bedd., Fl. Sylv. t. 255. 1872; Baker in Hook. f., Fl. Brit. India 2: 270. 1878. **Kulavu, Ennappain** (Oorali, Mala Arayan & Malampandaram).

Large trees; bark smooth, dark-grey, exudate resinous oil from heart wood. Leaves 1-pinnate, 6-7-foliolate; leaflets alternate, to 11 x 4 cm, ovate, acuminate. Flowers 6 mm long, 4 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 cm across, orbicular, concave on faces, glabrous; seed one, biconvex.

*Fl. & Fr.* : January-May

*Distr.* : Peninsular India. Common; in evergreen forests. Koruthode, *JA 18427.*

*Ethnobotanical use* : Resinous exudates from the heart wood of this tree called as Kulavenna is extracted and marketed. Massage with one drop of the exudate will relieve body pain.

## Subfamily : MIMOSOIDEAE

1. Stamens many ..... 2
1. Stamens equal to the sepals ..... 4
2. Pods twisted ..... **Archidendron**
2. Pods straight ..... 3

3. Prickled climbers; stamens free.....**Acacia**

3. Unarmed trees; stamens monadelphous.....**Albizia**

4. Spikes globose; herbs or trees.....5

4. Spikes linear; large tendrillate climbers.....**Entada**

5. Large trees with woody pods, unarmed.....**Xylia**

5. Herbs or ramblers with indented pods, prickled.....**Mimosa**

## ACACIA P. Miller

Gard. Dict. Abr. ed. 4. 28. 1754.

Erect or climbing shrubs; stems prickled. Leaves bipinnate; pinnae opposite; leaflets many, opposite, estipillate; 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. Leaflets ca. 1 mm broad.....2

1. Leaflets 3-4 mm broad.....3

2. Pods thick and fleshy; leaflets to 30 pairs.....**A. sinuata**

2. Pods flat and thin, not fleshy; leaflets to 50 pairs.....**A. pennata**

3. Leaflets 35-45 pairs; pods glandular-pubescent.....**A. torta**

3. Leaflets 18-22 pairs; pods glabrous.....**A. caesia**

**Acacia caesia** (L.) Willd., Sp. Pl. 4: 1090. 1806; Gamble, Fl. Pres. Madras 428. 1919; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 480. 1980; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 522. 1983; Manilal, Fl. Silent Valley 92. 1988. ***Mimosa caesia*** L., Sp. Pl. 522. 1753, p.p. ***Acacia intsia*** Willd. var. ***caesia*** (L.) Baker in Hook. f., Fl. Brit. India 2: 297. 1878. **Incha**

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, to 11 x 3.5 mm, oblong, truncate at base, apiculate at apex; thinly pubescent below, 3-nerved from base. Heads terminal, panicled. Pods to 13 x 2.2 cm, oblong, flat, acuminate at both ends, marginate.

*Fl. & Fr.* : February-May

*Distr.* : India, Malesia and Sri Lanka. Common; in disturbed evergreen forests. Koruthode, *JA 18429.*

*Ethnobotanical use* : Bark of this species is peeled, beaten and used on a scouring sponge.

**Acacia pennata** (L.) Willd., Sp. Pl. 4: 1090. 1806; Baker in Hook. f., Fl. Brit. India 2: 297. 1878, p.p.; Gamble, Fl. Pres. Madras 429. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 228. 1976; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 489. 1980; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 530. 1983; Manilal, Fl. Silent Valley 92. 1988; Sanj., Leg. India 42. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 167. 1996. *Mimosa pennata* L., Sp. Pl. 522. 1753. **Pulinchikkai** (Malaarayan)

Ramblers; branchlets slender, terete, prickles few, minute. Leaves to 20 cm long, pinnae 13 pairs, 7 cm long; leaflets *ca.* 6 x 1 mm, oblong, cordate at base, inequilateral, obtuse at apex, overlapping. Spikes 10 mm across, in axillary cymes. Pods 11 x 2.3 cm, oblong, obtuse, flat, yellowish.

*Fl. & Fr.* : September-December

*Distr.* : India, Malesia & Sri Lanka. Common; in moist deciduous forests. Vallakkadavu, *JA & KPR 16810.*

*Ethnobotanical use* : The bark is beaten and the juice is pasted on neck for tonsillitis.

**Acacia sinuata** (Lour.) Merr. in Trans. Amer. Philos. Soc. n. s. 24(2): 186. 1935; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 228. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 532. 1983. *Mimosa sinuata* Lour., Fl. Cochinch. 653. 1790. *Acacia rugata* Bunch.-Ham. ex Benth., London J. Bot. 1: 514. 1842; Gamble, Fl. Pres. Madras 429. 1919. **Cheevakka** (Mannan, Thevan), **Perumkai** (Mala Arayan).

Coarse ramblers, densely prickly; branchlets pubescent, black. Pinnae 8-10 pairs, to 5 cm long; leaflets to 6 x 1 mm, oblong, truncate at base, pubescent; rachis prickled, glandular. Heads axillary, solitary or paired, 1 cm across; peduncle 3 cm long. Flowers numerous, 2 mm long; filaments 5 mm long, yellow. Pods 12 x 2 cm, dark-brown; seeds transverse.

*Fl. & Fr.* : November-March

*Distr.* : Indo-Malesia and China. Common; in moist deciduous forests. Thekkady, *JA 13543*; *JA & KPR 16956.*

*Ethnobotanical use* : The powdered pods are effective for the prevention of leech bite and is also used as an insecticide. The seeds are powdered and added to large amount of water. Bathing using that water is good for rheumatic fever.

**Acacia torta** (Roxb.) Crib., Kew Bull. 1915: 410. 1915; Gamble, Fl. Pres. Madras 428. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 229. 1976; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 533. 1983; Sanj., Leg. India 44. 1992; Sasidh. & Sivar., Fl. Pl.

Thrissur For. 167. 1996. ***Mimosa torta*** Roxb., Fl. Ind. 2; 566. 1832. ***Acacia caesia*** auct. non Willd., 1806: Wight & Arn., Prodr. 278. 1834.

Rambling shrubs; branchlets puberulus. Leaves to 24 cm long; pinnae 12 pairs; leaflets 8 x 3 mm, oblong, obtuse at apex, subcordate at base, slightly pubescent, 1-nerved from base. Heads 1.5 cm across, in terminal panicles. Flowers many, 3 mm long; filaments 5.5 mm long, yellow. Pods 16 x 2.5 cm, flat, papery, yellowish-brown, densely glandular.

*Fl. & Fr.* : December-April

*Distr.* : Pantropical. Occasional; in moist deciduous forests. Thekkady, *JA & KPR 15319.*

## 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 5-6 pairs; heads binate.....**A. lebbeck**
1. Leaflets above 10 pairs; heads panicled.....2
2. Pinnae 3-4 pairs; leaflets to 13 pairs, each to 23 x 8 mm.....**A. odoratissima**
2. Pinnae 15-20 pairs; leaflets to 40 pairs, each to 6 x 1.5 mm.....**A. chinensis**

**Albizia chinensis** (Osbeck) Merr., Amer. J. Bot. 3: 575. 1916; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 230. 1976; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 500. 1980; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 536. 1983; Sanj., Leg. India 54. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 168. 1996. ***Mimosa chinensis*** Osbeck, Dagbok. Ostind. Resa 233. 1757. ***Mimosa stipulata*** Roxb., Fl. Ind. 2: 549. 1832, "*stipulata*". ***Albizia stipulata*** (Roxb.) Boivin, Encycl. 19(2): 33. 1838; Bedd., Fl. Sylv. t. 55. 1870; Baker in Hook. f., Fl. Brit. India 2: 300. 1878. ***Mimosa marginata*** Lam., Encycl. 1: 12. 1783. ***Albizia marginata*** (Lam.) Merr., Philipp. J. Sci. 5: 23. 1910; Gamble, Fl. Pres. Madras 433. 1919.

Tall trees; bark rough, black. Leaves to 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 8 mm long; corolla tube broaden up, pubescent; filaments 2 cm long, white. Pods 20 x 4 cm, glabrous, yellowish brown.

*Fl. & Fr.* : March-May

*Distr.* : Indo-Malesia. Common; in evergreen forests. Koruthode, *JA 13521.*

**Albizia lebbeck** (L.) Willd., Sp. Pl. 4: 1066. 1806; Bedd., Fl. Sylv. t. 53. 1870; Baker in Hook. f., Fl. Brit. India 2: 298. 1878; Gamble, Fl. Pres. Madras 432. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 230. 1976; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 502. 1980; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 538. 1983; Sanj., Leg. India 56. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 168. 1996.

Tall trees; bark smooth, white. Leaves 20-30 cm long; pinnae 2 pairs; leaflets 4.5 x 2.5 cm, oblong, obtuse, glabrate. Peduncles 10 cm long, axillary, paired; heads 4 cm across, dull yellow. Flowers pedicelled, 10 mm long; calyx tube 5 mm long, glabrous; corolla glabrous, lobes ovate, acute; filaments 3.5 cm long. Pods 20 x 3.5 cm, smooth with thick margin, yellow.

*Fl. & Fr.* : March-September

*Distr.* : Tropical Asia and Africa. Common in evergreen forests. Koruthode, *JA 13520, JA 14111, KPR & JA 14745.*

**Albizia odoratissima** (L. f.) Benth, London J. Bot. 3: 88. 1844; Bedd., Fl. Sylv. t. 54. 1870; Baker in Hook. f., Fl. Brit. India 2: 299. 1878; Gamble, Fl. Pres. Madras 431. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 230. 1976; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 472. 1980; Britto and Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 539. 1983; Manilal, Fl. Silent Valley 93. 1988; Sanj., Leg. India 57. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 168. 1996. *Mimosa odoratissima* L. f., Suppl. Pl. 437. 1781. **Karimthakarai** (Mannan).

Trees to 20 m high; bark dark, rough. Leaves to 25 cm long; pinnae to 15 cm long; leaflets oblong, obtuse at either ends, pubescent below. Panicle 15 cm across, axillary or terminal; heads 3 cm across, 15-25-flowered. Flowers 5 mm long, sessile; calyx 0.5 mm long, cupular; corolla 5-fid to half way down; lobes acute, hispid; staminal filaments 10 mm long. Pods to 21 x 2.5 cm, flat, brown, polished.

*Fl. & Fr.* : October-May

*Distr.* : Indo-Malesia. Common; in evergreen forests. Thekkady, *JA & KPR 15302;* Kottamala, *JA & KPR 15240;* Koruthode, *JA 16247.*

## 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 angular; pinnae 4-10 pairs; leaflets 15 or more pairs.....**A. clypearia**

1. Branchlets terete; pinnae 1 pairs; leaflets 4 pairs.....**A. monadelphum**

**Archidendron clypearia** (Jack) Nielsen, Adansonia 19: 15. 1979; Gang. & Chakrab., J. Econ. Tax. Bot. 17(3): 686. 1993. ***Inga clypearia*** Jack, Malayan Misc. 2: 78. 1822. ***Pithecellobium subcoriaceum*** Thw., Enum. Pl. Zeyl. 100. 1859; Baker in Hook.f., Fl. Brit. India 2: 305. 1878; Gamble, Fl. Pres. Madras 434.1919. ***P. anamalayanum*** Bedd., Fl. Sylv. t. 189.1872 [Fig. 27B].

Medium trees; branchlets ferrugineus tomentose; leaflets 8 x 3 mm, oblong, acute at apex, oblique at base, hispid below, margins folded; rachis hispid. Spike white, many, in terminal panicle, 4-12-flowered. Flowers white, to 10 mm long. Pods twisted, to 10 x 1.5 cm, hispid; dorsal suture coriaceous; seeds many, 5 mm across, compressed.

*Fl. & Fr.* : December-May

*Distr.* : Peninsular India. Common; in evergreen forests along high elevations above 1700 m msl. Vellimala, *JA 18602.*

**Archidendron monadelphum** (Roxb.) Nielson, Adansonia 19: 21. 1979; Sanj., Leg. India 61. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 169. 1996. ***Mimosa monadelpha*** Roxb., Fl. Ind. 2: 544. 1832. ***Pithecellobium bigeminum*** auct. non (L.) Mart. ex Benth., 1844: Baker in Hook. f., Fl. Brit. India 2: 303. 1878; Gamble, Fl. Pres. Madras 435. 1919; Gang. & Chakrab., J. Econ. Tax. Bot. 17(3): 684. 1993.

Small trees, branchlets minutely hairy. Leaves bipinnate, pinnae 2, opposite; leaflets 4 pairs, 15 x 6 cm, opposite, ovate, acuminate, oblique at base, glabrous; rachis glandular. Peduncle 3-8-flowered, axillary or terminal, densely rusty tomentose. Flowers 4 mm long, calyx 4-lobed, connate, lobes acute; petals 4, ovate, acute, united below; stamens 4, monadelphous; filaments 10 mm long; ovary many-ovuled, sessile; stigma minute. Pods twisted, strap-shaped, 2 cm broad; seeds 4-8, ovoid.

*Fl. & Fr.* : January-March

*Distr.* : Peninsular India. Common; in evergreen forests at low elevations. Vallakkadavu, *JA 13669*; Koruthode, *JA & KPR 14805.*

Fig. 27. **A.** *Smithia venkobarawii* Gamble
**B.** *Archidendron clypearia* (Jack.) Nielsen

## ENTADA Adanson

Fam. 2: 318, 554. 1763, *nom. cons.*

**Entada rheedei** Spreng., Syst. Veg. 2: 325. 1825 (*rheedii*); Gandhi in Sald. & Nicols., Fl. Hassan Dist. 231. 1976; Kosterman in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 464. 1980; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 542. 1983; Sanj., Leg. India 66. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 170. 1996. ***Entada pursaetha*** DC., Prodr. 2: 425. 1825. ***E. scandens*** auct. non Benth., 1841: Baker in Hook. f., Fl. Brit. India 2: 86. 1878; Gamble, Fl. Pres. Madras 417. 1919.

Lianas, tendrillate, stems glabrous. Leaves bipinnate, pinnae 2 or 3 pairs, the terminal pair modified into a tendril; leaflets 4-7 pairs, 5 x 2.5 cm, curved-oblong, obtuse, inequilateral. Spikes to 35 x 0.8 cm, axillary, solitary or paired, erect. Flowers 3 mm long, densely packed, yellow; calyx cupular, truncate; petals 4, free, valvate; stamens 10, free; filaments 6 mm long, ovary many-ovuled; style slender; stigma concave. Pods to 1 m long, thick, woody, crenate on both sutures; seeds many, biconvex, 5 cm across, orbicular, smooth.

*Fl. & Fr.* :February-June

*Distr.* : Indo-Malesia. Common; in evergreen forests. Koruthode, *JA & KPR 14728*; Umikuppan, *JA & KPR 14892.*

## 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.....**M. pudica**
1. Stem 4-angled; pinnae 10-12.....**M. diplotricha**

**Mimosa diplotricha** C. Wight & Sanvalle, Anal. Real. Acad. Ci. Habana 5: 405. 1865; Sanj., Leg. India 67. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 170. 1996. ***M. invisa*** Mart., Flora 20, Biebl. 8: 121. 1837; Nair, J. Bombay Nat. Hist. Soc. 61: 649. 1964; Fosb., Phytologia 15: 499. 1968; Kosterman in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 464. 1980; Manilal, Fl. Silent Valley 94. 1988. **Pandi thottavadi** (Mala Arayan).

Stout aggressively rambling shrubs; stem pubescent, prickles short, in 4-rows. Leaves to 10 cm long; pinnae opposite, to 5 cm long; leaflets to 35 pairs, to 5 x 1 mm, oblong, truncate at base, glabrous; rachis prickled. Spike 1 cm across, in terminal racemes, peduncled. Flowers many, 3 mm long; stamens 10, filaments 6 mm long. Pods 2-5 cm long, bristly, black when mature.

*Fl. & Fr.* :December-February

*Distr.* : Native of Tropical America, now an aggressive weed in many tropical countries. Common; an aggressive weed forming impenetrable growth in disturbed forests. Koruthode, *JA 18430.*

*Note :* This neotropical weed makes the regeneration of natural vegetation in disturbed areas by its dense coverage.

**Mimosa pudica** L., Sp. Pl. 518. 1753; Baker in Hook. f., Fl. Brit. India 2: 291. 1878; Gamble, Fl. Pres. Madras 421. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 231. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 544. 1983; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 464. 1980; Manilal, Fl. Silent Valley 94. 1988; Sanj., Leg. India 69. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 170. 1996.

Woody perennial herbs; prickles scattered. Pinnae to 3.5 cm long; leaflets 20-30 pairs 3 x 1 mm, oblong, cordate at base, acute at apex, spiny along the margins; stipule scarious, prominently fimbriate. Spikes 2 cm across, peduncled, axillary. Flowers 1.5 mm long; calyx minute; corolla tube broaden above, lobes obtuse; filaments 4, 9 mm long. Pods 15-25 x 3-5 mm, 3-5-seeded; joints strongly bristly along the margins.

*Fl. & Fr.* :Throughout the year

*Distr.* : Native of Tropical America, now run wild in many tropical countries. Very common; along lake shores. Anchuruli, *JA 17702.*

## XYLIA Bentham

in Hooker's J. Bot. 4: 417. 1842.

**Xylia xylocarpa** (Roxb.) Taub., Bot. Centralbl. 47: 397. 1891; Gamble, Fl. Pres. Madras 417. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 233. 1976; Sanj., Leg. India 73. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 171. 1996. ***Mimosa xylocarpa*** Roxb., Pl. Corom. t. 100. 1798. ***Xylia dolabriformis*** auct. non Benth., 1842: Bedd., Fl. Sylv. t. 186. 1872; Baker, in Hook. f., Fl. Brit. India 2: 286. 1878, p.p. **Irul** (Mala Arayan).

Trees to 20 m tall; bark roughs transversely splitting. Leaves bipinnate, pinnae 2; leaflets 5-7 pairs, to 10 x 5 cm, elliptic-oblong, acute, glabrous, rachis glandular between the leaflets. Spike globose, 1.5-2 cm across, racemose. Flowers numerous, 5 mm long, sessile, dull yellow; calyx 4 mm long, tubular, toothed at apex; petals 5, free or united at base, valvate; stamens 10, free, filaments 8 mm long; ovary many-ovuled; stigma minute. Pods 18 x 6 cm, curved-obovate, compressed, woody; seeds 4-10, transverse, oblong.

*Fl. & Fr.* :February-November

*Distr.* : Indo-Malesia. Common; in moist deciduous forests. Koruthode, *JA 13405.*

## 49. ROSACEAE

Juss., Gen. Pl. 334. 1789.

1. Prickly stranglers; ovaries many, free ..... **Rubus**
1. Erect trees or shrubs; ovaries 1-3, united ..... 2
2. Flowers in erect racemes, axillary; calyx tube free from the ovary ..... **Prunus**
2. Flowers in terminal panicles; calyx tube adnate to the ovary ..... **Photinia**

### PHOTINIA Lindley

Trans. Linn. Soc. 13: 103, t. 10. 1821.

**Photinia serratifolia** (Desf.) Kalkman, Blumea 21: 424. 1973. ***Crataegus serratifolia*** Desf. Cat. Hort. Paris ed. 3, 408. 1829. ***P. lindleyana*** Wight & Arn., Prodr. 302. 1834; Wight, Ic. t. 228. 1839; Hook. f., Fl. Brit. India 2: 380. 1878; Gamble, Fl. Pres. Madras 445. 1919.

Two varieties are found in the study area.

Key to the varieties

1. Panicle glabrous ..... var. **serratifolia**
1. Panicle tomentose ..... var. **tomentosa**

**Photinia serratifolia** (Desf.) Kalkman, Blumea 21: 424. 1973, var. **serratifolia**. Henry *et al.*, Fl. Tamil Nadu Ser. 1, 1: 141. 1983. ***Crataegus serratifolia*** Desf., Cat. Hort. Paris ed. 3. 408. 1829. ***Photinia lindleyana*** Wight & Arn., Prodr. 302. 1834; Wight, Ic. t. 228. 1839; Hook. f., Fl. Brit. India 2: 380. 1878; Gamble, Fl. Pres. Madras 445. 1919.

Medium sized trees. Leaves to 17.5 x 8.5 cm, obovate, nerves many, regular; petiole to 3 cm long. Panicle terminal, 10 cm across. Flowers 3 mm broad, white; calyx tube campanulate; petals obovate, 1.5 x 1 cm; stamens 20, free; ovary 2-celled, glabrous, sessile; ovules 2 in each cell. Fruit globose, covered by thick calyx tube.

*Fl. & Fr.* :March-May

*Distr.* : Southern Western Ghats. Common; in evergreen forests at high elevations. Uppermanalar, *JA 13711.*

**Photinia serratifolia** (Desf.) Kalkman, Blumea 21: 424. 1973, var. **tomentosa** (Gamble) Vivek. & Shetty in Henry *et al.*, Fl. Tamil Nadu Ser. 1, 1: 141. 1983; Manilal, Fl. Silent Valley 96. 1988. ***P. lindleyana*** Wight & Arn. var. ***tomentosa*** Gamble, Fl. Pres. Madras 445. 1919.

Medium sized trees. Leaves to 15 x 7 cm, obovate, abruptly acuminate at apex, acumen twisted; petiole to 3 cm long. Panicle terminal, 10 cm across. Flowers 4 mm broad, white; calyx lobes ovate, acute; petals obovate, 1.5 x 1 cm; stamens inserted at the rim of the calyx cup; ovary 3-celled, glabrous, sessile. Fruit globose, covered by thick calyx tube.

*Fl. & Fr.* :August-December

*Distr.* : Southern Western Ghats. Occasional; in evergreen forests at high elevations. Vellimala, *JA 14042.*

## PRUNUS Linnaeus

Sp. Pl. 473. 1753

**Prunus ceylanica** (Wight) Miq., Fl. Ind. Bat. 1: 366. 1855; Kalkman, Blumea 13: 52. 1965; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 213. 1976; Tirveng. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 376. 1981; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 553. 1983; Manilal, Fl. Silent Valley 97. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 171. 1996. ***Pygeum zeylanicum*** Gaertn., Fruct. 218, t. 46. 1788; Bedd., Fl. Sylv. t. 59. 1870. ***P. acuminatum*** Colebr., Trans. Linn. Soc. London 12: 300. t. 18. 1818; Hook. f., Fl. Brit. India 2: 318. 1878; Gamble, Fl. Pres. Madras 439. 1919, non ***Prunus acuminata*** (Wall.) Dietr., 1803. ***Polydontia zeylanica*** Wight, Ill. 1 203. 1840, "*Polyodontia*"; Wight, Ic. t. 256. 1840. ***Pygeum wightianum*** Blume ex Muell. in Walp., Ann. 4: 642. 1857; Hook. f., Fl. Brit. India 2: 319. 1878; Gamble, Fl. Pres. Madras 439. 1919. ***P. gardneri*** Hook. f., Fl. Brit. India 2: 321. 1878; Gamble, Fl. Pres. Madras 439. 1919. **Irattani** (Mannan), **Karmavu** (malam pandarum).

Large trees; bark black, splitting into rectangular pieces. Leaves alternate, simple, to 12 x 5 cm, ovate, acuminate, entire, nerves 8 pairs, prominent. Racemes to 10 cm long, axillary, erect, densely flowered. Flowers white, 6 mm across; pedicels to 6 mm long, slender; calyx 2 mm long, cupular, campanulate, lobes ovate, acute, densely hairy; petals obovate, stamens many, filaments 3 mm long; ovary sessile, 1-celled, glabrous; ovules 2, pendulous; style 1, subulate; stigma capitate. Fruit a drupe, 2-lobed, 1 x 2 cm, globose, glabrous; seeds 2, globose.

*Fl. & Fr.* :May-August

*Distr.* : India to Java and Sri Lanka. Common; in evergreen forests. Vellimala, *JA 15327.*

## 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 clusters 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. indicus**
3. Leaves 3-foliolate; petals white.....**R. ellipticus**
3. Leaves 5-7 foliolate; petals pink.....**R. niveus**

**Rubus ellipticus** Smith in Rees, Cyclop. 30: n. 16. 1815; Hook. f., Fl. Brit. India 2: 336. 1878; Gamble, Fl. Pres. Madras 441. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 214. 1976; Tirveng. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 349. 1981; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 555. 1983; Manilal, Fl. Silent Valley 98. 1988. *R. gowreephul* Roxb., Fl. Ind. 2: 517. 1832; Wight, Ic. t. 230. 1839.

Ramblers; stems covered with red bristles; prickles recurved, leaflets 5 x 5 cm, obovate to orbicular, serrulate; hispid below; nerves 7 or 8 pairs, spiny below; petiolule 5 mm long. Panicle axillary or terminal, fulvous tomentose; bracts 5 mm long, ovate, acute. Flowers white; pedicels 1 cm long, villous; sepals 6 x 4 mm, ovate, acute, united at base, pubescent; petals 7-8 mm long, obovate; torus densely villous; ovaries glabrous. Drupes 1.5 mm across, glabrous, deep red.

*Fl.* : December-May

*Distr.* : India, Africa, Australia and Sri Lanka. Common; in disturbed evergreen forests at high altitudes. Uppermanalar, *JA 13758.*

**Rubus glomeratus** Blume, Bijdr. 1111. 1826; Chithra in Henry *et al.*, Fl. Tamil Nadu Ser. 1, 1: 143. 1983; Manilal, Fl. Silent Valley 98. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 173. 1996. *R. fulvus* Focke, Biblioth. Bot. 17: 81. 1911, non Sudre, 1902: Gamble, Fl. Pres. Madras 441.

1919. ***R. moluccanus*** sensu Hook. f., Fl. Brit. India 2: 330. 1878 p.p., non L., 1753. Mulluvettila (Mannan) [Fig. 28 A].

Stem reddish, densely cottony hairy. Leaves to 8 x 8 cm, shallowly 5-lobed, cordate at base, rugose above, densely fulvous, cottony tomentose below; petiole 4 cm long. Flowers in terminal panicles, bracts 8 mm long, densely hairy; bracteole bifid, filiform; pedicels 7 mm long; sepals 10 mm long, united below; petals 4 x 2 mm, obovate; ovaries glabrous. Drupe 2 mm across, ovoid, yellow.

*Fl. & Fr.* :December-May

*Distr.* : India, Java to Philippines. Common; in disturbed evergreen forests at high altitudes. Vellimala, *JA 15333.*

*Ethnobotanical use* : The leaves are chewed along with the tender leaves of *Schumannianthus virgatus.*

**Rubus niveus** Thunb., Diss. Rub. 9, t. 1, f. 3. 1813; Gamble, Fl. Pres. Madras 442. 1919; Tirveng. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 346. 1981; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 556. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 173. 1996. ***R. lasiocarpus*** Smith in Rees, Cyclop. 30: n. 6. 1815; Wight, Ic. t. 232. 1839; Hook. f., Fl. Brit. India 2: 339. 1878 [Fig. 28 B].

Branches glaucous; prickles few, 6 mm long. Leaflets to 5 x 3 cm, elliptic, acute at either ends, subsessile, spinous-serrate, white-tomentose beneath, glabrous above; nerves 7 pairs. Racemes 2-3 together, axillary. Flowers pink, 6-8 mm across; bracts 4 mm long, lanceolate, entire; pedicels 1 cm long, slender, villous; sepals 6 mm long, lanceolate, united at base; petals 3 x 2 mm, obovate; ovaries densely pubescent. Drupe 2 x 1 mm, ovoid, acute, subglabrous

*Fl. & Fr.* : December-May

*Distr.* : India, China to Java and Sri Lanka. Common; in disturbed evergreen forests at high altitudes. Kottamala, *JA 13782.*

**Rubus indicus** Thunb., Diss. Rub. 5 & 7. 1813; Tirveng. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 351. 1981; Chithra in Henry *et al.*, Fl. Tamil Nadu Ser. 1, 1: 143. 1983. ***R. wightii*** Gamble, Fl. Pres. Madras 440. 1919. ***R. rugosus*** sensu Wight, Ic. t. 225. 1839, non Smith, 1815. ***R. moluccanus*** sensu Hook. f., Fl. Brit. India 2: 330. 1878, p.p., non L., 1753.

Stems densely tomentose. Leaves to 13 x 10 cm, shallowly 5-lobed, cordate at base, spineus-toothed, minutely rugose above, densely white-tomentose below; nerves prickly below; petiole 5 cm long. Flowers axillary or terminal, densely tomentose; bracts 10 x 6 cm, obovate, pedicels

Fig. 28. **A**. *Rubus glomeratus* Blume;
**B**. *Rubus niveus* Thunb.

8 mm long; sepals 10 x 5 mm, united below; petals obovate, white; ovary densely hairy. Drupe 2 x 1 mm, yellow, glabrous

*Fl. & Fr.* : January-June

*Distr.* : India, Thailand and Sri Lanka. Common; in disturbed forests. Uppupara, *JA & KPR 15482.*

## 50. CRASSULACEAE

DC. in Lamark & Candolle, Fl. Franc. ed. 3, 4(1): 382. 1805.

### KALANCHOE Adanson

Fam. 2: 248. 1763.

Erect fleshy herbs. Leaves opposite, entire, crenate or pinnatifid, thick. Flowers erect, in terminal paniculate cymes, bracteate; sepals 4, free or connate; petals 4, connate into a flask-shaped tube, lobes spreading; stamen 8, biseriate; filaments adnate to the corolla tube; carpels 4, free, with 4 hypogynous scales adnate to the base of corolla tube, narrowed into the style; ovules many, parietal. Fruit of 4 free follicles; seeds many, oblong, ribbed.

1. Leaves pinnatifid.....**K. schweinfurthii**
1. Leaves ovate, elliptic or obovoid, not pinnatifid.....2
2. Sepals 1 mm broad; leaves 10-15 cm long.....**K. bhidei**
2. Sepals 3 mm broad; leaves to 7 cm long.....**K. grandiflora**

**Kalanchoe bhidei** Cooke, Fl. Pres. Bombay 1: 467. 1903; Gamble, Fl. Pres. Madras 450. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 209. 1976; Srini. in Henry *et al.*, Fl. Tamil Nadu Ser. 1, 1: 145. 1983.

Erect herbs, to 40 cm high. Leaves 10-15 x 7 cm, elliptic, obtuse, crenate, sessile; upper leaves acute. Panicles 25 cm across, spreading; pedicels 5 mm long. Flowers many; sepals 6 x 1 mm, lanceolate, connate at base; corolla tube 1 cm long, lobes 5 x 3 mm, ovate, cuspidate, yellow; filaments 2.5 cm long, attached on the middle of corolla tube; anthers orbicular; ovaries 5 mm long; style 3 mm long, glabrous.

*Fl. & Fr.* :November-May

*Distr.* : South India. Rare; in grasslands. Mlappara, *JA 18417.*

**Kalanchoe grandiflora** Wall. ex Wight & Arn., Prodr. 359. 1834; Clarke in Hook. f., Fl. Brit. India 2: 415. 1878; Gamble, Fl. Pres. Madras 451. 1919; Srini. in Henry *et al.*, Fl. Tamil Nadu Ser. 1, 1: 145. 1983.

Herbs, to 60 cm high. Leaves to 7 x 3.5 cm, obovate, obtuse, crenate, narrowed to the base, sessile. Cymes 12 cm across, panicled. Flowers closely packed; pedicels 1 cm long; sepals 6 x 3 mm, ovate, acuminate, red-streaked; corolla tube 12 mm long, lobes 6 x 4 mm, obovate, cuspidate; yellow; anthers ovate; styles 4 mm long.

*Fl. & Fr.* :December-May

*Distr.* : Southern Western Ghats. Occasional; in grasslands. Swamikkayam, *JA 13106.*

**Kalanchoe schweinfurthii** Penzig in Atti, Congr. Bot. Geneva 341. 1893; Srini. in Henry *et al.*, Fl. Tamil Nadu Ser. 1, 1: 146. 1983. ***K. laciniata*** sensu Wight, Ic. t. 1158. 1846, non (L.) Pers. 1805: Clarke in Hook. f., Fl. Brit. India 2: 415. 1878; Gamble, Fl. Pres. Madras 451. 1919; Wickens, Kew Bull. 36(4): 672. 1982; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 560. 1983.

Densely villous herbs. Leaves to 18 x 15 cm, narrowly laciniate; lobes 0.3 cm broad, thick. Flowers many, in corymbose cymes; pedicels 1 cm long; sepals 5 x 2 mm, lanceolate, acute; corolla tube 10 mm long, dull pink; anthers ovate; lobes ovate, acute, villous; filaments unequal; anthers orbicular ovaries 5 mm long, ovoid, acute, ovules biseriate. Follicles 8 x 2 mm; seeds oblong, reddish brown.

*Fl. & Fr.* :December-April

*Distr.* : Peninsular India. Occasional; in moist deciduous forests. Thekkady, *JA 14581.*

## 51. 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. Flowers white; leaves peltate, semi-lunate ..... **D. peltata**
2. Flowers pink; leaves linear, terete ..... **D. indica**

**Drosera burmannii** Vahl, Symb. Bot. 3: 50. 1794; Wight, Ic. t. 944. 1845; Clarke in Hook. f., Fl. Brit. India 2: 424. 1878; Gamble, Fl. Pres. Madras 452. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 159. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 563. 1983; Amar. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 113. 1987; Manilal, Fl. Silent Valley 100. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 173. 1996.

Small herbs. Leaves to 10 x 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 mm across, white; style 3, free.

*Fl.* December-January

*Distr.* : South-East Asia. Rare; along marshy areas in grasslands. Thaannikkudy, *JA & KPR 18420.*

**Drosera indica** L., Sp. Pl. 282. 1753; Wight, Ill. 1: t. 20. 1840; Clarke in Hook. f., Fl. Brit. India 2: 424. 1878; Gamble, Fl. Pres. Madras 452. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 159. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 564. 1983; Amar. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 114. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 173. 1996.

Unbranched herbs, to 8 cm high. Leaves to 3 cm long, green, curved or straight. Flowers 8 mm across, many, in terminal racemes; pedicel 1 cm long; sepals 4 x 1 mm, glandular hairy, petals 5 x 5 mm, obovate, obtuse, glabrous. Capsule 5 x 3 mm, obovoid, 3-valved; seeds many, black, obovoid, densely muriculate.

*Fl. & Fr.* : September-December

*Distr.* : South Asia, Africa & Australia. Common; grassy patches in moist deciduous forests. Thekkady, *JA 12427;* Vallakkadavu, *JA 14163;* Kumarikulam, *JA & KPR 14241.*

**Drosera peltata** Sm. in Willd., Sp. Pl. 1: 1546. 1797; Wight, Ill 1: t. 20. 1840; Clarke in Hook. f., Fl. Brit. India 2: 424. 1878; Gamble, Fl. Pres. Madras 452. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 159. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 565. 1983; Amar. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 115. 1987; Manilal, Fl. Silent Valley 100. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 174. 1996. **Kosuvetti** (Mannan, Thevan).

Erect herbs, to 18 cm high, unbranched. Leaves to 5 mm across, semi-circular to lunar, covered with glandular hairs; petiole 1.5 cm long. Flowers in terminal racemes; pedicels 1 cm long, sepals 5, united at base, petals white, 5 x 4 mm, obovate, obtuse; styles 3, free.

*Fl. & Fr.* :November-December

*Distr.* : Indo-Malaya & Australia. Common; in hill top grasslands at higher elevations. Kalvarimala, *JA 13885*; Mangaladevi, *JA & KPR 16216.*

## 52. HALORAGACEAE

R. Brown in Flinders, Voy. Terra. Austr. 2: 549. 1814.

1. Flowers bisexual; petals absent; leaves linear, lower ones pinnatisect.....**Myriophyllum**

1. Flowers unisexual; petals present; leaves oblanceolate, lower ones not pinnatisect.....**Laurembergia**

### LAUREMBERGIA P. J. Bergius

Descript. Pl. Cap. 350. 1967

**Laurembergia coccinea** (Bl.) Kan. in Mart., Fl. Bras. 13 (2): 377, t. 68. 1882; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 566. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 1: 146. 1983; Manilal, Fl. Silent Valley 101. 1988. ***Epilithes coccinea*** Bl., Bijdr. 734. 1826. ***Serpicula brevipes*** Wight & Arn., Prodr. 338. 1834; Gamble, Fl. Pres. Madras 453. 1919; ***S. hirsuta*** Wight & Arn., Prodr. 338. 1834; Wight, Ic. t. 1001. 1845; Gamble, Fl. Pres. Madras 453. 1919. ***S. indica*** Thw., Enum. Pl. Zeyl. 123. 1859 p. p., *nom. illeg.*; Clarke in Hook. f., Fl. Brit. India 2: 431. 1878.

Procumbent herbs; stem pilose, reddish. Leaves to 1 x 0.5 cm, oblanceolate, dentate, hairy. Female flowers sessile, axillary, 3-5-together; sepals 4, 0.5 mm long, hispid; petals absent; ovary 1-celled; ovules 4; styles 4; short. Male flowers pedicelled; sepals 4, similar to female flowers; petals 4, 3 mm long, yellow; stamens 8, filaments short; anthers 3 mm long, oblong. Capsule 1-seeded, hispid, 1 mm long, subglobose.

*Fl. & Fr.* :Throughout the year

*Distr.* : Peninsular India and Sri Lanka. Common; in evergreen forests at higher elevations. Kottamala, *JA & KPR 16877.*

### MYRIOPHYLLUM Linnaeus

Sp. Pl. 992. 1753

**Myriophyllum oliganthum** (Wight & Arn.) F. V. Muell., Fragm. Phyt. Austr. 10: 54. 1876; van der Meijden, Blumea 17(2): 308. 1969; Nicols. in Sald. & Nicols., Fl. Hassan Dist. 270. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 567. 1983. ***Haloragis oligantha*** Wight & Arn., Prodr. 338.1834; Wight, Ic. t. 1061. 1846. ***Myriophyllum intermedium*** auct. non DC., 1828: Clarke in Hook. f., Fl. Brit. India 2: 433. 1878; Gamble, Fl. Pres. Madras 454. 1919.

Aquatic floating herbs, glabrous. Leaves alternate, to 15 x 1 mm, linear, flat, glabrous; lower ones pinnatisect into filiform lobes. Flowers sessile, in axillary clusters; sepals 4, 1 mm long, oblong; petals absent; stamens 4, filaments short; anthers 1 mm long, oblong; ovary 4-celled, ovules solitary in each cell, pendulous; styles 4, free, plumose. Fruit 4-partite, fruitlets 0.5 mm long, tuberculate.

*Fl. & Fr.* :Throughout the year

*Distr.* : Pantropical. Rare; in perennials ponds. Kumarikulam, *JA 13007.*

## 53. RHIZOPHORACEAE

R. Brown 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; Ding Hou in Steenis, Fl. Males. I, 5: 485. 1958; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 297. 1976; Macrae in Dassan. & Fasb., Rev. Handb. Fl. Ceylon 2: 487. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 174. 1996. ***Diatoma brachiata*** Lour., Fl. Cochinch. 296. 1790. ***Carallia integerrima*** DC., Prodr. 3: 33. 1828; Bedd., Fl. Sylv. 2: 439. 1878; Henslow in Hook. f., Fl. Brit. India 2: 439. 1878; Gamble, Fl. Pres. Madras 459. 1919. **Varangu** (Malampandaram, Mala Arayan).

Trees; bark dark brown. Leaves opposite, to 11 x 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 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, 8 x 6 mm, 1-seeded, glabrous.

*Fl. & Fr.* :December-March

*Distr.* : Peninsular India. Common; in evergreen forests at low altitudes. Koruthode, *JA 12228*; Pamba, *JA 12734*; Puthussery, *JA 13512.*

## 54. COMBRETACEAE

R. Brown, Prodr. 351. 1810.

1. Erect trees; calyx tube not produced above the ovary ..... 2
1. Scandent or climbing shrubs; calyx tube produced above the ovary ..... 3
2. Flowers in axillary globose spikes ..... **Anogeissus**
2. Flowers in panicles or spikes ..... **Terminalia**

3. Petals absent; sepals persistent ..... **Calycopteris**

3. Petals present; sepals deciduous or small ..... 4

4. Flowers on elongate spikes; calyx tube shortly produced above the ovary ..... **Combretum**

4. Flowers in cymes or racemes; calyx tube much produced above the ovary ..... **Quisqualis**

## ANOGEISSUS (A. P. de Candolle) Guillemen, Perrottet & A. Richard

Fl. Seneg. Tent. 1: 280, t. 65. 1832

**Anogeissus latifolia** (Roxb.) Bedd., Fl. Sylv. 1: t. 15. 1869; Clarke in Hook. f., Fl. Brit. India 2: 450. 1878; Gamble, Fl. Pres. Madras 466. 1919; Scott, Kew Bull. 33(4): 560. 1979; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 575. 1983; Manilal, Fl. Silent Valley 101; 1988; Philcox in Dassan., Rev. Handb. Fl. Ceylon 9: 37. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 176. 1996. ***Conocarpus latifolius*** Roxb., Fl. Ind. ed. 2, 2: 442. 1832; Wight, Ic. t. 994. 1845. **Vekkali, Marukkanjiram** (Mannan).

Medium sized trees; bark uneven, white. Leaves alternate and subopposite, to 9 x 6.5 cm, broadly ovate, obtuse at apex and base, nerves 8-10 pairs, glabrous; petioles 1 cm long, glabrous. Flowers small, 10-20-together in globose spikes, axillary, shortly pedicelled; calyx 3 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 x 2 mm, collected in dense head.

*Fl. & Fr.* :August-December

*Distr.* : India, Sri Lanka and Nepal. Common; in moist deciduous forests. Thekkady, *JA 12046*; Kokkara, *JA 13914.*

*Ethnobotanical use* : Timber is used for making handles of instruments and weapons.

## CALYCOPTERIS Lamarck

Tabl. Encycl. t. 35; 2(2): 485, t. 357. 1793.

**Calycopteris floribunda** Lam., Tabl. Encycl. 2: 485, t. 357. 1797; Clarke in Hook. f., Fl. Brit. India 2: 449. 1878; Gamble, Fl. Pres. Madras 467. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 292. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 576. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 176. 1996. ***Getonia floribunda*** (Lam.) Roxb., Fl. Corom. t. 87. 1795. **Pullanni** (Mala Arayan).

Stragglers. Leaves opposite, to 10 x 6 cm, ovate, acuminate, entire, punctuate and tomentose below; nerves 6-8 pairs, nervules reticulate; petioles 1 cm long. Panicles axillary and terminal, 5-10 x 5 cm; bracts leafy, hispid. Flowers sessile; calyx tube 5 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, 10 x 2.5 cm; fruiting sepals 18 x 6 mm, yellowish, persistent.

*Fl. & Fr.* :January-May

*Distr.* : South India and Sri Lanka. Common; in moist deciduous forests. Vallakkadavu, *JA 13420.*

*Ethnobotanical use* : Long stems are used for making baskets.

## COMBRETUM Loefling

Iter Hispan 308. 1758, *nom. cons.*

**Combretum ovalifolium** Roxb., Fl. Ind. 2: 226. 1832; Clarke in Hook. f., Fl. Brit. India 2: 458. 1878; Gamble, Fl. Pres. Madras 469. 1919; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 577. 1983; Philcox in Dassan., Rev. Handb. Fl. Ceylon 9: 34. 1995. **C. albidum** G. Don, Trans. Linn. Soc. London 15: 429. 1827, *nom. nud.*

Climbers. Leaves opposite, to 14 x 7 cm, ovate, acute at base and apex, entire, glabrous, domatia glandular; petiole 1 cm long, glandular at base. Flowers polygamodioecious, in drooping cylindrical spikes. Spikes to 10 x 2 cm, unbranched. Calyx tube 5 mm long, constricted above the ovary, widening above, lobes 4, ovate, acute; petals 4 or 5, much smaller; stamens 8 or 10; filaments 6 mm long; ovary 5-angled, inferior, 1-celled; ovules 2-5, pendulous, style subulate. Fruit a 5-winged drupe, 3.5 x 3.5 cm, wings broad, leathery, yellow.

*Fl. & Fr.* :January-April

*Distr.* : South India and Sri Lanka. Common; in evergreen forests at low elevations. Chenthamara, *JA 13680*; Koruthode, *JA 14804*; Pamba, *JA 17163.*

## 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. 1919.

Climbing shrubs. Leaves alternate or opposite, to 14 x 5 cm, oblong, acuminate at apex; nerves 8 pairs, looping below the margins, domatia hairy; petiole 5 mm long. Flowers in terminal cymes; calyx tube 15 mm long, produced above the ovary, narrow, hispid outside, lobes 5, 3 x 1 mm; petals 12 x 3 mm, oblong, reddish; stamens 10, filaments short; ovary 1-celled, ribbed, pubescent; ovules 3-4, pendulous; style adnate to the calyx tube. Fruit 5-winged.

*Fl. & Fr.* :January-May

*Distr.* : Peninsular India. Rare; in evergreen forests at low altitudes. Koruthode, *JA & KPR 14782.*

## TERMINALIA Linnaeus

Syst. Nat. ed. 12, 2: 74. 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 wingless ..... 3
2. Wings of fruits unequal; nerves of leaves up to 10 pairs..... **T. paniculata**
2. Wings of fruits equal; nerves of leaves up to 20 pairs..... **T. crenulata**
3. Leaves obovate; petiole 8 cm long; drupe without ridges..... **T. bellirica**
3. Leaves elliptic-oblong; petiole to 2 cm long; drupe ridged..... 4
4. Twigs fulvous-tomentose; nerves 7 or 8 pairs..... **T. chebula**
4. Twigs glabrous; nerves 13-16 pairs ..... **T. travancorensis**

**Terminalia bellirica** (Gaertn.) Roxb., Pl. Corom. t. 198. 1805, "*bellerica*"; Wight, Ic. t. 91. 1838; Clarke in Hook. f., Fl. Brit. India 2: 445. 1878; Gamble, Fl. Pres. Madras 463. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 292. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 581. 1983; Philcox in Dassan., Rev. Handb. Fl. Ceylon 9: 42. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 177. 1996. ***Myrobalanus bellirica*** Gaertn., Fruct. 2: 90, t. 97, ff. a-d. 1791, "*bellirina*". **Thanni** (Mannan, Oorali & Mala Arayan).

Large trees; bark smooth, white; branchlets thinly fulvous-hairy. Leaves alternate, to 16 x 8 cm, obtusely acuminate at apex, attenuate to the base; nerves 7 or 8 pairs, prominent, reticulate; petioles to 8 cm long, eglandular. Spikes axillary, to 16 cm long. Flowers sessile, 6 mm across; calyx tube campanulate, lobes triangular, densely villous inside, hispid outside; stamens 5. Drupe 2.5 x 1.8 cm, obovoid, stalked, glabrous.

*Fl. & Fr.* :February-August

*Distr.* : Indo-Malesia. Common; in evergreen forests. Koruthode, *JA 12204*; Arjunankotta, *JA 13383.*

**Terminalia chebula** Retz., Obs. Bot. 5: 31. 1789; Clarke in Hook. f., Fl. Brit. India 2: 446. 1878 p.p.; Gamble, Fl. Pres. Madras 464. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 294. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 583. 1983; Philcox in Dassan., Rev. Handb. Fl. Ceylon 9: 41. 1995. ***Myrobalanus chebula*** (Retz.) Gaertn., Fruct. 2: 91. t. 97. 1791. **Kadukka** (Mannan).

Small trees; bark rough. Leaves to 13 x 7 cm, ovate, obtuse or acute, densely velvete tomentose; intercostae minutely reticulate; petiole 1.5 cm long, with 2 glands above the middle. Panicles axillary and terminal, fulvous hairy, to 10 cm long. Flowers 5 mm across; sepals tomentose outside; stamens 5, filaments 4 mm long, glabrous; ovary densely villous. Drupe 3 x 2 cm, 5-ridged, ellipsoid, glabrous.

*Fl. & Fr.* :March-August

*Distr.* : Indo-Malaya. Common; in moist deciduous forest. Kokkara, *JA 12003;* Kumarikulam, *JA 14847.*

**Terminalia elliptica** Willd., Sp. Pl. 4: 969. 1806; Gang. & Chakrab., J. Econ. Tax. Bot. 16(2): 601. 1992. ***T. crenulata*** Roth, Nov. Pl. Sp. 380. 1821; Gamble, Fl. Pres. Madras 465. 1919; Sasidh. & Sivar., Fl. Pl. Thrissur For. 177. 1996. ***T. tomentosa*** (Roxb. ex DC.) Wight & Arn. var. ***crenulata*** (Roth) Clarke in Hook. f., Fl. Brit. India 2: 448. 1878. ***T. alata*** Heyne ex Roth., Nov. Pl. Sp. 379. 1821; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 293. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 580. 1983. **Karimaruthu** (Mala Arayan)

Tall trees, bark black, split into rectangular pieces, red inside. Leaves subopposite, to 20 x 9 cm, oblong, acute, eglandular, nervules parallel; petiole 2 cm long, eglandular. Panicles 15 x 10 cm, terminal, glabrous. Flowers 5 mm across; calyx lobes triangular, densely villous inside; stamens 5, filaments 5 mm long, glabrous; ovary densely long-villous. Drupe 3.5 x 5.5 cm, wings 5 broad, coriaceous, reddish brown.

*Fl. & Fr.* :April-August

*Distr.* : India and Burma. Common; in moist deciduous to evergreen forests. Koruthode, *JA 12247*; Sabarimala, *JA & KPR 15448.*

**Terminalia paniculata** Roth, Nov. Pl. Sp. 383. 1821; Bedd., Fl. Sylv. t. 20. 1869; Clarke in Hook. f., Fl. Brit. India 2: 448. 1878; Gamble, Fl. Pres. Madras 465. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 294. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 585. 1983; Manilal, Fl. Silent Valley 102. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 178. 1996. **Maruthu.**

Large trees; bark pale brown, pink inside; branchlets reddish. Leaves to 18 x 7 cm, ovate, oblong, minutely hirsute below; nerves to 10 pairs, nervules reticulate; glands one on either side of the midrib at base; petiole 1.5 cm long. Panicles to 20 cm across, densely tomentose. Flowers 8 mm across, white, closely packed; sepals ovate, densely villous inside; stamens 5, filaments glabrous. Drupe 13 x 12 mm, puberulus, reddish brown.

*Fl. & Fr.* :November-February

*Distr.* : South India. Common; in moist deciduous forests. Thekkady, *JA 14820;* Koruthode, *JA 16299.*

*Ethnobotanical use* : Juice from the fresh bark is used for loose motion.

**Terminalia travancorensis** Wight & Arn., Prodr. 314. 1834; Gamble, Fl. Pres. Madras 464. 1919; Sharma *et al.*, J. Econ. Tax. Bot. 11(1): 52. 1987; Chakrab. & Gang., J. Econ. Tax. Bot. 16(3): 603. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 178. 1996. ***T. angustifolia*** sensu Roxb., Fl. Ind. 2: 437. 1832, non Jacq., 1776: Clarke in Hook. f., Fl. Brit. India 2: 449. 1878.

Large trees; bark smooth, white; branchlets glabrous. Leaves opposite, to 14 x 4.5 cm, elliptic-oblong, acuminate at apex, glabrous; petiole 1 cm long. Panicles 10 x 10 cm, terminal, branches hispid. Flowers 2.5 mm across; sepals hispid outside, densely villous inside; stamens 10, filaments 4 mm long; ovary densely tomentose. Drupe 3 x 1.3 cm, ellipsoid, 5-ridged, glabrous.

*Fl. & Fr.* :April-August

*Distr.* : South India and Sri Lanka. Common; in evergreen forests. Koruthode, *JA 12257, 15202.*

*Note* : This species has so far been considered as restricted to South India until it has been collected from Sri Lanka (Kosterman, 1973).

## 55. MYRTACEAE

Juss., Gen. Pl. 322. 1789.

1. Leaves alternate ..... **Eucalyptus**
1. Leaves opposite ..... 2
2. Leaves 3-ribbed; style stellate-hairy ..... **Rhodomyrtus**
2. Leaves penninerved; style not stellate-hairy ..... 3
3. Seeds numerous; bark peeling off ..... **Psidium**
3. Seeds few-several; bark not peeling off ..... 4
4. Calyx tube produced above the ovary ..... **Syzygium**
4. Calyx tube not produced above the ovary ..... **Eugenia**

## 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. Leaves obovate, coriaceous ..... 2
1. Leaves ovate or elliptic, membranous ..... 3
2. Flowers in terminal corymbose cymes ..... **E. calcadensis**
2. Flowers axillary, solitary ..... **E. discifera**
3. Pedicels 1-1.5 cm long ..... **E. thwaitesii**
3. Pedicels 0.5 cm long ..... **E. bracteata**

**Eugenia bracteata** (Willd.) Roxb. ex DC., Prodr. 3: 264. 1828; Duthie in Hook. f., Fl. Brit. India 2: 502. 1879; Gamble, Fl. Pres. Madras 484. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 278. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 592. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 180. 1996. ***Myrtus bracteata*** Willd., Sp. Pl. 2: 969. 1799. ***Eugenia willdenowii*** Wight, Ic. t. 545. 1842 & Ill. 2: 13. 1850, non DC., 1828. ***Syzygium ruscifolium*** (Willd.) Sant. & Wagh, Bull. Bot. Surv. India 5: 109. 1963.

Shrubs; branchlets slender. Leaves to 7 x 3.5 cm, elliptic, obtusely acute at apex, acute at base, pale below; nerves 10-13 pairs, sub-prominent below; petiole 3 mm long. Flowers in axillary fascicles, 8 mm across, densely fulvous hairy; pedicels 5 mm long, densely hairy; bracteoles 2, lanceolate; calyx tube short, globose, lobes 5, orbicular; petals 5, 4 x 4 mm, orbicular, glabrous. Fruits not seen.

*Fl.* : March-April

*Distr.* : Peninsular India and Sri Lanka. Occasional; in evergreen forests. Puthussery, *JA 13500.*

**Eugenia calcadensis** Bedd., Ic. t. 162. 1868-1874; Duthie in Hook. f., Fl. Brit. India 2: 502. 1879; Gamble, Fl. Madras 484. 1919 [Fig. 29].

Trees, to 6 m high; bark smooth, white. Leaves to 3-4 x 2.5 cm, obovate, abruptly acuminate, base attenuate into the petiole; nerves 8-10 pairs, irregular, faint, intramarginal veins obscure; petiole 5-6 mm long, slender. Cymes terminal, corymbose, 5-6 cm across, branchlets slender, dichotomous, densely tomentose; pedicels 12 mm long, slender. Flowers 2.5 cm across; bracteoles to 5 x 1 mm, adpressed to the calyx tube, lanceolate, tomentose; calyx tube 4 x 4 mm, obovoid,

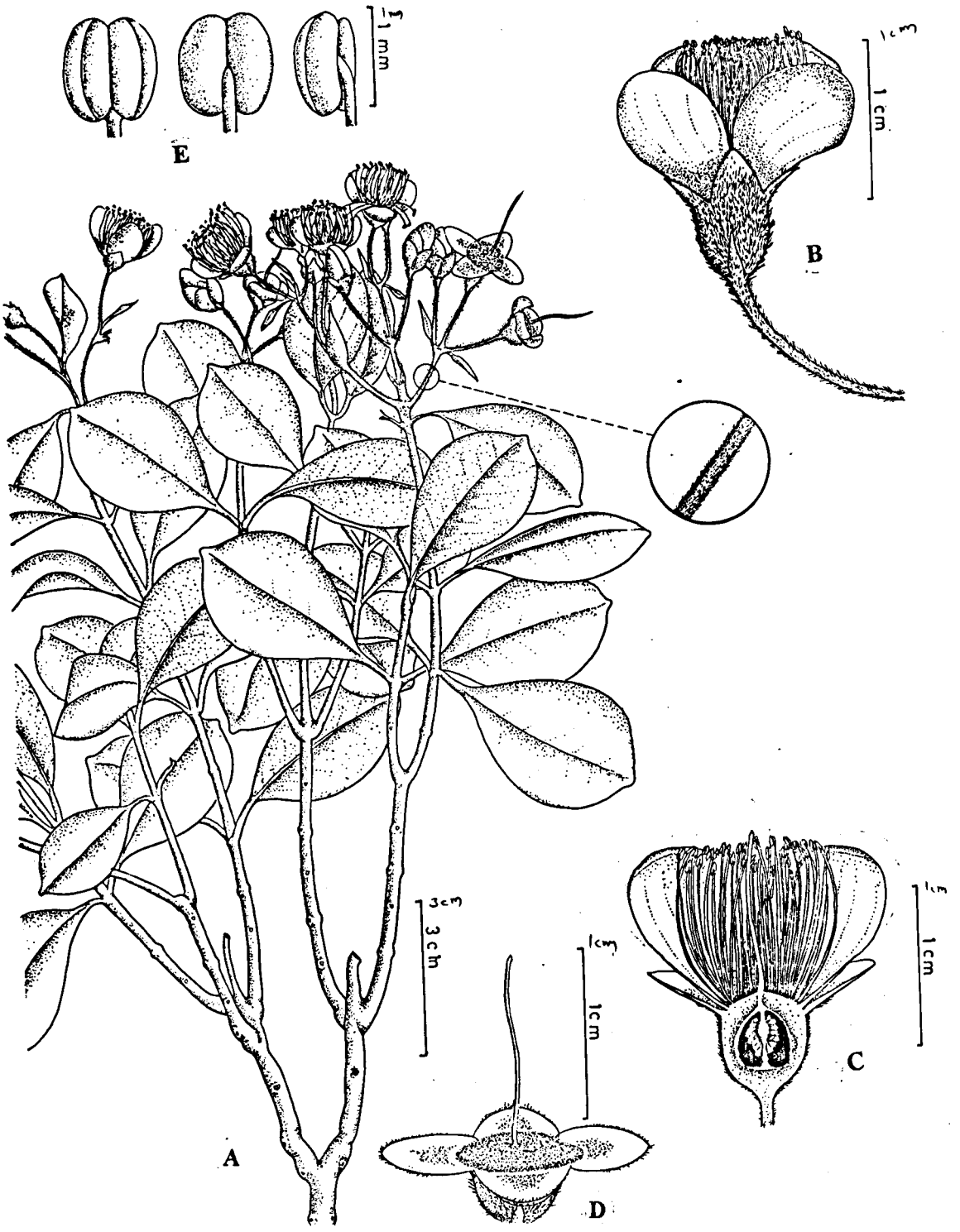



Fig. 29. *Eugenia calacadensis* Bedd.: **A**. habit; **B**. flower; **C**. flower L. S.; **D**. flower without petals and stamens; **E**. anthers.

densely adpressed-tomentose; lobes 5 x 5 mm, orbicular, obtuse; petals white, 10 mm across, orbicular, concave, ciliate; filaments 7-14 mm long, slender, reflexed in bud. Staminal disk not prominent, tomentose. Fruits not seen.

*Fl.* : April-May

*Distr.* : Endemic to Southern Western Ghats. Locally abundant; in evergreen forests above 1,700 m altitudes. Uppermanalar, *JA 13746.*

**Eugenia discifera** Gamble, Kew Bull. 1918: 239. 1918 & Fl. Pres. Madras 484. 1919; Henry *et al.*, J. Bombay Nat. Hist. Soc. 75(3): 688. 1979 & Fl. Tamilnadu Ser. 1, 1: 153. 1983.

Small trees; branchlets stout, terete. Leaves to 4 x 3 cm, obovate, obtuse or obtusely acute, attenuate to the base, coriaceous, margins recurved; nerves 10 or 11 pairs, subdistinct below; petiole 6 mm long. Flowers axillary, solitary or paired; pedicels 2 cm long, fulvous tomentose; calyx tube 3 mm long, campanulate; lobes 4, 4 x 5 mm, orbicular, tomentose outside; petals 10 x 8 cm, white, orbicular, ciliate; filaments to 7.5 mm long; disk broad, fulvous hairy. Berry 15 mm across, globose, crowned with persistent sepals.

*Fl. & Fr.* :February-May

*Distr.* : Endemic to Southern Western Ghats. Rare; in evergreen forests at high elevations. Sunderamala, *JA 13597;* Kottamala, *KPR & JA 15223.*

**Eugenia thwaitesii** Duthie in Hook. f., Fl. Brit. India 2: 506. 1879; Ashton in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 415. 1981; Manilal, Fl. Silent Valley 103. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 180. 1996. ***E. 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. 1919.

Shrubs; branchlets slender. Leaves to 5 x 2 cm, ovate, caudate-acuminate at apex, rounded at base, pale below, glabrous; nerves few, obscure; petiole 2 mm long. Flowers 2-3 together, 6 mm across, in axillary fascicles; pedicels fulvous hairy; calyx tube short, hairy; sepals orbicular; petals white; filaments 6 mm long. Berry 1 x 1.5 cm, glabrous, reddish; seeds 3, globose.

*Fl. & Fr.* :August-December

*Distr.* : South India and Sri Lanka. Occasional; in evergreen forests. Vellimala, *JA 12925, 14056.*

## RHODOMYRTUS (DC.) Reichenbach

Nom. 117. 1841.

**Rhodomyrtus tomentosus** (Ait.) Hassk., Flora 25(2): 35. 1842 var. **parviflora** (Alston) Scott, Kew Bull. 33(2): 315. 1979; Duthie in Hook. f., Fl. Brit. India 2: 469. 1878; Gamble, Fl. Pres.

Madras 471. 1919; Sebast. & Vivek., Bull. Bot. Surv. India 9(1-4): 172. 1967; Manilal, Fl. Silent Valley 104. 1988. *Myrtus tomentosa* Ait., Hort. Kew ed. 1, 2: 159. 1789; Wight, Ic. t. 522. 1842 [Fig. 30 A].

Stout shrubs, densely tomentose; branchlets terete. Leaves to 5 x 2.5 cm, elliptic-obovate, 3-ribbed, densely white-tomentose below; petiole 5 mm long. Cymes 15 cm broad, terminal or upper axillary. Flowers pedicelled, calyx tube globose, 6 mm long, pink, densely tomentose, lobes 5, orbicular; petals 5, white, orbicular, hairy outside; stamens many, filaments 8 mm long, pink; ovary 2-3-celled; style stellate, ovules few, hairy. Capsule 10 mm across; globose, densely hairy.

*Fl. & Fr.* :March-May

*Distr.* : India, Sri Lanka. Rare; in evergreen forests above 2000 m altitudes. Kottamala, *JA 15367.*

## 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. Staminal disk present; flowers more than 1 cm across ..... 2
1. Staminal disk absent; flowers less than 1 cm across ..... 8
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 ..... 5
4. Pedicels ca. 0.6 cm long ..... 6
5. Leaves ca. 2 cm broad, linear-lanceolate; flowers many-together, terminal ..... **S. occidentalis**
5. Leaves ca. 5 cm broad, elliptic; flowers 2-5 together or terminal ..... **S. laetum**
6. Branchlets quadrangular, intramarginal vein prominent; berries 3 x 2.5 cm ..... **S. jambos**
6. Branchlets terete; intramarginal vein absent; berries 1.5 cm across ..... 7
7. Leaves oblanceolate ..... **S. bourdillonii**
7. Leaves elliptic ..... **S. hemisphericum**

8. Leaves rounded to cordate at base ..... 9
8. Leaves acute or attenuate at base ..... 10
9. Branchlets terete; calyx tube turbinate ..... **S. benthamianum**
9. Branchlets quadrangular; calyx tube oblanceolate ..... **S. parameswaranii**
10. Leaves to 4 cm long ..... **S. rubicundum**
10. Leaves over 5 cm long ..... 11
11. Leaves obovate, apex obtuse or emarginate ..... **S. malabaricum**
11. Leaves elliptic, apex acute to acuminate ..... 12
12. Branchlets quadrangular; leaves oblong, acute ..... **S. heyneanum**
12. Branchlets terete; leaves elliptic, acuminate ..... 13
13. Cymes terminal; branches of cymes quadrangular ..... **S. densiflorum**
13. Cymes axillary; branches of cymes terete ..... 14
14. Leaves to 18 cm long ..... **S. cumini**
14. Leaves to 9 cm long ..... **S. gardneri**

**Syzygium benthamianum** (Wight ex Duthie) Gamble, Fl. Pres. Madras 478. 1919; Henry *et al.*, J. Bombay Nat. Hist. Soc. 75(3): 689. 1979. ***Eugenia arnottiana*** (Walp.) Wight var. ***benthamiana*** Wight ex Duthie in Hook. f., Fl. Brit. India 2: 484. 1878.

Small trees, branchlets terete. Leaves to 9 x 4 cm, elliptic-oblong, obtusely acute at apex, subsessile, reddish brown when dried; nerves many, close, parallel. Umbels corymbose. Flowers shortly pedicelled; calyx tube 2.5 mm long, 3 mm across, turbinate, glabrous; petals 3 x 3 mm, free; filaments 4 mm long; glabrous. Berry 7 x 4 mm, obovoid, glabrous, deep violet.

*Fl. & Fr.* : December-March

*Distr.* : Endemic to Southern Western Ghats. Common; in evergreen forests at high elevations. Vellimala, *NS & JA 12954*; Arjunankotta, *JA 13147*; Sunderamala, *JA 13597*; Chokkampetti, *JA 14476.*

**Syzygium bourdillonii** (Gamble) Rathkr. & Nair, J. Econ. Tax. Bot. 4: 287. 1983; Nayar & Sastry, Red Data Book Indian Pl. 1: 211. 1987. ***Jambosa bourdillonii*** Gamble, Kew Bull. 1918: 239. 1918 & Fl. Pres. Madras 414. 1919.

Medium sized trees. Leaves elliptic-lanceolate, acuminate, base acute, chartaceous, to 12 x 4 cm; lateral nerves about 12 pairs, connected by intramarginal nerve, prominent below. Flowers white, in few-flowered terminal cymes; petals orbicular, 1 cm across, gland-dotted.

*Fl. & Fr.* :March-April

*Distr.* : Southern Western Ghats. Frequent; in evergreen forests above 1200 m altitude, Chokkampetti, *JA 18601.*

**Syzygium cumini** (L.) Skeels, USDA. Bur. Pl. Industr. Bull. 248: 2. 1912; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 281. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 594. 1983; Manilal, Fl. Silent Valley 104. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 181. 1996. ***Myrtus cumini*** L., Sp. Pl. 471. 1753. ***Eugenia jambolana*** Lam., 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. 1919. **Kattu njaval** (Mannan), **Njavalppazham** (Malam pandarum).

Medium sized trees; bark white, light pink inside. Leaves to 18 x 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 mm broad, turbinate; filaments 7 mm long. Berry 10 x 7 mm, obovoid, deep blue.

*Fl. & Fr.* : January-May

*Distr.* : Indo-Malesia and Philippines. Common; in semi evergreen forests and moist deciduous forests. Vallakkadavu, *JA 13472;* Chenthamara, *JA 13680*; Umikuppan, *JA & KPR 14890.*

*Ethnobotanical use* : Fresh fruits are eaten.

**Syzygium gardneri** Thw., Enum. Pl. Zeyl. 117. 1859; Gamble, Fl. Pres. Madras 479. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 281. 1976; Sasidh. & Sivar., Fl. Pl. Thrissur For. 181. 1996. ***Eugenia gardneri*** (Thw.) Bedd., For. Man. Bot. 108. 1874; Duthie in Hook. f., Fl. Brit. India 2: 489. 1878. ***E. cymosa*** Lam. var. ***rostrata*** Duthie in Hook. f., Fl. Brit. India 2: 482. 1878. **Ayiri, Ana-ayiri** (Mannan).

Large trees; bark white, smooth; branchlets terete. Leaves 10 x 6 cm, elliptic, caudate-acuminate at apex, acute at base; nerves many, close, intramarginal vein 2 mm away from the margin; petiole 1.5 cm long. Cymes 7 x 8 cm, lax, terminal and axillary; branches slender. Flowers globose; pedicels 2-5 mm long; calyx tube 2 x 3 mm, obconical, lobes obtuse; petals calyptrate; filaments 4 mm long.

*Fl.* : December-February

*Distr.* : South India and Sri Lanka. Common; in semi-evergreen and evergreen forests. Inchippara, *JA 12597*; Mlappara, *JA 13303, 13308*; Arjunankotta, *JA 13371.*

*Ethnobotanical use* : Fruits are eaten fresh.

**Syzygium hemisphericum** (Wight) Alston in Trimen, Handb. Fl. Ceylon 6 (Suppl.): 115. 1931; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 281. 1976; Manilal, Fl. Silent Valley 105. 1988. ***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. 1919.

Large trees; bark dark-brown, rough; branchlets terete. Leaves to 16 x 6.5 cm, elliptic, acute at base and apex; nerves 10-13 pairs, intramarginal vein absent, coriaceous. Cymes 15 cm across, terminal; branches quadrangular. Flowers 3-4 cm across, densely packed; pedicel 5 mm long; calyx tube 6 mm long, obconical, lobes 4, 3 x 6 mm, obtuse; petals 7 mm across, free; filaments 15 mm long. Berry 15 mm across, globose, rough.

*Fl. & Fr.* :March-August

*Distr.* : South India and Sri Lanka. Common; in evergreen forests up to 1000 m altitudes. Pachakkanam, *JA 12302*; Koruthode, *JA 13493*; Karimala, *JA 13693.*

**Syzygium heyneanum** (Duthie) Wall. ex Gamble, Fl. Pres. Madras 482. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 281. 1976. ***Eugenia heyneana*** Duthie in Hook. f., Fl. Brit. India 2: 500. 1879. ***E. salicifolia*** Wight, Ic. t. 539. 1844, non DC., 1828.

Large shrubs; branchlets obscurely quadrangular. Leaves to 10 x 3 cm, oblong, obtuse at apex, acute at base, nerves many, irregular, pale below; petiole 3 mm long. Cymes 8 cm across, upper axillary or terminal; branches terete, stout. Flowers sessile; calyx tube 2 x 3.5 mm, turbinate; petals calyptrate, 3 mm across, light pink; filaments 3 mm long. Fruits not seen.

*Fl.* : January-March

*Distr.* : Endemic to Southern Western Ghats. Common; in evergreen forests. Koruthode, *JA 13404; JA & KPR 14799.*

**Syzygium jambos** (L.) Alston in Trimen, Handb. Fl. Ceylon 6 (Suppl.): 115. 1931; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 282. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 595. 1983; Manilal, Fl. Silent Valley 105. 1988. ***Eugenia jambos*** L., Sp. Pl. 470. 1753; Duthie in Hook. f., Fl. Brit. India 2:474.1878. ***Jambosa vulgaris*** DC., Prodr. 3:286. 1828; Wight, Ic. t. 435. 1841; Gamble, Fl. Pres. Madras 474. 1919. **Kattu chamba** (Mala Arayan).

Small trees, to 6 m high; branchlets quadrangular. Leaves to 18 x 5.5 cm, elliptic, acuminate at both ends, thick with many prominent lateral nerves, intramarginal vein 3 mm from the margin; petiole 1 cm long. Cymes terminal. Flowers 6 cm across; pedicels 5 mm long, thick; calyx tube 12 mm long, hemispheric, lobes 6 x 6 mm, orbicular; petals 10 x10 mm, orbicular, white; filaments 4 cm long. Berry 3 x 2.5 cm, oblong, reddish.

*Fl. & Fr.* :December-June

*Distr.* : Indo-Malesia and Sri Lanka. Occasional; in evergreen forests margins. Vallakkadavu, *JA 15443.*

*Ethnobotanical use* : Fruits are eaten

**Syzygium laetum** (Buch.-Ham.) Gandhi in Sald. & Nicols., Fl. Hassan Dist. 282. 1976; Manilal, Fl. Silent Valley 106. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 181. 1996. ***Eugenia laeta*** Buch.-Ham., Mem. Wern. Nat. Hist. Soc. 5: 338. 1826; Duthie in Hook. f., Fl. Brit. India 2: 479. 1878. ***E. pauciflora*** Wight, Ic. t. 526. 1842. ***Jambosa laeta*** (Buch.-Ham.) Bl., Mus. Bot. Lugd.-Bat. 1: 104. 1849; Gamble, Fl. Pres. Madras 474. 1919. ***J. pauciflora*** (Wight) Wight, Ill. 2: 14. 1850.

Small trees, branchlets terete, slender. Leaves to 12 x 5 cm, elliptic, acuminate at both ends, pale below; nerves to 12 pairs, intramarginal nerves obscure; petiole 5 mm long. Flowers to 6 cm across, solitary or 2-5-together, on axillary or terminal cymes; pedicels 2.5 cm long; calyx tube 15 mm long, obconical; sepals 8 x 8 mm, orbicular, persistent; petals 10 x 10 mm, glabrous; stamens 2-3 cm long, yellow or pink. Berry 25 x 15 mm, oblong, truncate at apex.

*Fl. & Fr.* :January-April

*Distr.* : Southern Western Ghats. Endemic. Common; in evergreen forests. Arjunankotta, *JA 13139, JA 13156*; Sabarimala, *JA & KPR 14955*; Koruthode, *JA & KPR 16909.*

**Syzygium malabaricum** (Bedd.) Gamble, Fl. Pres. Madras 481. 1919; Sasidh. & Sivar., Fl. Pl. Thrissur For. 183. 1996. ***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 to 11 x 8 cm, pale beneath, cuneate at base, coriaceous, nerves 9 or 10 pairs, irregular, intramarginal vein indistinct; petiole 2.5 cm long. Cymes 5 x 2.5 cm, axillary, few-flowered. Flowers 2.5 mm broad, shortly pedicelled; calyx tube turbinate, glabrous; petals calyptrate, white. Fruits not seen.

*Fl.* : January-April

*Distr.* : Western Peninsular India. Occasional; in semi-evergreen forests. Vallakkadavu, *JA 14176*; Chenthamara, *JA 15141*; Kavalappara, *JA KPR 14551.*

**Syzygium mundagam** (Bourd.) Chithra in Henry *et al.*, Fl. Tamilnadu Ser. 1, 1: 157. 1983; Manilal, Fl. Silent Valley 107. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 183. 1996. ***Eugenia mundagam*** Bourd., For. Trees Travancore 182. 1908. ***Jambosa mundagam*** (Bourd.) Gamble, Fl. Pres. Madras 473. 1919.

Medium sized trees; branchlets quadrangular. Leaves to 25 x 10 cm, oblong, obtuse, coriaceous; nerves to 20 pairs, irregular, intramarginal nerves indistinct. Cymes terminal, corymbose. Flowers few to many, 3 cm across; pedicels 5 mm long; calyx tube funnel shaped,

lobes 6 mm across, orbicular; petals 12 mm diam., white; filaments 2 cm long, glabrous, white. Fruit not seen.

*Fl.* : March-April

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Vallakkadavu, *JA 13428.*

**Syzygium munronii** (Wight) Chandr., Biol. Mem. 2(1 & 2): 58. 1977; Manilal, Fl. Silent Valley 107. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 183. 1996. ***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. 1919.

Large shrubs or small trees; branchlets quadrangular. Leaves to 22 x 7 cm, lanceolate, subsessile, glabrous, nerves and intramarginal veins prominent. Cymes 5-10 cm broad, terminal. Flowers few, 4 cm across; pedicels 1 cm long; calyx 2.5 cm long, funnel-shaped; lobes 1 x 1 cm, orbicular; petals larger, 15 x15 mm, yellowish white; filaments 2.5 cm long, white. Berry 25 x 15 mm, ellipsoid, glabrous.

*Fl. & Fr.* :December-April

*Distr.* : Peninsular India. Occasional; in evergreen forests. Chokkampetti, *JA 13350, JA & KPR 14482*; Poonkavanam, *JA 14920.*

**Syzygium occidentalis** (Bourd.) Gandhi in Sald. & Nicols., Fl. Hassan Dist. 282. 1976; Sasidh. & Sivar., Fl. Pl. Thrissur For. 185. 1996. ***Eugenia occidentalis*** Bourd., Indian For. 30: 195, t. 3. 1904. ***Jambosa occidentalis*** (Bourd.) Gamble, Fl. Pres. Madras 474. 1919.

Large shrubs. Leaves to 14 x 2.5 cm, linear-lanceolate, acuminate at both ends, nerves indistinct; petiole 1 cm long. Cymes 10 cm broad, terminal. Flowers yellow; calyx tube 15 mm long, funnel shaped; lobes ovate, obtuse, 6 mm across; petals 4, 8 mm broad, orbicular; filaments 25 mm long, yellow; style 3.5 cm long. Berry 2 x 1.5 cm, obovoid to globose.

*Fl. & Fr.* : December-May

*Distr.* : Southern Western Ghats. Common; in riverbed at low elevations. Attathodu, *JA 12754*; Vavalala, *JA 14434*; Damsite, *JA 15115.*

**Syzygium parameswaranii** Mohanan & Henry, J. Bombay Nat. Hist. Soc. 84(2): 408. 1987 & in Fl. Thiruvananthapuram 192. 1994.

Small trees, to 5 m tall. Leaves 4-5.5 x 2-3 cm, ovate, obtusely acute to obtuse, glabrous, glaucous beneath, green above when dried; nerves to 18 pairs, less prominent. Cymes to 5 cm across, terminal. Flowers 8-12-together; pedicels 8 mm long; calyx 4 mm broad, lobes 1 x 1.5

mm, triangular; petals 3 x 3 mm, orbicular; filaments 2.5 mm long, style 9 mm long. Fruits not seen.

*Fl.* : January-April

*Distr.* : Endemic to Southern Western Ghats (Kerala). Rare; in evergreen forests at high altitudes. Vellimala, *JA 12939*; Melmala, *JA 14468*; Kottamala, *JA & KPR 15205, JA 15294.*

**Syzygium rubicundum** Wight & Arn., Prodr. 330. 1834; Gamble, Fl. Pres. Madras 479. 1919. ***Eugenia rubicunda*** (Wight & Arn.) Wight, Ic. t. 538. 1842; Duthie in Hook. f., Fl. Brit. India 2: 495. 1878. ***S. lissophylla*** Thw., Enum. Pl. Zeyl. 117. 1859. ***Eugenia lissophylla*** (Thw.) Bedd., For. Man. Bot. 108. 1874; Duthie in Hook. f., Fl. Brit. India 2: 488. 1878.

Medium sized trees; bark smooth, branchlets 4-angled. Leaves to 5 x 2 cm, elliptic to obovate, obtusely shortly acuminate, attenuate to the base, black above when dried, nerves many, close; petiole 5 mm long. Cymes terminal, corymbose, densely flowered. Flowers shortly pedicelled; calyx tube 2 mm long, turbinate, 2.5 mm broad; petals calyptrate, 3 mm across, pale yellow; filaments 4 mm long, spreading. Berry 6 mm across, globose, black.

*Fl. & Fr.* :February-May

*Distr.* : Western Ghats and Sri Lanka. Common; in evergreen forests. Mlappara, *JA 13310;* Aladi, *JA 13556;* Melmanalar, *JA 13783.*

**Eucalyptus grandis** Hill ex Maiden is raised into forest plantations which covers an area of about 12000 acres in the study area.

**Psidium guajava** L., a small tree is found running wild along the lake shore and river sides.

*Ethnobotanical use* : The tender leaves are made into a paste and given for loose motion. The fruits are eaten

## 56. LECYTHIDACEAE

Poit., Mem. Mus. Hist. Nat. 13: 143. 1825.

### CAREYA Roxburgh

Pl. Coromandel 3: 13. 1811, *nom. cons.*

**Careya arborea** Roxb., Pl. Corom. t. 218. 1811; Bedd., Fl. Sylv. t. 205. 1872; Duthie in Hook. f., Fl. Brit. India 2: 511. 1879; Gamble, Fl. Pres. Madras 488. 1919; Macnae & Fosb. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 200. 1981; Britto & Matthew in Matthew, Fl. Tamil Nadu

Carnatic 3(1): 597. 1983; Manilal, Fl. Silent Valley 108. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 185. 1996. **Pezhu** (Mannan).

Small trees; branchlets puberulus; bark thick, pink inside. Leaves alternate, to 20 x 13 cm, obovate, obtuse, cuneate to the base; petiole 1.5 cm long, channelled. Flowers 6-7 cm across, in axillary small racemes on old branches; sepals 4, orbicular, 2 cm across; petals 4, white, 3 cm across, orbicular; stamens many, filaments long, connate at base; ovary 4-5-celled inferior, ovule; numerous on axils placentation; style 4 cm long. Fruit a berry 5-7 cm across, globose, crowned by sepals.

*Fl. & Fr.* :February-May

*Distr.* : India and Sri Lanka. Common; in moist deciduous forests. Thekkady, *JA 15326.*

## 57. MELASTOMATACEAE

Juss., Gen. Pl. 328. 1789.

1. Leaves 3-9-nerved from the base ..... 2
1. Leaves penninerved ..... **Memecylon**
2. Flowers 3-merous ..... **Sonerila**
2. Flowers 4 or 5-merous ..... 3
3. Epiphytic shrubs; leaves thick ..... **Medinilla**
3. Terrestrial plants; leaves not thick ..... 4
4. Flowers pink or purple in terminal cymes; leaves entire; seeds curved ..... **Osbeckia**
4. Flowers white in axillary cymes; leaves crenate; seeds not curved ..... **Clidemia**

### CLIDEMIA D. Don

Mem. Wern. Nat. Hist Soc. 4: 306. 1823.

**Clidemia hirta** D. Don, Mem. Wern. Nat. Hist. Soc. 4: 309. 1823; Bremer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 177. 1987.

Shrubs, to 1.5 m high; stems pilose. Leaves to 14 x 7 cm, ovate, acuminate, cordate at base, 5-ribbed, regular, hispid-tomentose, crenate, intercostae parallel; petiole 2 cm long. Cymes axillary. Flowers 2 cm across; pedicels slender, pilose; calyx tube 3 mm long, densely covered with simple bristles, lobes 5, acute; petals 7 mm long, ovate, acute, white, glabrous; stamens 10, all fertile; anthers not appendaged. Ovary many-celled, many-ovuled. Berry 7 x 5 mm, ovate, hispid; seeds many, 0.5 mm long, ovoid, brown, muriculate, glabrous.

*Fl. & Fr.* :Throughout the year

*Distr.* : Native of South America, naturalised in Old World Tropics. Occasional; in disturbed forest areas. Pachakkanam, *JA 12329, KPR 14812.*

## MEDINILLA Gaudinchaud

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 ..... 2
2. Leaves sessile; flowers many in a cyme ..... **M. fuchsioides**
2. Leaves petiolate; flowers 1-3 in a cyme..... **M. malabarica**

**Medinilla beddomei** Clarke in Hook. f., Fl. Brit. India 2: 548. 1879; Gamble, Fl. Pres. Madras 496. 1919; Manilal, Fl. Silent Valley 108. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 186. 1996. ***M. radicans*** sensu Bedd., Ic. t. 184. 1868-1874, non Blume, 1831.

Epiphytic shrubs; branches terete, pendulous. Leaves 2.5 cm across, obtuse at base and apex, very succulent, ribs indistinct; petiole 5 mm long. Cymes axillary, 1-3 flowered; pedicels 2 cm long, glabrous. Flowers white; calyx tube 7 mm long, wavy along the rim; petals white, 1.5 x 1.2 cm, obovate, spreading; stamens 10, anthers 8 mm long, acuminate, spur at the base of the anther, 1.5 mm long, curved up.

*Fl. & Fr.* :April-June

*Distr.* : Southern Western Ghats. Very common; in moist deciduous forests. Vallakkadavu, *JA 13712.*

**Medinilla fuchsioides** Gard., Calcutta J. Nat. Hist. 8: 12. 1847; Clarke in Hook. f., Fl. Brit. India 2: 548. 1879; Shetty & Karthik., Bull. Bot. Surv. India 18: 215. 1976; Bremer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 200. 1987.

Epiphytic shrubs; branches tubercled, quadrangular, densely fulvous hairy at nodes. Leaves to 7 x 3.5 cm, elliptic, obtuse, thick, sessile. Cymes 5-7 cm across, many-flowered. Flowers deflexed; pedicel 1 cm long; calyx tube 7 mm long, campanulate, reddish; petals 12 x 12 mm, orbicular, erect; stamens 8; anthers curved, spur very short; style 22 mm long, straight. Berry 8 x 8 mm, globose, many-seeded.

*Fl. & Fr.* :November-March

*Distr.* : South India and Sri Lanka. Common; along the margins of the evergreen forests above 1,500 m altitudes. Vellimala, *JA 12955.*

*Note* : Until its collection from Mahendragiri hills of Kanyakumari by Shetty & Karthikeyan (1976), it was considered endemic to Sri Lanka.

**Medinilla malabarica** Bedd., Ic. t. 157. 1868-1874; Clarke in Hook. f., Fl. Brit. India 2: 548. 1879; Gamble, Fl. Pres. Madras 496. 1919; Shetty & Vivek., Bull. Bot. Surv. India 14(1-4): 21. 1972; Manilal, Fl. Silent Valley 109. 1988.

Epiphytic shrubs; branchlets thick, rough. Leaves to 7 x 4 cm, ovate, acute, 5-nerved from base, glabrous, thick; ribs reddish brown; petiole to 7 mm long, thick. Cymes axillary, 1-3-flowered. Flowers light pink; pedicels stout, glabrous; calyx tube 7 mm long, glabrous, truncate above; petals 12 x 8 mm, ovate, obtuse.

*Fl. & Fr.* :November-February

*Distr.* : Peninsular India. Occasional; in evergreen forests at high elevations, Vellimala, *JA 18481.*

## 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 ..... 4
2. Branchlets quadrangular ..... 3
2. Branchlets terete ..... **M. malabaricum**
3. Flowers on short peduncled cymes; leaves to 13 x 5.5 cm ..... **M. depressum**
3. Flowers fascicled on axillary tubercles; leaves to 4.5 x 2.5 cm ..... **M. subcordatum**
4. Flowers sessile ..... 5
4. Flowers pedicelled ..... 6
5. Fascicles up to 5-flowered; leaves to 18 cm long, nerves prominent ..... **M. lawsonii**
5. Fascicles many-flowered; leaves to 4 cm long, nerves obscure ..... **M. flavescens**

6. Leaves linear-lanceolate, black when dry.....**M. angustifolium**

6. Leaves ovate to ovate-lanceolate, yellow when dry.....7

7. Leaves to 15 cm long, rough above.....**M. talbotianum**

7. Leaves to 8 cm long, shining above.....**M. edule**

**Memecylon angustifolium** Wight, Ic. t. 276. 1840; Clarke in Hook. f., Fl. Brit. India 2: 562. 1879; Gamble, Fl. Pres. Madras 504. 1919; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 288. 1976; Bremer, Opera Bot. 50: 14. 1979 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 217. 1987.

Shrubs; branchlets terete. Leaves to 8 x 2 cm, obtusely acuminate, acute at base; nerves indistinct. Cymes 2 cm across, many-branched; peduncle 3-5 mm long; pedicels slender. Berry 4 mm across, globose, glabrous.

*Fl. & Fr.* :May-July

*Distr.* : South India and Sri Lanka. Rare; in evergreen forests. Deviar, *JA 12104.*

**Memecylon depressum** Benth. ex Triana, Trans. Linn. Soc. London 25: 158. 1865-1866; Gamble, Fl. Pres. Madras 505. 1919; Sasidh. & Sivar., Fl. Pl. Thrissur For. 187. 1996. ***M. amplexicaule*** Roxb. var. ***malabarica*** Clarke in Hook. f., Fl. Brit. India 2: 559. 1879 p.p., excl. *typus*.

Shrubs; branchlets tetragonous towards the upper part of each internode, terete below. Leaves to 13 x 5.5 cm, ovate-oblong, acute at apex, subsessile, brown when dried, nerves about 12 pairs, subdistinct. Cymes 2.5 cm across, densely branched. Flowers 4 mm across, many-together; calyx teeth acute; petals 2.2 x 1.5 cm, ovate, acute, bluish white, filaments 1.5 mm long, anthers 1.5 mm long, curved; style 3 mm long. Berry 7 mm across.

*Fl. & Fr.* :June-August

*Distr.* : Southern Western Ghats. Common; in evergreen and semi-evergreen forests. Kokkara, *JA 12016*; Puthussery, *JA 13495*; Thekkady, *JA 13813*; Kottamala, *KPR 14080.*

**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. 1919; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 600. 1983. **Kasavu** (Mala Arayan).

Small trees; branchlets terete. Leaves to 7 x 2.5 cm, elliptic-lanceolate, acuminate and shortly cuspidate at tip, yellow when dry; petiole 6 mm long, slender. Peduncle 1-2 together, 2 mm long, stout, 3-6-flowered; pedicel 3 mm long. Flowers 6 mm across; calyx lobes acute; petals 2 mm across, blue. berry 5 mm across, globose, puberulus, yellow.

*Fl. & Fr.* :March-April

*Distr.* : Peninsular India & Sri Lanka. Common; in evergreen forests. Arjunankotta, *JA & KPR 15081.*

**Memecylon flavescens** Gamble, Kew Bull. 1919: 226. 1919 & Fl. Pres. Madras 503. 1919; Henry *et al.*, J. Bombay Nat. Hist. Soc. 75(3): 688. 1979; Manilal, Fl. Silent Valley 109. 1988.

Densely branched shrubs; branchlets terete. Leaves to 4 x 2 cm, obovate, obtuse, attenuate to the base, yellow when dry, nerves 4 or 5 pairs, indistinct; petiole 5 mm long. Cymes 1 cm across. Flowers sessile, 2.5 mm across; calyx teeth short, triangular; petals 1.5 x 1 mm, ovate, acute, pink; filaments 3 mm long. Berry 8 mm across, globose, yellow.

*Fl. & Fr.* :January-May

*Distr.* : Southern Western Ghats. Rare; in evergreen forests at high elevation. Uppermanalar, *JA 13049, JA & KPR 15033.*

**Memecylon lawsonii** Gamble, Kew Bull. 1919: 226. 1919 & Fl. Pres. Madras 503. 1919; Henry *et al.*, J. Bombay Nat. Hist. Soc. 75(3): 688. 1979; Manilal, Fl. Silent Valley 109. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 187. 1996 [Fig. 30 B].

Shrubs; branches few, terete. Leaves to 18 x 3.5 cm, lanceolate, acuminate; nerves 10-12 pairs, pale; petiole 1 cm long. Flowers 1-3, axillary; calyx 1 mm long, lobes ovate, acute, pale pink; petals 2.5 mm long, obovate-oblong, keeled, blue; stamens 8, anthers 1 mm long, curved at base. Berry 8 x 9 mm; yellow, sessile.

*Fl. & Fr.* :March-May

*Distr.* : Endemic to Southern Western Ghats. Occasional; in evergreen forests. Puthussery, *JA 13498.*

**Memecylon malabaricum** (Clarke) Cogn. in DC., Monogr. Phan. 7: 1148. 1891; Gamble, Fl. Pres. Madras 505. 1919; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 288. 1976. ***M. amplexicaule*** Roxb. var. ***malabarica*** Clarke in Hook. f., Fl. Brit. India 2: 559. 1879 p.p., incl. *typus*.

Large shrubs; branchlets terete. Leaves to 9 x 3.5 cm, subsessile, ovate-oblong, greenish yellow below when dry; nerves 10-12 pairs, scarcely visible. Cymes 1.5 cm across, peduncle very short or absent; pedicel 3-4 mm long, slender. Flowers 2 mm across, many-together; calyx lobes ovate, white-margined, glabrous; petals 1 mm across, obovate, blue.

*Fl. & Fr.* :April-June

*Distr.* : Southern Western Ghats. Common; in evergreen and semi-evergreen forests. Sabarimala, *JA & KPR 14940.*

**Memecylon subcordatum** Cogn. in DC., Monogr. Phan. 7: 1164. 1891; Gamble, Fl. Pres. Madras 505. 1919. ***M. amplexicaule*** Roxb. var. ***cordata*** Wight ex Clarke in Hook. f., Fl. Brit. India 2: 559. 1879.

Shrubs; branchlets slender. Leaves 4.5 x 2.5 cm, ovate, obtusely acuminate, sessile or shortly petiolate, greenish when dry; nerves 9 pairs. Cymes 1 cm across, many-flowered; peduncle short or absent; pedicel 2.5 mm long, slender; bracts fulvous-tomentose. Flowers 2.5 mm across; calyx shortly 4-toothed, puberulus outside; petals 1.5 x 1.5 mm, ovate, acute, blue; filaments 2.5 mm long, anthers curved; style 3.5 mm long.

*Fl. & Fr.* :March-May

*Distr.* : Peninsular India. Rare; in evergreen forests. Sabarimala, *JA 13689*; Poonkavanam, *JA & KPR 14977.*

**Memecylon talbotianum** Brandis in Talbot, Bombay List. ed. 2. Append. 1902 & Indian Trees 336. 1906; Gamble, Fl. Pres. Madras 503. 1919; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 288. 1976; Ramachandran, Nair & Nair, J. Econ. Tax. Bot.5(1): 139. 1984.

Trees or large shrubs; branchlets terete. Leaves to 15 x 5.5 cm, ovate-lanceolate, obtusely acuminate at apex, acute at base, drying dull yellow; nerves not visible; petiole 5-8 mm long. Peduncle 5 mm long, on old branches; pedicels 3 mm long. Berry 5 x 7 mm, yellow, glabrous, crowned by persistent sepals.

*Fl. & Fr.* :November

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Anchuruli, *JA 14294.*

## 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 axils placentation; style-1, long. Capsule globose, truncate at apex, opening by apical pores; seeds many, curved.

1. Flowers 4-merous ..... 2
1. Flowers 5-merous ..... 3

Fig. 30. **A**. *Rhodomyrtus tomentosus* (Ait.) Hassk.;
**B**. *Memecylon lawsonii* Gamble

2. Anthers truncate at apex.....**O. brachystemon**

2. Anthers attenuate at apex.....**O. zeylanica**

3. Calyx tube with few large, peltate, strongly bristled scales.....**O. wynaadensis**

3. Calyx tube densely bristled or hairy.....4

4. Leaves 1.5-2.5 cm long, ovate, sessile, black above when dried.....**O. leschenaultiana**

4. Leaves above 5 cm long, pedicellate, never black above when dried.....5

5. Branchlets covered with retrose hairs; lineoles branched.....**O. aspera** var. **travancorica**

5. Branchlets not covered as above; lineoles unbranched.....6

6. Calyx tube covered with simple hairs only; leaves yellowish when dry.....**O. gracilis**

6. Calyx tube covered with both simple hairs and stalked tufted hairs; leaves not yellowish when dry.....7

7. Leaves 5-7-nerved; calyx tube covered with long rufous hairs.....**O. aspera** var. **wightiana**

7. Leaves 3-nerved; calyx tube covered with short white bristles.....8

8. Branchlets to 1.5 mm thick, reddish; flowers to 20 mm across.....**O. virgata**

8. Branchlets 3-5 mm thick, not reddish; flowers to 40 mm across.....**O. aspera** var. **aspera**

**Osbeckia aspera** (L.) Bl., Bijdr. Natuurk. Wetensch. 6: 220. 1831; Sebast. & Vivek., Bull. Bot. Surv. India 9(1-4): 172. 1967; Bremer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 166. 1987, var. **aspera**, Hansen, Ginkgoana 4: 82. 1977; Manilal, Fl. Silent Valley 110. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 189. 1996. ***Melastoma asperum*** L., Sp. Pl. 389. 1753. ***Osbeckia kleinii*** Wight & Arn., Prodr. 323. 1834. ***O. courtallensis*** Gamble, Kew Bull. Misc. Inform. 1918: 242. 1918 & Fl. Pres. Madras 492. 1919. ***O. kewensis*** Fischer, Kew Bull. 1938: 34. 1938.

Shrubs; branches shortly atrorsely scabrid. Leaves to 5 x 2 cm, elliptic-oblong, acute at both ends, hairy; hairs half adnated; petiole 5 mm long. Flowers 3-9-together, in terminal cymes, sessile; calyx tube 8 x 12 mm, densely covered with stalked tufts of bristles; stalk 1 mm long, with about 30 bristles, bristles 1-3 mm long; sepals 4 x 2.5 mm, oblong, retuse, ciliate and bristled; petals 17 x 12 mm, obovate, pink, ciliate; anthers 8 mm long.

*Fl. & Fr.* :February-August

*Distr.* : Southern Western Ghats. Common; in openings of evergreen forests. Udumbatheri, *JA 13329*; Melmala, *KPR 14455*; Vallakkadavu, *JA 15409.*

**Osbeckia aspera** (L.) Bl. var. **travancorica** (Bedd. ex Gamble) Hansen, Ginkgoana 4: 84. 1977. ***O. travancorica*** Bedd. ex Gamble, Kew Bull. Misc. 1919: 404. 1919; Sasidh. & Sivar., Fl. Pl. Thrissur For. 190. 1996 [Fig. 32 A].

Shrubs or perennial herbs; branches covered with reddish retrose bristles. Leaves to 15 x 5 cm, ovate-oblong, acuminate, 7-ribbed, covered with adpressed hairs above and below; petiole 1 cm long. Flowers 6 cm across, 5-15 together in terminal cymes, bracts 1 cm across, orbicular;

calyx cup 13 mm long, densely covered with stalked bristles, lobes 7 x 4 mm, obovate, emarginate, bristled; intersepalar emergences with stellate bristles; petals 3.5 x 2.5 cm, obovate, pink; filaments 13 mm long, anthers 9 mm long, acuminate, constricted at base.

*Fl. & Fr.* :October-January

*Distr.* : Southern Western Ghats (Kerala). Common; in grasslands. Vallakkadavu, *JA 16888*; Koruthode, *JA 17137.*

*Note* : This species was thought to be possibly extinct (Nayar, 1997), but Sasidharan (1996) had earlier collected this from Thrissur forests.

**Osbeckia aspera** (L.) Bl. var. **wightiana** (Benth. ex Wight & Arn.) Trim., Fl. Ceylon 2: 196. 1894; Hansen, Ginkgoana 4: 85. 1977. ***O. wightiana*** Benth. ex Wight & Arn., Prodr. 1: 323. 1834; Wight Ic. t. 998. 1845; Clarke in Hook.f. Fl. Brit. India 2: 519. 1879; Gamble, Fl. Pres. Madras 493.1918

Shrubs; stem 4-gonous, scabrous. Leaves 9-10 x 3-4 cm, ovate, rounded at base, acute at apex, 5-ribbed, densely hairy; hairs half adnated above and below; petiole 1 cm long. Flowers 3-5-together in terminal sessile clusters; bracts densely rufous hairy; calyx tube 8 mm long, densely tufted hairy, hairs rufous brown; lobes 3 x 2 mm, bristled at tip; anthers 9 mm long, acuminate.

*Fl. & Fr.* :December-January

*Distr.* : Endemic to Southern Western Ghats. Common; along margins of evergreen forests and grasslands. Vavalala, *JA & KPR 14405*; Thaannikkudy, *JA & KPR 14494.*

**Osbeckia brachystemon** Naud., Ann. Sci. Nat. Bot. Ser. 3, 14: 57. 1850; Hansen, Ginkgoana 4: 100. 1977; Manilal, Fl. Silent Valley 111. 1988. ***O. cupularis*** D. Don ex Wight & Arn., Prodr. 1: 323. 1834 p.p.; Clarke in Hook. f., Fl. Brit. India 2: 514. 1879; Gamble, Fl. Pres. Madras 494. 1919; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 289. 1976.

Herbs, to 30 cm high; stems pilose. Leaves to 4 x 2 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 2 x 2 mm, triangular, bristled at apex; petals pink, 5 x 4 mm, obovate; anthers 1 mm long, obovate, truncate; seeds 0.3 x 0.3 mm, curved.

*Fl. & Fr.* :August-December

*Distr.* : South India and Sri Lanka. Common; in grasslands. Methaganam, *JA 13639*; Mangaladevi, *JA 14194.*

**Osbeckia gracilis** Bedd., Madras, J. Lit. Sci. Ser. 3, 1: 45. 1864; Clarke in Hook. f., Fl. Brit. India 2: 518. 1879. ***O. sublaevis*** Cogn. in DC., Monogr. Phan. 7: 321. 1891; Gamble, Fl. Pres. Madras 492. 1919. ***O. lineolata*** Gamble, Kew Bull. 1918: 241. 1918 & Fl. Pres. Madras. 492. 1919.

Stout shrubs; branches glaucous, glabrous. Leaves to 3.5 x 2 cm, elliptic-oblong, obtuse at apex and base, cuspidate, yellowish green, densely covered with half-adnated hairs spreading from midrib, 3-ribbed; petiole 3 mm long. Flowers in terminal cymes, pedicelled; calyx tube 7 mm long, densely simple-hairy, lobes 4 x 3 mm, ovate-oblong, obtuse, ciliate; petals 15 x 12 mm, obovate, ciliate, pink; anthers 5 mm long.

*Fl. & Fr.* :September

*Distr.* : Endemic to Southern Western Ghats. Common; in margins of moist deciduous forests. Thekkady, *JA & KPR 16821.*

**Osbeckia leschenaultiana** DC., Prodr. 3: 142. 1928; Clarke in Hook. f., Fl. Brit. India 2: 520. 1879; Gamble, Fl. Pres. Madras 493. 1919; Hansen, Ginkgoana 4: 87. 1977. ***Osbeckia gardneriana*** Wight, Ic. t. 997. 1845.

Shrubs; branchlets reddish, pilose. Leaves 1.5-3 x 1 cm, ovate, acute at apex, rounded at base, 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 7 mm long, densely covered with stalked bristles, stalk 1.5 mm long, to 15-bristled; lobes 4 x 3 mm, ovate, obtuse, with a tuft of 3-9 bristles at apex, ciliate; petals 15 x 17 mm, orbicular, ciliate; anthers 9 mm long, acuminate; filaments clavate.

*Fl. & Fr.* :April-May

*Distr.* : Southern Western Ghats (Kerala & Tamil Nadu). Rare; in evergreen forests margins at high elevations. Sunderamala, *JA 13587*; Anakuthivayal, *JA & KPR 17770.*

**Osbeckia virgata** D. Don ex Wight et Arn., Prodr. 1: 323. 1834; Hansen, Ginkgoana 4: 107. 1977; Manilal, Fl. Silent Valley 111. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 190. 1996. ***Osbeckia octandra*** auct. non (L.) DC., 1828: Clarke in Hook. f., Fl. Brit. India 2: 521. 1879; Gamble, Fl. Pres. Madras 493. 1919.

Shrubs; branchlets quadrangular, sparsely adpressed hairy. Leaves to 5-9 cm, elliptic, acute at both ends; hairs adnate its major length above, free below; petiole 5 mm long. Flowers 15 mm across, in terminal cymes, 3-9 together; calyx cup 6 mm long, emergences 2 mm long, 2-4-

bristled at tip; sepals 4 mm long, acuminate, bristled; petals 7 x 6 mm, anthers 4 mm long, acuminate.

*Fl. & Fr.* :October-January

*Distr.* : South India and Sri Lanka. Common; in evergreen forests. Pachakkanam, *JA 12652*; Chokkampetti, *JA 13347.*

**Osbeckia wynaadensis** Clarke in Hook. f., Fl. Brit. India 2: 521. 1879; Gamble, Fl. Pres. Madras 493. 1919; Hansen, Ginkgoana 4: 62. 1977; Sasidh. & Sivar., Fl. Pl. Thrissur For. 190. 1996.

Tall shrubs; branches densely scabrid. Leaves to 18 x 3 cm, lanceolate, acute, 3-5-nerved, hairy; hairs adnated and spreading from the midrib. Flowers many, in terminal panicled cymes; pedicels 4 mm long; calyx tube 8 mm long, bristles 4 or 5 in a tuft, to 3 mm long; lobes 11 x 5 mm, lanceolate, ciliate; petals 20 x 10 mm, obovate, anthers 7 mm long. Seeds 0.5 x0.3 mm obovoid, minutely muriculate.

*Fl. & Fr.* :October-January

*Distr.* : Southern Western Ghats (Kerala). Common; along marshy areas in semi-evergreen forests. Kalvarimala, *JA 13635*; Vavalala, *JA & KPR 14431*; Chenthamara, *JA 15148.*

**Osbeckia zeylanica** L. f., Suppl. Pl. 215. 1781; Clarke in Hook. f., Fl. Brit. India 2: 516. 1879; Gamble, Fl. Pres. Madras 494. 1919; Hansen, Ginkgoana 4: 43. 1977; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 603. 1983.

Herbs, to 8 cm high; branches quadrangular, hispid. Leaves to 1.5 x 0.6 cm, ovate, acute at either ends, serrulate, densely hairy; hairs half adnate, parallel to the midrib above, not adnate below. Flowers solitary or 2-3 together, terminal or upper axillary; pedicels 1.5 mm long; calyx tube 5 mm long, densely covered with tufted bristles, bristles 3-6 together, to 7 mm long, lobes 4 mm long, acuminate, ciliate; petals 5 x 4 mm, obovate, glabrous; anthers 4 mm long, acuminate; style 3 mm long. Seeds 0.3 x 0.3 mm, obovoid, muriculate.

*Fl. & Fr.* :October-May

*Distr.* : Peninsular India and Sri Lanka. Common; in grasslands. Thaannikkudy, *JA & KPR 15304.*

## SONERILA Roxburgh

Fl. Ind. 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 axils placentation; style-1, simple; stigma terminal, capitellate. Fruit capsule, dehiscing apically; seeds many, elliptic or oblong.

1. Stemless herbs; flowers on elongated scapes ..... 2
1. Stem present; flowers on axillary or terminal peduncled cymes ..... 3
2. Petals ca. 12 x 9 mm; peduncle red ..... **S. rotundifolia**
2. Petals ca. 5 x 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. Leaves densely hairy, acuminate at apex ..... **S. parameswaranii**
4. Leaves glabrous, acute at apex ..... 5
5. Flowers 2.5-3.5 cm across; stems thick and fleshy ..... 6
5. Flowers to 1.5 cm across; stem slender ..... 7
6. Leaves 3-ribbed, to 4 x 2 cm ..... **S. grandiflora**
6. Leaves 5-9-ribbed, ca. 8 x 3.5 cm ..... **S. speciosa**
7. Peduncle 3-5-flowered; nerves of the leaf all arise from the base ..... **S. brunonis**
7. Peduncle 20-30-flowered; 2 pairs of nerves arise from above the base of leaf ..... **S. clarkei**

**Sonerila brunonis** Wight & Arn., Prodr. 321. 1834; Wight, Ic. t. 1059. 1846; Clarke in Hook. f., Fl. Brit. India 2: 531. 1879; Gamble, Fl. Pres. Madras 499. 1919. ***S. arnottiana*** Thw. var. ***tenella*** Bedd., Trans. Linn. Soc. London 25: 217. 1865; Clarke in Hook. f., Fl. Brit. India 2: 532. 1879.

Stem to 20 cm high, reddish, glandular. Leaves 1.5-2.5 x 1-2 cm, ovate, acute at either ends, 5-nerved from base, serrulate, pilose above; petiole 1 cm long. Peduncle to 3 cm long, slender; raceme 3-6-flowered. Flowers 1 cm across; sepals ovate, acute, puberulus outside; petals obovate, obtusely acute, pink; anthers 2 mm long. Capsule 7 mm long, oblong; seeds curved, dark brown, glabrous.

*Fl. & Fr.* :November-January

*Distr.* : South India and Sri Lanka. Occasional; in grasslands. Koruthode, *JA 17136.*

**Sonerila clarkei** Cogn. in DC., Monogr. Phan. 7: 501. 1891; Gamble, Fl. Pres. Madras 499. 1919; Manilal, Fl. Silent Valley 112. 1988. ***S. amabilis*** sensu Bedd. ex Clarke in Hook. f., Fl. Brit. India 2: 533. 1879, non Kurz, 1871.

Erect herbs, to 30 cm high; stem and leaf beneath pinkish; branches quadrangular, winged. Leaves to 5 x 3 cm, ovate, acute, rounded or obliquely cordate at base, sparsely hairy above;

nerves 4 pairs, 2 from base and 2 from little above the base; petiole 2-5 cm long. Peduncles to 5 cm long, terminal and axillary, 10-20-flowered. Flowers to 15 mm across; pedicels 1 cm long; sepals triangular; petals 17 x 4 mm, elliptic, pink; anthers 2 mm long. Capsule 10 x 4 mm, ridged, glabrous; seeds muricate, brown.

*Fl. & Fr.* :October

*Distr.* : Endemic to South India. Not Common; in grasslands. Mangaladevi, *JA 12536*; Thekkady, *JA 12529.*

**Sonerila grandiflora** R. Br. ex Wight & Arn., Prodr. 322. 1834; Wight, Ic. t. 995. 1845; Clarke in Hook. f., Fl. Brit. India 2: 535. 1879; Gamble, Fl. Pres. Madras 499. 1919; Sebast. & Vivek., Bull. Bot. Surv. India 9(1-4): 172. 1967.

Herbs, to 30 cm high; stem minutely striate, reddish. Leaves to 4 x 2.2 cm, elliptic, acute at apex; attenuate at base; sharply serrate; petiole 1-2 cm long, reddish. Peduncles 3 cm long, 3-5-flowered. Flowers 2.5 cm across; pedicles 1 cm long; sepals triangular, with a black gland at apex; petals 13 x 10 mm, obovate, acute, pink; anthers 6 mm long, bottle-shaped, acuminate. Capsule 10 mm long, obovoid; seeds 0.8 mm long, dark brown.

*Fl. & Fr.* :November-December

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Uppermanalar, *JA 12960*; Vellimala, *JA & KPR 14311.*

**Sonerila parameswaranii** Ravik. & Lakshm., Rheedea 9(1): 63. 1999 [Fig. 31].

Undershrubs, 60-90 cm high, stem woody; branchlets terete, densely covered with fulvous hairs. Leaves to 7.5 x 3.5 cm, elliptic-lanceolate, acuminate, unequally cordate at base, shortly serrulate and ciliate along the margin, densely fulvous hairy; petiole 1-2 cm long, unequal in opposite pairs. Peduncle axillary, 1.5-2 cm long, 6-9 flowered in terminal scorpioidal cyme; pedicels 12 mm long; calyx tube 10 mm long, tubular; lobes 2 x 2 mm, widely triangular with subulate tip; petals pink, 23 x 16 mm, ovate, obtuse; filaments 9 mm long, slender; anthers 15 mm long, curved, attenuate to apex; ovary 8 x 4 mm, adnated to calyx tube, glabrous; style 20 mm long, thick, slightly curved, truncate at apex, glabrous; stigma terminal. Capsule 13 x 5 mm, obconical, 3-angled, 3-ribbed, glabrescent when mature, smooth, dehiscing apically; seeds 1 x 0.4 mm, oblong, hairy, dark brown.

*Fl. & Fr.* :December-February

*Distr.* : Southern Western Ghats (Kerala). Rare; in evergreen forests. Chokkampetti, *JA 14467.*

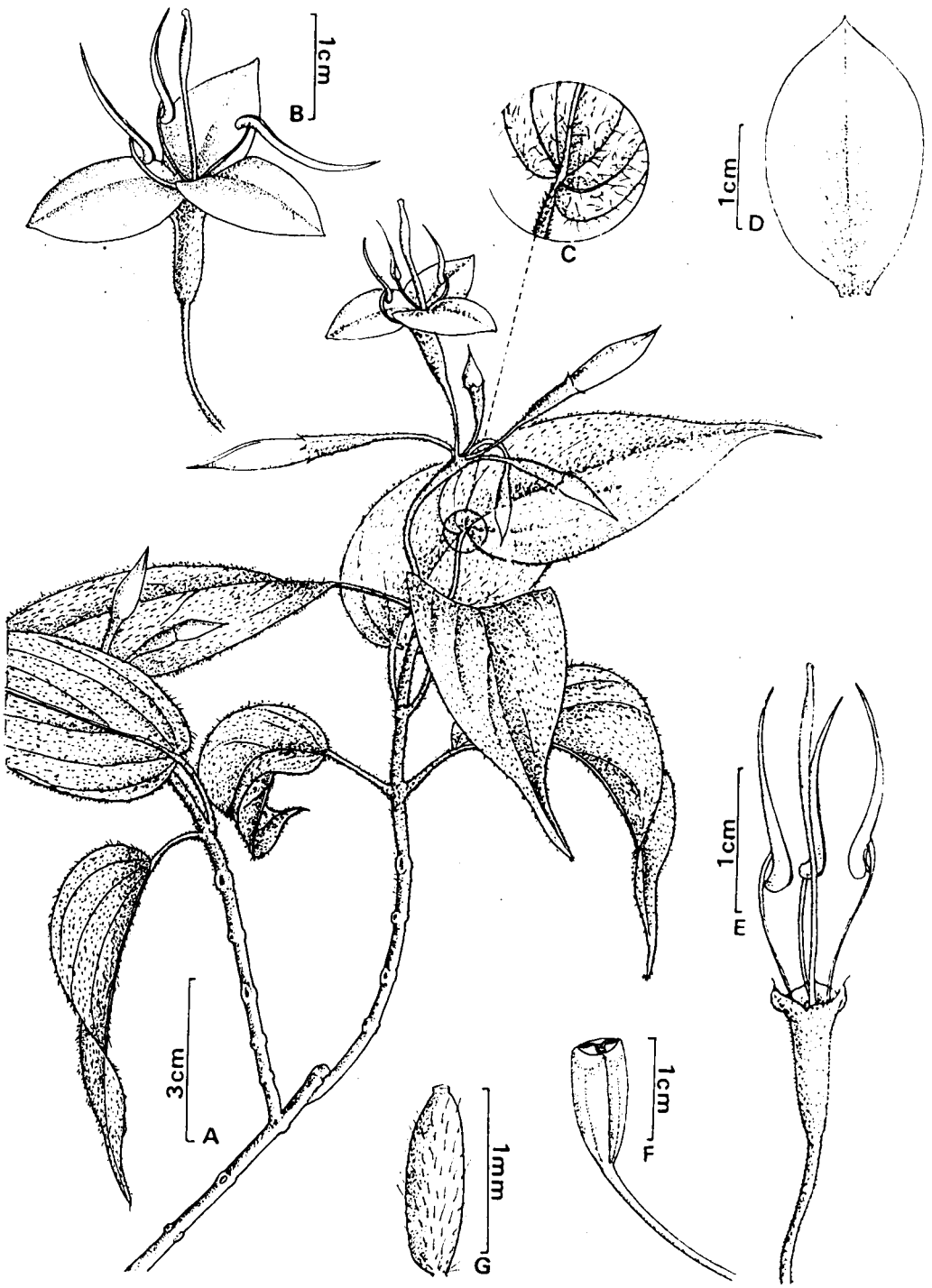



Fig. 31. *Sonerila parameswaranii* Ravi.: **A**. habit; **B**. flower; **C**. leaf base; **D**. petal; **E**. flowers without petals; **F**. fruit; **G**. seed.

**Sonerila rheedii** Wight & Arn., Prodr. 321. 1834; Gamble, Fl. Pres. Madras 500. 1919; Sasidh. & Sivar., Fl. Pl. Thrissur For. 193. 1996. ***S. wallichii*** sensu Clarke in Hook. f., Fl. Brit. India 2: 538. 1879, p.p., non Benn., 1844.

Stem to 15 cm high, quadrangular, hispid. Leaves to 12 x 6 cm, ovate, penninerved, acute at apex; rounded or cordate at base, hirtus, green; nerves 4 pairs; petiole 4 cm long, hispid. Peduncle terminal or upper axillary, 8-12-flowered. Flowers 1 cm across; pedicel 8 mm long; sepals triangular, glandular hairy; petals 4 x 3 mm, elliptic, with a hairy midrib; pink; anthers 3 mm long, acute. Capsule 4 x 3 mm, glandular hairy; seeds obovoid, brown, glandular.

*Fl. & Fr.* :September-December

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Koruthode, *JA 16245.*

**Sonerila rotundifolia** Bedd., Madras J. Lit. Sci. Ser. 2, 22: 74. 1861 & Ic. t. 169. 1868-1874; Clarke in Hook. f., Fl. Brit. India 2: 538. 1879; Gamble, Fl. Pres. Madras 500. 1919; Manilal, Fl. Silent Valley 112. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 193. 1996 [Fig. 32 B].

Stemless herbs. Leaves few, 6.5-8 cm across, orbicular, deeply cordate at base, crenate, 9-ribbed from base, pilose along the nerves, reddish brown, petiole to 12 cm long. Peduncle to 15 cm long, 8-10 flowered. Flowers 2.5 cm across, confined to the apex of the scape in scorpioidal cyme; pedicel 1 cm long, pink; sepals 1.5 x 3 mm, triangular; petals 12 x 9 mm, obovate, pink; anthers 6 mm long, acuminate, deeply cleft at base; filaments 7 mm long; style 11 mm long.

*Fl. & Fr.* : June-August

*Distr.* : Southern Western Ghats. Rare; in grasslands. Thaannikkudy, *JA 17837.*

**Sonerila speciosa** Zenk., Ann. Sci. Nat. Bot. Ser. 2, 6: 151. 1830; Wight, Ic. t. 995/2. 1845; Clarke in Hook. f., Fl. Brit. India 2: 534. 1879; Gamble, Fl. Pres. Madras 499. 1919.

Stout herbs, to 25 cm high; stem glabrous, minutely striate, fleshy. Leaves to 8 x 3.5 cm, ovate-oblong, acute at apex and base; sharply serrulate, glabrous; petiole to 6 cm long, thick. Peduncle 6 cm long, terminal, many-flowered; pedicel 1.5 cm long; calyx ovate, acuminate, glabrous. Capsule 7 x 5 mm, glabrous; seeds 1.2 mm long, oblong, light brown.

*Fl. & Fr.* :December-April

*Distr.* : Southern Western Ghats (Karnataka, Kerala & Tamil Nadu). Rare; in evergreen forests at high elevations. Anakuthivayal, *JA 17784.*

**Sonerila wallichii** Benn., Pl. Jav. Rar. 215. 1844; Clarke in Hook. f., Fl. Brit. India 2: 538. 1879, p.p.; Gamble, Fl. Pres. Madras 500. 1919; Sebast. & Vivek., Bull. Bot. Surv. India 9(1-4): 172.1967; Manilal, Fl. Silent Valley 113.1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 193. 1996.

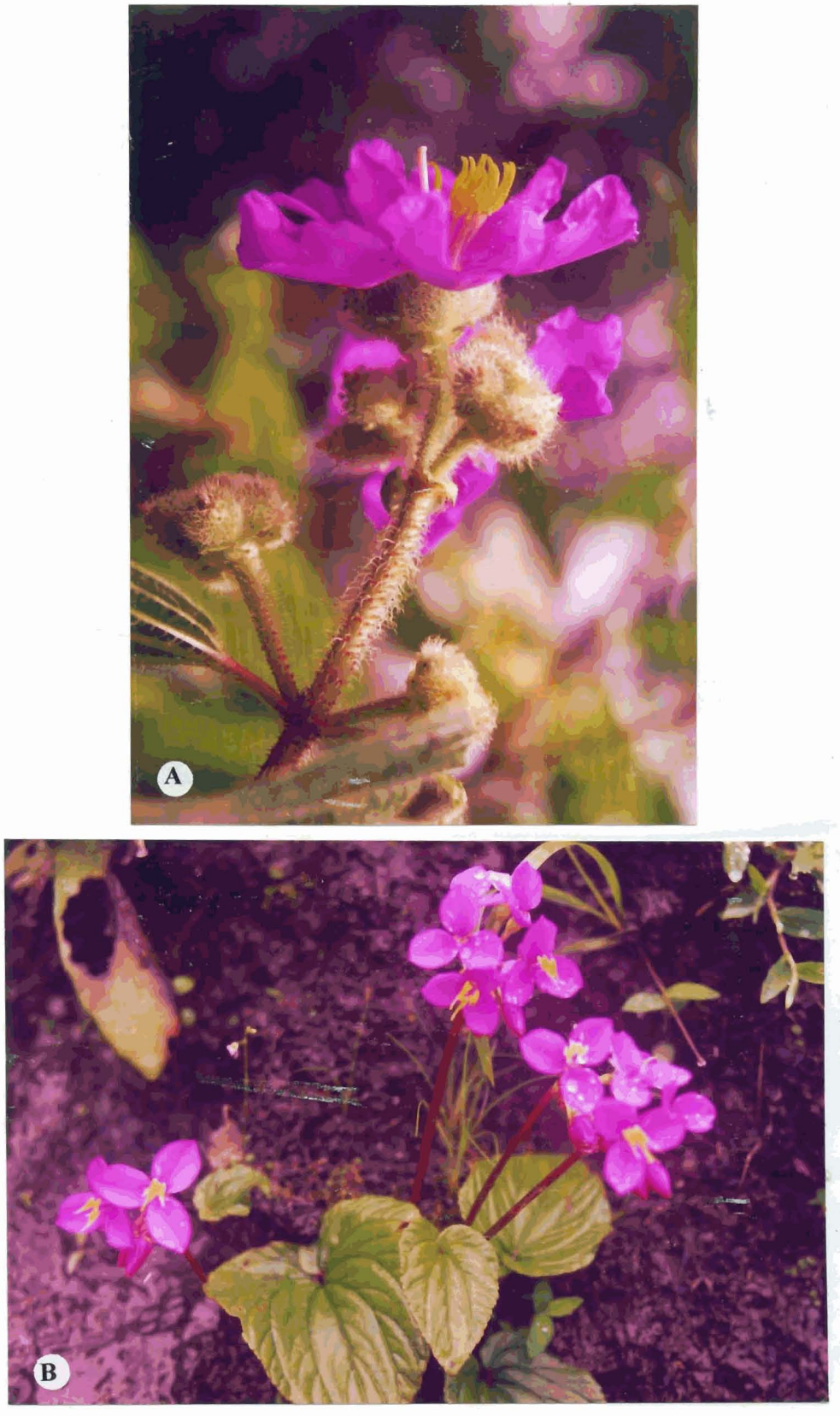



Fig. 32. A. *Osbeckia aspera* (L.) Bl. var. *travancorica* (Bedd. ex Gamble) Hansen
B. *Sonerila rotundifolia* Bedd.

Leaves one or very few; 5 x 3 cm, ovate, acute, cordate at base, serrulate, crispate hairy above, 3 pairs of nerves from the base; petiole 1-3 cm long. Peduncles to 9 cm long, glandular hairy; 4-6 flowered. Flowers 10 mm across; pedicels 5 mm long; sepals triangular, hairy; petals 5 x 4 mm, elliptic, acute, pink; anther 2 mm long, acute; style 5 mm long, glabrous. Capsule 2.5 x 2.5 mm, hemispheric, glandular hairy.

*Fl. & Fr.* :September-November

*Distr.* : Southern Western Ghats. Rare; on wet rocks in grasslands. Vallakkadavu, *JA 17946.*

## 58. LYTHRACEAE

J. St.-Hil., Expos. Fam. Nat. 2: 175. 1805.

1. Seeds flattened and winged; petals clawed; trees.....**Lagerstroemia**
1. Seeds ellipsoid or hemispheric; petals not clawed; marshy herbs.....2
2. Flowers axillary, solitary.....**Rotala**
2. Flowers 2-40 together, axillary.....**Nesaea**

### 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. Flower *ca.* 5 cm across; calyx tube ribbed; leaves to 20 cm long.....**L. speciosa**
2. Flowers to 8 mm across; calyx tube smooth; leaves to 10 cm long.....**L. microcarpa**

**Lagerstroemia microcarpa** Wight, Ic. t. 109. 1839; Bedd., Fl. Sylv. t. 30. 1869; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 273. 1976; Manilal, Fl. Silent Valley 113. 1988. ***L. lanceolata*** Wall. ex Clarke in Hook. f., Fl. Brit. India 2: 576. 1879; Gamble, Fl. Pres. Madras 513. 1919. ***L. thomsonii*** Koehne in Engl., Pflanzenr. 17: 251. 1903; Gamble, Fl. Pres. Madras 513. 1919. **Venthekku, Venda** (Mannan).

Large trees; bark smooth, white; branchlets terete. Leaves to 10 x 5 cm, elliptic-lanceolate, glaucous below; nerves 8 pairs; petiole to 1 cm long, subopposite. Flowers pedicellate; calyx lobes triangular, pubescent; petals 3 mm long, obovate, white, clawed; filaments erect, ovary 5-6-celled. Capsule 10 x 6 mm, obovoid, 6-valved; seeds 3-4 in each cell, 8 x 3 mm, flat, winged.

*Fl. & Fr.* :November-May

*Distr.* : Western Ghats. Common; in moist deciduous forests. Thekkady, *JA 12495;* Thaannikkudy, *JA 13792.*

*Ethnobotanical use* : The fresh bark is given to ladies after the delivery.

**Lagerstroemia speciosa**(L.) Pers., Syn. Pl. 2: 72. 1806; Verdcourt in Dassan., Rev. Handb. Fl. Ceylon 9: 210. 1995. ***Munchausia speciosa*** L. in Munchhausen's Der Hausvater 5 (1): 357, t.2. 1770. ***Adambea hirsuta*** Lam., Encycl. 1: 39. 1783. ***Lagerstroemia hirsuta*** (Lam.) Willd., Sp. Pl. 2: 1178. 1799. ***L. flos-reginae*** Retz., Obs. Bot. 5: 25. 1788, *nom. illeg.*; Clarke in Hook. f., Fl. Brit. India 2: 577. 1879; Gamble, Fl. Pres. Madras 513. 1919; Sasidh. & Sivar., Fl. Pl. Thrissur For. 195. 1996. ***Lagerstroemia reginae*** Roxb., Pl. Corom. t. 65. 1795; Wight, Ic. t. 413. 1843; Bedd., Fl. Sylv. t. 29. 1869; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 273. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 608. 1983. **Poomaruthu** (Mala Arayan).

Small to medium sized trees; branchlets terete. Leaves 15-20 x 5-8 cm, ovate-lanceolate, green beneath, nerves 16 pairs, looped; petiole 1 cm long. Panicles 20-30 cm long, branches puberulus. Flowers many; pedicel 1 cm long; calyx tube 1 x 1.3 cm, hemispherical, puberulus; petals 4 x 2.5 cm, obovate, pink; filaments attached below the rim of calyx tube; ovary 6-celled, style 2 cm long. capsule 2.5 cm across, globose, glabrous; seeds many, 1 cm across, oblong, winged.

*Fl. & Fr.* :March-June

*Distr.* : India, China and Malaya. Common; along river banks. Koruthode, *JA 13519.*

## NESAEA Commerson ex Humboldt, Bonpland et Kunth

Nova Gen. Sp. 6: ed. fol. 191. 1823, *nom. cons.*

Herbs, stems terete or angled. Leaves opposite, decussate, entire. Flowers 3-40 together, axillary, sessile or shortly pedicelled; calyx tube globose or campanulate, lobes 4, triangular; petals present or absent; stamens 4, included in the calyx tube. Ovary obovoid, 2-4-celled, style short, stout; stigma capitate. Capsule globose, opening above; seeds many, concave on one side.

1. Flowers 1-4 per axil; leaves attenuate at base.....**N. lanceolata**
1. Flowers 20-40 per axil; leaves amplexicaule at base.....**N. brevipes**

**Nesaea brevipes** Koehne in Engl., Bot. Jahrb. Syst. 3: 326. 1882; Gamble, Fl. Pres. Madras 510. 1919; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 610. 1983; Verdcourt in Dassan., Rev. Handb. Fl. Ceylon 9: 216. 1995. ***Ammannia cordata*** Wight & Arn., Prodr. 304. 1834, non ***Nesaea cordata*** Heirn, 1871; Clarke in Hook. f., Fl. Brit. India 2: 570. 1879.

Erect woody herbs, 30-60 cm high; stem reddish, terete. Leaves to 3.5 x 1 cm, elliptic-oblong, entire, to 7-nerved, cordate and amplexicaule at base. Flowers shortly pedicelled; bracts and bracteoles 1 mm long, similar; calyx 1.5 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 1.5 mm across, globose; seeds many, concave, brown, concave at one end.

*Fl. & Fr.* :January-March

*Distr.* : Peninsular India and Sri Lanka. Rare; in grasslands in marshy areas. Mangaladevi, *JA 17194.*

**Nesaea lanceolata** (Heyne ex Clarke) Koehne in Engl., Bot. Jahrb. Syst. 3: 325. 1882; Gamble, Fl. Pres. Madras 510. 1919; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 610. 1983; Verdcourt in Dassan., Rev. Handb. Fl. Ceylon 9: 215. 1995. ***Ammannia lanceolata*** Heyne ex Clarke in Hook. f., Fl. Brit. India 2: 570. 1879.

Small decumbent herbs, to 15 cm high. Leaves to 15 x 5 mm, oblanceolate or obovate, obtuse, attenuate at base, glabrous. Flowers 3 mm across, sessile, bud 4-angled, truncate at apex; calyx lobes 1.2 mm long, triangular, acute; petals absent; stamens 4, filaments attached near the base of calyx tube; ovary depressed-globose, 2-celled; ovules many; style absent; stigma sessile, globose; Capsule 2 x 3 mm, dehiscing apically; seeds many, 0.5 mm across, trigonous, deep brown.

*Fl. & Fr.* :September-December

*Distr.* : Peninsular India and Sri Lanka. Rare; in marshy grasslands. Thaannikkudy, *JA 14234, 14563.*

## **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.....**R. ritchiei**
2. Flowers in terminal or axillary racemes.....3
3. Bracts cordate; capsule 4-valved.....**R. rotundifolia**
3. Bracts acute at base, falcately folded; capsule 2-valved.....**R. indica**

**Rotala indica** (Willd.) Koehne, Bot. Jahrb. 1: 172. 1880; Gamble, Fl. Pres. Madras 508. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 274. 1976; Cook, Biossiera 29: 108. 1979; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 613. 1983; Joseph & Sivar., Proc. India Acad. Sci. (Pl. Sci.) 99: 184. 1989; Verdcourt in Dassan., Rev. Handb. Fl. Ceylon 9: 226. 1995. ***Peplis indica*** Willd., Sp. Pl. 2: 244. 1799. ***Ammannia peploides*** Spreng., Syst. 1: 444. 1825; Clarke in Hook. f., Fl. Brit. India 2: 566. 1879.

Erect or procumbent herbs; stems winged. Leaves to 10 x 7 mm, obovate-oblong, obtusely acute, 5-nerved. Flowers in lax racemes; bracts 8 x 2 mm, oblanceolate, glabrous; bracteoles 3 mm long, linear; calyx 3 mm long, campanulate, lobes ovate, acuminate; petals 0.5 mm long, elliptic, acute; filaments attached at the middle of calyx tube.

*Fl. & Fr.* :November-January

*Distr.* : India, Malaya to Philippines. Common; in grasslands in moist places. Kumarikulam, *JA 13009*; Thaannikkudy, *JA & KPR 14506.*

**Rotala ritchiei** (Clarke) Koehne, Bot. Jahrb. 4: 386. 1883; Cook, Biossiera 29: 71. 1979; Janardhanan, Bull. Bot. Surv. India 21: 230. 1979; Joseph & Sivar., Proc. Indian Acad. Sci. (Pl. Sci.) 99: 192. 1989; Rajesh *et al.*, J. Econ. Tax. Bot. 20: 725. 1996. ***Ammannia ritchiei*** Clarke in Hook. f., Fl. Brit. India 2: 566. 1879 [Fig. 33].

Emergent aquatic herbs, rooting at lower nodes. Leaves decussate, 10-20 x 5-15 mm, oblong, obtuse at apex, subcordate at base, stipule bristle like. Flowers 3.5 x 1 mm, shortly pedicelled; calyx tube 3 x 1 mm, 4-angled, with erect subulate appendages; petals pink, 0.5 x 0.5 mm, orbicular. Capsule for valved, 5 x 1 mm; seeds numerous, oblong.

*Fl. & Fr.* :October-December

*Distr.* : Peninsular India. Rare; in seasonal ponds in grasslands. Kumarikulam, *JA 13006*; *JA & KPR 14877.*

**Rotala rosea** (Poir.) Cook, Boissiera 29: 86. 1979; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 614. 1983; Joseph & Sivar., Proc. India Acad. Sci. (Pl. Sci.) 99: 192. 1989; Verdcourt in Dassan., Rev. Handb. Fl. Ceylon 9: 225. 1995. ***Ammannia rosea*** Poir. in Lam., Encycl. 329. 1810. ***A. leptopetala*** Blume, Ann. Mus. Bot. Lugd.-Bat. 2: 134. 1856. ***Rotala leptopetala*** (Blume) Koehne, Bot. Jahrb. 1: 162. 1880; Gamble, Fl. Pres. Madras 508. 1919.

Erect herbs, stems 4-angled and narrowly winged. Leaves to 10 x 2 mm, oblong, obtusely acute, round or retuse, sessile. Flowers 1.5 x 1 mm, axillary, solitary; bracteoles 1.2 mm long, linear; calyx 1.5 mm long, lobes triangular; intersepalar appendages subulate; petals 0.5 mm

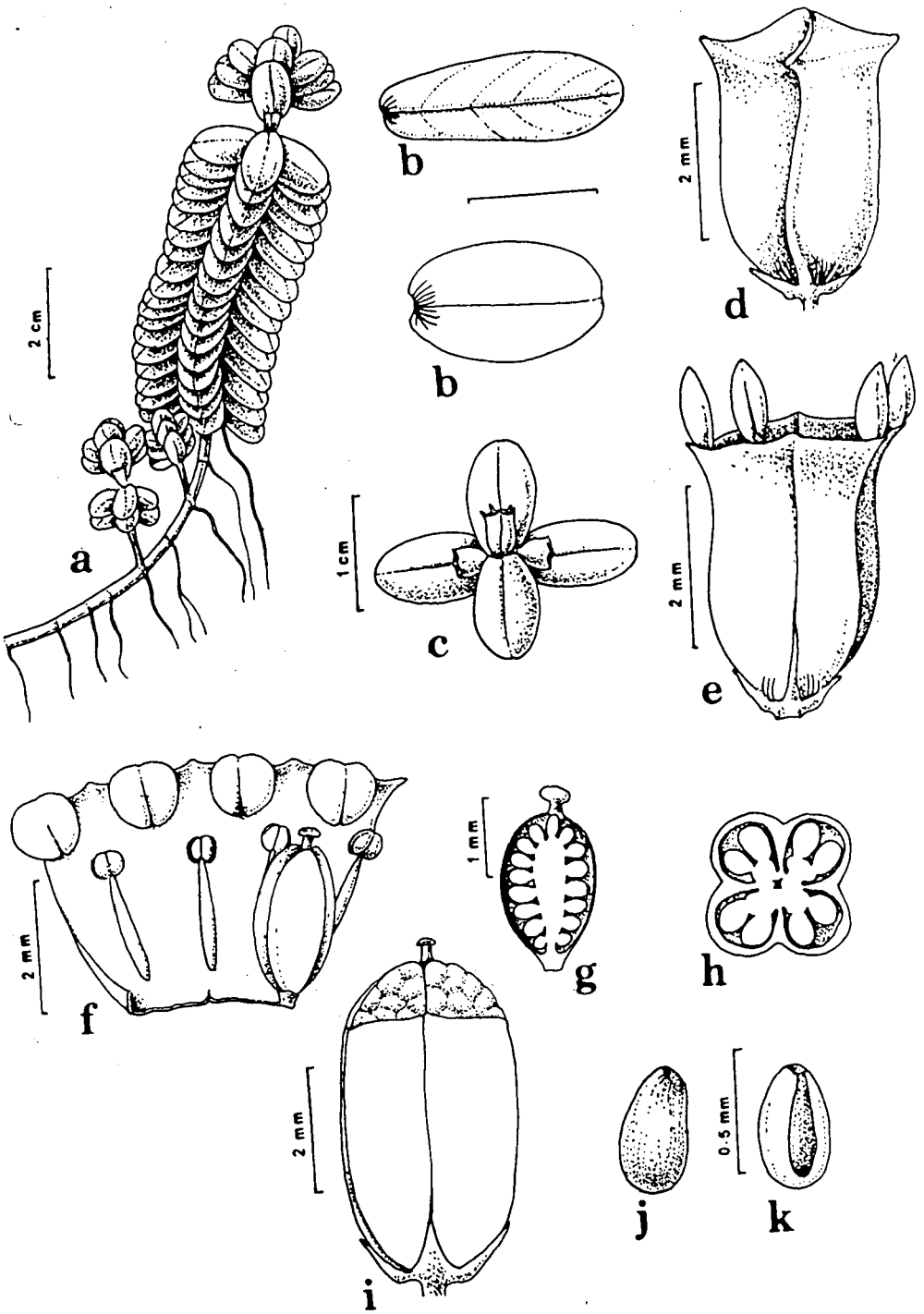



Fig. 33. *Rotala ritchiei* (Clarke) Koehne: **a.** habit; **b.** leaves; **c.** node showing flowers; **d.** flower bud; **e.** flower; **f.** flower cut open; **g.** ovary-L.S.; **h.** ovary-C. S.; **i.** fruit; **j.** & **k.** dorsal and ventral views of seed.

long, elliptic; stamens 5, attached below the middle of calyx tube, exserted; ovary 0.7 x 0.3 mm, style short, stigma pilose. Capsule 2 mm across, globose, 3-valved; seeds 0.5 x 0.5 mm, many, trigonous.

*Fl. & Fr.* :December-January

*Distr.* : south-East Asia. Common; in grasslands in marshy areas. Thaannikkudy, *JA 17033.*

**Rotala rotundifolia** (Buch.-Ham. ex Roxb.) Koehne, Bot. Jahrb. 1: 175. 1880; Gamble, Fl. Pres. Madras 509. 1919; Cook, Biossiera 29: 49. 1979; Joseph & Sivar., Proc. Indian Acad. Sci. (Pl. Sci.) 99: 193. 1989. ***Ammannia rotundifolia*** Buch.-Ham. ex Roxb., Fl. Ind. ed. 1, 1: 446. 1820; Clarke in Hook. f., Fl. Brit. India 2: 566. 1879.

Erect herbs, to 15 cm high; stem reddish, 4-angled. Leaves to 8 x 6 mm, oblong-orbicular, sessile, glabrous, 5-nerved. Racemes 1-1.5 cm long, bracteoles 2 mm long, lanceolate; calyx tube 2.5 mm long, lobes triangular, acute; intersepalar appendages absent; petals 1.5 x 1 mm, obovate; filaments attached near the base of calyx tube; ovary 1 x 1 mm, obovoid, truncate, obtuse, 4-angled; style 1 mm long.

*Fl. & Fr.* :Throughout the year

*Distr.* : India, Sri Lanka and China. Frequent, in grasslands in marshy areas. Kumarikulam, *JA & KPR 14876.*

## 59. 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. Flowers white; roots at lower nodes modified into floats; leaves obtuse ..... **L. adscendens**
1. Flowers yellow; roots not as above; leaves acute at apex ..... 2
2. Stamens 4 or 5; glabrous plants ..... **L. perennis**
2. Stamens 8 or 10; pubescent plants ..... **L. octovalvis** subsp. **sessiliflora**

**Ludwigia adscendens** (L.) Hara, J. Jap. Bot. 28: 290. 1953; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 285. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 621. 1983; Warren. in Dassan., Rev. Handb. Fl. Ceylon 9: 341. 1995. ***Jussiaea adscendens*** L., Mant. Pl. 1: 69. 1767. ***J. 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. 1919.

Floating herbs, roots from lower nodes modified into air-filled, white floats. Leaves to 4.5 x 1.5 cm, obovate, obtuse, attenuate at base, glabrous; nerves parallel; petiole 5-10 mm long. Flowers pedicelled; pedicel 3.5 cm long; calyx lobes 5, 11 x 2 mm, lanceolate, hispid, free; petals 1.5 x 1.5 mm, obovate to orbicular; stamens 8, anthers ovate; ovary densely hispid, style 5 mm long, hispid. Capsule 3 cm long, terete.

*Fl. & Fr.* :February-April

*Distr.* : Asia & Australia. Rare; in ponds and ditches. Thekkady, *JA & KPR 14590.*

**Ludwigia octovalvis** (Jacq.) Raven Kew Bull. 15: 476. 1962, subsp. **sessiliflora** (Mich.) Raven in Kew Bull. 15: 476. 1962; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 285. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 623. 1983; Manilal, Fl. Silent Valley 114. 1988; Warren. in Dassan., Rev. Handb. Fl. Ceylon 9: 337. 1995. ***Oenothera octovalvis*** Jacq., Enum. Syst. Pl. 19. 1760. ***Jussiaea suffruticosa*** L., Sp. Pl. 388. 1753; Clarke in Hook. f., Fl. Brit. India 2: 587. 1879; Gamble, Fl. Pres. Madras 516. 1919. ***J. octonervia*** forma ***sessiliflora*** Mich. in Mast. Fl. Bras. 13(2): 171. 1875. ***J. villosa*** Lam., Encycl. 3: 331. 1789; Gamble, Fl. Pres. Madras 1875. 1935.

Erect herbs, to 1.5 m high, stem densely villous. Leaves to 7 x 1.5 cm, lanceolate, densely hairy; nerves many, oblique; petiole 5 mm long. Flowers axillary, sessile; calyx lobes 4, 9 x 5 mm, ovate, acuminate, hispid; petals 10 x 7 mm, obovate, glabrous; anthers oblong; ovary hispid; disk 8-lobed, lobes clavate. Capsule 4.5 x 0.4 cm, linear, terete, hispid; seeds 0.6 x 0.6 mm, obliquely orbicular, muriculate, one side transversely rugose.

*Fl. & Fr.* :October-January

*Distr.* : Pantropical. Common; in grasslands in marshy areas. Thaannikkudy, *JA 12636*; Vavalala, *JA & KPR 14435*; Kavalappara, *JA & KPR 14533.*

**Ludwigia perennis** L., Sp. Pl. 119. 1753; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 285. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 623. 1983; Warren. in Dassan., Rev. Handb. Fl. Ceylon 9: 338. 1995. ***L. parviflora*** Roxb., Fl. Ind. 1: 440. 1820; Wight, Ill. 2: t. 101. 1950; Clarke in Hook. f., Fl. Brit. India 2: 588. 1879; Gamble, Fl. Pres. Madras 517. 1919.

Erect herbs with spreading roots, stems narrowly winged. Leaves to 5 x 2 cm, elliptic, acute at apex, attenuate to the petiole, nerves many, close; petiole 2.5 cm long. Flowers axillary, solitary, subsessile; calyx lobes 4, 4 x 1 mm, lanceolate; petals 6 x 3 mm, obovate, yellow; stamens 4, equal; ovary 4-celled, inferior; ovules many, style 1, stigma capitate. Capsule 2 x 0.2 cm, terete, glabrous.

*Fl. & Fr.* :Throughout the year

*Distr.* : Africa, Asia and Australia. Common; in water logged areas in grasslands. Vallakkadavu, *JA & KPR 16400.*

## 60. PASSIFLORACEAE

Juss. ex Kunth in Humboldt *et al.*, Nov. Gen. Sp. 2. ed. 4 : 126.1817.

1. Flowers bisexual; fruit a berry..... **Passiflora**
1. Flowers unisexual; fruit a capsule..... **Adenia**

### ADENIA Forsskal

Fl. Aegypt.-Arab. 77. 1775.

**Adenia hondala** (Gaertn.) Wilde, Blumea 15: 265. 1967; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 168. 1976; Rao *et al.*, J. Econ. Tax. Bot. 10(1): 243. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 197. 1996. ***Granadilla hondala*** Gaertn., Fruct. 2: 480, t. 180, f. 10. 1791. ***Modecca palmata*** Lam., Encycl. 4: 209. 1979; Clarke in Hook. f., Fl. Brit. India 2: 603. 1879. ***Adenia palmata*** (Lam.) Engl., Bot. Jahrb. Syst. 14: 375. 1892; Wight, Ic. t. 201. 1839; Gamble, Fl. Pres. Madras 525. 1919. **Thannikkeera** (Mannan, Thevan).

Climbers with tuberous roots, tendrils simple. Leaves palmately 3-5-lobed, lobes to 16 x 6 cm, oblong, membranous, with large circular sessile glands between lobes; petiole to 8 cm long. Flowers monoceous, in axillary cymes, 10 mm across; calyx gamosepalous, 13 mm long, lobes 5, ovate; petals 5, 13 x 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 cm across, globose, 3-valved.

*Fl. & Fr.* :February-July

*Distr.* : Western Peninsular India and Sri Lanka. Common; in evergreen forests. Kokkara, *JA 12020*; Vallakkadavu, *JA 13381*; Uppupara, *JA 13533.*

*Ethnobotanical use* : The leaves and young stems are used as green vegetables; the tuberous old roots are also cooked and eaten.

## 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 truncate at apex.....**P. leschenaultii**
2. Leaves 3-5-lobed, lobes acute.....**P. edulis**

**Passiflora foetida** L., Sp. Pl. 959. 1753; Gamble, Fl. Pres. Madras 524. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 169. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 630. 1983; Manilal, Fl. Silent Valley 114. 1988; Anilkumar & Ravi., J. Econ. Tax. Bot. 16(1): 69. 1992. **Poochapazham, Poodappazham** (Malam pandarum).

Densely pilose climber; tendrils leaf-opposed. Leaves to 10 x 9.5 cm, shallowly, 3-lobed, cordate at base; lobes triangular, acute; petiole to 5 cm long. Flowers solitary, axillary; bracteoles much divided into linear lobes, glandular; sepals 1.5 x 1 cm, ovate, acute, hairy outside; petals 1.8 x 1 cm, ovate, acute, white, glabrous; corona 4-seriate, pale violet; gynandrophore 0.8 cm long, stout. Berry 1.5 cm across, yellow; seeds black.

*Fl. & Fr.* :December-April

*Distr.* : Introduced from Tropical America. Rare; in disturbed forests. Manakkavala, *JA 15177.*

*Ethnobotanical use*: The fruits are eaten (Mannan & Malam pandarum)

**Passiflora leschenaultii** DC., Prodr. 3: 326. 1828; Wight, Ic. t. 39. 1838; Clarke in Hook. f., Fl. Brit. India 2: 599. 1879; Gamble, Fl. Pres. Madras 524. 1919; De Wilde, Blumea 20(1): 233. 1972; Manilal, Fl. Silent Valley 115. 1988.

Slender climbers. Leaves to 4 x 8 cm, flat above, sub-orbicular, 3-ribbed; petiole 2.5 cm long. Flowers solitary, axillary, 4 cm across; pedicels 3 cm long; calyx 1.5 cm long, deeply lobed to the base; petals 1.5 x 1 cm, ovate, obtuse, white; corona 3-seriate, linear, pinkish; gynandrophore 1 cm long; filaments 1 cm long. Berry 4.5 x 3 cm, oblong, reddish, smooth, 3-valved; seeds 4 x 3 mm, ovoid, prominently and regularly pitted.

*Fl. & Fr.* :December-March

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Sunderamala, *JA 13581*; Brook's peak, *JA 17008.*

**Passiflora edulis** Sims is found running wild in the study area

## 61. CUCURBITACEAE

Juss., Gen. Pl. 393. 1789.

1. Petals fimbriate.....**Trichosanthes**
1. Petals not fimbriate.....2
2. Leaves entire, penninerved; male flowers in large drooping panicles.....**Zanonia**
2. Leaves lobed or at least toothed, palminerved; male flowers not as above.....3
3. Anther cells conduplicate or flexuous.....4
3. Anther cells erect, straight.....10
4. Fruit fibrous inside, dehiscing by terminal pores.....**Luffa**
4. Fruit not fibrous inside, not dehiscing as above.....5
5. Leaves pinnately lobed.....**Citrullus**
5. Leaves entire or palmately lobed.....6
6. Ovary globose, smooth.....**Diplocyclos**
6. Ovary elliptic, echinate or hairy.....7
7. Calyx tube tubular; anthers included.....**Gymnopetalum**
7. Calyx tube campanulate; anthers not included.....8
8. Male flowers with large bracts; connectives of anthers not produced.....**Momordica**
8. Male flowers without large bracts; connectives of anthers produced into a hood.....9
9. Hood of the connective laciniate; fruit 2.5 cm across.....**Cucumis**
9. Hood of the connective not laciniate; fruit fusiform, to 1 cm across.....**Cucumella**
10. Leaves ovate-oblong; style not surrounded by annular disk.....**Cerasiocarpum**
10. Leaves lobed or deltoid; style surrounded by annular disk.....11
11. Connective of the anthers narrow; anther lobes straight.....**Mukia**
11. Connective of the anthers broad; anthers transverse or inclined.....12
12. Leaves amplexicaule.....**Solena**
12. Leaves not amplexicaule.....**Zehneria**

### CERASIOCARPUM Hooker. f.

in Benth. & Hooker f., Gen. 1: 832. 1867.

**Cerasiocarpum bennettii** (Miq.) Cogn. in DC., Monogr. Phan. 3: 729. 1881; Gamble, Fl. Pres. Madras 541. 1919; Chakravarthy, Fasc. Fl. India 2: 18. 1982; Sasidh. & Sivar., Fl. Pl. Thrissur

For. 199. 1996. ***Bryonopsis bennettii*** Miq., Fl. Ind. Bat. 1: 657. 1855. ***Aechmandra zeylanica*** Thw., Enum. Pl. Zeyl. 125. 1859. ***Cerasiocarpum zeylanicum*** (Thw.) Hook. f., Gen. Pl. 1: 832. 1862; Clarke in Hook. f., Fl. Brit. India 2: 629. 1879.

Scabrous creeper. Leaves to 13 x 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 mm across; calyx tube campanulate; 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 mm across. smooth; seeds ovoid, marginate.

*Fl. & Fr.* :July-October

*Distr.* : Indo-Malesia. Occasional; along the margins of shola forests. Mlappara, *JA 18418.*

*Note* : **Citrullus colocynthis** Schr. and **C. lanatus** Mats. are found running wild in disturbed areas in the study area.

## CUCUMELLA Chiovenda

Fl. Somalia 183. 1929.

**Cucumella silentvalleyii** Manilal *et al.*, Acta. Bot. India 13: 283. 1985; Manilal, Fl. Silent Valley 115. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 199. 1996.

Creepers, stems scabrid. Leaves to 4.5 x 5.5 cm, obtusely 5-angular, cordate at base crenate, scabrid; petiole 6 cm long. Flowers monoecious, axillary, solitary, pedicellate; calyx tube tubular; lobes ovate, acute; petals 5, 10 x 6 mm, obovate, obtuse, yellow. Stamens 3, free, erect, connective produced into a hood; anthers flexuous, hispid; ovary fusiform, hispid. Fruit 1.5 x 0.8 cm, ellipsoid, hispid; seeds 3.5 x 2 mm, obovate, compressed, smooth.

*Fl. & Fr.* :August-December

*Distr.* : Southern Western Ghats (Kerala). Rare; in the openings of evergreen forests. Koruthode, *JA 16231.*

## CUCUMIS Linnaeus

Sp. Pl. 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. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 176. 1976; Chakravarthy, Fl. India Fasc. 11: 35. 1982; Manilal, Fl. Silent Valley 116. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 199. 1996. **Peerappattikka.**

Slender climbers; stems scabrid; tendril simple. Leaves to 12 cm across; entire or shallowly 5-lobed, scabrous; petiole to 15 cm long. Male flowers in fascicles of 3-5; pedicel to 1 cm long; calyx tube campanulate, hispid; petals 7 mm long, obovate, yellow; stamens 3, anthers flexuous, coherent, connective crested with laciniate lobes. Female flowers solitary, calyx corolla similar to male flowers; ovary oblong, many-ovuled. Berry 3.5 x 2.5 cm, oblong, softly scattered-spinous, greenish-yellow with white stripes; seeds many, compressed.

*Fl. & Fr.* : August-November

*Distr.* : India, North Africa & Europe. Common; in semi-evergreen forests. Koruthode, *JA 13932;* Karadikkavala, *JA & KPR 16271.*

## **DIPLOCYCLOS** Post & O. Kuntze

Lex. 178. 1903.

**Diplocyclos palmatus** (L.) Jeffrey, Kew Bull. 15: 352. 1962; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 177. 1976; Chakravarthy, Fl. India Fasc. 11: 48. 1982; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 644. 1983; Manilal, Fl. Silent Valley 116. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 202. 1996. ***Bryonia palmata*** L., Sp. Pl. 1012. 1753. ***B. 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, non (L.) Naud., 1859; Gamble, Fl. Pres. Madras 534.1919. **Nai unnikkai** (Mala Arayan).

Slender climbers, tendrils bifid. Leaves to 12 cm across, palmately deeply 5-lobed, serrate, lobes scabrous; petiole 3-5 cm long. Flowers monoecious, fascicled, axillary, 3-7-together; pedicel 1.5 cm long; calyx tube 3 mm long, campanulate, lobes subulate; petals 5, 7 x 4 mm, obovate, 3 mm long; stamens 3, anthers conduplicate, 3 mm long; pistillode clavate, 3-lobed above; ovary globose, ovules horizontal; style slender; stigmas 3. Fruit a berry, 2 cm across, globose, red with white lines; seeds 6 x 7 mm, pyriform, compressed, thinly rugose.

*Fl. & Fr.* :January-March

*Distr.* : India and Sri Lanka. Common; in margins of evergreen forests. Uppupara, *JA 13192;* Arjunankotta, *JA & KPR 15073.*

*Ethnobotanical use* : Used as a fruit vegetable

## **GYMNOPETALUM** Arnott

in Hooker's J. Bot. 3: 278. 1841.

**Gymnopetalum wightii** Arn., Madras J. Lit. Sci. 12: 52. 1840; Clarke in Hook. f., Fl. Brit. India 2: 611. 1879; Gamble, Fl. Pres. Madras 530. 1919; Chakravarthy, Fl. India Fasc. 11: 54. 1982; Manilal, Fl. Silent Valley 118. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 202. 1996.

Scabrous climber; tendrils bifid. Leaves to 6 x 5 cm, cordate at base, entire or shallowly 3-lobed, acute, distantly spineus toothed; petiole 2 cm long. Male flowers 3-7 together, on long-peduncled cymes; peduncle 4-5 cm long; calyx tube to 18 mm long, constricted above, tubular, lobes subulate; petals 10 x 7 mm, obovate, entire, yellow; stamens 3, anthers conduplicate, 3 mm long; female flowers axillary, solitary; pedicellate; ovary elliptic, densely hispid; style 1, stigmas 3, linear. Berry 5 x 2 cm, oblong, red, acuminate at both ends; seeds 6 x 3 mm, oblong, compressed, black.

*Fl. & Fr.* :December-January

*Distr.* : India and Sri Lanka. Rare; in forests margins. Anchuruli, *JA 14275, JA 14278.*

## LUFFA P. Miller

Gard. Dict. Abr. ed. 4. 1754

**Luffa cylindrica** (L.) M. Roem., Syn. Monogr. 2: 63. 1846; Chakravarthy, Fl. India Fasc. 11: 70. 1982; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 646. 1983; Manilal, Fl. Silent Valley 118. 1988. ***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. 1919. **Peechilinga** (Mala Arayan).

Climbers, tendrils 3-6-fid. Leaves to 7 x 7 cm, shallowly 5-lobed, lobes triangular, acute, toothed, densely hispid below, scabrous above; petiole to 6 cm long. Female flowers axillary, solitary; pedicel to 6 cm long. Fruit to 21 x 7 cm, cylindric, terete, fibrous; seeds many.

*Fl. & Fr.* : November-December

*Distr.* : Pantropical. Occasional; along forest margins. Pambavalley, *JA 12751.*

Ethnobotanical use: The dried fruits is used as sponge in bathing.

## MOMORDICA Linnaeus

Sp. Pl. 1009. 1753

**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. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 177. 1976; Chakravarthy, Fl. India Fasc. 11: 94. 1982; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 648. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 204. 1996. **Kattupaval** (Urali).

Slender climbers; tendrils simple. Leaves to 8 x 7 cm, ovate, cordate at base, entire or shallowly 3-lobed, distantly glandular-toothed, scabrous below; petiole 2 cm long. Flowers dioecious, solitary, axillary; pedicels 4-6 cm long, bracteate at middle; bracts of male flower 1.5

cm across; calyx tube short, campanulate, lobes 10 x 1.5 mm, lanceolate; petals 27 x 18 mm, obovate, yellow; stamens 3, anthers free, conduplicate. Female flowers few; ovary densely muricate, ovules horizontal; stigma 3-lobed. Berry 5 x 2 cm, ellipsoid, densely echinate, red; seeds 8 x 7 mm, irregular, rugose, black.

*Fl. & Fr.* : September-December

*Distr.* : India, Burma, China and Sri Lanka. Common; in moist deciduous forests. Uppupara, *NS 1901, JA 14135, JA 14138.*

*Ethnobotanical use*: Tender and mature fruits are used as vegetable (Mannan).

## **MUKIA** Arnott

Madras J. Lit. Soc. 17 : 50. 1840.

Creepers or climbers with slender stems; tendrils simple. Leaves chartaceous, deltoid or ovate in outline, shallowly or deeply lobed. Flowers monoecious, clustered in axillary fascicles, female flowers sometimes solitary. Male flowers : calyx tube short, campanulate, lobes linear; corolla yellow, lobes ovate; stamens 3, free, anthers erect, one 1-celled and two 2-celled; pistillode 3-lobed. Female flowers: calyx and corolla similar to male flowers; ovary globose to fusiform, villous; ovules many; style short, stigma 3-lobed. Fruit a berry; seeds compressed, smooth or pitted.

1. Seeds smooth on faces; petiole ca. 3 cm long.....**M. leiosperma**
1. Seeds rugose on faces; petiole to 6 cm long.....**M. maderaspatana**

**Mukia leiosperma** (Wight & Arn.) Wight, Ann. Mag. Nat. Hist. 8: 208. 1842; Clarke in Hook. f., Fl. Brit. India 2: 623. 1879; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 649. 1983. ***Bryonia leiosperma*** Wight & Arn., Prodr. 1: 345. 1834. ***Melothria leiosperma*** (Wight & Arn.) Cogn. in DC., Monogr. Phan. 3: 622. 1881; Gamble, Fl. Pres. Madras 539. 1919; Chakravarthy, Fl. India Fasc. 11: 81. 1982.

Climbers, stems densely pilose. Leaves 6 x 6 cm, shallowly 5-lobed, lobes obtuse, cuspidate, spineus serrate along the margins, coarsely scabrous above, densely tomentose below; petiole 3 cm long, densely villous. Male flowers 2-3 together, fascicled; pedicel 1 cm long, villous; calyx tube 5 mm long, densely villous; petals yellow, glabrous. Berry 8 mm across, globose, glabrous; seeds few, 5 x 2.5 mm, obovate, smooth, emarginate, yellow.

*Fl. & Fr.* :January-March

*Distr.* : India, China and Sri Lanka. Occasional; along the margins of evergreen forests. Swamikkayam, *JA 13133.*

**Mukia maderaspatana** (L.) Roem., Syn. Monogr. 2: 47. 1846; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 178. 1976; Jeffrey, Kew Bull. 34: 802. 1980; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 650. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 204. 1996. *Cucumis maderaspatana* L., Sp. Pl. 1012. 1753. ***Mukia scabrella*** (L. f.) Arn. in Hook. f., Fl. Brit. India 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. 1919; Chakravarthy, Rec. Bot. Surv. India 17: 141. 1959 & Fl. India Fasc. 11: 83. 1982.

Stem coarsely scabrous. Leaves to 9 x 7 cm, ovate, cordate at base; entire or shallowly 5-lobed; spineus serrate, densely scabrous from peltate tubercles; petiole 6 cm long. Male flowers 8-12 together, 4 mm across, yellow; pedicel 6 mm long; calyx densely hairy outside, lobes subulate; petals 2.5 mm long, obovate, yellow; anthers 1 mm long. Female flowers solitary or 2-3 together. Berry 1 cm across; seeds 5 x 3 mm, obovate, marginate, yellowish white, rugose.

*Fl. & Fr.* :October-January

*Distr.* : Africa, Indo-Malesia and Australia. Common; in moist deciduous forests. Koruthode, *JA 14199.*

## **SOLENA** Lourerio

Fl. Cochinch. 477, 514. 1790.

**Solena amplexicaulis** (Lam.) Gandhi in Sald. & Nicols., Fl. Hassan Dist. 179. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 651. 1983; Manilal, Fl. Silent Valley 119. 1988. ***Bryonia amplexicaulis*** Lam., Encycl. 1: 496. 1785. ***Solena heterophylla*** Lour., Fl. Cochinch. 514. 1790. ***Zehneria umbellata*** Thw., Enum. Pl. Zeyl. 125. 1859; Clarke in Hook. f., Fl. Brit. India 2: 625. 1879. ***Melothria heterophylla*** (Lour.) Cogn. in DC., Monogr. Phan. 3: 618. 1881; Gamble, Fl. Pres. Madras 539. 1919; Chakravarthy, Fl. India Fasc. 11: 79. 1982.

Slender climbers; stem scabrous. Leaves to 15 x 7.5 cm, ovate, hastate and amplexicaule at base, coriaceous, scabrous. Flowers dioecious. Male flowers in axillary racemes; pedicels 8 mm long, bracteate at middle; calyx tube 6 mm long, campanulate, lobes minute; petals 1.5 mm long, triangular; stamens 3, erect, anthers transverse, connective produced into a globose hood. Female flowers solitary, pedicellate. Berry 2 x 2.5 cm, globose, smooth; seeds 8 x 8 mm, globose, rugose along the margins, dark brown.

*Fl. & Fr.* :December-May

*Distr.* : Indo-Malesia and Pakistan. Common; in disturbed forests areas. Mangaladevi, *JA 12702,* Uppupara, *13483;* Pachakkanam, *JA & KPR 15156.*

## 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. Female flowers bracteate; berry globose.....**T. anamalayansis**
1. Female flowers not bracteate; berry ellipsoid or fusiform.....2
2. Leaves unlobed, ovate.....**T. nervifolia**
2. Leaves palmately lobed.....3
3. Lobes of leaf entire, glabrous.....**T. tricuspidata**
3. Lobes of leaf denticulate, hairy.....4
4. Stem glandular; lobes of leaves obtuse; male flowers bracteate.....**T. lobata**
4. Stem eglandular, sparsely pilose; lobes of leaves acute; male flowers ebracteate.....**T. cucumeriana**

**Trichosanthes anamalayansis** Bedd., Madras J. Lit. Sci. Ser. 3, 1: 47. 1864 & Trans. Linn. Soc. London 25: 217. 1865; Gamble, Fl. Pres. Madras 530. 1919, "*anamalayana*"; Chakravarthy, Fl. India Fasc. 11: 107. 1982; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 652. 1983.

Large climbers; stem pilose, tendrils bifid. Leaves to 15 cm across, shallowly 3-5-lobed, lobes cuspidate, toothed, tomentose below, covered with circular cystolith above; petiole 5-6 cm long. Female flowers in cymes; bracts 3 cm across, deeply serrate; calyx tubular; petals 3 cm long, white. Berry 4 cm across, globose, red, smooth; seeds many, obovate, smooth.

*Fl. & Fr.* :September-December

*Distr.* : Southern Western Ghats. Common; in grasslands-forests margins. Uppupara, *JA 12489.*

**Trichosanthes cucumeriana** L., Sp. Pl. 1008. 1753; Clarke in Hook. f., Fl. Brit. India 2: 609. 1879; Gamble, Fl. Pres. Madras 529. 1919; Chakravarthy, Fl. India Fasc. 11: 112. 1982; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 653. 1983. ***T. anguina*** L., Sp. Pl. 1008. 1753; Clarke in Hook. f., Fl. Brit. India 2: 610. 1879; Gamble, Fl. Pres. Madras 530. 1919. **Kattu padavalam** (Mala Arayan).

Climbers. Leaves to 17 cm across, 5-9-lobed; lobes obovate or ovate, acute, spineus serrate, densely villous and coarsely reticulate below; petiole 3.5 cm long. Male flowers in 8-15 flowered

racemes. Female flowers axillary, solitary; calyx tube 15 mm long; petals 2.5 cm long, white. Fruiting pedicel 4-5 cm long. Berry 9 x 3.5 cm, fusiform with a cuspidate tip, glabrous; seeds 12 x 6 mm, oblong, compressed, undulate, truncate.

*Fl. & Fr.* :November-March

*Distr.* : Indo-Malaya. Common; along forests margins. Methaganam, *JA 13640.*

**Trichosanthes lobata** Roxb., Fl. Ind. 3: 703. 1832; Clarke in Hook. f., Fl. Brit. India 2: 610. 1879; Gamble, Fl. Pres. Madras 529. 1919; Chakravarthy, Fl. India Fasc. 11: 117. 1982; Manilal, Fl. Silent Valley 120. 1988. ***T. perrottetiana*** Cogn. in DC., Monogr. Phan. 3: 362. 1881; Gamble, Fl. Pres. Madras 529. 1919. ***T. villosula*** Cogn. in DC., Monogr. Phan. 3: 362. 1881; Fyson., Fl. South India Hill St. 2: t. 189. 1932; Gamble, Fl. Pres. Madras 529. 1919.

Climbers; stem glandular. Leaves 10 cm across, 5-lobed, lobes cuspidate, toothed, densely pubescent beneath. Male racemes to 17 cm long, glandular pubescent. Flowers to 15 in a raceme; pedicel 2.5-4 cm long; bracts 5 mm long, oblanceolate; calyx tube 2 cm long, puberulus; lobes linear; petals 3 x 0.7 cm, white, deeply fimbriate into narrow lobes. Female flowers solitary, axillary. Berry 8 x 3 cm, glabrous, green with white lines; seeds 13 x 6 mm, oblong, rugose along margins.

*Fl. & Fr.* :November-December

*Distr.* : Throughout India. Occasional; in evergreen forests. Umikuppan, *JA 12640,* Vellimala, *JA 12943.*

**Trichosanthes nervifolia** L., Sp. Pl. 1008. 1753; Gamble, Fl. Pres. Madras 529. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 180. 1976; Jeffrey, Kew Bull. 34: 979. 1980; Chakravarthy, Fl. Ind. Fasc. 11: 119. 1982; Manilal, Fl. Silent Valley 120. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 206. 1996. ***T. cuspidata*** Lam., Encycl. 1: 190. 1789; Gamble, Fl. Pres. Madras 529. 1919; Chakravarthy, Fl. India Fasc. 11: 112. 1982.

Slender climber. Leaves to 15 x 9 cm, ovate, acute, cordate at base, distantly denticulate, coarsely reticulate, glabrous; petiole 2 cm long. Male racemes 5 cm long, zig-zag, many flowered, glabrous; pedicel 1.5 cm long; calyx tube 3.5 cm long, narrow; petals 2 cm long, fimbriate into narrow lobes. Female flowers solitary. Berry to 11 x 7 cm, ellipsoid, smooth, yellow; seeds many, 10 x 10 mm, irregularly lobed; dark brown.

*Fl. & Fr.* :November-March

*Distr.* : Peninsular India and Sri Lanka. Fairly common; in all types of forests. Mlappara, *JA 13317;* Puthussery, *JA 13505;* Methaganam, *JA 16824.*

**Trichosanthes tricuspidata** Lour., Fl. Cochinch. 589. 1790; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 653. 1983; Manilal, Fl. Silent Valley 121. 1988. ***T. bracteata*** (Lam.) Voigt, Hort. Sub. Calc. 58. 1845; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 179. 1976; Chakravarthy, Fl. India Fasc. 11: 109. 1982. ***Modecca bracteata*** Lam., Encycl. 4: 210. 1797. ***Trichosanthes palmata*** Roxb., Fl. Ind. 3: 704. 1832; Wight, Ill. 2: 104. 1850; Clarke in Hook. f., Fl. Brit. India 2: 606. 1879; Gamble, Fl. Pres. Madras 529. 1919. ***T. lepiniana*** Cogn. in DC., Monogr. Phan. 3: 377. 1881; Gamble, Fl. Pres. Madras 530. 1919.

Glabrous climbers. Leaves to 12 x 15 cm, palmately 3-lobed, lobes oblong, acuminate; petiole 1 cm long. Male flowers in peduncled cymes; peduncle 6 cm long; bracts 3 x 2 cm, obovate, coarsely fimbriate; calyx tube 2.5 cm long, lobes lanceolate, 1.8 cm long.

*Fl.* : June

*Distr.* : India, Burma and Java. Rare; in evergreen forests. Poonkavanam, *JA & KPR 15486.*

## 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 3: 543. 1919; Chakravarthy, Fl. India Fasc. 11: 124. 1982; Manilal, Fl. Silent Valley 121. 1988.

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 to 40 x 15 cm, axillary, drooping. Flowers dioecious, 2-8 together, pedicelled; sepals 5, 2 mm long, ovate, acute, free; petals 3.5 x 2 mm, oblong; stamens 5, free; anthers transverse. Female flowers larger; ovary obconic, glabrous, 10-12 mm long. Fruits 6-10 x 2.5-3 cm, cylindric, clavate, truncate at apex; seeds many, 2 x 1 cm, compressed, oblong, winged.

*Fl. & Fr.* :September-December

*Distr.* : Indo-Malesia and Sri Lanka. Occasional; in disturbed forest areas. Vallakkadavu, *JA 17836.*

## 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 pedunculate umbels. Calyx tube

campanulate, 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. Flowers monoecious; petal glabrous ..... 2
1. Flowers dioecious; petals villous within ..... 3
2. Female flowers in axillary fascicles; petiole ca. 1.5 cm long ..... **Z. maysorensis** var. **umbellata**
2. Female flowers solitary; petioles to 5 cm long ..... **Z. maysorensis** var. **maysorensis**
3. Berry ellipsoid, 4 x 1.5 cm; leaves deltoid ..... **Z. thwaitesii**
3. Berry globose, 7 mm across; leaves cordate ..... **Z. scabra**

**Zehneria maysorensis** (Wight & Arn.) Arn., J. Bot. (Hooker) 3: 275. 1841, var. **maysorensis,** Gandhi in Sald. & Nicols., Fl. Hassan Dist. 181. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 655. 1983; Manilal, Fl. Silent Valley 122. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 206. 1996. ***Bryonia maysorensis*** Wight & Arn., Prodr. 345. 1834; Wight, Ic. t. 1609. 1850. ***Melothria mucronata*** sensu Chakravarthy, Monogr. Indian Cucurb. 148. 1959, non (Blume) Cogn., 1881. ***M. perpusilla*** var. ***subtruncata*** Cogn. in DC., Monogr. 3: 606. 1881; Gamble, Fl. Pres. Madras 538. 1919. ***M. perpusilla*** sensu Gamble, Fl. Pres. Madras 538. 1919, non (Blume) Cogn., 1881.

Branchlets glabrous. Leaves to 10 x 8 cm, widely cordate at base, shallowly 5-lobed, lobes glandular-serrate, glabrous; petiole to 5 cm long. Female flowers solitary, 5 mm across; pedicels 3 cm long; petals 2.5 x 1.5 mm, densely hispid; staminodes subulate; style 3-fid at apex. Male flowers 3-10, on peduncled umbels, 6 mm across; filaments bearded. Berry 13 x 6 mm, oblong, cylindrical, reddish; seeds 1.7 x 1.2 mm, obovoid, smooth, white.

*Fl. & Fr.* : September-January

*Distr.* : Peninsular India and Sri Lanka. Common; in the openings in forests and grasslands. Koruthode, *JA 12250,* Brook' Peak, *JA 17020.*

**Zehneria maysorensis** (Wight & Arn.) Arn. var. **umbellata** (Chakravarthy) Kumari in Nair & Henry, Fl. Tamil Nadu Ser. I, 1: 175. 1983. ***Melothria mucronata*** (Bl.) Cogn., var. ***umbellata*** Chakravarthy, Monogr. Indian Cucurb. 150. 1959 & Fl. India Fasc. 11: 85. 1982.

Branches scabrous. Leaves to 7 x 6 cm, ovate-deltoid, truncate or shallowly cordate at base, acuminate at apex, glabrous, coarsely toothed; petiole 1.5 cm long. Male flowers 6 mm across, 2-6 in umbels, pedicellate; peduncles 1.5 cm long; pedicel 3-5 mm long; petals white, glabrous.

Female flowers in axillary fascicles; pedicel to 1 cm long. Berry 8 mm across, globose; seeds obovoid, smooth, white.

*Fl. & Fr.* : August-December

*Distr.* : South Western India. Fairly common; along the margins of evergreen forests. Pachakkanam, *JA 12326;* Sabarimala, *JA 12377;* Vellimala, *14333.*

**Zehneria scabra** (L. f.) Sond. in Harv. & Sond., Fl. Cap. 2: 486. 1862; Jeffrey, Kew Bull. 15: 369 & 370. 1962; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 655. 1983; Manilal, Fl. Silent Valley 122. 1988. ***Bryonia scabra*** L. f., Suppl. Pl. 423. 1781. ***Zehneria hookeriana*** Arn., J. Bot. (Hooker) 3: 275. 1841; Clarke in Hook. f., Fl. Brit. India 2: 624. 1879. ***Melothria perpusilla*** sensu Chakravarthy, Monogr. India Cucurb. 146. 1959, p.p. & Fl. India Fasc. 11: 85. 1982, non (Bl.) Cogn., 1881. ***M. mucronata*** sensu Gamble, Fl. Pres. Madras 538. 1919, non (Blume) Cogn., 1881.

Glabrous climbers. Leaves to 7 x 7 cm, triangular, cordate at base, 3-lobed or entire, glandular toothed; petiole to 3 cm long. Umbel 3-5 flowered; peduncle 1.5 cm long. Female flowers 5 mm across; calyx tube 2 mm long, campanulate; petals 2.5 x 2 mm, obovate; stigma 3-lobed. Male flowers larger, 8 mm across; petals ovate, acute; anthers 1 mm long, connective pubescent. Berry 7 mm across, globose; seeds 5 x 4 mm, obovate, biconvex, smooth, not marginate.

*Fl. & Fr.* :August-December

*Distr.* : Indo-Malesia. Common; along the margins of evergreen forests at high elevations. Uppermanalar, *JA 13974;* Vellimala, *JA & KPR 14366,* Brook's Peak, *JA 17020.*

**Zehneria thwaitesii** (Schweinf.) Jeffrey in Kew Bull. 15: 371. 1962; Manilal, Fl. Silent Valley 123. 1988. ***Melothria thwaitesii*** Schweinf., Relique. Kotschy 44, t. 29. 1868. ***M. zeylanica*** Clarke in Hook. f., Fl. Brit. India 2: 626. 1879; Gamble, Fl. Pres. Madras 538. 1919; Chakravarthy, Fl. India Fasc. 11: 87. 1982. **Kattu koval** (Mannan).

Creeping prostrate herb; stems sulcate; tendrils undivided. Leaves to 4 x 5 cm, deltoid, acute, truncate at base, distantly glandular-toothed, scabrous above; petiole 1 cm long. Male flowers axillary, fascicled, 8 mm across; petals ovate, acute, spreading, glabrous; anthers 2 mm long. Female flowers solitary. Berry 4 x 1.5 cm, ribbed.

*Fl. & Fr.* :Throughout the year

*Distr.* : South India and Sri Lanka. Common; in all types of forests. Naduthottam, *JA 12149;* Uppupara, *JA 13033.*

*Ethnobotanical use* : The fruits are edible and eaten raw or cooked

## 62. DATISCACEAE

R. Brown ex. Lindl., Intr. Nat. Syst. Bot. 109. 1830.

### TETRAMELES R. Brown

Observ. Pl. Denham & Clapperton 230. 1826.

**Tetrameles nudiflora** R. Br. in Benn., Pl. Jav. Rar. 79, t. 17. 1838; Clarke in Hook. f., Fl. Brit. India 2: 627. 1879; Gamble, Fl. Pres. Madras 544. 1919; Sumithra. in Dassan. & Fosb., Rev Handb. Fl. Ceylon 6: 108. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 208. 1996. *T. grahamiana* Wight, Ic. t. 1956. 1853. **Cheenimaram** (Mala Arayan)

Tall trees with large buttresses; bark white, smooth. Leaves alternate, 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 mm across; sepals 4, ovate, united at base, stamens 4, free. Female flowers 4 mm long, 3 mm across; ovary 1-celled; inferior; ovules many, on 4-parietals placentas, styles 4, free, bulged at tip. Fruit a capsule, 6 x 4 mm, ovoid, opening by terminal pore; seeds brown.

*Fl. & Fr.* :February-May

*Distr.* : South-East Asia. Common; in evergreen forests. Puthussery, *JA 13497*; Uppupara, *JA 13534.*

## 63. 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. Leaves peltate, orbicular.....**B. albo-coccinea**

1. Leaves not peltate, ovate to broadly ovate.....2

2. Stem very short or absent; scape 20-80 cm long.....**B. floccifera**

2. Stem elongate; peduncles to 5 cm long.....3

3. Sepals 4; wings of the capsule strongly truncate at apex.....**B. trichocarpa**

3. Sepals 2; wings of capsule rounded at apex.....4

4. Leaves pubescent, margins coarsely serrate.....**B. malabarica**

4. Leaves glabrous, entire or distantly dentate.....**B. fallax**

**Begonia albo-coccinea** Hook., Bot. Mag. t. 4172. 1845; Clarke in Hook. f., Fl. Brit. India 2: 654. 1879; Gamble, Fl. Pres. Madras 546 1919; Kumar & Bhatt., J. Econ. Tax. Bot. 16(3): 566. 1992. ***B. grahamiana*** Wight, Ic. t. 1811. 1848. **Kalthamara** (Mannan).

Stemless herbs. Leaves 8 x 12 cm, orbicular, entire, pubescent below, nerves 10, radiating; petiole 12 cm long, densely pubescent. Scape 14-20 cm long, branching; cymes 5 cm across, dichotomous; pedicels 1 cm long, hispid. Flowers few; male sepals 4, outer sepals 7 x 9 mm, pale rose; inner sepals 7 x 5 mm, curved, hispid.

*Fl.* : Throughout the year

*Distr.* : Southern Western Ghats. Common; on wet rocks in evergreen forests at high elevations. Deviar, *JA 12098.*

*Ethnobotanical use* : The short stems are used for Syphilis (Mannan).

**Begonia fallax** A. DC., Prodr. 15(1): 329. 1864; Clarke in Hook.f. Fl. Brit. India 2: 645. 1879; Ansari, Nair & Nair, J. Econ. Tax. Bot. 5(1): 125. 1984. ***Diploclinium lindleyanum*** Wight, Ic. t. 1817. 1852 [Fig. 34 A].

Shrubs; stems reddish, glabrous. Leaves to 18 x 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 2.5 x 0.8 cm, oblong-lanceolate, glabrous, whitish. peduncle 3-4 cm long, axillary, dichotomously branched; cymes 5 cm across. Flowers few; pedicels 1 cm long; male sepals 4, outer 10 mm across, orbicular, pale pink; inner smaller, anthers truncate. Capsule 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.

*Fl. & Fr.* : December-March

Dist. Southern Western Ghats, endemic. Common; in ever green forests above 1200 m altitude, Aladi *JA 14449.*

*Note* : When *Diploclinium lindleyanum* is described Wight cited that this was allied to *B. malabarica* Lam. This made Gamble to merge these two species into **B. malabarica** Lam. Ansari *et al* (1984) critically studied these two species and found that the number of sepals and division of placenta are constant features.

**Begonia floccifera** Bedd., Ic. t. 11. 1868-1874; Clarke in Hook.f., Fl. Brit. India 2: 654. 1879; Gamble, Fl. Pres. Madras 546. 1919; Smith *et al.*, Smiths. Contrib. Bot. 60: 168. 1986; Kumar & Bhatt., J. Econ. Tax. Bot. 16(3): 567. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 207. 1996.

Leaves to 18 cm across, reniform or orbicular, obliquely cordate, distantly toothed, floccose-pubescent below, nerves 11, prominent; petiole to 30 cm long. Peduncle solitary or 2-3 together, pubescent; cymes 10 cm across, branched; pedicels filiform. Flowers many; male sepals 4, outer sepals 7 x 7 mm, orbicular; anthers truncate at apex; female sepals 2, 6 x7 mm, orbicular; styles 3, stigmas branched. Capsule 12 x 15 mm; seeds many, vertically ridged 0.5 x 0.25 mm, brown.

*Fl. & Fr.* :January-May

*Distr.* : Southern Western Ghats. Rare; in evergreen forests at high elevation. Chokkampetti, *JA 13612*; *JA & KPR 17781.*

**Begonia malabarica** Lam., Encycl. 1: 393. 1785; Clarke in Hook.f., Fl. Brit. India 2: 655. 1879; Gamble, Fl. Pres. Madras 546. 1919 ; Jayas. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 146. 1983; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 657. 1983; Ansari, Nair & Nair, J. Econ. Tax. Bot. 5(1): 125. 1984; Smith *et al.*, Smiths. Contrib. Bot. 60: 196. 1986; Manilal, Fl. Silent Valley 124. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 207. 1996. ***Diploclinium dipetala*** Wight, Ic. t. 1813. 1852 [Fig. 34 B].

Shrubs, to 2 m high; stem terete, glabrous. Leaves to 15 x 8 cm, ovate, strongly unequal at base, toothed and serrate along the margins, hispid; petiole to 6 cm long; stipule 13 x 5 mm, lanceolate. Peduncles to 3 cm, axillary; cymes 5-10 cm across, dichotomous. Flowers many; male sepals 2, 15 mm across, orbicular, pink; anthers 2 mm long, connective produced into a orbicular appendage; female sepals 7 x 13 mm, reniform. Capsule 2 x 1.5 cm, wings obtuse.

*Fl. & Fr.* :Throughout the year

*Distr.* : South India and Sri Lanka. Very common; along riverbanks in evergreen forests. Mangaladevi, *JA 12041*; Vellimala, *JA 14040.*

**Begonia trichocarpa** Dalz. in Hook.'s Kew J. Bot. Misc. Gard. 3: 280. 1851; Clarke in Hook. f., Fl. Brit. India 2: 653. 1879; Gamble, Fl. Pres. Madras 546. 1919; Kumar & Bhatt. J. Econ. Tax. Bot. 16(3): 567. 1992.

Large herbs; stem reddish, flaccid, sub-erect, hispid. Leaves to 8 x 3 cm, ovate-oblong, acuminate, obliquely cordate at base, hirtus, membranous, 5-nerved from the base; petiole 1-3 cm long, hispid; stipule 6 x 2 mm, lanceolate. Cymes 2 cm across, lateral; peduncle 1-2 cm long. Flowers 1-3 together; male sepals 4, outer sepals 5 x 7 mm, hispid; inner smaller, curved,

glabrous; female sepals 4, similar to male flowers. Capsule 1 x 2 cm obovate, truncate at apex, wings acute above; seeds minute, many, hexagonal.

*Fl. & Fr.* :August-December

*Distr.* : Southern Western Ghats. Common; along riversides at low elevations. Koruthode, *JA 12243; 17135.*

## 64. MOLLUGINACEAE

Hutch., Fam. Fl. Pl. 1: 128. 1926.

1. Flowers axillary, fascicled.....**Glinus**
1. Flowers in terminal panicled cymes.....**Mollugo**

### GLINUS Linnaeus

Sp. Pl. 463. 1753

Herbs. Leaves alternate, opposite or whorled, entire, stipulate. Flowers pedicelled, solitary, fascicled or cymose, axillary; sepals 5, imbricate; petals absent; stamens 5, free, alternate to sepals, filaments erect; ovary 5 celled, globose; ovules many, axile, styles 3-5, free. Fruit a capsule, loculicidal; seeds many, minute.

1. Plants densely covered with stellate hairs.....**G. lotoides**
1. Plants glabrous.....**G. oppositifolia**

**Glinus lotoides** L., Sp. Pl. 463. 1753; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 664. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 208. 1996. ***Mollugo lotoides*** (L.) O. Ktze., Rev. Gen. Pl. 214. 1891; Gamble, Fl. Pres. Madras 552. 1919; Fosb. in Dassan., Rev. Handb. Fl. Ceylon 9: 324. 1995. ***M. hirta*** Thunb., Prodr. Fl. Cap. 24. 1794; Clarke in Hook. f., Fl. Brit. India 2: 662. 1879.

Prostrate herbs. Leaves whorled, 3 or 4 at each node, to 3 x 1.5 cm, obovate to orbicular, obtuse, penninerved; petiole 5-10 mm long. Flowers in greenish-white, axillary fascicles of 3-5; pedicels 5-10 mm long; sepals 6 x 3 mm, densely stellate hairy, keeled; stamens 10-15, mixed with staminodes; ovary 3-celled, ellipsoidal, glabrous; styles 3, short.

*Fl. & Fr.* :December-April

*Distr.* : Pantropical. Occasional; along lake shores when water recedes. Thekkady, *JA & KPR 14911.*

Fig. 34. A. *Begonia fallax* A. DC.;
B. *Begonia malabarica* Lam.

**Glinus oppositifolia** (L.) A. DC., Bull. Herb. Boissier Ser. 2. 1: 552. 1901; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 665. 1983. ***Mollugo oppositifolia*** L., Sp. Pl. 89. 1753; Gamble, Fl. Pres. Madras 552. 1919; Fosb. in Dassan., Rev. Handb. Fl. Ceylon 9: 325. 1995. ***M. spergula*** L., Syst. Nat. ed. 10, 881. 1759; Clarke in Hook. f., Fl. Brit. India 2: 662. 1879.

Prostrate herbs, rooting at nodes. Leaves fascicled at nodes, to 4 x 2 cm, oblanceolate, acute or obtuse at apex. Flowers 3-6 together; pedicels to 1 cm long; sepals 3 mm long, ovate, acute; stamens 5; ovary 5-celled, oblong; styles 3. Capsule 3 mm long, oblong, glabrous; seeds subreniform, muricate, dark brown.

*Fl. & Fr.* :Throughout the year

*Distr.* : Africa, South-East Asia and Australia. Common; along lake shores and stream beds. Koruthode, *JA & KPR 14751.*

## MOLLUGO Linnaeus

Sp. Pl. 89. 1753

**Mollugo pentaphylla** L., Sp. Pl. 89. 1753; Gamble, Fl. Pres. Madras 553. 1919; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 668. 1983; Fosb. in Dassan., Rev. Handb. Fl. Ceylon 9: 329. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 208. 1996. ***M. stricta*** sensu Clarke in Hook. f., Fl. Brit. India 2: 663. 1879.

Erect herbs, to 20 cm high; stem quadrangular. Leaves whorled, 3-5 at each node, to 3 x 1 cm, obovate to lanceolate, obtuse or acute. Flowers 3 mm across, greenish-white, in terminal panicled cymes; pedicels 5-10 mm long, filiform; sepals 5, 2 x 1 mm, 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.

*Fl. & Fr.* :Throughout the year

*Distr.* : South-East Asia. Common; in lake shores and river beds. Thaannikkudy, *JA 12627*; Sabarimala, *JA 15479*; Anakuthivayal, *KPR 17739.*

## 65. APIACEAE

Lindl., Intr. Nat. Syst. Bot. ed. 2: 21. 1836; *nom. alt.* **Umbelliferae**

1. Umbels compound ..... 2
1. Umbels simple ..... 6
2. Lower leaves simple, orbicular ..... **Pimpinella**
2. Leaves all compound ..... 3

3. Leaves pedate ..... **Vanasushava**

3. Leaves pinnate or pinnatisect ..... 4

4. Fruit ovoid, not compress ..... **Carum**

4. Fruit compressed ..... 5

5. Leaflets linear-oblong ..... **Peucedanum**

5. Leaflets broader, ovate ..... **Heracleum**

6. Leaves digitately 7-9-lobed ..... **Hydrocotyle**

6. Leaves not lobed ..... **Centella**

## **CARUM** Linnaeus

Sp. Pl. 263. 1753

**Carum nothum** Clarke in Hook. f., Fl. Brit. India 2: 681. 1879; Gamble, Fl. Pres. Madras 559. 1919; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 1: 178. 1983.

Decumbent herbs with tuberous roots, to 90 cm high, stem terete, glabrous. Leaves bipinnate; pinnae trifoliate; leaflets to 6 x 2.5 cm, ovate, acuminate at apex, sharply serrate; petiole to 10 cm long, sheathing at base. Umbels compound, to 10 cm broad; peduncles to 20 cm long, leaf-opposed, rays 16, each to 6 cm long; pedicels 13 mm long, 12-14 together, slender. Flowers 1 mm across; calyx 5-toothed; petals 5, white, broadly ovate, cuspidate at apex with a strong midrib; white; stamens 5, erect; ovary 2-celled, style 2-fid. Fruit 2 x 1.5 mm, ovoid, obtuse, mericarps 6-ridged, glabrous, brown.

*Fl. & Fr.* :November-January

*Distr.* : India and Sri Lanka. Rare; in grasslands. Mangaladevi, *JA 12673.*

## **CENTELLA** Linnaeus

Sp. Pl. ed. 2, 1393. 1763.

**Centella asiatica** (L.) Urban in Mart., Fl. Bras. 11: 287, t. 78. 1879; Gamble, Fl. Pres. Madras 556. 1919; Krahnlik & Theob. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 484. 1981; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 676. 1983; Manilal, Fl. Silent Valley 124. 1988; Mukh. & Const., Umbell. India 15. 1993. ***Hydrocotyle asiatica*** L., Sp. Pl. 234. 1753; Wight, Ic. t. 565. 1842; Clarke in Hook. f., Fl. Brit. India 2: 669. 1879. **Kudakan, Kudangal.**

Herbs, rooting at nodes. Leaves orbicular-reniform, crenate or sub-entire, glabrous, to 5 cm across, nerves radiating; petiole to 12 cm long, sheathing at base. Flowers sessile, pink, in 2-5 flowered umbels; peduncles 1-2 cm long, axillary; calyx tube 1 mm long, adnate to the ovary,

lobes minute; petals 4, 1 mm long, oblong, recurved at apex, pink; stamens 4, filaments erect; ovary 2-celled, ovule solitary in each cell; style erect, bilobed at apex. Fruit ovoid, 3-4 mm long, reticulate-rugose, 7-9-ribbed.

*Fl. & Fr.* :August-November

*Distr.* : Asia & Pacific. Common; in moist deciduous forests. Koruthode, *JA 1797l.*

*Ethnobotanical use* : The entire plant is made into a paste and given for jaundice.

## HERACLEUM Linnaeus

Sp. Pl. 249. 1753

**Heracleum candolleanum** (Wight & Arn.) Gamble, Fl. Pres. Madras 565. 1919; Mukh. & Const., Umbell. India 243. 1993. ***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. **Kattugeerakam** (Mannan), **Njara** (Mala Arayan).

Shrubs; stem ridged, branched. Leaves to 45 x 25 cm, 1 or 2 pinnate; leaflets 7-9 or more, to 15 x 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 6-10 mm long, many-together, spreading. Flowers 5-merous, 2 mm across, calyx 5-toothed; petals 3, ovate, acuminate, with a strong midrib, glabrous; stamens 5, free, anthers ovate; ovary compressed. Fruit 7-10 x 4-7 mm, biconvex, dorsally compressed, winged, glabrous.

*Fl. & Fr.* :November-February

*Distr.* : Peninsular India. Common; in grasslands. Mangaladevi, *JA 16371.*

*Ethnobotanical use* : The fresh or dried fruits are orally given for stomach disorders

## 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. Umbels 3-5 together; leaves 7 cm across; petiole to 30 cm long.....**H. javanica**
1. Umbels solitary; leaves to 1.5 cm across; petiole to 6 cm long.....**H. sibthorpioides**

**Hydrocotyle javanica** Thunb., Diss. Hydroc. n. 17, t. 2. 1798; Clarke in Hook. f., Fl. Brit. India 2: 667. 1879; Gamble, Fl. Pres. Madras 556. 1919; Gandhi In Sald. & Nicols., Fl Hassan Dist. 416. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 681. 1983; Manilal, Fl. Silent Valley 125. 1988; Mukh. & Const., Umbell. India 11. 1993. ***H. polycephala*** Wight & Arn., Prodr. 366. 1834; Wight, Ic. t. 1003. 1845.

Creepers, stem villous, rooting at nodes. Leaves 9-lobed, crenate, obtuse, 9-ribbed from base; sparsely villous. Umbels fascicled; peduncles 1.5 cm long. Flowers 20-30 together, pedicellate; petals 0.6 mm long, ovate, acute. Fruit 1.5 x 2 mm, mericarps compressed, hemispherical, smooth.

*Fl. & Fr.* :Throughout the year

*Distr.* : Tropical Asia and Australia. Common; in semi-evergreen, evergreen and shola forests. Uppupara, *JA 14148.*

**Hydrocotyle sibthorpioides** Lam., Encycl. 3: 153. 1789; Gandhi In Sald. & Nicols., Fl Hassan Dist. 416. 1976; Mukh. & Const., Umbell. India 12. 1993. ***H. rotundifolia*** Roxb. ex DC., Prodr. 4: 64. 1830; Wight, Ic. t. 564. 1842; Clarke in Hook. f., Fl. Brit. India 2: 668. 1879; Gamble, Fl. Pres. Madras 556. 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 mm long, oblong, greenish. Fruit 0.7 x 0.7 mm, mericarps hemispherical, compressed, muricate.

*Fl. & Fr.* :Throughout the year

*Distr.* : Tropical Asia and Africa. Common; among grasses in marshy areas. Kumarikulam, *JA & KPR 14866*; Dam site, *JA & KPR 15043.*

## **PEUCEDANUM** Linnaeus

Sp. Pl. 245. 1753

**Peucedanum anamallayense** Clarke in Hook. f., Fl. Brit. India 2: 710. 1879; Fischer, Rec. Bot. Surv. India 9: 89. 1921, "*anamallayanum*"; Henry *et al.*, J. Bombay Nat. Hist. Soc. 75(3): 689. 1979; Mukh. & Const., Umbell. India 218. 1993.

Decumbent herbs with tuberous rootstock, to 40 cm high. Leaves decompound, to 20 x 15 cm, leaflets 4 x 0.7 cm, oblong, acute, penninerved, serrulate; rachis widely sheathing at base. Umbels terminal, compound; rays 5-7, each 3 cm long. Flowers polygamous, 1.5 mm across, pedicels 1 cm long, villous; calyx shortly 5 toothed; petals yellow, ovate, cuspidate with a strong

midrib; stamens 5, erect, filaments 1 mm long; pistillode biglobose; ovary glabrous, 2-celled, compressed. Mericarps orbicular, 8 mm across, biconvex, striate, winged.

*Fl. & Fr.* : November-January.

*Distr.* : Endemic to Anamalai Hills (Kerala). Rare; in grasslands. Mangaladevi, *JA 17982.*

## PIMPINELLA Linnaeus

Sp. Pl. 263. 1753

**Pimpinella candolleana** Wight & Arn., Prodr. 369. 1834; Wight, Ic. t. 341. 1840; Clarke in Hook. f., Fl. Brit. India 2: 687. 1879; Gamble, Fl. Pres. Madras 560. 1919; Sebast. & Vivek., Bull. Bot. Surv. India 9(1-4): 173. 1967; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1): 682. 1983; Mukh. & Const., Umbell. India 148. 1993 [Fig. 35].

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 cm long. Flowers 9-16 in an umbellule, 1.5 mm across, white; pedicels 5 mm long; calyx shortly 5-toothed; petals 5, 1 mm long, orbicular; stamens 5. Fruit 3 x 2 mm, ovate, densely villous, rugose.

*Fl. & Fr.* :November-January

*Distr.* : Peninsular India. Common; in grasslands. Thannikkudy, *JA 13068*; Kumarikulam, *JA & KPR 14269.*

## VANASUSHAVA Mukherjee & Constance

Kew Bull. 29: 595. 1974

**Vanasushava pedata** (Wight) Mukh. & Const., Kew Bull. 29: 595. 1974 & Umbell. India 90. 1993. ***Heracleum pedatum*** Wight, Ic. t. 342. 1840; Clarke in Hook. f., Fl. Brit. India 2: 716. 1879; Fyson, Fl. South India Hill. St. 2, t. 205. 1932; Gamble, Fl. Pres. Madras 565. 1919.

Procumbent herbs, rooting at lower nodes. Leaves pedate, 5-foliolate; leaflets to 4.5 x 2.5 cm, ovate, acute, serrate, scabrous; petiolule to 1 cm long; petiole to 13 cm long, sheathing at base. Umbels compound, 5 cm across; rays few, slender. Flowers white, 1.5 mm across. Calyx 5-toothed; petals white, unequal, orbicular, cuspidate; stamens 5, free, filaments erect; ovary compressed; style slender. Mericarps unequally winged.

*Fl. & Fr.* :October-December

*Distr.* : Peninsular India. Rare; in evergreen forests above 1500 m altitudes. Uppermanalar, *JA 13968.*

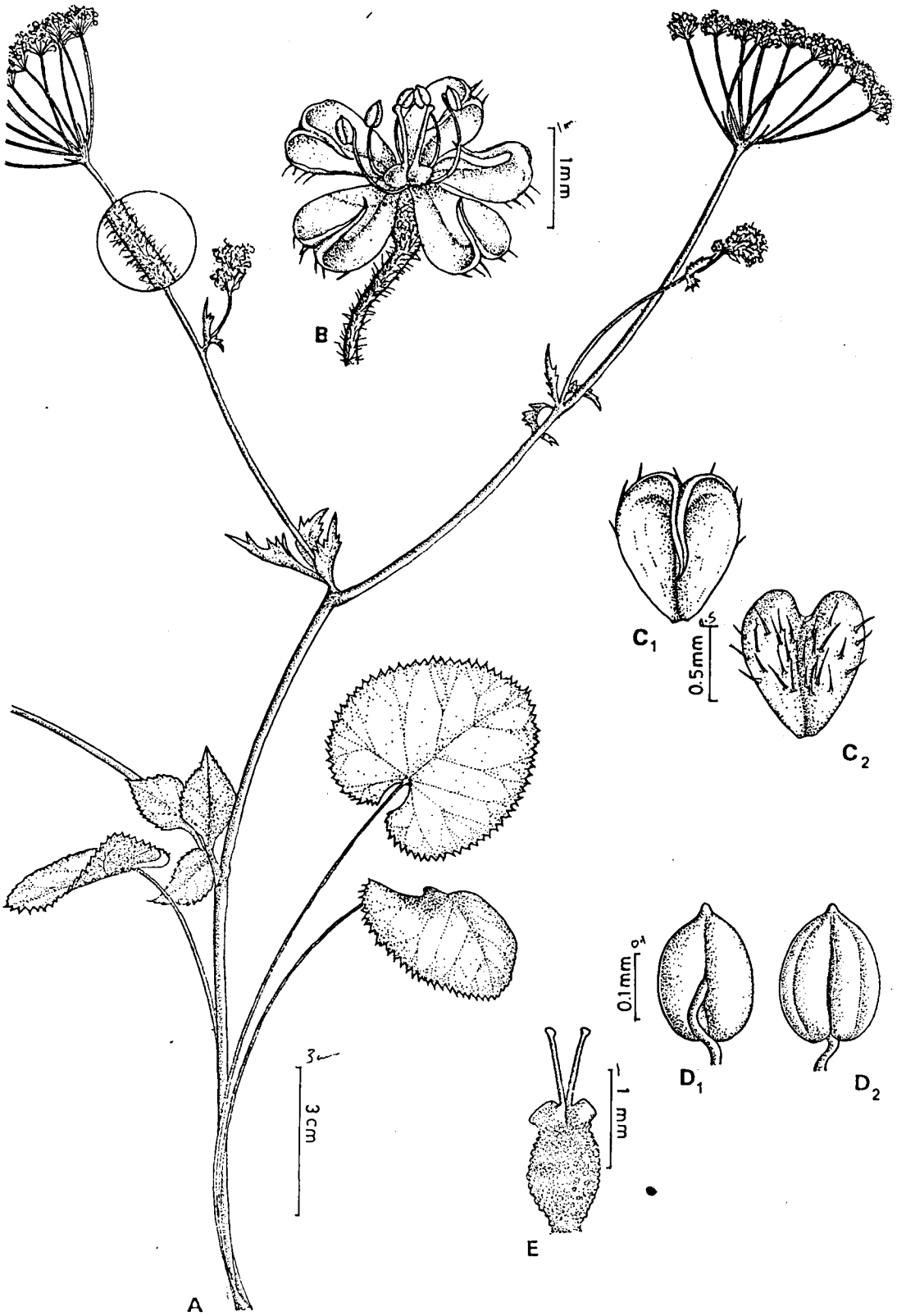



Fig. 35. *Pimpinella candolleana* Wight & Arn.: **A.** habit; **B.** flower; $C_1$. & $C_2$. petal-inner and outer views; $D_1$. & $D_2$. stamen; **E.** pistil.

## 66. ARALIACEAE

Juss., Gen. Pl. 217. 1789.

1. Leaves bipinnate; leaflets serrate; stem and leaves densely prickly.....**Aralia**
1. Leaves 1-pinnate or digitate; leaflets entire; stem and leaves unarmed.....2
2. Leaves digitate.....**Schefflera**
2. Leaves pinnate.....**Polyscias**

### ARALIA Linnaeus

Sp. Pl. 273. 1753

**Aralia malabarica** Bedd., Fl. Sylv. t. 121, pl. 15, f. 2. 1871; Clarke in Hook. f., Fl. Brit. India 2: 722. 1879; Gamble, Fl. Pres. Madras 567. 1919; Manilal, Fl. Silent Valley 126. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 212. 1996.

Large prickly shrubs. Leaves to 1 m long, bipinnately compound; leaflets opposite, to 18 x 7 cm, ovate, oblique at base, acuminate, sharply serrate, penninerved, sessile; rachis prickly, sheathing at base. Inflorescence large panicled umbels, 30 cm across; bracts ovate, acuminate. Flowers 3-4 mm across; 12-16 together; pedicels 1 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 7 x 7 mm, 5-angled, rugose; seeds five, 3 mm across, 3-angled, light brown.

*Fl. & Fr.* :July-September

*Distr.* : Southern Western Ghats. Occasional; in semi evergreen forests. Thekkady, *JA 12017.*

### POLYSCIAS J. R. Forster & G. Forster

Charact. Gen. 63, t. 32. 1775.

**Polyscias acuminata** (Wight) Seem., J. Bot. 3: 181. 1865; Clarke in Hook. f., Fl. Brit. India 2: 727. 1879; Gamble, Fl. Pres. Madras 568. 1919; Manilal, Fl. Silent Valley 127. 1988. ***Hedera acuminata*** Wight, Ic. t. 1062. 1846.

Large shrubs to small trees. Leaves to 30 cm long, 1-pinnate, leaflets opposite, 5-6 paired, 12 x 4 cm, elliptic-oblong, acuminate, entire, petiolulate; petiole sheathing at base. Umbels in axillary or terminal panicles, 30-50 cm long; bracts lanceolate. Flowers 4-5 mm across, 6-12 together, pedicellate; calyx lobes 5, ovate, acute; petals brown, 3 x 2 mm, ovate, acute, valvate; stamens 5, filaments shorter than anthers; ovary 5-celled, inferior; styles 5, free. Fruit a 5-angled globose berry.

*Fl. & Fr.* :December-February

*Distr.* : Peninsular India and Sri Lanka. Occasional; in evergreen forests at high elevations. Uppermanalar, *NS & JA 12994.*

## 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. Leaves 3-foliolate; racemes stellate-hairy.....**S. bourdillonii**
1. Leaves 5-many-foliolate; racemes not stellate-hairy .....2
2. Branches of panicles racemose; leaflets uneven along the margins .....**S. racemosa**
2. Branches of panicles umbellate; leaflets entire .....3
3. Lateral nerves of leaflets 6-8 pairs, prominently reticulate; petiole to 22 cm long.....**S. venulosa**
3. Lateral nerves of leaflets 15-17 pairs, indistinct; petiole to 10 cm long .....**S. wallichiana**

**Schefflera bourdillonii** Gamble, Kew Bull. 1919. 228. 1919 & Fl. Pres. Madras 570. 1919; Henry *et al.*, J. Bombay Nat. Hist. Soc. 75(3): 689. 1979.

Small trees or sometimes epiphyte, branchlets slender, 5 mm thick. Leaflets 5.5 x 2 cm, rhomboid, acute, attenuate to the base, glabrous; nerves 3-4 pairs, reticulate; petiolule unequal, 0.5-2 cm long; petiole 3-5 cm long; stipule indistinct. Racemes to 4 cm long, panicled or branched, stellate hairy. Flowers 1-3 together; 5 mm across; pedicels 5-10 mm long; calyx truncate; petals ovate, triangular. Berry 3 mm across, 5-angled.

*Fl. & Fr.* :March-April

*Distr.* : Endemic to Idukki district (Kerala). Rare; in evergreen forests at high elevations. Sunderamala, *JA 13574*; Uppermanalar, *KPR & JA 15022.*

**Schefflera racemosa** (Wight) Harms in Engl. & Prantl, Pflanzenf. 3(8): 38. 1894; Gamble, Fl. Pres. Madras 570. 1919. ***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 to 11 x 4.5 cm, elliptic, acuminate at apex, acute at base, margins uneven; nerves 8-13 pairs, not prominent; petiolule 3

cm long; petiole to 23 cm long. Panicles to 30 cm broad, from stout old branches. Flowers 5 mm across, 1-5 at the nodes of racemes; pedicels 1 cm long; bracts ovate, obtuse; calyx teeth obtuse; petals 2 x 1.5 mm, ovate, acute; filaments 3 mm long; styles united into a short column. Berry 6 x 6 mm, 5-angled, glabrous with persistent style.

*Fl. & Fr.* :February-May

*Distr.* : South India and Sri Lanka. Occasional; in evergreen forests at high elevations. Mlappara, *JA 12613*; Udumbatheri, *JA 13326*; Kottamala, *JA 13780.*

**Schefflera venulosa** (Wight & Arn.) Harms in Engl. & Prantl, Pflanzenf. 3(8): 39. 1894, var. **obliquinervia** Gamble, Fl. Pres. Madras 570. 1919; Mahesh., Bull. Bot. Surv. India 2: 376. 1960; Manilal, Fl. Silent Valley 128. 1988. ***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 to 14 x 8 cm, ovate-oblong, abruptly acuminate, rounded at base; nervules prominently reticulate; petiolule 7-10 cm long; stipule 5 mm broad, black. Panicles 20 cm across, glabrous; umbels 2 cm across, 3-12-flowered. Flowers brown; pedicel 8-12 mm long; calyx truncate; petals 2 x 2.5 mm, triangular. Berry 4 x 4 mm, globose, 5-angled.

*Fl. & Fr.* :April-July

*Distr.* : Indo-Malesia and Tropical Australia. Common; in evergreen forests. Kokkara, *JA 12012*; Sabarimala, *JA & KPR 15470.*

**Schefflera wallichiana** (Wight & Arn.) Harms in Engl. & Prantl, Pflanzenf. 3(8): 38. 1894; Gamble, Fl. Pres. Madras 570. 1919; Gandhi In Sald. & Nicols., Fl Hassan Dist. 414. 1976; Sasidh. & Sivar., Fl. Pl. Thrissur For. 213. 1996. ***Paratropia wallichiana*** Wight & Arn., Prodr. 377. 1834. ***Heptapleurum wallichianum*** (Wight & Arn.) Clarke in Hook. f., Fl. Brit. India 2: 730. 1879. **Ettilamaram** (Mannan).

Small trees or robust epiphytes; branchlets 2 cm thick. Leaves 5-8-foliolate, leaflets 20 x 10 cm, oblong, acute at apex, rounded at base, nervules not prominent; petiolule 5 cm long; stipule 1.5 cm broad, hyaline. Panicles large, terminal; umbels 20-30-flowered, peduncled; peduncle 2 cm long. Flowers 6 mm across; pedicels 0.7 cm long; calyx truncate; petals 5, 3 x 3 mm, triangular; style absent; stigma sessile. Berry 6 x 6 mm, 5-angled.

*Fl. & Fr.* :April-August

*Distr.* : South India and Sri Lanka. Common; in evergreen forests. Aladi, *JA 13555*; Kottamala, *JA 14021.*

## 67. ALANGIACEAE

DC., Prodr. 3: 203. 1828.

### ALANGIUM Lamarck

Encycl. Meth., Bot: 174. 1783, *nom. cons.*

**Alangium salvifolium** (L.f.) Wang. in Engler, Pflansenr. 41: 9. 1910, subsp. **sundanum** (Miq.) Bloem., Bull. Jard. Bot. Buitenz. Ill, 16: 156. 1939; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(1):687.1983; Matthew, Fl. India Fasc. 19: 5. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 213. 1996. ***Grewia salvifolia*** L.f., Suppl. 409. 1781. ***Alangium hexapetalum*** Lam., Encycl. 1: 175. 1783. ***A. sundanum*** Miq., Fl. Ind. Bat. 1: 774. 1856. ***A. salvifolium*** (L. f.) Wang. subsp. **hexapetalum** (Lam.) Wang. in Engl., Pflanzenr. 41: 9. 1910; Gamble, Fl. Pres. Madras 572. 1919. ***A. lamarckii*** Thw. var. ***glandulosum*** (Thw.) Clarke in Hook. f., Fl. Brit. India 2: 742. 1879. ***A. glandulosum*** Thw., Enum. Pl. Zeyl. 133. 1859. **Ankolam**.

Scandent shrubs. Leaves alternate, to 18 x 7 cm, obovate-oblong, acuminate at apex, round to subcordate at base, nerves 5 pairs, lowest pair from the base, rib-like; nervules reticulate, subparallel; petiole to 1 cm long. Flowers 2 cm long, in axillary fascicles; pedicels 8 mm long pubescent; calyx cupular, 5 mm across, 7-teethed, densely tomentose; petals 7, each 17 x 2 mm, linear-oblong, tomentose; stamens 14, filaments 8 mm long, ciliate below; anthers 7 mm long, linear; ovary inferior, 1-celled, ovule solitary; style 1, elongate, stigma capitate. Berry 2 x 1.3 cm, ellipsoid, tomentose

*Fl. & Fr.* :March-August

*Distr.* : Indo-Malaya and Sri Lanka. Occasional; in semi-evergreen forests. Koruthode, *JA 13401.*

## 68. CORNACEAE

(Dumort.) Dumort., Anal. Fam. Pl. 33, 34. 1829.

### MASTIXIA Blume

Bijdr. 654. 1825.

**Mastixia arborea** (Wight) Bedd., Fl. Sylv. t. 216. 1872.

Trees; branchlets terete. Leaves alternate, entire, penninerved, glabrous; petiole 3 cm long, stout. Flowers many, bisexual, in terminal panicles; shortly pedicelled; bracts small, ovate; bracteoles at the base of the calyx tube; calyx tube campanulate, 4 or 5-lobed; petals 4 or 5, ovate, valvate; stamens 4 or 5, alternipetalous; filaments short; ovary 1-celled; ovule 1, pendulous, style short, cylindric. Fruit an ovoid drupe.

It has two subspecies.

Key to the subspecies

1. Leaves with one row of glands on either sides of midrib .....subsp. **arborea**

1. Leaves eglandular.....subsp. **meziana**

**Mastixia arborea** (Wight) Bedd., Fl. Sylv. t. 216. 1872, subsp. **arborea**; Clarke in Hook. f., Fl. Brit. India 2: 745. 1879; Gamble, Fl. Pres. Madras 573. 1919; Matthew, Blumea 23(1): 88. 1976 & Fl. India Fasc. 19: 25. 1988; Manilal, Fl. Silent Valley 128. 1988. ***Bursinopetalum arboreum*** Wight, Ic. t. 956. 1845.

Large trees. Leaves to 10 x 4 cm, pale beneath, nerves 6-8 pairs, nervules less prominent; petiole 3 cm long. Panicle 7 cm across, densely tawny hairy, bracteoles 1.5 cm long. Flowers sessile, 7 mm across, greenish-white.

*Fl. & Fr.* :March-July

*Distr.* : Endemic to Southern Western Ghats. Common; in evergreen forests at higher elevations. Sunderamala, *JA & KPR 17791.*

**Mastixia arborea** (Wight) Bedd. subsp. **meziana** (Wang.) Matthew, Blumea 23(1): 88. 1976 Fl. India Fasc. 19: 27. 1988. ***M. meziana*** Wang. in Fedde. Repert. 4: 336. 1907. ***M. pentandra*** sensu Clarke in Hook. f., Fl. Brit. India 2: 746. 1879, non Blume 1826: Gamble, Fl. Pres. Madras 574. 1919.

Large trees. Leaves to 15 x 7 cm, cuneate at base, nerves 5-7 pairs, pale beneath; nervules parallel; petiole 3 cm long. Panicles densely tomentose. Flowers sessile, 7 mm across; petals villous. Drupe 3 x 1.5 cm, oblong, glabrous.

*Fl. & Fr.* :March-June

*Distr.* : Endemic to Southern Western Ghats. Common; in evergreen forests. Vallakkadavu, *JA 13438, 15433*; Arjunankotta, *JA 15093.*

## 69. CAPRIFOLIACEAE

Juss., Gen. Pl. 210. 1789.

### VIBURNUM Linnaeus

Sp. Pl. 267. 1753

Shrubs or small trees. Leaves simple, opposite, entire or serrate, petiolate. Flowers in terminal or axillary panicled umbels; calyx tube adnate to the ovary, lobes 5, short, persistent; corolla

campanulate, tube short, lobes 5, spreading; stamens 5, free, inserted on the corolla tube, antipetalous; ovary inferior, 1-3-celled; ovules solitary in each cell, pendulous; style short, stigma 3-lobed. Fruit a drupe, 1-seeded, dry or fleshy, seeds compressed.

1. Twigs covered with peltate reddish scale; panicle terminal.....**V. punctatum**
1. Twigs glabrous, reddish; panicles axillary, drooping.....**V. erubescens**

**Viburnum erubescens** Wall. ex DC., Prodr. 4: 329. 1830; Clarke in Hook. f., Fl. Brit. India 3: 7. 1880; Gamble, Fl. Pres. Madras 576. 1919. *V. **wightianum*** Wight & Arn., Prodr. 388. 1834; Wight, Ic. t. 1024. 1845.

Large shrubs. Leaves to 8 x 4 cm, ovate, oblong, acute, serrate; nerves 4-6 pairs, intercostae transverse, axils villous; petiole 1.5 cm long. Panicles to 6 x 4 cm, drooping. Flowers white, pedicelled; calyx lobes ovate, acute; corolla 6 mm long, urceolate; filaments inserted at the throat of corolla tube; ovary 1-celled; styles 3. Drupe 10 x 4 mm, obovoid, truncate with persistent calyx; seeds obovoid, rugose.

*Fl. & Fr.* : February-May

*Distr.* : India and Sri Lanka. Rare; in evergreen forests. Kottamala, *JA & KPR 15369.*

**Viburnum punctatum** Buch.-Ham. ex D. Don, Prodr. Fl. Nep. 142. 1825; Clarke in Hook.f., Fl. Brit. India 3: 5. 1880; Gandhi In Sald. & Nicols., Fl Hassan Dist. 595. 1976; Matthew, Fl. Tamil Nadu Carnatic 3(1): 690. 1983. *V. **acuminatum*** Wall. ex DC., Prodr. 4: 325. 1830; Wight, Ic. t. 1021, 1845; Gamble, Fl. Pres. Madras 575. 1919. **Konakarimaram, Konakaran** (Mannan).

Small evergreen trees. Leaves to 13 x 5 cm, elliptic, acuminate, punctuate below, nerves 8 pairs; petiole 1.5 cm long. Panicle 8 cm across. Flowers 5 mm across, pedicelled; calyx tube 2 mm long, lobes obtuse; corolla 2.5 mm long, white, lobes ovate, obtuse; ovary 1-celled. Drupe 8 x 5 mm, oblong, compressed, 1-seeded, reddish brown.

*Fl. & Fr.* : February-May

*Distr.* : South East Asia. Common; in semi-evergreen forests. Edappalayam, *JA 14822.*

## 70. 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. Corolla lobes valvate; bracts present ..... 6

5. Corolla lobes imbricate; bracts absent ..... 7

6. Leaves cordate at base; calyx toothed ..... **Haldina**

6. Leaves not cordate at base; calyx truncate ..... **Mitragyna**

7. Seeds winged ..... **Neonauclea**

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 ..... 18

10. Seeds winged ..... **Hymenodictyon**

10. Seeds wingless ..... 11

11. One calyx lobe enlarged, petalloid ..... **Mussaenda**

11. Calyx lobes equal ..... 12

12. Fruit a fleshy berry ..... **Mycetia**

12. Fruit a dehiscent capsule ..... 13

13. Anthers dehiscing by apical pore ..... 14

13. Anthers dehiscing laterally ..... 15

14. Calyx lobes 4; small herbs to 15 cm high; stigma 1 ..... **Argostemma**

14. Calyx lobes 5; large herbs to 100cm high; stigmas 2 ..... **Neurocalyx**

15. Corolla lobes dentate ..... **Dentella**

15. Corolla lobes entire ..... 16

16. Capsule obcordate; calyx lobes 5; flowers in scorpioidal cymes ..... **Ophiorrhiza**

16. Capsule otherwise; calyx lobes 4; flowers not in scorpioidal cymes ..... 17

17. Seeds with a ventral cavity; capsule many-seeded ..... **Neanotis**

17. Seeds without a ventral cavity; capsule few-seeded ..... **Hedyotis**

18. Climbing shrubs ..... **Oxyceros**

18. Erect shrubs ..... 19

19. Plants armed with axillary spines; flowers solitary ..... **Catunaregam**

19. Plants unarmed; flowers cymose ..... 20

20. Cymes axillary; leaves bifarious ..... **Aidia**

20. Cymes terminal; leaves decussate ..... **Tarenna**

21. Corolla lobes valvate ..... 22

21. Corolla lobes twisted ..... 31

22. Flowers axillary.....23
22. Flowers terminal.....29
23. Erect or creeping herbs.....24
23. Shrubs or trees.....27
24. Stipules entire; fruit a fleshy berry.....**Geophila**
24. Stipules lobed or fimbriate; fruit a capsule.....25
25. Fruit dehiscence circumscissile; sepals unequal.....**Mitracarpus**
25. Fruit dehiscence apical or lateral; sepals equal.....26
26. Ovary 3-celled.....**Richardia**
26. Ovary 2-celled.....**Spermacoce**
27. Corolla tube with a transverse row of deflexed hairs inside.....**Canthium**
27. Corolla tube not with a transverse row of deflexed hairs inside.....28
28. Ovary 2-loculed; foetid plants.....**Saprosma**
28. Ovary 4-loculed; not foetid plants.....**Lasianthus**
29. Corolla tube curved.....**Chassalia**
29. Corolla tube not curved.....30
30. Annual herbs; corolla tube narrow.....**Knoxia**
30. Perennial shrubs or small trees; corolla tube short.....**Psychotria**
31. Ovary 1-loculed.....**Octotropis**
31. Ovary 2-loculed.....32
32. Flowers axillary.....**Coffea**
32. Flowers terminal.....33
33. Stigma 2.....**Ixora**
33. Stigma 1.....**Pavetta**

## **AIDIA** Lourerio

Fl. Cochinch. 143. 1790.

**Aidia gardneri** (Lour.) Tirveng., Bull. Mus. Hist. Nat. (Paris) 35: 11. 1978; Henry *et al.*, Fl. Tamil Nadu Scr. 1, 2: 1. 1987. ***Griffithia gardneri*** Thw., Enum. Pl. Zeyl. 158. 1859; Bedd., Ic. t. 38. 1868-1874. ***Randia gardneri*** (Thw.) Hook. f., in Benth & Hook. f., Gen. Pl. 2: 88. 1873; Hook. f., Fl. Brit. India 3: 112. 1880; Gamble, Fl. Pres. Madras 617. 1921.

Small trees, to 7 m high; branches horizontal. Leaves to 11 x 4 cm, bifarious, lanceolate, acuminate, glabrous; nerves 4-6 pairs; petiole to 1.5 cm long. Flowers in axillary short cymes; bracts ovate, ciliate; calyx tube short, 5-toothed; corolla white, tube 3 mm long, villous at mouth, lobes 8 mm long, deflexed, oblong, obtuse, glabrous; stamens 5; anthers 5 mm long, linear,

inserted on the mouth of corolla tube; ovary 2-celled; ovules many; style 1, stout. Fruit a berry, 5 mm across, globose, dark blue.

*Fl. & Fr.* : April-June

*Distr.* : South India and Sri Lanka. Occasional; in evergreen forests. Mlappara, *JA 18433.*

## ARGOSTEMMA Wallich

in Roxburgh, Fl. Indica 2: 324. 1824.

**Argostemma courtallense** Arn. in Arn., Nat. Hist. 3: 22. 1839; Wight, Ic. t. 1160. 1846; Hook. f., Fl. Brit. India 3: 42. 1880; Gamble, Fl. Pres. Madras 590. 1921; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 572. 1976; Manilal, Fl. Silent Valley 129. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 216. 1996.

Erect herbs with a tuberous root stock. Leaves to 8 cm across, few, orbicular, cordate at base, villous above; petiole 0-2 cm; stipule 8 mm long, ovate, entire. Cymes terminal, 1-3 cm across; peduncle 3-6 cm long, 1-3 together. Flowers few, 10 mm long, pedicelled; 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.

*Fl. & Fr.* : August-October

*Distr.* : Southern Western Ghats. Common; in evergreen forests at damp places. Koruthode, *JA 12240, 14098.*

## CANTHIUM Lamarck

Encycl. Meth., Bot. 1: 602. 1785.

Shrubs or trees, armed or unarmed. Leaves petiolate, simple, entire; stipules 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. Flowers 4-merous ..... 2
1. Flowers 5-merous ..... 3
2. Stem armed with supra-axillary thorns ..... **C. parviflorum**
2. Stem unarmed ..... **C. travancoricum**
3. Fruit to 3 cm long ..... **C. ficiforme**
3. Fruit to 1.5 cm long ..... 4

4. Stems armed with supra-axillary thorns ..... 5

4. Stems unarmed ..... 6

5. Leaves cordate at base ..... **C. rheedii**

5. Leaves acute at base ..... **C. angustifolium**

6. Cymes sessile, few-flowered; leaves obtusely acute at apex; fruit ca. 13 x 7 mm ..... **C. neilgherrense**

6. Cymes peduncled, many-flowered; leaves caudate-acuminate at apex; fruit ca. 7 x 4 mm ... **C. dicoccum**

**Canthium angustifolium** Roxb., Fl. Ind. 2: 169. 1824; Hook. f., Fl. Brit. India 3: 135. 1880; Sant. & Merch., Bull. Bot. Surv. India 3(2): 108. 1961; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 574. 1976; Sasidh. & Sivar., Fl. Pl. Thrissur For. 217. 1996. ***Plectronia rheedii*** DC. var. ***angustifolia*** (Roxb.) Gamble, Fl. Pres. Madras 625. 1921. ***Dondisia leschenaultii*** DC., Prodr. 4: 469. 1830. ***Canthium leschenaultii*** (DC.) Wight & Arn. in Wight, Cat. 77. 1833 & Prodr. 426. 1834; Wight, Ic. t. 826. 1844-45. **Kattakara**.

Erect shrubs with slender branches; spines slender, straight. Leaves to 11 x 5 cm, lanceolate, long acuminate; domatia glandular; petiole 3-6 mm long; stipule acuminate, villous within. Cymes short, sessile. Flowers shortly pedicelled; calyx tube nearly truncate; corolla 5 mm long, tube globose, lobes lanceolate, spreading; anthers strongly cuspidate, hispid at tip. Style 3 mm long, densely bearded at middle. Drupe 10 mm across, globose, black.

*Fl. & Fr.* : September-February

*Distr.* : Western Peninsular India. Frequent; in evergreen and semi-evergreen forests. Koruthode, *JA 12449, JA & KPR 14744*; Arjunankotta, *JA 13386.*

**Canthium dicoccum** (Gaertn.) Teijsm. & Binn., Cat. Hort. Bog. 113. 1866; Sant. & Merch., Bull. Bot. Surv. India 3(2): 107. 1961; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 575. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 48. 1983; Manilal, Fl. Silent Valley 129. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 217. 1996. ***Psydrax dicoccos*** Gaertn., Fruct. 1: 125, t. 26, f. 2. 1788. ***Canthium didymum*** auct. non Gaertn. f., 1806: Hook. f., Fl. Brit. India 3: 132. 1880. ***Plectronia didyma*** Benth. & Hook. f., ex Brandis, For. Fl. 276. 1874; Gamble, Fl. Pres. Madras 624. 1921.

Small trees; bark white, corky. Leaves to 12 x 4.5 cm, elliptic, obtusely acuminate, coriaceous, shining above, nerves 3 or 4 pairs; petiole 0.5-1 cm long; stipules triangular, cuspidate. Peduncle 1 cm long, stout; pedicels 8 mm long, slender. Flowers 10 mm long; calyx lobes ciliate; corolla lobes oblong, reflexed, tube densely villous; style 14 mm long, glabrous. Drupe obovoid, glabrous; seeds rugose.

*Fl. & Fr.* : February-May

*Distr.* : Indo-Malesia and South China. Very common; in evergreen and semi-evergreen forests. Vallakkadavu, *JA 13473*; Kottamalapallam, *KPR 15231.*

**Canthium ficiforme** Hook. f., Fl. Brit. India 3: 133. 1880. ***Plectronia ficiformis*** (Hook. f.) Gamble, Fl. Pres. Madras 624. 1921; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 2. 1987.

Trees, stem glabrous, stout. Leaves to 13 x 6 cm, elliptic, acuminate at apex, coriaceous; nerves 3-4 pairs, oblique, domatia glandular; petiole to 1 cm long; stipule broadly ovate, cuspidate, scaly inside. Peduncles 2.5 cm long, solitary. Flowers many; pedicels 1.5-2 cm long. Drupe 3 x 1.7 cm, obovoid, glabrous; seeds rugose.

*Fl. & Fr.* : March-August

*Distr.* : Southern Western Ghats (Karnataka & Kerala). Rare; in evergreen forests at highest elevations. Kottamala, *JA 14064.*

**Canthium neilgherrense** Wight, Ic. t. 1064. 1846; Hook. f., Fl. Brit. India 3: 133. 1880; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 2. 1987; Manilal, Fl. Silent Valley 130. 1988. ***Plectronia neilgherrensis*** (Wight) Bedd., For. Man. Bot. 134/6. 1872; Gamble, Fl. Pres. Madras 625. 1921.

Large shrubs. Leaves to 6 x 3 cm, elliptic to obovate, subcoriaceous; domatia glandular; petiole to 5 mm long; stipules ovate, acute. Flowers 3-12 together in axillary fascicles; pedicels 3 mm long; calyx 2 mm long, obconical, lobes triangular, glabrous; corolla tube 4 mm long, campanulate, densely reflexed hairy below the stamens and erect hairy above the stamens in side; lobes 3 x 1.5 mm, oblong; style hispid. Drupe 13 x 7 mm, obovoid.

*Fl. & Fr.* : February-April

*Distr.* : Southern Western Ghats (Kerala & Tamil Nadu). Common; in evergreen forests at high elevations. Sunderamala, *JA 13575.*

**Canthium parviflorum** Lam., Encycl. 1: 602. 1788; Hook. f., Fl. Brit. India 3: 136. 1880; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 575. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 699. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 3. 1987. ***Plectronia parviflora*** (Lam.) Bedd., For. Man. Bot. 134/5. 1872; Gamble, Fl. Pres. Madras 625. 1921.

Shrubs with scandent branches; spines straight, small. Leaves to 7 x 5 cm, ovate, acuminate, rounded to subcordate at base, membranous; nerves 4-6 pairs, domatia glandular; petiole 1.5-2 cm long; stipule orbicular, scaly inside. Cymes 2-3, on axillary slender tubercles, peduncled; pedicels and branches many, slender. Flowers 5 mm long; calyx teeth minute; corolla tube 3 mm long, globose; lobes ovate, obtuse, cuspidate; style 4 mm long, glabrous.

*Fl. & Fr.* : February-April

*Distr.* : Peninsular India and Sri Lanka. Common; in moist deciduous forests. Thekkady, *JA 17199.*

**Canthium rheedii** DC., Prodr. 4: 474. 1830; Hook. f., Fl. Brit. India 3: 134. 1880; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 699. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 217. 1996. ***Plectronia rheedii*** (DC.) Bedd., For. Man. Bot. 134/5. 1872; Gamble, Fl. Pres. Madras 625. 1921.

Stout shrubs with scandent branches; stem strigose, thorn 1-2 cm long, stout, recurved. Leaves to 5 x 4 cm, broadly ovate, acute at apex; nerves 4-6 pairs, domatia hairy; petiole short, 3 mm long, hairy. Flowers 12 mm long, in axillary fascicles; calyx obconical, teeth minute; corolla tube 4 mm long, globose, with a row of hairs inside; lobes 7 x 3 mm, lanceolate, acuminate, spreading; anthers with a hispid beak; style 5 mm long, densely bearded at middle. Drupe 15 x 12 mm, obovoid, black; seeds rugose, hard.

*Fl. & Fr.* : February-April

*Distr.* : Western Peninsular India and Sri Lanka. Common; in evergreen forests. Lakshmipara, *JA 13302*; Uppermanalar, *JA 13701, JA 15014.*

**Canthium travancoricum** (Bedd.) Hook. f., Fl. Brit. India 3: 134. 1880; Sasidh. & Sivar., Fl. Pl. Thrissur For. 217. 1996. ***Plectronia travancorica*** Bedd., Ic. t. 239. 1868. 1874; Gamble, Fl. Pres. Madras 625. 1921.

Unarmed shrubs or small trees with scandent branches. Leaves on short arrested branchlets, 7 x 4.5 cm, ovate, acute, membranous; nerves 4-7 pairs; petiole 1-1.5 cm long; stipule orbicular, densely villous inside. Cymes 1-3 cm across, peduncled, with many slender villous branches. Flowers 6 mm long; calyx 2 mm long, teeth acute, glabrous; corolla tube densely villous near the mouth, lobes ovate, acute; style glabrous, 4 mm long.

*Fl. & Fr.* : February-April

*Distr.* : Southern Western Ghats (Kerala & Tamil Nadu). Occasional; in rocky evergreen forests. Arjunankotta, *JA 13387*; Chenthamarakokka, *JA 15144.*

## **CATUNAREGAM** Adanson

Fam. 2: 85. 1763.

**Catunaregam spinosa** (Thunb.) Tirvengadum, Bull. Mus. Hist. Nat. (Paris) Ser. 3, 35: 13. 1978; Manilal, Fl. Silent Valley 130. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 218. 1996.

*Gardenia spinosa* Thunb., Diss. Gard. 7: 16, t. 2, f. 4. 1780. ***Randia dumetorum*** (Retz.) Poir. in Lam., Encycl. Suppl. 2: 829. 1811; Wight, Ic. t. 580. 1842; Hook. f., Fl. Brit. India 3: 110. 1880; Gamble, Fl. Pres. Madras 615. 1921. ***Gardenia dumetorum*** Retz., Obs. Bot. 2: 14. 1781. **Malankara**.

Small trees with small straight axillary spines. Leaves opposite on short lateral branchlets, to 4.5 x 2 cm, obovate, obtuse, tomentose below, petiolate; stipule ovate, cuspidate. Flowers solitary, terminal on lateral branches, pedicellate; calyx tube 5 mm long, lobes obovate, hispid; corolla tube 6 mm long, broad, densely villous at the base inside; lobes 5, 12 mm long, obovate, twisted, white; stamens 5, anthers sessile at the mouth of the corolla; ovary 2-6-celled; ovules many; style 12 mm long, stout; stigma fusiform, ribbed. Fruit an obovoid berry, 4 x 3 cm, glabrous; seeds many, embedded in pulp.

*Fl. & Fr.* : May-November

*Distr.* : Tropical Asia and Africa. Common; in moist deciduous forests. Thekkady, *JA 13803*

## **CHASSALIA** Commerson ex Poiret

in Dict. Sc. Nat. 8: 198. 1817.

**Chassalia curviflora** (Wall.) Thw., Enum. Pl. Zeyl. 150. 1864 var. **ophioxyloides** (Wall.) Deb & Krishna, Bull. Bot. Surv. India 24: 222. 1982 (1983); Sasidh. & Sivar., Fl. Pl. Thrissur For. 218. 1996. ***Psychotria curviflora*** Wall. in Roxb., Fl. Ind. 2: 167. 1824. ***Psychotria ophioxyloides*** Wall. in Roxb., Fl. Ind. 2: 167. 1824; Sant. & Merch., Bull. Bot. Surv. India 3(2): 108. 1961. ***Chassalia curviflora*** Wall. ex Kurz., For. Fl. Burma 2: 14. 1877; Hook. f., Fl. Brit. India 3: 176. 1880, p.p.; Gamble, Fl. Pres. Madras 643. 1921. ***Psychotria ambigua*** Wight & Arn., Prodr. 433. 1834. ***Chassalia ophioxyloides*** (Wall.) Craib, Gard. Bull. Straits Settlem. 6: 474. 1930; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 576. 1976; Manilal, Fl. Silent Valley 131. 1988.

Shrubs, to 1.5 m tall. Leaves to 22 x 8 cm, oblanceolate, abruptly acuminate; nerves 12 pairs, regular; petiole to 3 cm long, stipule connate, ovate, membraneous, 2-fid. Cymes 7 x 4 cm, terminal, panicled, glabrous. Flowers 15 mm long, subsessile; calyx 1.5 mm long, globose, lobes 5, ovate; corolla 8 mm long, curved, lobes ovate, obtuse; stamens 5, included; anthers linear. Ovary 2-celled, ovule one in each cell; style 2-fid at apex. Fruit 6 mm across, globose, glabrous, 2-seeded.

*Fl. & Fr.* : January-July

*Distr.* : Indo-Malesia. Common; in evergreen forests. Thaannikkudy, *JA 18444.*

## COFFEA Linnaeus

Sp. Pl. 172. 1753

**Coffea crassifolia** Gamble, Kew Bull. 1920: 248. 1920 & Fl. Pres. Madras 637. 1921; Henry *et al.*. J. Bombay Nat. Hist. Soc.75(3): 689 1979.

Small trees; bark thinly corky. Leaves to 11 x 5 cm, ovate, acuminate, shining above; nerves 4-7 pairs, irregular; stipule 6 mm long, ovate, acuminate. Flowers sessile, in axillary clusters 3-12 together; calyx cupular, lobes 4, orbicular, ciliate, corolla tube 3 mm long, broad, glabrous, lobes 4, obovate, 3 x 2 mm, white; stamens 4, anthers sessile, erect, on the mouth of calyx tube; ovary 2 celled; ovule one in each cell; style bifid at apex. Drupe 10 x 7 mm, ellipsoidal; pyrenes 2, planoconvex, 7 x 5 mm, glabrous.

*Fl. & Fr.* : February-November

*Distr.* : Endemic to Southern Western Ghats. Frequent, in evergreen forests. Vellimala, *JA 12907*; Arjunankotta, *JA 13384*; Sunderamala, *JA 13583.*

## DENTELLA J. R. Forster & G. Forster

Charact. Gen. 25. 1776

**Dentella repens** (L.) J. R. & G. Forst., Char. Gen. Pl. 26, t. 13. 1776; Hook. f., Fl. Brit. India 3: 42. 1880; Gamble, Fl. Pres. Madras 590. 1921; Subram. & Sharma, Bull. Bot. Surv. India 10: 380. 1969; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 702. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 219. 1996. ***Oldenlandia repens*** L., Mant. Pl. 40. 1767.

Prostrate branching herbs; stem villous. Leaves to 5 x 2.5 mm, obovate, petiolate; stipule connate, chartaceous, toothed. Flowers 6-8 mm long, axillary, solitary, sessile; calyx lobes 5, lanceolate, hispid; corolla tube 5 mm long, ovate, dentate, white; stamens 5, inserted in the tube below the middle; filaments very short, anthers linear; ovary 2-celled; ovules many, style short, stigmas 2, filiform. Fruit a capsule, 5 x 2 mm, oblong, indehiscent; seeds many, angled.

*Fl. & Fr.* : Throughout the year

*Distr.* : Indo-Malesia and Polynesia. Common; in lake shores appear when water recedes. Dam site, *JA 15103.*

## GEOPHILA D. Don

Fl. Nepal. 136. 1825, *nom. cons.*

**Geophila repens** (L.) Johnst., Sargentia 8: 281. 1949; Raiz., Ind. For. 94: 44. 1968; Fosb. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6 : 320. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For.

219. 1996. ***Rondeletia repens*** L., Syst. Nat. (ed. 10) 928. 1759. ***Geophila reniformis*** D. Don, Prodr. 136. 1825; Wight, Ic. t. 54. 1838; Hook. f., Fl. Brit. India 3: 178. 1880; Gamble, Fl. Pres. Madras 643. 1921.***G. herbacea*** (Jacq.) K. Schum. in Engl. & Prantl, Pflanzenf. 4(4): 199. 1891; Stant. & Merch., Bull. Bot. Surv. India 3: 108. 1961.

Prostrate herbs; stems stoloniferous, rooting at nodes. Leaves 2.5 cm across, orbicular, cordate at base; petiole 2.5 cm long, hispid; stipules ovate, entire. Flowers 8 mm long, in 1-3 flowered axillary peduncled cymes; calyx tube globose, lobes 4, lanceolate, fimbriate; corolla tube 6 mm long, villous inside, lobes 4 or 5, 6 mm long, spreading, white; stamens included; anthers linear; ovary 2-celled, ovule one in each cell; style slender 2-fid at apex. Drupe 0.8 cm across, red, globose; seeds 2, 4 x 3 mm, plano-convex, rugose.

*Fl. & Fr.* : February-June

*Distr.* : Old world Tropics. Common; in moist deciduous forests. Poonkavanam, *JA 15497.*

## **HALDINA** Ridsdale

Blumea 24: 360. 1978.

**Haldina cordifolia** (Roxb.) Ridsd., Blumea 24: 361. 1978; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 707 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 219. 1996. ***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. 1921; Sant. & Merch., Bull. Bot. Surv. India 3(2): 107. 1961. **Manjakkadambu** (Mala Arayan).

Large trees; bark pale brown; branchlets tomentose. Leaves to 15 cm across, orbicular, cordate at base, tomentose below; petiole 5-8 cm long; stipule 13 mm long, obovate, obtuse. Heads 2 cm across, globose, 2-3 together, axillary, peduncled; receptacle hispid. Flowers 9 mm long, sessile; calyx tube obovoid, lobes 1.5 mm long, spathulate; corolla tube 8 mm long, 5-ridged; lobes 5, ovate, acute, small; stamens 5, exserted; ovules many; style 12 mm long, stigma globose. Capsule 5 x 3 mm, obovoid; seeds with tail at one end and a bifid wings at other end.

*Fl. & Fr.* : April-November

*Distr.* : Burma, India and Sri Lanka. Common; in moist deciduous forests. Thekkady, *JA 15301.*

## **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.

Though different taxonomists treated various species of genus *Hedyotis* under *Oldenlandia* L. and *Exallage* Bremek., in this thesis all the species are treated under the genus *Hedyotis* L. following the critical studies of Fosberg (1941& 1954), Shinners (1949), Lewis (1961) and Bakhuizen (1965).

1. Leaves over 1 cm broad; nerves prominent; shrubs or herbs ..... 2
1. Leaves under 1 cm broad; nerves not prominent; suberect or prostrate herbs ..... 8
2. Flowers in axillary sessile clusters ..... **H. auricularia**
2. Flowers in terminal peduncled corymbose or panicled cymes ..... 3
3. Leaves very coriaceous with recurved margins and strong nerves; stem with persistent stipules ..... 4
3. Leaves and stem otherwise ..... 5
4. Flowers pedicelled; leaves ca. 4.5 x 2.5 cm, glabrous above ..... **H. stylosa**
4. Flowers sessile; leaves to 2 x 0.7 cm, tomentose above ..... **H. articularis**
5. Cymes glabrous ..... 6
5. Cymes hairy ..... 7
6. Flowers pedicelled; leaves green when dry; stipule pinnatisect ..... **H. anamalayana**
6. Flowers sessile; leaves yellow when dry; stipule with glandular teeth ..... **H. eualata**
7. Stem branched, densely pubescent ..... **H. bourdillonii**
7. Stem scarcely branched, glabrous ..... **H. swertioides**
8. Leaves coriaceous, 7-10 mm broad, scabrous; flowers 1-3 together, axillary, sessile ..... **H. nitida**
8. Leaves membranous, 1-5 mm broad, glabrous; flowers pedicelled ..... 9
9. Erect herbs ..... 10
9. Prostrate herbs ..... 11
10. Flowers axillary, solitary; leaves to 5 mm broad ..... **H. herbacea**
10. Flowers in terminal dichotomous cymes; leaves to 1 mm broad ..... **H. affinis**
11. Flowers solitary, sessile or nearly so ..... **H. brachypoda**
11. Flowers in axillary umbels, pedicelled ..... **H. corymbosa**

**Hedyotis affinis** Roem. & Schult., Syst. 3: 194. 1818; Rao & Hemadri, Ind. For. 99: 374. 1973. ***Oldenlandia affinis*** (Roem. & Schult.) DC., Prodr. 4: 428. 1830; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 585. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 723. 1983. ***Hedyotis dichotoma*** Koen. ex Roth, Nov. Pl. Sp. 93. 1821, non Cav., 1801. ***Oldenlandia.***

*dichotoma* (Koen. ex Roth) Hook. f., Fl. Brit. India 3: 67. 1880, non Spreng. 1850; Gamble, Fl. Pres. Madras 601. 1921.

Erect herbs with slender filiform branches, to 30 cm high, glabrous. Leaves to 25 x 1 mm, linear, entire, sessile; stipule ovate, entire or 2-3 toothed. Flowers 2 mm long, in terminal dichotomous cymes; pedicel and peduncles filiform, 1.5-2 cm long; calyx 1 mm long, lobes acute, scabrid; corolla white, tube villous inside. Capsule 2 x 1.5 mm, obovoid, truncate at apex.

*Fl. & Fr.* : June-August

*Distr.* : South Western India. Rare; in opening of evergreen forests. Ambari, *JA 15399.*

**Hedyotis anamalayana** (Gamble) Rao & Hemadri, Ind. For. 99: 378. 1973; Henry *et al.*, J. Bombay Nat. Hist. Soc.75(3): 689 1979. ***Oldenlandia anamalayana*** Gamble, Kew Bull. 1920: 67. 1920 & Fl. Pres. Madras 599. 1921. ***Hedyotis lessertiana*** sensu Bedd., Ic. t. 31. 1868-1874, non Arn., 1836.

Small shrubs, glabrous. Leaves to 8 x 3.5 cm, ovate-lanceolate, cuneate at base, shining above; petiole 2 cm long; stipule 6 mm long, pinnatisect, hispid, sheathing at base. Panicles terminal, 5 x 3 cm, glabrous. Flowers 7 mm long; calyx lobes ovate, obtuse, corolla white, lobes oblong, obtuse, tube densely villous within; stamens included; style 7 mm long. Capsule 4 x 4 mm, septicidal; seeds angular, black.

*Fl. & Fr.* : October-March

*Distr.* : Southern Western Ghats. Common; in evergreen forests at high elevations. Kottamala, *JA 12911*; Sabarimala, *JA 13603*; Vellimala, *JA 14043.*

**Hedyotis articularis** R. Br. ex Wight & Arn., Prodr. 407. 1834; Wight, Ic. t. 1028. 1845; Hook. f., Fl. Brit. India 3: 51. 1880; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 6. 1987. ***Oldenlandia articularis*** (R. Br. ex Wight & Arn.) Gamble, Fl. Pres. Madras 597. 1921.

Coarse shrubs; stem articulated by persistent stipules. Leaves to 18 x 8 mm, lanceolate, acute, very coriaceous, nearly sessile, margins recurved, nerves 4 pairs, strong, thick, reddish, tomentose, stipule 7 mm long, teeth 6, unequal, hispid. Cymes 1.5-3 cm across, terminal, densely clustered, hirsute. Flowers 9 mm long, sessile, 10-20 in a cymes; calyx campanulate, lobes acute corolla tube slender; lobes oblong, pink, margin recurved; stamens included, anthers linear. Capsule 6 x 4 mm, obovoid, pubescent; seeds obovoid, black.

*Fl. & Fr.* : November-March

*Distr.* : Southern Western Ghats. Rare; in margins evergreen forests at high elevations. Vellimala, *JA 17940.*

**Hedyotis auricularia** L., Sp. Pl. 101. 1753; Bedd., Ic. t. 27. 1868-1874; Hook. f., Fl. Brit. India 3: 58. 1880; R. Rao & Hemadri, Ind. For. 99: 375. 1973; Manilal, Fl. Silent Valley 131. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 220. 1996. ***Oldenlandia auricularia*** (L.) K. Schum. in Engl. & Prantl, Pflanzenf. 4(4): 25. 1981; Gamble, Fl. Pres. Madras 597. 1921; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 585. 1976. ***Exallage auricularia*** (L.) Bremek., Verh. Kon. Wed-Akad. Wetensch., Afd. Natuurk., Tweede sect. Ser. 2, 48: 142. 1952.

Herbs to 50 cm high; branches pubescent. Leaves to 8 x 3 cm, elliptic, acute, scabrous below; nerves 5 pairs, prominent; petiole 5 mm long; stipules obovate, teeth 7, 3-5 mm long, hairy. Cymes axillary, 1 cm across. Flowers 10-20 together, to 3 mm long; calyx lobes spreading; corolla white. Capsule 2 mm across, globose; glabrous.

*Fl. & Fr.* : Throughout the year

*Distr.* : Indo-Malesia. Common; in disturbed forests. Koruthode, *JA 16281.*

**Hedyotis bourdillonii** Gamble, Kew Bull. 1919: 404. 1919 & Fl. Pres. Madras 598. 1921; Rao & Hemadri, Ind. For. 99: 378. 1973; Nair *et al.*, Bull. Bot. Surv. India 22(1-4): 205. 1980; Manilal, Fl. Silent Valley 131. 1988.

Stout shrubs; stem pubescent, 4-angled. Leaves to 4.5 x 2 cm, ovate, acute, membraneous, acute at base, pubescent below, scabrous above; nerves 3 pairs, near the base petiole 5 mm long; stipule ovate, teeth many, hispid. Panicles terminal 7 cm across, densely hirtus. Flowers shortly pedicelled or sessile, 9 mm long; calyx 3 mm long, lobes 1 x 1 mm, ovate, obtuse with a black gland at tip corolla tube 3 mm long, sparsely villous, within, lobes oblong, 3 mm long, pink; anthers 2 mm long, sessile attached at the middle of the corolla tube; style 6.5 mm long.

*Fl. & Fr.* : November-February

*Distr.* : Southern Western Ghats (Kerala). Common; along margins of grasslands and evergreen forests at high elevations. Kalvarimala, *JA 13865*; Vellimala, *JA 13995.*

*Note* : This very rare and endemic species was relocated from Silent Valley after a lapse of 120 years (Nair *et al.*, 1980)

**Hedyotis brachypoda** (DC.) Sivar. & Biju, Taxon 39: 672. 1990. ***Oldenlandia brachypoda*** DC., Prodr. 4: 424. 1830. ***O. diffusa*** Roxb., Fl. Ind. 1: 444. 1820; Hook. f., Fl. Brit. India 3: 65. 1880; Gamble, Fl. Pres. Madras 601. 1921.

Creeping herbs; stem terete, glabrous. Leaves to 3 x 0.2 cm, linear-lanceolate, serrulate; stipule triangular, 2-3-bristled. Flowers 4 mm long, axillary, solitary, sessile or shortly pedicelled; calyx lobes ovate, acute, serrulate; corolla white, lobes acute, spreading, glabrous; stigma deeply bifid to the base. Capsule 3 mm across, glabrous, opening apically; seeds black.

*Fl. & Fr.* : Throughout the year

*Distr.* : Tropical. Common; in disturbed forest areas. Kokkara, *JA 12064*; Vallakkadavu, *JA 15426. KPR 16334*; Thekkady, *JA 17903.*

**Hedyotis corymbosa** (L.) Lam., Encycl. 1: 272. 1792; Rao & Hemadri, Ind. For. 99: 375. 1973; Sivar. & Biju, Taxon 39: 671. 1990. ***Oldenlandia corymbosa*** L., Sp. Pl. 119. 1753; Hook. f., Fl. Brit. India 3: 64. 1880; Gamble, Fl. Pres. Madras 600. 1921; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 586. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 727. 1983.

Diffuse herbs, stem 4-angled, scabrous. Leaves to 25 x 4 mm, lanceolate, acute, lineolate-serrate, subsessile. Umbels axillary; peduncle to 1.5 cm long, slender. Flowers 2-3, 5 mm long; pedicels to 7 mm long, slender; calyx 3 mm long, lobes ovate, serrate; corolla white, capsule 3 x 3 mm, globose, opening apically; seeds many, angled.

*Fl. & Fr.* : Throughout the year

*Distr.* : Tropical. Common; in disturbed forest areas. Koruthode, *JA & KPR 14743*; Mlappara, *JA & KPR 16835*; Thekkady, *JA 16946*

**Hedyotis eualata** (Gamble) Henry & Subram., Proc. Ind. Acad. Sci. 76. 13: 28. 1972; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 7. 1987. ***Oldenlandia eualata*** Gamble, Kew Bull. 1919: 404. 1919 & Fl. Pres. Madras 598. 1921.

Scarcely branched weak subshrubs; stems glabrous, 4-lined. Leaves to 6.5 x 2.5 cm, ovate-lanceolate, acuminate, yellow when dried, rounded at base, glabrous; nerves 3 pairs; petiole 4-8 mm long; stipule 7 mm long, ovate, shortly glandular-toothed along the margins, glabrous. Cymes to 12 cm broad, in terminal corymbs. Flowers 10 mm long, sessile; calyx 4 mm long, glabrous; corolla pink; stigma 2.5 mm long, bifid to the base. Capsule 7 x 3 mm, 3-6 ridged; seeds sharply angled, black.

*Fl. & Fr.* : November-February

*Distr.* : Southern Western Ghats. Occasional; in grasslands. Kavalappara, *JA & KPR 14526.*

**Hedyotis herbacea** L., Sp. Pl. 102. 1753; Rao & Hemadri, Ind. For. 99: 376. 1973; Manilal, Fl. Silent Valley 132. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 221. 1996. ***Oldenlandia heynei*** R. Br. ex G. Don, Gen. Syst. 3: 531. 1834; Hook. f., Fl. Brit. India 3: 65. 1880. ***O. herbacea*** (L.) Roxb., Fl. Ind. 1: 495. 1820; Gamble, Fl. Pres. Madras 601. 1921; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 586. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 728. 1983.

Erect herbs, to 30 cm high; stems 4-angled, glabrous. Leaves to 30 x 2-5 mm, linear-oblong, acute, serrulate, sessile; stipule triangular, shortly toothed. Flowers axillary, solitary; pedicel 1.5-2 cm long, filiform; calyx 2 mm long; lobes lanceolate, toothed. Capsule 2 x 1.5 mm, septicidal at apex; seeds angled, black.

*Fl. & Fr.* : Throughout the year

*Distr.* : Pantropical. Common; in grasslands. Thaannikkudy, *JA 12620.*

**Hedyotis nitida** Wight & Arn., Prodr. 412. 1834; Hook. f., Fl. Brit. India 3: 61. 1880. ***H. glabella*** R. Br. ex Bedd., Ic. t. 36. 1868-74. ***Oldenlandia nitida*** (Wight & Arn.) Gamble, Fl. Pres. Madras 597. 1921; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 586. 1976. **Kallukkoduveli** (Mala Arayan).

Prostrate woody herbs; stems 4-angled, coarsely scabrid. Leaves to 7 x 1 cm, linear-lanceolate to elliptic, coriaceous, pale below; stipule 8 mm long, ovate, rounded at apex, strongly long-toothed, villous. Flowers sessile in axillary clusters, 1-3 together; calyx 4 mm long, lobes acute, ciliate; corolla 4-5 mm long, lobes spreading, white. Capsule 3 x 2 mm, ovoid, glabrous; seeds angled; deep brown, ovoid, glabrous; seeds angled, deep brown.

*Fl. & Fr.* : Throughout the year

*Distr.* : South Western India and Sri Lanka. Common; in moist deciduous forests and plantations. Vallakkadavu, *JA 13425.*

**Hedyotis stylosa** R. Br. ex Wight & Arn., Prodr. 407. 1834; Wight, Ic. t. 1027. 1845; Hook. f., Fl. Brit. India 3: 51. 1880; Manilal, Fl. Silent Valley 132. 1988. ***Oldenlandia stylosa*** (R. Br. ex Wight & Arn.) O. Ktze., Rev. Gen. Pl. 1: 292. 1891; Gamble, Fl. Pres. Madras 598. 1921.

Stout shrubs, to 50 cm high; stem 4-angled, glabrous or pubescent along 4 lines. Leaves ovate, acute, rounded at base, glabrous, nerves 5 pairs; petiole 5 mm long; stipule ovate, laciniate, densely hirtus. Cymes terminal and upper axillary, 3-5 cm across, panicled; pedicel 5 mm long, stout, glabrous; calyx limb 2 mm long, lobes obtuse, glabrous; corolla pink, 8 mm long, tube slender, villous within, lobes 4 mm long, oblong, obtuse, spreading; anthers 1 mm long, sessile, adnated by the centre; style 6 mm long. Fruits not seen.

*Fl.* : May

*Distr.* : Southern Western Ghats. Rare; in opening of rocky evergreen forests and margins of grasslands evergreen forest at high elevations. Kottamala, *JA & KPR 15365.*

**Hedyotis swertioides** Hook. f., Fl. Brit. India 3: 42. 1880; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 9. 1987. ***Oldenlandia swertioides*** (Hook. f.) O. Ktze., Rev. Gen. Pl. 1: 292. 1891; Gamble, Fl. Pres. Madras 598. 1921.

Erect sparingly branched, subshrubs; stems 4-angled, glabrous. Leaves to 6.5 x 3 cm, ovate, lanceolate, acute at either ends, glabrous; nerves 4 pairs, oblique, strong below; subsessile; stipule 6 mm long, pectinate. Cymes terminal, corymbose, to 9 cm across. Flowers to 10 mm long, sessile; calyx 4 mm long, lobes acute, densely puberulus; corolla tube 8 mm long, densely villous within, puberulus outside, lobes 2.5 x 1 mm, oblong, obtuse, pink; anthers 2.2 mm long, erect; style 5 mm long. Capsule 6 x 3 mm, oblong, densely puberulus, ridged; seeds angled, light brown.

*Fl. & Fr.* : December-February

*Distr.* : Southern Western Ghats. Common; in grasslands. Kumarikulam, *JA 13084.*

## HYMENODICTYON Wallich

in Roxburgh, Fl. Indica 2: 148. 1824, *nom. cons.*

Trees. Leaves opposite, entire, deciduous, petioled; stipule entire. Flowers in panicled, racemes, terminal; bracts leafy, reticulate, persistent; bracteoles linear; calyx tube obovoid, teeth 5, deciduous; corolla tube funneliform; lobes 5, valvate; stamens 5, exerted, anthers ovate, mucronate; ovary 2-celled; ovules many, style slender; stigma capitate. Fruit a 2-calved capsule, loculicidal; seeds many winged on lower end; wings bifid.

1. Leaves obovate, obtuse; stipule serrate; flowers sessile.....**H. obovatum**
1. Leaves ovate, acuminate; stipules entire; flowers pedicelled.....**H. orixense**

**Hymenodictyon obovatum** Wall. in Roxb., Fl. Ind. 2: 153. 1824; Wight, Ic. t. 1159. 1846; Hook. f., Fl. Brit. India 3: 36. 1880; Gamble, Fl. Pres. Madras 589. 1921; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 577. 1976; Manilal, Fl. Silent Valley 133. 1988; Deb, J. Econ. Tax. Bot. 13: 677. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 223. 1996.

Small trees. Leaves to 10 x 7 cm, obovate, apiculate, acute at base, glabrous; nerves 6-8 pairs, intercostae reticulate; petiole 4-6 cm long; stipule 8 mm long, ovate, acute, glandular serrate. Raceme branched or not, to 10 cm long, erect, glabrous, terminal. Flowers 5 mm long; calyx 2 mm long, lobes lanceolate, glabrous; corolla tube short, widening above, lobes ovate, glabrous; anthers elliptic; style 6 mm long, glabrous. Capsule 12 x 6 mm, ellipsoid, glabrous.

*Fl. & Fr.* : October-March

*Distr.* : South Western India. Common; in evergreen forests. Vallakkadavu, *JA 16807.*

**Hymenodictyon orixense** (Roxb.) Mabber., Taxon 31: 66. 1982; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 709. 1983; Deb, J. Econ. Tax. Bot. 13: 679. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 223. 1996. ***Cinchona orixensis*** Roxb., Bot. Descr. Swietenia 21. 1793 & 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; Wight, Ic. t. 79. 1838; Hook. f., Fl. Brit. India 3: 35. 1880; Gamble, Fl. Pres. Madras 589. 1921.

Large trees. Leaves to 20 x 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 mm long; calyx tube hispid; lobes ovate, acute; corolla tube slender, lobes triangular, tomentose outside; stamens exserted, anthers mucronate; style 7 mm long, stigma globose. Capsule 22 x 13 mm, ellipsoid, glabrous.

*Fl. & Fr.* : February-August

*Distr.* : Indo-Malesia. Common; in semi-evergreen forests. Koruthode, *JA 18445.*

## **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. Corolla tube to 12 mm long.....2
1. Corolla tube above 15 mm long.....4
2. Calyx shortly 4-toothed; cymes in large panicles; small trees.....**I. brachiata**
2. Calyx distinctly 4-lobed; cymes not in panicles; small shrubs .....3
3. Cymes 10 cm across, peduncled; calyx lobes shorter than the tube .....**I. nigricans**
3. Cymes 4-5 cm across, sessile; calyx lobes equal to the tube.....**I. monticola**
4. Calyx lobes equal to the lobes; leaves 3 at a node.....**I. cuneifolia**
4. Calyx lobes longer than the tube; leaves opposite.....5
5. Corolla tube 30 mm long; anthers deeply lobed at base; leaves with 10-12 lateral nerves.....**I. johnsoni**
5. Corolla tube 20 mm long; anthers not lobed ; leaves with 20 pairs of lateral nerves.....**I. malabarica**

**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. 1921; Husain & Paul, J. Econ. Tax. Bot. (Addl. Ser. 6): 161. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 225. 1996.

Trees, to 5 m tall; branchlets terete, glabrous. Leaves to 15 x 6 cm, oblong to oblanceolate, obtusely acute; nerves 8-10 pairs, reticulate, pale above; petiole 1.5 cm long; stipule triangular, acute. Cymes to 20 x 15 cm, peduncled, puberulus; bracts and bracteoles minute. Flowers sessile; calyx 1 mm long, shortly 4-thoothed; corolla tube 6 mm long, slender, lobes 2 x 1 mm, oblong; style 7 mm long, pubescent. Berry 5 mm across, globose, glabrous.

*Fl. & Fr.* : November-January.

*Distr.* : Southern Western Ghats. Common; along, riversides in evergreen forests. Pamba, *JA 12759.*

**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. 1921; Manilal, Fl. Silent Valley 133. 1988.

Glabrous shrubs. Leaves to 14 x 4.5 cm, elliptic, acuminate at apex, acute at base; nerves 6-9 pairs, irregular; petiole 1 cm long; stipule 8 mm 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 21 mm long, sessile, 3-9 together; bracts and bracteoles filiform, hispid; calyx 4 mm long, hispid, lobes ovate; corolla tube 18 mm long, slender, lobes 3.5 x 1.5 mm, oblong, puberulus; anthers 4 mm long, tailed at base; style 20 mm long, glabrous.

*Fl. & Fr.* : December-January

*Distr.* : India. Occasional; in evergreen forests. Pachakkanam, *JA 17042.*

**Ixora johnsoni** Hook. f., Fl. Brit. India 3: 139. 1880; Gamble, Fl. Pres. Madras 630. 1921; Henry *et al.*, J. Bombay Nat. Hist. Soc.75(3): 690. 1979; Mathew *et al.*, Rheedea 7(2): 74. 1997.

Small shrubs; stem little or not branched, glabrous. Leaves to 20 x 9 cm, elliptic-oblong, acute at both ends, green with ashy patches on either sides of midrib above; nerves 10-12 pairs, prominent, looping; petiole 8 mm long. Cymes 5-10 cm across, shortly peduncled or sessile. Flowers densely packed; shortly pedicelled; calyx tube 1.5 mm long, lobes 4.5 x 1 mm, oblong, mucronate; corolla tube slender, lobes 6 x 2.5 mm, ovate, acute; anthers 5 mm long, deeply lobed at base; style 4 cm long.

*Fl.* : February-May

*Distr.* : Southern Western Ghats (Kerala). Rare; in evergreen forests at low elevation. Karimala, *JA 13687*; Sabarimala, *JA & KPR 15449.*

**Ixora malabarica** (Dennst.) Mabber., Taxon 26: 539. 1977; Husain & Paul, J. Econ. Tax. Bot. (Addl. Ser. 6): 145. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 225. 1996. ***Chiococca***

*malabarica* Dennst., Schluess. Hort. Ind. Malab. 12, 19 & 37. 1818. ***Ixora lanceolaria*** Colebr. in Roxb., Fl. Ind. 1: 397. 1820; Wight, Ic. t. 827. 1844-45; Hook. f., Fl. Brit. India 3: 138 1880, p.p.; Gamble, Fl. Pres. Madras 630. 1921. ***I. leucantha*** Heyne ex G. Don var. ***malabarica*** Gamble, Fl. Pres. Madras 630. 1921.

Erect shrubs. Leaves to 16 x 5.5 cm, lanceolate, acuminate, broadest at the base; lateral nerves 20 pairs, perpendicular to the midrib; petiole 7 mm long; stipule 12 mm long, subulate with a broad base. Cymes 5-7 cm across, corymbose, strigose; basal bracts paired, to 2.5 cm long. Flowers many; pedicels 8 mm long, bracteolate at apex; calyx tube 2 mm long, lobes 4 x 1 mm, lanceolate, ciliate; corolla lobes 12 mm long, oblong, obtuse; anthers 8 mm long, linear; style 30 mm long; stigma curved out.

*Fl. & Fr.* : January-March

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Koruthode, *JA 18446.*

**Ixora monticola** Gamble, Kew Bull. 1920: 247. 1920 & Fl. Pres. Madras 631. 1921 Henry *et al.*, J. Bombay Nat. Hist. Soc. 75(3): 690. 1979; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 11. 1987.

Glabrous shrubs. Leaves to 8 x 3 cm, ovate, acute-acuminate, rounded at base; nerves to 10 pairs, prominently reticulate; petiole 1 cm long; stipule 5 mm long, ovate, acuminate. Cymes 4-5 cm across, trichotomous, glabrous; basal bracts 1 cm long, elliptic. Flowers 10 mm long, sessile, 3-together; bracts and bracteoles subulate; calyx tube 1.5 mm long, lobes 1.5 mm long, ovate; corolla tube 8 mm long, slender, lobes 2.5 x 1 mm, oblong, deflexed; anthers 2 mm long, acute; style 8 mm long. Berry 6 x 7 mm, biglobose, glabrous.

*Fl. & Fr.* : December-May

*Distr.* : Southern Western Ghats. Common; in evergreen forests at high elevations. Inchippara, *JA 12606*; Uppermanalar, *JA 13707*; Ambari, *JA 13791.*

**Ixora nigricans** R. Br. ex Wight & Arn., Prodr. 428. 1834; Wight, Ic. t. 318. 1840; Hook. f., Fl. Brit. India 3: 148. 1880; Gamble, Fl. Pres. Madras 631. 1921; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 579. 1976; Husain & Paul, J. Econ. Tax. Bot. (Addl. Ser. 6): 111. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 225. 1996.

Shrubs, glabrous. Leaves to 13 x 4 cm, elliptic to oblanceolate, long-acuminate, attenuate at base; nerves 8-10 pairs, reticulate; petiole 1 cm long; stipule 7 mm long, ovate, acuminate. Cymes 10 cm across; peduncles 4-6 cm long. Flowers pedicelled, many; calyx 2.5 mm long, lobes

1.5 mm long, acuminate; corolla tube 11 mm long, slender; lobes 5 x 2 mm, ovate, acute; style 16 mm long. Fruits not seen.

*Fl.* : December-May

*Distr.* : Indo-Malesia. Common; in evergreen forests. Vellimala, *JA 12932*; Uppermanalar, *JA 13125*; Vallakkadavu, *JA 13659*; Edappalayam, *JA & KPR 14823.*

## **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. Leaves to 6 x 1 cm, nerves 6 pairs.....**K. wightiana**
1. Leaves above 12 cm long, nerves above 12 pairs.....**K. sumatrensis**

**Knoxia sumatrensis** (Retz.) DC., Prodr. 4: 569. 1830; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 714. 1983. ***Spermacoce sumatrensis*** Retz., Obs. Bot. 4: 23. 1786.

Key to the varieties:

1. Stipular teeth hairy; leaves hispid.....var. **sumatrensis**
1. Stipular teeth glabrous; leaves glabrous except nerves..... var. **glaberrima**

**Knoxia sumatrensis** (Retz.) DC., Prodr. 4: 569. 1830 var. **glaberrima** Bhatt. et Deb, J. Econ. Tax. Bot. 61: 92. 1985; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 12. 1987; Manilal, Fl. Silent Valley 134. 1988. ***Spermacoce sumatrensis*** Retz., Obs. Bot. 4: 23. 1786. ***K. heyneana*** auct. non DC., 1830: Wight & Arn., Prodr. 439. 1834; Hook. f., Fl. Brit. India 3: 129. 1880.

Erect glabrous subshrubs. Leaves to 15 x 6 cm, lanceolate, acuminate, membranous; nerves 12-14 pairs; petiole 3-4 cm long; stipule 3 mm long, orbicular, stipular teeth 4-6, 10 mm long, glandular. Cymes 5 cm across, peduncle 8 cm long. Flowers shortly pedicelled; calyx 1.5 mm long, teeth short; corolla tube 3 mm long, slender, densely villous at mouth, lobes ovate, obtuse, lilac; style 4 mm long. Capsule 3 x 2 mm, slightly compressed, brown, glabrous.

*Fl. & Fr.* : October-January

*Distr.* : Peninsular India. Occasional; in evergreen forests at high elevations. Vellimala, *JA 12930*; Brook's Peak, *JA & KPR 17009.*

**Knoxia sumatrensis** (Retz.) DC., Prodr. 4: 570. 1830; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 714. 1983, var. **sumatrensis**; Bhatt. & Deb, J. Econ. Tax. Bot. 6: 89. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 226. 1996. ***Spermacoce sumatrensis*** Retz., Obs. Bot. 4: 23. 1786. ***Knoxia corymbosa*** auct. non Willd., 1797: Wight, Ill. Ind. t. 126. 1850; Hook. f., Fl. Brit. India 3: 128. 1880; Gamble, Fl. Pres. Madras 622. 1921.

Erect subshrubs; stem white-tomentose. Leaves to 13 x 3 cm, lanceolate, acuminate, hispid; nerves 10-13 pairs; petiole 5-10 cm long; stipules orbicular, membraneous, long-toothed. Cymes 5-15 cm across, pilose. Flowers 6 mm long, sessile; calyx lobes ovate, acute, hispid; corolla tube 3 mm long, narrow, densely villous at mouth, lobes ovate, obtuse, lilac or pink; style 5 mm long. Capsule 2 x 1 mm, oblong, glabrous.

*Fl. & Fr.* : November-January

*Distr.* : Indo-Malesia and Australia. Common; in moist deciduous forests. Thekkady, *JA & KPR 16351.*

**Knoxia wightiana** Wall. ex Wight & Arn., Prodr. 440. 1834; Hook. f., Fl. Brit. India 3: 129. 1880; Gamble, Fl. Pres. Madras 622. 1921; Bhatt. & Deb, J. Econ. Tax. Bot. 6: 81. 1985.

Glabrous woody herbs. Leaves to 6 x 1 cm, linear-lanceolate, curved, folded, glabrous, sessile; stipules ovate, 6 mm long, acute with few glandular teeth. Cymes 5-6 cm across, peduncled. Flowers 5 mm long, sessile; calyx 1.5 mm long, lobes obtuse; corolla-tube densely villous within; style 4 mm long. Capsule 2.5 x 2.5 mm; mericarps compressed, glabrous.

*Fl. & Fr.* : December-May

*Distr.* : Southern Western Ghats. Occasional; in grasslands-forests margins. Kavalappara, *JA & KPR 14532*; Ambari, *JA 15393.*

## 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. Branchlets glabrous ..... 2
1. Branchlets hairy ..... 3

2. Leaves cordate at base; cymes long-peduncled.....**L. dichotomous**

2. Leaves acute at base; cymes sessile or subsessile.....**L. acuminatus**

3. Leaves densely hairy below; stipule entire.....**L. strigillosus**

3. Leaves glabrous below; stipule fimbriate along margins.....**L. parvifolius**

**Lasianthus acuminatus** Wight, Calcutta J. Nat. Hist. 6: 511. 1846; Hook. f., Fl. Brit. India 3: 185. 1880, p.p.; Gamble, Fl. Pres. Madras 647. 1921; Deb & Gang., J. Econ. Tax. Bot. 15(1): 274. 1991.

Large shrubs. Leaves to 9 x 4 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 8 mm long, tube slender, lobes ovate, obtuse, densely villous. Drupe 5 x 5 mm, globose, glabrous.

*Fl. & Fr.* : July-October

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Mlappara, *JA 12120*; Uppermanalar, *13732*; Vellimala, *14054.*

**Lasianthus dichotomous** Wight, Calcutta J. Nat. Hist. 6: 508. 1848; Bedd., Ic. t. 13. 1868-1874; Hook. f., Fl. Brit. India 3: 191. 1880; Gamble, Fl. Pres. Madras 648. 1921; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 13. 1987.

Large shrubs. Leaves to 12.5 x 5.5 cm, ovate, oblong, abruptly acuminate; nerves 6-8 pairs, prominent, nervules parallel, forked; petiole 1 cm long; stipule 6 mm long, villous. Cymes 2-3 cm across, dichotomous; peduncle 2 cm long. Flowers 8-10 mm long, sessile; calyx 4 mm long, lobes 4, lanceolate; corolla tube campanulate, villous; ovary 4-celled; style 4 mm long. Berry 6 x 6 mm, obovoid, glabrous.

*Fl. & Fr.* : December-May

*Distr.* : Southern Western Ghats. Common; in evergreen forests at high elevations. Sunderamala, *JA 13593*; Lakshmipara, *JA 13799*; Vellimala, *JA 14038.*

**Lasianthus parvifolius** Wight, Calcutta J. Nat. Hist. 6: 512. 1846; Hook. f., Fl. Brit. India 3: 186. 1880; Gamble, Fl. Pres. Madras 647. 1921; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 13. 1987.

Shrubs; branchlets adpressed hairy. Leaves 7-9.5 x 3.5-5.5 cm, obovate, acute, cuspidate at apex, glabrous, coriaceous; nerves 5 pairs, prominent, nervules forked; margins recurved; petiole 1 cm long; stipule 7 x 4 mm, oblong, obtuse, villous within, margins fimbriate. Flowers 3-5 together, sessile; calyx teeth triangular, ciliate.

*Fl. & Fr.* : December-May

*Distr.* : Southern Western Ghats (Tamil Nadu and Kerala). Rare; in evergreen forests at high elevations. Mlappara, *JA 18447.*

**Lasianthus strigillosus** Hook. f., Fl. Brit. India 3: 185. 1880; Gamble, Fl. Pres. Madras 647. 1921; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 13. 1987; Deb & Gang., J. Econ. Tax. Bot. 15(1): 300. 1991.

Large shrubs, stems densely strigose-hairy. Leaves to 12 x 4 cm, elliptic-oblong, acuminate at apex, acute at base; nerves 6 pairs, oblique, nervules closely parallel, 1-2 mm apart; petiole 5-10 mm long; stipule 3 mm long, ovate, obtuse, densely hairy. Flowers 5 mm long in axillary fascicles, sessile; calyx hirsute; corolla tube short, lobes densely hairy. Fruits not seen.

*Fl.*: August-January

*Distr.* : India, Tamilnadu. Common; in evergreen forests at high elevations. Kalvarimala, *JA 13063*; Vellimala, *JA 14031.*

*Note* : The present collection is the first report of its occurrence in Kerala.

## MITRACARPUS Zuccarini

in Schultes, Mant. 3: 210. 1827.

**Mitracarpus villosus** (Sw.) DC., Prodr. 4: 572. 1830; Verdc., Kew Bull. 30: 317-322. 1975; Manilal, Fl. Silent Valley 136. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 227. 1996. ***Spermacoce villosa*** Sw. Prodr. 29. 1788. ***Staurospermum verticillatum*** Schum. & Thonn., Besker. Guin. Pl. 73. 1827. ***Mitracarpus verticillatus*** (Schum. & Thonn.) Vatke, Linnaea 40: 196. 1876; Sebastine & Ramam., Bull. Bot. Surv. India 9: 291. 1968; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 561. 1976.

Erect herbs, to 50 cm high, little or not branched; stems 4-angled. Leaves to 3.5 x 1.5 cm, elliptic, acute, sessile, 3-5-nerved, plicate; stipules connate, membranous, fimbriate. Flowers minute, in axillary clusters; calyx lobes 4, unequal; corolla 2.5 mm long, 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 2 mm long, obovoid, with persistent calyx lobes, hirtus, circumscissile; seeds 2, 1 x 0.5 mm, oblong, rugose.

*Fl. & Fr.* : Throughout the year

*Distr.* : Native of Tropical America, spread to other tropical countries. Common; in disturbed forests areas. Thekkady, *JA 12408.*

## MITRAGYNA P. W. Korthals

Observ. Naucleis Ind. 19: 1839, *nom. cons.*

**Mitragyna parvifolia** (Roxb.) Korth., Obs. Naucl. Ind. 19. 1839; Gamble, Fl. Pres. Madras 585. 1921; Balch. f., Taxon 19: 472. 1970; Ridsdale, Blumea 24: 3. 1978; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 716. 1983; Manilal, Fl. Silent Valley 136. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 227. 1996. ***Nauclea parvifolia*** Roxb., Pl. Corom. t. 52. 1796. ***Stephegyne parvifolia*** (Roxb.) Korth., Verh. Nat. Gesch. Ned. Bezitt. Bot. 161. 1842; Hook. f., Fl. Brit. India 3: 25. 1880. **Malamthumba** (Mannan, Urali).

Large trees. Leaves to 17 x 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 3 cm across, terminal, solitary; bracteoles spathulate. Flowers 12 mm long, shortly pedicelled, calyx tube truncate; corolla tube 8 mm long, villous inside, lobes 4, oblong, deflexed; anthers sessile; ovules many; style 12 mm long, filiform. Capsule 6 x 4 mm, 6-ribbed, ellipsoid.

*Fl. & Fr.* : August-January

*Distr.* : Indo-Malesia. Common; in moist deciduous forests. Koruthode, *JA 12233*; Swamikkayam, *JA 13101*; Koruthode, *JA 15198.*

## 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. 1921; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 719. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 14. 1987.

Climbers. Leaves to 11 x 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 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 1 cm across; seeds oblong.

*Fl. & Fr.* : May-July

*Distr.* : India, China and Japan. Common; in evergreen forests. Deviar, *JA 12095.*

## MUSSAENDA Linnaeus

Sp. Pl. 177. 1753

Erect climbing shrubs, stems terete. Leaves opposite or ternate; stipules ovate, lanceolate, entire or bifid. Flowers in terminal cymes; bracts and bracteoles similar, deciduous; calyx tube

obovoid; lobes 5, unequal, one lobe forms into large and petalloid; corolla tube cylindric, villous inside, lobes 5, ovate, acute, spreading, valvate; stamens 5, included, filaments short, anthers linear; ovary 2-celled; ovule numerous on peltate placentas, style linear, stigmas 2, linear. Fruit a fleshy berry, obovoid to ovoid; seeds many, pitted.

1. Calyx lobes equal.....**M. tomentosa**
1. Calyx lobes unequal, one lobe large and petalloid.....2
2. Cymes much congested; stems densely villous; stipule divided to the base.....**M. hirsutissima**
2. Cymes lax; stem adpressed hairy; stipules divided half way down.....**M. belilla**

**Mussaenda belilla** Buch.-Ham., Trans. Linn. Soc. London 14: 203. 1824; Ridsdale in Manilal, Bot. Hist. Hort. Malab. 131. 1980; Sasidh. & Sivar., Fl. Pl. Thrissur For. 228. 1996. ***M. frondosa*** L. var. ***laxa*** Hook. f., Fl. Brit. India 3: 89. 1880. ***M. laxa*** (Hook. f.) Hutchinson ex Gamble, Fl. Pres. Madras 610. 1921. **Vellapperuma** (Mannan).

Climbing shrubs. Leaves to 10 x 8 cm, broadly ovate, acuminate, rounded at base, thinly hairy; nerves 10-12 pairs, parallel; petiole 5 cm long, slender; stipule 12 mm long. Flowers pedicelled; larger calyx lobes 8-9 cm across, orbicular, hirsute, white; other calyx lobes 10 mm long, linear; corolla tube 28 mm long, slender, adpressed hairy; petals yellow, densely villous inside. Fruits 8 x 6 mm, ovoid.

*Fl. & Fr.* : June-October

*Distr.* : Southern Western India. Common; in moist deciduous forests. Thekkady, *JA 13811.*

*Ethnobotanical use* : Stem without bark is chewed by mother after childbirth.

**Mussaenda hirsutissima** (Hook. f.) Hutchinson ex Gamble, Fl. Pres. Madras 610. 1921; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 719. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 15. 1987. ***M. frondosa*** L. var. ***hirsutissima*** Hook. f., Fl. Brit. India 3: 90. 1880.

Scandent shrubs; branchlets densely white-hispid. Leaves to 11 x 5 cm, broadly elliptic, acuminate at either ends, densely hispid; nerves 6-8 pairs, not prominent; petiole 1-3 cm long; stipule 12 mm long, densely hispid. Cymes terminal, congested. Flowers densely arranged; larger calyx lobes, 8 x 4.5 cm, elliptic, acute, long-clawed; corolla tube 30 mm long, narrow, densely hispid, lobes 12 x 10 mm, cuspidate. Fruits not seen.

*Fl.* : December-February

*Distr.* : Southern Western Ghats. Common; in evergreen forests at high elevations. Vallakkadavu, *JA 13430*, Uppermanalar, *JA 13706*; Kottamala, *JA 14012.*

**Mussaenda tomentosa** Wight ex Wall. in G. Don, Gen. Syst. 3: 491. 1834; Hook. f., Fl. Brit. India 3: 88. 1880; Gamble, Fl. Pres. Madras 610. 1921; Manilal, Fl. Silent Valley 136. 1988.

Scandent shrubs; stem fulvous hairy. Leaves to 11 x 5 cm, ovate, acuminate, densely villous; nerves 7-9 pairs; petiole 1 cm long, hispid; stipules 8 mm long divided to the base. Cymes peduncled, congested. Flowers 3-9-together; calyx tube 6 mm long, obconical, lobes 10 mm long, linear; corolla tube 2.5 cm long, densely hairy outside, mouth with dense tuft of yellow hairs.

*Fl. & Fr.* : December-January

*Distr.* : Southern Western India. Rare; in margins of evergreen shola forests. Kumarikulam, *JA 13004.*

## MYCETIA Reinwardt

in Syll. Ratisb. 2: 9. 1828.

**Mycetia acuminata** (Wight) O. Ktze., Rev. Gen. Pl. 1: 289. 1891; Gamble, Fl. Pres. Madras 612. 1921; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 582. 1976; Deb, Bull. Bot. Surv. India 28(1-4): 116. 1986; Manilal, Fl. Silent Valley 137. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 229. 1996. ***Lawia acuminata*** Wight, Ic. t. 1070. 1846. ***Adenosacme lawii*** Hook. f., Fl. Brit. India 3: 96. 1880.

Erect fleshy herbs. Leaves to 27 x 10 cm, elliptic-oblong, acuminate at apex; nerves to 20 pairs, prominent, parallel; petiole 5-8 cm long, stipule 12 mm long, ovate, acute, membraneous. Cymes 5-7 cm across, axillary, peduncled. Flowers 6 mm long, pedicelled; calyx 6 mm long, lobes 5, acuminate; corolla blue, spreading, tube short, lobes 5, ovate, spreading; stamens adnate to the corolla tube, anthers linear; ovules many on peltate placentas; style short; stigmas linear. Berry, 8 mm across, white, fleshy; seeds many, angular.

*Fl. & Fr.* : November-January

*Distr.* : South Western India. Common; in evergreen forests. Arjunankotta, *JA 13159.*

## 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. Leaves to 3 x 1.5 cm; flowers clustered in upper leaf axils.....**N. tubulosa**

1. Leaves to 8 x 4.5 cm; flowers in terminal peduncled cymes.....**N. decipiens**

**Neanotis decipiens** (Hook. f.) W. H. Lewis, Ann. Missouri Bot. Gard. 53: 37. 1966; Das, Ind. J. For. 7: 317. 1984; Sasidh. & Sivar., Fl. Pl. Thrissur For. 230. 1996. ***Anotis decipiens*** Hook. f., Fl. Brit. India 3: 72. 1880; Gamble, Fl. Pres. Madras 604. 1921.

Procumbent herbs, rooting at lower nodes; stems glabrous. Leaves ovate, acuminate, sparsely villous; nerves 7-9 pairs; petiole 3 cm long, hairy. Cymes 3-5 cm across, terminal; branches glabrous, slender. Flowers 5-6 mm long, blue or pink, subsessile; calyx lobes ovate, ciliate; corolla tube slender, shortly villous inside, lobes ovate, villous.

*Fl. & Fr.* : September-December

*Distr.* : Southern Western Ghats. Common; along margins of evergreen forests and grasslands. Pachakkanam, *JA & KPR 14373*; Vallakkadavu, *JA 16801.*

**Neanotis tubulosa** (G. Don) Mabber. in Manilal, Bot. Hist. Hort. Malab. 92. 1980; Manilal, Fl. Silent Valley 138. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 230. 1996. ***Oldenlandia tubulosa*** G. Don, Gen. Syst. 3: 531. 1834, p.p. ***Hedyotis quadrilocularis*** Thw., Enum. Pl. Zeyl. 144. 1859; Bedd., Ic. t. 28. 1868-1874. ***Anotis quadrilocularis*** (Thw.) Hook. f., Fl. Brit. India 3: 74. 1880; Gamble, Fl. Pres. Madras 605. 1921.***Neanotis quadrilocularis*** (Thw.) W. Lewis, Ann. Missouri Bot. Gard. 53: 40. 1966; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 721. 1983

Procumbent annual herbs; stems glabrous. Leaves ovate, acute at both ends, minutely villous; nerves 3-4 pairs; petiole 5 mm long; stipule orbicular, ciliate, membraneous. Flowers 2-5 together; calyx lobes ovate, acute, glabrous, corolla tube 3 mm long, lobes 2 x 1 mm, ovate. Capsule 3 x 2 mm, glabrous, 3-celled; seeds 2-5 in each cell, pitted, concave on faces.

*Fl. & Fr.* : July-December

*Distr.* : Peninsular India. Common; in grasslands forests margins. Mangaladevi, *JA 12478*; Kottamala, *14010*; Vallakkadavu, *JA & KPR 16316.*

## NEOLAMARCKIA Bosser

Adansonia Ser. 4, 6: 247. 1984

**Neolamarckia cadamba** (Roxb.) Bosser, Adansonia Ser. 4, 6: 247. 1984; Sasidh. & Sivar., Fl. Pl. Thrissur For. 231. 1996. ***Nauclea cadamba*** Roxb., Fl. Ind. 2: 121. 1824. ***Anthocephalus cadamba*** (Roxb.) Miq., Fl. Ind. Bat. 2: 135. 1850; Hook. f., Fl. Brit. India 3: 23. 1880. ***A.***

*indicus* A. Rich., Mem. Rubiac. 157. 1830; Gamble, Fl. Pres. Madras 583. 1921. *Neerkadambu* (Mala Arayan).

Large trees. Leaves opposite, to 22 x 12 cm, oblong, obtuse, apiculate, tomentose when young; nerves *ca.* 14 pairs, nervules parallel; stipule lanceolate, entire. Heads 4-6 cm across, terminal, peduncled. Flowers sessile, densely packed; calyx lobes 5, each 6 mm long, oblong; corolla tube 10 mm long, slender, glabrous, lobes oblong, 6 mm long; anthers 3 mm long, sessile, sagittate at base, apiculate; ovary 2 or 4 celled; ovules numerous; style entire, stigma clavate. Capsule membraneous; seeds many, compressed.

*Fl. & Fr.* : May-August

*Distr.* : Indo-Malesia, Australia and Pacific. Common; along river sides in evergreen forests at low altitudes. Sabarimala, *JA 15462.*

## NEONAUCLEA Merrill

J. Washington Acad. Sc. 5: 538. 1915.

**Neonauclea purpurea** (Roxb.) Merr., Interpr. Rumph. Herb. Amboin. 483. 1917; Gamble, Fl. Pres. Madras 584. 1921; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 584. 1976; Rids., Blumea 21(2): 340. 1978. ***Nauclea purpurea*** Roxb., Pl. Corom. t. 54. 1796; Hook. f., Fl. Brit. India 3: 26. 1880.

Small trees. Leaves to 13 x 4 cm, elliptic, acute; nerves 12 pairs, regular, nervules, subparallel; stipules 7 mm long, ovate, obtuse, entire. Head 4 cm across, globose, terminal or axillary; receptacle hispid. Flowers 12 mm long, densely packed, sessile; calyx tube angular, lobes 5, hispid; corolla tube 8 mm long, glabrous, lobes obovate, obtuse; stamens included; anthers apiculate; ovary 2-celled; ovules many; style 15 mm long, stigma globose. Capsule 5 x 3 mm, obovoid, truncate, hispid above; seeds many, winged on both ends.

*Fl. & Fr.* : December-May

*Distr.* : South India. Common; along riverbanks in evergreen forests at low altitudes. Pambavalley, *JA 12737*; Sabarimala, *KPR 15472.*

## NEUROCALYX Hooker

Ic. Pl. 2: 174. 1837.

**Neurocalyx calycinus** (R. Br. ex Benn.) Robins., Proc. Amer. Acad. Arts 45: 402. 1910; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 584. 1976; Bremer, Bot. Notiser 132: 403. 1979 & in Dassan. & Fosb., Rev Handb. Fl. Ceylon 6: 323. 1987; Manilal, Fl. Silent Valley 138. 1988.

*Argostemma calycinum* R. Br. ex Benn., Pl. Jaw. Rar. 97. 1838. ***Neurocalyx hookeriana*** Wight, Ic. t. 52. 1838. *N. **wightii*** Arn., Ann. Nat. Hist. Ser. 1, 3: 22. 1839; Hook. f., Fl. Brit. India 3: 47. 1880; Gamble, Fl. Pres. Madras 591. 1921.

Large herbs, pubescent. Leaves to 26 x 7 cm, oblanceolate, acute at apex, rusty puberulus; nerves to 18 pairs, prominent below; stipule 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, 8 x 5 mm, ovate; corolla tube absent, lobes 5 x 3 mm, ovate, twisted; stamens 5, anthers connate into a conical tube; ovary 2-celled, ovules many, style slender. Capsule irregularly bursting, 4 x 4 mm; seeds many, pitted.

*Fl. & Fr.* : August-December

*Distr.* : South India and Sri Lanka. Common; in evergreen forests. Koruthode, *JA 12238.*

## **OCTOTROPIS** Beddome

Fl. Sylv. t. 327. 1873.

**Octotropis travancorica** Bedd., Fl. Sylv. tt. 327. 1873; Hook. f., Fl. Brit. India 3: 131. 1880; Gamble, Fl. Pres. Madras 627. 1921; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 18. 1987.

Large shrubs to small trees; branchlets spiral, slender, deciduous. Leaves to 12 x 4 cm, lanceolate, acuminate; petiole 5 mm long; stipule ovate, acute, entire, glabrous. Flowers 10 mm long, on axillary peduncled umbels; peduncle 1.5 cm long; calyx tube obconical, teeth 4, triangular, acute; corolla tube 5 mm long, funnel form, puberulus, lobes oblong, deflexed, glabrous; stamens 4, anthers sessile, 5 mm long, linear; ovary 1-celled; ovule one or two, pendulous; style stout, stigmas 2. Berry 15 x 5 mm, ellipsoid, deep red; seed 1.

*Fl. & Fr.* : December-March

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Kalvarimala, *JA 12800*; Mlappara, *JA 13341.*

## **OPHIORRHIZA** Linnaeus

Sp. Pl. ed. 1, 150. 1753

Erect or decumbent herbs. Leaves opposite, entire, petiolate; stipule 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. Corolla tube *ca.* 25 mm long ..... **O. grandiflora**

1. Corolla tube below 10 mm long ..... 2

2. Flowers deep pink ..... **O. pectinata**

2. Flowers white ..... 3

3. Leaves to 5 x 3 cm; cymes 1-2 cm across ..... **O. rugosa** var. **prostrata**

3. Leaves above 12 cm long; cymes 5 cm or more across ..... 4

4. Flowers ca. 6 mm long, ebracteate; stipule triangular, acute ..... **O. mungos**

4. Flowers ca. 15 mm long, bracteate; stipule lanceolate, acuminate ..... **O. brunonis**

**Ophiorrhiza brunonis** Wight & Arn., Prodr. 404. 1834; Hook. f., Fl. Brit. India 3: 79. 1880; Gamble, Fl. Pres. Madras 608. 1921; Manilal, Fl. Silent Valley 139. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 232. 1996.

Small subshrubs; branches pubescent. Leaves to 20 x 7 cm, lanceolate, acuminate, glabrous except the nerves; nerves 10-12 pairs, arching; petiole 2-4 cm long, hispid; stipule 10 mm long, lanceolate, glabrous. Cymes 5-7 cm broad, terminal, corymbose; peduncle 2-6 cm long, hispid. Flowers 15 mm long, densely arranged; bracteoles 13 mm long, filiform, villous; calyx lobes 2 mm long, hairy; corolla tube 8 mm long, hispid, lobes ovate, obtuse; anthers 2.5 mm long, linear. Fruits not seen.

*Fl.*: Almost throughout the year

*Distr.* : Southern Western Ghats. Occasional; in evergreen forests. Poonkavanam, *JA & KPR 15488.*

**Ophiorrhiza grandiflora** Wight, Ic. t. 1069. 1846; Hook. f., Fl. Brit. India 3: 80. 1880; Gamble, Fl. Pres. Madras 608. 1921.

Undershrubs; stems glabrous. Leaves to 13 x 4 cm, lanceolate, acuminate, membranous; nerves to 10 pairs, prominent below; petiole 1.5 cm long, slender; stipule 5 mm long, lanceolate, glabrous. Cymes 3-6 cm broad, terminal, peduncled, sparsely villous; bracteoles 25 mm long, linear, villous. Flowers white, to 4 cm long; calyx ovoid, hispid, lobes 3-4 mm long, ovate; corolla tube 27 mm long, villous within, lobes 12 x 9 mm, ovate, acute; anthers included, 3.5 mm long. Fruits not seen.

*Fl.* : August-December

*Distr.* : Karnataka and Kerala. Common; in evergreen forests at high altitudes. Vellimala, *JA 14029.*

**Ophiorrhiza mungos** L., Sp. Pl. 150. 1753; Hook. f., Fl. Brit. India 3: 77. 1880; Gamble, Fl. Pres. Madras 607. 1921; Manilal, Fl. Silent Valley 139. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 232. 1996.

Erect subshrubs; stems scabrous. Leaves to 15 x 7 cm, ovate, acuminate at apex, decurrent or cuneate at base; nerves 14 pairs, regular, parallel, scabrid below; petiole 2-3 cm long; stipule triangular, acute. Cymes 5-8 cm broad, spreading, branches rusty tomentose. Flowers pedicelled; calyx glabrous; corolla tube, villous in a ring at mouth. Capsule 4 x 8 mm, glabrous; seeds angled, brown.

*Fl. & Fr.* : Throughout the year

*Distr.* : Indo-Malesia. Very Common; in all types of forests. Kokkara, *JA 12010.*

**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. 1921; Henry *et al.,* Fl. Tamil Nadu Ser. 1, 2: 18. 1987.

Erect herbs, to 40 cm high, glabrous. Leaves to 17 x 5 cm, elliptic-lanceolate, acuminate at both ends; nerves *ca.* 8 pairs; petiole to 5 cm long; stipule ovate, acute. Cymes 2-5 cm broad; peduncle to 6 cm long. Flowers densely packed; bracteoles 8 x 4 mm, curved-oblong, acute; calyx lobes ovate, glabrous; corolla tube 8 mm long with a ring of erect hairs at throat, lobes ovate, acute; anthers nearly sessile. Capsule 5 x 1 2 mm, 2-winged, glabrous; seeds squarish, brown.

*Fl. & Fr.* : Throughout the year

*Distr.* : Peninsular India and Sri Lanka. Common; in evergreen forests at all elevations. Mlappara, *JA 12112*; Ambari, *JA 13765*; Thaannikkudy, *JA & KPR 14220.*

**Ophiorrhiza rugosa** Wall., Cat. 6235. 1824 var. **prostrata** (D. Don) Deb & Mondal, Bull. Bot. Surv. India 24: 228. 1982. ***O. prostrata*** D. Don, Prodr. Fl. Nep. 136. 1825 p.p.; Sant. & Merch., Bull. Bot. Surv. India 3(2): 109. 1961; Manilal, Fl. Silent Valley 139. 1988. ***O. harrisiana*** Heyne ex D. Don, Gen. Syst. 3: 523. 1834; Wight, Ic. t. 1162. 1846, "harrisonii"; Hook. f., Fl. Brit. India 3: 78. 1880; Gamble, Fl. Pres. Madras 607. 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 5 cm long. Flowers minute, white; calyx 1 mm long, lobes ovate; corolla 3 mm long, white. Capsule 2.5 mm across, compressed; seeds 3-5, rugose, folded.

*Fl. & Fr.* : August-December

*Distr.* : Southern Western Ghats. Rare; in evergreen forests at high altitudes. Kalvarimala, *JA 13874.*

## OXYCEROS Loureiro

Fl. Cochinch. 150. 1790.

**Oxyceros rugulosus** (Thw.) Tirvengadum, Nord. J. Bot. 3: 466. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 19. 1987; Manilal, Fl. Silent Valley 140. 1988. ***Griffithia rugulosa*** Thw., Enum. Pl. Zeyl. 159. 1859. ***Randia rugulosa*** (Thw.) Bedd., For. Man. Bot. 133. 1871; Hook. f., Fl. Brit. India 3: 113. 1880; Gamble, Fl. Pres. Madras 617. 1921; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 731. 1983.

Climbing shrubs. Leaves to 16 x 7 cm, elliptic, acuminate, glabrous; nerves 8-10 pairs; petiole 1.5 cm long, thick; stipule 6 mm long, ovate, acuminate. Cymes lateral or axillary, 5-8 cm across; shortly peduncled. Flowers 25 mm long; calyx tube 6 mm long, obconical, teeth 5, obsolete; corolla tube 12 mm long, densely villous in a ring inside; lobes 13 mm long, oblong, deflexed, white; stamens 5, filaments short, inserted at the mouth of corolla tube; anthers 8 mm long, linear, apiculate; ovary 2-celled; ovules many, sunken in the axile placentas; style 18 mm long, stigma clavate. Berry 10 x 10 mm; seeds few, rugose.

*Fl. & Fr.* : March-April

*Distr.* : Peninsular India and Sri Lanka. Common; in semi-evergreen forests. Vallakkadavu, *JA 13423*; Umikuppan, *JA & KPR 14882.*

## 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. Leaves densely hairy below.....2
1. Leaves glabrous below.....3
2. Style ca. 3.7 cm long; leaves oblanceolate.....**P. hispidula**
2. Style ca. 2.8 cm long; leaves ovate.....**P. tomentosa**
3. Leaves to 17 x 6 cm, acuminate; style ca. 6.5 cm long.....**P. calophylla**
3. Leaves to 7 x 2 cm, acute; style ca. 2 cm long.....**P. siphonantha**

**Pavetta calophylla** Bremek., Fedde. Repert. 37: 90. 1934; Gamble, Fl. Pres. Madras 1379. 1936; Sasidh. & Sivar., Fl. Pl. Thrissur For. 232. 1996.

Glabrous shrubs. Leaves elliptic, acuminate, attenuate at base and apex; nerves 9 pairs, hispid below; petiole 2 cm long; stipule 7-8 mm long, ovate, acuminate. Cymes 6-10 cm broad, hispidulous. Flowers pedicelled; calyx 2 mm long, obconical, lobes ciliate; corolla tube 18 mm long, slender, glabrous outside, villous inside, lobes 9 x 4 mm, oblong, white; anthers 7 mm long; style 6.5 cm long.

*Fl. & Fr.* : January

*Distr.* : Peninsular India. Rare; in evergreen forests at high elevations. Karimala, *JA 13123.*

**Pavetta hispidula** Wight & Arn., Prodr. 431. 1834; Hook. f., Fl. Brit. India 3: 151. 1880; Gamble, Fl. Pres. Madras 633. 1921, 1378. 1936; Sasidh. & Sivar., Fl. Pl. Thrissur For. 233. 1996.

Small shrubs; stems hispid. Leaves to 15 x 4.5 cm, oblanceolate, acuminate, narrowed to the base, glabrous above, hispid below; nerves 6-8 pairs, looping below the margins; petiole 2 cm long; stipules ovate, mucronate. Cymes 5-8 cm broad, lax, hispidulous. Flowers white, pedicels 8 mm long; calyx 3 mm long, teeth short, recurved, hispid; corolla tube 15 mm long, thinly hispid, lobes 8 x 3 mm, oblong, glabrous; style 37 mm long. Fruits not seen.

*Fl.*: May

*Distr.* : Peninsular India and Sri Lanka. Occasional; in evergreen forests. Uppermanalar, *JA 13739.*

**Pavetta siphonantha** Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 2: 133. 1850; Gamble, Fl. Pres. Madras 1378. 1936.

Glabrous shrubs. Leaves oblanceolate, obtusely acute, glabrous, except the midrib below; nerves 6 pairs, not prominent. Cymes 5-7 cm broad, branches and pedicels hispid. Flowers white, 13 mm long; calyx 2 mm long, sparsely hairy; corolla tube 10 mm long, glabrous, lobes 4 x 2.5 mm, obovate; style 2 cm long; stigma spoon-shaped. Fruits not seen.

*Fl.* : April

*Distr.* : Southern Western Ghats. Rare; in evergreen forests at high elevations. Kottamala, *JA & KPR 15281.*

**Pavetta tomentosa** Roxb. ex J. E. Smith in Rees, Cyclop. 26: n. 52. 1813; Gamble, Fl. Pres. Madras 1379. 1936; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 588. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 733. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 233. 1996. ***P. indica*** L. var. ***tomentosa*** (Roxb. ex J. E. Smith) Hook. f., Fl. Brit. India 3: 150. 1880.

Large shrubs; stem densely white-tomentose. Leaves to 13 x 7 cm, ovate, acuminate, tomentose; nerves 10 pairs, reticulate; petiole 3 cm long; stipule triangular, cuspidate, tomentose. Cymes 10 cm broad, terminal, densely tomentose, shortly peduncled. Flowers pedicelled; pedicels 6 mm long; calyx 2.5 mm long, retrose hairy, 4-toothed; corolla tube 12 mm long, glabrous, lobes 7 x 1.5 mm, oblong, hairy at base; anthers 7 mm long, linear; style 28 mm long, glabrous.

*Fl. & Fr.* : May-July

*Distr.* : India, S. China, Malaya to Australia. Common; in evergreen and semi-evergreen forests. Kottamalapallam, *JA & KPR 15234.*

## **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. Leaves ternate; stipules 3 cm long.....**P. anamalayana**
1. Leaves opposite; stipules shorter .....2
2. Corolla tube glabrous within.....**P. nudiflora**
2. Corolla tube villous within.....3
3. Domatia present in the nerve axils .....4
3. Domatia absent.....6
4. Flowers in congested globose cymes .....5
4. Flowers in racemiform cymes.....**P. elongata**
5. Cymes fulvous villous, peduncled; lateral nerves of leaves jointed into an intramarginal vein...**P. nigra**
5. Cymes not fulvous villous; intramarginal vein absent .....**P. nilgiriensis**
6. Stipule glabrous within; bracts connate, 3-lobed .....**P. connata**
6. Stipules densely villous inside; bracts free, not lobed .....7
7. Leaves yellow beneath when dried.....8
7. Leaves not yellow when dried.....9
8. Corolla ca. 3 mm long; stipules acute at apex .....**P. flavida**
8. Corolla ca. 6 mm long; stipules emarginate at apex.....**P. truncata**

9. Cymes 10 cm across; lateral nerves of leaves faint towards the margins ..... **P. macrocarpa**

9. Cymes 4-5 cm across; lateral nerves clear towards the margins ..... 10

10. Corolla tube hairy along a transverse line inside; cymes glabrous ..... **P. keralensis**

10. Corolla tube densely and broadly villous inside; cymes thinly tomentose ..... **P. bisulcata**

**Psychotria anamalayana** Bedd., Ic. t. 236. 1868-1874; Hook. f., Fl. Brit. India 3: 171. 1880; Gamble, Fl. Pres. Madras 641. 1921; Deb & Gang., J. Econ. Tax. Bot. Addl. Ser. 7: 128. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 236. 1996.

Shrubs, 2.5 m tall; branchlets stout. Leaves 15-20 x 6-7 cm, oblanceolate, obtuse, apiculate, attenuate to the base, coriaceous; nerves 10-12 pairs, regular, 12-13 mm apart, reticulate towards the margins; domatia absent; petiole to 4.5 cm long, stipule 3 cm long, lanceolate, glabrous within. Cymes 3-6 cm across, glabrous. Flowers 5 mm long, sessile; calyx 4-toothed; corolla tube villous at the base. Drupe 13 x 7 mm, obovoid, 4-angled, glabrous.

*Fl. & Fr.* : February-March

*Distr.* : South India. Common; in evergreen forests. Chokkampetti, *JA 13362.*

**Psychotria bisulcata** Wight & Arn., Prodr. 434. 1834; Wight, Ic. t. 1039. 1845; Hook. f., Fl. Brit. India 3: 171. 1880; Gamble, Fl. Pres. Madras 641. 1921; Deb & Gang., J. Econ. Tax. Bot. Addl. Ser. 7: 116. 1989.

Subshrubs. Leaves to 11 x 4.5 cm, elliptic, abruptly acuminate, cuneate at base, membranous; nerves 7 or 8 pairs, prominent below, reticulate; petiole 1 cm long; stipule 7 mm long, ovate, cuspidate, densely rufous-villous within. Cymes 3-4 cm across, villous at nodes. Flowers 4 mm long, sessile; calyx 1.5 mm long, truncate, glabrous; corolla tube 2.5 mm long densely villous inside, lobes acute, deflexed; style 1.5 mm long, broaden up. Fruits not seen.

*Fl.* : March

*Distr.* : South India and Sri Lanka. Occasional; in evergreen forests. Sabarimala, *JA & KPR 14944.*

**Psychotria connata** Wall. in Roxb., Fl. Ind. 2: 163. 1824; Hook. f., Fl. Brit. India 3: 171. 1880; Gamble, Fl. Pres. Madras 641. 1921; Deb & Gang., J. Econ. Tax. Bot. Addl. Ser. 7: 114. 1989. ***P. laevigata*** Wight & Arn., Prodr. 433. 1834; Wight, Ic. t. 828. 1844.

Large shrubs. Leaves to 15 x 4.5 cm, oblanceolate, acuminate; nerves 6-8 pairs, indistinct, 13 mm apart; petiole 2 cm long; stipule 1 cm long, ovate, emarginate, glabrous inside. Cymes 4-6

cm across, axillary, peduncled, rusty-puberulus; peduncles 3-4 cm long; bracts 3-5 mm long, ciliate, coriaceous. Flowers 4.5 mm long, sessile; calyx 2 mm long, lobes ovate, acute, ciliate. Corolla 3.5 mm long, lobes 5, oblong, acute. Fruits not seen.

*Fl.* : June-August

*Distr.* : Southern Western Ghats (Kerala & Tamil Nadu). Common; in evergreen forests. Vallakkadavu, *JA & KPR 15411.*

**Psychotria elongata** (Wight) Hook. f., Fl. Brit. India 3: 163. 1880; Gamble, Fl. Pres. Madras 641. 1921; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 735. 1983. ***Grumilea elongata*** Wight, Ic. t. 1036. 1845.

Shrubs, to 2.5 m high. Leaves 10 x 6 cm, obovate, obtusely acute, nerves 12-15 pairs, 5 mm apart, parallel, nervules reticulate, domatia glandular; petiole 1 cm long; stipule ovate, acute, rufous hairy inside. Cymes 5-7 x 1-1.5 cm, hispid. Flowers 7 mm long, grouped; calyx 2 mm long, lobes ovate, acuminate, ciliate; corolla tube 4 mm long, broadly villous inside, lobes 5, ovate, acute. Fruit 6 x 5 mm, globose, glabrous.

*Fl. & Fr.* : October-December

*Distr.* : South India and Sri Lanka. Common; in evergreen forests. Mangaladevi, *JA 12473.*

**Psychotria flavida** Talbot, Trees & Shrubs Bombay 113. 1894; Gamble, Fl. Pres. Madras 641. 1921; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 589. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 736. 1983; Deb & Gang., J. Econ. Tax. Bot. Addl. Ser. 7: 89. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 236. 1996.

Small shrubs. Leaves to 13 x 4 cm, oblanceolate, acuminate; nerves to 12 pairs, parallel, 8 mm apart, reticulate, prominent; stipule 1 cm long, ovate, uncinate. Cymes 3 x 3 cm, peduncled. Flowers 4 mm long; calyx 5-lobed, lobes ovate; corolla 3 mm long, lobes, ovate, acute; style 1 mm long, entire.

*Fl. & Fr.* : March-May

*Distr.* : Peninsular India. Occasional; in evergreen forests. Sabarimala, *JA & KPR 14946.*

**Psychotria keralensis** Deb & Gang., Bull. Bot. Surv. India 25: 213. 1983(1985) & J. Econ. Taxon. Bot. Addl. Ser. 7: 48. 1989.

Shrubs. Leaves to 15 x 6 cm, obovate, obtusely acuminate, cuneate at base; nerves 11-13 pairs, intercostae, reticulate, distinct; stipules 11 x 9 mm, ovate, densely rufous hairy inside. Cymes 4 x 4 cm, branches opposite, glabrous. Flowers 7 mm long, sessile; calyx 2 mm long,

lobes ovate, glabrous; corolla tube equal to the lobes, lobes 4, deflexed. Fruit 17 x 10 mm, ellipsoid, glabrous.

*Fl. & Fr.* : January-May

*Distr.* : Southern Western Ghats (Kerala). Occasional; in evergreen forests. Kathiramudi, *JA 13038*; Poonkavanam, *JA & KPR 15483.*

**Psychotria macrocarpa** Hook. f., Fl. Brit. India 3: 162. 1880; Gamble, Fl. Pres. Madras 641. 1921; Manilal, Fl. Silent Valley 141. 1988; Deb & Gang., J. Econ. Tax. Bot. Addl. Ser. 7: 54. 1989.

Shrubs, to 2 m tall. Leaves 14-17 x 5-7 cm, obovate, abruptly acuminate, tip obtuse; cuneate at base; nerves 8-10 pairs, 2 cm apart; petiole to 3 cm. Panicle 4 x 10 cm, branches whorled, spreading, hirtus. Flowers 3-5-together; calyx truncate, glabrous; stamens included, connectives of anthers glandular; style 4 mm long, bifid at apex. Fruit 7 x 7 mm, globose, smooth.

*Fl. & Fr.* : January-March

*Distr.* : Southern Western Ghats (Kerala and Tamil Nadu). Common; in moist deciduous forests. Koruthode, *JA 13173*; Thekkady, *JA & KPR 15318.*

**Psychotria nigra** (Gaertn.) Alston in Trimen, Handb. Fl. Ceylon 6 (Suppl.): 152. 1931; Sohm., in Dassan. & Fosb., Rev Handb. Fl. Ceylon 6: 345. 1987; Manilal, Fl. Silent Valley 142. 1988; Deb & Gang., J. Econ. Tax. Bot. Addl. Ser. 7: 49. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 236. 1996. ***Grumilea nigra*** Gaertn., Fruct. 1: 138. t. 28. 1788. ***Psychotria thwaitesii*** Hook. f., Fl. Brit. India 3: 162. 1880; Gamble, Fl. Pres. Madras 640. 1921.

Large shrubs, 2-3 m tall. Leaves to 19 x 8.5 cm, obovate, obtuse, broadly apiculate, nerves to 16 pairs, regular, 8-10 mm apart, domatia glandular; stipule 12 mm long, ovate, strongly mucronate. Cymes 1-1.5 cm across, 3-6-together, globose, densely fulvous hairy; peduncle 2-3 cm long, stout. Flowers many, densely packed, 5 mm long; calyx 1.5 mm long, campanulate, 5-toothed, ciliate; corolla white, 3 mm long, tube hairy at mouth, lobes reflexed. Drupe 6 mm across, subglobose, pyrenes smooth.

*Fl. & Fr.* : January-May

*Distr.* : Peninsular India and Sri Lanka. Frequent, in evergreen forests. Sabarimala, *JA & KPR 14896.*

**Psychotria nilgiriensis** Deb & Gang., Taxon 31: 546. 1982; Deb & Gang., J. Econ. Tax. Bot. Addl. Ser. 7: 85. 1989. ***P. congesta*** (Wight & Arn.) Hook. f., Fl. Brit. India 3: 162. 1880, non Spreng. ex DC., 1830; Gamble, Fl. Pres. Madras 640. 1921. ***Grumilea congesta*** Wight & Arn., Prodr. 432. 1834; Wight, Ic. t. 1037. 1845.

Small shrubs. Leaves to 8 x 4 cm, obovate, obtuse, cuneate at the base, green when dried; nerves 7 or 8 pairs, domatia glandular; petiole 2 cm long, stipule 6 mm long, ovate, acute. Cymes 2 x 2 cm, terminal, congested. Flowers 5 mm long; calyx cupular, lobes obtuse, ciliate; corolla 5 mm long, tube shorter than lobes, villous along a transverse line inside. Fruit 11 x 7 mm, ellipsoidal, glabrous.

*Fl. & Fr.* : December-January

*Distr.* : Southern Western Ghats. Common; in evergreen forests at high elevations. Sunderamala, *JA 13588*; Kottamala, *JA & KPR 15353.*

**Psychotria nudiflora** Wight & Arn., Prodr. 434. 1834; Hook. f., Fl. Brit. India 3: 175. 1880; Gamble, Fl. Pres. Madras 641. 1921; Deb & Gang., J. Econ. Tax. Bot. Addl. Ser. 7: 56. 1989.

Shrubs. Leaves to 13 x 4 cm, elliptic to oblanceolate, acuminate, narrowed to the base, reddish brown when dried; nerves 10-13 pairs, reticulate; petiole 1 cm long, slender; stipule ovate, obtuse. Cymes 4 cm across, peduncled, rusty puberulus, branches whorled. Flowers sessile; calyx 1 mm long, membraneous; corolla 5.5 mm long, lobes 4, short; style 2-fid at apex. Fruits not seen

*Fl.* : December-January

*Distr.* : Southern Western Ghats (Kerala & Tamil Nadu). Rare; in evergreen forests at high elevations. Vellimala, *JA 12952.*

**Psychotria truncata** Wall. in Roxb., Fl. Ind. 2: 162. 1824; Hook. f., Fl. Brit. India 3: 163. 1880; Gamble, Fl. Pres. Madras 640. 1921; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 589. 1976; Deb & Gang., J. Econ. Tax. Bot. Addl. Ser. 7: 66. 1989.

Large shrubs. Leaves to 12 x 6 cm, obovate, obtuse, broadly apiculate; nerves 9-11 pairs, 6 mm apart, reticulate towards the margins; petiole 1.5 cm long; stipule 12 mm long. Cymes 4 cm across, long-peduncled; branches whorled. Flowers 8 mm long, sessile; calyx 1 mm long, shallowly lobed, ciliate; corolla lobes 6, oblong, deflexed. Fruits not seen.

*Fl.* : April

*Distr.* : Western Peninsular India. Rare; in evergreen forests. Odamala, *JA 13607.*

## **RICHARDIA** Linnaeus

Sp. Pl. 330. 1753

**Richardia scabra** L., Sp. Pl. 330. 1753; Balakr., Bull. Bot. Surv. India 6: 85. 1964; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 740. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 237. 1996.

Procumbent herbs, scabrous; stem narrowly 4-winged. Leaves to 4 x 2 cm, obovate, obtuse, scabrid, subsessile; stipule connate, membraneous, teeth 4 or 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 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 2 x 2 mm, globose, septicidal; seeds 2, oblong.

*Fl. & Fr.* : Throughout the year

*Distr.* : Native of Tropical America; spread to Africa & some parts of Asia. Common; in disturbed forest areas. Mangaladevi, *JA 12174*; Thekkady, *KPR 14600*; Koruthode, *KPR 14735*.

## **RUBIA** Linnaeus

Sp. Pl. 109. 1753

**Rubia cordifolia** L., Mant. Pl. 197. 1771; Hook. f., Fl. Brit. India 3: 202. 1880; Gamble, Fl. Pres. Madras 655. 1921; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 590. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 741. 1983; Manilal, Fl. Silent Valley 142. 1988. **Manchatti, Murukkodi** (Mannan).

Scabrous climber, stem 4-angled, articulate. Leaves whorled, 4 in each node, equal or unequal, to 7 x 3 cm, ovate, cordate at base, acuminate at apex, 3-5-ribbed from base; petiole 2-5 cm long. Flowers 3 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.

*Fl. & Fr.* : May-July

*Distr.* : Tropical countries of Asia and Africa. Common; in semi-evergreen forests. Mangaladevi, *JA 12182*.

*Ethnobotanical use* : The roots are made into a paste and pasted to mouth for ulcers on mouth.

## **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. Corolla tube ca. 4 mm long; leaves sessile.....**S. glomeratum**

1. Corolla tube ca. 12 mm long; leaves petiolate.....**S. foetens**

**Saprosma foetens** (Wight) K. Schum. in Engl. & Prantl, Pflanzenf. 4(4): 122. 1891; Manilal, Fl. Silent Valley 142. 1988; Gang., J. Econ. Tax. Bot. 15(1): 84. 1991. ***Lasianthus foetens*** Wight, Calcutta J. Nat. Hist. 6: 517. 1846. ***Dysodidendron ceylanica*** Gard., Calcutta J. Nat. Hist. 7: 2. 1847. ***Serissa wightii*** Bedd., Ic. t. 15. 1868-1874. ***Saprosma ceylanicum*** (Gard.) Bedd., For. Man. Bot. 134/12. 1872; Hook. f., Fl. Brit. India 3: 193. 1880; Gamble, Fl. Pres. Madras 649. 1921. **Theenari, Peenari** (Mannan).

Small trees; branchlets white. Leaves to 6 x 2.5 cm, elliptic, acute, cuspidate, dark when dried; petiole 5-8 mm long. Flowers 1-3 together on short cymes, axillary; peduncle and branched slender; calyx 4 mm long, teeth 4, short; corolla tube glabrous inside, lobes 8 x 8 mm, triangular, spreading, dull white. Fruits not seen.

*Fl.* : August-December

*Distr.* : Southern Western Ghats. Common; in evergreen forests at high elevations Kottamala, *JA 14068.*

**Saprosma glomeratum** (Gard.) Bedd., For. Man. Bot. 134/11. 1872; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 591. 1976; Manilal, Fl. Silent Valley 143. 1988; Gang., J. Econ. Tax. Bot. 15(1): 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. Kew Gard. Misc. 3: 37. 1851; Hook. f., Fl. Brit. India 3: 192. 1880; Gamble, Fl. Pres. Madras 649. 1921. ***Serissa glomerata*** (Gard.) Bedd., Ic. t. 16. 1868-1874.

Shrubs, to 1.5 m tall. Leaves to 12 x 5 cm, ovate-oblong, acute, subcordate at base; domatia glandular; nerves 10-15 pairs. Flowers 3-6 together, in terminal clusters, 7 mm long, shortly pedicelled; calyx 2 mm long, lobes 4, ovate, acute; corolla white, densely hairy within; anthers sessile. Berry 1 cm across, globose, emarginate, deep blue.

*Fl. & Fr.* : March-July

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Mlappara, *JA 12122*; Ambari, *JA 13794.*

## 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. Calyx lobes 2; leaves to 2.5 cm long.....**S. mauritiana**
1. Calyx lobes 4; leaves over 4 cm long.....2
2. Leaves ovate; seeds ca. 3 x 1.5 cm.....**S. latifolia**
2. Leaves linear-lanceolate; seeds ca. 1.5 x 1 mm.....3
3. Seeds rugose; leaves petiolate.....**S. pusilla**
3. Seeds smooth; leaves sessile .....**S. articularis**

**Spermacoce articularis** L. f., Suppl. Pl. 119. 1782; Sivar. *et al.*, Proc. Ind. Acad. Sci. (Pl. Sci.) 97: 349. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 238. 1996. ***Borreria articularis*** (L. f.) Will., Bull. Herb. Boiss. Ser. 5, 2: 88. 1905. ***Spermacoce hispida*** auct. non L., 1753: Hook. f., Fl. Brit. India 3: 200. 1881; Verdc., Fl. Trop. Africa 1: 301. 1976; Deb & Dutta, J. Econ. Taxon. Bot. 5: 1046. 1984, p.p. ***Borreria hispida*** sensu Gamble, Fl. Pres. Madras 656. 1921, non Schum., 1891.

Erect woody herbs, stems 4-winged, scabrid. Leaves to 6 x 1.3 cm, acute at both ends, mucronate at apex, glabrous; nerves 6 or 7 pairs, very oblique; petiole 5-10 mm long, slender; stipule membranous, teeth, 5-7, to 7 mm long, glabrous. Flowers many; calyx lobes acute, glabrous; corolla white. Capsule 2 x 2 mm, obcordate, glabrous; seeds black.

*Fl. & Fr.* : October-December

*Distr.* : Tropical regions of Asia and Africa. Common; in grasslands. Koruthode, *JA 12438.*

**Spermacoce latifolia** Aublet, Hist. Pl. Guinea Fr. 1: 55, t. 19/1. 1775; Verdc., Fl. Trop. E. Africa 1: 364. 1976; Deb & Dutta, Bull. Bot. Surv. India 18: 216. 1979; Sivar. *et al.*, Proc. Ind. Acad. Sci. (Pl. Sci.) 97: 355. 1987; Manilal, Fl. Silent Valley 143. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 238. 1996. ***Borreria eradii*** Ravi, J. Bombay Nat. Hist. Soc. 6: 539. 1970. **Pachha palla** (Malam pandarum).

Decumbent herbs; stem 4-winged, scabrous. Leaves to 5 x 2.5 cm, acute, scabrous; nerves 5 pairs; petiole very short, broad; stipular teeth 4-6, hispid. Flowers in clusters of 2-5, axillary, sessile; calyx tube 2 mm long, lobes hispid; corolla tube short, lobes erect. Capsule 4 x 3 mm, compressed, hispid; seeds ellipsoid, minutely pitted, dark brown.

*Fl. & Fr.* : Throughout the year

*Distr.* : Native of Tropical America, spread widely in Tropical countries of Africa and Asia. Common; in disturbed forests areas and forests plantations. Thekkady, *JA 16814.*

**Spermacoce mauritiana** Osea Gideon ex Verdc., Kew Bull. 37: 547. 1983; Sivar. *et al.*, Proc. India Acad. Sci. (Pl. Sci.) 97: 356. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 238. 1996. ***S. ocymoides*** auct. non Burm. f., 1708: Hook. f., Fl. Brit. India 3: 200. 1881, p.p. ***Borreria ocymoides*** auct. non (Burm. f.) DC., 1830: Gamble, Fl. Pres. Madras 654. 1921. ***Spermacoce decandollei*** Deb & Dutta, J. Econ. Taxon. Bot. 5: 1044. 1984.

Diffuse herbs; stems hispid. Leaves to 2.5 x 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 1 x 1 mm, with wings like persistent sepals; seeds 1 x 0.5 mm, oblong, minutely pitted, dark brown.

*Fl. & Fr.* : Throughout the year

*Distr.* : Indo-Malesia. Common; in open disturbed forests. Vellimala, *JA & KPR 15329.*

**Spermacoce pusilla** Wall. in Roxb., Fl. Ind. 1: 379. 1820; Verdc., Fl. Trop. East Africa 1, (Rubiac.) 356. 1976; Sivar. *et al.*, Proc. Ind. Acad. Sci. (Pl. Sci.) 97: 356. 1987; Manilal, Fl. Silent Valley 144. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 238. 1996. ***Borreria pusilla*** (Wall.) DC., Prodr. 4: 543. 1830. ***B. stricta*** sensu Gamble, Fl. Pres. Madras 654. 1921, non (L. f.) K. Schum., 1891.

Herbs, to 30 cm high, stems glabrous. Leaves to 5 x 0.7 cm, lanceolate, acuminate, thinly scabrid, sessile; stipule cupular, 6-7-teethed, teeth 7 mm long, glabrous. Flowers many, in dense axillary clusters; calyx lobes 4, acuminate, glabrous; corolla 2 mm long, white, lobes spreading. Capsule 2 x 1.5 mm, ovoid, scabrid above.

*Fl. & Fr.* : October-January

*Distr.* : Tropical Africa eastward to Malesia. Common; in grasslands. Mangaladevi, *JA 12461, JA 14200*; Thaannikkudy, *JA 12621*; Uppupara, *JA 13188.*

## 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 in, 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. Ovule many in each locule of the ovary; seeds planoconvex.....**T. asiatica**

1. Ovule one in each locule of the ovary; seeds rounded.....**T. monosperma**

**Tarenna asiatica** (L.) O. Ktze. ex K. Schum., Bot. Tidsskr. 24: 332. 1902; Rani & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 744. 1983. ***Rondeletia asiatica*** L., Sp. Pl. 172. 1753. ***Webera corymbosa*** Willd., Sp. Pl. 1: 1224. 1798; Hook. f., Fl. Brit. India 3: 102. 1880. ***Chomelia asiatica*** (L.) O. Ktze., Rev. Gen. Pl. 1: 278. 1891; Gamble, Fl. Pres. Madras 613. 1921. ***Stylocoryne webera*** A. Rich., Mem. Soc. Hist. Nat. Paris 5: 248. 1834; Wight, Ic. t. 309. 1840 & t. 584. 1842.

Glabrous shrubs. Leaves to 17 x 6 cm, elliptic-oblong, acuminate at apex and base, nerves 13 pairs; petiole 3-4 cm long. Cymes peduncled, axillary, 10 cm across; peduncle to 6 cm long; branches slender. Drupe 6 mm across, globose; seeds 2, black.

*Fl. & Fr.* : January-June

*Distr.* : Peninsular India, Malesia and Sri Lanka. Common; in semi-evergreen forests. Vallakkadavu, *KPR & JA 16376.*

**Tarenna monosperma** (Wight & Arn.) Raju, Sci. & Cult. 32: 554. 1966; Sasidh. & Sivar., Fl. Pl. Thrissur For. 240. 1996. ***Stylocoryne monosperma*** Wight & Arn., Prodr. 401. 1834; Wight, Ic. t. 317. 1840; Gamble, Fl. Pres. Madras 635. 1921. ***Webera monosperma*** (Wight & Arn.) Hook. f., Fl. Brit. India 3: 103. 1880.

Shrubs to 2 m high. Leaves to 18 x 6.5 cm, elliptic-oblanceolate, acuminate at apex; nerves 12-14 pairs, regular, petiole 1.5 cm long, stout. Cymes peduncled, to 15 cm across, corymbose. Flowers 3.5 cm long; calyx 3 mm long, hispid; corolla tube glabrous, white; style entire, hairy towards the base. Drupe 1 x 1 cm, globose, glabrous.

*Fl. & Fr.* : January-May

*Distr.* : Southern Western Ghats. Frequent; in evergreen forests at all elevations. Arjunankotta, *JA 13380*; Odamala, *JA 13606, 15098.*

## **WENDLANDIA** Bartling ex A. P. de Candolle

Prodr. 4: 411. 1830, *typ. cons.*

**Wendlandia thyrsoidea** (Schultes) Steud., Nomencl. ed. 2, 2: 786. 1841; Rani & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 745. 1983; Manilal, Fl. Silent Valley 145. 1988. ***Canthium thyrsoideum*** Schultes in Roem. & Schultes, Syst. 6: 207. 1820. ***Wendlandia notoniana*** Wall. ex Wight & Arn., Prodr. 403. 1834; Wight, Ic. t. 1033. 1845; Hook. f., Fl. Brit. India 3: 40. 1880; Gamble, Fl. Pres. Madras 588. 1921.

Large stiff shrubs; stems terete, tomentose. Leaves ternate, to 12 x 4.5 cm, elliptic, acute, tomentose beneath; nerves 5-12, regular; petiole 1 cm long; stipule 6 mm long, ovate, acute. Panicle terminal, *ca.* 15 cm across, hispid. Flowers 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.

*Fl. & Fr.* : March-June

*Distr.* : Peninsular India and Sri Lanka. Common; in grasslands and savannahs forests. Sabarimala, *JA & KPR 14851.*

## 71. ASTERACEAE

Dumort., Comment. Bot. 55. 1822. *nom. alt.*, **Compositae**

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 spicate ..... **Spilanthes**
5. Receptacle flat, concave or convex, not spicate .....6
6. Pappus absent; heads axillary, sessile..... **Eleutheranthera**
6. Pappus present; heads terminal, peduncled .....7
7. Pappus 2-3, bristle like..... **Adenostemma**
7. Pappus 5-many, setaceous .....8
8. Anthers appendaged at apex; pappus scaly ..... **Ageratum**
8. Anthers not appendaged; pappus of hairs.....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. Leaves all basal; scapigerous herbs ..... **Launaea**
11. Leaves all cauline; stems elongate .....12

12. Achenes truncate at apex, not beaked.....**Sonchus**

12. Achenes acute at apex, beaked .....**Youngia**

13. Groups of heads supported by 3-4 spathes; bracts calycine; leaves radical.....**Elephantopus**

13. Heads not supported by spathes; bracts paleaceous; leaves cauline.....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.....**Gynura** p.p.(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 .....**Senecio** (p.p.)

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 shrubs; leaves not as above, petiolate.....**Blepharispermum**

21. Leaves opposite.....22

21. Leaves alternate .....30

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.....25

24. Leaves simple, entire .....26

25. Pappus of 3 retrorsely barbed bristles.....**Bidens**

25. Pappus absent .....**Moonia**

26. Pappus absent or reduced into minute teeth .....27

26. Pappus developed .....28

27. Involucral bracts longer than the head, viscid glandular hairy .....**Sigesbeckia**

27. Involucral bracts shorter or equal to the head, not viscid or hairy .....**Eclipta**

28. Achenes terete, densely hairy; pappus many, setaceous .....**Tridax**

28. Achenes 3-4-angled, glabrous; pappus 3-4, scaly .....29

29. Capitula axillary, solitary, peduncled; flowers yellow .....**Wedelia**

29. Capitula in terminal peduncled cymes; flowers white.....**Galinsoga**

30. Capitula more than 4 cm across; large shrubs.....**Tithonia**

30. Capitula less than 2 cm across; herbs or small shrubs.....31

31. Anther bases tailed....32
31. Anthers bases obtuse or entire, not tailed....35
32. Bracts spreading; bisexual flowers all sterile....**Anaphalis**
32. Bracts not spreading; bisexual flowers usually fertile....33
33. Aromatic plants; heads panicled or corymbose; bracts green....**Blumea**
33. Not aromatic plants; heads densely packed in terminal panicles; bracts hyaline....34
34. Upper surface of leaves glabrous, not ribbed....**Gnaphalium**
34. Upper surface of leaves cottony hairy, ribbed....**Helichrysum**
35. Capitula solitary....36
35. Capitula cymose or panicled....39
36. Outer female florets rayed....37
36. Outer female flowers not rayed....38
37. Pappus absent; corolla 4-lobed; leaves basal....**Myriactis**
37. Pappus present; corolla 5-lobed; leaves cauline....**Erigeron**
38. Heads sessile; pappus zero; glabrous plants....**Centipeda**
38. Heads pedunculate; pappus tubular; villous plants....**Grangea**
39. Anther bases sagittate....40
39. Anther base obtuse or entire....41
40. Leaf-base decurrent to the wings of the stem; flowers pink....**Laggera**
40. Leaf-base amplexicaule not decurrent; flowers yellow....**Vicoa**
41. Pappus present....42
41. Pappus absent....45
42. Corolla of female flowers shorter than the corolla of bisexual flowers....**Conyza**
42. Corollas equal....43
43. Pappus many, prominent....44
43. Pappus 4, small, deciduous bristles....**Dichrocephala**
44. Erect herbs; leaves pinnately cut....**Erechtites**
44. Climbers; leaves not pinnately cut....**Senecio** (*S. scandens)*
45. Florets of outer row rayed....**Parthenium**
45. Florets all tubular....**Artemisia**

## ACANTHOSPERMUM Shrank

Pl. Rar. Hort. Monac. Pl. 53. 1819.

**Acanthospermum hispidum** DC., Prodr. 5: 522. 1836; Gamble, Fl. Pres. Madras 704. 1921; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 599. 1976; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 206. 1980; Rani & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 758. 1983; Chowdhery in Hajra *et al.*, Fl. India 12: 361. 1995. Sasidh. & Sivar., Fl. Pl. Thrissur For. 243. 1996.

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, 5 mm long, oblong, acute, hairy. Outer row of flowers female, ligulate; limb 1.5 mm long, yellow, 3-lobed at apex; side lobes narrower. Inner flowers bisexual; corolla 2 mm long, tubular, 5-toothed at apex, yellow; anthers sagittate at base. Achenes 5 x 3 mm, obovate, with two diverging long spines at apex, compressed, densely covered with hooks; pappus absent.

*Fl. & Fr.* : October-January

*Distr.* : Native of South America, introduced to other Tropical countries. Common; in disturbed forests. Sabarimala, *JA 12380*; Thekkady, *KPR 14914.*

**ADENOSTEMMA** J. R. Forster & J. G. Forster

Charact. Gen. 89, t. 45. 1776.

Shrubs, stems terete. Leaves opposite, ovate, acute at apex, cuneate at base, entire, crenate or toothed. Heads many, on terminal corymbose panicle, globose to depressed globose; bracts in two series, obovate, obtuse; receptacle pitted. Flowers all bisexual, tubular; corolla white, 5-lobed above; lobes broad, acute; anther bases obtuse or sagittate. Achenes obovoid, 3-angled, curved; pappus of 3-4 glandular bristles.

1. Achenes verrucose; leaves to 12 cm long.....**A. lavenia**
1. Achenes smooth; leaves 15-20 cm long.....**A. macrophylla**

**Adenostemma lavenia** (L.) O. Ktze., Rev. Gen. Pl. 1: 304. 1891; Gamble, Fl. Pres. Madras 677. 1921; Panigr., Kew Bull. 30: 648. 1976; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 139. 1980; Rani & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 759. 1983; Manilal, Fl. Silent Valley 145. 1988; Uniyal in Hajra *et al.*, Fl. India 12: 346. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 243. 1996. ***Verbesina lavenia*** L., Sp. Pl. 902. 1753. ***A. viscosum*** Forst., Char. Gen. 90. 1776; Clarke, Comp. India 28.1876; Hook. f., Fl. Brit. India 3:242. 1881.

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 5 mm, hemispherical, pedunculate; bracts 4 mm long, obovate, obtuse, brown, glabrous. Flowers many, white; corolla 2.5 mm long; tube puberulus; lobes hairy. Achenes 4 mm long, curved-obovoid, 3-angled, black; pappus 3-4 glandular bristles.

*Fl. & Fr.* : October-January

*Distr.* : India, China, Africa and Australia. Very Common; in semi-evergreen and moist deciduous forests. Koruthode, *JA 17887.*

**Adenostemma macrophylla** (Bl.) DC., Prodr. 5: 113. 1836; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 140. 1980. ***Lavenia macrophylla*** Bl., Bijdr. 905. 1826. ***Adenostemma viscosum*** var. ***reticulatum*** Clarke, Comp. India 30. 1876.

Herbs, 50-90 cm high; stems glandular hairy. Leaves 15-17 x 8-9 cm, ovate, acute at apex, decurrent at base, pubescent along the nerves below; petiole 5-7 cm long. Heads many, 5 x 7-8 mm, bracts 4 mm long, obovate, obtuse, glabrous. Flowers white, many; corolla 2 mm long, hairy along the lobes. Achenes 5 x 1 mm, curved, 3-angled, dark brown; pappus of 3 gland-tipped bristles.

*Fl. & Fr.* : October-January

*Distr.* : India & Malaya. Common; in evergreen forests. Inchippara, *NS & JA 12593.*

## AGERATINA Spach.

Hist. Nat. Veg. Phan. 10. 286. 1841.

**Ageratina adenophora** (Spreng.) King & Robins., Phytologia 19: 211. 1970; Rani & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 760. 1983; Manilal, Fl. Silent Valley 146. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 244. 1996. ***Eupatorium adenophorum*** Spreng., Syst. Veg. (ed. 16) 3: 420. 1826. ***E. glandulosum*** sensu Kunth, Nov. Gen. Sp. 4: 122, t. 346. 1820, non Michaux, 1803; Matthew, Rec. Bot. Surv. India 20: 135. 1969. **Appa**, **Pachha** (Mannan).

Subshrubs, glandular hairy; stems violet-blue. Leaves opposite, to 8 x 4 cm, ovate, acute, serrate; petiole 2 cm long. Heads 7 mm across, 5 mm long, packed, in terminal corymbose panicle; bracts 3 -seriate, 4 x 1 mm, lanceolate, strongly 3-ribbed. Outer florets bisexual, 4 mm long; corolla white, tube narrow, campanulate above, 5-lobed, hispid. Inner florets female. Achenes 2 mm long, curved, ellipsoid, 5-angled, brown, smooth; pappus 5-10, 4 mm long, white, barbed.

*Fl. & Fr.* : December-May

*Distr.* : Pantropical. Common; in disturbed evergreen forests at high elevations. Vellimala, *JA 17891.*

*Ethnobotanical use* : Leaves and tender parts are made into a paste and are applied on wounds for healing it.

## AGERATUM Linnaeus

Sp. Pl. 839. 1753

**Ageratum conyzoides** L., Sp. Pl. 839. 1753, Clarke, Comp. India 30. 1876; Hook. f., Fl. Brit. India 3: 243. 1881; Gamble, Fl. Pres. Madras 677. 1921; Ramam. in Sald. & Nicols., Fl. Hassan

Dist. 600. 1976; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 141. 1980; Rani & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 761. 1983; Manilal, Fl. Silent Valley 147. 1988; Uniyal in Hajra *et al.*, Fl. India 12: 348. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 244. 1996.

Herbs, viscid hairy. Leaves opposite, to 7 x 5 cm, ovate, acute at apex, crenate, rounded at base; petiole 1-3 cm long. Heads white, to 7 mm across, 5 mm long, in terminal corymbose panicle; bracts 1-3-seriate, 3-4 mm long, elliptic, toothed at apex, 3-ribbed. Flowers all similar, bisexual; corolla 2.5 mm long, tubular, white, glabrous, 5-lobed at apex; stamens 5, anthers linear. Achenes 2 mm long, linear, 5-angled, hirtus along the angles; pappus 3-4 mm long, many, setaceous.

*Fl. & Fr.* : Throughout the year

*Distr.* : Native of America, now spread widely in all warm countries. Very common; in disturbed forest areas. Thekkady, *JA 18401.*

*Ethnobotanical use* : The leaves are pasted with leaves of *Psidium guajava* and given in cold water for loose motion.

## **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 scabrous above, ca. 3 mm broad.....**A. aristata**
1. Leaves woolly-hairy above, 6-10 mm broad.....2
2. Bracts pinkish; achenes papillose.....**A. subdecurrens**
2. Bracts white; achenes scaly.....**A. lawii**

**Anaphalis aristata** DC., Prodr., 6: 274. 1838; Wight, Ic. t. 119. 1846; Hook. f., Fl. Brit. India 3: 285. 1881; Gamble, Fl. Pres. Madras 696. 1921; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 763. 1983; Manilal, Fl. Silent Valley 147. 1988; Pant in Hajra *et al.*, Fl. India 13: 55. 1995.

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 3 x 3 mm, hemispherical, collected in terminal dense clusters; bracts 4 mm long, spreading, elliptic, acute, wooly, solid at base. Bisexual flowers central, 5 or 6; corolla 2.5 mm long, broader above. Female flowers many; corolla 1.5 mm long, slender. Achenes cylindrical, brown, papillose; pappus 2 mm long, white.

*Fl. & Fr.* : July-December

*Distr.* : Peninsular India. Rare; in grasslands. Mangaladevi, *JA 12042.*

**Anaphalis lawii** (Hook. f.) Gamble, Fl. Pres. Madras 696. 1921; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 763. 1983; Pant in Hajra *et al.*, Fl. India 13: 66. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 245. 1996. ***Anaphalis oblonga*** DC. var. ***lawii*** Hook. f., Fl. Brit. India 3: 283 1881.

Branched herbs, to 60 cm high; stems white, wooly. Leaves 4-5 x 0.7 cm, oblong, acute at apex, amplexicaule at base. Heads 4 x 4 mm, in densely branched corymbose cymes; bracts 3-seriate, 3-4 mm long, elliptic, acute, dentate at apex; brown at lower part; outer ones wooly. Bisexual flowers 5-7, central; corolla 2.5 mm long, white, 5-toothed at apex. Achenes 1 mm long, cylindrical, scaly, brown.

*Fl. & Fr.* : August-December

*Distr.* : Peninsular India. Occasional; in open grasslands along hilltop. Kalvarimala, *JA 13905.*

**Anaphalis subdecurrens** (DC.) Gamble, Fl. Pres. Madras 695. 1921; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 764. 1983; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 194. 1980; Manilal, Fl. Silent Valley 148. 1988; Pant in Hajra *et al.*, Fl. India 13: 75. 1995. ***Gnaphalium subdecurrens*** DC. in Wight, Contrib. 21. 1834. ***Anaphalis oblonga*** DC., Prodr. 6: 274. 1837; Hook. f., Fl. Brit. India 3: 283. 1881.

Erect herbs; stems densely covered with smoky wool. Leaves 3-6 x 0.6-1 cm, oblanceolate, acute, 1-veined, sessile. Heads 3 x 6 mm, sessile, collected in terminal congested cymes; bracts 3 mm long, elliptic, entire, acute with solid lower portion; outer ones wooly. Female flowers many; corolla yellow, slender, glabrous. Bisexual flowers 4-6, central; corolla broader. Achenes brown, papillose; pappus 2 mm long, white.

*Fl. & Fr.* : July-November

*Distr.* : South India and Sri Lanka. Common; in hilly grasslands. Mangaladevi, *JA 12175.*

## **ARTEMISIA** Linnaeus

Gen. Pl. ed. 5. 367. 1754.

Annual or perennial shrubs; stems terete. Leaves alternate, usually clustered towards the apex, entire or variously lobed. Heads numerous, in terminal leafy large panicles, globose; bracts 2-3-series, ovate, obtuse; receptacle glabrous, flat. Flowers all tubular; outer one row female, inner bisexual. Corolla 5-lobed at apex, white; anthers obtuse at base. Achene oblong, striate; pappus absent.

1. Leaves deeply pinnatifid, softly white tomentose or glabrous beneath; stem puberulus.....**A. nilagirica**
1. Leaves oblanceolate, 3-5-toothed at apex, glabrous on either sides; stem glabrous.....**A. japonica**

**Artemisia nilagirica** (Clarke) Pamp. in Nuovo., Giorn. Bot. Ital. 33: 452. 1926; Sant., Bull. Bot. Surv. India 3(1): 12. 1961; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 602. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 765. 1983; Manilal, Fl. Silent Valley 149. 1988 Naithani in Hajra *et al.*, Fl. India 12: 36. 1995. ***A. vulgaris*** L. var. ***nilagirica*** Clarke, Comp. India 162. 1876. ***A. indica*** sensu Wight, Ic. t. 112. 1846. non Willd., 1803. ***A. vulgaris*** auct. non L., 1753: Hook. f., Fl. Brit. India 3: 325. 1881; Gamble, Fl. Pres. Madras 713. 1921. **Karpoora thulasi** (Mannan).

Perennial fragrant shrubs, 1-3 m high; stems terete, puberulus. Leaves to 20 x 10 cm; lobes oblong, acute; upper ones entire. Panicle axillary and terminal, leafy. Heads 3-4 mm long, globose; bracts 2.5 mm long, ovate-oblong, softly woolly, ciliate. Female flowers many; corolla 1.5 mm long, white, narrow. Bisexual flowers 4-6; corolla 2.5 mm long, broader, glabrous, connective of anthers mucronate. Achene 1.5 mm long, oblong, glabrous.

*Fl. & Fr.* : August-December

*Distr.* : Peninsular India. Very common; along forest margins. Vallakkadavu, *KPR 16382.*

*Ethnobotanical use* : The leaves and tender parts are pressed and the juice is applied externally on head for lice.

**Artemisia japonica** Thunb., Fl. Jap. 310. 1784; Naithani in Hajra *et al.*, Fl. India 12: 28. 1995. ***Artemisia parviflora*** Buch.-Ham. ex. D. Don, Prodr. Fl. Nep. 181. 1825; Hook. f., Fl. Brit. India 3: 322. 1881; Gamble, Fl. Pres. Madras 713. 1921; Sant., Bull. Bot. Surv. India 3(1): 12. 1961; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 766. 1983; Ling, Bull. Bot. Surv. India 33(1-4): 301. 1991. ***A. glabrata*** DC. in Wight, Contrib. 20. 1834; Wight, Ic. t. 111. 1846.

Annuals or perennials, 1.5 m high; stems terete. Leaves cuneate at base, 5 x 3 cm, usually clustered. Heads 3 x 3 mm, globose, in terminal narrow leafy panicles; bracts 2-3 mm long,

ovate, obtuse. Inner few flowers bisexual; corolla 2 mm long, tubular; lobes acute; anthers obtuse at base. Achenes 1 mm long, ellipsoid, faintly striate; yellowish brown.

*Fl. & Fr.* : December-May

*Distr.* : India & Burma. Frequent; in savannahs and grasslands. Thannikkudy, *JA & KPR 15400.*

## **BIDENS** Linnaeus

Sp. Pl. 831. 1753

**Bidens biternata** (Lour.) Merr. & Sheriff, Bot. Gaz. 88. 293. 1929; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 602. 1976; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 229. 1980; Manilal, Fl. Silent Valley 149. 1988; Chowdhery in Hajra *et al.*, Fl. India 12: 366. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 245. 1996. ***Coreopsis biternata*** Lour., Fl. Cochinch. 508. 1790. ***Bidens pilosa*** auct. non L., 1753: Hook. f., Fl. Brit. India 3: 309. 1881; Gamble, Fl. Pres. Madras 709. 1921. **Kandavare kuthi, Snehappullu**.

Erect subshrubs; stem ribbed. Leaves pinnate or bipinnate, to 16 cm long; leaflets 6-8 x 3 cm, ovate, acuminate, serrate. Heads 18-20 mm long, oblong, in loose corymbose cymes or solitary; bracts 8 x 2 mm, 2-seriate, oblong, acute; outer ones ciliate. Flowers outer whorl ligulate; limb 5 x 3 mm, oblong, 3-lobed, white. Inner flowers bisexual; corolla tubular, 5-lobed, yellow, lobes obtuse; anthers obtuse at base. Achenes 16 mm long, linear, glabrous; pappus 3, retrorsely barbed, spinescent.

*Fl. & Fr.* : Throughout the year

*Distr.* : India, Tropical Africa, Malesia and Australia. Common; in all localities. Kokkara, *JA 12002.*

## **BLEPHARISPERMUM** Wight ex de Candolle

in Wight, Contrib. 11. 1834.

**Blepharispermum petiolare** DC. in Wight, Contrib. 12. 1834; Wight, Ic. t. 1092. 1846; Hook. f., Fl. Brit. India 3: 276. 1881; Gamble, Fl. Pres. Madras 692. 1921; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 184. 1980; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 32. 1987; Pant in Hajra *et al.*, Fl. India 13: 42. 1995 .

Shrubs, to 1 m high. Leaves 8-10 x 5 cm, alternate, ovate, acuminate, entire, glabrous; petioles 1 cm long. Heads 3-6-flowered, densely packed in globose clusters of 15 mm across, panicled, terminal, long-peduncled; bracts 1-seriate, 5 x 1 mm, white, oblong, obtuse, glabrous. Flowers two types. Female flowers 2, outer; corolla tubular, 3 mm long, white, 3-lobed. Bisexual

flowers 2 or 3, inner, sterile; corolla tubular, 4 mm long, 3-4-lobed, yellow. Achenes obovate, biconvex, black, ciliate; pappus of few hairs.

*Fl. & Fr.* : December-April

*Distr.* : South India and Sri Lanka. Rare; in disturbed moist deciduous forests. Aruvioda, *JA 13647.*

## **BLUMEA** A. P. de Candolle

Arch. Bot. 2: 514. 1883, *typ. 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. Leaves decurrent at base into wings of the stem.....**B. alata**
1. Leaves not decurrent at base.....2
2. Flowers pink.....**B. mollis**
2. Flowers yellow .....3
3. Prostrate herbs with radiating branches.....**B. oxyodonta**
3. Erect herbs or shrubs .....4
4. Leaves glabrous below .....5
4. Leaves variously tomentose below .....7
5. Heads in congested panicles; herbs up to 50 cm high.....**B. lacera**
5. Heads in large lax panicles; shrubs, 1-3 m high.....6
6. Leaves pinnatisect; petiole not appendaged .....**B. virens**
6. Leaves oblanceolate; petioles appendaged .....**B. lanceolaria** var. **spectabilis**
7. Leaves densely white tomentose beneath; stem reddish.....8
7. Leaves hirtus or softly hairy beneath; stem not reddish .....9
8. Corolla lobes pubescent; leaves acute at apex.....**B. eriantha**
8. Corolla lobes glandular; leaves obtuse at apex .....**B. barbata**
9. Leaves rosetted, basal and cauline; densely white tomentose beneath.....**B. hieracifolia**
9. Leaves cauline only, not densely white tomentose beneath.....**B. membranacea** var. **jacquemontii**

**Blumea alata** (D. Don) DC., Prodr. 5: 488. 1836; Wight, Ic. t. 1101. 1846; Grierson in Ceylon J. Sci., Biol. Sci. 11: 10. 1974 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 167. 1980; Manilal, Fl. Silent Valley 150. 1988. ***Erigeron alatum*** D. Don, Prodr. Fl. Nep. 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. 1921; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 805. 1983; Kumar in Hajra *et al.*, Fl. India 13: 148. 1995.

Subshrubs; stems winged, densely villous. Leaves alternate, to 8 x 2 cm, obovate-oblong, obtuse, sessile, decurrent at base along the stem. Heads 12 x 4 mm, in terminal leafy panicle; bracts many-seriate, to 8 x 1 mm, oblong-lanceolate, acute to acuminate. Female flowers outer several rows; corolla 4 mm long, slender, 4 toothed at apex. Bisexual flowers few, central; corolla 7 mm long, pink, lobes acute, glabrous. Achenes 2 mm long, ribbed, hispid; pappus 7 mm long, white.

*Fl. & Fr.* : December-February

*Distr.* : Indo-China and Tropical Africa. Common; in grasslands. Kalvarimala, *JA 17871.*

**Blumea barbata** DC. in Wight, Contrib. 14. 1834; Hook. f., Fl. Brit. India 3: 262. 1881; Gamble, Fl. Pres. Madras 687. 1921; Randeria, Blumea 10: 267. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 604. 1976; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 171. 1980; Kumar in Hajra *et al.*, Fl. India 13: 119. 1995.

Stiff herbs, 1 m high, stem reddish, hispid. Leaves to 7 x 3 mm, obovate-oblanceolate, obtuse, distantly serrate, glabrous above, fulvous-tomentose below, nearly sessile. Heads 7 x 6 mm, in terminal and axillary congested cymes; bracts 7 x 0.5 mm, linear-lanceolate, silky hairy. Flowers many; corolla 4 mm long, glabrous; bisexual corolla broader. Achenes 1 mm long, ribbed, hairy, brown.

*Fl. & Fr.* : November-March

*Distr.* : Peninsular India and Sri Lanka. Common; in moist deciduous forests. Kalvarimala, *JA 17867.*

**Blumea eriantha** DC. in Wight, Contrib. 15. 1834; Hook. f., Fl. Brit. India 3: 266. 1881; Gamble, Fl. Pres. Madras 686. 1921; Randeria, Blumea 10: 279. 1960; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 32. 1987; Kumar in Hajra *et al.*, Fl. India 13: 122. 1995.

Erect unbranched herbs, to 50 cm high; stems reddish, sparsely hairy. Leaves 3-6 x 1-2 cm, elliptic to obovate, acuminate at base, scabrid above. Heads 6 x7 mm, in terminal congested leafy panicle; peduncle 5 mm long; bracts 6 x 0.5 mm, lanceolate, acuminate, brown; outer smaller, pubescent. Bisexual flowers few, central; corolla 4 mm long, sparsely hairy; lobes pubescent. Achene 1 mm long, ribbed, sparsely hairy; pappus 4 mm long, brownish.

*Fl. & Fr.* : October-February

*Distr.* : Southern Western Ghats. Rare; in Moist deciduous forest. Methaganam, *JA 17876.*

**Blumea hieracifolia** (D. Don) DC. in Wight, Contrib. 15. 1834; Wight, Ic. t. 1099. 1846; Hook. f., Fl. Brit. India 3: 263. 1881; Gamble, Fl. Pres. Madras 687. 1921; Randeria, Blumea 10: 247. 1960; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 33. 1987; Manilal, Fl. Silent Valley 151. 1988; Kumar in Hajra *et al.*, Fl. India 13: 125. 1995. ***Erigeron hieracifolium*** D. Don, Prodr. Fl. Nepal. 172. 1825.

Tall herbs, 80-100 cm high; stems strigose or glandular-hairy. Basal leaves larger, oblong-oblanceolate, acute at base and apex, coarsely dentate, scabrous above. Heads 10 x 12 mm, in axillary and terminal pedunculate clusters of 3-5; peduncle 2-3 cm long; bracts 7 x 0.5 mm, oblong, hairy; receptacle white-tomentose. Female corolla 5 mm long; lobes with 2-5 bristles at apex. Achenes ribbed, hairy.

*Fl. & Fr.* : October-February

*Distr.* : Indo-Malesia. Common; in moist deciduous forests and savannahs. Methaganam, *JA 17888.*

**Blumea lacera** (Burm. f.) DC. in Wight, Contrib. 14. 1834; Hook. f., Fl. Brit. India 3: 263. 1881; Gamble, Fl. Pres. Madras 687. 1921; Randeria, Blumea 10: 265. 1960; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 170. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 770. 1983; Kumar in Hajra *et al.*, Fl. India 13: 128. 1995; Sasidh. & Sivar., & Sivar., Fl. Pl. Thrissur For. 247. 1996. ***Conyza lacera*** Burm. f., Fl. Ind. t. 59. 1768. *Rackila.*

Herbs; stems terete, glabrous. Leaves broadly elliptic, to 10 x 5 cm, acute at both ends; irregularly toothed. Heads 7 x 7 mm, globose, terminal and upper axillary, 10-15 together; bracts 7 x 1 mm, hairy at apex, inner oblong, acute, outer smaller. Bisexual flowers few; corolla 4-6 mm long, glandular, of female flowers slender. Achenes ribbed, hairy.

*Fl. & Fr.* : November-February

*Distr.* : Indo-Malesia, Africa and Australia. Very common; in semi-evergreen forest. Mlappara, *JA 13196.*

**Blumea lanceolaria** (Roxb.) Druce, Bot. Soc. Exch. Club. Brit. Isles 4: 609. 1917, var. **spectabilis** (DC.) Randeria, Blumea 10: 22067. 1960; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 163. 1980; Manilal, Fl. Silent Valley 151. 1988; Kumar in Hajra *et al.*, Fl. India 13: 130. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 247. 1996. ***Conyza lanceolaria*** Roxb., Fl. Ind. 3: 432. 1832. ***Blumea spectabilis*** DC., Prodr. 5: 445. 1836; Hook. f., Fl. Brit. India 3: 269. 1881; Gamble, Fl. Pres. Madras 688. 1921.

Shrubs, to 2.5 m high; stems glandular. Leaves 20-30 x 6 cm, oblanceolate, acute at apex, serrate, attenuate at base, glabrous, sometimes lobed towards the base; petioles entire or barbed. Heads 10 x 10 mm, in terminal large panicle; bracts many, 10 x 1 mm, oblong, hairy. Female flowers outer few; corolla 8 mm long, glandular, dull white. Achenes 10-ribbed, thinly hairy; pappus reddish.

*Fl. & Fr.* : December-April

*Distr.* : Tropical Asia. Common; in semi-evergreen and moist deciduous forests. Mavadi, *JA 17878.*

**Blumea membranacea** Wallich ex DC., Prodr. 5: 440. 1836, var. **jacquemontii** (Hook. f.) Randeria, Blumea 10: 271. 1960; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 771. 1983; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 33. 1987; Manilal, Fl. Silent Valley 151. 1988; Kumar in Hajra *et al.*, Fl. India 13: 135. 1995; Sasidh. & Sivar., & Sivar., Fl. Pl. Thrissur For. 247. 1996. ***B. jacquemontii*** Hook. f., Fl. Brit. India 3: 265. 1881; Gamble, Fl. Pres. Madras 688. 1921.

Herbs to 1 m high; stem covered with simple and glandular hairs. Leaves 10-15 x 3-4 cm, elliptic, acute at either ends, margins lyrate-serrate, decurrent along petiole; petiole to 5 cm long. Heads 8 x 10 mm, pedunculate, in large terminal panicles with pubescent branches; bracts 8 x 0.5 mm, linear-oblong, acute, glabrous; outer smaller. Bisexual corolla 6 mm long; lobes acute, glabrous; female corolla smaller. Achenes 1.5 mm long, ribbed, hairy.

*Fl. & Fr.* : December-April

*Distr.* : India. Rare; in openings of evergreen forests. Anakuthivayal, *KPR & JA 17803.*

**Blumea mollis** (D. Don) Merr., Philipp. J. Sci. 5: 395. 1910; Randeria, Blumea 10: 261. 1960; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 169. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 771. 1983; Manilal, Fl. Silent Valley 152. 1988; Kumar in Hajra *et al.*, Fl. India 13: 135. 1995. ***Erigeron molle*** D. Don, Prodr. F;. Nep. 172. 1825. ***Blumea wightiana*** DC. in Wight, Contrib. 14. 1834; Hook. f., Fl. Brit. India 3: 261. 1881; Gamble, Fl. Pres. Madras 686. 1921. ***B. neilgherrensis*** Hook. f., Fl. Brit. India 3: 261. 1881; Gamble, Fl. Pres. Madras 686. 1921.

Herbs, 30-70 cm high; stems strigose. Leaves to 5 x 3 cm, obovate, obtuse, glandular serrate, covered with simple and glandular hairs, nearly sessile. Heads 5 x 6 mm, in axillary and terminal thyrsiform clusters; peduncle strigose; bracts 5 mm long, linear, hairy; outer smaller. Bisexual flowers around 10, central; corolla 3 mm long, glandular. Female flowers many; corolla slender. Achenes ellipsoid, ribbed, hairy; pappus 3 mm long.

*Fl. & Fr.* : September-January

*Distr.* : Tropical Africa & Asia. Common; in disturbed deciduous forest. Thekkady, *JA 12424.*

**Blumea oxyodonta** DC. in Wight, Contrib. 15. 1834; Hook. f., Fl. Brit. India 3: 266. 1881; Gamble, Fl. Pres. Madras 686. 1921; Randeria, Blumea 10: 280. 1960; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 773. 1983; Kumar in Hajra *et al.*, Fl. India 13: 139. 1995; Sasidh. & Sivar., & Sivar., Fl. Pl. Thrissur For. 247. 1996.

Prostrate herbs; stems slender, radiating from the root stock, pubescent. Radical leaves 8 x 3 cm, oblanceolate, obtuse, dentate; cauline leaves sessile, smaller. Heads few, 8 mm long, globose, in terminal panicles; bracts densely tomentose; outer 3 x 0.3 mm, lanceolate; inner 6 x 0.3 mm, linear. Female flowers yellow, many; corolla 3 mm long, lobes glandular hairy. Bisexual flowers few; corolla 4 mm long, broad. Achenes 3 mm long, ribbed, pubescent.

*Fl. & Fr.* : November-February

*Distr.* : Throughout India, Pakistan, Indo-china and South China. Common; in disturbed forest areas. Thekkady, *JA 18402.*

**Blumea virens** Wall. ex DC. in Wight, Contrib. 14. 1834; Hook. f., Fl. Brit. India 3: 264. 1881; Gamble, Fl. Pres. Madras 686. 1921; Randeria, Blumea 10: 272. 1960; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 173. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 773. 1983; Kumar in Hajra *et al.*, Fl. India 13: 143. 1995.

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 x 7 mm, many, in axillary and terminal large panicles, peduncles 1.5 cm long, glabrous; outer bracts 2 mm long, lanceolate, hairy at apex; inner larger, 6 mm long, linear-oblong. Bisexual florets 10, central; corolla 5 mm long, glandular. Female florets many; corolla 4 mm long, slender. Achenes 2 mm long, ribbed, oblong, hairy; pappus 4 mm long, white.

*Fl. & Fr.* : November-February

*Distr.* : Indo-China and Malesia. Common; along the margins of semi-evergreen forest. Koruthode, *JA & KPR 14753.*

## **CENTIPEDA** Loureiro

Fl. Cochinch. 492. 1790.

**Centipeda minima** (L.) A. Braun & Asch., Index Sem. Hort. Berol. App. 6. 1867; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 235. 1980; Matthew & Rani in Matthew, Fl. Tamil

Nadu Carnatic 3 (1): 774. 1983; Naithani in Hajra *et al.*, Fl. India 12: 48. 1995. ***Artemisia minima*** L., Sp. Pl. 849. 1753. ***Centipeda orbicularis*** Lour., Fl. Cochinch. 2: 493. 1790; Hook. f., Fl. Brit. India 3: 317. 1881; Gamble, Fl. Pres. Madras 678. 1921.

Prostrate glabrous herbs; stems slender. Leaves alternate, 1-1.5 x 0.8 cm, obovate, obtuse, cuneate at base, dentate. Heads 3 x 2 mm, axillary, sessile, hemispherical; bracts 2-seriate, 1-mm long, lanceolate, hairy. Flowers 2-types. Female flowers in outer few rows; corolla minute, tubular, shortly 4-toothed, yellow. Bisexual flowers inner, few; corolla campanulate, 0.6 mm long, 4-lobed, yellow; stamens 4, anthers entire at base. Achenes 1 mm long, obovate, 4-angled, ciliate, brown; pappus absent.

*Fl. & Fr.* : January-April

*Distr.* : Asia Australia and Pacific. Common; along lake shores when water level down. Thekkady, *JA 13621, KPR 14858.*

## CHROMOLAENA A. P. deCandolle

Prodr. 5: 133. 1836.

**Chromolaena odorata** (L.) King & Robins., Phytologia 20: 204. 1970; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 608. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 776. 1983; Manilal, Fl. Silent Valley 152. 1988; Sasidh. & Sivar., & Sivar., Fl. Pl. Thrissur For. 248. 1996. ***Eupatorium odoratum*** L., Syst. Nat. (ed. 10), 1205. 1759; Hook. f., Fl. Brit. India 3: 244. 1881; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 140. 1980; Uniyal in Hajra *et al.*, Fl. India 12: 354. 1995. **Kammunistu pachha**.

Shrubs, glandular hairy. Leaves opposite, to 12 x 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 2-3 cm long, cylindrical-oblong. Heads to 10 mm long, in terminal corymbose cymes; bracts 3-5-seriate, to 8 mm long, ovate, obtuse; outer smaller, inner linear, acute, 3-ribbed. Flowers few to many, similar, bisexual; corolla 5 mm long, white, tubular, 5-lobed, pubescent at apex; anthers linear, 2.5 mm long; styles 7 mm long, spreading. Achenes 4 mm long, linear, 5-angled, scabrous, black; pappus many, 4-7 mm long, setaceous, yellowish.

*Fl. & Fr.* : November-February

*Distr.* : Native of America, widely spread in Tropical Asia. Gregarious in disturbed forest areas. Thekkady, *JA 18403.*

*Ethnobotanical use* : Tender parts are pressed by hands and the juice is used to cure wounds (Mala Arayan)

## CONYZA Lessing

Syn. Gen. Comp. 203. 1832, *typ. 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. Leaves entire; heads pinkish.....**C. leucantha**
1. Leaves serrate, crenate or lobed; heads yellow or white.....2
2. Corolla equal in length; heads bright yellow; low herbs.....**C. stricta**
2. Corolla of female flowers shorter than bisexual flowers; corolla dull yellow; erect stout herbs.....3
3. Heads up to 10; leaves radical.....**C. japonica**
3. Heads many; leaves not as above.....4
4. Panicle linear or racemose; heads 2 mm across.....**C. bonariensis**
4. Panicle corymbose; heads 8 mm across.....**C. aegyptiaca**

**Conyza aegyptiaca** (L.) Ait., Hort. Kew. ed. 1. 3: 183. 1789; Hook. f., Fl. Brit. India 3: 258. 1881; Gamble, Fl. Pres. Madras 683. 1921; Sunita *et al.*, J. Econ. Tax. Bot. 12(2): 435. 1987; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 36. 1987; Hajra in Hajra *et al.*, Fl. India 12: 103. 1995. ***Erigeron aegyptiacus*** L., Mant. 1: 112. 1767, "*aegyptiacum*".

Erect herbs, to 75 cm high; stems ridged, densely hispid. Leaves to 8 x 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 6 x 8 mm, globose; bracts 4 x 0.5 mm, linear, thinly hispid. Female corolla 1.5 mm long, slender, toothed at apex, white; bisexual corolla 2.5 mm long, broader, yellow. Achenes 1 mm long, yellowish brown; pappus 2 mm long, brown.

*Fl. & Fr.* : December-April

*Distr.* : India, Africa, China, Japan and Australia. Common; in disturbed moist evergreen forest. Thekkady, *JA 17868.*

*Note* : The present collection is the first authentic record of occurrence in Kerala.

**Conyza bonariensis** (L.) Cronq., Bull. Torrey Bot. Club 70. 632. 1943; Grierson, Dassan & Fosb., Rev. Handb. Fl. Ceylon 11: 158. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 777. 1983; Sunita *et al.*, J. Econ. Tax. Bot. 12(2): 436. 1987; Hajra in Hajra *et*

*al.*, Fl. India 12: 104. 1995. ***Erigeron bonariensis*** L., 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. 1921.

Stout erect herbs, to 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 7 x 2 mm, oblong, cylindrical; bracts oblong, obtuse, 4 x 0.5 mm, glabrous; outer bracts smaller, hispid. Female corolla 3 mm long, slender. Bisexual flowers inner, few; corolla 4 mm long, widening upward. Achenes 1.5 mm long, biconvex, truncate, hairy, yellow; pappus 4 mm long, yellow.

*Fl. & Fr.* : December-March

*Distr.* : Native of America, spread to Pantropical countries. Common; in grasslands and lake shores. Kalvarimala, *JA 17873.*

*Note* : This species has not been reported so far from Kerala and the present collection form the record of occurrence in Kerala.

**Conyza japonica** (Thunb.) Less., Syn. Gen. Comp. 204. 1832; Hook. f., Fl. Brit. India 3: 258. 1881; Gamble, Fl. Pres. Madras 683. 1921; Sunita *et al.*, J. Econ. Tax. Bot. 12(2): 436. 1987; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 36. 1987; Hajra in Hajra *et al.*, Fl. India 12: 105. 1995. ***Erigeron japonica*** Thunb., Fl. Jap. 312. 1784.

Herbs; stem solitary, 25-35 cm high, hispid. Leaves to 5 x 2.5 cm, obovate, obtuse, cuneate at base; petiole 1 cm long. Heads to 7 x 9 mm, globose, 5-8 together, in terminal clusters; bracts 3 mm long, lanceolate, glabrous; receptacle thinly hairy. Female corolla 1.5 mm long. Bisexual florets a few, at the centre; corolla 2.5 mm long, yellow; lobes acute. Achenes 1 mm long, compressed, oblong, thinly hairy, pappus 4 mm long, setaceous.

*Fl. & Fr.* : November-March

*Distr.* : India and Afghanistan to Japan. Common; in disturbed moist deciduous forests. Thekkady, *KPR & JA 16354.*

**Conyza leucantha** (D. Don) Ludlow & Raven, Kew Bull. 17: 70. 1963; Grierson in Rev. Handb. Fl. Ceylon 1: 157. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 778. 1983; Sunita *et al.*, J. Econ. Tax. Bot. 12(2): 436. 1987; Hajra in Hajra *et al.*, Fl. India 12: 105. 1995. ***Erigeron leucanthum*** D. Don, Prodr. 171. 1825. ***Conyza viscidula*** Wall. ex DC., Prodr. 5: 383. 1836; Hook. f., Fl. Brit. India 3: 258. 1881; Gamble, Fl. Pres. Madras 683. 1921.

Shrubs, 1-2 m high; branchlets terete, finely glandular-pubescent. Leaves to 10 x 2.5 cm, elliptic, acute at apex, attenuate to nearly sessile at base, glabrous above, thinly puberulus below. Heads 7 x 5 mm, globose, 5-10 together, in lax corymbose cymes on branch tips; bracts 4-5 mm long, lanceolate, glandular hairy. Female corolla 0.5 mm long, pink. Bisexual flowers 4-6; corolla 4.5 mm long. Achenes 1 mm long; pappus reddish, 5.5 mm long, bisexual florets sterile.

*Fl. & Fr.* : December-June

*Distr.* : India, Malesia, Australia and Sri Lanka. Common; in disturbed moist deciduous forests. Thekkady, *JA 13840.*

**Conyza stricta** Willd., Sp. Pl. 1922. 1803; Hook. f., Fl. Brit. India 3: 258. 1881; Gamble, Fl. Pres. Madras 683. 1921; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 779. 1983; Sunita *et al.*, J. Econ. Tax. Bot. 12(2): 437. 1987; Hajra in Hajra *et al.*, Fl. India 12: 108. 1995; Sasidh. & Sivar., & Sivar., Fl. Pl. Thrissur For. 248. 1996.

Erect woody herbs, to 30 cm high; stem terete or ridged, pubescent. Leaves to 2-5 x 1 cm, oblanceolate to spathulate, obtuse, entire or serrate, pubescent. Heads 3 x 3 mm, in dense corymbose panicle; bracts lanceolate, acute, pubescent outside. Corolla similar, 2.5 mm long, bright yellow. Achenes 1 mm long, ribbed, hairy; pappus 3 mm long, yellow.

*Fl. & Fr.* : Throughout the year

*Distr.* : Africa, India and China. Rare; in grassy hill tops. Varayattumudi, *JA 12074.*

**DICHROCEPHALA** L' Heritier ex A. P. de Candolle

Arch. Bot. (Paris) 2: 517. 1833.

**Dichrocephala integrifolia** (L. f.) O. Ktze., Rev. Gen. Pl. 333. 1891; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 149. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 781. 1983; Manilal, Fl. Silent Valley 153. 1988; Hajra in Hajra *et al.*, Fl. India 12: 114. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 249. 1996. ***Hippia integrifolia*** L. f., Suppl. Pl. 1781. ***Dichrocephala latifolia*** DC. in Wight, Contrib. India Bot. 11. 1834; Hook. f., Fl. Brit. India 3: 245. 1881; Gamble, Fl. Pres. Madras 679. 1921.

Diffuse herbs, hispid. Leaves alternate, to 4 x 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. Flowers two types. 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 1 mm long, obovate, compressed, 4-ribbed, glabrous; pappus 4 deciduous bristles.

*Fl. & Fr.* : October-February

*Distr.* : Tropical Asia, China and Africa. Common; in disturbed forest areas. Thekkady, *JA 18404.*

## ECLIPTA Linnaeus

Mant. Pl. 12: 157, 286. 1771, *typ. cons.*

**Eclipta prostrata** (L.) L., Mant. Pl. 286. 177; Sant., Bull. Bot. Surv. India 3(1): 15. 1961; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 212. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 783. 1983; Koyama, Taxon 30: 505. 1981; Chowdhery in Hajra *et al.*, Fl. India 12: 381. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 249. 1996. ***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. 1921. **Kayyunnium**.

Erect or prostrate annual herbs, stems strigose. Leaves to 2 x 0.8 cm, alternate, entire, elliptic, acute at either ends, hispid. Heads 8 x 10 mm, depressed, conical, solitary, axillary, peduncled; bracts elliptic, acute, biseriate; receptacle covered with slender paleae. Female flowers usually in outer 2 rows; corolla slender; limb 2 mm long, 2-lobed, 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.

*Fl. & Fr.* : Throughout the year

*Distr.* : Cosmopolitan. Very common; in moist deciduous forests. Thekkady, *JA & KPR 16942.*

## ELEPHANTOPUS Linnaeus

Sp. Pl. 814. 1753

**Elephantopus scaber** L., Sp. Pl. 814.1753; Wight, Ic. t. 1080. 1846; Hook. f., Fl. Brit. India 3: 242. 1881; Gamble, Fl. Pres. Madras 676. 192; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 135. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 784. 1983; Rao in Hajra *et al.*, Fl. India 13: 333. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 250. 1996. **Otta veran. Anachuvadi**.

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 10 x 2 mm, lanceolate, calycine. Flowers similar, bisexual; corolla tubular, 8-10 mm long, 5-lobed; pink; anthers sagittate at base. Achenes 4 mm long, obovoid, ribbed, hairy; pappus 6, bristle-like, scabrid, connate at base.

*Fl. & Fr.* : October-March

*Distr.* : Indo-China, Africa, Malaya and Australia. Frequent; in moist deciduous forests. Thekkady, *JA 12524.*

*Ethnobotanical use* : The entire plants are used for migraine by Mala Arayans. One entire plant is made into a paste and paste externally on forehead and another plant is collected, encircles around the head who suffer headache and bury it.

## **ELEUTHERANTHERA** Poit. ex Bose

Nouv. Dict. Hist. Nat. ed. 7, 498. 1803.

**Eleutheranthera ruderalis** (Sw.) Sch.-Bip., Bot. Zeit. 24: 165. 1866; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 217. 1980; Chowdhery in Hajra *et al.*, Fl. India 12: 383. 1995; Sasi. & Nambiar, Ind. J. For. 4: 240. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 250. 1996. ***Melampodium ruderale*** Sw., Fl. Ind. Occ. 3: 1372. 1806.

Annual herbs. Leaves to 7.5 x 4 cm, ovate, acute, cuneate at base; nerves 3-4 pairs, basal pairs rib-like; petiole 5-10 mm long. Heads axillary, 5-8 mm across, shortly peduncled; bracts few, to 8 x 4 mm, ovate, obtuse, outer bracts leafy. Flowers 6-12, bisexual; corolla yellow, 3-4 mm long, 5-lobed above, pubescent; anthers sagittate at base. Achenes 3 x 1.5 mm, 4-angled, obovoid, tubercled, black; pappus knot-like.

*Fl. & Fr.* : November-February

*Distr.* : Native of Tropical America. Common; in disturbed forest areas. Thekkady, *JA 18416.*

## **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 scabrid, lower leaves sessile.....**E. scabra**
1. Leaves glabrous, lower ones petiolate.....**E. sonchifolia**

**Emilia scabra** DC., Prodr. 6: 303. 1837; Wight, Ic. t. 1123. 1846; Gamble, Fl. Pres. Madras 716. 1921; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 787. 1983; Mathur in Hajra *et al.*, Fl. India 13: 211. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 250. 1996. ***E. 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 8 x 1 mm, oblong, herbaceous, acute, glabrous. Flowers many; corolla 7 mm long, glandular, pink, lobes acute. Achenes 3 mm long, ribbed, hispid along the angles.

*Fl. & Fr.* : Throughout the year

*Distr.* : Peninsular India. Very common; in moist areas at high elevations. Vellimala, *JA & KPR 14309.*

**Emilia sonchifolia** (L.) DC. in Wight, Contrib. 24. 1884; Hook. f., Fl. Brit. India 3: 336. 1881. Gamble, Fl. Pres. Madras 716. 192; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 251. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 787. 1983; Manilal, Fl. Silent Valley 154. 1988; Mathur in Hajra *et al.*, Fl. India 13: 212. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 251. 1996. ***Cacalia sonchifolia*** L., Sp. Pl. 835. 1753. **Muyal cheviyan**.

Herbs, to 30 cm high. Leaves 3-8 cm long, ovate-oblong, entire or lyrate, pinnatisect, crenate with large terminal lobe. Heads 1.2 cm long, few, on long terminal peduncles; bracts 7 mm long, oblong, with hyaline margins, acute; receptacle rugose. Flowers many; corolla 8 m long; lobes oblong, glandular; anthers 1 mm long, entire at base. Achenes 2 mm long, tetrangular, hispid along the angles; pappus 13 mm long, white.

*Fl. & Fr.* : Throughout the year

*Distr.* : Tropical Countries. Very common; in grasslands. Kumarikulam, *JA 13008.*

*Ethnobotanical use* : The entire plant is made into paste and given for blood vomiting.

## ERECHTITES Rafinesque-Schmaltz

Fl. Ludov. 65. 1817.

**Erechtites valerianifolia** (Wolf) DC., Prodr. 6: 294. 1838; Nair & Srinivasan, J. Econ. Tax. Bot. 3: 289-294. 1982. Henry et al., Fl. Tamil Nadu Ser. 1(2): 39. 1987. Senecio valerianifolia Wolf, Ind. Sem. Hort. Berol. 1825.

Erect herbs, to 1 m high; stems glabrous. Leaves alternate, 10-20 cm long, deeply pinnately cut, lobes unequally serrate, glabrous or minutely hirtus; petioles to 5 cm long, slender. Heads terminal, cymose, peduncled, to 10 mm long, oblong; bracts 2-seriate, outer narrow; inner oblong with hyaline margins, glabrous. Florets many, dissimilar; outer few rows female florets, inner few bisexual florets; corolla 9.5 mm long, similar, narrow, tubular, lobes 5, acute, glandular; stamens 5, anthers entire at base; stigmas 2, slender. Achene 3 mm long, oblong, not beaked, many-ribbed, glabrous; pappus many, cottony, 9 mm long, white or pinkish.

*Fl. & Fr.* : October-March.

*Distr.* : Pantropical. Occasional; in moist deciduous forests. Thekkady, *JA 13371.*

## **ERIGERON** Linnaeus

Sp. Pl. 863. 1753

**Erigeron karvinskianus** DC., Prodr. 5: 285. 1836; Grierson, Ceylon J. Sci. Biol. Sci. 10: 52. 1972 & Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1:154.1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 788. 1983; Hajra in Hajra *et al.*, Fl. India 12: 122. 1995. ***E. mucronatus*** DC., Prodr. 5: 285. 1836; Gamble, Fl. Pres. Madras 682. 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 8 x 8 mm, terminal, solitary, peduncled; bracts few-seriate, linear-lanceolate, acuminate. Female flowers ligulate, peripheral; limb 4 mm long, narrow, entire, purple. Bisexual flowers inner, tubular; corolla 3 mm long, 5-lobed, yellow; anthers obtuse at base. Achenes compressed, hairy at base; pappus few, setose, white.

*Fl. & Fr.* : Throughout the year

*Distr.* : Native of Mexico, introduced in India, Malesia and S. Europe. Common; along road cuttings in forests and grasslands. Uppupara, *JA & KPR 15008.*

## **GALINSOGA** Ruiz & Pavon

Prodr. 110. t. 24. 1794.

**Galinsoga parviflora** Cav., Ic. et Descr. 3: 41, t. 281. 1796; Clarke, Comp. India 142. 1876; Hook. f., Fl. Brit. India 3: 311. 1881; Gamble, Fl. Pres. Madras 711. 192; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 231. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 791. 1983; Chowdhery in Hajra *et al.*, Fl. India 12: 388. 1995.

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 4 x 3 mm, many, in axillary or terminal peduncled cymes; peduncles dichotomous, slender; bracts biseriate, 3 x 2 mm, ovate, acute, glabrous; receptacle paleate. Outer row of flowers ligulate, limb deeply 3-lobed, white. Inner flowers tubular, bisexual; corolla 1.5 mm long, 5-toothed; anthers obtuse at base. Achenes 2 mm long, obovoid, truncate, black, 3-4-angled, scabrid; pappus of 3-4 fimbriate hyaline scales.

*Fl. & Fr.* : September-December

*Distr.* : Native of South America. Common; along the margins of forests at higher elevations. Vellimala, *NS & JA 12997.*

## GNAPHALIUM Linnaeus

Sp. Pl. 850. 1753.

Herbs, whole plants covered with wooly or cottony hairs. Leaves alternate, entire, usually sessile. Heads in congested fascicles or corymbs, axillary or terminal; bracts 2-3-seriate, ovate or oblong, with a solid base, imbricate. Flowers 2-types. Female flowers very numerous in outer few rows, with very slender corolla. Bisexual flowers fewer, usually 1-5, central, with broaden corolla; corolla lobes 5, glandular; anthers tailed at the base. Achenes terete or angled; pappus many, setaceous.

1. Leaves glabrous above; achenes glandular; erect herbs ..... **G. polycaulon**
1. Leaves woolly above; achenes scaly; prostrate herbs ..... **G. pulvinatum**

**Gnaphalium polycaulon** Pers., Syn. 2: 421. 1807; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 795. 1983; Pant in Hajra *et al.*, Fl. India 13: 91. 1995. ***G. indicum*** auct. non L. 1753: Hook. f., Fl. Brit. India 3: 289. 1881; Gamble, Fl. Pres. Madras 698. 1921.

Erect woolly herbs, 20-30 cm high; stems terete. Leaves 5-7 x 1 cm, oblanceolate to spathulate, obtuse, narrow to the base, entire. Heads 3-5 x 2 mm, in axillary congested spikes; bracts 2-3-seriate, 3 x 1 mm, oblong, obtuse, glabrous, hyaline. Bisexual flowers 2, central; corolla 2 mm long; lobes glandular. Female flowers very many; corolla 2 mm long, narrow. Achenes 2-3-angled, glandular between angles; pappus many, setaceous, equal to corolla.

*Fl. & Fr.* : November-February

*Distr.* : Pantropical. Common; in grasslands and Savannahs. Uppupara, *JA 13181.*

**Gnaphalium pulvinatum** Delile, Fl. Egypt. 266, t. 44. 1812; Hook. f., Fl. Brit. India 3: 289. 1881; Gamble, Fl. Pres. Madras 698. 1921; Pant in Hajra *et al.*, Fl. India 13: 92. 1995.

Prostrate branched woolly herbs, 10-25 cm long. Leaves to 4 x 0.6 cm, oblanceolate, acute at apex, narrowed at base into a petiole. Heads 3 x 3 mm, globose, in terminal leafy branched spikes; peduncle short or absent; bracts 2.5 x 0.5 mm, oblanceolate, acute, cottony hairy; outer bracts brown; inner bracts hyaline. Bisexual flowers 9-10, central; corolla 1.5 mm long, reddish. Female flowers numerous; corolla 1.5 mm long, lobes glandular. Achenes terete, brown.

*Fl. & Fr.* : November-March

*Distr.* : India and Western Asia. Common; in river bed and marshy lake shores; Thekkady, *KPR & JA 14573.*

## GRANGEA Adanson

Fam. 2: 121, 563. 1763.

**Grangea maderaspatana** (L.) Poir. in Lam, Encycl. Suppl. 2: 825. 1812; Wight, Ic. t. 1097. 1846; Hook. f., Fl. Brit. India 3: 247. 1881; Gamble, Fl. Pres. Madras 680. 192; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 150. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 796. 1983; Hajra in Hajra *et al.*, Fl. India 12: 127. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 251. 1996.

Prostrate herbs, densely hispid. Leaves alternate, 2-3 x 1.5 cm, oblanceolate, irregularly pinnate-lobed, auricled at base, sessile. Heads 8 mm across, globose, axillary, solitary, pedunculate; bracts 2-3 seriate; 5 mm long, oblong, obtuse, hairy; receptacle convex, naked. Outer few rows of flowers female; corolla 2 mm long, slender, tubular, yellow. Inner flowers bisexual; corolla 2 mm long, campanulate, 5-lobed; anthers obtuse at base. Achenes obovate, compressed, hispid along margins; pappus a fimbriate crown.

*Fl. & Fr.* : December-April

*Distr.* : Indo-Malesia and Africa. Common; along lake shores when water goes down. Thekkady, *JA 13620;* Kumarikulam, *KPR 14864.*

## GYNURA Cassini

Dict. Sci. Nat. 34: 391. 1825.

Erect fleshy herbs; stem usually furrowed. Leaves alternate, entire or lobed. Heads few to many in corymbose cymes, bracteolate at base; bracts uniseriate, oblong, glabrous. Flowers all bisexual, similar, tubular; corolla broadening up, 5-lobed, yellow; anthers obtuse at base; stigmatic lobes oblong. Achenes oblanceolate, ribbed, pubescent between the ribs; pappus numerous, cottony, white.

1. Leaves lyrate-laciniate.....**G. lycopersicifolia**
1. Leaves not as above.....2
2. Heads with bracteoles; flowers pink.....**Gynura crepidioides**
2.Heads without bracteoles; flowers yellow.....3
3. Whole plant glabrous.....**G. nitida**
3. Whole plant hirtus or tomentose.....4
4. Upper leaves amplexicaule; heads 15-20; roots not tuberous.....**G. travancorica**
4. Upper leaves petiolate not amplexicaule; heads up to 7; roots tuberous.....**G. pseudo-china**

**Gynura crepidioides** Benth in Hook., Niger Fl. 438. 1849. ***Crassocephalum crepidioides*** (Benth.) S. Moore, J. Bot. 50: 211. 1912; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 610. 1976; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 248. 1980; Nair & Srinivasan, J. Econ. Tax. Bot. 3: 290 1982; Mathur in Hajra *et al.*, Fl. India 13: 201. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 248. 1996. ***Erechtites valerianifolia*** sensu Fischer in Gamble, Fl. Pres. Madras 1882. 1936, non (Wolf) DC., 1838. **Appooppan thadi** (Mannan).

Erect herbs, to 1 m high; stems fleshy. Leaves alternate, 12-15 x 6 cm, elliptic, acute, serrate, glabrous, attenuate to the petiole; nerves to 6 pairs, regular, petiole to 2 cm long. Heads 15 mm long, 6 mm across, in corymbose cymes; bracts 1-seriate, 10 x 1 mm, linear-lanceolate, overlapping, glabrous. Flowers similar, bisexual; corolla 12 mm long, slender, 5-lobed at apex, pink. Achenes 10-ribbed; pappus to 10 mm long, white, silky.

*Fl. & Fr.* : August-December

*Distr.* : Native of Africa, now widely spread and hence Pantropical. Occasional; in disturbed forest areas. Thekkady, *JA 13907.*

*Note:* Moore (I.c.) made the combination *Crassocephalum crepidioides* based on the name *Gynura crepidioides* Benth. But according to ICBN (1994) the generic name Gynura is conserved over Crassocephalum. In the present work also the recent concept is followed.

**Gynura lycopersicifolia** DC., Prodr. 6: 300. 1838; Hook. f., Fl. Brit. India 3: 334. 1881; Gamble, Fl. Pres. Madras 714. 1921; Davies, Kew Bull. 35 (2): 365. 1981; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 244. 1980; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 41. 1987; Mathur in Hajra *et al.*, Fl. India 13: 220. 1995.

Succulent fleshy erect herbs, 35-50 cm high. Leaves to 13 x 5 cm; lobes rhomboid, serrate, hoary tomentose, fleshy; terminal lobe larger. Heads cylindric, 15 x 7 mm, 8-10 together, on terminal congested panicle; bracts 12 x 2 mm, oblong, acute, glandular at apex, hyaline along margins. Corolla 13 mm long, glandular; lobes obtuse; anthers obtuse at base. Achenes 4.5 mm long, ribbed, hirsute, black; pappus 14 mm long, cottony, white.

*Fl. & Fr.* : October-December

*Distr.* : South India and Sri Lanka. Rare; on wet rocks in moist deciduous forests. Kumily, *JA 12566.*

**Gynura nitida** DC. in Wight, Contrib. 24. 1834; Wight, Ic. t. 1121. 1846; Hook. f., Fl. Brit. India 3: 333. 1881; Gamble, Fl. Pres. Madras 714. 1921; Davies, Kew Bull. 35 (2): 366. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 800. 1983; Manilal, Fl. Silent

Valley 154. 1988; Mathur in Hajra *et al.*, Fl. India 13: 221. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 251. 1996.

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 16 x 12 mm, cylindrical, 10-20 together, in panicled cymes, bracteolate; peduncle 2-4 cm long; bracts 10 x 2 mm, lanceolate, acute; receptacle rugose. Flowers not all fertile; corolla 10 mm long, lobes obtuse, glandular. Achenes 3.5 x 1 mm, ellipsoid, 11-ribbed, truncate, black; pappus 14 mm long, white.

*Fl. & Fr.* : August-January

*Distr.* : Peninsular India. Common; in grasslands. Kalvarimala, *JA 13867*; Uppupara, *KPR & JA 14130.*

**Gynura pseudo-china** (L.) DC., Prodr. 6: 299. 1838; Hook. f., Fl. Brit. India 3: 334. 1881; Gamble, Fl. Pres. Madras 714. 1921; Davies, Kew Bull. 35 (2): 364. 1981; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 41. 1987; Mathur in Hajra *et al.*, Fl. India 13: 223. 1995. ***Senecio pseudochina*** L., Sp. Pl. 867. 1753.

Weak herbs, to 30 cm high; roots usually tuberous; stem densely puberulus. Leaves to 5 x 3 cm, obovate, obtuse, cuneate at base, hoary tomentose, entire or shortly toothed, petiolate. Heads 15 x 8 mm, 1-7, on a terminal congested peduncled cymes; branches and peduncles densely puberulus; involucral bracts 10 mm long, oblong, acute, glabrous, hyaline along the margins. Corolla 10 mm long, lobes oblong, glandular. Achenes 4 mm long, thinly hairy or glabrous; pappus white.

*Fl. & Fr.* : July-December

*Distr.* : India and Sri Lanka. Rare; in openings in evergreen forests at higher elevations. Deviar, *JA 12136.*

**Gynura travancorica** W. W. Smith, Rec. Bot. Surv. India 6: 29. 1914; Gamble, Fl. Pres. Madras 714. 1921; Davies, Kew Bull. 35 (2): 364. 1981; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 42. 1987; Mathur in Hajra *et al.*, Fl. India 13: 224. 1995.

Erect herbs, 60-100 cm high, whole plant hispid tomentose. Leaves 10-13 x 3.5 cm, elliptic, acute at either ends, sharply and distantly serrate; upper ones amplexicaule. Heads 16-18 x 7 mm, 15-20, in terminal panicled cymes; bracts 11 x 2 mm, oblong, acute, glabrous. Flowers many; corolla yellow, 13 mm long, lobes acute, glandular; anthers 2 mm long, obtuse at base. Achenes ribbed, pubescent, black; pappus 12 mm long, white.

*Fl. & Fr.* : September-December

*Distr.* : Southern Western Ghats. Common; in rocky grasslands. Thaannikkudy, *JA 12780*; Kottamala, *JA 14072.*

## HELICHRYSUM P. Miller

Gard. Dict. Abr. ed. 4. 1754, *orth. cons.*

Herbs or undershrubs, densely covered with wooly hairs. Leaves alternate, entire, glabrous above, wooly below. Heads very densely packed, corymbose or fascicled, terminal or axillary; bracts ovate, hyaline or yellow, not spreading, 2-3-seriate. Flowers 2-types. Female flowers in outer few rows, fertile; corolla very narrow. Bisexual flowers central, few, fertile or sterile, with broad 5-lobed corolla; anther bases tailed. Achenes angled, scabrid; pappus many, setaceous.

1. Leaves cauline; spikes terminal, corymbose; bisexual flowers 10-15.....**H. buddleioides**

1. Leaves basal and cauline; spikes terminal and axillary, not corymbose; bisexual flowers 1 or 2.....

.....**H. perlanigerum**

**Helichrysum buddleioides** DC. in Wight, Contrib. 20. 1834; Wight, Ic. t. 113. 1846; Hook. f., Fl. Brit. India 3: 290. 1881; Gamble, Fl. Pres. Madras 699. 1921; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 42. 1987; Pant in Hajra *et al.*, Fl. India 13: 99. 1995.

Subshrubs, 50-70 cm high, densely cottony wooly. Leaves 5-10 x 1.5-2 cm, elliptic-oblong, acute at apex, narrowed and amplexicaule at base, sparsely cottony above, 5-7-ribbed. Heads 4 x 4 mm, globose, densely packed; bracts 3-4-seriate, 3.5 x 1 mm, oblanceolate, obtuse, yellow or hyaline, glabrous. Bisexual flowers 10-15; corolla 2 mm long, glabrous, yellow. Female flowers many; corolla 3 mm long. Achenes 3-angled, scabrid

*Fl. & Fr.* : November-March

*Distr.* : Western Peninsular India. Common; along forest margins and grasslands at higher elevations. Uppermanalar, *JA 12978*; Vellimala, *KPR & JA 14306, JA 14349.*

**Helichrysum perlanigerum** Gamble, Kew Bull. 1920: 341. 1920 & Fl. Pres. Madras 699. 1921; Chandrab. & Nair, Bull. Bot. Surv. India 21(1-4): 237. 1979; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 42. 1987; Pant in Hajra *et al.*, Fl. India 13: 100. 1995 [Fig. 36].

Stout perennial herbs, 35-45 cm high. Basal leaves larger, 9 x 2 cm, oblanceolate, obtuse, narrowed to the base and amplexicaule at extreme base, glabrous above, softly white wooly below; cauline leaves 4-5 x 0.8 cm, oblanceolate, obtuse. Heads 3 x 2 mm, in leafy clusters, sessile; bracts 2-3-seriate, 2 mm long, oblong, obtuse, yellow or hyaline. Bisexual flowers 1 or 2,

Fig. 36. *Helichrysum perlanigerum* Gamble: **A.** habit; **B.** capitulum; **C.** flower; **D.** corolla opened; **E.** stamen and pistil; **F.** achene.

central; corolla 2 mm long, glabrous. Female corolla slender. Achenes 5 mm long, 3-angled, black, hirtus; pappus 2.5 mm long, setaceous.

*Fl. & Fr.* : August-December

*Distr.* : Endemic to Idukki district (Kerala). Very rare; along the margins of evergreen forests at higher elevations. Uppermanalar, *JA 13975.*

**LAGGERA** Schultz-Bipontinus ex K. H. E. Koch

Linnaea 19: 391. 1847.

**Laggera crispata** (Vahl) Hepper & Wood, Kew Bull. 38: 83. 1983; Pant in Hajra *et al.*, Fl. India 13: 151. 1995. ***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. 1921; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 806. 1983.

Erect shrubs, 2 m high; branches winged. Leaves alternate, to 15 x 6 cm, obovate, viscid-glandular, irregularly lobed, decurrent at base, forming dissected wings along the stem. Heads 12 x 12 mm, many, in large panicle, branches and peduncles winged; bracts many, oblong, acute, puberulus. Flowers dissimilar. Female flowers peripheral, in several rows; corolla 5 mm long, filiform. Bisexual flowers 10-20, central; corolla 6 mm long, yellow, 5-lobed; anthers entire at base. Achenes 1.5 mm long, oblong, faintly ribbed, hairy; pappus 8 mm long, many, reddish, setaceous.

*Fl. & Fr.* : November-February

*Distr.* : Africa, India, South-East Asia and Sri Lanka. Occasional; in semi-evergreen forests. Thekkady, *JA 17890.*

**LAUNAEA** Cassini

Dict. Sci. Nat. 25: 61, 321. 1822.

**Launaea acaulis** (Roxb.) Babc. ex Kerr., Craib Fl. Siam. 2: 299. 1936; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 620. 1976; Manilal, Fl. Silent Valley 155. 1988; Mamg. & Rao in Hajra *et al.*, Fl. India 12: 305. 1995. ***Prenanthes acaulis*** Roxb., Fl. Ind. 3: 403. 1832. ***Lactuca glabra*** DC. in Wight Contrib. 26. 1834. ***Microrhynchus glabra*** (DC.) Wight, Ic. t. 1145. 1846. ***Crepis acaulis*** (Roxb.)Hook.f., Fl. Brit. India 3:396.1881; Gamble, Fl. Pres. Madras 730.1921.

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 15 x 8 mm, cylindrical, 10-

15 together, cymose, on elongated scapes. Scapes 3-5, 15-20 cm high, branched, glabrous. Bracts uniseriate, 10 x 2.5 mm, acute, oblong, margins white. Flowers all ligulate; corolla bright yellow, 18 mm long, glabrous, limb oblong; anthers sagittate at base. Achenes 5 x 1 mm, compressed, yellowish brown.

*Fl. & Fr.* : Throughout the year except the hottest

*Distr.* : India - China. Very common; in grasslands. Uppupara, *JA & KPR 14987.*

## **MIKANIA** Willdenow

Sp. Pl. 3:1742.1803, *nom. cons.*

**Mikania cordata** (Burm. f.) Robinson, Contrib. Gray Herb. 104: 65. 1934; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 146. 1980; Sasidh. & Sivar., Fl. Pl. Thrissur For. 251. 1996. ***Eupatorium cordatum*** Burm., Fl. India 176, t. 58. 1768. ***Mikania scandens*** auct. non L., 1753: Clarke, Comp. Ind. 34. 1876; Hook. f., Fl. Brit. India 3: 144. 1881. **Vayara**.

Climbers; stems glandular-hispid. Leaves opposite, to 8 x 6 cm, ovate, acute at apex, cordate at base, crenate, glabrate; petiole 2-4 cm long. Heads 5 mm long, in axillary panicles; bracts biseriate, outer 2 smaller, inner 3-5, 4 x 1.5 mm, ovate, obtuse. Flowers 3-5, similar, bisexual; corolla 3 mm long, tubular, lobes 5, glandular, white; anthers linear. Achenes 2 mm long, 5-ribbed, black, glabrous; pappus 4 mm long, many, hispid.

*Fl. & Fr.* : November-February

*Distr.* : Tropical Asia and Tropical Africa. Gregarious in disturbed forest areas. Koruthode, *JA 18405.*

*Note* : A very rapidly spreading weeds in disturbed forests and forest plantations. Sometimes the leaves are used as a fodder.

## **MOONIA** Arnott

Nova Acta Phys. Med. Caes. Leop.-Carol. Nat. Cur. 18:348.1836

**Moonia heterophylla** Arn., Nova Acta Nat. Cur. 18: 349. 1836; Gamble, Fl. Pres. Madras 704. 1921; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 207. 1980; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 44. 1987; Manilal, Fl. Silent Valley 155. 1988; Chowdhery in Hajra *et al.*, Fl. India 12: 401. 1995. ***Chrysogonum heterophyllum*** (Arn.) Benth. ex Clarke, Comp. India 182. 1876; Hook. f., Fl. Brit. India 3: 303. 1881. ***Moonia arnottiana*** Wight, Ic. t. 1105. 1846.

Erect subshrubs, to 70 cm high. Leaves opposite, to 8 x 8 cm; lowers 1-pinnately compound or divided; lobes elliptic, acuminate, serrate; hirtus below; petiole sheathing at base. Heads 10 x 8

mm, solitary, pedunculate, upper axillary; bracts 6 x 2 mm, obovate, acute, ciliate. Outer flowers female, ligulate; limb deeply divided into 3 lobes, yellow; bisexual flowers central; corolla tubular; anthers entire at base, black. Achenes 3.5 x 2 mm, biconvex, puberulus, black; pappus absent; bisexual flowers usually sterile.

*Fl. & Fr.* : November-February

*Distr.* : South India and Sri Lanka. Common; in openings of evergreen forests at higher elevations. Vellimala, *JA 12989.*

## **MYRIACTIS** Lessing

Linnaea 6:127.1831

**Myriactis wightii** DC. in Wight, Contrib. 10.1834, var. **bellidioides** Hook. f., Fl. Brit. India 3: 247. 1881; Gamble, Fl. Pres. Madras 680.1921; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2:44. 1987; Manilal, Fl. Silent Valley 155. 1988; Hajra in Hajra *et al.*, Fl. India 12: 135. 1995 [Fig. 37].

Small herbs with tuberous roots, stem short or absent. Leaves radical, to 2-4 x 2 cm, obovate, obtuse, hispid, shortly petioled or sessile. Heads 4 mm long, cylindrical, solitary, on long peduncles; peduncles to 15 cm long; bracts biseriate, 3 mm long, lanceolate, acute. Female florets peripheral; corolla tube 1 mm long, white; limbs 2.5 x 0.5 mm, oblong, recurved. Inner florets male; corolla tubular, 2 mm long; lobes acute, glandular; stamens 4, connectives appendaged. Achenes 3 x 1 mm, ellipsoid, compressed, obtusely 3-angled, acute at both ends, smooth; pappus absent.

*Fl. & Fr.* : March-May

*Distr.* : Endemic to South India. Rare; in grasslands. Mlappara, *JA 18415.*

*Note* : This species has not been reported from Kerala. Hence the present collection is the first record of occurrence in the state

## **PARTHENIUM** Linnaeus

Sp. Pl. 988. 1753.

**Parthenium hysterophorus** L., Sp. Pl. 988. 1753; Ellis & Swamin. in J. Bombay Nat. Hist. Soc. 66: 233. 1969; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 620. 1976; Matthew, Fl. Tamil Nadu Carnatic 809. 1983; Vajravelu, Fl. Palghat 259. 1990; Chowdhery, Fl. Ind. 12: 403. 1995.

Erect herbs; branches dichotomous, puberulus. Leaves alternate, deeply pinnatisect, lobes to 10 x 1 cm, oblong-lanceolate, entire, acute at apex, pubescent, base decurrent. Heads in terminal, lax panicles; bracts 2-seriate, to 3 x 1.5 mm, ovate, obtuse, ciliate. Florets dissimilar; outer florets 5, rayed, female; corolla ligulate; limb short, entire; inner florets male; corolla tubular,

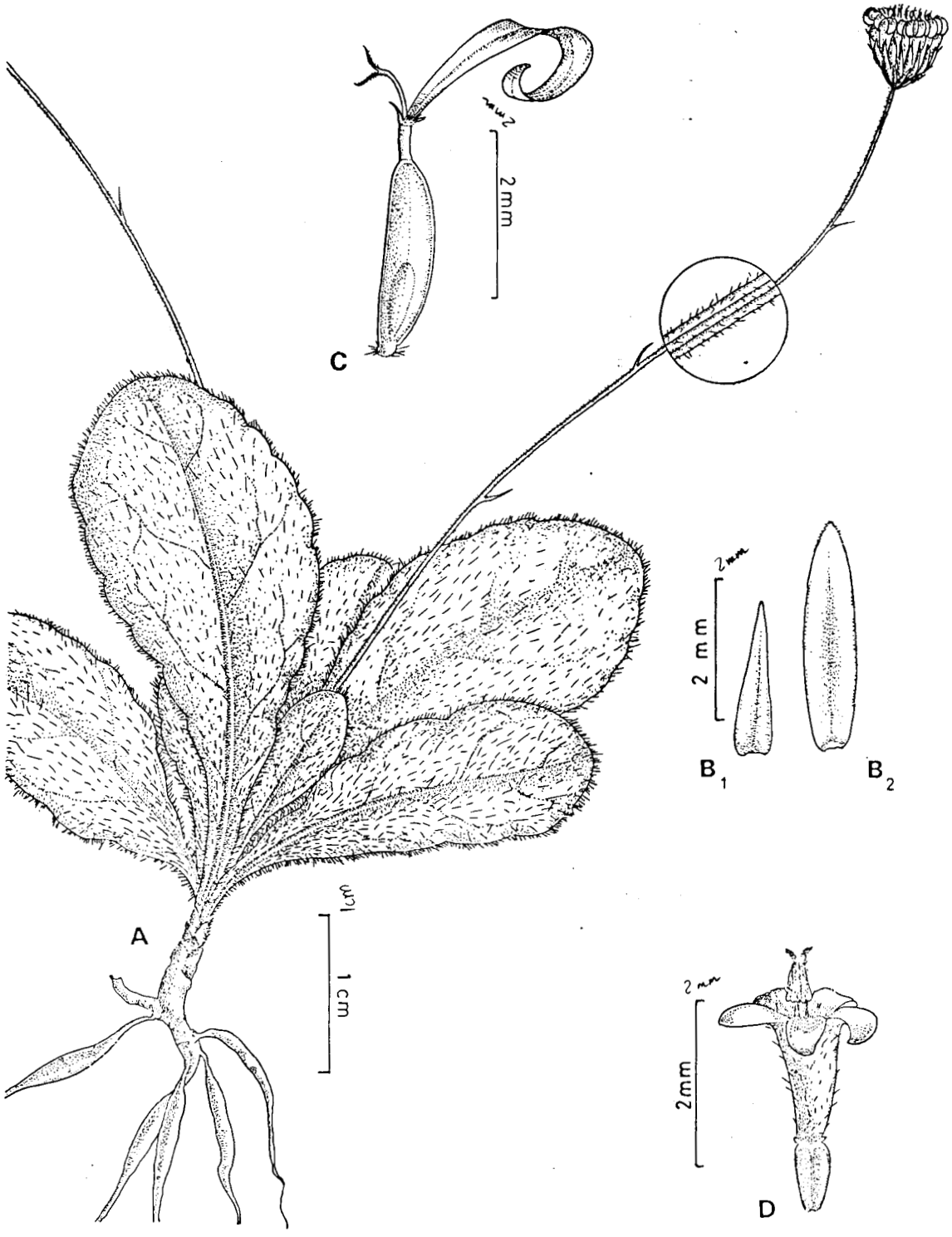



Fig. 37. *Myriactis wightii* DC. var. *bellidioides* Hook. f.: **A.** habit; **$B_1$. & $B_2$.** phyllaries; **C.** female ray flower; **D.** bisexual tubular flower.

white; anthers obtuse at base. Achenes 2 x 1.5 mm, broadly ovoid, compressed, puberulus, margin thickened; pappus absent or with two short hooks.

*Fl. & Fr.* : August-February

*Distr.* : Native of America, now a Pantropical weed; Abundant in dry and moist deciduous forests; Thekkady, *JA 18613.*

## **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 with brown nerves beneath; stem dark puberulus; pappus reddish ..... **P. phyllolaenum**
1. Leaves without brown nerves beneath; stem thinly hairy; pappus yellow..... **P. scabridum**

**Phyllocephalum phyllolaenum** (DC.) Narayana in Curr. Sci. 51. 438. 1982; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 45. 1987; Uniyal in Hajra *et al.*, Fl. India 13: 341. 1995. ***Decaneurum phyllolaenum*** DC., Prodr. 7: 264. 1838. ***Centratherum phyllolaenum*** (DC.) Benth. ex Clarke, Comp. India 4. 1876; Hook. f., Fl. Brit. India 3: 228. 1881; Gamble, Fl. Pres. Madras 677. 1921.

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 1 cm, peduncled, few; bracts 2 or 3-seriate, 10 x 2 mm, oblong, cuspidate, outer bracts tomentose. Flowers 10-12, tubular; corolla 8-10 mm long, lobes acute, glabrous; anthers deep violet. Achenes 2 mm long, 10-ribbed, glabrous, brown; pappus 2 mm long, many, setaceous.

*Fl. & Fr.* : October-February

*Distr.* : Peninsular India. Common; in open evergreen forests and semi-evergreen forest. Udumbatheri, *JA 13340.*

**Phyllocephalum scabridum** (DC.) Kirkman, Rhodora 83: 10. 1981; 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. ***Centratherum molle*** (DC.) Benth., Gen. Pl. 2: 225. 1873; Hook. f., Fl. Brit. India 3: 227. 1881; Gamble, Fl. Pres. Madras 666. 1921.

Fleshy herbs, to 1 m high. Leaves 15 x 6.5 cm, elliptic, acuminate at both ends, thinly scabrid above, deeply serrate; nerves 11 pairs, nervules reticulate. Peduncles 1.5 cm long, tomentose. Heads 1.3 x 1 cm, few; inner bracts 9 x 2 mm; outer bracts 8 x 4 mm, white-tomentose, ciliate along the margins. Flowers 12-15; corolla 8 mm long, tube broadening up; lobes oblong, glabrous. Achenes 1.5 mm long, 12-ribbed, glabrous; pappus few, 2.5 mm long.

*Fl. & Fr.* : November-February

*Distr.* : Western Peninsular India. Common; in semi-evergreen forest. Kalvarimala, *JA 17877.*

## **SENECIO** Linnaeus

Sp. Pl. 866. 1753.

Erect or climbing shrubs. Leaves alternate, entire or lobed, petiolate. Heads in terminal and axillary panicles, cylindrical; bracts 1-seriate, oblong, acute. Flowers 2-types or 1-type, bisexual or bisexual and unisexual; female flowers outer, ligulate; limb 3-lobed, yellow; bisexual flowers central; corolla tubular, 5-lobed at apex, yellow; anthers tailed or not. Achene oblong, ribbed; pappus many, setaceous.

1. Erect herbs or shrubs; leaves attenuate at base ..... **S. stylosus**
1. Climbing shrubs; leaves cordate at base ..... 2
2. Flowers homogamous; anther-bases tailed; leaves cottony beneath ..... **S. corymbosa**
2. Flowers heterogamous; anther-bases not tailed; leaves glabrous beneath ..... **S. scandens**

**Senecio corymbosa** 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. 1921; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 261. 1980; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 47. 1987; Manilal, Fl. Silent Valley 156. 1988. ***Cissampelopsis corymbosa*** (Wall. ex DC.) Jeffrey & Chen Kew Bull. 39(2): 341. 1984; Mathur in Hajra et al., Fl. India 13: 199. 1995.

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 9 x 6 mm, in woolly panicles, axillary or terminal; bracts 1-seriate, 6 x 1.5 mm, oblong, with thick midrib, glabrous. Corolla 7 mm long; lobes acute, yellow; anthers tailed at base. Achenes oblong, glabrous, brown; pappus 7 mm long.

*Fl. & Fr.* : December-April

*Distr.* : South India and Sri Lanka. Common; in evergreen forest at higher elevations. Kottamalapallam, *JA 12923.*

**Senecio scandens** Buch.-Ham. ex D. Don, Prodr. Fl. Nep. 178. 1825; Hook. f., Fl. Brit. India 3: 352. 1881; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 260. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 811. 1983; Manilal, Fl. Silent Valley 157. 1988; Mathur in Hajra *et al.*, Fl. India 13: 280. 1995. ***S. wightianus*** DC. in Wight, Contrib. 22. 1834; Wight, Ic. t. 1136. 1846; Gamble, Fl. Pres. Madras 724. 1921.

Climbing shrubs; stems ridged, zig-zag, glabrous. Leaves 5-10 x 2-4 cm, ovate, hastate at base, acute at apex, serrate, decurrent and auricled at the base of the petiole. Heads 7 x 5 mm, many, in axillary panicle with zig-zag branches; bracts 5 x 1.5 mm, oblong, similar. Female flowers peripheral; corolla 7 mm long, limb 3-lobed, yellow. Bisexual flowers central; corolla 4 mm long, tubular. Achenes ribbed, hairy between the ribs; pappus white, 3-4 mm long.

*Fl. & Fr.* : December-February

*Distr.* : Indo-China. Occasional; in evergreen forest at high elevations. Vellimala, *KPR & JA 14307.*

**Senecio stylosus** Balakr., J. Bombay Nat. Hist. Soc. 67: 62. 1970. ***Gynura walkeri*** Wight, Ic. t. 1122. 1846. ***Notonia walkeri*** (Wight) Clarke, Comp. India 176. 1876; Hook. f., Fl. Brit. India 3: 337. 1881; Gamble, Fl. Pres. Madras 717. 1921; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 264. 1980. Kleinia walkeri (Wight) Uniyal in Rao, Fl. India Enum. Aster. 49. 1988; Mathur in Hajra *et al.*, Fl. India 13: 227. 1995

Fleshy subshrubs, to 1.5 m high; stem glabrous. Leaves to 13 x 4 cm, alternate, elliptic, acuminate at either ends, crenate-serrate, glabrous; petiole 4 cm long. Heads 14 x 8 mm in terminal corymbose panicle; bracteolate; involucral bracts 10 mm long, uniseriate, oblong, glabrous; receptacle paleate. Flowers all bisexual, tubular; corolla 8 mm long, 5-lobed, white or pale yellow; anthers entire at base. Achenes 5 mm long, oblong, 10-ribbed; hairy between ribs; pappus many, cottony, white, setaceous.

*Fl. & Fr.* : April-May

*Distr.* : South India and Sri Lanka. Rare; in evergreen forests in damp shades at high elevations. Sunderamala, *JA 13586, KPR 17742.*

## SIGESBECKIA Linnaeus

Sp. Pl. 900. 1753

**Sigesbeckia orientalis** L., Sp. Pl. 900. 1753; Clarke, Comp. India 133. 1876; Hook. f., Fl. Brit. India 3: 304. 1881; Gamble, Fl. Pres. Madras 704. 1921; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 210. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1):

812. 1983; Manilal, Fl. Silent Valley 158. 1988; 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 8 x 4 mm, solitary, terminal, on slender, densely hairy peduncles; bracts biseriate, outer bracts spathulate, 8 mm long, viscid hairy; inner ovate, short. Flowers: outer row ligulate, female, inner bracts rows bisexual, tubular; limb of ligulate corolla 2 mm long, 3-lobed, yellow. Disc florets 2 mm long; anthers bases obtuse. Achenes 4 mm long, curved, truncate at apex, 4-angled; black; pappus absent.

*Fl. & Fr.* : October-January

*Distr.* : Throughout Tropical Countries. Common; in moist deciduous forests. Thekkady, *JA 12422.*

## **SONCHUS** Linnaeus

Sp. Pl. 793. 1753.

Erect milky herbs; stems terete. Leaves alternate, entire or variously lobed, usually amplexicaule, glabrous. Heads few, in terminal panicled cymes, campanulate or cylindric, thickened at base; receptacle naked, flat, involucral bracts 3-seriate, oblong, acute. Flowers similar; corolla ligulate, ligule 5-lobed; yellow; anthers sagittate at base; stigmatic lobes linear. Achene compressed, ribbed, brown; pappus many, cottony, white.

1. Bracts glabrous; leaves pinnatifid ..... **S. oleraceus**
1. Bracts glandular hairy; leaves not lobed ..... **S. wightianus**

**Sonchus oleraceus** L., Sp. Pl. 794. 1753; Hook. f., Fl. Brit. India 3: 414. 1881; Gamble, Fl. Pres. Madras 732. 1921; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 273. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 814. 1983; Mamg. & Rao in Hajra *et al.*, Fl. India 12: 321. 1995. ***S. ciliatus*** Lam., Fl. Franc. 287. 1805; Wight, Ic. t. 1141. 1846.

Annuals, to 90 cm high; stems glandular hairy. Leaves to 15 x 6 cm, runcinate-pinnatifid, with a wide hastate terminal lobe, auricled and amplexicaule at base; lobes spinulose-serrate. Heads 15 x 8 mm, few, in panicled cymes; bracts 10 x 1.5 mm, 3-seriate, oblong, obtuse. Female corolla 12 mm long, limb yellow, 5-lobed; lobes obtuse. Achenes 3 x 1 mm, narrowed to the base, truncate at apex, muriculate; pappus 10 mm long, white, cottony.

*Fl. & Fr.* : July-December

*Distr.* : Cosmopolitan. Frequent; along roadsides in disturbed forests. Thekkady, *JA 12394.*

**Sonchus wightianus** DC., Prodr. 7: 187. 1838; Wight, Ic. t. 1142. 1846; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 275. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 814. 1983; Mamg. & Rao in Hajra *et al.*, Fl. India 12: 321. 1995. ***S. arvensis*** sensu Hook. f., Fl. Brit. India 3: 414. 1881. non L., 1753: Gamble, Fl. Pres. Madras 732. 1921.

Perennials, 90-120 cm high. Leaves to 22 x 5 cm, oblanceolate, obtuse or acute at apex, narrowed to the base, amplexicaule, minutely spinulose-serrate along the margins, glaucous below. Heads 18 x 12 mm, in terminal panicled cymes; peduncles glandular-hairy; bracts 12 x 1.5 mm, 3-5 series, oblong, acute. Female corolla 15 mm long, glabrous; limb yellow, 5-lobed; anthers bases shortly tailed. Achenes 3 x 1 mm, minutely rugulose; pappus 10 mm long.

*Fl. & Fr.* : July-December

*Distr.* : India & China. Common; in disturbed moist deciduous forests. Karadikkavala, *JA 12051.*

## SPHAERANTHUS Linnaeus

Sp. Pl. 927. 1753

**Sphaeranthus indicus** L., Sp. Pl. 927. 1753; Hook. f., Fl. Brit. India 3: 275. 1881 p.p.; Gamble, Fl. Pres. Madras 692. 1921; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 181. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 816. 1983; Kumar in Hajra *et al.*, Fl. India 13: 160. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 253. 1996. ***S. hirtus*** Willd., Sp. Pl. 3: 2395. 1802; Wight, Ic. t. 1094. 1846. **Adackamaniyan** (Mala Arayan).

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.

*Fl. & Fr.* : December-April

*Distr.* : Indo-Malesia and Australia. Common; in lake shores. Thekkady, *JA 14572.*

*Ethnobotanical use* : The entire plants are made into a paste and applied externally for mumps (Mala Arayan).

## 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; pappus absent.

1. Flowers yellow; bracts ovate, obtuse.....**S. paniculata**
1. Flowers creamy white; bracts lanceolate.....**S. radicans**

**Spilanthes paniculata** DC., Prodr. 5: 625. 1836; Kosterm. & Philip., Blumea 6: 354. 1950; Grierson, Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 220. 1980; Sivar. & Remote., J. Econ. Tax. Bot. 10(1): 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. ***S. acmella*** L. var. ***paniculata*** (DC.) Clarke Comp. Ind. 139. 1876; Hook. f., Fl. Brit. India 3: 307. 1881.

Procumbent herbs, stems scabrid. Leaves to 4 x 2.5 cm, ovate, acute, scabrous above and below; petiole 1 cm long. Heads 10 x 7 mm, solitary, conical; peduncles to 10 cm long, bracts 4 x 2 mm, ovate, obtuse, glandular; receptacle spicate, paleaceous. Flowers similar; corolla tubular, 2.5 mm long, campanulate above; lobes 0.5 mm long, ovate, acute, glabrous; anthers black. Achenes 2 x 1 mm, obovate, biconvex, dark brown, glandular.

*Fl. & Fr.* : October-January

*Distr.* : South India and Malesia. Common; in margins of grasslands. Kalvarimala, *JA 17874.*

**Spilanthes radicans** Jacq., Collect. Bot. Chen. Hist. Nat. 11: 1714. 1804; Sivar. & P. Matthew, Ancient Sci. Life 3: 169. 1984; Sivar. & Remes., J. Econ. Tax. Bot. 10(1): 144. 1987; Chowdhery in Hajra *et al.*, Fl. India 12: 412. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 254. 1996. ***S. ocymifolia*** A. H. Moore, Proc. Amer. Acad. Sci. 42: 531. 1907. **Palluvedanachedi**.

Erect herbs, 30-70 cm high; stem glabrous. Leaves 7 x 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 4 x 1 mm, glabrous. Flowers similar; corolla 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.

*Fl. & Fr.* : October-January

*Distr.* : Native of Tropical America. Common; in disturbed moist deciduous forests and Savannahs. Mangaladevi, *JA 12701.*

## 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. 1921; Grierson in Dassan. & Fosb., Rev. Handb. Fl.

Ceylon 1: 222. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 818. 1983; Manilal, Fl. Silent Valley 159. 1988; Chowdhery in Hajra *et al.*, Fl. India 12: 413. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 254. 1996.

Subshrubs. Leaves opposite, to 8 x 5 cm, ovate, acute, membranous, serrulate; nerves 2-pairs; petiole 1-3 cm long. Heads 1-3 together, axillary, sessile; bracts biseriate, 4-6 mm long, lanceolate, acute, hyaline, coriaceous. Flowers yellow, dissimilar. Female flowers few, peripheral, ligulate; corolla yellow, limb 1 mm long, 4-lobed at apex. Bisexual flowers central, few; corolla 4 mm long, tube narrow, lobes 5, oblong; anthers linear, sagittate at base. Achenes compressed, shortly winged; of bisexual florets trigonous.

*Fl. & Fr.* : October-February

*Distr.* : Native of West Indies, introduced in India, China and Malesia. Common; in disturbed forest areas. Koruthode, *JA 18406.*

*Ethnobotanical use* : The leaves are made into a paste and applied on forehead to relieve from headache and is also used for healing wounds

**TITHONIA** Desfontaines ex A. L. Jussieu

Gen. 189. 1789.

**Tithonia diversifolia** (Hemsl.) A. Gray, Proc. Amer. Acad. Arts 19: 5. 1883; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 218. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 820. 1983; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 50. 1987; Chowdhery in Hajra *et al.*, Fl. India 12: 416. 1995. ***Mirasolia diversifolia*** Hemsl., Biol. Contrib. Amer. 2: 168, t. 47. 1881. **Kaippan pachha**.

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; inner 10-14 mm long, oblong, obtuse. Flowers 2-types; outer female, ligulate; limb 3-5 x 1.5 cm, oblong, entire or 2-toothed, yellow. Inner flowers tubular, bisexual; corolla 8-10 mm long, 5-lobed, yellow; anthers erect, base obtuse, black. Achenes 6 mm long, dark brown, hairy; pappus of two bristles.

*Fl. & Fr.* : October-March

*Distr.* : Native of South America. Common; in disturbed forests. Vallakkadavu, *KPR & JA 16377.*

## 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. 1921; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 232. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 821. 1983; Manilal, Fl. Silent Valley 160. 1988; Chowdhery in Hajra *et al.*, Fl. India 12: 418. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 255. 1996.

Procumbent herbs; stems terete, hispid. Leaves 3-6 x 1.5-3 cm, ovate, acute, serrate, bulbous-based hairy; petiole 5-10 mm long. Heads 1.3 x 1.5 cm, solitary, on long peduncles; bracts in 3-series, lanceolate, hairy. Outer row of flowers ligulate, female, limb 3 x 2 mm, 3-toothed, white; inner flowers bisexual, tubular; corolla 6 mm long, 5-lobed at apex, yellow; anthers sagittate at base. Achenes 2 mm long, obovoid, densely hairy; pappus many, setaceous.

*Fl. & Fr.* : Throughout the year

*Distr.* : Native of Central America. Common; in disturbed forest areas. Thekkady, *JA 12423.*

## 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. Achenes not ribbed ..... 2
1. Achenes ribbed ..... 3
2. Leaf tip obtuse, densely tomentose ..... **V. albicans**
2. Leaf tip acute, glabrous or thinly pubescent ..... **V. cinerea**
3. Achenes 3-4-angled ..... 4
3. Achenes 10-ribbed ..... 6
4. Leaves grey-tomentose beneath ..... **V. multibracteata**
4. Leaves white-woolly beneath ..... 5
5. Large shrubs, 3-4 m high; achenes 3-angled ..... **V. comorinensis**
5. Small shrubs, 1 m high; achenes 4-angled ..... **V. salvifolia**

6. Trees; leaves over 10 cm broad ..... 7

6. Shrubs or herbs; leaves below 8 cm broad ..... 8

7. Heads 4-6-flowered; leaves distantly serrate ..... **V. travancorica**

7. Heads 1-flowered; leaves entire ..... **V. arborea**

8. Outer pappus paleaceous; achenes pubescent ..... **V. anthelmintica**

8. Outer pappus setaceous; achenes glabrous ..... 9

9. Leaves white-tomentose beneath ..... 10

9. Leaves grey-tomentose or glabrous beneath ..... 11

10. Nervules faint; stems branched; pappus reddish ..... **V. heynei**

10. Nervules prominent; stems unbranched; pappus yellow ..... **V. indica**

11. Outer involucral bracts acuminate or aristate; heads many-flowered ..... 12

11. Outer involucral bracts acute or obtuse; heads 5-flowered ..... **V. divergens**

12. Leaves coriaceous, regularly serrate ..... **V. peninsularis**

12. Leaves chartaceous, crenate-serrate ..... **V. saligna** var. **nilghirensis**

**Vernonia albicans** DC in Wight, Contrib. 6. 1834; Clarke, Comp. India 22. 1876; Gamble, Fl. Pres. Madras 676. 1921; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 824. 1983; Uniyal in Hajra *et al.*, Fl. India 13: 351. 1995. ***Vernonia cinerea*** sensu Hook. f., Fl. Brit. India 3: 233. 1881 non Less., 1829.

Stout under shrubs, 1-1.5 m high; stems ribbed, white-wooly. Leaves to 5 x 4 cm, broadly ovate, rounded or cordate at base, crenate; petiole 1- 1.5 cm long. Heads 12 x 7 mm, in large terminal panicle, peduncled; bracts 5 mm long, elliptic, acute, tomentose outside; corolla 5 mm long, 5-toothed at apex, glabrous; anthers 1.5 mm long. Achenes 2 mm long, densely adpressed hairy; outer pappus paleaceous, fimbriate; inner pappus 4 mm long, white, setaceous.

*Fl. & Fr.* : July-December

*Distr.* : Peninsular India and Sri Lanka. Rare; in opening along evergreen forests. Mlappara, *JA 12084.*

**Vernonia anthelmintica** (L.) Willd., Sp. Pl. 3: 1634. 1803; Hook. f., Fl. Brit. India 3: 236. 1881; Grierson, Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 121. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 826. 1983; 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. 1921.

Stout herbs, to 1.5 m high; stems scabrid. Leaves to 13 x 5 cm, elliptic, acute at apex and base, scabrous; sharply serrate; nerves 10-11 pairs; petiole 1-2 cm long. Heads 15 x 12 mm, in lax corymbose panicles; bracts 10 mm long, leafy, oblong, obtuse; inner bracts smaller, 8 x 2 mm. Flowers 30-40; corolla 10 mm long, with a narrow basal part, widen above, lobes acute, glabrous; anthers 2 mm long. Achenes 4 x 1 mm, glandular between ribs, pubescent; outer pappus paleacous, fimbriate, inner pappus 6 mm long, reddish.

*Fl. & Fr.* : October-January

*Distr.* : India and Sri Lanka. Common; in open or disturbed moist deciduous forests. Thekkady, *JA 17855.*

**Vernonia arborea** Buch.-Ham., Trans. Linn. Soc. London 14: 218. 1824; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 122. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 826. 1983; Manilal, Fl. Silent Valley 160. 1988; Uniyal in Hajra *et al.*, Fl. India 13: 359. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 255. 1996. ***Monosis wightiana*** DC. in Wight, Contrib. 5. 1834; Wight, Ic. t. 1085. 1846. ***Vernonia monosis*** Benth. ex Clarke, Comp. India 24. 1876; Gamble, Fl. Pres. Madras 672. 1921. ***Vernonia arborea*** Buch.-Ham. var. ***wightiana*** (DC.) Hook. f., Fl. Brit. India 3: 239. 1881. **Karana** (Mannan).

Trees, to 10 m high; bark dark brown, narrowly vertically fissured; branchlets densely brown silky hairy. Leaves 15-17 x 7-10 mm, obovate, abruptly acuminate, densely pubescent, nerves 10- 12 pairs, regular, prominent; petioles 1-2 cm long, stout. Panicle 25 x 20 cm, terminal, densely pubescent. Heads many, 10 x 2 mm; bracts similar, 4 x 2 mm, ovate, obtuse, inner bracts acute, pubescent. Flower solitary; corolla 9 mm long, glabrous; lobes acute; anthers 4 mm long. Achenes 4 mm long, 10-ribbed, hairy between the ribs; pappus similar, 9 mm long, bent at base, setaceous, white.

*Fl. & Fr.* : February-March

*Distr.* : South India and Sri Lanka. Common; in evergreen forests at higher elevations. Sunderamala, *JA & KPR 14825.*

*Ethnobotanical interests* : Flowers of this evergreen tree produce high amount of nectar; hence Mannan start to collect the honey soon after the flowering of this tree.

**Vernonia cinerea** (L.) Less., Linnaea 4: 291. 1829; Hook. f., Fl. Brit. India 3: 233. 1881; Gamble, Fl. Pres. Madras 676. 1921; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 134. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 827. 1983; Uniyal in Hajra *et al.*, Fl. India 13: 367. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 256. 1996. ***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 5 x 3 mm, in terminal corymbose cymes, peduncled; outer bracts minute, inner oblong, acute, cuspidate, hairy. Flowers 5-10, similar; corolla 3 mm long, glabrous. Achenes 1.5 mm long, hairy; outer pappus 1 mm long, setaceous, inner 3 mm long.

*Fl. & Fr.* : Throughout the year

*Distr.* : Tropical Asia, Africa and Australia. Very common; in savannahs and moist deciduous forests. Mangaladevi, *JA 12172, JA 14079.*

*Ethnobotanical use* : The leaves are used as salad.

**Vernonia comorinensis** W. W. Smith, Rec. Bot. Surv. India 4: 283. 1911; Gamble, Fl. Pres. Madras 675. 1921; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 52. 1987; Uniyal in Hajra *et al.*, Fl. India 13: 3369. 1995.

Large shrubs; branchlets wooly tomentose. Leaves to 20 x 5 cm, lanceolate, acute at either ends, rugose above, margins irregular, densely white-tomentose below; nerves 12-15 pairs; petiole 1.5 cm long. Heads 9 x 5 mm, oblong, in dense corymbose panicle; branchlets wooly-tomentose; bracts oblong, wooly, 6 mm long, outer smaller, lanceolate. Flowers 15-22; corolla 6 mm long. Achenes 3-winged, glandular; outer pappus paleaceous, inner setaceous, white.

*Fl. & Fr.* : December-March

*Distr.* : Peninsular India. Very rare; in evergreen forests at higher elevations. Vellimala, *JA 12913.*

**Vernonia divergens** (Roxb.) Edgew., J. Asiat. Soc. Bengal 21: 172. 1853; Hook. f., Fl. Brit. India 3: 234. 1881; Gamble, Fl. Pres. Madras 673. 1921; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 828. 1983; Manilal, Fl. Silent Valley 161. 1988; Uniyal in Hajra *et al.*, Fl. India 13: 370. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 256. 1996. ***Eupatorium divergens*** Roxb., Fl. Ind. 3: 414. 1832. ***Decaneurum divergens*** (Roxb.) DC., Prodr. 5: 68. 1836; Wight, Ic .t 1084. 1846.

Erect shrubs, 1-2 m high, usually unbranched; stems reddish, grey-tomentose. Leaves to 10 x 5 cm, elliptic, acute at both ends, serrate, scabrous above, pubescent beneath; nerves 6-8 pairs, regular; petiole 1-2 cm long. Heads 6 x 4 mm, globose; bracts oblong, acute, grey tomentose. Flowers few, corolla 12 mm long, glabrous. Achenes 2 mm long, glandular; pappus all setaceous, brown.

*Fl. & Fr.* : December-March

*Distr.* : India & Malay peninsula. Very common; in hilly grasslands. Kalvarimala, *JA 17872.*

**Vernonia heynei** Bedd. ex Gamble, Kew Bull. 1920: 340. 1920 & Gamble, Fl. Pres. Madras 673. 1921; Henry *et al.*, J. Econ. Tax. Bot. 75(3): 691. 1979; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 53. 1987; Uniyal in Hajra *et al.*, Fl. India 13: 371. 1995.

Shrubs, to 1.5 m high, stems densely cottony-hairy. Leaves to 8 x 3 mm, ovate, acute, crenate, densely hairy below, glabrous above; nerves 8 pairs, faint; petiole 1-1.5 cm long. Cymes 5-8 cm across, corymbose. Heads 13 mm long, densely packed; peduncles 1 cm long, hairy; bracts 3 or 4-seriate, outer smaller, inner 6 x 1.5 mm, elliptic. Flowers 12-15; corolla 8 mm long, lobes oblong, recurved. Achenes 3 x 1 mm, 10-ribbed, smooth; pappus biseriate, similar, 8 mm long.

*Fl. & Fr.* : January-April.

*Distr.* : Southern Western Ghats(Kerala & Tamil Nadu). Rare; in evergreen forests at higher elevations. Kottamala, *JA 17876.*

*Note* : This species has been collected from Mahendragiri hills, Kanyakumari District, Tamil Nadu in 1969 after its type collection (Uniyal,1995). The present collection shows the second locality of this species in South India and here also its populations is not rich.

**Vernonia indica** Clarke, Comp. India 16. 1876; Hook. f., Fl. Brit. India 3: 238. 1881; Gamble, Fl. Pres. Madras 674. 1921; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 52. 1987; Uniyal in Hajra *et al.*, Fl. India 13: 372. 1995.

Shrubs, 1-2 m high, usually not branching; stems white-wooly. Leaves to 12 x 5 cm, elliptic, acute at base and apex, serrate, glabrous above, densely white-tomentose below; nerves 6-8 pairs, raised below, reticulate. Heads many, 8 x 5 mm, globose, in panicled cymes; bracts unequal, oblong, obtuse, cottony-hairy. Flowers 5-10; corolla to 7 mm long, pink, glabrous. Achenes 2 mm long, strongly ribbed, glandular; pappus outer setaceous or absent; inner 6 mm long, setaceous, yellow.

*Fl. & Fr.* : October-February

*Distr.* : Western Peninsular India. Common; in hilly grasslands. Mangaladevi, *JA 14076.*

**Vernonia multibracteata** Gamble, Kew Bull 1920:341.1920 & Fl. Madras 675.1921; Henry *et al.*, J. Econ. Tax. Bot. 75(3): 691.1979; Uniyal in Hajra *et al.*, Fl. India 13: 374. 1995 [Fig. 38].

Shrubs; branches sparse, grey wooly-tomentose. Leaves 12-20 x 3-4 cm, lanceolate, acute at apex and base, unequally serrate-toothed, densely golden tomentose beneath, glabrous above. Cymes to 15 x 15 cm, terminal, corymbose; branches densely velvet-tomentose. Heads 9 x 5 mm, peduncled; bracts 5 x 2 mm, oblong, acuminate; outer bracts narrower, smaller, hairy. Flowers to 20, similar; corolla 7-8 mm long, lobes oblong, obtuse, glabrous. Achenes 2.5 mm long, 4-angled, glandular, outer pappus scaly, fimbriate; inner pappus to 10 mm long, setaceous, dull yellow.

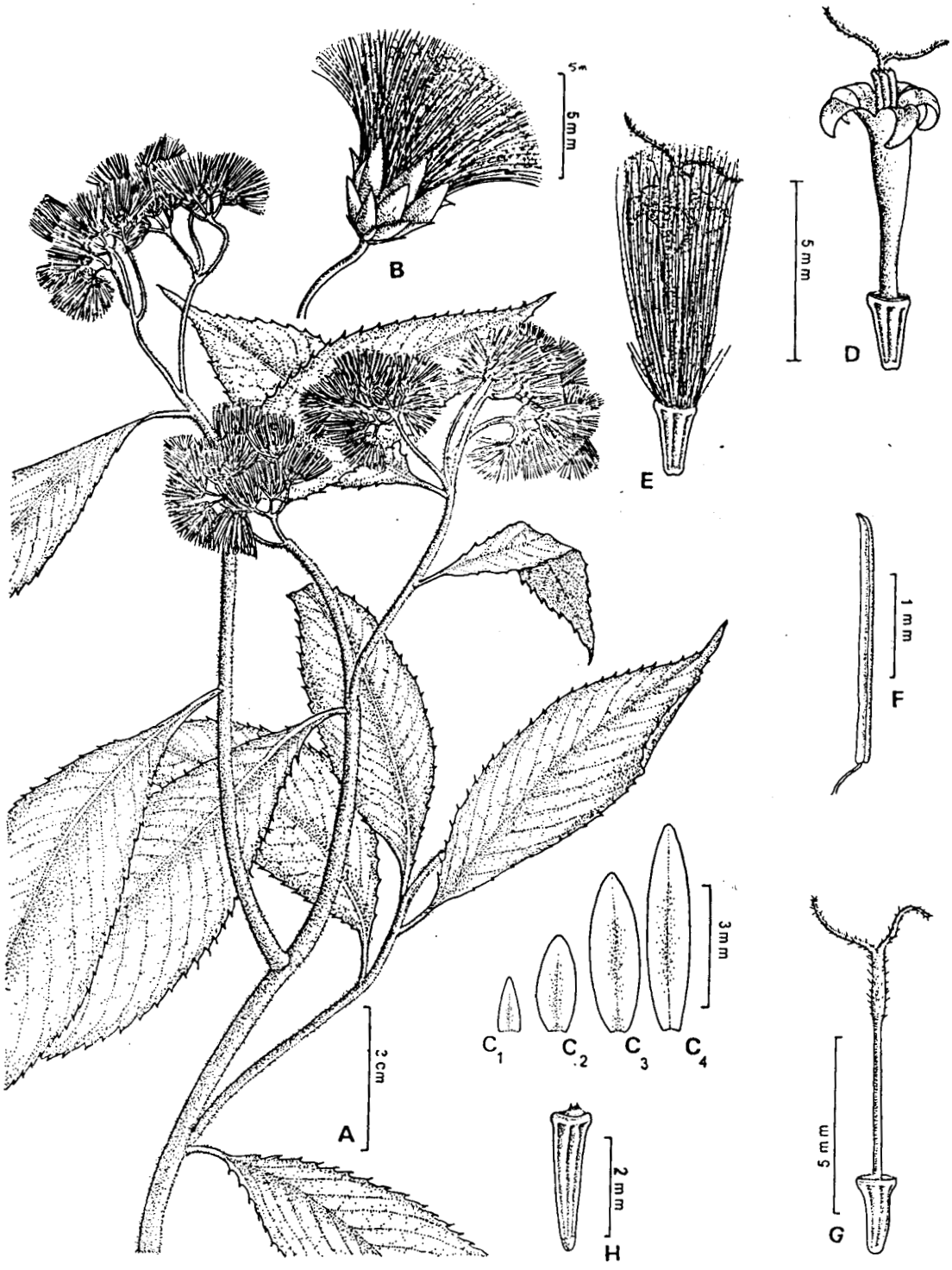



Fig. 38. *Vernonia multibracteata* Gamble **A.** flowering twig, **B.** head, $C_1$.,$C_2$., $C_3$. & $C_4$. phyllaries, **D.** flower without pappus, **E.** flower with pappus, **F.** stamen, **G.** pistil, **H.** achene.

*Fl. & Fr.* : December-March

*Distr.* : Southern Western Ghats (Kerala). Rare; in hilly grasslands. Kalvarimala, *JA 17886.*

*Note* : Nayar and Sastry (1987) categorised this species as Endangered (3, 5) as it had not been recollected since its type collection made by Beddome in 1880. Nayar (1997) commented that this species is possibly extinct. Hence the present collection is the recollection of it over 110 years after the type collection. In the present locality it is with only a scattered population.

**Vernonia peninsularis** (Clarke) Clarke ex Hook. f., Fl. Brit. India 3: 233. 1881; Gamble, Fl. Pres. Madras 674. 1921; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 53. 1987; Uniyal in Hajra *et al.*, Fl. India 13: 378. 1995. ***V. bracteata*** Wall. var. ***peninsularis*** Clarke, Comp. India 18. 1876. ***Decaneurum silhetense*** Wight, Ic. t. 1083. 1846.

Subshrubs, to 1.5 m high; stems ribbed, pectinate-hairy. Leaves to 10 x 5 cm, elliptic, acute at base and apex, serrate, pectinate-hairy below, nerves 5-6 pairs, reticulate. Heads 15 x 13 mm, globose, in terminal loose corymbose cymes, long-peduncled; bracts 7-9 x 2 mm, outer deflexed; corolla 10 mm long, pale pink. Achenes glabrous; outer pappus setaceous, 6-9 mm long, white.

*Fl. & Fr.* : December-March

*Distr.* : Peninsular India. Common; in open forest at higher elevations. Vellimala, *NS & JA 12996.*

**Vernonia saligna** DC., Prodr. 5: 33. 1836 var. **nilghirensis** Hook. f., Fl. Brit. India 3: 235. 1881; Gamble, Fl. Pres. Madras 674. 1921; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 53. 1987; Uniyal in Hajra *et al.*, Fl. India 13: 383. 1995.

Subshrubs, to 1.5 cm high; stem terete, wooly-tomentose. Leaves 8-12 x 2-3 cm, elliptic, acuminate at both ends, distantly crenate-serrate, pubescent along the nerves beneath; petiole 1.5-3 cm long. Panicle terminal, lax, to 25 cm across; branches strigose. Heads 5-6 x 7 mm; involucral bracts 2-3-seriate, dissimilar, outer bracts linear, 6 mm long, sharply acuminate, inner 6 x 1 mm, lanceolate, 3-nerved, hairy. Flowers few, similar; corolla 5 mm long, glabrous; anthers 2 mm long. Achenes 1.5 mm long, glandular between ribs; pappus reddish-white; outer 0.5 mm long, setaceous, inner 4.5 mm long, setaceous.

*Fl. & Fr.* : January-May

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Chokkampetti, *JA 13349.*

**Vernonia salvifolia** Wight, Ic. t. 1079. 1846; Hook. f., Fl. Brit. India 3: 237. 1881; Gamble, Fl. Pres. Madras 675. 1921; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 53. 1987; Uniyal in Hajra *et al.*, Fl. India 13: 385. 1995.

Large shrubs; stems white-woolly. Leaves clustered towards the tips of branchlets, to 8 x 2 cm, elliptic, acute at both ends, crenulate, rugose above, coriaceous, densely cottony-hairy below; petiole 5-10 mm long, stout. Cymes terminal, corymbose, to 10 cm across, branches stout, densely cottony-hairy. Heads 10 x 8 mm, subglobose, sessile, densely packed ; bracts to 7 x 2 mm, lanceolate, sharply acute, outer ones smaller, ovate, wooly. Flowers few; corolla 7 mm long, lobes oblong, acute, glabrous. Achenes 4 x 1.5 mm, oblong, 3-angled, smooth, glabrous, outer pappus 1 mm long, fimbriate; inner pappus 4 mm long, setaceous, white.

*Fl. & Fr.* : January-April

*Distr.* : Southern Western Ghats. Rare; in evergreen forests at high elevations. Kottamala, *JA & KPR 17789.*

**Vernonia travancorica** Hook. f., Fl. Brit. India 3: 240. 1881; Gamble, Fl. Pres. Madras 673. 1921; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 53. 1987; Uniyal in Hajra *et al.*, Fl. India 13: 391. 1995. ***Vernonia volkameriaefolia*** sensu Bedd., Fl. Sylv. t. 225. 1872, non DC., 1836. **Karana** (Mannan).

Small trees; bark grey with narrow vertical fissures; branchlets puberulus. Leaves to 20 x 6 cm, elliptic, obtusely acute at base and apex, glabrous; nerves 6 pairs, prominent, regular; petiole 1.5 cm long. Panicle to 25 x 20 cm, terminal, sub-pyramidal; branchlets puberulus. Heads 10 x 4 mm, oblong; outer bracts orbicular, obtuse, hairy; inner bracts 7 x 2.5 mm, oblong, obtuse, glabrous. Flowers 4-6, similar, pink; corolla 10 mm long, lobes oblong, glabrous. Achenes 7 mm long, yellowish brown, glandular; pappus similar, 9-10 mm long, setaceous, white, bent at base.

*Fl. & Fr.* : January-March

*Distr.* : Southern Western Ghats. Very common; in evergreen forests. Mullayar, *JA 13307*; Pachapallam, *JA 13571.*

*Ethnobotanical interests* : Flowers of this evergreen tree produce high amount or nectar; hence Mannans start to collect the honey soon after the flowering of this tree.

## VICOA Cassini

Ann. Sci. Nat. (Paris) 17: 418. 1829.

**Vicoa indica** (L.) DC. in Wight, Contrib. 10. 1834; Wight, Ic. t. 1148. 1846; Gamble, Fl. Pres. Madras 701. 1921; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 200. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 830. 1983; Manilal, Fl. Silent Valley 162. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 256. 1996. ***Inula indica*** L., Sp. Pl. ed. 2, 2: 1237. 1763. ***Vicoa auriculata*** Cass., Ann. Sci. Nat. Ser. 1, 17: 418. 1829; Hook. f., Fl. Brit. India 3: 297. 1881.

Densely scabrous erect herbs; stems terete, reddish. Leaves 6 x 1-2 cm, elliptic, acute at apex, amplexicaule and auricled at base. Heads 10-12 x 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 mm long, shortly 5 lobed; anthers sagittate at base. Achenes 1 mm long, cylindric, hairy; pappus of 10-12 bristles, 3 mm long, setaceous.

*Fl. & Fr.* : December-March

*Distr.* : Indo-China and Tropical Africa. Common; in disturbed forests. Koruthode, *JA 17889.*

**WEDELIA** N. J. Jacquin.

Enum. Pl. Carib. 8, 28. 1760, *nom. cons.*

**Wedelia urticaefolia** (Bl.) DC. in Wight, Contrib. 18. 1834; Wight, Ic. t. 1106. 1846; Hook. f., Fl. Brit. India 3: 306. 1881; Gamble, Fl. Pres. Madras 707. 1921; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 832. 1983; Chowdhery in Hajra *et al.*, Fl. India 12: 426. 1995. ***Verbesina urticaefolia*** Bl., Bijdr. 911. 1826.

Erect branched herbs; stem hispid. Leaves 8-12 x 4-5 cm, opposite, acute at apex, obtusely cuneate at base, crenate, hispid. Heads 12 x 6 mm, cylindrical, solitary or 2-3 together, on peduncle of 2-4 cm high; bracts 2-seriate, outer larger, 8 x 2 mm, oblong, obtuse, hispid. Outer row of flowers female, ligulate; limb broadly oblong, 3-lobed at apex; bisexual flowers central, few; corolla 8 mm long, tubular, 5-lobed; anthers entire at base. Achenes oblanceolate, 4-angled, black; pappus a ring of 4 acute scales.

*Fl. & Fr.* : Throughout the year

*Distr.* : Peninsular India. Common; in moist deciduous forests. Thekkady, *JA 12773.*

**XANTHIUM** Linnaeus

Sp. Pl. 987. 1753

**Xanthium indicum** Koen. in Roxb., Fl. Ind. 3: 601. 1832; Wight, Ic. t. 1104. 1846; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 209. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 833. 1983; Chowdhery in Hajra *et al.*, Fl. India 12: 426. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 256. 1996. ***X. strumarium*** L., Sp. Pl. 987. 1753 p.p.; Hook. f., Fl. Brit. India 3: 303. 1881; Gamble, Fl. Pres. Madras 703. 1921.

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 1.5 x 0.7 cm, paired on each head, enclosed in a 2-beaked utricle; pappus absent.

*Fl. & Fr.* : Throughout the year

*Distr.* : Indo-Malesia, Java and Sri Lanka. Gregarious in moist localities. Kokkara, *JA 12511.*

### YOUNGIA Cassini

Ann. Sci. Nat. (Paris) 23: 88. 1831.

**Youngia japonica** (L.) DC., Prodr. 7: 194. 1838; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 268.1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 834. 1983 ; Mamg. & Rao in Hajra *et al.*, Fl. India 12: 329. 1995. ***Prenanthes japonica*** L., Mant. Pl. 107. 193. 1767. ***Youngia napifolia*** DC., Prodr. 7: 193. 1838; Wight, Ic. t. 1846. ***Crepis japonica*** (L.) Benth., Fl. Hong. 194. 1861; Hook. f., Fl. Brit. India 3: 395. 1881; Gamble, Fl. Pres. Madras 730. 1921.

Slender scapigerous herbs, 50-80 cm high. Leaves 10-15 cm long, basal or basal and cauline, membranous; terminal lobe larger and obtuse, crenate, glabrous or thinly puberulus; petiole to 6 cm long. Heads 6 x 3 mm, numerous on large slender terminal panicle; bracts 2-seriate, 5 x 1 mm, glabrous, inner ones smaller. Flowers yellow, bisexual, similar, all ligulate; corolla 5 mm long, tube slender, limb 5-toothed, glandular; stamens 5, excerted, anthers sagittate at base. Achenes 2 x 1 mm, ribbed, beaked, scabrous, brown.

*Fl. & Fr.* : October-February

*Distr.* : South-East Asia. Common; along forests margins with grasslands at higher elevations. Uppermanalar, *JA 12980.*

## 72. CAMPANULACEAE

Juss., Gen. Pl. 163. 1789.

1. Flowers zygomorphic; stamens monadelphous.....**Lobelia**
1. Flowers actinomorphic; stamens free.....2
2. Flowers 4-merous, in terminal panicles.....**Wahlenbergia**
2. Flowers 5-merous, in racemes.....**Asyneuma**

## ASYNEUMA Grisebach & Schenk

Arch. Naturgesch. 18: 335. 1852.

**Asyneuma fulgens** (Wall.) Briq., Candollea 4: 334. 1931; Rao & Jain, Ind. For. 105: 565. 1979; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 836. 1983. ***Campanula fulgens*** Wall. in Roxb., Fl. Ind. 2: 99. 1824; Hook. f., Fl. Brit. India 3: 442. 1881; Gamble, Fl. Pres. Madras 740. 1921; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 162. 1983.

Erect slender herbs, to 70 cm high. Leaves alternate, 4 x 3.5 cm, ovate, serrate, thinly hairy, rounded at base. Flowers in elongated branched racemes, 3-together at nodes; calyx 7 mm long, subulate; corolla campanulate, 8 mm long, lobes ovate-oblong, white; stamens 5, free; filaments dialated at base; ovary inferior, 3-celled; ovules numerous; styles cylindrical. Capsule 7 x 5 mm, dehiscing along sides; seeds many.

*Fl. & Fr.* : July-December

*Distr.* : India and Sri Lanka. Not common; in grasslands. Mangaladevi, *JA 12681.*

## LOBELIA Linnaeus

Sp. Pl. 929. 1753.

Herbs or shrubs, stems 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. Stem terete; leaves more than 10 cm long ..... 2
1. Stem 3-angled or winged; leaves less than 3 cm long ..... 3
2. Racemes terminal and axillary, panicled; corolla lobes unequal; dorsal 2 anthers bearded at apex ..... **L. nicotianaefolia**
2. Racemes terminal, undivided; corolla lobes equal; anthers not bearded at apex ..... **L. leschenaultiana**
3. Seeds trigonous; all anthers bearded at apex ..... 4
3. Seeds oblong; only two anthers bearded at apex ..... 5
4. Calyx tube pubescent; flowers axillary ..... **L. zeylanica**
4. Calyx tube glabrous; flowers in terminal racemes ..... **L. alsinoides**
5. Corolla ca. 10 mm long; leaves ca. 3.5 x 2 cm ..... **L. dichotoma**
5. Corolla 3-4 mm long; leaves ca. 1.5 x 1 cm ..... **L. heyneana**

**Lobelia alsinoides** Lam., Encycl. 3: 588. 1792; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 168. 1983; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 837. 1983; Harid. & Mukh., Fasc. Fl. India 19: 42. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 257. 1996. ***L. trigona*** Roxb., Fl. Ind. 2: 111. 1824; Clarke in Hook. f., Fl. Brit. India 3: 423. 1881; Gamble, Fl. Pres. Madras 736. 1921.

Decumbent herbs, rooting from lower nodes; stems 3-winged. Leaves 1-2 x 1-1.5 cm, ovate-orbicular, crenate, obtuse, petiolate; petiole 3 mm broad; upper leaves sessile, elliptic, acute, smaller. Flowers in terminal raceme; pedicels 3 cm long, filiform; sepals 5 mm long, lanceolate; corolla blue,10 mm long, upper 3 lobes obovate, lower 2 lobes narrower; all anthers hairy at apex. Capsule 6 mm long, glabrous; seeds trigonous, brown.

*Fl. & Fr.* : Throughout the year

*Distr.* : India, China and Malesia. Very common; in marshy areas in grasslands. Kumarikulam, *JA 13010*; Anchuruli, *JA & KPR 14295*; Thannikkudy, *KPR 14492.*

**Lobelia dichotoma** Miq., Fl. Ind. Bat. 2: 576. 1856; Harid. & Mukh., Fasc. Fl. India 19: 47. 1988. ***L. zeylanica*** Clarke in Hook. f., Fl. Brit. India 3: 425. 1881, incl. var. ***walkeri***, p. p.; Gamble, Fl. Pres. Madras 736. 1921.

Diffuse herbs, to 20 cm high; stems 3-winged, glabrous. Leaves obovate, obtuse or acute, base narrowly winged on the petiole, crenate-serrate; nerves 4 pairs; upper leaves sessile. Flowers in terminal, short raceme; pedicel 3 mm long; sepals 4.5 x 1 mm, lanceolate, glabrous; corolla blue, 10 mm long, ventral lobe broader; lateral & dorsal lobes lanceolate; anthers 2.5 mm long, 2 anthers with penicillate black hairs at apex; style stout, curved; stigma with a ring of hairs below.

*Fl. & Fr.* : Throughout the year

*Distr.* : India and Sri Lanka. Rare; in marshy areas in evergreen forests. Anakuthivayal, *JA 17802.*

**Lobelia heyneana** Schult. in Roem. & Schult., Syst. 5: 50. 1819; Sant., Rec. Bot. Surv. India 16: 158. 1953; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 169. 1983; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 838. 1983; Harid. & Mukh., Fasc. Fl. India 19: 51. 1988; Manilal, Fl. Silent Valley 162. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 257. 1996. ***L. trialata*** Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 157. 1825; Clarke in Hook. f., Fl. Brit. India 3: 425. 1881; Gamble, Fl. Pres. Madras 736. 1921.

Erect or decumbent herbs, rooting at lower nodes; stems triangular, winged. Leaves ovate, acute, serrate; petioles 2-3 mm long. Flowers axillary, solitary; pedicel 7 mm long, slender,

glabrous; calyx lobes 2 mm long, subulate; corolla 3-4 mm long, blue; two anthers with penicillate black hairs at apex. Capsule 2.5 mm long, obconical, truncate; seeds biconvex, ovoid, glabrous, brown.

*Fl. & Fr.* : July-December

*Distr.* : India, China and Thailand. Occasional; in marshy areas in grasslands. Kumarikulam, *JA & KPR 14260.*

**Lobelia nicotianaefolia** Roth ex Roem. & Schult., Syst. Veg. 5: 47. 1819; Clarke in Hook. f., Fl. Brit. India 3: 427. 1881; Gamble, Fl. Pres. Madras 736. 1921; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 172. 1983; Harid. & Mukh., Fasc. Fl. India 19: 53. 1988; Manilal, Fl. Silent Valley 163. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 258. 1996. ***L. trichandra*** Wight, Ic. t. 1171. 1848. **Kattu pukayila**.

Succulent biennial shrubs, to 2 m high; old stems covered with persistent prominent leafscars. 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 2 cm long, lanceolate; sepals 12 mm long, elliptic, serrulate, scabrid; corolla 30 mm long, ventral lobe ovate, lateral lobes linear, white, minutely tomentose; staminal sheath tubular; anthers 6 mm long, pubescent, black, dorsal two anthers bearded at apex. Capsule 9 mm across, globose; seeds ovoid.

*Fl. & Fr.* : October-January

*Distr.* : India and Sri Lanka. Very common; in grasslands above 1000 m. Kumarikulam, *JA 13002.*

*Ethnobotanical use* : Mannan use the juice of the leaves of this shrub for preventing leech bite

**Lobelia leschenaultiana** (Presl) Skottsb., Act. Hort. Bot. Gothob. 4: 4, f. 2-7. 1928; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 174. 1983; Harid. & Mukh., Fasc. Fl. India 19: 52. 1988. ***Rapuntium leschenaultiana*** Presl., Prodr. Monogr. Lobel. 24. 1836. ***Lobelia excelsa*** Roxb., Fl. Ind. 2: 114. 1824, non Bonpl., 1813; Clarke in Hook. f., Fl. Brit. India 3: 427. 1881 p. p.; Gamble, Fl. Pres. Madras 737. 1921. ***L. aromatica*** Moon ex Wight, Ic. t. 1172. 1848.

Stout erect shrubs, usually unbranched. Leaves 15-25 x 3-6 cm, linear-elliptic, densely pubescent below, shortly and broadly petiolate. Racemes terminal, 25-60 cm long, cylindrical, unbranched; bracts 2.5 cm long, linear, pubescent. Flowers numerous, densely packed; pedicel pubescent; bracts 2.5 cm long, linear; sepals 14 x 2 mm, linear, acuminate, serrate, pubescent;

corolla pale pink, 25 mm long, lobes linear; staminal tube narrow, 2.5 cm long, anthers 7 mm long, all glabrous. Capsule 8 x 8 mm, depressed globose, scabrid; seeds biconvex, brown.

*Fl. & Fr.* : December-April

*Distr.* : India and Sri Lanka. Rare; in evergreen forests at higher elevations. Uppermanalar, *NS & JA 15034.*

**Lobelia zeylanica** Linn. Sp. Pl. 932. 1753; Moelino in van Steenis, Fl. Males. ser. 1, 6: 128. 1960; Cramer in Dassan. & Fosb. Rev Handb. Fl. Ceylon 4: 170. 1983; Harid. & Mukh., Fasc. Fl. India 19: 58. 1988. ***L. hirta*** Wall. in Roxb., Fl. Ind. 2: 113. 1824. ***L. affinis*** Wall. ex G. Don, Gen. Hist. 3: 709. 1834, non Mirbach, 1805; Clarke in Hook. f., Fl. Brit. India 3: 424. 1881 [Fig. 39].

Procumbent herbs, rooting at lower nodes; stems 3-angled and winged, pilose. Leaves to 2.2 x 2 cm, upper ones shorter, broadly ovate, acute, serrate, truncate and shortly decurrent sat base, pubescent on nerves, glandular-serrate; petiole to 5 mm long, flattened. Flowers axillary, solitary; pedicel 15-25 mm long, bracteoles 2, 2 mm long; sepals 6 x 1 mm, oblong, acute, ciliate; corolla blue, 5-7 mm long, lobes pubescent outside, ventral lobe elliptic, acute, lateral and dorsal lobes linear, acute; anthers all bearded at apex; ovary 10-ribbed; hairy outside. Capsule 5 x 3.5 mm, globose, densely pilose with persistent sepals; seeds trigonous, brown, smooth.

*Fl. & Fr.* : Almost throughout the year

*Distr.* : South-East Asia. Rare; in marshy areas of grasslands and Savannahs. Thannikkudy, *JA 14492.*

*Note* : *Lobelia zeylanica* Linn. was first described from Sri Lanka and later recorded from Northern states of India. The name *Lobelia zeylanica* is a much confused one in literature (Haridasan & Mukherjee, 1988). The plant referred to as *Lobelia zeylanica* sensu Clarke (1881) by Gamble (1921) is now known as *Lobelia dichotoma* Miq. Haridasan & Mukherjee (1988) have shown the distribution of *L. zeylanica* in India: from Madhya Pradesh to North-east India. No collection of this species was recorded from Southern States. The present collection is the first record of occurrence in Kerala.

## WAHLENBERGIA H. A. Schrader ex A. W. Roth

Novae Pl. Sp. 399. 1821 *nom. cons.*

**Wahlenbergia hookeri** (Clarke) Tuy., Fl. Males. 6(1): 114. 1960; Manilal, Fl. Silent Valley 164. 1988. ***Cephalostigma hookeri*** Clarke, Hook. f., Fl. Brit. India 3: 429. 1881; Gamble, Fl. Pres. Madras 738. 1921 [Fig. 40].

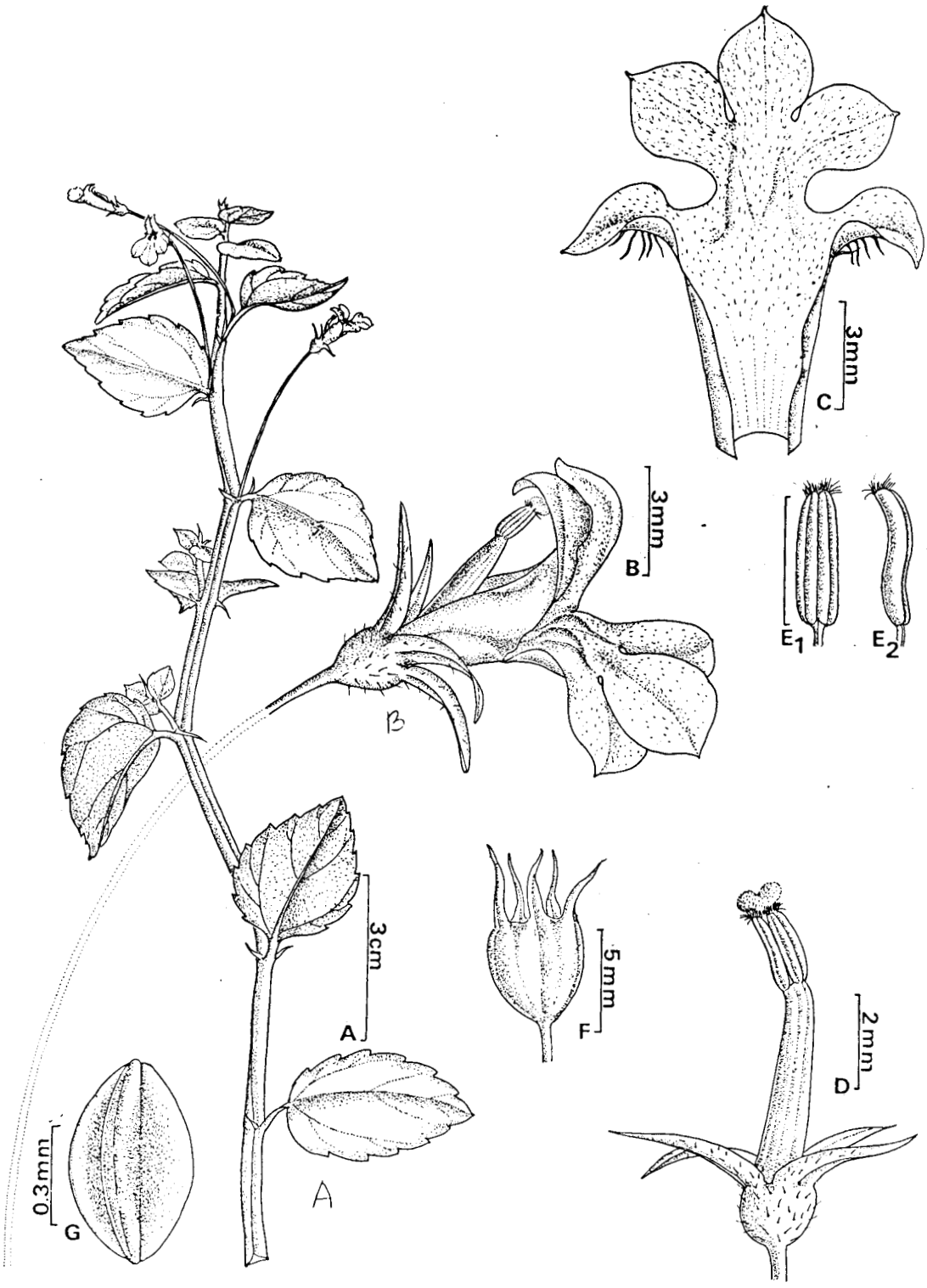



Fig. 39. *Lobelia ceylanica* L.: **A**. habit; **B**. flower; **C**. corolla; **D**. flower without corolla; $\mathbf{E_1}$ & $\mathbf{E_2}$. anthers; **F**. fruit; **G**. seed.

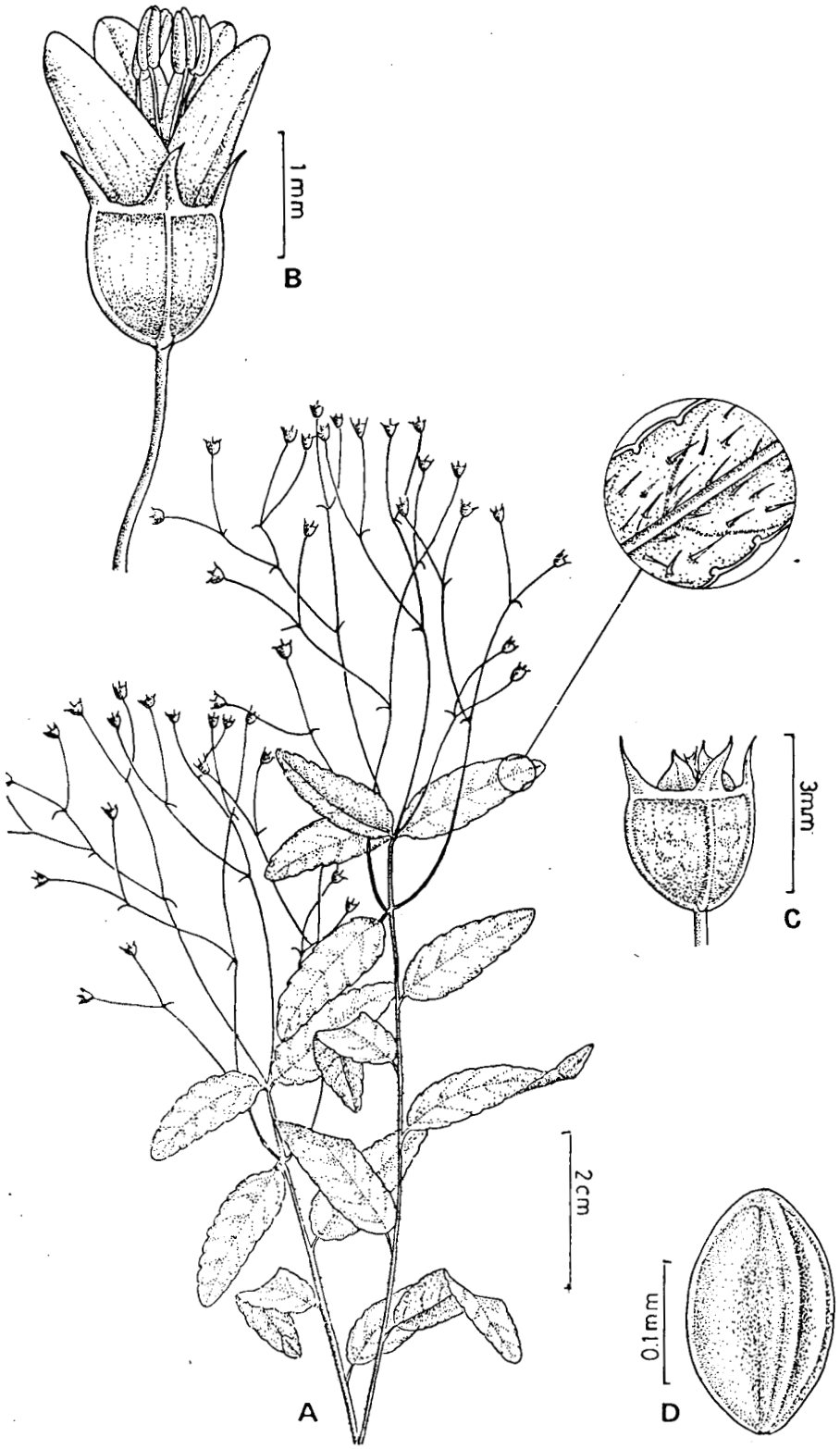



Fig. 40. *Wahlenbergia hookeri* (Clarke) Tuy.: **A.** habit; **B.** flower; **C.** fruit; **D.** seed.

Erect slender herbs, 7-15 cm high; stem pilose, terete. Leaves alternate, clustered, to 2.2 x 0.9 cm, ovate-oblong, obtuse, crenate, thinly pubescent with glassy hairs; petiole 3 mm long, densely pilose. Flowers 3.5 mm long, in terminal dichotomous cymes; branches and pedicels filiform, glabrous; sepals 5, 1 mm long, ovate; corolla white, 2 mm long, lobes equal, linear-oblong; stamens 5, free, erect; filaments broaden at base; anthers sagittate; ovary 2-celled, many-ovuled, inferior; style slender; stigma 2-lobed.

*Fl. & Fr.* : June-December

*Distr.* : Endemic to South India. Rare; in grasslands. Mangaladevi, *NS & JA 12691*; Thannikkudy, *JA 13832.*

*Note* : Stephan and Vajravelu (1997) commented on the status of this species as very rare. They were able to make recollection of this species from Mudumalai (Tamilnadu) after the type collection.

## 73. VACCINIACEAE

DC. ex. Gray, Nat. Arr, Brit. Pl. 2: 394., 404. 1821.

### VACCINIUM Linnaeus

Sp. Pl. 349. 1753

Shrubs. Leaves alternate, serrate, shortly petiolate. Flowers in axillary or terminal racemes, pedicelled, bracteate; bracteoles 2, filiform; calyx tube obconical, adnated to the ovary, teeth 5, small; corolla tube urn-shaped, lobes 5, very short; stamens 10, free; anthers oblong produced above into two tube with terminal circular opening; ovary 5-celled, inferior; ovules many; style - 1, stigma pointed. Fruit a berry, 5-celled, crowned with persistent sepals; seeds many in each cell, compressed.

1. Leaves ca. 1.5 cm broad, racemes 6-10 cm long ..... **V. neilgherrense**

1. Leaves 2.5-3 cm broad; racemes 3-4 cm long ..... **V. leschenaultii**

**Vaccinium leschenaultii** Wight, Ic. t. 1188. 1848; Clarke, Hook. f., Fl. Brit. India 3: 455. 1882; Gamble, Fl. Pres. Madras 742. 1921; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 57. 1987; Manilal, Fl. Silent Valley 164. 1988 [Fig. 41].

Glabrous shrubs, branchlets slender. Leaves 4-6 x 3 cm; elliptic, acute, serrulate; nerves 4-6 pairs, glaucous below. Racemes slender; pedicels 3 mm long, calyx lobes triangular, ciliate. Capsule 4 x 4 mm, globose, glabrous, white.

Fig. 41. *Vaccinium leschenaultii* Wight: **A.** fruiting twig; **B.** fruit

*Fr.* : December (The specimen collected was in fruiting stage).

*Distr.* : Southern Western Ghats. Rare; in evergreen forests at high altitudes. Kottamala, *NS & JA 12914.*

**Vaccinium neilgherrense** Wight, Calcutta J. Nat. Hist. 8: 173. 1847 & Ic. t. 1189. 1848; Clarke in Hook. f., Fl. Brit. India 3: 454. 1882, "*nilgherrense*"; Gamble, Fl. Pres. Madras 741. 1921; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 843. 1983; Manilal, Fl. Silent Valley 164. 1988.

Small trees, branchlets drooping. Leaves to 9 x 1.5 cm, lanceolate, acuminate; nerves very oblique. Flowers 10 mm long; calyx tube glabrous, lobes ovate, ciliate; corolla white, glabrous, lobes ovate, spreading; filaments tomentose. Fruits not seen.

*Fl.* : December

*Distr.*: Southern Western Ghats. Common; along riverbanks in evergreen forests. Vallakkadavu, *NS & JA 12710.*

## 74. ERICACEAE

Juss., Gen. Pl. 159. 1789.

### RHODODENDRON Linnaeus

Sp. Pl. ed. 1, 392. 1753.

**Rhododendron arboreum** J. E. Smith, Exot. Bot. t. 6. 1804 subsp. **nilagiricum** (Zenk.) Tagg., Stevenson, Sp. Rhod. 15. 1930; Chamberlain, Not. Roy. Bot. Gard. Edinburgh 39: 331. 1982; Manilal, Fl. Silent Valley 165. 1988. ***R. nilagirica*** Zenk., Amer. Sci. Nat. Ser. 2, 6: 150. 1836; Gamble, Fl. Pres. Madras 743. 1921. ***R. arboreum*** J. E. Smith var. ***nilagirica*** (Zenk.) Clarke in Hook. f., Fl. Brit. India 3: 466. 1881.

Small trees, branchlets stout. Leaves alternate, clustered, to 10 x 5 cm; ovate-oblong, obtuse, rounded at base; golden brown below, coriaceous; petiole 1.5 cm long. Flowers in terminal congested cymes; calyx 5-lobed, rusty tomentose; corolla red, to 5 cm long, campanulate, 5-lobed; stamens 10, filaments long, free; ovary many-celled; ovules numerous; style 1, slender; stigma capitate. Fruit a woody capsule, 5-20 celled; seeds many.

*Fl. & Fr.* : February-June

*Distr.* : Southern Western Ghats. Rare; in evergreen forests above 2000 m altitudes. Kottamala, *JA 15368.*

## 75. PLUMBAGINACEAE

Juss., Gen. Pl. 92. 1789.

### PLUMBAGO Linnaeus

Sp. Pl. 151. 1753

**Plumbago zeylanica** L., Sp. Pl. 151. 1753; Wight, Ill. 2 : t. 179. 1850; Clarke in Hook. f., Fl. Brit. India 3: 480. 1882; Gamble, Fl. Pres. Madras 744. 1921; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 845. 1983. **Vellakkoduveli.**

Subscandent subshrubs; stems striate. Leaves alternate, to 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 11 mm long, tubular, 5-ribbed, lobes small, obtuse, glandular hairy; corolla tube 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, 2 mm long, circumscissile at base, glandular hairy.

*Fl. & Fr.* : August-December

*Distr.* : Old World Tropics. Occasional; in disturbed moist deciduous forests. Thekkady, *JA 12395.*

## 76. PRIMULACEAE

Vent., Tabs. Regne Veg. 2: 285. 1799.

1. Capsule circumscissile; erect herbs..... **Anagallis**
1. Capsule valvate; creeping herbs..... **Lysimachia**

### ANAGALLIS Linnaeus

Sp. Pl. 148. 1753

**Anagallis pumila** Sw., Prodr. 1: 40. 1788; Gamble, Fl. Pres. Madras 747. 1921; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 846. 1983. ***Centunculus tenellus*** Duby, DC., Prodr. 8: 72. 1844; Wight, Ic. t. 2000. 1853; Clarke in Hook. f., Fl. Brit. India 3: 506. 1882. ***Mycropyxis tenella*** (Duby) Wight, Ic. t. 1585. 1850.

Glabrous herbs, to 7 cm high. Leaves alternate, opposite below, to 8 x 4 mm, obovate, acute, shortly petiolate. Flowers small, white, solitary, axillary; pedicel 8 mm long, slender; calyx lobes 5, free, 1.5 mm long; corolla 3 mm across, campanulate, lobes 5, obovate, 3 mm long; stamens 5,

free; ovary 1-celled; ovules many, on free central placenta; style short, stigma hairy. Capsule 3 mm across, many-seeded.

*Fl. & Fr.* : July-December

*Distr.* : India, Tropical America and Africa. Common; in grasslands above 1000 m altitudes. Thekkady, *JA 12429, JA & KPR 16844.*

### **LYSIMACHIA** Linnaeus

Sp. Pl. 146. 1753.

**Lysimachia procumbens** Baudo, Ann. Sci. Nat. Bot. 2: 20. 1843; Bentvelzen in Steenis, Fl. Males. Ser. 1, 6: 183. 1962; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 60. 1987. ***L. deltoidea*** Wight, Ill. 2: t. 144. 1850; Clarke in Hook. f., Fl. Brit. India 3: 505. 1882; Gamble, Fl. Pres. Madras 746. 1921.

Villous herbs; stem shortly creeping. Leaves opposite, to 2 x 1.5 cm; ovate, acute, rounded to cordate at base; petiole 5 mm long. Flowers axillary, solitary; pedicels 1.5 cm long; slender, erect; calyx 5-partite, lobes 6 mm long, lanceolate; corolla yellow, 1.5 cm across, deeply 5-lobed, lobes obovate; stamens 5, filaments inserted at the base of corolla tube, shortly united at base; ovary 1-celled, globose, ovules many, on free central placenta; style filiform. Capsule 6 mm across, globose, 5-valved; seeds many, trigonous.

*Fl. & Fr.* : September

*Distr.* : Southern Western Ghats. Rare; in grasslands at high elevations. Kottamala, *JA 15371.*

## 77. MYRSINACEAE

R. Brown, Prodr. 532. 1810.

1. Ovary half inferior; berry many-seeded.....**Maesa**
1. Ovary superior; berry 1-seeded .....2
2. Climbing shrubs; flowers in terminal panicled racemes.....**Embelia**
2. Erect shrubs or trees; flowers not in panicles .....3
3. Flowers densely clustered in fascicles.....**Rapanea**
3. Flowers in umbels or racemes.....**Ardisia**

### **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. Leaves auricled at base.....**A. sonchifolia**
1. Leaves not auricled at base.....2
2. Leaves crenate-serrate along the margins.....3
2. Leaves entire along the margins.....4
3. Umbels deflexed; branchlets rusty tomentose.....**A. stonei**
3. Umbels not deflexed, branchlets gland-dotted.....**A. blatteri**
4. Leaves to 4 x 2 cm; flowers in umbels.....**A. rhomboidea**
4. Leaves to 10 x 3.5 cm; flowers racemose.....**A. pauciflora**

**Ardisia blatteri** Gamble, Kew Bull. 1921: 121. 1921 & Fl. Pres. Madras 755. 1921; Pandur. & Nair, J. Econ. Tax. Bot. 17(1): 174. 1993 [Fig. 42].

Shrubs, branchlets slender, gland-dotted, usually horizontal. Leaves to 8 x 2.5 cm, elliptic, acuminate at both ends, crenate-serrate; nerves to 16 pairs, prominent below, depressed above, drying reddish brown; petiole 1 cm long. Umbels axillary; peduncle 1.5 cm long, slender, rusty-tomentose. Flowers white, 5-9 together; pedicels 6 mm long; sepals 1.2 mm long, ovate, acute, rusty tomentose, black-punctate; corolla lobes 3 mm long, ovate, acute, black-punctate; anthers apiculate; ovary globose; style 4 mm long, glabrous. Fruits not seen.

*Fl.* : December

*Distr.* : Southern Western Ghats (Kerala). Rare; in evergreen forests. Vellimala, *JA 12904.*

**Ardisia pauciflora** Heyne ex Roxb., Fl. Ind. 2: 279. 1824; Wight, Ic. t. 1214. 1848; Clarke in Hook. f., Fl. Brit. India 3: 529. 1882; Gamble, Fl. Pres. Madras 755. 1928; Manilal, Fl. Silent Valley 166. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 259. 1996.

Shrubs, branchlets radiate, densely punctuate with red glands. Leaves elliptic, acuminate at both ends, densely punctuate with black glands below; nerves indistinct; petiole 5 mm long. Racemes umbellate, axillary; peduncles to 1.5 cm long. Flowers few-together; pedicels short; sepals ovate, acute, hairy, punctate; corolla lobes 2.5 mm long, ovate, acute, reddish brown, glabrous; anthers apiculate. Berry 6 mm across, globose, black, smooth.

*Fl. & Fr.* : August-January

*Distr.* : South India and Sri Lanka. Common; in evergreen forests at above 700 m altitudes. Aruvioda, *JA 12313.*

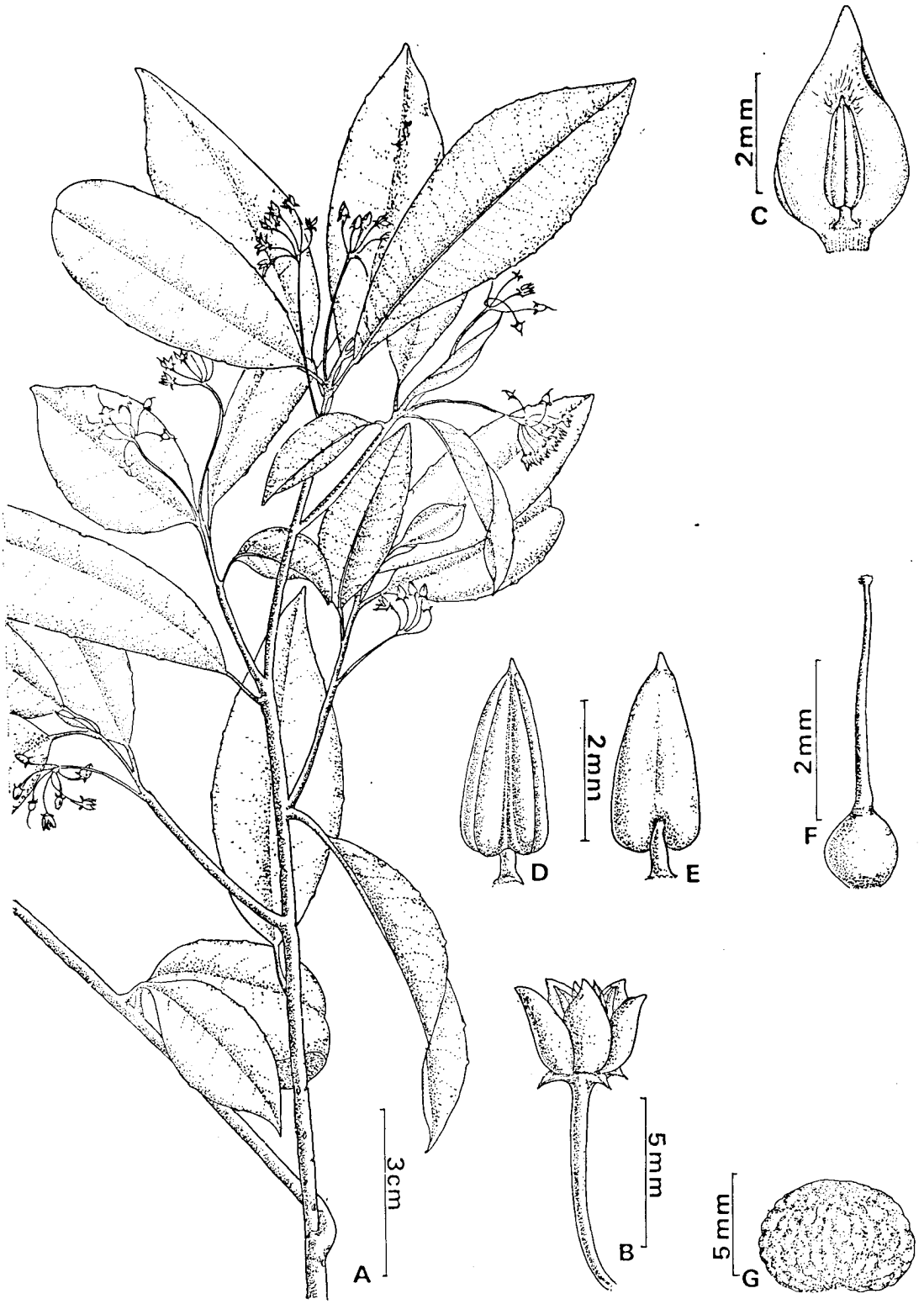



Fig. 42. *Ardisia blatteri* Gamble: **A.** flowering twig; **B.** flower; **C.** corolla lobe with stamen; **D.** & **E.** dorsal and ventral views of anther; **F.** pistil; **G.** seed.

**Ardisia rhomboidea** Wight, Ic. t. 1213. 1848; Clarke in Hook. f., Fl. Brit. India 3: 529. 1882; Gamble, Fl. Pres. Madras 755. 1921; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 61. 1987.

Large shrubs, 3-4 m high, branchlets white, glabrous. Leaves rhomboid, acuminate at either ends, punctuate with black glands below; nerves indistinct; petiole 6 mm long. Umbels axillary, peduncles 1.5 cm long. Flowers few-many, white; pedicels 8 mm long, red puberulus; bracts lanceolate; sepals 1 mm long, lanceolate, punctuate with red glands; corolla lobes 3 mm long, ovate, acute, punctate; anthers ovate, apiculate.

*Fl. & Fr.* : September-December

*Distr.* : Peninsular India. Common; in evergreen forests above 1200 m altitudes. Mlappara, *JA 18448.*

**Ardisia sonchifolia** Mez in Engl., Pflanzenr. 9: 116. 1902; Gamble, Fl. Pres. Madras 755. 1921; Sasidh. & Sivar., Fl. Pl. Thrissur For. 259. 1996. ***A. villosa*** Roxb. var. ***obtusa*** Clarke in Hook. f., Fl. Brit. India 3: 525. 1882.

Shrubs; branchlets gland-dotted. Leaves 10-22 x 4-6 cm, oblanceolate, acute to acuminate at apex, attenuate and auricled at base, entire; nerves *ca.* 16 pairs, strongly punctuate along the margins; petiole 5 mm long. Umbels terminal, 5 x 5 cm, tomentose, peduncled; pedicels 5-6 mm long, rusty-tomentose. Flowers 5-15 in an umbel, pale pink; sepals 3 x 1.5 mm, ovate, acute, hairy; corolla lobes 4 mm long, ovate, acute, punctate; anthers acute. Berry 6-7 mm across, pink, glabrous.

*Fl. & Fr.* : February-May

*Distr.* : Southern Western Ghats. Common; in evergreen forests above 1200 m altitudes. Chokkampetti, *JA 13563*; Vellimala, *JA 17792.*

**Ardisia stonei** Sasi. & Sivar., Rheedea 4: 116. 1994 & Fl. Pl. Thrissur For. 260. 1996.

Low shrubs; branchlets rusty tomentose. Leaves to 15 x 4.5 cm, oblanceolate, abruptly acuminate at apex, attenuate and rounded at base, crenate-serrate along the margins, glabrous; nerves *ca.* 18 pairs, distinct, coarsely reticulate . Flowers in deflexed and shortly peduncled umbels, axillary, pedicels 3 mm long; calyx lobes 2 mm long, lanceolate, acuminate; corolla pink, lobes 6 mm long, lanceolate, acuminate, red-glandular; anthers acute.

*Fl. & Fr.* : May-July

*Distr.* : Southern Western Ghats (Kerala). Common; in evergreen forests up to 780 m altitudes. Poonkavanam, *JA 17825.*

**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. Leaves chartaceous with one row of glandular pits on either side of the midrib; stem not lenticellate..... ...**E. ribes**

1. Leaves thick and coriaceous without glandular pits; stems densely lenticellate..... **E. adnata**

**Embelia adnata** Bedd. ex Clarke in Hook. f., Fl. Brit. India 3: 514. 1882; Gamble, Fl. Pres. Madras 752. 1921; Sasidh. & Sivar., Fl. Pl. Thrissur For. 260. 1996.

Large climbers, branchlets stout, lenticellate, reddish. Leaves to 8 x 4 cm, oblong, subacute at apex, rounded or cordate at base, thickly coriaceous, shining above; lateral nerves indistinct; petiole 5 mm long, stout. Panicles terminal, branches long, puberulus. Flowers many, shortly pedicellate; sepals 1 mm long, ovate, pubescent outside; corolla lobes 5, 2 mm long, ovate, densely villous within; anthers with a brown gland at back; ovary globose, glabrous; style conical. Fruits not seen.

*Fl.*: February-May

*Distr.* : Southern Western Ghats. Occasional; in evergreen forests. Sunderamala, *JA 13610*; Kottamala, *JA & KPR 15208.*

**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. 1921; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 852. 1983; Manilal, Fl. Silent Valley 166. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 263. 1996.

Climbers; branchlets slender, white, without lenticellate. Leaves to 7 x 3 cm, elliptic, acute at both ends; nerves many, parallel, faint; petiole 1 cm long. Panicles 15 x 15 cm, glabrous, branches long, slender racemose; pedicels 1.5 cm long. Flowers white, many; sepals small, triangular, tomentose; petals 2 mm long, ovate, acute, densely tomentose. Berry 2.5 mm across, globose.

*Fl. & Fr.* : January-May

*Distr.* : Indo-Malesia and South China. Common; in semi-evergreen forests. Vallakkadavu, *JA 13441* Kottamala, *JA & KPR 15291.*

## MAESA Forsskal

Fl. Aegypt.-Arab. 66. 1775.

**Maesa indica** (Roxb.) DC., Trans. Linn. Soc. London 17: 134. 1834; Wight, Ic. t. 1206. 1848; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 852. 1983; Manilal, Fl. Silent Valley 166. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 263. 1996. ***Baeobotrys indica*** Roxb., Fl. Ind. 2: 230. 1824. ***Baeobotrys dubia*** Wall. in Roxb., Fl. Ind. 2: 235. 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. 1921. ***Maesa perrottetiana*** Alph. DC. in DC., Prodr. 8: 80. 1844; Gamble, Fl. Pres. Madras 749. 1921. ***M. indica*** (Roxb.) DC. var. ***perrottetiana*** (A. DC.) Clarke in Hook. f., Fl. Brit. India 3: 509. 1882. **Vannathi, Vannan maram** (Mannan).

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 2 mm long; bracteoles 2, opposite, inserted, below the calyx; calyx tube adnate to the ovary, lobes 5, orbicular, 0.5 mm long; corolla white, 4 mm across, lobes obovate; stamens 5; anthers orbicular; ovary 1-celled, ovules many, immersed in globose placenta, stigma capitate. Fruit a fleshy berry, 4 mm across; seeds few, angular, black.

*Fl. & Fr.* : Throughout the year

*Distr.* : India. Common; in moist deciduous forests. Thekkady, *JA 12525.*

*Ethnobotanical use* : The fruits are edible.

## RAPANEA Aublet

Pl. Gue. 1: 121, t. 46. 1775

Trees or stout shrubs. Leaves alternate, closely packed, entire, coriaceous with resinous dots. Flowers polygamous or dioecious, in fascicles, subsessile, usually below the leaves; bracts imbricate; calyx 4 or 5 lobed, lobes ovate, acute, persistent, glandular; corolla tube short or absent; lobes 4 or 5, oblong, spreading; stamens 4 or 5, antipetalous; anthers sessile at the base of corolla; ovary 1-celled, conical; ovules few, immersed in globular placenta; styles 3, free. Fruit a globose berry, 1-seeded.

1. Pedicels absent; sepals ciliate.....**R. capitellata**

1. Pedicels 2-4 mm long; sepals not ciliate.....**R. daphnoides**

**Rapanea capitellata** (Wall.) Mez in Engl., Pflanzenr. 9: 356. 1902; Gamble, Fl. Pres. Madras 750. 1921; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 62. 1987. ***Myrsine capitellata*** Wall. in Roxb., Fl. Ind. 2: 295. 1824; Wight, Spicil. Neilgh. t. 137. 1851; Clarke in Hook. f., Fl. Brit. India 3: 512. 1882, p.p.

Shrubs; branchlets stout, glabrous, covered with numerous closely placed leafscars. Leaves to 6 x 2 cm, oblanceolate, obtusely acute, narrowed to the base, sessile or shortly petioled. Flowers sessile, or shortly pedicelled, densely packed in the axils of leaves and leafscars; bracts ovate, obtuse, hairy; sepals 1 mm long, ovate, acute, ciliate, glandular; corolla 3 mm long, lobes oblong, obtuse, papillose, densely glandular; anthers sessile, obtuse; style pubescent, stigma 3-lobed, spreading. Fruits not seen.

*Fl.* : March-May

*Distr.* : India and Java. Occasional; in evergreen forests above 1700 m altitudes. Sunderamala, *JA 17804.*

**Rapanea daphnoides** Mez in Engl., Pflanzenr. 9: 357. 1902; Gamble, Fl. Pres. Madras 751. 1921; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 62. 1987.

Shrubs, branchlets slender, rough with persistent leafscars. Leaves to 7 x 1.5 cm, linear-lanceolate, obtuse at apex, glabrous, subcoriaceous; petiole 5-10 mm long. Flowers densely fascicled; sepals 1 mm long, ovate, glandulose; corolla 3 mm long, densely papillose, glandular lineolate. Berry 5 mm across, globose, densely covered with glands.

*Fl. & Fr.* : February-May

*Distr.* : Southern Western Ghats. Rare; in evergreen forests above 1700 m altitudes. Vellimala, *KPR & JA 15347*; Anakuthivayal, *JA 17772.*

## 78. SAPOTACEAE

Juss., Gen. Pl. 151. 1789.

1. Corolla lobes 18-24 ..... **Mimusops**
1. Corolla lobes less than 10 ..... 2
2. Staminodes present; older branches thorny ..... **Xantolis**
2. Staminodes absent; stem not thorny ..... 3
3. Stamen equal to the number of calyx lobes; nerves of the leaves many, close and parallel ..... **Chrysophyllum**
3. Stamens 2; nerves of the leaves not as above ..... 4

4. Calyx lobes 6 ..... **Palaquium**

4. Calyx lobes 4 ..... 5

5. Stamens 8; corolla lobes 4 ..... **Isonandra**

5. Stamens 16; corolla lobes 8 ..... **Madhuca**

## CHRYSOPHYLLUM Linnaeus

Sp. Pl. 192. 1753

**Chrysophyllum roxburghii** G. Don, Gen. Syst. 4: 33. 1838; Bedd., Fl. Sylv. t. 236. 1873; Clarke in Hook. f., Fl. Brit. India 3: 535. 1882; Gamble, Fl. Pres. Madras 758. 1921; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 856. 1983; Verdcourt & Meijer in Dassan., Rev. Handb. Fl. Ceylon 9: 404. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 264. 1996. *C. lanceolatum* (Bl.) DC., Prodr. 8: 162. 188. **Kappalam** (Mannan).

Large trees, to 35 m high; branchlets slender, rusty tomentose. Leaves to 15 x 5 cm, oblong, abruptly acuminate at base and apex, glabrous, nerves many, closely placed, parallel, forming an intramarginal vein; petiole 5 mm long. Flowers in axillary fascicles; pedicel 5 mm long, slender; sepals 2.5 x 2 mm, ovate, obtuse; corolla white, 3 mm long, lobed to the middle; lobes obtuse, glabrous, white; stamens 5, filaments 1 mm long, anthers acute, sagittate at base; ovary globose, densely hairy; style conical. Berry 4-5 cm across, globose, glabrous.

*Fl. & Fr.* : May-August

*Distr.* : Indo-Malesia. Common; in evergreen forests. Koruthode, *JA 12216*; Maddalako-ttithode, *JA 13735.*

*Ethnobotanical use* : The mature fruits are edible (Mannan, Malam pandaram)

## 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. Transverse nervules close, regular, curved and parallel; leaves oblanceolate ..... **I. lanceolata**

1. Transverse nervules not as above; leaves elliptic or oblong ..... 2

2. Anthers villous or hairy; flowers shortly pedicelled ..... **I. perrottetiana**

2. Anthers glabrous; flowers sessile ..... **I. stocksii**

**Isonandra lanceolata** Wight, Ic. t. 359. 1840; Clarke in Hook. f., Fl. Brit. India 3: 539. 1882; Gamble, Fl. Pres. Madras 761. 1921; Manilal, Fl. Silent Valley 167. 1988; Verdcourt & Meijer in Dassan., Rev. Handb. Fl. Ceylon 9:383.1995; Sasidh. &Sivar., Fl. Pl. Thrissur For.264. 1996.

Small trees or large shrubs; branchlets slender. Leaves thin, to 16 x 7 cm, abruptly acuminate at apex, cuneate at base, 9-13-nerved, distinct below; petiole 10 mm long. Flowers in axillary fascicles, shortly pedicelled; bracts acute; bracteoles rounded; sepals 1.5 x 1 mm, ovate, acute, tomentose; corolla greenish yellow or dull white, 7 mm long, lobes acute; stamens 8, anthers cuspidate at apex. Berry 1.5 x 1 cm, ellipsoid, smooth, reddish.

*Fl. & Fr.* : Throughout the year

*Distr.* : India, Burma and Sri Lanka. Fairly common; in evergreen forests. Ezhanakkuzhi, *JA 13320*; Inchippara, *JA 13613.*

**Isonandra perrottetiana** A. DC. in DC., Prodr. 8: 188. 1844; Wight, Ic. t. 1219. 1859; Clarke in Hook. f., Fl. Brit. India 3: 539. 1882; Gamble, Fl. Pres. Madras 761. 1921; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 63. 1987. ***I. candolleana*** Wight, Ic. t. 1220. 1850.

Small trees; branchlets slender, lenticellate. Leaves to 11 x 4 cm, elliptic, acute, tip rounded, margins recurved, 7-9-nerved, nervules faint; petiole 3-5 mm long. Flowers in axillary fascicles, densely packed; pedicels 2 mm long, tomentose; bracts and bracteoles obtuse; sepals 2.5 x 2 mm, obtuse, tomentose; corolla dull white, 4 mm long, lobes obtuse, emarginate; anthers obtuse, black-hairy at tip; ovary densely brown-tomentose. Berry 17 x 10 mm, obovoid, cuspidate, glabrous.

*Fl. & Fr.* : December-February

*Distr.* : Southern Western Ghats. Rare; in evergreen forests at high elevations. Vellimala, *JA & NS 12906.*

**Isonandra stocksii** Clarke in Hook. f., Fl. Brit. India 3: 539. 1882; Gamble, Fl. Pres. Madras 761. 1921; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 63. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 264. 1996.

Small trees; branchlets stout, glabrous. Leaves to 9 x 5 cm, obovate, obtusely acute, acute at base; lateral nerves 7 pairs, regular, nervules not prominent; petiole 7 mm long. Flowers in the axils of fallen leaves, fascicled, sessile; bracts & bracteoles minute, obtuse; sepals 2 x 2 mm, orbicular, obtuse, hairy outside; corolla dull yellow, 5 mm long, lobes oblong, emarginate, curved in; stamens 8, anthers oblong, acute; ovary tomentose. Fruits not seen.

*Fl.* : January

*Distr.* : Southern Western Ghats. Rare; in evergreen forests at above 1000 m altitudes. Arjunankotta, *JA 13144.*

## MADHUCA Hamilton ex J. F. Gmelin

Syst. Nat. 2: 773, 799. 1791.

**Madhuca neriifolia** (Moon) H. J. Lam, Bull. Jard. Bot. Buitenz. Ser. 3, 7: 182, 265. 1925; Van Royan, Blumea 10: 98. 1960; Verdcourt & Meijer in Dassan., Rev. Handb. Fl. Ceylon 9: 395. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 265. 1996. ***Bassia neriifolia*** Moon, Cat. Pl. Ceylon 36. 1824. ***B. malabarica*** Bedd., For. Man. Bot. 140. 1872; Clarke in Hook. f., Fl. Brit. India 3: 544. 1882. **Ilippa**, **Attillippa** (Mala Arayan).

Small to medium trees; branchlets stout. Leaves closely packed, to 15 x 4 cm, oblong, acute or obtuse at apex, entire, 12-15-nerved; petiole 1 cm long. Flowers in axillary fascicles; pedicels 2-3 cm long, thinly tomentose; sepals 4, biseriate, outer sepals 8 x 4 mm, ovate, hairy, inner smaller; corolla yellowish red, 15 mm 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 2 cm long. Berry ellipsoid.

*Fl. & Fr.* : January-May

*Distr.* : India and Sri Lanka. Very common; along river banks in evergreen forests. Vallakkadavu, *JA 13658*; Koruthode, *JA & KPR 14749*.

*Ethnobotanical use* : The fruits are pressed and the oil (Ilippayenna) is used for cooking (Mala Aryan); the flowers are eaten raw by Mannan. The fruits are eaten by Malam pandaram

## 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. 1921; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 860. 1983; Verdcourt & Meijer in Dassan., Rev. Handb. Fl. Ceylon 9: 357. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 267. 1996.

Large trees; branchlets stout, rusty tomentose. Leaves to 12 x 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 7 mm long, stout, rusty tomentose; sepals 4 + 4; outer sepals 8 x 4 mm, ovate, acute, brown-tomentose, inner smaller, white tomentose; corolla yellowish brown, to 12 mm 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 4 x 2.5 cm, ovoid, glabrous.

*Fl. & Fr.* : December & May

*Distr.* : India, Burma and Sri Lanka. Common; in evergreen forests. Thaannikkudy, *JA 13011, 13826*.

## **PALAQUIUM** Blanco

Fl. Filip. 403. 1837.

Tall trees, bark reddish inside, milky. Leaves alternate, petiolate, entire. Flowers fascicled in axils of fallen leaves, pedicellate; sepals 3 + 3, outer larger, valvate, inner imbricate; corolla tube short, campanulate, lobes 6, imbricate; stamens 12-20, attached at the base of corolla, anthers lanceolate, connective produced; ovary 6-celled, densely hairy; style slender. Fruit an ellipsoid or globose berry.

1. Branchlets very stout; leaves obtuse; berry globose.....**P. ravii**
1. Branchlets slender; leaves acute; berry ellipsoid.....**P. ellipticum**

**Palaquium ellipticum** (Dalz.) Baill., Traite Bot. Med. Phan. 1500. 1884; Gamble, Fl. Pres. Madras 764. 1921; Manilal, Fl. Silent Valley 168. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 267. 1996. ***Bassia elliptica*** Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 36. 1851; Bedd., Fl. Sylv. t. 43. 1869. ***Dichopsis ellipticum*** Benth., Gen. Pl. 2: 658. 1876; Clarke in Hook. f., Fl. Brit. India 3: 542. 1882. **Pali** (Mannan).

Large trees; bark reddish inside; branches glabrous. Leaves to 8 x 4 cm, elliptic, abruptly acuminate at apex, attenuate at base; lateral nerves 9 pairs, prominent below, parallel. Flowers in axillary fascicles; pedicels 1.5 cm long, slender; outer sepals 7 x 5 mm, ovate, acute, pubescent, inner smaller; corolla yellowish brown, 10 mm 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 3 x 1 cm, ellipsoid, ridged, curved, smooth.

*Fl. & Fr.* : December-May

*Distr.* : Western Ghats. Very common; in evergreen forests. Vellimala, *JA 12926.*

*Ethnobotanical use* : The fruits and flowers are eaten; seeds are roasted and eaten.

**Palaquium ravii** Sasi. & Vink, Blumea 35: 385. 1991; Sasidharan & Sivar. Fl. Pl. Thrissur For. 267. 1996.

Large trees; bark smooth, reddish inside. Leaves 6-10 x 4-6 cm, obovate, obtuse, rounded at apex, cuneate to attenuate at base, thickly coriaceous; lateral nerves 6 pairs, not prominent; nervules inconspicuous; petiole 1-2 cm long, stout. Flowers in axillary clusters, 2-8 together, usually in the axils of leafscars; pedicels 2 cm long, stout; outer sepals 4-5 x 2-3 mm, ovate, obtuse, inner similar, oblong; corolla dull white, tube 3 mm long, villous inside at mouth, lobes 5

x 2 mm, oblong; stamens 12, biseriate, connective bifid; ovary hairy, shallowly 10-ribbed. Berry 2 cm across, obovoid, brown, rough; seeds 1 or 2.

*Fl. & Fr.* : May-March

*Distr.* : Southern Western Ghats (Kerala). Rare; in evergreen forests. Mlappara, *JA 13616.*

**XANTOLIS** Rafinesque – Schmaltz

Sylva Tellur. 36. 1838.

**Xantolis tomentosa** (Roxb.) Raf., Sylv. Tellur, 36. 1833; Verdcourt and Meijer in Dassan., Rev. Handb. Fl. Ceylon 9: 407. 1995. ***Sideroxylon tomentosum*** Roxb., Pl. Corom. 1: 28, t. 28. 1795; Clarke in Hook. f., Fl. Brit. India 3: 538. 1882; Gamble, Fl. Pres. Madras 759. 1921. ***Sapota elengioides*** DC. in DC., Prodr. 8: 176. 1844; Wight, Ic. t. 1218. 1848.

Small trees; old branches with stout thorns; branchlets thinly pubescent. Leaves to 5.5 x 3 cm, obovate, abruptly acute, attenuate to the base; nerves obscure, hairy below; petiole 1 cm long. Flowers in the axils of fallen leaves, fascicled; pedicel 5 mm long, tomentose; sepals 3 + 3, 6 x 3 mm, ovate, acute, hairy, inner smaller; corolla 10 mm long, campanulate, tube globose, throat densely hairy; lobes lanceolate; stamens 6, filaments hairy at base; staminodes 4, filiform, hairy with a broad base; ovary conical, densely hairy; style 10 mm long. Berry 2.5 x 1.5 cm, ovoid, apiculate.

*Fl. & Fr.* : August-December

*Distr.* : India, Burma and Sri Lanka. Occasional; in margins of evergreen forests. Kalvarimala, *JA 12788*; Vellimala, *JA 13909.*

## 79. 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. Leaves to 4 cm long ..... 2
1. Leaves above 6 cm long ..... 3
2. Flowers 3-merous ..... **D. ferrea**
2. Flowers 4 or 5-merous ..... **D. buxifolia**
3. Branchlets at least minutely hispid ..... 4
3. Branchlets glabrous ..... 9
4. Flowers 5-merous; male flowers with large bracts ..... **D. paniculata**
4. Flowers 4-merous; male flowers without large bracts ..... 4
5. Berry densely hairy; leaves oblong-oblanceolate ..... **D. pruriens**
5. Berry not densely hairy; leaves ovate or elliptic ..... 6
6. Corolla campanulate; leaves membranous, black when dry ..... **D. sylvatica**
6. Corolla tubular or urceolate; leaves coriaceous, not black when dry ..... 7
7. Leaves elliptic-oblong, margins of sepals strongly reflexed ..... **D. nilagirica**
7. Leaves ovate; margin of sepals not as above ..... 8
8. Leaves tomentose along the nerves below; cymes densely fulvous hairy ..... **D. ghatensis**
8. Leaves glabrous beneath; cymes covered with imbricating bracts ..... **D. assimilis**
9. Leaves obovate obtuse, glaucous beneath ..... **D. ovalifolia**
9. Leaves ovate, oblong or elliptic, acute to acuminate, green beneath ..... 10
10. Calyx irregularly lobed; leaves to 25 cm long ..... **D. toposia**
10. Calyx lobes regular; leaves to 18 cm long ..... 11
11. Flowers 4-merous ..... 12
11. Flowers 5-merous ..... 13
12. Berry globose; leaves ovate; bark reddish brown, smooth ..... **D. montana**
12. Berry hemispheric; leaves oblong; bark black rough ..... **D. ebenum**
13. Female flowers on old stem; calyx lobes erect in fruit ..... **D. bourdillonii**
13. Female flowers axillary; calyx lobes deflexed in fruit ..... 14
14. Berry 2.5 cm across; female flowers fascicled ..... **D. candolleana**
14. Berry 5 cm across; female flowers solitary ..... **D. malabarica**

**Diospyros assimilis** Bedd., Madras For. Rep. 20, t. 1. 1866-1867; Clarke in Hook. f., Fl. Brit. India 3: 558. 1882; Gamble, Fl. Pres. Madras 775. 1923; Henry *et al.,* Fl Tamil Nadu Ser. 1, 2: 65. 1987. **Nanchi maram** (Mannan).

Large trees; branchlets thinly tomentose. Leaves to 15 x 7 cm, ovate-lanceolate, acuminate, base acute or rounded, glabrous; nerves 5-7 pairs, impressed above, projected below; nervules obscure, reticulate; petiole 1 cm long. Flowers in dense axillary cymes, sessile; peduncles 3-5 mm long, covered with imbricating bracts; calyx 2 mm long, cupular, lobes 4, ovate, obtuse, densely tomentose; corolla 10 mm long, salver-shaped, broaden at base, densely minutely tomentose,

lobes 6 x 4 mm, ovate, acute, tomentose outside; stamens 14, filaments unequal, glabrous, anthers shortly unequal, acute, connective thinly villous along the back. Fruits not seen.

*Fl.* : March

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Koruthode, *JA 13394.*

**Diospyros bourdillonii** Brandis, Ind. Trees 435. 1906; Gamble, Fl. Pres. Madras 777. 1923; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 65. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 269. 1996.

Medium trees, trunk fluted, buttressed; bark black, smooth, pale pink inside; branchlets glabrous. Leaves to 17 x 8 cm, ovate-oblong, abruptly acuminate, tip pointed, rounded at base; nerves 5-8 pairs, parallel; nervules subparallel, prominent; petiole 8 mm long. Male flowers in shortly peduncled axillary cymes; calyx 10 mm long, brown-tomentose outside, lobes 5, ovate; corolla tube 13 mm long, urceolate, hispid, lobes orbicular, 7 mm across, deflexed; stamens 20; filaments equal, anthers cuspidate. Female flowers solitary or clustered on old branches or on trunks. Berry 4 cm across, globose, calyx accrescent, 3.5 cm across, not deflexed.

*Fl. & Fr.* : February-April

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Koruthode, *JA 13461*; Sabarimala, *KPR & JA 14935.*

**Diospyros buxifolia** (Bl.) Hiern, Trans. Cambridge Philos. Soc. 12: 218. 1873; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 195. 1976; Sasidh. & Sivar., Fl. Pl. Thrissur For. 270. 1996. ***Leucoxylum buxifolium*** Bl., Bijdr. 1169. 1827. ***Diospyros microphylla*** Bedd., Ic. t. 133. 1868-1874; Clarke in Hook. f., Fl. Brit. India 3: 559. 1882; Gamble, Fl. Pres. Madras 776. 1923.

Large trees with whorled branches on juvenile trees; bark brownish red, smooth; branchlets densely hispid. Leaves 1-4.5 x 1-1.5 cm, ovate-lanceolate, densely hispid below, subsessile. Cymes axillary, shortly peduncled, densely hispid, 3-flowered; calyx 2 mm long campanulate, hairy; lobes 4, orbicular; corolla greenish yellow, 3 mm long, campanulate, lobes orbicular, obtuse, hairy outside; stamens 16, paired, filaments unequal, pistillode a peltate sessile disc with 8 stellate lobes, hairy. Drupe 15 x 8 mm, elliptic-oblong, reddish-brown, glabrous; seed 1, foveolate.

*Fl. & Fr.* : January-May

*Distr.* : Indo-Malesia. Common; in evergreen forests. Sabarimala, *JA 15456;* Pamba, *JA & KPR 17141.*

**Diospyros candolleana** Wight, Ic. tt. 1221 & 1222. 1848; Clarke in Hook. f., Fl. Brit. India 3: 566. 1882; Gamble, Fl. Pres. Madras 773. 1923; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 195. 1976. ***D. canarica*** Bedd., Ic. t. 134. 1868-1874. 5: 513. 1888.

Large trees; branchlets glabrous, black. Leaves to 15 x 6.5 mm, oblong, obtusely acuminate, base acute, glabrous; nerves obscure, pale beneath; petiole 1 cm long. Flowers in axillary fascicles, 3-15 together, densely fulvous tomentose; calyx 5 mm long, lobes 5, ovate, acute; corolla urceolate, 8 mm long, lobes 5, ovate, acute; anthers distinctly unequal, filaments glabrous. Berry 2.5 cm across, globose, yellowish brown; seeds 15 x 8 mm, oblong, glabrous, black, shining.

*Fl. & Fr.* : January-March

*Distr.* : Western Peninsular India. Occasional; in evergreen forests. Pamba, *JA & KPR 17148*; Sabarimala, *JA 17734*.

**Diospyros ebenum** Koen., Physiogr. Salsk. Mag. 1: 176. 1781; Wight, Ic. t. 188. 1839; Clarke in Hook. f., Fl. Brit. India 3: 558. 1882; Gamble, Fl. Pres. Madras 775. 1923; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 16. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 864. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 270. 1996.

Small trees; bark smooth, brownish black; branchlets slander, ashy puberulus. Leaves to 10 x 4 cm; oblong, acute at both ends, thinly coriaceous, glabrous; nerves 8-12 pairs, lower two pairs erose from the base; nervules closely reticulate, prominent, shining above; petiole 5-8 mm long. Male flowers in short cymes, axillary on leafscars; peduncles tomentose; sepals 4, each 2 mm long, ovate, ciliate; corolla dull white, to 1 cm long, lobes extend to the middle; stamens 36, in short groups. Female flowers solitary or 2-3 together; sepals 5 mm long, ovate, folded back. Berry 1 cm across; glabrous; fruiting calyx 2 cm across; 4-angled; lobes recurved, tomentose.

*Fl. & Fr.* : March-June

*Distr.* : Peninsular India and Sri Lanka. Rare; along the margins of grasslands with deciduous forests. Thekkady, *JA 13809*.

**Diospyros ferrea** (Willd.) Bakh., Gard. Bull. S. S. 7: 162. 1933; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 9. 1981; Henry et al., Fl. Tamil Nadu Ser. 1, 2: 66. 1987. ***Ehretia ferrea*** Willd., Phytogr. 1: 4, t. 2, f. 2. 1794. ***Maba neilgherrensis*** Wight, Ill. 2: t. 148. bis. E. 1850; Gamble, Fl. Pres. Madras 268. 1923.

Small trees or large shrubs; branchlets slender, virgate. Leaves to 4 x 2 cm, elliptic, obtusely acuminate at apex, acute at base, glabrous. Flowers axillary, solitary, to 6 mm across; calyx 4

mm long, lobes 3, triangular, acute, puberulus outside, densely villous inside; petals yellow to white, 3 mm across, orbicular, villous. Fruits 7-9 mm long, ovoid to sub-globose, smooth and glossy.

*Fl. & Fr.* : February-May

*Distr.* : Peninsular India and Sri Lanka. Occasional; in evergreen forests. Ambari, *JA 13768.*

**Diospyros ghatensis** Ramesh & Franceschi, Blumea 38: 131. 1993; Sasidharan & Sivar., Fl. Pl. Thrissur For. 271. 1996.

Large trees; bark dark brown, smooth, young branchlets minutely tomentose, becomes glabrous when mature. Leaves to 10 x 5 cm, ovate-lanceolate, acuminate, base acute to truncate, glabrous, nerves 6-8 pairs, faint above, prominent below, tomentose along the nerves; petiole 1 cm long, thinly hispid. Male flowers sessile, in dense cymes, densely fulvous tomentose; calyx 2 mm across, 2 mm long, lobes 4, orbicular; corolla white, 8 mm long, tubular, lobes 4, 4 x 3 mm, ovate-obtuse, glabrous; stamens 14.

*Fl. & Fr.* : April

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Arjunankotta, *JA 15095.*

**Diospyros malabarica** (Desr.) Kostel., Allg. Med. Pharm. Fl. 3: 1099. 1834; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 27. 1981. ***Garcinia malabarica*** Desr. in Lam., Encycl. 3: 701. 1719. ***Diospyros peregrina*** auct. non Guerke 1891; Gamble, Fl. Pres. Madras 777. 1923. ***D. embryopteris*** Pers. Syn. 2: 624. 1807; Bedd., Fl. Sylv. t. 69. 1870; Clarke in Hook. f., Fl. Brit. India 3: 556. 1882 [Fig. 45 A].

Medium trees; branchlets glabrous. Leaves to 20 x 7 cm, coriaceous, elliptic-oblong, acute at both ends; nerves to 10 pairs, basal nerves erose, coarsely reticulate; petiole 1 cm long, stout. Berry 5 cm across, obovoid, densely covered with ferrugineus tomentum; seeds 2 x 1 cm, ellipsoid, rugose, fruiting calyx 3 cm across, coriaceous, woody, reflexed.

*Fl. & Fr.* : October-March

*Distr.* : Sri Lanka, India and Malaya. Rare; in evergreen forests. Vellimala, *JA 17934.*

**Diospyros montana** Roxb., Pl. Corom. t. 48. 1795; Wight, Ic. t. 1225. 1848; Clarke in Hook. f., Fl. Brit. India 3: 555. 1882; Gamble, Fl. Pres. Madras 776. 1923; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 196. 1976; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 20. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3, 1: 867. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 271. 1996. **Nanchi maram, Karimaram** (Mannan).

Medium sized trees; bark greyish or reddish brown, thin, smooth, yellowish inside; trunk sometimes thorny when young. Leaves to 8 x 4 cm, ovate-oblong, acute at apex, base rounded, subcoriaceous; nerves 7-10 pairs, minutely reticulate; petiole 1 cm long. Male flowers in axillary cymes, sessile, 6 mm across; calyx 3 mm long, lobes 4, ovate, acute, ciliate; corolla greenish yellow, 6 mm long, urceolate, glabrous, lobes 4, shorted than the tube; stamens 16. Female flowers usually solitary, axillary. Berry 1.5 cm across, globose, smooth, yellow; fruiting calyx 2 cm across, flat or reflexed.

*Fl. & Fr.* : April-February

*Distr.* : Indo-Malesia to Tropical Australia. Occasional; in moist deciduous and semi-evergreen forests. Thekkady, *JA 18421.*

**Diospyros nilagirica** Bedd., Ic. t. 136. 1868-1874; Clarke in Hook. f., Fl. Brit. India 3: 566. 1882; Gamble, Fl. Pres. Madras 775. 1923; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 67. 1987; Manilal, Fl. Silent Valley 168. 1988. **Karim thuvara** (Mannan).

Small trees; bark black, smooth, yellowish when cut; younger branches fulvous tomentose, glabrous when mature. Leaves to 12.5 x 3.5 cm, ovate or oblong-lanceolate, acuminate, sparsely pubescent beneath, margins recurved; nerves *ca.* 7 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 7 mm long, campanulate, lobes broadly ovate or orbicular, obtuse, densely fulvous hairy, margins strongly reflexed, not accrescent; corolla pale yellow, 15 mm long, salver shaped, lobes 5 x 5 mm, ovate; staminodes 8, ovary densely hairy, ovoid; stigma 4-toothed. Berry 2.5 mm across, globose, glabrous; seeds 12 x 7 mm, compressed.

*Fl. & Fr.* : February-April

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Mlappara, *JA 13301*; Pachapallam, *JA 13567.*

**Diospyros ovalifolia** Wight, Ic. t. 1227. 1848; Clarke in Hook. f., Fl. Brit. India 3: 557. 1882; Gamble, Fl. Pres. Madras 777. 1923; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 15. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 868. 1983.

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 1 cm long. Flowers 3-9 together on leaf scars, sessile. Male flowers usually 4-merous, 6 mm across; calyx 3 mm across, 3 mm long, lobes orbicular, densely hairy; corolla 6 mm long, lobes orbicular, obtuse; stamens 14-16, anthers acuminate. Female flowers

axillary, clustered, usually 5-merous; calyx 4 mm long, campanulate, lobes orbicular; corolla 6 mm long, campanulate, white, glabrous; ovary densely hairy; staminodes absent. Berry 1.5 cm across, greenish brown, thinly hispid.

*Fl. & Fr.* : May-October

*Distr.* : Peninsular India and Sri Lanka. Very common; in evergreen forests. Melmanalar, *JA 13738, JA 13736*; Thaannikkudy, *JA 16862.*

**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. 1923; Sasidh. & Sivar., Fl. Pl. Thrissur For. 271. 1996. **Karumaram** (Mala Arayan), **Thuvara** (Mannan).

Small to medium trees; bark black, smooth; branchlets densely hispid. Leaves to 16 x 5 cm, oblong, acute, base round or cuneate; margin reflexed near the base; nerves 5 or 6 pairs, strongly reticulate, glossy above; petiole 8 mm long. Male flowers 3-5 together in long peduncled cymes; calyx 10 x 12 mm, globose, 5-angled, minutely hispid, lobes broadly ovate or orbicular, margins strongly revolute; corolla dull or creamy white, tube 12 mm long, narrowed above, hispid; lobes 8 x 4 mm, oblong; stamens 16-20 in 2-3 series, filaments paired, unequal. Female flowers axillary, solitary. Berry 4 x 3 cm, ovoid to obovoid, obtuse, obtusely 5-angled, yellowish brown, puberulus; seeds few, 2 x 0.8 cm, ellipsoid; fruiting calyx 1.5 x 3 cm, saccate.

*Fl. & Fr.* : January-August

*Distr.* : Southwards from Konkan, in Western Ghats; endemic. Common; in evergreen forests at low level. Koruthode, *JA 12221*; Koruthode, *JA & KPR 14712.*

**Diospyros pruriens** Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 4: 110. 1852; Bedd., Ic. t. 129. 1868-1874; Clarke in Hook. f., Fl. Brit. India 3: 553. 1882; Gamble, Fl. Pres. Madras774. 1923; Sald. in Sald. & Nicols., Fl. Hassan Dist. 197. 1976; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 67. 1987; Manilal, Fl. Silent Valley 168. 1988.

Trees to 10 m high; branchlets densely fulvous-tomentose. Leaves to 12 x 4 cm, oblong-oblanceolate, abruptly acuminate at apex, base rounded, densely hispid below; nerves to 14 pairs, closely reticulate, prominent; petiole to 5 mm long, hispid. Female flowers in axillary fascicles, sessile; calyx 10 mm long, deeply lobed, densely hispid; corolla tube 8 mm long, urceolate, densely hispid, lobes 7 x 4 mm, ovate, acute; staminodes 8, minute; ovary densely bristled; style 5-fid at apex. Capsule 2 x 1.5 cm, ovoid, densely strong bristled.

*Fl. & Fr.* : January-March

*Distr.* : Peninsular India; endemic. Occasional; in evergreen forests at low elevation. Koruthode, *JA 13490*; Pamba, *JA 17159.*

**Diospyros sylvatica** Roxb., Pl. Corom. t. 47. 1795; Bedd., Ic. t. 121. 1868-1874; Clarke in Hook. f., Fl. Brit. India 3: 559. 1882; Gamble, Fl. Pres. Madras 773. 1923; Sald. in Sald. & Nicols., Fl. Hassan Dist. 198. 1976; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 35. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 871. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 271. 1996. **Manja thuvara** (Mannan).

Large trees; bark light brown, smooth; branchlets adpressed-hairy. Leaves 7-13 x 2-5 cm, elliptic, acuminate, base acute or narrowed, black when dry, membranous; nerves 7-9 pairs, obscure; petiole 6 mm long. Flowers 6 mm across, in short axillary cymes; peduncle 5 mm long, glabrous; calyx 3 mm long, campanulate, lobes ovate, acute, pubescent outside; corolla 6 mm long, campanulate, lobes triangular, obtuse; stamens about 24, filaments ciliate at apex. Female flowers 8-10 mm across; ovary globular, glabrous, styles 4 or 5, free, staminodes absent.

*Fl. & Fr.* : January-May

*Distr.* : Peninsular India and Sri Lanka. Very common; in semi-evergreen and evergreen forests. Vallakkadavu, *JA 13437*; Thekkady, *JA 15171*; Kottamalapallam, *JA 15230*; Kottamala, *JA & KPR 15235.*

**Diospyros toposia** Buch.-Ham., Trans. Linn. Soc. 15: 115. 1827; Clarke in Hook. f., Fl. Brit. India 3: 556. 1882; Gamble, Fl. Pres. Madras 778. 1923.

Medium sized trees; branchlets glabrous. Leaves to 25 x 10 cm, oblong, acute at apex, base acute or rounded; nerves 10-13 pairs, irregular, basal ones erose, reticulate; petiole 1 cm long. Female flowers axillary, solitary; calyx divided to the base, densely fulvous hairy; corolla lobes densely hairy outside.

*Fl.* : March (The specimen collected was with few flower buds only).

*Distr.* : Southern Western Ghats. Rare; in semi-evergreen forests. An imperfect specimen only could be collected. Vallakkadavu, *JA 13470.*

## 80. SYMPLOCACEAE

Desf., 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. Flowers solitary, axillary.....2
1. Flowers 2-many, racemose or spicate.....3
2. Drupe glabrous; leaves to 5 x 2 cm, glabrous.....**S. monantha**
2. Drupe villous; leaves to 15 x 5 cm, fulvous tomentose.....**S. pulchra** var. **villosa**
3. Branchlets glabrous.....4
3. Branchlets tomentose.....7
4. Drupe ampulliform; racemes often branched.....**S. cochinchinensis** var. **laurina**
4. Drupe oblong or ovoid; racemes not branched.....5
5. Sepals glabrous; leaves with 10 or 11 pairs of lateral nerves.....**S. racemosa**
5. Sepals hairy; leaves with 5 or 6 pairs of lateral nerves.....6
6. Pedicel ca. 5 mm long; leaves crenate-serrate, drying to brownish black.....**S. wynadense**
6. Pedicel at most 1 mm long; leaves closely sharply serrate; drying to greenish yellow.....**S. obtusa** var. **pedicellata**
7. Spike 8-10 cm long; sepals glabrous.....**S. foliosa**
7. Spike 1-5 cm long; sepals hairy.....**S. macrophylla**

**Symplocos cochinchinensis** (Lour.) Moore J. Bot. 52. 148. 1914, ssp. **laurina** Nooteb., Leiden Bot. Ser. 1, Rev. Sympl. Old World. 156. 1975 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 458. 1981; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 198. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 874. 1983; Manilal, Fl. Silent Valley 169. 1988; Hore, Fl. India Fasc. 20: 146. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 272. 1996. ***Myrtus laurinus*** Retz., Obs. Bot. 4: 26. 1786. ***Symplocos spicata*** Roxb. var. ***laurina*** (Retz.) Clarke in Hook. f., Fl. Brit. India 3: 573. 1882; Gamble, Fl. Pres. Madras 782. 1921; Wight, Ic. t. 150. 1839. **Pachotti**.

Small trees. Leaves to 13 x 6 cm, elliptic, acute at base and apex, dentate-crenulate, coriaceous, glabrous; lateral nerves 7-10 pairs, intercostae reticulate; petiole 1.5 cm long, glabrous. Spikes to 7 cm long, solitary or branched, axis hispid. Flowers white, sessile, many, sepals rounded, 1 mm across, hairy; corolla 7 mm across, glabrous, lobes orbicular; stamens numerous, equal, arranged, in 5 groups; style glabrous. Drupe 5 mm long, glabrous.

*Fl. & Fr.* : December-January

*Distr.* : South East Asia and Australia. Fairly common; in all types of forest, mostly along the margins of forests. Vellimala, *NS & JA 12937*; Vallakkadavu, *KPR & JA 14085.*

**Symplocos foliosa** Wight, Ic. t. 1234. 1848; Clarke in Hook. f., Fl. Brit. India 3: 582. 1882; Gamble, Fl. Pres. Madras783. 1921; Nooteb., Leiden Bot. Ser. 1, Rev. Sympl. Old World. 194. 1975; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 68. 1987; Hore, Fl. India Fasc. 20: 150. 1990. ***S. nervosa*** Wight, Ic. t. 1235. 1848, non DC., 1844.

Trees; branchlets fulvous tomentose, glabrous when mature. Leaves to 15 x 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 10 mm across, white; sepals glabrous, roundish; corolla lobes orbicular, ciliate; stamens 30-40. Drupe 10 x 5 mm, ovoid, yellow.

*Fl. & Fr.* : November-January

*Distr.* : Endemic to Southern Western Ghats. Common; in semi-evergreen forests. Uppupara, *JA & NS 12720*; Swamikkayam, *JA 13103.*

**Symplocos macrophylla** Wall. ex A. DC., Prodr. 8: 257. 1844; Clarke in Hook. f., Fl. Brit. India 3: 578. 1882; Nooteb., Leiden Bot. Ser. 1, Rev. Sympl. Old World. 222. 1975.

There are three subspecies found in the study area.

Key to the subspecies

1. Drupe rusty villous.....**S. macrophylla** ssp. **macrophylla**
1. Drupe glabrous at least when mature.....2
2. Leaves to 5 x 2.5 cm, obtuse at apex; flowers white.....**S. macrophylla** ssp. **microphylla**
2. Leaves 10-20 x 3-7 cm; flowers pinkish.....**S. macrophylla** ssp. **rosea**

**Symplocos macrophylla** Wall. ex A. DC. subsp. **macrophylla**, Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 68. 1987; Hore, Fl. India Fasc. 20: 158. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 281. 1994. ***S. gardneriana*** Wight, Ic. t. 1213. 1848; Clarke in Hook. f., Fl. Brit. India 3: 582. 1882; Gamble, Fl. Pres. Madras 782. 1921 [Fig. 43].

Small trees; branchlets densely fulvous-tomentose. Leaves to 13 x 6 cm, elliptic, acute at base and apex, coriaceous, crenate, margins recurved, yellow when dry, densely hairy above and below; lateral nerves 8 pairs, coarsely reticulate below. Spike 3-5 cm long, stout, tomentose. Flowers sessile; sepals ovate, acute, densely hairy. Drupe 12 x 7 mm, oblong, brown, densely hirsute.

*Fr.* : December (Flowering specimens could not be collected)

*Distr.* : Endemic to Southern Western Ghats. Rare; in evergreen forests at higher elevation. Vellimala, *JA & NS 12998.*

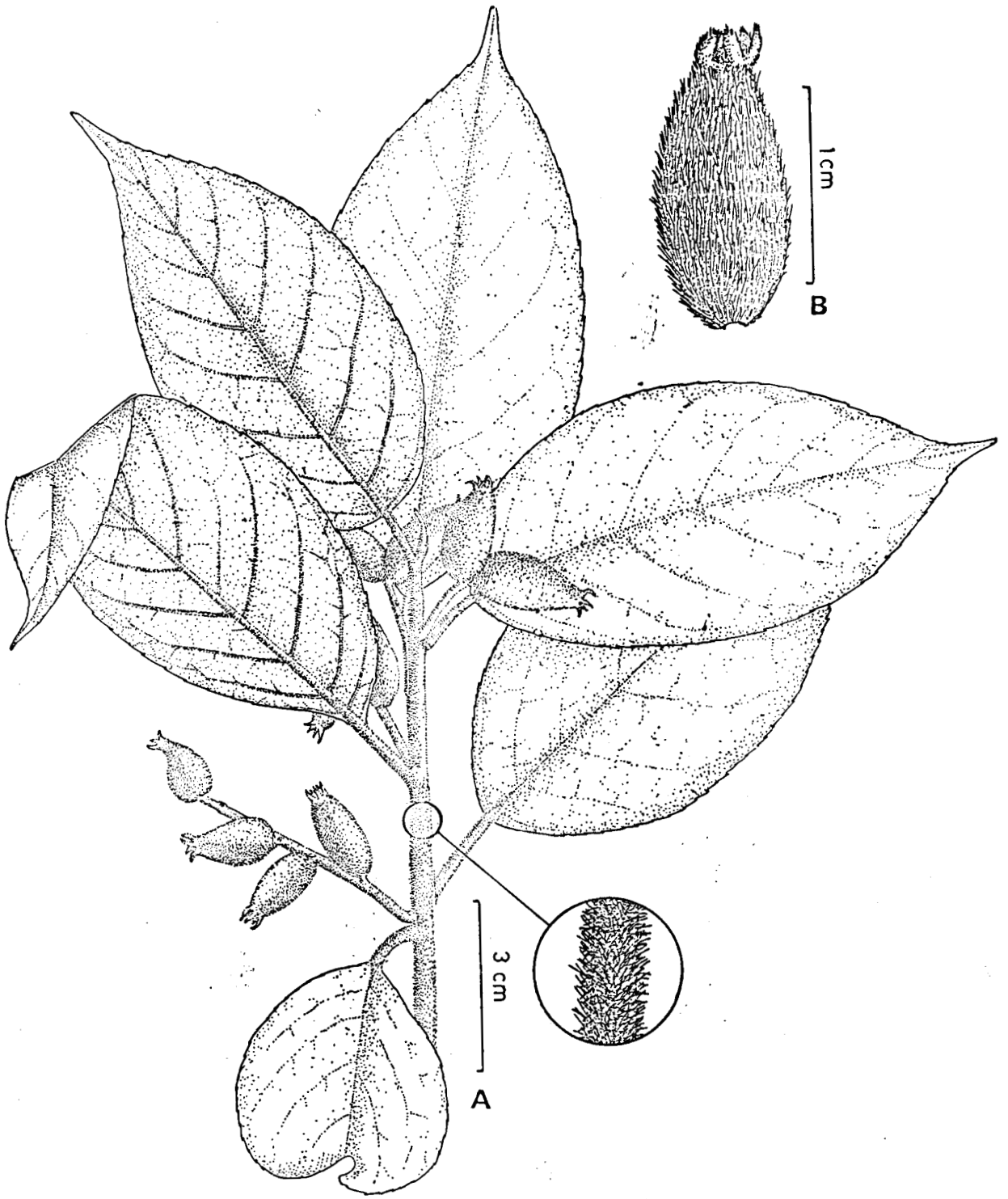



Fig. 43. *Symplocos macrophylla* Wall. ex A. DC. ssp. *macrophylla*: **A.** fruiting twig; **B.** fruit

**Symplocos macrophylla** Wall. ex A. DC. subsp. **microphylla** (Wight) Nooteb., Leiden Bot. Ser. 1, Rev. Sympl. Old. World. 229. 1975; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 68. 1987; Hore, Fl. India Fasc. 20: 159. 1990. ***S. microphylla*** Wight, Ic. t. 1232. 1848; Clarke in Hook. f., Fl. Brit. India 3: 581. 1882; Gamble, Fl. Pres. Madras 748. 1921.

Shrubs; young branches fulvous-tomentose. Leaves oblong or obovate, obtuse or emarginate at apex, minutely serrulate; lateral nerves 4 or 5 pairs, thinly hairy below, yellowish green when dry; petiole 3 mm long, tomentose. Spike 2 cm long, unbranched, 4-8-flowered, fulvous-tomentose. Flowers sessile; sepals 3 x 3 mm, obtuse, hairy; corolla 8 mm across, glabrous, lobes 5 mm long, oblong, obtuse; stamens 40-50, free, attached at the base of 6he corolla; disk glabrous; ovary hairy at apex. Drupe 12 x 5 mm, oblong, glabrous, curved, yellow.

*Fl. & Fr.* : February-April

*Distr.* : Endemic to Southern Western Ghats. Rare; in evergreen forests at higher elevation. Sunderamala, *JA 13589.*

**Symplocos macrophylla** Wall ex A. DC. subsp. **rosea** (Bedd.) Nooteb., Leiden Bot. Ser. 1, Rev. Sympl. Old. World. 229. 1975; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 68. 1987; Hore, Fl. India Fasc. 20: 159. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 282. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 272. 1996. ***S. rosea*** Bedd., Trans. Linn. Soc. London 25: 219. 1866; Clarke in Hook. f., Fl. Brit. India 3: 583. 1882; Gamble, Fl. Pres. Madras 783. 1921.

Shrubs 3 m high; branchlets hispid. Leaves oblanceolate, bluntly acuminate, spineus serrate, coriaceous, glabrous; nerves 4 or 5 pairs, midrib hairy below; petiole 1 cm long. Spikes 4 cm long, unbranched, hispid; bracts ovate, acute, hispid. Flowers few, shortly pedicelled; sepals rounded, densely hairy; corolla 10 mm across, glabrous, lobes roundish; stamens 50, unequal; disk hairy. Drupe 15 x 4 mm, cylindrical, blue, glabrous.

*Fl. & Fr.* : February-April

*Distr.* : Endemic to Southern Western Ghats. Very common; in evergreen forests at low elevations. Koruthode, *JA 13399*; Sabarimala, *JA & KPR 14996.*

**Symplocos monantha** Wight, Ic. t. 1236. 1848; Clarke in Hook. f., Fl. Brit. India 3: 581. 1882; Gamble, Fl. Pres. Madras 784. 1921; Nooteb., Leiden Bot. Ser. 1, Rev. Sympl. Old World. 240. 1975; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 69. 1987; Hore, Fl. India Fasc. 20: 160. 1990 [Fig. 44].

Shrubs; branchlets tomentose. Leaves to 5 x 2 cm, ovate, acuminate, serrate, coriaceous; nerves obscure, glabrous; petiole 5 mm long, thinly hairy. Flowers sessile or shortly pedicelled, axillary; bracts ovate, hairy; sepals 1.5 mm long, triangular, acute, ciliate; corolla lobes

Fig. 44. *Symplocos monantha* Wight: **A**. twig; **B**. fruit; **C**. fruit-C. S.

4 x 3 mm, united at base, obtuse, glabrous; stamens 30-40 in 5-6 bundles, attached at the base of the corolla; disk 5 lobed, thinly hairy; ovary hairy at apex. Drupe 12 x 5 mm, ovoid, truncate at apex, white.

*Fl. & Fr.* : November-January

*Distr.* : Endemic to Southern Western Ghats. Rare; in evergreen forests at higher elevation. Vellimala, *JA 12933*, *JA 13993*; Mlappara, *JA 13324*.

*Note* : This species was considered as possibly extinct (Nayar,1997). The present collection is the recollection after 150 years of its type collection made by R. Wight from Shevagherry Hills of Tamil Nadu and the present collection is a new record for Kerala State.

**Symplocos obtusa** Wall. ex G. Don, Gen. Hist. 4: 3. 1887, var. **pedicellata** (Clarke) Nooteb., Leiden Bot. Ser. 1, Rev. Sympl. Old World. 244. 1975 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 467. 1981. ***S. laeta*** var. ***pedicellata*** Clarke in Hook. f., Fl. Brit. India 3: 583. 1882.

Trees, to 10 m high. Leaves to 7 x 2.5 cm, elliptic, acuminate at either ends, closely serrate, dark grey when dry, glabrous; lateral nerves 5-7 pairs, subprominent, petiole 5-6 mm long. Racemes 2-3 cm long, unbranched, axis hispid. Flowers few, distant; pedicels 1 mm long, slender; sepals 1.5 x 1 mm, obtuse, hairy. Drupe 12 x 5 mm, terete, yellowish-green, minutely hispid towards the apex.

*Fr.* : May. (Flowering specimens could not be collected)

*Distr.* South India and Sri Lanka. Rare; in evergreen forests at higher elevations. Pachayarmala, *JA 13773*.

*Note* : The present collection of this Sri Lankan endemic species is a new record for India.

**Symplocos pulchra** Wight, Ic. t. 1230. 1848, var. **villosa** (Brand.) Nooteb., Leiden Bot. Ser. 1, Rev. Sympl. 266. 1975; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 69. 1987; Manilal, Fl. Silent Valley 169. 1988; Hore, Fl. India Fasc. 20: 165. 1990. ***S. villosa*** Brand. in Engler, Pflanzenr. Heft 6: 63. 1901; Gamble, Fl. Pres. Madras 784. 1921.

Shrubs; branchlets densely villous. Leaves elliptic-lanceolate, acuminate at apex, cuneate at base, densely adpressed-hairy below, distantly spineus-serrate; nerves 7 pairs, slender, looping below the margin, green when dry; petiole 6 mm long. Flowers shortly peduncled; sepals acute, hairy; corolla 7 mm across, white. Drupe 12 mm long, oblong, white-villous

*Fl. & Fr.* : March-April

*Distr.* : Endemic to Southern Western Ghats. Common; in evergreen forests at higher elevation. Sunderamala, *JA 13580*.

**Symplocos racemosa** Roxb., Fl. Ind. 2: 539. 1832; Clarke in Hook. f., Fl. Brit. India 3: 576. 1882; Nooteb., Leiden Bot. Ser. 1, Rev. Sympl. Old World. 271. 1975; Ramam in Sald. & Nicols., Fl. Hassan Dist. 200. 1976; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 69. 1987; Manilal, Fl. Silent Valley 170. 1988; Hore, Fl. India Fasc. 20: 166. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 282. 1994. ***S. beddomei*** Clarke in Hook. f., Fl. Brit. India 3: 582. 1882; Gamble, Fl. Pres. Madras 783. 1921. ***S. candolleana*** Brand in Engl., Pflanzenr. 6: 49. 1901; Gamble, Fl. Pres. Madras 782. 1921.

Small to medium trees; branchlets glabrous. Leaves to 9 x 4 cm, ovate to elliptic, shortly acuminate, crenate with recurved margins, glabrous; nerves 10-12 pairs, looping below the margins; petiole 1.5 cm long, glabrous. Racemes 3-6 cm long, fulvous tomentose, many flowered; pedicels 2-3 mm long; sepals triangular, acute, glabrous. Drupe 13 x 5 mm, ovoid, glabrous, shallowly furrowed, yellow.

*Fr.* : February. (Flowering specimens could not be collected).

*Distr.* India, Burma and China. Rare; in margins of evergreen forests at high elevations. Kalvarimala, *JA 13911.*

**Symplocos wynadense** (O. Ktze.) Nooteb., Leiden Bot. Ser. 1, Rev. Sympl. Old. World. 293. 1975; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 69. 1987; Hore, Fl. India Fasc. 20: 172. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 282. 1994. ***Eugeniodes wynadense*** O. Ktze., 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. 1921.

Small trees; branchlets glabrous. Leaves 8-11 x 4 cm, elliptic, rounded or acute at base, acuminate at apex, crenate-serrate, glabrous, nerves 5-7 pairs, slender; petiole 1 cm long, glabrous. Spike to 6 cm long, unbranched; peduncle slender, densely hairy. Flowers few; pedicels 5 mm long; sepals ovate, obtuse, densely hairy; corolla white, 8 mm across, glabrous; stamens numerous, free; style 5 mm long, hairy. Drupe glabrous.

*Fl. & Fr.* : August-December

*Distr.* : Endemic to Southern Western Ghats. Rare; in evergreen forests. Koruthode, *JA 12222.*

## 81. OLEACEAE

Hoffmanns. & Link, Fl. Cap. 2: 15-31. 1862.

1. Stems quadrangular; leaves 3-ribbed from base.....**Myxopyrum**
1. Stems terete; leaves not 3-ribbed from base.....2

2. Erect trees or shrubs; corolla lobes valvate ..... 3

2. Scandent shrubs or climbers; corolla lobes twisted ..... **Jasminum**

3. Petals united in pairs or free ..... **Chionanthus**

3. Petals united at the base into a tube ..... 4

4. Flowers polygamous; panicle axillary ..... **Olea**

4. Flowers all bisexual; panicles terminal ..... **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 obovate, obtuse ..... **C. zeylanicus**

1. Leaves elliptic, acuminate ..... 2

2. Corolla lobes acuminate; drupe to 1.5 cm long ..... 3

2. Corolla lobes obtuse; drupe 2-3 cm long ..... **C. ramiflorus**

3. Calyx densely pubescent; petiole ca. 1 cm long ..... **C. mala-elengi**

3. Calyx glabrous; petiole ca. 3 cm long ..... **C. roxburghii**

**Chionanthus mala-elengi** (Dennst.) P.S.Green, Bull. Bot. Surv. India 26. 124. 1984; Srivast. & Kapoor, J. Econ. Tax. Bot. 15: 133. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 273. 1996. ***Forsythia mala-elengi*** Dennst., Schluess. Hort. Malab. 12, 21 & 31. 1818. ***Linociera malabarica*** Wall ex G. Don, Gen. Syst. 4: 53. 1847; Clarke in Hook. f., Fl. Brit. India 3: 607. 1882; Gamble, Fl. Pres. Madras 794. 1923; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 514. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 888. 1983. ***Chionanthus malabaricus*** (Wall. ex G. Don) Bedd., Fl. Sylv. t. 239. 1872. **Kallidala** (Mannan).

Trees with spherical canopy, to 15 m high; branchlets thinly tomentose. Leaves to 10 x 5.5 cm, obovate, abruptly acuminate, acumen twisted, glabrous, glaucous beneath; nerves 11-13 pairs; petiole 1 cm long. Cymes congested, pedunculate. Flowers sessile; calyx lobes 1.5 mm long, ovate, obtuse; corolla 7 mm long, lobes attached in pairs, linear acuminate, glabrous; ovary densely hairy. Drupe 10 x 5 mm, ellipsoid, slightly curved ,acute, ridged.

*Fl. & Fr.* : December-February

*Distr.* : Peninsular India. Common; in moist deciduous and semi-evergreen forests. Pachakkanam, *JA & KPR 14396*; Vavalala, *KPR & JA 14426.*

**Chionanthus ramiflorus** Roxb., Fl. Ind. 1: 106. 1820; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 70. 1987; Manilal, Fl. Silent Valley 172. 1988; Srivast. & Kapoor, J. Econ. Tax. Bot. 15(1): 136. 1991. ***Linociera ramiflora*** (Roxb.) G. Don, Gen. Syst. 4: 54. 1837; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 514. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 889. 1983. ***L. macrophylla*** Wall. ex D. Don, Gen. Syst. 4: 53. 1837; Clarke in Hook. f., Fl. Brit. India 3: 610. 1882; Gamble, Fl. Pres. Madras 795. 1923.

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, 6 x 6 cm; branches glabrous. Pedicel 1 cm long; sepals acute, glabrous; corolla 3 mm long, connate in pairs, ovary glabrous. Capsule black, glabrous.

Two varieties were found in the study area.

1. Fruit ca. 3.5 x 2 cm.....var. **peninsularis**
1. Fruit 1.5-2 x 1.2 cm.....var. **ramiflorus**

var. **peninsularis** , Ravikum. & Lakshm. in Bull. Bot. Surv. India 31: 163. 1989.

*Fl. & Fr.* : March-April

*Distr.* : Endemic to Southern Western Ghats. Common; in evergreen forest at high elevations. Aladi, *JA 13558.*

var. **ramiflorus**

*Fl. & Fr.* : February-April

*Distr.* : Endemic to Southern Western Ghats. Rare; in evergreen forest at high elevations. Lakshmipara, *JA 13309.*

**Chionanthus roxburghii** (Spreng.) Srivast. & Kapoor, Geophytology 11: 262. 1981; Srivast. & Kapoor, J. Econ. Tax. Bot. 15(1): 137. 1991. ***Olea roxburghii*** Spreng., Neue Entdeck 5(3): 78. 1822; Wight, Ic. t. 735. 1843. ***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.

Medium trees; branchlets glabrous, grey. Leaves to 12 x 5 cm, elliptic, shortly acuminate, narrowed to the base, glabrous, punctate below; nerves 10 pairs; petiole 3 cm long. Panicle axillary and terminal, to 10 cm long; branches glabrous. Flowers white, densely packed; pedicels 1 cm long; sepals triangular; corolla lobes 3-4 mm long, oblong, obtuse. Drupe 15 x 8 mm, ellipsoidal, glabrous, black.

*Fl. & Fr.* : December-April

*Distr.* : Endemic to Southern Western Ghats. Rare; in evergreen forests at high elevations. Melmala, *JA & KPR 14442.*

**Chionanthus zeylanica** L., Sp. Pl. 8. 1753; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 890. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 70. 1987; Green in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 268 1987; Srivast. & Kapoor, J. Econ. Tax. Bot. 15: 140. 1991. ***Linociera purpurea*** Vahl, Enum. 1: 47. 1805; Clarke in Hook. f., Fl. Brit. India 3: 608. 1882. ***Linociera zeylanica*** (L.) Gamble, Fl. Pres. Madras 794. 1923.

Small trees; branchlets minutely hairy. Leaves 4-6 x 2 cm, obovate to oblanceolate, attenuate at base, glabrous; nerves indistinct; petiole 8 mm long. Panicle 2-5 cm across, branches hairy. Flowers densely packed; pedicel 2 mm long; sepals obtuse, ciliate; corolla 5 mm long, lobes oblong, obtuse, free or connate in pairs, glandular; ovary glabrous, glandular. Fruits not seen.

*Fl.* : April

*Distr.* : Peninsular India and Sri Lanka. Rare; in moist deciduous forests. Vallakkadavu, *JA 13663.*

## **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. Cymes terminal; leaves truncate at base, obtuse at apex.....**J. calophyllum**
2. Cymes axillary; leaves acute or rounded at base, acuminate at apex.....**J. flexile**
3. Leaves cordate at base.....4
3. Leaves acute or rounded at base.....6
4. Calyx lobes glabrous.....**J. cordifolium**
4. Calyx lobes pubescent.....5
5. Corolla lobes obtuse at apex; leaves thinly pubescent; bracts white.....**J. rottlerianum**
5. Corolla lobes acute at apex; leaves densely pubescent; bracts green.....**J. multiflorum**
6. Erect shrubs with scandent branches; leaves obtuse at apex.....**J. cuspidatum**
6. Climbing shrubs; leaves acuminate at apex.....**J. angustifolium** var. **sessiliflorum**

**Jasminum angustifolium** (L.) Willd. var. **sessiliflorum** (Vahl) Green, Kew Bull. 40: 227. 1985 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 258. 1987; Henry *et al.*, Fl. Tamil Nadu Ser.

1, 2: 71. 1987. ***J. sessiliflorum*** Vahl, Enum. Pl. 1: 29. 1804; Clarke in Hook. f., Fl. Brit. India 3: 597. 1882; Gamble, Fl. Pres. Madras790. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 885. 1983.

Scandent shrubs; stem glabrous. Leaves to 8 x 2.5 cm, lanceolate, acuminate at apex, base rounded, glabrous; petiole 1 cm long. Cymes 3-flowered, peduncled or sessile; pedicel 2 cm long; bracts absent. Flowers white; calyx tube 3 mm long, lobes 10 mm long, subulate, glabrous; corolla tube 13 mm long, lobes 15 x 6 mm, oblong, obtuse, glabrous. Berry 8 x 5 mm, oblong, obtuse, glabrous.

*Fl. & Fr.* : July-January

*Distr.* : South India and Sri Lanka. Common; along stream banks in evergreen forests at high elevations. Mlappara, *JA 12117*; Ambari, *JA 13770.*

**Jasminum calophyllum** Wall. ex A. DC., Prodr. 8: 310. 1844; Clarke in Hook. f., Fl. Brit. India 3: 602. 1882; Gamble, Fl. Pres. Madras 791. 1923; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 71. 1987. ***J. courtallense*** Wight, Ic. t. 1252. 1848.

Climbing shrubs; stems glabrous. Leaflets subequal, to 5 x 3.5 cm, ovate, membranous, glabrous; nerves 3 or 4 pairs; petiolules unequal. Cymes terminal, 3-4 cm long; peduncle short. Flowers white, few; pedicels to 5 mm long; calyx tube 2 mm long, 5-toothed, thinly hairy; corolla tube 8-12 mm long, lobes 5 x 3 mm, ovate, acute, glabrous.

*Fl. & Fr.* : Throughout the year

*Distr.* : South India. Rare; in evergreen forests at *ca.* 1000 m elevations. Aruvioda, *JA 13644.*

**Jasminum cordifolium** Wall. ex G. Don, Gen. Syst. 4: 60. 1837-38; Clarke in Hook. f., Fl. Brit. India 3: 596. 1882; Gamble, Fl. Pres. Madras 790. 1923; Mohanan & Henry, Fl. Thiruvananthapuram 284. 1994.

Scandent shrubs; twigs glabrous. Leaves to 10 x 6.5 cm, broadly ovate, acuminate, truncate or cordate at base; nerves 3 or 4 pairs, nearly basal, glabrous; petiole 1.5 cm long. Flowers many, in terminal or axillary cymes; bracts 6 mm long, subulate; calyx tube 3 mm long, lobes 13 mm long, narrow, glabrous; corolla tube 12 mm long, lobes 5, 8 x 3 mm, oblong, acute, glabrous, white. Berry 12 x 8 mm, oblong, obtuse, glabrous.

*Fl. & Fr.* : Throughout the year

*Distr.* : Southern Western Ghats. Common; in evergreen forests at high elevations. Deviar, *JA 12096*; Ambari, *JA 13769.*

**Jasminum cuspidatum** Rottl. in Ges, Naturf. Fr. Ber. N. S. 4: 192. 1803; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 512. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 882. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 71. 1987. ***J. rigidum*** Zenk., Pl. Ind. 5, t. 6. 1835; Clarke in Hook. f., Fl. Brit. India 3: 598. 1882; Gamble, Fl. Pres. Madras 790. 1923; Wight, Ic. t. 1247. 1848.

Erect shrubs; stem subscandent, glabrous. Leaves 4-6 x 2-3 cm, lanceolate, rounded at the acute 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 5 mm long, stout; calyx tube 2 mm long, campanulate, glabrous, lobes 6 mm long, narrow; corolla tube 2-2.5 cm long, lobes 1.5-1.7 cm long, oblong, acute. Berry 8 x 7 mm, ovoid, glabrous.

*Fl. & Fr.* : Throughout the year

*Distr.* : South India and Sri Lanka. Rare; in evergreen forests at high elevations. Deviar, *JA 12093.*

**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. 1923; Green in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 261. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 273. 1996. ***J. azoricum*** sensu Burm. f., Fl. Ind. 6. 1768, p.p., non L., 1753.

Climbing shrubs; stem glabrous. Leaflets subequal, 10 x 5 cm, ovate-lanceolate, base rounded, apex acuminate, glabrous, acumen curved, lateral nerves 7 pairs; petiolules unequal, middle petiolulate to 2.5 cm long, laterals smaller. Cymes to 15 cm long, terminal, corymbose, peduncled; bracts and bracteoles minute, subulate. Flowers many; pedicels 1.5 cm long; calyx 3 mm long, truncate, glabrous; corolla tube 3 cm long, lobes 13 x 6 mm, oblong, obtuse, white with pink tinge. Berry 10 x 5 mm, oblique-obovoid, black, glabrous.

*Fl. & Fr.* : Throughout the year

*Distr.* : Peninsular India and Sri Lanka. Very common; along margins of sholas and in evergreen forests. Vellimala, *JA 12931*; Lakshmipara, *JA 13304.*

**Jasminum multiflorum** (Burm. f.) Andr., Bot. Repos. 8, t. 496. 1807; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 884. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 274. 1996. ***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. 1923. ***J. bracteatum*** Roxb., Fl. Ind. 1: 92. 1820; Wight, Ic. t. 1248. 1848.

Climbing shrubs; stem densely pubescent. Leaves to 8 x 4 cm, ovate, acute to acuminate, round or cordate at base; petiole 1 cm long, hairy. Cymes terminal, congested, pubescent; peduncle 4-8 cm long; bracts 15 x 5 cm, acuminate, hispid. Flowers densely packed; calyx tube short, lobes 8 mm long, subulate, hairy; corolla tube 15 mm long, lobes 5-8, to 10 mm long, oblong, acute, white.

*Fl. & Fr.* : Throughout the year

*Distr.* : India, China and Sri Lanka. Common; along margins of evergreen forests and stream sides. Uppermanalar, *JA 13715*; Umikuppan, *KPR & JA 14881.*

**Jasminum rottlerianum** Wall. ex DC., Prodr. 8: 305. 1844; Clarke in Hook. f., Fl. Brit. India 3: 593. 1882; Gamble, Fl. Pres. Madras 789. 1923; Green in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 259. 1987; Manilal, Fl. Silent Valley 171. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 274. 1996.

Climbing shrubs; stems pubescent. Leaves 7-10 x 4 cm, oblong, acuminate, base rounded; nerves 4 pairs; petiole 1 cm long. Cymes terminal, congested; peduncle 1.5-2 cm long, tomentose; bracts 8 x 3 mm, hairy. Flowers many, densely packed; calyx tube 2 mm long, lobes 4 mm long, subulate, densely hairy; corolla tube 2 cm long, lobes 7, to 8 mm long, oblong, obtuse, white with pink tinge, glabrous.

*Fl. & Fr.* : December-June

*Distr.* : Peninsular India and Sri Lanka. Rare; in evergreen forests. Vallakkadavu, *JA 13653.*

## **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.

*Note* : Green (1990) merged all the South Indian Species of Ligustrum into one species (*L. perrottetii* A. D.C). But in the present work we treat our collections into two distinct species.

1. Panicles 20-25 x 15 cm; nerves of leaves obscure.....**L. robustum** var. **walkeri**

1. Panicles to 15 x 5 cm; nerves of leaves 6-7 pairs, prominent.....**L. perrottetii**

**Ligustrum perrottetii** DC., Prodr. 8: 294. 1844; Clarke in Hook. f., Fl. Brit. India 3: 615. 1882; Gamble, Fl. Pres. Madras 797. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 887. 1983; Manilal, Fl. Silent Valley 172. 1988. ***L. neilgherrense*** Wight, Ic. t. 1243. 1848.

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 1 cm long. Panicle effuse, pubescent. Flowers many, closely packed; pedicel 1-2 mm long; calyx 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.

*Fl. & Fr.* : August-December

*Distr.* : Peninsular India. Common; in hilltops at high elevations. Kalvarimala, *JA 13870*

**Ligustrum robustum** (Roxb.) Bl., Mus. Bot. Lugd.-Bat. 1: 313. 1849, subsp. **walkeri** (Decne.) Green, Kew Bull. 40: 130. 1985 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 270. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 274. 1996. ***Phillyrea robusta*** Roxb., Fl. Ind. 1:101. 1820. ***L. walkeri*** Decne., Nov. Arch. Mus. Hist. Nat. 2: 27. 1879; Clarke in Hook. f., Fl. Brit. India 3: 614. 1882; Gamble, Fl. Pres. Madras 797. 1923.

Large shrubs or small trees; branchlets with elliptical lenticels. Leaves 6-10 x 4-5 cm, ovate, acute, punctate; nerves indistinct; petiole 1 cm long. Panicle loose, branches puberulus. Flowers distant; pedicel 2 mm long; calyx tube 2 mm long, 5-toothed; corolla 5 mm long; lobes longer than the tube, ovate, obtuse, white; ovary truncate at apex; stigma spathulate. Berry 7 mm long, obovoid.

*Fl. & Fr.* : July-December

*Distr.* : Peninsular India and Sri Lanka. Common; in hilltop forests at high elevation. Mangaladevi, *JA 12030*; Kalvarimala, *JA 13860*.

## MYXOPYRUM Blume

Bijdr. 683. 1825.

**Myxopyrum smilacifolium** Bl., Mus. Bot. Lugduno-Batavum 1: 320. 1851; Clarke in Hook. f., Fl. Brit. India 3: 618. 1882, p.p. ssp. **smilacifolium** Kiew, Blumea 25: 509. 1984; Manilal, Fl. Silent Valley 172. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 275. 1996. ***M. serratulum*** Hill, Kew Bull. 1910: 41. 1910; Gamble, Fl. Pres. Madras 798. 1923. **Chathuramulla** (Mala Arayan), **Chathura kkodi** (Malam pandaram).

Climbing shrubs; stem quadrangular, scabrous. Leaves to 15 x 5 cm, elliptic, acute at either ends, sharply serrulate, glabrous; petiole 1 cm long. Panicle axillary, 5 x 5 cm. Flowers sessile;

calyx deeply 4-lobed, lobes triangular, acute; corolla tube 2 mm long, cylindrical, lobes 3 mm long, oblanceolate, terete; stamens 2, anthers cleft at base; ovary 2-celled, style absent, stigma 2-toothed. Berry 1 x 1 cm, smooth, yellowish brown; seeds 2, spherical, black, rough.

*Fl. & Fr.* : August-March

*Distr.* : Indo-Malaya and China. Common; in evergreen forest. Koruthode, *JA 12242*; Vallakkadavu, *JA 13468*.

*Ethnobotanical use*: The stem and leaves are boiled with coconut oil and applied for chronic head ache.

## **OLEA** Linnaeus

Sp. Pl. 8. 1753

Trees. Leaves simple, opposite, petiolate. Inflorescence of axillary or terminal dichaesium. Flowers bisexual or polygamous; sepals 4, basely connate; corolla rotate or campanulate, lobes equal, valvate, usually oblong; stamens 2, free, on the corolla tube, filaments short; ovary 2-celled, ovules 2 in each cell; style short, stigma capitate. Fruit a drupe; seed 1.

1. Domatia glandular.....**O. glandulifera**
1. Domatia absent.....**O. dioica**

**Olea dioica** Roxb., Fl. Ind. 1: 105. 1820; Clarke in Hook. f., Fl. Brit. India 3: 612. 1882; Gamble, Fl. Pres. Madras 796. 1923; Matthew, Fl. Tamil Nadu Carnatic 3 (1): 891. 1983; Manilal, Fl. Silent Valley 173. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 275. 1996. **Karivetti, Koruku** (Malam pandarum).

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 to 1 cm long. Inflorescence an axillary panicle. Flowers many; pedicel 3 mm long; calyx campanulate; lobes 4, obtuse, ciliate; corolla 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 x 6 mm; seeds 6 x 4 mm, minutely muriculate.

*Fl. & Fr.* : February-June

*Distr.* : India. Fairly common; in moist deciduous forests and Savannahs. Kumily, *JA 13810*.

**Olea glandulifera** Wall. ex G. Don, Gen. Syst. 4: 49. 1837-1838; Wight, Ic. t. 1238. 1848; Fl. Brit. India 3: 612. 1882; Fl. Pres. Madras 796. 1923. ***O. bournei*** Fyson in Kew Bull. 1914: 186. 1914.

Medium trees, bark smooth. Leaves 10 x 5 cm, broadly elliptic, entire, acuminate at apex, cuneate at base; petiole 1 cm long. Panicles terminal, 5 cm across. Flowers bisexual, 4 mm across; corolla lobes spreading, deeply lobed.

*Fl. & Fr.*: May-August

*Distr.* : Peninsular India. Occasional; in evergreen sholas. Kathiramudi, *JA 18484*

## 82. APOCYNACEAE

Juss., Gen. Pl. 143. 1789.

1. Erect shrubs or trees.....2
1. Climbing shrubs.....9
2. Lateral nerves many, forming an intramarginal vein; branchlets yellow.....**Chilocarpus**
2. Lateral nerves not as above, intramarginal vein absent; branchlets not yellow.....3
3. Ovary syncarpus; fruit a berry.....**Carissa**
3. Ovary apocarpus; fruit of 2 mericarps.....4
4. Staminal filaments twisted.....**Parsonsia**
4. Staminal filaments not twisted.....5
5. Flowers 8 cm or more across.....**Chonemorpha**
5. Flowers below 2 cm across.....6
6. Tips of corolla lobes deflexed or twisted.....**Ichnocarpus**
6. Tips of corolla lobes not deflexed or twisted.....7
7. Lowers leaves whorled.....**Ellertonia**
7. Leaves opposite.....8
8. Corolla tube bearded within; flowers white.....**Aganosma**
8. Corolla tube glabrous within; flowers yellow.....**Anodendron**
9. Leaves 3-many at each nodes.....10
9. Leaves opposite at each node.....11
10. Fruit a drupe; seeds few, not ciliate; leaves 4 per node.....**Rauvolfia**
10. Fruit a follicles; seeds many, ciliate at both ends; leaves 7-many at each nodes.....**Alstonia**
11. Mouth of corolla tube with entire or lobed corona.....**Wrightia**
11. Mouth of corolla tube without corona.....12
12. Seeds few, arillate, not comose; corolla tube bearded within.....**Tabernaemontana**
12. Seeds many, comose, not arillate; corolla tube glabrous within.....**Holarrhena**

### AGANOSMA G. Don

Gen. Hist. 4: 69, 77. 1837.

**Aganosma cymosa** (Roxb.) G. Don, Gen. Syst. 4: 77. 1837-1838; Hook. f., Fl. Brit. India 3: 665. 1882 incl. var. ***elegans*** (G. Don) Hook. f., Fl. Brit. India 3: 665. 1882; Gamble, Fl. Pres.

Madras 819. 1923; Stevens in Sald. & Nicols., Fl. Hassan Dist. 429. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 900. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 55 1983; Manilal, Fl. Silent Valley 173. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 276. 1996. ***Echites cymosa*** Roxb., Fl. Ind. 2: 16. 1832; Wight, Ic. t. 395. 1840. ***Aganosma elegans*** G. Don, Gen. Hist. 4: 77. 1837.

Twining climber, stem adpressed-hairy. Leaves to 15 x 5 cm, elliptic, obtuse or acute, glabrous; lateral nerves 6 pairs, reddish brown, nervules reticulate; petiole hairy. Flowers in terminal peduncled congested cymes; pedicels 3 mm long, hairy; sepals 7 mm long, lanceolate, acuminate, pubescent; corolla tube 8 mm long, inflated below the middle, lobes ovate, 5 mm long, acute, pubescent outside; stamens attached below the middle; anthers sagitate; ovary hairy at apex. Follicle 20 cm long, oblong, acuminate, densely tomentose; seeds 15 x 5 mm, long-comose.

*Fl. & Fr.* : December-May

*Distr.* : Peninsular India and Sri Lanka. Common; in evergreen forests. Deviar, *JA 12107*; Vallakkadavu, *KPR 15430.*

## 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. Leaves obtuse; corolla tube ca. 7 mm long; large trees.....**A. scholaris**
1. Leaves acuminate; corolla tube ca. 20 mm long; shrubs or small trees.....**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. 1923; Stevens in Sald. & Nicols., Fl. Hassan Dist. 429. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 902. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 42. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 277. 1996. *Ezhilampala* (Mala Arayan).

Large trees; bark grey, corky. Leaves to 18 x 6 cm, oblanceolate, obtuse, glabrous; lateral nerves 40, parallel; petiole to 1 cm long. Cymes globose, in panicled umbels, pedicels short,

puberulus; sepals ovate, obtuse, puberulus; corolla tube broad, lobes 4 mm across, obovate to orbicular, creamy yellow. Follicle 35-50 cm long, terete; seeds elliptic-oblong, papillose.

*Fl. & Fr.* : December-April

*Distr.* : India, Malesia and Sri Lanka. Common; in moist deciduous forests. Puthussery, *JA 13700*; Koruthode, *KPR & JA 14100.*

**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. 1923; Manilal, Fl. Silent Valley 174. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 277. 1996. **Theeppala**.

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 1 mm long, ovate, acute, ciliate; corolla tube slender, hairy inside; lobes 13 mm long, oblong, acute, white. Follicle 8-16 cm long, 2-angled, acute; seeds smooth.

*Fl. & Fr.* : Throughout the year

*Distr.* : Tropical Asia. Occasional; in moist deciduous forests. Dam site, *KPR & JA 15122.*

## **ANODENDRON** Alph. de Candolle

Prodr. 8: 443. 1844.

Climbing shrubs. Leaves opposite, oblong, entire. Flowers in axillary or terminal panicles; bracts minute; calyx 5-lobed; corolla tube cylindrical, dialated opposite the stamens, glabrous inside, lobes 5, spreading, oblong, twisted; stamens 5, included; anthers sagitate, adherent around the stigma; ovary 2, carpellary, free, adnated to the cupular disk; style 1, short, stigma conical. Fruit of 2 diverging follicles; seeds many, oblong, compressed, beaked, tipped with long silky coma.

1. Leaves ca. 3 cm broad; nerves indistinct; sepals obtuse.....**A. rhinosporum**
1. Leaves ca. 6 cm broad; nerves distinct, 12-16 pairs; sepals acute.....**A. manubriatum**

**Anodendron manubriatum** Merr., Philipp. J. Sci. 7: 333. 1912; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 69. 1983; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 904. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 277. 1996. ***Anodendron paniculatum*** A. DC. in DC., Prodr. 8: 444. 1844; Hook. f., Fl. Brit. India 3: 668. 1882; Gamble, Fl. Pres. Madras 820. 1923. ***Echites paniculata*** Roxb., Fl. Ind. 2: 17. 1832, non Poir., 1812; Wight, Ic. t. 396. 1840.

Large glabrous climbers. Leaves to 12 x 6 cm, elliptic-oblong, abruptly acuminate at apex, rounded at base; nerves 12-16 pairs; petiole 1.5 cm long. Panicles axillary and terminal; bracts ovate, acute, white. Flowers yellow; sepals 1 mm long, ovate, glabrous, white; corolla tube 2 mm long, lobes 3 mm long, spreading, oblong, obtuse; stamens below the middle of corolla tube, anthers penicillate at apex. Follicle to 13 x 2.5 cm, terete, glabrous; seeds to 2.5 cm long, linear elliptic, beaked

*Fl. & Fr.* : February-October

*Distr.* : Indo-Malesia and Sri Lanka. Occasional; in semi-evergreen and evergreen forests. Puthussery, *JA 13506.*

**Anodendron rhinosporum** Thw., Enum. Pl. Zeyl. 194. 1860; Hook. f., Fl. Brit. India 3: 669. 1882; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 70. 1983; Matthew *et al.*, J. Econ. Tax. Bot. 5: 502. 1984; Sasidh. & Sivar., Fl. Pl. Thrissur For. 278. 1996.

Large climbers. Leaves to 10 x 3 cm, oblanceolate, obtusely acuminate at apex, acute to cuneate at base; lateral nerves 9-11 pairs, irregular; petiole 0.7 cm long. Panicles terminal, glabrous. Flowers shortly pedicelled, yellow; sepals ovate, acute, follicle to 10 x 1.2 cm, terete, glabrous; seeds to 4 cm long, linear.

*Fl. & Fr.*: May-June

*Distr.* : South India and Sri Lanka. Rare; in evergreen forests. Aruvioda, *JA 13645.*

## **CARISSA** Linnaeus

Syst. Nat. ed. 12, 2: 189. 1767, *nom. cons.*

**Carissa inermis** Vahl, Symb. Bot. 3: 43. 1794; Gamble, Fl. Pres. Madras 805. 1923; Stevens in Sald. & Nicols., Fl. Hassan Dist. 431. 1976; Manilal, Fl. Silent Valley 174. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 278. 1996. ***C. macrophylla*** Wall. ex A. DC. in DC., Prodr. 8: 332. 1844; Hook. f., Fl. Brit. India 3: 631. 1882.

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 5 mm long. Flowers in sessile or peduncled terminal cymes; pedicel 3 mm long, stout; sepals 4 mm long, lanceolate, reddish, pubescent; corolla white, tube 2 cm long, cylindric, curved, bulged towards the apex, lobes 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 2 cm across, globose, glabrous; seeds 2-4, compressed.

*Fl. & Fr.* : December-April

*Distr.* : Endemic to Peninsular India. Common; in evergreen forests. Vallakkadavu, *JA 13435*; Dam site, *JA & KPR 15048.*

## CHILOCARPUS Blume

Cat. Gew. Buitenz. 22. 1823.

**Chilocarpus denudatus** Bl., Bijdr. 1025. 1826; Markgraf, Blumea 19: 65. 1971; Sasidh. & Sivar., Fl. Pl. Thrissur For. 279. 1996. ***Hunteria atrovirens*** G. Don, Syst. 4: 105. 1837. ***C. atrovirens*** (G. Don) Bl., Mus. Bot. Lugd.-Bat 1: 153. 1850, *'atroviridis'*; Hook. f., Fl. Brit. India 3: 626. 1882; Gamble, Fl. Pres. Madras 802. 1923. ***Chilocarpus malabaricus*** Bedd., Ic. t. 175. 1868-1874.

Large glabrous climbers, old stem with warty tubercles, tender parts yellow, glabrous. Leaves to 15 x 5 cm, oblong, abruptly acuminate, base acute glabrous; nerves many, parallel, close, forming an intramarginal vein; petiole 1 cm long, yellow. Flowers in axillary panicled cymes; peduncle to 6 cm long; pedicels to 3 mm long, slender; bracts small ovate; calyx 1 mm long, lobes ovate, acute, united at the lower half; corolla yellow, 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, 7 x 3 cm; seeds many, embedded in the yellow pulp.

*Fl. & Fr.* : March-August

*Distr.* : Endemic to Kerala and Karnataka. Fairly common; in evergreen forests often along the stream banks. Pamba, *JA & KPR 17140*; Uppupara, *JA 17730.*

## 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. ***E. fragrans*** Moon, Cat. 20. 1824. ***Echites macrophylla*** Roxb., Fl. Ind. 2: 13. 1832. ***Chonemorpha macrophylla*** (Roxb.) G. Don, Gen. Syst. 4: 76. 1837; Hook. f., Fl. Brit. India 3: 661. 1882; Gamble, Fl. Pres. Madras 818. 1923. ***Chonemorpha fragrans*** (Moon) Alston, Ann. Roy. Bot. Gard. (Peradeniya) 11:203.1929; Chatterj., Kew Bull. 3:68.1948; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 56. 1983. **Perum kurumba** (Mala Arayan)

Large climbers; branches hispid. Leaves to 20 x 20 cm, orbicular, obtuse, base cordate, densely tomentose above and below; nerves 12 pairs, regular, prominent arching below the margins; petiole 7 cm long. Flowers in terminal or axillary cymes; few together; pedicels stout,

pubescent; calyx 5-lobed, lobes obovate, obtuse; corolla tube 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, black; seeds many, obovate, comose; coma to 5 cm long, many, cottony.

*Fl. & Fr.* : April-December

*Distr.* : India Sri Lanka and Andamans. Occasional; in evergreen forests. Koruthode, *JA 14794.*

## ELLERTONIA R. Wight

Ic. 4: 2, t. 1295. 1848.

**Ellertonia rheedei** Wight, Ic. t. 1295. 1848; Hook. f., Fl. Brit. India 3: 641. 1882; Gamble, Fl. Pres. Madras 811. 1923; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 77. 1987.

Large climbers, glabrous; tender stem reddish. Leaves 3-4 at nodes, 12 x 4 cm, oblong, abruptly acuminate; nerves to 14 pairs, reddish; petiole 5 mm long. Flowers many, in terminal peduncled cymes; bracts subulate; calyx 2 mm long, lobes acuminate, glabrous, reddish; corolla tube 10 mm long, curved; lobes 5 mm long, oblong, obtuse; stamens 5, included, filaments attached at the middle of the corolla tube, anthers penicillate at apex; carpels free, style filiform, stigma oblong, 2-fid at apex. Follicles 8-11 cm long, divaricate, linear, terete; seeds many, 2 cm long, oblanceolate, winged.

*Fl. & Fr.* : October-March

*Distr.* : Endemic Karnataka and Kerala. Occasional; in evergreen forests. Koruthode, *JA 12255*; Vallakkadavu, *NS & JA 12721.*

## HOLARRHENA R. Brown

Mem. Wern. Nat. Hist. Soc. 1: 62. 1811.

**Holarrhena pubescens** (Buch.-Ham.) Wall. ex G. Don, Gen. Syst. 78. 1837; Kruif, Meded. Landb. Wagen 81-2: 17. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 910. 1983; Panigr., Taxon 36: 466. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 280. 1996. ***Echites pubescens*** Buch.-Ham., Trans. Linn. Soc. London 13: 521. 1821. ***Chonemorpha antidysenterica*** G. Don, Gen. Syst. 4: 76. 1837; Wight, Ic. t. 439. 1841. ***Holarrhena antidysenterica*** (Roth) A. DC. in DC., Prodr. 8: 413. 1844; Hook. f., Fl. Brit. India 3: 644. 1882; Gamble, Fl. Pres. Madras 811. 1923.

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 to 5 mm

long. Flowers in terminal or axillary cymes; cymes 5-10 cm across; bracts lanceolate, glabrous; pedicels 1.5 cm long, slender, glabrous; calyx 3 mm long, lobes lanceolate; corolla yellowish white, tube 10 mm long, pubescent outside, glabrous within; lobes 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 40 x 0.5 cm, terete; seeds 1-2 cm long, linear oblong, acute, concave, comose.

*Fl. & Fr.* : April-October

*Distr.* : Indo-Malesia. Common; in moist deciduous forests. Koruthode, *JA 17998.*

## ICHNOCARPUS R. Brown

Mem. Wern. Nat. Hist. Soc. 1: 61. 1811.

**Ichnocarpus frutescens** (L.) R. Br. in Ait., Hort. Kew. (ed. 2) 2: 69. 1811; Wight, Ic. t. 430. 1841; Hook. f., Fl. Brit. India 3: 669. 1882; Gamble, Fl. Pres. Madras 820. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 912. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 71. 1983; Middleton, Blumea 39(1): 77. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 280. 1996. ***Apocynum frutescens*** L., Sp. Pl. 213. 1753.

Climbers, branchlets brown-tomentose. Leaves opposite, to 6 x 3 cm, ovate, obtusely acute, rounded at base; nerves 5 pairs, golden brown-pubescent below; petiole to 5 mm long. Flowers 3.5 mm long, in terminal or axillary panicled cymes; pedicels 3 mm long; calyx 1 mm long, 5-lobed, lobes ovate, acute, pubescent; corolla white, salver shaped, contracted at mouth, tube 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, to 15 cm long, slender, rusty puberulus; seeds many, compressed, crowned with long silky coma.

*Fl. & Fr.* : August-March

*Distr.* : South-East Asia and Australia. Common; in moist deciduous forests. Pamba, *JA 17177.*

## PARSONSIA R. Brown

Asclepiadeae 53. 1811, *nom. cons.*

**Parsonsia alboflavescens** (Dennst.) Mabber., Taxon 26: 532. 1977; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 914. 1983; Manilal, Fl. Silent Valley 175. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 281. 1996. ***Periploca alboflavescens*** Dennst., Schluess. Hort. Ind. Malab. 12: 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 1814. 1923. ***Heligme rheedii*** Wight, Ic. t. 1303. 1848.

Twining shrubs; stem glabrous, green. Leaves to 17 x 10 cm, elliptic-oblong, rounded at base, abruptly acuminate at apex, glabrous; nerves 4 or 5 pairs; petiole 2 cm long. Flowers in axillary peduncle cymes; peduncles 8 cm long, glabrous, pedicel 6 mm long; sepals ovate, acute; corolla greenish yellow, tube 10 mm long, mouth with a ring of hairs, lobes oblong, spreading, 6 mm long; stamens 5, inserted at the base of the corolla tube, filaments twisted around the style; anthers 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.

*Fl. & Fr.* : June-January

*Distr.* : South Asia. Common; in evergreen forests. Vavalala, *JA & KPR 14415*; Sabarimala, *JA 15450.*

## **RAUVOLFIA** Linnaeus

Sp. Pl. 208. 1753.

Shrubs; branchlets glabrous. Leaves ternate, 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. Corolla tube ca. 15 mm long; seeds smooth or slightly rugose; peduncles red.....**R. serpentina**
1. Corolla tube to 8 mm long; seeds rugose; peduncles green .....2
2. Peduncles slender; corolla pinkish at the throat.....**R. micrantha**
2. Peduncles stout; corolla white.....**R. verticillata**

**Rauvolfia micrantha** Hook. f., Fl. Brit. India 3: 633. 1882; Gamble, Fl. Pres. Madras 808. 1923; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 78. 1987.

Shrubs, to 1.5 m high; branches slender, glabrous. Leaves 8-13 x 2-5 cm, elliptic, membranous, abruptly acuminate at both ends; lateral nerves to 12 pairs; petiole 1 cm long. Flowers in axillary long-peduncled congested cymes; sepals 1.5 mm long, triangular, acute, basely connate; corolla white with reddish at throat, 8 mm long, glabrous, lobes ovate, acute. Capsule 7 x 5 mm, ovoid, acute, glabrous.

*Fl. & Fr.* : December-May

*Distr.* : Endemic to Southern Western Ghats. Occasional; in evergreen forests at low elevations. Koruthode, *JA & KPR 14779, 16278.*

**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. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 917. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 49 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 282. 1996. ***Ophioxylon serpentinum*** L., Sp. Pl. 1043. 1753; Wight, Ic. t. 849. 1844-1845. **Sarpagandhi** (Mala Arayan).

Shrubs, to 1 m high; rootstock thick, sap watery. Leaves to 10 x 3 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 4 mm long, oblong, acute; corolla tube 15 mm long, lobes 5 mm long, oblong, obtuse. Capsule 5 x 5 mm, ovoid, obtuse, black, smooth.

*Fl. & Fr.* : November-March

*Distr.* : India, Burma and Sri Lanka. Occasional; in openings at evergreen and moist deciduous forests. Vallakkadavu, *JA 13416.*

**Rauvolfia verticillata** (Lour.) Baill., Bull. Soc. Linn. Paris 1: 768. 1888; ; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 47. 1983; Markgraf, Blumea 30: 160. 1984; Sasidh. & Sivar., Fl. Pl. Thrissur For. 282. 1996. ***Dissolena verticillata*** Lour., Fl. Cochinch. 137. 1790. ***Tabernaemontana densiflora*** Wall. in Edward's Bot. Reg. 15: t. 1273. 1829. ***Ophioxylon neilgherrense*** Wight, Ic. t. 1292. 1848. ***Rauvolfia densiflora*** (Wall.) Benth. ex Hook. f., Fl. Brit. India 3: 633. 1882; Gamble, Fl. Pres. Madras 808. 1923; Manilal, Fl. Silent Valley 175. 1988.

Shrubs with milky latex, to 1.5 m high. Leaves to 14 x 6 cm, obovate, abruptly acuminate, base acute to attenuate, subcoriaceous; lateral nerves 14 pairs, prominent, nervules slender; petiole 2 cm long. Cymes terminal or axillary; peduncles 5-8 cm long. Flowers white; pedicels 1 cm long; calyx lobes acuminate, glabrous, reddish; corolla 1 cm long, lobes ovate, acute. Capsule 10 x 7 mm, oblong, smooth, black.

*Fl. & Fr.* : November-January

*Distr.* : India and Sri Lanka. Common; in openings in evergreen at high elevations. Vellimala, *JA 12938.*

## 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. Capsule 1-seeded, shortly beaked; sepals ciliate.....**T. gamblei**
1. Capsule many seeded, with a curved beak; sepals glabrous.....**T. heyneana**

**Tabernaemontana gamblei** Subram. & Henry, Bull. Bot. Surv. India 12: 1. 1970; Leeuwenberg, Rev. Tabernaemontana Old World. 157. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 282. 1996. ***Ervatamia caudata*** Gamble, Kew Bull. 1921: 310. 1921 & Fl. Pres. Madras 813. 1923; non ***Tabernaemontana caudata*** Merr., 1909.

Shrubs, to 1.5 m high; branchlets white. Leaves opposite, often unequal, to 10 x 4 cm, elliptic, caudate acuminate, acute at base, lateral nerves 7 pairs, petiole 1 cm long. Cymes terminal. Flowers white; pedicels stout, 1 cm long; sepals ovate, obtuse; corolla tube to 17 mm long, cylindrical; lobes 15 mm long, oblong, obtuse. Capsule 3 x 1.25 cm, not curved; aril red.

*Fl. & Fr.* : April-July

*Distr.* : Endemic to Southern Western Ghats. Common; in evergreen forests. Deviar, *JA 12100*; Mlappara, *JA 12138.*

**Tabernaemontana heyneana** Wall. in Edward's Bot. Reg. 15: t. 1273. 1829; Hook. f., Fl. Brit. India 3: 646. 1882; Leeuwenberg, Rev. Tabernaemontana Old World. 161. 1991; Sasidh. & Sivar.,, Fl. Pl. Thrissur For. 283. 1996. ***Ervatamia heyneana*** (Wall.) Cooke, Fl. Pres. Bombay 2: 134. 1904; Gamble, Fl. Pres. Madras 813. 1923. **Koonampala** (Mala Arayan).

Large shrubs or small trees; bark corky with shallow fissures; branches white. Leaves to 18 x 7 cm, elliptic-oblong, acuminate at apex, acute at base; lateral nerves 12-15 pairs; petiole 2 cm long. Cymes terminal or axillary; peduncles to 4 cm long. Flowers pedicellate; calyx 4 mm long, lobes short, oblong, obtuse; corolla white, tube 25 mm long; lobes 15 mm long, oblong, obtuse, apex crisped. Capsule yellow, 5 x 1.5 cm, beak acuminate; aril red.

*Fl. & Fr.* : April-October

*Distr.* : Endemic to Western Ghats. Common; in evergreen forests. Chenthamara, *JA 12284*; Poonkavanam, *KPR & JA 14975.*

**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. Corona fimbriate; leaves glabrous.....**W. tinctoria**

1. Corona entire or shallowly lobed; leaves densely tomentose below.....**W. arborea**

**Wrightia arborea** (Dennst.) Mabber., Taxon 26: 533. 1977; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 920. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 283. 1996. ***Periploca arborea*** Dennst., Schluess., Hort. Ind. Malab. 13: 23 & 25. 1818. ***Wrightia tomentosa*** Roem. & Schultes, Syst. 4: 414. 1819; Wight, Ic. t. 443. 1841; Hook. f., Fl. Brit. India 3: 653. 1882; Gamble, Fl. Pres. Madras 816. 1923; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 64. 1983.

Small trees; branchlets pubescent. Leaves to 10 x 6 cm, elliptic, acuminate at apex, base acute, scabrous above; nerves 9 or 10 pairs, regular; petiole 5 mm long. Cymes terminal, sessile. Flowers reddish brown; pedicels 1 cm long, stout; sepals 4 mm long, obtuse, hairy; corolla tube 5 mm long, lobes 15 x 10 mm, obovate, puberulus; corona thick, erect, toothed, reddish brown; anthers conical, 8 mm long, hairy. Follicles to 16 x 2 cm, subterete, sparsely white-tubercled.

*Fl. & Fr.* : April-December

*Distr.* : India, Sri Lanka and Malay peninsula. Occasional; in moist deciduous forests. Sabarimala, *JA & KPR 17721.*

**Wrightia tinctoria** (Roxb.) R. Br., Mem. Wern. Nat. Hist. Soc. 1: 47. 1811; Wight, Ic. t. 444. 1841; Bedd., Fl. Sylv. t. 241. 1872; Hook. f., Fl. Brit. India 3: 653. 1882; Gamble, Fl. Pres. Madras 815. 1923; Mabber., Taxon 26: 533. 1977; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 921. 1983; Manilal, Fl. Silent Valley 175. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 283. 1996. ***Nerium tinctorium*** Roxb., Orient. Repert. 1: 39. 1791.**Danthappala** (Mala Arayan)

Small trees; branchlets white, glabrous. Leaves 8-10 x 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 4 mm long, broad, lobes 12 x 5 mm, oblong, obtuse; corona many, erect, linear; anthers acuminate, coriaceous, 6 mm long. Mericarps 30 cm long, terete, joined at apex, glabrous; seeds oblong.

*Fl. & Fr.* : February-December

*Distr.* : Indo-Malesia. Common; in moist deciduous forests. Thekkady, *JA 12560*; Sabarimala, *JA & KPR 14929.*

*Ethnobotanical use*: Chewing of the leaves is effective for tooth ache

## 83. ASCLEPIADACEAE

R. Brown, Asclepideae 12,19. 1810.

1. Filaments free; cymes axillary.....2
1. Filaments united into a tube; peduncle from the nodes between petiole.....3
2. Corolla lobes valvate; leaves with 10-20 pairs of lateral nerves.....**Hemidesmus**
2. Corolla lobes imbricate; leaves with numerous close and parallel lateral nerves.....**Cryptolepis**
3. Erect shrubs.....4
3. Twiners, lianas or epiphytic subshrubs.....5
4. Corolla pale purple to greenish-whitish; gynostegium violet.....**Calotropis**
4. Corolla crimson; gynostegium yellow.....**Asclepias**
5. Epiphytes; leaves thick, fleshy.....**Hoya**
5. Terrestrial; leaves not fleshy.....6
6. Corolla tube elongated, more than 1.2 cm long.....**Ceropegia**
6. Corolla tube short, less than 7 mm long.....7
7. Corolla lobes alternating with fleshy ridges within the sinus.....8
7. Corolla lobes without ridges inside.....9
8. Coronal ridges not produced beyond the sinus of corolla lobes; internode with 2 lines of pubescence.....**Bidaria**
8. Coronal ridges produced beyond the sinus of corolla lobes; pubescence of internode not in 2 lines.....**Gymnema**
9. Corona 2-seriate.....10
9. Corona uniseriate.....11
10. Stem hairy; leaves cordate at base.....**Pergularia**
10. Stem glabrous; leaves cuneate or rounded at base.....**Cosmostigma**
11. Corona cupular.....**Holostemma**
11. Corona otherwise.....12
12. Corona lobes tubercle-like, radiating from the base of the staminal column.....**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. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 929. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 74. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 284. 1996.

Herbs, to 1 m tall; stem terete, glabrous, glaucous. Leaves lanceolate to linear-lanceolate, to 10 x 3 cm, glabrous; nerves 8-13 pairs, narrow; petiole 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 2.5 mm long, ovate; corolla *ca.* 1.2 cm across, tube short, lobes oblong, yellow, deflexed; coronal lobes yellow, 7 mm long. Follicle to 7 x 1.5 cm, terete or fusiform; seeds many, comose

*Fl. Fr.*: March-November

*Distr.* : Native of West Indies, introduced to other tropical countries. Common; in open moist areas. Koruthode, *JA & KPR 15200.*

## BIDARIA (Endlicher) Decaisne

in DC., Prodr. 8: 623. 1844.

Twining shrubs with white latex; internodes of tender parts with two transverse lines of pubescence. Leaves membranous. Flowers axillary in solitary umbellate cymes; calyx lobes lanceolate; corolla campanulate, lobes spreading, contorted; corona of 5 vertical 2-lobed ridges entirely adnated to the corolla tube; connective of the anthers produced into a membranous tip; pollinia paired. Mericarps narrowly ellipsoid or spindle shaped.

1. Leaves 9-12 x 3-5 cm, narrowly elliptic-oblong.....**B. indica**
1. Leaves 10-17 x 4-7 cm, broadly elliptic-oblong.....**B. montana**

**Bidaria indica** Rahman & Wilcock, Blumea 34: 99. 1989. ***Gymnema montana*** (Roxb.) Hook. f. var. ***beddomei*** Hook. f., Fl. Brit. India 4: 32. 1883; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 85. 1987.

Glabrous twining shrubs. Leaves to 12 x 5 cm, elliptic-oblong, acuminate, base rounded; nerves 4-6 pairs; petiole 12 mm long. Flowers yellow, 5 x 8 mm, in 4 or 5-flowered axillary umbels; peduncle 12 mm long, stout, puberulus; pedicels to 8 mm long; sepals to 4 x 1.9 mm, oblong, obtuse, pubescent; corolla tube 3.5 mm long, lobes 4 x 2.5 mm, obovate, retuse,

pubescent outside, yellow; corona corolline, ridges tomentose; gynostegium 6 x 3 mm, cylindrical. Fruits not seen.

*Fl.* : April-May

*Distr.* : Southern Western Ghats, endemic. Rare; in evergreen forests. Uppermanalar, *JA 13725.*

**Bidaria montana** (Roxb.) Rahman & Wilcock, Blumea 34: 99-101. 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. 1923; Manilal, Fl. Silent Valley 178. 1988.

Glabrous twining shrubs; branchlets terete. Leaves to 16 x 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 to 0.5 cm long, stout. Flowers 5-30 together; pedicels 6-7 mm long; slender, pubescent; calyx lobes linear-oblong, ciliate, 2 mm long; corolla greenish white, glabrous, tube 3 mm long, globose, lobes 3 x 2 mm, oblong; corolline corona 5 pairs of densely pubescent ridges; gynostegium 4 x 2 mm, ridged. Fruits not seen.

*Fl.* : January-April

*Distr.* : Southern Western Ghats, endemic. Occasional; in evergreen forests. Sabarimala, *JA 14999.*

## CALOTROPIS R. Brown

Mem. Wern. Nat. Hist. Soc. 1: 39. 1811.

**Calotropis gigantea** (L.) R. Br. in Ait., Hort. Kew (ed. 2) 2: 78. 1811; Hook. f., Fl. Brit. India 4: 17. 1883; Gamble, Fl. Pres. Madras 832. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 929. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 78. 1983; Manilal, Fl. Silent Valley 176. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 285. 1996. ***Asclepias gigantea*** L., Sp. Pl. 214. 1753.

Shrubs, to 1.5 m tall; stem rounded. Leaves to 16 x 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, 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, 1 cm long. Fruit saccate, to 6 x 3 cm, ovoid; seeds many.

*Fl. & Fr.*: Throughout the year

*Distr.* : South East Asia. Occasional; along roadsides at lower altitudes. Thekkady, *JA 18000.*

## 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. Erect herbs.....**C. pusilla**
1. Twiners.....2
2. Stem hairy.....3
2. Stem glabrous.....4
3. Flowers 6-7 cm long, inner corona spathulate.....**C. beddomei**
3. Flowers 2.5-3 cm long; inner corona linear, curved at tips.....**C. hirsuta**
4. Leaves linear, to 1 cm broad.....**C. ensifolia**
4. Leaves ovate, elliptic or oblong-lanceolate, to 6 cm broad.....5
5. Flowers 6-7 cm long; outer corona deltoid, bifid.....**C. metziana**
5. Flowers 1-3 cm long; outer corona truncate or linear.....6
6. Flowers purple.....**C. intermedia**
6. Flowers greenish-white or violet.....7
7. Outer corona linear, equals to inner; corolla tube greenish towards the base, white above **C. maculata**
7. Outer corona truncate, inner linear; corolla tube greenish violet.....**C. candelabrum**

**Ceropegia beddomei** Hook. f., Fl. Brit. India 4: 75. 1883; Gamble, Fl. Pres. Madras: 859. 1923; Ansari, Fl. India Fasc. 16: 23. 1984.

Hispid twiners. Leaves to 15 x 1.5 cm, linear-oblong, acute to acuminate, glabrous above; petiole to 5 mm long. Flowers solitary or binate, axillary, dark brown, to 8 cm long; peduncle 4 cm long; bracts subulate; pedicel to 1 cm long; sepals to 10 x 1 mm, linear; corolla tube 3.5 cm long, funnel shaped above, narrowed below and slightly dialated at base; lobes 4 cm long, spirally twisted in bud, lanceolate, acuminate, hairy inside and along the margins, deeply depressed at

midrib; outer corona shallowly divided, 3 mm across, lobes triangular, acute, hairy; inner corona 1.5 mm long, spathulate.

*Fl & Fr.* : August-December

*Distr.* : Southern Western Ghats (Kerala), endemic. Rare; moist deciduous and semi-evergreen forests. Koruthode, *JA 16251*; Pachakkanam, *JA 17849*.

**Ceropegia candelabrum** L., Sp. Pl. 211. 1753; Hook. f., Fl. Brit. India 4: 70. 1883; Gamble, Fl. Pres. Madras 857. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 935. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 120. 1983; Ansari, Fl. India Fasc. 16: 12. 1984; Manilal, Fl. Silent Valley 176. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 286. 1996.

Glabrous twining herbs. Leaves to 7 x 5 cm, linear-elliptic to ovate-orbicular, obtuse to apiculate, base acute or rounded, nerves 3 pairs, reticulate; petiole to 1.5 cm long. Cymes few to many flowered; peduncles longer than the petioles; pedicels 11 mm long; sepals 3 x 0.5 mm, lanceolate; corolla 26 mm long, tube slightly inflated below, greenish-white with purple streaks, hispid, lobes 6 x3 mm, yellow, hairy within, beak purplish; outer corona 3 x 1.5 mm, of 5 entire or truncate hairy lobes; inner corona erect, linear-spathulate, glabrous.

*Fl. & Fr.*: September-November.

*Distr.* : South India and Sri Lanka. Occasional; in Semi-evergreen and evergreen forests. Thekkady, *JA 12396*; Vellimala, JA & *KPR 16869*.

**Ceropegia ensifolia** Bedd., Madras J. Lit. Sci. (Ser. 3) 1: 52. 1884 & Ic. t. 173. 1874; Hook. f., Fl. Brit. India 4: 75. 1883; Gamble, Fl. Pres. Madras 859. 1923; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 83. 1987. ***C. albiflora*** Hook. f., Fl. Brit. India 4: 75. 1885; Gamble, Fl. Pres. Madras 859. 1923. ***C. ciliata*** Wight subsp. ***ensifolia*** (Bedd.) Huber in Mem. Soc. Bot. 12: 69, t.3, f.36. 1957 [Fig. 45 B].

Glabrous,twiner; tuber 2.5 cm across, subglobose. Leaves to 10 x 0.5 cm, linear-lanceolate, acuminate, base attenuate into a short petiole. Cymes 5-10 cm long, axillary, pubescent. Flowers green, few together; sepals 4 x 1 mm, lanceolate; corolla tube 1.5 cm long, slightly dialated below, narrow above; lobes 1.5 cm long, oblong, glabrous; outer corona 2 mm across; lobes deltoid, ciliate; inner corona spathulate, 1.5 mm long, ciliate towards base.

*Fl. & Fr.* : October-December

*Distr.*: Southern Western Ghats; endemic. Occasional; in semi-evergreen forests. Pachakkanam, *JA 17849*.

**Ceropegia hirsuta** Wight & Arn. in Wight, Contrib. 30. 1834; Hook. f., Fl. Brit. India 4: 7. 1883; Gamble, Fl. Pres. Madras 562. 1922; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 936. 1983; Ansari, Fl. India Fasc. 16: 16. 1984, excl. syn.; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 83. 1987; Manilal, Fl. Silent Valley 177. 1988. ***C. ophiocephala*** Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 2: 259. 1850. ***C. hirsuta*** var. ***stenophylla*** Hook. f., Fl. Brit. India 4: 71. 1983. ***C. hispida*** Blatt. & Mc Cann, J. Bombay Nat. Hist. Soc. 35: 409. 1931.

Hirsute twiner. Leaves to 12 x 1 cm, linear, acuminate, base acute, pubescent; petiole to 5 mm long. Flowers purple, 3-10 together, 3 cm long; peduncle 5mm long, stout; pedicels 12 mm long; calyx lobes 8 mm long, linear, ciliate; corolla dark purplish brown, tube 2.5 cm long, dialated at base, cylindric, broaden above, hairy inside, lobes 6 mm long, ovate, acute, hairy within; outer corona 5 mm across, lobes deltoid, bifid, densely ciliate, inner corona linear, erect, 2.5 mm long, hooked at tips, villous at base.

*Fl.* : October (Fruiting specimens could not be collected)

*Distr.* : Peninsular India. Very rare; in evergreen forests at high elevations. Kottamala, *JA 17879.*

**Ceropegia intermedia** Wight, Ic. t. 1263. 1848; Huber, Mem. Soc. Bot. 12: 61, t. 2, f. 26. 1957; Hook. f., Fl. Brit. India 4: 71. 1883; Gamble, Fl. Pres. Madras 858. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 937. 1983; Ansari, Fl. India Fasc. 16: 18. 1984; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 83. 1987; Manilal, Fl. Silent Valley 177. 1988.

Glabrous twiners. Leaves to 10 x 2 cm, lanceolate, acute to acuminate, base rounded or acute; nerves 3 or 4 pairs; petiole 1-1.7 cm long. Flowers purple, to 3 x 1 cm, few to many together, in axillary racemes; pedicels 15 mm long; sepals 4 x 0.6 mm, linear; corolla tube 2 cm long, prominently dialated at base, narrow above; lobes 10 x 3 mm, ovate, pubescent inside; gynostegium 4 x 0.9 mm; outer corona shallowly lobed, lobes blunt; inner corona lobes spathulate, connate above.

*Fl. & Fr.* : August-December

*Distr.* : South India and Sri Lanka. Occasional; in evergreen forests. Vellimala, *JA 13997, 14363.*

**Ceropegia maculata** Bedd., Madras J. Lit. Sci. (Ser. 3) 1: 52. 1864; Ansari, Fl. India Fasc. 16: 23. 1984; Nayar & Sastry, Red Data Book Indian Pl. 2: 46. 1988; Sasidh. & Sivar.,, Fl. Pl. Thrissur For. 286. 1996. ***C. parviflora*** Trimen, J. Bot. 27: 164. 1889.

Slender glabrous herbs. Leaves to 8.5 x 5.5 cm, ovate, acute or acuminate, base obtuse or rounded, membranous; nerves 3 pairs; petiole to 2.5 cm long. Peduncles shorter than the petioles.

Fig. 45. **A**. *Diospyros malabarica* (Desr.) Kostel.
**B**. *Ceropegia ensifolia* Bedd.

Flowers few to many, subumbellate; pedicel 1 cm long; sepals 3 mm long, linear; corolla to 1.8 cm long, base slightly inflated, greenish-violet on lower 2/3, white above, thinly villous in a ring inside, lobes 4 mm long, ovate, bluish-green, sparsely hairy; outer corona of 5 lobes, each deeply divided, hairy at base; inner corona linear as long as or slightly longer than the outer. Fruits not seen.

*Fl.* : September-November

*Distr.* : Southern Western Ghats (Kerala), endemic. Rare; in evergreen forests. Thannikkudy, *JA 16857.*

**Ceropegia metziana** Miq., Anal. Bot. Ind. 3: 11. 1852; Ansari, Fl. India Fasc. 16: 25. 1984; Nayar & Sastry, Red Data Book Indian Pl. 2: 51. 1988; Sasidh. & Sivar.,, Fl. Pl. Thrissur For. 286. 1996. ***C. brevicollis*** Hook. f., Fl. Brit. India 4: 74. 1883, p.p.; Gamble, Fl. Pres. Madras 859. 1923. ***C. stocksii*** non Hook. f., 1883: Gamble, Fl. Pres. Madras 859. 1923.

Twining herbs, stems pubescent at nodes. Leaves to 15 x 5 cm, ovate or ovate-oblong, acute or acuminate, mucronate, base acute; petiole 2-3 cm long. Peduncle to 2 cm long, glabrous or hairy. Flowers few together; pedicels 2-2.5 cm long, stout; sepals 7 mm long, linear; corolla to 7.5 cm long, base inflated, funnel-shaped above, lobes 3.5 cm long, ovate-deltoid, dull pink with purple dots; outer corona 6 mm across, lobes deltoid, bifid, hairy; inner corona 2.5 mm long, glabrous. Follicle 23-28 cm long, 5 mm thick, terete, with a 5 cm long beak; seeds 10 x 3 mm, oblong; coma 15 mm long.

*Fl & Fr.* : September-November

*Distr.* : Southern Western Ghats (Kerala), endemic. Occasional; in evergreen forests. Mlappara *JA 13319*; Kottamala, *JA 13302.*

**Ceropegia pusilla** Wight & Arn. in Wight, Contrib. 31. 1834; Hook. f., Fl. Brit. India 4: 66. 1883; Gamble, Fl. Pres. Madras 856. 1923; Ansari, Fl. India Fasc. 16: 28. 1984; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 84. 1987.

Erect tuberous herbs, to 15 cm tall; tuber 3-5 cm across, depressed globose. Leaves to 8 x 0.4 cm, linear, acute, base narrowed into a short petiole. Peduncle 8-10 mm long. Flowers greenish, 3-5 together, 3.5 cm long; sepals 4 x 1 mm, subulate, puberulus; corolla tube 1.6 cm long, dialated below; lobes 1.5 x 0.4 cm, oblong, obtuse, base revolute, auricled; outer corona 2 mm across, divided, lobes obtuse; inner corona 4.5 mm long, oblong, obtuse, connate. Fruits not seen.

*Fl.* : September

*Distr.* : Peninsular India, endemic. Rare; in grasslands. Vallakkadavu, *JA & KPR 16332*

## COSMOSTIGMA R. Wight

Contrib. Bot. India 41. 1834.

**Cosmostigma racemosum** (Roxb.) Wight, Contrib. 42. 1834 & Ic. t. 591. 1842; Hook. f., Fl. Brit. India 4: 46. 1883; Gamble, Fl. Pres. Madras 846. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 938. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 106. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 288. 1996. ***Asclepias racemosa*** Roxb., Fl. Ind. 2: 32. 1832.

Climbers; stem glabrous. Leaves to 10 x 5 cm, ovate, acute or acuminate, base rounded or subcordate, glabrous, with a few small black glandular papillae at base; lateral nerves 3 pairs, basally 5-nerved; petiole to 2.5 cm long. Racemes to 2.5 cm long. Flowers 8 mm across, many together; pedicels 1 cm long, slender, pubescent; sepals small, ovate to orbicular, ciliate; corolla greenish-yellow with brown dots, 4 mm long, lobes ovate, with minute brown spots; gynostegium 2 mm across, outer corona lobes orbicular, emarginate, membranous; inner corona similar to outer. Fruits not seen.

*Fl.* : July-August

*Distr.* : India and Sri Lanka. Occasional; in semi-evergreen forests. Sabarimala, *JA & KPR 15494.*

## CRYPTOLEPIS R. Brown

Mem. Wern. Nat. Hist. Soc. 1: 69. 1811.

**Cryptolepis buchananii** Roem. & Schult., Syst. Veg. 4: 409. 1819; Wight, Ic. t. 494. 1840; Hook. f., Fl. Brit. India 4: 5. 1883; Fl. Pres. Madras 826. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 939. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 183. 1983; Manilal, Fl. Silent Valley 177. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 288. 1996. **Pal valli**.

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 3 cm broad axillary cymes, few together; peduncles to 2 cm long, glabrous; pedicels 3-5 mm long; sepals free, 2 mm long, ovate, obtuse, with a small scale at the base inside; corolla campanulate, greenish-yellow, tube 2 mm long, lobes linear-lanceolate, 8 x 2 mm, imbricate; coronal lobes 1-seriate, clavate, 2 mm long, connate with corolla tube. Follicle 9 x 1 cm, divaricate, lanceolate, glabrous.

*Fl. & Fr.* : March-August

*Distr.* : India, Burma and Sri Lanka. Fairly common; in moist deciduous forests, in open areas. Vallakkadavu, *JA & KPR* 15441.

## 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, Contrib. 44. 1834 & Ic. t. 349. 1840; Hook. f., Fl. Brit. India 4: 29. 1883; Gamble, Fl. Pres. Madras 839. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 946. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 289. 1996. ***Periploca sylvestris*** Retz., Ob. Bot. 2: 15. 1781. **Chakkara kolli** (Mala Arayan)

Climbers; branchlets fulvous-tomentose. Leaves to 7 x 5 cm, often much smaller, elliptic to ovate or obovate, obtusely acute, base truncate or obtuse, subcoriaceous, densely tomentose below; nerves 3 pairs; petiole 1-3 cm long. Flowers 4 mm across, umbellate, many together; peduncle to 1 cm long, hispid; pedicels 6 mm long, slender; sepals 2 mm long, ovate; corolla campanulate, yellow, 2.5 mm long, tube globose, lobes triangular; corolline corona 5 vertical pairs of pubescent ridges; gynostegium 1.5 x 1 mm, cylindrical. Follicle 7.5 x 0.8 cm, lanceolate, seeds 10 x 5 mm, much compressed.

*Fl. & Fr.* : July-January

*Distr.* : Peninsular India, Sri Lanka and Tropical Africa. Occasional; in semi-evergreen forests. Sabarimala, *JA & KPR 15500.*

## HEMIDESMUS R. Brown

Mem. Wern. Nat. Hist. Soc. 1: 56. 1811.

**Hemidesmus indicus** (L.) R. Br. in Ait., Hort. Kew (ed. 2) 2: 75. 1811; Wight, Ic. t. 594. 1842; Hook. f., Fl. Brit. India 4: 5. 1883; Gamble, Fl. Pres. Madras 825. 1923; Stevens in Sald. & Nicols., Fl. Hassan Dist. 448. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 947. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 185. 1983; Manilal, Fl. Silent Valley 178. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 289. 1996. ***Periploca indica*** L., Sp. Pl. 211. 1753. **Naruneendi, Nannari** (Mala Arayan)

Slender twining herbs, stem slender, glabrous, usually brownish. Leaves very variable, 4-15 x 0.7-2 cm, elliptic-oblong to linear-lanceolate, acute to acuminate, pale below, young leaves often variegated, glabrous on both sides; nerves 10-15 pairs; petiole to 5 mm long. Flowers several, in axillary shortly peduncled cymes; pedicels many, short, bracteate; sepals 1 mm long, ovate, free; corolla mostly yellow, sometimes purple, 8 mm across, tube globose, lobes ovate, acute, valvate; corona 5, scale-like, connate with corolla tube; stamens 5, filaments subconnate at base: pollinia in pairs; gynostegium obovoid. Follicles 2, slender, terete.

*Fl. & Fr.* : August-December

*Distr.* : Peninsular India and Sri Lanka. Common; in moist deciduous forests. Koruthode, *JA & KPR 16300.*

## HOLOSTEMMA R. Brown

Mem. Wern. Nat. Hist. Soc. 1: 42. 1811.

**Holostemma ada-kodien** Schult. in Roem. & Schult., Syst. Veg. 6: 95. 1820; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 949. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 291. 1996. ***H. rheedei*** Spreng. ex Wall., Pl. As. Rar. 2: 51. 1831; Wight, Contrib. 55. 1834 & Ic. t. 597. 1842; Hook. f., Fl. Brit. India 4: 21. 1883. ***Asclepias annularis*** Roxb., Fl. Ind. 2: 37. 1832. ***H. annulare*** (Roxb.) K. Schum. in Engl. & Prantl, Pflanzenf. 4(2): 250. 1895; Gamble, Fl. Pres. Madras 834. 1923; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 81. 1983.

Glabrous twiners. Leaves to 12 x 8 cm, oblong or ovate, acute to cuspidate, base widely and deeply cordate; lateral nerves ca. 4-7 pairs, lower 2 pairs basal, base with few papillate glands; petiole to 4-5 cm long. Flowers few to many in axillary peduncled cymes; peduncles shorter than the petioles, stout; pedicels 1.5 cm long; calyx lobes ovate, 4 mm long; corolla 2.5 cm across, campanulate, pale purple, lobes 8 x 6 mm, ovate, obtuse; gynostegium 8 x 6 mm, outer corona short, truncate; inner corona 5, ovate, acute, glabrous. Fruits not seen.

*Fl.* : September-November

*Distr.* : India and Sri Lanka. Occasional; in moist deciduous forests, Koruthode, *JA 17863.*

## 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.....2
1. Leaves broad or elliptic.....3

2. Leaves retuse at apex.....**H. retusa**

2. Leaves acute at apex.....**H. pauciflora**

3. Leaves broadly elliptic, acuminate.....**H. wightii**

3. Leaves narrowly elliptic, acute or short acuminate.....**H. ovalifolia**

**Hoya ovalifolia** Wight & Arn. in Wight, Contrib. 37. 1834; Wight, Ic. t. 847. 1844; Hook. f., Fl. Brit. India 4: 60. 1883; Gamble, Fl. Pres. Madras 849. 1923; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 110. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 293. 1996.

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 *ca.* 0.8 cm long. Flowers 6-12, in axillary peduncled umbel; peduncles stout, to 3.5 cm long; pedicels slender, *ca.* 1.5 cm long; sepals 1.5 mm long, oblong; corolla 1 cm across, creamy-white, lobes ovate, acute; corona purplish, 4 x 4 mm, lobes acute. Follicles 9 x 1 cm, lanceolate.

*Fl Fr.* : November-December

*Distr.* : Peninsular India and Sri Lanka. Occasional; in semi-evergreen forests. Sabarimala, *JA 17864.*

**Hoya pauciflora** Wight, Ic. t. 1269. 1848; Hook. f., Fl. Brit. India 4: 56. 1883; Gamble, Fl. Pres. Madras 849. 1923; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 109. 1983; Manilal, Fl. Silent Valley 179. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 293. 1996.

Slender epiphytic glabrous climbers; stems sometimes rooting from nodes. Leaves 4-6 x 0.7-0.9 cm, linear-lanceolate, obtuse, base truncate; petiole to 3 mm long. Flowers in few-flowered subsessile umbellate cymes, terminal on lateral smaller branches or axillary; pedicels 1.5-2 cm long, slander; sepals 1.5 mm long, ovate; corolla white, 1.2-2 cm across, campanulate, lobes shallow, triangular; corona 4 mm across, lobes rounded at apex.

*Fl.* : November-December

*Distr.* : Peninsular India and Sri Lanka. Fairly common; in evergreen forests, Vellimala, *JA & KPR 16871.*

**Hoya retusa** Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 4: 294. 1852; Hook. f., Fl. Brit. India 4: 56. 1883; Gamble, Fl. Pres. Madras 849. 1923.

Epiphyte with slender terete stem, glabrous. Leaves usually clustered at short branch tips, to 8 x 0.4 cm, linear-spathulate, retuse at apex, subsessile. Flowers creamy, to 1 cm across, axillary, solitary; pedicels to 1 cm long, slender, filiform; sepals 1 mm long, oblong, obtuse, hispid

outside; corolla 10 mm across, creamy white, lobes triangular; corona deep purple, 5 mm across, lobes obovoid, radiating.

*Fl. & Fr.* : July-October

*Distr.* : Western Ghats. Occasional; in lowland evergreen forests. Koruthode, *JA 12211*

**Hoya wightii** Hook. f., Fl. India 4: 59. 1883; Gamble Fl. Pres. Madras 849, 1923; Manilal, Fl. Silent Valley 179. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 299. 1994 [Fig. 46].

Stout pendulous epiphytes, stem terete, glabrous. Leaves to 7 x 4 cm, elliptic, acuminate, base acute, thick and coriaceous; nerves 6-8 pairs, horizontal; petiole to 2 cm long. Flowers yellowish white, 1.5 cm across, many together; peduncles to 1 cm long, stout; pedicels 2.5 cm long; sepals 2.5 mm long, ovate, ciliolate; corolla lobes ovate, margins revolute; corona deep purple, 6 x 6 mm, lobes 3 mm high, subglobose.

*Fl. & Fr.* : April-May

*Distr.* : South India. Occasional; in evergreen forests. Vellimala, *JA 13591;* Uppermanalar, *JA & KPR 15011.*

## **MARSDENIA** R. Brown

Mem. Wern. Nat. Hist. Soc. 1: 28. 1811, *nom cons.*

**Marsdenia tirunelvelica** Henry & Subr., J. Bombay Nat. Hist. Soc. 73. 186, ff. 1-5. 1976; Sasi. & Swarup., J. Econ. Tax. Bot. 18: 626. 1994.

Glabrous twiners. Leaves to 8 x 5 cm, elliptic, acuminate, round to subcordate at base, glaucous beneath; nerves 5-8 pairs, subprominent, nervules reticulate; petiole 1-1.5 cm long. Flowers creamy, 5 x 5 mm, in short peduncled umbels; peduncles 5 mm long, stout; pedicels shorter than peduncle; sepals 2.5 x 2 mm, orbicular, obtuse, ciliate along margins; corolla tube urceolate, 4 mm long, pubescent within, lobes 2 x 1 mm, ovate, obtuse, margins ciliolate; gynostegium 3 x 2 mm; corona 1-seriate, ovate, membranous, acute, glabrous. Fruits not seen.

*Fl.*: February-May

*Distr.* : South India, endemic. Rare; in evergreen forests. Vellimala, *JA & KPR 15355.*

## **PERGULARIA** Linnaeus

Syst. Nat. ed. 12, 2: 191. 1767.

**Pergularia daemia** (Forssk.) Chiov., Result. Sci. Misc. Stefan. Paoli Somal. Ital. 1: 16. 1916; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 955. 1983; Huber in Dassan. &

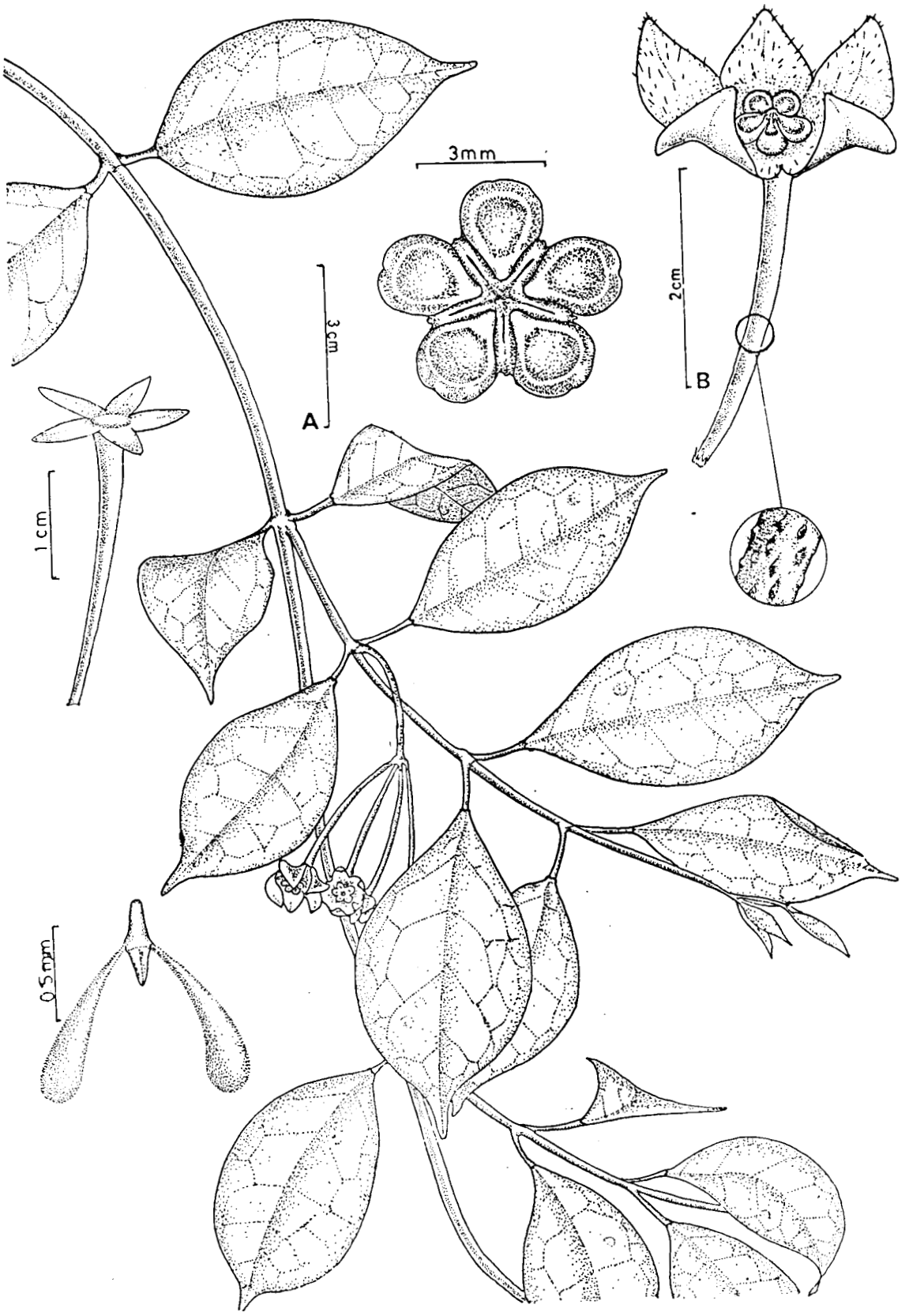



Fig. 46. *Hoya wightii* Hook. f.: **A.** flowering branch; **B.** flower; **C.** calyx; **D.** gynostegium as viewed from above; ***E.*** *pollinia.*

Fosb., Rev. Handb. Fl. Ceylon 4: 86. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 86. 1987. ***Asclepias daemia*** Forssk., Fl. Aeg.-Arab. 51. 1775. ***Cynanchum extensum*** Jacq., Misc. 2: 353. 1781. ***Daemia extensa*** (Jacq.) R. Br. in Ait. Hort. Kew ed. 2, 2 : 76. 1811; Wight, Ic. t. 596. 1842; Hook. f., Fl. Brit. India 4: 20. 1883. ***Pergularia extensa*** (Jacq.) N. E. Br. in Dyer, Fl. Cap. 4: 758. 1908; Gamble, Fl. Pres. Madras 2: 837. 1923.

Pubescent twiner. Leaves to 10 x 8 cm, ovate, caudate-acuminate, base deeply cordate; nerves 4-5 pairs; petiole to 6 cm long. Flowers creamy, 1.5 cm across, in branched cymes, peduncles to 12 cm long, pedicels to 2-3 cm long, slender; sepals short, hispid; corolla campanulate, tube villous at mouth, lobes 0.5 x 0.4 cm, ovate, acute, pubescent; outer corona 2 mm high, membranous, shallowly lobed, lobes emarginate, inner corona lobes vermiform, incurved, winged, 8 mm high. Follicle 6 x 1.5 cm, lanceolate, acuminate, covered with hooked glochidiate bristles.

*Fl. & Fr.* : July-November

*Distr.* : Tropical Africa India and Sri Lanka. Occasional; along roadsides. Thekkady, *JA & KPR 15314.*

## **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 suberect ..... 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, distinct ..... **T. capparidifolia**
4. Leaves membranous, ovate, acute, nerves indistinct ..... **T. tetrapetala** var. **tenuissima**
5. Stem trailing; root-stock woody ..... **T. rotundifolia**
5. Stem climbing ; root stock not woody ..... 6
6. Leaves 10-14 x 8 cm, broadly ovate-elliptic, subacuminate; flowers ca. 15 mm across ..... **T. subramanii**
6. Leaves to 5 x 1.2 cm, oblong, obtuse, apiculate; flowers ca. 2 mm across ..... **T. mollissima**

**Tylophora capparidifolia** Wight & Arn. in Wight, Contrib. 51. 1834; Hook. f., Fl. Brit. India 4: 41. 1883; Gamble, Fl. Pres. Madras 2: 843. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 962. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 89. 1987.

Glabrous twiners; stem twining to the right, slender. Leaves to 6 x 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 to 1 cm long. Raceme axillary, solitary, umbellate, congested, to 4 cm long. Flowers few; pedicels 8-12 mm long, slender; sepals 1.5 mm long, lanceolate; corolla 4 mm across, lobes obovate, revolute above, glabrous; corona brown, 1 mm across, lobes 5, uneven. Follicle 3-4 cm long, 8-10 mm thick, ovoid, narrowed at apex into a beak.

*Fl & Fr.* : January-May

*Distr.* : Southern Western Ghats, endemic. Occasional; in evergreen forests. Kottamala, *JA 13785.*

**Tylophora fasciculata** Buch.-Ham. ex Wight & Arn. in Wight, Contrib. 50. 1834; Wight, Ic. t. 848. 1845; Hook. f., Fl. Brit. India 4: 40. 1883; Gamble, Fl. Pres. Madras 842. 1923; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 93. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 89. 1987; Mohanan & Henry, Fl. Thiruvananthapuram 299. 1994.

Erect or suberect, pubescent twiners. Leaves to 4 x 2 cm, ovate, acute, rounded at base; nerves 3 or 4 pairs, lowest pairs basal; young leaves pinkish; petiole 1 cm long. Flowers brownish, 4 x 4 mm, 3-8 together, in axillary peduncled cymes; pedicels 5-8 mm long; sepals linear, puberulus; corolla lobes 2.5 x 1 mm, elliptic, obtuse, pubescent within; gynostegium 1.5 x 1 mm; corona process ovoid. Follicle 4 x 1 cm, ellipsoidal, glabrous

*Fl. & Fr.* : July-October

*Distr.* : India and Sri Lanka. Occasional; in grasslands. Varayattumudi, *JA 12075.*

**Tylophora macrantha** Hook. f., Fl. Brit. India 4: 40. 1883; Gamble, Fl. Pres. Madras 843. 1923; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 89. 1987; Manilal, Fl. Silent Valley 179. 1988.

Pubescent climbers; 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 6 x 5 mm, in 8-10-flowered, axillary, peduncled cymes; peduncles 1-1.5 cm long, puberulus; pedicels 8-10 mm long, glandular punctate; sepals 2 x 0.5 mm, ovate-lanceolate, acute, outside pubescent; corolla brown, 10 mm across, lobes 5 x 3.5 mm, elliptic, acuminate, truncate, inner pubescent. Gynostegium 1 x 2 mm, processes obovoid. Fruits not seen.

*Fl.* : June

*Distr.* : Southern Western Ghats; endemic. Occasional; in grasslands. Vallakkadavu, *JA 15420.*

**Tylophora mollissima** Wight & Arn., in Wight, Contrib. 49. 1834; Wight, Ic. t. 1275. 1848; Hook. f., Fl. Brit. India 4: 48. 1883; Gamble, Fl. Pres. Madras 843. 1923; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 89. 1987.

Pubescent twiners. Leaves to 5 x 2 cm, oblong, rounded, apiculate, rounded at base; nerves 4 pairs, narrow; petiole 5-15 mm long. Raceme 3-10 cm long, branched, umbellate, axillary. Flowers pinkish, 2 mm across, clustered in short lateral groups; pedicels 5-9 mm long; sepals 1 x 0.5 mm, ovate, acute, hirsute; corolla brownish, lobes 2 x 1 mm, ovate-oblong, obtuse; corona shallowly 5-lobed. Fruits not seen.

*Fl.* : Throughout the year

*Distr.* : Southern Western Ghats, endemic. Occasional; in grasslands. Kalvarimala, *JA 13879*; Uppermanalar, *JA & KPR 15028*; Eravangalar, *JA & KPR 15267*; Brook's peak, *JA 17005.*

**Tylophora rotundifolia** Buch.-Ham. ex Wight, Contrib. 50. 1834; Hook. f., Fl. Brit. India 4: 43. 1883; Gamble, Fl. Pres. Madras 843. 1923; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 89. 1987.

Trailing herbs; stems covered with curved hairs. Leaves to 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 cm long, peduncled. Flowers creamy, 7 mm across, many together; sepals 2 x 0.2 mm, linear, hirsute; corolla lobes 3 x 2 mm, ovate, obtuse; gynostegium 1.1 x 1 mm, corona process globose. Follicle 4 x 1.5 cm, ellipsoid, glabrous.

*Fl. & Fr.* : May-September

*Distr.* : Peninsular India. Occasional; in grasslands. Thannikkudy, *JA 12632.*

**Tylophora subramanii** Henry, Proc. Indian Acad. Sci. 65B: 161. 1967; Shetty & Vivek., Bull. Bot. Surv. India 14(1-4): 22. 1972; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 90. 1987.

Pubescent stout twiners. Leaves to 14 x 8 cm, ovate or elliptic, oblong, obtuse at apex, aciculate, rounded or cordate at base, rusty pubescent; nerves 6 pairs, irregular; petiole 1.5-3 cm long. Umbel axillary, solitary, 10-15-flowered; peduncle to 10 mm long. Flowers creamy, 1.5 cm across; pedicels 8 mm long, stout, pubescent; sepals 3.5 x 1.5 mm, oblong, acute, hirsute; corolla lobes 6 x 5 mm, ovate, obtuse, oblique at apex; corona 3 x 3 mm, orbicular to shortly 5-lobed; Gynostegium 3 mm high, shortly 5-lobed at apex, glabrous.

*Fl. & Fr.* : March-June

*Distr.* : Southern Western Ghats, endemic. Rare; in evergreen forests, Sunderamala, *JA 13604*; Uppermanalar, *JA 13763*

*Note* : This species was originally described from Tirunelvely. Its occurrence in Idukki district was earlier reported by Shetty and Vivekananthan (1972).

**Tylophora tetrapetala** (Dennst.) Suresh in Nicols. *et al.*, Interp. Hort. Malab. 64. 1988, var. **tenuissima** (Roxb. ex Willd.) Swarup., Blumea 38:234.1993. ***Asclepias tetrapetala*** Dennst., Schluss. Hort. Mal. 14, 18, 35. 1818. ***A. tenuissima*** Roxb. ex Schult. 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; Mohanan & Henry, Fl. Thiruvananthapuram 300. 1994. ***T. tenuissima*** (Roxb. ex Schult.) Wight & Arn. in Wight, Contrib. 49. 1834; Wight, Ic. t. 588. 1842 Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 96. 1983.

Glabrous twiners. Leaves to 5 x 1.5 cm, oblong-lanceolate, apiculate, rounded at base, nerves 4 pairs, very slender; petiole 0.5 cm long. Umbels in branched racemes, up to 4 cm long; peduncle 1.5 cm long, slender. Flowers brownish, 3 mm across, 3-7 together, in lateral umbellate cluster; pedicels to 8 mm long; sepals subulate, glabrous; corolla yellowish brown, lobes 4, ovate, acute; gynostegium 0.6 x 1 mm; corona process globose. Follicle 4 cm long, ovoid, glabrous, narrowed into a short beak.

*Fl.* : May-June

*Distr.* : Indo-Malesia. Rare; in evergreen forests. Thekkady, *JA & KPR 14915.*

*Note* : Swarupanandan and Nicolson (1993) recognised two varieties. The present specimens from evergreen forests, with oblong, lanceolate, membranous leaves and with sessile individual cymes belongs to var. **tenuissima** Swarupanandan (1993).

## 84. LOGANIACEAE

R. Brown ex Mart., Nov. Gen. Sp. Pl. 2: 133. 1827.

1. Leaves 3-5-ribbed from the base ..... **Strychnos**
1. Leaves penninerved ..... 2
2. Corolla lobes twisted; leaves succulent; large epiphytic shrubs ..... **Fagraea**
2. Corolla lobes valvate; leaves not succulent; climbers ..... **Gardneria**

### FAGRAEA Thunberg

Vet. Acad. Handl. Stockh. 125. 1782.

**Fagraea ceylanica** Thunb., Vetensk. Acad. Handl. 3: 132. 1782; Hook. f., Fl. Brit. India 4: 83. 1883 "*zeylanica*"; Gamble, Fl. Pres. Madras 865. 1923; Manilal, Fl. Silent Valley 180. 1988;

Sasidh. & Sivar., Fl. Pl. Thrissur For. 295. 1996. ***F. obovata*** Wall. in Roxb., Fl. Ind. 2: 33. 1824; Hook. f., Fl. Brit. India 4: 83. 1883; Gamble, Fl. Pres. Madras 865. 1923. **Modakam**, **Modakakkodi** (Mannan), **Kompal** (Malam pandarum).

Small trees or shrubs, terrestrial or epiphytic. Leaves to 20 x 8 cm, obovate, obtuse, base cuneate, entire, fleshy, glossy above; petiole to 2.5 cm, united by stipular sheath at base. Flowers few to many, large, in terminal cymes, 5-merous; branches of cyme stout; calyx tube 5 mm long, lobes 8 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 cm long; stigma capitate. Berry 4 cm long, ellipsoid, obtuse, glabrous, glossy.

*Fl. & Fr.* : June-December

*Distr.* : South India, Indo-Malesia and Sri Lanka. Common; along the margins of evergreen forests. Sabarimala, *JA 15475.*

## **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. 1923; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 91. 1987; Manilal, Fl. Silent Valley 181. 1988.

Small glabrous climbers. Leaves to 10 x 5 cm, ovate, abruptly acuminate, acute at base, entire; nerves 4 or 5 pairs; petiole 1 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 mm long, basely united, oblong, acute; stamens 4, attached at the base of corolla lobes; ovary 2-celled, glabrous; style subulate. Berry 7 x 6 mm, globose, blue; seeds 2, cup-shaped, with pulpy placenta on concave surface.

*Fl. & Fr.* : July-January

*Distr.* : Indo-Malesia. Common; in evergreen forests. Mlappara, *JA 12119*; Vellimala, *NS & JA 12903.*

## **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. Berry 6-7 cm across; tendrils simple.....**S. colubrina**
1. Berry to 3 cm across; tendrils, if present, forked .....2
2. Corolla-tube short, lobes 5 times longer than the tube.....**S. vanprukii**
2. Corolla-tube at least as long as the lobes .....3
3. Trees; corolla-tube much longer than lobes.....**S. nux-vomica**
3. Tendrillate climbers; corolla-tube as long as the lobes.....4
4. Leaves reddish when dry; berries shining.....**S. lenticellata**
4. Leaves green when dry; berries ash coloured, rough.....**S. minor**

**Strychnos colubrina** L., Sp. Pl. 189. 1753; Nicols. *et al.*, Interp. Hort. Malab. 163. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 297. 1996. ***S. wallichiana*** Steud. ex DC., Prodr. 9: 13. 1845; Bisset & Philcox, Taxon 20: 543. 1971. ***S. rheedei*** Clarke in Hook. f., Fl. Brit. India 4: 87. 1883. ***S. cinnamomifolia*** Thw. var. ***wightii*** Hill., Kew Bull. 1917: 194. 1917; Gamble, Fl. Pres. Madras 869. 1923.

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 mm long; calyx 1.5 mm long, lobes ovate, obtuse, ciliate; corolla greenish yellow, tube 10 mm long, hairy inside, lobes 4 x 2 mm, oblong, obtuse; anthers sessile; style 12 mm long, stigmas bilobed, globose. Berry globose, glabrous, greenish.

*Fl. & Fr.* : March-August

*Distr.* : Indo-Malesia. Common; in evergreen forests at lowered elevation. Koruthode, *JA 12213*; Kallar, *JA 13459.*

**Strychnos lenticellata** Hill., Kew Bull. 1917: 159. 1917; Gamble, Fl. Pres. Madras 868. 1923; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 91. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 297. 1996.

Large climbing shrubs; tendrils 7 cm long, forked, lobes curved. Leaves to 9 x 4 cm, acute at base and apex, reddish brown when dry, 3-ribbed with a narrow sub-marginal rib; nervules raised; petiole 7 mm long, glabrous. Cymes short, axillary, 2 cm across. Flowers 5-6 together; pedicels 5-6 mm long, slender; calyx 1.5 mm long, lobes ovate, acute, glabrous; corolla 6 mm

across, tube equal to the lobes; ovary glabrous, style 6 mm long. Berry 2 cm across, globose, seeds 1 or 2, flat, compressed.

*Fl. & Fr.* : April-June

*Distr.* : Southern Western Ghats, endemic. Common; in evergreen forests at high elevations. Aladi, *JA 13560.*

**Strychnos minor** Dennst., Schluess. Hort Malab. 15, 25, 33. 1818; Bisset & Philcox, Taxon 20: 542. 1971; Nicols. *et al.*, Interp. Hort. Malab. 164. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 297. 1996. ***S. colubrina*** sensu Clarke in Hook. f., Fl. Brit. India 4: 87. 1883 p.p., non L., 1753. Gamble, Fl. Pres. Madras 868. 1923

Large woody climbers; tendrils forked. Leaves 9-12 x 4 cm, acute at both ends, 3-ribbed with a narrow intramarginal vain, reticulation not prominent, green when dry. Cymes 3 x 2 cm, axillary; bracts ovate, acute. Flowers few together; pedicel 3 mm long, hirsute; calyx lobes obtuse, ciliate; corolla 5 mm long, yellow, tube villous inside, lobes 2.5 mm long, ovate, acute; filaments 1 mm long, hirtus. Berry 2 cm across, subglobose, ash-white, rugose.

*Fl. & Fr.* : November-February

*Distr.* : Indo-Malesia. Common; in evergreen forests at low elevations. Pambavalley, *JA 12739.*

**Strychnos nux-vomica** L., Sp. Pl. 189. 1753; Bedd., Fl. Sylv. t. 243. 1872; Clarke in Hook. f., Fl. Brit. India 4: 90. 1883; Gamble, Fl. Pres. Madras 868. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 966. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 297. 1996.

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 cm long. Cymes 2-3 cm across, terminal. Flowers sessile; calyx 1 mm long, lobes triangular, acute, pubescent; corolla greenish yellow, tube 10 mm long, hairy within; lobes 4 x 1.5 mm, oblong, acute; anthers sessile, inserted at the throat of corolla tube. Berry 3-4 cm across, red, glabrous; seeds 3 or 4, orbicular, flat.

*Fl. & Fr.* : March-May

*Distr.* : India, Indo-China, Malesia and Sri Lanka. Common; in moist deciduous forests at low elevations. Ennakkapally, *JA 13487.*

**Strychnos vanprukii** Craib in Kew Bull. 1911: 421. 1911. ***S. aenea*** Hill., Kew Bull. 1917: 138. 1917; Gamble, Fl. Pres. Madras 867. 1923; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 92. 1987.

Large climbers; tendrils 6-12 cm long, bifid. Leaves 10-15 x 5-7 cm, elliptic, acute at both ends, reddish when dry; nerves prominent, nervules subparallel; petiole 5 mm long. Cymes 2 x 3

cm, peduncled, axillary. Flowers many; calyx lobes 2 x 1 mm, ovate, acute, glabrous; corolla bright yellow, 7 mm long, tube short, lobes 5-6 x 1.5 mm, oblong, acute, hairy inside; filaments 4 mm long, anthers hardly wider than filaments; ovary conical, continued into the style, together 5 mm long, stigma 2-toothed.

*Fl. & Fr.* : April

*Distr.* : Southern Western Ghats. Rare; in evergreen forests at low elevation. Arjunankotta, *JA 15069.*

## 85. BUDDLEJACEAE

K. Wilh., Samenpflanzen. 90. 1910.

### BUDDLEJA Linnaeus

Sp. Pl. 112. 1753

**Buddleja asiatica** Lour., Fl. Cochinch. 1: 72. 1790; Clarke in Hook. f., Fl. Brit. India 4: 82. 1883; Gamble, Fl. Pres. Madras 865. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 968. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 92. 1987; Manilal, Fl. Silent Valley 181. 1988.

Erect shrubs; stem densely white-pubescent. Leaves opposite, to 11 x 2 cm, lanceolate, acuminate, white-tomentose beneath, glabrous above; petiole .6 mm long. Racemes terminal, panicled, to 15 cm long; rachis densely white hairy. Flowers closely placed, subsessile; bracts subulate; calyx deeply 5-partite, 2.5 mm long, hirsute; corolla 3 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.

*Fl. & Fr.* : October-January

*Distr.* : South-East Asia. Common; in savannahs. Kumily, *JA 12498.*

## 86. GENTIANACEAE

Juss., Gen. Pl. 141. 1789.

1. Flowers irregular.....**Canscora**
1. Flowers regular.....2
2. Ovary one celled; calyx free; petals with a nectary chamber at base inside.....**Swertia**
2. Ovary 2-celled; calyx united; petals without nectary chambers.....**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. Stem 4-winged; bracts perfoliate ..... 2
1. Stem wingless; bracts free ..... **C. diffusa**
2. Flowers rose; calyx not winged, striate ..... **C. roxburghii**
2. Flowers white; calyx broadly winged ..... **C. perfoliata**

**Canscora diffusa** (Vahl) R. Br. ex Roem. & Schultes, Syst. 3: 301. 1820; Clarke in Hook. f., Fl. Brit. India 4: 103. 1883; Gamble, Fl. Pres. Madras 878. 1923; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3:71.1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 972. 1983; Manilal, Fl. Silent Valley 181. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 298. 1996. ***Gentiana diffusa*** Vahl, Symb. Bot. 3:47. 1794. ***Canscora lawii*** Wight, Ic. t. 1327. 1848.

Branched annual herbs, to 30 cm high; stem 4-angular. Lower leaves elliptic, petiolate; upper ones ovate, sessile, 3-ribbed, glabrous. Cymes terminal; bracts ovate. Flowers many; pedicel 1 cm long, filiform; calyx 6 mm long, wingless, 5-toothed, glabrous; corolla white, 9 mm long, tube cylindrical, lobes lanceolate, acute; two stamens fertile, two sterile; capsule 5 mm long, linear-oblong.

*Fl. & Fr.* : November-December

*Distr.* : South East Asia, Tropical Africa and Tropical Australia. Very common; along stream banks at low elevations. Attathodu, *JA 12748*; Kavalappara, *JA & KPR 14548.*

**Canscora perfoliata** Lam., Encycl. 1: 601. 1785; Clarke in Hook. f., Fl. Brit. India 4: 1094. 1884; Gamble, Fl. Pres. Madras 879. 1923; Manilal, Fl. Silent Valley 182. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 298. 1996.

Branched annual herbs, 40-55 cm high. Leaves to 4 x 1.5 cm, ovate, acute, upper ones sessile, lower petiolate. Cymes terminal; bracts 10 mm across, membranous. Flowers many; pedicel 13 mm long, winged towards apex; calyx 15 mm long, 8-winged, lobes acuminate, wings strongly nerved; corolla 18-20 mm long, glabrous, lobes unequal. Capsule 8 x 2 mm, oblong; seeds irregular, brown, glassy.

*Fl. & Fr.* : November-December

*Distr.* : South West India. Very common; along stream banks. Attathodu, *NS & JA 12747.*

**Canscora roxburghii** Arn. ex Miq., Anal. Bot. Ind. 3: 10. 1852; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 72. 1981; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 93. 1987; Manilal, Fl. Silent Valley 182. 1988. ***C. perfoliata*** sensu Wight, Ic. t. 1327. 1850, non Lam., 1785. *C. wallichii* Clarke in Hook. f., Fl. Brit. India 3: 105. 1883; Gamble, Fl. Pres. Madras 879. 1923.

Branched herbs to 20 cm high. Leaves to 2.5 x 1 cm, lanceolate, rounded at base, sessile, 3-ribbed, glabrous. Cymes terminal and on lateral branches; bracts 10 mm across, acuminate on either ends. Flowers few; pedicel 8 mm long, filiform; calyx 10 mm long, tube narrowly 8-winged or ribbed, lobes 4, acuminate; corolla 14 mm long, tube cylindrical, lobes two larger obovate and two smaller oblong, acute; stamens 4, one fertile with larger anther.

*Fl. & Fr.* : October-December

*Distr.* : South India and Sri Lanka. Common; in grasslands. Thekkady, *JA 12397*; Thaannikkudy, *JA & KPR 14235.*

## EXACUM Linnaeus

Sp. Pl. 112. 1753.

Annual or perennials, erect, glabrous. 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 ..... **E. sessile**
1. Calyx winged; leaves over 1.5 cm long ..... 2
2. Flowers 4-merous ..... 3
2. Flowers 5-merous ..... 4
3. Leaves 5-ribbed; corolla ca. 3 cm long ..... **E. grande**
3. Leaves 3-ribbed; corolla ca. 2 cm long ..... **E. tetragonum**
4. Corolla lobes ca. 10 mm long; stem 4-winged ..... **E. wightianum**
4. Corolla lobes more than 20 mm long; stem 4-angled ..... 5
5. Leaves erect, acute; stem terete ..... **E. anamallayanum**
5. Leaves horizontal, acuminate; stem quadrangular ..... **E. atropurpureum**

**Exacum anamallayanum** Bedd., Ic. t. 154. 1874; Gamble, Fl. Pres. Madras 874. 1923; Klack., Opera Bot. 84: 69. 1985; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 93. 1987. ***E. atropurpureum*** Bedd. var. ***anamallayanum*** (Bedd.) Clarke in Hook. f., Fl. Brit. India 4: 97. 1883.

Perennial herbs, 80-150 cm high. Leaves 5-7 x 3-4 cm, ovate, acute, base encircle the stem, 5-ribbed. Cymes terminal and upper axillary; peduncles 2 cm long. Flowers few; pedicel 2 cm long; calyx 10 mm long, lobes lanceolate, acuminate, wing smooth; corolla 35 x 15 mm, blue with yellow throat, tube short, lobes obovate, abruptly acuminate, apiculate; anthers 10 mm long, glandular at apex.

*Fl. & Fr.* : March-May

*Distr.* : Southern Western Ghats, endemic. Rare; in openings of evergreen forests at higher elevations. Kottamala, *JA 17897.*

**Exacum atropurpureum** Bedd., Ic. t. 119. 1874; Clarke in Hook. f., Fl. Brit. India 4: 97. 1883; Gamble, Fl. Pres. Madras 874. 1923; Klack., Opera Bot. 84: 71. 1985; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 94. 1987; Mohanan & Henry, Fl. Thiruvananthapuram 305. 1994.

Erect woody herbs, to 50 cm high. Leaves to 4.5 x 2.5 cm, broadly ovate, rounded or cordate at base, acute to acuminate at apex, sessile, 5-ribbed. Cymes terminal; bracts 15 x 10 mm, ovate, acute. Flowers many; pedicel 4 cm long, stout, 4-angled; calyx 10 mm long, lobes acuminate, wings 2 mm broad, strongly veined, obtuse at base; corolla tube 5 mm long, lobes 20 mm long, elliptic, acute, blue; anthers 8 mm long, bottle-shaped, glandulose at apex; ovary 5 x 3 mm, glabrous; style 13 mm long, stigma globose.

*Fl. & Fr.* : March-May

*Distr.* : Southern Western Ghats; endemic. Rare; in evergreen forests at higher elevations. Sunderamala, *JA 13584.*

**Exacum grande** Klack., Opera Bot. 84: 43. 1985; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 94. 1987. ***E. perrottetii*** auct. non Griseb, 1845: Wight, Ic. t. 1322. 1848; Clarke in Hook. f., Fl. Brit. India 4: 95. 1883; Gamble, Fl. Pres. Madras 872. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 975. 1983.

Perennial herbs, to 120 cm high; stem narrowly winged. Leaves to 8.5 x 3.5 cm, elliptic, amplexicaule at base, acute at apex, 5-ribbed. Cymes terminal, corymbose; bracts 1 cm long, lanceolate, acuminate. Flowers many; pedicel 10 mm long; calyx 13 mm long, lobes 4, acuminate, wings 3 mm broad; corolla blue, lobes 30 x 10 mm, ovate, acute; anthers 11 mm long, eglandular.

*Fl. & Fr.* : December-February

*Distr.* : South India, endemic. Rare; in grasslands at higher elevations. Kalvarimala, *JA 12794*; Kumarikulam, *NS & JA 13018.*

**Exacum sessile** L., Sp. Pl. 112. 1753; Wight, Ic. t. 1324. 1848; Clarke in Hook. f., Fl. Brit. India 4: 98. 1883; Gamble, Fl. Pres. Madras 874. 1923; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 65. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 975. 1983; Klack., Opera Bot. 84: 51. 1985; Manilal, Fl. Silent Valley 183. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 299. 1996.

Erect herbs, to 20 cm high; stem narrowly winged. Leaves to 10 x 8 mm, 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 mm long, lobes oblong, acute; corolla violet or light blue, lobes deltoid; anthers 1.5 mm long.

*Fl. & Fr.* : July-December

*Distr.* : Peninsular India and Sri Lanka. Very common; in grasslands at all elevations. Thekkady, *JA 13838*; Kalvarimala, *JA 13893.*

**Exacum tetragonum** Roxb., Fl. Ind. 1: 413. 1820; Clarke in Hook. f., Fl. Brit. India 4: 95. 1883; Gamble, Fl. Pres. Madras 873. 1923; Klack., Opera Bot. 84: 37. 1985; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 94. 1987; Manilal, Fl. Silent Valley 183. 1988.

Tall herbs, to 120 cm high; stems quadrangular, not or narrowly winged. Leaves to 7 x 1.5 cm, elliptic, narrowed to a broad petiole, acute at apex, 3-ribbed. Cymes terminal, corymbose; bracts 7 mm long, linear. Flowers many; calyx 9 mm long, wings 2 mm broad, lobes acuminate; corolla blue, tube short, lobes 20 x 8 mm, elliptic, acute; anthers 8 mm long, eglandular, filaments broaden at base.

*Fl. & Fr.* : December-January

*Distr.* : Southern Western Ghats, endemic. Common; in grasslands. Kavalappara, *JA & KPR 14549.*

**Exacum wightianum** Arn., Ann. Sci. Nat. Bot. 11: 176. 1839; Wight, Ic. t. 840. 1844; Clarke in Hook. f., Fl. Brit. India 4: 97. 1883; Gamble, Fl. Pres. Madras 873. 1923; Klack., Opera Bot. 84: 74. 1985; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 95. 1987. ***E. atropurpureum*** Bedd. var. ***palghatense*** Gamble, Fl. Pres. Madras 874. 1923.

Woody erect herbs, to 90 cm high; stems scarcely dichotomous or unbranched. Leaves 5-8 x 3-5 cm, ovate, acute, cordate at base, 5-ribbed. Cymes terminal, peduncled; bracts linear

lanceolate. Flowers few; pedicels deflexed in fruit; calyx 14 mm long, lobes lanceolate, acuminate, wings 3 mm broad, obtuse to subcordate at base, nerves not prominent; corolla tube 4 mm long, lobes obovate, glandular; anthers 4.5 mm long, black-glandular at apex.

*Fl. & Fr.* : November-January

*Distr.* : Southern Western Ghats, endemic. Common; in grassy patches at higher elevations. Inchippara, *JA 12598*; Vellimala, *JA & KPR 14352.*

**SWERTIA** Linnaeus

Sp. Pl. 226. 1753

**Swertia corymbosa** (Griseb.) Wight ex Clarke in Hook. f., Fl. Brit. India 4: 126. 1883; Gamble, Fl. Pres. Madras 881. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 977. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 96. 1987; Manilal, Fl. Silent Valley 184. 1988. ***Ophelia corymbosa*** Griseb., Gen. Sp. Gent. 317. 1839; Wight, Ic. t. 1329. 1848. **Avalpoovu** (Mannan).

Stout erect herbs; 30-40 cm high; stem 4-angled, profusely branched. Leaves to 3 x 2 cm, ovate, acute, subamplexicaule at base, 3-ribbed. Cymes terminal, corymbose. Flowers densely packed; bracts 1 cm long, lanceolate; pedicel 13 mm long; calyx lobes 11 x 1.5 mm, lanceolate, free; corolla white with bluish spots, 12 x 4 mm; lobes 4, connate at base only; nectary chamber at the base of corolla, covered with an orbicular lid, rim of the chamber with scabrous bristle; stamens 4, all fertile; ovary ovoid; style short; stigma capitate. Capsule 2-valved; seeds many, reticulate.

*Fl. & Fr.* : September-December

*Distr.* : Peninsular India. Common; in grasslands at hill tops. Mangaladevi, *JA 12471.*

*Ethnobotanical use* : Paste of roots are mixed with cow milk and is given orally for stomach disorders

## 87. MENYANTHACEAE

(Dumort.) Dumort., Anal. Fam. Pl. 20, 25. 1829.

**NYMPHOIDES** J. Hill

Brit. Herbal. 77. 1756.

**Nymphoides hydrophylla** (Lour.) O. Ktze., Rev. Gen. Pl. 2: 429. 1891; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 979. 1983; Sivar., & Joseph, Aqua. Bot. 45: 153. 1993.

*Menyanthes hydrophylla* Lour., Fl. Cochinch. 1: 129. 1790. ***M. cristata*** Roxb., Pl. Corom. t. 105. 1798. ***Limnanthemum cristatum*** (Roxb.) Griseb., Gen. Sp. Gent. 342. 1839; Wight, Ill. 2: t. 157, f. 4. 1850; Clarke in Hook. f., Fl. Brit. India 4: 131. 1883; Gamble, Fl. Pres. Madras 883. 1923 [Fig. 47 A].

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, 4 x 1.5 mm, oblong, corolla to 13 mm 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 3 x 2 mm; obovoid, glabrous; seeds many, 1 x 1 mm, biconvex.

*Fl. & Fr.* : Throughout the year

*Distr.* : India and China. Occasional; in rivers and ditches in grasslands. Kumarikulam, *JA & KPR 14246*; Vallakkadavu, *JA 17106.*

## 88. BORAGINACEAE

Juss., Gen. Pl. 128. 1789.

1. Flowers in panicled cymes; trees or large shrubs.....2
1. Flowers solitary or in racemes or scorpioidal cymes; low shrubs or herbs.....3
2. Styles twice forked; drupe more than 1 cm across.....**Cordia**
2. Styles once forked; drupe less than 0.7 cm across.....**Ehretia**
3. Nutlets glochidiate; style gynobasic.....**Cynoglossum**
3. Nutlets smooth; style terminal.....4
4. Lower leaves opposite; anthers connivent in a cone.....**Trichodesma**
4. Leaves all alternate; anthers free.....5
5. Flowers solitary or 2-3 together.....6
5. Flowers in scorpioid cymes.....7
6. Styles 2; prostrate herbs.....**Coldenia**
6. Style 1; stout virgate shrubs.....**Rotula**
7. Scandent glabrous shrubs.....**Tournefortia**
7. Erect hispid herbs.....**Heliotropium**

### COLDENIA Linnaeus

Sp. Pl. 125. 1753

**Coldenia procumbens** L., Sp. Pl. 125. 1753; Clarke in Hook. f., Fl. Brit. India 4: 144. 1883; Gamble, Fl. Pres. Madras 892. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic

3(1): 983. 1983; Joan & James in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 23. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 301. 1996. **Nilum paranda**

Prostrate herbs with radiating branches; stems hispid. Leaves 2-4 x 2 cm, oblong with wavy margins, obtuse, densely hispid, nerves deeply impressed above; petiole to 1 cm long. Flowers axillary, solitary, sessile; sepals 5, 1 mm long, ovate, acute; corolla pale green, 2 mm long, 5-lobed, tube short; stamens 5, filaments short, inserted inside the tube; ovary 4-lobed, 2-celled, 2-ovules in each cell; styles 2, free, stigmas capitate. Drupe 2 mm across, 4, 1-seeded pyrenes; seeds globose.

*Fl. & Fr.* : May-June

*Distr.* : South East Asia. Occasional; in lake shores appears flowers when water recedes. Manakkavala, *JA & KPR 15173.*

## **CORDIA** Linnaeus

Sp. Pl. 190. 1753.

Trees or shrubs. Leaves ovate or elliptic, entire or serrate, petioled. Flowers polygamous, in corymbose cymes, branches dichotomous; calyx campanulate, 3-5-lobed; corolla campanulate, lobes 5, curved out, imbricate; stamens 5, exerted; anthers sagitate; ovary 4-celled, one ovule in each cell; styles terminal, twice divided; stigmas capitate. Fruit a drupe with sticky pulp; seeds usually solitary.

1. Drupe ellipsoid; leaves serrate, subglabrous.....**C. octandra**
1. Drupe globose; leaves entire, densely tomentose.....**C. wallichii**

**Cordia octandra** DC., Prodr. 9: 477. 1845; Clarke in Hook. f., Fl. Brit. India 4: 140. 1883; Gamble, Fl. Pres. Madras 889. 1923; Sasidh. & Sivar., Fl. Pl. Thrissur For. 301. 1996. *C. **serrata*** sensu Wall. in Roxb., Fl. Ind. 2: 333. 1824, non Juss., 1830: Wight, Ic. t. 469. 1840.

Small trees; bark dark-grey; branchlets sparsely hairy. Leaves to 12 x 8 cm, ovate, acute or rounded at base, abruptly acuminate, at apex, serrate, scabrous above and below, nerves 5 pairs, nervules parallel; petiole 5 cm long. Cymes 10 x 10 cm, terminal, corymbose; branches and pedicels pilose. Flowers creamy yellow, pedicelled; calyx 14 mm long, densely woolly within; corolla 20 mm long, campanulate, lobes oblong, obtuse; filaments shorter than corolla lobes, hairy below; ovary obovoid, style short or absent, stigma sessile, 2-lobbed. Drupe 3 x 1.5 cm, ellipsoid, acute, glabrous.

*Fl. & Fr.* : September-November

*Distr.* : Endemic to Southern Western Ghats (Kerala). Rare; in evergreen forest at low elevations, Pamba, *JA 12383, JA 12761.*

**Cordia wallichii** G. Don, Gen. Syst. 4: 379. 1837; Bedd., Fl. Sylv. t. 245. 1872; Gamble, Fl. Pres. Madras 887. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1000. 1983; Manilal, Fl. Silent Valley 185. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 301. 1996. *C. **obliqua*** Willd. var. ***wallichii*** (G. Don) Clarke in Hook. f., Fl. Brit. India 4: 137. 1883. *C. **obliqua*** Willd. var. ***tomentosa*** Kazmi, J. Arnold Arbor. 51: 143. 1970. **Cheru thekku, virimaram** (Mannan).

Trees, to 15 m high; bark white corky; branchlets densely pubescent. Leaves to 14 x 8 cm, elliptic, acute at base and apex, densely pubescent below, scarcely above; nerves to 5 pairs, prominent; petiole 3 cm long. Cymes 8 x 8 cm, terminal, corymbose. Flowers creamy white; calyx 9 mm long, lobes 3, ovate, acute, hairy; corolla 15 mm long; lobes 6, oblong, acute; stamens 6, filaments villous at base. Drupe 2 x 2 cm, depressed-globose, yellow, shining.

*Fl. & Fr.* : April-June

*Distr.* : North Africa and South Asia. Common; in moist deciduous forests. Thekkady, *JA 13622*

*Ethnobotanical use* : The sticky pulp of the fruits are eaten (Mannan).

## CYNOGLOSSUM Linnaeus

Sp. Pl. 134. 1753

**Cynoglossum zeylanicum** (Vahl ex Hornem.) Thunb. ex Lehm., Neue Schriften Naturf. Gen. Halle 3(2): 20. 1817; Kazmi, J. Arnold Arbor. 52: 344. 1971; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 983. 1983; Manilal, Fl. Silent Valley 185. 1988; Verdc., Kew Bull. 43: 347. 1988; Joan & James in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 28. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 303. 1996. ***Anchusa zeylanica*** Vahl ex Hornem., Enum. Pl. Hort. Hafn. 3. 1807. ***Cynoglossum furcatum*** Wall. ex Roxb., Fl. Ind. 2: 6. 1824; Wight, Ic. t. 1395; Clarke in Hook. f., Fl. Brit. India 4: 155. 1883; Gamble, Fl. Pres. Madras 900. 1923. **Kayooram, Mudichilooram** (Mannan)

Erect 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 to 5 pairs, prominent, arching, upper leaves smaller; petiole to 1 cm long, flat. Racemes 10-35 cm long, straight or arching. Flowers sessile, many; sepals 5, 2 mm long, 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.

*Fl. & Fr.* : Throughout the year

*Distr.* : Indo-Malaya and Sri Lanka. Common; in openings of all types of forests. Thekkady, *JA 17954.*

## **EHRETIA** P. Browne

Civ. Nat. Hist. Jamaica 168. 1756.

**Ehretia indica** (Dennst. ex Kostel.) M.R. & S.M. Almeida, J. Bombay Nat. Hist. Soc. 90: 424. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 303. 1996. ***Bruxanella indica*** Dennst. ex Kostel., Allig. Med. Pharm. Fl. 5: 2002. 1836. ***Ehretia laevis*** Roxb. var. ***canarensis*** Clarke in Hook. f., Fl. Brit. India 4: 142. 1883. ***E. canarensis*** (Clarke) Gamble, Fl. Pres. Madras 891. 1923.

Trees, to 8 m high; branchlets glabrous. Leaves alternate, to 13 x 5 cm, elliptic, acuminate at apex, base acute; lateral nerves 4-6 pairs, drying black; domatia glandular; petiole 1.5 cm long. Cymes terminal and axillary, 5-10 cm across,. Flowers sessile; sepals 1 mm long, obtuse, ciliate; corolla white, 4 mm long, lobes oblong, obtuse; stamens 5, filaments 3.5 mm long; anthers 1 mm long, oblong, excerted above the level of petals; ovary ovoid, 2-celled, ovules 2 in each cell, style terminal, 3 mm long. Fruit a berry, 3-4 mm across, globose, reddish; seeds 4.

*Fl. & Fr.* : August-December

*Distr.* : Indo-China. Common; in semi-evergreen forests. Kalvarimala, *JA 13913.*

## **HELIOTROPIUM** Linnaeus

Sp. Pl. 130. 1753

**Heliotropium indicum** L., Sp. Pl. 130. 1753; Clarke in Hook. f., Fl. Brit. India 4: 152. 1883; Gamble, Fl. Pres. Madras 896. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 988. 1983; Joan & James in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 30. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 309. 1994.

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 to 5 cm long. Flowers sessile, in terminal 5-20 cm long scorpioid cymes, densely packed; sepals 1.5 mm long, lanceolate, hispid outside; corolla white, 3 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, 4 x 3 mm, glabrous; seeds 4, subglobose.

*Fl. & Fr.* : Throughout the year

*Distr.* : Pantropical. Common; in lake shores. Thekkady, *JA 17953.*

## ROTULA Loureiro

Fl. Cochinch. 121. 1790.

**Rotula aquatica** Lour., Fl. Cochinch. 121. 1790; Gamble, Fl. Pres. Madras 893. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1003. 1983; Manilal, Fl. Silent Valley 185. 1988; Joan & James in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 7. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 304. 1996. ***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. **Kalloorvanchi** (Mala Arayan).

Stout branching shrubs; branched virgate, usually pinkish, glabrous. Leaves alternate or fascicled, 1-2 x 0.5 cm, oblong-oblanceolate, obtuse, sessile. Flowers solitary or in few flowered cymes axillary; calyx 3.5 mm long 5-partite, lobes lanceolate; corolla pink, 5 mm long, 7 mm across, 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.

*Fl. & Fr.* : Throughout the year

*Distr.* : India to Philippines. Common; along rocky riverbeds, Koruthode, *JA & KPR 14734.*

*Ethnobotanical use* : The old stems and roots with bark are used for kidney stones. There are two kinds of **Kalloorvanchi:** one type (Poovan) is producing adventitious roots from tips of the branches when it touches the soil; the other type (Pida) is not producing such roots; the first kind is the useful one. The stems and roots are boiled till the colour of water is changed dull brown. This water is orally given. Mannan drink this water even though not suffering from problems of kidney stones. They believe that this is a prevention from such urinary problems.

## TOURNEFORTIA Linnaeus

Sp. Pl. 140. 1753

**Tournefortia heyneana** Wall. ex G. Don, Gen. Syst. 4: 369. 1837; Clarke in Hook. f., Fl. Brit. India 4: 145. 1883; Gamble, Fl. Pres. Madras 893. 1923; Manilal, Fl. Silent Valley 186. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 304. 1996. ***T. reticosa*** Wight, Ic. t. 1386. 1848; Clarke in Hook. f., Fl. Brit. India 4: 146. 1883; Gamble, Fl. Pres. Madras 893. 1923.

Scandent shrubs, branches glabrous. Leaves alternate, to 15 x 4 cm elliptic, oblong, acuminate at apex, acute to rounded at base, entire; petiole 1.5 cm long. Flowers in dichotomous scorpioid cymes, terminal, pedicelled; calyx 5-lobed, 2 mm long, ovate, acute; corolla 7 mm long, bottle-shaped, tubular, lobes 5, very short; stamens 5, included; anthers sessile, oblong; ovary 4-celled;. style terminal, bifid at apex. Drupe 4 x 3 mm, dehiscent into 2 pyrenes.

*Fl. & Fr.* : January-March

*Distr.* : Southern Western Ghats; endemic. Common; in evergreen forests. Arjunankotta, *JA 13155*; Uppermanalar, *KPR & JA 14443.*

### **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. 1923; Banarjee & Pramanik, Bull. Bot. Surv. India 17(1-4): 120. 1975; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 994. 1983; Manilal, Fl. Silent Valley 186. 1988; Joan & James in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 25. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 305. 1996.

Coarsely hispid erect herbs, to 50 cm high. Leaves 8-10 x 2 cm, lanceolate, acute at base and apex, tubercled hairy above, tomentose below; petiole 5 mm long. Flowers axillary or in terminal cymes, pedicelled; sepals 10 x 5 mm, enlarging in fruit, lobes 5, acuminate; corolla blue, 8 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.

*Fl. & Fr.* : Throughout the year

*Distr.* : India and Sri Lanka. Occasional; in disturbed forests. Thekkady, *JA 12403*; Thekkady, *JA & KPR 14817.*

## 89. 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; flowers 0.8 cm across.....**Evolvulus**
2. Style 1; flowers more than 1 cm across.....3
3. Fruit indehiscent.....4
3. Fruit dehiscent.....5
4. Style absent; petals obcordate.....**Erycibe**
4. Style present, filiform; petals not as above.....**Argyreia**
5. Pollen grains spinulose.....**Ipomoea**
5. Pollen grains smooth.....6
6. Ovary 1-celled, densely hairy.....**Hewittia**
6. Ovary 4-celled, glabrous.....**Merremia**

## **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; leaves oblanceolate, cuneate at base.....**A. cuneata**
1. Climbing shrubs; leaves ovate, rounded or cordate at base .....2
2. Ovary 2-celled; fruits reddish inside.....**A. imbricata**
2. Ovary 4-celled; fruits not reddish inside.....3
3. Leaves acute at base, thinly pubescent below .....**A. daltonii**
3. Leaves cordate at base, thickly pubescent below.....**A. hirsuta**

**Argyreia cuneata** (Willd.) Ker-Gawl., Bot. Reg. 8: t. 661. 1822; Clarke in Hook. f., Fl. Brit. India 4: 191. 1883; Gamble, Fl. Pres. Madras 909. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1006. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 102. 1987. ***Convolvulus cuneatus*** Willd., Sp. Pl. 1: 873. 1798. ***Rivea cuneata*** (Willd.) Wight, Ic. t. 890. 1844-45.

Erect shrubs; stem usually unbranched, terete, glabrous. Leaves to 6 x 2.5 cm, entire, shortly apiculate at apex, glabrous above, tomentose below; nerves 5 pairs, pinnate; petiole 8 mm long. Flowers in axillary peduncled cymes or solitary, peduncles 2 cm long, few-flowered; sepals 6 x 7 mm, orbicular, obtuse, glabrous; corolla 4 cm across, bluish pink. Berry 10 x 10 mm, ovoid, glabrous, yellow.

*Fl. & Fr.* : October-January

*Distr.* : Peninsular India. Rare; in rocky grasslands at high altitudes. Surulippara, *JA 17980.*

**Argyreia daltonii** Clarke in Hook. f., Fl. Brit. India 4: 190. 1883; Gamble, Fl. Pres. Madras 907. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1008. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 102. 1987.

Slender climbers; stem adpressed-hairy. Leaves to 14 x 6 cm, ovate, acute, thinly pubescent below, glabrous above; nerves 6 pairs, oblique, reticulate; petiole 1-3 cm long. Cymes axillary, peduncles stout; bracts 1.5-2 cm long, leaf-like. Flowers few; pedicels 0.5 cm long; sepals 4 mm long, ovate, obtuse, inner smaller, acute; corolla 4 cm long, 3 cm across; pink, glabrous. Berry 1.5 cm across.

*Fl. & Fr.* : October-January

*Distr.* : Peninsular India. Rare; in margin of grasslands and evergreen forests sholas. Pachakkanam, *JA 17981.*

**Argyreia hirsuta** Wight & Arn., Nova 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. 1923; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 296. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 305. 1996. ***Rivea hirsuta*** (Wight & Arn.) Wight, Ic. t. 891. 1845. **Pathvan** (Malam pandaram).

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, to 10 cm long; bracts leafy, 3-4 cm long, elliptic, shortly petioled; sepals equal, ovate, obtuse, sparsely hairy; corolla 7 cm long, 6 cm broad, campanulate, hispid outside, pink. Berry 13 mm across, depressed-globose, yellow, glabrous.

*Fl. & Fr.* : August-December

*Distr.* : South India and Sri Lanka. Common; in margins of evergreen forests. Koruthode, *JA & KPR 16274.*

**Argyreia imbricata** (Roth.) Sant. & Patel, Trans. Bose-Res. Inst. Calcutta 22: 40. 1958; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 102. 1987. ***Ipomoea imbricata*** Roth, Nov. Pl. 112. 1821. ***Lettsomia aggregata*** Roxb., Fl. Ind. 2: 76. 1824; Wight, Ic. t. 1359. 1848; Clarke in Hook. f., Fl. Brit. India 4: 191. 1883; Gamble, Fl. Pres. Madras 910. 1923. ***L. mysorensis*** Clarke in Hook. f., Fl. Brit. India 4: 192. 1883; Fischer, Rec. Bot. Surv. India 9(1): 123. 1921.

Large climbers; stem white-woolly. Leaves 8-12 x 6 cm, ovate, obtusely acute, apiculate, rounded or subcordate at base, strigose above, white-tomentose beneath, nerves impressed above; petiole 3 cm long. Cymes terminal; peduncles 5 cm long; bracts and bracteoles small. Flowers few, shortly pedicelled; calyx lobe orbicular, 10 x 7 mm, densely hairy outside, reddish inside; corolla 2 cm long, pink. Berry 5 x 5 mm, reddish, densely hairy outside.

*Fl. & Fr.* : August-December

*Distr.* : Peninsular India. Rare; in margins of evergreen sholas. Thaannikkudy, *JA 17979.*

## CUSCUTA Linnaeus

Sp. Pl. 124. 1753.

Leafless stem parasite; stem much twining, send off haustoria into the host plant, yellow. Flowers in congested cymes at nodes, shortly peduncled or sessile; bracts absent; sepals 5, ovate,

obtuse, free; corolla campanulate, lobes triangular or oblong, usually recurved with scales in the tube; stamens 5, equal, included; ovary 4-celled, ovules solitary in each cell, styles 2 or very short, stigmas 2, ovoid or globose. Capsule globose, dehiscent; seeds angular, glabrous.

1. Scales of the corolla orbicular, styles short, not divided ;stem reddish ..... **C. reflexa**
1. Scales of the corolla deeply divided; style 2 long; stem yellow ..... **C. chinensis**

**Cuscuta chinensis** Lam., Encycl. 2: 229. 1786; Wight, Ic. t. 173. 1849; Clarke in Hook. f., Fl. Brit. India 4: 227. 1883; Gamble, Fl. Pres. Madras 931. 1923; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 305. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1013. 1983.

Stem 0.5 mm thick, yellow, glabrous. Flowers sessile, densely clustered in cymes; sepals 2 mm long, obtuse; corolla 2 mm long, campanulate, lobes obtuse, hyaline; scale below the attachment of stamens; ovary conical; styles unequal, stigma globose. Capsule 3 x 3 mm, globose, glabrous; seeds 1.5 x 1 mm, obovoid, obtusely trigonous, brown.

*Fl. & Fr.* : Throughout the year

*Distr.* : Asia and Australia. Common; on low bushes in moist deciduous forests. Sivaloda, *JA 12505.*

**Cuscuta reflexa** Roxb., Pl. Corom. t. 104. 1798; Clarke in Hook. f., Fl. Brit. India 4: 225. 1883; Gamble, Fl. Pres. Madras 931 1923; Ooststr., Blumea 73: 70. 1938; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 306. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1014. 1983.

Stem 3 mm thick, reddish, glabrous. Flowers in stout racemes, sessile; sepals 2 x 2 mm, brown, fleshy, glabrous; corolla 5 mm long, reddish-rose, thick, lobes ovate-oblong; scale 2 x 2 mm, obtuse and fimbriate at apex; style stout, short; stigma oblong, unequal.

*Fl. & Fr.* : December-April

*Distr.* : Indo-Malesia. Rare; in evergreen forests at higher elevations seen chiefly on Psychotria sp. Vellimala, *JA & KPR 14321.*

## **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. 1923; Hoogland, Blumea 7: 352. 1953; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 467. 1976; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon

1: 308. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 306. 1996. ***E. wightiana*** Grah., Cat. Pl. Bomb. 137. 1839; Gamble, Fl. Pres. Madras 930. 1923.

Large woody climbers, bark covered with warty tubercles; branchlets brown tomentose. Leaves alternate, to 11 x 5 cm, elliptic, acute at base and apex, entire, coriaceous, glabrous, nerves 6-8 pairs; petiole 1 cm long, rusty tomentose. Flowers in axillary or terminal panicles; bracts and bracteoles minute; calyx 3 mm long, densely hairy; lobes obovate; corolla yellow, 7 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, 5-8 mm across, obovoid.

*Fl. & Fr.* May-December

*Distr.* : India and Sri Lanka. Common; in semi-evergreen forests. Thaannikkudy, *JA 14426.*

## **EVOLVULUS** Linnaeus

Sp. Pl. ed. 2, 391. 1762.

**Evolvulus alsinoides** (L.) L., Sp. Pl. ed. 2. 1: 392. 1762; Clarke in Hook. f., Fl. Brit. India 4: 220. 1883; Gamble, Fl. Pres. Madras 922. 1923; Ooststr., Mono. Evolv. 26. 1934; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 309. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1015. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 306. 1996. ***Convolvulus alsinoides*** L., Sp. Pl. 157. 1753.

Diffuse herbs, stem villous. Leaves to 18 x 8 mm; elliptic oblong, acute, base rounded, densely villous, cuspidate. Flowers in axillary 1-3 flowered cymes, peduncles slender, 2 cm long; pedicels 1 cm long, bracts and bracteoles similar, lanceolate; sepals 5, 3 x 1 mm, lanceolate, hairy; corolla blue, campanulate, 8 mm across; lobes shallow; stamens 5, included; ovary 2-celled, ovules 4, styles 2, free, forked, stigmas linear. Fruit a capsule, 3 mm across, globose, glabrous; seeds 4, ellipsoid, acute, black.

*Fl. & Fr.* : Throughout the year

*Distr.* : Native of Tropical America. Rare; in disturbed moist deciduous forests. Thaannikkudy, *JA 12156*; Thekkady, *JA 17907.*

## **HEWITTIA** R. Wight & Arnott

Madras J. Lit. Sci. 5: 17, 22. 1837.

**Hewittia malabarica** (L.) Suresh in Nicols. *et al.*, Interp. Hort. Malab. 88. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 307. 1996. ***Convolvulus malabarica*** L., Sp. Pl. 155. 1753. *C.*

***sublobatus*** L. f., Suppl. Pl. 135. 1782. ***C. bicolor*** Vahl, Symb. Bot. 3: 25. 1974, non Desr. 1792. ***Hewittia bicolor*** (Vahl) Wight & Arn., Madras J. Lit. Sci. 1(5): 22. 1837; Wight, Ic. t. 835. 1844; Clarke in Hook. f., Fl. Brit. India 4: 216. 1883; Gamble, Fl. Pres. Madras 924. 1923. ***H. sublobata*** (L. f.) O. Ktze., Rev. gen. Pl. 2: 441. 1891; Ooststr. in Steenis, Fl. Malesia 1, 4: 438. 1953; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 312. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1016. 1983. ***Hewittia scandens*** (Milne) Mabber. in Manilal, Bot. Hist. Hort. Malab. 84. 1980; Manilal, Fl. Silent Valley 187. 1988.

Creepers; stems densely hispid. Leaves to 7 x 6 cm, ovate, truncate or cordate at base, entire, acute, hispid; petiole 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, to 15 x 5 mm, acute, hairy, inner smaller, lanceolate; corolla 25 mm long, lobed; yellow with brown eye; stamens equal; filaments glabrous; ovary densely hairy; style tomentose; stigmas 2, clavate, papillose. Capsule 7 x 9 mm, depressed globose; hairy; seeds 4 x 3.5 mm, obovoid, dark brown.

*Fl. & Fr.* : Throughout the year

*Distr.* : Tropical Asia and Africa. Very common; in all forests types. Thekkady, *KPR & JA 14827, JA & NS 16940.*

## **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. Corolla red, salver-shaped..... **I. hederifolia**
1. Corolla not red, funnel-shaped or campanulate..... 2
2. Leaves glabrous..... 3
2. Leaves pubescent or at least thinly tomentose..... 6
3. Leaves deeply and palmately 5-7-lobed..... 4
3. Leaves entire or shallowly lobed..... 5
4. Slender climbers; flowers few; leaves to 7 cm across..... **I. cairica**
4. Stout climbers; flowers many; leaves to 15 cm across..... **I. mauritiana**

5. Corolla 15-16 cm long; outer sepals strongly cuspidate.....**I. alba**

5. Corolla 2-5 cm long; sepals acute, not cuspidate.....**I. obscura**

6. Leaves palmately divided in to 5-7 lobes.....**I. pes-tigridis**

6. Leaves entire or shortly 3-lobed.....7

7. Capsule densely hairy; corolla ca. 10 mm long.....**I. eriocarpa**

7. Capsule glabrous; corolla 1.5 cm or more long.....8

8. Leaves white tomentose beneath; trichomes on bracts and sepals yellow.....**I. wightii**

8. Leaves not white tomentose beneath; trichomes on bracts and sepals not yellow.....9

9. Leaves entire.....10

9. Leaves deeply or shallowly lobed.....12

10. Sepals acute, hairy; leaves ovate-oblong, mucronate.....**I. barlerioides**

10. Sepals obtuse, glabrous; leaves broadly ovate or orbicular, not mucronate.....11

11. Leaves thinly tomentose; corolla hairy outside; stem prickled.....**I. turbinata**

11. Leaves pubescent; corolla glabrous outside; stem without prickles.....**I. campanulata**

12. Sepals unequal, acute; corolla ca. 1.5 cm long; leaves 3-5-lobed.....**I. deccana**

12. Sepals equal, acuminate; corolla 7-8 cm long; leaves not or shallowly lobed.....**I. nil**

**Ipomoea alba** L., Sp. Pl. 161. 1753; Ooststr. in Steenis, Fl. Malesia 1, 4: 480. 1953; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 317. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1020. 1983; Manilal, Fl. Silent Valley 188. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 308. 1996. ***I. 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. 1923.

Perennial climbers; stem stout, glabrous. Leaves to 15 x 12 cm, ovate, acuminate at apex, cordate at base, 11-nerved from base; petiole to 9 cm long. Peduncles 12-16 cm long, stout. Flowers 1-3 together, but usually solitary; pedicels 2 cm long; sepals 1.5 cm long, lanceolate, strongly aristate, glabrous; corolla white, 8-10 cm broad, funnel shaped, lobes spreading, glabrous. Capsule 2.5 x 1.5 cm, glabrous; seeds glabrous.

*Fl. & Fr.* : August-January

*Distr.* : Pantropical. Common; in moist deciduous forests. Thekkady, *JA 16817.*

**Ipomoea barlerioides** (Choisy) Benth. ex Clarke in Hook. f., Fl. Brit. India 4: 201. 1883; Gamble, Fl. Pres. Madras 915. 1923; Gandhi in Sald., & Nicols., Fl. Hassan Dist. 470. 1976; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 106. 1987. ***Aniseia barlerioides*** Choisy, Convolv. Orient. 102. 1834.

Hispid creepers or twiners. Leaves to 5 x 2 cm, ovate-oblong, obtuse, mucronate, cordate at base, densely strigose hairy, nerves 5-7 pairs; petiole 1 cm long. Flowers solitary; axillary; peduncle 10 mm long, pedicels short; sepals 1.7 x 1 cm, outer ovate, inner lanceolate, acute to acuminate, densely pilose hairy, broaden in fruit; corolla 6 cm long; 4-5 cm across, purple, hairy outside; filaments 2 cm long, hairy at base; ovary glabrous, stigma biglobose. Capsule 12 x 10 mm, glabrous; seeds 6 x 5 mm, trigonous, densely hairy along the angles and faces.

*Fl. & Fr.* : June-December

*Distr.* : India and Burma. Rare; in grasslands and Savannahs. Mangaladevi, *JA 16221.*

**Ipomoea cairica** (L.) Sweet, Hort. Brit. ed. 1, 287. 1827; Gamble, Fl. Pres. Madras 918. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1024. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 106. 1987. ***Convolvulus cairica*** L., Syst. Nat. ed. 10, 922. 1759. ***Ipomoea pulchella*** sensu Wight, Ic. t. 156. 1839, non Roth, 1821. ***I. palmata*** Forssk., Fl. Aeg.-Arab. 43. 1775; Clarke in Hook. f., Fl. Brit. India 4: 214. 1883.

Glabrous climbers. Leaves divided below the middle, lobes elliptic, chartaceous, acute at apex; petiole to 4 cm long. Flowers solitary or in few flowered cymes; calyx lobes subequal, to 7 x 3.5 mm, apiculate; corolla pink, 5 cm across; capsule 7 mm across, globose, glabrous; seeds pubescent.

*Fl. & Fr.* : Throughout the year

*Distr.* : Pantropical, introduced. Common; in disturbed forest areas as an aggressive weed. Thekkady, *JA 18487.*

**Ipomoea campanulata** L., Sp. Pl. 160. 1753; Wight, Ic. t. 1375. 18848; Gamble, Fl. Pres. Madras 917. 1923; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 327. 1980; Sasidh. & Sivar., Fl. Pl. Thrissur For. 308. 1996. ***I. campanulata*** L. var. ***illustris*** Clarke in Hook. f., Fl. Brit. India 4: 211. 1883. ***I. illustris*** (Clarke) Prain, Bengal Pl. 2: 735. 1903.

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 8 cm long, stout. Flower 1 or 2 together; pedicels 3.5 cm long, stout; sepals 1 x 1 cm, orbicular, outer 3 pubescent outside, growing in fruit; corolla 9 cm long, lobes acute, pale purple with dark purple at centre, glabrous; filaments hairy at base. Capsule 2 x 2 cm, globose, glabrous; seeds black, hairy on angles.

*Fl. & Fr.* : November-December

*Distr.* : India, China, Malesia and Sri Lanka. Occasional; in moist deciduous forests. Anchuruli, *JA & KPR 14292.*

**Ipomoea deccana** Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1; 324. 1980; Manilal, Fl. Silent Valley 188. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 308. 1996. ***I. bracteata*** Wight, Ic. t. 1374. 1848, non Cav., 1799: Clarke in Hook. f., Fl. Brit. India 4: 203. 1883; Gamble, Fl. Pres. Madras 918. 1923. ***I. deccana*** var. ***lobata*** (Clarke) Johri, J. Econ. Tax. Bot. 5: 432. 1984.

Hispid creepers. Leaves to 4 x 4 cm, 5-lobed, cordate at base; lobes rhomboid, acute; petiole 4-5 cm long. Peduncle 2.5-5 cm long; bracts 1.5 x 1 cm, ovate, obtuse, 2-5 together, forming a capitate head, Flowers 3 together; sessile; sepals unequal, to 9 x 3 mm, acute, hairy; inner smaller; corolla purple, 15 mm long, campanulate, glabrous; filaments unequal, inserted near the base of corolla tube. Capsule 6 x 6 mm, globose, puberulus in vertical lines; seeds pubescent, black.

*Fl. & Fr.* : November-January

*Distr.* : India and Sri Lanka. Common; in openings of evergreen forests chiefly along river sides. Koruthode, *KPR & JA 16914.*

**Ipomoea eriocarpa** R. Br., Prodr. 484. 1810; Clarke in Hook. f., Fl. Brit. India 4: 203. 1883; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 325. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1026. 1983; Manilal, Fl. Silent Valley 188. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 309. 1996. ***Convolvulus hispidus*** Vahl, Symb. Bot. 3: 29. 1794. ***Ipomoea hispida*** (Vahl) Roem. & Schult., Syst. 4: 238. 1819, non Zucc., 1809: Gamble, Fl. Pres. Madras 915. 1923. ***I. sessiliflora*** Roth, Nov. Pl. Sp. 116. 1821; Wight, Ic. t. 169. 1839.

Creepers, stem hispid. Leaves to 6 x 3.5 cm, ovate, entire, acuminate, cordate at base, finely hirsute; petiole to 2 cm long. Flowers in axillary sessile or peduncled cymes; bracts and bracteoles minute, hairy; sepals outer 3 larger, 6 mm long, ovate, acuminate, inner 2 smaller, all hispid; corolla 1 cm long, campanulate, pale pink, hairy; filaments glandular hairy at base; ovary densely hairy. Capsule 6 x 6 mm, globose, densely hispid; seeds triangular, glabrous.

*Fl. & Fr.* : July-January

*Distr.* : Paleotropical. Common; in all types of forests. Koruthode, *JA 12239*; Mlappara, *NS & JA 12572.*

**Ipomoea hederifolia** L., Syst. Nat. (ed. 10) 925. 1759; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 325. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1027. 1983; Manilal, Fl. Silent Valley 189. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 309. 1996. ***I. phoenicea*** Roxb., Fl. Ind. 2: 92. 1824. ***I. coccinea*** sensu Clarke in Hook. f., Fl. Brit. India 4:

199. 1883, non L., 1753. ***Quamoclit phoenicea*** (Roxb.) Choisy, Mem. Soc. Phys. Geneve 6: 433. 1834; Gamble, Fl. Pres. Madras 919. 1923 [Fig. 47 B].

Slender climbers, stem glabrous. Leaves to 10 x 8 cm, ovate, acuminate, cordate at base, entire or shallowly 3-lobed, membranous, glabrous; petiole to 15 cm long. Peduncle to 16 cm long, glabrous, slender, erect. Flowers 2-6 together; pedicels 5-7 mm long; sepals 7 mm long, ovate, long-cuspidate; corolla red, 4 cm long, tubular to funneliform, glabrous, lobes acute; stamens equal, inserted inside the tube. Capsule 6 x 6 mm, globose, glabrous; septum persistent, transparent; seeds 5 x 3 mm, trigonous, hairy.

*Fl. & Fr.* : Throughout the year

*Distr.* : Native of South America, naturalised in many tropical countries. Occasional; in disturbed forests areas. Dam site, *JA & KPR 15111.*

**Ipomoea mauritiana** Jacq., Coll. Bot. 4: 216. 1719; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 331. 1980; Sasidh. & Sivar., Fl. Pl. Thrissur For. 309. 1996. ***I. paniculata*** R. Br., Prodr. 486. 1810; Gamble, Fl. Pres. Madras 918. 1923. ***I. digitata*** sensu Clarke in Hook. f., Fl. Brit. India 4: 202. 1883, non L., 1759.

Stout perennial climbers, stem glabrous. Leaves to 15 x 15 cm, orbicular in outline, deeply lobed, lobes elliptic, acuminate; petiole to 12 cm long. Peduncle up to 17 cm long, erect, stout. Flowers panicled; pedicels 2.5 cm long; sepals 7 x 7 mm, orbicular, glabrous; corolla 5.5 cm long, 4 cm across, campanulate, purple. Capsule 14 x 12 mm, ovoid, glabrous, 4-valved; seeds 7 x 5 mm, obtusely trigonous, densely covered with long cottony hairs.

*Fl. & Fr.* : June-January

*Distr.* : Native of West Indies. Occasional; in evergreen forests at low elevation. Koruthode, *JA 17131.*

**Ipomoea nil** (L.) Roth., Cat. 1; 36. 1797; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 332. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1028. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 309. 1996. ***Convolvulus nil*** L., Sp. Pl. (ed. 2) 219. 1762. ***Ipomoea hederacea*** auct. non (L.) Jacq., 1787; Clarke in Hook. f., Fl. Brit. India 4: 199. 1883; Gamble, Fl. Pres. Madras 917. 1923.

Large twiners; stem covered with reflexed hairs. Leaves to 9 x 6 cm, cordate at base, shallowly 3-lobed, lobes ovate, acute, thinly hairy; petiole 2-4 cm long. Peduncle to 3 cm long; retrorse hairy. Flowers solitary on peduncle; pedicels 7 mm long; sepals 3 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 1 x 1.4 cm, depressed globose, glabrous; seeds angular, glabrous.

*Fl. & Fr.* : Throughout the year

*Distr.* : Native of America, now widely spread in Pantropical countries. Fairly common; in all types of forests at all elevations. Thekkady, *JA & KPR 16368.*

**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. 1923; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 333. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1030. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 310. 1996. ***Convolvulus obscurus*** L., Sp. Pl. (ed. 2), 220. 1762.

Slender creepers; stem glabrous. Leaves to 5 x 3.5 cm, broadly ovate, acuminate, base cordate; petiole to 4 cm long. Peduncle axillary, 4-5 cm long, tomentose. Flowers 1 or 2 on each peduncle; sepals 5 mm long, ovate, acute, glandular, outer 2 smaller; corolla 25 mm long, 25 mm broad, white with pink eye, glabrous; anthers sagitate at base. Capsule 10 x 8 mm, globose, glabrous; seeds 6 x 4 mm, compressed, brown, thinly pubescent.

*Fl. & Fr.* : Almost throughout the year

*Distr.* : Tropical Africa and Asia. Common; in all types of forests. Thekkady, *JA 12426;* Mlappara, *JA 12571;* Vellimala, *JA 13947.*

**Ipomoea pes-tigridis** L., Sp. Pl. 162. 1753; Wight, Ic. t. 836. 1844-1845; Clarke in Hook. f., Fl. Brit. India 4: 204. 1883; Gamble, Fl. Pres. Madras 918. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1031. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 310. 1996. ***I. pes-tigridis*** L. var. ***hepaticifolia*** (L.) Clarke in Hook. f., Fl. Brit. India 4: 204. 1883. ***I. hepactifolia*** L., Sp. Pl. 161. 1753. **Poochakkal valli** (Mala Arayan),

Slender twiners. Leaves to 10 x 12 cm, lobes obovate, acuminate; petiole to 7 cm long. Flowers 3-5 together, subsessile, in bracteate heads; bracts densely bristly, foliaceous; sepals 10 mm long, pubescent; corolla 3 cm long, pink, funnel shaped; capsule globose; seeds black, grey pubescent.

*Fl. & Fr.* : September-December

*Distr.* : Peninsular India and Sri Lanka. Occasional; in disturbed forest areas. Koruthode, *JA 18488.*

*Ethnobotanical use* : used as medicinal herb (Mala Arayan).

Fig. 47 **A.** *Nymphoides hydrophylla* (Lour.) O. Ktze.
**B.** *Ipomoea hederifolia* L.

**Ipomoea turbinata** Lag., Gen. Sp. Pl. 10. 1816; Verdc., Kew Bull. 33: 167. 1978; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 108. 1987. ***Convolvulus muricatus*** L., Mant. Pl. 44. 1767. ***I. muricata*** (L.) Jacq., Hort. Schoenbr. 3: 40, t. 323. 1803, non Cav., 1799: Clarke in Hook. f., Fl. Brit. India 4: 197.1883. ***Calonyction muricatum*** (L.) G. Don, Gen. Syst. 4: 264. 1837-1838; Gamble, Fl. Pres. Madras 920. 1923.

Stem glabrous, prickled. Leaves 6-10 x 6-10 cm or larger, orbicular, cordate at base, abruptly acuminate at apex, thinly tomentose above; petiole to 8 cm long. Peduncle 6-15 cm long. Flowers in cymes; bracts 6-12 mm long, oblong, acute, glabrous; sepals 8 x 6 mm, ovate, obtuse, glabrous; corolla 5 cm long, funneliform, pinkish purple, hairy outside. Capsule glabrous

*Fl. & Fr.* : August-February

*Distr.* : India and South East Asia. Common; in disturbed moist deciduous forests. Thekkady, *JA 12425.*

**Ipomoea wightii** (Wall.) Choisy, Mem. Soc. Phys. Geneve 6: 470. 1834; Clarke in Hook. f., Fl. Brit. India 4: 203. 1883; Gamble, Fl. Pres. Madras 917. 1923; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 343. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1033. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 109. 1987. ***Convolvulus wightii*** Wall., Pl. Asiat. Rar. 2: 55, t. 171. 1831.

Small twiners; stem hirsute. Leaves to 10 x 9 cm, orbicular in outline, cordate at base, shallowly 3-lobed, lobes acute, distantly toothed, hirsute above, petiole 5 cm long. Peduncle 10 cm long; bracts many, linear-lanceolate, yellowish hispid. Flowers 3-5 together, sessile; sepals 20 x 5 mm, lanceolate, acuminate, densely hispid; corolla 3 cm long, campanulate, purple. Capsule 5 x 5, globose, glabrous; seeds hairy on angles.

*Fl. & Fr.* : December-January

*Distr.* : Tropical Africa, India and Sri Lanka. Occasional; in grasslands. Thaannikkudy, *JA & KPR 16984.*

## **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. Leaves entire; flowers white.....**M. umbellata**

1. Leaves lobed at least into basal auricle; flowers not white.....2

2. Corolla 4-6 cm long; stem usually hispid.....**M. vitifolia**

2. Corolla up to 2 cm long; stem glabrous.....3

3. Seeds hairy on the angles; leaves linear, base auricled and toothed.....**M. tridentata**

3. Seeds glabrous; leaves ovate, base not as above.....**M. hederacea**

**Merremia hederacea** (Burm. f.) Hall. f. in Bot. Jahrb. Syst. 18: 118. 1893; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 350. 1980; Rani and Matthew in Matthew, Fl. Tamil Nadu Carnatic. 3(1): 1037. 1983. ***Evolvulus hederaceus*** Burm. f., Fl. India 77. t. 30. 1768. ***Ipomoea chryseides*** Ker-Gawl. in Bot. Reg. 4: t. 270. 1818; Wight, Ic. t. 157. 1839; Hook. f., Fl. Brit. India 4: 206. 1883. ***Merremia chryseides*** (Ker-Gawl.) Hall. f. in Bot. Jahrb. Syst. 16: 552. 1893; Gamble, Fl. Pres. Madras 929. 1923.

Creeping herbs. Stems puberulus. Leaves 2.5 x 2.5 cm, shallowly 3-lobed, cordate at base, chartaceous, 5-7-nerved from base, glabrous, lobes sub-orbicular; petiole 1-4 cm long, hispid. Flowers many, on axillary dichasial cyme to 10 cm long: pedicels to 4 mm long; sepals unequal, to 5 x 4 mm, obovate, truncate at apex, cuspidate; corolla 10 mm long, 15 mm across, yellow, glabrous; filaments glandular hairy below. Capsule 5 x 5 mm, glabrous; seeds hairy.

*Fl. & Fr.* : November-January

*Distr.* : Old World tropics. Common; in openings of evergreen forests at low elevations. Pamba, *JA 17074.*

**Merremia tridentata** (L.) Hall. f. in Bot. Jahrb. Syst. 16: 552. 1893; Gamble, Fl. Pres. Madras 928. 1923; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 351. 1980; Rani and Matthew in Matthew, Fl. Tamil Nadu Carnatic. 3(1): 1037. 1983. ***Convolvulus tridentatus*** L., Sp. Pl. 157. 1753. ***Ipomoea tridentata*** (L.) Roth in Roem. Arab. Bot. 1(2): 38. 1797; Hook. f., Fl. Brit. India 4: 205. 1883

Trailing herbs. Leaves to 3 x 1 cm, lanceolate to oblong, hastate at base, acute at apex, mucronate, chartaceous, penninerved, glabrate; petiole 5 mm long, hairy. Flowers solitary, axillary; pedicels to 2.5 cm long, slender; sepals subequal, to 6 x 2 mm, ovate, acute, cuspidate inner ones acuminate; corolla 12 mm long, 15 mm across, white or cream to yellowish, throat usually pale purple. Capsule 6 x 6 mm, glabrous; seeds 3 x 3 mm, glabrous, black.

*Fl. & Fr.* : November-February

*Distr.* : Widely distributed from Tropical Africa to Australia through Asia. Common; in all types of forests. Koruthode, *JA 16921.*

**Merremia vitifolia** (Burm. f.) Hall. f., Bot. Jahrb. Syst. 16: 552. 1893; Gamble, Fl. Pres. Madras 928. 1923; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 355. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1040. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 312. 1996. ***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, to 8 x 9 cm, 5-7-lobed, lobes acute, distantly dentate, petiole to 7 cm long. Peduncle 8 cm long, hirsute or glabrous. Flowers few, racemose; pedicels 1.5 cm long; sepals 1.5 cm long, ovate, obtuse, emarginate, sparsely bristled; corolla yellow, 5 cm broad, funnel-shaped, glabrous; stamens 5, equal, filaments broaden and glandular at base. Capsule 1.5 x 1.5 cm, glabrous; seeds 8 x 6 mm, trigonous, dark brown; fruiting calyx lobes 2.5 x 1.5 cm.

*Fl. & Fr.* : August-January

*Distr.* : Indo-Malesia & Sri Lanka. Very common; in disturbed areas at low elevations. Koruthode, *JA & KPR 14707.*

**Merremia umbellata** (L.) Hall. f., Bot. Jahrb. Syst. 16: 552. 1893; Gamble, Fl. Pres. Madras 928. 1923; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 354. 1980; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1040. 1983; Manilal, Fl. Silent Valley 190. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 312. 1996. ***Convolvulus umbellatus*** L., Sp. Pl. 155. 1753. ***Ipomoea cymosa*** Roem. & Schult., Syst. Nat. 4: 241. 1819; Clarke in Hook. f., Fl. Brit. India 4: 211. 1883.

Prostrate or twining herbs, stems sparsely hairy. Leaves to 8 x 5 cm, oblong, acuminate at apex, entire, membranous, glabrous above, sparsely hairy below; petiole 1 cm long, hairy. Peduncle 3 cm long, hispid. Flowers subumbellate; pedicels 1 cm long; sepals 8 x 6 mm, suborbicular, obtuse; corolla 3.5 cm long, campanulate, white, lobes hairy at apex; filaments broaden and glandular below. Capsule 2 cm across, globose, seeds angular, black, pubescent

*Fl. & Fr.* : Throughout the year

*Distr.* : Pantropical. Common; in all types of forest areas. Koruthode, *JA 14792*; Dam site, *JA & KPR 15118.*

## 90. 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 3 cm across, blue; calyx tube angled.....**Nicandra**
5. Flowers to 1.5 cm across, yellow; calyx tube not angled.....6
6. Calyx covering the fruit; leaves entire.....**Physalis**
6. Calyx not covering the fruit; leaves pinnatisect.....**Lycopersicon**

## **DATURA** Linnaeus

Sp. Pl. 179. 1753

**Datura metel** L., Sp. Pl. 179. 1753; Sant., J. Bombay Nat. Hist. Soc. 47: 657. 1948; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 1052. 1983. ***D. alba*** Nees, Trans. Linn. Soc. London 17: 73. 1834; Wight, Ic. t. 852. 1844. ***D. fastuosa*** auct. non L., 1759: Wight, Ic. t. 1396. 1848; Clarke in Hook. f., Fl. Brit. India 4: 242. 1883; Gamble, Fl. Pres. Madras 941. 1923.

Shrubs, stems terete. Leaves alternate, 10-20 x 6-12 cm, ovate, acute at apex, unequal at base, glabrous, membranous; petiole to 10 cm long. Flowers erect, solitary, axillary, pedicellate; calyx green, to 6 cm long, tubular, lobes 5, erect, acute, glabrous; corolla to 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 3.5 cm across, globose, prickly; seeds compressed, glabrous.

*Fl. & Fr.* : Throughout the year

*Distr.* : Tropical and Subtropical Asia & Africa. Occasional; in disturbed moist deciduous forests. Thekkady, *JA & KPR 16819.*

## **LYCIANTHES** Hassler

Annuaire Conserv. Jard. Bot. Geneve 20: 180. 1917, *nom. cons.*

**Lycianthes laevis** (Dunal) Bitter, Abh. Nat. Ver. Bremen 24: 484. 1920; Deb, Bot. J. Linn. Soc. 76: 293. 1978 & J. Econ. Tax. Bot. 1: 40. 1980; Manilal, Fl. Silent Valley 191. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 315. 1996. ***Solanum laeve*** Dunal, Solan. Synop. 22. 1816; Clarke in Hook. f., Fl. Brit. India 4: 231. 1883; Gamble, Fl. Pres. Madras 936. 1923. ***S. bigeminatum*** Nees, Trans. Linn. Soc. London 17: 42. 1837. ***Lycianthes bigeminata*** (Nees) Bitter, Abh. Nat. Ver. Bremen 24: 480. 1920; Hepper in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 388. 1987.

Herbs or shrubs; branches glabrous or scabrous. Leaves alternate or fascicled, 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 globose, red; seeds many, flat, concentricity reticulate.

Key to the subspecies

1. Branches zig-zag; calyx cup without appendages.....ssp. **bigeminata**
1. Branches straight; calyx cup with vermiform appendages .....ssp. **laevis**

**Lycianthes laevis** (Dunal) Bitter, ssp. **bigeminata** (Nees) Deb Bot. J. Linn. Soc. 76. 193. 1978; Sasidh. & Sivar., Fl. Pl. Thrissur For. 315. 1996. ***Solanum bigeminatum*** Nees, Trans. Linn. Soc. London 17: 42. 1837; Clarke in Hook. f., Fl. Brit. India 4: 231. 1883.

Leaves 18-25 x 6-8 cm. Flowers fascicled. Berry 6 x 6 mm, red.

*Fl. & Fr.* : August-December

*Distr.* : South India and Sri Lanka. Fairly common; in evergreen forests at all elevations. Koruthode, *JA 12217.*

**Lycianthes laevis** (Dunal) Bitter, ssp. **laevis**

Leaves 8-18 x 2-5 cm. Flowers solitary or fascicled. Berry 6 x 6 mm; seeds yellow.

*Fl. & Fr.* : September-December

*Distr.* : Southern Western Ghats. Very common; in evergreen forests at all elevations. Koruthode, *JA 12445.*

## LYCOPERSICON P. Miller

Gard. Dict. Abr. ed. 4. 1754.

**Lycopersicon esculentum** Miller, Gard, Dict. (ed. 8) n. 2. 1768, a sticky pubescent herb, running wild with smaller fruits in disturbed forests where tribes were inhabited [Fig. 48 A].

## NICANDRA Adanson

Fam. Pl. 2: 219. 1763, *nom. cons.*

**Nicandra physalodes** (L.) Gaertn., Fruct. 2: 237, t. 131, f. 2. 1791, "*physaloides*"; Clarke in Hook. f., Fl. Brit. India 4: 240. 1883; Gamble, Fl. Pres. Madras 941. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1054. 1983; Manilal, Fl. Silent Valley 192. 1988.

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 3 cm across, solitary, axillary; calyx campanulate, tube inflated, cordate at base, 5-angled; corolla 2 cm long; 3 cm across, campanulate, blue or bluish violet; stamens 5, free. Berry 1.5 x 1.5 cm, smooth; seeds pitted.

*Fl. & Fr.* : August-September

*Distr.* : Native of Central America, widely naturalised in tropical countries. Occasional; introduced. Mangaladevi, *JA 12539.*

## **PHYSALIS** Linnaeus

Sp. Pl. 183. 1753

**Physalis peruviana** L., Sp. Pl. ed. 2, 1670. 1762; Clarke in Hook. f., Fl. Brit. India 4: 238. 1883; Gamble, Fl. Pres. Madras 939. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1057. 1983; Hepper in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 392. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 316. 1996.

Weak annual erect herbs, to 60 cm high. Leaves alternate, to 7 x 6 cm, broadly ovate, obliquely cordate at base, entire or shortly lobed, 3-nerved from base; petiole to 3 cm long. Flowers axillary, solitary; pedicels 1 cm long, slender; calyx campanulate, accrescent in fruit, membranous; corolla campanulate, yellowish with deep brown centre, 15 mm across, tube hairy inside; stamens 5, anthers vertically splitting; ovary with many ovules, style glabrous; stigma 2-toothed. Berry globose, 10 mm across, covered by the balloon like 2.5-3 cm across fruiting calyx; seeds many, compressed.

*Fl. & Fr.* : July-December

*Distr.* : Native or Tropical America, widely naturalised in tropical countries. Rare; in evergreen forests at high elevations. Deviar, *JA 12137.*

## **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. Plants glabrous.....2

1. Plants densely hairy.....3

2. Leaves laciniate or pinnately divided; climbing or straggling shrubs.....**S. seaforthianum**

2. Leaves entire; erect annual herbs.....**S. americanum**

3. Flowers blue, purple or violet.....4

3. Flowers white.....9

4. Berry densely covered with stellate hairs; leaves over 30 cm broad.....**S. lasiocarpum**

4. Berry glabrous when mature; leaves up to 15 cm broad.....5

5. Leaves glabrous above; silvery white beneath .....**S. giganteum**

5. Leaves pubescent above, not silvery white beneath.....6

6. Leaves covered with simple hairs only; berry white with green lines .....**S. virginianum**

6. Leaves covered with stellate hairs; berry yellow or red.....7

7. Flowers 1-3 together; fruit 2-3 cm across .....**S. melongena** var. **insanum**

7. Flowers many-together; fruit to 1 cm across.....8

8. Plants covered with viscid hairs.....**S. sisymbrifolium**

8. Plants not covered with viscid hairs.....**S. anguivi**

9. Plants covered with simple hairs, densely prickled; berry 25 mm across, red.....**S. capsicoides**

9. Plants covered with stellate hairs, sparsely or not prickled; berry 1 cm across, yellow.....10

10. Leaves shallowly lobed; ovary glabrous.....**S. torvum**

10. Leaves entire; ovary densely stellate hairy.....**S. erianthum**

**Solanum americanum** Mill., Gard. Dict. ed. 8, No. 5. 1768; Edmonds, Kew Bull. 27: 103. 1972; Hepper in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 368. 1987; Schill. & Anders., Bot. J. Linn. Soc. 102: 256. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 316. 1996. ***S. nigrum*** auct. non L. 1753: sensu Gamble, Fl. Pres. Madras 936. 1923. **Manithakkali** (Mannan).

Glabrous annual herbs to 50 cm high. Leaves 4-8 x 1.5-4 cm, ovate to broadly ovate, attenuate at base, entire or serrate, membranous. Peduncle 1 cm long. Flowers umbelled; pedicels 1 cm long, filiform, glabrous; calyx deeply 5-partite, corolla white with bluish shade, 5 mm across, lobes oblong. Berry 6 x 6 mm, black, smooth, glossy; seeds 1 x 1 mm, orbicular, yellow, pitted.

*Fl. & Fr.* : Throughout the year

*Distr.* : Native of Tropical America. Common; along lake banks and riversides. Thekkady, *JA 13836.*

*Ethnobotanical use* : The leaves and tender stems are used as green vegetable. It is said that the plant contains a poisonous substance which when eaten make the people to vomit and unconscious, but Mannans are found even drinking the juice from the cooked leaves.

**Solanum anguivi** Lam., Encycl. 2: 23. 1794; Hepper, Bot. J. Linn. Soc. 76: 290. 1978; Brummitt, Taxon 32: 279. 1983; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1058. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 317. 1996. ***S. indicum*** auct. non L. 1753: Wight, Ic. t. 346. 1840; Clarke in Hook. f., Fl. Brit. India 4: 234. 1883; Gamble, Fl. Pres. Madras 938. 1923. ***S. violaceum*** Hepper in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 378. 1987.

Key to the varieties

1. Stellate hairs unequal with one erect long arm; pedicels reflexed.....**S. anguivi** var. **multiflora**
1. Stellate hairs with equal arms; pedicels erect.....**S. anguivi** var. **anguivi**

**Solanum anguivi** Lam., Encycl. 2: 23. 1794, var. **anguivi. Puthiri chunda** (Mannan, Mala Arayan).

Erect armed herbs; prickles 5 mm long, straight with a broaden base. Leaves to 9 x 5 cm, shallowly lobed, densely hairy below, sparsely above; petiole 3-5 cm long. Raceme axillary, 8-12-flowered, peduncled. Flowers blue; pedicels 1.5 cm long, straight, erect; corolla 20 mm across, densely stellate hairy outside; style hairy. Berry 7 x 7 mm, orange-yellow, smooth.

*Fl. & Fr.* : October-December

*Distr.* : India, China, Indochina, Malaya and Philippines. Common; in moist deciduous forests. Kumily, *NS & JA 12550.*

*Ethnobotanical use* : The roots are useful for various cardiac problems; the fruits are noticed eaten raw by Mannan, and they believe that this makes them more healthy

**Solanum anguivi** Lam. var. **multiflora** (Roth ex Roem. & Schultes) Chithra in Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 115. 1987. ***S. multiflorum*** Roth ex Roem. & Schultes, Syst. 4: 669. 1819. ***S. indicum*** L., var. ***multiflora*** (Roth ex Roem. & Schultes) Clarke in Hook. f., Fl. Brit. India 4: 235. 1883; Gamble, Fl. Pres. Madras 938. 1923; Manilal, Fl. Silent Valley 193. 1988. ***S. ferox*** L. var. ***minus*** Wight, Ic. t. 1400. 1848.

Erect woody herbs; stems prickled; prickles stout, broaden towards the base. Leaves to 15 x 12 cm, shallowly lobed, densely stellate hairy; petiole 3 cm long. Raceme 12-25-flowered, very shortly peduncled. Flowers blue, densely packed; pedicels 1.2 cm long, curved; corolla 22 mm across, glabrous or hairy. Berry 8 mm across, orange-red, smooth.

*Fl. & Fr.* : November-January

*Distr.* : Peninsular India. Common; in moist deciduous forests. Thekkady, *NS & JA 12772*; Kalvarimala, *JA 13868.*

**Solanum capsicoides** All., Melanges Philos. Mat. Soc. Roy. Turin. 12: 64. 1773; Hepper in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 374. 1987. ***S. aculeatissimum*** Jacq., Ic. Pl. Rar. 1: t. 41. 1787; Clarke in Hook. f., Fl. Brit. India 4: 237. 1883; Gamble, Fl. Pres. Madras 939. 1923. ***S. ciliatum*** Lam., Encycl. 2: 21. 1797.

Densely hispid erect herbs; prickles simple, 0.5-2 cm long, very narrow, numerous on all parts except berry. Leaves to 15 x 10 cm, shallowly lobed, membranous. Flowers solitary, usually deflexed; pedicel 2 cm long, stout; corolla white, 25 mm across, glabrous, lobes oblong. Capsule 1-2 cm across, red, smooth; seeds 5 x 5 mm, pitted, yellowish.

*Fl. & Fr.* : October-December

*Distr.* : Native of Tropical America. Rare; in semi-evergreen forests. Sivaloda (Thekkady), *JA 12517.*

**Solanum erianthum** D. Don, Prodr. 96. 1825; Roe, Taxon 17: 176. 1968; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1059. 1983; Hepper in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 370. 1987; Manilal, Fl. Silent Valley 193. 1988. ***S. verbascifolium*** auct. non L., 1753: Wight, Ic. t. 1398. 1848; Clarke in Hook.f., Fl. Brit. India 4: 230. 1883; Gamble, Fl. Pres. Madras 936. 1923.

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 cm long. Cymes terminal or subterminal; peduncle 5 cm long, stout. Flowers many, erect, densely packed; pedicels 1 cm long; corolla white, densely pubescent outside. Capsule 8 x 8 mm, orange-yellow, hairy when young.

*Fl. & Fr.* : July-December

*Distr.* : Pantropical. Common; in semi-evergreen forests. Kokkara, *JA 12011.*

**Solanum giganteum** Jacq., Coll. Bot. 4: 125. 1791; Wight, Ic. t. 893. 1844-45; Clarke in Hook. f., Fl. Brit. India 4: 233. 1883; Gamble, Fl. Pres. Madras 937. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1060. 1983.

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 to 5 cm long. Cymes terminal or subterminal; peduncle 4-5 cm long. Flowers densely packed; pedicel 1 cm long, densely white-stellate hairy; corolla blue, hairy outside. Berry 7 x 7 mm, red, glabrous; seeds smooth.

*Fl. & Fr.* : Throughout the year

*Distr.* : Peninsular India and Sri Lanka. Common; in semi-evergreen forests and evergreen forests. Arjunankotta, *KPR & JA 15070.*

**Solanum lasiocarpum** Dunal, Hist. Solanum 223. 1813; Whalen, Costich & Heiser, Gentes Herb 12: 100. 1981; Hepper in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 371. 1987; Manilal, Fl. Silent Valley 193. 1988. ***S. 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. 1923. ***S. stramoniifolium*** sensu Kerr in Craib, Fl. Siam Enum. 3(2): 37. 1954; Henry *et al.*, Fl. Tamilnadu Ser. 1, 2: 117. 1987; non Jacq., 1781. **Ana modumuttikka** (Mannan);

Robust shrubs, to 1.5 m high; stems densely spineus prickled and stellate hairy. Leaves to 35 x 35 cm, 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, densely covered with spineus bristles.

*Fl. & Fr.* : Throughout the year

*Distr.* : India, Hong Kong & Sri Lanka. Common; in evergreen forests at high elevations. Mlappara, *JA 18449.*

*Ethnobotanical use* : The fruits are rubbed so as to remove the bristles and are eaten fresh

**Solanum melongena** L., Sp. Pl. 186. 1753, var. **insanum** (L.) Prain, Bengal Pl. 746. 1903; Gamble, Fl. Pres. Madras 937. 1923; Matthew & Rani in Matthew., Fl. Tamil Nadu Carnatic 3 (1): 1061. 1983; Deb, Taxon 38: 139. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 317. 1996. ***S. insanum*** L., Mant. Pl. 46. 1767. ***S. coagulans*** Forssk., Fl. Aeg.-Arab. 47. 1775; Clarke in Hook. f., Fl. Brit. India 4: 236. 1883. **Velutha chunda** (Mannan).

Erect shrubs; stems usually bluish; prickles to 1 cm long, on stem, petiole and leaves, stout with broaden and bluish base. Leaves to 7 x 5 cm, shallowly lobed; stellate hairs equally armed; petiole 3-6 cm long. Flowers solitary, axillary; pedicels 2.5 cm long, deflexed in flowers and fruits; calyx hairy or with scattered prickles; corolla blue, 1.5 cm across, hairy outside. Berry yellow, 2.5 cm across, globose, smooth.

*Fl. & Fr.* : September-December

*Distr.* : South West Asia, Arabia and Egypt. Occasional; in disturbed forest areas. Thekkady, *JA 12400.*

*Ethnobotanical use* : The fruits are used for making curries

**Solanum seaforthianum** Andr., Bot. Repos. 8: t. 504. 1808; Bor. & Raiz., Beautif. Ind. Climbers Shrub. 127. 1954; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1063. 1983; Hepper in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 387. 1987.

Scandent shrubs. Leaves to 8 x 4 cm, petiolate. Peduncle 5 cm long. Flowers in corymbose cymes; pedicel 1 cm long, narrow; corolla 1.5 cm across, not spreading, blue. Berry 7 x 7 mm, reddish.

*Fl. & Fr.* : December-March

*Distr.* : Native of Brazil. Occasional; in disturbed forest areas. Thekkady, *JA & KPR 14910.*

**Solanum sisymbrifolium** Lam., Tabl. Encycl. 2: 25. 1792; Fyson, Fl. South Ind. Hill St. 2: t. 359. 1932; Gamble, Fl. Pres. Madras 938. 1923; Hepper in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 387. 1987.

Stout undershrubs, stems densely covered with fulvous hairs, prickles on stem 8 mm long, 5 mm broad, stout, straight. Leaves 12 x 8 cm, shallowly lyrate, densely pubescent above and below; prickles 1 cm long, narrow, sharp, straight; stellate hairs unequally armed with one erect longer arm. Flowers 12 mm across, 4-8 together, in axillary racemes; pedicels 1 cm long, densely pubescent; corolla blue, thinly tomentose outside. Berry glabrous.

*Fl. & Fr.* : Throughout the year

*Distr.* : Peninsular India. Rare; in openings of evergreen forests and higher elevations. Sunderamala, *JA 18489.*

**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. 1923; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1064. 1983; Hepper in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 376. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 317. 1996. **Chunda, Ana chunda, Cheriya modumutticka** (Mannan).

Shrubs, to 2.5 m high, sparsely prickled; prickles stout, broaden at base. Leaves to 18 x 13 cm, entire or shallowly lobed; petiole to 4 cm long. Peduncle short; cymes congested, axillary. Flowers many; pedicel 1 cm long, narrow; corolla white, 1.5 cm across, stellate hairy outside, style glabrous. Berry 13 x 13 mm, globose, yellow; seeds pitted.

*Fl. & Fr.* : Throughout the year

*Distr.* : Tropical America, Malaya, China and India. Very common; in openings of all types of forests. Thekkady, *JA 12409*; Thaannikkudy, *KPR & JA 14223.*

*Ethnobotanical use* : The fruits are the major bait in angling. The leaves used for abortion of fetus. One fresh leaf is folded and placed in another leaf and the entire thing is heated to a bearable warmth. Eating of the first leaf is enough for abortion of fetus. The fruits are also used for the same use. The leaves are believed as powerful to stop pregnancy.

**Solanum virginianum** L., Sp. Pl. 187. 1753; Hepper & Jaeger, Kew Bull. 41: 434. 1986; Hepper in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 375. 1987. ***Solanum surattense*** Burm. f., Fl. Ind. 57. 1768; Venkatareddi, Bull. Bot. Surv. India 11: 209. 1969; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1063. 1983. ***S. xanthocarpum*** Schrader & Wendl., Sert. Hannov. 1: 8, t. 2. 1795; Clarke in Hook. f., Fl. Brit. India 4: 236. 1883; Gamble, Fl. Pres. Madras 938. 1923. ***S. jacquinii*** Willd., Sp. Pl. 1: 1041. 1798; Wight, Ic. t. 1401. 1848.

Branched diffuse herbs, stems glandular hairy; prickles 2 cm long, spinescent, gradually or not broaden towards the base, present on all parts except berries. Leaves to 13 x 10 cm, lyrate, membranous; petioles to 8 cm long. Peduncle absent. Flowers 2-4 together, axillary; pedicel 2 cm long, stout; corolla 18 mm across, sparsely hispid. Berry 25 mm across, reddish, smooth; seeds flat, not pitted.

*Fl. & Fr.* : September-January

*Distr.* : Asia, Tropical America and Africa. Common; in evergreen forests. Sabarimala, *JA 12376.*

**Brugmansia suaveolens** (Humb. & Bonpl. ex Willd.) Bercht. & Presl., Rostl. 1: 45. 1823.

Large shrubs; stems white, smooth. Leaves to 25 x 15 cm, elliptic, acute, penninerved. Flowers solitary axillary; calyx tubular, shortly lobed, to 12 cm long; corolla dull white, funneliform, to 30 cm long, deflexed, lobes shallow; stamens 5, free large. Fruit oblong or ellipsoid, smooth.

*Distr.* A native of South East Brazil is running wild in moist deciduous forests, especially in damp places. Thekkady, *JA 18612.*

## 91. SCROPHULARIACEAE

Juss., Gen. Pl. 117. 1789.

1. Leaves all alternate..... **Pedicularis**
1. Leaves opposite, whorled or upper ones only alternate ..... 2
2. Flowers regular..... **Scoparia**
2. Flowers irregular..... 3
3. Upper leaves alternate, lower opposite..... 4
3. All leaves opposite or whorled..... 8
4. Calyx spathaceous, split on one side; roots reddish..... **Centranthera**
4. Calyx not as above; roots not reddish ..... 5
5. Leaves divided into linear lobes ..... **Sopubia**
5. Leaves entire or toothed, not dissected into linear lobes..... 6

6. Plants glabrous; sepals leafy ..... **Mazus**

6. Plants scabrid with bulbous-based hairs; sepals not leafy ..... 7

7. Corolla lobes equal; lower leaves obovate ..... **Buchnera**

7. Corolla lobes unequal; lower leaves linear-oblong ..... **Striga**

8. Fertile stamens 4 ..... 9

8. Fertile stamens 2 ..... 15

9. Filaments of lower stamens appendaged ..... 10

9. Filaments of lower stamens not appendaged ..... 11

10. Stout erect herbs; appendages of filaments orbicular, basal; capsule depressed-globose ..... **Artanema**

10. Prostrate or trailing herbs, rarely erect; appendages of filaments linear or clavate, not basal; capsule oblong ..... **Torenia**

11. Longer stamens with smaller anthers; corolla bilabiate at the folded throat ..... **Mimulus**

11. Anthers equal; corolla not bilabiate at the folded throat ..... 12

12. Anthers stalked ..... 13

12. Anthers not stalked ..... **Lindernia** (p. p.)

13. One anther lobe aborted; calyx lobe unequal ..... **Adenosma**

13. Anther lobes not aborted; calyx lobes equal ..... 14

14. Calyx lobes foliaceous; non-aromatic plants ..... **Mecardonia**

14. Calyx lobe not foliaceous; aromatic plants ..... **Limnophila**

15. Staminodes vermiform, erect, curved; filaments long; anthers cells divergent ..... **Lindernia** (p.p.)

15. Staminodes very small, scale-like; filaments short; anthers cells parallel ..... **Dopatrium**

## ADENOSMA R. Brown

Prodr. 442. 1810.

**Adenosma subrepens** Benth., Gen. Pl. 2: 949. 1876; Hook. f., Fl. Brit. India 4: 263. 1884; Gamble, Fl. Pres. Madras 949. 1923; Pandur. & Nair, J. Econ. Tax. Bot. 17(1): 173. 1993.

Low scandent herbs; stems villous, aromatic. Leaves opposite, to 4 x 2 cm, ovate, acute, crenate, cuneate at base, hispid above and below; nerves 6 pairs, prominent, nervules reticulate; petiole 7 mm long. Flowers axillary, solitary, subsessile; bracteoles absent; calyx 7 mm long, deeply lobed, lobes 5, upper larger, hirsute; corolla 10 mm long, blue, bilabiate, upper lip erect, entire, lower lip 3-lobed; stamens 4, didynamous, anthers stipitate, of shorter stamens 1-celled; ovary glabrous; style dialated at tip. Fruit a septicidal capsule; seeds many, pitted.

*Fl. & Fr.* : September-December

*Distr.* : South India. Occasional; in semi-evergreen forests. Koruthode, *JA 18490.*

## ARTANEMA D. Don

in Sweet, Brit. Fl. Gard. Ser. 2, t. 234. 1834, *nom cons.*

**Artanema longifolia** (L.) Vatke, Linnaea 43: 207. 1881; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 404. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 318. 1996. ***Columnea longifolia*** L., Mant. Pl. 90. 1767. ***Artanema sesamoides*** Benth., Scroph. Ind. 39. 1835; Wight. Ic. t. 1410. 1849; Hook. f., Fl. Brit. India 4: 274. 1884; Gamble, Fl. Pres. Madras 955. 1923.

Undershrubs. Leaves opposite, to 20 x 8 cm, elliptic, acuminate, serrate, attenuate at base, glabrous; nerves to 6 pairs, distinct below; petiole short or absent. Racemes terminal, to 20 cm long; bracts leafy; bracteoles absent. Flowers sessile, to 25 mm long; calyx 12 mm long, campanulate, divided to the middle, lobes acuminate, glabrous; corolla 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 7 x 8 mm, depressed globose; seeds cylindrical, puberulus, brown.

*Fl. & Fr.* : August-January

*Distr.* : India & Sri Lanka and Eastward to Malesia. Occasional; in marshy areas of semi-evergreen forests. Pachakkanam, *JA 12303*; Thaannikkudy, *JA & KPR 14216.*

## BUCHNERA Linnaeus

Sp. Pl. 630. 1753

**Buchnera hispida** Buch.-Ham. ex D. Don, Prodr. Fl. Nep. 91. 1825; Wight, Ic. t. 1413. 1849; Hook. f., Fl. Brit. India 4: 298. 1884; Gamble, Fl. Pres. Madras 966. 1923; Sald. & Nicols., Fl. Hassan Dist. 517. 1976; Manilal, Fl. Silent Valley 194. 1988.

Rigid hispid erect herbs, to 60 cm high, usually not branched. Lower leaves opposite, 5 x 1 cm, elliptic, obtuse, serrate, attenuate at base; upper leaves alternate, narrower, densely hispid. Flowers in terminal lax spike of 20 cm long; bracts ovate, acute, hispid; sepals 5-6 mm long, tubular, acutely lobed; corolla tube 8 mm long, narrow, hairy inside; lobes equal, small, spreading, blue; stamens 4, filaments short, anthers not cohering; ovary many-ovuled; style stout, stigma terminal. Capsule 5 x 3 mm, oblong, loculicidal, opening by apical slits, glabrous; seeds 0.5 mm long, curved-obovoid, black, angled.

*Fl. & Fr.* : October-January

*Distr.* : Tropical Africa & India. Rare; in grasslands. Mangaladevi, *JA 12692.*

## CENTRANTHERA R. Brown

Prodr. 438. 1810.

**Centranthera indica** (L.) Gamble, Fl. Pres. Madras 971. 1924; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 396. 1981; Manilal, Fl. Silent Valley 195. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 319. 1996. ***Rhinanthus indica*** L., Sp. Pl. 603. 1753. ***Centranthera hispida*** R. Br., Prodr. 438. 1810; Hook. f., Fl. Brit. India 4: 301. 1885; Gamble, Fl. Pres. Madras 971. 1924.

Coarsely scabrid erect herbs, 10-20 cm high, roots reddish; stems terete. Lower leaves opposite, 4 x 0.6 cm, linear oblong, obtuse, densely bulbous based hairy. Flowers axillary, solitary, sessile or some times in terminal raceme; calyx 13 mm long, spathaceous, split at one side, ribbed, lobes acute; corolla 25 mm 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 8 x 5 mm, ovoid; seeds spirally reticulate.

*Fl. & Fr.* : October-January

*Distr.* : South India, Burma, Malesia and Sri Lanka. Rare; in marshy areas in grasslands. Kavalappara, *JA & KPR 14540.*

## DOPATRIUM F. Hamilton ex Bentham

in Lidley Edward's Bot. Reg. ad t. 1770(4). 1835

**Dopatrium junceum** (Roxb.) Buch.-Ham. ex Benth., Scroph. Ind. 31. 1835; Hook. f., Fl. Brit. India 4: 274. 1884; Gamble, Fl. Pres. Madras 954. 1923; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 424. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1074. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 320. 1996. ***Gratiola juncea*** Roxb., Pl. Corom. 2: 16, t. 127. 1798.

Erect herbs, to 20 cm high. Basal leaves larger, ovate-oblong, 3 x 1 cm, obtuse; cauline smaller, distant. Flowers axillary, solitary, sessile; bracts ovate, obtuse; sepals 2 mm long, connate at base, obtuse; corolla pale blue, 6 mm long, bilabiate; upper lip emarginate, lower lip equally 3-lobed, lobes obtuse; stamens 2, anthers parallel; staminodes 2, very small, appendaged; ovary obovoid, glabrous; style 1 mm long, stigma truncate. Capsule globose, sessile; seeds many, wrinkled or rugose, brown.

*Fl. & Fr.* : Throughout the year except the driest months

*Distr.* : Throughout Eastern Tropical countries. Common; in marshy areas and riverbeds. Vallakkadavu, *JA & KPR 15441.*

## 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; leaves 3 at nodes, entire.....**L. aromatica**
1. Flowers axillary, solitary; leaves opposite, entire or dissected .....2
2. Leaves penninerved, entire .....**L. repens**
2. Leaves ribbed from base, lower ones or all multifid.....**L. indica**

**Limnophila aromatica** (Lam.) Merr., Interpr. Rumph. Herb. Amb. 466. 1917; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 404. 1981. ***Ambulia aromatica*** Lam., Encycl. 1: 128. 1783. ***Limnophila gratissima*** Bl., Bijdr. 749. 1826; Hook. f., Fl. Brit. India 4: 266. 1884; Gamble, Fl. Pres. Madras 951. 1923.

Decumbent fleshy herbs, glabrous. Lower leaves opposite, upper ones ternate, to 5 x 1.5 cm, elliptic-oblong, sessile, acute, serrate, penninerved, glabrous. Raceme 15 cm long, many-flowered; bracts subulate; pedicels 1.3 cm long, filiform, scabrous; calyx 6 mm long, divided into 5 to the middle, glabrous; corolla 2.5 cm long, purple. Capsule 5 x 3 mm, 4-valved; seeds cylindric, black, muricate.

*Fl. & Fr.* : October-January

*Distr.* : South-East Asia and Australia. Rare; in marshy areas in semi-evergreen forests. Kavalappara, *JA & KPR 14522*; Pamba, *JA 17071.*

**Limnophila indica** (L.) Druce, Rev. Bot. Soc. Exch. Club. Br. Isles (1913) 3: 420. 1914; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 432. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1080. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 320. 1996. ***Hottonia indica*** L., Syst. Nat. (ed. 10), 919. 1759. ***L. gratioloides*** R. Br., Prodr. 442. 1810; Hook. f., Fl. Brit. India 4: 271. 1884; Gamble, Fl. Pres. Madras 952. 1923.

Small herbs; stems erect, usually unbranched, glandular-pubescent. Lower leaves dissected, upper ones entire, 3-ribbed, serrate, glabrous, to 1.5 cm long. Flowers axillary, solitary or in terminal raceme; pedicels to 1 cm long, slender; calyx 4 mm long, campanulate, 5 toothed,

glabrous; corolla yellow, 10 mm long, shortly bilabiate, lobes obtuse, glabrous. Capsule 4 x 3 mm, subglobose, glabrous; seeds many, black.

*Fl. & Fr.* : July-December

*Distr.* : South-East Asia and Australia. Frequent; along lake shores and open marshy areas. Thaannikkudy, *JA 12428, JA & KPR 16952.*

**Limnophila repens** (Benth.) Benth. in DC., Prodr. 10. 387. 1846; Philcox, Kew Bull. 24: 154. 1970; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 427. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1081. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 320. 1996. ***Stemodia repens*** Benth. in Edward's 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. 1923.

Procumbent hispid herbs, to 40 cm long. Leaves to 3 x 1 cm, oblanceolate, acute, serrate, sessile, gland-dotted. Flowers axillary, solitary or in terminal raceme, pedicelled; sepals 7 x 1 mm, oblong, acute, hirtus, basely connate; corolla 13 mm long, yellow, hairy, bilabiate, upper lip emarginate, lower lip 3-lobed, lobes equal, obtuse; anthers stalked; stigma with two small lateral projections. Capsule 5 x 2 mm, ovoid; seeds round, black.

*Fl. & Fr.* : August-April

*Distr.* : South-East Asia. Common; in water logged grasslands. Thaannikkudy, *JA 12353*; Kumarikulam, *JA & KPR 14865.*

## **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 ..... 6

3. Leaves closely serrate.....4

3. Leaves crenate, entire or distantly serrate.....5

4. Base of the staminodes broadened; serration of the leaves spinaceous; small erect herbs.....**L. ciliata**

4. Base of the staminodes not broadened; serration of the leaves not spinescent procumbent herbs.....**L. ruellioides**

5. Leaves 3-4-nerved, ovate-lanceolate, 7-10 mm wide; prostrate herbs.....**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. Leaves densely hairy; stems green.....**L. viscosa**

7. Leaves glabrous; stem bluish.....**L. crustacea**

8. Leaves orbicular; prostrate herbs.....**L. rotundifolia**

8. Leaves ovate, acute; erect herbs.....9

9. Flower in terminal racemes; corolla ca. 6 mm long.....**L. parviflora**

9. Flowers axillary; corolla 8-10 mm long.....**L. hyssopioides**

**Lindernia anagallis** (Burm. f.) Pennell, J. Arnold Arbor. 24. 252. 1943; Philcox, Kew Bull. 17: 484. 1964; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 410. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1084. 1983; Sivar. & Mathew, J. Bombay Nat. Hist. Soc. 80: 139. 1983; Manilal, Fl. Silent Valley 195. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 322. 1996. ***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. 1923.

Procumbent herbs, to 20 cm long, rooting from nodes. Leaves to 25 x 15 mm, ovate, acute, crenate; nerves 5 pairs. Flowers axillary; pedicel 2 cm long, solitary; sepals 4 x 1 mm, united at the base, glabrous; corolla blue, 12 mm 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 13 mm long; seeds 0.2 mm long, oblong, rugose, orange-brown.

*Fl. & Fr.* : Throughout the year except the driest months.

*Distr.* : Tropical Asia, Malesia and Tropical Australia. Common; in marshy areas. Kokkara, *JA 12514*; Vavalala *KPR & JA 14417.*

**Lindernia antipoda** (L.) Alston in Trimen., Fl. Ceylon 6: 214. 1931; Philcox, Kew Bull. 17: 484. 1964; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1085. 1983; Sivar. & Mathew, J. Bombay Nat. Hist. Soc. 80: 133. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 322. 1996. ***Ruellia antipoda*** L., Sp. Pl. 635. 1753. ***Gratiola veronicifolia*** Retz., Obs. Bot. 4: 8. 1786. ***Bonnaya veronicifolia*** (Retz.) Urban, Berl. Deutsch. Bot. Ges. 2: 436. 1884; Gamble, Fl. Pres. Madras 962. 1923.

Stems creeping and erect, 15-20 cm long, glabrous. Leaves 1.5 cm long, ovate-lanceolate, serrate; nerves 3 or 4 pairs; petiole smaller. Flowers in terminal raceme, sometimes axillary, solitary; pedicel to 0.7 cm long, glabrous; sepals 5 mm long, connate below the middle, glabrous; corolla 10 mm long, purple; upper lip emarginate; lower lip obtusely 3-lobed, glabrous; stamens 2, anthers tailless. Capsule to 1.2 cm long, linear, terete, glabrous.

*Fl. & Fr.* : Throughout the year

*Distr.* : India, Malesia & Philippines. Common; in marshy areas. Thekkady, *JA & KPR 15055*; Thekkady, *KPR 17036.*

**Lindernia ciliata** (Colsm.) Pennell, Brittonia 2: 182. 1936; Philcox, Kew Bull. 22: 51. 1968; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3:412. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1086. 1983; Sivar. & Mathew, J. Bombay Nat. Hist. Soc. 80. 133. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 322. 1996. ***Gratiola ciliata*** Colsm., Prodr. Desc. Grat. 14. 1793. ***Bonnaya brachiata*** Link & Otto, Ic. Pl. Select. 25, t. 11. 1820; Hook. f., Fl. Brit. India 4: 284. 1884. Gratiola serrata Roxb., Fl. Ind. 1: 140. 1820. ***Ilysanthes serrata*** (Roxb.) Urban in Berl. Deutsch. Bot. Ges. 2: 436. 1884; Gamble, Fl. Pres. Madras 962. 1923.

Small erect herbs, to 8 cm high. Leaves 1-2 x 0.5 cm, oblong, sessile, obtuse, spineus serrate, glabrous. Flowers in terminal racemes; pedicels 1-2 mm long, slender; sepals 4 mm long, lanceolate, united below the middle, acuminate; corolla blue,12 mm long, tube slender, upper lip orbicular, lower lip obtusely 3-lobed; stamens 2, anthers unequal; staminodes hooked. Capsule 15 mm long, linear

*Fl. & Fr.* : September-December

*Distr.* : South-East Asia & Malesia. Common; in grasslands along hilltops. Kottamala, *JA 17898.*

**Lindernia crustacea** (L.) F. Muell., Syst. Cens. Austral. Pl. 1: 97. 1882; Philcox, Kew Bull. 22: 17. 1968; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 407. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1088. 1983; Sivar. & Mathew, J. Bombay Nat. Hist. Soc. 80: 136. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 323. 1996. ***Capraria crustacea*** L., Mant. Pl. 87. 1767. ***Vandellia crustacea*** (L.) Benth., Scroph. Ind. 35. 1835; Wight, Ic. t. 863. 1844-45; Hook. f., Fl. Brit. India 4: 274. 1884; Gamble, Fl. Pres. Madras 959. 1923.

Erect branched herbs, 5-15 cm high, rooting from lower nodes; stems bluish, glabrous. Leaves to 1.5 x 1 cm, broadly ovate, obtusely acute, serrate; nerves 4 pairs; petioles to 5 mm long. Racemes terminal or sometimes the flowers axillary; pedicels to 1.5 cm long; calyx 3 mm long, 5-fid to below the middle, lobes acute, glabrous; corolla 5 mm long, purple; staminal filament of

lower stamen appendaged at middle. Capsule 3.5 mm, globose, glabrous; seeds 0.5 mm long, obovoid, rugose, yellow.

*Fl. & Fr.* : Throughout the year

*Distr.* : Paleotropical. Common; in moist deciduous forests at low elevations. Koruthode, *JA & KPR 16282.*

**Lindernia hyssopioides** (Linn.) Haines, Bot. Bihar & Orisasa 635. 1922; Philcox, Kew Bull. 22: 50. 1968; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1090. 1983; Sivar. & Mathew, J. Bombay Nat. Hist. Soc. 80: 136. 1983; Manilal, Fl. Silent Valley 195. 1988. ***Gratiola hyssopioides*** L., Mant. 174. 1767. ***Ilysanthes hyssopioides*** (L.) Benth. in DC., Prodr. 10: 419. 1846; Hook. f., Fl. Brit. India 4: 283 1884; Gamble, Fl. Pres. Madras 961. 1923.

Erect herbs, branched at base; stems glabrous. Leaves to 1.5 x 1 cm, ovate, acute, sessile, erect, 3-ribbed from base; upper leaves smaller. Flowers axillary; pedicels to 2 cm long, deflexed in fruit; sepals 4 mm long, lanceolate, puberulus; corolla blue, 8-10 mm 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 6-7 x 3 mm, acute, glabrous.

*Fl. & Fr.* : June-January

*Distr.* : South-East Asia. Common; in marshy areas. Thaannikkudy, *JA & KPR 14585*; Aruvioda, *JA 16840.*

**Lindernia oppositifolia** (Retz.) Mukerjee, J. Ind. Bot. Soc. 24: 134. 1945; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1090. 1983; Sivar. & Mathew, J. Bombay Nat. Hist. Soc. 80: 134. 1983. ***Gratiola oppositifolia*** Retz., Obs. Bot. 4: 8. 1786. ***Bonnaya oppositifolia*** (Retz.) Spreng., Syst. 1:41. 1824; Hook. f., Fl. Brit. India 4: 286 1884. ***Ilysanthes oppositifolia*** (L.) Urban in Burl. Deutsch. Bot. Ges. 2: 435. 1884; Gamble, Fl. Pres. Madras 962. 1923.

Procumbent herbs; stems glabrous. Leaves to 4 x 0.5 cm, linear-oblong, acute, distantly serrate, sessile. Racemes to 13 cm long, terminal; pedicels opposite, 2 cm long, slender, perpendicular to the axis. Flowers paired; sepals 7 mm long, linear lanceolate, free to the base; corolla 12 mm long; upper lip entire or emarginate, lower lip equally 3-lobed; anthers divaricate; staminodes linear, bulged at apex. Capsule 17 x 1.5 mm, terete; seeds 0.3 mm long, obovoid, minutely muriculate.

*Fl. & Fr.* : July-December

*Distr.* : Peninsular India. Common; in marshy areas in grasslands. Kokkara, *JA 12063*; Thaannikkudy, *JA & KPR 14231.*

**Lindernia parviflora** (Roxb.) Haines, Bot. Bihar & Orisasa 645. 1922; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1091. 1983; Sivar. & Mathew, J. Bombay Nat. Hist. Soc. 80: 135. 1983. ***Gratiola parviflora*** Roxb., Pl. Corom. 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. 1923.

Decumbent herbs, 10-20 cm high; stems glabrous. Leaves to 1.5 x 0.7 cm, ovate, acute, entire, sessile; nerves 3 pairs. Flowers in terminal racemes or upper axillary; bracts 5 x 3 mm, ovate; pedicel deflexed in fruit, 1.5 cm long; sepals 3 mm long, connate at base; corolla 6 mm long; upper lip bifurcated at apex; lower lip obtusely 3-lobed; staminodes with lateral vermiform appendages. Capsule 5 x 2.5 mm, ovoid, glabrous; seeds 0.3 mm long, obovoid, yellow, glabrous.

*Fl. & Fr.* : Throughout the year

*Distr.* : South Asia and Tropical Africa. Rare; in marshy areas in grasslands. Vallakkadavu, *JA & KPR 15423.*

**Lindernia rotundifolia** (L.) Mukerjee, J. Ind. Bot. Soc. 24: 132. 1945; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 416. 1981 Sivar. & Mathew, J. Bombay Nat. Hist. Soc. 80: 135. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 323. 1996. ***Gratiola rotundifolia*** L., Mant. 274. 1771. ***Ilysanthes rotundifolia*** (L.) Benth. in DC., Prodr. 10: 420. 1846; Hook. f., Fl. Brit. India 4: 254. 1885; Gamble, Fl. Pres. Madras 962. 1923.

Prostrate branched herbs, rooting from nodes, glabrous. Leaves to 10 x 10 mm, orbicular, glabrous, sessile, serrate or entire, 3-ribbed from base. Flowers axillary; pedicels 1.6 cm long , slender, solitary; sepals 2.5 mm, elliptic, glandular-hairy; corolla 11 mm long; upper lip notched at apex, lower lip 3-lobed, lobes 3 mm across, hairy at the throat; staminodes 4 mm long, filiform, appendaged; stigmas hairy. Capsule 3 mm long, globose; seeds 0.5 mm long, curved, striate, pale brown.

*Fl. & Fr.* : Throughout the year except the driest

*Distr.* : South India, Sri Lanka and Mauritius. Common; in marshy areas and along the lake shores, Kokkara, *JA 12515*; Thondiyar, *JA & KPR 14283.*

**Lindernia ruellioides** (Colsm.) Pennell, Brittonia 2: 182. 1936; Philcox, Kew Bull. 17: 484. 1964; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1092. 1983; Sivar. & Mathew, J. Bombay Nat. Hist. Soc. 80: 132. 1983. ***Gratiola ruellioides*** Colsm., Prodr. Desc. Grat. 12. 1793. ***Gratiola reptans*** Roxb., Fl. Ind. 1: 140. 1820. ***Bonnaya reptans*** (Roxb.) Spreng., Syst. 1: 41. 1824; Hook. f., Fl. Brit. India 4: 284. 1884; ***Ilysanthes reptans*** (Roxb.) Urban, in Ber. Deutsch. Bot. Ges. 2: 436. 1884; Gamble, Fl. Pres. Madras 962. 1923.

Creeping herbs with erect branches, lower nodes rooting. Leaves to 5 x 1.8 cm, elliptic-oblong, obtuse at apex, coarsely dentate-serrate; nerves 3-5 pairs; petiole 0.5-1 cm long. Raceme terminal. Flowers opposite; pedicels 1 cm long, slender, perpendicular to axis; sepals 6 mm long, lanceolate, basely connate, glabrous; corolla blue, 2-lipped, lobes round. Capsule 1.7 cm long, linear, acuminate; seeds trigonous, 0.5 mm long, rugose, brown.

*Fl. & Fr.* : October-January

*Distr.* : India, Java and Philippine Islands. Occasional; in semi-evergreen forests. Umikuppan, *JA 12641.*

**Lindernia viscosa** (Hornem.) Merr., Sp. Blanc. 14. 1918; Philcox, Kew Bull. 22: 38. 1968; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 406. 1981; Sivar. & Mathew, J. Bombay Nat. Hist. Soc. 80: 137. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 323. 1996. ***Gratiola viscosa*** Hornem., En. Pl. Hort. Hafn. 19. 1807. ***Vandellia hirsuta*** Benth., Scroph. Ind. 36. 1835; Gamble, Fl. Pres. Madras 959. 1923.

Diffuse herbs, to 15 cm high, hispid. Leaves to 4 x 2 cm, ovate, obtuse, serrate, white below; lower ones petiolate, upper sessile. Raceme terminal, hispid; sepals 4 mm long, free to the base; corolla 5-6 mm long, white; upper lip entire, lower lip 3-lobed, lobes orbicular. Capsule 3 x 3 mm, globose; seeds cylindrical, yellow, smooth.

*Fl. & Fr.* : August-December

*Distr.* : India, Sri Lanka, Burma and Philippines. Occasional; in grasslands and in wet places of moist deciduous forests. Vallakkadavu, *JA 14870.*

## MAZUS Loureiro

Fl. Cochinch. 385. 1790.

**Mazus pumilus** (Burm. f.) Steenis, Nov. Guinea n. s. 9: 31. 1958; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 444. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 324. 1996. ***Lobelia pumila*** Burm. f., Fl. Ind. 186, t. 60. 1768. ***Mazus rugosus*** Lour., Fl. Cochinch. 2: 385. 1790; Hook. f., Fl. Brit. India 4: 259. 1884; Gamble, Fl. Pres. Madras 947. 1923.

Branched herbs, to 10 cm tall; stems hispid. Lower leaves opposite and closely packed, to 5 x 2 cm, obovate, obtuse, crenate to serrate, upper ones alternate, smaller. Flower few, in terminal racemes; pedicels 10 mm long, slender, woody, erect; calyx campanulate, 6 mm long, divided to the middle, lobes triangular to ovate, leafy; corolla pale violet with yellow centre, 2-lipped, upper lip orbicular, lower 3-lobed, midlobe smaller than sidelobes, spreading; stamens 4, didynamous, anthers divaricate; style short, stigma 2-lamellate. Capsule 3 x 3 mm, oblong; seeds oblong, rugose, brown.

*Fl. & Fr.* : July-December

*Distr.* : South-East Asia. Common; along the margins of forests at higher elevations. Brook's Peak, *JA & KPR 17029.*

## MECARDONIA Ruiz & Pavon

Prodr. 95. 1794.

**Mecardonia procumbens** (Mill.) Small, Fl. Southeast. U.S. 1065 & 1338. 1903; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1097. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 324. 1996. ***Erinus procumbens*** Mill., Gard. Dict. ed. 8. n. 6. 1768. ***Herpestis chamaedryoides*** Kunth in H.B.K., Nov. Gen. Sp. 2: 369. 1817.

Diffuse herbs, stems 4-angled. Leaves opposite, sessile, to 1.5 x 0.6 cm, ovate-lanceolate, base acute, crenate-serrate, penninerved. Flowers axillary, solitary; pedicels 1 cm long; bracteoles oblong, 0.5 cm long; calyx deeply 5-partiate, inner 2 lobes much narrower, 4 x 0.5 cm; outer ovate-lanceolate, 6 x 3 mm; corolla yellow, 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.

*Fl. & Fr.* : October-December

*Distr.* : Subtropical America. Occasional; in disturbed forests and grasslands. Vallakkadavu, *JA 15289.*

## MIMULUS Linnaeus

Sp. Pl. 634. 1753.

**Mimulus orbicularis** Benth., Scroph. Ind. 29. 1835; Hook. f., Fl. Brit. India 4: 259 1884; Gamble, Fl. Pres. Madras 947. 1923; Banerjee & Maity, Bull. Bot. Surv. India 32 (1-4): 136. 1990.

Prostrate herbs, to 10 cm long. Leaves to 1.5 x 1.2 cm long, broadly ovate or orbicular, serrate, glabrous, sessile. Flowers: lower few axillary, long-pedicellate, upper ones sessile, 2-4 together; calyx 3 mm long, 5-lobed, lobes with ciliate-keels; corolla yellowish-white, 8 mm long; upper lip entire, rounded; lower lip 3-lobed; stamens 4, didynamous, anthers divaricate, free; ovary glabrous, many-ovuled, style slender, stigma lamellate. Capsule 5 x 2.5 mm, ellipsoid; seeds reddish brown, rugose in vertical lines.

*Fl. & Fr.* : August-December

*Distr.* : India. Rare; in marshy areas of grasslands. Brandippara, *JA & KPR 16337* .

## **PEDICULARIS** Linnaeus

Sp. Pl. 607. 1753

**Pedicularis zeylanica** Benth., Scroph. Ind. 54. 1835; Wight, Ic. t. 1419. 1849; Hook. f., Fl. Brit. India 4: 317. 1884; Gamble, Fl. Pres. Madras 972. 1924; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 391. 1981.

Weak stemmed semiparasitic herbs; stems suberect, hispid. Leaves alternate, sessile, to 5 x 2 cm, oblong, pinnately lobed, lobes crenate, hispid. Flowers in terminal racemes, densely arranged, sessile; calyx campanulate, 5-toothed; corolla pink, 2-2.5 cm long, bilipped, upper lip hooded; lower lip equally 3-lobbed, purple, tube broadening above; stamens 4, perfect, anthers narrowing to one end, connate in pairs; style slender, stigma terminal. Capsule 8 x 6 mm, split at one side, glabrous; seeds reticulate.

*Fl. & Fr.* : August-December

*Distr.* : Southern Western Ghats and Sri Lanka. Common; in grasslands. Kalvarimala, *JA 13896*; Mangaladevi, *JA & KPR 14172.*

## **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. 1924; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 439. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1100. 1983; Manilal, Fl. Silent Valley 196. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 324. 1996. **Kallurukki** (Mala Arayan)

Erect annuals, 10-60 cm high; stems ridged. Leaves whorled, 3.5 x 1.5 cm, elliptic to obovate, acute, serrate; lateral nerves 3 pairs; petiole 7 mm long. Flowers axillary, solitary; pedicels 7 mm long, erect, slender; calyx 3 mm long, deeply 4-lobed, lobes ovate, obtuse, curved; corolla rotate, 4-lobed, white, throat densely hairy, lobes 3 mm long, obovate; stamens 4, subequal; ovary globose, style clavate, stigma truncate. Capsule globose, longer than the calyx, 2-valved; seeds many, pitted.

*Fl. & Fr.* : Throughout the year

*Distr.* : A native of tropical America, widely spread in most of the tropical countries. Very common; in disturbed forest areas. Koruthode, *JA 17899.*

*Ethnobotanical use* : The entire plants are cooked along with rice and is eaten for people suffering from Kidney stones

**SOPUBIA** F. Hamilton ex D. Don

Prodr. Pl. Nepal. 88. 1825.

Erect herbs. Leaves opposite, variously divided or dissected. Flowers axillary, pedicelled; bracts and bracteoles linear; calyx campanulate, 5-cleft to the middle, ribbed, lobes acuminate; corolla tube broadening above, lobes subequal; stamens 4, anthers confluent in pairs; one anther lobe of each stamen sterile and spurred; stigma obovate, tongue-shaped. Capsule oblong, loculicidal; seeds striate or reticulate.

1. Corolla pink; leaves dissected in to linear lobes; anthers not bearded .....**S. delphiniifolia**

1. Corolla yellow with purple centre; leaves entire or trifid; anthers bearded.....**S. trifida**

**Sopubia delphiniifolia** (L.) G. Don, Gen., Syst. 4: 560. 1837 "*delphinifolia*"; Hook. f., Fl. Brit. India 4: 302. 1885; Gamble, Fl. Pres. Madras 970. 1924; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 394. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1101. 1983; Manilal, Fl. Silent Valley 196. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 325. 1996. ***Gerardia delphiniifolia*** L., Cent. Pl. 2: 21. 1756,

Annuals or perennials; stems hispid. Leaves 2-3.5 cm long, lobes narrow, filiform, hirtus. Flowers axillary; pedicels 2-3 cm long, slender; calyx 9 mm long, tube ribbed, lobes acuminate, free to the middle, scabrid; corolla 2.5 cm long, tube ventricose, lobes subequal, obovate, obtuse; stamens 4, one anther lobe sterile, spurred. Capsule 5 x 3.5 mm, truncate at apex; seeds oblong, pitted.

*Fl. & Fr.* : October-January

*Distr.* : Peninsular India and Sri Lanka. Common; in grasslands. Thaannikkudy, *JA & KPR 14505.*

**Sopubia trifida** Buch.-Ham. ex D. Don, Prodr. 88. 1825; Hook. f., Fl. Brit. India 4: 302. 1884; Gamble, Fl. Pres. Madras 970. 1924; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 394. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1102. 1983; Manilal, Fl. Silent Valley 197. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 325. 1996.

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 7 mm long; calyx 3.5 mm long, campanulate, lobes triangular, glandular; corolla 12 mm across, lobes rotate, subequal; anthers bearded at base. Capsule 3 x 2.5 mm, emarginate at apex; seeds brown.

*Fl. & Fr.* : July-December

*Distr.* : India and Sri Lanka. Common; in high altitude grasslands. Mangaladevi, *JA 12179.*

**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, secondary ribs ending at the sinus of calyx .....**S. asiatica**
1. Flowers white; calyx tube 15-ribbed, all ribs ending at the tips of the calyx lobe.....**S. angustifolia**

**Striga angustifolia** (D. Don) Sald., Bull. Bot. Surv. India 5: 70. 1963; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 401. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1103. 1983; Manilal, Fl. Silent Valley 197. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 325. 1996. ***Buchnera angustifolia*** D. Don, Prodr. 91. 1825. ***Striga euphrasioides*** auct. non Benth., excl. basionym.: Hook. f., Fl. Brit. India 4: 299. 1884; Gamble, Fl. Pres. Madras 968. 1924.

Erect, little or not branched herbs, to 30 cm high, scabrid. Leaves 2-4 x 0.4 cm, linear-lanceolate, scabrid. Flowers in terminal spikes; bracts lanceolate; sepals 10 mm long; corolla 14 mm long, 2-lipped, upper lip orbicular, lower lip 3-lobed. Capsule 4 x 3 mm, obovoid, cuspidate, glabrous; seeds cylindrical, brown.

*Fl. & Fr.* : October-December

*Distr.* : India, Sri Lanka and Indonesia. Common; in grasslands. Kumarikulam, *JA & KPR 14247.*

**Striga asiatica** (L.) O. Ktze., Rev. Gen. Pl. 2: 466. 1891; Hepper, Rhodora 76: 46. 1974; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1104. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 126. 1987; Manilal, Fl. Silent Valley 197. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 326. 1996. ***Buchnera asiatica*** L., Sp. Pl. 1630. 1753. ***Striga lutea*** Lour., Fl. Cochinch. 1: 22. 1790; Hook. f., Fl. Brit. India 4: 299. 1884; Gamble, Fl. Pres. Madras 968. 1924; Sald., Bull. Bot. Surv. India 5: 69. 1963.

Stems to 35 cm high, tubercled hairy. Leaves to 4 x 0.5 cm, lanceolate to oblanceolate, thickly scabrid. Flowers sessile in terminal spike; bracts and bracteoles lanceolate; sepals 1 cm long, oblong, glabrous, united to near the tip, tubercled hairy; corolla 14 mm long, tube slender; upper lip orbicular, entire. Capsule 4 x 3 mm, oblong, glabrous; seeds angular, pitted

*Fl. & Fr.* : August-December

*Distr.* : South Asia and Tropical Africa. Common; in grasslands. Koruthode, *JA 16255.*

## **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. Erect herbs with terminal cymose flowers; corolla ca. 0.6 cm long ..... **T. lindernioides**
1. Creeping herbs; flowers axillary, solitary; corolla over 1.5 cm long ..... 2
2. Wings of calyx tube ciliate; corolla to 1.5 cm long; filaments with clavate appendage.. **T. courtallensis**
2. Wings of calyx tube glabrous; corolla ca. 2.5 cm long; filaments with vermiform appendage ..... 3
3. Corolla tube yellow; calyx tube broadly winged ..... **T. travancorica**
3. Corolla tube deep blue; calyx tube narrowly winged ..... **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. 1923; Sald., Bull. Bot. Surv. India. 8: 129. 1966; Manilal, Fl. Silent Valley 198. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 326. 1996. **Kakkappoo**.

Prostrate herbs. Leaves to 3 x 2 cm, ovate, acute, serrate, base truncate to subcordate, thinly hairy; nerves to 4 pairs; petiole to 2 cm long. Flowers axillary, solitary; pedicels 4-5 cm long, slender; calyx 1.5 cm long, ribbed with brown line, narrowly winged, glabrous, wing decurrent at base into the pedicel; lobes acuminate; corolla 2.5 cm long, deep-violet, with pale lower lip, lobes obtuse, glabrous; appendages of lower filament shortly subulate.

*Fl. & Fr.* : August-December

*Distr.* : South India. Common; in open forest areas. Sabarimala, *JA 12371.*

**Torenia courtallensis** Gamble, Kew Bull.1923: 116. 1923 & Gamble, Fl. Pres. Madras 956. 1923. ***T. cordifolia*** sensu Hook. f., Fl. Brit. India 4: 276. 1884 p.p., non Roxb., 1802.

Creeping herbs; stems slender, glabrous. Leaves to 2.5 x 1.5 cm, ovate-deltoid, acute, rounded at base, sparsely hairy; petiole 0.5 cm long. Flowers axillary, solitary; pedicels to 7 cm long; hirtus; calyx 0.8 cm long, broadly winged; wing ciliate; corolla tube white; lobes obtuse, hairy, bluish violet; appendage on staminal filaments 3 mm long, clavate. Capsule 8 mm long, ellipsoid, glabrous.

*Fl. & Fr.* : August-December.

*Distr.* : South-East Asia. Rare; in marshy areas of evergreen forests at higher elevations. Kottamala, *JA 14008*; Vellimala, *JA & KPR 14367.*

*Note* : Saldanha in His study The genus *Torenia* of Western Peninsular India commented that he could not collect *T. courtallensis* and he opined that this species would be occurring only in Eastern India.

**Torenia lindernioides** Sald., Bull. Bot. Surv. India. 8: 129. 1966.

Erect branched herbs, to 10 cm tall. Leaves to 1.5 x 1 cm, broadly ovate, acute, rounded at base, serrate; nerves 3 pairs; petiole 0.5 cm long. Racemes terminal, or sometimes the flowers upper axillary; pedicel 10 mm long, slender. Calyx 6 mm long, campanulate, narrowly winged, 5-lobed at apex; corolla 6 mm long, violet, Capsule 5 mm long, ellipsoid, glabrous; seeds 0.3 mm long, ovoid, pitted, yellow.

*Fl. & Fr.* : Throughout the year

*Distr.* : Southern Peninsular India. Rare; in lake and river sides. Dam site, *JA & KPR 15046.*

**Torenia travancorica** Gamble, Fl. Pres. Madras 957. 1923; Sald., Bull. Bot. Surv. India 8: 130. 1966; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 442. 1981. ***T. asiatica*** Hook. f., Fl. Brit. India 4: 277. 1884 p.p. [Fig. 48 B].

Creeping or scandent herbs; stems slender, 4-angled, with 10 cm long internodes. Leaves to 6 x 2 cm, ovate, acuminate, base rounded, thinly hirtus; nerves 5-7 pairs; petiole to 1 cm long. Flowers axillary; pedicels to 2.5 cm long, solitary, glabrous; calyx 2.2 cm long, tubular, narrowly winged, ciliolulate or glabrous, lobes acute; corolla 3.5 cm long, tube yellow, lobes deep blue, obtuse, spreading; anthers connate in pairs; appendages on the filaments 6 mm long, filiform. Capsule 2 cm long, glabrous; seeds pitted, pale brown.

*Fl. & Fr.* : Throughout the year

*Distr.* : India and Sri Lanka. Common; in openings of evergreen forests. Vallakkadavu, *JA 13661*; Koruthode, *JA & KPR 17130* .

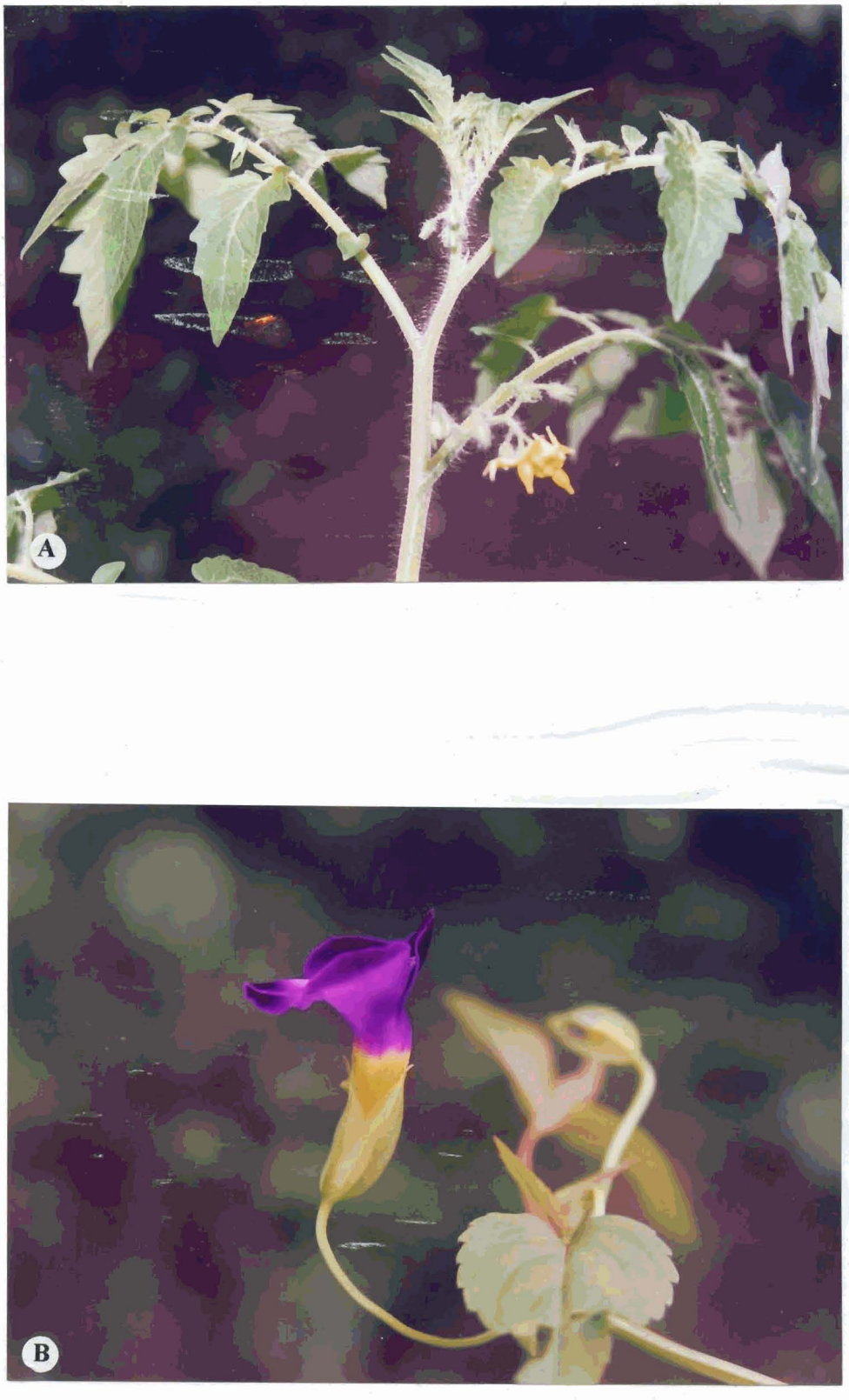



Fig. 48. **A.** *Lycopersicon esculentum* Miller;
**B.** *Torenia travancorica* Gamble

## 92. OROBANCHACEAE

Vent., Tabl. Regne Veg. 2: 292. 1799.

1. Calyx spathaceous, split on one side.....**Aeginetia**
1. Calyx tubular, 5-lobed.....**Christisonia**

### 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, slender, 1-flowered; corolla tube deep purple.....**A. indica**
1. Scape branched, stout, many-flowered; corolla tube yellow.....**A. pedunculata**

**Aeginetia indica** L., Sp. Pl. 632. 1753; Wight, Ic. t. 895. 1844; Hook. f., Fl. Brit. India 4: 320. 1884; Gamble, Fl. Pres. Madras 974. 1924; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 532. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1107. 1983; Manilal, Fl. Silent Valley 198. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 327. 1996 [Fig. 49 A].

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 cm long, glabrous, reddish; corolla 3 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 cm long, dehisce apically; seeds many, white, rugose

*Fl. & Fr.* : August-October

*Distr.* : India, China South East Asia. Fairly common; in moist deciduous forests. Koruthode, *JA 12265, KPR & JA 16254.*

**Aeginetia pedunculata** (Roxb.) Wall., Pl. Asiat. Rar. 2: t. 219. 1831; Wight, Ic. t. 1421. 1849; Hook. f., Fl. Brit. India 4: 320. 1884; Gamble, Fl. Pres. Madras 974. 1924; Sasidh. & Sivar., Fl. Pl. Thrissur For. 327. 1996. ***Orobanche pedunculata*** Roxb., Hort. Beng. 45. 1829 [Fig. 49 B].

Rootstock erect, glabrous or scabrid. Scapes branched, 10-20 cm long, glabrous, pink or brownish yellow. Flowers many; calyx 4 cm long, split along one side, puberulus, acute. pale orange; corolla 6 cm long, 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.

*Fl. & Fr.* : August-December

*Distr.* : Indo-Malesia. Common; in savannahs and grasslands. Mangaladevi, *JA 17952.*

## CHRISTISONIA Gardner

Calcutta J. Nat. Hist. 8: 153. 1897.

Parasitic herbs, fleshy; stems covered with scales, usually tufted. Flowers peduncled; bracteoles present or absent; calyx tubular, 5-teethed; corolla tube long, straight or curved, lobes subequal, round, spreading; stamens 4, anthers 2 or 1-celled; one anther lobe always short and spur-like or absent; ovary 1-celled. Ovules numerous, on highly lobed parietal placentation style long; stigma peltate. Fruit a 2-valved capsule.

1. Anthers 1-celled.....**C. neilgherrica**
1. Anthers 2-celled.....2
2. Whole plant white or pale yellow; anthers unequal.....**C. calcarata**
2. Plant pink or blue; anthers equal.....3
3. Bracteoles present; whole plant glandular hairy, to 12 cm tall.....**C. bicolor**
3. Bracteoles absent; plants not glandular hairy, to 40 cm tall.....**C. tubulosa**

**Christisonia bicolor** Gard., Calcutta J. Nat. Hist. 8: 159. 1847; Hook. f., Fl. Brit. India 4: 322. 1884; Gamble, Fl. Pres. Madras 976. 1924; Sasidh. & Sivar., Fl. Pl. Thrissur For. 327. 1996. *C. **aurantiaca*** Wight, Ic. t. 1486. 1849.

Stem 8-12 cm long, pubescent; scales few, distant. Flowers peduncled and pedicellate; bracteoles 2, 8 x 3 mm, lanceolate, acute, pubescent; calyx 18 mm long, brick-red, lobes short, triangular, acuminate, glandular pubescent; corolla 6 cm long, tube narrow below, widening above, lobes yellow, orbicular, glandular hairy; filaments 25 mm long, sterile, anther lobes 3 mm long, spur-like, acuminate; placenta lobed; style to 4.5 cm long, stigma peltate with a large pit at centre.

*Fl. & Fr.* : June-October

*Distr.* : South India and Sri Lanka. Occasional; in savannahs and other grasslands. Pambavalley, *JA & KPR 16223.*

**Christisonia calcarata** Wight, Ic. t. 1426. 1849; Hook. f., Fl. Brit. India 4: 322. 1884.

Glabrous herbs; stems to 6 cm long. Flowers many, closely packed; peduncle 1.5-2 cm long; bracts 5 x 7 mm, orbicular; calyx 22 mm long, lobes ovate, acute, cuspidate; corolla 4 cm long,

more or less 2-lipped above, lobes rounded, glabrous; fertile anthers of upper stamens 3 x 2 mm, ovoid, sterile lobe 7 mm long, straight, compressed; filament 1 cm long; lower stamens with shorter anthers, filaments 2.5 cm long; ovary 7 x 3 mm, conical, glabrous; style 3 cm long, stigma peltate, pubescent.

*Fl. & Fr.* : April-July

*Distr.* : Western Peninsular India. Rare; in evergreen forests at higher elevations as a parasite on *Strobilanthes* spp. Uppermanalar, *JA 13753.*

*Note* : The present collection is a new record of occurrence in Kerala.

**Christisonia neilgherrica** Gard., Calcutta J. Nat. Hist. 8: 157. 1847; Hook. f., Fl. Brit. India 4: 322. 1884; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 128. 1987. ***Campbellia cytinoides*** Wight, Ic. t. 1425. 1849; Gamble, Fl. Pres. Madras 976. 1924.

Stout parasitic herbs; stems 6 cm long, densely covered with thick scales; scales 10 x 8 mm, ovate, obtuse; whole plant white or yellow. Flowers in terminal clusters, sessile or shortly pedicelled; bracts 10 mm long, ovate, obtuse; bracteoles 2, each 8 mm long, ovate, boat shaped, acute, glandular hairy; calyx 2 cm long, campanulate, lobes rounded, pubescent; corolla 3 cm long, tube cylindric, broad, lobes obovate, obtuse, glandular hairy; anthers not spurred, filaments equal, to 17 mm long, glandular hairy at base; ovary hemispherical, glabrous, style 20 mm long, hairy; stigma globose, papillose.

*Fl. & Fr.* : April-May

*Distr.* : Southern Western Ghats. Rare; in evergreen forests at higher elevations. growing on *Strobilanthes* spp., Kottamala, *JA & KPR 15363.*

**Christisonia tubulosa** (Wight) Benth. ex Hook. f., Fl. Brit. India 4: 321 1884; Gamble, Fl. Pres. Madras 975. 1924; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 534. 1976. ***Oligopholis tubulosa*** Wight, Ic. t. 1422. 1849 [Fig. 49 C].

Stems reddish, to 40 cm high, glabrous. Peduncle 3 cm long, stout; bracts 8 mm long, ovate, acute; calyx 2 cm long, orange coloured, glabrous, lobes unequal, acute; corolla to 5 cm long; tube slightly curved, 1.5-2 cm broad, yellowish white, lobes equal, 1.5 cm across, thinly tomentose, pink; stamens equal, filaments hairy; sterile anther lobe hooked; stigma peltate, papillose.

*Fl. & Fr.* : August-December

*Distr.* : South India. Common; in shades near water courses, usually growing on roots of reeds. Koruthode, *JA 12226.*

## 93. LENTIBULARIACEAE

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; bracts medi- or basifixed; 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. Flowers rose-pink; lower lip of corolla 5-lobed.....**U. striatula**
1. Flowers blue, violet or yellow; lower lip of corolla entire or 3-lobed .....2
2. Bracts medifixed .....**U. caerulea**
2. Bracts basifixed.....3
3. Foliar organs linear.....4
3. Foliar organs spathulate.....6
4. Racemes twining; flowers yellow.....**U. scandens**
4. Racemes erect; flowers blue or bluish-purple.....5
5. Capsule wall uniformly thickened; testa cells of seeds isodiametric.....**U. uliginosa**
5. Capsule wall thickened along dehiscent margins; testa cells of seeds elongated.....**U. graminifolia**
6. Fruiting calyx subequal, broadly ovate; seeds ellipsoid; testa cells narrowly elongated.....**U. praeterita**
6. Fruiting calyx unequal; upper broadly ovate, acuminate, lower linear ovate; seeds subglobose; testa cells isodiametric.....**U. nayarii**

**Utricularia caerulea** L., Sp. Pl. 18. 1753; Wight in Hook. J. Bot. Kew. Gard. Misc. 1: 374. 1849 & Ic. t. 1583. 1850; Gamble, Fl. Pres. Madras 983. 1924; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1112. 1983; Manilal, Fl. Silent Valley 199. 1988; Janarthanam & Henry, Fl. India Ser. 4, 42. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 328. 1996. ***U. nivea*** Vahl, Enum. Pl. 1: 203. 1804; Wight, in Hook. J. Bot. Kew Gard. Misc. 1: 372. 1849 & Ic. t. 1582. 1850. ***U. racemosa*** Wall. ex Walp. in Meyen, Obs. Bot. 19: 401. 1843; Wight in Hook., J. Bot. Kew Gard. Misc. 1: 374. 1849 & Ic. t. 1584. f. 1. 1850 [Figs. 50 A & $A^1$].

Fig. 49. **A**. *Aeginetia indica* L.;
**B**. *Aeginetia pedunculata* Wall.;
**C**. *Christisonia tubulosa* (Wight) Benth. ex Hook. f.

Foliar organs spathulate, revolute, up to 8 mm long, 1 nerved. Traps ovoid, mouth terminal. Racemes up to 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 mm long, larger than lower lip. Capsule subglobose; seeds ovoid, hilum terminal, testa reticulate, cells elongate.

*Fl. & Fr.* : August-December

*Distr.* : South-East Asia and Australia. Common; in marshy areas in grasslands. Thaannikkudy, *JA & KPR 14237.*

**Utricularia graminifolia** Vahl, Enum. Pl. 1: 195. 1804; Gamble, Fl. Pres. Madras 981. 1924; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1116. 1983; Manilal, Fl. Silent Valley 199. 1988; Janarthanam & Henry, Fl. India Ser. 4, 57. 1992. ***Utricularia pedicellata*** Wight, in Hook.'s J. Bot. Kew Gard. Misc. 1: 373. 1849 & Ic. t. 1578, f. 2. 1850. ***U. uliginoides*** Wight in Hook.'s J. Bot. Kew Gard. Misc. 1: 372. 1849 & Ic, t. 1575. 1850.

Foliar organs, linear, obtuse, 3-nerved, up to 2 cm long. Traps subglobose, mouth basal, appendages 2, subulate, simple. Racemes to 30 cm long; bracts basifixed, ovate, lanceolate. Flowers blue to purple; calyx lobes unequal, ovate, acute, upper lip 4 x 2.5 mm, lower lip 3 x 2 mm; upper lip of corolla linear, oblong, lower lip obovate. Capsules ovoid, thickened along dehiscent margins; seeds subglobose; testa reticulate.

*Fl. & Fr.* : Throughout the year

*Distr.* : India, China and Sri Lanka. Occasional; in marshy grasslands. Pachakkanam, *JA & KPR 17046.*

**Utricularia nayarii** Janarthanam & Henry, Bull. Bot. Surv. India 28: 195. 1986 & Fl. India Ser. 4, 77. 1992.

Foliar organs spathulate, 3-nerved, 1 cm long. Traps globose, mouth basal; appendages 2, subulate, simple, glandular. Racemes to 10 cm long, erect; bracts basifixed, ovate, deltoid, acuminate. Flowers blue; calyx lobes unequal, acuminate; upper lip 2.5 x 2 mm, lower lip 1.8 x 1.5 mm; upper lip of corolla oblong, rounded; lower lip obovate; spur 3 mm long, conical, acute.

*Fl. & Fr.* : October-December

*Distr.* : Kerala & Tamil Nadu. Rare; on wet rocks, Mlappara, *JA & KPR 14272.*

**Utricularia praeterita** Taylor in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 1120, t. 87. 1983 & Kew Bull. (Addl. Ser.) 14. 321, f. 87. 1989; Janarthanam & Henry, Fl. India Ser. 4, 81. 1992.

Foliar organs spathulate, to 10 mm long, 3-nerved. Traps subglobose, mouth basal, appendages 2, subulate. Racemes up to 15 cm long, erect; bracts basifixed. Flowers violet; calyx lobes subequal, upper lip ovate, acuminate, lower lip ovate, dentate; corolla: upper lip oblong, rounded, lower lip suborbicular, spur 5 mm long, conical, acute. Capsule ovoid; seeds ellipsoid, hilum lateral terminal, testa reticulate.

*Fl. & Fr.* : August-October

*Distr.* : Western Ghats. Rare; in grasslands. Vellimala, *JA & KPR 15344.*

*Note* : The present collection is the first report of its occurrence in Kerala

**Utricularia scandens** Benj., Linnaea 20: 309. 1847, Abraham & Subramanyam, Proc. India Acad. Sci. 62 B: 98. 1965; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1120. 1983; Janarthanam & Henry, Fl. India Ser. 4, 97. 1992. ***Utricularia volubilis*** sensu Wight ex Benj., Linnaea 20: 309. 1847, *p p.*, non R. Br., 1810. ***U. wallichii*** Wight in Hook. J. Bot. Kew. Gard. Misc. 1: 372. 1849. ***U. wallichianum*** sensu Wight, Ic. t. 1572, f. 1. 1850, non Berry, 1845: Hook. f., Fl. Brit. India 4: 332. 1884; Gamble, Fl. Pres. Madras 982. 1924.

Foliar organs linear, nerved, 1 cm long; trap globose, mouth basal, appendages 2, subulate. Racemes up to 20 cm long, twining; bracts basifixed, ovate-acuminate. Flowers yellow; calyx lobes unequal, upper lobes ovate, acuminate, 3.5 x 2 mm, lower lobe 2.8 x 2 mm, ovate, bidentate; corolla: upper lip 2.5 x 1.5 mm, obovate, shallowly emarginate, lower lip 3 x 2.5 mm, orbicular, hairy in throat; spur 3 mm long, conical, acute. Capsule ovoid, dehiscent; margins thickened; seeds ovoid to ellipsoid, testa reticulate, cells elongated.

*Fl. & Fr.* : Throughout the year

*Distr.* : Africa, South-East Asia and Northern Australia. Common; in grasslands. Thannikkudy, *JA & KPR 14236.*

**Utricularia striatula** Sm. in Rees, Cyclop. 37: n. 17. 1819; Gamble, Fl. Pres. Madras 983. 1924; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1123. 1983; Janarthanam & Henry, Fl. India Ser. 4. 106. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 328. 1996. ***U. pusilla*** sensu Graham, Cat. Pl. Bombay 165. 1839, non Vahl, 1804. ***U. orbiculata*** Wall. ex A. DC. in DC., Prodr. 8: 18. 1844; Clarke in Hook. f., Fl. Brit. India 4: 334. 1884. ***U. glochidiata*** Wight in Hook.'s J. Bot. Kew Gard. Misc. 1: 373. 1849 & Ic. t. 1581. 1850 [Figs. 50 B & B$^1$].

Foliar organs to 4 x 3 mm, orbicular, rostrate at base; scape scattered on stolen, filiform. Traps globose, mouth lateral; scape 8 cm long, erect, 3-5-flowered; bracts medifixed. Flowers rose pink; calyx unequal, papillose, upper lip 2 x 2 mm, orbicular, lower lip 1 x 0.9 mm, ovate,

Fig. 50. **A.** *Utricularia caerulea* L.; **A¹.** single flower;
**B.** *Utricularia striatula* Sm.; **B¹.** flowers enlarged.

rounded; corolla bluish violet with yellow throat; upper lip suborbicular, lower lip 5-lobed, throat hairy, spur cylindrical, acute. Capsule ovoid; seeds oblong, clavate, glochidiate.

*Fl. & Fr.* : July-December

*Distr.* : Tropical Africa and South East Asia. Common; on wet rocks in grasslands. Mlappara, *JA & KPR 14274.*

**Utricularia uliginosa** Vahl, Enum. Pl. 1: 203. 1804; Wight in Hook.'s J. Bot. Kew Gard. Misc. 1: 373. 1849 & Ic. t. 1580, f. 1. 1850; Gamble, Fl. Pres. Madras 981. 1924; Janarthanam & Henry, Fl. India Ser. 4, 113. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 328. 1996.

Foliar organs linear, rounded, up to 5 cm. Traps subglobose, glandular, mouth basal appendages 2, subulate. Racemes up to 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, 8 mm long, upper lip oblong, emarginate, lower lip obovate or elliptic. Capsule ovoid; seeds subglobose, testa reticulate, cells isodiametric.

*Fl. & Fr.* : Throughout the year with peak in August-October

*Distr.* : India, Sri Lanka. Japan and Australia. Common; in marshy places, Pachakkanam, *KPR 16838.*

## 94. GESNERIACEAE

Dumort., Comment. Bot. 57. 1822.

1. Epiphytic subshrubs; seeds tipped with hairs.....**Aeschynanthus**
1. Terrestrial herbs or shrubs; seeds not tipped with hairs.....2
2. Perfect stamens 2.....3
2. Perfect stamens 4.....4
3. Leaves unequal at base; flowers blue.....**Rhynchoglossum**
3. Leaves equal at base; flowers white.....**Rhynchotechum**
4. Fruit loculicidal; leaves radical.....**Didymocarpus**
4. Fruit circumscissile; leaves cauline.....**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. 1923; Subram. & Henry, Bull. Bot. Surv. India 12(1-4): 1. 1970; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 528. 1976; Manilal, Fl.

Silent Valley 199. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 329. 1996. ***A. ceylanica*** sensu Wight, Ic. t. 1347. 1848, non Gard., 1846. ***A. perrottetii*** A. DC. var. ***planiculmis*** Clarke in Hook. f., Fl. Brit. India 4: 340. 1884, "*platyculmis*". ***A. planiculmis*** (Clarke) Gamble, Fl. Pres. Madras 985. 1924.

Epiphytic subshrubs; stems terete, glabrous, scandent. Leaves opposite, to 8 x 1.5 cm, elliptic, succulent, acute, pale below; petiole 5 mm long. Flowers axillary, solitary or rarely paired; pedicels 1 cm long; sepals 8 x 1 mm, free, lanceolate; corolla pink, 4.5 cm long, tubular, curved, widening above, oblique at mouth, lobes 5, subequal, ovate, obtuse, glandular-ciliate; stamens 4, all perfect; filaments 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 cm long, linear; seeds linear, many.

*Fl. & Fr.* : October-January

*Distr.* : Peninsular India; endemic. Common; in evergreen forests. Mangaladevi, *JA 12541.*

## **DIDYMOCARPUS** Wallich

Edinburgh Philos. J. 1: 378. 1819, *nom. cons.*

Scapigerous herbs; stems very short. Leaves radical, rosetted, 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, rounded or cordate at base ..... **D. ovalifolia**
1. Leaves irregular-crenately lobed or dentate, acute to attenuate at base ..... 2
2. Wings of the petiole lyrate ..... **D. humboldtianus**
2. Wings of the petiole entire ..... 3
3. Scape to 22 cm long ..... **D. fischeri**
3. Scape to 10 cm long ..... **D. tomentosus**

**Didymocarpus fischeri** Gamble, Kew Bull. 1923: 117. 1923 & Fl. Pres. Madras 989. 1924; Sasidh. & Sivar., Fl. Pl. Thrissur For. 329. 1996.

Scapigerous herbs. Leaves 6-12 x 5-8 cm, broadly elliptic, acute, irregularly crenate; lateral nerves 5 or 6 pairs, prominently reticulate, densely bullate above with cluster of hairs, pubescent below, attenuate to the base; petiole 1-6 cm long, 7 mm broad; younger leaves sessile. Cymes

dichotomous, glandular hairy, 8 cm across; pedicels *ca.* 13 mm long. Flowers several, blue; sepals 3 x 1 mm, oblong, obtuse, basely united; corolla 15 mm long, curved, lobes orbicular, 7 mm across, glandular-hairy outside; staminodes 2, linear, curved; ovary glandular hairy; stigma spoon-shaped, papillose.

*Fl. & Fr.* : April

*Distr.* : Southern Western Ghats; endemic. Rare; in high altitude grasslands. Kottamala, *JA 15309.*

**Didymocarpus humboldtianus** Gard., Calcutta J. Nat. Hist. 6: 477. 1846; Clarke in Hook. f., Fl. Brit. India 4: 353. 1884; Gamble, Fl. Pres. Madras 989. 1924; Theobald & Grupe in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 84. 1981; Manilal, Fl. Silent Valley 200. 1988.

Scapigerous herbs. Leaves to 6-7 x 6 cm, broadly ovate, obtuse, rounded or cordate at base, broadly crenate, bullate-tomentose above, tomentose beneath; nerves 5-6 pairs; petiole 5-8 cm long, wings divided. Scape few, 15-20 cm long, branched. Raceme glandular hairy; bracts and bracteoles similar, linear. Flowers blue, paired; pedicel 1.5 cm long; sepals 3.5 x 1 mm, oblong, obtuse; corolla blue, 13 mm long, thinly hairy, mouth oblique, lobes orbicular; staminodes hooked; ovary densely glandular-hairy, stigma oblique, papillose. Capsule 4 x 0.2 cm, acuminate, glandular hairy; seeds ellipsoid, rugate, brown.

*Fl. & Fr.* : August-December

*Distr.* : South India and Sri Lanka. Rare; in high altitudes grasslands. Kottamala, *JA 14019.*

**Didymocarpus ovalifolia** Wight, Ic. t. 1351. 1848; Clarke in Hook. f., Fl. Brit. India 4: 354. 1884; Gamble, Fl. Pres. Madras 988. 1924; Manilal, Fl. Silent Valley 200. 1988.

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.

*Fl. & Fr.* : August-December

*Distr.* : Peninsular India. Rare; in evergreen forests. Koruthode, *JA 16811.*

**Didymocarpus tomentosus** Wight, Ic. t. 1349. 1848; Clarke in Hook. f., Fl. Brit. India 4: 353. 1884; Gamble, Fl. Pres. Madras 989. 1924; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1125. 1983.

Scapigerous herbs. Leaves 6-7 x 4 cm, elliptic, acute, irregularly crenate-serrate, densely bullate above, densely fulvous tomentose below; nerves 4 pairs, prominently reticulate below; petiole 1-3 cm long, 5 mm broad; central leaves sessile. Scapes few, to 12 cm long. Cymes glandular-hairy; pedicels 1 cm long. Flowers blue, subumbellate; sepals 2.5 x 1 mm, oblanceolate, obtuse, long-hairy; corolla 11 mm long, glandular-hairy, lobes obovate to orbicular; staminodes straight, bristle-like; ovary densely glandular, hairy. Capsule 2 x 0.2 cm, linear, densely glandular hairy

*Fl. & Fr.* : August-December

*Distr.* : Southern Western Ghats. Common; in rocky grasslands. Kalvarimala, *JA 13891.*

## **EPITHEMA** Blume

Bijdr. 737. 1826.

**Epithema carnosum** (G. Don) Benth., Scroph. India 57: 665. 1835, var. **hispida** Clarke in DC., Monogr. Phan. 5: 178. 1883 & in Hook. f., Fl. Brit. India 4: 369. 1884; Gamble, Fl. Pres. Madras 992. 1924; Theobald & Grupe in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 103. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 330. 1996. ***Aikinia carnosa*** G. Don, Gen. Syst. 4: 665. 1838. ***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 6 mm long, hairy; calyx 5 mm long, campanulate, lobes 5, acuminate, united above the middle; corolla 7 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 5 x 3 mm, ovoid, circumscissile; seeds twisted, brown, ridged.

*Fl. & Fr.* : August-December

*Distr.* : India and Southern China. Common; in evergreen forests. Koruthode, *JA 12241, 14116*; Kalvarimala, *JA 13895.*

## **RHYNCHOGLOSSUM** Blume

Bijdr. 741. 1826.

**Rhynchoglossum notonianum** (Wall.) Burtt, Notes Roy. Bot. Gard. Edinb. 24: 170. 1962; Theobald & Grupe in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 99. 1981; Manilal, Fl. Silent Valley 200. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 330. 1996. ***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. 1924.

Fleshy herbs, glabrous; stems thick. Leaves alternate and opposite, to 17 x 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 to 5 mm long; sepals 5, 8 mm long, 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 6 x 4 mm, ovoid, loculicidal; seeds many, reticulate.

*Fl. & Fr.* : August-December

*Distr.* : Peninsular India and Sri Lanka. Fairly common; in moist shady areas in evergreen forests. Thekkady, *JA 18438.*

### **RHYNCHOTECHUM** Blume

Bijdr. 775. 1826.

**Rhynchotechum permolle** (Nees) Burtt, Notes Roy. Bot. Gard. Edinburgh 24: 39. 1962; Theobald & Grupe in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 105. 1981; Manilal, Fl. Silent Valley 201. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 331. 1996. ***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. 1924.

Subshrubs, to 50 cm high, densely golden tomentose. Leaves alternate, to 30 x 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 7 mm long, lanceolate; corolla white, 12 mm across, tube short, lobes rotate, obovate, glabrous; stamens 4, equal, filaments arcuate; ovary ovoid, produced into a stout style; ovules many. Berry globose, 6 mm across, white.

*Fl. & Fr.* : September-December

*Distr.* : South India and Sri Lanka. Fairly common; in evergreen forests. Mlappara, *JA 13366.*

## 95. BIGNONIACEAE

Juss., Gen. Pl. 137. 1789.

1. Leaves bipinnate; capsule warty-tubercled.....**Radermachera**

1. Leaves simple-pinnate; capsule not as above.....2

2. Capsule tetragonous; flowers ca. 1.5 cm across.....**Stereospermum**

2. Capsule not tetragonous; flowers more than 3 cm across.....3

3 Leaflets serrate; corolla yellow.....**Tecoma**

3. Leaflets entire; corolla not yellow.....4

4. Capsule erect, wingless; corolla red; much branched tree..... **Spathodea**

4. Capsule horizontal, winged: corolla pinkish white; rarely branched.....**Pajanelia**

## **PAJANELIA** de Candolle

Bibl. Univ. Genev. 17: 130. 1838.

**Pajanelia longifolia** (Willd.) K. Schum. in Engl. & Prantl, Pflanzenf. 4(3b): 244. 1895; Steenis, Fl. Males. I, 8: 163. 1977; Sasidh. & Sivar., Fl. Pl. Thrissur For. 332. 1996. ***Bignonia longifolia*** Willd., Sp. Pl. 3: 306. 1800. ***Pajanelia rheedii*** Wight, Ic. tt. 1343, 1344. 1848; Clarke in Hook. f., Fl. Brit. India 4: 384. 1884; Gamble, Fl. Pres. Madras 1000. 1924. **Payyani, Payyazhantha**.

Medium trees, bole roundish, usually unbranched, covered with prominent leaf scars. Leaves to 1 m long, leaflets 8-10 pairs, to 20 x 12 cm, ovate, inequilateral, oblique at base, subsessile, acute to acuminate at apex. Flowers in terminal racemose panicles, pedicelled; calyx 4.5 cm long, campanulate, rusty tomentose, filled with sap; corolla 9 cm long and 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 6 cm long, stigma spoon shaped. Capsule to 30 x 6 cm; winged; seeds flat, papery, winged.

*Fl. & Fr.* : January-May

*Distr.* : Indo-Malesia. Occasional; in semi-evergreen forests. Thekkady, *JA 17985.*

*Note* : This species is used as a supporting tree in pepper plantations in many tribal settlements.

## **RADERMACHERA** Zollinger & Moritzi

in Zollinger, Syst. Verzeichniss Ind. Archipel 3: 53. 1855.

**Radermachera xylocarpa** (Roxb.) K. Schum. in Engl. & Prantl, Pflanzenf. 4(3b): 243. 1895; Gamble, Fl. Pres. Madras 999. 1924; van Steenis, Blumea 23(1): 131. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1132. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 332. 1996. ***Bignonia xylocarpa*** Roxb., Fl. Ind. 3: 108. 1832; Wight, Ic. tt. 1335, 1336. 1848; Bedd., Fl. Sylv. t. 70. 1870. ***Stereospermum xylocarpum*** (Roxb.) Benth. in Benth. & Hook. f., Gen. Pl. 2: 1047. 1876; Clarke in Hook. f., Fl. Brit. India 4: 383. 1884. **Kattumuringa** (Mannan), **Pooppathiri**.

Medium trees, bark grey-corky. Leaves to 60 cm long, bipinnate; leaflets opposite, to 8 x 5 cm, ovate, acute to acuminate, glabrous; nerves 5-7 pairs. Flowers in terminal panicled cymes, pedicelled, 5-8 together; calyx 1 cm long, campanulate, irregularly 5-lobed, corolla 4.5 cm long and 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 40 x 2 cm, woody, warty tubercled, bivalved; seeds winged, 1.5 cm long.

*Fl. & Fr.* : February-April

*Distr.* : Peninsular India. Common; in savannahs and moist deciduous forests. Thekkady, *JA 13546*; Thannikkudy, *JA & KPR 14845.*

**SPATHODEA** Palisot de Beauvois,

Fl. Oware 1: 46. 1805.

**Spathodea campanulata** Beauv. F. Oware 1: 47, tt. 27 & 28. 1805; Gamble, Fl. Madras 1000. 1924; Gandhi in Sald. & Nicols. Fl. Hassan Dist. 537. 1976; Henry *et al.*, Fl. Tamil Nadu Ser 1(2), 136. 1987.

Trees; twigs tomentose. Leaves 1-pinnate, to 40 cm long; leaflets many, opposite, to 12 x 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 to 20 cm long, erect, compressed, woody; seeds flat, winged 1-1.5 cm across, white.

*Fl. & Fr.* : November-may.

*Distr.* : Tropical Africa, introduced. Cultivated in gardens and run wild. Thekkady, *JA 18614.*

**STEREOSPERMUM** Chamisso

Linnaea 7: 720. 1833.

**Stereospermum colais** (Buch.-Ham. ex Dillw.) Mabber., Taxon 27: 553. 1979; Manilal, Fl. Silent Valley 201. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 332. 1996. ***Bignonia colais*** Buch.-Ham. ex Dillw., Rev. Hort. Malab. 28. 1839. ***Stereospermum tetragonum*** DC., Prodr. 9: 210. 1845; Gamble, Fl. Pres. Madras 998. 1924. ***S. chelonoides*** sensu Wight, Ic. t. 1341. 1845, non (L.f.) DC.,1838: Clarke in Hook.f., Fl. Brit. India 4:383.1884. ***Dipterosperma personatum*** Hassk., Flora 25(2): Biebl. 28. 1842. ***Stereospermum. personatum*** (Hassk.) Chatter., Bull. Bot. Soc. Bengal 2: 70. 1948; Santisuk, Kew Bull. 28: 178. 1973. **Pathiri maram**.

Large trees, bark transversally rugose, grey. Leaves to 35 cm long, 1-pinnate; leaflets to 12 x 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 mm long, campanulate, shallowly lobed, lobes obtuse; corolla yellow, 2 cm long, 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 to 35 x 0.7 cm, subtetragonous, spirally splitting; seeds 8 mm long, with membranous wing on both sides.

*Fl. & Fr.* : April-October

*Distr.* : Indo-Malesia. Common; in moist deciduous forests. Thekkady, *JA 12557;* Thaannikkudy, *JA 13741.*

**TECOMA** A. L. Jussieu

Gen. 139. 1789.

**Tecoma stans** (L.) Kunth in Humboldt, Kunth & Bonpl., Nov. Gen. Sp. 3: 144. 1819; Bor & Raiz., Beautif. Ind. Climbers Shrubs 37, t. 9, f. 28. 1954; Gandhi in Sald. & Nicols. Fl. Hassan Dist. 537. 1976; Henry *et al.*, Fl. Tamil Nadu Ser. 1(2), 137. 1987. ***Bignonia stans*** L., Sp. Pl. ed. 2, 2: 871. 1763. ***Stenolobium stans*** (L.) D. Don, Edinburgh Philos. J. 9: 264. 1823; Gamble, Fl. Pres. Madras 1000. 1924.

Shrubs; branches slender, glabrous. Leaves opposite, 18-25 cm long, imparipinnate; leaflets to 10 x 2 cm, lanceolate, acuminate at apex, serrate; petiolule absent. Flowers several to many, in terminal raceme; pedicel to 5 mm long; calyx to 5 mm long campanulate, lobes short; corolla yellow, 3-4 cm across, tube cylindrical at base, lobes equal; stamens 4, filaments hairy at base; anthers pubescent; disc cupular. Capsule linear, compressed, acuminate at both ends, 10-20 cm long; seeds many, compressed with hyaline wings.

*Fl. & Fr.* : January-May.

*Distr.* : Native of North America, planted in gardens and found naturalised. Occasional, in disturbed forests,. Thekkady, *JA 16348.*

## 96. PEDALIACEAE

R. Brown, Prodr. 519. 1810.

**SESAMUM** Linnaeus

Sp. Pl. 634. 1753

**Sesamum orientale** L., Sp. Pl. 634. 1753; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1140. 1983; Seggeler, Taxon 38: 656. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur

For. 333. 1996. ***S. indicum*** L., Sp. Pl. 634. 1753; Clarke in Hook. f., Fl. Brit. India 4: 387. 1884; Gamble, Fl. Pres. Madras 1002. 1924.

Erect herbs, young shoots 4-angled, puberulus. Leaves opposite below, alternate above, basal leaves often 3-foliolate, elliptic-lanceolate, variable in size, pubescent on both sides. Flowers solitary, axillary, terminating into a leafy raceme above; calyx 5-lobed; lobes unequal; corolla purple, 3.5 x 2 cm, tube ventricose, 2-lipped above, lobes 5; stamens 4, included. Capsule to 1.8 x 0.5 cm, oblong, beaked, compressed, medianly grooved, pubescent; seeds many, compressed, black.

*Fl. & Fr.* : July-December

*Distr.* : India and Sri Lanka; cultivated in all hot countries. Fairly common; in disturbed moist deciduous forests. Sabarimala, *JA 18474.*

## 97. ACANTHACEAE

Juss., Gen. Pl. 102. 1789.

1. Stamens 4 ..... 2
1. Stamens 2 ..... 10
2. Climbers; calyx 10-15-toothed or absent ..... **Thunbergia**
2. Shrubs or herbs; calyx 4 or 5-partite ..... 3
3. Retinacula absent ..... **Staurogyne**
3. Retinacula present ..... 4
4. Seeds more than two in each cell of the capsule; flowers in axillary clusters ..... 5
4. Seeds 2 or 1 in each cell of the capsule ..... 6
5. Flowers solitary or paired ..... **Dipteracanthus**
5. Flowers densely clustered ..... **Hygrophila**
6. Bracts orbicular; spikes 1-sided ..... **Phaulopsis**
6. Bracts not orbicular; spikes cylindrical ..... 7
7. Corolla 2-lipped; bracts spinous ..... **Lepidagathis**
7. Corolla lobes subequal; bracts minute, not spinous ..... 8
8. Flowers in racemes; bracts minute ..... **Asystasia**
8. Flowers spicate; bracts large ..... 9
9. Petals twisted; filaments united into an adnate sheath ..... **Strobilanthes** (p. p.)
9. Petals imbricate; filaments free ..... **Crossandra**
10. Ovules more than 2 in each cell ..... 11
10. Ovules 2 or 1 in each cell ..... 13
11. Flowers mixed with axillary cladodes ..... **Haplanthodes**
11. Flowers not mixed with cladodes ..... 12

12. Corolla tube 2-5 times longer than lip, lobes subequal.....**Gymnostachyum**
12. Corolla tube equal to or shorter than the lip, lobes unequal, bilipped .....**Andrographis**
13. Flowers on one-sided spikes.....**Rungia**
13. Flowers on cylindrical spikes, cymes or panicles.....14
14. Corolla bilabiate.....15
14. Corolla equally 5-lobed .....19
15. Inflorescence bracts in opposite pairs.....**Dicliptera**
15. Inflorescence bracts not as above .....16
16. Anther cells with white appendage; corolla tube broad.....**Justicia**
16. Anther cells without appendages; corolla tube slender.....17
17. Flowers in dense terminal spike; anther cells parallel .....**Ecbolium**
17. Flowers in branched panicled cymes.....18
18. Flowers white; bracts minute.....**Rhinacanthus**
18. Flowers pink; bracts broad.....**Peristrophe**
19. Corolla lobes twisted in bud .....20
19. Corolla lobes imbricate in bud .....21
20. Corolla tube slender, not ventricose.....**Eranthemum**
20. Corolla tube short, ventricose above..... **Strobilanthes** (p. p.)
21. Sepals 4, unequal.....**Barleria**
21. Sepals 5, equal .....**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. Anthers not bearded; upper lip of corolla 2-lobed; stout herbs.....**A. explicata**
1. Anthers bearded; upper lip of corolla rarely emarginate; slender herbs .....2
2. Panicle congested, ca. 5 x 3 cm; staminal filaments glabrous .....**A. neesiana**
2. Panicle lax, over 10 cm long; staminal filaments hairy ..... 3
3. Leaf-base cordate .....**A. atropurpurea**
3. Leaf-base acute .....4
4. Racemes solitary; nerves of leaves 10 pairs; scandent herbs .....**A. macrobotrys**
4. Racemes panicled; nerves of leaves 5 pairs; erect herbs.....**A. paniculata**

**Andrographis atropurpurea** (Dennst.) Alston, Taxon 26: 539. 1977; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 139. 1987. ***Justicia atropurpurea*** Dennst., Schluess. Hort. Ind. Malab.12: 35. 1818. ***Andrographis wightiana*** Anders. ex Nees in DC., Prodr. 11: 517. 1847; Wight, Ic. t. 1558.1850; Clarke in Hook. f., Fl. Brit. India 4:503.1884; Gamble, Fl. Pres. Madras 1048. 1924.

Suberect undershrubs; stems hairy. Leaves to 10 x 4 cm, ovate, acuminate, broadest at base, glabrous; nerves 4 or 5 pairs, subprominent; petiole 0-5 mm long. Panicle with long lax racemes, scabrid; bracts and bracteoles subulate. Flowers distant; calyx lobes 5 mm long, subulate, hairy; corolla 18 mm long, glabrous, upper lip orbicular, retuse, dark brown, lower lip shallowly lobed, light pink with brown spots; lower anther bases bearded. Capsule 22 x 3 mm, oblong, glandular hairy; seeds 8, orbicular, glabrous.

*Fl. & Fr.* : August-March

*Distr.* : Peninsular India. Common; in openings of evergreen forests. Ennakkapally, *JA 12259.*

**Andrographis explicata** (Clarke) Gamble, Fl. Pres. Madras 1049. 1924; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 139. 1987. ***A. viscosula*** Nees var. ***explicata*** Clarke in Hook. f., Fl. Brit. India 4: 504. 1884. ***A. zeylanica*** sensu Wight, Ic. t. 1560. 1850, non Nees, 1847.

Erect woody undershrubs, *ca.* 1 m high; stems glabrous. Leaves to 15 x 4 cm, elliptic, acuminate at both ends, strigose; nerves 7-10 pairs; petiole 2 cm long. Panicle 10-30 x 20 cm, pyramidal; branches glandular-strigose; bracts and bracteoles minute. Flowers many; calyx lobes 4.5 mm long, lanceolate, subulate, glandular hairy; corolla 20 mm long, tube gradually broadening above, not or slightly bellied; upper lip 2-lobed, dark-purple; lobes of lower lip equal, obtuse, hairy; anthers acute at base, glabrous, filaments attached near the base of the corolla, glabrous; style puberulus. Capsule 25 x 4 mm, linear-oblong, hairy, retinacula acute; seeds 12.

*Fl. & Fr.* : August-December

*Distr.* : Southern Western Ghats. Common; in moist deciduous forests. Karadikkavala, *JA 13922.*

**Andrographis macrobotrys** Nees in DC., Prodr. 11: 516. 1847; Clarke in Hook. f., Fl. Brit. India 4: 503. 1884; Gamble, Fl. Pres. Madras 1048. 1924; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 139. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 335. 1996.

Erect or scandent undershrubs; stems stout, glabrous. Leaves to 13 x 3 cm, elliptic, lanceolate, coriaceous, glabrous; nerves to 10 pairs; petiole 6 mm long. Racemes to 19 cm long, upper axillary. Flowers distant; calyx lobes 3 mm long, glandular hairy; corolla 20 mm long, tube ventricose; upper lip entire, midlobe of the lower lip broader than laterals, hairy; filaments bulged

at base, hairy. Capsule 25 mm long, linear oblong, glandular hairy, retinacula acute; seeds 8, glabrous.

*Fl. & Fr.* : November-February

*Distr.* : Peninsular India and Sri Lanka. Common; in semi-evergreen forests. Pachakkanam, *JA 12664.*

**Andrographis neesiana** Wight, Ic. t. 1561. 1850; Clarke in Hook. f., Fl. Brit. India 4: 504. 1884; Gamble, Fl. Pres. Madras 1049. 1924; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 140. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 335. 1996.

Unbranched herbs, 30-45 cm high; branches strigose. Leaves 2-4 x 2 cm, ovate-elliptic, acute at both ends, glabrous, ciliate, nearly sessile; nerves 5 pairs. Panicle 2-5 x 4 cm, congested, terminal, strigose. Flowers densely arranged; calyx lobes 6 mm long, acuminate, glandular hairy, connate at base; corolla 14 mm long, tube not ventricose, upper lip emarginate; lobes of lower lip obtuse, hairy; filaments broaden below, anthers attenuate at base; style hairy. Capsule 16 x 3 mm, oblong, acute, hairy; seeds 6, glabrous.

*Fl. & Fr.* : July-December

*Distr.* : Southern Western Ghats. Common; in open grasslands. Mangaladevi, *JA 12028.*

**Andrographis paniculata** (Burm. f.) Wall. ex Nees in Wall., Pl. Asiat. Rar. 3: 116. 1832; Wight, Ic. t. 518. 1842; Clarke in Hook. f., Fl. Brit. India 4: 501. 1884; Gamble, Fl. Pres. Madras 1048. 1924; Matthew and Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 48. 1983; Manilal, Fl. Silent Valley 202. 1988. ***Justicia paniculata*** Burm. f., Fl. Ind. 9. 1768. **Kiriath, Nila veppu, Nilamkanjiram**

Slender woody herbs; branches glabrous. Leaves to 9 x 1.5 cm, elliptic, acuminate at apex, base acute, decussate, glabrous. Panicle terminal and upper axillary, glandular-hairy. Flowers many, distant; calyx lobes 3 mm long, linear, hairy, connate at base; corolla 14 mm long, tube ventricose, hairy, upper lip entire, midlobe of lower lip broader than laterals, acute, glandular-hairy; ovary puberulus, style hairy. Capsule 20-30 x 3 mm, oblong, acute, hairy; retinacula spoon shaped; seeds 8, glabrous.

*Fl. & Fr.* : Throughout the year

*Distr.* : Peninsular India and Sri Lanka. Common; in moist deciduous forests. Thaannikkudy, *JA 13786.*

*Ethnobotanical use* : The entire plant is used in cough and fever (Mala Arayan); the plant is made into a paste and mixed with cow milk and is orally given.

## 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. Leaves linear-lanceolate, glabrous ..... **A. travancorica**
1. Leaves ovate, glabrous or hairy ..... 2
2. Branches grey-puberulus ..... **A. gangetica**
2. Branches glabrous ..... **A. dalzelliana**

**Asystasia dalzelliana** Sant., Kew Bull. 1948: 276. 1948; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 542. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1156. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 141. 1987. ***A. violacea*** Dalz. ex Clarke in Hook. f., Fl. Brit. India 4: 494. 1884; Gamble, Fl. Pres. Madras 10631924.

Diffuse herbs; stems weak, glabrous. Leaves 6-10 x 3 cm, ovate, rounded and decurrent at base, pubescent; petiole 2 cm long. Raceme solitary, axillary, to 15 cm long, glabrous. Flowers distant; calyx lobes free; corolla 22 mm long, violet with blue spots; lobes orbicular, obtuse.

*Fl. & Fr.* : September-December

*Distr.* : S. Western India. Rare; in evergreen forests at higher elevations. Vellimala, *JA 12948.*

**Asystasia gangetica** (L.) T. Anders. in Thw., Enum. Pl. Zeyl. 235. 1860; Gamble, Fl. Pres. Madras 1063. 1924; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 543. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1157. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 141. 1987. ***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.

Erect or diffuse herbs, 20-35 cm high. Leaves to 5 x 3 cm, obovate, acuminate at apex, base rounded, pubescent; petiole 1 cm long, densely tomentose. Racemes terminal. Flowers distant; pedicels 3 mm long; calyx lobes 7 mm long, linear, acuminate, glandular hairy, free to the base;

corolla 25 mm long, yellow; tube ventricose, lobes orbicular; anthers cuspidate at base. Capsule 25 mm long, puberulus; seeds 4, compressed, rugose.

*Fl. & Fr.* : Throughout the year

*Distr.* : Africa, eastward to Malesia. Frequent; in disturbed forests. Koruthode, *JA 13177.*

**Asystasia travancorica** Bedd., Ic. t. 178. 1868-1874; Clarke in Hook. f., Fl. Brit. India 4: 494. 1884; Gamble, Fl. Pres. Madras 1063. 1924; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 141. 1987.

Erect herbs, 50-70 cm high. Leaves to 15 x 1.5 cm, acute to acuminate at both ends, glabrous or thinly hairy; nerves 5-6 pairs, oblique. Racemes 1-3, terminal, interrupted. Flowers clustered; calyx 6 mm long, oblong, acute, glabrate, basely connate; corolla 20 mm long, violet, lobes obtuse; anthers obtuse at base, glabrous. Capsule 25 mm long, puberulus; seeds 4, cubical, rugose.

*Fl. & Fr.* : September-December

*Distr.* : Southern Western Ghats, endemic. Rare; in evergreen and moist deciduous forests. Thaannikkudy, *JA 12345*; Sivaloda, *JA·12504.*

## **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. Inflorescence a terminal spike; outer sepals whitish with reddish nerves..... **B. courtallica**
1. Inflorescence axillary or terminal helicoidal cyme; sepals not as above ..... 2
2. Leaves densely tawny pubescent below..... **B. involucrata**
2. Leaves not or scarcely pubescent below..... **B. lawii**

**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. 1924; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 543. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1160. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 336. 1996.

Shrubs 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, 5 mm long, lanceolate. Flowers closely packed; outer sepals 18-20 x 6.5 mm, elliptic, acuminate, pubescent; inner sepals 15 mm long, linear, acuminate, hairy; corolla 4-5 cm long, tube and throat yellow or white; lobes 1.5 cm long, obovate, blue; filaments villous at base. Capsule 2.3 x 0.9 cm, elliptic, glabrous; seeds 4, 5 x 5 mm, orbicular, hairy, brown; retinacula 6 mm long.

*Fl. & Fr.* : November-January

*Distr.* : Peninsular India; endemic. Common; in evergreen sholas, Arjunankotta, *JA 13162*; Vallakkadavu, *JA 13665.*

**Barleria involucrata** Nees in Wall., Pl. Asiat. Rar. 3: 92. 1832, var. **elata** (Dalz.) Hook. f., Fl. Brit. India 4: 486. 1884; Fyson, Fl. S. Ind. Hill. St. 2: t. 393. 1932; Gamble, Fl. Pres. Madras 1060. 1924; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 544. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1163. 1983; Manilal, Fl. Silent Valley 202. 1988. ***B. 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 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 15 x 3 mm, lanceolate, pubescent; corolla 7-8 cm long, tube 4-6 cm long, cylindrical, thinly hairy out, lobes spreading, blue; filaments villous at base.

*Fl. & Fr.* : November-January

*Distr.* : Southern Western Ghats; endemic. Very common; in evergreen forests. Vavalala, *JA 12783*; Uppermanalar, *JA 12957.*

**Barleria lawii** T. Anders., J. Linn. Soc. 9: 492. 1867; Clarke in Hook. f., Fl. Brit. India 4: 486. 1884; Gamble, Fl. Pres. Madras 1060. 1924. ***B. beddomei*** T. Anders. ex. Bedd., Ic. t. 258. 1868-1874.

Shrubs, 1-2 m high; stems terete, thinly puberulus. Leaves to 15 x 5 cm, elliptic, acuminate at both ends; nerves *ca* 6 pairs. Cymes densely pubescent, upper axillary and terminal; bracts 12 x 2 mm, lanceolate; bracteoles 8 x 1 mm, linear. Flowers many; outer sepals 2.5 x 0.6 cm, lanceolate, densely adpressed-hairy, one bifid at apex; inner sepals 15 mm long, acuminate, pubescent; corolla 5 cm long, tube white, 3.5 cm long, lobes blue, obovate; filaments pubescent with the throat of corolla tube.

*Fl. & Fr.* : October-December

*Distr.* : Western Peninsular India; endemic. Common; in evergreen shola forests. Mangaladevi, *JA 12537*; Inchipparathode, *JA 12590.*

## **CROSSANDRA** R. A. Salisbury

Parad. Lond. t. 12. 1806

**Crossandra infundibuliformis** (L.) Nees in Wall., Pl. Asiat. Rar. 3: 98. 1832; Sant., Bot. Mem. Univ. Bombay 2: 55. 1951; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1069. 1983. ***Justicia infundibuliformis*** L., Syst. Nat. (ed. 10), 850. 1758. ***Crossandra undulaefolia*** Salisb. in Hook., Parad. Lond. t. 12. 1805; Clarke in Hook. f., Fl. Brit. India 4: 492. 1884; Gamble, Fl. Pres. Madras 1055. 1924. ***C. axillaris*** Nees in Wall., Pl. Asiat. Rar. 3: 98. 1832; Wight, Ic. t. 460. 1841.

Subshrubs, 1-2 m high. Leaves opposite, 6-9 x 2-4 cm, elliptic, acute at either ends, usually crowded towards the apex; petiole to 4 cm long. Spike terminal or rarely axillary, dense, to 7 cm long; peduncle 5-10 cm long; bracts in 4 rows, 15 x 5 mm, lanceolate; bracteoles 15 x 3 mm, linear, acuminate, pubescent. Flowers many, densely packed; calyx lobes 5, unequal, to 9 mm long, glandular-hairy, outer one sometimes 2-fid at apex; corolla bluish green, tube 2.5 cm long, narrow, lobes 5, subequal, 1 cm long, oblong, spreading; stamens 4, inserted at the middle of corolla tube, included, filaments unequal, anthers bearded; ovary oblong, 4-ovuled; style narrow, stigma fimbriate. Capsule 10 x 5 mm, oblong; seeds 4, orbicular.

*Fl. & Fr.* : December-March.

*Distr.* : India and Sri Lanka. Common; in evergreen forests at low elevations. Arjunankotta, *JA 18611.*

## **DICLIPTERA** A. L. Jussieu

Ann. Mus. Natl. Hist. Nat. 9: 267. 1807, *nom. cons.*

Small herbs, erect or diffuse. Leaves opposite, entire. Flowers in cymes, terminal or axillary, with some lower bracts sterile. Fertile bracts deltoid to orbicular, opposite, carries 1-3 flowers; bracteoles linear; calyx lobes subequal, connate at base; corolla 2-lipped; upper lip entire or emarginate; lower lip 3-lobed, recurved; stamens 2, anther cells superposed; ovary 2-celled; ovules paired in each cell; style narrow, stigma bifid. Fruit a capsule with solid stalk; seeds compressed verrucose or papillose.

1. Cymes peduncled; bracts acute ..... **D. foetida**

1. Cymes sessile; bracts obtuse, cuspidate ..... **D. cuneata**

**Dicliptera cuneata** Nees in Wall., Pl. Asiat. Rar. 3: 111. 1832; Wight, Ic. t. 1552. 1850; Clarke in Hook. f., Fl. Brit. India 4: 552. 1884; Gamble, Fl. Pres. Madras 1073. 1924; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 546. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1170. 1983; Henry *et al.,* Fl. Tamil Nadu Ser. 1, 2: 144. 1987.

Subshrubs. Leaves to 7 x 5 cm, elliptic, acuminate, base rounded or cuneate, hispid; petiole 2-3 cm long. Cymes sessile or shortly peduncled, subcapitate; bracts 18 x 12 mm, obovate, obtuse, mucronate, hispid; bracteoles 5 mm long, lanceolate, subulate. Flowers to 13 together; sepals 7 mm long, lanceolate, hispid; corolla pink, 8 mm long, tube slender; filaments hairy.

*Fl. & Fr.* : November-May

*Distr.* : Peninsular India. Occasional; in evergreen forests. Uppermanalar, *KPR & JA 15015.*

**Dicliptera foetida** (Forssk.) Blatt., Rec. Bot. Surv. India 8: 361. 1921; Wood, Kew Bull. 38: 453. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 337. 1996. ***Justicia foetida*** Forssk., Fl. Aeg.-Arab. 5. 1775. ***Dicliptera zeylanica*** Nees in DC., Prodr. 11: 474. 1847; Clarke in Hook. f., Fl. Brit. India 4: 552. 1885; Gamble, Fl. Pres. Madras 1072. 1924; Manilal, Fl. Silent Valley 203. 1988.

Shrubs, 1-2 m high; stems terete. Leaves to 7 x 3.5 cm, elliptic, acute at both ends, glabrous except the nerves below; nerves 5 pairs; petiole 2.5 cm long. Flowers in peduncled axillary cymes; bracts 15 x 13 mm, deltoid, cuspidate; calyx lobes 4 mm long, lanceolate, acuminate; corolla pink, 20 mm long, bilabiate; lobes obtuse; stamens 2, filaments hairy, anthers in two levels. Capsule clavate, widened above; seeds hirtus.

*Fl. & Fr.* : November-March

*Distr.* : Peninsular India and Sri Lanka. Common; in evergreen forests. Vellimala, *JA 14362.*

## 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; Sant., J. Bombay Nat. Hist. Soc. 51: 352. 1953; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1171. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 337. 1996. ***Ruellia prostrata*** Poir. in Lam., Encycl. 6: 349. 1804, Bedd., Ic. t. 282. 2868-1874; Clarke in Hook. f., Fl. Brit. India 4: 411. 1884; Gamble, Fl. Pres. Madras 1017. 1924.

Diffuse herbs, rooting at lower nodes; stems villous. Leaves to 6 x 4 cm, ovate, acute, entire, base acute of obtuse; petiole 2-3 cm long. Flowers axillary, 2 or 3 together; bracts absent; bracteoles foliar, 1.5 x 1 cm, ovate; calyx 5-partite, lobes 10 mm long, linear, ciliate; corolla

yellow, tube 8 mm long, lobes subequal, 1 cm long, obovate; stamens 4, didynamous, filaments connate below; ovary 2-celled, style densely hairy. Capsule 1.5 x 0.6 cm, linear oblong; seeds 5 in each cell, orbicular, compressed, marginate, smooth.

*Fl. & Fr.* : Throughout the year

*Distr.* : Endemic to Peninsular India. Common; in disturbed forest areas. Thekkady, JA *16339.*

## **ECBOLIUM** S. Kurz

J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 40: 75. 1871.

**Ecbolium ligustrinum** (Vahl) Vollesen, Kew Bull. 44. 651. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 338. 1996. ***Justicia ligustrina*** Vahl, Enum. 1: 118. 1804. ***J. laetevirens*** Vahl, Enum. 1: 118. 1804; Nees in DC., Prodr. 11: 427. 1847. ***Ecbolium linneanum*** Kurz, J. Soc. Bengal 40: 75. 1871; Clarke in Hook. f., Fl. Brit. India 4: 545. 1884; Gamble, Fl. Pres. Madras 1074. 1924, Incl. all vars. ***E. viride*** (Forssk.) Alston var. ***laetevirens*** (Vahl) Raizada, Ind. For. 84: 482. 1958; Manilal, Fl. Silent Valley 203. 1988.

Glabrous shrubs; stems terete. Leaves to 22 x 6 cm, elliptic-lanceolate, acuminate on both ends; lateral nerves 7 pairs; petiole 3.5 cm long. Spikes terminal, to 12 cm long; bracts 23 x 12 mm, elliptic, glabrous; bracteoles filiform. Flowers many; sepals 5 mm long, linear, acuminate, hirtus, united at base, corolla bluish-green, bilabiate, tube 27 mm long, narrow, upper lip linear-oblong, shortly bifid; lower lip deeply 3-lobed, midlobe broader, 13 mm long; tube 25 mm long, narrow, hairy; stamens 2, anthers parallel; style slender; stigma 2-lobed, clavate. Capsule 23 x 10 mm, clavate, thinly hairy; seeds one in each chamber, 8 x 8 mm, orbicular, compressed, white, rugulose.

*Fl. & Fr.* : October-January

*Distr.* : India and Sri Lanka. Common; in evergreen forests. Pamba, *KPR & JA 17155.*

## **ERANTHEMUM** Linnaeus

Sp. Pl. 9. 1753

**Eranthemum capense** L., Sp. Pl. 9. 1753; Sant., J. Bombay Nat. Hist. Soc. 51: 355. 1953; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 548. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1176. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 338. 1996. ***E. montanum*** Roxb., Fl. Ind. 1: 100. 1820; Wight, Ic. t. 466. 1841; Gamble, Fl. Pres. Madras 1025. 1924. ***Daedalacanthus montanus*** (Roxb.) T. Anders. in Thw., Enum. Pl. Zeyl. 229. 1860; Clarke in Hook. f., Fl. Brit. India 4: 421. 1884.

Subshrubs; branchlets glandular-pubescent. Leaves to 15 x 5 cm, elliptic, acuminate at both ends, entire, glabrous; nerves 5-7 pairs; petioles to 3 cm long. Spikes 3-7 cm long, terminal, branched; bracts 20 x 5 mm, lanceolate, acuminate, glandular hairy; bracteoles linear. Flowers many; sepals 5, united at the base, lanceolate, acuminate, hairy; corolla blue, tube 3 cm long, slender, glabrous, blue, lobes equal, 12 mm 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.

*Fl. & Fr.* : July-December

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Deviar *JA 12132*; Sabarimala, *KPR 17725*.

## 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. Leaves basal; flowers in terminal peduncled cymes ..... **G. febrifugum**
1. Leaves cauline; flowers in axillary scorpioid cymes ..... 2
2. Flowers green or yellow; leaves hirsute ..... **G. canescens**
2. Flowers blue; leaves glabrous ..... **G. latifolium**

**Gymnostachyum canescens** (Nees) T. Anders, J. Linn. Soc. Bot. 9: 505. 1867; Clarke in Hook. f., Fl. Brit. India 4: 509. 1884; Gamble, Fl. Pres. Madras 1053. 1924; Sasidh. & Sivar., Fl. Pl. Thrissur For. 339. 1996. ***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 12-14 pairs, prominent. Cymes axillary, panicled, hirsute; bracts and bracteoles similar, 2 mm long, ovate. Flowers many, densely packed; sepals 5 mm long, glandular hairy; corolla greenish white, 15 mm long, tube 10 mm long, narrow, lobes obtuse, hispid; anthers unequal, glabrous. Capsule 16 x 2 mm, oblong, acute, hirsute; seeds many, orbicular, golden brown.

*Fl. & Fr.* : November-February

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Arjunankotta, *JA 13170*; Koruthode, *KPR 14813.*

**Gymnostachyum febrifugum** Benth., Flora 32: 558. 1849; Clarke in Hook. f., Fl. Brit. India 4: 508. 1884; Gamble, Fl. Pres. Madras 1053. 1924; Sasidh. & Sivar., Fl. Pl. Thrissur For. 339. 1996. ***G. alatum*** Wight, Ic. t. 1525. 1850.

Scapigerous herbs; stems very short. Leaves to 7 x 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 mm long, glabrous; corolla pink, 2.5 cm long, yellow at mouth; anthers pubescent. Capsule 25 x 2 mm, glabrous; seeds 16-20, orbicular, golden brown.

*Fl. & Fr.* : November-January

*Distr.* : S. W. India. Common; in evergreen forests near water sources. Attathodu, *JA 12756.*

**Gymnostachyum latifolium** (Dalz.) T. Anders., J. Linn. Soc. Bot. 9: 505. 1867; Bedd., Ic. t. 253. 1868-1874; Clarke in Hook. f., Fl. Brit. India 4: 509. 1884; Gamble, Fl. Pres. Madras 1053. 1924; Manilal, Fl. Silent Valley 204. 1988.

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 5.5 mm long, lanceolate, basally united; corolla 15 mm long, blue, lobes oblong, obtuse; filaments thinly hairy at base. Capsule 2 x 0.2 cm, linear-oblong, acute; seeds ovoid, golden brown, densely hairy.

*Fl. & Fr.* : February-April

*Distr.* : Southern Western Ghats. Rare; in evergreen forests at high elevations. Chokkampettimala, *JA & KPR 17769.*

## HAPLANTHODES O. Kuntze

in Post et O. Kuntze, Lex. 265. 1903.

**Haplanthodes neilgherryensis** (Wight) Majumdar, Bull. Bot. Soc. Bengal 25: 76. 1971; Sasidh. & Sivar., Fl. Pl. Thrissur For. 339. 1996. ***Haplanthus neilgherryensis*** Wight, Ic. t. 1556. 1850; Gamble, Fl. Pres. Madras 1052. 1924. ***Haplanthus tentaculatus*** Nees. var. ***neilgherrensis*** Clarke in Hook. f., Fl. Brit. India 4: 507. 1884.

Profusely branched herbs, 25-40 cm high, branches quadrangular, glabrous. Leaves to 7 x 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 mm long, lobes filiform, hairy; corolla 10 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 7 mm long, oblong; seeds 6-12, thinly hairy.

*Fl. & Fr.* : November-February

*Distr.* : South India, endemic. Rare; in moist deciduous forests. Karimala, *JA 17989.*

## **HYGROPHILA** R. Brown

Prodr. 479. 1810.

**Hygrophila salicifolia** (Vahl) Nees in Wall., Pl. Asiat. Rar. 3: 81. 1832; Wight, Ic. t. 1490. 1849; Clarke in Hook. f., Fl. Brit. India 4: 407. 1884; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 550. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1180. 1983. ***Ruellia salicifolia*** Vahl, Symb. Bot. 3: 84. 1794. ***Hygrophila angustifolia*** Cook, Fl. Pres. Bombay 2: 354. 1904; Gamble, Fl. Pres. Madras 1016. 1924.

Erect subshrubs, rooting at lower nodes; stems quadrangular. Leaves to 10 x 1 cm, linear-lanceolate, strigose along the nerves. Flowers in axillary clusters, sessile; bracts 6 mm long, linear; bracteoles minute; calyx 12 mm long, tubular; lobes oblong, acuminate, hairy within; corolla pale pink, 15 mm long, bilabiate; tube slender, ventricose above; stamens 4, filaments united into a sheath, ciliate. Capsule 14 x 2 mm, terete, glabrous; seeds many, densely hairy.

*Fl. & Fr.* : August-December

*Distr.* : India and Sri Lanka. Common; in the marshy areas in moist deciduous forests. Thaannikkudy, *JA 12359.*

## **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 4 or 2; compressed; rugose.

1. Bracts white with green nerves.....**J. betonica**
1. Bracts green.....2
2. Sepals 4.....3
2. Sepals 5.....8
3. Leaves and sepals glabrous.....4
3. Leaves and sepals hairy.....6
4. Spike to 1.5 cm long; seeds puberulus.....**J. prostrata**
4. Spike over 5 cm long; seeds glabrous.....5
5. Corolla ca. 9 mm long; leaves sessile.....**J. notha**
5. Corolla ca. 5 mm long; leaves petiolate.....**J. neesii**
6. Branches glabrous; leaves black when dry; spikes to 6 cm long.....**J. latispica**
6. Branches strigose; leaves yellow when dry; spikes up to 2.5 cm long.....7
7. Bracts oblanceolate with hyaline margin; leaves to 3 cm broad.....**J. procumbens**
7. Bracts lanceolate, without hyaline margins; leaves to 1 cm broad .....**J. japonica**
8. Capsule glabrous.....**J. gendarussa**
8. Capsule densely hairy.....9
9. Corolla ca. 25 mm long; shrubs .....**J. santapaui**
9. Corolla below 10 mm long; herbs.....**J. wynaadensis**

**Justicia betonica** L., Sp. Pl. 15. 1753; Clarke in Hook. f., Fl. Brit. India 4: 525. 1885; Gamble, Fl. Pres. Madras 1078. 1924; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 551. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1184. 1983; Manilal, Fl. Silent Valley 205. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 341. 1996.

Shrubs, 1-3 m high; stems terete, glabrous. Leaves 5-15 x 4 cm, elliptic, acuminate at either ends, glabrous; nerves 10-12 pairs; petiole 4 cm long. Spike to 10 cm long, terminal and upper axillary; bracts 13-15 x 5 mm, ovate, acuminate. Flowers bluish-white; calyx 5 mm long, lobes oblong, hairy, 3-ribbed; corolla white with bluish streaks, 12 mm long, hairy; style hairy. Capsule 14 x 5 mm, hairy; seeds 3 x 2 mm, orbicular.

*Fl. & Fr.* : Throughout the year

*Distr.* : Tropical Africa, India & Sri Lanka, extending to Malesia. Frequent; in moist deciduous forests. Thekkady, *KPR & JA 15308.*

**Justicia gendarussa** Burm. f., Fl. Ind. 10. 1768; Clarke in Hook. f., Fl. Brit. India 4: 532. 1885; Gamble, Fl. Pres. Madras 1079. 1924; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic

3(1): 1186. 1983; Manilal, Fl. Silent Valley 205. 1988; Grah., Kew Bull. 43: 589. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 341. 1996. ***Gendarussa vulgaris*** Nees in Wall., Pl. Asiat. Rar. 3: 104. 1832; Wight, Ic. t. 468. 1841.

Shrubs, branches dark purple, terete, smooth. Leaves linear or oblong-lanceolate, acute or obtuse, base acute, chartaceous, glabrous, to 10 x 1.8 cm; lateral nerves 5-7 pairs, bluish; petiole 2-3 mm long. Spikes terminal, to 8 cm long, narrow; bracts linear, 4 mm long. Flowers white; calyx lobes linear-lanceolate, 5 mm long; corolla white with purple streaks, 1.5 cm long. Ovary and style puberulus. Capsule 12 mm long, glabrous

*Fl. & Fr.* : November-February

*Distr.* : S. E. Asia. Occasional; in disturbed moist deciduous forests. Thekkady, *JA 17942.*

**Justicia japonica** Thunb., Fl. Jap. 20. 1784; Sasidh. & Sivar., Fl. Pl. Thrissur For. 342. 1996. ***J. simplex*** D. Don, Prodr. 118. 1825; Clarke in Hook. f., Fl. Brit. India 4: 539. 1884; Gamble, Fl. Pres. Madras 1080. 1924. ***Rostellularia japonica*** (Thunb.) Ellis, Bull. Bot. Surv. India 22: 196. 1966.

Diffuse, branching herbs, 10-20 cm high; stems angular, strigose. Leaves to 2.5 x 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 4 mm long, lanceolate, ciliate. Flowers 8 mm long, densely packed; calyx 4 mm long; lobes 4, ciliate along margins and midribs; corolla purple with pink lines, 7 mm long, villous at base inside. Capsule 3 mm long, glabrous; seeds 4, rugose, brown.

*Fl. & Fr.* : Throughout the year

*Distr.* : Indo-Malesia, East Asia and Tropical Africa. Common; in grasslands. Mangaladevi, *JA 12184*; Kumarikulam, *JA & KPR 14856.*

**Justicia latispica** (Clarke) Gamble, Fl. Pres. Madras 1080. 1924. ***J. procumbens*** L., var. ***latispica*** Clarke in Hook. f., Fl. Brit. India 4: 539. 1885. ***Rostellularia procumbens*** sensu Wight, Ic. t. 1539. 1850, non Nees, 1832. ***R. latispica*** (Clarke) Bremek., Verh. Kon. Ned. Akad. Wetensch., Afd. Natuurk., Tweede Sect. 45: 71. 1948; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 158. 1987.

Erect or procumbent herbs, 30-50 cm high, rooting from lower nodes; stems ribbed, glabrous. Leaves 3-5 x 1.3 cm, elliptic-oblong, obtusely acute at apex, black when dry; nerves 4 or 5 pairs; petioles 7 mm long. Spikes 3-6 x 1 cm, cylindrical; bracts 7 mm long, lanceolate, ciliate. Flowers 12 mm long; calyx lobes 4 mm long, ciliate along the margins; corolla 10 mm long, villous at base inside, lilac with brown streaks on lower lip; ovary hairy at apex; style hairy. Capsule 5 mm long, glabrous.

*Fl. & Fr.* : October-January

*Distr.* : South India and Sri Lanka. Occasional; in the openings of evergreen forests. Inchippara, *JA 12605.*

**Justicia neesii** Ramam. in Saldanha & Nicol., Fl. Hassan Dist. 551. 1976; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 150. 1987. ***J. micrantha*** sensu Wall. ex Clarke in Hook. f., Fl. Brit. India 4: 536. 1885, non Pohl ex Nees, 1847; Gamble, Fl. Pres. Madras 1080. 1924.

Subshrubs, 40-80 cm high; stems hispid. Leaves to 3.5 x 2 cm, ovate, acute at apex, round or acute at base, glabrous; nerves 4 pairs; petiole 7 mm long. Spikes 5 x 0.6 cm, terminal; bracts 4 mm long, lanceolate, acuminate. Flowers densely packed; calyx lobes 5 mm long, linear, acuminate; corolla 6 mm long, lilac with pink spots. Capsule 6 mm long, oblong, acute, glabrous; seeds orbicular, rugose, brown.

*Fl. & Fr.* : October-January

*Distr.* : India. Common; in moist deciduous forests. Kumily, *JA 12546.*

**Justicia notha** Clarke in Hook. f., Fl. Brit. India 4: 537. 1885; Gamble, Fl. Pres. Madras 1080. 1924. ***Rostellularia simplex*** Wight, Ic. t. 1542. 1850; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 159. 1987, non ***Justicia simplex*** D. Don, 1825.

Erect herbs, rarely branched, 30-40 cm high; stems angular, scabrid. Leaves to 5 x 0.8 cm, linear-oblong, sessile, acute, glabrous. Spikes 7 x 0.7 cm, terminal, narrow, cylindric; bracts 6 x 2 mm, elliptic, acute, ciliolate. Flowers many, densely packed; calyx lobes 6 mm long, sometimes $5^{th}$ lobe present; corolla lilac, 9 mm long, tube hairy at two patches near the base inside, glabrous; ovary hairy. Capsule 4 mm long, glabrous; seeds 4, rugose, brown.

*Fl. & Fr.* : September-December

*Distr.* : India. Rare; in grasslands. Mangaladevi, *JA 17988.*

**Justicia procumbens** L., Sp. Pl. 15. 1753; Clarke in Hook. f., Fl. Brit. India 4: 539. 1884; Gamble, Fl. Pres. Madras 1080. 1924; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1188. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 342. 1996. ***Rostellularia procumbens*** (L.) Nees in Wall., Pl. Asiat. Rar. 3: 101. 1832.

Diffuse herbs, to 25 cm high, profusely branched. Leaves 4-6 x 2-3 cm, ovate, acute at either ends, hispid; nerves 5 pairs; petioles 1 cm long, hirtus. Spikes 1-2.5 x 1 cm, terminal, oblong; bracts 5 x 1.5 mm, oblanceolate, cuspidate, ciliate, with green midrib; bracteoles linear. Flowers many; calyx lobes 3.5 mm long, lanceolate, ciliate; corolla 7 mm long, hairy with pink lines,

upper lip 2-lobed. Capsule 5 x 2 mm, glabrous; seeds 1 x 1 mm. orbicular, brown, striately rugose.

*Fl. & Fr.* : Throughout the year

*Distr.* : Australia, India and Sri Lanka. Common; in moist deciduous forests and grasslands. Thekkady, *JA 12522.*

**Justicia prostrata** (Roxb. ex Clarke) Gamble, Fl. Pres. Madras 1081. 1924; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1188. 1983. ***J. 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; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 159. 1987

Erect or prostrate herbs; stems puberulus. Leaves to 1.7 x 1 cm, ovate, obtuse or acute, base rounded; nerves 4 pairs; petioles 7 mm long. Spikes 1.5 cm long, terminal, cylindrical to ovoid; bracts and bracteoles similar, 2 mm long. Flowers lax; calyx lobes 3 mm long, lanceolate, glabrous; corolla 4 mm long, white, glabrous; ovary glabrous. Capsule 3 mm long, glabrous; seeds triangular, rugose, puberulus, reddish brown.

*Fl. & Fr.* : Throughout the year

*Distr.* : India and Sri Lanka. Occasional; in moist deciduous forests. Vallakkadavu, *JA 15410.*

**Justicia santapaui** Bennet, J. Bombay Nat. Hist. Soc. 67: 358. 1970; Sasidh. & Sivar., Fl. Pl. Thrissur For. 342. 1996. ***Hemichoriste montana*** Nees in Wall., Pl. Asiat. Rar. 3: 102. 1832. Wight, Ic. t. 1538. 1850. ***Justicia montana*** (Nees) Wall. ex T. Anders., J. Linn. Soc. Bot. 9: 509. 1867; Clarke in Hook. f., Fl. Brit. India 4: 525. 1885; Gamble, Fl. Pres. Madras 1078. 1924. ***J. andersonii*** Ramam. in Sald. & Nicols., Fl. Hassan Dist. 551. 1976.

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 pairs, prominent; petioles 5-6 cm long. Spike 20 cm long, axillary, peduncled, simple or branched; bracts and bracteoles similar, 5 x 1.5 mm, oblong, pubescent. Flowers lax; calyx lobes 9 mm long, lanceolate, puberulus; corolla white with pink spots, villous at the base between the filaments; ovary densely hairy. Capsule 25 mm long, clavate, glabrous

*Fl. & Fr.* : October-January

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Pamba, *JA 17156.*

**Justicia wynaadensis** (Nees) Heyne ex T. Anders., J. Linn. Soc. Bot. 9: 515. 1867; Clarke in Hook. f., Fl. Brit. India 4: 533. 1884; Gamble, Fl. Pres. Madras 1079. 1924; Ramam. in Sald. &

Nicols., Fl. Hassan Dist. 552. 1976; Sasidh. & Sivar., Fl. Pl. Thrissur For. 342. 1996. ***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 to 18 x 6 cm, lanceolate, acuminate at either ends, glabrous; lateral nerves 7 pairs; petioles 1-3.5 cm long. Spike 10 cm long, axillary and terminal, slender; rachis pubescent, sometimes branched. Flowers in distant pairs; bracts 3 x 1 mm, hairy; corolla 12 mm long, throat hairy; ovary glabrous. Capsule 17 mm long, pubescent; seeds obovoid, oblique, minutely rugulose, dark brown.

*Fl. & Fr.* : November-February

*Distr.* : Southern Western Ghats, endemic. Common; in evergreen forests. Mullakkudy, *JA 13121*; Pamba, *KPR & JA 17146.*

## **LEPIDAGATHIS** Willdenow

Sp. Pl. 3(1): 400. 1800.

**Lepidagathis incurva** Buch.-Ham. ex D. Don, Prodr. Fl. Nep. 119. 1825; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 553. 1976; Manilal, Fl. Silent Valley 206. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 343. 1996. ***L. hyalina*** Nees in Wall., Pl. Asiat. Rar. 3: 95. 1832; Clarke in Hook. f., Fl. Brit. India 4: 521. 1885; Gamble, Fl. Pres. Madras 1068. 1924.

Erect stiff herbs; stems angular, strigose. Leaves 6-8 x 3 cm, ovate, acute at apex, cuneate at base, hispid; nerves to 7 pairs. Spikes terminal and axillary, clustered; bracts and bracteoles similar, 3.5 x 2 mm, lanceolate, ciliate, hyaline. Flowers densely packed; sepals 5, 5 mm long, linear-lanceolate, ciliate, glandular-hairy at apex; corolla 6 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, style curved, stigma capitate. Capsule 4 mm long, ellipsoid, hairy at apex; seeds 4, compressed, rugose, brown.

*Fl. & Fr.* : Throughout the year

*Distr.* : S. W. India. Common; in moist deciduous forests. Thekkady, *JA 13525, 13627.*

## **PERISTROPHE** C. G. D. Nees

in Wallich, Pl. Asiat. Rar. 3: 77, 112. 1832.

**Peristrophe montana** Nees in Wall., Pl. Asiat. Rar. 3: 113. 1832; Wight, Ic. t. 1533. 1850; Clarke in Hook. f., Fl. Brit. India 4: 4: 556. 1885; Gamble, Fl. Pres. Madras 1084. 1924; Henry

*et al.*, Fl. Tamil Nadu Ser. 1, 2: 155. 1987; Manilal, Fl. Silent Valley 210. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 344. 1996.

Erect shrubs; stems quadrangular. Leaves to 17 x 6 cm, ovate, acuminate, glabrous; nerves 7 pairs; petiole to 6 cm long. Cymes axillary and terminal, trichotomous; bracts 2, opposite, 2.5 x 1.5 cm, ovate, obtuse; bracteoles 6 mm long, linear. Flowers pink; calyx lobes 5, 4 mm long, linear, united below the middle; corolla tube 30 mm long, slender, 2-lipped above; lower lip 3-lobed, upper 15 mm long, orbicular, emarginate; stamens 2, filaments hairy, attached at the throat of corolla tube; anthers linear, curved, ovary glabrous, style filiform, stigma 2-lobed. Capsule 13 mm long, stipitate, tomentose.

*Fl. & Fr.* : October-January

*Distr.* : Peninsular India and Sri Lanka. Common; in semi-evergreen forests. Thekkady, *JA 12521*; Karadikkavala, *KPR 16823.*

## **PHAULOPSIS** Willdenow

Sp. Pl. 3(1): 4, 342. 1800, *orth. cons.*

**Phaulopsis imbricata** (Forssk.) Sweet., Hort. Brit. ed. 1. 327. 1827; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1194. 1983; Manilal, Fl. Silent Valley 210. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 345. 1996. ***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. 1924. ***Phaulopsis parviflora*** Willd., Sp. Pl. 3: 342. 1800; Clarke in Hook. f., Fl. Brit. India 4: 417. 1884. ***P. dorsiflora*** (Retz.) Sant., Kew Bull. 3: 276. 1948. ***Aetheilema reniforme*** Nees in Wall., Pl. Asiat. Rar. 3: 94. 1832; Wight, Ic. t. 1533. 1850.

Diffuse herbs, branches glandular hairy. Leaves in unequal pairs, up to 5 x 2 cm, elliptic, acuminate at both ends, hairy along the nerves below; nerves 4 pairs; petiole 2.5 cm long. Spikes axillary, 2 x 1 cm, 1-sided; bracts paired, 6 x 7 mm, orbicular, hairy and long ciliate along the margins; bracteoles absent. Flowers small, scarcely seen above the bracts; calyx lobes 5, unequal, to 5 mm long, oblanceolate, hairy; corolla 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 3 mm long, glabrous; seeds 4, compressed.

*Fl. & Fr.* : October-January

*Distr.* : Indo-Malesia, China and Africa. Common; in moist deciduous forests. Thekkady, *NS & JA 12771.*

## PSEUDERANTHEMUM Radlkfer

Sitzungber. Math. Phys. C. L. Konigl. Bayer. Akad. Wiss. Munchen 13: 282. 1883.

**Pseuderanthemum malabaricum** (Clarke) Gamble, Fl. Pres. Madras, 1064. 1924; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 557. 1976; Sasidh. & Sivar., Fl. Pl. Thrissur For. 345. 1996. ***Eranthemum malabaricum*** Clarke in Hook. f., Fl. Brit. India 4: 497. 1884.

Shrubs; stems terete, white, smooth. Leaves to 10 x 4 cm, elliptic, acuminate to base and apex, glabrous, glaucous below; nerves 5 pairs; petiole to 2 cm long. Spike 3-8 cm long, terminal, slender; bracts and bracteoles similar, 3 mm long, linear. Flowers in small interrupted clusters; calyx 6 mm long, lobes united at base, acuminate; corolla tube 30 mm long, slender; lobes 10 mm long, obovate, equal; stamens 2, free, anthers oblong; ovary few-ovuled, style slender, elongated, stigma bilobed. Capsule 18 x 5 mm, clavate, basal portion solid; seeds 5 x 3 mm, compressed, reticulate.

*Fl. & Fr.* : January-March

*Distr.* : South India and Sri Lanka. Common; in evergreen forests. Arjunankotta, *JA 13673.*

## RHINACANTHUS C.G.D. Nees

in Wallich, Pl. Asiat. Rar. 3: 76, 108. 1832.

**Rhinacanthus nasuta** (L.) Kurz., J. Asiat. Soc. Bengal 39: 79. 1870; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1196. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 346. 1996. ***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. 1884; Gamble, Fl. Pres. Madras 1083. 1924. **Vella kkurunji** (Thevan)

Erect shrubs; stems terete, tomentose. Leaves to 12 x 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, 2 mm long, hispid. Flowers many, lax; sepals 5, 5 mm long, linear-lanceolate, hispid; corolla white, tube 25 mm 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 cm long, clavate, with a lower solid slender stalk, glabrous; seeds 1 or 2 in each cell, rugose.

*Fl. & Fr.* : November-May

*Distr.* : India, Sri Lanka and Madagascar. Common; in moist deciduous forests. Kalvarithode, *JA 13634.*

## 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.....2
1. Basal bracts absent .....4
2. Bracts dissimilar, obtuse with broad hyaline margins .....**R. wightiana**
2. Bracts similar, acute, without or with a narrow hyaline margin .....3
3. Corolla more than 15 mm long; spike 1.5-2 cm broad; subshrubs .....**R. laeta**
3. Corolla ca. 5 mm long; spike ca. 0.6 cm broad; herbs.....**R. apiculata**
4. Spikes strictly axillary.....**R. pectinata**
4. Spikes terminal and upper axillary.....5
5. Fertile bracts obovate; lateral nerves of leaves 4-6 pairs .....**R. latior**
5. Fertile bracts lanceolate; lateral nerves of leaves 7-8 pairs.....**R. sisparensis**

**Rungia apiculata** Bedd., Ic. t. 247. 1868-1874, Clarke in Hook. f., Fl. Brit. India 4: 548. 1884; Gamble, Fl. Pres. Madras 1070. 1924; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 159. 1987.

Herbs; stems puberulus. Leaves to 7 x 3 cm, ovate-lanceolate, acute to acuminate, glabrous; lateral nerves 6-7 pairs; petiole to 1 cm long. Spikes 2-4 x 0.6 cm; basal bracts lanceolate, hirtus; floral bracts 8 x 2 mm, elliptic, acuminate, hirtus; bracteoles 8 mm long, acuminate, hairy. Sepals similar to bracteoles, united at base; corolla 8 mm long, white with pink spots, upper lip emarginate. Capsule 4 mm long, pubescent; seeds rugose, black.

*Fl. & Fr.* : October-February

*Distr.* : S. India and Sri Lanka. Common; in evergreen forests. Vavalala, *KPR & JA 14402.*

**Rungia laeta** Clarke in Hook. f., Fl. Brit. India 4:550. 1885; Fyson, Fl. S. Ind. Hill. St. 2: t. 399. 1932; Gamble, Fl. Pres. Madras 1071.1924; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 159. 1987.

Shrubs to 70 cm high; stems terete, glabrous. Leaves 6-8 x 3-5 cm, ovate-lanceolate, acute, glabrous; nerves 6-8 pairs; petiole 2 cm long. Spikes white, 3-6 x 2 cm, oblong, peduncled, floral bracts white, 16 x 7 mm, lateral ones empty, elliptic to obovate, acute, ciliate; bracteoles 10 x 2

mm, linear. Flowers white; sepals 7 x 1.5 mm, lanceolate, aristate; corolla 18 mm long, white with brown spots, thinly hairy, upper lip emarginate; filaments glabrous. Capsule 9 mm long, pubescent; seeds 4, rugose, brown.

*Fl. & Fr.* : July-January

*Distr.* : Peninsular India, endemic. Common; in evergreen forests at high elevations. Uppermanalar, *JA 12961.*

**Rungia latior** Nees in DC., Prodr. 11: 472. 1827; Wight, Ic. t. 1548. 1850; Clarke in Hook. f., Fl. Brit. India 4: 546 1885; Gamble, Fl. Pres. Madras 1071. 1924; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 159. 1987. ***R. longifolia*** Nees var. ***latifolia*** Wight ex Clarke, Hook. f., Fl. Brit. India 4: 547. 1885.

Decumbent herbs, rooting from lower nodes; stems terete, hirtus. Leaves to 5 x 2.5 cm, ovate-lanceolate, acute to rounded at base, hirtus; lateral nerves 4-6 pairs. Spikes 1.5 x 1 cm, in terminal cluster of 3-5; sterile bracts 7 x 2 mm, linear, with hyaline margins, hirtus; fertile bracts 5 x 3.5 mm, obovate, hirtus, ciliate, with broader hyaline margin; bracteoles obovate, emarginate; sepals 3.5 mm long, lanceolate, acuminate, hairy; corolla 5-6 mm long; lower anther with a white glandular appendage.

*Fl. & Fr.* : October-January

*Distr.* : Peninsular India, endemic. Common; in the openings of evergreen forests at higher elevations. Vellimala, *JA 12946.*

**Rungia pectinata** (L.) Nees in DC., Prodr. 11: 469. 1847; Wight, Ic. t. 1547. 1850; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 559. 1976; Manilal, Fl. Silent Valley 211. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 346. 1996. ***Justicia pectinata*** L., Amoen. Acad. 4: 299. 1759. ***Rungia parviflora*** Nees var. ***pectinata*** (L.) Clarke in Hook. f., Fl. Brit. India 4: 550. 1885; Gamble, Fl. Pres. Madras 1017. 1924.

Profusely branched herbs; stems hairy. Leaves to 6 x 2 cm, ovate to linear-oblong or obovate. Spikes 2 x 0.7 cm, 2-5 together, axillary, sessile; sterile bracts 4 x 2 mm, elliptic, narrowly winged on one side; fertile bracts 3 x 2 mm, obovate, broadly winged on either sides, emarginate, pubescent; bracteoles similar to bracts. Flowers small, densely packed; sepals linear, acuminate, hyaline, hairy; corolla 4 mm long, upper lip entire, white; upper anthers hairy. Capsule 2.5 mm long, glabrous; seeds orbicular, rugose, brown.

*Fl. & Fr.* : Throughout the year

*Distr.* : Burma, India and Sri Lanka. Very common; in moist deciduous forests. Thekkady, *JA 13625*; Koruthode, *JA & KPR 16934.*

**Rungia sisparensis** T. Anders., J. Linn. Soc. Bot. 9: 518. 1867; Clarke in Hook. f., Fl. Brit. India 4: 546. 1884; Gamble, Fl. Pres. Madras 1071. 1924; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 160. 1987.

Herbs; stems glabrous or hairy along one line. Leaves to 15 x 2.5 cm, elliptic, acuminate at both ends, glabrous; lateral nerves 6-8 pairs. Spikes 1.5-3 x 1.5 cm, oblong, 2-3 together, axillary or terminal, peduncled or sessile; sterile bracts 8 x 2 mm, lanceolate, acuminate, narrow margined; fertile bracts 8 x 4 mm, lanceolate, broadly winged, apiculate, ciliate along margins. Flowers few to several; sepals 5 mm long, linear-lanceolate, acuminate, ciliate; corolla 10 mm long, upper lip entire; lower lip obtusely 3-lobed; lower anthers with globose appendage.

*Fl. & Fr.* : November-January

*Distr.* : Southern Western Ghats; endemic. Common; in moist deciduous forests. Edappalayam, *JA 12781.*

**Rungia wightiana** Nees in Wall., Pl. Asiat. Rar. 3: 110. 1832; Wight, Ic. t. 1549. 1850; Clarke in Hook. f., Fl. Brit. India 4: 546. 1885; Gamble, Fl. Pres. Madras 1071. 1924; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 160. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 346. 1996.

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 0.8 cm, terminal, 3-8 together, shortly peduncled or sessile, basal bracts lanceolate, acute; sterile bracts along two outer rows, 7 x 5 mm, obovate, emarginate, cuspidate; fertile bracts 5 x 2 mm, acute, aristate; bracteoles linear, acuminate. Flowers pale blue; sepals 5 mm long, glabrous; corolla 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.

*Fl. & Fr.* : Throughout the year

*Distr.* : Peninsular India; endemic. Common; in evergreen forests. Umikkuppan, *KPR & JA 14894*; Kottamala, *JA 15300.*

## STAUROGYNE Wallich

Pl. Asiat. Rar. 2: 80, t. 186. 1831.

**Staurogyne zeylanica** (Nees) O. Ktze., Rev. Gen. Pl. 1: 497. 1891; Gamble, Fl. Pres. Madras 1011. 1924; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 560. 1976; Sasidh. & Sivar., Fl. Pl. Thrissur For. 347. 1996. ***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 to 8 x 3 cm, oblanceolate, acuminate, attenuate at base, puberulus below, hirtus above; petiole 2-3 cm long. Spikes axillary

and terminal, up to 7 x 1 cm, cylindrical; bracts 13 x 3 mm, oblanceolate, hirtus; bracteoles smaller, linear. Flowers few; sepals 5, unequal, linear, hirtus; corolla 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 mm long, oblong; seeds 8-10 pairs, brown, rugose; retinacula absent.

*Fl. & Fr.* : October-January

*Distr.* : Western Peninsular India and Sri Lanka. Rare; in riparian evergreen forests. Pambavalley, *JA 12765*; Sabarimala, *JA & KPR 15005.*

## **STROBILANTHES** Blume

Bijdr. 781, 796. 1826.

*Note*: The broad generic concept of *Strobilanthes* is followed in the present work.

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, free.....2
1. Fertile stamens 4, united into a sheath adnate with the corolla tube.....7
2. Sterile stamens with rudimentary anthers; flowers 1-3 in a spike.....**S. foliosus**
2. Sterile stamens absent; flowers more than 3 in a spike.....3
3. Abaxial surface of leaves densely white or tawny pubescent .....4
3. Abaxial surface of leaves glabrous.....6
4. Bracts glabrous or glandular-hairy.....**S. jeyporensis**
4. Bracts densely tawny-pubescent .....5
5. Leaves acuminate, entire, golden-tomentose beneath.....**S. lawsonii**
5. Leaves acute, crenulate, white-tomentose with prominently reticulate nerves.....**S. kunthianus**
6. Floral bracts larger than involucral bracts; sepals connate into a tube below the middle; leaf margin entire.....**S. cuspidatus**
6. Floral bracts smaller than involucral bracts; sepals connate at middle; leaf margins crenulate..... .....**S. consanguineus**

7. Stamens equal ..... 8

7. Stamens unequal ..... 9

8. Bracts acute or acuminate, yellowish green ..... **S. micranthus**

8. Bracts obtuse or rounded, reddish brown ..... **S. luridus**

9. Seeds hairy ..... 10

9. Seeds glabrous ..... 15

10. Spikes deflexed, lanceolate ..... **S. tristis**

10. Spikes erect, oblong or ovoid ..... 11

11. Spikes panicled, numerous ..... 12

11. Spikes cymose, solitary or 2-3 together ..... 14

12. Flowers pedicellate; bracts and bracteoles absent ..... **S. rubicundus**

12. Flowers sessile; bracts and bracteoles present ..... 13

13. Panicle hirtus-tomentose; seeds flat ..... **S. homotropus**

13. Panicle puberulus; seeds biconvex ..... **S. gracilis**

14. Bracts linear oblong; leaves acute at base, petiolate ..... **S. caudatus**

14. Bracts broadly ovate; leaves cordate at base, sessile ..... **S. sessilis**

15. Bracts and bracteoles hairy, hirtus or at least ciliate along the margins ..... 16

15. Bracts and bracteoles glabrous ..... 19

16. Spikes flat or truncate above ..... 17

16. Spikes globose or ovoid ..... 18

17. Filaments unequal; staminodes present; leaves to 15 x 8 cm; lateral nerves 7-8 pairs ..... **S. pulneyensis**

17. Filaments nearly equal; staminodes absent; leaves to 7 x 4 cm; lateral nerves 4 pairs ..... **S. wightianus**

18. Stems and leaves hirtus; staminal sheath deeply cleft ..... **S. urceolaris**

18. Stems and leaves pubescent; staminal sheath not cleft ..... **S. anceps**

19. Bracts decurrent along the axis ..... **S. decurrens**

19. Bracts not decurrent ..... 20

20. Bracts sharply acuminate ..... **S. warreensis**

20. Bracts acute or obtuse ..... 21

21. Spikes solitary ..... **S. ciliatus**

21. Spikes 2-5 together ..... 22

22. Leaves covered with bulbous based hairs ..... **S. asperrimus**

22. Leaves glabrous ..... **S. heyneanus**

**Strobilanthes anceps** Nees in DC., Prodr. 9: 189. 1847; Clarke in Hook. f., Fl. Brit. India 4: 442. 1884; Gamble, Fl. Pres. Madras 1038. 1924; Sasidh. & Sivar., Fl. Pl. Thrissur For. 348. 1996. ***Ruellia punctata*** Nees in DC Prodr. 11: 147. 1847; Wight, Ic. t. 1563. 1850. ***Nilgirianthus punctatus*** (Nees) Bremek., Verh. Kon. Ned. Akad. Wetensch. 41: 174. 1944; Manilal, Fl. Silent Valley 209. 1988.

Shrubs, 1.5-2 m high; branches obscurely 4-angled; hairy along the angles. Leaves to 14 x 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 6 x 6 mm, orbicular, ciliate; floral bracts 10 x 8 mm, orbicular, glandular-ciliate along the margins; bracteoles 7 x 2 mm, oblanceolate. Flowers several, densely packed; sepals 5, 4 mm long, lanceolate; corolla white or blue, 18-20 mm long, hairy outside, tube narrow below, ventricose above; staminal sheath glabrous.

*Fl. & Fr.* : December-February

*Distr.* : South India and Sri Lanka. Common; in evergreen forests at high elevations. Mlappara, *JA 13336* .

**Strobilanthes asperrimus** Nees in DC., Prodr. 11: 183. 1847; Clarke in Hook. f., Fl. Brit. India 4: 443. 1884; Gamble, Fl. Pres. Madras 730. 1924; Henry *et al.,* Fl. Tamil Nadu Ser. 1, 2: 161. 1987.

Stout bushy shrubs, 40-75 cm high; branches hirtus. Leaves to 10 x 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 x 1.5 cm, axillary, on trichotomous peduncles, ovoid; involucral bracts 8 x 6 mm, broadly ovate, obtuse; floral bracts 13 x 10 mm, ovate, concave, obtuse, glabrous; bracteoles absent. Flowers few to many; sepals 6 x 2.5 mm, oblong, emarginate, connate a little above the base; corolla blue, 25 mm long; tube stout, with a patch of hairs inside above the stamens; staminal filaments and sheath hairy; style bulged below the stigma, hairy. Capsule 9 x 4 mm, glabrous; seeds winged.

*Fl. & Fr.* : September-January

*Distr.* : S. India and Sri Lanka. Common; along forests margins. Koruthode, *JA 12444.*

**Strobilanthes caudatus** T. Anders. in Thw., Enum. Pl. Zeyl. 227. 1864 & J. Linn. Soc. Bot. 9: 470. 1867; Bedd., Ic. t. 213. 1868-1874; Clarke in Hook. f., Fl. Brit. India 4: 441. 1884; Gamble, Fl. Pres. Madras 1040. 1924. ***Mackenzia caudata*** (T. Anders.) Ramam. in Sald. & Nicols., Fl. Hassan Dist. 553. 1976.

Subshrubs; branches terete, glabrous. Leaves 8-12 x 2-3 cm, elliptic, caudate acuminate, glabrous, entire; nerves 8 pairs. Spikes 1.5 x 2 cm axillary, solitary or 2-3 together, peduncled; peduncle 3 cm long; involucral bracts smaller than floral bracts, linear; floral bracts 20 x 2 mm, linear, obtuse, glandular-hairy; bracteoles 3, linear. Flowers few; calyx 7 mm long, lobes linear-oblong, hairy; corolla 22 mm long, blue, tube narrow at base, with two patches of hairs at throat; staminal sheath hairy. Fruits not seen.

*Fl.* : December

*Distr.* : Western Peninsular India; endemic. Rare; in evergreen forests at high elevations. Brook's Peak, *JA 17992.*

**Strobilanthes ciliatus** Nees in Wall., Pl. Asiat. Rar. 3: 85. 1832; Bedd., Ic. t. 211. 1868-1874; Clarke in Hook. f., Fl. Brit. India 4: 439. 1884; Gamble, Fl. Pres. Madras 1039. 1924; Sasidh. & Sivar., Fl. Pl. Thrissur For. 348. 1996. ***Nilgirianthus ciliatus*** (Nees) Bremek., Verh. Kon. Ned. Akad. Wetensch. 41: 172. 1944; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 555. 1976. **Cheru kurunji** (Mannan)

Shrubs, 1-2 m high; branches terete, glabrous. Leaves to 15 x 5 cm, acuminate at either ends, glabrous; nerves 5 pairs, raised above, scabrid; petiole 2 cm long. Spikes 1.5 cm long, axillary, solitary, peduncled; bracts 6 x 4 mm, obovate; bracteoles 5 x 1 mm, linear-oblong. Flowers 5-15; calyx 5 mm long, lobes oblong, connate below the middle; corolla 15 mm long, white with pink patches on lower lobes; staminal sheath hairy.

*Fl. & Fr.* : December-March

*Distr.* : Southern Western Ghats; endemic. Common; in evergreen forests. Mlappara, *JA 17991.*

**Strobilanthes consanguineus** (Nees) Clarke in Hook. f., Fl. Brit. India 4: 435. 1884; Gamble, Fl. Pres. Madras 1036. 1924. ***Endopogon consanguineus*** Nees in Wall., Pl. Asiat. Rar. 3: 99. 1832. ***Phlebophyllum spicatum*** Bremek. in Verh Kon. Ned. Akad. Wetensch. 41: 169. 1944; Mohanan & Henry, Fl. Thiruvananthapuram 351. 1994.

Shrubs, 2-3 m high; branchlets glabrous. Leaves to 8 x 4 cm, broadly elliptic, acuminate at apex, rounded or cordate at base, glabrous; lateral nerves 7-8 pairs; petiole 2-3 cm long. Spikes 5-7 cm long, terminal, panicled; peduncles 2 cm long, glandular hairy with two opposite bracts at base; floral bracts 5 mm long, lanceolate; bracteoles slender, densely glandular hairy. Flowers few in each spike; calyx lobes 7 mm long, glandular-hairy, joined below the middle into a tube; corolla 17 mm long, glabrous, tube narrow at base with two tufts of hairs inside above.

*Fl. & Fr.* : October-February

*Distr.* : Peninsular India. Common; in evergreen forests at higher elevations. Udumbatheri, *JA 13327.*

**Strobilanthes cuspidatus** (Benth.) T. Anders., J. Linn. Soc. Bot. 9: 465. 1867; Clarke in Hook. f., Fl. Brit. India 4: 435. 1884; Gamble, Fl. Pres. Madras 1036. 1924; Bedd., Ic. t. 221. 1868-1874; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1203. 1983. ***Endopogon***

*cuspidatus* Benth., Linnaea 24: 646. 1851. ***Endopogon versicolor*** Wight, Ic. t. 1497. 1849. ***Phlebophyllum versicolor*** (Wight) Bremek., Verh. Kon. Ned. Akad. Wetensch. 41: 170. 1944.

Large shrubs; stems terete; branchlets adpressed-white woolly. Leaves to 15 x 6 cm, ovate, acuminate, entire, base acute, glabrous; lateral nerves 7-10 pairs. Spikes 3-5 cm long, interrupted, on trichotomously branched peduncle; bracts 2-4, 2 x 0.5 cm, lanceolate, glandular-hairy. Flowers few; calyx 7 mm long, lobes subulate, glandular-hairy; corolla 25 mm long, blue; staminal filaments glabrous. Capsule 16 mm long, stalked, glabrous; seeds orbicular, hairy.

*Fl. & Fr.* : November-February

*Distr.* : Peninsular India. Common; in evergreen forests. Arjunankotta, *JA 13379.*

**Strobilanthes decurrens** Nees in DC., Prodr. 11: 1898. 1847; Clarke in Hook. f., Fl. Brit. India 4: 440. 1884; Gamble, Fl. Pres. Madras 1040. 1924. ***Goldfussia decurrens*** (Nees) Wight, Ic. t. 1522. 1851. ***Nilgirianthus decurrens*** (Nees) Bremek., Verh. Kon. Ned. Akad. Wetensch. 41: 173. 1944; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 154. 1987.

Subshrubs, branches obtusely quadrangular, glabrous. Leaves 15-17 x 5-7 cm, elliptic, shortly acuminate, decurrent at the base, glabrous; petiole 2-3 cm long. Spikes 4-8 x 2 cm, oblong, solitary, axillary; peduncle deflexed, with small basal bracts in the middle; bracts 2 x 1 cm, ovate, acute, decurrent along the axis; bracteoles minute. Flowers few to many; calyx 10 mm long; lobes acuminate, glabrous, corolla 20 mm long, glabrous, blue; staminal filaments hairy. Capsule 14 x 8 mm, glabrous; seeds 8 x 5 mm, one in each chamber, flat, yellowish, glabrous.

*Fl. & Fr.* : October-January

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Inchippara, *JA 12596*; Vellimala, *JA 12947.*

**Strobilanthes foliosus** (Wight) T. Anders., J. Linn. Soc. 9: 467. 1867; Clarke in Hook. f., Fl. Brit. India 4: 433. 1884; Gamble, Fl. Pres. Madras 1035. 1924; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 1204. 1983. ***Endopogon foliosus*** Wight, Ic. t. 1501. 1849. ***Nilgirianthus foliosus*** (Wight) Bremek., Verh. Kon. Ned. Akad. Wetensch. 41: 173. 1944; Manilal, Fl. Silent Valley 208. 1988.

Shrubs; branchlets terete, glabrous, stout, reddish. Leaves 4-7 x 1.5-3 cm, elliptic, acute at either ends, coriaceous, whitish below, serrate; petiole 1-2 cm long. Spikes 3-4 cm long, lanceolate, axillary and terminal; basal bracts 4, in two opposite pairs, 3 x 1 cm; floral bracts 2 x 0.6 cm, lanceolate, glabrous; bracteoles 17 x 3 mm, linear. Flowers few; calyx 17 mm long, lanceolate, glabrous; corolla 4.5 mm long, glabrous, blue, tube cylindrical at lower part; filaments united, hairy. Capsule 15 mm long; seeds 8 x 7 mm, yellowish, glabrous.

*Fl. & Fr.* : December-May

*Distr.* : Peninsular India. Rare; in evergreen forests at high elevations. Sunderamala, *JA 13590.*

**Strobilanthes gracilis** Bedd., Ic. t. 207. 1868-1874; Clarke in Hook. f., Fl. Brit. India 4: 474. 1884; Gamble, Fl. Pres. Madras 1043. 1924. ***Mackenziea gracilis*** (Bedd.) Bremek., Verh. Kon. Ned. Akad. Wetensch. 41: 182. 1944; Manilal, Fl. Silent Valley 207. 1988.

Thick shrubs; stems obtusely quadrangular, glabrous. Leaves 12-15 x 4-6 cm, elliptic, decurrent and auricled at base, acuminate at apex, serrate; lateral nerves 6-7 pairs; petiole 3-5 cm long. Spikes panicled, terminal and upper axillary; bracts 7 x 2 mm, oblanceolate, glandular hairy. Flowers 1-3 in a spike; sepals 9 x 1.5 mm, tube 1 mm long, lobes oblanceolate; corolla 30 mm long; tube narrow below, ventricose above, hairy; staminal filaments hairy. Capsule 14 x 7 mm, elliptic, compressed; seeds 3.5 x 3 mm, orbicular, flat.

*Fl. & Fr.* : April-June

*Distr.* : Southern Western Ghats. Common; in evergreen forests at higher elevations. Vellimala, *JA 13966, JA & KPR 14360.*

**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. 1924; Sasidh. & Sivar., Fl. Pl. Thrissur For. 348. 1996. ***S. rugosus*** Wight, Ic. t. 1619. 1850. ***Nilgirianthus heyneanus*** (Nees) Bremek., Verh. Kon. Ned. Akad. Wetensch. 41: 173. 1944; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 555. 1976.

Shrubs; branches glabrous. Leaves 8-13 x 6 cm, elliptic, acuminate, attenuate to the base, glabrous. Spikes 2 x 1.5 cm, axillary, 2-3 together on trichotomous peduncle, ovoid or globose; bracts 14 x 11 mm, orbicular or obovate, concave, glabrous; bracteoles absent. Flowers 4-10 in each spike; sepals 6 x 2 mm, united to the middle, glabrous; corolla 2.5 cm long, white; staminal sheath ciliate. Capsule 10 x 5 mm, glabrous; seeds 3 mm, biconvex, densely hairy along the margins.

*Fl. & Fr.* : September-January

*Distr.* : Southern Western Ghats. Very common; in evergreen forests at lower elevations. Ennakkapally, *JA 12448.*

**Strobilanthes homotropus** Nees in DC., Prodr. 11: 187. 1847; Clarke in Hook. f., Fl. Brit. India 4: 474. 1884; Gamble, Fl. Pres. Madras 1043. 1924. ***S. sexennis*** sensu Bedd., Ic. t. 206. 1868-1874, non Nees, 1847. ***Mackenziea homotropa*** (Nees) Bremek., Verh. Kon. Ned. Akad. Wetensch. 41: 182. 1944; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 153. 1987.

Large shrubs or small trees; young branches glandular-hairy. Leaves 15-25 x 4-10 cm, elliptic, acuminate at apex, attenuate and auricled at base; lateral nerves 5-6 pairs. Spikes 1-3 flowered, in terminal panicles, hirtus, tomentose; bracts 10-15 mm long, leafy, bracteoles 10 x 2 mm, spathulate, glandular-hairy. Sepals 13 x 2 mm, spathulate, hairy; corolla 2.8 cm long, pale blue; staminal filaments hairy. Capsule 14 x 7 mm, glabrous; seeds 5 x 4 mm, compressed.

*Fl. & Fr.* : December-April

*Distr.* : Southern Western Ghats. Rare; in evergreen forests at higher elevations. Vellimala, *JA & KPR 15019.*

**Strobilanthes jeyporensis** Bedd., Ic. t. 214. 1868-1874; Clarke in Hook. f., Fl. Brit. India 4: 436. 1884; Gamble, Fl. Pres. Madras, 1036. 1924.

Large shrubs, branches terete, glabrous. Leaves to 10 x 6 cm, broadly elliptic, acuminate to base and apex, lateral nerves 11-12 pairs. Spikes 7 x 0.7 cm, in axillary panicles; bracts 7 x 3 mm, glandular-hairy; bracteoles minute. Flowers scattered; calyx 8 mm long, lobes, subulate, glabrous; corolla 1.5-2 cm long, glabrous, pale blue; staminal filaments ciliate; style hairy.

*Fl. & Fr.* : December-January

*Distr.* : Peninsular India. Rare; along the margins of evergreen forests. Uppermanalar, *JA 12964.*

**Strobilanthes kunthianus** (Nees) T. Anders. ex. Benth., Fl. Hongk. 262. 1861; Clarke in Hook. f., Fl. Brit. India 4: 434. 1884; Gamble, Fl. Pres. Madras 1036. 1924; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3 (1): 1204. 1983. ***Phlebophyllum kunthianum*** Nees in Wall., Pl. Asiat. Rar. 3: 83. 1832; Wight, Ic. t. 448. 1841. **Neelakkurunji**..

Bushy shrubs; branches reddish, glabrous. Leaves to 6 x 3 cm, elliptic, glabrous above, coriaceous. Spikes 3-5 cm long, cylindric, 2-5, on axillary peduncles; involucral bracts 2-3, elliptic, tomentose; floral bracts 12 x 4 mm, ovate-acuminate, tawny pubescent; bracteoles 7 x 1.5 mm, linear-lanceolate. Flowers many; calyx 10 mm long, lobes acuminate; corolla 25 mm long, blue, hairy.

*Fl. & Fr.* : September-January

*Distr.* : Peninsular India. Common; in grasslands at higher elevations. Thaannikkudy, *JA 12360.*

**Strobilanthes lawsonii** Gamble, Kew Bull. 1923: 374. 1923 & Fl. Pres. Madras 1037. 1924; Sasidh. & Sivar., Fl. Pl. Thrissur For. 348. 1996. ***Phlebophyllum lawsonii*** (Gamble) Bremek., Verh. Kon. Ned. Akad. Wetensch. 41: 169. 1944.

Shrubs; branches tawny-pubescent. Leaves to 11 x 6 cm, broadly elliptic, acuminate at either ends; lateral nerves 12 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 2 cm long, blue, glabrous; staminal filaments hairy.

*Fl. & Fr.* : December-January

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Chenthamara, *JA 13034.*

**Strobilanthes luridus** Wight, Ic. t. 1515 & 1516. 1850; Clarke in Hook. f., Fl. Brit. India 4: 450. 1884; Gamble, Fl. Pres. Madras 1042. 1924. ***Didyplosandra lurida*** (Wight) Bremek., Verh. Kon. Ned. Akad. Wetensch. 41: 178. 1944; Henry *et al.,* Fl. Tamil Nadu Ser. 1, 2: 144. 1987; Manilal, Fl. Silent Valley 203. 1988.

Large shrubs; branchlets terete, grey-puberulus. Leaves to 25 x 15 cm, broadly elliptic, acute at both ends, hispid, serrulate; lateral nerves 8-9 pairs. Spikes 8-15 x 2-5 cm oblong, cylindrical, 2-3 together, axillary on old branches; peduncle deflexed; bracts 2.5 x 3 cm, orbicular, reddish brown; bracteoles 2 x 0.4 cm, linear. Flowers densely packed; calyx 23 mm long, lobes elliptic, ciliate along margins, white; corolla 35 mm long, campanulate, dark blue; lobes deflexed, orbicular; staminal filaments glabrous. Capsule 20 x 6 mm, glabrous; seeds 4 x 4 mm, orbicular, yellowish.

*Fl. & Fr.* : November-January

*Distr.* : Southern Western Ghats. Common; in evergreen forests at higher elevations. Uppermanalar, *JA 12956.*

**Strobilanthes micranthus** Wight, Ic. t. 1519. 1850; Clarke in Hook. f., Fl. Brit. India 4: 444. 1884; Gamble, Fl. Pres. Madras 1040. 1924. ***Taeniandra micrantha*** (Wight) Bremek., Verh. Kon. Ned. Akad. Wetensch. 41: 175. 1944; Henry *et al.,* Fl. Tamil Nadu Ser. 1, 2: 161. 1987.

Large shrubs; branchlets quadrangular, glabrous. Leaves to 18 x 9 cm, elliptic, acuminate at both ends, crenulate, glabrous; lateral nerves 9 pairs, pubescent below. Spikes 5-10 cm long, ovoid to oblong, solitary, axillary, enlarging in fruit; peduncles deflexed, glabrous; bracts 27 x 12 mm, lanceolate, hirtus, with an oval depression towards the base inside; bracteoles hairy. Calyx 17 mm long, lobes acuminate; corolla 18 mm long, campanulate with deflexed lobes; reddish brown; staminal filaments glabrous. Seeds 6 x 4 mm, oblong.

*Fl. & Fr.* : November-January

*Distr.* : Southern Western Ghats. Common; in evergreen forests at higher elevation. Vellimala, *JA 12952.*

**Strobilanthes pulneyensis** Clarke in Hook. f., Fl. Brit. India 4: 438. 1884; Gamble, Fl. Pres. Madras 1038. 1924; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(1): 1206. 1983. ***S. punctatus*** Bedd., Ic. t. 204. 1868-1874, non Nees, 1847. ***Xenacanthus pulneyensis*** (Clarke) Bremek., Verh. Kon. Ned. Akad. Wetensch. 41: 176. 1944; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 561. 1976; Manilal, Fl. Silent Valley 212. 1988.

Profusely branched shrubs; branchlets densely hirtus. Leaves elliptic, acuminate, densely hirtus; nerves 7 pairs, regular. Spikes peduncled, flattened, 1-3 in axils; bracts 1-3 x 1.2 cm, ovate to orbicular, serrate, densely white hairy at base; bracteoles linear, hairy. Flowers few to many; sepals 10 mm long, hairy; corolla 26 mm long, tube narrow, 10 mm long, thinly hairy outside; staminal sheath ciliate.

*Fl. & Fr.* : October-January

*Distr.* : Southern Western Ghats. Very common; in semi-evergreen forests. Pachakkanam, *JA 12666.*

**Strobilanthes rubicundus** (Nees) T. Anders., J. Linn. Soc. Bot. 9: 483. 1867; Clarke in Hook. f., Fl. Brit. India 4: 475. 1884; Gamble, Fl. Pres. Madras 1044. 1924. ***Leptacanthus rubicundus*** Nees in Wall., Pl. Asiat. Rar. 3: 90. 1832; Manilal, Fl. Silent Valley 207. 1988. ***S. paniculatus*** sensu Bedd., Ic. t. 199. 1868-1874, non Anders., 1867.

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 7 mm long, lobes glandular-hairy; corolla 17 mm long, glabrous, pale blue; capsule 17 mm long, linear, glabrous; seeds 2.5 x 2 mm, brown.

*Fl. & Fr.* : December-February

*Distr.* : Peninsular India. Common; in evergreen forests. Sabarimala, *KPR & JA 17704.*

**Strobilanthes sessilis** Nees in Wall., Pl. Asiat. Rar. 3: 185. 1832; Wight, Ic. t. 1511. 1850; Clarke in Hook. f., Fl. Brit. India 4: 452. 1884; Gamble, Fl. Pres. Madras 1042. 1924. ***Pleocaulus sessilis*** (Nees) Bremek., Verh. Kon. Ned. Akad. Wetensch. 41: 185. 1944; Manilal, Fl. Silent Valley 210. 1988.

Sparingly branched subshrubs; stems terete, strigose. Leaves 2-5 x 3 cm, ovate, acute, sessile, serrate, densely strigose, base cordate; nerves 6 pairs. Spikes 3-5 cm long, cylindrical, axillary and terminal; bracts 10 x 7 mm, acuminate, densely hairy. Flowers many, densely arranged; calyx 9 x 2 mm, lobes lanceolate, hairy; corolla 30 mm long, blue, hairy, filaments densely hairy.

*Fl. & Fr.* : November-January

*Distr.* : Southern Western Ghats (Kerala). Rare; in grasslands. Uppermanalar, *JA 17990.*

**Strobilanthes tristis** (Wight) T. Anders., J. Linn. Soc. Bot. 9: 470. 1867; Clarke in Hook. f., Fl. Brit. India 4: 441. 1884; Gamble, Fl. Pres. Madras 1040. 1924. ***Goldfussia tristis*** Wight, Ic. t. 1508. 1850; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 147. 1987.

Shrubs; branchlets glabrous. Leaves 15-25 x 4-10 cm, acuminate at either ends, glabrous; petiole 4-8 cm long. Spikes 2.5-4 cm long, lanceolate, acuminate, 1-2-flowered, deflexed, in axillary clusters, glabrous; bracts 2.5 x 0.5 cm, lanceolate, acuminate, ciliate along the margins. Sepals 17 x 2.5 mm, acuminate, hairy; corolla 30 mm long, narrowed to the base, glabrous, white; staminal sheath glabrous. Capsule 11 x 3 mm; seeds orbicular.

*Fl. & Fr.* : November-January

*Distr.* : Southern Western Ghats. Very common; in evergreen forests. Kalvarimala, *JA 12787*; Mlappara, *JA 13042.*

**Strobilanthes urceolaris** Gamble, Kew Bull. 1923: 374. 1923 & Fl. Pres. Madras 1038. 1924; Ramachandran *et al.*, J. Econ. Tax. Bot. 6(2): 264. 1985. ***Nilgirianthus urceolaris*** (Gamble) Bremek., Verh. Kon. Ned. Akad. Wetensch. 41: 173. 1944.

Shrubs; branchlets densely hirtus. Leaves to 9 x 5 cm, ovate, acute at either ends, densely scabrous, crenate, nerves 7-8 pairs; petiole 3 cm long. Spikes 1.5-2 cm long, ovoid, 5-8-together on short lateral branches; bracts 8 x 4 mm, obovate, densely hirtus; bracteoles linear, hirtus. Flowers few; calyx lobes 9 mm long, linear, united above the base, densely hairy; corolla 17 mm long, glabrous, blue or white; filaments paired, united into two sheaths; style hairy. Capsule 10 mm long, glabrous; seeds 4 x 3 mm, oblong, brown.

*Fl. & Fr.* : December-January

*Distr.* : Southern Western Ghats. Common; in evergreen forests at high elevations. Uppermanalar, *JA 12959*; Vellimala, *JA & KPR 14359.*

**Strobilanthes warreensis** Dalz., Hook. J. Bot. Kew Gard. Misc. 2: 341. 1850; Clarke in Hook. f., Fl. Brit. India 4: 439. 1884; Gamble, Fl. Pres. Madras 1039. 1924. ***S. parviflorus*** Bedd., Ic. t. 197. 1894. ***Nilgirianthus warreensis*** (Dalz.) Bremek., Verh. Kon. Ned. Akad. Wetensch. 41: 173. 1944; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 556. 1976; Manilal, Fl. Silent Valley 209. 1988.

Large shrubs with stilt roots from lower nodes; branchlets terete, glabrous. Leaves to 15 x 6 cm, elliptic, acuminate to both ends, glabrous, coriaceous, crenate; nerves 6-7 pairs; petiole 3-4 cm long. Spikes 1.5 x 1.5 cm, ovoid, axillary, solitary or paired; bracts 16 x 6 mm, with a broad base and filiform tip, glabrous; bracteoles similar, 12 x 2 mm. Flowers few; calyx 10 mm long;

lobes united below the middle, glabrous; corolla 20 mm long, white, tube 1 cm long; staminal filaments hairy.

*Fl. & Fr.* : December-May

*Distr.* : Southern Western Ghats. Common; in evergreen forests. in all elevations. Sabarimala, *JA & KPR 17744.*

**Strobilanthes wightianus** Nees in Wall., Pl. Asiat. Rar. 3: 86. 1832; Wight, Ic. t. 1514. 1850; Clarke in Hook. f., Fl. Brit. India 4: 438. 1884; Gamble, Fl. Pres. Madras 1037. 1924. ***Nilgirianthus wightianus*** (Nees) Bremek., Verh. Kon. Ned. Akad. Wetensch. 41: 174. 1944; Manilal, Fl. Silent Valley 209. 1988.

Shrubs; branches hirtus. Leaves 7 x 4 cm, ovate, acuminate, serrate, densely hirtus; nerves 4 pairs; petiole 2-3 cm long. Spikes 1.5 x 2.5 cm, obconical; peduncle 2-6 cm long; involucral bracts 2-4, leafy, 1-3 x 1.5 cm; floral bracts densely hairy at base; bracteoles linear. Flowers few; sepals 10 mm long, hairy, united below the middle; corolla 2 cm long, pale blue, tube 5 mm long, villous inside. Capsule 9 x 3 mm, glabrous; seeds 3 x 3 mm, orbicular, glabrous, oblique at base.

*Fl. & Fr.* : October-January

*Distr.* : Southern Western Ghats. Common; in evergreen and semi-evergreen forests. Umikuppan, *JA 12642.*

## 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 racemose ..... **T. mysorensis**
1. Flowers solitary ..... 2
2. Leaves densely tomentose; corolla yellow with a brown centre ..... **T. alata**
2. Leaves glabrous; corolla white ..... **T. fragrans**

**Thunbergia alata** Boj. ex Sims, Bot. Mag. t. 2591. 1825; Clarke in Hook. f., Fl. Brit. India 4: 391. 1884; Gamble, Fl. Pres. Madras 1008. 1924; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 560. 1976.

Hispid climbers. Leaves to 6 x 2.5 cm, ovate, hastate at base, 5-ribbed from base; petiole 5 cm long, winged. Flowers solitary; pedicel to 5 cm long, bracteoles 1.5 x 1 cm, ovate, cordate; corolla yellow, tube 18 mm long, brown inside, lobes obovate, obtuse. Capsule 1 cm across, globose, beak to 1.5 cm long, hispid.

*Fl. & Fr.* : Throughout the year

*Distr.* : Native of Africa, spread to tropical countries. Common; in disturbed forest areas. Thekkady, *JA 14592*; Dam site, *JA 15041.*

**Thunbergia fragrans** Roxb., Pl. Corom. t. 67. 1795; Clarke in Hook. f., Fl. Brit. India 4: 390. 1884; Gamble, Fl. Pres. Madras 1007. 1924; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 560. 1976; Sasidh. & Sivar., Fl. Pl. Thrissur For. 350. 1996.

Scabrous climber. Leaves to 8 x 6 cm, ovate, entire, acute, base truncate to subcordate, scabrid, 5-nerved from base; petiole 4 cm long. Flowers solitary; pedicels 3 cm long; bracteoles 1.5 cm long, ovate-oblong, obtuse, mucronate; sepals of 8-16 fibrils; corolla white, 4 cm across, tube 3 cm long, lobes 3.5 cm; filaments glandular hispid at base. Capsule 1 cm across, glabrous, beak 1.5 cm long, acute.

*Fl. & Fr.* : Throughout the year

*Distr.* : Peninsular India. Common; in grasslands. Mangaladevi, *JA 17986.*

**Thunbergia mysorensis** (Wight) T. Anders., J. Linn. Soc. Bot. 9: 448. 1867; Clarke in Hook. f., Fl. Brit. India 4: 393. 1884; Gamble, Fl. Pres. Madras 1008. 1924; Matthew, Fl. Tamil Nadu Carnatic. 3(1): 1212. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 350. 1996. ***Hexacentris mysorensis*** Wight, Ic. t. 871. 1844.

Climbers. Leaves to 14 x 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 15-25 x 5-12 mm, ovate-oblong-lanceolate, pedicels 2-3 cm long, opposite; calyx obscure; corolla yellow, to 4 cm long, 6 cm across, tube ventricose, lobes obovate, glabrous; filaments ciliate, anthers spurred. Capsule 3 cm long.

*Fl. & Fr.* : Throughout the year

*Distr.* : Peninsular India. Common; in evergreen forests. Arjunankotta, *JA 13137.*

## 98. VERBENACEAE

J. St.-Hil., Expos. Fam. Nat. 1: 245. 1805.

Note: Following the ICBN (1994), the family **Symphoremataceae** is treated under the broad circumscription of the family **Verbenaceae**

1.Cluster of flowers surrounded by radiate involucral bracts.....2
1.Cluster of flowers not surrounded by radiate involucral bracts.....3
2. Stamens exserted; cymes solitary or in short panicles.....**Symphorema**
2. Stamens included; cymes forming large thyrsoid panicles.....**Sphenodesme**
3. Fertile stamens 2; flowers sunken in the cavities of spike.....**Stachytarpheta**
3. Fertile stamens 4, 5 or 6; flowers not as above.....2
4. Flowers in centrifugal cymes.....3
4. Flowers in centripetal spikes.....**Lantana**
5. Leaves digitate.....**Vitex**
5. Leaves simple.....4
6. Corolla regular; young parts stellate hairy.....5
6. Corolla irregular; young parts not stellate hairy.....6
7. Flowers 4-merous; fruit glabrous.....**Callicarpa**
7. Flowers 6-merous; fruit densely hairy.....**Tectona**
8. Flowers more than 3 cm broad.....**Gmelina**
8. Flowers less than 2 cm broad.....7
9. Drupes with 1 pyrene.....8
9. Drupes with 4 pyrenes.....**Clerodendrum**
10. Trees or large shrubs.....**Premna**
10. Small herbs.....**Pygmaeopremna**

### CALLICARPA Linnaeus

Sp. Pl. 111. 1753

**Callicarpa tomentosa** (L.) Murr., Syst. Veg. ed. 13. 130. 1774; H. N. & A. L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 299. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 351. 1996. ***Tomex tomentosa*** L., Sp. Pl. 118. 1753. ***Callicarpa arborea*** sensu Miq. ex Clarke in Hook. f., Fl. Brit. India 4: 507. 1885, non Roxb., 1832. ***C. lanata*** L., Mant. 331. 1771; Gamble, Fl. Pres. Madras 1092. 1924. ***C. wallichiana*** Walp., Rep. 4: 125. 1845; Wight, Ic. t. 1480. 1849. **Cheru thekku** (Mannan, Mala Arayan), **Puliyan thekku** (Malam pandaram).

Small trees, branchlets densely grey-pubescent. Leaves to 25 x 15 cm, broadly ovate, acuminate at apex, rounded at base, entire, densely covered with stellate hairs below; nerves 7

pairs; petiole to 5 cm long. Flowers in axillary corymbose cymes, branched, densely tomentose; pedicels absent; calyx 2 mm long, campanulate, lobes 5, obtuse; corolla 4 mm long, tube short; lobes 4, spreading; stamens 4; filaments glandular, anthers sagittate; ovary pubescent; style slender, stigma capitate. Berry 3 mm across, globose, glabrous.

*Fl. & Fr.* : February-May

*Distr.* : South Asia. Occasional; in semi-evergreen forests. Thekkady, *JA 13538.*

*Ethnobotanical use* : Stem bark is given to ladies when they resume to eat meat after delivery. The leaves are used for rheumatic fever.

## **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. Leaves whorled, acute at base; corolla blue ..... **C. serratum**
1. Leaves opposite, cordate or rounded at base; corolla not blue ..... 2
2. Flowers red; leaves shallowly 3-5-lobed, glabrous ..... **C. paniculatum**
2. Flowers white; leaves entire or shortly serrate; densely glandular pubescent ..... **C. viscosum**

**Clerodendrum paniculatum** L., Mant. Pl. 90. 1767, "*paniculata*"; Clarke in Hook. f., Fl. Brit. India 4: 593. 1885; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 487. 1976; H. N. & A. L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 412. 1983.

Shrubs, stems glabrous. Leaves to 35 x 35 cm, broadly, ovate to orbicular, 2-3 dentate, shining above; petiole 5-15 cm long; axils with white hairs. Cymes panicled, pyramidal, to 35 x 20 cm. Flowers many; calyx lobes oblong, glabrous; corolla tube 1 cm long, lobes obovate, red.

*Fl. & Fr.* : Throughout the year

*Distr.* : South Eastern Asia. Occasional; in disturbed moist deciduous forests. Vallakkadavu, *JA & KPR 15445.*

**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. 1924; H. N. & A. L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 417. 1983; Sasidh. & Sivar., Fl.

Pl. Thrissur For. 351. 1996. *Volkameria serrata* L., Mant. Pl. 90. 1767. **Perikilam. Kurukkutti**.

Shrubs; branchlets 4-angled. Leaves to 35 x 25 cm, obovate, acuminate at both ends, serrate, scabrous, nerves 8-10 pairs; petiole 1-3 cm long, stout. Panicles terminal, oblong, to 30 x 10 cm, pubescent. Flowers blue, shortly pedicelled; calyx 4 mm long, lobes obtuse, hairy; corolla 15-20 mm long, hairy below, lobes round. Berry 1 cm across, 2-4-lobed, depressed globose; seeds 2-4, rugose, black.

*Fl. & Fr.* : December-May

*Distr.* : India to Indonesia. Occasional; in disturbed forest areas. Kumarikulam, *JA & KPR 14873*; Thekkady, *JA & KPR 15322.*

**Clerodendrum viscosum** Vent., Jard. Mal. 1: t. 25. 1803; H. N. & A. L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 473. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 351. 1996. ***C. infortunatum*** auct. non. L., 1753: Wight, Ic. t. 1471. 1849, "*infortunata*", Clarke in Hook. f., Fl. Brit. India 4: 594. 1885; Gamble, Fl. Pres. Madras 1100. 1924.

Large shrubs; stems sub-tetragonous, pubescent. Leaves to 20 x 20 cm, orbicular, cordate at base, acute at apex, densely glandular-pubescent, nerves 4-6 pairs; lower pairs basal; petiole to 8 cm long, pubescent. Flowers white, in large panicled cymes; calyx 12 mm long, lobes acuminate; corolla tube 2 cm long, slender, lobes 1 x 0.5 cm, obovate, pubescent; filaments hairy at base. Berry 0.8-1 cm across, 1-3-lobed, black, glabrous.

*Fl. & Fr.* : September-February

*Distr.* : South Asia. Occasional; in disturbed forest areas. Thekkady, *JA 18450.*

## **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. 1924; H. N. & A. L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 340. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 352. 1996. **Kumbil**.

Trees; bark white, branchlets stout, yellow-tomentose. Leaves to 20 x 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 mm long, campanulate, 5-toothed, tomentose; corolla brownish-yellow, 3 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 x 1.5 cm, ovoid, yellow, smooth.

*Fl. & Fr.* : January-May

*Distr.* : India to Indonesia. Common; in moist deciduous forests and savannahs. Thaannikkudy, *JA 18451.*

**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 prickled; spikes globose.....**L. camara**
1. Stem villous; spikes oblong.....**L. indica**

**Lantana camara** L., Sp. Pl. 627. 1757; Clarke in Hook. f., Fl. Brit. India 4: 502. 1885; Gamble, Fl. Pres. Madras 1087. 1924; H. N. & A. L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 220. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 352. 1996. **Kongini, Arippoo, Unnichedi, Njandukali** (Mannan).

Rambling shrubs; stems with retrorse prickles especially along the angles. Leaves to 6 x 3.5 cm, ovate, acute at apex, rounded or cordate at base, coarsely scabrous, rugose, crenate; petiole 1-2.5 cm long. Spikes 1.5 cm across, globose, axillary, solitary peduncled; bracts 8 x 3 mm, ovate, obtuse, floral bracts much smaller. Flowers densely packed; calyx 1 mm long truncate, ciliate; corolla reddish, 4 mm broad, tube 8 mm long, curved, slender. Berry 4 x 4 mm, dark blue, smooth.

*Fl. & Fr.* : Throughout the year

*Distr.* : Native of West Indies, naturalised in most of the Tropical countries. Gregarious; in moist deciduous forests. Thekkady, *JA 18452.*

*Ethnobotanical use* : Mannan eat the fruits; juice from the leaves are effective for fever. Bathing in water mixed with the juice is usually recommended by Malam pandaram for fever.

**Lantana indica** Roxb., Fl. Ind. 3: 89. 1832; Wight, Ic. t. 1464. 1849; Clarke in Hook. f., Fl. Brit. India 4: 562. 1885; Gamble, Fl. Pres. Madras 1087. 1924; Gandhi in Sald. & Nicols., Fl.

Hassan Dist. 490. 1976; H. N. & A. L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 218. 1983.

Subshrubs, densely covered with bulbous based hairs. Leaves to 8 x 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, solitary on long peduncles; lowers bracts 13 x 9 mm, ovate, acute, cordate at base; floral bracts smaller, 10 x 5 mm, lanceolate. Flowers densely packed; calyx 1 mm long, truncate, ciliate; corolla tube 7 mm long, hispid, lobes rounded. Berry 6 x 6 mm, reddish brown, smooth.

*Fl. & Fr.* : October-January

*Distr.* : India and Sri Lanka. Rare; in savannahs. Mangaladevi, *NS & JA 12700.*

## **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. Erect shrubs; staminal filaments glabrous; leaves oblong.....**P. glaberrima**
1. Climbers; staminal filaments hairy; leaves broadly ovate.....2
2. Petiole ca. 2.5 cm long; leaf membranous.....**P. paucinervis**
2. Petiole ca. 5 cm long; leaf coriaceous.....**P. coriacea**

**Premna coriacea** Clarke in Hook. f., Fl. Brit. India 4: 573. 1885; Gamble, Fl. Pres. Madras 1095. 1923; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 491. 1976; Sasidh. & Sivar., Fl. Pl. Thrissur For. 353. 1996.

Large climbing shrubs; branchlets pilose, lenticellate. Leaves to 18 x 10 cm, ovate-oblong, abruptly acuminate at apex, cordate at base, entire, glabrous; nerves 4-5 pairs, very prominent beneath. Cymes to 15 cm across, corymbose, terminal; branches pilose; peduncles to 12 cm long, erect; bracts 3 mm long, ovate. Flowers many, creamy white; pedicels 1 mm long hispid; calyx 1 mm long, truncate, pinkish brown, puberulus; corolla 3.5 mm long, hairy.

*Fl. & Fr.* : October-January

*Distr.* : South India. Common; in savannahs and moist deciduous forests. Thannikkudy, *JA 18453.*

**Premna glaberrima** Wight, Ic. t. 1484. 1849; Clarke in Hook. f., Fl. Brit. India 4: 577. 1885; Gamble, Fl. Pres. Madras 1096. 1923; Henry *et al.*, J. Bombay Nat. Hist. Soc. 75(3): 693. 1979; Mohanan & Henry, Bull. Bot. Surv. India 22(1-4): 107. 1980; Sasidh. & Sivar., Fl. Pl. Thrissur For. 353. 1996.

Erect shrubs; branchlets scandent, puberulus. Leaves to 15 x 6 cm, elliptic-oblong, abruptly acuminate, rounded at base, entire or distantly serrulate, glabrous; nerves 6-7 pairs; petiole 1.5 cm long. Cymes 5 x 5 cm, terminal, corymbose; pedicels 2 mm long, hairy; calyx 2 mm long, shortly bilipped, hispid; corolla greenish white or cream, 5 mm long, throat hairy. Drupes 3 x 3 mm, hispid; seed 1, rugose, brown.

*Fl. & Fr.* : October-March

*Distr.* : South India. Common; in evergreen forests. Puthussery, *JA 13496*; Poonkavanam, *JA & KPR 14943.*

**Premna paucinervis** (Clarke) Gamble, Fl. Pres. Madras 1095. 1923; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 168. 1987. ***P. purpurascens*** Thw. var. ***paucinervis*** Clarke in Hook. f., Fl. Brit. India 4: 574. 1885 [Fig. 51].

Large climbing shrubs; branchlets minutely hispid. Leaves to 10 x 6 cm, abruptly acuminate, rounded at base, rarely acute; lateral nerves 3-4 pairs. Cymes 10 cm across, corymbose. Flowers shortly pedicelled; calyx 1 mm long, cupular, pink, puberulus; corolla dull pink, 3 mm long, lobes obtuse, densely white-hairy; filaments bearded; ovary glabrous, style 3 mm long, 2-fid at apex.

*Fl. & Fr.* : December-May

*Distr.* : Endemic to South India. Rare; in semi-evergreen forests. Aruvioda, *JA 13649*; Damsite, *JA & KPR 15112.*

*Note* : Clarke (1885) and Gamble (1923) commented on this species as quite rare and hence sufficient specimens could not be collected and studied. There is no specimen in MH. In the present locality this is with viable population.

## PYGMAEOPREMNA Merrill

in Philipp. J. Sci. 5: 225. 1910

**Pygmaeopremna herbacea** (Roxb.) Moldanke, Phytologia 2: 54. 1941; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 168. 1987. ***Premna herbacea*** Roxb., Hort. Bengal 46. 1814; Clarke in Hook. f., Fl. Brit. India 4: 581. 1885; Gamble, Fl. Pres. Madras 1097. 1923.

Herbs, to 10 cm high. Leaves sessile, to 5 x 4 cm, radical, obovate to orbicular, crenate, tomentose, along nerves. Cymes 2 cm across, peduncled, terminal, densely hairy. Flowers

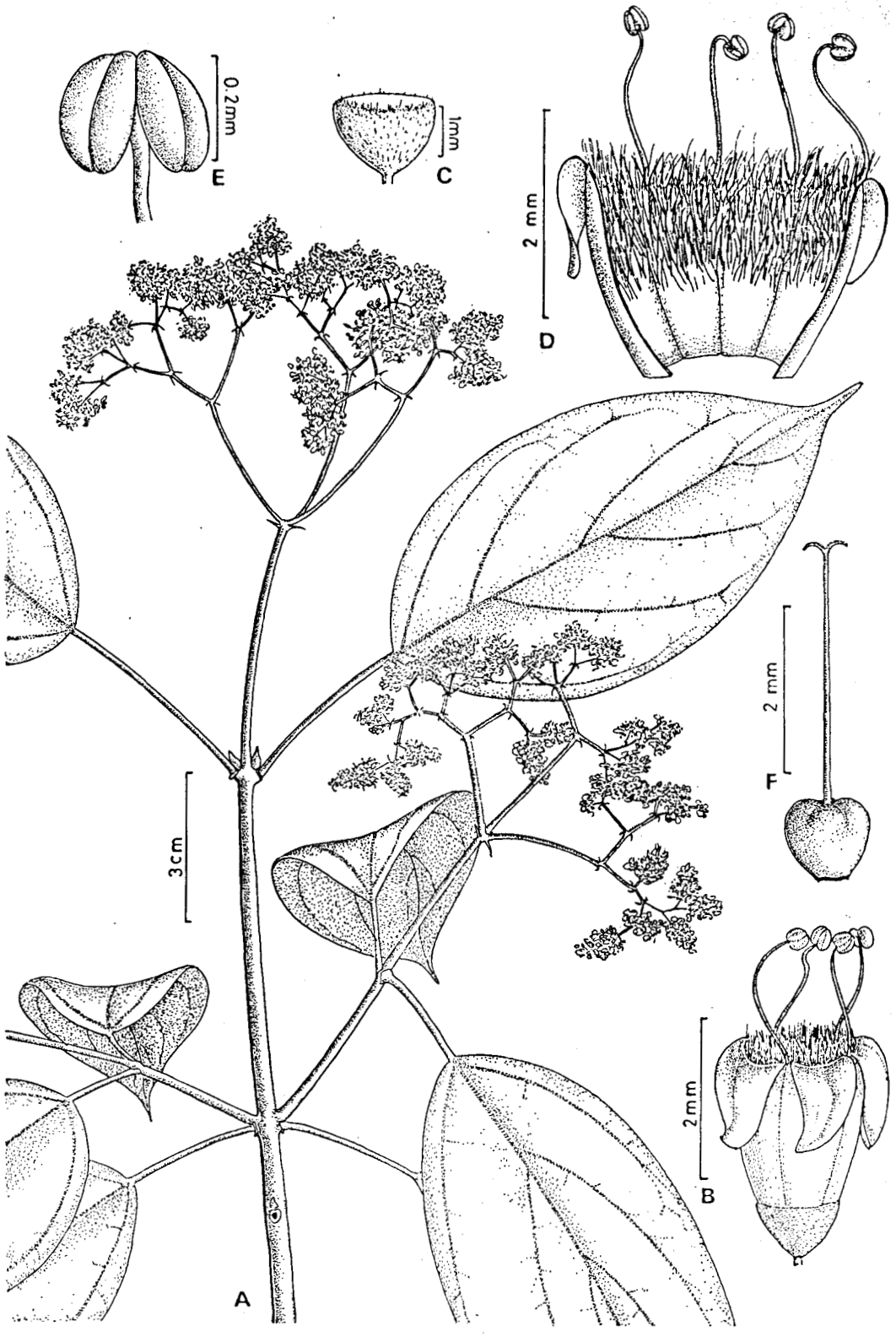



Fig. 51. *Premna paucinervis* (Clarke) Gamble: **A.** flowering twig; **B.** flower; **C.** calyx; **D.** corolla with stamen; **E.** anther; **F.** pistil.

pedicelled; calyx 2 mm long, lobes obtuse, ciliate; corolla 3 mm long, bilabiate, dull yellow, throat thinly hairy, lobes 4, oblong, glandular; filaments glabrous.

*Fl. & Fr.* : August-December

*Distr.* : India and Burma. Rare; along lake shores. Edappalayam, *JA 18453.*

## SPHENODESME Jack

Malay. Misc. 1: 1. 19. 1820.

**Sphenodesme paniculata** Clarke in Hook. f., Fl. Brit. India 4: 600. 1885; Gamble, Fl. Pres. Madras 1104. 1924; Henry *et al.*, Fl Tamil Nadu Ser. 1, 2: 170. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 355. 1996.

Climbing or scandent shrubs, branchlets sub-tetragonous, canescent. Leaves to 14 x 8 cm, broadly elliptic, acute, base obtuse or acute, entire, glabrous above and tomentose below, nerves 6-8 pairs, prominent, nervules reticulate; petiole 1.5 cm long. Panicles terminal, golden-brown tomentose, 20-30 cm long; involucral bracts 6, obovate, obtuse, subequal, to 2.5 x 1 cm. Flowers 5-15 together; calyx densely tomentose, 6 mm long, 3-6-lobed, lobes ovate, acute; corolla white, 1 cm long, funnel-shaped, 5 or 6-lobed, lobes oblong, tomentose; stamens 5 or 6, included; ovary 2-celled, ovule 2 in each cell, style short, stigma 2-lobed. Drupe globose, enclosed by the calyx, 12-seeded

*Fl. & Fr.* : December-April

*Distr.* : South India. Uncommon, in evergreen forests. Koruthode, *JA 15131.*

## STACHYTARPHETA Vahl

Enum. 1: 205. 1804, *nom. cons.*

**Stachytarpheta jamaicensis** (L.) Vahl, Enum. Pl. 1: 206. 1804; H. N. & A. L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 253. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 354. 1996. ***Verbena jamaicensis*** L., Sp. Pl. 19. 1753. ***Stachytarpheta indica*** var. ***jamaicensis*** (L.) Trimen, Cat. Pl. Ceylon 68. 1885 & Handb. Fl. Ceylon 3: 348. 1895; Gamble, Fl. Pres. Madras 1090. 1924. ***S. indica*** sensu Clarke in Hook. f., Fl. Brit. India 4: 564. 1885, p.p.; non (L.) Vahl, 1804. **Narivalan, Seemakongini.**

Erect glabrous shrubs. Leaves opposite, to 10 x 6 cm, ovate, acute, crenate, serrate, base cuneate; lateral nerves 5 or 6 pairs, reticulate, nervules impressed above; petiole 1-3 cm long. Spikes terminal, to 20 cm long, linear. Flowers sunken in the rachis; bracts 6 mm long, linear-ovate; calyx tubular, 6 mm long, ridged; lobes acuminate; corolla blue, 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.

*Fl. & Fr.* : Throughout the year

*Distr.* : Pantropical. Common; in the disturbed moist deciduous forests and lake shores. Koruthode, *JA & KPR 14733.*

## SYMPHOREMA Roxburgh

Pl. Corom. 2: 46. 1805.

**Symphorema involucratum** Roxb., Pl. Corom. 2: 46, t. 186. 1798; Wight, Ic. t. 362. 1840; Clarke in Hook. f., Fl. Brit. India 4: 599. 1885; Gamble, Fl. Pres. Madras 1104. 1924; H. N. & A. L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 189. 1983; Ramachandran & Nair, J. Econ. Tax. Bot. 5(1): 139. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 357. 1996.

Large woody climbers, stems with warty tubercles; branchlets yellow-tomentose. Leaves to 10 x 6 cm, elliptic or oblong, acute to acuminate, rounded at base, inequilateral, entire or serrate; lateral nerves 5-7 pairs, reticulate. Flowers 6 or 7, in peduncled capitate cymes; peduncle 2.5 cm long; involucral bracts 6, 7 x 2 mm, elliptic-oblong, enlarged in fruit; calyx 6 mm long, campanulate, 4-8-lobed, tomentose; corolla 6 mm long, white, campanulate, 6-8-lobed, sparsely hairy; stamens 6-8; ovary 2 or imperfectly 4-celled. Fruit 1-seeded. enclosed by the calyx.

*Fl. & Fr.* : March-May

*Distr.* : India, Burma, Thailand and Sri Lanka. Fairly common; in semi-evergreen forests. Koruthode, *JA & KPR 14776.*

## TECTONA Linnaeus f.

Suppl. 20. 151. 1781. *nom. cons.*

**Tectona grandis** L. f., Suppl. Pl. 151. 1781; Bedd., Fl. Sylv. t. 250. 1872; Clarke in Hook. f., Fl. Brit. India 4: 570. 1885; Gamble, Fl. Pres. Madras 1092. 1924; H. N. & A. L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 304. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 354. 1996. **Thekku**.

Large trees; branchlets 4-angled, puberulus. Leaves to 45 x 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, to 50 x 40 cm, puberulus. Flowers to 7 mm across, white; calyx 5 mm long, lobes 6, ovate, white, tomentose; corolla 6 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.

*Fl. & Fr.* : December-April

*Distr.* : Indo-Malaya. Common; in moist deciduous forests and savannahs. Karadikkavala, *JA & KPR 16211.*

## 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, leaflets sessile; inflorescence terminal.....**V. altissima**
1. Leaves 5-foliolate, leaflets petiolulate; inflorescence axillary.....**V. leucoxylon**

**Vitex altissima** L. f., Suppl. Pl. 294. 1781; Wight, Ic. t. 1466. 1849; Clarke in Hook. f., Fl. Brit. India 4: 584. 1885; Gamble, Fl. Pres. Madras 1102. 1923; H. N. & A. L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 353. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 355. 1996. *V. alata* Heyne ex Roth, Nov. Pl. Sp. 316. 1821; Clarke in Hook. f., Fl. Brit. India 4: 584. 1885. **Mayila** (Mannan, Urali, Mala Arayan).

Large trees; bark grey, branchlets lenticellate, minutely tomentose. Leaflets sessile, to 15 x 5 cm, elliptic, acuminate, entire; lateral nerves 12 pairs; petiole to 10 cm long, winged. Panicles to 25 x 15 cm, branches tomentose. Flowers 3-10 together; calyx 3 mm long, campanulate, lobes ovate, white, tomentose; corolla 5 mm long, blue, throat villous, lobes obtuse; filaments hairy at base; ovary densely hairy. Drupes 5 x 5 mm, glabrous, blue.

*Fl. & Fr.* : May-July

*Distr.* : Indo-China and Sri Lanka. Common; in evergreen and semi-evergreen forests. Kallidamkunnu, *JA & KPR 16228.*

*Ethnobotanical use* : Wood is used for Asthma; pieces of wood is put in water and kept overnight and this water is given daily for asthma patients. The bark and outer wood is boiled in water and the water is used for bathing for mother after childbirth.

**Vitex leucoxylon** L. f., Suppl. Pl. 293. 1781; Clarke in Hook. f., Fl. Brit. India 3: 587. 1885; Gamble, Fl. Pres. Madras 1103. 1923; H. N. & A. L. Moldenke in Dassan. & Fosb., Rev.

Handb. Fl. Ceylon 4: 365. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 355. 1996. ***Wallrothia leucoxylon*** (L. f.) Roth, Nov. Pl. Sp. 391. 1821; Wight, Ic. t. 1467. 1849. **Vella notchi, Attu notchi** (Mala Arayan).

Shrubs, branchlets glabrous. Leaflets to 14 x 4 cm, elliptic, acute at both ends, glabrous, lateral nerves 12-14 pairs; petiolule 2 cm long; petiole to 8 cm long. Cymes axillary, dichotomous, long-peduncled, hispid; peduncle to 8 cm long. Flowers few to many; pedicels 5 mm long, calyx 5 mm long, sub-bilabiate, tomentose, lobes acute; corolla 14 mm long, lobes, oblong to orbicular, curved, white, throat hairy; filaments unequal, hairy at base.

*Fl. & Fr.* : November-March

*Distr.* : India and Sri Lanka. Common; along riversides in evergreen forests. Pamba, *NS & JA 12760*; Vallakkadavu, *JA 13411*.

*Ethnobotanical use* : The leaves are used for rheumatic fever.

## 99. LAMIACEAE

Lindl., Intr. Nat. Syst. Bot. ed. 2: 275. 1836; *nom. alt.* **Labiatae**

1. Calyx equally or subequally 5-lobed ..... 2
1. Calyx distinctly 2-lipped ..... 7
2. Plants stellately pubescent; flowers yellow; nutlets fleshy ..... **Gomphostemma**
2. Plants not stellately pubescent; flowers otherwise; nutlets dry ..... 3
3. Leaves 3 at each node; calyx tube much smaller than lobes ..... **Colebrookea**
3. Leaves opposite; calyx tube longer than the lobes ..... 4
4. Flowers in axillary clusters or globose heads ..... 5
4. Flowers in elongated spikes, racemes or in panicles ..... 6
5. Calyx 8-10-teethed, ribbed; stamens erect; corolla white ..... **Leucas**
5. Calyx 5-teethed, not ribbed; stamens declinate; corolla usually blue ..... **Hyptis**
6. Corolla 4-lobed, slightly bilabiate; stamens exserted ..... **Pogostemon**
6. Corolla 5-lobed, strongly bilabiate; stamens included ..... **Anisomeles**
7. Corolla 1-lipped; ovary 4-lobed ..... **Teucrium**
7. Corolla 2-lipped; ovary 4-partite ..... 8
8. Upper lip of corolla equal to or longer than the lower lip ..... 9
8. Upper lip of corolla shorter than the lower lip ..... 10
9. Flowers congested in globose or ovoid-oblong heads ..... **Acrocephalus**
9. Flowers in whorls of elongated racemes or spikes ..... 11
10. Style entire at tip; corolla tube narrow, longer ..... **Orthosiphon**
10. Style 2-fid at tip; corolla tube broad, shorter ..... **Ocimum**

11. Lips of calyx deeply saccate at base; flowers paired at nodes of racemes.....**Scutellaria**

11. Lips of calyx not saccate, though sometimes gibbous at base; flowers not paired .....12

12. Staminal filaments connate into a sheath round the style.....Coleus

12. Staminal filaments not connate .....13

13. Flowers pedicelled; calyx lobes acuminate, the upper lip not closing the mouth.....**Plectranthus**

13. Flowers sessile; calyx lobes obtuse, the upper lip closing the mouth of calyx .....**Anisochilus**

## ACROCEPHALUS Bentham

in Edward's Bot Reg. sub tt. 1282, 1300. 1829.

**Acrocephalus hispidus** (L.) Nicols. & Sivadas., Taxon 29: 324. 1980; Sasidh. & Sivar., Fl. Pl. Thrissur For. 358. 1996. ***Gomphrena hispida*** L., Sp. Pl. 1: 326. 1762. ***Prunella indica*** Burm. f., Fl. Ind. 130. 1768. ***Acrocephalus capitatus*** (Roth) Benth. in Edward's Bot. Reg. 15. sub t. 1282. 1829; Hook. f., Fl. Brit. India 4: 611. 1885. ***Ocimum capitatum*** Roth, Nov. Pl. Sp. 276. 1821. ***Acrocephalus indicus*** (Burm. f.) O. Ktze., Rev. Gen. Pl. 2: 511. 1891; Gamble, Fl. Pres. Madras 115. 1924.

Erect or diffuse branched herbs; stem minutely pubescent. Leaves 2-3 x 1 cm, elliptic, acute at either ends, crenate, glabrous. Inflorescence an ovoid head, 1.5 x 0.8 cm; basal bracts 2, foliar; floral bracts 3 mm across, deltoid. Flowers densely packed; calyx 5-6 mm long, bilabiate; upper lip entire, obovate; lower lip 4-toothed, scabrous; corolla white, 2.5 mm long, bilabiate; upper lip entire, lower lip 4-toothed, glabrous; stamens 4, didynamous; ovary 4-partite, glabrous; style slender, stigma 2-lobed. Nutlets 1 mm long, oblong, smooth; seeds yellowish white, smooth.

*Fl. & Fr.* : August-January

*Distr.* : Indo-Malesia and Indochina. Common; in grassy areas in moist deciduous forests. Pamba, *JA 12384*; Koruthode, *JA & KPR 14755.*

## ANISOCHILUS Wallich ex Bentham

in Lindley, Edward's Bot. Reg. 15: t. 1300. 1830 .

Annuals or perennial herbs; stems quadrangular usually thickly hairy. Leaves opposite or whorled, thick and densely hairy. Flowers compactly packed in cylindrical spike, arranged axillary or in terminal panicles; calyx bilabiate upper lip entire or shortly 2-lobed, deflexed; lower lip 3-lobed; corolla 2-lipped, upper lip 3-4 lobed, lower elongate, entire. Stamens 4, unequal, declinate; ovary 4-partite, style bifid at apex. Nutlets ovoid.

1. Leaves whorled at nodes; spike to 30 cm long.....**A. verticillatus**

1. Leaves opposite; spikes to 15 cm long.....2

2. Upper lip of fruiting calyx entire; leaf base cordate, puberulus ..... **A. carnosus**

2. Upper lip of fruiting calyx lobed or emarginate; leaf base acute or attenuate ..... 3

3. Spike in terminal panicles; leaves 10 cm or more broad; shrubs ..... **A. robustum**

3. Spikes axillary or terminal, peduncled, not panicled; leaves less than 5 cm broad; herbs ..... 4

4. Leaves ca. 1.5 cm long, entire; spikes solitary, terminal ..... **A. argenteus**

4. Leaves over 3 cm long, serrate or crenate; spikes many, axillary and terminal ..... 5

5. Spikes 8 mm broad; corolla lobes acute ..... **A. dysophylloides**

5. Spikes 4 mm broad; corolla lobes obtuse ..... **A. sericeus**

**Anisochilus argenteus** Gamble, Kew Bull. 1924: 265. 1924 & Fl. Pres. Madras 1127. 1924; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 171. 1987. Nayar & Sastry Red Data Book Ind. Pl. 3: 163. 1990.

Stout herbs to 30 cm high; stem silvery white tomentose. Leaves to 1.5 x 1 cm, obovate, acute at apex, entire, densely hairy, closely packed on stem, sessile. Spikes to 8 cm long, 0.5-1 cm broad, cylindrical to tetragonous; bracts and calyx densely villous; corolla small, yellowish.

*Fl. & Fr.* : January-February

*Distr.* : Southern Western Ghats (Kerala). Rare; in rocky areas in evergreen forests at higher elevations. Vellimala, *JA 14025; JA & KPR 14308.*

**Anisochilus carnosus** (L. f.) Wall. ex Benth. in Wall., Pl. Asiat. Rar. 2: 18. 1831; Hook. f., Fl. Brit. India 4: 627. 1885; Gamble, Fl. Pres. Madras 1127. 1924; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 152. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 358. 1996. ***Lavandula carnosa*** L. f., Suppl. Pl. 273. 1781.

Fleshy herbs; stem quadrangular, puberulus. Leaves to 5 x 4.5 cm, broadly ovate, obtuse, cordate at base, crenate scabrous; petiole 5 cm long. Spikes 2-4 x 1 cm, cylindrical, oblong, panicled; peduncle 5-7 cm long. Flowers densely packed; bracts minute; calyx 5 mm long, red glandular, upper lip entire, declined, lower lip orbicular; corolla 5 mm long, blue, upper lip oblanceolate, lower lip obtusely 4-lobed; filaments glabrous. Nutlets triangular, smooth, brown.

*Fl. & Fr.* : November-January

*Distr.* : Peninsular India, Sri Lanka and Burma. Common; on bare muddy rocks. Thekkady, *JA & KPR 16966.*

**Anisochilus dysophylloides** Benth. in Wall., Pl. Asiat. Rar. 2: 19, 60. 1831; Hook. f., Fl. Brit. India 4: 628. 1885, var. **purpureus** (Wight) Gamble, Fl. Pres. Madras 1128. 1924; ; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 171. 1987 . ***A. purpureus*** Wight, Ic. t. 1435. 1849. ***A. albidus***

Wight, Ic, t. 1435 & 1436. 1849. *A. dysophylloides* sensu Hook.f., Fl. Brit. India 4: 628. 1885 p.p., non Benth., 1830.

Subshrubs; stem obtusely quadrangular, tomentose. Leaves to 3 x 1 cm, obovate, acute, cuneate at base, nearly sessile, densely tomentose. Spikes 5 cm long, 0.8 cm broad, many, terminal and upper axillary, peduncled; bracts 3 mm long, ovate. Flowers many; calyx 4 mm long, very densely hairy, upper lip declinate, closing the mouth; corolla 4 mm long; upper lip entire, concave; lower lip acutely 4-lobed, white; filaments glabrous. Nutlets mucilaginous when wet, trigonous, smooth, brown.

*Fl. & Fr.* : December-March

*Distr.* : Southern Western Ghats (Kerala and Tamil Nadu). Not common; rocky openings in evergreen forests. Mlappara, *JA 13198.*

**Anisochilus robustus** Hook. f., Fl. Brit. India 4: 629. 1885; Gamble, Fl. Pres. Madras 1126. 1924; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 172. 1987.

Shrubs, to 2.5 m high; stem tetragonous, densely puberulus. Leaves to 20 x 15 cm, broadly ovate, obtuse, crenate, base acute, hirtus above, densely tomentose below, 10-nerved; petioles 2-4 cm long. Spikes 15 cm long, panicled, terminal. Flowers densely packed; calyx 3 mm long, glabrous; upper lip erect, shortly lobed, puberulus, densely red-glandular; corolla 4 mm long, upper lip concave, clawed, greenish yellow; lower lip obscurely 4-lobed.

*Fl. & Fr.* : March-May

*Distr.* : Peninsular India. Rare; among the rock formations in the evergreen forests. Vellimala, *JA 14059*; Kottamala, *JA & KPR 15206.*

**Anisochilus sericeus** Benth. in DC., Prodr. 12: 82. 1848; Hook. f., Fl. Brit. India 4: 629. 1885; Gamble, Fl. Pres. Madras 1128. 1924; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 172. 1987.

Shrubs; stem densely pilose, to 1 m high. Leaves 3.5 x 1.2 cm, oblanceolate, acute at apex, cuneate at base, serrulate, subsessile, densely pilose; petiole to 5 mm long. Spikes 5 x 0.4 cm, slender, panicled; peduncle 7 cm long, slender; bracts 2.5 mm long. Flowers many, densely packed; calyx 2 mm long, upper lip 2-lobed, lobes acute, densely hairy; corolla 4 mm long, upper lip erect, spoon-shaped, lobes obtuse, puberulus, brownish.

*Fl. & Fr.* : November-January

*Distr.* : Peninsular India. Occasional; in grasslands. Kathiramudi, *JA 13035.*

*Note* : Nayar (1997) commented on this species as critically endangered. The present locality is with a scattered population among rocks.

**Anisochilus verticillatus** Hook. f., Fl. Brit. India 4: 629. 1885; Gamble, Fl. Pres. Madras 1127. 1924.

Shrubs, 1-2 m high; stem grooved, villous. Leaves to 7 x 1.5 cm, oblong, obtuse, sessile, densely hairy, nerves 4 pairs, very oblique. Spikes 7 mm broad, linear, solitary or 2-3 together, terminal, densely hairy; bracts 4 mm long, ovate. Flowers whorled, thickly arranged; calyx 4.5 mm long, deflexed, densely villous, upper lip closing the tube, entire; corolla 10 mm long, white to blue, upper lip spathulate, concave, lower lip 3-lobed, midlobe emarginate or lobuled. Nutlets trigonous, brown, smooth.

*Fl. & Fr.* : November-December

*Distr.* : Western Peninsular India. Rare; in rocky areas in moist deciduous forests at low elevations. Koruthode, *JA 16924.*

*Note* : Stephan and Vajravelu (1997) considered this species to be very rare, and there was no specimen available in MH till it was recollected by Stephan from Mudumalai in Tamil Nadu.

## ANISOMELES R. Brown

Prodr. 503. 1810

**Anisomeles indica** (L.) O. Ktze., Rev. Gen. Pl. 512. 1891; Gamble, Fl. Pres. Madras 1140. 1924; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 176. 1981. ***Nepeta indica*** L., Sp. Pl. 571. 1753. ***Anisomeles ovata*** R. Br. in Ait., Hort. Kew. ed. 2, 3 : 364. 1811. Hook. f., Fl. Brit. India 4: 672. 1885.

Shrubs; stem densely woolly. Leaves to 13 x 7 cm, broadly ovate, acuminate at apex, densely woolly, unequally crenate; petiole 2-3 cm long. Racemes 5-12 x 3 cm, terminal; bracts foliar, 2 x 1 cm. Flowers closely packed in globose thyrse; calyx 10 mm long, lobes equal, acuminate, hispid; corolla violet or purple, 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 2 x 1.5 mm, plano-convex, light brown.

*Fl & Fr.*: June-September

*Distr.* : India, China, Japan to Malesia and Sri Lanka. Common; in moist deciduous forests. Thekkady, *JA 12356.*

## COLEBROOKEA J. J. Smith

Exot. Bot. 2: 111. 1806.

**Colebrookea oppositifolia** Sm., Exot. Bot. 2: 111, t. 115. 1805; Hook. f., Fl. Brit. India 4: 642. 1885; Gamble, Fl. Pres. Madras 1138. 1924; Sasidh. & Sivar., Fl. Pl. Thrissur For. 359. 1996.

Large shrubs; stem and leaves densely tomentose. Leaves to 20 x 6 cm, elliptic, acuminate, crenulate, base acute to acuminate, nerves *ca.*10 pairs, oblique. Spikes to 10 x 0.5 cm, panicled, terminal, densely hairy. Flowers in close whorls; calyx 1.5 mm long; tube very short, densely white-hairy, lobes subulate; corolla 2 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.

*Fl. & Fr.* : October-February

*Distr.* : India, Indochina and China. Common; in semi-evergreen forests. Thekkady, *JA 12775*; Anchuruli, *JA & KPR 14299.*

## **COLEUS** Loureiro

Fl. Cochinch. 2: 372. 1790.

Herbs or shrubs, stem usually fleshy. Leaves opposite, ovate, crenate, petiolate. Flowers whorled in terminal panicle or spike; bracts ovate, acuminate; calyx 2-lipped; upper lip broad; lower lip divided into 4 acuminate lobes; corolla bilabiate, lower lip boat shaped, acuminate, keeled; upper lip 4-lobed; stamens 4; filaments connate into a sheath; ovary 4-partite; style 2-fid above. Nutlets 2-4, globose.

1. Leaves to 4 x 2 cm, densely villous; flowers sessile.....**C. barbatus**
1. Leaves 15-30 x 10-20 cm, glabrous; flowers pedicelled.....**C. malabaricus**

**Coleus barbatus** (Andr.) Benth., Pl. Asiat. Rar. 2: 15. 1831; Hook. f., Fl. Brit. India 4: 625. 1885; Gamble, Fl. Pres. Madras 1124. 1924; Cramer, Kew Bull. 32: 555. 1978 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 141. 1981. ***Plectranthus barbatus*** Andr., Bot. Rep. 9: t. 594. 1809.

Stout herbs; stem densely villous. Leaves ovate, acute or obtuse, densely long-villous, usually folded. Spike 15-25 cm long, terminal with distant whorls of flowers; bracts 10 x 8 mm, broadly ovate, abruptly acuminate hairy. Flowers 8-12 in each whorl, sessile; calyx 5 mm long, densely hairy; upper lip entire, broader; lower lip narrowly 4-lobed; corolla tube 6 mm long, exserted, lower lobe 12 mm long, blue, boat-shaped, upper lip 3 x 3 mm, 4-lobed. Nutlets globose, black, smooth.

*Fl. & Fr.* : September-December

*Distr.* : Tropical Africa, India and Sri Lanka. Common; in grasslands. Mangaladevi, *JA 12472*; Kalvarimala, *JA 13888.*

**Coleus malabaricus** Benth. in Wall., Pl. Asiat. Rar. 2: 16. 1831; Hook. f., Fl. Brit. India 4: 626. 1885; Gamble, Fl. Pres. Madras 1124. 1924; Cramer, Kew Bull. 32: 556. 1978 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 145. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 359. 1996.

Herbs; stem pinkish, puberulus. Leaves broadly ovate, acute, base truncate or subcordate, crenate, puberulus, nerves 4 pairs; petiole to 10 cm long. Racemes in terminal to 30 cm long panicles, with distant whorls of flowers; bracts 5 x 3 mm, ovate. Flowers 5-10 in each whorl; calyx 8 mm long, striate, upper lip obtuse; lower lip unequally toothed, glabrous; corolla 1.5 cm long, pink; filaments glabrous.

*Fl. & Fr.* : August-February

*Distr.* : South India and Sri Lanka. Common; in evergreen forests. Udumbatheri, *JA 13335*; Vellimala, *JA & KPR 14041.*

## GOMPHOSTEMMA Wallich

Cat. 2151. 1830.

Shrubs or undershrubs. Leaves elliptic, acute at either ends, covered with dense stellate hairs below. Flowers in dense terminal spike or in axillary clusters; bracts elliptic, acute, densely hairy; calyx campanulate, 5-lobed; lobes equal; corolla bilabiate with a slender tube; upper lip entire, hooded; lower lip obtusely 3-lobed; stamens 4, filaments unequal, erect; anthers equal, parallel; ovary glabrous, 4-partite; style slender; stigma 2-fid. Fruit of 4 nutlets.

1. Flowers in terminal cylindrical spikes; leaves ca. 15 cm broad.....**G. heyneanum**
1. Flowers in axillary whorls; leaves 5-10 mm broad .....2
2. Corolla included in the calyx tube, the lobes protruding .....**G. keralensis**
2. Corolla protruded well beyond the calyx tube .....**G. eriocarpa**

**Gomphostemma eriocarpa** Benth. in Wall., Pl. Asiat. Rar. 2: 12. 1831; Hook. f., Fl. Brit. India 4: 698. 1885; Gamble, Fl. Pres. Madras 1157. 1924; Mohanan & Henry, Fl. Thiruvananthapuram 365. 1994. ***G. oblongum*** Wight, Ic. t. 1457. 1849.

Subshrubs; stem terete, puberulus. Leaves to 15 x 5 cm, serrate, glabrescent above, densely covered with stellate pubescent below, nerves 4 pairs; petiole 1.5 cm long. Flowers 5-10 together, sessile; bracts oblong, obtuse; calyx 10 mm long, densely hairy, lobed to the middle, lobes acuminate; corolla 25 mm long; tube slender, 15 mm long, midlobe of lower lip broad, entire, yellow, upper lip oblong; filaments unequal, puberulus. Nutlets hairy, globose.

*Fl. & Fr.* : July-December

*Distr.* : Southern Western Ghats; endemic. Common; throughout the evergreen forests at all elevations. Mlappara, *JA 12114.*

**Gomphostemma heyneanum** Wall. ex Benth. in Wall., Pl. Asiat. Rar. 2: 12. 1831, var. **rottleri** Prain, Ann. Roy. Bot. Gard. (Calcutta) 3: 249, t. 80. 1891; Gamble, Fl. Pres. Madras 1157. 1924Gandhi in Sald. & Nicols., Fl. Hassan Dist. 501. 1976; Sasidh. & Sivar., Fl. Pl. Thrissur For. 360. 1996. **Kattuthulasi** (Mannan).

Subshrubs; stem obtusely 4-angular, densely covered with stellate hairs. Leaves 25 x 15 cm, broadly elliptic, acute at both ends, thickly stellate hairy below, sparsely hairy above, crenate, nerves 5-7 pairs; petiole 4-6 cm long. Racemes 18 x 2.5 cm. Flowers 10 to 20 together, densely packed; bracts elliptic, acute. Calyx 12 mm long, lobed to the middle, lobes lanceolate; corolla 15 mm long, tube 7 mm broad, cylindric, midlobe of lower lip obtuse, emarginate; filaments unequal, glabrous. Nutlets glabrous.

*Fl. & Fr.* : September-January

*Distr.* : South West India. Frequent in moist deciduous and semi-evergreen forests. Mangaladevi, *JA & KPR 16301*; Mullakkudy, *JA 13848.*

**Gomphostemma keralensis** Vivekananthan *et al.*, Kew Bull. 38: 189. 1984.

Subshrubs; stem quadrangular, stellately tomentose. Leaves 26 x 10 cm, elliptic-oblanceolate, dentate, acuminate; petiole to 10.6 cm long. Flowers 10-15, sessile, axillary; bracts elliptic, acute; calyx 12 mm long, lobed to the middle; lobes ovate, subulate; corolla 8 mm long; upper lip ovate, rounded; lower lip 3-lobed, lobes oblong, rounded, midlobe smaller than the lateral lobes, filaments hairy. Nutlets oblong-ellipsoid, pubescent.

*Fl. & Fr.* : October

*Distr.*: Idukki District, Kerala. Rare; Thekkady, *Vivekananthan, 48658 (MH).*

*Note* : Though repeated field trips were made to type locality I have not come across this taxon during my studies.

## **HYPTIS** N. J. Jacquin

Collectanea 1: 101, 103. 1787.

Aromatic herbs or undershrubs. Leaves opposite, elliptic, crenate. Flowers in capitate heads or racemose; calyx tubular or campanulate, equally 5-lobed, ribbed; corolla bilabiate, upper lip 3-lobed; lower 2-lobed, spreading; stamens 4, declinate, included; filaments naked; anthers confluent; ovary 4-partite, style entire or shortly bifid. Nutlets oblong, smooth.

1. Flowers in capitate globose heads; leaves 15-30 x 2-10 cm, lamina decurrent on the petiole.....**H. capitata**
1. Flowers in axillary pedunculate cymes; leaves ca. 6 x 3 cm, lamina not decurrent on the petiole.....**suaveolens**

**Hyptis capitata** Jacq., Ic. Pl. Rar. 1: 11, t. 114. 1781-86; Benth in DC., Prodr. 12. 106. 1848; Mukherjee, Rec. Bot. Surv. India 14(1): 63. 1940; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 156. 1981.

Shrubs, to 2 m tall; stem hollow when old, furrowed or obscurely 4-angled, puberulus. Leaves broadly elliptic to lanceolate, scabrid, nerves 5-7 pairs, oblique. Heads 1-2.5 cm across, on long peduncle, axillary and terminal. Flowers numerous, densely packed; calyx 7 mm long in fruit, glandular, lobes 5-7, acute to acuminate, united well above the middle; corolla 4 mm long, white. Nutlets smooth, black.

*Fl. & Fr.* : October-February

*Distr.* : Native to Tropical America, spread to Indo-Malesia. Common; in disturbed forest areas in low elevations. Koruthode, *JA & KPR 14815.*

**Hyptis suaveolens** (L.) Poit., Ann. Mus. Hist. Nat. 7: 472, t. 27, f. 2. 1806; Hook. f., Fl. Brit. India 4: 630. 1885; Gamble, Fl. Pres. Madras 1129. 1924; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 155. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 360. 1996. ***Ballota suaveolens*** L., Syst. Nat. (ed. 10) 1100. 1759.

Shrubs, to 1.5 m high; stem obtusely 4-angular, thinly hairy. Leaves ovate, acute, hispid below, glabrate above; petiole to 5 cm long. Flowers in clusters of 1-12; calyx tube 8 mm long, tubular, 10-ribbed, glandular hairy, teeth spinulose, 4 mm long; corolla 5 mm long, lobes short, glabrous inside, blue. Nutlets 4 x 2.5 mm, compressed, with a ridge on dorsal surface, pubescent, deep brown, mucilaginous when wet.

*Fl. & Fr.* : August-February

*Distr.* : Native of Tropical America. Common; in disturbed moist deciduous forests. Thekkady, *JA 12402.*

## 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.....3

2. Calyx teeth very unequal, glabrous; leaves 5-10 mm broad ..... **L. indica**

2. Calyx teeth equal or subequal, hispid ; leaves more than 1 cm broad ..... **L. zeylanica**

3. Throat of calyx tube glabrous ..... 4

3. Throat of calyx tube villous ..... 5

4. Flowers in axillary whorls of 2-4; leaves under 2.5 cm long ..... **L. biflora**

4. Flowers in axillary whorls of 6-10; leaves to 8 cm long ..... **L. mollissima** var. **scaberula**

5. Calyx teeth spreading ..... **L. vestita**

5. Calyx teeth erect ..... 6

6. Leaves broadly ovate, rounded or cordate at base; calyx teeth sub-equal ..... **L. pubescens**

6. Leaves elliptic, acute at base; calyx teeth equal ..... 7

7. Bracts pubescent outside; teeth of calyx tube ca. 1.5 mm long, mouth with white hairs; leaves ca. 1 cm broad, obtuse ..... **L. hirta**

7. Bracts glabrous outside; teeth of calyx tube ca. 5 mm long, mouth with brown hairs; leaves ca. 3 cm broad, acute ..... **L. ciliata**

**Leucas biflora** (Vahl) R. Br., Prodr. 504. 1810; Wight, Ic. t. 866. 1845; Hook. f., Fl. Brit. India 4: 683. 1885; Gamble, Fl. Pres. Madras 1150. 1924; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 186. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 361. 1996. ***Phlomis biflora*** Vahl, Symb. Bot. 3: 42. 1794.

Diffuse or scandent herbs; branches finely pubescent. Leaves broadly ovate, acute, base obtuse, membranous, crenate, to 3.5 x 2 cm; petiole 0.5 cm long. Flowers solitary; calyx tubular, 7 mm long, finely strigose; corolla white, 1.4 cm long, annulate-villous inside at middle. Nutlets oblong, truncate.

*Fl. & Fr.* : October-February

*Distr.* : South India and Sri Lanka. Common; in moist deciduous forests. Thekkady, *JA 18605.*

**Leucas ciliata** Benth. in Wall., Pl. Asiat. Rar. 1: 61. 1830; Hook. f., Fl. Brit. India 4: 687. 1885; Gamble, Fl. Pres. Madras 1153. 1924; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 503. 1976.

Subscandent herbs with few branches; branches hispid. Leaves to 8 x 3 cm, ovate, acute at both ends, densely hispid; petiole 1 cm long. Heads terminal, 3 cm across, globose; bracts 15 x 1 mm, strongly ciliate. Flowers 30-40 in a head, densely packed; calyx tube 12 mm long, not ribbed, teeth 5 mm long, ciliate; corolla tube 10 mm long, upper lip obovate, concave, brown hairy, lower lip white, 10 x 8 mm, 3-lobed, midlobe orbicular, glabrous. Nutlets 3 x 1.5 mm, 3-angled brown, smooth.

*Fl. & Fr.* : August-January

*Distr.* : India. Common; in moist deciduous forests. Thekkady, *JA 14439.*

**Leucas hirta** (Heyne ex Roth) Spreng., Syst. Veg. 2: 743. 1825; Hook. f., Fl. Brit. India 4: 687. 1885; Gamble, Fl. Pres. Madras 1153. 1924; Matthew, Fl. Tamil Nadu Carnatic. 3(1): 1261. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 361. 1996. ***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 8 mm long. Heads terminal; bracts 10 x 1 mm, linear, bristly. Flowers 15-30 in a head; calyx tube 7 mm long, white, densely hairy outside; corolla tube 5 mm long, upper lip emarginate, white, hairy, midlobe of lower lip emarginate.

*Fl. & Fr.* : November-March

*Distr.* : Peninsular India. Common; in grasslands. Thekkady, *JA 18440.*

**Leucas indica** (L.) R. Br. ex Vatke, Oesterr., Bot. Zeits. 25: 95. 1875; Sasidh. & Sivar., Fl. Pl. Thrissur For. 361. 1996. ***Leonurus indicus*** L., Syst. Nat. (ed. 10), 1101. 1759. ***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. 1924.

Erect slender herbs; branches scabrid. Leaves 8-9 x 0.5 cm, linear, lanceolate, acuminate, scabrid; petiole 1 cm long. Heads terminal and upper axillary, 1.5-2 cm across; bracts 4 mm long, linear, hairy. Flowers 10-15 in a head; calyx 7 mm long; mouth very oblique; teeth minute, scabrous; corolla tube 5 mm long, upper lip obovate, black or grey hairy; lower lip with very small lateral lobes. Nutlets 3-angled, brown, glabrous.

*Fl. & Fr.* : Throughout the year

*Distr.* : Indo-Malesia. Fairly common; in grasslands. Uppupara, *JA 13189*; Koruthode, *JA 16287.*

**Leucas mollissima** Wall. ex Benth. in Wall., Pl. Asiat. Rar. 1: 62. 1830, var. **scaberula** Hook. f., Fl. Brit. India 4: 682. 1885; Gamble, Fl. Pres. Madras 1151. 1924; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 504. 1976; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 185. 1981.

Scandent herbs; stem hirtus. Leaves to 2-6 x 2-4 cm, ovate, truncate at base, crenate, glabrescent; petiole 2 cm long. Flowers usually 2, axillary; bracts 6 mm long, hirtus; calyx tube 8 mm long, teeth 3 mm long, narrow, scabrid; corolla tube 10 mm long, upper lip white, densely hairy; lower lip 8 x 8 mm, white, glabrous.

*Fl. & Fr.* : Throughout the year

*Distr.* : India Eastward to Malesia. Fairly common; in all types of forests, mostly in disturbed areas. Kalvarimala, *JA 13890*; Thaannikkudy, *JA & KPR 14221.*

**Leucas pubescens** Benth., Lab. Gen. Sp. 610. 1834; Hook. f., Fl. Brit. India 4: 684. 1885; Gamble, Fl. Pres. Madras 1152. 1924; Matthew, Fl. Tamil Nadu Carnatic. 3(1): 1265. 1983.

Erect herbs with thick root stock; stem covered with reflexed tomentum. Leaves 2.5 x 2.5 cm, broadly ovate to orbicular, crenate, thickly pubescent; petiole 1-1.5 cm long. Heads axillary; bracts 8-10 mm long, hairy. Flowers 10-15 together; calyx tube 8 mm long, teeth unequal, to 4 mm long, acuminate, hairy; corolla tube 10 mm long, slender, upper lip obovate, densely white hairy; lower lip 8 x 8 mm, 3-lobed, midlobe orbicular, emarginate.

*Fl. & Fr.* : Almost throughout the year

*Distr.* : Peninsular India. Rare; in the openings of high altitude evergreen forests. Kottamalapallam, *JA 15398.*

**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. 1924; Matthew, Fl. Tamil Nadu Carnatic. 3(1): 1266. 1983.

Stout herbs, 25-50 cm high, branches rufous hairy. Leaves 6 x 2.5 cm, ovate, obtuse at apex, acute at base, crenate-serrate, densely pubescent; petiole 5-7 mm long. Heads 2 cm across, terminal; bracts 10 x 1 mm, linear, hairy. Flowers 20-30 in each head; calyx tube 8 mm long, mouth rufous hairy, teeth 1.5 mm long, spreading; corolla tube 8 mm long, upper lip covered with brown hairs; lower lip 10 x 8 mm, 3-lobed; midlobe orbicular, emarginate with undulate margins.

*Fl. & Fr.* : October-January

*Distr.* : Peninsular India. Common; in high altitude grasslands. Kalvarimala, *JA 12729.*

**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. 1924; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 183. 1981. ***Phlomis zeylanica*** L., Sp. Pl. 586. 1753.

Small erect herbs; branches villous. Leaves to 6 x 1 cm, elliptic, obtuse at apex, scabrous; petiole 5 mm long. Heads terminal and upper axillary; bracts 6 mm long, linear, acute, ciliate. Flowers 10-20 in a head; calyx 6 mm long, mouth slightly oblique, teeth 1 mm long, scabrous; corolla tube 7 mm long, upper lip obovate, with black hairs, midlobe of lower lip rounded.

*Fl. & Fr.* : June-March

*Distr.* : South-East Asia. Very common; in grasslands. and savannahs. Vallakkadavu, *KPR & JA 15427.*

## **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 10 x 5 cm; seeds not mucilaginous when wet.....**O. gratissimum**
1. Leaves to 4 x 2 cm; seeds heavily mucilaginous when wet.....**O. americanum**

**Ocimum americanum** L., Cent. Pl. 1: 15. 1755; Paton, Kew Bull. 47: 425. 1992; Sasidh. & Sivar., Fl. Pl. Thrissur For. 362. 1996. ***O. canum*** Sims, Bot. Mag. 51: t. 2452. 1824; Hook. f., Fl. Brit. India 4: 607. 1885; Gamble, Fl. Pres. Madras 1111. 1924; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 114. 1981. **Thulasi**.

Woody herbs, stem hirtus. Leaves elliptic, acute to acuminate, base truncate or obtuse, subentire, sparsely hairy or glabrous; petiole to 2 cm long. Racemes 13 cm long, densely pubescent. Flowers 5-7 in each whorl; calyx 3 x 5 mm, upper lip 3 x 3 mm, orbicular, densely hairy, corolla white, 5 mm long, glabrous; filaments glabrous. Nutlets 1.5 mm long, sub-trigonous, minutely pitted, dark brown

*Fl. & Fr.* : Throughout the year

*Distr.* : Paleotropic. Common; disturbed areas in moist deciduous forests. Thekkady, *JA 12404.*

**Ocimum gratissimum** L., Sp. Pl. 1197, 1753; Hook. f., Fl. Brit. India 4: 608. 1885; Gamble, Fl. Pres. Madras 1111. 1924; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 112. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 362. 1996. **Attu thulasi** (Mala Arayan).

Shrubs, 2 m high; stem glandular-scabrid. leaves elliptic to obovate, base attenuate serrate, acuminate at apex; nerves 6-pairs; thinly tomentose below; petiole to 6 cm long. Racemes terminal, panicled; bracts oblanceolate. Flowers 4-6 at each node; pedicel 4 mm long; calyx 5 mm long, glabrous; upper lip ovate, obtuse, lobes of lower lip acuminate, glandular; corolla white, tube 2-3 mm long, lobes obtuse; filaments glabrous or villous at base; anthers sagittate at base. Nutlets 1.5 x 1 mm, pitted, brown.

*Fl. & Fr.* : Throughout the year

*Distr.* : Pantropical. Common; along the riverbeds at low elevations. Koruthode, *JA 16385.*

*Ethnobotanical use* : The whole plant is boiled in water and the water is orally given for viral fever.

## ORTHOSIPHON Bentham

Edward's Bot. Reg. 15: t. 1300. 1830.

**Orthosiphon thymiflorus** (Roth) Sleensen, Reinwardtia 5: 42. 1959; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 124. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 363. 1996. ***Ocimum thymiflorum*** Roth, Nov. Pl. Spec. 269. 1821. ***Orthosiphon tomentosa*** Benth. in Wall., Pl. Asiat. Rar. 2: 14. 1831; Hook. f., Fl. Brit. India 4: 613. 1885. ***O. glabratus*** Benth. in Wall., Pl. Asiat. Rar. 2: 14. 1831; Gamble, Fl. Pres. Madras 1114. 1924.

Erect herbs; stem hirtus. Leaves opposite, 5 x 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; pedicels 2-3 mm long; calyx 6-7 mm long, deflexed, 2-lipped; upper lip broad, entire, lower lip 4-lobed, lobes subulate, hairy; corolla 13 mm long, 2-lipped, tube 9 mm long, cylindric, upper lip 4-lobed, lower lip cup-shaped; stamens 4, included, declinate, style slender, stigma terminal, capitate. Nutlets 2-4, orbicular, pitted.

*Fl. & Fr.* : Throughout the year

*Distr.* : Indo-Malesia. Common; in disturbed moist deciduous forests. Thekkady, *JA 15305.*

## PLECTRANTHUS L' Heritier

Stirp. Novae 84. 1788.

Herbs or shrubs, branches quadrangular. leaves ovate to 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. Leaves densely hairy below.....2
1. Leaves glabrous or minutely hairy.....4
2. Fruiting calyx densely woolly; nutlets mucilaginous when wet.....**P. nilgherricus**
2. Fruiting calyx glandular; nutlets not mucilaginous when wet.....3
3. Calyx bilabiate; leaves cordate at base.....**P. wightii**
3. Calyx equally 5-lobed; leaves obtuse and decurrent at base.....**P. japonicus**
4. Large shrubs, above 2 m high; corolla 20-30 mm long.....**P. deccanicus**
4. Annual herbs, below 50 cm tall; corolla less than 8 mm long.....5
5. Leaves lanceolate, base acute.....**P. rivularis**
5. Leaves ovate, base cuneate.....**P. stocksii**

**Plectranthus deccanicus** Briq., Annuaire Conserv. Jard. Bot. Geneve 234. 1898 ; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 182. 1987; ***Plectranthus fruticosus*** (Benth.) Wight ex Hook. f., Fl. Brit. India 4: 623. 1885; Gamble, Fl. Pres. Madras 1122. 1924; Henry *et al.*, J. Bombay Nat. Hist. Soc. 75(3): 693. 1979. ***Coleus fruticosus*** Benth. in DC., Prodr. 12: 78. 1848.

Tall shrubs; stem tetragonous, fleshy, glabrous. Leaves 20 x 20 cm, broadly ovate, acute, rounded or cordate at base, crenate, nerves 4 pairs, villous above, densely hairy below; petiole 6 cm long. Panicle 30 x 20 cm, terminal, puberulus. Flowers distant, many; calyx 6 mm long, glabrous, glandular, lobes acute; upper lip ovate, obtuse; corolla violet, glabrous. Nutlets 1 x 1 mm, oblong, brown.

*Fl. & Fr.* : November-January

*Distr.* : Peninsular India. Occasional; in open rocky areas in evergreen forests. Kalvarimala, *JA 17134.*

**Plectranthus japonicus** (Burm. f.) Koidz., Bot. Mag. (Tokyo) 43: 386. 1929; Santapau & Wagh, Bull. Bot. Surv. India 5: 107. 1964. ***Scutellaria japonica*** Burm. f., Fl. Ind. 130. 1768. ***Plectranthus coesta*** Buch.-Ham. ex D. Don, Prodr. 117. 1825; Hook. f., Fl. Brit. India 4: 619. 1885; Gamble, Fl. Pres. Madras 1121. 1924.

Tall herbs; branches quadrangular, white-woolly. Leaves 8 x 3.5 cm, ovate, acute, crenate, pubescent above, decurrent at base; petiole 1-2.5 cm long. Panicle 20-35 cm long, leafy, tomentose. Flowers many in each whorl; calyx equally 5-lobed, 10-ribed, lobes acute, red-glandular; corolla 6 mm long, white, lower lip saccate, woolly outside, upper lip reflexed, lobes equal, acute; filaments glabrous. Nutlets 1 x 1 mm, orbicular, smooth, brown.

*Fl. & Fr.* : November-February

*Distr.* : India and Burma. Frequent; in grasslands. Vallakkadavu, *JA & KPR 16890.*

**Plectranthus nilgherricus** Benth. in DC., Prodr. 12: 57. 1848; Hook. f., Fl. Brit. India 4: 619. 1885; Gamble, Fl. Pres. Madras 1121. 1924; Sasidh. & Sivar., Fl. Pl. Thrissur For. 363. 1996.

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 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 mm long, white with red spot, glandular, lobes ciliate, midlobe larger than sidelobes; filaments glabrous. Nutlets brown, mucilaginous when wet.

*Fl. & Fr.* : December-February

*Distr.* : Southern Western Ghats. Frequent; in grasslands. Swamikkayam, *JA 13105.*

**Plectranthus rivularis** Wight ex Hook. f., Fl. Brit. India 4: 617. 1885; Gamble, Fl. Pres. Madras 1120.1924; Henry *et al.*, J.Bombay Nat. Hist. Soc. 75(3):693.1979; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 183. 1987. ***Rabdosia rivularis*** (Wight ex Hook. f.) Hara, J. Jap. Bot. 47: 199. 1972.

Woody herbs; stem quadrangular, puberulus. Leaves 6-8 x 2.5 cm, elliptic to lanceolate, scabrous above, crenate except the lower one third, glandular; petiole 2-3 cm long. Panicle 6-12 x 2-4 cm, puberulus; pedicel 5 mm long, slender. Flowers densely packed; calyx 5 mm long, lobes triangular; corolla 6 mm long, white with pink spots, upper lip orbicular, hood-like, lobes of lower lip equal; filaments glabrous, declinate, anthers slightly confluent. Nutlets 1.5 x 1 mm, ovoid, smooth, brown, not mucilaginous.

*Fl. & Fr.* : October-May

*Distr.* : Southern Western Ghats. Frequent; along riversides in evergreen forests above 1000 m. Mlappara, *JA 13318.*

**Plectranthus stocksii** Hook. f., Fl. Brit. India 4: 618. 1885; Gamble, Fl. Pres. Madras 1121. 1924; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 506. 1976; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 183. 1987.

Herbs, often decumbent at base; stem densely glandular-hairy. Leaves 6 x 5 cm, acute at apex, glabrous above, covered with red glands below; petiole 5-7 cm long. Panicle 10-25 cm long, with slender branches. Flowers many; calyx 3 mm long, densely red-glandular, hirtus, upper lip 2-lobed; corolla 7 mm long, lower lip concave, obtuse, white.

*Fl. & Fr.* : July-December

*Distr.* : Central and South India. Common; in grasslands along road cuttings. Vallakkadavu, *JA 16890.*

**Plectranthus wightii** Benth., Labiat. Gen. Sp. 41. 1832; Wight, Ic. t. 1429. 1849; Hook. f., Fl. Brit. India 4: 619. 1855; Gamble, Fl. Pres. Madras 1120. 1924; Sasidh. & Sivar., Fl. Pl. Thrissur For. 364. 1996. ***P. pulneyensis*** Hook. f., Fl. Brit. India 4: 617. 1855. ***P. nepetaefolius*** Benth. in DC., Prodr. 12: 57. 1848; Hook. f., Fl. Brit. India 4: 619. 1855.

Annual herbs; stem densely hairy. Leaves 6 x 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 3 mm long, bilabiate, lobes acute, densely glandular hirtus, 10-ribbed; corolla 7 mm long, lower lip concave, obtuse; upper lip 4-lobbed, lobes equal, obtuse, glandular. Nutlets smooth.

*Fl. & Fr.* : August-December

*Distr.* : Peninsular India. Common; along the road cuttings in grasslands. Vallakkadavu, *JA 16890.*

## 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; subshrubs.....**P. heyneanus**
4. Cymes 10-25-flowered, closely placed; large shrubs.....**P. benghalensis**
5. Leaves orbicular, obtuse; diffuse herbs.....**P. rotundatus**
5. Leaves ovate, acute to acuminate; erect herbs.....6
6. Staminal filaments naked or hairy at the base only.....7
6. Staminal filaments bearded.....8
7. Ovary covered with glands; calyx tube densely hairy within, lobes acute.....**P. speciosus**
7. Ovary hairy; calyx tube glabrous within, lobes acuminate.....**P. travancoricus**
8. Corolla lobes equal.....**P. auricularia**
8. Corolla lobes unequal.....**P. wightii**

**Pogostemon auricularia** (L.) Hassk., Tijdsch. Nat. Gesch. 10: 127. 1843; El-Gazzar & Watson, Taxon 16(3): 188. 1967; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 172. 1981; Press, Enum. Fl. Pl. Nepal 3: 162. 1982; Mohanan & Henry, Fl. Thiruvananthapuram 371. 1994. ***Mentha auricularia*** (L., Mant. Pl. 1: 81. 1767. ***Dysophyla auricularia*** (L.) Bl., Bijdr. 826. 1826; Hook. f., Fl. Brit. India 4: 638. 1885; Gamble, Fl. Pres. Madras 1135. 1924.

Scandent herbs; stem terete, villous. Leaves to 6 x 2 cm, lanceolate, acute, rounded at base, crenulate, densely glandular villous. Spike 7 x 1 cm, cylindrical, terminal; bracts ovate, bracteoles lanceolate. Flowers many, densely packed; calyx 1.5 mm long; lobes 5, equal; corolla 3 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.

*Fl. & Fr.* : November-may

*Distr.* : South-East Asia. Common; in waterlogged areas in grasslands. Vallakkadavu, *JA 13185.*

**Pogostemon benghalensis** (Burm. f.) O. Ktze., Rev. Gen. Pl. 2: 517. 1891; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 507. 1976; Sasidh. & Sivar., Fl. Pl. Thrissur For. 364. 1996. ***Origanum benghalense*** Burm. f., Fl. Ind. 128, t. 38, f. 3. 1768. ***Pogostemon plectranthoides*** Desf., Ann. Mus. Hist. Nat. 2: 156, t. 6. 1808; Hook. f., Fl. Brit. India 4: 632. 1885; Gamble, Fl. Pres. Madras 1133. 1924.

Shrubs, to 2 cm high; stem hoary pubescent, subterete, reddish. Leaves 12-15 x 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 4 mm long, pubescent outside, glabrous inside; lobes acuminate; corolla pink, 7 mm long, lobes acute, hairy, pink; staminal filaments unequal. purple, bearded with moniliform hairs.

*Fl. & Fr.* : August-January

*Distr.* : India. Common; along the margins of evergreen forests at higher elevations. Vellimala, *JA 17893.*

**Pogostemon heyneanus** Benth. in Wall., Pl. Asiat. Rar. 1: 31. 1830; Wight, Ic. t. 1440. 1849; Gamble, Fl. Pres. Madras 1133. 1924; Mukh., Rec. Bot. Surv. India 14: 71. 1940; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 171. 1981; Mohanan & Henry, Fl. Thiruvananthapuram 371. 1994. ***P. patchouli*** sensu Hook. f., Fl. Brit. India 4: 653. 1885, non Pellet, 1844.

Subshrubs; stem hoary tomentose. Leaves 11 x 6 cm, ovate, acute, irregularly crenate, glabrescent; petiole 3 cm long. Racemes panicled, interrupted, not 1-sided; bracts and bracteoles similar, 2.5 x 1 mm. Flowers few together; calyx 4 mm long, glandular, lobes triangular; corolla 5 mm long; lower lip 3-lobed, middle lobe narrower, acute; filaments bearded. Nutlets biconvex, orbicular, smooth, brown.

*Fl. & Fr.* : October-January

*Distr.* : India, Sri Lanka and Malesia. Occasional; along the margins of evergreen forests. Koruthode, *JA & KPR 14796, KPR 17063.*

**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. 1924; Sasidh. & Sivar., Fl. Pl. Thrissur For. 364. 1996. ***Elsholtzia paniculata*** Willd., Sp. Pl. 3: 59. 1800.

Subshrubs. Leaves to 8 x 4 cm, ovate, acuminate at either ends, irregularly dentate, densely hirtus-tomentose; lateral nerves 3-4 pairs; petiole 2 cm long, tomentose. Panicle large, branches 5-10-flowered, 1-sided; bracteoles 5 x 3 mm, oblique, falcate, imbricating regularly. Flowers

densely packed; calyx 4 mm long, 5-ribbed; lobes acuminate, hirtus; corolla purplish, 6 mm long; pubescent outside; filaments bearded.

*Fl. & Fr.* : November-January

*Distr.* : Western Peninsular India. Common; in moist deciduous forests. Kumarikulam, *JA 13015.*

**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. 1924; Sasidh. & Sivar., Fl. Pl. Thrissur For. 364. 1996. **Poothachida.**

Densely pubescent diffuse herbs. Leaves 7 x 5 cm, ovate, oblique at base, acute at apex, irregularly dentate, nerves 4 pairs; petiole 1 cm long. Spikes 10-20-flowered, clustered, racemose or panicled; bracteoles 6 x 4 mm, ovate-falcate, regularly imbricating, hairy. Flowers densely packed; calyx 5 mm long, lobes acute; corolla purple, 6 mm long, hairy, lobes acute, hairy; filaments bearded with purple moniliform hairs. Nutlets trigonous, dark brown, smooth

*Fl. & Fr.* : Throughout the year except the driest.

*Distr.* : Western Peninsular India. Fairly common; in moist deciduous forests and in openings in evergreen forests at low elevations. Koruthode *JA 18476.*

**Pogostemon rotundatus** Benth. in Wall., Pl. Asiat. Rar. 1: 31. 1830; Hook. f., Fl. Brit. India 4: 636. 1885; Gamble, Fl. Pres. Madras 1134. 1924; Henry *et al.*, J. Bombay Nat. Hist. Soc. 75(3): 693. 1979; Sasidh. & Sivar., Fl. Pl. Thrissur For. 365. 1996.

Profusely branched herbs; stem villous. Leaves 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 1 cm, terminal solitary, cylindrical, continuous; bracts and bracteoles minute. Flowers densely packed; calyx 4 mm long, densely hairy, lobes acuminate; corolla white or yellow, 6.5 mm long; lobes obtuse; filaments bearded. Nutlets biconvex, obovoid, minutely reticulate, brown.

*Fl. & Fr.* : November-January

*Distr.* : Peninsular India. Common; in grasslands. Kumarikulam, *JA 13005.*

**Pogostemon speciosus** Benth. in Wall., Pl. Asiat. Rar. 1: 31. 1830; Wight, Ic. t. 1443. 1849; Hook. f., Fl. Brit. India 4: 637. 1885; Gamble, Fl. Pres. Madras 1134. 1924; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 185. 1987.

Erect shrubs; stem covered with deflexed hairs. Leaves to 7 x 5 cm, ovate, rounded at base, irregularly crenate, strigose; nerves 5-pairs. Spikes 10 cm long, solitary terminal; rachis reflexed hairy; bracts and bracteoles minute, linear. Flowers many, perpendicular to the axis or deflexed;

calyx 6 mm long, lobes acute to acuminate, strigose along the nerves outside; corolla yellow to white, 11 mm long, lobes obtuse, hairy; filaments hairy at extreme base; ovary densely glandular.

*Fl. & Fr.* : November-January

*Distr.* : Southern Western Ghats. Rare; in openings of evergreen forests at high elevations. Vellimala, *JA 14310.*

**Pogostemon travancoricus** Bedd., Ic. t. 159. 1868-1874; Hook. f., Fl. Brit. India 4: 637. 1885; Gamble, Fl. Pres. Madras 1135. 1924; Mohanan & Henry, Fl. Thiruvananthapuram 372. 1994.

Subshrubs; branches quadrangular, puberulus. Leaves to 8 x 5 cm, ovate, acute at apex, rounded at base, crenate-serrate, minutely pubescent above, scabrous below; petiole 7 cm long, tomentose. Spike to 15 cm long, terminal, solitary; rachis with retrose hairs. Flowers sessile, densely packed, deflexed; calyx 7 mm long, 12-ribbed; lobes hairy; corolla yellow, 10 mm long, lobes obtuse, revolute at apex, hairy filaments 12 mm long, well excerted, hairy at base, ovary rugose, hairy. Nutlets quadrangular, smooth

*Fl. & Fr.* : October-March

*Distr.* : Southern Western Ghats (Kerala). Frequent; in the openings at high elevations. Udembatheri, *JA 13333.*

**Pogostemon wightii** Benth., Lab. Sp. 155. 1833; Hook. f., Fl. Brit. India 4: 635. 1885; Gamble, Fl. Pres. Madras 1134. 1924; Mohanan & Henry, Fl. Thiruvananthapuram 372. 1994.

Subshrubs; branches quadrangular, strigose. Leaves 5-6 x 3-4 cm, ovate, acute at apex, rounded at base, densely strigose, irregularly crenate; nerves 4 pairs. Spikes 4-8 cm long, 1-1.5 cm broad, terminal, continuous with peduncled clusters of flowers, axis densely hairy; bracts linear, ciliate. Flowers perpendicular to the axis; calyx 4 mm long, lobes with bristles along margins; corolla 5 mm long; middle lobe of upper lip narrower, hairy; filaments bearded. Nutlets biconvex to triangular, brown, smooth.

*Fl. & Fr.* : December-January

*Distr.* : Southern Western Ghats. Rare; in evergreen forests at high elevations. Brook's Peak, *JA 17031.*

## **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. Leaves lanceolate, acute at either ends, ca. 1 cm broad; inflorescence glandular-pilose.....**S. barbata**
1. Leaves ovate, rounded or cordate at base, more than 2 cm broad; inflorescence hispid.....2
2. Roots tuberous; nutlets spinulose.....**S. violacea**
2. Roots fibrous; nutlets granulate or tuberculate.....3
3. Leaves densely hispid and purplish below; nutlets granulate.....**S. wightiana**
3. Leaves puberulus, not purplish below; nutlets tuberculate.....**S. colebrookeana**

**Scutellaria barbata** D. Don, Prodr. 109. 1825; Mc Kean, Notes Roy. Bot. Gard. Edinburgh 40: 183. 1982; Alan Patan, Kew Bull. 45(3): 436. 1990. ***S. rivularis*** Benth. in Wall., Pl. Asiat. Rar. 1: 66. 1830; Hook. f., Fl. Brit. India 4: 670. 1885; Gamble, Fl. Pres. Madras 1142. 1924; Wight, Ic. t. 1450. 1849.

Stiff herbs; stem glandular-pilose. Leaves to 3 x 1 cm, acute at base and apex, distantly crenate, 3-nerved, densely white-glandular; petiole 5-10 mm long. Racemes 10 cm long; bracts orbicular, cuspidate. Flowers paired, calyx 6 x 4 mm, hairy, both lips saccate; corolla 10 mm long, lobes acute; anthers hairy. Nutlets globose, granulate, black.

*Fl. & Fr.* : October-December

*Distr.* : India and China. Very rare; in high elevation evergreen forests. Vellimala *JA 18475.*

**Scutellaria colebrookeana** Benth. in Wall., Pl. Asiat. Rar. 1: 67. 1830; Gamble, Fl. Pres. Madras 1142. 1924. ***S. violacea*** Heyne ex Benth. var. ***colebrookeana*** (Benth.) Hook. f., Fl. Brit. India 4: 668. 1885, "*colebrookiana*".

Puberulus herbs. Leaves to 3 x 3 cm, deltoid, acute, base truncate, dentate, nerves 4 pairs; petioles 2.5 cm long. Racemes 12 cm long, bracts 3 x 1 mm, ovate, acute. Flowers paired, calyx 5 x 5 mm, upper lip and lower lip equal, white, glabrous; corolla 12 mm long, pale purple, glabrous, lower lip broader; filaments glabrous. Nutlets tuberculate, dark brown

*Fl. & Fr.* : October-December

*Distr.* : Peninsular India. Not common, along the margins of moist deciduous forests. Thaannikkudy, *JA 12634.*

**Scutellaria violacea** Heyne ex Benth. in Wall., Pl. Asiat. Rar. 1: 66. 1830; Wight, Ic. t. 1449. 1849; Hook. f., Fl. Brit. India 4: 668. 1885; Gamble, Fl. Pres. Madras 1142. 1924; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 158. 1981; Alan Patan, Kew Bull. 45(3): 430. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 365. 1996.

Erect herbs; stem hispid. Leaves to 7 x 5 cm, ovate, acute, crenate, base cordate, hispid; petiole 4-5 cm long. Racemes 15 cm long, glandular hispid; bracts ovate, 3 mm long. Flowers paired, long-pedicelled; calyx glabrous, upper lobe 7 x 5 mm, saccate, lower lip 4 x 3 mm; corolla pale blue, 15 mm long, lateral lobes of lower lip shorter, glabrous; filaments fimbriate at base; anthers bearded, confluent. Nutlets spherical, tuberculate

*Fl. & Fr.* : October-December

*Distr.* : South India and Sri Lanka. Common; along margins of evergreen forests with grasslands. Thaannikkudy, *JA 12635.*

**Scutellaria wightiana** Benth. in Wall., Pl. Asiat. Rar. 1: 67. 1830; Gamble, Fl. Pres. Madras 1142. 1924; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 186. 1987. ***S. violacea*** Heyne ex Benth. var. ***hispidior*** Benth. in DC., Prodr. 12: 418. 1848; Hook. f., Fl. Brit. India 4: 668. 1885.

Erect herbs; stem densely hairy. Leaves 8 x 6 cm, ovate, cordate at base, purplish below, crenate, acute at apex, densely hairy; petiole 3 cm long, reddish. Raceme 12-16 cm long, slender, glandular hairy. Flowers paired, distant; bracts ovate; calyx glabrous, white, upper lip 6.5 x 5 mm, orbicular, concave; lower lip smaller; corolla pale pink, 13 mm long, hairy. Nutlets spherical, rugose.

*Fl. & Fr.* : July-December

*Distr.* : Southern Western Ghats. Common; in evergreen forests at high elevations. Mlappara, *JA 12126.*

## **TEUCRIUM** Linnaeus

Sp. Pl. 562. 1753

**Teucrium tomentosum** Heyne ex Benth. in Wall., Pl. Asiat. Rar. 1: 58. 1830; Hook. f., Fl. Brit. India 4: 700. 1885; Gamble, Fl. Pres. Madras 1158. 1924; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 193. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 365. 1996.

Erect shrubs; branchlets tomentose. Leaves 11 x 6 cm, ovate, acute at apex, rounded at base, crenate, hairy along nerves; petiole 1-3 cm long. Racemes panicled, terminal and axillary; bracts 3 mm long, ovate, small. Flowers closely packed; pedicellate; calyx 6 mm long, lobed near the apex, lobes equal, acute, hairy; corolla yellow to white, 11 mm long, upper lip absent, lower lip 3-lobed, lateral lobes smaller; stamens didynamous, filaments glabrous; anthers reniform; style filiform, stigma bifid. Nutlets 4, basely united, globular, reticulately pitted, glandular.

*Fl. & Fr.* : November-January

*Distr.* : South India and Sri Lanka. Common; in grasslands and moist deciduous forests. Mangaladevi, *JA 12687.*

## 100. PLANTAGINACEAE

Juss., Gen. Pl. 89. 1789.

### PLANTAGO Linnaeus

Sp. Pl. 112. 1753

**Plantago erosa** Wall. in Roxb., Fl. Ind. 1: 423. 1820; Pilger in Engl., Pflanzenr. 20: 60. 1937; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 187. 1987. ***P. asiatica*** auct. non L., 1753: Wight, Ill. 2: t. 177. 1850; Gamble, Fl. Pres. Madras 1160. 1923. ***P. major*** sensu Hook. f., Fl. Brit. India 4: 705. 1885 p.p., non L., 1753.

Herbs; stem short or absent. Leaves radical, 7 x 5 cm, ovate, obtuse, decurrent at base into a winged petiole, villous; petiole 5-6 cm long, sheathing at base. Flowers in elongated axillary spikes, densely packed, bracts ovate, keeled; sepals 4, 2.5 mm long, ovate, free; corolla white, 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, 6 x 3 mm; seeds many, oblong, black.

*Fl. & Fr.* : November-January

*Distr.* : Pantropical. Common; in openings of evergreen forests at high elevations. Vellimala, *JA 12987.*

## 101. NYCTAGINACEAE

Juss., Gen. Pl. 90. 1789.

### BOERHAVIA Linnaeus

Sp. Pl. 3. 1753

Diffuse herbs, stems woody. Leaves opposite, in unequal pairs, petiolate. Flowers in cymose or panicled umbels, petioled or sessile; bracts 5, ovate, deciduous; perianth tubular, pink or white, shortly 5-fid at apex, stamens 3-5, filaments long, connate at base; anthers didynamous; ovary stalked, 1-celled; ovule 1, basal; style 1, stigma peltate. Fruit a nut enclosed in the viscid perianth tube.

1. Flowers pedicelled; leaves to 8 x 5 cm.....**B. chinensis**
1. Flowers sessile; leaves to 4 x 4 cm.....**B. diffusa**

**Boerhavia chinensis** (L.) Asch. & Schweinf. in Schweinf., Beitr. Fl. Aethiop. 1: 167. 1867, "*Boerhaavia*". Stemmerik in Steenis, Fl. Males. Ser.1, 6(3): 455. 1964; Gandhi in Sald. &

Nicols., Fl. Hassan Dist. 91. 1976 *Valeriana chinensis* L., Sp. Pl. 33. 1753. ***Boerhavia repanda*** Willd., Sp. Pl. 1: 22. 1797; Wight, Ic. t. 1766. 1852; Hook. f., Fl. Brit. India 4: 709. 1885; Gamble, Fl. Pres. Madras 1163. 1925.

Diffuse herbs with divaricate scandent branches; stems white, glabrous. Leaves equal, ovate, acute, shallowly lobed, cordate at base, lineolate; petiole to 2.5 cm long. Flowers 1 cm long, 3-6 together in panicled umbel; pedicels 13 mm long, capillary; bracts 3 mm long, glandular; perianth 8 mm long, narrow, pink. Capsule 8 x 1.5 mm, oblanceolate, densely lineolate, glandular.

*Fl. & Fr.* : October-February

*Distr.* : Paleotropics. Occasional; in moist deciduous forests. Kumily, *JA 12554.*

**Boerhavia diffusa** L., Sp. Pl. 3. 1753; Gamble, Fl. Pres. Madras 1162. 1925; Stemmerik in Steenis, Fl. Males. Ser.1, 6(3): 454. 1964; Sasidh. & Sivar., Fl. Pl. Thrissur For. 366. 1996. ***B. repens*** L., Sp. Pl. 3. 1753; Hook. f., Fl. Brit. India 4: 709. 1885. ***B. procumbens*** Banks ex Roxb., Fl. Ind. 1: 148. 1820; Wight, Ic. t. 874. 1844-45. **Thazhuthama**.

Herbs with long trailing branches; stem reddish, tomentose. Leaves unequal, ovate, obtuse, undulate along margins, truncate to subcordate at base, tomentose; petiole to 1 cm long. Flowers 4 mm long, 4-10 together, in axillary or terminal, peduncled umbels; bracts 5, ovate, glandular, perianth pink, stamens 3, capsule 3 x 1 mm, clavate, 5-ribbed, glandular.

*Fl. & Fr.* : October-February

*Distr.* : Paleotropics. Common; in disturbed moist deciduous forests. Kumily, *JA 12548.*

## 102. AMARANTHACEAE

Juss., Gen. Pl. 87. 1789.

1. Leaves alternate.....2
1. Leaves opposite.....4
2. Flowers unisexual .....**Amaranthus**
2. Flowers bisexual.....3
3. Seeds several in a utricle.....**Celosia**
3. Seed solitary.....**Indobanalia**
4. Flowers on elongate slender spikes.....5
4. Flowers on short cylindrical spikes or in sessile clusters .....7
5. Flowers all fertile, not in clusters.....**Achyranthes**
5. Flowers fertile and sterile, clustered .....6
6. Fertile flowers solitary in a group.....**Cyathula**
6. Fertile flowers few in a group .....**Pupalia**

7. Sepals equal ..... **Allmania**

7. Sepals unequal ..... 8

8. Style absent; anthers 1-celled ..... **Alternanthera**

8. Style present; 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 to 16 x 3 cm, linear-lanceolate; staminal tube truncate ..... **A. bidentata**

1. Leaves to 10 cm long, elliptic or ovate; staminal tube semicircular at apex ..... **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. 1925;

Two varieties are found in the study area:

Key to the species

1. Tepals equal, mouth of staminal tube long ciliate; branches tomentose ..... var. **aspera**

1. Tepals unequal; mouth of staminal tube not ciliate; branches glabrous ..... var. **pubescens**

**Achyranthes aspera** L., Sp. Pl. 204. 1753, var. **aspera;** Townsend in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 38. 1980; Rani, J. Bombay Nat. Hist. Soc. 82: 446. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 367. 1996. **Van kadaladi.**

Erect stout herbs; stems tomentose. Leaves to 10 x 6 cm, broadly elliptic to obovate, abruptly acuminate, tomentose, nerves 6 pairs; petiole 5 mm long. Spike to 20 cm long, hispid; bracts 6 mm long, lanceolate, aristate; bracteoles entire, aristate. Flowers deflexed; tepals 7.5 x 2 mm, elliptic, acute, glabrous, equal; staminal sheath truncate; ovary truncate at apex. Achenes 3 mm long, ovoid, brown.

*Fl. & Fr.* : December-January

*Distr.* : South India and Sri Lanka. Common; in moist deciduous forests. Koruthode, *JA 13176.*

**Achyranthes aspera** L. var. **pubescens** (Miq.) Townsend, Kew Bull. 28: 145. 1973 & Kew Bull. 29: 473. 1974; Rani, J. Bombay Nat. Hist. Soc. 82: 446. 1985.

Erect herbs; stem glabrous. Leaves to 6 x 2.5 cm, ovate-lanceolate, acuminate at apex and base, pubescent above and below; petiole 5 mm long. Spike 5-10 cm long, hispid; bracts 2.5 mm long, lanceolate, aristate; bracteoles orbicular, emarginate at apex, cuspidate, cusp 3 mm long. Flowers many, perpendicular to the axis; outer tepals larger, 5 mm long, lanceolate, acuminate, glabrous, inner smaller with revolute apex; staminal tube truncate, minutely ciliate or glabrous. Achenes 2 mm long, truncate, cuspidate, dark brown.

*Fl. & Fr.* : August-January

*Distr.* : India. Rare; along the margins of evergreen forests at higher elevations. Uppermanalar, *JA 13963.*

**Achyranthes bidentata** Bl., Bijdr. 545. 1826; Wight, Ic. t. 1779. 1852; Hook. f., Fl. Brit. India 4: 730. 1885; Gamble, Fl. Pres. Madras 1176. 1925; Townsend in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 40. 1980; 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 mm long. Spike axillary and terminal, 15-30 cm long, narrow, glabrous; bracts 4 x 1.5 mm, lanceolate, long-aristate; bracteoles 3 mm long, entire, strongly aristate. Flowers distant, perpendicular to axis; tepals equal, 7 x 1.5 mm, lanceolate, acuminate, glabrous; staminal sheath truncate. Achenes 3 x 1.5 mm, cylindrical, longitudinally striate, reddish-brown.

*Fl. & Fr.* : January-April

*Distr.* : Asia and Africa. Occasional; along the margins of evergreen forests. Uppermanalar, *JA 13718.*

## 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. 1925; Townsend in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 7. 1980; Sasidh. & Sivar., Fl. Pl. Thrissur For. 368. 1996.

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 4 mm long, lanceolate, acuminate with filiform tips; tepals 5, equal, 5 x 1 mm, 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 3 x 2 mm, ellipsoid with a long beak, biconvex, black.

*Fl. & Fr.* : Almost throughout the year

*Distr.* : Tropical Asia. Common; in moist deciduous forests. Thaannikkudy, *JA 12357*; Thekkady, *JA 13837.*

## 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 5 or 3; 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. Perianth lobes aristate, spinescent; stems densely pilose.....**A. pungens**
1. Perianth lobes acute, scarious; stems glabrous or sparsely hairy.....2
2. Leaves spathulate; perianth lobes unequal .....**A. paronychioides**
2. Leaves oblong-oblanceolate; perianth lobes equal.....**A. sessilis**

**Alternanthera paronychioides** A. St. Hill., Voy. Bres. 2: 439. 1833; Sundararaj, J. Bombay Nat. Hist. Soc. 53: 525. 1956; Veldkamp, Blumea 19(1): 167. 1971; Townsend in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 50. 1980; Sasidh. & Sivar., Fl. Pl. Thrissur For. 369. 1996.

Prostrate herbs; stem sparsely covered with long crisped hairs. Leaves to 3 x 0.7 cm, oblanceolate to spathulate, acute, glabrous. Spike 5 x 3 mm, solitary, axillary, few-flowered, sessile; bracts and bracteoles similar, 1.5 mm long, hyaline, apiculate. Flowers densely packed; tepals 5, outer three larger, 2.5 x 1 mm, ovate, acute, inner smaller, all hairy; stamens 3-5; ovary obovoid, compressed, stigma bilobed.

*Fl. & Fr.* : January-March

*Distr.* : Native of Tropical America, naturalised in Old World countries. Common; along lake beds and appear when water recedes. Thekkady, *JA & KPR 14584.*

**Alternanthera pungens** Kunth in H.B.K., Nov. Gen. Sp. 2: 206. 1817; Melville, Kew Bull. 13: 174. 1958; Townsend in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 47. 1980. ***A. echinata*** J. E. Smith in Rees, Cyclop. 39: 10. 1819.

Prostrate herbs. Leaves to 1.5 x 1 cm, deltoid to obovate, obtuse, base narrowed into a short petiole, glabrous. Spikes to 10 x 6 mm, 2-3 together, axillary, sessile; bracts and bracteoles equal, 5 mm long, scarious, aristate. Flowers densely packed; tepals 5, outer three larger, 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.

*Fl. & Fr.* : Throughout the year

*Distr.* : Native of America, widely spread in Tropical Countries. Occasional; along roadsides in moist deciduous forests. Thekkady, *KPR & JA 14596.*

**Alternanthera sessilis** (L.) R. Br. ex. DC., Cat. Hort. 4: 77. 1813; Wight, Ic. t. 727. 1840; Hook. f., Fl. Brit. India 4: 731. 1885; Townsend in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 49. 1980; Sasidh. & Sivar., Fl. Pl. Thrissur For. 369. 1996. ***Gomphrena sessilis*** L., Sp. Pl. 225. 1753. ***Alternanthera triandra*** Lam., Encycl. 1: 95. 1785; Gamble, Fl. Pres. Madras 1179. 1925. **Kozhuppa, Kozhuppacheera** (Mannan).

Erect or prostrate herbs; stems glabrous. Leaves to 4 x 1 cm, elliptic-oblong to oblanceolate, obtuse, crenate, attenuate at base into a petiole, glabrous. Spike 7-12 x 5 mm, sessile, solitary or 2-3 together; bracts and bracteoles similar, 1 mm long, broadly ovate, acute, glabrous. Flowers yellowish red; tepals equal, 2.5 x 1.5 mm, ovate, acute, glabrous, 3-nerved at base; stamens 3. Achenes 2 x 2 mm, obovoid, emarginate at apex; seed orbicular, compressed, brown.

*Fl. & Fr.* : Throughout the year

*Distr.* : Pantropical. Very common; along lake shores and riversides. Kavalappara, *JA & KPR 14560*; Thekkady, *JA 14571.*

*Ethnobotanical use* : Used as green salad.

## AMARANTHUS Linnaeus

Sp. Pl. 989. 1753

**Amaranthus viridis** L., Sp. Pl. ed. 2, 1405. 1763; Hook. f., Fl. Brit. India 4: 720. 1885; Gamble, Fl. Pres. Madras 1171. 1925; Townsend in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 19. 1980 Matthew, Fl. Tamil Nadu Carnatic. 3(2): 1309. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 369. 1996. ***Euxolus caudatus*** Moq. in DC., Prodr. 13(2): 274. 1849; Wight, Ic. t. 1773. 1852. **Kuppacheera**.

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 to 4 cm long. Spikes terminal and axillary,

interrupted. Flowers unisexual, mixed, densely arranged; bracts and bracteoles similar, ovate, acuminate; tepals 3, 1.5 mm long, obovate, obtuse; stamens 3, free; ovary obovoid, styles 2, frees stigmas terminal. Achenes 2 x 1 mm, ovoid, acute, membranous; seed 1, 1 x 1 mm, biconvex, dark brown, shining with hexagonal epidermal cells.

*Fl. & Fr.* : Throughout the year

*Distr.* : Cosmopolitan. Occasional; in disturbed forest areas. Umikuppan, *JA & KPR 14899* .

## CELOSIA Linnaeus

Sp. Pl. 205. 1753

**Celosia pulchella** Miq. in DC., Prodr. 13(2): 238. 1849; Wight, Ic. t. 1768. 1852; Hook. f., Fl. Brit. India 4: 715. 1885; Gamble, Fl. Pres. Madras 1166. 1925; Townsend in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 4. 1980.

Erect glabrous herbs. Leaves to 9 x 5 cm, alternate, ovate, acuminate, base truncate and shortly cuneate; nerves 5 pairs; petioles 2-4 cm long. Spike terminal, 5-15 cm long, slender. Flowers clustered, all fertile; bracts and bracteoles similar, 1 mm long, ovate, acute, hyaline; tepals 5, 2.5 x 1 mm, ovate, acute, hyaline; stamens 5, filaments united at base; ovary globose, style absent; stigmas 2, curved, pilose. Utricles 4 x 3 mm, ovoid; circumscissile; seeds many, 1 x 1 mm, reniform, black, muricate.

*Fl. & Fr.* : August-January

*Distr.* : India and Sri Lanka. Rare; in forest margins at high elevations. Deviar, *JA 12135*; Kalvarimala, *JA 13032.*

## CYATHULA Blume

Bijdr. 548. 1826, *nom. cons.*

**Cyathula prostrata** (L.) Bl., Bijdr. 549. 826; Hook. f., Fl. Brit. India 4: 723. 1885; Gamble, Fl. Pres. Madras 1172. 1925; Townsend in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 26. 1980; Sasidh. & Sivar., Fl. Pl. Thrissur For. 370. 1996. ***Achyranthes prostrata*** L., Sp. Pl. ed. 2, 1: 296. 1761. ***Desmochaeta prostrata*** (L.) DC., Cat. Hort. Monsp. 102. 1813; Wight, Ic. t. 733. 1843. **Cheru kadaladi.**

Decumbent herbs. Leaves opposite, 7 x 3.5 cm, rhomboid, acute at either ends, thinly pubescent; petiole 5-15 mm long. Spike terminal, to 18 cm long, slender, solitary. Flowers in groups of 3-5 of which one perfect and other neutor flowers; bracts and bracteoles similar, 1.5 mm long, lanceolate, acuminate, pubescent; sepals 5, free, 3 x 1 mm, 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 2 x 1 mm, obovoid, compressed, golden brown.

*Fl. & Fr.* : Almost throughout the year

*Distr.* : Tropical Countries. Common; in semi-evergreen and moist deciduous forests. Thekkady, *JA 13624.*

*Ethnobotanical use* : The entire plant is made into a paste with or without turmeric and pasted externally for muscle aliments.

## **GOMPHRENA** Linnaeus

Sp. Pl. 224. 1753

**Gomphrena serrata** L., Sp. Pl. 224. 1753; Mears, Taxon 29: 86. 1980. ***G. decumbens*** Jacq., Hort. Schoenbr. t. 482. 1805; Gamble, Fl. Pres. Madras 1179. 1925.

Decumbent herbs; stems hispid. Leaves opposite, 4 x 1 cm, obovate, obtuse, tomentose. Spikes 2 x 1 cm, oblong, supported by 2 basal bracts. Flowers many, densely packed; sepals 5, outer ones lanceolate, 7 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, 2 x 2 mm, muriculate, brown. Sterile flowers with hooked, bristle like tepals.

*Fl. & Fr.* : Almost throughout the year

*Distr.* : Native of America. Common; along roadsides in moist deciduous forests. Thekkady, *JA 12405*; Uppupara, *JA 13180.*

## **INDOBANALIA** A. N. Henry et R. Roy

Bull. Bot. Surv. India 10: 274. 1969.

**Indobanalia thyrsiflora** (Moq.) Henry & Roy, Bull. Bot. Surv. India 10: 274. 1968; Sasidh. & Sivar., Fl. Pl. Thrissur For. 370. 1996. ***Banalia thyrsiflora*** Moq. in DC., Prodr. 13(2): 278. 1849; Wight, Ic. t. 1774. 1852; Hook. f., Fl. Brit. India 4: 716. 1885; Gamble, Fl. Pres. Madras 1167. 1925.

Erect herbs; stems glabrous, ribbed. Leaves alternate, to 10 x 5 cm, ovate, acuminate, cuneate at base, hairy below; lateral nerves 8 pairs; petiole 2 cm long. Spikes thyrsoid, panicled, narrow, terminal and axillary; bracts and bracteoles similar, broadly ovate. Flowers 2-3 together; sepals free, equal, 3 x 1 mm, 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.

*Fl. & Fr.* : November-January

*Distr.* : India. Common; in evergreen forests. Uppupara, *NS & JA 12715*; Vellimala, *JA & KPR 14330.*

**PUPALIA** A. L. Jussieu

Ann. Mus. Natl. Hist. Nat. 2: 132. 1803, *nom cons.*

**Pupalia lappacea** (L.) Juss., Ann. Mus. Nat. Hist. Nat. 2: 132. 1803; Hook. f., Fl. Brit. India 4: 724. 1885; Gamble, Fl. Pres. Madras 1173. 1925; Townsend in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 28. 1980. ***Achyranthes lappacea*** L., Sp. Pl. 204. 1753.

Straggling herbs; stems densely hispid. Leaves 2-5 x 2-3 cm, obovate, obtuse, fulvous tomentose; petiole to 1 cm long. Spike 15-25 cm long, terminal, usually unbranched. Flowers sterile and fertile together in distant clusters; bracts 3 mm across, orbicular; bracteoles smaller; sepals 5, 5 x 2 mm, elliptic, acute, densely covered with hooked bristles, woody; stamens 5, filaments united into short tube at base; ovary obovoid, compressed; style simple; stigma capitate. Achenes 2 x 2 mm, biconvex, brown, smooth. Sterile flowers with reduced hooked bristles.

*Fl. & Fr.* : August-December

*Distr.* : Pantropical. Occasional; in moist deciduous forests. Thekkady, *JA 13950.*

## 103. CHENOPODIACEAE

Vent., Tabl. Regne. Veg. 2: 253. 1799.

*Note*: According to the ICBN (1994) the family **Basellaceae** is not recognised in the family rank. Following the present concept it is now treated under the broad concept of the family **Chenopodiaceae**.

1. Erect herbs, aromatic; leaves lobed ..... **Chenopodium**
1. Twining herbs, not aromatic; leaves entire ..... **Basella**

**BASELLA** Linnaeus

Sp. Pl. 272. 1753

**Basella alba** L., Sp. Pl. 272. 1753; Wight, Ic. t. 896. 1844-1845; Harriman in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 1. 1991; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1327. 1983. **Vasalacheera** (Thevan, Paliyan).

Twining fleshy herbs; stems terete, glabrous. Leaves to 5 x 4 cm, ovate, acute or obtuse, rounded at base, thick, fleshy, glabrous; petiole 1 cm long. Flowers in axillary, stout, erect, 3-10 cm long spikes; bracts ovate, bracteoles orbicular; perianth calycine, lobes 5, 4 mm long, united at base; stamens 5, antitepalous, free; ovary glabrous, 1-celled; ovule 1, styles 3, stigma linear. Utricle globose, 5 mm across, fleshy, white, glabrous.

*Fl. & Fr.* : October-December

*Distr.* : Tropical Asia and Tropical Africa. Occasional; in moist deciduous forests. Kumily, *JA 12549.*

*Ethnobotanical use* : Vegetative parts are used as a green vegetable (Thevan)

### **CHENOPODIUM** Linnaeus

Sp. Pl. 218. 1753

**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. 1925; Matthew, Fl. Tamil Nadu Carnatic 3(2): 1322. 1983. **Eeche kolli** (Mannan).

Erect pungent smelling herbs, profusely branching. Leaves alternate, to 8 x 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.

*Fl. & Fr.* : Throughout the year

*Distr.* : Native of Tropical America, widely introduced in many tropical countries. Occasional; in disturbed forest areas. Thekkady, *JA 18491.*

*Ethnobotanical use* : Stems and leaves are with very pungent smell; Mannan make a paste from the vegetative parts and is used as mild insecticide (Mannan)

## 104. PHYTOLACCACEAE

R. Brown in Tuckey, Narr. Exped. Zaire 454. 1818.

### **PHYTOLACCA** Linnaeus

Sp. Pl. 441. 1753.

**Phytolacca octandra** L., Sp. Pl. ed. 2, 1: 631. 1762; Matthew, J. Bombay Nat. Hist. Soc. 62: 72. 1965; Ghosh & Sikdar, J. Econ. Tax. Bot. 4(1): 159. 1983.

Erect fleshy herbs. Leaves alternate, 8 x 3 cm, obovate to spathulate, acute at apex, narrowed to the base, lineolate. Flowers 5-7 mm across, in long, axillary, 15 cm long racemes, shortly pedicelled; perianth lobes 5, ovate, spreading; stamens 5, free, filaments erect, anthers versatile; ovary depressed-globose, 6-7-lobed, 6-7-celled; ovules solitary in each cell, styles 6-7, short, curved out. Fruit a capsule, 8 mm across, depressed-globose, fleshy; seeds 6-8, biconvex, black, glabrous, polished.

*Fl. & Fr.* : October-December

*Distr.* : Native of Tropical America, widely spread in many tropical countries. Occasional; in disturbed moist deciduous forests. Thekkady, *JA 17922.*

## 105. POLYGONACEAE

Juss., Gen. Pl. 82. 1789.

1. Flowers 6-merous ..... **Rumex**

1. Flowers 3-5-merous ..... **Polygonum**

### **POLYGONUM** Linnaeus

Sp. Pl. 359. 1753, *typ. cons.*

Herbs or undershrubs. 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 5-10, free or connate, imbricate; stamens 5, antitepalous, free; ovary 1-celled; ovules solitary, basal, style 3, free or basely united; stigma capitate. Fruit an ovoid or trigonous nutlets.

*Note*: The broad generic concept of Polygonum is followed in the present work.

1. Flowers in axillary clusters ..... **P. plebeium**

1. Flowers in terminal racemes or cymes ..... 2

2. Stipular tube glabrous at mouth ..... 3

2. Stipular tube ciliate at mouth ..... 5

3. Inflorescence 4-8 cm; long, linear; leaves linear-lanceolate ..... **P. glabrum**

3. Inflorescence to 1 cm long, globose; leaves elliptic or deltoid ..... 4

4. Leaves to 5 x 3 cm, nut biconvex; heads sessile ..... **P. nepalense**

4. Leaves to 11 x 6 cm; nut trigonous; heads peduncled ..... **P. chinense**

5. Nut biconvex ..... 6

5. Nut trigonous ..... 7

6. Leaves to 15 x 5 cm, densely tomentose; spikes 4-8 cm long.....**P. pulchrum**

6. Leaves to 4 x 0.7 cm, glabrous; spikes to 3 cm long.....**P. minus**

7. Racemes stout, erect; bracts with 4-10 flowers in each.....**P. barbatum**

7. Racemes slender, drooping; bracts with 1 or 2 flowers in each .....**P. hydropiper**

**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. 1925; Sasidh. & Sivar., Fl. Pl. Thrissur For. 371. 1996. ***Persicaria barbata*** (L.) H. Hara in Hara, Fl. East. Himalayas 1: 70. 1966; Matthew, Fl. Tamil Nadu Carnatic 3(2): 1334. 1983.

Erect stout herbs. Leaves 6-12 x 2-3 cm, elliptic-lanceolate, acuminate at either ends, glabrate or pubescent, subsessile; nerves many, slender; ochrea 15 mm 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, 2.5 mm long, oblong, obtuse, glandular; stamens 8; styles 3. Nut trigonous, acute, glabrous.

*Fl. & Fr.* : September-January

*Distr.* : India, Tropical Africa and eastward to Australia. Common; in waterlogged areas in semi-evergreen forests. Sivaloda, *JA 12509*; Thekkady, *KPR & JA 14579.*

**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. 1925; Sasidh. & Sivar., Fl. Pl. Thrissur For. 371. 1996.***Persicaria chinensis*** (L.) Gross, Bot. Jahrb. Syst. 49: 269, 277 & 315. 1913; Matthew, Fl. Tamil Nadu Carnatic 3(2): 1334. 1983. **Mudanthi** (Mannan).

Trailing or scandent shrubs; stem glabrous. Leaves ovate, cordate at base, oblique, abruptly acuminate, punctuate, glabrous except the midrib below; nerves many; petiole 1.5 cm long; ochrea 2-3 cm long, membranous, ribbed, oblique at mouth, glabrous. Spike 7 x 7 mm, panicled, globose; peduncles glandular-hairy; bracts ovate, obtuse, 1-flowered. Flowers pedicelled; tepals 4, white, 5 x 2.5 mm, oblong, obtuse, glabrous; stamens 8, styles 3. Nut 5 x 2.5 mm, trigonous, glabrous, acute, brown.

*Fl. & Fr.* : July-January

*Distr.* : India, China, Japan and Malesia. Very common; in evergreen forests. Mlappara, *JA 17961.*

*Ethnobotanical use* : Tender stems are used as green vegetable (Mannan). The stem is eaten before eating fish.

**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. 1925; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 198. 1987. ***Persicaria glabra*** (Willd.) M. Gomes, Ann. Inst. Segunda Ensef. Habana 2: 278. 1896; Matthew, Fl. Tamil Nadu Carnatic 3(2): 1336. 1983.

Stout erect herbs, glabrous, to 100 cm high. Leaves to 16 x 3 cm, linear-lanceolate, acuminate at both ends, punctuate.; petiole 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 2 x 1.5 mm, biconvex, acute, brown.

*Fl. & Fr.* : October-January

*Distr.* : India, Africa, Eastward to Malesia. Common; in moist areas of semi-evergreen forests. Sivaloda, *JA 12507.*

**Polygonum hydropiper** L., Sp. Pl. 361. 1753 Hook. f., Fl. Brit. India 5: 39. 1886; Gamble, Fl. Pres. Madras 1190. 1925; Sasidh. & Sivar., Fl. Pl. Thrissur For. 371. 1996.

Two variety are found in the Tiger Reserve

Key to the varieties:

1. Stems hispid with strong adpressed hairs; leaves 10-13 cm long.....**P. hydropiper** var. **flaccidum**
1. Stems glabrous; leaves to 9 cm long.....**P. hydropiper** var. **hydropiper**

**Polygonum hydropiper** L., Sp. Pl. 361. 1753, var. **flaccidum** Steward, Contrib. Gray Herb. 88: 59. 1930; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 198. 1987. ***P. flaccidum*** auct. non Roxb., 1832: Hook. f., Fl. Brit. India 5: 39. 1886; Gamble, Fl. Pres. Madras 1190. 1925. ***P. donnii*** Wight, Ic. t. 1801. 1852.

Stout herbs; stems sometimes decumbent at base. Leaves to 13 x 2 cm, elliptic to linear-lanceolate, acuminate, hispid below and along the nerves above; ochrea 15 mm long, adpressed-hairy, strongly bristled at mouth. Racemes 6-10 cm long, slender; bracts obovate, ciliate, glabrous. Flowers paired, pedicellate; tepals 5, oblong, obtuse, glandular-pubescent, stamens 10; style 3-fid, stigmas globose. Nut trigonous

*Fl. & Fr.* : Throughout the year

*Distr.* : Indo-Malaya. Common; in moist localities of semi-evergreen forests. Sivaloda, *JA 12507.*

**Polygonum hydropiper** L., var. **hydropiper**

Slender erect herbs. Leaves 3-6 x 2 cm, elliptic, acuminate, base acute, subsessile, scabrous along the nerves, nerves many, slender; ochrea 10 mm long, with immersed hairs, mouth ciliate.

Racemes 3-8 cm long, panicled, slender, sometimes drooping; bracts 3 mm long, obovate, ciliate. Flowers solitary or paired in each bract; tepals 2 mm long, oblong, obtuse, red-glandular; stamens 5; styles 3-fid. Nut trigonous, apiculate.

*Fl. & Fr.* : September-February

*Distr.* : Pantropical. Occasional; in moist localities of semi-evergreen forests. Swamikkayam, *JA 12483*; Inchippara, *JA 12587.*

**Polygonum minus** Huds., Fl. Angl. ed. 1. 148. 1762; Hook. f., Fl. Brit. India 5: 36. 1886; Gamble, Fl. Pres. Madras 1189. 1925; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 198. 1987. ***P. strictum*** All., Fl. Pedem. 2: 297. 1785; Wight, Ic. t. 1800. 1852.

Creeping herbs, rooting at nodes, glabrous. Leaves linear-lanceolate, scabrid below; ochrea 10 mm long, shortly bristled at mouth. Racemes to 3 cm long, cylindrical, terminal, panicled; bracts ovate, ciliate at mouth. Flowers closely packed; tepals 5, pink, ovate, obtuse, united at base; stamens 5. Nuts 1.5 x 1 mm, biconvex, ellipsoid, brown, shining.

*Fl. & Fr.* : January-March

*Distr.* : Asia and Europe. Common; in evergreen forests at higher elevations. Vellimala, *JA 18454.*

**Polygonum nepalense** Meis., Mon. Polygon. 84, t. 7, f. 2. 1826; Wight, Ic. t. 1804. 1852. ***P. alatum*** Buch.-Ham. ex Spreng., Syst. Cur. Post. 4 (2): 154. 1827; Hook. f., Fl. Brit. India 5: 41. 1886. ***P. punctatum*** Buch.-Ham. ex D. Don, Prodr. Fl. Nep. 72. 1825; Gamble, Fl. Pres. Madras 1190. 1925. ***Persicaria nepalense*** (Meis.) Gross, Bot. Jahrb. Syst. 49: 277. 1913; Matthew, Fl. Tamil Nadu Carnatic 3(2): 1337. 1983.

Diffuse herbs, rooting from lowers nodes. Leaves deltoid, acute at apex, cuneate at base, sparsely hairy along the nerves below, glandulose; petiole 5-10 mm long; ochrea truncate at mouth, glabrous. Spike on the axils of terminal leaf, sessile, conical; bracts elliptic, acute, glabrous. Flowers solitary or paired; tepals white, 2 mm long, oblong, obtuse, glabrous; stamens 5; styles 2, joined below. Nut 1.5 x 1.5 mm, biconvex, apiculate, minutely puberulus, brown.

*Fl. & Fr.* : Throughout the year

*Distr.* : Tropical Africa, India, east to Malesia. Occasional; along the margins of evergreen forests at higher elevations. Vellimala, *JA 12986, JA 13977.*

**Polygonum plebeium** R. Br., Prodr. 420. 1810. "plebejum; Hook. f., Fl. Brit. India 5: 27. 1886; Gamble, Fl. Pres. Madras 1188. 1925; Matthew, Fl. Tamil Nadu Carnatic 3(2): 1339. 1983.

Sasidh. & Sivar., Fl. Pl. Thrissur For. 371. 1996. ***P. indicum*** Heyne ex Roth, Nov. Pl. Sp. 208. 1821; Wight, Ic. t. 1808. 1852.

Prostrate woody herbs with radiate branches; stems glabrous. Leaves to 10 x 4 mm, oblong, sessile, acute, glabrous; ochrea chartaceous, white, ciliate. Flowers 3-7 together, sessile, axillary; tepals 5, ovate, acute, glabrous; stamens 5. Nut 1.5 mm long, trigonous, acute, glabrous, brown.

*Fl. & Fr.* : February-May

*Distr.* : Africa, Asia, Malesia and Australia. Common; along lake shores when water level recedes. Dam site, *JA & KPR 15104*; Thekkady, *JA 14816.*

**Polygonum pulchrum** Bl., Bijdr. 530. 1826; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 199. 1987. ***P. tomentosum*** Willd., Sp. Pl. 2: 447. 1799, auct. non Schrank, 1789: Hook. f., Fl. Brit. India 5: 30. 1886; Gamble, Fl. Pres. Madras 1189. 1925. ***Persicaria pulchra*** (Bl.) Sojak, Preslia 46(2): 154. 1974; Matthew, Fl. Tamil Nadu Carnatic 3(2): 1339. 1983.

Densely tomentose stout herbs. Leaves to 15 x 5 cm, ovate, acuminate at apex, acute or rounded at base; nerves 13 pairs; petiole 2-3 cm long; ochrea 1 cm long, densely hairy. Spike 4-8 x 1 cm; bracts hairy. Flowers 3-5 in a bract, pedicelled; tepals 5, hairy; stamens 5; style 2-fid. Achenes 3 x 3 mm, biconvex, brown.

*Fl. & Fr.* : October-January

*Distr.* : Africa, India, Sri Lanka and Malesia. Common; in waterlogged areas in semi-evergreen and moist deciduous forests. Sivaloda, *JA 12506.*

## **RUMEX** Linnaeus

Sp. Pl. 333. 1753

**Rumex nepalense** Spreng., Syst. Veg. 2: 159. 1825; Wight, Ic. t. 1810. 1852; Hook. f., Fl. Brit. India 5: 60. 1886; Gamble, Fl. Pres. Madras 1192. 1925; Matthew, Fl. Tamil Nadu Carnatic 3(2): 1340. 1983.

Herbs, to 1 m tall; stem grooved. Leaves to 20 x 6 cm, elliptic-lanceolate, crenulate, punctuate; petiole 2-5 cm long. Flowers bisexual, in axillary fascicles, forming racemes above with whorled flowers; pedicelled, perianth lobes 6, biseriate, inner larger, 3 mm across, orbicular; stamens 6, free, filaments short; ovary 3-celled, 3-winged, ovules solitary in each cell; styles 3, spreading, stigma laciniate. Capsule 3-winged, 2.5 x 1.5 mm, glabrous.

*Fl. & Fr.* : December-January

*Distr.* : Paleotropics Rare; in openings of evergreen forests at high altitudes. Brook's peak, *JA 17010.*

## 106. PODOSTEMACEAE

Rich. ex C. Agardh, Aphor. Bot. 125. 1822.

1. Stem thread-like. floating.....**Indotristicha**
1. Stem ribbon-like.....2
2. Capsule isolobous.....**Polypleurum**
2. Capsule anisolobous.....3
3. Leaves persistent.....**Podostemum**
3. Leaves cauducous.....**Zeylanicum**

### **INDOTRISTICHA** van Royen

Acta Bot. Neerl. 8: 474. 1959

**Indotristicha ramosissima** (Wight) van Royen, Acta Bot. Neerl., 8: 474. 1959; Sasidh. & Sivar., Fl. Pl. Thrissur For. 372. 1996; Nagendra & Arekal, Bull. Bot. Surv. India 57: 246. 1997. ***Dalzellia ramosissima*** Wight, Ic. t. 1920. f. 1. 1852. ***Terniola ramosissima*** (Wight) Willis, Ann. Roy Bot. Gard. (Peradeniya) 1(3): 208, 293, 306, tt. 5-9, f. 29. 1902; Gamble, Fl. Pres. Madras 1194. 1925.

Stem free floating, branched, to 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, 2 mm long, ovate; stamens 3; ovary 2.5 mm long, ellipsoid, stigma 3-lobed.

*Fl. & Fr.* : January-March

*Distr.* : Southern Western Ghats. Common; in streams of moist deciduous forests. Koruthode, *JA & KPR 17987.*

### **PODOSTEMUM** Michaux

Fl. Bor. Am. 2: 164, t. 44. 1803.

**Podostemum subulatus** Gard., Calcutta J. Nat. Hist. 7: 184. 1846; Hook. f., Fl. Brit. India 5: 65. 1886; Willis, Ann. Roy Bot. Gard. (Peradeniya) 1: 229. 1902; Gamble, Fl. Pres. Madras 1196. 1925; Sasidh. & Sivar., Fl. Pl. Thrissur For. 372. 1996; Matthew & Satheesh, Aquatic Bot. 57: 257. 1997.

Thallus branched, creeping. Leaves to 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 to 6 mm; ovary 2.5 x 1.5 mm, 6-ribbed, stigma lobes equal. Capsule 3 x 1.5 mm, ovoid.

*Fl. & Fr.* : December-January

*Distr.* : South India and Sri Lanka. Common; on boulders and rocks in streams of evergreen forests. Sunderamala, *JA 13602*; Thaannikkudy, *JA & KPR 14501.*

**POLYPLEURUM** (Tulsane) Warming

Kongel. Danske Vidensk.-Selsk. Skr. Ser. 6, II: 64. 1901

**Polypleurum stylosum** (Wight) Hall, Kew Bull. 26: 131. 1971; Nagendra & Arekal, Bull. Bot. Surv. India 23: 232. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 373. 1996; Matthew & Satheesh, Aquatic Bot. 57: 287. 1997. ***Dicraea stylosa*** Wight, Ic. t. 1917, f. 2. 1852; Willis, Ann. Roy. Bot. Gard. (Peradeniya) 1: 225. 1902; Gamble, Fl. Pres. Madras 1196. 1925. ***Podostemon stylosus*** (Wight) Benth. ex Hook. f., Fl. Brit. India 5: 64. 1884. **Karimpayal** (Mala Arayan) [Fig. 52 A].

Thallus ribbon like, branched, 15-20 cm long; attached at base; bracts 4-6, alternate, distichous. Spathella splitting into 4 or 5 lobes; pedicel 10 mm long. Tepals 2 mm long; stamens and andropodium 4 mm long; ovary 3 x 1 mm, 6-ribbed, stigma lobes subequal. Capsule 3 x 1.5 mm, ovoid, 6-ribbed, pedicel 1.2-1.5 cm long; seeds many.

*Fl. & Fr.* : November-January

*Distr.* : India and Sri Lanka. Common; on boulders and rocks in stream in evergreen forests. Vavalala, *JA & KPR 14420*; Thaannikkudy, *JA & KPR 15502.*

*Ethnobotanical use* : A paste made from the thallus like plant body of this plant can be applied externally to ease childbirth (Mala Arayan)

**ZEYLANIDIUM** (Tulasne) Engler

in Engler & Prantl, Nat. Pflanzenfam. ed. 2, 18a : 61. 1930.

**Zeylanidium lichenoides** (Kurz) Engl. in Engl. & Prantl., Nat. Pflanzenfam. (ed. 2) 18a: 62. 1928; Sasidh. & Sivar., Fl. Pl. Thrissur For. 373. 1996; Matthew & Satheesh, Aquatic. Bot. 57: 243. 1997. ***Hydrobryum lichenoides*** Kurz, J. Asiat. Soc. Bengal 42(2): 103. 1873; Gamble, Fl. Pres. Madras 1199. 1925. ***Podostemon acuminatus*** Wedd. in DC., Prodr. 17: 75. 1873; Hook. f., Fl. Brit. India 65: 66. 1884. ***P. microcarpus*** Wedd. in DC., Prodr. 17: 76. 1873; Hook. f., Fl. Brit. India 5: 66. 1886.

Thallus ribbon like, lower smaller; upper larger. Spathella 2 x 1 mm, prostrate. Flowers 2.5 x 1 mm, zygomorphic; tepals 2, 1 mm long, scarious, subulate; stamens 2, monadelphous, andropodium 1.2 x 0.3 mm; anthers bilobed, lobes unequal; ovary 1.5 x 0.9 mm, ellipsoid,

smooth; stigma bilobed, lobes unequal, smooth. Capsule 2 x 1 mm, anisolobous, ellipsoid, ribs 8; one lobe persistent, stalk 2 mm, long.

*Fr.* November-January

*Distr.* : Southern Western Ghats. Occasional; on boulders and rocks in streams of evergreen forests. Thaannikkudy, *JA & KPR 14496.*

## 107. ARISTOLOCHIACEAE

Juss., Gen. Pl. 74. 1789.

1. Flowers actinomorphic; erect shrubs ..... **Thottea**
1. Flowers zygomorphic; climbers ..... **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; capsule ca. 8 x 4 cm ..... **A. tagala**
1. Leaves rounded or subcordate at base; capsule ca. 3 x 2 cm ..... **A. indica**

**Aristolochia indica** L., Sp. Pl. 960. 1753; Hook. f., Fl. Brit. India 5: 75. 1886; Gamble, Fl. Prcs. Madras 1202. 1925; Sasidh. & Sivar., Fl. Pl. Thrissur For. 373. 1996. ***A. lanceolata*** Wight, Ic. t. 1858. 1852. **Iswaramooli.**

Twiners; stem glabrous. Leaves to 13 x 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 2 cm long. Flowers to 4.5 cm long, 3-5 together in axillary cymes, greenish-brown; pedicels 1.5 cm long, perianth tube 1.5 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 to 10 x 7 mm, brown, samaroid.

*Fl. & Fr.* : July-October

*Distr.* : India, Sri Lanka, Nepal and Bangladesh. Common; in evergreen and semi-evergreen forests. Thaannikkudy, *JA 12073*; Mlappara, *JA 12089;* Thekkady, *JA 12503.*

*Ethnobotanical use* : The fresh stem with roots are ground in coconut milk and given for the treatment of dysentery (Mannan).

**Aristolochia tagala** Cham., Linnaea 7: 207, t. 5, f. 3. 1832; Gamble, Fl. Pres. Madras 1202. 1925; Sasidh. & Sivar., Fl. Pl. Thrissur For. 374. 1996. ***A. roxburghiana*** Klotzsch in Monatsber Koenigl. Preuss. Akad. Wiss. Berlin 596. 1859; Hook. f., Fl. Brit. India 5: 75. 1886. ***A. acuminata*** sensu Roxb., Fl. India 3: 489. 1832, non Lam., 1783; Wight, Ic. t. 771. 1844. **Garuda kkodi, Iswaramooli.**

Twiners; stem glabrous. Leaves to 18 x 10 cm, ovate, acuminate at apex, glabrous, 5-7-nerved from deeply cordate base; petiole 4-5 cm long. Flowers 6.5 cm long, in axillary raceme; bracts 5 mm long, ovate; perianth tube 1 cm long, hairy inside, glabrous outside; limb 4.5 cm long, 1 cm broad, brown, tomentose; stamens 12, biseriate; connective broad, anthers oblong; style 6-7-fid, short. Capsule obovoid, stalked, 6-celled.

*Fl. & Fr.* : February-June

*Distr.* : Indo-Malesia. Common; in evergreen forests. Inchippara, *JA 13553*; Uppermanalar, *JA 13823*; Poonkavanam, *JA 15496.*

## 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. Flowers on slender deflexed racemes; anthers biseriate..... **T. dinghoui**

1. Flowers on axillary fascicles; anther uniseriate..... **T. siliquosa**

**Thottea dinghoui** Swarup., Blumea 28: 407. 1983.

Perennial herbs. Leaves 15-17 x 6-8 cm, elliptic, acuminate, glabrous above, hispid below; nerves 5-8 pairs. Racemes 10-20 cm long, arising from the base of the stem, ascending or trailing, puberulus. Flowers alternate, yellow; bracts linear; tepals 3, yellow, 6 x 4 mm, ovate, free, spreading, hairy on outside; stamens 15, biseriate; filaments connate at base; anthers linear, yellow; ovary hairy; ovules numerous. Capsule 6 x 0.5 cm, 4-valved, purple; seeds many, yellowish-brown.

*Fl. & Fr.* : March-June

*Distr.* : Idukki District, Kerala. Rare; in evergreen forests. Arjunankotta, *JA 15092.*

**Thottea siliquosa** (Lam.) Ding Hou., Blumea 27: 327. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 374. 1996. ***Apama siliquosa*** Lam., Encycl. 1: 91. 1783; Gamble, Fl. Pres. Madras 1200. 1925. ***Bragantia wallichii*** R. Br. ex Wight & Arn., Edinburgh New Philos. J. 15: 181. 1833; Wight, Ic. t. 520. 1842; Hook. f., Fl. Brit. India 5: 73. 1886. **Alpam** (Mannan).

Shrubs; branchlets angled. Leaves to 25 x 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 5 mm long. Flowers in axillary fascicles, 1-5 together, 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 to 12 cm long, 5 mm broad, cylindrical; seeds 2 mm long, trigonous, rugose.

*Fl. & Fr.* : Throughout the year

*Distr.* : Peninsular India and Sri Lanka. Common; in all types of forests. Thannikkudy, *JA 12774;* Vallakkadavu, *JA 13427;* Anchuruli, *KPR 14297.*

*Ethnobotanical use* : Extract from the roots is mixed with cow milk and is given orally for stomach disorders (Mannan). The extract of roots is mixed with salt and given for dysentery patients. The roots are used by Malampandaram to strengthen the toddy of *Arenga wightii.*

## 108. 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. Bracts triangular, stalked; spikes umbellate; leaves over 20 cm across.....**Lepianthes**
2. Bracts orbicular, sessile; spike not umbellate; leaves below 5 cm across.....**Peperomia**

### LEPIANTHES Rafinesque

Sylva Tellur. 84. 1838.

**Lepianthes umbellatum** (L.) Raf., Sylva Tellur. 85. 1838; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 289. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 374. 1996. ***Piper umbellatum*** L., Sp. Pl. 30. 1753. ***P. subpeltatum*** Willd., Sp. Pl. 1: 166. 1797; Hook. f., Fl. Brit. India 5: 95. 1886. ***Hackeria subpeltata*** (Willd.) Kunth, Linnaea 13: 571. 1839; Gamble, Fl. Pres. Madras 1208. 1925. ***Pothomorphe subpeltata*** (Willd.) Miq., Comm. Phyt. 37. 1840; Wight, Ic. t. 1925. 1853. **Peechampan** (Mannan).

Erect shrubs, to 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, to 20 cm long. Spikes 8-15 x 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.

*Fl. & Fr.* : Throughout the year

*Distr.* : Tropical. Common; in semi-evergreen and evergreen forests. Umikuppan, *KPR & JA 14895.*

## **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, not more than 10 mm long; spike pubescent.....**P. tetraphylla**
1. Leaves alternate, opposite or rarely whorled, more than 10 mm long; spikes glabrous.....2
2. Spikes 7-12 cm long; leaves opposite and whorled, pubescent .....**P. blanda**
2. Spikes to 5 cm long; leaves alternate or opposite, never whorled, glabrous.....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. wightiana**
4. Leaves alternate and upper opposite, cuneate at base.....**P. portulacoides**

**Peperomia blanda** (Jacq.) Kunth, Nov. Gen. Sp. 1: 67, t. 13. 1815; DC., Candollea 1: 311. & 322. 1923, var. ***floribunda*** (Miq.) Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 294. 1987. ***Piper blandum*** Jacq., Collect. 3: 211. 1789, ***Peperomia arabica*** Decne. var. ***floribunda*** Miq., Syst. Pip. 122. 1843. ***P. dindigulensis*** Miq., Syst. Pip. 122. 1843; Hook. f., Fl. Brit. India 5: 98. 1886; Gamble, Fl. Pres. Madras 1210. 1925. ***P. 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 1.2 cm long. Spike slender, erect; peduncle 1-2 cm long; bracts orbicular, peltate with white margins. Flowers distant. Nutlets 0.5 x 0.5 mm, obovoid to orbicular, acute, scaly.

*Fl. & Fr.* : July-December

*Distr.* : Old world tropics. Common; in shady areas of moist deciduous and semi-evergreen forests. Naduthottam, *JA 12142*; Thekkady, *JA 12563.*

**Peperomia pellucida** (L.) Kunth, Nov. Gen. Sp. 1: 64. 1815; Gamble, Fl. Pres. Madras 1210. 1925; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 299 1987. ***Piper pellucidum*** L., Sp. Pl. 30. 1753. **Thaklippan** (Malam pandaram)

Fleshy herbs, to 20 cm high. Leaves alternate, to 3 x 2 cm, ovate, cordate at base, acute, glabrous, 5-ribed, fleshy, shortly petioled. Spikes axillary, solitary, to 3 cm long, slender.

*Fl. & Fr.* : Throughout the year except the dry seasons

*Distr.* : Pantropical. Common; in disturbed forest areas and road cuttings. Koruthode, *JA 16397.*

*Ethnobotanical use* : Malam pandaram believe that this species is the food of tortoises

**Peperomia portulacoides** (Lam.) Dietr., Sp. Pl. ed. 6. 1: 172. 1831; Wight, Ic. t. 1922. 1853; Hook. f., Fl. Brit. India 5: 98. 1886; Gamble, Fl. Pres. Madras 1210. 1925; Sasidh. & Sivar., Fl. Pl. Thrissur For. 375. 1996. ***Piper portulacoides*** Lam., Encycl. 1: 82. 1791.

Glabrous terrestrial herbs, 15-20 cm high. Leaves to 3.5 x 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, 5 cm long, slender, glabrous; peduncle 2 cm long; bracts orbicular, sessile, margins white. Nut partially embedded in the rachis.

*Fl. & Fr.* : September-December

*Distr.* : South India. Common; among mosses on rocks in evergreen forests. Pachakkanam, *JA 12305*; Poonkavanam, *JA 12393.*

**Peperomia tetraphylla** (Forst.) Hook. & Arn., Bot. Beech Voy. 97. 1841; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 292. 1987. ***Piper tetraphyllum*** Forst., Prodr. 5. 1759. ***Piper reflexum*** L. f., Suppl. Pl. 91.1781. ***Peperomia reflexa*** (L. f.) Dietr., Sp. Pl. 1: 180.1839; Wight, Ic. t. 1923. 1853; Hook. f., Fl. Brit. India 5: 99. 1886; Gamble, Fl. Pres. Madras 1209. 1925.

Epiphytic herbs; branches diffuse to procumbent; stem and leaves thinly pubescent. Leaves 7-10 x 5-7 mm, orbicular, obtuse. Spike 1.5 cm long, erect, stout; peduncle 0.8 cm long; bracts peltate, sessile, with white margins. Flowers densely arranged; stamens 2; stigmas 3-toothed. Nutlets 0.8 x 0.4 mm, ovoid, beaked, brown, glabrous.

*Fl. & Fr.* : November-January

*Distr.* : Pantropical. Very common; in evergreen forests at high elevations. Mangaladevi, *NS & JA 12674.*

**Peperomia wightiana** Miq. in Hook.'s London J. Bot. 5: 548. 1846; Wight, Ic. t. 1924. 1853; Hook. f., Fl. Brit. India 5: 98. 1886; Gamble, Fl. Pres. Madras 1210. 1925; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 297. 1987.

Terrestrial or sometimes epiphytic herbs, to 20 cm high. Leaves to 2 x 1.75 cm, orbicular, obtuse or shortly acute at apex, rounded at base, 5-ribbed, usually alternate; petiole 3 mm long. Spike 5 cm long, terminal or upper axillary, slender, glabrous, usually 2 or 3 together; bracts ovate, peltate. Nutlets 1 x 0.5 mm, ellipsoid, rugose, dark brown.

*Fl. & Fr.* : July-December

*Distr.* : Peninsular India and Sri Lanka. Occasional; among mosses on wet rocks in evergreen forests at high elevations. Kalvarimala, *JA 13866.*

## **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. Spikes erect.....2
1. Spikes pendulous.....3
2. Leaves cordate at base; female spikes ca. 3 cm long.....**P. longum**
2. Leaves acute at base; female spikes below 1 cm long.....**P. mullesua**
3. Leaves penninerved; peduncles 10-12 cm long.....**P. barberi**
3. Leaves 3-7-nerved from base; peduncle below 5 cm long.....4
4. Branchlets and leaves pubescent; berries ovoid, acute.....**P. hymenophyllum**
4. Branchlets and leaves glabrous; berries obtuse.....5
5. Spikes 15-25 cm long.....**P. argyrophyllum**
5. Spike less than 15 cm long.....6
6. Bracts forming a chamber.....7
6. Bracts not forming a chamber.....8
7. Spikes pubescent, green.....**P. trichostachyon**
7. Spikes glabrous, reddish.....**P. galeatum**
8. Bracts cupular; berry 3-5 mm across.....**P. nigrum**
8. Bracts curved and hooded at one side; berry 6-7 mm across.....**P. wightii**

**Piper argyrophyllum** Miq., Syst. Piperac. 330. 1844; Wight, Ic. t. 1914. 1853; Hook. f., Fl. Brit. India 5: 93. 1886; Gamble, Fl. Pres. Madras 1207. 1925; Rahiman & Nair, J. Bombay Nat. Hist. Soc. 84: 71. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 375. 1996.

Climbing shrubs. Leaves 8-13 x 5-6 cm, ovate or elliptic, acuminate at apex, acute or rounded at base, oblique, lower side usually covered with white scales, glabrous, basely 7 nerved; petiole 1 cm long; stipule to 1.5 cm long, lanceolate. Spikes slender, leaf-opposed, drooping; peduncle 2-3 cm long; bracts oblong, adnate to the rachis with free margins, ciliate; stamens 2. Berry 3 x 3 mm, globose, stigma 4, curved.

*Fl. & Fr.* : August-December

*Distr.* : Southern Western Ghats. Fairly common; in semi-evergreen forests at all elevation. Karadikkavala, *JA 13921*; Koruthode, *KPR & JA 14810.*

**Piper barberi** Gamble, Kew Bull. 387. 1924 & Fl. Pres. Madras 1206. 1925; Subram. & Henry, Bull. Bot. Surv. India 12(1-4): 4. 1970; Henry *et al.*, J. Bombay Nat. Hist. Soc. 75(3): 694. 1979; Nayar & Sastry, Red Data Book India Pl. 2: 181. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 375. 1996.

Slender climbing shrubs. Leaves 10-15 x 2-6 cm, oblong-lanceolate, abruptly acuminate at apex, acute or obtuse at base; lateral nerves 6-pairs, looped below the margins, glabrous and glossy above; petiole 1 cm long; stipule 1.5 cm long, lanceolate. Spike to 15 cm long, glabrous, slender, pendulous; peduncles puberulus; bracts peltate, orbicular, entire. Flowers densely arranged; stamen 1. Berry 3.5 x 3.5 mm, globose; stigma 3-lobed.

*Fl. & Fr.* : August-December

*Distr.* : Southern Western Ghats. Rare; in evergreen forests at low elevations. Koruthode, *JA 12253*; Arjunankotta, *JA 13678.*

**Piper galeatum** Cas. in DC., Prodr. 16(1): 242. 1869; Hook. f., Fl. Brit. India 5: 80. 1886; Gamble, Fl. Pres. Madras 1205. 1925; Rahiman & Nair, J. Bombay Nat. Hist. Soc. 84:75. 1987.

Stout climbing shrubs, glabrous. Leaves 10-16 x 3-6 cm, elliptic, acuminate, acute at base, 5-ribbed; petiole 1-1.5 cm long. Spike to 9 cm long, leaf-opposed, drooping, slender, male spike longer and slender; peduncle 1 cm long, reddish, glabrous; bracts formed into a fleshy globose cup. Flowers distant; stamens 2. Berry 8 x 8 mm, globose, smooth, yellow.

*Fl. & Fr.* : October-January

*Distr.* : Southern Western Ghats. Common; in semi-evergreen and evergreen forests. Sivaloda, *JA 12513*; Uppupara, *NS & JA 12706.*

**Piper hymenophyllum** Miq., H. Loud. J. Bot. 5: 554. 1846; Wight, Ic. t. 1942. 1853; Hook. f., Fl. Brit. India 5: 93. 1886; Gamble, Fl. Pres. Madras 1207. 1925; Matthew & Rani in Matthew,

Fl. Tamil Nadu Carnatic 3(2): 1351. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 280. 1987; Rahiman & Nair, J. Bombay Nat. Hist. Soc. 84: 80. 1987; Manilal, Fl. Silent Valley 231. 1988.

Slender climbers. Leaves to 13 x 6 cm, ovate, rounded to subcordate at base, often unequal sided, acuminate at apex, 7-ribbed, membranous; petiole 1 cm long. Spike 20 cm long, slender, drooping; male spike shorter; bracts oblong, adnate to the rachis with free margins, hairy; stamens 2 or 3. Berry 5 mm long, ovoid, beaked; stigma 3-lobed.

*Fl. & Fr.* : Throughout the year

*Distr.* : South India and Sri Lanka. Occasional; in semi-evergreen and evergreen forests. Swamikkayam, *JA 12487*; Kalvarimala, *JA 13880.*

**Piper longum** L., Sp. Pl. 29. 1753; Hook. f., Fl. Brit. India 5: 83. 1886; Gamble, Fl. Pres. Madras 1205. 1925; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 288. 1987; Rahiman & Nair, J. Bombay Nat. Hist. Soc. 84: 80. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 376. 1996. ***Chavica roxburghii*** Miq., Syst. Piperac. 239. 1843; Wight, Ic. t. 1928. 1853. **Thippali** (Mala Arayan) [Fig. 52 B].

Scandent or straggling shrubs, sometimes ascending and climbing. Leaves to 8 x 4 cm, ovate, acute at apex, cordate and strongly oblique at base, 7-nerved, membranous, shining above; nerves impressed; petiole 1-3 cm long. Female spike stout, erect; peduncle 1.5 cm long; bracts peltate, orbicular. Male spike to 7 cm long, erect, slender; stamens 2. Berry 2 mm across, glabrous, black or deep red.

*Fl. & Fr.* : August-January

*Distr.* : India, Sri Lanka and Malay Peninsula. Common; in semi-evergreen forests at low elevations. Koruthode, *JA 12206.*

*Ethnobotanical use* : Fresh of dried fruits are ground and orally given for relieving from stomach disorders

**Piper mullesua** Buch.-Ham. ex D. Don, Prodr. Fl. Nep. 20. 1825; Rahiman & Nair J. Bombay Nat. Hist. Soc. 84: 78. 1987. ***Chavica sphaerostachya*** Miq., Syst. Piperac. 239. 1843; Wight, Ic. t. 1928. 1853. ***P. brachystachyum*** Wall. ex Hook. f., Fl. Brit. India 5: 87. 1886; Gamble, Fl. Pres. Madras 1206. 1925; Manilal, Fl. Silent Valley 231. 1988. **Kattu thippali** (Mannan).

Slender climbers. Leaves to 9 x 4 cm, elliptic, acuminate at apex, acute at base, 3-5 ribbed from base, secondary nerves prominent, glabrous. Female spike to 7 x 4 mm, erect, oblong; peduncle 3 mm long; male spike to 4 cm long, erect, slender; bracts peltate, orbicular; stamens 3. Berry 1.5 mm across, red; stigmas 3, spreading.

*Fl. & Fr.* : October-January

*Distr.* : India and Bhutan. Rare; in evergreen forests at low elevations. Vallakkadavu, *JA & NS 12728*; Puthussery, *JA 13698.*

**Piper nigrum** L., Sp. Pl. 28. 1753; Hook. f., Fl. Brit. India 5: 90. 1886; Gamble, Fl. Pres. Madras 1206. 1925; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1352. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 283. 1987; Rahiman & Nair, J. Bombay Nat. Hist. Soc. 84: 73. 1987; Manilal, Fl. Silent Valley 231. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 376. 1996.

Glabrous climbers. Leaves to 16 x 10 cm, ovate, acuminate at apex, acute, rounded or truncate at base, 7-nerved, nervules subparallel; petiole to 2.5 cm long. Spikes to 12 cm long, slender; peduncles to 2.5 cm long; bracts united forming a cup below the flower. Flowers closely placed; stamens 2. Drupes 5 mm across, globose, smooth, deep red; stigmas 3-5, recurved.

*Fl. & Fr.* : August-January

*Distr.* : Peninsular India, spread to many countries including Sri Lanka. Common; in all types of forests. Ennakkapally, *JA 12256.*

**Piper trichostachyon** (Miq.) C. DC. in DC., Prodr. 16(1): 242. 1869; Hook. f., Fl. Brit. India 5: 80. 1886; Gamble, Fl. Pres. Madras 1205. 1925; Rahiman & Nair, J. Bombay Nat. Hist. Soc. 84: 74. 1987; Manilal, Fl. Silent Valley 232. 1988.

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 to 10 cm long, stout, drooping; bracts pubescent, formed into a fleshy cup; stamens 2. Berry 6 x 6, globose, yellowish red; stigmatic lobes 3.

*Fl. & Fr.* : March-December

*Distr.* : Peninsular India. Common; in semi-evergreen and moist deciduous forests. Uppupara, *JA 13478*; Mullakkudy, *KPR & JA 14828.*

**Piper wightii** Miq. in Hook.'s London J. Bot. 5: 552. 1846; Wight, Ic. t. 1939. 1853; Hook. f., Fl. Brit. India 5: 94. 1886; Gamble, Fl. Pres. Madras 1207. 1925; Sasidh. & Sivar., Fl. Pl. Thrissur For. 376. 1996.

Stout glabrous climbers. Leaves 14-17 x 6-8 cm, ovate, acuminate at apex, round to subcordate at base, 3-5-ribbed, coriaceous, midrib with 2-3 lateral nerves similar to ribs, nervules reticulate; petiole 2 cm long. Spike 8 cm long stout, drooping; peduncle 2 cm long; bracts curved and hooded at one side. Flowers distantly arranged; stamens 2. Berry reddish, to 7 mm across, globose, smooth; stigmatic lobes 3 or 4.

*Fl. & Fr.* : July-December

*Distr.* : Southern Western Ghats. Common; moist deciduous forests. Kokkara, *JA 12019.*

## 109. CHLORANTHACEAE

R. Brown 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; Verdc., Kew Bull. 39: 66. 1983; Sumithra. in Dassan., Rev. Handb. Fl. Ceylon 9: 26. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 376. 1996. ***Chloranthus grandifolius*** Miq., Fl. Bot. 1: 802. 1856. ***Chloranthus brachystachya*** sensu Hook. f., Fl. Brit. India 5: 100. 1886 p.p., non Bl., 1829: Gamble, Fl. Pres. Madras 1211. 1925. ***Sarcandra grandifolia*** (Miq.) Subram. & Henry, Bull. Bot. Surv. India 12: 5. 1972; Manilal, Fl. Silent Valley 232. 1988.

Evergreen shrubs; branchlets glabrous, terete. Leaves opposite, to 17 x 6.5 cm, elliptic, acute at base and apex, serrate, glabrous; nerves 7 or 8 pairs. Flowers in terminal, trichotomous to 10 cm long spike, unisexual, clustered; bracts yellow, petalloid, 6 mm long, perianth absent; stamen 1, filaments and connectives broad, thick; ovary 1-celled, ovule 1, basal, stigma sessile, truncate. Berry 8 x 4 mm, ovoid, purplish-black, smooth.

*Fl. & Fr.* : October-February

*Distr.* : India and Sri Lanka. Common; in evergreen forests. Mlappara, *JA 17984.*

## 110. MYRISTICACEAE

R. Brown, 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., Mongr. Myris. 365. 1897; Sasidh. & Sivar., Fl. Pl. Thrissur For. 377. 1996. ***Myristica farquhariana*** Hook. f. & Thoms., Fl. Ind.

162. 1855, non Hook. f., 1886. ***M. 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. 1925.

Small trees with red sap, bark smooth, reddish inside; branchlets ferrugineus tomentose. Leaves to 19 x 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 to 5 mm long, perianth 4 mm long, ovoid, lobed to the middle; stamens 6, filaments combined into a short column below the level of anthers; anthers 2.5 mm long, free at apex; ovary 1-celled, stigma sessile, subentire. Fruit a globose capsule with thick rind; seed one, globose, with laciniate aril.

*Fl.* : March

*Distr.* : Indo-Malaya. Rare; in evergreen forests. Puthussery, *JA 13510.*

## KNEMA Loureiro

Fl. Cochinch. 604. 1790.

**Knema attenuata** (Hook. f. & Thoms.) Warb., Monogr. Myris. 590. 1897; Gamble, Fl. Pres. Madras 1215.1925; de Wilde, Blumea 25: 439.1979; Sasidh. & Sivar., Fl. Pl. Thrissur For. 377. 1996. ***Myristica attenuata*** Wall. ex Hook. f. & Thoms. in Fl. Ind. 157. 1855; Hook. f., Fl. Brit. India 5:110.1886. ***M. corticosa*** Bedd., Fl. Sylv. t. 278.1872. **Chorapayin** (Mannan) [Fig. 52 C].

Trees with radiating branches and reddish exudation; bark greyish black; branchlets rusty tomentose. Leaves to 20 x 7.5 cm, elliptic-oblong, acuminate at apex, rounded at base; fulvous tomentose below; nerves to 18 pairs, parallel; petiole to 1 cm long. Cymes axillary, peduncled, densely fulvous-tomentose; pedicels 7-8 mm long. Male flowers 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 x 2 cm, ellipsoid, cuspidate at apex, 2-valved; seed 1, ellipsoidal.

*Fl. & Fr.* : February-August

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Koruthode, *JA 12262*; Thekkady, *13044*; Chenthamara, *13445*; Karimala, *JA & KPR 13695.*

*Ethnobotanical use* : Seeds are used for stomach disorders; the endosperm is given orally.

## 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**

**Myristica beddomei** King, Ann. Roy. Bot. Gard. (Calcutta) 3: 291, t. 118. f. 1-8, 1891; Gamble, Fl. Pres. Madras 1214. 1915; de Wilde, Blumea, 42(1): 149. 1997. ***M. laurifolia*** Hook. f. & Thoms., Fl. Ind. 163. 1855; Hook. f., Fl. Brit. India 5: 103. 1886. ***M. contorta*** Warb., Monogr. Myris. 5-7. 1897; Gamble, Fl. Pres. Madras 1214. 1925. ***M. dactyloides*** auct. non, Gaertn., 1788; J. Sinclair, Gard. Bull. Sing. 23: 445, f. 78. 1968, p.p.; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 42. 1976; Sasidh. & Sivar., Fl. Pl. Thrissur For. 378. 1996. **Pathirippoo** (Mannan), **Pain poo** (Mala Arayan).

Medium trees with reddish sap; bark black, red inside; branchlets glabrous. Leaves to 25 x 6 cm; oblong, obtusely acute at either ends, glabrous; nerves to 20 pairs, regular, prominent; petiole 2-2.5 cm long. Cymes in short panicles; densely fulvous hairy. Flowers 4 mm across, 3-5 together; calyx tube 4 mm long, shortly 3-lobed; anthers 10, linear. Female flowers solitary. Capsule *ca.* 5 cm across; globose, densely puberulus.

*Fl. & Fr.* : October-February

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Koruthode, *JA 12263*; Vellimala, *12927*; Arjunankotta, *13161*; Kavalappara, *KPR 14538.*

*Ethnobotanical use* : The oil mace is used in paint industry, Mannans collect this and market.

*Note* : Synclair (1968) merged *M. beddomei* King and *M. dactyloides* Gaertn. But de Wilde (1997) after critical study among the South Asian species of *Myristica* reinstated the species status to both the *M. beddomei* and *M. dactyloides*. *M. dactyloides* is restricted to Sri Lanka (de Wilde, 1997).

**Myristica malabarica** Lam., Acad. Roy. Sci. Mem. Math. Phys. (Paris) 162. 1791; Bedd., Fl. Sylv. t. 269. 1872; Hook. f., Fl. Brit. India 5: 103. 1886; Gamble, Fl. Pres. Madras 1213. 1925; Manilal, Fl. Silent Valley 233. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 378. 1996; de Wilde, Blumea 42(1): 175. 1997.

Medium trees with red sap, bark black, red inside; branchlets glabrous. Leaves to 20 x 10 cm, elliptic-oblong, acute at apex and obtuse or rounded at base, glabrous; nerves to 12 pairs, obscure; petiole 2.5 cm long. Panicle to 5 cm across, branchlets slender, glabrous; Flowers

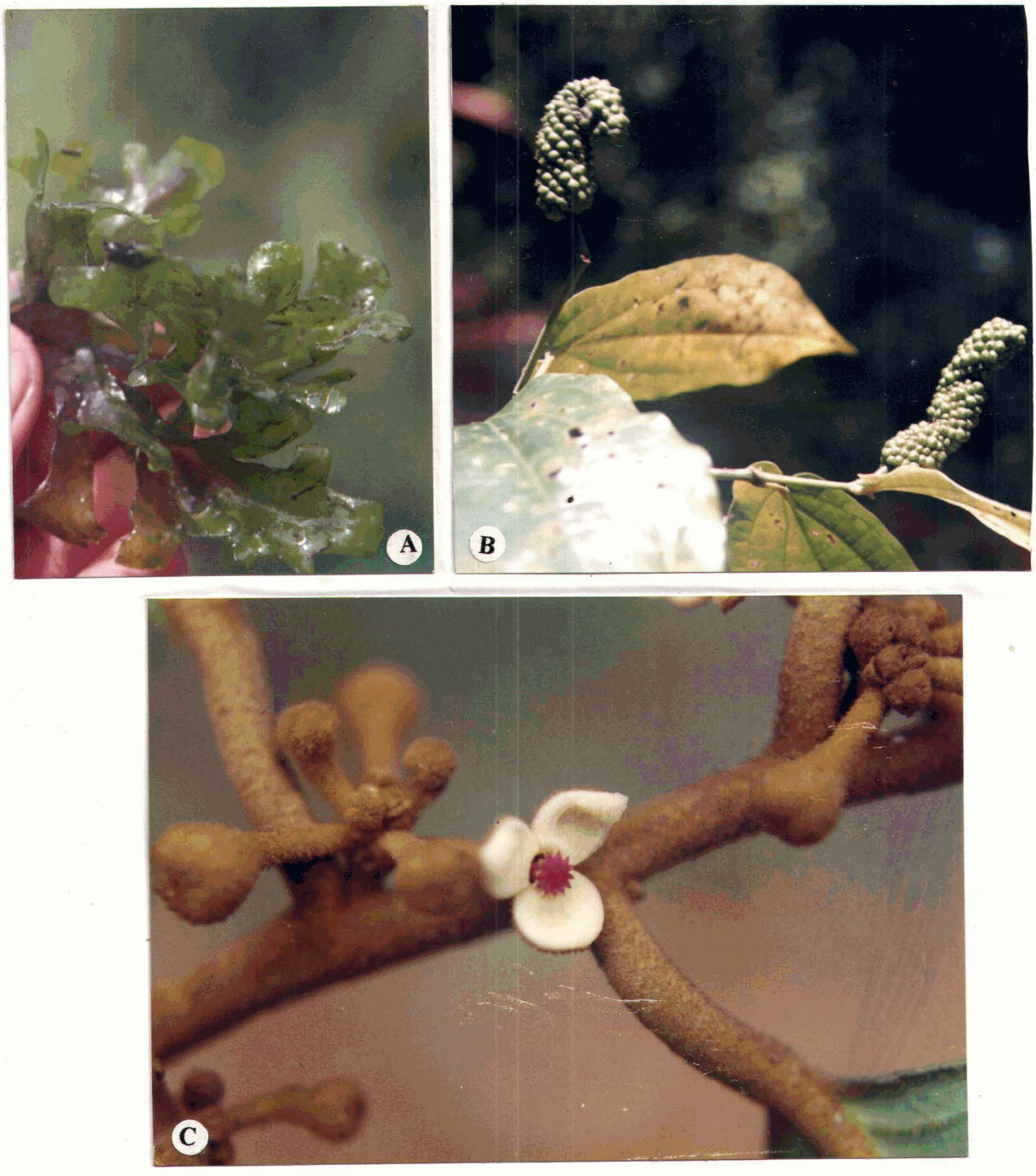



Fig. 52. A. *Polypleurum stylosum* (Wight) Hall;
B. *Piper longum* L.;
C. *Knema attenuata* (Hook. f. & Thoms.) Warb.

7.5 mm long; perianth yellow, urceolate, 3-lobed at apex; androphore 6 mm long, shortly stipitate; anthers 10-20, 2.5 mm long. Capsule 7.5 x 3.5 cm, oblong, tomentose; aril red.

*Fl. & Fr.* : February

*Distr.* : Southern Western Ghats. Occasional; in evergreen forests at low elevations. Koruthode, *JA 13397.*

## 111. LAURACEAE

Juss., Gen. Pl. 80. 1789.

1. Leaves opposite or subopposite ..... **Cinnamomum**
1. Leaves alternate or verticillate ..... 2
2. Anthers 4-celled ..... 3
2. Anthers 2-celled ..... 4
3. Ovary deeply seated in perianth tube, drupes surrounded by persisting perianth tube ..... **Cryptocarya**
3. Ovary not as above; drupes without perianth tube ..... **Beilschmiedia**
4. Flowers dioecious ..... 5
4. Flowers bisexual ..... 7
5. Leaves 3-ribbed; fertile stamens 6 ..... **Neolitsea**
5. Leaves penninerved; fertile stamens 9 or 12 ..... 6
6. Leaves usually verticillate; involucral bracts deciduous ..... **Actinodaphne**
6. Leaves scattered; involucral bracts persistent in flowers ..... **Litsea**
7. Fruiting pedicels warted at apex; leaves obovate ..... **Alseodaphne**
7. Fruiting pedicels not warted; leaves oblong or elliptic ..... 8
8. Perianth lobes reflexed in fruit; leaves oblong ..... **Persia**
8. Perianth lobes erect in fruit; leaves elliptic or oblanceolate ..... **Phoebe**

### 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 up to 12 cm long, glabrous below; shrubs or small trees ..... 2
1. Leaves above 14 cm long; densely hairy below; medium to large trees ..... 3

2. Leaves obtuse at apex, coriaceous ..... **A. campanulata** var. **obtusa**

2. Leaves acuminate at apex, membranous ..... **A. salicina**

3. Leaves oblanceolate; lateral nerves very oblique ..... **A. bourdillonii**

3. Leaves elliptic; lateral nerves not as above ..... 4

4. Flowers in sessile clusters, 3-5 together; nervules of leaves prominent ..... **A. tadulingamii**

4. Flowers in racemes, many together; nervules of leaves obscure ..... **A. malabarica**

**Actinodaphne bourdillonii** Gamble, Kew Bull. 1925: 129. 1925 & Fl. Pres. Madras 1231. 1925; Manilal, Fl. Silent Valley 234. 1988; Nair, J. Econ. Tax. Bot. 17(2): 266. 1993.

Large trees; branchlets densely tomentose. Leaves to 25 x 7 cm, elliptic to 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 12 x 8 mm, orbicular; tepals 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 9 mm across, globose, black, smooth.

*Fl. & Fr.* : December-May

*Distr.* : Southern Western Ghats (Kerala). Common; in evergreen forests. Vellimala, *JA 12929*, Arjunankotta, *JA 13146*, Eravangalar, *JA 15265.*

**Actinodaphne campanulata** Hook. f., Fl. Brit. India 5: 148. 1886, var. **obtusa** Gamble, Fl. Pres. Madras 1230. 1925; Mohanan & Henry, Bull. Bot. Surv. India 22(1-4): 106. 1980; Manilal, Fl. Silent Valley 234. 1988 [Fig. 53].

Densely branched shrubs or small trees; branchlets stout, glabrous. Leaves whorled, 8 in each whorl, to 12 x 3 cm, elliptic to oblanceolate, glabrous, coriaceous; nerves 12 or 13 pairs, intercostae parallel; petiole 1.5 cm long. Flowers in axillary tubercles, 3-6 together; perianth lobes 3 x 3 mm, orbicular; densely fulvous-tomentose outside; stamens in male flowers 5, filaments tomentose; staminodes spathulate. Female flowers peduncled. Drupes globose.

*Fl. & Fr.* : February-May

*Distr.* : Southern Western Ghats. Occasional; in evergreen forests at high elevations. Mlappara, *JA 13321;* Deviar, *JA 17956.*

**Actinodaphne malabarica** Balakr., J. Bombay Nat. Hist. Soc. 63: 329. 1967; Sasidh. & Sivar., Fl. Pl. Thrissur For. 379. 1996. ***A. hirsuta*** sensu Hook. f., Fl. Brit. India 5: 152. 1886, non Bl., 1851; Gamble, Fl. Pres. Madras 1231. 1925. **Pattatthalli, Pukachan** (Mannan).

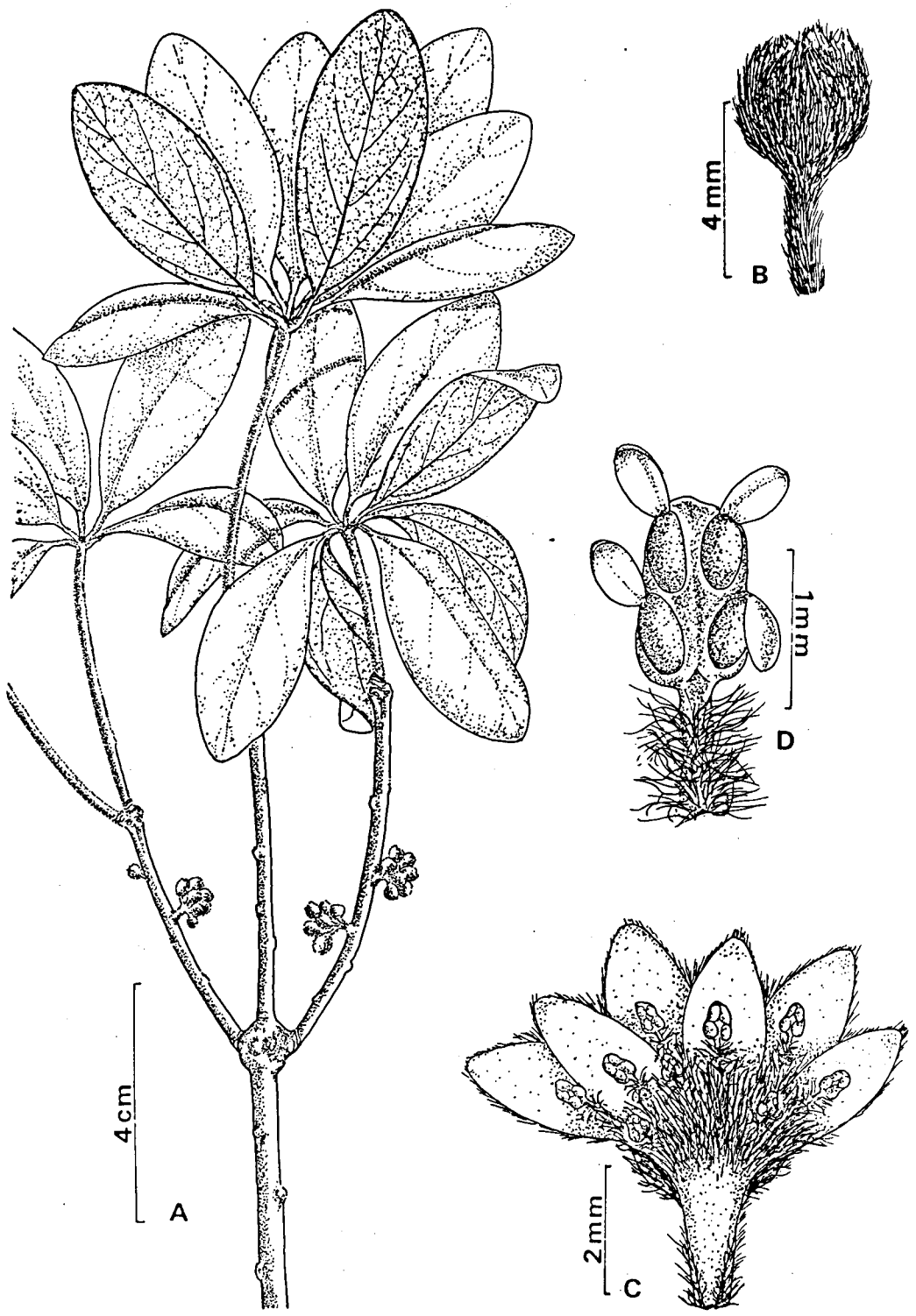



Fig. 53. *Actinodaphne campanulata* Hook. f.: **A**. flowering twig; **B**. flower; **C**. perianth with stamens and staminodes; **D**. fertile stamen - ventral view.

Medium trees; branchlets densely dark hispid. Leaves to 18 x 6 cm, elliptic, acuminate, base acute; nerves 12-14 pairs, obscure towards margins; nervules parallel, obscure, densely hispid below, glabrous above; petiole 2 cm long. Racemes 2.5 cm long, densely tomentose; bracts 10 x 7 mm, orbicular. Flowers pedicelled; tepals 4 mm long, oblong, obtuse, densely hispid; filaments 2-glandular at base. Female flowers in short racemes; pedicels 12 mm long, slender. Berry 1 cm across, globose; fruiting calyx entire.

*Fl. & Fr.* : August-February

*Distr.* : Southern Western Ghats. Common; in moist deciduous and semi-evergreen forests. Thekkady, *JA 12399*, Karadikkavala, *JA 13917.*

*Ethnobotanical use* : The fruits are used as bait in angling.

**Actinodaphne salicina** Meisner in DC., Prodr. 15(1): 212. 1864; Hook. f., Fl. Brit. India 5: 148. 1886; Gamble, Fl. Pres. Madras 1230. 1925; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 206. 1987.

Small trees or large shrubs; branchlets slender, glabrous. Leaves to 8.5 x 2.5 cm, narrowly elliptic or oblanceolate, attenuate at the base, membranous, glaucous beneath; nerves 8-12 pairs, parallel; intercostae, densely and minutely reticulate; petiole to 6 mm long.

*Fl. & Fr.* : Specimens collected was in vegetative stage.

*Distr.* : Southern Western Ghats. Rare; in evergreen forests at high elevation. Deviar, *JA 12124.*

**Actinodaphne tadulingamii** Gamble, Kew Bull. 1925: 130. 1925 & Fl. Pres. Madras 1231. 1925; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 206. 1987; Pandur. & Nair, J. Econ. Tax. Bot. 17(1): 173. 1993.

Medium trees; branchlets rusty tomentose. Leaves to 20 x 5 cm, elliptic-lanceolate, acuminate, base acute; nerves to 15 pairs, nervules parallel, prominent, densely hispid below, glabrate above; petiole to 1.5 cm long. Female flowers 3-5 together on lateral tubercles, sessile.

*Fl.* : December

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Vellimala, *JA 12929.*

## ALSEODAPHNE Nees

in Wallich, Pl. Asiat. Rar. 2: 61, 71. 1831.

**Alseodaphne semecarpifolia** Nees in Wallich, Pl. Asiat. Rar. 2: 72. 1831; Wight, Ic. t. 1827. 1852, var. **parvifolia** Hook. f., Fl. Brit. India 5:144.1886; Gamble, Fl. Pres. Madras 1226.1925; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1356. 1983; Kosterm. in Dassan., Rev. Handb. Fl. Ceylon 9: 132. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 379. 1996.

Small trees, branchlets stout. Leaves 7-15 x 3-7 cm, obovate, obtuse, attenuate to base, glabrous; nerves 7 pairs. Panicle 5 x 3 cm, axillary; peduncle to 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 23 x 18 mm, ellipsoid to globose.

*Fl. & Fr.* : April-February

*Distr.* : Peninsular India and Sri Lanka. Rare; in evergreen forests at high elevations. Sunderamala, *JA 13592*; Uppermanalar, *JA & KPR 15030*.

## **BEILSCHMIEDIA** Nees

in Wallich, Pl. Asiat. Rar. 2: 61, 69. 1831.

Trees or shrubs, evergreen. Leaves alternate or opposite, entire. Flowers bisexual, in axillary racemes or panicles. Perianth lobes 6, subequal, deciduous; stamens 9, perfect, in 3 whorls; inner most whorl with extrorse anthers; anthers 2-celled; staminodes 3, inner to the stamens, cordate, glands 6, stipitate; ovary continues into the style; stigma obtuse. Fruit a berry, oblong or ovoid.

1. Leaves alternate.....**B. bourdillonii**
1. Leaves opposite or subopposite.....**B. wightii**

**Beilschmiedia bourdillonii** Brandis, Indian Trees 528. 1906; Gamble, Fl. Pres. Madras 1221. 1925; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1357. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 207. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 380. 1996.

Large trees; branchlets glabrous. Leaves to 15 x 5 cm, elliptic, acute at base and apex, glabrous; nerves 8-10 pairs, irregular, nervules reticulate; petiole 1.5 cm long. Panicles to 3 cm across, axillary, tomentose, shortly peduncled; bracts many, ovate, pubescent. Flowers bisexual, 3 mm across, shortly pedicelled; perianth lobes 6, equal, 2 x 1 mm, ovate, tomentose outside; stamens 9, in 3 rows; outer filaments with 2 glands at the base; anthers of innermost row extrorse, staminodes 3, inner to stamens; ovary tomentose.

*Fl. & Fr.* : January

*Distr.* : Peninsular India. Rare; in evergreen forests. Karimala, *JA 13119*.

**Beilschmiedia wightii** (Nees) Benth. ex Hook. f., Fl. Brit. India 5: 124. 1886; Gamble, Fl. Pres. Madras 1221. 1925; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 207. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 380. 1996. ***Haasia wightii*** Nees, Syst. Laurin. 676.1836; Wight, Ic. t. 1831. 1852.

Medium trees; branchlets rough, glabrous. Leaves to 10 x 6 cm, broadly ovate, obtusely acuminate at apex, acute at base, coriaceous; nerves to 8 pairs, nervules, coarsely reticulate, glabrous; petiole to 1 cm long; panicles axillary and terminal, branches slender. Berry 3 x 2 cm, ovoid, smooth.

*Fl. & Fr.* : January-February

*Distr.* : Southern Western Ghats. Occasional; in evergreen forests. Vellimala, *JA 18492.*

## 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 ..... 2
1. Leaves glabrous ..... 3
2. Leaves to 6 cm long, ribbed from above the base ..... **C. perrottetii**
2. Leaves to 15 cm long, ribbed from the base ..... **C. sulphuratum**
3. Ribs reaching apex of the leaf ..... 4
3. Ribs not reaching the apex of the leaf ..... 5
4. Leaves to 10 cm long; cymes ca. 6 x 3 cm, axillary ..... **C. verum**
4. Leaves 15-22 cm long; cymes 10-20 x 5-7 cm, axillary and terminal ..... **C. malabatrum**
5. Panicles tomentose ..... **C. keralaense**
5. Panicles glabrous ..... 6
6. Leaves obtuse; nervules indistinct ..... **C. macrocarpum**
6. Leaves acute; nervules distinct ..... **C. wightii**

**Cinnamomum keralaense** Kosterm., Bull. Bot. Surv. India 25: 98. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 207. 1987. ***C. litseaefolium*** auct. non Thw., 1861: Hook. f., Fl. Brit. India 5: 133. 1886; Gamble, Fl. Pres. Madras 1225. 1925.

Medium trees; branchlets glabrous. Leaves to 11 x 5 cm, ovate, acute-acuminate at apex, cuneate at base, ribes from 1 cm above the base; nervules not prominent, subparallel; petiole 2.5 cm long. Panicle 5-10 cm long, axillary; peduncle 7 cm long, slender. Flowers 6 mm across; pedicels 4 mm long, slender, pubescent; tepals 5, ovate, obtuse, densely tomentose; fertile

stamens in second and fourth whorls, filaments sparsely tomentose; staminodes in first and third whorls, hairy.

*Fl. & Fr.* : December-January

*Distr.* : Southern Western Ghats (Kerala). Rare; in evergreen forests. Pamba, *JA & KPR 17082*, Chenthamara, *JA & KPR 17091*.

**Cinnamomum macrocarpum** Hook. f., Fl. Brit. India 5: 133. 1886; Gamble, Fl. Pres. Madras 1225. 1925; Kosterm., Bull. Bot. Surv. India 25: 100. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 392. 1994. ***C. iners*** sensu Wight, Ic. tt. 122 & 130. 1839, non Reinw. ex Bl., 1826.

Tall trees; branchlets glabrous. Leaves to 12 x 6 cm, ovate, obtusely acute, cuneate at base; ribs 1-1.5 cm above the base; nervules indistinct; petiole 2.5 cm long, stout. Panicle axillary, long-peduncled, glabrous. Flowers 6 mm across; tepals 6, hairy. Fruiting calyx 1 cm across, cupular. Drupes 2 x 1 cm, ellipsoid, dark-brown.

*Fl. & Fr.* : January-April

*Distr.* : Western Peninsular India. Common; in evergreen forests. Sabarimala, *JA 15090*.

**Cinnamomum malabatrum** (Burm. f.) Bl., Bijdr. 568. 1826; Kosterm. in Manilal, Bot. Hist. Malab. 167. 1980 & Bull. Bot. Surv. India 25: 102. 1983; Manilal, Fl. Silent Valley 234. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 380. 1996. ***Laurus malabatrum*** Burm. f., Fl. Ind. 92. 1768. ***Cinnamomum iners*** sensu Gamble, Fl. Pres. Madras 1224.1925, non Rainw. ex Bl., 1826. **Vazhana, Patta** (Mannan, Urali, Thevan, Paliyan).

Small to medium trees; branchlets glabrous. Leaves to 22 x 8 cm, oblong, acute at base and apex, ribbed from or 1.5 cm above the base; petiole 2 cm long. Panicle 10-20 x 3-5 cm, upper axillary, densely yellow-tomentose. Flowers 3-4 mm across; pedicels 3 mm long; tepals ovate, acute; stamens in first and forth whorls; filaments tomentose; staminodes in second and third whorls; ovary glabrous.

*Fl. & Fr.* : February-June

*Distr.* : Western Ghats. Common; in evergreen and semi-evergreen forests. Edappalayam, *JA & KPR 14819*; Sabarimala, *JA & KPR 14928, JA 14979, JA 14985*.

*Ethnobotanical use* : Fresh bark when pressed on the forehead relieves from chronic headache and migraine; consumption of the fresh petioles also give the same result. Many tribes are engaged in collecting and marketing the bark of this tree. Whole plant part of saplings of this species is eaten for hunger

**Cinnamomum perrottetii** Meis. in DC., Prodr. 15: 22, 504. 1864; Hook. f., Fl. Brit. India 5: 134. 1886; Gamble, Fl. Pres. Madras 1225. 1925; Kosterm., Bull. Bot. Surv. India 25: 113. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 208. 1987.

Small trees, twigs densely branched, tomentose. Leaves to 6 x 4 cm, broadly ovate, acute, rounded at base; ribs from 5 mm above the base, nervules regular, parallel, indistinct below; petiole 1 cm long. Panicle 3-4 cm long, densely fulvous tomentose, 3-9-flowered. Flowers 6 mm long, 5 mm broad; pedicels 7 mm long; tepals 3 x 2 mm, ovate, acute, densely fulvous hairy; stamens in 3 whorls, filaments tomentose; glands sessile; ovary glabrous. fruits not seen.

*Fl.* : March

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Anakuthivayal, *JA 17798.*

**Cinnamomum sulphuratum** Nees in Wall., Pl. Asiat. Rar. 2: 74. 1831; Hook. f., Fl. Brit. India 5:132.1886; Gamble, Fl. Pres. Madras 1225.1925; Kosterm., Bull. Bot. Surv. India 25: 114. 1983; Manilal, Fl. Silent Valley 235. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 381. 1996.

Medium trees; 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 7-15 mm long. Panicle 3 x 3 cm, axillary, tomentose; peduncle *ca.* 7 cm long. Flowers 5 mm long; pedicels hairy; sepals 5, oblong, densely hairy; stamens in 3 whorls; glands globose; staminodes triangular.

*Fl. & Fr.* : March-June

*Distr.* : Southern Western Ghats. Common; along the margins of evergreen forests. Vallakkadavu, *JA 13475.*

**Cinnamomum verum** J. Presl. in Bercht. & Presl., Priros. Rostl. 2: 36. t. 7. 1825; Kosterm., Bull. Bot. Surv. India 25:126.1983 & in Dassan., Rev. Handb. Fl. Ceylon 9:112.1995; Mohanan & Henry, Fl. Thiruvananthapuram 392. 1994. ***C. zeylanicum*** Bl., Bijdr. 568. 1826; Wight, Ic. t. 123. 1839; Hook. f., Fl. Brit. India 5: 131. 1886; Gamble, Fl. Pres. Madras 1224. 1925.

Medium size trees; branchlets glabrous. Leaves to 10 x 5.5 cm, ovate, acute, rounded at base; ribs 0.5-1 cm above the base, intercostae irregular; petiole to 3 cm long. Panicle 6 x 3 cm, axillary, pubescent; peduncle to 7 cm long. Flowers 5 mm long, 6 mm across; pedicels to 7 mm long; tepals ovate, acute, densely hairy; stamens 6, in two rows, inner filaments with stalked glands; staminodes 3, inside the stamens. Fruiting calyx cupular, ribbed.

*Fl. & Fr.* : December-February

*Distr.* : South India and Sri Lanka. Common; in evergreen forests. Mlappara, *JA 13070*, Thekkady, *JA 17200.*

**Cinnamomum wightii** Meisner in DC., Prodr. 15(1): 11. 1864; Hook. f., Fl. Brit. India 5: 132. 1886; Gamble, Fl. Pres. Madras 1224. 1925; Kosterm., Bull. Bot. Surv. India 25: 122. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 209. 1987.

Small trees; branchlets glabrous. Leaves to 9 x 4 cm, elliptic, acute at either ends, glabrous, glaucous below; ribs 1 cm above the base, nervules parallel, regular, distinct; petiole 12 mm long, stout, glabrous. Cymes to 3 cm long, to 10-flowered. Flowers 6 mm long, closely packed; pedicels 5 mm long; tepals oblong, obtuse.

*Fl. & Fr.* : May-June

*Distr.* : Southern Western Ghats. Rare; in evergreen forests at high elevations. Kottamala, *JA & KPR 15383.*

## 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 broadly ovate-orbicular, obtuse; drupes obovoid ..... **C. stocksii**
1. Leaves elliptic-oblong, acute or acuminate; drupes oblong or globose ..... 2
2. Drupes oblong, puberulus; leaves to 12 cm long ..... **C. beddomei**
2. Drupes globose, smooth; leaves to 16 cm long ..... **C. bourdillonii**

**Cryptocarya beddomei** Gamble, Kew Bull. 1925: 127. 1925 & Fl. Pres. Madras 1218. 1925; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 209. 1987 [Fig. 54].

Medium trees; branchlets rusty puberulus. Leaves to 12 x 6.5 cm, ovate-oblong, shortly acuminate at apex, rounded at base, glabrous; nerves 9 pairs, nervules sub-parallel, pinkish brown beneath; petiole 1 cm long, stout. Panicle to 12 x 4 cm, axillary, rusty puberulus; peduncles short. Drupes 10 x 6 mm, puberulus.

*Fl. & Fr.* : September-January

*Distr.* : Southern Western Ghats (Kerala). Rare; in evergreen forests. Koruthode, *JA 14117.*

**Cryptocarya bourdillonii** Gamble, Kew Bull. 1925: 125. 1925 & Fl. Pres. Madras 1218. 1925; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 209. 1987; Manilal, Fl. Silent Valley 235. 1988; Sasidh.

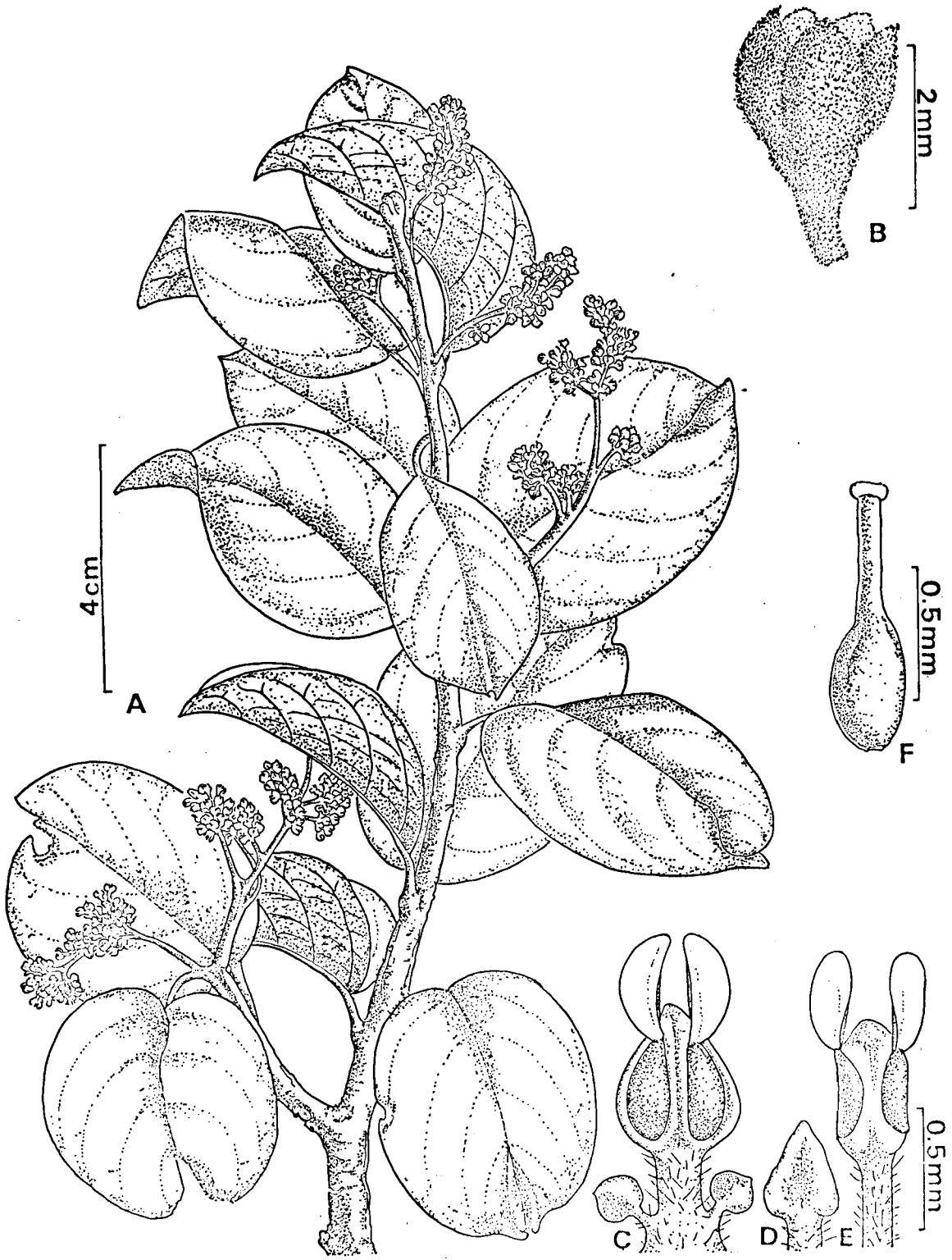



Fig. 54. *Cryptocarya beddomei* Gamble: **A**. flowering twig; **B**. flower; **C**. stamen of first row; **D**. sterile stamen inner most row; **E**. stamen of third row; **F**. pistil.

& Sivar., Fl. Pl. Thrissur For. 381. 1996. *C. wightiana* sensu Hook. f., Fl. Brit. India 5: 120. 1886 p.p., non Thw., 1861.

Large trees; branchlets rusty puberulus. Leaves to 16 x 7 cm, abruptly acute to acuminate, glabrous; nerves 9 or 10 pairs, irregular; nervules sub-parallel, prominent beneath; petiole 2 cm long, tomentose. Panicle 5-7 cm across, axillary, rusty tomentose. Flowers 3-4 mm across, shortly pedicelled; perianth lobes 6, 3 mm long, ovate, tomentose; stamens 12, filaments pubescent, outer ones with glands; ovary glabrous. Drupes globose with an obtuse beak, glabrous.

*Fl. & Fr.* : February-August

*Distr.* : Peninsular India. Common; in evergreen forests at low elevations. Koruthode, *JA 12246;* Arjunankotta, *JA 15374.*

**Cryptocarya stocksii** Meisner in DC., Prodr. 15(1): 71. 1864; Hook. f., Fl. Brit. India 5: 120. 1886; Gamble, Fl. Pres. Madras 1219. 1925; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 209. 1987.

Small trees; branchlets thick, prominently lenticellate, rough, glabrous. Leaves to 8 x 7 cm, rounded to cordate at base, thickly coriaceous, margins revolute; nerves 5-7 pairs, nervules parallel, prominent, glaucous beneath. Panicles axillary, congested, few flowered, stout. Drupes 18 x 8 mm, woody, with short obtuse beak, black, glabrous.

*Fr.* : December, (the specimen collected was in fruiting stage).

*Distr.* : Peninsular India. Rare; in evergreen forests at high elevations. Vellimala, *JA 18441.*

## 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. Umbellules sessile ..... 2
1. Umbellules peduncled ..... 4
2. Leaves to 12 cm long; nerves to 6 pairs; branchlets glabrous ..... **L. coriacea**
2. Leaves 14-20 cm long; nerves 8-15 pairs; branchlets hairy ..... 3

3. Flowers 10-12 in an umbellule; leaves oblong, minutely pubescent.....**L. laevigata**

3. Flowers 4-6 in an umbellule; leaves obovate, densely pubescent beneath .....**L. bourdillonii**

4. Umbellules solitary.....5

4. Umbellules in fascicles, cymes, spike or racemes.....6

5. Branchlets and leaves densely tomentose; umbellules ca. 2.5 cm across.....**L. quinqueflora**

5. Branchlets and leaves glabrous; umbellules ca. 1 cm across.....**L. ligustrina**

6. Leaves hairy beneath.....7

6. Leaves glabrous beneath .....9

7. Umbellules in fascicles.....**L. insignis**

7. Umbellules in racemes.....8

8. Leaves to 11 cm long, margins recurved.....**L. wightiana**

8. Leaves to 20 cm long, margins not recurved.....**L. floribunda**

9. Leaves elliptic lanceolate, lateral nerves prominent.....**L. beddomei**

9. Leaves ovate-oblong, lateral nerves not prominent.....10

10. Berries depressed globose, ca. 2.5 cm across; leaves pale beneath.....**L. oleoides**

10. Berries ellipsoid, to 1.5 cm long; leaves reddish beneath.....11

11. Branchlets minutely tomentellus.....**L. glabrata**

11. Branchlets glabrous .....**L. stocksii**

**Litsea beddomei** Hook. f., Fl. Brit. India 5: 177. 1886; Gamble, Fl. Pres. Madras 1237. 1925; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 209. 1987.

Small trees; branchlets ferrugineus-tomentose. Leaves to 12 x 4 cm, acute at apex, attenuate to the base; nerves 7-10 pairs, prominent below, glaucous; petiole 1.5 cm long. Racemes to 3 cm long, axillary, ferrugineus-tomentose. Male umbellule 8 mm across, peduncled; bracts orbicular, tomentose inside. Flowers 4 in an umbellule; perianth lobes 2 mm long, obovate, hairy; filaments glandular, tomentose; anthers with 4 openings. Female umbellule 112 mm across, 3-7 together. Flowers 5-7; staminodes in 2 rows, biglobular with short cusp at centre.

*Fl. & Fr.* : May

*Distr.* : Southern Western Ghats. Rare; in evergreen forests at high altitudes. Kottamala, *JA 15381.*

**Litsea bourdillonii** Gamble, Kew Bull. 1925: 131. 1925 & Fl. Pres. Madras 1237. 1925; Nair, J. Econ. Tax. Bot. 17(2): 272. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 382. 1996 [Fig. 55].

Medium trees; branchlets dark brown-tomentose. Leaves to 20 x 9 cm, obovate, abruptly acute at apex, cuneate at base; nerves to 15 pairs, parallel, pale white beneath, punctate below; petiole 1.5 cm long, stout, tomentose. Umbellules 2-5 together, axillary, fascicled; bracts

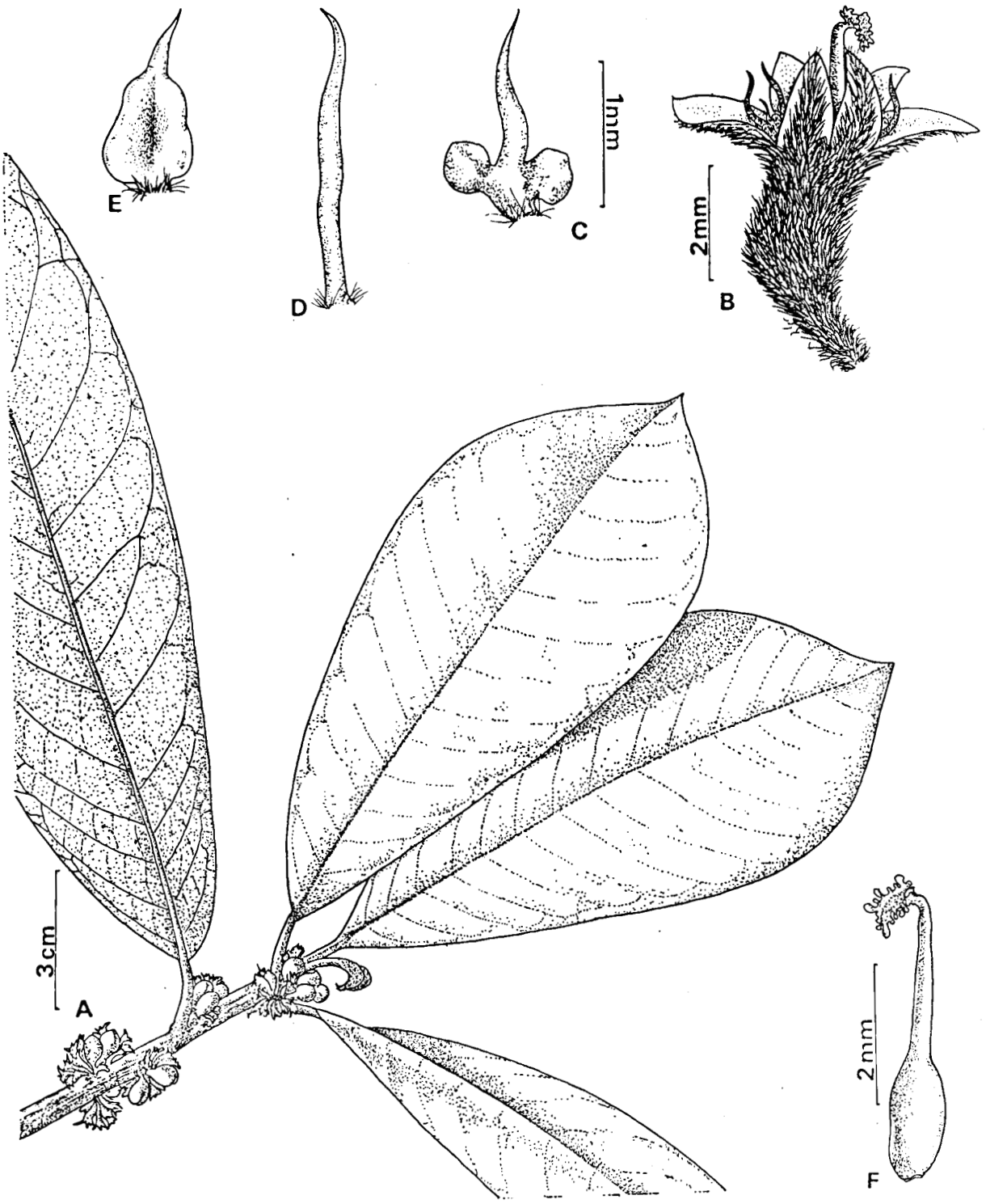



Fig. 55. *Litsea bourdillonii* Gamble: **A**. flowering twig; **B**. female flower; **C, D & E**. staminodes; **F**. pistil.

orbicular, densely white-tomentose. Flowers 4-6 in an umbellule, densely hairy; stamens 12, filaments glabrous, outer ones with short glands at base. Fruits not seen.

*Fl.* : December

*Distr.* : Southern Western Ghats. Rare; in evergreen forests at high elevations. Vellimala, *JA & KPR 14337.*

**Litsea coriacea** (Heyne ex Meisner) Hook. f., Fl. Brit. India 5: 166. 1886; Gamble, Fl. Pres. Madras 1236. 1925; Manilal, Fl. Silent Valley 236. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 382. 1996. ***Tetranthera coriacea*** Heyne ex Meisner in DC., Prodr. 15(1): 186. 1864.

Small to medium trees; branchlets glabrous. Leaves to 16 x 5 cm, elliptic to obovate, acute at base, acuminate at apex, coriaceous; nerves 4-6 pairs; intercostae faint; petiole 1 cm long. Umbellules 3-6 together, sessile, axillary on leafscars. Flowers 8-10 in an umbellule; perianth lobes oblong, finely hirsute; stamens 12. Fruits not seen.

*Fl.* : April

*Distr.* : Western Ghats. Common; in semi-evergreen forests. Vallakkadavu, *JA 13672*, Karadikkavala, *JA 13916.*

**Litsea floribunda** (Bl.) Gamble, Fl. Pres. Madras 1238. 1925; Manilal, Fl. Silent Valley 236. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 382. 1996. ***Cylicodaphne floribunda*** Bl., Mus. Bot. Lugduno-Batavum 1: 387. 1851. ***Tetranthera wightiana*** sensu Bedd., Fl. Sylv. t. 293. 1873, non Nees, 1836. ***Litsea wightiana*** Hook. f., Fl. Brit. India 5: 177. 1886, p.p.

Tall trees; branchlets fulvous-tomentose. Leaves to 18 x 9 cm, obovate, obtuse, acute at base, fulvous-tomentose below; nerves to 13 pairs, prominent below, nervules subparallel; petiole 1 cm long; dark brown-hairy. Racemes 4 cm long, axillary. Umbellules few, peduncle 8 mm long; bracts orbicular, densely tomentose outside. Flowers 6-8 in an umbellule; perianth lobes silky tomentose; stamens 12. Female umbellules panicled. Drupes 1 cm across, obovoid; fruiting calyx 1 cm across, cupular.

*Fl. & Fr.*: December-February

*Distr.* : Throughout India. Occasional; in semi-evergreen forests. Mangaladevi, *JA 12693*, Chenthamara, *13453.*

**Litsea glabrata** (Wall. ex Nees) Hook. f., Fl. Brit. India 5: 174. 1886; Gamble, Fl. Pres. Madras 1237. 1925; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 210. 1987. ***Tetranthera glabrata*** Wall. ex Nees in Wall., Pl. Asiat. Rar. 2: 67. 1831.

Medium trees; branchlets glabrous. Leaves to 18 x 5 cm, elliptic to linear oblong, acute at base and apex, coriaceous; nerves 7 pairs; petiole 1.5 cm long. Racemes 2-6 cm long, axillary. Flowers 3-6 together; tepals ovate, hispid outside, filaments glandular hairy. Berry ovoid; fruiting perianth obconic.

*Fl. & Fr.* : January

*Distr.* : Western Peninsular India. Occasional; in semi-evergreen forests. Thekkady, *JA 13043.*

**Litsea insignis** Gamble, Kew Bull. 1925: 130. 1925 & Fl. Pres. Madras 1237. 1925; Sasidh. & Sivar., Fl. Pl. Thrissur For. 382. 1996.

Medium trees; branchlets ferrugineus tomentose. Leaves to 20 x 12 cm, obovate, obtuse,, acute at base, brown below when dry; nerves 9-11 pairs, nervules parallel, close; petiole 2.5 cm long. Umbellule fascicled on old branches, 7 mm across, 10-20 together; peduncles 7 mm long; bracts orbicular, densely hairy. Flowers 6 in an umbellule, sessile, perianth lobes 5, oblong, densely hairy; stamens 12, filaments hairy, outer ones with stalked glands at base. Berry 2.5 x 1.5 cm, ellipsoid, obtuse, reddish brown, glabrous; fruiting perianth 1.5 cm across, 1 cm high, obconic.

*Fl. & Fr.* : October-March

*Distr.* : Peninsular India. Common; in semi-evergreen forests. Karadikkavala, *JA 12195*, Chenthamara, *JA 15139.*

**Litsea laevigata** (Nees) Gamble, Fl. Pres. Madras 1236. 1925; Manilal, Fl. Silent Valley 237. 1988. ***Tetranthera attenuata*** Nees var. ***laevigata*** Nees, Syst. Laurin. 677. 1836. ***Tetranthera salicifolia*** Roxb. ex Nees in Wall., Pl. Asiat. Rar. 2: 66. 1831. ***Litsea salicifolia*** (Roxb. ex Nees) Hook. f., Fl. Brit. India 5: 167. 1886. **Mulaku nari** (Mannan).

Medium trees; branchlets puberulus. Leaves to 16 x 5 cm, oblong, acute at base and apex, minutely pubescent beneath; nerves 6-8 pairs, prominent beneath; petiole 1 cm long. Umbellule 8 mm across, 1-3 together, subsessile; bracts orbicular, pubescent. Flowers 10-12 in an umbellule, pedicelled, perianth lobes 2 mm long, densely hairy; stamens 12, filaments 3 mm long, hairy, 2-glandular at base. Berry ellipsoid, glabrous.

*Fl. & Fr.* : December-May

*Distr.* : India. Common; in semi-evergreen forests. Anchuruli, *JA 14298*; Thekkady, *JA 17906.*

**Litsea ligustrina** (Nees) Hook. f., Fl. Brit. India 5: 158. 1886; Gamble, Fl. Pres. Madras 1235. 1925; Mohanan & Henry, Fl. Thiruvananthapuram 395. 1994. ***Tetranthera ligustrina*** Nees in Wall., Pl. Asiat. Rar. 2: 65. 1831; Wight, Ic. t. 1835. 1852.

Shrubs or small trees; branchlets glabrous. Leaves pseudoverticillate, to 10 x 4.5 cm, elliptic to obovate, acute or obtuse at apex, acute at base; nerves 7 pairs; petioles 5 mm long. Peduncle 1 cm long. Umbellules 7 mm across; bracts glabrous. Flowers 5-8 in an umbellule, subsessile; perianth absent; stamens to 12, filaments bearded with 2 glands at base. Female umbellule a little larger; staminodes 12, in three whorls, spathulate with glands at base; style glabrous. berry 8 mm across, deep green, globose.

*Fl. & Fr.* : August-May

*Distr.* : Peninsular India. Common; in evergreen forests. Deviar, *JA 12108*; Mlappara, *12145*; Vellimala, JA *12942*; Ambari, JA *13793.*

**Litsea oleoides** (Meisner) Hook. f., Fl. Brit. India 5: 175. 1886; Gamble, Fl. Pres. Madras 1236. 1925; Sasidh. & Sivar., Fl. Pl. Thrissur For. 383. 1996. ***Tetranthera oleoides*** Meisner in DC., Prodr. 15(1): 195. 1864.

Large trees; branchlets angled, glabrous. Leaves to 18 x 6 cm, oblong, acute at both ends, pale beneath; nerves ca. 12 pairs, not prominent; petiole 2.5 cm long. Umbellule 6 mm across, in long axillary raceme, peduncles 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.

*Fl. & Fr.* : August-April

*Distr.* : Peninsular India. Common; in evergreen and semi-evergreen forests. Kokkara, *JA 12022*, Thekkady, JA *12518*; Uppermanalar, JA *13723*; Thekkady, JA *13817.*

**Litsea quinqueflora** (Dennst.) Suresh in Nicols. *et al.*, Interpret. van Rheede, Hort. Malab. 158. 1988; Kosterm. in Dassan., Rev. Handb. Fl. Ceylon 9: 146. 1995. ***Darwinia quinqueflora*** Dennst., Schlussel Hort. Mala. in Allg. Deusthe Garten Mag. 2(2): 12, 31. 1818. ***L. 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. ***Litsea deccanensis*** Gamble, Fl. Pres. Madras 1235. 1925; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1360. 1983.

Small trees; branchlets densely tomentose. Leaves to 20 x 9 cm, obovate, obtuse at apex, acute to the base; nerves 9-11 pairs, reticulate; petiole 2.5 cm long. Peduncle 1.5-2 cm long. Umbellules 10-20 mm across; bracts orbicular, densely tomentose outside. Flowers to 25 in an

umbellule, pedicels 4 mm long; perianth lobes 3-5 or absent, 2 mm long, densely hairy; stamens 25-30, filaments bearded.

*Fl. & Fr.* : August-October

*Distr.* : South India and Sri Lanka. Common; in semi-evergreen and moist deciduous forests. Thaannikkudy, *JA 12615*, Mullakkudy, *13858*.

**Litsea stocksii** (Meisner) Hook. f., Fl. Brit. India 5: 176. 1886; Gamble, Fl. Pres. Madras 1236. 1925; Manilal, Fl. Silent Valley 237. 1988. ***Tetranthera oblonga*** Nees var. ***stocksii*** Meisner in DC., Prodr. 15(1): 205. 1864.

Medium trees; branchlets glabrous. Leaves to 15 x 5 cm, elliptic to obovate, acute, reddish beneath, glabrous; lateral nerves 7-9 pairs; petiole 1 cm long. Racemes 6 cm long. Umbellules few, peduncled; bracts orbicular, puberulus. Flowers pedicelled, 6-8 in an umbellule. Fruiting calyx 12 mm across, entire or crenate. Drupes 12 x 8 mm, obovoid, reddish brown, smooth.

*Fr.* : April

*Distr.* : Concan and Southwards. Occasional; in evergreen forests. Arjunankotta, *JA 15094*.

**Litsea wightiana** (Nees) Hook. f. in Benth. & Hook. f., Gen. Pl. 3: 162. 1880 & Fl. Brit. India 5: 176. 1886, p.p., var. **tomentosa** (Meisner) Gamble, Fl. Pres. Madras 1238. 1925; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 211. 1987. ***Cylicodaphne wightiana*** Nees var. ***tomentosa*** Meisner in DC., Prodr. 15(1): 200. 1864.

Small trees; branchlets ferrugineus-tomentose. Leaves to 11 x 6 cm, obovate, obtuse, base acute, coriaceous, margins folded; nerves 9 pairs, prominent; petiole 2 cm long. Racemes 6 cm long, axillary. Umbellules 1 cm across, nearly sessile; bracts 6-8, obovate, 8 mm across, densely hairy outside. Flowers 6-12 in an umbellule; perianth lobes 5, 4 x 2 mm, oblong, densely fulvous hairy; stamens 12, filaments 4 mm long, bearded, outer ones with 2 stalked glands at base. Fruits not seen.

*Fl.* : August-October

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Mangaladevi, *JA 12183*, Swamikkayam, JA *12481*.

## NEOLITSEA (Bentham) Merrill

Phillip. J. Sci. 1 (Suppl.): 56. 1906 *nom. cons.*

Trees. Leaves alternate or pseudoverticillate, 3-ribbed. Flowers dioecious, 3-7 together in umbellules. Umbellules in cymes or racemes in leaf axils, bracteate at base; involucral bracts 4,

deciduous. Flowers pedicellate; perianth 4-lobed; stamens in male flowers 6, anthers introrse; filaments of inner stamens 2-glandular; staminodes in female flower 6, linear clavate; ovary 1-celled, ovoid, stigma peltate on stout style; pistillode small, in male flowers. Fruit a 1-seeded, globose or ellipsoid berry.

1. Leaves to 9 cm broad, white and strongly nerved beneath ..... **N. fischeri**
1. Leaves to 6 cm broad, not white beneath, nerves indistinct ..... 2
2. Fruiting calyx ca. 2.5 mm across; leaves elliptic ..... **N. cassia**
2. Fruiting calyx ca. 7 mm across; leaves ovate ..... **N. scrobiculata**

**Neolitsea cassia** (L.) Kosterm., J. Sci. Res. (Jakarta) 1: 85. 1952 & in Dassan., Rev. Handb. Fl. Ceylon 9: 164. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 383. 1996. ***Laurus cassia*** L., Sp. Pl. 369. 1753. ***Litsea zeylanica*** Nees in Amoen., Bot. Benn. Fasc. 1: 58. t. 5. 1823; Hook. f., Fl. Brit. India 5: 178. 1886. ***Neolitsea zeylanica*** (Nees) Merr., Philipp. J. Sci. 1 (Suppl.): 57. 1906; Gamble, Fl. Pres. Madras 1239. 1925.

Large shrubs to small trees; branchlets slender, glabrous. Leaves to 9 x 3 cm, elliptic-lanceolate, acuminate at apex, attenuate to the base, glaucous beneath, thin, subcoriaceous; ribs from above the base, nervules indistinct; petiole 8 mm long. Umbellule 6-8 mm across, sessile, in fascicles of 3-5; bracts 4 mm long, oblong, obtuse, glabrous. Berry 1.5 x 1 cm, ellipsoid, smooth, black; calyx cup toothed.

*Fl. & Fr.* : March-December

*Distr.* : South India and Sri Lanka. Occasional; in evergreen forests. Sunderamala, *JA 13617*; Vellimala, *JA & KPR 14318.*

**Neolitsea fischeri** Gamble, Kew Bull. 1925: 132. 1925 & Fl. Pres. Madras 1239. 1925; Sharma *et al.*, J. Econ. Tax. Bot. 11(1): 53. 1987; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 212. 1987.

Medium trees; branchlets stout, tender parts thinly fulvous hairy. Leaves to 15 x 9 cm, broadly elliptic, obtusely and shortly acuminate, acute at base; 3-ribbed from 1.5 cm above the base; midrib with strong lateral nerves, nervules parallel, curved, thinly pubescent below; petiole 3 cm long, stout, thinly pubescent.

*Fl.* : Only a vegetative specimen was collected, flowers and fruits not seen.

*Distr.* : Southern Western Ghats. Rare; in evergreen forests at high elevations. Vellimala, *JA 14301*, Anakuthivayal, JA *17799.*

**Neolitsea scrobiculata** (Meisner) Gamble, Fl. Pres. Madras 1240. 1925; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1362. 1983; Manilal, Fl. Silent Valley 237. 1988.

***Litsea scrobiculata*** Meisner in DC., Prodr. 15(1): 223. 1864. ***L. zeylanica*** sensu Hook. f., Fl. Brit. India 5: 178. 1886, p.p., non Nees, 1823.

Medium trees; branchlets glabrous, black. Leaves to 9 x 6 cm, ovate, abruptly obtusely acute or acuminate, attenuate at base, densely scrobiculate, 3-ribbed from the base, midribs with 1-3 pairs of lateral nerves. Peduncle 8 mm long. Berry 12 x 10 mm, obovoid to globose; calyx cup obconic, entire.

*Fr.* : January (Flowering specimens could not be collected).

*Distr.* : India, Sumatra, Java and Sri Lanka. Common; in evergreen forests. Arjunankotta, *JA 13151.*

## **PERSEA** P. Miller

Gard. Dict. Abr. ed. 4, 1754. *nom. cons.*

**Persea macrantha** (Nees) Kosterm., Reinwardtia 6: 193. 1962 & in Dassan., Rev. Handb. Fl. Ceylon 9: 129. 1995; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1363. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 383. 1996. ***Machilus macrantha*** Nees in Wall., Pl. Asiat. Rar. 2: 70. 1831; Wight, Ic. t. 1824. 1852; Hook. f., Fl. Brit. India 5: 140. 1886; Gamble, Fl. Pres. Madras 1227. 1925. **Kulamavu, Kurna** (Mannan).

Large trees; bark granular, smelling; branchlets glabrous. Leaves to 20 x 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 8-10 mm across, shortly pedicelled; perianth lobes 6, greenish white, 6 mm long, ovate; stamens 9, 3-seriate, innermost row with extrorse anthers, filaments pubescent; ovary conical, 1-celled, pubescent. Drupes 1.2 cm across, globose, black, glabrous.

*Fl. & Fr.* : March-December

*Distr.* : South India and Sri Lanka. Common; in semi-evergreen forests. Vallakkadavu, *JA 13474*, Sabarimala, JA *17733*; Anchuruli, JA & *KPR 14280.*

*Ethnobotanical use*: Bark of this tree is used to adulterate the cinnamon bark and the paste made of the bark is applied on the bark of Rubber (*Hevea braziliensis*) for increase the production of latex (Mala Arayan).

## **PHOEBE** Nees

Syst. Laurin. 98. 1836.

Shrubs or trees. Leaves alternate or pseudoverticillate, penninerved. Flowers bisexual, in axillary panicles, pedicellate; perianth 6-lobed, tube short, accrescent in fruit; stamens 9, free,

filaments of inner most row glandular; anthers of innermost row extrorse others introrse; staminodes 3, inner to the stamens, sagittate; ovary globose, glabrous; style slender; stigma peltate. Fruit a berry, seated on erect perianth lobes.

1. Branchlets densely rusty tomentose ..... **P. wightii**

1. Branchlets glabrous ..... **P. lanceolata**

**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. 1925; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 212. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 384. 1996.

Small trees; branchlets slender. Leaves to 18 x 6 cm, oblanceolate, long-acuminate, attenuate to the base; nerves 9-11 pairs; nervules subparallel; petiole 1.5 cm long. Peduncle 6-8 cm long, slender, axillary; pedicels 5-10 mm long, glabrous. Flowers 5 mm across; perianth lobes 2.5 mm long, ovate, glabrous, connate at base; stamens 9; filaments 1.5 mm long, pubescent with two reniform appendages at base. Berry 15 x 8 mm, ellipsoid, glabrous, black. Fruiting perianth lobes 5 x 3 mm.

*Fl. & Fr.* : October-December

*Distr.* : India and Burma. Common; in semi-evergreen forests. Thekkady, *JA 12502*; Karadikkavala, JA *12694.*

**Phoebe wightii** Meisner in DC., Prodr. 15(1): 38. 1864; Gamble, Fl. Pres. Madras 1228. 1925; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1364. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 212. 1987. ***P. paniculata*** auct. non Nees, 1836: Wight, Ic. t. 1820. 1852; Hook. f., Fl. Brit. India 5: 142. 1886.

Small to medium trees; branchlets stout. Leaves to 15 x 6 cm, obovate, shortly acuminate, acute at base, glabrous above, tomentose below; nerves 9-11 pairs, prominent beneath, nervules subparallel; petiole 1 cm long, stout. Peduncle 5 cm long, axillary, slender, pubescent, 6-12-flowered. Flowers 6 mm across; perianth lobes 3 mm long, ovate, densely hairy; ovary thinly pubescent; stamens 12, outer filaments 2-glandular at base; ovary thinly hairy.

*Fl. & Fr.* : May

*Distr.* : India and Burma. Rare; in evergreen forests at high elevations. Eravangalar, *JA 15273.*

## 112. PROTEACEAE

Juss., Gen. Pl. 78. 1789.

### HELICIA Loureiro

Fl. Cochinch. 1: 83. 1790.

**Helicia nilagirica** Bedd., Madras J. Lit. Sci. 3. 1: 50, t. 11. 1864; Hook. f., Fl. Brit. India 5: 190. 1886; Gamble, Fl. Pres. Madras 1243. 1925; Sleumer, Blumea 8(1): 69. 1955; Manilal, Fl. Silent Valley 237. 1988.

Small trees; branchlets stout. Leaves to 16 x 6 cm, elliptic, entire or serrate, acute, coriaceous; nerves 6-8 pairs, prominent; petiole 5 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, 12 mm across; seeds 1 or 2, rugose.

*Fl. & Fr.* : September-March

*Distr.* : Southern Western Ghats. Rare; along rivers banks in semi-evergreen forests. Vallakkadavu, *JA 15160*

## 113. THYMELAEACEAE

Juss., Gen. Pl. 76. 1789.

### GNIDIA Linnaeus

Sp. Pl. ed. 1, 356. 1753

**Gnidia glauca** (Fresen.) Gilg, Bot. Jahrb. Syst. 19: 265. 1894; Townsend in Dassan. & Fosb., Rev Handb. Fl. Ceylon 2: 505. 1981; Manilal, Fl. Silent Valley 238. 1988. ***Lasiosiphon glaucus*** Fresen., Flora 21: 603. 1838. ***Gnidia eriocephala*** Meisner in Denkschr., Koenigl.-Baier. Bot. Ges. Regensburg 3: 292. 1841; Wight, Ic. t. 1859. 1852. ***Lasiosiphon eriocephalus*** (Meisner) Decne. in Jacq., Voy. 148. 1844; Hook. f., Fl. Brit. India 5: 197. 1886; Gamble, Fl. Pres. Madras 1244. 1925.

Small trees or large shrubs; branchlets glabrous. Leaves spiral, to 9 x 1.5 cm, oblong, acute at apex, rounded at base, entire, glabrous, penninerved; petiole 2-3 mm long. Flowers many, in terminal heads surrounded by leafy bracts; pedicels 3 mm long, densely packed; perianth 15 mm long, tubular, densely silky hairy, deciduous at the middle, lobes 5, short; stamens 10, biseriate,

free, filaments attached to the perianth tube; ovary 1-celled, hairy, ovule solitary, pendulous; stigma capitate. Capsule 4 x 1 mm, ellipsoid, thinly hairy, covered by the persisting base of the perianth tube.

*Fl. & Fr.* : January-June

*Distr.* : Peninsular India and Sri Lanka. Common; among rocks in grasslands at high altitudes. Kottamala, *JA 15412.*

## 114. ELAEAGNACEAE

Juss., Gen. Pl. 74. 1789.

### ELAEAGNUS Linnaeus

Sp. Pl. 121. 1753

**Elaeagnus conferta** Roxb., Fl. Ind. 1: 460. 1820; Gamble, Fl. Pres. Madras 1246. 1925; Sasidh. & Sivar., Fl. Pl. Thrissur For. 384. 1996. ***E. latifolia*** auct. non L., 1753: Bedd., Fl. Sylv. t. 180. 1872; 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 to 14 x 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, 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, 2.6 x 1.2 cm, reddish, fleshy.

*Fl. & Fr.* : November-April

*Distr.* : Indo-Malesia. Common; in evergreen forests. Mangaladevi, *JA 12688*; Kalvarithode, *JA 13629.*

*Ethnobotanical use* : Fruit of this plant is edible when fully mature.

## 115. LORANTHACEAE

Juss., Ann. Mus. Natl. Hist. Nat. 12: 292. 1808.

*Note* : Following ICBN (1994) the family **Viscaceae** is treated under the broad concept of the family **Loranthaceae**

1. Petals present.....2
1. Petals absent.....7
2. Petals 4.....3
2. Petals 5 or 6.....4

3. Corolla gamopetalous, lobes acute; flowers in fascicles or cymes.....**Scurrula**

3. Corolla polypetalous, lobes obtuse; flowers in spikes or racemes.....**Helixanthera**

4. Bracteoles present; calyx tubular.....**Macrosolen**

4. Bracteoles absent; calyx cupular.....5

5. Flowers sessile; leaves 3-5-ribbed from base .....**Helicanthes**

5. Flowers pedicelled; leaves penninerved.....6

6. Leaves alternate or fascicled; flowers in fascicles .....**Taxillus**

6. Leaves opposite; flowers in racemes or cymes.....**Dendrophthoe**

7. Anthers dehisce by longitudinal slats .....**Korthalsella**

7. Anthers dehisce by pores .....**Viscum**

## **DENDROPHTHOE** C. F. P. Martius

Flora 13. 1830.

Stout parasitic shrubs; branches erect or drooping. Leaves opposite, entire, thick and coriaceous, petiolate. Flowers in racemes or cymes, axillary; bracts ovate, obtuse; calyx cupular, 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. Branches trigonous; leaves very thick.....**D. trigona**

1. Branches terete; leaves not very thick.....2

2. Flowers in peduncled cymes or solitary; corolla split below the middle .....**D. neelgherrensis**

2. Flowers in racemes; corolla split above the middle.....**D. falcata**

**Dendrophthoe falcata** (L. f.) Etting. in Denkschr., Kaiserl. Akad. Wiss., Math.-Naturwiss. Kl. 32: 52, 53, 58. t. 13. 1872. ***Loranthus falcatus*** L. f., Suppl. Pl. 211. 1781.

Two varieties are found in the study area.

Key to the varieties:

1. Calyx densely white pubescent; leaves acute at base, equal.....var. **pubescens**

1. Calyx glabrous; leaves obliquely cordate at base.....var. **falcata**

**Dendrophthoe falcata** (L. f.) Etting. in Denkschr., Kaiserl. Akad. Wiss., Math.-Naturwiss. Kl. 32: 52, 53, 58, t. 13. 1872. var. **falcata,** Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1372. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 215. 1987; Wiens in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 134. 1987; Manilal, Fl. Silent Valley 239. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 385. 1996. ***Loranthus falcatus*** L. f., Suppl. Pl. 211. 1781. ***L. amplexifolia***

DC., Prodr. 4: 306. 1830. ***L. longiflorus*** Desr. in Lam., Encycl. 3: 598. 1792, var. ***falcata*** (L. f.) Kurz, For. Fl. Burma 2: 321. 1877; Hook. f., Fl. Brit. India 5: 215. 1886; Gamble, Fl. Pres. Madras 1253. 1925. ***L. longiflorus*** Desr. var. ***amplexifolia*** (DC.) Thw., Enum. Pl. Zeyl. 134. 1859; Hook. f., Fl. Brit. India 5: 215. 1886; Gamble, Fl. Pres. Madras 1253. 1925. **Chempoo** (Mannan).

Branches stout, smooth. Leaves to 20 x 10 cm, ovate-falcate, acute or obtuse at apex or orbicular, cordate at base, glabrous, coriaceous. Racemes to 8 cm long, axillary, drooping, glabrous. Flowers many, closely packed; pedicel 3 mm long; calyx cupular; corolla 5 cm long, pink with greenish lobes; style glabrous, stigma slightly wider than style. Berry 10 mm across, ovoid, crimson, smooth.

*Fl. & Fr.* : December

*Distr.* : South India and Sri Lanka. Common; in evergreen forests on *Glochidion* sp. Vellimala. *JA & KPR 14323.*

*Ethnobotanical use* : The corolla of this plant is eaten (Mannan)

**Dendrophthoe falcata** (L. f.) Etting. var. **pubescens** (Hook. f.) Chandra. in Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 215. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 385. 1996. ***Loranthus longiflorus*** Desr. in Lam., Encycl. 3: 598. 1792, var. ***pubescens*** Hook. f., Fl. Brit. India 5: 215. 1886; Gamble, Fl. Pres. Madras 1253. 1925.

Branches stout, smooth. Leaves 6-15 x 2-4 cm, elliptic-oblong, obtusely acute, base truncate to sub-cordate, glabrous; nerves 3-5 pairs, sub-prominent; petiole 2-3 mm long, flattened. Racemes 2-3 cm long, pubescent; pedicel 3 mm long. Flowers many; corolla pink, 3 cm long, pubescent outside, lobes 7 mm long, curved; tube inflated above the middle, white below, pink middle and green above.

*Fl. & Fr.* : January-June

*Distr.* : Peninsular India. Occasional; in evergreen forests, usually on *Hydnocarpus* sp., *Gmelina arborea* and *Tectona grandis*. Vallakkadavu, *JA & KPR 15404*; Pamba, *JA 17158.*

**Dendrophthoe neelgherrensis** (Wight & Arn.) Tieghem, Bull. Soc. Bot. France 4: 252. 1895; Wiens in Dassan. &Fosb.,Rev. Handb. Fl. Ceylon 6:130.1987; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 215. 1987. ***Loranthus neelgherrensis*** Wight & Arn., Prodr. 382. 1834; Wight, Ic. t. 1020. 1845; Hook. f., Fl. Brit. India 5: 216. 1886; Gamble, Fl. Pres. Madras 1254. 1925 [Fig. 56 A].

Large woody parasitic shrubs; branches transversally rugose, glabrous. Leaves to 7-10 x 3.5 cm, obovate, obtuse, coriaceous, narrowed to the base; petiole to 7 mm long. Flowers 3-6 together in axillary cymes; peduncle 7 mm long, slender; bracts small, ovate; pedicel 3 mm long,

puberulus; calyx obscurely toothed; corolla 15-20 mm long, yellow, cleft to below the middle, lobes recurved. Berry 7 x 4 mm, obovoid.

*Fl. & Fr.* : March-July

*Distr.* : South India and Sri Lanka. Common; in evergreen forests, usually on *Toona ciliata*. Vellimala, *JA 13992*; Mlappara, *JA & KPR 17736*.

**Dendrophthoe trigona** (Wight & Arn.) Danser ex Sant., Rec. Bot. Surv. India 16: 163. 1953; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1373. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 215. 1987; Manilal, Fl. Silent Valley 239. 1988. ***Loranthus trigonus*** Wight & Arn., Prodr. 386. 1834; Hook. f., Fl. Brit. India 5: 219. 1886; Gamble, Fl. Pres. Madras 1253. 1925.

Parasitic shrubs; branches to 15 mm thick, rugose, glabrous. Leaves to 20 x 13 cm, ovate, obtuse, acute at base, coriaceous; petiole 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 1 x 0.5 cm, obovoid.

*Fl. & Fr.* : December

*Distr.* : Southern Western Ghats. Occasional; in semi-evergreen forests, usually on *Ficus tsjahela*. Vallakkadavu, *JA 17054*.

## HELICANTHES Danser

Verh. Kon. Ned. Akad. Wetensch., Afd. Natuurk. Tweede Sect. 29(6): 5. 1933.

**Helicanthes elasticus** (Desr.) Danser, Verh. Kon. Akad. Wetensch., Afd. Natuurk., Tweede Sect. 2. 29(6): 55. 1933; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1373. 1983; Chandra. in Henry *et al.*, Fl. Tamil Nadu Ser.1, 2: 216. 1987; Manilal, Fl. Silent Valley 239. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 385. 1996. ***Loranthus elasticus*** Desr. in Lam., Encycl. 3: 599. 1792; Hook. f., Fl. Brit. India 5: 216. 1886; Gamble, Fl. Pres. Madras 1254. 1925. ***L. euphorbiae*** Wight, Calcutta J. Nat. Hist. 6: 363. 1846 & Ic. t. 1063. 1846.

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 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 5 mm across, globose, red.

*Fl. & Fr.* : March-April

*Distr.* : Peninsular India. Common; in riparian evergreen forests, usually on *Madhuca neriifolia*. Vallakkadavu, *JA 13440*.

## 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. Flowers in elongated spikes ..... 2
1. Flowers in racemes ..... 3
2. Leaves obovate, obtuse, opposite, ca. 3 x 2.5 cm ..... **H. lepidophylla**
2. Leaves elliptic, acuminate, alternate, ca. 10 x 3.5 cm ..... **H. hookeriana**
3. Bracts with a small appendage; corolla dark brown at apex; branches tomentose ..... **H. obtusata**
3. Bracts without appendage; corolla purplish at apex; branches glabrous ..... 4
4. Leaves to 12 x 5 cm, acute at base; petals 5-7 mm long ..... **H. wallichiana**
4. Leaves to 7 x 5 cm, obtuse at base; petals 18 mm long ..... **H. intermedia**

**Helixanthera hookeriana** (Wight & Arn.) Danser, Bull. Jard. Bot. Buitenzorg Ser. 3, 10: 317. 1929; Wiens in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 148. 1987; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 216. 1987. ***Loranthus hookerianus*** Wight & Arn., Prodr. 381. 1834; Hook. f., Fl. Brit. India 5: 207. 1886; Gamble, Fl. Pres. Madras 1251. 1925.

Branches slender, tubercled, glabrous. Leaves to 10 x 3.5 cm, elliptic, acuminate, glabrous; petiole to 7 mm long. Spike to 7 cm long, unbranched, many-flowered; bracts tomentose. Flowers in small excavations on the rachis; calyx broaden at base; corolla 1 cm long, curved, lobes 4, tomentose; stamens 4, stigma globose.

*Fl. & Fr.* : March-May

*Distr.* : South India and Sri Lanka. Rare; in evergreen forests, on *Croton malabaricus*. Arjunankotta, *NS, JA & KPR 15082.*

**Helixanthera intermedia** (Wight) Danser, Bull. Jard. Bot. Buitenzorg Ser. 3, 10: 317. 1929; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 307. 1976; Mohanan & Henry, Fl. Thiruvananthapuram 399. 1994. ***Loranthus intermedius*** Wight, Calcutta J. Nat. Hist. 6: 361. 1846; Hook. f., Fl. Brit. India 5: 205. 1886; Gamble, Fl. Pres. Madras 1251. 1925.

Glabrous shrubs. Leaves ovate, obtuse, coriaceous, base obtuse, truncate, or sub-cordate ; petiole 1 cm long. Racemes 7 cm long, axillary, many-flowered; pedicel 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.

*Fl. & Fr.* : March-May

*Distr.* : South Western India. Rare; in evergreen forests at high elevations. Kottamala, *JA & KPR 15370.*

**Helixanthera lepidophylla** (Walp.) Danser, Bull. Jard. Bot. Buitenzorg Ser. 3, 10: 317. 1929; Chandra. in Henry *et al.*, Fl. Tamil Nadu Ser.1, 2: 216. 1987. ***Loranthus lepidophyllus*** Walp., Ann. 2: 730. 1852. ***L. wightii*** Hook. f., Fl. Brit. India 5: 207. 1886; Gamble, Fl. Pres. Madras 1251. 1925.

Branches densely puberulus, rugose. Leaves to 4 x 2.5 cm, obovate to orbicular, puberulus; petiole 5-7 mm long. Spike to 3 cm long, puberulus. Flowers many; bud 10 mm long; calyx rim hairy; corolla 7 mm long, puberulus, pinkish brown.

*Fl. & Fr.* : June-August

*Distr.* : South Western India. Very rare; in evergreen forests at high elevations. Vellimala, *JA 12101.*

**Helixanthera obtusata** (Schultes) Danser, Bull. Jard. Bot. Buitenzorg Ser. 3, 10: 317. 1929; Chandra. in Henry *et al.*, Fl. Tamil Nadu Ser.1, 2: 216. 1987; Manilal, Fl. Silent Valley 240. 1988. ***Loranthus obtusatus*** Schultes in Roem. & Schultes, Syst. 7: 1650. 1830; Hook. f., Fl. Brit. India 5: 205. 1886; Gamble, Fl. Pres. Madras 1251. 1925 [Fig. 56 B].

Branchlets terete, slender, ferrugineus-tomentose. Leaves to 14 x 8 cm, ovate, obtuse, base rounded, coriaceous, glabrous; petiole 1 cm long. Racemes to 8 cm long, densely golden tomentose; bracts with a small appendage. Flowers many; pedicel 5 mm long, reflexed; corolla dark pink, 18 mm long, 4-angular and curved in bud, lobes 4, free, tomentose outside; anthers dark brown; stigma globose.

*Fl. & Fr.* : May

*Distr.* : Southern Western Ghats. Rare; in evergreen forests, usually on *Hydnocarpus alpina.* Ambari, *JA 13764*; Eravangalar, *JA & KPR 15283.*

**Helixanthera wallichiana** (Schultes) Danser, Bull. Jard. Bot. Buitenzorg. Ser. 3, 10: 319. 1929; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 307. 1976; Sasidh. & Sivar., Fl. Pl. Thrissur For. 386. 1996; Manilal, Fl. Silent Valley 240. 1988. ***Loranthus wallichianus*** Schultes in Roem. & Schultes, Syst. 7: 100. 1829; Wight, Ic. t. 143. 1839; Hook. f., Fl. Brit. India 5: 205. 1886; Gamble, Fl. Pres. Madras 1251. 1925.

Branchlets rugose or lenticellate. Leaves ovate, obtuse, base acute or rounded glabrous; nerves 2 or 3 pairs; petiole 5 mm long. Racemes 3 cm long, slender, glabrous; pedicel 3 mm long, corolla reddish, terete in bud, lobes 4, glabrous.

*Fl. & Fr.* : April-August

*Distr.* : South Western India. Common; in evergreen forests, on *Orophea erythrocarpa*. Mullakkudy, *JA 13849*; Arjunankotta, *JA & KPR 15096*.

## **KORTHALSELLA** van Tieghem

Bull. Soc. Bot. France 43: 83. 1896.

**Korthalsella japonica** (Thunb.) Engl. in Engl. & Prantl, Pflanzenfam. 1: 138. 1887; Gamble, Fl. Pres. Madras 1256. 1925; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 217. 1987. ***Viscum japonicum*** Thunb., Trans. Linn. Soc. London 2: 329. 1794; Hook. f., Fl. Brit. India 5: 226. 1886.

Tufted parasitic herbs, stems flattened, jointed, green, glabrous. Leaves absent. Flowers unisexual, membranous, minute, fascicled, at the tips of the inter node, sessile; perianth lobes 3, persistent; stamens 3; anthers 2-celled; ovary obovoid, 1-celled, placenta central; style absent; stigma minute. Fruit an obovoid, fleshy berry, to 3 mm across.

*Fl. & Fr.* : Almost throughout the year

*Distr.* : India, China, Mauritius and Australia. Rare; in evergreen forests at higher elevations, usually growing on Syzygium spp. Kottamala, *JA 18493*.

## **MACROSOLEN** (Blume) Blume

in J. A. Schultes et J. H. Schultes in

J. J. Roemer et J. A. Schultes, Syst. Veg. 7: 1731. 1830.

Parasitic shrubs. Leaves opposite, entire, coriaceous. Flowers in axillary pedunculate cymes or solitary; bracts ovate, obtuse or acute, keeled; bracteoles 2, similar to bracts; calyx tubular, truncate with short obtuse lobes; corolla gamopetalous, tube curved, widening above, lobes 6 or 5, strongly recurved; stamens 6 or 5, antipetalous; anthers linear, style slender; stigma hemispherical. Berry ellipsoid.

1. Corolla ca. 2 cm long, yellow at the middle; leaves to 8 cm long, branches 2-angled.....**M. parasiticus**
1. Corolla ca. 5 cm long, pink all along; leaves to 13 cm long; branches terete.....**M. capitellatus**

**Macrosolen capitellatus** (Wight & Arn.) Danser, Blumea 2: 36. 1936; Wiens in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 126. 1987; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 217. 1987.

Fig. 56. A. *Dendrophthoe neelgherrensis* (Wight & Arn.) Tieghem

B. *Helixanthera obtusata* (Schultes) Danser

***Loranthus capitellatus*** Wight & Arn., Prodr. 382. 1834; Hook. f., Fl. Brit. India 5: 221. 1886. ***Elytranthe capitellata*** (Wight & Arn.) Engl. in Engl. & Prantl, Pflanzenfam. 3(1): 189. 1889; Gamble, Fl. Pres. Madras 1255. 1925.

Branches 2-angulr, glabrous. Leaves 5-8 x 2-3 cm, elliptic-lanceolate, acute, cuneate at base, coriaceous; nerves 2 or 3 pairs, obscure; petiole to 7 mm long. Peduncle to 10 mm long; bracts and bracteoles similar, ovate to orbicular, keeled. Flowers few together; calyx tube 4 mm long, truncate with short rounded lobes; corolla yellow to white or pale scarlet with base and apex green, split below the middle. Berry 6 x 5 mm, beaked with persistent calyx tube.

*Fl. & Fr.* : April-June

*Distr.* : South India and Sri Lanka. Occasional; in evergreen forests, on *Artocarpus heterophyllus*. Thaannikkudy, *JA 15376.*

**Macrosolen parasiticus** (L.) Danser, Blumea 2: 36. 1936; Wiens in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 128. 1987; Manilal, Fl. Silent Valley 240. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 386. 1996. ***Lonicera parasitica*** L., Sp. Pl. 175. 1753. ***Loranthus loniceroides*** L., Sp. Pl. ed. 2, 1: 473. 1762; Wight, Ic. t. 203. 1839; Hook. f., Fl. Brit. India 5: 221. 1886. ***Elytranthe loniceroides*** (L.) G. Don, Gen. Syst. 3: 427. 1834; Gamble, Fl. Pres. Madras 1255. 1925. **Chempoo** (Mannan).

Branches terete, glabrous. Leaves ovate-lanceolate, acuminate, rounded at base; nerves obscure; petiole 1.5 cm long. Peduncle 1 cm long, 1-6-flowered; bracteoles orbicular; calyx 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.

*Fl. & Fr.* : May-August

*Distr.* : South India and Sri Lanka. Common; usually on *Ficus tsjahela, Terminalia paniculata*, etc. Thaannikkudy, *JA 13790.*

*Ethnobotanical use* : Flowers are used in angling.

## **SCURRULA** Linnaeus

Sp. Pl. 110. 1753

**Scurrula parasitica** L., Sp. Pl. 110. 1753; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1374. 1983; Wiens in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 146. 1987; Manilal, Fl. Silent Valley 241. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 386. 1996. ***Loranthus scurrula*** L., Sp. Pl. ed. 2. 1: 472. 1762; Roxb., Pl. Corom. t. 140. 1800; Hook. f., Fl.

Brit. India 5: 208. 1886. ***L. buddleioides*** Desr. in Lam., Encycl. 3: 660. 1792; Gamble, Fl. Pres. Madras 1251. 1925.

Parasitic shrubs; branches erect, tomentose. Leaves 5-9 x 3-5 cm, ovate, rounded at base and apex; golden tomentose below; petiole to 1 cm long. Flowers in axillary fascicles or shortly peduncled cymes, 16-20 together; bract ovate, densely tomentose; calyx cupular; corolla 15 mm long, slender, densely tomentose; lobes 4, ovate, acute; stamens 4, filaments glabrous; stigma clavate. Berry obovoid, densely hairy.

*Fl. & Fr.* : June-December

*Distr.* : Indo-Malaya. Common; on *Maesa indica*. Pachakkanam, *NS & JA 12650.*

## TAXILLUS van Tieghem

Bull. Soc. Bot. France 42: 256. 1895.

Profusely branched parasitic herbs; stem terete. leaves alternate or fascicled, entire. Flowers in axillary fascicles, 3-15 together; calyx cupular, shortly acute-teethed; corolla gamopetalous, slender, split along one side, lobes 5, ovate, acute, erect; stamens 5; ovary 1-celled, 1-ovuled; stigma hemispherical. Berry obovoid, truncate.

1. Leaves cuneate at base, fascicled, glabrous; corolla glabrous ..... **T. cuneatus**
1. Leaves acute at base, alternate, densely floccose tomentose; corolla tomentose..... **T. tomentosus**

**Taxillus cuneatus** (Heyne ex Roth) Danser, Bull. Jard. Bot. Buitenzorg Ser. 3, 10: 354. 1929; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1375. 1983; Wiens in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 144. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 387. 1996. ***Loranthus cuneatus*** Heyne ex Roth, Nov. Pl. Sp. 193. 1821; Hook. f., Fl. Brit. India 5: 214. 1886; Gamble, Fl. Pres. Madras 1253. 1925.

Branches slender, rugulose, glabrous. Leaves to 3 x 1.5 cm, obovate, rounded or retuse at apex; nerves obscure; petiole 2-4 mm long. Racemes axillary, shortly peduncled; bracts 1 mm long, obovate. Flowers few; calyx 1.5 mm long, irregularly toothed, pubescent; corolla 2 cm long, tube inflated at middle, curved, greenish-white. Berry 8 mm long, ovoid, crimson.

*Fl. & Fr.* : Almost throughout the year

*Distr.* : South India and Sri Lanka. Common; on *Phyllanthus emblica*. Kokkara, *JA 18455.*

**Taxillus tomentosus** (Heyne ex Roth) Tieghem, Bull. Soc. Bot. France 42: 256. 1895; Wiens in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 139. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For.

387. 1996. ***Loranthus tomentosus*** Heyne ex Roth, Nov. Pl. Sp. 191. 1821; Hook. f., Fl. Brit. India 5: 212. 1886; Gamble, Fl. Pres. Madras 1252. 1925.

Branches lenticellate, young shoots fulvous tomentose. Leaves to 5 x 2.5 cm, obovate to oblong, obtuse, glabrous above; nerves 4-5 pairs; petiole 5 mm long. Flowers 3-8, fascicled; pedicels 2 mm long; calyx 2 mm long, lobes triangular; corolla greenish white, pink at base, to 16 mm long, densely hairy, tube gibbous, lobes spreading; stigma hemispheric. Berry sub-globose, tomentose.

*Fl. & Fr.* : June-December

*Distr.* : South India and Sri Lanka. Common; on *Antidesma menasu*, *Glochidion* sp. etc. Karadikkavala, *JA 12192*; Anchuruli, *KPR 14288.*

## **VISCUM** Linnaeus

Sp. Pl. 1023. 1753

Parasitic shrubs, stem articulated, drooping or erect, usually green coloured. Leaves opposite, entire or absent. Flowers unisexual, monoecious, fascicled, solitary or in groups of 3, axillary; bracts and bracteoles cupular; perianth lobes adnate to the ovary in female flowers, cupular in male flowers, 4, triangular, connate below; stamens 4, epitepalous; anthers sessile on the perianth tube; ovary inferior, 1-celled; ovule solitary; style absent, stigma sessile. Berry ellipsoid to globose, viscid.

1. Stem leafless, green.....2
1. Stem leafy .....4
2. Branches terete.....**V. ramosissimum**
2. **Branches angled or flattened** .....3
3. Internodes broadened above, flattened .....**V. articulatum**
3. Internodes uniform; quadrangular.....**V. angulatum**
4. Berry covered with tubercles; flowers pedicelled .....**V. heyneanum**
4. Berry smooth; flowers sessile.....5
5. Leaves lanceolate, falcate; berry oblong.....**V. monoicum**
5. 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. 1925; Rao, J. Ind. Bot. Soc. 36(2): 140. 1957; Manilal, Fl. Silent Valley 241. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 388. 1996.

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 5 x 5 mm, globose, yellowish.

*Fl. & Fr.* : March-May

*Distr.* : Indo-Malesia. Occasional; in savannahs usually on *Olea dioica.* Thaannikkudy, *JA 18456.*

**Viscum articulatum** Burm. f., Fl. Ind. 211. 1768; Hook. f., Fl. Brit. India 5: 226. 1886; Gamble, Fl. Pres. Madras 1259. 1925; Rao, J. Ind. Bot. Soc. 36(2): 126. 1957; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1377. 1983; Wiens in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 416. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 388. 1996. ***V. nepalense*** Spreng., Syst. Cur. Post. 4(2): 57. 1827; Danser, Blumea 4: 283. 1936.

Branches green, drooping; internodes flattened, 5-6 mm broad, wedge shaped, smooth. Flowers 3-6 together, axillary, sessile; male and female flowers mixed; bracts cupular; perianth lobes 1 mm long, ovate, acute. Berry 4 mm across, globose, white.

*Fl. & Fr.* : March-June

*Distr.* : South-East Asia. Common; on *Phyllanthus emblica.* Brandippara, *JA & KPR 14909*; Vallakkadavu, *JA 15417.*

**Viscum heyneanum** DC., Prodr. 4: 278. 1830; Rao, J. Ind. Bot. Soc. 36(2): 157. 1957; Wiens in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 417. 1987; Henry *et al.,* Fl. Tamil Nadu Ser. 1, 2: 218. 1987. ***V. verruculosum*** Wight & Arn., Prodr. 379. 1834; Hook. f., Fl. Brit. India 5: 224. 1886; Gamble, Fl. Pres. Madras 1258. 1925. ***V. orbiculatum*** Wight, Ic. t. 1016. 1845; Hook. f., Fl. Brit. India 5: 224. 1886; Gamble, Fl. Pres. Madras 1258. 1925.

Branchlets terete, suberect. Leaves 4 x 1-2 cm, ovate-lanceolate, acute or obtuse, tip rounded, 3-5-nerved from base, glandular, narrowing into a small petiole. Flowers in peduncled cymes. Peduncles 5 mm long, 3-flowered, 3-8 in the axils, slender. Flowers in each triad all male, all female, or middle one female and laterals male, sessile. Berry 5 x 2 mm, ellipsoid, acute.

*Fl. & Fr.* : June-September

*Distr.* : South India and Sri Lanka. Rare; on *Helicteres isora.* Koruthode, *JA 16294*; Kallidamkunnu, *JA & KPR 16226.*

**Viscum monoicum** Roxb. ex DC., Prodr. 4: 278. 1830; Hook. f., Fl. Brit. India 5: 224. 1886; Gamble, Fl. Pres. Madras 1258. 1925; Rao, J. Ind. Bot. Soc. 36(2): 160. 1957; Wiens in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 420. 1987; Manilal, Fl. Silent Valley 242. 1988.

Stem terete, erect or drooping. Leaves to 8 x 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.

*Fl. & Fr.* : May-August

*Distr.* : South-East Asia. Common; in moist deciduous forests on *Antidesma menasu*. Thekkady, *JA 13931.*

**Viscum orientale** Willd., Sp. Pl. 4: 737. 1805; Hook. f., Fl. Brit. India 5: 224. 1886; Gamble, Fl. Pres. Madras 1258. 1925; Rao, J. Ind. Bot. Soc. 36(2): 154. 1957; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1378. 1983; Wiens in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 419. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 388. 1996.

Branchlets erect or drooping; internodes terete and angled towards the apex. Leaves to 4 x 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.

*Fl. & Fr.* : April-May

*Distr.* : South India and Sri Lanka. Common; on *Maesa perrottetiana*. Thekkady, *JA 13547.*

**Viscum ramosissimum** Wight & Arn., Prodr. 380. 1834; Hook. f., Fl. Brit. India 5: 224. 1886; Gamble, Fl. Pres. Madras 1258. 1925; Rao, J. Ind. Bot. Soc. 36(2): 142. 1957; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1378. 1983; Wiens in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 416. 1987; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 219. 1987.

Branchlets drooping; stems terete, green, smooth or ridged when dried, slender. Flowers 3-together, axillary; one female and 2 males, 3 female flowers or all the 3 male flowers; bracts and bracteoles orbicular. Berry ovoid, 3 mm across.

*Fl. & Fr.* : June-August

*Distr.* : South India and Sri Lanka. Rare; on *Phyllanthus emblica*. Vallakkadavu, *JA 15418.*

## 116. SANTALACEAE

R. Brown, Prodr. 350. 1810.

1. Flowers bisexual; unarmed trees ..... **Santalum**

1. Flowers unisexual; armed shrubs ..... **Scleropyrum**

## **SANTALUM** Linnaeus

Sp. Pl. 349. 1753.

**Santalum album** L., Sp. Pl. 349. 1753; Roxb., Fl. Ind. 1: 462. 1820; Bedd., Fl. Sylv. 256. 1872; Hook. f., Fl. Brit. India 5: 231. 1886; Gamble, Fl. Pres. Madras 1261. 1925; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1381. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 219. 1987; Mohanan & Henry, Fl. Thiruvananthapuram 401. 1994. **Chanthanam**.

Small trees. Leaves opposite, to 7 x 4 cm, elliptic, acute at apex, rounded at base; nerves 10-12 pairs; petiole to 1.5 cm long. Inflorescence of panicled cymes, 5 cm across, terminal and axillary. Flowers bisexual, 5-merous, 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 1 x 0.8 cm, obovoid, smooth, black.

*Fl. & Fr.* : February-May

*Distr.* : Peninsular India. Common; in moist deciduous forests and savannahs. Kokkara, *JA 18435.*

*Ethnobotanical use* : Mannan use the bark for chewing (masticatory use), in some occasions they use the leaves of *Rubus* spp., also along with this bark.

## **SCLEROPYRUM** Arnott

in Mag. Bot. & Zool. 2: 549 1838, *nom. cons.*

**Scleropyrum pentandrum** (Dennst.) Mabber., Taxon 26: 533. 1977; Sasidh. & Sivar., Fl. Pl. Thrissur For. 388.1996. ***Pothos pentandrus*** Dennst., Schluss. Hort. Ind. Malab. 16,24,33. 1818. ***Sphaerocarya wallichiana*** Wight & Arn., Edinb. New Phil. J. 15: 180. 1833..***Scleropyrum wallichianum*** (Wight & Arn.) Arn., Mag. Zool. Bot. 2: 550. 1838; Wight, Ic. t. 241. 1839; Hook. f., Fl. Brit. India 5: 234. 1886; Gamble, Fl. Pres. Madras 1262. 1925 [Fig. 57 A].

Small trees; trunk with sharp axillary thorns. Leaves alternate, to 15 x 9 cm, ovate or oblong, acute or acuminate, base truncate or rounded, coriaceous; nerves 5 pairs, irregular. Flowers polygamous on drooping spikes. Spikes unequal, solitary or fascicled, along mature stems, 5-10 cm long; bracts triangular, acuminate, 1.5 mm long, 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 x 2 cm; purple, crowned by the perianth tube, 1-seeded.

*Fl. & Fr.* : December-May

*Distr.* : Western Peninsular India and Sri Lanka. Occasional; along the riversides in semi-evergreen forests. Pachakkanam, *JA 18436.*

Fig. 57. A. *Scleropyrum pentandrum* (Dennst.) Mabber.

B. *Balanophora fungosa* J. R. & G. Forst. ssp. *indica* (Arn.) Hansen

## 117. BALANOPHORACEAE

Rich., Mem. Mus. Hist. Nat. 8: 429. 1822.

### BALANOPHORA J. R. & G. Forster

Charact. Gen. 99, 100. 1776.

**Balanophora fungosa** J. R. & G. Forst., Charact. Gen. 100, t. 50. 1776, subsp. **indica** (Arn.) Hansen, Dansk., Bot. Ark 28: 100. ff. 20 & 21. 1972; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1383. 1983; Fagerlind in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 103. 1987; Manilal, Fl. Silent Valley 242. 1988. ***Langsdorffia indica*** Arn., Ann. Nat. Hist. 2: 37. 1838. ***Balanophora indica*** (Arn.) ex Griff., Trans. Linn. Soc. London 20: 95. 1846; Hook. f., Fl. Brit. India 5: 237. 1886; Gamble, Fl. Pres. Madras 1263. 1925. **Athi thippali** [Fig. 57 B].

Herbs; root parasite, fleshy; root stock globular; peduncle stout, to 15 cm long, 2 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.

*Fl. & Fr.* : February-March

*Distr.* : India, Malesia & Australia. Common; in reed brakes, on roots of *Oxytenanthera monadelpha*. Mlappara, *JA 13197.*

*Ethnobotanical use* : Mannans use this for healing mumps; the tuberous portion is made into a paste and is applied externally; they believe that the tuberous part is poisonous.

## 118. BUXACEAE

Dumort., Comment. Bot. 54. 1822.

### SARCOCOCCA Lindley

Edwards's Bot. Reg. 1012. 1826.

**Sarcococca saligna** (D. Don) Muell.-Arg. in DC., Prodr. 16(1): 11. 1869; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 243. 1987. ***Buxus saligna*** D. Don, Prodr. Fl. Nep. 63. 1825. ***Sarcococca pruniformis*** Lindl., Bot. Reg. 12: t. 1012. 1826, p.p.; Hook. f., Fl. Brit. India 5: 266. 1887, p.p. ***S. trinervia*** Wight, Ic. t. 1877. 1852; Gamble, Fl. Pres. Madras 1265. 1925.

Scandent shrubs. Leaves alternate, to 18 x 8 cm, elliptic, acuminate, 3-ribbed from base. Flowers unisexual, in axillary racemes. Male racemes 1-2 cm long. Flowers densely packed; bracts ovate, bracteoles 4, opposite, paired; perianth lobes 4, 2 x 2 mm, ovate, acute, stamens 4,

free, antitepalous. Female racemes smaller, few-flowered, bracteoles many; tepals 6, ovate, ciliate; ovary 3-celled, globose, glabrous, ovules 2 in each cell; styles 2. Berry 7 x 7 mm, globose, black.

*Fl. & Fr.* : October-December

*Distr.* : India, Sumatra, Sri Lanka and Afghanistan. Common; in evergreen forests. Inchippara, *JA 12603.*

## 119. EUPHORBIACEAE

Juss., Gen. Pl. 384.. 1789.

*Note*: The broad family concept (ICBN, 1994) of Euphorbiaceae is followed in the present work. So the members of the **Bischofiaceae, Daphniphyllaceae** and **Stilaginaceae** are treated under Euphorbiaceae

1. Leaves 3-foliate.....**Bischofia**
1. Leaves simple.....2
2. Flowers arranged in cyathea; perianth absent; stamen 1.....**Euphorbia**
2. Flowers not in cyathea; perianth present; stamens 2 or more.....3
3. Cells of ovary 1-ovuled.....4
3. Cells of ovary 2-ovuled.....23
4. Stamens 2 in male flowers.....5
4. Stamens 7 to many in male flowers.....10
5. Climbers with stinging hairs.....**Tragia**
5. Erect trees or shrubs without stinging hairs.....6
6. Leaves peltate; flowers in panicled globose spikes.....**Macaranga**
6. Leaves not peltate; flowers not in globose spike.....7
7. Leaves opposite.....**Excoecaria**
7. Leaves alternate.....8
8. Cocci of capsule with 2 rows of tubercles; seeds carunculate; herbs.....**Sebastiania**
8. Cocci of capsule not tubercled; seeds not carunculate; trees.....9
9. Plants with milky juice; male sepals imbricate.....**Sapium**
9. Plants without milky juice; male sepals valvate.....**Epiprinus**
10. Petals present in male flowers.....11
10. Petals absent in male flowers.....16
11. Male flowers in umbels.....**Blachia**
11. Male flowers not in umbels.....12
12. Filaments inflexed in bud; plants monoecious.....**Croton**
12. Filaments erect in bud; plants dioecious.....13

13. Leaves penninerved; petals free ..... 14
13. Leaves palminerved; petals united ..... **Givotia**
14. Stamens connate into a branched gonophore; female sepals enlarged in fruit ..... **Dimorphocalyx**
14. Stamens free; female sepals not enlarged in fruit ..... 15
15. Male sepals valvate; stamens 8-13, pistillode prominent ..... **Agrostistachys**
15. Male sepals imbricate; stamens numerous, pistillode absent ..... **Paracroton**
16. Leaves palmatisect; female flowers towards the upper parts of terminal racemes ..... **Ricinus**
16. Leaves not palmately lobed; female flowers not arranged as above ..... 17
17. Filaments branched ..... **Homonoia**
17. Filament not branched ..... 18
18. Male sepals imbricate ..... **Suregada**
18. Male sepals valvate ..... 19
19. Female flowers axillary, solitary or binate ..... **Cleidion**
19. Female flowers not as above ..... 20
20. Flowers monoecious; herbs ..... 21
20. Flowers dioecious; shrubs or trees ..... 22
21. Racemes interrupted; male sepals 3 ..... **Claoxylon**
21. Racemes continuous; male sepals 4 ..... **Acalypha**
22. Leaves glandular; fruit a capsule ..... **Mallotus**
22. Leaves eglandular; fruit a drupe ..... **Trewia**
23. Male flowers in spikes or racemes ..... 24
23. Male flowers in axillary fascicles or shortly peduncled cymes or umbels ..... 28
24. Ovary 1-celled ..... **Antidesma**
24. Ovary 2-4-celled ..... 25
25. Connectives of anthers apiculate ..... **Daphniphyllum**
25. Connectives of anthers not apiculate ..... 26
26. Female flowers solitary, long pedicelled ..... **Meineckia**
26. Female flowers 1-numerous in short or long racemes ..... 28
27. Racemes densely clustered on the trunk ..... **Baccaurea**
27. Racemes axillary, solitary or 2-3 together ..... **Aporusa**
28. Styles united into a conical or slender column, toothed at apex; ovary 4-15-celled ..... **Glochidion**
28. Styles otherwise; ovary 1-3-celled ..... 29
29. Petals present ..... 30
29. Petals absent ..... 31
30. Stamens united; ovary 2-celled ..... **Bridelia**
30. Stamens free; ovary 3-celled ..... **Actephila**
31. Disc combined with the calyx ..... 32
31. Disc free from the calyx ..... 33

32. Anthers sessile on the angles of the staminal column ..... **Sauropus**

32. Anthers adnate to the column ..... **Breynia**

33. Stamens 6-many; styles small or absent ..... **Drypetes**

33. Stamens 3-5; styles persistent in fruits ..... 34

34. Female sepals 4; branchlets not phyllanthoid ..... **Margaritaria**

34. Female sepals 4 or 5; branchlets phyllanthoid ..... 35

35. Filaments free, alternating with lobes of disc ..... **Securinega**

35. Filaments variously united; disc not lobed ..... **Phyllanthus**

## 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; leaves ca. 9 x 5 cm ..... **A. racemosa**

1. Racemes bisexual; leaves ca. 3 x 2 cm ..... **A. brachystachya**

**Acalypha brachystachya** Hornem., Hort. Hafn. 1. 1807; Hook. f., Fl. Brit. India 5: 416. 1887; Gamble, Fl. Pres. Madras 1330. 1925; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1405. 1983; Manilal, Fl. Silent Valley 243. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 391. 1996.

Prostrate or procumbent herbs; stems striate, puberulus. Leaves ovate, acute, rounded to cordate at base, 3-5-nerved from base, sparsely hairy; petiole 0.5-2 cm long. Racemes to 1.5 cm long, bisexual, axillary. Female flowers 1-4 at the base of the raceme, sessile, sepals 3-5, oblong, glandular-ciliate; styles 3, bifid above. Male flowers many, towards the upper part of raceme; perianth lobes glandular pubescent; stamens 8, free, on a dome-shaped receptacle. Capsule 2 x 2 mm, hispid; seeds ovoid with hilum at one end.

*Fl. & Fr.* : August-December

*Distr.* : Indo-Malesia and Tropical Africa. Rare; along the margins of evergreen sholas. Mangaladevi, *JA 12477, JA & KPR 16303.*

**Acalypha racemosa** Heyne ex Baill., Etud. Gen. Euphorb. 443. 1858; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 221. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 391. 1996. ***A. paniculata***

Miq., Fl. Ned. Ind. 1(2): 406. 1859; Hook. f., Fl. Brit. India 5: 415. 1887; Gamble, Fl. Pres. Madras 1330. 1925.

Undershrubs to 1.5 m tall; stem adpressed hairy. Leaves ovate, acuminate, base rounded, serrate, glabrous, except nerves; nerves 6 pairs, lowest pair from the base, strong; petiole to 10 cm long, slender. Male racemes 10 cm long, axillary, solitary, unbranched; flowers 1 mm across, clustered, sessile; sepals orbicular; stamens 8. Female racemes in terminal branched panicles, to 10 x 8 cm. Flowers 1 mm across, clustered; sepals ovate. Capsule 2.5 mm across, 3-lobed, glandular hairy.

*Fl. & Fr.* : July-December

*Distr.* : Indo-Malesia and Tropical Africa. Common; in evergreen and semi-evergreen forests. Mlappara, *JA 12140*; Thekkady, *JA 12543*; Vellimala, *JA & KPR 14334*.

## ACTEPHILA Blume,

Bijdr. 581. 1825.

**Actephila excelsa** (Dalz.) Muell.-Arg., Linnaea 32: 78. 1863; Hook. f., Fl. Brit. India 5: 282. 1887; Gamble, Fl. Pres. Madras 1283. 1925; Henry et al., Fl. Tamil Nadu Ser. 1(2): 221 1987. ***Anomospermum excelsum*** Dalz. in Hooker's J. Bot. Kew Gard. Misc. 3: 228. 1851. ***Actephila neilgherrensis*** Wight, Ic. t. 1910. 1852.

Dioecious trees or large shrubs; branches stout. Leaves alternate, usually clustered towards the apex, simple, 15-20 x 5-8 cm, lanceolate to oblanceolate, narrow to the base, acute at apex, coriaceous. Female flowers solitary, sub-apical; pedicels 1-3 cm long. Male flowers many, shortly pedicelled or sessile, clustered on leaf-axils; calyx lobes 5, ovate, minute in male flowers, much larger in female flowers, imbricate; petals smaller than sepals; stamens 3-6, filaments free or very shortly combined at base; ovary sessile, 3-celled; ovules 2 in each cell. Fruit a septicidal capsule with hard cocci, *ca.* 3 cm across; seeds oblong, 1 cm long.

*Fl. & Fr.* : December-May

*Distr.* : Indo-Malesia. Rare along the margins of evergreen sholas. Vellimala, *JA 13696, JA 15366.*

## 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. Racemes to 16 cm long; leaves entire; trees.....**A. borneensis**
1. Racemes to 2 cm long; leaves serrate; shrubs .....**A. indica**

**Agrostistachys borneensis** Becc., Nelle For. Borneo 331. 1902; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3: 1409. 1983; Manilal, Fl. Silent Valley 244. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 391. 1996. ***Sarcoclinium longifolium*** Wight, Ic. tt. 1887 & 1888. 1852, p.p. ***A. longifolia*** (Wight) Benth. ex Hook. f., Fl. Brit. India 5: 407. 1887, p.p. ***Agrostistachys meeboldii*** Pax & Hoffm. in Engl., Pflanzenf. 57: 100. 1912; Gamble, Fl. Pres. Madras 1318. 1925. **Kozhivalan** (Mannan).

Small to medium trees with white latex. Leaves to 30 x 7 cm, oblanceolate, acute, base long-attenuate, coriaceous; nerves to 14 pairs, regular, nervules indistinct; petiole flat. Male racemes axillary, slender; bracts broadly ovate, ciliate. Flowers many in each bract; sepals 3 mm long, ovate; petals smaller, oblong; stamens 8, pistillode present. Female flowers lax in shorter racemes; sepals and petals similar to male flowers. Capsule 15 mm across; cocci globose, reddish; seeds globose, brown, polished.

*Fl. & Fr.* : October-February

*Distr.* : Indo-Malaya. Common; in evergreen forests. Mlappara, *JA 12586*; Uppupara, JA *12717.*

*Ethnobotanical use* : The tree is unbranched during its early growth, so Mannans select this for the use of poles.

**Agrostistachys indica** Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 2: 41. 1850; Bedd., Ic. t. 241. 1868-1874; Hook. f., Fl. Brit. India 5: 406. 1887; Gamble, Fl. Pres. Madras 1317. 1925; Manilal, Fl. Silent Valley 244. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 391. 1996.

Stout shrubs. Leaves to 21 x 9 cm, elliptic-oblong, acute, coriaceous, base attenuate, spineus serrate; nerves 13 pairs, regular, prominent, nervules parallel; petiole 1 cm long. Male flowers in short axillary racemes; bracts broadly ovate, densely tomentose; sepals white, 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, 3 x 3 mm, imbricating, ciliate; pedicel 7 mm long, stout; sepals oblong, densely hairy. Capsule 15 mm across, cocci minutely hispid; seeds globose, glabrous.

*Fl. & Fr.* : January-April

*Distr.* : Peninsular India. Occasional; in evergreen forests. Umikuppan, *JA 13039;* Sabarimala, *JA 13601.*

## 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 2; leaves to 6 cm long, obtusely acute ..... **A. acidum**
1. Stamens 3-5; leaves 8-17 cm long, acuminate ..... 2
2. Branchlets and dorsal surface of leaves pubescent ..... **A. menasu**
2. Branchlets and leaves glabrous ..... **A. zeylanicum**

**Antidesma acidum** Retz., Obs. Bot. 5: 30. 1788; Fischer, Kew Bull. 1932: 65. 1932; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1412. 1983; Mandal & Panigr., J. Econ. Tax. Bot. 4: 258. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 392. 1996. ***Stilago diandra*** Roxb., Pl. Corom. t. 166. 1802. ***A. diandrum*** (Roxb.) Roth., Nov. Pl. Sp. 369. 1821; Hook. f., Fl. Brit. India 5: 361. 1887; Gamble, Fl. Pres. Madras 1298. 1925. **Vanchi** (Malam pandaram)

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; tepals 4, to 1.5 mm long, free; disk prominent; stamens 5. Flowers closely packed, sessile. Female racemes 2-4 cm long. Flowers many; pedicels 3 mm long; sepals 2 mm across, ovate, fimbriate, greenish yellow. Drupes 5 mm across, oblong, red, smooth.

*Fl. & Fr.* : July-November

*Distr.* : Indo-Malesia. Common; in moist deciduous forests. Kokkara, *JA 12007*; Koruthode, *JA 12244*; Thekkady, *JA 12564*.

*Ethnobotanical use* : Mature fruits are eaten.

**Antidesma alexiteria** L., Sp. Pl. 1027. 1753, p.p., Hook. f., Fl. Brit. India 5: 359. 1887; Mandal & Panigr., J. Econ. Tax. Bot. 4: 257. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 428. 1994. ***A. zeylanicum*** Lam., Encycl. 1: 207. 1792; Gamble, Fl. Pres. Madras 1297. 1925; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1414. 1983.

Small trees; branchlets glabrous. Leaves to 10 x 4 cm, elliptic-oblong, long-acuminate, mucronate at apex, acute at base, glabrous; nerves 7-9 pairs, sub-prominent, shining above; petiole 5 mm long, stipule ovate, hairy. Female spikes 3 cm long, axillary, densely hairy; bracts ovate, acute. Flowers closely packed; sepals 4, ovate, acute, hispid; ovary beaked, stigma recurved, glabrous. Fruits not seen.

*Fl.* : March-September

*Distr.* : Peninsular India and Sri Lanka. Occasional; in evergreen forests. Chenthamara, *JA 13451*; Vallakkadavu, *JA 16390.*

**Antidesma menasu** (Tul.) Miq. ex Muell.-Arg. in DC., Prodr. 15(2): 257. 1866 p.p., Hook. f., Fl. Brit. India 5: 364. 1887 p.p.; Gamble, Fl. Pres. Madras 1297. 1925; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1413. 1983; Mandal & Panigr., J. Econ. Tax. Bot. 4: 256. 1983; Manilal, Fl. Silent Valley 245. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 392. 1996. *A. pubescens* Roxb. var. ***menasu*** Tul., Ann. Sci. Nat. Bot. Ser. 3, 15: 215. 1851.

Small trees. Leaves to 17 x 8 cm, ovate-oblong, abruptly acuminate at apex, acute to the base; nerves 7-9 pairs, regular, looping, prominent; petiole 5 mm long, hispid. Female racemes 7-12 cm long, terminal, usually branched, minutely hispid. Flowers 2 mm across; sepals ovate, free, concave, hispid. Male racemes shorter, axillary or terminal. Flowers sub-sessile; stamens 3. Drupes 5 x 3 mm, glabrous, reddish.

*Fl. & Fr.* : March-August

*Distr.* : Peninsular India. Very common; along stream sides in evergreen forests. Uppermanalar, *JA 13965*; Koruthode, JA *15199.*

*Ethnobotanical use* : Mature fruits are edible and eaten.

## **APORUSA** 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. Male spikes to 2 cm long; female flowers 1-3 together.....2
1. Male spikes 3-6 cm long; female flowers 4-15 together.....**A. lindleyana**
2. Ovary densely hairy; leaf tip long-acuminate.....**A. acuminata**
2. Ovary glabrous; leaf tip acute.....**A. fusiformis**

**Aporusa acuminata** Thw., Enum. Pl. Zeyl. 288. 1861; Hook. f., Fl. Brit. India 5: 348. 1887; Gamble, Fl. Pres. Madras 1309. 1925; Mandal & Panigr., Bull. Bot. Surv. India 26(1&2): 42.

1984; Chakr. & Gang., J. Econ. Tax. Bot. 17(1): 158. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 393. 1996. **Swarna vetti, Neer vetti** (Mannan) [Fig. 58 A].

Slender shrubs with weak branchlets. Leaves to 12 x 4 cm, elliptic-oblong, acute at base, entire, glabrous; nerves 7 or 8 pairs, irregular; intercostae reticulate; petiole 1 cm long, stipule 2 mm long, ovate, tomentose. Male flowers in 1.5 cm long spike, densely packed; stamens 3. Female flowers 1-3 together, axillary, fascicled; bracts ovate, tomentose; sepals 4, 1 mm long, ovate, tomentose; styles bifid. Capsule 12 x 10 mm, ovoid, glabrous or hairy; seeds 7 x 6 mm, obovoid; glabrous; aril red.

*Fl. & Fr.* : March-May

*Distr.* : South India and Sri Lanka. Common; in evergreen forests. Vallakkadavu, *JA 13667*; Koruthode, *JA 14701*; Sabarimala, *JA & KPR 14939.*

*Ethnobotanical use* : The fruits are edible and eaten by Mannan

**Aporusa fusiformis** Thw., Enum. Pl. Zeyl. 288. 1861; Hook. f., Fl. Brit. India 5: 351. 1887; Gamble, Fl. Pres. Madras 1309. 1925; Mandal & Panigrahi, Bull. Bot. Surv. India 26: 42. 1984 (1985) ; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 221. 1987; Chakr. & Gang., J. Econ. Tax. Bot. 17(1): 160. 1993.

Large shrubs; branchlets glabrous. Leaves to 9.5 x 5.5 cm, elliptic-oblong, acute at both ends, entire, glabrous; nerves 6 pairs, reticulate; petiole 1-2 cm long, stipule falcate, 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. Fruits not seen.

*Fl.* : January-March

*Distr.* : South India and Sri Lanka. Common; in evergreen forests. Arjunankotta, *JA 13154*; Chokkampetti, *JA 13561, 13562*; Sabarimala, *JA 17788.*

**Aporusa lindleyana** (Wight) Baill., Etud. Gen. Euphorb. 645. 1858; Hook. f., Fl. Brit. India 5: 349. 1887; Gamble, Fl. Pres. Madras 1309. 1925; Mandal & Panigr., Bull. Bot. Surv. India 26(1&2): 42. 1984; Chakr. & Gang., J. Econ. Tax. Bot. 17(1): 158. 1993. ***Scepa lindleyana*** Wight, Ic. t. 361. 1840. **Vetti, Neer vetti** (Mannan).

Small to medium trees; branchlets glabrous. Leaves to 18 x 8 cm, ovate-oblong, acuminate at apex, acute at base, coriaceous; nerves 7 pairs, prominent; petiole 2 cm long; stipules 10 x 5 mm, 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 10 mm across, aril orange-yellow.

*Fl. & Fr.* : January-April

*Distr.* : Peninsular India and Sri Lanka. Common; in evergreen forests. Koruthode, *JA 13395*; Puthussery, JA & *KPR 17065.*

*Ethnobotanical use* : The fruits are edible and eaten.

## **BACCAUREA** Loureiro

Fl. Cochinch. 651. 1790.

**Baccaurea courtallensis** (Wight) Muell.-Arg. in DC., Prodr. 15(2): 459. 1866; Hook. f., Fl. Brit. India 5: 367. 1887; Gamble, Fl. Pres. Madras 1310. 1925; Sasidh. & Sivar., Fl. Pl. Thrissur For. 393. 1996. ***Pierardia courtallensis*** Wight, Ic. t. 1912. 1852. **Moottithoori, Moottippuli** (Mala Arayan) [Fig. 58 B].

Trees, bole uneven with tubercles; bark white. Leaves alternate, often clustered towards the branch tips, to 17 x 7 cm, oblanceolate, abruptly acuminate, base acute; nerves 4-6 pairs; petiole 1-3 cm long. Flowers dioecious, in densely clustered 15 cm long slender racemes, on old stem. Male flowers 2 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 cm across, globose, 3-valved, tomentose, red; seeds 3, oblong, arillate.

*Fl. & Fr.* : January-May

*Distr.* : Throughout Western Ghats. Fairly common; in evergreen forests at low elevations. Arjunankotta, *JA 13377*; Uppupara, *JA 14140.*

*Ethnobotanical use* : The fruits are edible and eaten.

## **BISCHOFIA** Blume

Bijdr. 1168. 1826-1827

**Bischofia javanica** Bl., Bijdr. 1169. 1827; Bedd., Fl. Sylv. t. 259. 1872; Hook. f., Fl. Brit. India 5: 345. 1887; Gamble, Fl. Pres. Madras 1312. 1925; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1485. 1983; Manilal, Fl. Silent Valley 246. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 395. 1996. ***Microelus roeperianus*** Wight & Arn. in Edinburgh New Philos. J. 14: 298. 1833; Wight, Ic. t. 1880. 1852. **Nannal maram, Chorakkali** (Mannan).

Large trees with round bole and reddish exudations; bark thinly peeling, red inside, fibrous. Leaves 3-foliolate; leaflets to 16 x 9 cm, equal, ovate, acuminate, serrate or entire; petiole to

Fig. 58. A. *Aporusa acuminata* Thw. - twig with fruits
B. *Baccaurea courtallensis* (Wight) Muell.-Arg.

15 cm long. Flowers dioecious, in axillary panicled 15-20 cm long racemes; sepals 5, 1 mm long, recurved; stamens 5, free; ovary 3-celled, globose, glabrous, styles 2, hairy, spreading. Fruit a globose berry, 7 mm across; seeds 3, trigonous.

*Fl. & Fr.* : March-October

*Distr.* : Indo-Malesia and Pacific Islands. Fairly common; in semi-evergreen and evergreen forests. Thekkady, *JA 17968.*

*Ethnobotanical use* : The bark is used to stain the fishing nets. Tigers usually scratch on this tree to clean their nails.

## BLACHIA Baillon

Etud. Gen Euph. 388. t. 19. 1858, *nom. cons.*

Shrubs. Leaves alternate or subopposite, entire, penninerved, petiolate. Flowers monoecious or dioecious. Male flowers umbellate, terminal with slender pedicels; sepals 4 or 5, orbicular, concave; petals 5, smaller, hyaline; stamens 10-20, on a convex receptacle, free. Female flowers in short peduncled umbel, 3-5-together; sepals oblong; petals absent; ovary 3 or 4 celled; ovule 1 in each cell; style 3, free, bifid. Fruit a 3-lobed capsule; cocci 2-valved; seeds 3, oblong, mottled.

1. Peduncle of umbel ca. 5 cm long.....**B. umbellata**
1. Peduncle of umbel ca. 1 cm long.....**B. reflexa**

**Blachia reflexa** Benth., J. Linn. Soc. Bot. 17: 226. 1880; Hook. f., Fl. Brit. India 5: 402. 1887; Gamble, Fl. Pres. Madras 1338. 1925; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 222. 1987; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 333. 1976.

Large glabrous shrubs. Leaves to 15 x 6.5 cm, elliptic, acuminate, base acute; nerves 10-12 pairs, irregular, intercostae reticulate; petiole 0.5 cm long. Female flowers in terminal peduncled umbel; pedicel 1 cm long, glabrous; sepals 5, 4 x 1 mm, oblong, acute, glabrous; styles 3 mm long. Capsule 1 cm across, glabrous; seeds 6 x 5 mm, globose, smooth, mottled with red.

*Fl. & Fr.* : February-May

*Distr.* : Southern Western Ghats. Occasional; in evergreen forests. Vellimala, *JA 18422.*

**Blachia umbellata** (Willd.) Baill., Etud. Gen. Euphorb. 387. t. 19. 1858; Hook. f., Fl. Brit. India 5: 402. 1887; Gamble, Fl. Pres. Madras 1338. 1925; Sasidh. & Sivar., Fl. Pl. Thrissur For. 396. 1996. ***Croton umbellatus*** Willd., Sp. Pl. 4: 545. 1805.

Glabrous shrubs; branchlets slender. Leaves to 15 x 5 cm, elliptic, acuminate at apex, base acute; nerves 10-13 pairs, irregular, looping; petiole 1 cm long. Male flowers 5 mm across, 5-10

together in a terminal umbel; pedicel 1.5 cm long; sepals 2.5 x 2 mm, ovate, acute, glabrous; stamens 15-20. Female flowers 8 mm across; 3-5, on stout peduncle, sepals 5, 4 x 2 mm, oblong, acute, glabrous; ovary glabrous; styles 3, 8 mm long, bifid. Capsule 18 mm across, 3-lobed, glabrous.

*Fl. & Fr.* : February

*Distr.* : South India and Sri Lanka. Occasional; in evergreen forests. Arjunankotta, *JA 13385.*

## 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 4.5 x 2.5 cm, acute at apex; capsule ca. 8 mm across ..... **B. vitis-idaea**
1. Leaves to 1.5 x 1.3 cm, obtuse to retuse at apex; capsule ca. 5 mm across ..... **B. retusa**

**Breynia retusa** (Dennst.) Alston, Ann. Roy. Bot. Gard. 11: 204. 1929; Airy Shaw, Kew Bull. 26. 227. 1972; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1415. 1983; Manilal, Fl. Silent Valley 246. 1988; Chakr. & Gang., J. Econ. Tax. Bot. 20(3): 505. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 396. 1996. ***Phyllanthus retusus*** Dennst., Schluess. Hort. Ind. Malab. 24. 1818. ***Phyllanthus patens*** Roxb., Fl. Ind. 3: 667. 1832. ***Melanthesa turbinata*** Wight, Ic. t. 1897. 1852. ***Breynia patens*** (Roxb.) Rolfe, J. Bot. 11: 359. 1882; Hook. f., Fl. Brit. India 5: 329. 1887; Gamble, Fl. Pres. Madras 1304. 1925.

Glabrous shrubs. Leaves ovate, glaucous below, base rounded, black when dried; nerves 6 pairs; petiole 3 mm long; stipule ovate, cordate at base. Female flowers 3 mm across, solitary; pedicels 5 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, 5 x 3 mm, trigonous, white.

*Fl. & Fr.* : March-May

*Distr.* : Indo-Malaya. Occasional; in evergreen forests at high elevations. Kottamalapallam, *JA & KPR 15210, 15224*; Ambari, *JA 15390.*

**Breynia vitis-idaea** (Burm. f.) Fischer, Kew Bull. 1932: 65. 1932; Airy Shaw, Kew Bull. 26. 227. 1972; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1416. 1983; Chakr. & Gang., J. Econ. Tax. Bot. 20(3): 509. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 396. 1996. ***Rhamnus vitis-idaea*** Burm. f., Fl. Ind. 61. 1768. ***Melanthesa rhamnoides*** Wight, Ic. t. 1898, fig 1. 1852. ***Breynia rhamnoides*** (Retz.) Muell.-Arg. in DC., Prodr. 15(2): 440. 1866; Hook. f., Fl. Brit. India 5: 330. 1887; Gamble, Fl. Pres. Madras 1304. 1925.

Densely branched shrubs; stems glabrous. Leaves ovate, rounded at base, glabrous; nerves 5-8 pairs, reticulate, black when dried; petiole 3 mm long; stipule ovate, obtuse. Female flowers axillary; pedicels 4 mm long; perianth 2 mm across, lobes ovate, acute. Male flowers 2-5 together, fascicled; perianth lobes 1.5 mm long. Capsule globose, red; seeds 6, 4 x 2 mm, trigonous, white, glabrous.

*Fl. & Fr.* : October-May

*Distr.* : Indo-Malesia. Common; in semi-evergreen and moist deciduous forests. Mlappara, *JA 12576*; Vallakkadavu, *JA 14089*; Uppupara, *KPR 14137*; Thekkady, *KPR 15303.*

## **BRIDELIA** 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. Scandent shrubs ..... **B. scandens**
1. Erect trees ..... 2
2. Flowers axillary; leaves to 12 cm long; nerves up to 16-19 pairs ..... **B. crenulata**
2. Flowers in terminal branched spikes; leaves to 22 cm long; nerves 23-25 pairs ..... **B. airy-shawii**

**Bridelia airy-shawii** P. T. Li, Acta Phyt. Sin. 20: 117. 1982; Das, Ind. J. For. 7: 315. 1984; Sasidh. & Sivar., Fl. Pl. Thrissur For. 397. 1996. ***Cluytia retusa*** L., Sp. Pl. 1042. 1753. ***B. retusa*** (L.) Spreng. in L., Syst. Veg. (ed. 16) 3: 48. 1826, non A. Juss., 1824: Bedd., Fl. Sylv. t. 266. 1872; Hook. f., Fl. Brit. India 5: 268. 1887, p.p., Gamble, Fl. Pres. Madras 1280. 1925; Airy Shaw, Kew Bull. 26: 230. 1972; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1417. 1983. **Mulluvenga** (Mala Arayan).

Medium trees; branchlets thinly hairy. Leaves to 22 x 11 cm, elliptic-oblong, acute, obtuse or retuse at apex, round or cordate at base, tomentose, below; nerves 23-25 pairs, prominent, dichotomous near the margins; nervules parallel. Flowers in groups in terminal branched spikes, monoecious, 6 mm across; sepals 5, reddish brown, 3 x 1.5 mm, lanceolate, acute, hispid outside; petals smaller, yellow, obovate; styles 3, dichotomous. Capsule 8 mm across, glabrous, black.

*Fl. & Fr.* : May-September

*Distr.* : Indo-Malaya. Common; in moist deciduous and semi-evergreen forests. Koruthode, *JA 12229*; Sabarimala, *JA & KPR 15455.*

**Bridelia crenulata** Roxb., Fl. Ind. 3: 734. 1832; Ramam. in Sald. & Nicols. Fl. Hassan Dist. 334. 1976; Henry et al., Fl. Tamil Nadu Ser. 1, 2: 223. 1987. ***B. roxburghiana*** ( Muell.-Arg.) Gehrm., Bot. Jahrb. 41 (Beibl. 95): 30. 1908; Gamble, Fl. Madras 1280. 1925. ***Cluytia retusa*** L., Sp. Pl. 1042. 1753. ***Bridelia retusa*** (L.) Spreng., var. ***roxburghiana*** Muell.-Arg. in DC., Prodr. 15(2): 493. 1866; Hook.f., Fl. Brit. India 5: 268. 1887. **Kadukumaram** (Mannan)

Small deciduous trees; young shoots brown-tomentose. Leaves 8-12 x 2-5 cm, elliptic-oblong, obtuse to retuse at apex, subcordate at base, velvet tomentose beneath; nerves 16-19 pairs, parallel with close parallel nervules; petiole 5-6 mm long. Flowers in axillary clusters, 5-10 together; pedicels 2-3 mm long, slender, tomentose; calyx lobes 2 mm long, triangular, acute, tomentose. Drupe 6-7 mm diam., globose, glabrous, pinkish turning black.

*Fl. & Fr.* : March-June.

*Distr.* : Peninsular India. Common; in moist deciduous forests and savannahs. Kumarikulam, *JA 14846.*

**Bridelia scandens** (Roxb.) Willd., Sp. Pl. 4: 979. 1805; Gamble, Fl. Pres. Madras 1281. 1925; Airy Shaw, Kew Bull. 26: 230. 1972; Manilal, Fl. Silent Valley 247. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 397. 1996. ***Cluytia scandens*** Roxb., Pl. Corom. t. 173. 1802. *Bridelia stipularis* sensu Hook. f., Fl. Brit. India 5: 270. 1887, non Bl., 1825.

Scandent shrubs; branchlets hispid. Leaves to 11.5 x 7 cm, ovate-oblong, obtuse, hispid, below; nerves 8-10 pairs, prominent, dichotomous near the margins. Flowers 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 7 x 6 mm, obovoid; seeds 2, with a large depression on one side and a deep furrow on the other side.

*Fl. & Fr.* : October-December

*Distr.* : Peninsular India. Occasional; in semi-evergreen forests and moist deciduous forests. Thekkady, *JA 12494.*

## CLAOXYLON A. Jussieu

Euph. Tent. 43, t. 14. 1824.

**Claoxylon beddomei** Hook. f., Fl. Brit. India 5: 413. 1887; S. Rani & Balakr., Rheedea 5: 128. 1995. ***Micrococca beddomei*** (Hook. f.) Prain, Ann. Bot. (London) 25: 630. 1911; Gamble, Fl. Pres. Madras 1328. 1925; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 235. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 410. 1996.

Slender herbs, glabrous. Leaves to 17 x 5 cm, elliptic-oblong, serrate; petiole 3-6 cm long, slender. Flowers dioecious. Male flowers in distant clusters on slender racemes, pedicellate with many imbricating bracts; sepals 5, orbicular, pubescent; stamens many, free. Female flowers 1-few on axillary raceme; bracts few; sepals 5, 2 x 1 mm, ovate, ciliate; ovary densely bristled hairy; styles 3, free, radiating. Capsule 3-lobed, 5 mm broad.

*Fl. & Fr.* : December-February

*Distr.* : Southern Western Ghats (Kerala). Occasional; in forest margins at high elevations. Udumbatheri, *JA 13337.*

## CLEIDION Blume

Bijdr. 612. 1825.

**Cleidion javanicum** Bl., Bijdr. 613. 1825; Bedd., Fl. Sylv. t. 272. 1872; Hook. f., Fl. Brit. India 5: 444. 1887; Gamble, Fl. Pres. Madras 1325. 1925; Airy Shaw, Euphorb. New Guinea 57. 1980 & Kew Bull. 37: 12. 1982; Sasidh. & Sivar., Fl. Pl. Thrissur For. 398. 1996. *Acalypha* ***spiciflora*** Burm.f., Fl. Ind. 303, t. 61.1768. ***C. spiciflorum*** (Burm. f.) Merr., Interpr. Rumph. Herb. Amb. 322. 1917; Airy Shaw, Kew Bull. 26: 234. 1972.

Small to medium dioecious trees; branchlets glabrous. Leaves to 15 x 6 cm, elliptic-oblong, obtusely acuminate at apex, acute at base, serrate, penninerved; petiole to 4 cm long; stipule ovate, acute, entire. Male flowers in axillary 16 cm long 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, lobe 1 x 1 cm, globose; seeds 1 in each cell, globose.

*Fl. & Fr.* : January-July

*Distr.* : India, South China Eastwards to Malesia. Fairly common; in semi-evergreen forests. Kokkara, *JA 12024,* Mullakkudy, *13118*; *KPR & JA 14560.*

## **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, carunculate.

1. Leaves to 5 x 3 cm, serrate; capsule ca. 6 x 4 mm; erect stiff herbs ..... **C. bonplandianus**
1. Leaves larger, entire; capsule over 1 cm broad; tall shrubs or trees ..... 2
2. Leaves opposite or whorled ..... **C. zeylanicus**
2. Leaves alternate ..... 3
3. Mature leaves glabrous on both sides; capsule glabrous ..... **C. tiglium**
3. Mature leaves and capsule stellate hairy or scaly ..... 4
4. Staminal filaments bearded; glands on the leaves sessile ..... 5
4. Staminal filaments glabrous; glands on the leaves stalked ..... **C. caudatus**
5. Branchlets and underside of leaves covered with white silvery scales ..... **C. malabaricus**
5. Branchlets and underside of leaves covered with stellate hairs ..... **C. laccifer**

**Croton bonplandianus** Baill., Adansonia 4: 339. 1864; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2):1420.1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 399.1996. *C. sparsiflorus* Morong., Ann. New York Acad. Sci. 7: 221. 1893; Gamble, Fl. Pres. Madras 1316. 1925.

Erect undershrubs; branches stellate-scaly. Leaves ovate-lanceolate, acute to acuminate at apex, base rounded, glabrous; nerves 10 pairs. Racemes to 7 cm long, terminal. Female flowers basal few, 3 mm across; sepals 5, triangular, glabrous; petals oblong, longer than sepals; torus densely villous; ovary densely hairy, styles 3, divided, lobes curled. Male flowers above the female ones in the raceme; stamens 10-15. Capsule obovoid, stellate hairy; seeds 4.5 x 2.5 mm, minutely pitted.

*Fl. & Fr.* : Throughout the year

*Distr.* : Native of South America, now naturalised in Old World Tropics. Occasional; in disturbed forest areas and lake sides. Thekkady, *JA 15316.*

**Croton caudatus** Geiseler, Crot. Monogr. 73. 1807; Hook. f., Fl. Brit. India 5: 388. 1887; Gamble, Fl. Pres. Madras 1315. 1925; Airy Shaw, Kew Bull. 26: 245. 1972 & 37: 14. 1982; Sasidh. & Sivar., Fl. Pl. Thrissur For. 399. 1996.

Scandent shrubs. Leaves to 11x 6 cm, ovate, acuminate, irregularly crenate, cordate at base, sparsely stellate hairy; petiole 2-3.5 cm long, densely stellate hairy, stipule 15 mm long, divided into 2-5 linear lobes. Racemes to 20 cm long, densely tomentose. Female flowers pedicelled, 8 mm across; sepals lanceolate; petals hispid; ovary densely stellate hairy, style linear, not divided, 6 mm long. Male flowers many; sepals ovate; petals similar to sepals; torus densely villous; stamens many, filaments, glabrous. Capsule 20 x 17 mm, obovoid, retuse, densely stellate hairy.

*Fl. & Fr.* : December-March

*Distr.* : South India. Common; in evergreen and semi-evergreen forests. Koruthode, *JA 13489*; Sabarimala, *KPR 17729.*

**Croton laccifer** L., Sp. Pl. 1005. 1753, "*lacciferum*" ; Wight, Ic. t. 1915. 1852; Gamble, Fl. Pres. Madras 1315. 1925; Airy Shaw, Kew Bull. 26: 248. 1972; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1420. 1983; Manilal, Fl. Silent Valley 247. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 399. 1996. ***C. aromaticus*** sensu Hook. f., Fl. Brit. India 5: 338. 1887, p.p. non L., 1753.

Shrubs, branchlets stellate, brown tomentose. Leaves to 12 x 6 cm, ovate, acuminate, cordate at base, 3-ribbed from base, glands 2 pairs; upper leaves with acute base; petiole 2-3 cm long. Racemes 10 cm long, solitary or paired, densely stellate hairy; female flower 7 mm across; sepals ovate, acute; petals obovate, ciliate; styles 3, each dichotomously divided, glabrous. Male flowers many, similar to female flowers; stamens 20, filaments bearded. capsule 1 cm across, globose, densely stellate hairy.

*Fl. & Fr.* : March-September

*Distr.* : India, Burma and Sri Lanka. Occasional; along the margins of evergreen forests. Vellimala, *JA 18423.*

**Croton malabaricus** Bedd., Ic. t. 181. 1868-1874; Hook. f., Fl. Brit. India 5: 386. 1887; Gamble, Fl. Pres. Madras 1314. 1925; Sasidh. & Sivar., Fl. Pl. Thrissur For. 399. 1996. **Chunnampu maram** (Mannan).

Small to medium trees, stellately scaly. Leaves to 18 x 12 cm, ovate, rounded at base, acuminate, silvery white, below; nerves 7 or 8 pairs, lowers ones from the base; glands sessile; petiole 6-8 cm long; stipule 15 mm long, filiform. Racemes 10 cm long, terminal. Female flowers pedicelled, 10 mm across; sepals ovate, obtuse, silky tomentose; petals obovate; ovary stellate hairy. Male flowers smaller; stamens 10, filaments bearded. Capsule 2 x 2 cm, obovoid, emarginate, densely brown scaly; seeds 13 x 8 mm, oblong, mottled with brown.

*Fl. & Fr.* : April-July

*Distr.* : Southern Western Ghats. Common; in evergreen and semi-evergreen forests. Puthussery, *JA 13503*; Sabarimala, *KPR 14941.*

**Croton tiglium** L., Sp. Pl. 1004. 1753; Hook. f., Fl. Brit. India 5: 393. 1887; Gamble, Fl. Pres. Madras 1315. 1925; Manilal, Fl. Silent Valley 246. 1988. **Kadalavanakku** (Mala Arayan).

Small trees, younger parts stellate hairy. Leaves to 13 x 6 cm, ovate, crenulate, rounded at base; nerves 4 or 5 pairs; petiole 5-8 cm long. Racemes 12 cm long, sparsely stellate hairy. Flowers 5 mm across; sepals ovate, acute, tomentose at tip; petals oblong, white, densely villous; stamens 15. Capsule 2 x 2 cm, obovoid; seeds dull white.

*Fl. & Fr.* : December-May

*Distr.* : India, China and Malaya. Occasional; in disturbed forests and old tribal settlements in the reserve. Pambavalley, *JA 17077.*

*Ethnobotanical use* : The fruits are used for fish poisoning (Mala Arayan).

**Croton zeylanicus** Muell.-Arg., Linnaea 34: 107. 1865 & in DC., Prodr. 15(2): 581. 1866; Manilal, Fl. Silent Valley 247. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 400. 1996. *C. **reticulatus*** Heyne ex Muell.-Arg. in DC., Prodr. 15(2): 580. 1866; Hook. f., Fl. Brit. India 5: 380. 1887; Gamble, Fl. Pres. Madras 1314. 1925.

Shrubs, densely covered with brown, fimbriate scales. Leaves to 20 x 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 cm long. Female flowers pedicelled, 4 mm across; sepals ovate, obtuse; petals obovate, smaller, tomentose; ovary brown stellate hairy; styles 3, each 3 fid and then 2 fid, glabrous. Male flowers smaller; stamens many, filaments glabrous Capsule 1.3 x 1 cm, ovoid; seeds 8 x7 mm, oblong, mottled with brown.

*Fl. & Fr.* : August

*Distr.* : South India and Sri Lanka. Rare; along evergreen forest margins. Pachakkanam, *JA 12279*; Uppermanalar, *JA 13825.*

## **DAPHNIPHYLLUM** Blume

Bijdr. 1152. 1826.

**Daphniphyllum neilgherrense** (Wight) K. Rosenth. in Engl., Pflanzenr. 4(147 a): 7. 1919; Gamble, Fl. Pres. Madras 1311. 1925; Mohanan & Henry, Fl. Thiruvananthapuram 429. 1994. ***Goughia neilgherrensis*** Wight, Ic. t. tt. 1878 & 1879. 1852. ***Daphniphyllum glaucescens*** sensu

Muell.-Arg. in DC., Prodr. 16(2): 3. 1866, non Bl., 1826-1827; Hook. f., Fl. Brit. India 5: 353. 1887.

Small evergreen trees; latex milky; branchlets stout. Leaves to 10 x 4 cm, oblong-obovate, obtuse, entire; nerves 8 pairs, pale below, glabrous; petiole 3 cm long. Flowers dioecious. Male flowers in axillary racemes; bracts 3 x 3 mm, ovate, obtuse, ciliate; sepals 5, 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 12 mm across, reddish green.

*Fl & Fr.*. : December

*Distr.* : India, Java and Korea. Rare; along evergreen forest margins. Uppermanalar, *JA & KPR 14439.*

## **DIMORPHOCALYX** Thwaites

Enum. Pl. Zeyl. 278. 1861.

**Dimorphocalyx lawianus** (Muell.-Arg.) Hook. f., Fl. Brit. India 5: 404. 1887; Gamble, Fl. Pres. Madras 1337. 1925; Sasidh. & Sivar., Fl. Pl. Thrissur For. 400. 1996. ***Trigonostemon lawianus*** Muell.-Arg., Linnaea 34: 212. 1865, p.p.; Bedd., Fl. Sylv. t. 273. 1872.

Trees, branchlets slender, white. Leaves to 16 x 7 cm, elliptic, acuminate, base acute; nerves 13 pairs, irregular; petiole 2 cm long; stipule ovate, acute. Flowers dioecious, male flowers in 5 cm long axillary raceme, 8-10 mm across; calyx 5 mm long, campanulate, 5-toothed above; petals 5, 10 x 5 mm, obovate, white; stamens many, combined into a branched column. Female flowers few, in short racemes; sepals 5, 2.5 cm long, oblanceolate; 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, to 20 x 22 mm.

*Fl. & Fr.* : February-April

*Distr.* : Throughout the Western Ghats. Common; in evergreen forests. Koruthode, *JA 13402; 15150*; Poonkavanam, *JA 14957*; Chenthamara, *JA 15145.*

## **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 usually solitary; calyx lobes 4 or 5, imbricate; stamens 4-24, placed round the disk, free; disk flat, crenate; ovary 1-4-celled, oblong,

ovule 2 in each cell, pendulous; stigma 1, sessile, flat or recurved. Fruit a globose-ellipsoid or lobed, drupe 1-4-celled; seed solitary in each cell, arillate.

1. Leaves to 15 cm long; ovary 1-celled.....2
1. Leaves over 20 cm long; ovary 2-4-celled.....4
2. Branchlets and petiole tomentose.....**D. wightii**
2. Branchlets glabrous .....3
3. Leaves to 14 cm long; pedicels of female flowers to 4.5 cm long.....**D. elata**
3. Leaves to 9 cm long; pedicels of female flowers to 1 cm long .....**D. venusta**
4. Female flowers 3-20 together, pedicelled; leaves entire, thinly pubescent along midrib below ..... ..... .....**D. malabarica**
4. Female flowers 1 or 2 together, sessile; leaves distantly crenate, glabrous .....**D. oblongifolia**

**Drypetes elata** (Bedd.) Pax & Hoffm. in Engl., Pflanzenr. 81: 268. 1922; Manilal, Fl. Silent Valley 248. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 401. 1996. ***Hemicyclia elata*** Bedd., Fl. Sylv. t. 279. 1872; Hook. f., Fl. Brit. India 5: 339. 1887; Gamble, Fl. Pres. Madras 1300. 1925.

Medium trees with fluted bole; branchlets drooping, glabrous. Leaves to 14 x 5 cm, elliptic-oblong, obtusely acuminate; nerves 9 pairs, nervules transverse; petiole 5 mm long. Male pedicels 15 mm long, fascicled; sepals 4, 4 mm long, oblong, densely tomentose, stamens 8, filaments hispid. Female flowers 1 or 2, axillary; pedicels slander, sepals equal to male flowers; ovary 3 x 2 mm, densely tomentose; stigma 3-4-lobed, peltate. Drupes to 20 x 13 mm, obovoid, glabrous.

*Fl. & Fr.* : January-March

*Distr.* : Peninsular India. Common; in evergreen forests at low elevations. Arjunankotta, *JA 13164*; Koruthode, *JA 13398.*

**Drypetes malabarica** (Bedd.) Airy Shaw, Kew Bull. 23: 56. 1969; Sasidh. & Sivar., Fl. Pl. Thrissur For. 401. 1996; Chakrab. *et al.*, J. Econ. Tax. Bot. 21: 269. 1997. ***Cyclostemon malabaricus*** Bedd., For. Man. Bot. 199. 1873; Hook. f., Fl. Brit. India 5: 341. 1887; Gamble, Fl. Pres. Madras 1302. 1925.

Medium trees with slightly fluted bole and horizontal branches; branchlets angled, densely villous. Leaves to 26 x 8.5 cm; oblong, unequally obtuse at base, abruptly acuminate at apex; nerves 8 pairs, reticulate; petiole 1 cm long, hispid. Female flowers 18 mm across, clustered on old wood; pedicels 14 mm long, stout, densely fulvous tomentose; sepals 4, 7 x 4 mm, oblong, densely tomentose outside; ovary globose, densely hispid; stigma 4-lobed, peltate, black.

*Fl. & Fr.* : February-April

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Pamba, *JA 17719.*

**Drypetes oblongifolia** (Bedd.) Airy Shaw, Kew Bull. 23: 57. 1969; Manilal, Fl. Silent Valley 248. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 401. 1996; Chakrab. *et al*, J. Econ. Tax. Bot. 21: 270. 1997. ***Laneasagum oblongifolium*** Bedd., Madras J. Lit Sci. n. s. 6: 71. 1861. ***Cyclostemon macrophyllus*** Bl. var. ***sessiliflora*** Bedd., Fl. Sylv. t. 278. 1872. ***C. macrophyllus*** Bl. var. ***peninsularis*** Hook. f., Fl. Brit. India 5: 341. 1887. ***C. macrophyllus*** auct. non Bl., 1825: Gamble, Fl. Pres. Madras 1302. 1925.

Medium trees with horizontal branches; branchlets scabrous. Leaves to 23 x 10 cm, oblong, rounded at base, acuminate at apex; nerves 9-11 pairs, prominent below, strongly reticulate. Female flowers 6.5 mm across, sessile, solitary or paired; bracts minute, orbicular; sepals 4, 6.5 mm across, orbicular, densely fulvous hairy outside; ovary globose, densely hairy; stigma discoid, shortly lobed, glabrous. Male flowers subsessile; sepals ovate; stamens many. Drupes 2 x 1.5 cm, obovoid, densely hispid, rind hard.

*Fl. & Fr.* : April-June

*Distr.* : Southern Western Ghats (South Karnataka and Kerala). Occasional; in evergreen forests. Arjunankotta, *JA 15067.*

**Drypetes venusta** (Wight) Pax & Hoffm. in Engl., Pflanzenr. 81: 268. 1922; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 226. 1987; Chakrab. *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; Hook. f., Fl. Brit. India 5: 339. 1887; Gamble, Fl. Pres. Madras 1300. 1925. **Palakani, Thalakanimaram** (Mannan).

Trees with fluted bole and drooping branches; branchlets glabrous. Leaves to 9 x 3.5 cm, elliptic, abruptly acuminate, base acute; nerves 7-10 pairs, reticulate; petiole 5 mm long. Male flowers 8 mm across, fascicled, axillary; pedicels 3-6-together, 5-8 mm long, slender, minutely hispid; tepals 4, 4 x 2 mm, oblong, obtuse, hispid outside; stamens 10, filaments 3 mm long, glabrous; disk densely villous.

*Fl. & Fr.* : January

*Distr.* : Peninsular India. Common; in evergreen forests. Anchuruli, *JA 17125.*

*Ethnobotanical importance* : A beautiful tree for its general canopy structure and hence it is usually planted near the houses of Mannan as a shade tree.

**Drypetes wightii** (Hook. f.) Pax & Hoffm. in Engl., Pflanzenr. 81: 273. 1922; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 227. 1987; Chakrab. *et al.*, J. Econ. Tax. Bot. 21: 277. 1997. ***Hemicyclia wightii*** Hook. f., Fl. Brit. India 5: 339. 1887; Gamble, Fl. Pres. Madras 1300. 1925.

Small trees; bole fluted; branches drooping; bark white, smooth; branchlets tomentose. Leaves 4-7 x 2.5 cm, elliptic, acuminate, glabrous; nerves many, irregular, prominently reticulate; petiole 5 mm long, tomentose. Male flowers sub-sessile, solitary or fascicled; calyx lobes 4, ovate, acute, 2 mm long, densely hispid, connate at base; stamens few, filaments glabrous. Female pedicel 1 cm long, densely hispid. Capsule 13 x 0.8 cm, obovoid, glabrous.

*Fl. & Fr.* : October-March

*Distr.* : Peninsular India. Common; in evergreen forests. Inchippara, JA *12591*; Chokkampetti, JA *13346*, Uppermanalar, JA *13719, JA 13737.*

## EPIPRINUS Griffith

Notul. Pl. Asiat. 4: 487. 1854.

**Epiprinus mallotiformis** (Muell.-Arg.) Croizat, J. Arnold Arbor. 23: 53. 1942; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1424. 1983; Manilal, Fl. Silent Valley 249. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 401. 1996. ***Symphyllia mallotiformis*** Muell.-Arg. in Linnaea 34: 156. 1865; Gamble, Fl. Pres. Madras 1323. 1925. ***Cephalocroton indicum*** Bedd., Fl. Sylv. t. 261. 1872. ***Adenochlaena indica*** (Bedd.) Bedd. ex Hook. f., Fl. Brit. India 5: 418. 1887.

Small trees; tender parts stellate-tomentose. Leaves alternate, to 17 x 8 cm, elliptic, acute; nerves 6 pairs, prominent, nervules reticulate; petioles unequal, to 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, 3 mm long, lanceolate, densely tomentose; ovary 3-celled, densely hairy, styles 3, to 15 mm 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 2.5 cm across, 3-lobed, lobes globular, densely stellate hairy; seeds 3, globose.

*Fl. & Fr.* : April-July

*Distr.* : Peninsular India. Common; in evergreen forests. Mlappara, *JA 12081.*

## 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, oblong, carunculate.

1. Small trees; branches angled, thick, with spines; leaves absent ..... **E. vajraveluii**

1. Erect or prostrate herbs or subshrubs; unarmed; leaves present ..... 2

2. Leaves to 6 x 4 mm; nerves aeriolate, prostrate herbs ..... **E. thymifolia**

2. Leaves more than 2 cm long; nerves not aeriolate; erect herbs or subshrubs ..... 3

3. Cyathia in shortly peduncled axillary cymes; leaves to 4 x 1.5 cm ..... **E. hirta**

3. Cyathia in terminal cymes; leaves above 7 cm long ..... 4

4. Leaves oblanceolate; cyathium solitary on terminal panicled cymes; seeds biconvex, smooth ..... **E. rothiana**

4. Leaves elliptic, obtuse, cyathea densely clustered on terminal compact cymes; seeds squarish, rugose ..... **E. heterophylla**

**Euphorbia heterophylla** L., Sp. Pl. 483. 1753; Smith, Kew Bull. 2: 264. 1972; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1432. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 414. 1994. ***E. prunifolia*** Jacq., Hort. Schoenbr. 3: 15, t. 277. 1798; Hook. f., Fl. Brit. India 5: 266. 1887.

Erect branched herbs, to 40 cm tall; stems glabrous, glaucous. Leaves to 12 x 5.5 cm, elliptic, acute or obtuse, glabrous above, pubescent below; petiole 3-4 cm long. Cyathium 3 x 2, many together, obconical; bracts lobed, lobes fimbriate, glabrous, glands 2, sessile; stamens many. Capsule 6 x 6 mm, cocci globular, puberulus; seeds 3 x 2.5 mm, squarish, rugose.

*Fl. & Fr.* : Throughout the year

*Distr.* : India, Sumatra, Afghanistan and Sri Lanka. Occasional; in disturbed moist deciduous forests. Thekkady, *JA 12551*, Dam site, *JA & KPR 15106.*

**Euphorbia hirta** L., Sp. Pl. 454. 1753; Gamble, Fl. Pres. Madras 1275. 1925; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1434. 1983; Manilal, Fl. Silent Valley 249. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 403. 1996. ***E. pilulifera*** sensu Hook. f., Fl. Brit. India 5: 250. 1887, non L., 1753. **Nilampala**

Erect unbranched herbs; stem villous, white or reddish. Leaves opposite, to 4 x 1.5 cm, ovate, unequal at base, acute at apex, serrate, hirtus below, 3-ribbed from base; petiole 3 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 1 x 1.5 mm, 3-lobed, lobes acute, hispid; seeds 1 x 0.5 mm, 3-angular, rugose.

*Fl. & Fr.* : Throughout the year

*Distr.* : Pantropical. Common; in disturbed moist deciduous forests. Thekkady, *JA & KPR 15313.*

**Euphorbia rothiana** Spreng., Syst. Veg. 3: 796. 1826; Wight, Ic. t. 1864. 1852; Hook. f., Fl. Brit. India 5: 263. 1887; Gamble, Fl. Pres. Madras 1278. 1925; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1438. 1983; Manilal, Fl. Silent Valley 249. 1988. ***E. laeta*** sensu Heyne ex Roth, Nov. Pl. 230. 1821, non Ait., 1789: Raju, J. Econ. Tax. Bot. 6: 413. 1985.

Erect subshrubs, to 2.5 m tall, stems glaucous, glabrous. Leaves alternate, opposite or whorled, to 10 x 1.5 cm, acute at apex, entire, glabrous, glaucous below; base attenuate into a short petiole. Cyathium 2 x 2 mm, in terminal panicled cymes, 5-glandular around the rim of involucre. Male florets many, filaments glabrous; ovary long-stalked. Capsule 3 x 3 mm, cocci 3, globular, smooth; seeds 2.5 x 2 mm, obovoid, smooth.

*Fl. & Fr.* : December-April

*Distr.* : Peninsular India and Sri Lanka. Common; in forest margins. Kalvarimala, *JA 13031.*

**Euphorbia thymifolia** L., Sp. Pl. 454. 1753; Hook. f., Fl. Brit. India 5: 252. 1887; Gamble, Fl. Pres. Madras 1276. 1925; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1439. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 230. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 404. 1996.

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, 0.5 mm across; involucre 0.8 mm long, campanulate, 4-glandular. Male flowers 1-4; ovary tomentose, styles 3, Capsule 1.5 mm across, minutely adpressed pubescent; seeds 1 x 0.5 mm, 3-angled, transversally rugose.

*Fl. & Fr.* : October-February

*Distr.* : Tropical Asia. Common; along forest roads and river beds when water recedes. Thekkady, *JA & KPR 14912*; Dam site, JA *15102*; Thaannikkudy, JA *16832.*

**Euphorbia vajraveluii** Binojk. & Balakr., Cactus Succ. J. 63: 229. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 404. 1996.

Stout trees to 4 m tall; stems thick, succulent, flattened or 3-angled, 3-4 cm broad, glabrous; angles armed with paired black spines, 1-10 mm long. Leaves minute, 5mm long, ovate. Cyathea solitary or 2-5 together, 5-8 mm across, sessile above the spines along the angles of the stem, involucral lobes obtuse, glabrous, 4-glanded along the angles. Male florets fascicled in 4 or 5 bundles with 4-6 in each bundle; ovary glabrous; styles connate to the middle. Fruits not seen.

*Fl.* : October

*Distr.* : Western Ghats. Rare; along margins of evergreen forests. Kottamala, *JA & KPR 16880.*

## EXCOECARIA Linnaeus

Syst. Nat. ed. 10, 2: 1288. 1759.

Trees or shrubs, juice milky. Leaves opposite, petiolate. Flowers in unisexual or bisexual spikes; rachis glandular. Male flowers towards the upper parts of racemes, 2-3 in the axils of each bracts; sepals 3, free; stamens 3, free. Female flowers 1-few, at the base of the raceme or on separate raceme; sepals 3, larger than male flowers; ovary 3-celled; ovule 1 in each cell, styles 3, spreading. Fruit a 3-lobed capsule; cocci separating from columella; seeds subglobose.

1. Leaves crenulate along the margins; bracts with 1 male flower.....**E. crenulata**

1. Leaves entire along the margins; bracts with 2 or 3 male flowers.....**E. robusta**

**Excoecaria crenulata** Wight, Ic. t. 1865. 1852; Hook. f., Fl. Brit. India 5: 473. 1888; Gamble, Fl. Pres. Madras 1345. 1925. Ramam. in Sald. & Nicols., Fl. Hassan Dist. 340. 1976; Manilal, Fl. Silent Valley 250. 1988.

Large shrubs; branchlets glabrous. Leaves to 20 x 6 cm, oblanceolate, acuminate, narrowed to the base; nerves 10-15 pairs, regular; petiole 3 cm long; stipules 15 mm long, lanceolate. Male racemes 8 cm long, slender, bracts orbicular, 3 mm across, ciliate. Flowers solitary; sepals 3, 1 mm long, oblong; stamens 3, free, anthers sessile, pistillode present. Female flowers 2-5 on short terminal raceme; bracts similar to male flowers; sepals larger; styles 3-fid, recurved. Capsule 12 mm across, glabrous.

*Fl. & Fr.* : April-May

*Distr.* : Peninsular India and Sri Lanka. Common; in evergreen forests. Sunderamala, *JA 13582*; Aruvioda, *JA 13648.*

**Excoecaria robusta** Hook. f., Fl. Brit. India 5: 474. 1888; Gamble, Fl. Pres. Madras 1345. 1925; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 230. 1987; Chandrab., Bull. Bot. Surv. India 12(1-4): 275. 1970; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1443. 1983.

Subshrubs, branchlets stout. Leaves to 19 x 4 cm, linear-oblong, acuminate, acute at base, glabrous, coriaceous; nerves 23 pairs, regular; petiole 1-2 cm long, stipule lanceolate. Male racemes 5-6 cm long, terminal, stout; bracts 4-5 mm across, orbicular, ciliate. Flowers many; male sepals 2 mm long, spineus serrate, stamens 3, free, much exserted.

*Fl. & Fr.* : April

*Distr.* : South India and Sri Lanka. Common; in evergreen forests. Arjunankotta, *JA 15071.*

## GIVOTIA Griffith

Calcutta J. Nat. Hist. 4: 388. 1843.

**Givotia rottleriformis** Griff., Calcutta J. Nat. Hist. 4: 388. 1844; Wight, Ic. t. 1889. 1854; Hook. f., Fl. Brit. India 5: 395. 1887; Gamble, Fl. Pres. Madras 1342. 1925; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1443. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 230. 1987.

Medium trees; branchlets densely stellate-tomentose. Leaves alternate, 17 x 15 cm, broadly ovate, acute, cordate at base, dentate, glabrous above, densely stellate tomentose below; nerves from the base; petiole to 10 cm long. Flowers dioecious, in axillary to 20 cm long, paniculate cymes. Male flowers pedicelled, sepals 5, obovate, obtuse; stamens 20, free. Female flowers few in shorter panicles; ovary 3-celled; styles 3, spreading, 2-fid. Capsule 3 cm across, globose, densely tomentose; seeds 3, oblong.

*Fl. & Fr.* : November-January

*Distr.* : Peninsular India and Sri Lanka. Common; along margins of moist deciduous forests. Brandippara, *JA 16361*.

## GLOCHIDION J. R. Forster & J. G. A. Forster

Charact. Gen. 113, t. 57. 1775, *nom. cons.*

Shrubs or trees, branchlets deciduous. Leaves alternate, bifarious, 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, apex produced; ovary 3-15-celled, conical, ovule 2 in each cell; styles 3-15, short, connate into a column. Fruit a capsule, 3-15 valved, globose or depressed globose; seeds 3-15, hemispheric or laterally compressed.

1. Capsule globose; leaves cordate at base; anthers 4 or more.....**G. zeylanicum**
1. Capsule depressed globose; leaves acute at base; anthers 3.....2
2. Branchlets and leaves densely tomentose .....3
2. Branchlets and leaves glabrous .....4
3. Leaves to 9 x 3 cm, nervules parallel.....**G. heyneanum**
3. Leaves to 15 x 6 cm, nervules reticulate.....**G. hohenackeri** var. **johnstonei**
4. Epidermal cells of the seeds distinct, each oblong, irregularly disposed; ovary 8-celled....**G. ellipticum**
4. Epidermal cells of the seeds not distinct; ovary 5-celled.....**G. bourdillonii**

**Glochidion bourdillonii** Gamble, Kew Bull. 1925: 330. 1925 & Fl. Pres. Madras 1308. 1925; Mohanan & Henry, Fl. Thiruvananthapuram 417. 1994; Chakr. & Gang., J. Econ. Tax. Bot. 10(1): 187. 1995.

Small glabrous trees. Leaves to 12 x 5 cm, elliptic-oblong, coriaceous, unequal at base; nerves 6-8 pairs, prominently reticulate; petiole 3 mm long. Flowers in axillary subsessile, clusters; pedicels 3-5 mm long. Capsule 6.5 mm across, deeply 5-lobed, depressed above with a knot in the sinus; seeds 5, 3 x 3 mm, dark brown, glabrous.

*Fl. & Fr.* : June-September

*Distr.* : Southern Western Ghats (Kerala). Rare; along the margins of evergreen forests. Chenthamara, *JA 12286.*

**Glochidion ellipticum** Wight, Ic. t. 1906. 1852; Hook. f., Fl. Brit. India 5: 321. 1887; Gamble, Fl. Pres. Madras 1308. 1925; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1445. 1983; Chakr. & Gang., J. Econ. Tax. Bot. 10(1): 199. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 404. 1996.

Small glabrous trees. Leaves to 11 x 3.5 cm, elliptic-oblong, abruptly acuminate, acute and oblique at base; nerves 5-7 pairs, narrow; petiole 5 mm long. Female flowers 2 mm across, 6-10 together in an axil; pedicels 6 mm long; sepals 6, 2 mm long, obovate, obtuse, hispid inside; ovary densely hispid, 8-celled; style column 1 mm long, 5-toothed at apex. Capsule 1 cm across, depressed above; hirsute; seeds 8, glabrous, brown.

*Fl. & Fr.* : December-June

*Distr.* : Peninsular India, endemic. Common; in evergreen forests. Pachakkanam, *JA 13273, JA 12275*; Mlappara, JA *13314*; Kalvarimala, JA *13852.*

**Glochidion hohenackeri** (Muell.-Arg.) Bedd., For. Man. Bot. 193. 1873 var. **johnstonei** (Hook.f.) Chakr. & Gang., J. Econ. Tax. Bot. 10(1): 210. 1995. ***Glochidion johnstonei*** Hook. f., Fl. Brit. India 5: 314. 1887; Gamble, Fl. Pres. Madras 1307.1925; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 341. 1976.

Small trees, branchlets villous. Leaves to 15 x 6 cm, ovate-oblong, acuminate at apex; unequal at base, thinly tomentose below, especially along the midrib; nerves 6-8 pairs, nervules prominently reticulate; petiole 2-3 mm long. Flowers in axillary clusters, densely tomentose.

*Fl.* : March (a very imperfect specimen only could be collected which was in bud stage)

*Distr.* : Western Ghats, Canara and southwards, endemic. Rare; in evergreen forests. Vallakkadavu, *JA 13414.*

**Glochidion heyneanum** Wight Ic. t. 1908. 1852; Chakr. & Gang., J. Econ. Tax. Bot. 10(1): 205. 1995. ***Glochidion velutinum*** Wight, Ic. t. 1707, f. 2. 1852; Hook. f., Fl. Brit. India 5: 322. 1887; Gamble, Fl. Pres. Madras 1307. 1925; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 231. 1987.

Small trees. Leaves elliptic, acute at both ends, densely velutinous-tomentose; nerves 7 pairs, nervules subparallel; petiole 5 mm long, tomentose. Flowers solitary or 2-3 together, pedicels 5 mm long; female sepals 5, ovate, acute, densely tomentose; ovary ovoid, style 1 mm long, 5-toothed at apex. Male flowers 4 mm across, 2 or 3 together; stamens 3. Capsule 8 mm across, tomentose; seeds 5-7, 2 x 2.5 mm, grey, smooth.

*Fl. & Fr.* : July-August

*Distr.* : India & Burma. Common; in moist deciduous forests. Kokkara, *JA 12052, 12200.*

**Glochidion zeylanicum** (Gaertn.) Juss., Euphorb. Gen. Tent. 107. 1824.

There are two well distinct varieties in the study area:

Key to the varieties:

1. Leaves densely tomentose below ..... var. **tomentosum**
1. Leaves glabrous below..... var. **zeylanicum**

**Glochidion zeylanicum** (Gaertn.) Juss., Euphorb. Gen. Tent. 107. 1824, var. **tomentosum** (Dalz.) Chakr. & Gang., J. Econ. Tax. Bot. 10(1): 210. 1995.***Glochidion tomentosum*** Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 2: 38. 1850; Hook. f., Fl. Brit. India 5: 309. 1887; Gamble, Fl. Pres. Madras 1306. 1925; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 342. 1976.

Small trees; branchlets glabrous. Leaves to 15 x 7 cm, ovate-oblong, acute, base round to cordate, glabrous above; nerves 8 pairs, nervules parallel, prominent; petiole to 5 mm long. Flowers 4-6 together, in axillary umbel, peduncles adnate to the stem; pedicels 6-8 mm long; sepals 5, 3 x 2 mm, ovate, acute, tomentose, shortly toothed at apex; style 3 mm long, densely hispid. Capsule 10 mm across, depressed globose, beaked, hispid.

*Fl. & Fr.* : March-July

*Distr.* : Indo-Malesia. Common; in moist deciduous forests. Kokkara, *JA 12005*; Vallakkadavu, *JA 13471.*

**Glochidion zeylanicum** (Gaertn.) Juss. Euphorb. Gen. Tent. 107. 1824, Hook. f., Fl. Brit. India 5: 310. 1887; Gamble, Fl. Pres. Madras 1306. 1925; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1446. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 405. 1996, var. **zeylanicum** Chakr. & Gang., J. Econ. Tax. Bot. 10(1): 210. 1995; ***Bridelia zeylanica*** Gaertn., Fruct. 2: 128, t. 109. 1790.

Small glabrous trees. Leaves to 15 x 7 cm, ovate, obtusely acuminate, base round or cordate; nerves 8 pairs, nervules prominently reticulate; petiole 5 mm long. Flowers 3-5, in axillary umbel, peduncle 8 mm long, adnate to the stem; pedicels 4 mm long; sepals 4 or 5, ovate, obtuse, connate at base; style 3 mm long, toothed at apex. Capsule 7 mm across, glabrous, beaked.

*Fl. & Fr.* : March-May

*Distr.* : Indo-Malesia. Common; in semi-evergreen forests. Vallakkadavu, *JA 13654*; Koruthode, *JA & KPR 14761.*

## **HOMONOIA** Loureiro

Fl. Cochinch. 601. 1760.

**Homonoia riparia** Lour., Fl. Cochinch. 2: 637. 1790; Hook. f., Fl. Brit. India 5: 455. 1887; Gamble, Fl. Pres. Madras 1333. 1925; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1447. 1983; Manilal, Fl. Silent Valley 250. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 405. 1996. *Attu vanchi* (Mala Arayan)

Large shrubs; branchlets pubescent, reddish. Leaves spiral, closely packed, to 18 x 2 cm, linear-oblong, acute at either ends, penninerved, covered with yellow scales below and pubescent along nerves; petiole 1 cm long, tomentose; stipule filiform. Flowers dioecious in axillary 10-15 cm long racemes. Male flowers 3 mm across, sepals 2-5, glabrous, ciliate along the margins, yellowish red; stamens many, free. Female flowers sessile, densely packed; bracts ovate; sepals 2 mm long, lanceolate, ciliate; ovary densely hairy; styles 3, spreading, linear. Capsule 5 mm across, globose, hairy.

*Fl. & Fr.* : December-May

*Distr.* : India, South China and eastwards to Malesia and Pacific Islands. Frequent along the river banks at low elevations. Koruthode, *JA 18424.*

## **MACARANGA** Du Petit – Thouars

Gen Nova Madag. 26. 1806.

**Macaranga indica** Wight, Ic. t. 1883. 1852; Hook. f., Fl. Brit. India 5: 446. 1887; Gamble, Fl. Pres. Madras 1326. 1925; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1453. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 233. 1987; Manilal, Fl. Silent Valley 252. 1988; Manilal, Fl. Silent Valley 252. 1988. *Vatta, Vattakkanni*

Trees with reddish exudation; bark brown; branchlets fulvous tomentose, glaucous. Leaves alternate, to 23 x 23 cm, orbicular, peltate, yellow-punctuate below; nerves radiating from the petiole, 13-16 pairs, prominent below, nervules parallel; petiole 15-20 cm long, glaucous; stipule

large, lanceolate. Flowers dioecious. Male flowers 2 mm across, in globose clusters arranged in axillary 5 cm long zig-zag panicles; bracts broadly ovate, appendaged, with many flowers; sepals 3-5, orbicular, glandular; stamens 3, free. Female flowers solitary in bracts in globose heads; ovary 3-celled, ovule one in each cell; style entire. Capsule globose. Fruits not seen.

*Fl.* : August

*Distr.* : India and Sri Lanka. Common; in disturbed forest areas. Uppupara, *JA 14134.*

## MALLOTUS Loureiro

Fl. Cochinch. 601. 1790.

Trees or shrubs. Leaves alternate or opposite, entire or toothed, 3-7-ribbed or penninerved, nervules parallel, gland-dotted beneath. Flowers monoecious or 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; seeds ovoid or globose.

1. Leaves alternate ..... **M. philippensis**
1. Leaves opposite ..... 2
2. Leaves densely stellate tomentose below; shortly peltate; male flowers in terminal panicles ..... **M. tetracoccus**
2. Leaves not stellate tomentose below, not peltate; male flowers in axillary racemes ..... 3
3. Leaves to 13 cm long ..... **M. resinosus**
3. Leaves to 25 cm long ..... **M. beddomei**

**Mallotus beddomei** Hook. f., Fl. Brit. India 5: 438. 1887; Gamble, Fl. Pres. Madras 1323. 1925; Manilal, Fl. Silent Valley 252. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 419. 1994.

Scandent shrubs. Leaves to 25 x 9 cm, elliptic to oblanceolate, long-acuminate at apex, base acute, dentate along the margins, glabrous; nerves 5 or 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 x 2 mm, ovate, glabrous; stamens many.

*Fl. & Fr.* : January-March

*Distr.* : Southern Western Ghats(Kerala & Tamil Nadu); endemic. Common; in evergreen forests. Arjunankotta, *JA 13138.*

**Mallotus philippensis** (Lam.) Muell.-Arg., Linnaea 34: 196. 1865; Hook. f., Fl. Brit. India 5: 442. 1887, "*philippinensis*"; Bedd., Fl. Sylv. t. 289. 1873; Gamble, Fl. Pres. Madras 1322.

1925; Airy Shaw, Kew Bull. 21: 392. 1968 & 26: 300. 1972; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1456. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 408. 1996. ***Croton philippense*** Lam., Encycl. 2: 206. 1786.

Small trees; branchlets rusty tomentose. Leaves to 18 x 8 cm, ovate, acuminate, 3-ribbed from the obtuse base, densely red-glandular beneath; nerves 6 pairs, nervules parallel, prominent; petiole 3-6 cm long, densely rusty puberulus. Flowers in terminal rusty puberulus panicle. Male flowers 4 mm across, sepals 3, ovate, acute, hairy; stamens many. Capsule 7 mm across, globose, densely red-glandular; seeds 1-4, globose, glabrous, brown.

*Fl. & Fr.* : October-February

*Distr.* : Indo-Malesia and Australia. Common; in evergreen forests. Thekkady, *JA 12562*; Umikuppan, *JA 12645*; Koruthode, *KPR 14807.*

**Mallotus resinosus** (Blanco) Merr., Sp. Blancoan. 222. 1918; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 340. 1976. ***Adelia resinosa*** Blanco, Fl. Philip. ed. 2. 562. 1845. ***Claoxylon muricatus*** Wight Ic. t. 1886. 1852. ***Mallotus muricatus*** (Wight) Thw., Enum. Pl. Zeyl. 273. 1861; Bedd., Fl. Sylv. t. 208. 1872; Hook. f., Fl. Brit. India 5: 436. 1887; Gamble, Fl. Pres. Madras 1322. 1925.

Erect shrubs, branchlets rusty tomentose. Leaves to 13 x 4.5 cm, oblanceolate, acuminate at apex, acute at base, distantly serrate, glandular; nerves 9 pairs, prominent, nervules closely parallel; petioles unequal, 0.3-1.8 cm long. Male racemes 1-4 cm long, rusty tomentose; flowers 3 mm across, closely packed, tomentose. Capsule 15 mm across, covered with curved spines and yellow glands; seeds 5 mm across, globose, dull brown.

*Fl. & Fr.* : October-March

*Distr.* : Southern Western Ghats, endemic. Common; in evergreen forests at high elevations. Vellimala, *JA 12925*; Chokkampetti, *JA 13367*; Kottamala, *JA 14023.*

**Mallotus tetracoccus** (Roxb.) Kurz., J. Asiat. Soc. Bengal 16: 245. 1873; Airy Shaw, Kew Bull. 26: 298. 1972; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1457. 1983; Manilal, Fl. Silent Valley 252. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 408. 1996. ***Rottlera tetracocca*** Roxb., Fl. India 3: 827. 1832.***R. peltata*** Wight, Ic. t. 1873. 1852. ***Mallotus albus*** auct. non Muell.-Arg., Linnaea 34: 188. 1865 excl. basionym. ***Rottlera albus*** var. ***occidentalis*** : Hook. f., Fl. Brit. India 5: 429. 1887; Gamble, Fl. Pres. Madras 1321. 1925.

Small trees; branchlets tomentose. Leaves to 18 x 16 cm, broadly ovate to orbicular, entire or shortly toothed; nerves 7 pairs, prominent, nervules parallel, brownish beneath; petioles unequal, to 20 cm long. Female flowers in branched terminal panicles; sepals 5-6, ovate, stellate-

tomentose; ovary globose, densely hairy, styles 3, bifid, spreading. Capsule 15 mm across, 4-lobed, densely stellate hairy. Male flowers in groups of 3-6, sessile, sepals 4 or 5, orbicular, densely hairy; stamens many, free.

*Fl. & Fr.* : October-February

*Distr.* : India, Southwest China and Sri Lanka. Common; in evergreen forests. Pachakkanam, *JA 12651.*

*Note* : Mueller (1865) included the south Indian specimens when established Mallotus albus (*Rottlera alba* Roxb. and *R. tetracocca* Roxb.). But according to Croizat (1940), *R. alba* Roxb. is now *Mallotus paniculatus* (Lam.) Mueller and *R. tetracocca* is Mallotus *tetracoccus* (Roxb.) Kurz.

## MARGARITARIA Linnaeus f.

Suppl. 66, 428. 1782.

**Margaritaria indica** (Dalz.) Airy Shaw, Kew Bull. 20: 387. 1966; Webster, J. Arnold Arbor. 60(4): 425. 1979; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1459. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 408. 1996. ***Prosorus indicus*** Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 4: 346. 1852; Gamble, Fl. Pres. Madras 1294. 1925; Airy Shaw, Kew Bull. 16: 342. 1963. ***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, to 10 x 5 cm, obovate, obtusely acuminate, glaucous beneath, membranous. Male flowers fascicled, many together; perianth lobes 4, ovate, acute; stamens 4, free; pistillode clavate. Female flowers solitary or a few together, axillary; pedicels 8-10 mm long, slender; perianth 1-seriate; lobes 4, 2 mm long, ovate, acute; capsule 8 mm across, depressed globose, 3-lobed; seeds trigonous, arillate.

*Fl. & Fr.* : March-April

*Distr.* : Indo-Malesia and Australia. Occasional; in semi-evergreen forests. Thaannikkudy, *JA 12309.*

## MEINECKIA Baillon

Etud. Gen. Euph. 586. 1858.

**Meineckia longipes** (Wight) Webster, Acta Bot. Neerl. 14: 356. 1965; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 235. 1987. ***Peltandra longipes*** Wight, Ic. t. 1891. 1852. ***Phyllanthus longipes*** (Wight) Muell.-Arg., Linnaea 32: 10. 1863; Hook. f., Fl. Brit. India 5: 287. 1887. ***Neopeltandra longipes*** (Wight) Gamble, Fl. Pres. Madras 1286. 1925.

Shrubs with slender branchlets. Leaves alternate, bifarious, membranous, 6-11 x 2-4 cm, ovate-lanceolate, acuminate, base acute or obtuse, penninerved; petiole 1 cm long; stipule ovate, cordate at base, white. Male flowers 1 mm across, in racemes of 5-12 mm long; bracts 1 mm long, ciliate; sepals 5, 1 mm long, orbicular; stamens 5, combined into a column at base. Female flowers solitary, in the upper axils of the branchlets, peduncles 4 cm long, slender; sepals 3 x 2 mm, ovate, ovary 3-celled; styles 3, bifid. Capsule 8 x 8 mm, globose, glabrous; seeds reniform, rugose.

*Fl. & Fr.* : October-January

*Distr.* : Southern Western Ghats (Kerala), endemic. Common; in semi-evergreen forests. Inchippara, *JA 12583*; Aruvioda, *JA 16842.*

## PARACROTON Miquel

Fl. Ind. Bat. 1(2): 382. 1859.

**Paracroton pendulus** (Hassk.) Miq., Fl. Ind. Bat. 1: 11, 382. 1854, subsp. **zeylanicus** (Thw.) Balakr. & Chakrab., Kew Bull. 48: 719. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 411. 1996. ***Ostodes zeylanica*** (Thw.) Muell.-Arg., Linnaea 34: 214. 1865; Bedd., Fl. Sylv. t. 274. 1872; Hook. f., Fl. Brit. India 5: 400. 1887; Gamble, Fl. Pres. Madras 1336. 1925. ***Desmostemon zeylanica*** Thw., Enum. Pl. Zeyl. 278. 1861. ***Fahrenheitia zeylanica*** (Thw.) Airy Shaw, Kew Bull. 20: 410. 1967; Manilal, Fl. Silent Valley 250. 1988.

Large shrubs. Leaves alternate, to 12 x 5 cm, obovate, acuminate, glabrous; nerves 6 pairs, nervules horizontal. Flowers in elongate pendulous racemes; male flowers 3-8 together, clustered, shortly pedicellate; bracts ovate, ciliate; sepals 5, equal, 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, 3 cm across, rusty tomentose.

*Fl. & Fr.* : August-December

*Distr.* : South Western India and Sri Lanka. Rare; in evergreen forests at higher elevations. Deviar, *JA 12129.*

## PHYLLANTHUS Linnaeus

Sp. Pl. 981. 1753

Herbs, shrubs or small trees. Leaves alternate, distichous, usually on short, lateral branchlets. Flowers monoecious, solitary or in axillary fascicles; calyx lobes 5 or 6, imbricate, entire; stamens 3, filaments free or united at base; ovary 3-celled, ovules 2 in each cell; style 3, free or connate at base, 2-fid, spreading. Fruit a dehiscent or indehiscent capsule; seeds 6, trigonous, smooth or rugose.

1. Trees.....**P. emblica**

1. Herbs or shrubs.....2

2. Fruit a berry.....**P. reticulatus**

2. Fruit a capsule.....3

3. Stamens 4; female flowers usually terminal on the branchlets.....4

3. Stamens 3; female flowers not arranged as above.....6

4. Leaves to 1 cm long.....**P. stipulacea**

4. Leaves more than 2 cm long.....5

5. Capsule covered with branched hairs; leaves up to 2.2 cm long.....**P. pinnatus**

5. Capsule smooth; leaves 4-5 cm long.....**P. beddomei**

6. Leaves 3-4 cm long; female pedicels 1.5-2 cm long.....**P. gardnerianus**

6. Leaves to 2.5 cm long; female pedicel to 1 cm long.....7

7. Seeds transversely ridged.....8

7. Seeds vertically ridged or smooth.....9

8. Leaf tip apiculate, pinkish; nerves 4-6 pairs.....**P. urinaria**

8. Leaf tip acute, green; nerves 8-10 pairs.....**P. virgatus**

9. Seeds ridged; leaves along short lateral branchlets; erect herbs.....10

9. Seeds smooth; leaves not along lateral branchlets; prostrate herbs with coarse radiating branches.....**P. narayanaswamii**

10. Female pedicel ca. 6 mm long; flowers ca. 8 mm across; leaflets distant on branchlets.....**P. rheedii**

10. Female pedicels to 3 mm long; flowers to 4 mm across; leaflets close on branchlets.....11

11. Leafy branchlets to 10 cm long, 3-angled; leaflets ca. 15 x 10 mm.....**P. kozhikodianus**

11. Leafy branchlets to 4 cm long; slender; leaflets ca. 8 x 3 mm.....**P. amarus**

**Phyllanthus amarus** Schum. & Thonn., Kongel. Danske Vidensk.-Selsk. Skr. 4: 195. 1829; Webster, J. Arnold. Arbor. 38: 313. 1957 & Brittonia 22: 69. 1970; Airy Shaw, Kew Bull. 26: 91. 1971 & Euphorb. Borneo 182. 1975; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1464. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 412. 1996. ***P. niruri*** auct. non L., 1753, Wight, Ic. t. 1894. 1852; Hook. f., Fl. Brit. India 5: 298. 1887; Gamble, Fl. Pres. Madras 1290. 1925. ***P. fraternus*** Webster, Contrib. Gray. Herb. 176: 53. 1955. **Keelar nelli** (Mannan).

Erect glabrous herbs, to 25 cm tall; leafy branchlets to 4 cm long. Leaves to 8 x 3 mm, oblong, obtuse, chartaceous; nerves indistinct, glaucous beneath, stipule not peltate, lanceolate. Female flowers solitary; pedicels 2 mm long; sepals 5, oblong, obtuse with hyaline margins, glabrous; stamens 3, filaments connate. Capsule 2 x 2 mm, smooth; seeds 6, 1 x 1 mm, trigonous, prominently 6-ridged on outer face, rugose along concentric lines on lateral faces.

*Fl. & Fr.* : November-January

*Distr.* : Native of Tropical America, naturalised in Paleotropics. Common; in disturbed forest areas. Thekkady, *JA 14913, 16347*; Sabarimala, *KPR & JA 15473.*

*Ethnobotanical use* : The entire plant is powdered along with leaves of *Ricinus communis* and given in cow milk for jaundice.

**Phyllanthus beddomei** (Gamble) Mohanan, J. Econ. Tax. Bot. 6: 480. 1985; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 236. 1987; Mohanan & Henry, Fl. Thiruvananthapuram 423. 1994. ***Reidia beddomei*** Gamble, Kew Bull. 1925: 331. 1925 & Fl. Pres. Madras 1293. 1925; Henry *et al.*, J. Bombay Nat. Hist. Soc. 75(3): 694. 1979.

Subshrubs, glabrous, lateral leafy branchlets to 30 cm long, spiral. Leaves 5 x 3 cm, ovate acute, rounded at base, glabrous, pale below; nerves 8 pairs, faint; petiole 3 mm long; stipules ovate, acute, green. Male pedicels 1 cm long; sepals 4 or 5, 5 x 2 mm, oblong, acute, glabrous; stamens 4, filaments combined into a column; anthers sessile. Female flowers larger on longer pedicels, usually towards the tips of the lateral branchlets; sepals 7 x 4 mm, ovate, acute. Capsule globose, glabrous; seeds trigonous, minutely transversally rugose; fruiting calyx 12 x 5 mm.

*Fl. & Fr.* : February-March

*Distr.* : Southern Western Ghats (Kerala), endemic. Rare; along margins of evergreen forests at high elevations. Udumbatheri, *JA 13332.*

**Phyllanthus emblica** L., Sp. Pl. 982. 1753; Hook. f., Fl. Brit. India 5: 289. 1887; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1466. 1983; Manilal, Fl. Silent Valley 253. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 412. 1996. ***Emblica officinalis*** Gaertn., Fruct. 2: 122. 1791; Wight, Ic. t. 896. 1852; Gamble, Fl. Pres. Madras 1295. 1925. **Nelli**

Small to medium trees; leafy branchlets 8-18 cm long, villous. Leaves to 1 x 0.25 cm, numerous on lateral branchlets, oblong, obtuse, shortly apiculate, glabrous; nerves indistinct; stipules lanceolate, ciliate. Flowers densely clustered in leaf axils, pedicelled; sepals 6, 2 mm long, oblong, glabrous; stamens 3, filaments combined into a column. Capsule 1-2.5 cm across, subglobose, fleshy with 1 nut, glabrous.

*Fl. & Fr.* : July-December

*Distr.* : Indo-Malesia and South China. Common; in savannahs. Vallakkadavu, *JA 15413.*

*Ethnobotanical use* : Fresh bark of this tree is used along with jaggerine in preparing drinks; the bark is given to ladies after childbirth. The fruits are also eaten fresh or prepared into curies

**Phyllanthus gardnerianus** (Wight) Baill., Etud. Gen. Euphorb. 628. 1858; Gamble, Fl. Pres. Madras 1290. 1925; Manilal, Fl. Silent Valley 253. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For.

412. 1996. ***Macraea gardneriana*** Wight, Ic. t. 1902, f. 3. 1852. ***Phyllanthus simplex*** Retz. var. ***gardneriana*** (Wight) Muell.-Arg., Linnaea 32: 32. 1863; Hook. f., Fl. Brit. India 5: 295. 1887.

Erect herbs or subshrubs to 1 m high, without short leafy lateral branchlets. Leaves to 4 x 1.5 cm, oblong, obtuse at both ends, glabrous; nerves 6-9 pairs, reticulate; petiole 1 mm long, stipule peltate, acuminate, chartaceous. Female flowers axillary, solitary; sepals 4, 2 x 1 mm, ovate, acute. Male flowers 2-3 together, shortly pedicelled, 2 mm across; stamens 3, free, erect. Capsule 5 x 5 mm, depressed globose, glabrous; seeds trigonous, minutely reticulate.

*Fl. & Fr.* : November-May

*Distr.* : Paleotropics. Common; in grasslands and moist deciduous forests. Pachakkanam, *JA 12315*; Karadikkavala, *JA 13920*; Koruthode, *KPR 14746, JA 16266.*

**Phyllanthus kozhikodianus** Sivar. & Mani., J. Ind. Bot. Soc. 56: 165. 1977; Sivar. & Joseph, J. Bombay Nat. Hist. Soc. 17: 369. 1981; Manilal, Fl. Silent Valley 254. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 413. 1996.

Erect herbs, to 60 cm high; leafy branchlets to 10 cm long, 3-winged or semialate. Leaves 1-2 x 1 cm, obovate, obtusely acute, chartaceous, glaucous below; nerves 4-6 pairs; stipule lanceolate, acuminate. Female flowers axillary, solitary; pedicels 3 mm long; sepals 6, equal, 3 x 1 mm, obovate, obtuse with white margins; disk 6-lobed; styles 3, spreading. Male flowers in axillary fascicles; sepals acute; stamens 3. Capsule 3 x 3 mm, smooth, subglobose; seeds 1.5 x 1 mm, trigonous, 5-striated on outer face.

*Fl. & Fr.* : September-December

*Distr.* : Western Ghats & Eastern Himalayas. Occasional; in disturbed forest areas. Thekkady, *JA & KPR 16366.*

**Phyllanthus narayanaswamii** Gamble, Kew Bull. 1925: 329. 1925 & Fl. Pres. Madras 1289. 1925; Henry *et al.*, J. Bombay Nat. Hist. Soc. 75(3): 694. 1979.

Stout prostrate herbs; branches radiating from stout rootstock, glabrous. Leaves to 13 x 7 mm, elliptic, cordate at base, coriaceous, glabrous, margin recurved; stipule peltate, chartaceous. Flowers pedicelled; pedicel 5 mm long; bracts orbicular, chartaceous. Male flowers 3 mm across, sepals orbicular, hyaline along the margins; stamens 3, filaments free. Female sepals oblong with white margins. Capsule 3 x 3 mm, rugose, black; seeds 6, not ridged, fruiting pedicel to 10 mm long.

*Fl. & Fr.* : August-February

*Distr.* : Southern Western Ghats(Kerala), endemic. Occasional; on wet rocks in open areas at high altitudes. Kottamala, *JA 14017.*

**Phyllanthus pinnatus** (Wight) Webster, J. Arnold Arbor. 38: 52. 1957; Airy Shaw, Kew Bull. 23: 41. 1969; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1467. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 238. 1987. ***Chorisandra pinnata*** Wight, Ic. t. 1994. 1853. ***Phyllanthus wightianus*** Muell.-Arg., Linnaea 32: 47. 1863; Hook. f., Fl. Brit. India 5: 303. 1887. ***Reidia floribunda*** Wight, Ic. t. 1903. 1852; Gamble, Fl. Pres. Madras 1293. 1925.

Subshrubs; stem densely strigose, reddish. Leaves to 22 x 10 mm, obliquely oblong, acute at both ends, apiculate, reticulate below, hispid above and below; stipules lanceolate. Female pedicel 1.5 cm long, axillary, solitary, slender; sepals 5, 4 x 2.5 mm, ovate, acute, hispid; ovary densely hairy; styles 3, deeply bifid. Male sepals similar to female sepals; stamens 4, filaments combined into a column. Capsule densely covered with branched hairs.

*Fl. & Fr.* : November-April

*Distr.* : Southern Western Ghats (Kerala & Tamil Nadu); endemic. Common; in evergreen forests. Vallakkadavu, *JA 13671*; Vavalala, *JA & KPR 14424.*

**Phyllanthus reticulatus** Poir., Lam., Encycl. 5: 298. 1804; Hook. f., Fl. Brit. India 5: 288. 1887; Airy Shaw, Euphorb. Borneo 185. 1975; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1468. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 413. 1996. ***Kirganelia reticulata*** (Poir.) Baill., Etud. Gen. Euphorb. 613. 1858; Gamble, Fl. Pres. Madras 1294. 1925. ***Anisonema multiflora*** Wight, Ic. t.1899. 1852.

Densely branched shrubs, branchlets rough, villous, reddish brown. Leaves to 3 x 1.3 cm, elliptic-oblong, obtusely acute, entire, glabrous, shortly petiolate; stipule lanceolate, sometimes spinescent. Flowers fascicled on leaf axils; pedicels 5-8 mm long; male sepals 5, 2 mm long, orbicular, reddish; stamens 5, outer filaments free, inner ones combined. Capsule 4 mm across, fleshy; seeds 1.5 x 1 mm, trigonous, brown, reticulate.

*Fl. & Fr.* : September-February

*Distr.* : Indo-Malesia and Tropical Africa. Common; along lake shores. Thekkady, *JA 12415.*

**Phyllanthus rheedii** Wight, Ic. t. 1895, f. 1. 1852; Hook. f., Fl. Brit. India 5: 293. 1887; Gamble, Fl. Pres. Madras 1289. 1925; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 238. 1987.

Woody herbs, to 80 cm high; stems glabrous. Leaves to 2.5 x 1.5 cm, obovate, obtusely acute, distant on lateral branchlets, glaucous beneath; nerves 7-9 pairs, stipules lanceolate, acuminate; petiole 2mm long. Flowers solitary or fascicled; sepals 6, 4.5 x 2mm, obovate, obtuse, green with narrow white margins, glabrous; ovary globose, styles 3, bifid, radiating. Capsule 5 mm across, glabrous, smooth; seeds 2 x 1.5 mm, trigonous, longitudinally striate with minute cross bars.

*Fl. & Fr.* : October-January

*Distr.* : South India and Sri Lanka. Rare; along evergreen forest margins. Vellimala, *JA 14341*; Vallakkadavu, *JA & KPR 16399.*

**Phyllanthus stipulacea** (Gamble) Kumari & Chandr. in Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 239. 1987. ***Reidia stipulacea*** Gamble, Kew Bull.1925: 332. 1925 & Fl. Pres. Madras 1293. 1925; Henry *et al.*, J. Bombay Nat. Hist. Soc. 75(3): 694. 1979.

Erect subshrubs; leafy branchlets densely packed towards the apex of main stem, puberulus, rough with persisting stipules. Leaves ovate, gibbous to one side, glabrous, glaucous below; nerves 3 pairs, prominent; petiole 1 mm long; stipule 2.5 mm long, lanceolate. Male flowers solitary, 2 mm across; sepals 5, orbicular, glabrous, reddish; stamens 3, free. Female flowers long-pedicelled; sepals 3 x 1.5 mm, obovate; styles 3, shortly bifid at apex.

*Fl. & Fr.* : March-April

*Distr.* : Southern Western Ghats, endemic. Rare; along the margins of forests at high elevations. Chokkampetti, *JA 17770.*

**Phyllanthus urinaria** L., Sp. Pl. 982. 1753; Hook. f., Fl. Brit. India 5: 293. 1887; Gamble, Fl. Pres. Madras 1289. 1925; Webster, J. Arnold. Arbor. 38: 194. 1958 & Brittonia 22: 65. 1970; Webster & Airy Shaw, Kew Bull. 26: 91. 1972; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1469. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 413. 1996.

Erect herbs, to 30 cm high, leafy branchlets scabrid, to 7 cm long. Leaves to 1.5 x 0.7 cm, oblong, obtuse, pinkish, serrulate, sessile; nerves 4-6 pairs, stipule ovate, cordate at base, acuminate. Flowers subsessile, axillary, fascicled; sepals 5 or 6, oblong or orbicular, obtuse; disk in male flowers 6-lobed, entire in female flowers. Capsule 2.5 mm across, depressed globose, coarsely verrucose; seeds 6, 1 mm long, transversally prominently ridged.

*Fl. & Fr.* : January-June

*Distr.* : East Tropical Asia and spread as a weed throughout the Paleotropics. Common; in openings of all types of forests. Koruthode, *JA 16232.*

**Phyllanthus virgatus** Forst. f., Ins. Austr. Prod. 65. 1786; Airy Shaw, Kew Bull. 26: 325. 1972 & 37: 34. 1982; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1469. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 413. 1996. ***P. simplex*** Retz., Obs. Bot. 5: 29. 1788; Hook. f., Fl. Brit. India 5: 295. 1887; Gamble, Fl. Pres. Madras 1289. 1925. ***P. oblongifolia*** Wight, Ic. t. 1902, f. 1. 1852.

Erect herbs to 70 cm high, glabrous; leafy branchlets scabrous. Leaves to 18 x 6 mm, 21-30 pairs on lateral branchlets, oblong, acute at either ends, serrulate; nerves 8-10 pairs; petiole to 1 mm long; stipule ovate, cordate at base, decurrent on either sides. Female flowers sessile, solitary; sepals 5 or 6, 1 mm long, ovate, acute. Male flowers solitary, subsessile; sepals ovate. Capsule 3 x 3 mm, rugose; seeds 6, 2 x 1.5 mm, trigonous, transversally strongly ridged connected with minute parallel crossbars.

*Fl. & Fr.* : October-December

*Distr.* : Indo-Malesia, Polynesia and China. Occasional; in moist deciduous forests. Koruthode, *JA 16293.*

## 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. 1925; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 347. 1976; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1471. 1983; Manilal, Fl. Silent Valley 254. 1988. *Avanakku*

Shrubs, stem glaucous. Leaves to 40 cm across, peltate, palmately 6-9-lobed, lobes lanceolate, serrate; nerves palmate, strongly reticulate; petiole to 20 cm long; stipule sheathing, large. Flowers monoecious, in long terminal racemes. Male flowers at the base of the raceme, 7 mm 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 12 mm across, 3-valved; seeds oblong, carunculate, mottled with white and brown.

*Fl. & Fr.* : September-January

*Distr.* : Native of Tropical Africa and spread to other tropical countries. Common; in disturbed moist deciduous forests. Thekkady, *JA 18425.*

## SAPIUM Jacqumount

Enum. Syst. Pl. 9, 31. 1760, *nom. cons.*.

**Sapium insigne** (Royle) Benth. in Benth. & Hook. f., Gen. Pl. 3: 335. 1880; Hook. f., Fl. Brit. India 5: 471. 1888; Gamble, Fl. Pres. Madras 1346. 1925; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1471. 1983; Manilal, Fl. Silent Valley 254. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 413. 1996. ***Falconeria insignis*** Royle, Ill. 354, t. 98.,f. 2. 1839. ***Falconeria malabarica*** Wight Ic. t. 1866. 1852.

Small trees; branchlets stout, latex milky. Leaves alternate, 18 x 7 cm, elliptic-oblong, acuminate, crenate, serrate, base with 2-sessile glands; nerves to 15 pairs, parallel; petiole to 5 cm long. Flowers monoecious; male and female flowers on separate spikes. Male spike to 25 cm long, stout, glandular; bracts distinct, ovate. Male flowers 5-10 together in each bracts, 1 mm across; 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.

*Fl. & Fr.* : February

*Distr.* : Indo-Malesia. Rare; in evergreen forests. Arjunankotta, *JA 13389.*

## **SAUROPUS** Blume

Bijdr. 595. 1825-1826.

Shrubs. Leaves alternate, bifarious, on lateral branchlets, entire. Flowers monoecious, clustered or solitary, axillary, pedicelled; male sepals 6, ovate, united, urceolate; female sepals 6, 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 10 x 3.5 cm, acuminate, green when dry.....**S. androgynus**
1. Leaves to 2.5 x 1.5 cm, obtuse, black when dry.....**S. quadrangularis**

**Sauropus androgynus** (L.) Merr., Bull. Bur. Forest. Philipp. Islands 1: 30. 1903; Gamble, Fl. Pres. Madras 1303. 1925; Mohanan & Henry, Fl. Thiruvananthapuram 425. 1994; Chakr. & Gang., J. Econ. Tax. Bot. 20(3): 519. 1996. ***Clutia androgyna*** L., Mant. Pl. 128. 1767. ***Sauropus albicans*** Bl., Bijdr. 596. 1826; Hook. f., Fl. Brit. India 5: 332. 1887. ***S. indicus*** Wight, Ic. t. 1952. f. 2. 1853.

Erect shrubs; branchlets glabrous. Leaves ovate-lanceolate, truncate at base, glaucous below, glabrous; nerves 4-6 pairs, prominent below; petiole 2 mm long, slender; stipules lanceolate, 3 mm long. Female flowers solitary, axillary; pedicel 1 cm long. Capsule 1 cm across, violet, glabrous.

*Fl. & Fr.* : October-January

*Distr.* : India, Java, Philippines and Sri Lanka. Common; in disturbed forest areas. Koruthode, *JA 13577, JA 14783*; Vallakkadavu, JA & *KPR 16389.*

**Sauropus quadrangularis** (Willd.) Muell.-Arg., Linnaea 32: 73. 1863; Hook. f., Fl. Brit. India 5: 335. 1887; Gamble, Fl. Pres. Madras 1303. 1925; Chakr. & Gang., J. Econ. Tax. Bot. 20(3):

534. 1996; Sasidh. & Sivar., Fl. Pl. Thrissur For. 414. 1996. ***Phyllanthus quadrangularis*** Willd., Sp. Pl. 4: 585. 1805.

Glabrous shrubs. Leaves ovate-obtuse, emarginate at apex, glaucous below, black when dried; nerves 5 pairs, prominent; petiole 2 mm long; stipules cordate at base. Flowers solitary, axillary, pedicelled. Male flowers 3 mm across; sepals ovate, acute; stamens 3, anthers sessile on erect staminal column. Female sepals broadly ovate, obtuse, emarginate, united by the disk; styles 3, 2-fid at apex. Capsule 1.2 cm across, smooth, glabrous.

*Fl. & Fr.* : January-March

*Distr.* : Indo-Malaya. Common; in evergreen and semi-evergreen forests. Sabarimala, *KPR 14995*; Vallakkadavu, *JA 15184.*

## **SEBASTIANIA** Sprengel

Neue Entdeck. Pflanzenk. 2: 118. 1820.

**Sebastiania chamaelea** (L.) Muell.-Arg., DC., Prodr. 15(2): 1175. 1866; Hook. f., Fl. Brit. India 5: 475. 1888; Gamble, Fl. Pres. Madras 1344. 1925; Airy Shaw, Kew Bull. 26: 339. 1972; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1474. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 414. 1996.

Erect herbs with milky latex. Leaves to 6 x 0.7 cm, linear-oblong, obtuse, mucronate, lineolate along the margins, glabrous. Male flowers in short axillary raceme; 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 6 x 6 mm, 3-lobed, cocci with 2 vertical rows of tubercles; seeds 3, oblong.

*Fl. & Fr.* : Almost throughout the year

*Distr.* : Indo-Malesia, Australia and Oceana. Common; in disturbed forest areas. Koruthode, *JA & KPR 16262.*

## **SECURINEGA** Commerson. ex A. Jussieu

Gen. 388. 1789, *nom. cons.*

**Securinega virosa** (Roxb. ex Willd.) Baill., Adansonia 6: 334. 1866; Airy Shaw, Kew Bull. 26: 340. 1972; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1475. 1983; Manilal, Fl. Silent Valley 255. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 415. 1996. ***Phyllanthus virosus*** Roxb. ex Willd., Sp. Pl. 4: 578. 1805. ***Flueggea microcarpa*** Bl., Bijdr. 580. 1826; Hook. f., Fl. Brit. India 5: 328. 1887. ***F. virosa*** (Willd.) Baill., Etud. Gen. Euphorb. 593. 1858; Gamble, Fl. Pres. Madras 1296. 1925.

Branched shrubs, unarmed; stems course, branchlets often thorny. Leaves alternate, 1.5-5 x 2.5 cm, obovate, obtuse, glabrous; nerves 5-7 pairs, reticulate; petiole 5 mm long. Flowers dioecious, in axillary fascicles, 5-20 together, pedicels 6 mm long, slender; calyx lobes 5, 1.5 x 1 mm, 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 4 x 4 mm, depressed globose, glabrous, 3-valved; seeds 3, trigonous, rough.

*Fl. & Fr.* : March-June

*Distr.* : Indo-Malesia to Polynesia, East Asia and Tropical Africa. Common; in disturbed forest areas. Damsite, *JA 15117*; Thekkady, *JA & KPR 16369.*

**SUREGADA** Roxburgh ex Rottler

Ges. Naturf. Freunde Berlin Neue Schriften 4: 206. 1803

**Suregada angustifolia** (Baill. ex Muell.-Arg.) Airy Shaw, Kew Bull. 23: 128. 1969; Manil. & Sivar., Sci. & Cult. 41: 436. 1975; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1478. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 426. 1994. ***Gelonium angustifolium*** Baill. ex Muell.-Arg. in DC., Prodr. 15(2): 1128. 1866. ***G. lanceolatum*** auct. non Willd., 1806: Wight, Ic. t. 1867. 1852; Hook. f., Fl. Brit. India 5: 459. 1887; Gamble, Fl. Pres. Madras 1343. 1925.

Glabrous shrubs with stipular scars at nodes. Leaves alternate, to 13 x 4.5 cm, oblanceolate or oblong, acuminate, at apex, entire, punctuate above; stipule sheathing. Male flowers 3 mm across, 5-25 together, in short leaf-opposed, shortly peduncled cymes; sepals 5, orbicular; stamens 10-25, free. Female flowers solitary, axillary, 3 mm across; sepals ovate, obtuse, ciliate; globose, styles 3, free, dichotomously split, recurved. Capsule 3-lobed, 8 mm broad, lobes keeled; seeds 3, smooth, globose.

*Fl. & Fr.* : November-December

*Distr.* : Peninsular India and Sri Lanka. Rare; in evergreen forests. Pambavalley, *JA 12752.*

**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. Male sepals cuspidate; pedicel glandular hairy; petiole to 9 cm long ..... **T. bicolor**

1. Male sepals obtuse; pedicels not glandular hairy; petiole 3-4 cm long ..... **T. muelleriana**

**Tragia bicolor** Miq., Linnaea 26: 222. 1853; Hook. f., Fl. Brit. India 5: 465. 1888; Gamble, Fl. Pres. Madras 1332. 1925; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 240. 1987.

Densely hispid twiners, young parts fulvous-tomentose. Leaves to 13 x 8 cm, ovate, acuminate, cordate at base, regularly serrate, densely hispid below, sparsely above; lateral nerves 5 or 6 pairs, nervules reticulate; stipule 8 mm long, lanceolate, acuminate, 1 or 2-toothed on sides, ciliate. Racemes to 7 cm long, hispid; bracts 4 x 1 mm, lanceolate, glandular-ciliate; pedicels 3 mm long, glandular-hispid. Male flowers 2.5 mm across; sepals 3, orbicular, glabrous; stamens 3, filaments free.

*Fl. & Fr.* : March-June

*Distr.* : Southern Western Ghats; endemic. Occasional; along margins of evergreen forests at high elevations. Uppermanalar, *JA 13762*; Kottamala, *JA 15296.*

**Tragia muelleriana** Pax & Hoffm. in Engl., Pflanzenr. 68: 80. 1919; Gamble, Fl. Pres. Madras 1332. 1925; Sasidh. & Sivar., Fl. Pl. Thrissur For. 415. 1996. ***T. involucrata*** L. var. ***cordata*** Muell.-Arg. in DC., Prodr. 15: 943. 1866; Hook. f., Fl. Brit. India 5: 465. 1888.

Twiners. Leaves to 13 x 6 cm, ovate-oblong, cordate at base, acuminate, serrulate, glabrate, nerves 6 pairs, nervules parallel; stipule 3 mm long, ovate. Racemes 5 cm long, axillary, puberulus; bracts 1 mm long, ovate, acute. Male flowers 2 mm across, sepals ovate, glabrous; anthers 3, sessile. Female sepals 5 mm long, ovate, free, with many marginal lobes, densely hispid; ovary hispid; style connate at base. Capsule 1 x 1 cm, glabrous; seeds 4 x 4 mm, globose, fruiting calyx lobes 10 x 6 mm, hispid, fimbriate.

*Fl. & Fr.* : December-February

*Distr.* : India, Burma and Sri Lanka. Rare; in moist deciduous forests. Thekkady, *JA & KPR 16994.*

## TREWIA Linnaeus

Sp. Pl. 1193. 1753

**Trewia nudiflora** L., Sp. Pl. 1193. 1753; Wight, Ic. t. 1870. 1852; Hook. f., Fl. Brit. India 5: 423. 1887; Gamble, Fl. Pres. Madras 1319. 1925; Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1482. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 416. 1996.

Medium trees; bark white, smooth; branchlets glabrous. Leaves opposite, to 18 x 12 cm, broadly ovate, acuminate at apex, cordate at base, nerves 3 from the base; petioles unequal, 3-12 cm long. Male flowers in 15 cm long racemes, appears along with new leaves, 5 mm across,

sepals 5, united; stamens many, free. Female flowers axillary, solitary or paired, long-pedicels 4-5 cm long; calyx lobes truncate, tomentose; ovary densely stellate-tomentose; styles 3, connate below, 2 cm long, papillose. Capsule 2 cm across, globose, tomentose; seeds 3, ovoid.

*Fl. & Fr.* : February-April

*Distr.* : Peninsular India. Common; along river banks in evergreen forests. Vallakkadavu, *JA 13407*; Koruthode, *JA & KPR 14720.*

## 120. URTICACEAE

Juss., Gen. Pl. 400. 1789.

1. Plants with stinging hairs ..... 2
1. Plants without stinging hairs ..... 4
2. Leaves deeply lobed; flowers in dense spike ..... **Girardinia**
2. Leaves not lobed, serrulate or entire; flowers not in dense spikes ..... 3
3. Leaves penninerved; large shrubs or small trees ..... **Dendrocnide**
3. Leaves 3-ribbed from base; herbs or subshrubs ..... **Laportea**
4. Succulent herbs; usually epiphytic ..... **Procris**
4. Not succulent, terrestrial plants ..... 5
5. Fruiting perianth fleshy ..... 6
5. Fruiting perianth not fleshy ..... 7
6. Leaves densely white tomentose beneath; flowers in globose spikes ..... **Debregeasia**
6. Leaves not white tomentose beneath; flowers fascicled or cymose ..... **Oreocnide**
7. Flowers clustered in fleshy receptacle ..... **Elatostema**
7. Flowers not in fleshy receptacle ..... 8
8. Flowers in peduncled erect cymes ..... 9
8. Flowers in axillary clusters or drooping spikes ..... 10
9. Leaves opposite, serrate ..... **Pilea**
9. Leaves alternate, entire ..... **Pellionia**
10. Leaves entire; fruiting perianth winged and wingless; herbs ..... **Pouzolzia**
10. Leaves serrate or serrulate; fruiting perianth wingless; large shrubs ..... **Boehmeria**

### BOEHMERIA Jacquin

Enum. Pl. Carib. 9. 1760.

Shrubs. Leaves opposite or alternate, serrate, 3-ribbed, punctate; stipules free. Inflorescence raceme, spike or sessile, axillary clusters, unisexual. Flowers monoecious or dioecious, globose; male perianth lobes 3-5, free or united; female perianth lobes fused into a tube toothed at apex; stamens 3-5, free, pistillode clavate or globose; ovary 1-celled; ovules one, basal; stigma filiform. Achene ovoid or obovoid.

1. Leaves alternate; flowers in axillary clusters.....**B. glomerulifera**

1. Leaves opposite; flowers in long axillary spikes.....**B. macrophylla**

**Boehmeria glomerulifera** Miq. in Zoll., Syst. Veg. Ind. Archip. 101, 104. 1854; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 87. 1976; Sasidh. & Sivar., Fl. Pl. Thrissur For. 417. 1996. ***B. malabarica*** Wedd., Arch. Mus. Hist. Nat. 8: 350. 1855-56; Hook. f., Fl. Brit. India 5: 575. 1888; Fischer in Gamble, Fl. Pres. Madras 1387. 1928. **Thannikkuringi** (Malam pandaram).

Shrubs to 2 m high; stem pilose. Leaves to 15 x 8 cm, ovate, acuminate, serrulate, base rounded, pubescent below, glabrous above; lateral nerves 5-6 pairs, lowest pairs opposite, rib-like; petiole to 5 cm long. Flowers 10-20 together, axillary; male flowers 2 mm across; perianth lobes 4, united below, glabrous; stamens 4, free. Female perianth lobes 4 or 5, hispid. Achenes 1.2 x 1 mm, obovoid, glabrous, stigma 2 mm long, persistent.

*Fl & Fr.* : October-December

*Distr.* : Indo-Malesia. Common; in evergreen forests at high altitudes. Vellimala, *JA 14329.*

**Boehmeria macrophylla** Hornem., Hort. Bot. Hafn. 2: 890. 1815; Friis & Marais, Kew Bull. 37: 164. 1982; Mohanan & Henry, Fl. Thiruvananthapuram 435. 1994. ***B. platyphylla*** D. Don, Prodr. Fl. Nep. 60. 1825; Hook. f., Fl. Brit. India 5: 578. 1886, incl. var. ***longissima***; Fischer in Gamble, Fl. Pres. Madras 1387. 1928; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 87. 1976.

Shrubs; stem glabrous. Leaves to 13 x 6 cm, ovate, acuminate, acute to rounded at base, crenate, 3-ribbed, cystolith absent, shortly pilose along the ribs; intercostae reticulate; petiole to 6 cm long. Spike to 35 cm long, drooping, glabrous. Flowers clustered, 3-9 together; perianth-tube gibbous at base, 2-toothed at apex; hirtus, stigma 3 mm long, hispid. Achenes 2 x 1 mm, ovoid, beaked, puberulus.

*Fl. & Fr.* : November-December

*Distr.* : South West India and Sri Lanka. Rare; in evergreen forests. Uppermanalar, *JA 12976.*

## **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 oblong-lanceolate; spikes in short lateral cymes.....**D. longifolia**

1. Leaves orbicular; spikes in lateral panicles.....**D. ceylanica**

**Debregeasia ceylanica** Hook. f., Fl. Brit. India 5: 592. 1888; Fischer in Gamble, Fl. Pres. Madras 1389. 1928; Henry *et al.*, J. Bombay Nat. Hist. Soc. 75(3): 694, 1979; Manilal, Fl. Silent Valley 261. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 417. 1996.

Small trees; branchlets stout. Leaves to 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 to 15 cm long; stipule ovate, bifid above. Spike 6 mm across, globose; peduncled. Female flowers densely packed; perianth tubular, narrowed at apex, 3-5 toothed. Achenes 0.5 mm long, ellipsoid.

*Fl. & Fr.* : January-March

*Distr.* : South India and Sri Lanka. Occasional; in evergreen forests. Koruthode, *JA 13175.*

**Debregeasia longifolia** (Burm. f.) Wedd. in DC., Prodr. 16(1): 235. 1869; Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1489. 1983; Manilal, Fl. Silent Valley 261. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 418. 1996. ***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. 1928; Wilmot-Dear, Kew Bull. 43: 675. 1988. ***Conocephalus niveus*** Wight Ic. t. 1959. 1853. **Poonool maram** (Mannan).

Shrubs; branchlets slender, densely shaggy-pubescent. Leaves to 16 x 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 cm long; stipules linear-lanceolate. Spike 4 mm across; peduncles 5 mm long; bracts and bracteoles ovate, ciliate; male perianth lobes 4, free, 1 mm long, ovate, densely woolly; stamens 4, free.

*Fl. & Fr.* : December-March

*Distr.* : Indo-Malesia. Common; in evergreen forests, often in open areas. Thekkady, *JA 18459.*

*Ethnobotanical use* : Fibers from the stem is used as cordage.

## **DENDROCNIDE** Miquel

Pl. Jungh. 29. 1851.

**Dendrocnide sinuata** (Bl.) Chew in Gard., Bull. Straits Settlem. 21: 206. 1965; Sasidh. & Sivar., Fl. Pl. Thrissur For. 418. 1996. ***Urtica sinuata*** Bl., Bijdr. 505. 1826. ***Laportea crenulata*** Gaud., Voy. Uranie 12: 498. 1830; Bedd., Fl. Sylv. t. 306. 1873; Hook. f., Fl. Brit. India 5: 550. 1888; Fischer in Gamble, Fl. Pres. Madras 1373. 1928; Manilal, Fl. Silent Valley 263. 1988. ***Urtica crenulata*** (Gaud.) Roxb., Fl. Ind. 3: 591. 1832; Wight, Ic. t. 686. 1840. **Kattan plavu, Koyyavu** (Mannan); **Anaye viratti.**

Large shrubs to small trees; branchlets terete, white, covered with soft stinging hairs. Leaves to 20 x 10 cm, elliptic to oblong-lanceolate, acute at either ends, entire or crenate, lateral nerves

9 pairs; petiole to 6 cm long. Inflorescence axillary, peduncled cymes, branches dichotomous, to 20 x 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 4 mm long, puberulus, persistent. Achenes 6 mm, ovoid, white, glabrous.

*Fl. & Fr.* : January

*Distr.* : Peninsular India and Sri Lanka. Common; in evergreen forests. Arjunankotta, *JA 13172.*

*Note* : Tribes usually apply cooked rice (bearable hot) on parts of the body where the plant parts contacted. Mannans do not consume certain fishes which eat the flowers and fruits of *Dendrocnide sinuata* during its flowering and fruiting seasons since it also may cause vomiting, headache and fever.

## 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. Male receptacle sessile; cystolith dense.....**E. lineolatum**
1. Male receptacle peduncled; cystolith scarce.....**E. wightii**

**Elatostema lineolatum** Wight, Ic. t. 1984. 1853; Hook. f., Fl. Brit. India 5: 565. 1888; Fischer in Gamble, Fl. Pres. Madras 1376. 1928; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 88. 1976; Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1490. 1983; Manilal, Fl. Silent Valley 262. 1988; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 244. 1987.

There are two varieties in the study area:

Key to the varieties

1. Leaves ca. 0.5 cm broad ..... var. **linearis**
1. Leaves over 3 cm broad.....var. **lineolatum**

**Elatostema lineolatum** Wight Ic. t. 1984. 1853, var. **linearis** Wedd. in Arch., Mus. Hist. Nat. 9: 313. 1856, "*lineare*"; Hook. f., Fl. Brit. India 5: 565. 1888; Fischer in Gamble, Fl. Pres. Madras 1377. 1928; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 244. 1987.

Erect subshrubs; branchlets scandent, pilose, densely covered with cystolith. Leaves to 8 x 0.5 cm, linear, acuminate, oblique at base, glabrous, entire, cystolith very dense. Receptacle sessile, solitary or 2-3 together. Male perianth lobes 4, 1 mm long, obovate, glabrous.

*Fl. & Fr.* : May-June

*Distr.* : South India and Sri Lanka. Rare; in evergreen forests. Vellimala, *JA 18460.*

**Elatostema lineolatum** Wight, Ic. t. 1984. 1853, var. **lineolatum**, "*lineolata*";

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 3 mm long, oblanceolate; perianth lobes 4, 1.5 x 1 mm, hairy at apex, red-glandular; stamens 4, anthers deeply cleft at base.

*Fl. & Fr.* : January-May

*Distr.* : India. Common; in evergreen forests. Sunderamala, *JA 13579*, Kottamala, JA *15299.*

**Elatostema wightii** Hook. f., Fl. Brit. India 5: 570. 1888; Fischer in Gamble, Fl. Pres. Madras 1377. 1928; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 244. 1987.

Small herbs; stems usually unbranched. Leaves to 10 x 3.5 cm, ovate, inequilateral, acuminate at apex, rounded at base, widely crenate, sessile; cystolith scarce. Male receptacle 8 mm across, peduncles 4 cm long, slender; bracts ovate, cuspidate; bracteole lanceolate. Flowers many, perianth lobes 4, free, 1.5 mm long, ovate, long-cuspidate; stamens 4, free. Female receptacle 8 mm across, sessile; bracts obovate, cuspidate, fimbriate.

*Fl. & Fr.* : August

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Pachakkanam, *JA 12324.*

## GIRARDINIA Gaudichaud-Beaupre

in Freycinet Voyage Monde, Uranie Physicienne Bot. 498. 1830.

**Girardinia diversifolia** (Link) Friis, Kew Bull. 36: 145. 1981; Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1490. 1983; Manilal, Fl. Silent Valley 262. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 419. 1996. ***Urtica diversifolia*** Link, Enum. Pl. 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*. ***G. leschenaultiana*** Decne. in Jacq., Voy. 4: 152. 1844; Wight, Ic. t. 1976. 1853; Fischer in Gamble, Fl. Pres. Madras 1372. 1928. ***G. zeylanica*** Decne. in Jacq., Voy. 4: 152. 1844; Fischer in Gamble, Fl. Pres. Madras 1373. 1928. ***G. heterophylla*** Decne. var. ***zeylanica*** (Decne.) Hook. f., Fl. Brit. India 5: 551. 1888. **Ana Choriyanam, Kuttithoova, Anaye viratti** (Mannan).

Erect shrubs with sharp stinging hairs and prickles. Leaves alternate, to 18 x 22 cm, deeply palmately lobed, irregularly dentate, densely pubescent below, strongly ribbed; petiole to 12 cm long, densely prickly; stipule 15 x 6 mm, connate, lanceolate. Inflorescence of simple or branched spikes of 6 x 6 cm, curved. Flowers monoecious or deciduous, female perianth lobes 2, opposite, 2 x 2 mm, keeled, bristled, male perianth lobes 4 or 5, free, valvate; stamens 4 or 5; ovary 1-celled, ovule solitary; stigma penicillate, papillose, 10 mm long. Achenes 2.5 x 2.5 mm, biconvex, orbicular, yellow, smooth.

*Fl. & Fr.* : November-December

*Distr.* : South India and Sri Lanka. Common; in evergreen forests. Kalvarimala, *JA 12791.*

## **LAPORTEA** Gaudichaud-Beaupre

in Freycinet Voyage Monde, Uranie Physicienne Bot. 498. 1830, *nom. cons.*

Herbs or undershrubs with stinging hairs. Leaves alternate, toothed, 3-ribbed, not lobbed, with linear cystolyths; stipules connate in pairs. Inflorescence of spike or panicles. Flowers monoecious or dioecious, male perianth lobes 4 or 5, ovate; female perianth lobes 4, free, inflexed on bud; pistillode globose; ovary oblique, 1-celled; ovule solitary; style lateral. Achene oblique, compressed.

1. Pedicels broadly winged; flowers paniculate ..... **L. bulbifera**

1. Pedicel wingless; flowers in interrupted clusters on long spike ..... **L. interrupta**

**Laportea bulbifera** (Sieb. & Zucc.) Wedd. in Arch., Mus. Hist. Nat. 9: 139. 1856; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 245. 1987. ***Urtica bulbifera*** Sieb. & Zucc., Abh. Math.-Phys. Cl. Koenigl. Bayer. Akad. Wiss. 4: 214. 1846. ***Laportea terminalis*** Wight, Ic. t. 1972. 1853; Hook. f., Fl. Brit. India 5: 549. 1888; Fischer in Gamble, Fl. Pres. Madras 1373. 1928. **Thoova, Choriyanam** (Mannan).

Prickly herbs. Leaves 10-16 x 5-8 cm, ovate, acute at apex, cordate at base, serrate, densely bristled above; nerves to 4 pairs, reticulate; petiole to 8 cm long. Cymes terminal to 10 cm across; pedicels flattened. Achenes 2 mm across, compressed, obovoid, black.

*Fl. & Fr.* : November-February

*Distr.* : India and Sri Lanka. Fairly common; in evergreen forests above 1400 m altitude. Vellimala, *JA 17477.*

**Laportea interrupta** (L.) Chew in Gard., Bull. Straits Settlem. 21: 200. 1965; Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1491. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 420. 1996. ***Urtica interrupta*** L., Sp. Pl. 985. 1753. ***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. 1928.

Herbs with strong stinging hairs. Leaves 9-15 x 7-10 cm, broadly ovate, acuminate, rounded at base, coarsely serrulate; nerves 6 pairs, reticulate; petiole 6 cm long. Spikes to 22 cm long, interrupted, axillary; erect or horizontal; peduncles 12 cm long. Female perianth lobes 1 mm long, ovate, hispid, keeled; ovary compressed; style 1 mm long; ovary compressed; male perianth lobes 4, 1 mm long, curved, hirtus; stamens 4. Achenes 1.5 x 1 mm, ovate, acute, rugose at margins.

*Fl. & Fr.* : October-January

*Distr.* : Paleotropics. Common; in semi-evergreen forests. Thekkady, *JA 12526.*

## **OREOCNIDE** Miquel

Pl. Jungh. 39. 1851.

**Oreocnide integrifolia** (Gaud.) Miq., Ann. Mus. Bot. Lugduno-Batavum 4: 306. 1869; Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1492. 1983; Manilal, Fl. Silent Valley 264. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 420. 1996. ***Villebrunea integrifolia*** Gaud., Voy. Bonite Bot. t. 91. 1844; Hook. f., Fl. Brit. India 5: 589. 1888; Fischer in Gamble, Fl. Pres. Madras 1388. 1928.

Small trees. Leaves alternate, to 17 x 6 cm, oblong-oblanceolate, entire, acuminate, base acute; nerves 4-6 pairs, lowest pairs basal, punctate, glabrous; stipule 1 cm long, lanceolate. Flowers in axillary fascicles, monoecious or dioecious; male perianth 1.5 mm long, 4-lobed, united below; female perianth 2 mm long, tubular, narrowed above, toothed; stamens 3-5; pistillode obovate; ovary adnate to perianth tube, 1-celled, ovule basal; style absent; stigma discoid, fimbriate. Achenes adnate to the perianth, embraced by fleshy bracteoles, to 4 mm across.

*Fl. & Fr.* : December-February

*Distr.* : Indo-Malaya and South China. Common; in semi-evergreen forests. Thekkady, *JA 18461.*

*Ethnobotanical use* : Fruits are edible and are eaten.

## **PELLIONIA** Gaudichaud-Beaupre

in Freycinet Voyage Bot. 494, t 119. 1826, *nom. cons.*

**Pellionia heyneana** Wedd., Monog. Urtic. 287, t. 5. 1856; Hook. f., Fl. Brit. India 5: 561. 1888; Fischer in Gamble, Fl. Pres. Madras 1380. 1928; Manilal, Fl. Silent Valley 264. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 421. 1996.

Subshrubs; stem arched, angled, densely lineolate. Leaves distichous, lamina to 20 x 6 cm, falcate-elliptic, inequilateral, acuminate, acute at base, 3-ribbed; cystolith many, linear; petiole 1.5 cm long. Flowers in axillary peduncled cymes; peduncles stout, erect, to 15 cm long. Male flowers pedicelled, perianth reddish, lobes 4, equal, 2 mm long, oblong; stamens 4, free. Female flowers pedicelled, in short lateral congested cymes; peduncle to 1.5 cm long; perianth reddish, lobes 5, unequal, oblong to 1.5 mm long. Achenes 0.6 x 0.5 mm, obovate, acute, biconvex, tubercled.

*Fl. & Fr.* : March-May

*Distr.* : Western Peninsular India and Sri Lanka. Common; in evergreen forests. Chokkampetti, *JA 13565; NS 5099.*

## **PILEA** Lindley

Collect. Bot. ad. t. 4. 1821, *nom. cons.*

Herbs. Leaves opposite, equal or unequal, 3-ribbed, serrate, lineolate; stipules intra-petiolar, connate. Inflorescence axillary, peduncled, dichotomous cyme. Flowers monoecious or dioecious. Male perianth lobes 2-4, free or connate, gibbous or spurred; female perianth lobes 3, unequal; stamens 2-4, free; ovary 1-celled, straight; ovule solitary, basal; stigma penicillate; pistillode small or oblong. Achene ovoid or oblong, biconvex.

1. Leaves to 19 cm long, nervules parallel, prominent ..... **P. melastomoides**
1. Leaves to 6 cm long, nervules not parallel ..... 2
2. Perianth lobes spurred; achenes narrowed at apex ..... **P. wightii**
2. Perianth lobes spurless; achenes rounded at apex ..... **P. kingii**

**Pilea kingii** Fischer, Kew Bull. 1927: 76. 1927 & in Gamble, Fl. Pres. Madras 1376. 1928; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 246. 1987. ***P. wightii*** Wedd. var. ***macrophylla*** Hook. f., Fl. Brit. India 5: 555. 1888.

Slender herbs; stems usually unbranched, glabrous. Leaves to 5.5 x 4 cm, broadly ovate, acuminate, rounded or cordate at base; spineus-serrate, 3-ribbed; lineoles scarce, glabrous; petiole to 5 cm long. Cymes 2 cm across, axillary, dichotomous, on slender 6 cm long peduncle. Achenes 1 x 1 mm, biconvex, smooth.

*Fl. & Fr.* : January-March

*Distr.* : Southern Western Ghats (Kerala and Tamil Nadu). Rare; in evergreen forests at high altitudes. Uppermanalar, *JA 13129.*

**Pilea melastomoides** (Poir.) Bl., Mus. Bot. Lugduno-Batavum 2: 54. 1856; Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1493. 1983; Manilal, Fl. Silent Valley 264. 1988; Sasidh. &

Sivar., Fl. Pl. Thrissur For. 421. 1996. ***Urtica melastomoides*** Poir. in Lam., Encycl. Suppl. 4: 223.1816. ***Urtica trinervia*** Roxb., Fl. Ind. 3:582.1832. ***Pilea trinervia*** (Roxb.) Wight, Ic.t. 1973. 1853; Hook. f., Fl. Brit. India 5: 557. 1888; Fischer in Gamble, Fl. Pres. Madras 1379. 1928.

Dioecious subshrubs, glabrous. Leaves to 19 x 9 cm, ovate, acuminate, rounded at base, serrate, 3-ribbed, nervules parallel, pubescent along nervules below; lineoles crowded; petiole unequal in opposite pairs, to 10 cm long. Male panicle 10 cm across, axillary; flowers sessile, 4 mm across; perianth lobes 4, ovate, acute; stamens 4. Female panicle 2 cm across, shortly peduncled. Flowers smaller than male flowers; perianth lobes 1 mm long, stigmas 3-fid. Achenes 1 mm across, biconvex.

*Fl. & Fr.* : August-December

*Distr.* : Indo-Malesia. Very common; in evergreen forests. Pachakkanam, *JA 12300*; Vallakkadavu, *JA & KPR 16387*, Brook's peak, JA *17022.*

*Note* : Female plants are usually with smaller leaves.

**Pilea wightii** Wedd., Ann. Sci. Nat. Bot. Ser. 4, 1: 186. 1854; Hook. f., Fl. Brit. India 5: 554. 1888; Fischer in Gamble, Fl. Pres. Madras 1379. 1928; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 247. 1987. ***P. radicans*** Wight, Ic. t. 1974. 1853, non Wedd., 1852.

Slender herbs, glabrous. Leaves 1-3 x 1-2 cm, broadly ovate to suborbicular, acute, subcordate at base, crenate, 3-ribbed; petiole 2-4 cm long. Female cymes 1-2 cm across, shortly peduncled, branches pink; perianth lobes curved, smooth. Achenes 0.5 x 0.5 mm, biconvex, smooth or tubercled.

*Fl. & Fr.* : October-December

*Distr.* : India, Java and Sri Lanka. Rare; in evergreen forests. Mlappara, *JA 17911.*

## **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.....2
1. Flowers in racemes.....3
2. Male flowers 4-merous; leaves 3-ribbed from base.....**P. zeylanica**
2. Male flowers 5-merous; leaves 5-ribbed from base.....**P. auriculata**

3. Racemes axillary.....**P. meeboldii**

3. Racemes terminal.....4

**Pouzolzia auriculata** Wight, Ic. t. 1980, f. 2. & t. 1099, f. 37. 1853; Hook. f., Fl. Brit. India 5: 582. 1888; Fischer in Gamble, Fl. Pres. Madras 1383. 1928; Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1494. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 247. 1987; Mohanan & Henry, Fl. Thiruvananthapuram 438. 1994.

Erect herbs; stem adpressed scabrous. Leaves alternate, to 5 x 2 cm, lanceolate, acute at base and apex; midrib with 2 pairs of lateral nerves, densely pilose below; petiole to 1.5 cm long; stipule 7-10 mm long, lanceolate with filiform tip. Cymes dense, sessile. Male and female flowers together; bracteoles filiform; male perianth lobes 1.5 mm long, oblanceolate, hispid above; filament 2 mm long, glabrous. Female flowers sessile; perianth tube 2-toothed at apex, pubescent; ovary 2-winged; stigma 3-4 mm long. Achenes 1.5 x 1 mm, ovoid, polished.

*Fl. & Fr.* : October-January

*Distr.* : Peninsular India and Sri Lanka. Common; among rocks in moist deciduous forests. Thekkady, *JA 12565.*

**Pouzolzia meeboldii** Smith & Ramaswami, Rec. Bot. Surv. India 6: 40. 1914; Fischer in Gamble, Fl. Pres. Madras 1383. 1928; 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 6 x 3 mm, ovate. Male flowers 2 mm across, truncate at apex; perianth lobes 4, transversally plicate. Female flowers smaller; perianth lobe 0.5 mm long, ciliate at apex, stigma 2 mm long. Achenes 1 mm long, ridged, brown.

*Fl. & Fr.* : August-January

*Distr.* : Southern Western Ghats. Common; along rocky cuttings in grasslands. Uppupara, *JA 14128.*

**Pouzolzia wightii** Benn., Pl. Jav. Rar. 1: 66. 1838; Wight, Ic. t. 2093. f. 8. 1853; Hook. f., Fl. Brit. India 5: 584. 1888; Fischer in Gamble, Fl. Pres. Madras 1383. 1928; Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1497. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 439. 1994.

There are two varieties in the study area.

Key to the varieties:

1. Leaves to 7 cm long, opposite.....**P. wightii** var. **wightii**

1. Leaves to 13 cm long, ternate.....**P. wightii** var. **wallichiana**

**Pouzolzia wightii** Benn. Pl. Jav. Rar. 1: 66. 1838, var. **wallichiana** Hook. f., Fl. Brit. India 5: 584. 1888; Fischer in Gamble, Fl. Pres. Madras 1384. 1928; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 249. 1987.

Woody herbs; stem terete, pilose. Leaves ternate, to 12 x 2 cm, lanceolate, acuminate, densely pubescent, acute to rounded at base, 3-ribbed; stipule 6 x 4 mm, ovate. Raceme 20-25 cm long, terminal; bracts 2.5 x 0.5 cm, alternate or whorled, lanceolate, leaf-like. Male flowers hemispherical, pedicel 4 mm long, pilose; perianth lobes 4, equal, 3 mm long. Achenes 4 x 4 mm, winged, hispid.

*Fl. & Fr.* : October-December

*Distr.* : Southern Western Ghats. Common; among rocks in grasslands. Vallakkadavu, *JA 12792.*

**Pouzolzia wightii** Benn., Pl. Jav. Rar. 1: 66. 1838, var. **wightii**

Herbs; stem pilose. Leaves to 6.5 x 2.5 cm, ovate to elliptic, acuminate, 3-ribbed, hispid; stipule 8 x 6 mm, ovate. Spike to 35 cm long, terminal; bracts 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, 2.5 mm long, ciliate; filaments puberulus. Female flowers sessile; perianth tube striate, hispid. Achenes 1.5 x 1 mm, ovoid, wingless.

*Fl. & Fr.* : October-January

*Distr.* : South Western India, Concan southwards. Common; in grasslands. Mlappara, JA *12146*, Kalvarimala, JA *13873*; Pachakkanam, *JA & KPR 14400, 17320.*

**Pouzolzia zeylanica** (L.) Benn. Pl. Jav. Rar. 1: 67. 1838; Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1497. 1983; Manilal, Fl. Silent Valley 265. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 422. 1996. ***Parietaria zeylanica*** L., Sp. Pl. 1052. 1753. ***Parietaria indica*** L., Mant. Pl. 128. 1767. ***Pouzolzia indica*** (L.) Gaudich., Voy. Uranie 12: 503. 1830; Wight, Ic. t. 1980. f. 1. & 2100. f. 40. 1853; Hook. f., Fl. Brit. India 5: 581. 1888; Fischer in Gamble, Fl. Pres. Madras 1382. 1928.

Slender procumbent herbs. Leaves alternate or opposite, to 5 x 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, 1.5 mm long, sparsely villous. Achenes 2-winged.

*Fl. & Fr.* : July-December

*Distr.* : Indo-Malesia and East Asia. Common; in disturbed forests and forest plantations. Kalvarimala, *JA 12643;* Vellimala, *JA 13887.*

**PROCRIS** Commerson ex Jussieu

Gen. 403. 1789.

**Procris crenata** Robinson, Philipp. J. Sci. 5: 507. 1911; Hara, Enum. Fl. Pl. Nepal 3: 204. 1982; Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1498. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 422. 1996. ***P. wightiana*** Wall. ex Wedd., Monog. Urtic. 336. 1856, *nom. illegit.*; Fischer in Gamble, Fl. Pres. Madras 1378. 1928. ***P. laevigata*** sensu Hook. f., Fl. Brit. India 5: 575. 1888, non Bl., 1826.

Succulent herbs, usually epiphytic, stem erect or scandent. Leaves to 8 x 2.5 cm, elliptic-lanceolate, crenate, penninerved, cystolith linear; petiole 3 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 1 mm long, ovoid, apiculate, rugose.

*Fl. & Fr.* : October-January

*Distr.* : Africa, Eastwards to India, Eastern Asia and Philippines. Occasional; in and evergreen semi-evergreen forests. Mangaladevi, *JA 12187.*

## 121. ULMACEAE

Mirb., Elem. Physiol. Veg. Bot. 2: 905. 1815.

1. Fruits samaroid; ovary stipitate; flowers polygamous ..... **Holoptelea**
1. Fruits drupes; ovary not stipitate; flowers unisexual ..... 2
2. Leaves 3-ribbed from base; plants monoecious ..... **Celtis**
2. Leaves 5-ribbed from base; plants dioecious ..... **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. Perianth lobes 5; midrib of leaf without strong lateral nerves ..... **C. philippensis**
1. Perianth lobes 4; midrib of leaf with strong lateral nerves ..... **C. tetrandra**

**Celtis philippensis** Blanco, Fl. Filip. 197. 1837, var. **wightii** (Planch.) Soep. in Steenis, Fl. Males. Ser. 1, 8: 62. 1977; Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1501. 1983; Sasidh.

& Sivar., Fl. Pl. Thrissur For. 424. 1996. *C. wightii* Planch., Ann. Sci. Nat. Bot. Ser. 3, 10: 307. 1948; Wight, Ic. t. 1969. 1853; Hook. f., Fl. Brit. India 5: 483. 1888; Fischer in Gamble, Fl. Pres. Madras 1349. 1928.

Trees; bark grey, white with black streaks inside; branchlets lenticellate, pubescent. Leaves to 9 x 5 cm, ovate, long-acuminate, entire, base rounded, coriaceous, pubescent along the nerves, reddish brown below when dry, petiole 7-15 mm long. Cymes 3 x 2 cm, axillary, usually on new shoots. Flowers few to many; sepals 2 x 1 mm, ovate, ciliate; disk villous; ovary ovoid, style 8 mm long, pubescent; male sepals same as female sepals; stamens 5, free. Drupes 7 x 5 mm, ovoid, smooth.

*Fl. & Fr.* : April-July

*Distr.* : Indo-Malesia, Australia, Oceana and Tropical Africa. Common; in evergreen forests. Arjunankotta, *JA 13675*; Damsite, *JA 15121*; Chokkampettimala, *JA & KPR 17780.*

**Celtis tetrandra** Roxb., Fl. Ind. 2: 63. 1832; Hook. f., Fl. Brit. India 5: 482. 1888; Fischer in Gamble, Fl. Pres. Madras 1348. 1928; Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1502. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 250. 1987. ***C. serotina*** Planch., Ann. Sci. Nat. Bot. Ser. 3. 10: 301. 1848; Wight, Ic. t. 1570. 1850.

Medium trees; branchlets slender, pubescent. Leaves to 11 x 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 1 cm long. Flowers fascicled or in short cymules, axillary, pedicels 1 cm long, filiform; male sepals 1.5 mm long, ciliate; stamens 4. Drupes 7 x 6 mm, ovoid, glabrous.

*Fl. & Fr.* : February-April

*Distr.* : Indo-Malaya. Rare; in evergreen forests. Kalvarimala, *JA 13632*; Mangaladevi, *JA & KPR 17186.*

## 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. 1853; Hook. f., Fl. Brit. India 5: 481. 1888; Fischer in Gamble, Fl. Pres. Madras 1348. 1928; Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1503. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 424. 1996. ***Ulmus integrifolius*** Roxb., Pl. Corom. t. 78. 1798. **Aaval**.

Deciduous polygamous trees. Leaves to 10 x 6 cm, ovate, entire, abruptly acuminate at apex, rounded or subcordate at base, punctate below, nerves 9 pairs; petiole 1.5 cm long. Flowers appear before leaves, in axillary congested 12 mm long cymes, monoecious or bisexual; sepals 4 or 5, free, 2 mm long, 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 3 cm across, samaroid, glabrous.

*Fl. & Fr.* : February-April

*Distr.* : Indo-Malesia. Occasional; in disturbed forest areas. Thekkady, *JA 13532, JA 17198.*

### **TREMA** Loureiro

Fl. Cochinch. 539, 562. 1790.

**Trema orientalis** (L.) Bl., Mus. Bot. Lugduno-Batavum 2: 62. 1856; Hook. f., Fl. Brit. India 5: 484. 1888; Fischer in Gamble, Fl. Pres. Madras 1350. 1928; Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1504. 1983; Manilal, Fl. Silent Valley 258. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 424. 1996. ***Celtis orientalis*** L., Sp. Pl. 1044. 1753; Wight, Ic. tt. 602 & 603. 1842. **Pottama, Pottamaram.**

Small dioecious trees; branchlets scabrous to adpressed pubescent. Leaves to 15 x 5 cm, alternate, ovate, acuminate, serrulate, cordate at base, 3-5-ribbed from base, tomentose below, scabrous above; lateral nerves 5 or 6 pairs; petiole 1 cm long. Flowers in axillary fascicles or cymes. Male flowers usually sessile; sepals 4 or 5, equal, 2 mm long, curved; stamens 5. Female flowers in cymes; sepals unequal, ciliate; ovary ovate, 1-celled, style 2-fid, curved, stigmas plumose. Fruit a drupe, 3 mm across, globose.

*Fl. & Fr.* : September-December

*Distr.* : India, eastwards to Malesia and Australia and to Africa. Occasional; in disturbed forests. Thekkady, *NS 855, JA 12416.*

## 122. CANNABACEAE

Endl., Gen. Pl. 286. 1837.

### **CANNABIS** Linnaeus

Sp. Pl. 1027. 1753

**Cannabis sativa** L., Sp. Pl. 1027; 1753; Hook. f., Fl. Brit. India 5: 487. 1888; Fischer in Gamble, Fl. Pres. Madras 1350. 1928; Rani & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1506. 1983. **Ganchavu** (Mannan).

Erect aromatic shrubs. Leaves opposite, alternate above, palmately 3-9-foliolate; leaflets 6-9 x 1 cm, lanceolate, serrate, glandular below; petiole 3-5 cm long; stipules 1 cm long, lanceolate. Flowers dioecious, in short axillary cymes of panicles; male flowers 5 mm across; tepals 5, free; stamens 5; anthers glandular. Female flowers enclosed in spathaceous bracts; perianth absent;

ovary globose, 1-celled; ovules solitary; styles 2, filiform. Fruit an achene, 4 x 3 mm, compressed; seed shiny, brown.

*Fl. & Fr.* : Throughout the year

*Distr.* : Throughout India. Occasionally seen in remote areas of the Tiger Reserve. Thaannikkudy, *JA 18458.*

*Ethnobotanical use* : Tribals (Nangan) believe that the consumption (use) of this drug enables them to withstand snake bite, so when à snake bite happens they soon smoke gangavu and pour juice of its leaves to the wound.

## 123. MORACEAE

Link, Handbuch 2: 444. 1831.

1. Flowers enclosed in syconia ..... **Ficus**
1. Flowers not enclosed in syconia ..... 2
2. Male flowers on disciform receptacle ..... 3
2. Male flowers on globose or oblong heads; fruit a sorosis ..... **Artocarpus**
3. Small herbs; female flowers aggregated, sunk in the fleshy receptacle ..... **Dorstenia**
3. Trees; female flowers solitary ..... **Antiaris**

### ANTIARIS Leschenault

Ann. Mus. Par. 16: 478, t. 22. 1810, *nom. cons.*

**Antiaris toxicaria** Lesch., Ann. Mus. Natl. Hist. Nat. 16: 478, t. 22. 1820; Hook. f., Fl. Brit. India 5: 537. 1888; Fischer in Gamble, Fl. Pres. Madras 1367. 1928; Sasidh. & Sivar., Fl. Pl. Thrissur For. 425. 1996. ***A. innoxia*** Bl., Rumphia 1: 172, t. 54. 1835; Bedd., Fl. Sylv. t. 307. 1873. ***A. saccidora*** Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 232. 1851; Wight., Ic. t. 1958. 1853. **Karanjili, Maravuri (Mala Arayan).**

Lofty deciduous trees with large buttresses, exudation sticky; bark greyish white, smooth pale white inside, strongly fibrous. Leaves bifarious, to 15 x 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 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.

*Fl. & Fr.*: December-March

*Distr.* : Africa, Asia and Australia. Common; in evergreen forests. Koruthode, *JA 13488.*

*Ethnobotanical use* : The fruits are said to be poisonous; the bark is beaten into rough fibers, and is used as rough cloths.

## 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. Fruits smooth, 2-4 cm long.....**A. gomezianus** ssp. **zeylanicus**
1. Fruits echinate; over 6 cm long .....2
2. Under surface of leaves and young shoots hirsute; male spikes over 10 cm long .....**A. hirsutus**
2. Leaves and young shoots glabrous; male spikes under 5 cm long .....**A. heterophyllus**

**Artocarpus gomezianus** Wall. ex Trecul, Ann. Sci. Nat. Bot. Ser. 3, 8: 118. 1847, ssp. **zeylanicus** Jarrett, J. Arnold Arbor. 41: 90. 1960; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 216. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 425. 1996. ***A. lakoocha*** sensu Fischer in Gamble, Fl. Pres. Madras 1369. 1928, non Roxb., 1832. **Theempalachhi** (Mannan), **Pulichakka** (Paliyan, Urali), **Kattu kadaplavu** (Mala Arayan).

Medium sized to large trees, bark brownish black, pinkish inside; twigs grey adpressed tomentose. Leaves to 16 x 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, 8 mm across, peduncles 1 cm long. Syncarp subglobose, uneven, fleshy, greenish yellow.

*Fl. & Fr.* : February-June

*Distr.* : Peninsular India and Sri Lanka. Common; in evergreen forests. Mullakkudy, *JA 13742.*

*Ethnobotanical use* : The fruits are edible when fully ripe (Mannan).

**Artocarpus heterophyllus** Lam., Encycl. 3: 209. 1789; Jarrett, J. Arnold Arbor. 40: 334. 1959; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 217. 1981; Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1509. 1983; Manilal, Fl. Silent Valley 258. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 426. 1996. ***A. integrifolius*** auct. non L. f., 1781: Wight., Ic. t. 678. 1840; Hook. f., Fl. Brit. India 5: 541. 1888; Fischer in Gamble, Fl. Pres. Madras 1369. 1928.

Large trees with white sticky sap, bark dark greyish-brown, trunk with warty tubercles; branchlets glabrous. Leaves to 15 x 7 cm, obovate or oblong-obovate, acute or obtuse, base cuneate, entire (seedling and coppice 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 to 30 x 25 cm; seeds oblong, smooth.

*Fl. & Fr.* : November-March

*Distr.* : South-east Asia. Occasional; in evergreen forests. Karadikkavala, *JA 14902.*

**Artocarpus hirsutus** Lam., Encycl. 3: 210. 1789; Wight, Ic. t. 1957. 1853; Bedd., Fl. Sylv. t. 308. 1873; Hook. f., Fl. Brit. India 5: 541. 1888; Fischer in Gamble, Fl. Pres. Madras 1369. 1928; Sasidh. & Sivar., Fl. Pl. Thrissur For. 426. 1996.

Very large trees with white sticky latex; bark brownish-black; branchlets angled, hispid. Leaves to 18 x 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, to 15 cm long, cylindrical; peduncle to 4 cm long. Syncarp echinate, tomentose, to 12 x 8 cm, yellow when ripe.

*Fl. & Fr.* : November-March

*Distr.* : Peninsular India. Fairly common; in semi-evergreen forests. Koruthode, *JA 17150.*

*Ethnobotanical use* : Fruits are edible when fully ripe (Mala Arayan).

## **DORSTENIA** Linnaeus

Sp. Pl. 121. 1753

**Dorstenia indica** Wall. ex Wight, Ic. t. 1964. 1853; Hook. f., Fl. Brit. India 5: 494. 1888; Fischer in Gamble, Fl. Pres. Madras 1370. 1928; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 228. 1981; Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1510. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 426. 1996.

Herbs. Leaves alternate, to 9 x 2.5 cm, obovate or oblanceolate, acute, base attenuate or cuneate, membranous, distantly toothed, sparsely hirsute along the nerves beneath, nerves 8-13 pairs; petiole 1 cm long. Flowers monoecious, many, on obconical receptacle. Receptacle axillary, solitary, discoid, 5-angled, to 1.5 cm across, marginal lobes to 0.5 cm long; peduncles 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, sunken.

*Fl. & Fr.* : August-December

*Distr.* : South India and Sri Lanka. Common; along moist shady places in evergreen forests. Pachakkanam, *JA 12325.*

## 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. Leaves opposite ..... **F. hispida**
1. Leaves alternate ..... 2
2. Receptacles on short branched tubercles ..... 3
2. Receptacles axillary ..... 4
3. Climbers; leaves cordate at base; receptacle 4 cm across ..... **F. amplocarpa**
3. Trees; leaves acute at base; receptacle 2 cm across ..... **F. racemosa**
4. Receptacles 3-6 per axils ..... 5
4. Receptacle paired or solitary ..... 6
5. Lowest pair of nerves rib-like, erose; figs sessile ..... **F. tsjahela**
5. Lowest pair of nerves not rib-like, or erose; figs shortly peduncled ..... **F. caulocarpa**
6. Receptacle peduncled ..... 7
6. Receptacle sessile ..... 14
7. Bracteoles at or near the base of the peduncle ..... 8
7. Bracteoles at or near the apex of the peduncle ..... 10
8. Leaves not scabrous; nerves forming intramarginal vein ..... **F. nervosa**
8. Leaves scabrous; nerves not forming intramarginal vein ..... 9
9. Receptacle ca. 15 mm across; leaves equal at base, to 20 cm long ..... **F. exasperata**
9. Receptacle ca. 7 mm across; leaves unequal at base, to 10 cm long ..... **F. tinctoria** ssp. **gibbosa**
10. Scandent epiphytic shrubs; branches triangular ..... **F. rigida** var. **bracteata**
10. Erect trees; branches terete ..... 11
11. Receptacle solitary; leaves shining above ..... **F. callosa**
11. Receptacles paired; leaves not as above ..... 12
12. Receptacle 3 x 2 cm; leaves coriaceous; petiole to 6 cm long ..... **F. beddomei**
12. Receptacle less than 1.5 cm across; leaves otherwise; petiole to 3 cm long ..... 13
13. Lateral nerves 10 pairs; leaves yellowish-brown when dried; receptacle ca. 14 mm across ..... **F. virens** var. **wightiana**
13. Lateral nerves 15-18 pairs; leaves reddish-brown when dried; receptacle 7 mm across ..... **F. costata**

14. Branchlets and leaves beneath and branchlets densely tomentose .....**F. drupacea** var. **pubescens**

14. branchlets and leaves glabrous .....15

15. Leaves cordate at base.....**F. arnottiana**

15. Leaves rounded or acute at base .....16

16. Leaves with a strong pair of nerves above the base, obtuse or obliquely acute at apex.....**F. microcarpa**

16. Leaves without such nerves, acuminate to caudate at apex .....17

17. Receptacle ca. 13 mm across; leaves rounded at base, with 16-19 pairs of nerves..... **F. amplissima**

17. Receptacle ca. 6 mm across; leaves acute at base, with 10-12 pairs of nerves .....**F. talbotii**

**Ficus amplissima** J. E. Smith in Rees, Cyclop. 14: n. 1. 1810; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 242. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1515. 1983; Manilal, Fl. Silent Valley 259. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 427. 1996. ***F. tsiela*** Roxb. ex Buch.-Ham., Trans. Linn. Soc. London 15: 149. 1826; Wight, Ic. t. 668. 1840; Hook. f., Fl. Brit. India 5: 515. 1888; Fischer in Gamble, Fl. Pres. Madras 1362. 1928.

Tall trees; bark grey, smooth; branchlets glabrous. Leaves to 12 x 9 cm, ovate to oblong, acute, base acute to truncate, glabrous; nerves closely parallel, intercostae irregular, prominent, reddish-brown below, intramarginal nerve distinct; petiole 2.5-6 cm long; stipules 2 cm long, ovate. Receptacle depressed-globose to obovoid, yellow, mainly along leafless axils and rarely axillary.

*Fl. & Fr.* : September-January

*Distr.* : Peninsular India and Sri Lanka. Common; in evergreen forests. Thaannikkudy, *JA 12340*; Sabarimala, *JA 12573*; Pamba, *JA & KPR 17157.*

**Ficus amplocarpa** Govindarajalu & Masilamoney, Proc. Indian Acad. Sci. (Pl. Sci.) 91: 117. 1982; Henry *et al.*, Fl. Tamil Nadu Ser 1, 2: 251. 1987. ***Pogonotrophe macrocarpa*** Miq., London J. Bot. 7: 74. 1848; Wight, Ic. t. 1965. 1853. ***Ficus macrocarpa*** (Miq.) Wight ex King, Ann. Roy. Bot. Gard. (Calcutta) 1: 166, t. 208. 1888 & in Hook. f., Fl. Brit. India 5: 534. 1888, non Bl., 1825: Fischer in Gamble, Fl. Pres. Madras 1365. 1928.

Large climber; stem rounded, rooting; branchlets subglabrous. Leaves to 15 x 10 cm, ovate, cordate but sometimes unequal at base, abruptly acuminate at apex, 3-nerved from base, hispid below; lateral nerves 2 or 3 pairs, minutely hispid; petiole 7 cm long. Receptacle many together on lateral tubercles on old stem, globose, mottled with pink, pubescent; peduncle 1 cm long, bracteolate at the middle.

*Fl. & Fr.* : November-February

*Distr.* : South India and Sri Lanka. Common; in evergreen forests. Uppupara, *NS & JA 12708.*

**Ficus arnottiana** (Miq.) Miq., Ann. Mus. Bot. Lugduno-Batavum 3: 287. 1867; King in Hook. f., Fl. Brit. India 5: 513. 1888; Fischer in Gamble, Fl. Pres. Madras 1363. 1928; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 244. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1516. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 428. 1996. ***Urostigma arnottiana*** Miq., London J. Bot. 6: 564. 1847.

Small trees; bark grey, reddish inside; branchlets glabrous, slender. Leaves to 17 x 10 cm, ovate, caudately acuminate at apex, acumen 4 cm long, deeply cordate at base; margins sometimes uneven; lateral nerves 10 pairs, reddish brown when dried; intercostae reticulate; petiole 6-10 cm long; stipules 6 mm long, ovate, acuminate. Receptacle 6 mm across; sessile or very shortly peduncled, on axils of leaf scars or axillary, yellowish brown; peduncles to 3 mm long; bracteoles at the base of the fig.

*Fl. & Fr.* : October-February

*Distr.* : Peninsular India and Sri Lanka. Common; along river banks in evergreen forests. Koruthode, *JA 12437;* Pambavalley, *JA 12741, JA 12767.*

**Ficus beddomei** King, Ann. Roy. Bot. Gard., Calcutta 1: 26, tt. 24 & 81. 1887 & in Hook. f., Fl. Brit. India 5: 513. 1888; Fischer in Gamble, Fl. Pres. Madras 1364. 1928; Corner, Gard. Bull. s.s. 21: 12. 1965; Sasidh. & Sivar., Fl. Pl. Thrissur For. 428. 1996.

Tall trees; bark smooth, brown; branchlets with prominent stipular scars. Leaves to 18 x 12 cm, ovate, abruptly sharply acuminate, rounded to truncate at base; nerves 15 pairs, parallel, regularly looped below the margins, lowest pairs from base, nervules joined at the middle into a median vain; petiole 6 cm long; stipule 5 cm long, lanceolate, glabrous. Peduncle 1.5 cm long, stout, angled; bracteoles 6 x 3 mm, ovate. Receptacle globose, glabrous, green.

*Fl. & Fr.* November-January

*Distr.* : Peninsular India. Common; in semi-evergreen forests. Uppupara, *JA & NS 12695.*

**Ficus callosa** Willd., Acta Acad. Berol. 102. 1798; King in Hook. f., Fl. Brit. India 5: 516. 1888; Fischer in Gamble, Fl. Pres. Madras 1364. 1928; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 263. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 428. 1996.

Medium trees; bark dark grey, pale white inside; branchlets scabrous. Leaves to 20 x 12 cm, elliptic-oblong, obtusely acute at apex, rounded to cordate at base, minutely scabrous beneath, coriaceous, glossy above; nerves 10 pairs, prominent, regularly arched below the margins; petiole 3-7 cm long; stipule 1 cm long, broadly ovate. Receptacle 2.5 cm across, axillary, globose, scabrous, yellow; peduncle 2.5 cm long, slender; bracteoles below the apex.

*Fl. & Fr.* March-May

*Distr.* : India, Burma and Sri Lanka. Common; in semi-evergreen forests. Kokkara, *JA 13522.*

**Ficus caulocarpa** Miq., Ann. Mus. Bot. Lugduno-Batavum 3: 268. 1867; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 240. 1981; Sasidh. & August., Rheedea 9(1): 77. 1999. ***F. infectoria*** Roxb., var. ***caulocarpa*** (Miq.) King, Ann. Roy. Bot. Gard. Calcutta 1: 63, Pl. 79. 1887.

Large trees with aerial roots, bole buttressed; bark grey, smooth; branchlets glabrous. Leaves 11-19 x 4-10 cm, ovate-oblong, obtusely acuminate at apex, acumen to 1 cm long, rounded or subcordate at base, coriaceous, glabrous; lateral nerves 9-11 pairs, obscure towards the margins, looping irregularly, intercostae subdistinct, shortly attenuate at base; petiole to 7.5 cm long, articulated and deciduous at the base of the blade; stipule grey-puberulus. Receptacle 2-6 together on axils of leafscars, appear before sprouting, 7 mm across, globose, white; peduncle 3 mm long, puberulus; bracteoles at the base of the peduncle, puberulus.

*Fl. & Fr.* : March-May

*Distr.* : South India and Sri Lanka. Rare; in semi-evergreen forests. Kokkara, *JA 13523.*

*Note* : This species was known to be as an endemic to Sri Lanka (Corner, 1981). The present collection is a record of an addition to Flora of India. (Sasidharan & Jomy Augustine , 1999).

**Ficus costata** Ait., Hort. Kew. 3: 452. 1789; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 246. 1981; Sasidh. & August., Rheedea 9(1): 79. 1999. ***F. caudiculata*** Trim., J. Bot. 23: 243. 1885; King in Hook. f., Fl. Brit. India 5: 510. 1888. ***F. mooniana*** King in Hook. f., Fl. Brit. India 5: 514. 1888 [Fig. 59].

Medium trees, rarely epiphytic; branchlets slender, glabrous. Leaves to 13 x 6 cm, ovate-oblong, abruptly, sharply acuminate at apex, acumen 1 cm long, subcordate at base, reddish brown when dry, subcoriaceous; lateral nerves 16-18 pairs, joined below the margin into a narrow intramarginal vain, intercostae reticulate; petiole 3 cm long. Receptacle 8 mm across, smooth, yellowish; peduncle 5 mm long, glabrous; bracteoles 3, at apex of the peduncle.

*Fl. & Fr.* : November-December

*Distr.* : South India and Sri Lanka. Rare; in evergreen forests at low elevations. Pambavalley, *JA 12742*; Pamba, *JA & KPR 17072.*

*Note* : This species was known to be as endemic to Sri Lanka (Corner, 1981). The present collection is the first record of an addition to Flora of India (Sasidharan & Jomy Augustine, 1999).

**Ficus drupacea** Thunb., Diss. Ficus 6, 11. 1786, var. **pubescens** (Roth) Corner in Gard. Bull. Straits Settlem. 17: 381. 1960 & 21: 13. 1965 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 247. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1519. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 428. 1996. ***F. mysorensis*** Heyne ex Roth var. ***pubescens*** Roth in

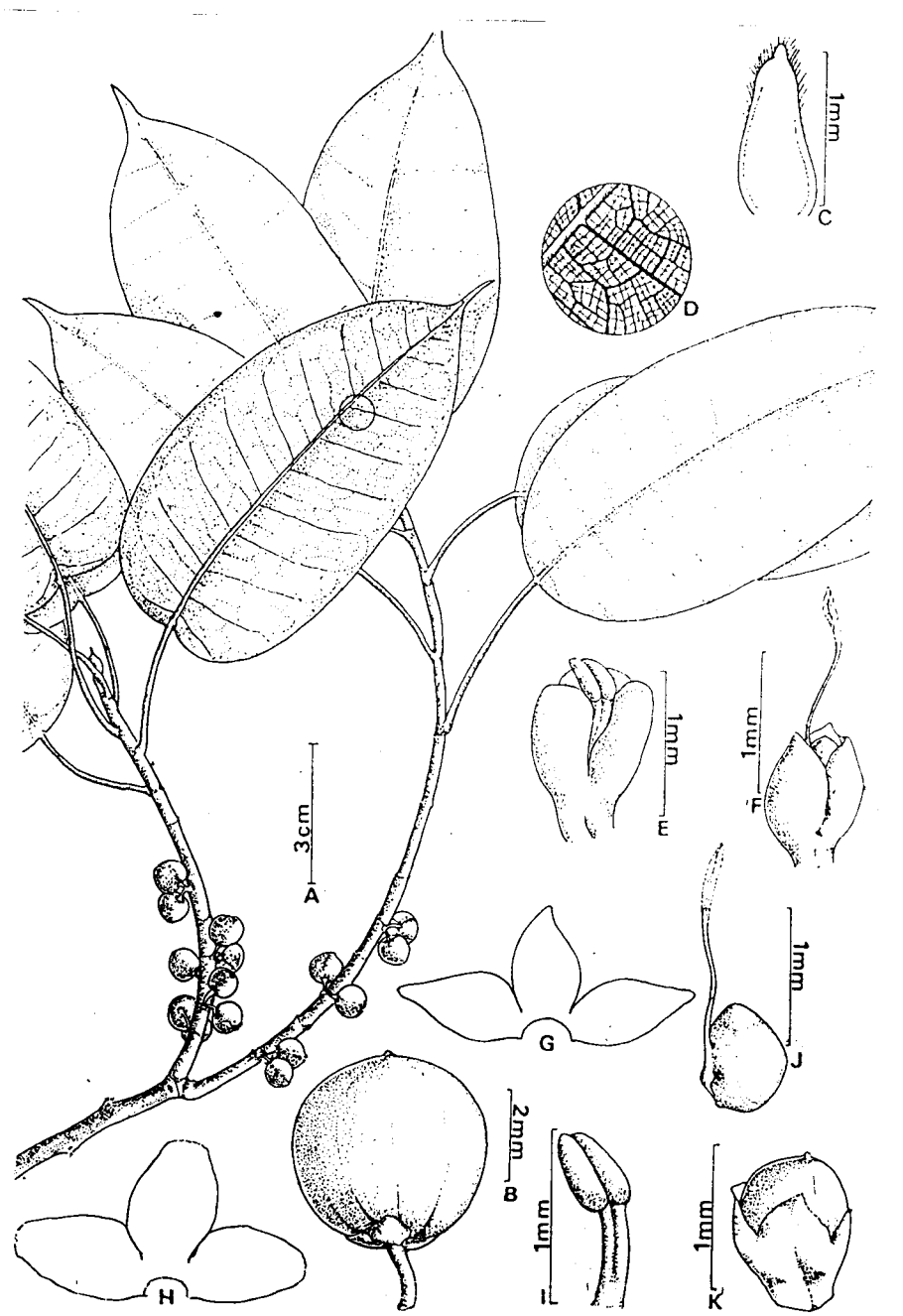



Fig. 59. *Ficus costata* Ait.: **A.** flowering twig; **B.** young fig; **C.** stipule; **D.** portion of leaf showing nervations; **E.** male flower; **F.** female flower; **G.** perianth of female flower; **H.** perianth male flower; **I.** stamen; **J.** pistil; **K.** seed.

Roem. & Schultes, Syst. 1:508.1817; King, Ann. Roy. Bot. Gard. (Calcutta) 1:19, tt. 14 & 81 D. 1887 & in Hook. f., Fl. Brit. India 5: 500. 1888; Fischer in Gamble, Fl. Pres. Madras 1361.1928.

Large trees; bark dark brown, branchlets thick, fulvous tomentose. Leaves to 17 x 10 cm, ovate, acute; rounded to subcordate at base; lateral nerves to 17 pairs, parallel, looping below the margins forming an intramarginal vain; lowest pair narrow; petiole 3 cm long; stipule 2 cm long, glabrous towards the apex. Receptacle 2 cm across, paired, densely fulvous pubescent when young, glabrous when mature, yellow; bracteoles 3, ovate, tomentose towards the apex.

*Fl. & Fr.* : August-October

*Distr.* : India, Bangladesh and Sri Lanka. Common; in semi-evergreen forests. Kokkara, *JA 12196*; Swamikkayam, *JA 12485.*

**Ficus exasperata** Vahl, Enum. Pl. 2: 197. 1806; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 274. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1520. 1983; Manilal, Fl. Silent Valley 259. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 429. 1996. ***F. 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. 1928.

Small trees; bark thick, greyish brown; branchlets scabrous. Leaves to 20 x 12 cm, ovate to obovate, acute to acuminate at apex, base acute to round, coarsely scabrous; lateral nerves 4 pairs, basal pair opposite, intercostae coarsely reticulate; leaves of saplings and coppice often lobed; petiole 5 cm long. Receptacle solitary, 15 mm across, globose, yellow, deep pink when ripe, coarsely scabrid; peduncle 1 cm long, bracteoles 6 or 7, above the base, ovate.

*Fl & Fr.* January-March

*Distr.* : East Africa, Peninsular India and Sri Lanka. Common; in moist deciduous forests; Kurisumala, *JA 13053*; Vallakkadavu, *JA 13467.*

**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. 1928; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 277. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1522. 1983; Manilal, Fl. Silent Valley 259. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 429. 1996. ***F. oppositifolia*** Roxb., Pl. Corom. t. 124. 1999; Wight, Ic. t. 638. 1840. **Thondi.**

Small trees; branchlets hollow, cylindrical. Leaves to 18 x 10 cm, ovate-oblong or obovate-oblong, abruptly acuminate; base round to subcordate; lateral nerves 5 pairs, lowest pairs opposite, basal; intercostae subparallel; petiole 2 cm long; stipule 1.5 cm long, ovate, acute. Receptacles 2 cm across, many, fascicled, on slender drooping long leafless branches, obovoid-globose, hispid, greenish yellow; peduncles very short or absent

*Fl. & Fr.* : October-February

*Distr.* : India, South-China and Sri Lanka. Common; in semi-evergreen forests. Thekkady, *JA 17930.*

**Ficus microcarpa** L. f., Suppl. Pl. 442. 1781; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 258. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1522. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 429. 1996. ***F. retusa*** auct. non L., 1767: King, Ann. Roy. Bot. Gard. (Calcutta) 1: 50, tt. 61. 1887 & in Hook. f., Fl. Brit. India 5: 511. 1888; Fischer in Gamble, Fl. Pres. Madras 1362. 1928. ***F. retusa*** L., var. ***nitida*** auct. non Thunb., 1781-1801: King in Hook. f., Fl. Brit. India 5: 511. 1888; Fischer in Gamble, Fl. Pres. Madras 1362. 1928.

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 to 11 pairs, lowest pair above the base, rib-like; petiole 1 cm long; stipule 1 cm long, ovate, glabrous. Receptacle 8 mm across, paired, sessile, globose, smooth, yellow; bracteoles 3, ovate, obtuse.

*Fl. & Fr.* : August-February

*Distr.* : China, India and Sri Lanka. Very common; in evergreen and semi-evergreen forests. Swamikkayam, *JA 12488*; Umikuppan, JA *12647*; Lakshmipara, JA *13305;* Kottamala, JA *14027*; Vallakkadavu, JA *14162.*

**Ficus nervosa** Heyne ex Roth in Roem. & Schultes, Syst. 1: 513. 1817; King, Ann. Roy. Bot. Gard. (Calcutta) 1: 53, t. 65. 1887 & in Hook. f., Fl. Brit. India 5: 512. 1888; Fischer in Gamble, Fl. Pres. Madras 1364. 1928; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 264. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1524. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 429. 1996.

Large trees; bark greyish brown to black; branchlets glabrous. Leaves to 15 x 7 cm, ovate-oblong, obtusely shortly acuminate, rounded at base, coriaceous; lateral nerves to 12 pairs, lower ones opposite, forming an intramarginal vein; petiole 2.5 cm long; stipule 1 cm long, lanceolate. Receptacle 1.5 cm across, paired, axillary, reddish-brown, smooth; peduncle 1 cm long, bracteoles minute at the base of the peduncle.

*Fl. & Fr.* December-March

*Distr.* : India, China and Sri Lanka. Common; in evergreen forests. Chenthamara, *JA 13457*; Kokkara, *JA 13526*; Arjunankotta, *JA & KPR 15080*; Sabarimala, *JA 17710.*

**Ficus racemosa** L., Sp. Pl. 1060. 1753; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 266. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1526. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 430. 1996. ***F. glomerata*** Roxb., Pl. Corom. t. 123. 1799; Wight, Ic. t. 667. 1840; King, Ann. Roy. Bot. Gard. (Calcutta) 1: 173. t. 218 A. 1888 & in Hook. f., Fl. Brit. India 5: 535. 1888; Fischer in Gamble, Fl. Pres. Madras 1364.1928.

Small trees without aerial roots; branchlets puberulus, slender. Leaves to 15 x 6 cm, elliptic-oblong to lanceolate, acute at apex; acute to rounded at base; lateral nerves 8 pairs, lowest pair

from the base, opposite, ribbed; intercostae reticulate; petiole 3 cm long; stipule 15 mm long, glabrous. Tubercles branched, drooping, to 20 cm long; receptacles 2 cm across, globose, ashy-puberulus; peduncles 7 mm long; bracteoles 3, at the base of the peduncle.

*Fl. & Fr.* March-June

*Distr.* : South Asia. Common; along margins of evergreen forests. Chenthamara, *JA 13450*; Thekkady, JA *13807.*

**Ficus rigida** Jack, Malay. Misc. 2: 7-12.1822, var. **bracteata** (Corner) Bennet, Indian J. For. 594): 326. 1982. ***Ficus glaberrima*** Bl. var. ***bracteata*** Corner, Gard. Bull. Straits Settlem. 17: 388. 1959 (1960). ***F. travancorica*** King, Ann. Roy. Bot. Gard. (Calcutta) 1: 28. tt. 26 & 820. 1887 & in Hook. f., Fl. Brit. India 5: 503. 1888; Fischer in Gamble, Fl. Pres. Madras 1365. 1928.

Large scandent epiphytic shrubs; branchlets angled, densely covered with stipular scars, glabrous. Leaves to 20 x 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 3 cm long; stipule 4 cm long, glabrous. Receptacle 8-12 mm across, axillary, paired, globose, glabrous; peduncle 5 mm long; bracteoles 3, ovate, at the apex of the peduncle.

*Fl. & Fr.* : August-December

*Distr.* : Southern Western Ghats. Common; along river banks in semi-evergreen forests. Methaganam, *JA 12639*; Pachakkanam, *KPR & JA 14381.*

*Note* : This very rare, variety was known to occur in Palghat (Nelliamlathy) and Quilon districts of Kerala and Kanyakumari. Pandurangan (1993) reported it from Idukki. In the present Study area this is found with a viable population.

**Ficus talbotii** King, Ann. Roy. Bot. Gard. (Calcutta) 1: 51, tt. 63 & 84. 1887 & in Hook. f., Fl. Brit. India 5: 512. 1888; Fischer in Gamble, Fl. Pres. Madras 1363. 1928; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 254. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1528. 1983.

Large trees; branchlets glabrous, reddish. Leaves to 10 x 5 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 cm long; stipule 6 mm long, ovate, pubescent. Receptacle paired, 6 mm across, obovoid, sessile, white; bracteoles ovate, obtuse, at the base of the fig.

*Fl. & Fr.* : August-December

*Distr.* : South India, Sri Lanka and Thailand. Occasional; in semi-evergreen forests. Karadikkavala, *JA 13915.*

**Ficus tinctoria** Forst. f., Fl. Ins. Austr. 76. 1786, subsp. **gibbosa** (Bl.) Corner, Gard. Bull. Straits Settlem. 17: 476. 1960; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1528. 1983, var. **cuspidifera** (Miq.) Chithra in Henry *et al.*, Fl. Tamil Nadu Ser. 1, 2: 255. 1987. ***F. cuspidifera*** Miq., London J. Bot. 7: 434. 1848; ***F. gibbosa*** Bl., Bijdr. 466. 1826, var. ***cuspidifera*** (Miq.) King, Ann. Roy. Bot. Gard. Calcutta 1: 6, t. 2A. 1887; King in Hook. f., Fl. Brit. India 5: 497. 1888. Fischer in Gamble, Fl. Pres. Madras 1365. 1928.

Epiphytic or independent trees; aerial roots many, interlacing; bark smooth, white; branchlets slender, scabrous. Leaves 6-8 x 3-5 cm, elliptic-ovate or oblanceolate, gibbous to one side, acute at apex and base, scabrous; lateral nerves 3-5 pairs, distinct; petiole 6 mm long; stipule lanceolate, glabrous. Receptacle paired, 7 mm across, orange-yellow, globose, scabrous; peduncle 6 mm long, slender; bracteoles 3, at the base of the peduncle.

*Fl. & Fr.* : October-December

*Distr.* : India, China, Andamans and Sri Lanka. Common; in semi-evergreen forests. Thekkady, *JA 12544*; Thekkady, JA *12545*; Mlappara, JA *12612*; Umikuppan, JA *12640.*

*Ethnobotanical use* : The fruits are used in angling

**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. 1928; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 237. 1981; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1530. 1983; Manilal, Fl. Silent Valley 260. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 430. 1996.

Large deciduous trees, sometimes epiphytic; bark black, smooth, light pink inside, fibrous; branchlets glabrous. Leaves to 18 x 7 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 to 7 cm long; stipule to 6 cm long, lanceolate, yellowish red. Receptacle 5 mm across, in clusters of 3-6, sessile, globose, yellow; bracteoles 3, glabrous, yellow.

*Fl. & Fr.* : October-December

*Distr.* : Peninsular India and Sri Lanka. Very common; in all types of forests. Mlappara, *JA 12574.*

**Ficus virens** Ait., Hort. Kew 3: 451. 1789; Matthew & Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1531. 1983, var. **wightiana** (Miq.) Chithra in Henry *et al.*, Fl. Tamil Nadu ser 1, 2: 256. 1987. ***Urostigma wightianum*** Miq., London J. Bot. 6: 566. 1847. ***Ficus infectoria*** Roxb. var. ***wightiana*** (Miq.) King, Ann. Roy. Bot. Gard. Calcutta 1: 63, t. 77. 1887; Fischer in Gamble, Fl. Pres. Madras 1362. 1928. ***F. wightiana*** (Miq.) ex Miq., Ann. Mus. Bot. Lugduno-Batavum, 3: 286. 1867; King in Hook. f., Fl. Brit. India 5: 516. 1888.

Medium trees; branchlets glabrous. Leaves to 12 x 6 cm, ovate-oblong, bluntly acuminate at apex, rounded at base; lateral nerves 10 pairs, parallel, indistinct towards the margins, lowest pairs from the base, opposite, erose; petiole 3.5 cm long; stipule to 8 mm long, ovate. Receptacle 14 mm across, glabrous, white; peduncles 5 mm long; bracteoles 3, at the apex of the peduncle, ovate.

*Fl. & Fr.* : May-August

*Distr.* : Peninsular India. Common; in evergreen and semi-evergreen forests. Thaannikkudy, *JA 12072*; Koruthode, *JA 12232*; Mullakkudy, *JA 13740.*

## 124. SALICACEAE

Mirb., Elem. Physiol. Veg. Bot. 2: 905. 1815.

### SALIX Linnaeus

Sp. Pl. 1015. 1753

**Salix tetrasperma** Roxb., Pl. Corom. t. 97. 1798; Wight, Ic. t. 1954. 1853; Hook. f., Fl. Brit. India 5: 626. 1888; Fischer in Gamble, Fl. Pres. Madras 1390. 1928; Rani & Matthew, in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1538. 1983; Manilal, Fl. Silent Valley 266. 1988.

Small trees. Leaves alternate, to 11 x 4 cm, ovate, acuminate, serrate, nerves many, close, glaucous beneath. Flowers unisexual, dioecious, in long drooping, axillary 6-15 cm long, racemes; bracts 2 x 2 mm, densely woolly, perianth absent; stamens 8, free; ovary stalked, 1-celled; tomentose; ovule few; stigma sessile, notched. Capsule 5 mm across, 2-4 valved; seeds 1-4, oblong, crowned with long, cottony hairs.

*Fl. & Fr.* : January-April

*Distr.* : India, Sumatra and Java. Occasional; along riversides. Thaannikkudy, *JA 13027*; Chenthamara, *JA 13682.*

## 125. HYDROCHARITACEAE

Juss., Gen. Pl. 67. 1789.

### BLYXA Noronha ex Du Petit-Thouars

Gen Nova. Madag. 4. 1806.

**Blyxa aubertii** Rich., Mem. Cl. Sci. Math. Phy. Inst. France 1811(2): 19-23, 77. t. 4. 1814; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1542. 1983; Cook & Luoud, Aquatic Bot. 15: 11. 1983; Manilal, Fl. Silent Valley 266. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 441. 1994. ***Blyxa echinosperma*** (Clarke) Hook. f., Fl. Brit. India 5: 661.

1888; Fischer in Gamble, Fl. Pres. Madras 1397. 1928; Matthew, Fl. Tamil Nadu Carnatic 3(2): 1542. 1983.

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, 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, 2 mm broad; seeds many, 3 mm long, ellipsoidal, echinate, tailed at both ends, white.

*Fl. & Fr.* : December-March

*Distr.* : Canara and Southwards. Common; in ditches and ponds. Kumarikulam, *JA & KPR 14859*; Thaannikkudy, *JA 15425.*

## 126. BURMANNIACEAE

Blume, Enum. Pl. Javae 27. 1827.

### BURMANNIA Linnaeus

Sp. Pl. 287. 1753.

**Burmannia coelestis** D. Don, Prodr. 44. 1825; Hook. f., Fl. Brit. India 5: 665. 1888; Fischer in Gamble, Fl. Pres. Madras 1399. 1928; Jonker in Steenis, Fl. Males I, 4: 17. 1948; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1549. 1983; Manilal, Fl. Silent Valley 267. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 431. 1996; Hajra, Fl. India Fasc. 19: 9. 1998.

Small herbs, stem much reduced. Leaves absent. Flowers regular, on long terminal peduncle, 1-3 together; calyx tube 3-winged, 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.

*Fl. & Fr.*: October-December

*Distr.* : Indo-Malaya, China, Japan and Sri Lanka. Common; in grasslands along road cuttings and wet rocks. Mlappara, *JA 16836.*

## 127. ORCHIDACEAE

Juss., Gen. Pl. 64. 1789.

1. Epiphytes or lithophytes ..... 2
1. Terrestrials ..... 36
2. Leaves equitant ..... 3
2. Leaves not equitant ..... 4

3. Stem very short; leaves tufted; scapes terminal, many-flowered.....**Oberonia**

3. Stem elongate; leaves imbricating throughout; scapes terminal and lateral, few-flowered....**Podochilus**

4. Lip not spurred, sometimes saccate .....5

4. Lip spurred .....2

5. Flowers with a mentum .....6

5. Flowers without a mentum.....8

6. Mentum formed by the lateral sepals and foot of the column.....7

6. Mentum formed by the lip and the foot of the column.....**Kingidium**

7. Rhizome long, annulate; stem nodose, bearing uninodal pseudobulbs.....**Flickingeria**

7. Rhizome short; stem with single pseudobulb or plurinodal pseudobulb .....**Dendrobium**

8. Column-foot present .....9

8. Column-foot absent .....13

9. Lip clawed, joined to the foot, mobile.....10

9. Lip sessile, not mobile.....12

10. Scapes lateral; flowers racemose or umbellate.....11

10. Scapes terminal; flowers panicled.....**Polystachya**

11. Inflorescence 1-2-flowered; flowers wide-opened; operculum with long tail like prolongation....**Trias**

11. Inflorescence many-flowered; flowers not wide-opening; operculum without tail like prolongation.....
.....**Bulbophyllum**

12. Sepals connated at base to form a tube; inflorescence usually one-flowered .....**Porpax**

12. Sepals free, inflorescence one to many-flowered.....**Eria**

13. Bracts imbricating, convolute, almost concealing the flowers.....**Pholidota**

13. Bracts not imbricating, not concealing the flowers.....14

14. Leaves terete.....**Luisia**

14. Leaves flat.....15

15. Scapes terminal; column long, curved.....**Liparis** (p.p.)

15. Scapes lateral; column very short.....16

16. Pseudobulb absent.....17

16. Pseudobulb present, ovoid or subglobose.....18

17. Small plants; leaves basal, oblong or elliptic, not keeled, obtuse; flowers white or pinkish; lip saccate.....**Sirhookera**

17. Robust plants; leaves keeled; flowers brownish, on very long lateral peduncle; midlobe of lip with an auricular callus.....**Cottonia**

18. Flowers small, to 0.5 x 0.2 cm.....19

18. Flowers large, to 4.5 x 2.5 cm.....20

19. Pseudobulb subglobose; spike 6-7 cm long, compactly-flowered towards apex; lip ovate-oblong, acute, glandular; lateral sepals strongly keeled.....**Thelasis**

19. Pseudobulb ovoid; spike 10-15 cm long, uniformly dense-flowered; lip obovate, obtuse, hairy within..
.....**Phraetia**

20. Sepals and petals similar, pinkish brown; leaf apex unequally lobed, obtuse....**Cymbidium aloifolium**

20. Sepals and petals unequal, white; leaf apex acute; flowers white with yellow tinge.....**Coelogyne**

21. Lip with 2 small collateral spurs.....**Diplocentrum**

21. Lip with a single conical saccate spur.....22

22. Plants leafy during flowering.....23

22. Plants leafless during flowering.....35

23. Column-foot distinct.....24

23. Column-foot absent .....25

24. Leaves terete; flower 1-3, in short lateral peduncle.....**Papilionanthe**

24. Leaves strap shaped, keeled; flowers many, in long lateral or terminal peduncle.....**Aerides**

25. Spur longitudinally septate almost to the mouth .....**Cleisostoma**

25. Spur not longitudinally septate.....26

26. Spur distant from the base of lip; inflorescence dense, drooping raceme.....**Rhynchostylis**

26. Spur at the base of the lip; inflorescence not a drooping raceme.....27

27. Mouth of the spur closed by a horizontal plate from the back wall.....28

27. Mouth of the spur open.....29

28. Stem elongated, 30-50 cm long; leaves elliptic-oblong, obtuse, 2-3 x 1.5 cm; flowers yellow, on short peduncle.....**Trichoglottis**

28. Stem, 10-15 cm high; leaves oblong, 10-15 x 2 cm; flowers greenish white, on long often branched peduncle .....**Pomatocalpa**

29. Sepals and petals narrowed to the base .....30

29. Sepals and petals not narrowed to the base .....33

30. Lip saccate or spurred.....31

30. Lip not saccate.....32

31. Leaves articulated at base; spur of lip conical, sub-acute; midlobe obtuse.....**Smithsonia**

31. Leaves not articulated at base; spur of lip deeply saccate, basin-like, strongly attached to column, mid lobe ovate, acute, dentate at the rim of sac.....**Gastrochilus**

32. Flowers creamy white or yellow with red stripes, brittle; lip conical, acute, side lobes minute, pointed..... ...**Acampe**

32. Flowers pinkish or greenish without red stripes, not brittle; lip ovate or oblong, obtuse or truncate at apex, side lobes large.....**Vanda**

33. Leaves cylindric, terete.....**Seidenfadeniella**

33. Leaves not terete.....34

34. Mid-lobe small, triangular, acute.....**Robiquetia**

34. Mid-lobe shoe-shaped, knob with a callus.....**Schoenorchis**

35. Column with distinct foot, bearing lateral sepals.....**Chiloschista**

35. Column without foot .....**Taeniophyllum**

36. Plants climbing; stem green, fleshy; leaves cauducous ..... **Vanilla**

36. Plant not climbing; stem not green; leaves not cauducous ..... 37

37. Plants leafy, autophytes ..... 38

37. Plants leafless, saprophytes ..... 62

38. Plants with pseudobulb ..... 39

38. Plants without pseudobulb ..... 45

39. Leaves solitary ..... **Tainia**

39. Leaves 2 or more ..... 40

40. Flowers spurred ..... 41

40. Flowers not spurred; lip sometimes saccate ..... 43

41. Spur longer than sepals; lip adnate to the top of the column ..... **Calanthe**

41. Spur shorter than sepals; lip adnate to the base of the column ..... 42

42. Pseudobulbs fusiform; spur bilobed ..... **Oeceoclades**

42. Pseudobulbs ovoid or rhizomatous; spur not bilobed ..... **Eulophia** (p.p.)

43. Column with long up-curved foot, inflorescence lateral, short, few-flowered; flowers gibbously jug shaped ..... **Acanthephippium**

43. Column without foot; inflorescence and flowers otherwise ..... 44

44. Leaves ensiform, conduplicate; inflorescence erect; flowers brownish ..... **Cymbidium ensifolium**

44. Leaves plaited; inflorescence lateral, long, decurved, many-flowered; flowers white, with pink spots ..... **Geodorum**

45. Plants with underground tubers; rhizome erect or creeping ..... 55

45. Plants without underground tubers or tuberoid roots ..... 46

46. Flowers 3-3.5 cm across, pink; plants erect, 50-100 cm high; leaves linear, tip acute ..... **Arundina**

46. Flowers to 1.5 cm across, whitish-yellow or yellowish purple; plants smaller; leaves not linear ..... 47

47. Lip superior ..... 48

47. Lip inferior ..... 49

48. Column long, curved, winged towards apex; mid-lobe not dentate ..... **Liparis** (p.p.)

48. Column short, not winged; mid-lobe of lip dentate ..... **Malaxis**

49. Leaves radical or basal; spike spirally twisted ..... **Spiranthes**

49. Leaves cauline; spikes not spirally twisted ..... 50

50. Stem woody ..... **Tropidia**

50. Stem fleshy ..... 51

51. Lip entire, cymbiform, hairy within, mid-lobe not lobed, but recurved ..... **Goodyera**

51. Lip lobed, not hairy, mid-lobe lobed ..... 52

52. Lip spurred, spur exserted beyond the base of sepals; mesochile of lip with flanges of threads ..... **Anoectochilus**

52. Lip saccate; mesochile of lip without any such flanges ..... 53

53. Flowers solitary, 1-1.5 cm across.....**Aenhenrya**
53. Flowers many, 0.5 cm or less across.....54
54. Sepals free.....**Zeuxine**
54. Sepals connate half way into a tube.....**Cheirostylis**
55. Leaf single, leafless during flowering.....56
55. Leaves 2-many, leafy during flowering.....57
56. Leaf linear, acute.....**Pachystoma**
56. Leaf cordate-orbicular.....**Nervilia**
57. Spur 2, from back of the superior lip.....**Satyrium**
57. Spur single or absent.....58
58. Lip adnate to the whole face of the column, bearing an appendage which over-top the anther; lateral sepals connated.....**Disperis**
58. Lip adnate only to the base of the column; lateral sepals free.....59
59. Flowers pink; lip obcordate.....**Brachycorythis**
59. Flowers white; lip otherwise.....60
60. Stigma lobes free, each on a stigmaphore.....**Habenaria**
60. Stigma lobes not free, but confluent.....61
61. Flowers about 5 cm across; side lobes of lip laciniate.....**Pecteilis**
61. Flowers 0.5-1 cm across; side lobes of lip not laciniate.....**Peristylus**
62. Pollinia 2, waxy.....**Eulophia** (*E. ramentacea*)
62. Pollinia 2, sectile.....63
63. Lip spurred; flowers white, speckled with pink.....**Epipogium**
63. Lip saccate, not spurred; flowers yellow.....**Aphyllorchis**

## **ACAMPE** Lindley

Fol. Orch. 4: 95. 1853, *nom. cons.*

**Acampe ochracea** (Lindl.) Hochr., Bull. New York Bot. Gard. 6: 270. 1910; Abraham & Vatsala., Intr. Orch. 452. 1981. ***Saccolabium ochraceum*** Lindl., Bot. Reg. Misc. 2. 1842; Hook. f., Fl. Brit. India 6: 62. 1890

Epiphytes. Leaves 16-19 x 2 cm, oblong, keeled, obliquely bilobulate at apex. Flowers yellow, 1.5 x 1.5 cm, in 10-20 cm long, axillary, racemose panicles; dorsal sepal 7 x 2 mm, obovate, obtuse; 5-veined; lateral sepals 6 x 1-2 cm, obliquely oblong, acute, 3-veined; petals 7 x 1-2 mm, obovate-oblong or spathulate, 6-veined; lip 4 x 2 mm, triangular, obtuse, papillate, with 5 x 1 mm, cylindrical spur.

*Fl.* : January-March

*Distr.* : Indo-China and Sri Lanka. Common; in moist deciduous and semi-evergreen forests. Koruthodu, *JA & KPR 14732.*

## ACANTHEPHIPPIUM Blume ex Lindley

Bijdr. 353. 1825.

**Acanthephippium bicolor** Lindl., Bot. Reg. 20: t. 1730; Hook. f., Fl. Brit. India 5: 815. 1890; Fischer in Gamble, Fl. Pres. Madras 1426. 1928; Sald. in Sald. & Nicols., Fl. Hassan Dist. 812. 1976; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 145. 1981; Abraham & Vatsala, Intr. Orch. 272. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1572. 1983; Manilal, Fl. Silent Valley 268. 1988.

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 cm across, in 2-5-flowered racemes from the top of new pseudobulbs; bracts 3.5 x 3, cymbiform; sepals fused to form gibbous tube; dorsal sepals 3.2 x 1.1 cm, 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 3.1 x 1.5 cm, spathulate, obtuse; lip 3-lobed, 1.5 x 2 cm, lateral lobes erect, rounded; midlob recurved, oblong-spathulate, obtuse, disc 3-lamellate.

*Fl.* : June-July

*Distr.* : South India and Sri Lanka. Rare; in evergreen forests. Mlappara, *JA 17834*.

## 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. Sepals obovate; disc with a single 2-lobed callus at base.....**A. maculosum**
1. Sepals suborbicular to oblong; disc with 2-fleshy calli at base.....**A. ringens**

**Aerides maculosum** Lindl., Bot. Reg. t. 58, 1845; Hook. f., Fl. Brit. India 6: 45. 1890; Fischer in Gamble, Fl. Pres. Madras 1442. 1928; Sald. in Sald. & Nicols., Fl. Hassan Dist. 813. 1976; Manilal, Fl. Silent Valley 268. 1988.

Leaves 7-8 x 1-1.5 cm, oblong, keeled, obliquely obtuse with a short mucro. Flowers pinkish violet, 1 x 1 cm, in about 10 cm long, axillary racemes; sepals subsimilar, 10 x 10 mm, ovate, obtuse; petals 10 x 5 mm, oblong, obtuse; lip 15 x 15 mm, midlobe ovate, emarginate, spur 10 x 2 mm, cylindrical.

*Fl.* : May-June

*Distr.* : South India. Rare; in evergreen forests. Kottamala, *JA & KPR 15364.*

**Aerides ringens** (Lindl.) Fischer, Kew Bull. 1928: 284. 1928 & in Gamble, Fl. Pres. Madras 1442. 1928; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 205. 1981; Abraham & Vatsala, Intr. Orch. 446. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1593. 1983; Manilal, Fl. Silent Valley 269. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 433. 1996. ***Saccolabium ringens*** Lindl. in Wall. Cat. 7313. 1832. ***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 [Fig. 60 A].

Leaves 13-15 x 0.5 cm, linear, keeled, obliquely bilobulate. Flowers white with pink, 2 x 1.5 cm, in about 20 cm long, lax racemes; dorsal sepal 8 x 3 mm, oblong-ovate, acute, 5-veined; laterals 5 x 3.5 mm, broadly ovate, acute, 5-veined; petals 6 x 3 mm, oblong, obtuse, 5-veined; lip 6 x 2 mm, ovate, acute, side lobes oblong or orbicular small, midlobe linear-oblong, acute; disc with fleshy callus; spur 6 x 2 mm, cylindrical.

*Fl.* : June-July

*Distr.* : South India and Sri Lanka. Fairly common; in moist deciduous and semi-evergreen forests. Sunderamala, *JA 13594* ; Thekkady, *JA & KPR 14120.*

## AENHENRYA Gopalan

J. Bombay Nat. Hist. Soc. 90: 271. 1994.

**Aenhenrya rotundifolia** (Blatt.) Sathish & Rasm., Novon 7: 81. 1997; Sasidharan *et al.*, J. Bombay Nat. Hist. Soc. 94: 473. 1997. ***Odontochilus rotundifolius*** Blatt., J. Bombay Nat. Hist. Soc. 32. 521. 1928; Fischer in Gamble, Fl. Pres. Madras 3: 1453. ***Anoectochilus rotundifolius*** (Blatt.) Balakr., J. Bombay Nat Hist. Soc. 63: 327. 1966; Nayar & Sastry, Red Data Book. Indian Plants 1: 220. 1987. ***Aenhenrya agastyamalayana*** Gopalan, J. Bombay Nat. Hist. Soc. 90: 271. 1994.

Terrestrial herbs, 15-20 cm tall; rhizome creeping, moniliform. Leaves to 3 x 2 cm, ovate, acute, fleshy; petiole 1.5 cm long. Flowers white, solitary; scape 10-15 cm long, pubescent; dorsal sepal 20 x 10 mm, ovate-lanceolate, acuminate, 5-veined, hairy outside; petals 17-20 x 5-6 mm, oblong, subacuminate, 3-veined; lip 17-20 x 10-12 mm, 3-lobed, ligulate, lateral lobes ovate-lanceolate, fringed at margin towards apex; midlobe 3-lobed.

*Fl.* : May-June

*Distr.* : South India. Very rare; in evergreen forests. Vellimala, *JA 13779.*

## 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. 1928; Abraham & Vatsala., Intr. Orch. 196. f. 18. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1557. 1983; Manilal, Fl. Silent Valley 269. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 434. 1996.

Terrestrial herbs with creeping rhizome. Leaves to 5 x 4 cm, ovate or elliptic, acute, dark maroon with golden netted veins; petiole 1.5 cm long. Flowers white, 2.5 x 1 cm, in about 25 cm long raceme; dorsal sepal 11 x 5 mm, ovate, acuminate, 1-veined; lateral sepals 12 x 5 mm, obovate-oblong, subacuminate, 1-veined; petals 10 x 3-4 mm, obliquely oblong, acuminate, 1-veined, connate with dorsal sepal; lip 3-lobed, 20 x 20 mm, side lobes 10 x 3 mm, oblong, retuse, curved, mesochile with 5-7 pairs of long fimbriate epichile, bilobed, lobes broad at apex, truncate; spur bilobulate, with spindle-shaped gland.

*Fl.* : November-December

*Distr.* : Southern Western Ghats. Occasional; in evergreen forests. Melmanalar, *JA 13124*; Melmala, *JA & KPR 14472.*

## APHYLLORCHIS Blume

Bijdr. t. 77. 1825.

**Aphyllorchis montana** Reichb. f., Linnaea 41: 57. 1877; Hook. f., Fl. Brit. India 6: 110; King & Pantl., Ann. Bot. Gard. (Calcutta) 8 (4) : t. 349. 1898; Fischer in Gamble, Fl. Pres. Madras 3: 1457. 1928; Sald. in Sald. & Nicols., Fl. Hassan Dist. 814. 1976; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 340. 1981.

Saprophytes, 50-60 cm tall. Flowers yellow, 3 x 1 cm, racemose; bracts 10 x 2 mm, linear lanceolate; dorsal sepal 13 x 4 mm, oblong, obtuse; lateral sepals 11 x 3 mm, oblong, obtuse; petals 11 x 3 mm, oblong, obtuse; lip 9 x 5 mm, ovate, acute, 3-lobed, side lobes obliquely ovate-obtuse; midlobe ovate, acute.

*Fl.* : July-August

*Distr.* : India and Sri Lanka. Rare; in evergreen forests. Naduthottam, *JA 12147.*

## ARUNDINA Blume

Bijdr. 401. 1825.

**Arundina graminifolia** (D. Don) Hochr., Bull. New York Bot. Gard. 6: 270. 1910; Fischer in Gamble, Fl. Pres. Madras 1432. 1928; Holttum, Rev. Fl. Malaya 1: 188. 1964; Jayaw. in

Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 165. 1981; Abraham & Vatsala., Intr. Orch. 497, f. 159. 1981; Manilal, Fl. Silent Valley 270. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 434. 1996. ***Bletia graminifolia*** D. Don, Prodr. 29. 1825. ***Arundina bambusifolia*** Lindl., Gen. Sp. Orch. 125. 1830; Wight, Ic. t. 1661. 1852; Hook. f., Fl. Brit. India 5: 857. 1890 [Fig. 60 B].

Erect stout terrestrial plants; stem to 2 m tall, terete. Leaves distichous, linear-lanceolate, to 8 x 2 cm, persistent. Flowers about 4 cm across, pink-purple, in terminal few-flowered racemes or short panicles; sepals free, similar, ovate-lanceolate, 3.5 x 1 cm; petals broader than the sepals, rhomboid, elliptic, 3.5 x 2 cm; lip trumpet shaped, enclosing the column, bilobed at apex, margin crenulate, midlobe with lamellae, purple with white shades at base; column long, narrowly winged; pollinia 8, lenticular.

*Fl.* : July-September

*Distr.* : India, Malesia and Borneo. Rare; among rocks in grasslands. Uppupara, *JA 17845.*

## **BRACHYCORYTHIS** Lindley

Gen. Sp. Orch. 363. 1838.

Terrestrial herbs; stems leafy unbranched. Leaves scattered, ovate, acute, sessile. Flowers solitary, axillary or in terminal racemes; sepals and petals subsimilar; petals entire; lip petalloid, broad, entire with a short conical spur; column short devoid of foot; pollinia erect, granular.

1. Leaves closely set; epichile of lip obovate or orbicular, with a central triangular apiculus.....**B. iantha**
1. Leaves well spaced out, epichile broadly obcordate, with a very large sinus, central apiculus very small.....**B. splendida**

**Brachycorythis iantha** (Wight) Summerh., Kew Bull. 2: 240. 1955; Abraham & Vatsala, Intr. Orch. 254. t. 44. 1981. ***Platanthera iantha*** Wight, Ic. t. 1692. 1851. ***P. affinis*** Wight, Ic. t. 1693. 1851. ***Habenaria galeandra*** Benth. in Hook. f., Fl. Brit. India 6: 163. 1890. ***Phyllomphax obcordata*** (D. Don) Schltr., Report 16: 119. 1906; Fischer in Gamble, Fl. Pres. Madras 1476. 1928.

Unbranched herbs. Leaves 2.5-3 x 0.9-11 cm, elliptic-oblong, acute, 3-nerved, well spaced. Flowers pink, 1.5 x 1 cm; dorsal sepal 4.5 x 2 mm, ovate-lanceolate, acute, 3-veined; lateral sepals 7 x 2.5 mm, falcate, ovate-oblong, acute, 3-veined; petals 5 x 1.5 mm, lanceolate, obliquely acute at apex, 1 or 2-veined; lip 14 x 12 mm, obcordate with a large sinus, sac ovate, obtuse, 2 x 2 mm, biparted.

*Fl.* : June-August

*Distr.* : India and China. Rare; in grasslands. Mangaladevi, *KPR 16218.*

**Brachycorythis splendida** Summerh., Kew Bull. 2: 240. 1955; Abraham & Vatsala, Intr. Orch. 256, t. 45. 1981. ***Habenaria iantha*** Hook. f., Fl. Brit. India 6: 164. 1890 p.p. Descr. tantum partim. excl. basionym. ***Phyllomphax obcordata*** Schltr. var. ***iantha*** (Hook. f.) Fischer in Gamble, Fl. Pres. Madras 1476. 1928.

Herbs. Leaves 3-3.5 x 1.5-2 cm, ovate-lanceolate, acute, closely set. Flowers pink, 3 x 2 cm, in 5-10 cm long, terminal raceme; bracts foliaceous, 15-17 x 10-12 mm, ovate, acuminate; dorsal sepal and petals connated to form a hood; dorsal sepal 8 x 4.5 mm, ovate, acute, 3-veined; lateral sepals 10 x 4.5 mm, obliquely ovate-lanceolate, acute, 4-veined; petals 8 x 2.5 mm, falcate-linear, acuminate, 3-veined; lip 23 x 16 mm, obcordate, with a triangular apiculus.

*Fl.* : July-September

*Distr.* : Southern Western Ghats. Occasional; in grasslands. Vellimala, *JA 14061, JA 14077,* Mangaladevi, *JA 12026.*

## **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. Inflorescence racemose ..... 2
1. Inflorescence umbellate ..... 4
2. Lip fringed with long acicular hairs ..... **B. tremulum**
2. Lip without hairs ..... 3
3. Petals terminating in long filiform apex with a fleshy knob, dark brown ..... **B. fusco-purpureum**
3. Petals lacking such tails, yellowish brown ..... **B. neilgherrense**
4. Sepals subequal; flowers creamy white ..... **B. mysorense**
4. Sepals very unequal; dorsal sepal much shorter than the laterals; flowers yellow or brownish-red ..... 5
5. Pseudobulbs much reduced; inflorescence densely packed head of many small brownish-red flowers ..... **B. xylophyllum**
5. Pseudobulbs well developed; inflorescence lax umbels 5-6-flowered; flowers yellowish ..... 6
6. Pseudobulb with two leaves, leafless when flowering; dorsal sepal and petals fimbriate on margins ..... **B. fimbriatum**
6. Pseudobulb with one leaf, leafy when flowering; petals and sepals not fimbriate ..... 7

Fig. 60. A. *Aerides ringens* (Lindl.) Fischer;
B. *Arundina graminifolia* (D. Don) Hochr.

7. Pseudobulbs compactly placed; flowers greenish-pink; column with oblanceolately producing long stelidia.....**B. macraei**

7. Pseudobulbs distantly placed; flowers yellowish-pinkish; column with forward pointing stelidia.....8

8. Inflorescence 1-2-flowered; flowers golden yellow.....**B. aureum**

8. Inflorescence 4-8-flowered; flowers yellow to pinkish brown.....9

9. Leaves 4-5 x 1-15 cm, elliptic-oblong.....**B. fischeri**

9. Leaves 6-13 x 1-3 cm, linear-oblong.....10

10. Flowers 13-25 mm long; dorsal and lateral sepals puberulus.....**B. elegantulum**

10. Flowers 35 mm long; dorsal and lateral sepals glabrous.....**B. kaitiense**

**Bulbophyllum aureum** (Hook. f.) J.J. Sm., Bull. Buitz. 2, 8: 22. 1912; Abraham & Vatsala, Intr. Orch. 338, t. 76. 1981; Manilal, Fl. Silent Valley 270. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 435. 1996. ***Cirrhopetalum aureum*** Hook. f., Fl. Brit. India 5: 777. 1890; Fischer in Gamble, Fl. Pres. Madras 1420. 1928.

Pseudobulb ovoid, 1.5 x 1 cm, tapering towards apex, ridged, distantly placed on stout rhizomes. Leaves solitary, 5 x 1.5 cm, elliptic-oblong, base subacuminate to form 1 cm long petiole, apex obtuse-emarginate. Flowers 1 or 2, golden yellow, 3 x 1 cm, in about 4 cm long slender peduncle; bract 4.8 x 1.6 mm, lanceolate, acute, 3-veined; dorsal sepals 8.5 x 5.5 mm, elliptic, obtuse at apex, 5-veined; lateral sepals 17 x 3-4 mm, oblong, lanceolate, acute, 5-veined; petals 5.5 x 3.5-5 mm, ovate, oblong, broad at base, 3-veined; lip 8 x 2-3 mm, ovate-oblong, obtuse, curved, fleshy.

*Fl.* : December-January

*Distr.* : Southern Western Ghats. Rare; in semi-evergreen and evergreen forests. Pachakkanam, *JA & KPR 17089*.

**Bulbophyllum elegantulum** (Rolfe) J. J. Sm., Bull. Jard. Bot. Buitenz. (Ser. 2) 8: 23. 1912; Seidenf., Dansk Bot. Ark. : 29: 184. 1973. ***Cirrhopetalum elegantulum*** Rolfe, Gard. Chron. 1: 552. 1891 & Kew Bull. 1892: 23. 1892.

Pseudobulb ovoid, ridged, distantly placed, 2 x 1 cm, Leaves solitary, 6-9 x 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 3.8-5.5 x 1.1 mm, lanceolate, acute, 3-veined; pedicel 2.5-4 mm long; dorsal sepal 3-6.5 x 2-3 mm, elliptic, apiculate, 5-veined, puberulus, hooded; lateral sepals 9.5-13 x 2-4 mm, oblong, lanceolate, acute, 5-veined, connate along the dorsal margins, papillate near the base; petals 2-3.5 x 1-2.5 mm, elliptic, obovate-oblong, obtuse, 3-veined, speckled with brown spots; lip 2-3.5 x 1 mm, ovate, oblong, obtuse, slightly curved.

*Fl.* : May-June

*Distr.* : South India. Rare; in evergreen forests. Uppermanalar, *JA 13713* ; Kottamala, *JA 13745.*

**Bulbophyllum fimbriatum** (Lindl.) Reichb. f., Walp. Ann. Bot Syst. 6: 260. 1861; Sald. in Sald. & Nicols., Fl. Hassan Dist. 814. 1976; Seidenf., Dansk. Bot. Ark. 29: 243. 1973; Abraham & Vatsala, Intr. Orch. 336, t. 75. 1981. ***Cirrhopetalum fimbriatum*** Lindl., Bot. Reg. Misc. 72. 1839; Wight, Ic. t. 1655. 1851; Hook. f., Fl. Brit. India 5: 774. 1890; Fischer in Gamble, Fl. Pres. Madras 1420. 1928.

Pseudobulb subglobose, 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 4.2 x 1 mm, lanceolate, subacuminate; pedicel 2 mm long; dorsal sepals 7.5 x 2.5 mm, ovate, long-caudate, 3-veined, fimbriate along the margins, hooded; lateral sepals 30 mm x 3 mm, oblong, subacute, cuspidate at apex, 5-veined, connate along their ventral margins; petals 4 x 1 mm, lanceolate, acuminate, with long hairs, 1-veined; lip 3 x 0.9 mm, oblong, subacute, fleshy, curved, grooved.

*Fl.* : March-April

*Distr.* : South-west India and Sri Lanka. Occasional; in semi-evergreen and evergreen forests. Vallakkadavu, *JA 13465.*

**Bulbophyllum fischeri** Seidenf., Dansk Bot. Ark. 29: 202. 1973; Abraham & Vatsala, Intr. Orch. 341. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1591. 1983; Manilal, Fl. Silent Valley 271. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 435. 1996. ***Cirrhopetalum gamblei*** Hook. f., Fl. Brit. India 5: 778. 1890; Fischer in Gamble, Fl. Pres. Madras 1420. 1928. ***C. macraei*** auct. non Lindl., 1820: Wight, Ic. t. 1652. 1851. ***Bulbophyllum gamblei*** (Hook. f.) J.J. Sm., Bull. Jard. Bot. Buitz. (Ser. 2) 8: 24. 1912, non Hook. f., 1890.

Pseudobulb ovoid, ridged, 1 x 1 cm, distantly placed. Leaves solitary, 4-5.5 x 1-1.5 cm, elliptic-oblong or linear-oblong, base subacute; petiole 1 cm long, obtuse, emarginate at apex. Flowers 4-8, yellow, in 5-8 cm long slender peduncle; bracts 4-5.5 x 1-2.6 mm, elliptic, acute, 5-veined; dorsal sepal 3.5-7.5 x 2-4 mm, ovate or elliptic, acute, 5-veined, puberulus, hooded; lateral sepals 11-20 x 3-4.1 mm, linear-lanceolate, subacuminate, 5-veined, puberulus near the base; petals 1.9-4.5 x 1.5-3 mm, elliptic-oblong or orbicular, obtuse, 3-veined; lip 4 x 1-2 mm, ovate, oblong, obtuse, curved.

*Fl.* : April-May

*Distr.* : South India and Sri Lanka. Rare; in evergreen forests. Sunderamala, *JA 13595*; Uppermanalar, *JA & KPR 15018.*

**Bulbophyllum fusco-purpureum** Wight, Ic. t. 1651. 1851; Hook. f., Fl. Brit. India 5: 760. 1890; Fischer in Gamble, Fl. Pres. Madras 1418. 1928; Abraham & Vatsala, Intr. Orch. 334. 1981.

Pseudobulb ovoid, 4.5 x 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 12 x 8 mm, ovate, acute, 9-veined; dorsal sepal 1.9 x 0.9 mm, ovate, subacuminate, 7-veined; lateral sepals 32 x 12.5 mm, ovate, lanceolate, acute, keeled, fleshy, 7-veined; petals 17 x 4 mm, at base with a caudate long tail; lip 16 x 7-9 mm, ovate-oblong, subacute, apiculate at apex; side lobes falcately oblong, obtuse; disc channelled.

*Fl.* : April-May

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Odamala, *JA 13605*; Uppermanalar, *JA & KPR 15036*.

*Note*: This threatened orchid was thought as restricted to Nilgiris and with a fragile population. In the present locality this is with a stable population.

**Bulbophyllum kaitiense** Reichb. f., Walp. Ann. Bot. Syst. 6: 262. 1861; Seidenf., Dansk. Bot. Ark. 29: 204. 1973; Abraham & Vatsala, Intr. Orch. 338, t. 77. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1592. 1983. ***Cirrhopetalum neilgherrense*** Wight, Ic. t. 1654. 1852; Hook. f., Fl. Brit. India 5: 788. 1890. Fischer in Gamble, Fl. Pres. Madras 1420. 1928.

Pseudobulb ovoid, 2.5 x 2 cm, distantly placed. Leaves solitary, 13 x 3 cm, oblong, subacute at base, obtuse at apex; petiole 2 cm long. Flowers 5-7, pinkish-brown, in about 9 cm long, peduncle; bracts 7 x 2 mm, ovate, acuminate, 5-veined; dorsal sepal 3 x 6 mm, broadly ovate, acute, 7-veined, hooded; lateral sepals 2.2 cm x 7 mm, ovate-oblanceolate, acute, 5-veined; petals 5 x 3.2 mm, ovate, apiculate, slightly oblique. Lip 2 mm, ovate-oblong, obtuse, curved.

*Fl.* : April-May

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Melmanalar, *NS & JA 15017*.

**Bulbophyllum macraei** (Lindl.) Reichb. f., Walp. Ann. Bot. Syst. 6: 263. 1861; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 110, t. 51. 1981. ***Cirrhopetalum macraei*** Lindl., Gen. Sp. Orch. 59. 1830; Trimen, Handb. Fl. Ceylon 4: 158. 1898. ***C. walkerianum*** Wight, Ic. t. 1657. 1851.

Pseudobulb ovoid, 1-2.5 x 0.5-0.8 cm, tapering towards apex, smooth. Leaves solitary, 10-12 x 3-4 cm, elliptic-oblong to oblong, acute at apex, acuminate at base; petiole 1.5-2 cm long. Flowers 3 or 4, light pink, in about 18 cm long peduncle; bracts 8 x 3 mm; dorsal sepal 17 x 5

mm, lanceolate, acuminate, 5-veined, hooded; lateral sepals, 35 x 3 mm, ovate-linear, long acuminate, 5-veined; petals 6 x 3 mm, ovate-falcate, apiculate, 3-veined; lip 5 x 1-1.5 mm, cordate at base, oblong, obtuse, curved.

*Fl.* : May-June

*Distr.* : South India and Sri Lanka. Very rare; in evergreen forests. Kottamala, *JA 13777.*

*Note* : This species was considered to be restricted to Sri Lanka until it was reported from Tamil Nadu by Srinivasan & Chithra (1989). The present collection is a record of its addition to Kerala Flora.

**Bulbophyllum mysorense** (Rolfe) J.J. Sm., Bull. Jard. Bot. Buitz.(Ser. 2) 8: 26. 1912; Fischer in Gamble, Fl. Pres. Madras 1418. 1928; Sald. in Sald. & Nicols., Fl. Hassan Dist. 815. 1976. ***Cirrhopetalum mysorense*** Rolfe, Bull. Misc. Inform. 39. 1895.

Pseudobulb ovoid, 2 x 1.5 cm. Leaves solitary, 6-7.5 x 1-1.5 cm, linear-oblong, base subacute; petiole 1 cm long, obtuse, emarginate at apex. Flowers 3-4, white, in about 5 cm long umbel from the base of pseudobulb; bracts 4 x 1 mm, lanceolate, acuminate, 1-veined; dorsal sepal 14 x 3.5 mm, lanceolate, acuminate, 5-veined; lateral sepals 16 x 3 mm, lanceolate, long-acuminate, 5-veined; petals 4.8 x 3.6 mm, elliptic, linear-lanceolate, acute, 3-veined; lip 3 x 1 mm, oblong, acute, curved.

*Fl.* : June-July

*Distr.* : Southern Western Ghats. Rare; in semi-evergreen forests. Thekkady, *JA 12201.*

*Note* : The present collection is the first record of its occurrence in Kerala.

**Bulbophyllum neilgherrense** Wight, Ic. t. 1650. 1851; Hook. f., Fl. Brit. India 5: 761. 1890; Fischer in Gamble, Fl. Pres. Madras 1418. 1928; Abraham & Vatsala, Intr. Orch. 334, f. 74. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1591. 1983; Manilal, Fl. Silent Valley 271. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 435. 1996 [Fig. 62 A].

Pseudobulb ovoid, ridged, to 3.5 x 2 cm. Leaves solitary, to 16 x 4 cm, oblong, base subacute with 1 cm long petiole, apex acute. Flowers brownish-yellow to brown, 12 x 8 mm, in 18-20 cm long dense raceme; dorsal sepal 5 x 1.1 mm, ovate, acute-apiculate, 5-veined, hooded; lateral sepals 8 x 4.5 mm, falcately elliptic-acuminate, 5-veined; petals 1.8 x 1-2 mm, ovate, acute, apiculate, 1-veined, glandular; lip 4 x 1-2 mm, acute, side lobes falcate.

*Fl.* : December-January

*Distr.* : South West India. Fairly common; in all forest types, often grows as lithophyte. Koruthodu, *JA & KPR 14726*; Pamba, *JA 17070.*

**Bulbophyllum tremulum** Wight, Ic. t. 1749. 1841; Hook. f., Fl. Brit. India 5: 763. 1890; Fischer in Gamble, Fl. Pres. Madras 1418. 1928; Abraham & Vatsala, Intr. Orch. 331, f. 72. 1981; Manilal, Fl. Silent Valley 271. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 435. 1996.

Pseudobulb ovoid, 1 x 1 cm. Leaves solitary, 5 x 1 cm, oblong, base acute into 4 mm long petiole, obtuse at apex. Flowers 10-12, brown, in 12-15 cm long slender lax racemes; bracts 1.8 x 0.9 mm, ovate; sepals hairy inner and along margins; dorsal sepal 9.5 x 1.5 mm, subulates, 3-veined; lateral sepals 9.5 x 2-3 mm, ovate, subacuminate, 3-veined; petals 2 x 0.9 mm, falcately-lanceolate, acute, 1-veined; lip 6.5 x 1.5 oblong, obtuse, brownish, with acicular hairs, along the margins.

*Fl.* : March-April

*Distr.* : Southern Western Ghats. Fairly common; in evergreen forests. Pamba, *JA 17138.*

**Bulbophyllum xylophyllum** Par & Reichb. f., Trans. Linn. Soc. 30: 151. 1874; Hook. f., Fl. Brit. India 5: 766. 1890; Seidenf., Dansk. Bot. Ark. 33: 179, t. 127. 1979. Sasidharan *et al.*, J. Bombay Nat. Hist. Soc. 94: 474. 1997. ***B. agastyamalayanum*** Gopalan & Henry, J. Bombay Nat. Hist. Soc. 89: 78. 1993 [Fig. 61].

Pseudobulb minute or indistinct, button like, 1.2 x 1 mm. Leaves solitary, 3 x 1-1.2 mm, elliptic, subacute, mucronate, base cuneate; petiole 0.5 cm long. Flowers 10-12, red, in 3-3.5 cm long slender umbel; bracts 1.9 x 1 mm, ovate, subacuminate, margins subentire, 1-veined, keeled; dorsal sepal 3.8 x 1.9 mm, ovate, lanceolate, acute, 3-veined; lateral sepals 2.9 x 2 mm, ovate-falcate, apiculate, 3-veined; petals 2 x 1 mm, linear, falcate, acute, 1-veined; lip 1.2 x 1, oblong, subacute to obtuse, puberulus, grooved distally, fleshy, curved; column 0.9 x 0.7 mm, base produced into slightly curved foot, 1.2 x 1 mm; column teeth, forward pointing, cuspidate 0.5 mm long.

*Fl.* : December

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Melmala, *JA & KPR 14474.*

*Note* : *B. agastyamalayanum* published as a new species by Gopalan and Henry (1993) is reduced to synonym (Sasidharan *et al.*, 1997). The present collection is a new record for Kerala.

## CALANTHE R. Brown

Bot Reg. 7: sub t. 573. 1821, *nom. cons.*

Terrestrial herbs, base of stem pseudobulbous. Leaves large, plaited. Flowers in erect, elongated racemes, terminal or lateral to pseudobulbs; sepals subequal, spreading; petals free; lip

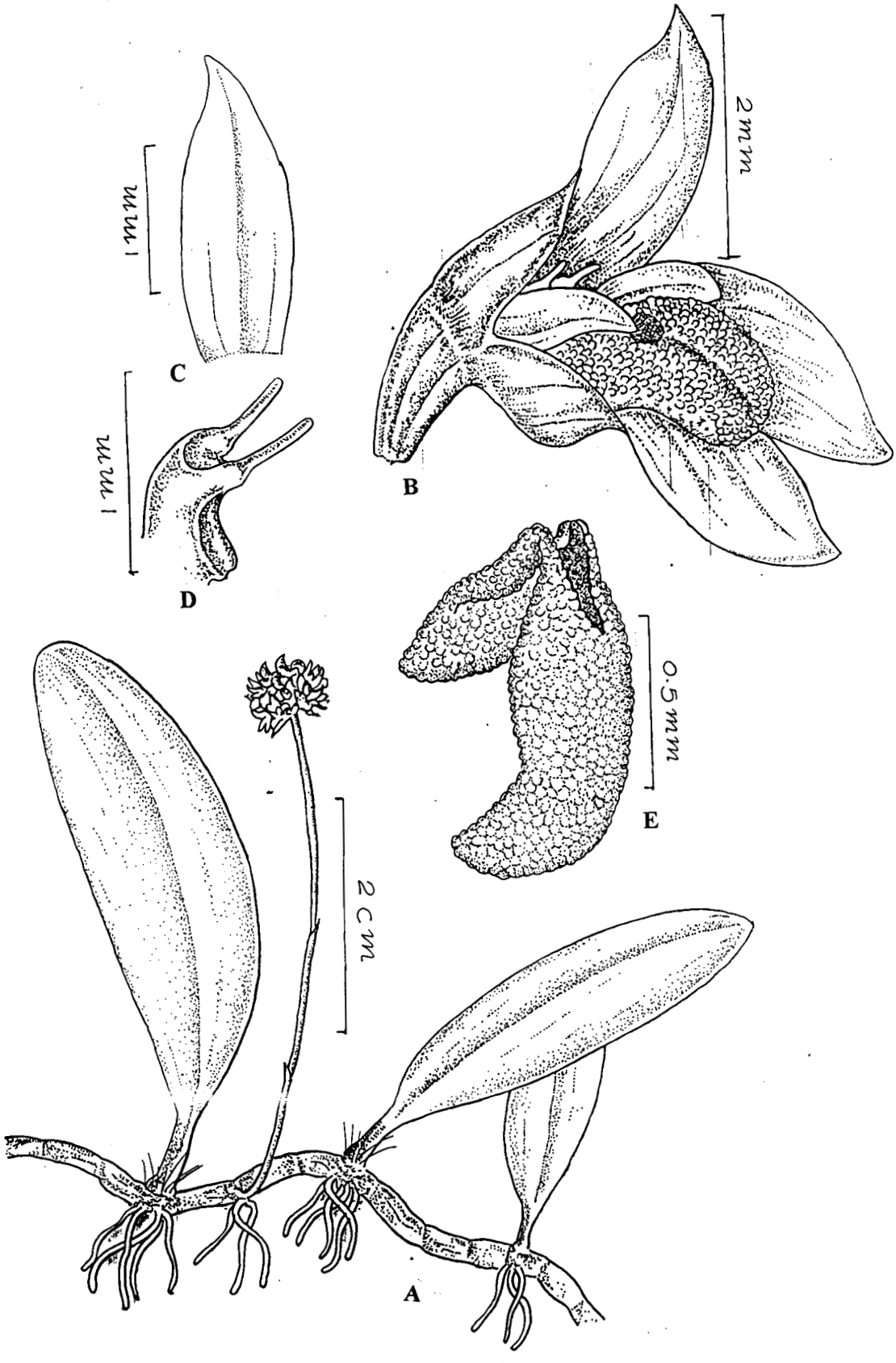



Fig. 61. *Bulbophyllum xylophyllum* Par. & Reichb. f.: **A**. habit; **B**. flower; **C**. petal; **D**. column; **E**. Lip.

3-lobed, spurred, shortly keeled or with callii at base; adnate to the top of the short column; pollinia 8, waxy, in two groups of 4.

1. Flowers pink; dorsal sepal 21 x 8 mm, oblong, lanceolate, apiculate, 7-veined; lateral lobes of lip 3 x 1mm, obliquely ovate, obtuse..... **C. masuca**

1. Flowers rose or white; dorsal sepal 11 x 7 mm, ovate, obtuse, 3-5-veined; lateral lobe of lip 5.5 x 2 mm, oblong, obtuse..... **C. triplicata**

**Calanthe masuca** (D. Don) Lindl., Gen. Sp. Orch. 249. 1833; Hook. f., Fl. Brit. India 5: 850. 1890; Fischer in Gamble, Fl. Pres. Madras 1432. 1928; Holttum, Rev. Fl. Malaya 1: 534. 1964; Abraham & Vatsala., Intr. Orch. 265, t. 50. 1981; Manilal, Fl. Silent Valley 272. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 436. 1996. ***Bletia masuca*** D. Don, Prodr. 30. 1825. ***Calanthe emarginata*** Wight, Ic. t. 1918. 1845.

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 21 x 8 mm, oblong-lanceolate, apiculate, 7-veined; lateral sepals 23 x 9 mm, oblong-lanceolate, acuminate, 7-veined; petals 18 x 9 mm, elliptic-lanceolate, obtuse, 5-veined; lip 15 x 10, 3-lobed, side lobes small, 3 x 1 mm, obliquely ovate, obtuse, midlobe obcordate; spur 31 x 2 mm, cylindrical, acute.

*Fl.* : October-November

*Distr.* : India to Malesia. Occasional; in evergreen forests. Kottamala, *JA 13981.*

**Calanthe triplicata** (Willem.) Ames, Philip. J. Sci. 2: 326. 1907; Holttum, Rev. Fl. Malaya 1: 154. 1964; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 160. 1981; Abraham & Vatsala, Intr. Orch. 263, t. 48. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1573. 1983. ***Orchis triplicata*** Willem., Ann. Bot. (Usteri) 18: 52. 1976. ***Calanthe veratrifolium*** R. Br., Bot. Reg. 9: pl. 720. 1823; Hook. f., Fl. Brit. India 5: 851. 1890; Fischer in Gamble, Fl. Pres. Madras 1432. 1928.

Leaves 35 x 9-10 cm, broadly elliptic-oblong, acute, glabrous, with 10-15 cm long petiole. Flowers rose, in 80-90 cm long pubescent, terminal raceme; flower bearing portion 5-10 cm long; dorsal sepal 11 x 7 mm, ovate, obtuse, 3-5-veined; lateral sepals 12 x 7 mm, elliptic, apiculate, 5-veined; petals 11 x 2-5 mm, obovate, 3-veined; lip 10 x 10 mm, 3-lobed, side lobes 5.5 x 2 mm, oblong, obtuse; midlobe, 2-lobuled, each 4 x 4.5 mm, obovate-oblong, rounded to truncate at apex; spur 20 mm long, disc with fleshy calli at mouth.

*Fl.* : May-June

*Distr.* : India to Philippine Islands. Common; in evergreen forests. Kottamala, *JA 13722.*

## CHEIROSTYLIS Blume

Bijdr. 413, t. 16. 1825.

Delicate terrestrial herbs; stem leafy, unbranched, decumbent at base with succulent internodes. Leaves membranous, ovate, acute, sessile or petioled. Flowers white, in long raceme; sepals united, tube ventricose; petals smaller than sepals, narrow; lip erect, adnated at the base of column, base saccate or cymbiform; epichile 2-lobed ate apex; column short with 2 appendages, foot absent; pollinia erect, 2-partite.

1. Leaves long-petioled ..... **C. parvifolia**
1. Leaves sessile ..... **C. flabellata**

**Cheirostylis flabellata** (Wight) Hook. f., Fl. Brit. India 6: 105. 1890; Fischer in Gamble, Fl. Pres. Madras 1454. 1928; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 160. 1981; Abraham & Vatsala, Intr. Orch. 194. 1981; Manilal, Fl. Silent Valley 272. 1988.

Delicate terrestrial herbs, 20 cm tall; stem reddish. Leaves few, 2.5 cm long, ovate, acute, sessile, brownish red. Racemes terminal, 10-20 cm long, glandular pubescent. Flowers white, glandular pubescent, 1.2 cm long; sepals oblong; petals linear oblong; lip bilobed, lobules obovate, dentate.

*Fl.* : July-August

*Distr.* : India, Sri Lanka and Burma. Rare; in moist deciduous and evergreen forests. Koruthodu, *JA & KPR 17846.*

**Cheirostylis parvifolia** Lindl., Bot. Reg. Misc. 25: 20. 1839; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 298. 1981; Joseph & Ansari in Nair *et al.*, Fl. Tamil Nadu Ser. 1, 3: 6. 1989.

Terrestrial herbs, 10-20 cm high. Leaves 3-5, clustered towards apex, 1-2.5 x 0.6-0.9 cm, ovate, or ovate-lanceolate, acute, membranous, pinkish on drying, glabrous; petiole 1-2 cm long, sheathed. Flowers white, 6-8, in 10-12 cm long terminal pubescent raceme; sepals and petals united into a tube, 3 mm; dorsal sepal 1 x 0.9 mm, ovate, obtuse, 1-veined; lateral sepals 0.9 x 0.6 mm, ovate, subacute; petals 0.6 x 0.5 mm, obliquely oblanceolate, obtuse, 1-veined; lip, 3 x 1-4 mm, bilobed, trifid, lobules 3 each, lanceolate, subacute, base saccate with 3-lobed calli.

*Fl.* : October-November

*Distr.* : India and Sri Lanka. Rare; in semi-evergreen forests. Vallakkadavu, *JA 12722.*

*Note* : The present collection forms a record of its occurrence in Kerala

## CHILOSCHISTA Lindley

Bot. Reg. 18: sub t. 1522. 1832.

**Chiloschista glandulosa** Blatt. & Mc Cann, J. Bombay Nat Hist. Soc. 35. 488. 1932; Sant. & Kapad., Orch. Bombay 210. 1966 [Fig. 62 B].

Small leafless epiphytes, roots to 2 mm thick. Scape 5 cm long, narrowed to base, thickening upwards, glandular pubescent. Flowers 3 or 4, brownish yellow; bracts 2.5 x 2 mm, ovate, apiculate; dorsal sepal 5 x 2 mm, obovate-oblong, obtuse, 5-veined; lateral sepals 4 x 2.5 mm, oblong, subacute; petals 5 x 3 mm, ovate, acute; lip 3-lobed, lateral lobes 3 x 3, oblong acute; mid lobe 1.5 x 1.5 mm, ovate, acute.

*Fl.* : January-March

*Distr.* : India. Rare; in moist deciduous forests. Thekkady, *KPR 16816.*

## CLEISOSTOMA Blume

Bijdr. 362. 1825.

**Cleisostoma tenuifolium** (L.) Garay, Bot. Mus. Leafl. Harvard 23: 175. 1972; Seidenf., Dansk Bot. Ark. 29: 30. 1975; Abraham & Vatsala., Intr. Orch. 471, t. 145. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 436. 1996. ***Epidendrum tenuifolium*** L., Sp. Pl. 952. 1753. ***Sarcanthus pauciflorus*** Wight, Ic. t. 1747. 1851. ***S. 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. 1928; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 273. 1981.

Pendulous epiphytes, 20-30 cm long. Leaves 10-12 x 0.5 cm, linear, strongly keeled, acute. Flowers yellow, in 3-6 cm long, leaf-opposed racemes; dorsal sepal 4.5 x 1.2 mm, obovate-oblong, lanceolate, acute, 3-veined; lateral sepals 3 x 1 mm, elliptic, acute, 3-veined; petals 3 x 0.8 mm, falcately-oblong, truncate, 1-veined; lip 2 x 4 mm, 3-lobed, side lobes 1.5 x 1 mm, ovate, apiculate, midlobe, 2 x 1 mm, ovate, with 2 fleshy calli; spur 3 x 1 mm, oblong-ovoid.

*Fl.* : July-August

*Distr.* : Southern Western Ghats and Sri Lanka. Fairly common, in semi-evergreen and evergreen forests. Koruthodu, *JA 12210.*

## 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. Pseudobulbs subglobose, corrugated; lip 24 x 7-15 mm, mid-lobe, ovate, acute; disc with 3 crenate ridges.....**C. nervosa**

1. Pseudobulbs ovoid; lip 12 x 7-8 mm, quadrate, emarginate, disc 2 lamellate.....**C. breviscapa**

**Coelogyne breviscapa** Lindl., Fol. Orch. Coelogyne 4. 1854; Hook. f., Fl. Brit. India 5: 833. 1890; Fischer in Gamble, Fl. Pres. Madras 1430. 1928; Das & Jain, Fl. India Fasc. 5: 7. 1980; Abraham & Vatsala. Intr. Orch. 277. f. 56. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1574. 1983; Manilal, Fl. Silent Valley 273. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 437. 1996. *C. angustifolia* Wight, Ic. t. 1641. 1851.

Pseudobulb ovoid, ridged, 4 x 1 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 1 cm, lanceolate, acute; dorsal sepal 13 x 4 mm, oblong-lanceolate, acute, 5-veined; lateral sepals 11.5 x 3.5-4.1 mm, oblong-lanceolate, acute, 5-veined; petals 11 x 2-2.5 mm, linear, acute, 3-veined; lip 12 x 7-8 mm, 3-lobed, middle ovate.

*Fl.* : March-April

*Distr.* : South India and Sri Lanka. Occasional; in semi-evergreen and evergreen forests. Vallakkadavu, *JA 13466*; Vellimala, *KPR 14365*; Kozhikkanam, *KPR 14375*; Arjunankotta, *KPR & JA 15084.*

**Coelogyne nervosa** A. Rich., Ann. Sci. Nat. (Ser. 2) 15: 16. 1841; Fischer in Gamble, Fl. Pres. Madras 1430. 1928; Das & Jain, Fl. India Fasc. 5: 18. 1980; Abraham & Vatsala., Intr. Orch. 285. 1981; Manilal, Fl. Silent Valley 273. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 437. 1996. *C. corrugata* Wight, Ic. t. 1639. 1851; Hook. f., Fl. Brit. India 5: 835. 1890.

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 12 x 19 mm, ovate, acute; dorsal sepal 26 x 9 mm, oblong or elliptic, acute, to apiculate, 9-veined; lateral sepals 29 x 9 mm, oblong-elliptic, acute, apiculate, 9-veined; petals 27 x 9 mm, elliptic, acute at both ends, 5-veined; lip 24 x 7-15 mm, ovate, acute, trilobed, side lobes, obliquely ovate.

*Fl.* : June-July

*Distr.* : Southern Western Ghats. Fairly common; in evergreen and shola forests. Pachakkanam, *JA 12320*; Kalvarimala, *JA 13863.*

## COTTONIA Wight

Ic. t. 1755. 1852.

**Cottonia peduncularis** (Lindl.) Reichb. f., Cat. Orch. Schiller 52. 1857; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 26. 1981; Abraham & Vatsala., Intr. Orch. 456, f. 138. 1981; Manilal, Fl. Silent Valley 274. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 437. 1996. ***Vanda peduncularis*** Lindl., Gen. Sp. Orch. 216.1833. ***Cottonia macrostachya*** Wight, Ic. t.1755. 1851; Hook. f., Fl. Brit. India 6:26.1890; Fischer in Gamble, Fl. Pres. Madras 1439. 1928 [Fig. 62 C].

Epiphytes, 10-20 cm tall. Leaves few, spiral, closely packed, 8-10 x 1 cm, oblong, keeled, bilobed at apex. Flowers brown, in 20-40 cm long peduncle; dorsal sepal 9 x 4 mm, obovate-oblong, obtuse, 7-veined; lateral sepals 8 x 4.5 mm, obovate-oblong, obtuse, 7-veined; petals 8 x 3 mm, linear-oblong, obliquely truncate, 3-veined; lip 1.2 x 10 mm, subpanduriformis, 2-auricled at base with interposed calli, lateral lobes orbicular, midlobe trifid, lateral lobules orbicular.

*Fl.* : March-May

*Distr.* : Peninsular India and Sri Lanka. Fairly common; in semi-evergreen and evergreen forests. Pachakkanam, *JA & KPR 15158.*

## 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; foot 0. Pollinia 2 or 4, sessile.

1. Epiphytes; leaves laureate, coriaceous, bifid at apex; flowers purple; pollinia 2.....**C. aloifolium**

1. Terrestrials; leaves ensiform, conduplicate; flowers yellow; pollinia 4....**C. ensifolium** ssp. **haematodes**

**Cymbidium aloifolium** (L.) Sw., Nov. Act. Sc. Upsal. 6: 73. 1799; Wight, Ic. tt. 1687 & 1688. 1851; Hook. f., Fl. Brit. India 6: 8. 1890, *p.p.*; Fischer in Gamble, Fl. Pres. Madras 1436. 1928; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 183. 1981; Abraham & Vatsala., Intr. Orch. 305, f. 68. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1604. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 437. 1996. ***Epidendrum aloifolium*** L., Sp. Pl. 953. 1753.

Robust epiphytic; roots numerous, densely covering the base. Leaves 30-35 x 1.5 x 2 cm, oblong, obtuse at apex. Flowers in 30-40 cm long, pendulous, lax slender racemes; sepals similar,

25 x 5 mm, linear-lanceolate, acute, 7-veined; petals 20 x 6 mm, oblong-lanceolate, acute, 5-veined; lip 17 x 10 mm, 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.

*Fl.* : April-May

*Distr.* : India, Sri Lanka, China and Borneo. Common; in semi-evergreen and moist deciduous forests. Thekkady, *JA 12008.*

**Cymbidium ensifolium** (L.) Sw. Nov. Act. Sc. Upsal. 6: 73. 1799, ssp. **haematodes** (Lindl.) Dupuy & Cribb., Gen. *Cymbidium* 161. 1988. Epidendrum ensifolium L., Sp. Pl. 90. 1753. *C. **ensifolium*** (L.) Sw. var. ***haematodes*** (Lindl.) Trim., Cat. 89. 1855; & Handb. Fl. Ceylon 4. 180. 1898; Sald. in Sald. & Nicols., Fl. Hassan Dist. 817. 1976; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 186. 1981. *C. **haematodes*** Lindl., Gen. Sp. Orch. 162. 1833. ***Limodorum longifolium*** Roxb., Hort. Beng. 63. 1814. ***Cymbidium cyperifolium*** Wall ex Lindl., Gen. Sp. Orch. 163. 1833; Hook. f., Fl. Brit. India 6: 13. 1890; Manilal, Fl. Silent Valley 275. 1988.

Erect herbs. Leaves few, 50-60 x 1.5-2 cm, linear, acute. Flowers yellow, in about 40 cm long raceme from the middle of the leaves; rachis to 30 cm long; dorsal sepal 37 x 9 mm, elliptic-oblong, acute, 7-veined; lateral sepals 37 x 9 mm, subfalcately oblong, acute, 7-veined; petals 30 x 1 mm, lanceolate, acute, 9-veined; lip 2.4 x 9.5 mm, base slightly saccate, lateral lobes rounded, midlobe orbicular, obtuse, revolute; column 13 x 3 mm.

*Fl.* : September-October

*Distr.* : India, Sri Lanka, China and Japan. Rare; in evergreen forests. Mlappara, *JA 12614.*

## **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 short, reduced to single pseudobulb.....2
1. Stem long of many nodes.....3
2. Leaves linear, mostly leafless during flowering; lip greenish .....**D. microbulbon**
2. Leaves elliptic-oblong, leafy during flowering; lip pinkish.....**D. anamalayanum**

Fig. 62. **A**. *Bulbophyllum neilgherrense* Wight;
**B**. *Chiloschista glandulosa* Blatt. & Mc Cann;
**C**. *Cottonia peduncularis* (Lindl.) Reichb.

3. Flowers on leafy nodes or terminal ..... 4
3. Flowers on leafless nodes ..... 8
4. Flowering portion with short black hairs; lip with lamellate ridges ..... **D. nutantiflorum**
4. Flowering portion without such hairs; lip without such ridges ..... 5
5. Flowers fascicled on leaf-opposed tubercles ..... **D. haemoglossum**
5. Flowers racemose ..... 6
6. Racemes terminal, straight, shorter than the leaves ..... **D. wightii**
6. Racemes axillary and terminal, straight, longer or as long as the leaves ..... 7
7. Lip panduriform ..... **D. panduratum**
7. Lip obovate ..... **D. heyneanum**
8. Flowers fascicled on short tubercles on nodes ..... 9
8. Flowers racemose ..... 10
9. Stem clavate ..... **D. heterocarpum**
9. Stem not clavate, cylindric ..... **D. macrostachyum**
10. Stem much branched; flowers 4-6 mm across; lip unlobed ..... **D. herbaceum**
10. Stem unbranched; flowers 1-2.5 cm across; lip 3-lobed ..... 11
11. Petals obovate; mid-lobe of lip subquadrate ..... **D. ovatum**
11. Petals elliptic-lanceolate; mid-lobe of lip ovate, acute ..... **D. barbatulum**

**Dendrobium anamalayanum** Chandr., Chandrasek. & Nair, J. Bombay Nat. Hist. Soc. 78: 575. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1588. 1983 [Fig. 63 A].

Pseudobulb ovoid, 1-1.5 x 0.5-0.7 cm. Leaves few, 2-3 x 0.5 cm, linear-lanceolate, acute. Flowers 4-6, pink, in 4-5 cm long slender terminal racemes; pedicels 3 mm long; dorsal sepal 11 x 4.5 mm, lanceolate, obtuse, 5-veined; lateral sepals 10 x 5 mm, falcately ovate, subacute, apiculate, 5-veined; petals 11.5 x 3-4 mm; oblanceolate, slightly falcate, subacute, apiculate, 5-veined; lip 9 x 9 mm, trilobed, lateral lobes ovate-acute; midlobe ovate, acute; margins thick, fleshy, crenate, disc with 3-tipped calli.

*Fl.* : April-May

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Sunderamala, *JA 13596*; Kottamala, *JA & KPR 15362.*

**Dendrobium barbatulum** Lindl., Gen. Sp. Orch. 84. 1830; Hook. f., Fl. Brit. India 5: 719. 1890; Fischer in Gamble, Fl. Pres. Madras 1416. 1928; Sald. in Sald. & Nicols., Fl. Hassan Dist. 819. 1976; Manilal, Fl. Silent Valley 276. 1988.

Stem 5-10 cm long, terete, leafless when flowering. Flowers creamy white, in about 5.8 cm long terminal 5-6-flowered racemes; pedicel 1.2 cm long; dorsal sepal 12.5 x 4.5 mm, lanceolate, obtuse, 5-veined; lateral sepals 12.5 x 8 mm, ovate-lanceolate, acute, 5-veined; petals 13.5 x 9

mm, obovate, obtuse, 7-veined; lip 13 x 11 mm, 3-lobed, side lobes ovate, obtuse, 5 x 3 mm, midlobe 8 x 7.5 mm, obovate, truncate at apex, disc with an oblong callus and yellow hairs.

*Fl.* : December-January

*Distr.* : Southern Western Ghats. Rare; in moist deciduous forests. Thekkady, *KPR 14594.*

**Dendrobium haemoglossum** Thw., Enum. Pl. Zeyl. 429. 1864; Hook. f., Fl. Brit. India 5: 740. 189; Fischer in Gamble, Fl. Pres. Madras 1416. 1928; Sald. in Sald. & Nicols., Fl. Hassan Dist. 820. 1976; Abraham & Vatsala, Intr. Orch. 365. 1981; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 88. 1981; Manilal, Fl. Silent Valley 276. 1988.

Stem woody, terete, pendulous, 30-40 cm long. Leaves 10-12 cm x 7-8 mm, linear, obliquely obtuse at apex. Flowers 2-4, white, on leaf opposed tubercles; pedicel 1.2 cm long; dorsal sepal 9 x 4 mm, oblong-lanceolate, subacute, 5-veined; lateral sepals 9.5 x 5.5 mm, obliquely ovate-lanceolate, subacute, 5-veined; petals 8.5 x 3 mm, lanceolate, subacute, 3-5-veined; lip 10 x 3-3.5 mm, oblanceolately oblong, undulate, subacute, deep red.

*Fl.* : April-May

*Distr.* : Southern Western Ghats. Occasional; in evergreen forests. Pachakkanam, *JA & KPR 15157.*

**Dendrobium herbaceum** Lindl., Bot. Misc. 69. 1840; Hook. f., Fl. Brit. India 5: 719. 1890; Fischer in Gamble, Fl. Pres. Madras 1416. 1928; Abraham & Vatsala, Intr. Orch. 368, f. 91. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1590. 1983; Manilal, Fl. Silent Valley 276. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 438. 1996. ***D. ramosissimum*** Wight, Ic. t. 1648. 1851.

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 5 x 1.5 mm, oblong-lanceolate, acute, 3-veined; lateral sepals 4 x 1.5-2 mm, oblong, subacute, apiculate, falcate, 3-veined; petals 4 x 1 mm, subfalcately oblong, obtuse, apiculate, 1-veined; lip 3 x 2 mm, side lobes ovate-orbicular; midlobe thick, orbicular, obtuse.

*Fl.* : December-January

*Distr.* : South and North-East India. Occasional; in moist deciduous and semi-evergreen forests. Arjunankotta, *JA 13149.*

**Dendrobium heterocarpum** Lindl., Gen. Sp. Orch. 78. 1830; Hook. f., Fl. Brit. India 5: 737. 1890; Fischer in Gamble, Fl. Pres. Madras 1416. 1928; Sald. in Sald. & Nicols., Fl. Hassan

Dist. 820. 1976; Abraham & Vatsala, Intr. Orch. 361. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1589. 1983; Manilal, Fl. Silent Valley 276. 1988. ***D. aureum*** Lindl., Gen. Sp. Orch. 77. 1830; Wight, Ic. t. 1646. 1851.

Stem 20-35 cm, clavate. Leaves 8-10 x 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 23 x 9 mm, oblong-lanceolate, obtuse, 5-veined; lateral sepals 21 x 6-11 mm, obliquely ovate-oblong, lanceolate, subacute, 7-veined; petals 23 x 10-12 mm, obliquely elliptic, apiculate, 7-veined; lip 21 x 10-15 mm, quadrately ovate, apiculate, hairy within; side lobes ovate, obtuse; midlobe ovate, acute, apiculate, margins, crenulate.

*Fl.* : December-January

*Distr.* : South-East Asia. Rare; in evergreen forests. Arjunankotta, *JA 13148.*

**Dendrobium heyneanum** Lindl., Gen. Sp. Orch. 78. 1830; Wight, Ic. t. 909. 1845; Hook. f., Fl. Brit. India 5: 718. 1890; Fischer in Gamble, Fl. Pres. Madras 1415. 1928; Abraham & Vatsala, Intr. Orch. 358, f. 87. 1981; Manilal, Fl. Silent Valley 277. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 438. 1996.

Stem 15-20 cm long. Leaves 8-10 x 0.6-0.8 cm, linear, acute, sessile, sheathed at base. Flowers white, in 8-10 cm long, 10-12 flowered, slender axillary or terminal racemes; pedicel 7 mm; dorsal sepal 9 x 2 mm, oblong-lanceolate; acute, 5-veined; lateral sepals 9 x 2.5 x 3 mm, obliquely ovate-lanceolate, acute, 5-veined; petals 9.5 x 1-1.5 mm, oblanceolate-linear, acute, 3-veined; lip 12.5 x 4-6.5 mm, obovate, side lobes oblong-lanceolate, acute; midlobe, ovate, subacute, apiculate, margins dentate; disc with a fleshy callus.

*Fl.* : August-November

*Distr.* : Southern Western Ghats. Occasional; in evergreen forests. Pachakkanam, *JA 12770 & 12777.*

**Dendrobium macrostachyum** Lindl., Gen., Sp. Orch. 78. 1830; Wight, Ic. t. 1647. 1851; Hook. f., Fl. Brit. India 5: 735. 1890; Fischer in Gamble, Fl. Pres. Madras 1416. 1928; Abraham & Vatsala, Intr. Orch. 355, ff. 84,85. 1981; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 90, f. 41. 1981; Manilal, Fl. Silent Valley 277. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 439. 1996.

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 2 cm long; dorsal sepal 13-14 x 3 mm, oblong-lanceolate, acute, 5-veined; lateral sepals 17 x 3.4 mm, obliquely

oblong-lanceolate, acute, 5-veined; petals 14 x 4 mm, lanceolate, acute, 3-veined; lip 17 x 9-10 mm, quadrate, crenulate, ciliate, apiculate at apex.

*Fl.* : April

*Distr.* : South India and Sri Lanka. Fairly common; in moist deciduous and semi-evergreen forests. Karimala, *JA 13684*; Thannikkudy, *JA 13828*; Arjunankotta, *JA 15085.*

**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. 1928; Abraham & Vatsala, Intr. Orch. 358. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1588. 1983. ***Dendrobium humile*** Wight, Ic. t. 1643. 1851.

Pseudobulbs ovoid, 1.5 x 1 cm, scaly. Leaves 8 x 2 mm, linear-long, acute at apex, conduplicate at base, thin membranous. Flowers white, in about 5 cm long, terminal flexuous racemes; bracts 2.1 x 1.1 mm, ovate, cuspidate; dorsal sepal 6.1 x 1.1 mm, ovate-oblong, obtuse, 3-veined; lateral sepals 6 x 3 mm, ovate, obtuse, 3-veined; petals 6 x 1.5-2 mm, falcately oblanceolate, obtuse, 3-veined; lip greenish, 5 x 4 mm, trilobed, sessile; midlobe orbicular, truncate, thick, wrinkled, retuse at apex, disc with thick calli, truncate, retuse at apex.

*Fl.* : December

*Distr.* : Peninsular India. Rare; in evergreen forests. Vavalala, *JA & KPR 14408.*

**Dendrobium nutantiflorum** Hawkes & Heller, Lloydia 20: 121. 1975. ***D. nutans*** Lindl., Gen. Sp. Orch. 90. 1830; Hook. f., Fl. Brit. India 5: 734. 1890; Fischer in Gamble, Fl. Pres. Madras 1416. 1928; Abraham & Vatsala, Intr. Orch. 363. 1981; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 82. 1981; Manilal, Fl. Silent Valley 278. 1988.

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 1.3 cm long; dorsal sepal 15.5 x 2-3 mm, oblong-lanceolate, acute, 5-veined; lateral sepals 13 x 2-3, linear-lanceolate, acute, 5-veined; petals 14 x 2-3 mm, oblong-lanceolate, acute, 5-veined; lip 17 x 4.6 mm, obovate-lanceolate, 3-lobed, lateral lobes oblong, rounded; midlobe ovate-lanceolate, acute; disc 4-lamellate.

*Fl.* : April-May

*Distr.* : South India and Sri Lanka. Rare; in evergreen forests. Uppermanalar, *JA & KPR 15016.*

**Dendrobium ovatum** (L.) Kraenz. in Engl., Pflanzenr. 45: 71.1910; Fischer in Gamble, Fl. Pres. Madras 1416. 1928; Abraham & Vatsala, Intr. Orch. 353, f. 83. 1981; Sasidh. & Sivar., Fl. Pl.

Thrissur For. 439. 1996. ***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. ***D. barbatulum*** Wight, Ic. t. 910.1845, non Lindl., 1830 [Fig. 63 B].

Stem 20-40 cm long; leafless when flowering. Flowers white, in 15-20 cm long terminal and axillary racemes; bracts 3 x 1.5 mm, lanceolate, acute, 1-veined; dorsal sepal 10 x 3-3.5 mm, oblong, obtuse, 5-veined; lateral sepals 11 x 5-6 mm, elliptic-oblong, acute, subfalcate, 5-veined; petals 11 x 7.5 mm, obovate, orbicular, 3-veined; lip 13 x 6-7.5 mm, obovate; side lobes falcately ovate-orbicular; midlobe obovate, acute; disc with a tuft of green hairs.

*Fl.* : December-January

*Distr.* : Southern Western Ghats. Common; in moist deciduous forests. Koruthode, *JA & KPR 17866.*

**Dendrobium panduratum** Lindl., Linn. Soc. Bot. 3: 19. 1859; Thw., Enum. Pl. Zeyl. 298. 1861; Hook. f., Fl. Brit. India 5: 717. 1890; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 76. 1981; Manilal, Fl. Silent Valley 278. 1988.

Stem flattened, compressed, 2.5 x 0.5 cm, sheathed with scales. Leaves to 40 x 6 mm, linear-lanceolate, acute. Flowers white with pinkish tinge, 4-5, in about 3 cm long terminal flexuous raceme; bracts 2.5 x 2 mm, ovate, acuminate, 3-veined; dorsal sepal 5.8 x 2.1 mm, oblong-lanceolate, apiculate, 5-veined; lateral sepals 8.5 x 3 mm, subfalcately ovate-lanceolate, subacuminate, 5-veined; petals 6 x 1-2 mm, oblanceolate, apiculate, 3-veined; lip, 5 x 7 mm, pandurate, orbicular to obcordate, crenate, margins thick, disc channelled, ending in a pink fleshy callus.

*Fl.* : May-July

*Distr.* : South India and Sri Lanka. Rare; in evergreen forests. Pachakkanam, *JA 12227.*

**Dendrobium wightii** Hawkes & Heller, Orquidea 24: 16. 1962; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1590. 1983. ***D. graminifolium*** Wight, Ic. t. 1649. 1851, non Willd., 1805; Hook. f., Fl. Brit. India 5: 718. 1890; Fischer in Gamble, Fl. Pres. Madras 1415. 1928. ***Dendrobium wightii*** Balakr., J. Bombay Nat. Hist. Soc. 67: 66. 1970.

Lithophyte on wet rocks, stem slender, terete, 15-20 cm tall. Leaves to 6.7 x 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 10 x 3 mm, slightly obliquely oblong-lanceolate, acute, 3-veined; petals 8 x 2 mm, oblanceolate, acute, margins serrulate or erose, 3-veined; lip 11 x 3-6 mm, 3-lobed; lateral lobes 2 x 1 mm, obliquely ovate-oblong,

obtuse; midlobe 6 x 6 mm, orbicular, margins crenate, wavy; base of the lip united with the column foot and lateral sepals forming a cylindric spur, 3 x 1 mm, obtusely bifid at apex.

*Fl.* : June-September

*Distr.* : Southern Western Ghats. Rare; in evergreen and semi-evergreen forests. Vallakkadavu, *JA & KPR 16812.*

## **DIPLOCENTRUM** Lindley

Bot. Reg. 18: sub t. 1522. 1832.

Epiphytes, stem short, sheathed. Leaves distichous, linear, subterete, fleshy. Flowers on lateral elongated sub-spicate racemose panicles; sepals and petals subequal, free, the lateral sepals slightly larger; lip sessile, spreading, entire, basally 2-spurred; column short, 2-auricled; foot 0; pollinia 2, globose, 2-partite.

1. Lip oblong, rounded, 6.5-7 x 3 mm; lateral sepals ovate-falcate, 3 x 4 mm; petals oblong, truncate..... **D. recurvum**
1. Lip lanceolate, truncate, 5.5 x 6 mm; lateral sepals broadly ovate, 4.2 x 1.9 mm; petals ovate, subacute..... **D. congestum**

**Diplocentrum congestum** Wight, Ic. t. 1682. 1851; Hook. f., Fl. Brit. India 6: 78. 1890; Fischer in Gamble, Fl. Pres. Madras 1449. 1928; Sant. & Kapad., Orch. Bombay 236. 1966; Sasidh. & Sivar., Fl. Pl. Thrissur For. 439. 1996.

Stem 2-4 cm long. Leaves 10-15 x 0.4 cm, linear, keeled, bilobed at apex. Flowers pink, in 10-20 cm long, rarely branched racemes; dorsal sepal 3-3.5 x 2 mm, elliptic, bimucronate at apex, 3-veined; lateral sepals 4 x 2.9 mm, broadly obovate, acute, 3-veined; petals 3 x 1.5 mm, oblong-elliptic, obtuse, 3-veined; lip 6 x 3 mm, ovate-lanceolate, obtuse, 5-veined, with 2 collateral spurs.

*Fl.* : April-May

*Distr.* : Southern Western Ghats. Rare; in moist deciduous and evergreen forests. Thannikkudy, *JA & KPR 14901, JA 16868.*

**Diplocentrum recurvum** Lindl., Bot. Reg. 18: sub t. 1522. 1832. & Gen. Sp. Orch. 218. 1833; Hook. f., Fl. Brit. India 6: 78. 1890; Fischer in Gamble, Fl. Pres. Madras 1449. 1928; Abraham & Vatsala, Intr. Orch. 469. 1981; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 225. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1602. 1983. ***Diplocentrum longifolium*** Wight, Ic. t. 1681. 1852.

Stem 6-8 cm long. Leaves linear, 15-20 x 0.4 cm, keeled, or subterete, obtuse, mucronate. Flower pink, in branched 25-35 cm long racemes; dorsal sepal 3 x 1.1 mm, oblanceolate, bimucronate, 3-veined; lateral sepals 4 x 2 mm, falcately oblong, lanceolate, obtuse, 3-veined; petals 3 x 1.5 mm, oblong-lanceolate, subacute, 3-veined; lip 6.9 x 3 mm, oblong-lanceolate, obtuse, 7-veined, with 2 collateral spurs; disc with a fleshy ridge, forking at apex.

*Fl.* : May-June

*Distr.* : South India and Sri Lanka. Common; in evergreen and moist deciduous forests. Kottamala, *JA & KPR 15128.*

## **DISPERIS** Swartz

Kongl. Vetensk. Acad. Nya Handl. 21: 214. 1800

**Disperis neilgherrense** Wight, Ic. t. 1719. 1851; Hook. f., Fl. Brit. India 6: 169. 1890; Fischer in Gamble, Fl. Pres. Madras 1478. 1928; Abraham & Vatsala, Intr. Orch. 208. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1569. 1983. ***D. zeylanica*** Trimen, J. Bot. 23: 245. 1885; Sald. in Sald. & Nicols., Fl. Hassan Dist. 824. 1976; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 381. 1981.

Terrestrial herbs with a tuber, stem 10-15 cm tall. Leaves to 10 x 9 mm, ovate, cordate, acute, sessile. Flowers pale-pink or rose, one or two in terminal raceme. Floral bracts, foliaceous, 9 x 6 mm, cordate, acute. Dorsal sepal and petals connated to form a hood over the column; dorsal sepal 9 x 2 mm, linear-lanceolate, 3-veined; lateral sepals 16 x 7 mm, obliquely obovate, obtuse, many-veined; petals 10 x 6 mm, obliquely obovate or elliptic, subacute, 3-veined; lip 5 x 5 mm, anchor shaped, bifid, with two long linear recurved arms with yellow papillae.

*Fl.* : May-June

*Distr.* : Southern Western Ghats. Rare; along road cuttings in evergreen forests and grasslands. Kottamala, *JA 13778.*

## **EPIPOGIUM** R. Brown

Prodr. 330, 331. 1810.

**Epipogium roseum** (D. Don) Lindl., J. Linn. Soc. Bot. 1: 177. 1857; Sant. & Kapad., Orch. Bombay 237. 1966; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 336, f. 148. 1981; Manilal, Fl. Silent Valley 279. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 440. 1996. ***Limodorum roseum*** D. Don, Prodr. 30. 1825. ***Epipogium nutans*** Reichb. f., Bonplandia 5: 36.

1836; Hook. f., Fl. Brit. India 6: 124. 1890; Fischer in Gamble, Fl. Pres. Madras 1460. 1928 '*Epipogum*'. ***Podanthera pallida*** Wight, Ic. t. 1759. 1851 [Fig. 63 C].

Saprophytic tuberous herbs, 15-25 cm tall; tuber 2-3 x 2 cm, ovoid or oblongoid. Flowers white, speckled with pink spots, racemose; dorsal sepal 9 x 1.4 mm, linear, subacute, obtuse, 3-veined; lateral sepals 10 x 1 mm, linear, subacute, 3-veined; petals 9.5 x 2 mm, oblong-lanceolate, obtuse. disc with 2 rows of tubercles; spur 3 x 2 mm, saccate; column 4 x 1.2 mm; ovary 3.5 x 1.2 mm.

*Fl.* : April-May

*Distr.* : India and Sri Lanka. Fairly common; in evergreen forests. Arjunankotta, *JA 13165.*

## **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. Stem reduced to small discoid, button like pseudobulb .....2
1. Stem elongate, plurinodal pseudobulb .....4
2. Flowers solitary on scape; lip 3-lobed.....**E. reticosa**
2. Flowers 2 to many on scape; lip unlobed .....3
3. Inflorescence 2-flowered; leaves linear-oblanceolate .....**E. nana**
3. Inflorescence 4-12-flowered; leaves linear-lanceolate.....**E. dalzellii**
4. Stem uniformly thick; leaves 3-5; inflorescence many-flowered.....**E. polystachya**
4. Stem clavate; leaves 2; scape 1 or 2-flowered.....5
5. Leaves 4-6 x 1 cm; disc of lip with 2 ridges .....**E. pauciflora**
5. Leaves 9-10 x 2.5-3 cm; disc of lip with single ridge .....**E. pseudoclavicaulis**

**Eria dalzellii** Lindl., J. Linn. Soc. 3: 47. 1859; Hook. f., Fl. Brit. India 5: 789. 1890; Wight, Ic. t. 1642. 1851; Fischer in Gamble, Fl. Pres. Madras 1425. 1928; Sald. in Sald. & Nicols., Fl. Hassan Dist. 827. 1976; Abraham & Vatsala, Intr. Orch. 375. 1981; Manilal, Fl. Silent Valley 279. 1988.

Pseudobulbs 1.5 cm in diameter. Leaves 3 or 4, 7 x 1 cm, oblanceolate, obtuse, mucronate. Racemes to 10 cm long, second peduncle 4 cm long. Flowers greenish-yellow; bracts 5 x 1 mm, lanceolate, sublanceolate; sepals subsimilar, lanceolate, acuminate, margins with stalked glands,

Fig. 63. A. *Dendrobium anamalayanum* Chandr.;
B. *Dendrobium ovatum* (Willd.) Kranz.;
C. *Epipogium roseum* (D. Don) Lindl.

3-veined; petals slightly, narrower than sepals; lip 3 x 1 mm, falcate panduriform, minutely papillate; disc with 2 thick yellowish orange ridges.

*Fl.* September-October

*Distr.* : South India and Sri Lanka. Rare; in evergreen forests. Sabarimala, *Sivadas 16045* (CALI).

**Eria nana** A. Rich., Ann. Sci. Nat. (Ser. 2) 11: 19. 1841; Fischer in Gamble, Fl. Pres. Madras 1425. 1928; Abraham & Vatsala, Intr. Orch. 337. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1576. 1983.

Pseudobulb yellowish-green, discoid, 5 mm diameter. Leaves 2 or 3, 60 x 4 mm, oblanceolate or elliptic-oblong, cuspidate, conduplicate, sheathing at base, mucronate at tip, 6-nerved, margin scabrous. Flowers creamy yellow, 8 mm long, in about 20 mm long, slender terminal raceme; bracts 1 x 2 mm, triangular, encircling the pedicel, margins wavy, apiculate, gland-dotted; dorsal sepal 7.5 x 1 mm, lanceolate, long-acuminate, 3-veined; lateral sepals 3 x 1-2 mm, ovate-lanceolate, acuminate, 3-veined; petals 7 x 3 mm, lanceolate, acuminate, 3-veined; lip 4 x 1 mm, subsessile, ligulate, distally glandular on underside; basal margins entire, distally crenulate, retuse to emarginate at apex; disc with 2 fleshy calli at base.

*Fl.* : October-November

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Kottamala, *KPR 16873.*

**Eria pauciflora** Wight, Ic. t. 1636. 1851; Hook. f., Fl. Brit. India 5: 779. 1890; Fischer in Gamble, Fl. Pres. Madras 1425. 1928; Abraham & Vatsala, Intr. Orch. 377. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1577. 1983; Manilal, Fl. Silent Valley 280. 1988.

Stem clavate, 8-10 cm tall. Leaves 2, 4-6 x 1 cm, oblong-lanceolate, acute. Flowers white, in 1.5-2 cm long, 2-flowered, terminal raceme; bracts 6 x 3 mm, oblong-lanceolate, acute, 3-veined; dorsal sepal 7.5 x 2.8 mm, obovate-oblong, acute, 3-veined; lateral sepals 10 x 5.5-7 mm, obliquely ovate, acute; petals 8.5 x 2 mm, oblong-lanceolate, subacute-obtuse, 3-veined; lip 6.5 x 3.6 mm, quadrate, emarginate at apex; disc with fleshy bilobed calli; midlobe with 3 fleshy ridges.

*Fl.* : August-September

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Pachakkanam, *JA 12268*; Kottamala, *JA 13980.*

**Eria pseudoclavicaulis** Blatt. & McCann., J. Bombay Nat. Hist. Soc. 32: 519. 1928; Fischer in Gamble, Fl. Pres. Madras 1426. 1928; Abraham & Vatsala, Intr. Orch. 380. 1981.

Stem clavate, 20-25 cm tall. Leaves 2, 9-10 x 2.5-3 cm, elliptic-oblong, lanceolate, acute. Flowers white, in 1.5-2 cm long, 2-flowered, terminal raceme; bracts 2, 11 x 6 mm, ovate, acute, 9-veined; dorsal sepal 15 x 6 mm, oblong-lanceolate, obtuse, 7-veined; lateral sepals 11 x 6 mm, oblong-lanceolate, obtuse, 6-veined; lip 12 x 10 mm, obovate; side lobes ovate, obtuse, midlobe, orbicular to truncate; disc with longitudinal fleshy ridges.

*Fl.* : August-September

*Distr.* : Southern Western Ghats. Common; in evergreen forests, above 1500 m. Uppermanalar, *JA 13979.*

**Eria polystachya** A. Rich., Ann. Sci. Nat. (Ser. 2) 11: 20, t. 9. 1814; Wight, Ic. t. 1635. 1852; Hook. f., Fl. Brit. India 5: 793. 1890; Fischer in Gamble, Fl. Pres. Madras 1425. 1928; Abraham & Vatsala, Intr. Orch. 382. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1577. 1983.

Pseudobulb 2-3 cm long, covered with sheaths. Leaves 13-16 x 2 cm, oblong, acute. Flowers yellowish, in 10-15 cm long, many-flowered, terminal raceme; dorsal sepal 7.1 x 1.2 cm, linear-lanceolate, acute, 3-veined; lateral sepals 6 x 1-2 cm, falcately ovate-lanceolate, acute, 3-veined; lip 3 x 0.8-1 mm, oblong, lanceolate, subacute, disc with 2 ridges at base, 3-veined.

*Fl.* : August-September

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Pachakkanam, *JA 12266.*

**Eria reticosa** Wight, Ic. t. 1637. 1851; Hook. f., Fl. Brit. India 5: 787. 1890; Abraham & Vatsala, Intr. Orch. 373, f. 94. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1576. 1983; Manilal, Fl. Silent Valley 280. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 440. 1996. ***E. bracteata*** auct. non Lindl., 1859: Fischer in Gamble, Fl. Pres. Madras 1425. 1928 [Fig. 65 A].

Pseudobulbs discoid, 6-10 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 10 x 7.5 mm, ovate, acute, 9-veined; dorsal sepal 16-19 x 6-7 mm, oblong-lanceolate, obtuse, 7-veined; lateral sepals 16-20 x 6-11 mm, obliquely ovate-lanceolate, acute, 7-veined; petals 15-19 x 6 mm, oblong-lanceolate, subacute, 5-veined; lip 16-19 x 5-9 mm, elliptic-oblong or ovate, obtuse emarginate at apex; disc with 2 white ridges reaching subapically.

*Fl.* : May-October

*Distr.* : Peninsular India. Fairly Common; in evergreen and shola forests. Mangaladevi, *JA 12038, 12675*; Kottamala, *JA 14001*; Kottamala, *JA & KPR 16874.*

**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. Leaves absent; saprophytes ..... **E. ramentacea**
1. Leaves, present; autophytes ..... 2
2. Leaves linear, grass-like, appear while flowering, less than 2 cm broad..... **E. epidendraea**
2. Leaves elliptic to oblong-lanceolate, appear after flowering..... **E. spectabilis**

**Eulophia epidendraea** (Koen.) Schltr., Orchideen 346. 1914; Abraham & Vatsala. Intr. Orch. 294. f. 64. 1981; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 168. 1981; Seidenf., Opera Bot. 72: 32. 1983; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1605. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 441. 1996. ***Serapias epidendraea*** Koen. in Retz., Obs. Bot. 6: 65. 1791. ***Eulophia virens*** R. Br., Bot. Reg. 7: sub. t. 573. 1822; Wight, Ic. t. 913. 1845; Hook. f., Fl. Brit. India 6: 1. 1890.

Pseudobulbs conical, to 6 x 3 cm. Scape to 50 cm long, branched. Flowers greenish-white, 1.3 cm long; sepals and petals linear, cuspidate, 1 x 0.2 cm; lip 1 cm long, obovate-oblong; side lobes 5 mm long; midlobe obtuse, margin crenulate; spur 1.5 mm long.

*Fl.* : December-January

*Distr.* : India and Sri Lanka. Occasional; in moist deciduous forests. Koruthodu, *JA 16276.*

*Note* : For a detailed discussion on the identity and correct nomenclature see Seidenfaden (1983).

**Eulophia ramentacea** Lindl. ex Wight, Ic. t. 1666. 1851; Henry et al., Fl. Tamil Nadu Ser. 1, 3: 12. 1987. ***E. pratensis*** Lindl., J. Linn. Soc. 3: 25. 1858; Hook. f., Fl. Brit. India 6: 4. 1890; Fischer in Gamble, Fl. Pres. Madras 1435.1928 [Fig. 64].

Flowers brownish yellow, in 40-45 cm long, purplish raceme, with 2 or 3 amplexicaule sterile bracteolar sheathes. Floral bracts, 12-15 x 6.6-7 mm, ovate, acuminate, 9-veined; dorsal sepal 13.5 x 5 mm, oblanceolate-oblong, obliquely notched at apex with ovate-acute apiculum, 7-veined; lateral sepals 12.5 x 6 mm, oblong, acute, apiculate, 7-veined; petals 11 x 5 mm, oblanceolate, obtuse, 3-veined at base, branching laterally; lip 12.5 x 12 mm, quadrate, 3-lobed; side lobes wing like, oblong, truncate; midlobe ovate, obtuse; disc with 3 lamellate ridges, brownish lines inside the lip.

*Fl.* : March-April

*Distr.* : India and Sri Lanka. Rare; in grasslands. Kumarikulam, *KPR 14855.*

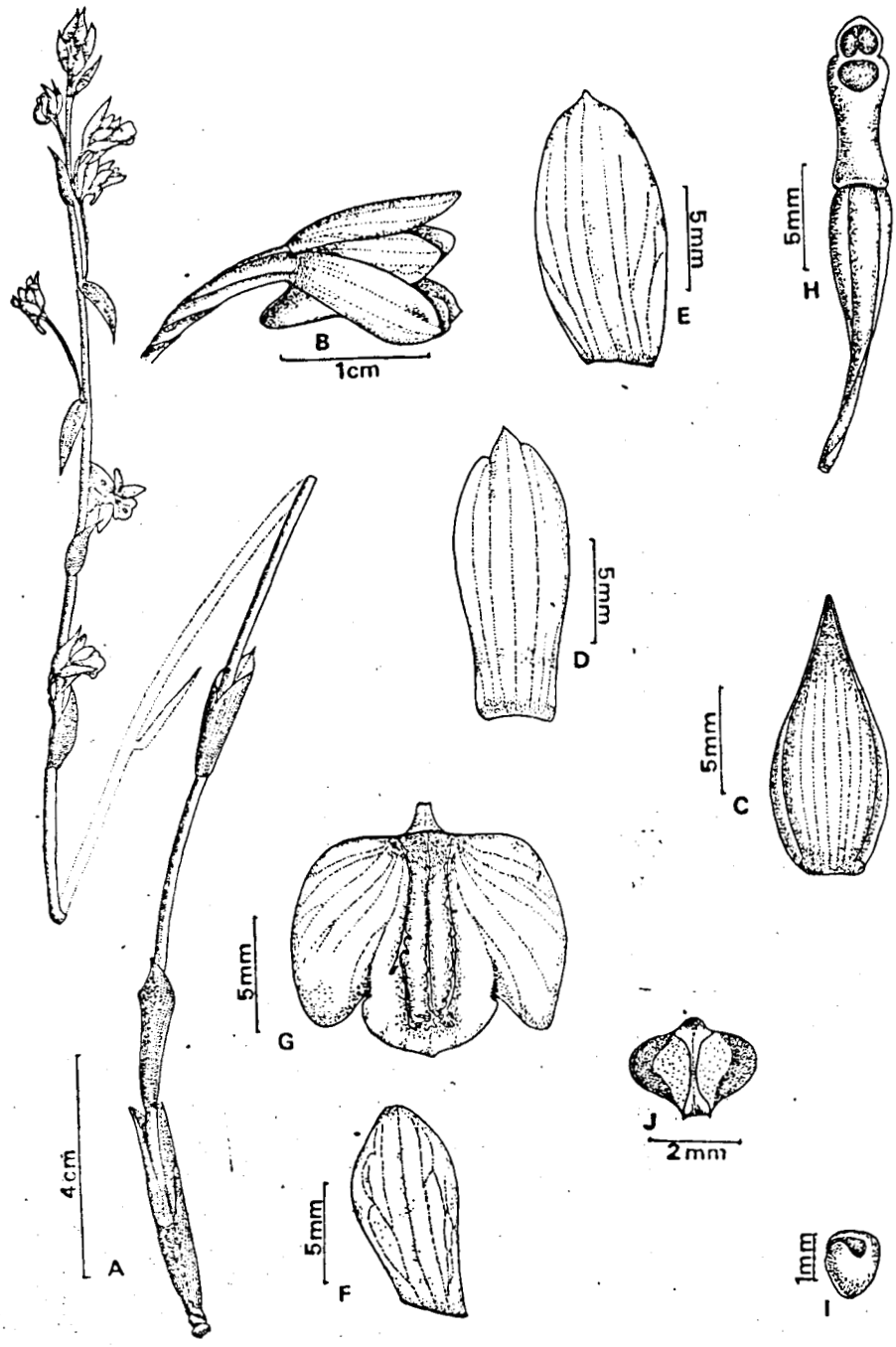



Fig. 64. *Eulophia ramentacea* Lindl. ex Wight: **A**. habit; **B**. flower; **C**. sepal; **D**. petal; **F**. lateral sepal; **G**. labellum; **H**. column with ovary; **I**. pollinarium; **J**. pollinium.

**Eulophia spectabilis** (Dennst.) Suresh in Nicols. *et al.*, Interp. Hort. Malab. 119. 300. 1988. ***Wolfia spectabilis*** Dennst., Schluess. 11, 25, 38. 1818. ***Eulophia nuda*** Lindl., Gen. Sp. Orch. 180. 1833; Hook. f., Fl. Brit. India 6: 5. 1890; Fischer in Gamble, Fl. Pres. Madras 180. 1928; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 175. 1981; Abraham & Vatsala, Intr. Orch. 300. 1981.

Leaves appears after flowering, 125-130 x 3-4 cm, including 66 cm long petiole, elliptic to oblong-lanceolate, acuminate. Flowers pink, in above 75 cm long, lax raceme; dorsal sepal 22 x 7 mm, oblanceolate-oblong, obtuse, 9-veined; lateral sepals 25 x 7 mm, falcately oblong-lanceolate, obtuse, 9-veined; petals 19 x 10 mm, elliptic or oblong-lanceolate, obtuse, 9-veined; lip 23 x 10-17 mm, 3-lobed, side lobes orbicular; midlobe ovate-orbicular, emarginate, disc with rows of ridges.

*Fl.* : April-August

*Distr.* : India, Sri Lanka, China and Thailand. Occasional; in grasslands. Pachakkanam, *JA 12269*; Vallakkadavu, *JA 15040.*

## FLICKINGERIA Hawkes

Orchid Weekly 2: 451. 1961.

**Flickingeria nodosa** (Dalz.) Seidenf., Dansk Bot. Ark. 34: 41. 1980; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1586. 1983; Manilal, Fl. Silent Valley 283. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 442. 1996. ***Dendrobium nodosum*** Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 4: 292. 1852. ***D. macraei*** auct. non Lindl., 1830: Hook. f., Fl. Brit. India 5: 714. 1890. ***Desmotrichum fimbriatum*** auct. non Bl., 1825: Fischer in Gamble, Fl. Pres. Madras 1412. 1928. ***Ephemerantha macraei*** sensu Joseph, Orch. Nilgiris 88. 1982, non (Lindl.) Hunt & Summerh., 1961.

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 cm, oblong-lanceolate, obtuse. Flowers white, 1-3 from the tip of a pseudobulb; bracts 1.8 x 2.5 mm, ovate, acuminate, 3-veined; dorsal sepal 10.5 x 3.5 mm, oblong-lanceolate, acute, 5-veined; lateral sepals 10 x 4.5 mm, obliquely oblong-lanceolate, acute, 7-veined; petals 9.5 x 2.5 mm, lanceolate, acute, 3-veined; lip 12 x 6 mm, 3-lobed; lateral lobes oblong, obtuse; midlobe sub quadrate, recurved, crenulate.

*Fl.* : March-April

*Distr.* : India and Sri Lanka. Fairly common; in semi-evergreen and moist deciduous forests. Thekkady, *JA 12194*; Mangaladevi, *JA 14173.*

## 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. Leaf 2.5-3 cm broad; sac of lip naked.....**G. bigibbus**
1. Leaf 1-1.5 cm broad; sac of lip with a conical callus.....**G. acaulis**

**Gastrochilus acaulis** (Lindl.) O. Ktze., Rev. Gen. Bot. 2: 661. 1891; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 242. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1598. 1983. ***Cleisostoma acaulis*** Lindl., Gen. Sp. Orch. 227. 1833. ***Saccolabium acaule*** (Lindl.) Hook. f., Fl. Brit. India 6: 61. 1890. ***Vanda pulchella*** Wight, Ic. t. 9. 1852. ***G. pulchellus*** (Wight) Schult., Fedde. Repert 12: 215. 1913, non Reddy, 1906: Abraham & Vatsala, Intr. Orch. 466. 1981. ***Saccolabium nilagiricum*** Hook. f., Fl. Brit. India 6: 60. 1890. ***S. pulchellum*** (Wight) Fischer in Gamble, Fl. Pres. Madras 3: 1446. 1928. ***Gastrochilus indicus*** Garay, Bot. Mus. Leafl. Harward. Univ. 23(10): 180. 1974.

Stem 2 cm high. Leaves 4-10 x 1 cm, oblong, obliquely bifid at apex. Flowers yellow, on 2 cm long, stout, lateral raceme; dorsal sepal 8 x 3.5 mm, obovate, obtuse; lateral sepals 7.5 x 4 mm, elliptic, obtuse; petals 7 x 3.5, obovate; lip 7 x 8 mm, deeply saccate; epichile triangular, margins dentate with few papillae near centre.

*Fl.* : March-April

*Distr.* : South India and Sri Lanka. Rare; in evergreen and moist deciduous forests. Vallakkadavu, *JA 13433.*

**Gastrochilus bigibbus** (Reichb. f. ex Hook. f.) O. Ktze., Rev. Gen. Pl. 2: 661. 1891; Seidenf., Opera Bot. 95: 303. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 442. 1996. ***Saccolabium bigibbus*** Reichb. f. ex Hook. f., Bot. Mag. 95: t. 5769. 1867; Hook. f., Fl. Brit. India 6: 61. 1890.

Stem 1-2 cm high. Leaves 10-15 x 2.5-3 cm, oblong, obliquely bifid at apex, obtuse. Flowers pale yellow, in 2 cm long, lateral racemes; dorsal sepal 6.5 x 3.2 mm, obovate, obtuse, 3-veined, gland-dotted; lateral sepals 7 x 2.8 mm, obovate, obtuse, 3-veined, gland-dotted; lip 6.5 x 8 mm, deeply saccate, 4 mm broad; midlobe white with yellow centre, finely red-dotted, irregularly toothed on margin; sac with a few spots inside, naked.

*Fl.* : November-December

*Distr.* : India. Occasional; in evergreen forests above 600 m. Thekkady, *KPR 17900.*

## GEODORUM Jackson

in Andrews Bot. Repos. 10: t. 626. 1811.

**Geodorum densiflorum** (Lam.) Schltr., Fedde. Repert. 4: 259. 1929; Fischer in Gamble, Fl. Pres. Madras 1437. 1928; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 180. 1981; Abraham & Vatsala, Intr. Orch. 327, f. 71. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1608. 1983; Manilal, Fl. Silent Valley 284. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 442. 1996. ***Limodorum densiflorum*** Lam., Encycl. 3: 516. 1792. ***Geodorum purpureum*** R. Br. in Ait. f., Hort. Kew. 5: 207. 1813; Hook. f., Fl. Brit. India 6: 16. 1890. ***G. dilatatum*** auct. non R. Br., 1813: Wight, Ic. t. 612. 1844; Hook. f., Fl. Brit. India 6: 17. 1890.

Terrestrial herbs, 60-70 cm tall; pseudobulb ovoid, 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 15 x 4 mm, lanceolate, acuminate, 1-3-veined; dorsal sepal 13 x 4.5 mm, oblanceolate-oblong, acute, apiculate at apex, 5-veined; lateral sepals 13 x 5.1 mm, elliptic-oblong, acute, 7-veined; petals 12.5 x 6 mm, oblanceolate, obtuse; lip cymbiform, side margins incurved, apex faintly bilobed; disc with longitudinal callus.

*Fl.* : April-June

*Distr.* : India, China and Sri Lanka. Fairly common; in moist deciduous forests and occasionally in semi-evergreen forests. Thekkady, *JA 17835.*

## GOODYERA R. Brown

in Aiton, Hort. Kew, ed. 2, 5: 197. 1813.

**Goodyera procera** (Ker.-Gawl.) Hook., Exot. Fl. t. 39. 1832; Lindl., Gen. sp. Orch. 493. 1830; Wight, Ic. t. 1729. 1851; Hook. f., Fl. Brit. India 6: 111. 1890; Fischer in Gamble, Fl. Pres. Madras 1456. 1928; Sald. in Sald. & Nicols., Fl. Hassan Dist. 831. 1976; Seidenf., Dansk Bot. Ark. 32: 22. 1978; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 308. 1981; Manilal, Fl. Silent Valley 284. 1988. ***Neottia procera*** Ker-Gawl., Bot. Mag. 8: t. 639. 1822.

Terrestrial fleshy herbs, to 40 cm tall. Leaves to 16 x 2.5 cm, elliptic-lanceolate, acuminate; petiole sheathing at base. Flowers greenish-white, in 15-20 cm long, dense spike; bracts 7.5 x 2.5 cm, ovate-lanceolate, acuminate, margins glandular hairy, 1-veined; dorsal sepal 3.5 x 2 mm, ovate, acute, 3-veined; lateral sepals 2.5 x 2 mm, elliptic, acute, 3-veined; petals 2.9 x 1 mm,

obliquely spathulate, 1-veined; lip 2.5 x 2 mm, cymbiform, with infolded margins; midlobe obtusely bilobed, recurved; hypochile with tuft of hairs; disc with 2 calli.

*Fl.* : February-March

*Distr.* : India, Malaya and Borneo. Occasional; in evergreen forests. Mlappara, *JA 13338*; Mlappara, *KPR 14903.*

## **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. Petals 2-partite.....2
1. Petals entire.....4
2. Leaves basal; inflorescence 1 or 2-flowered .....**H. rariflora**
2. Leaves cauline; inflorescence many-flowered.....3
3. Petals 2-partite almost to the base, glabrous .....**H. multicaudata**
3. Petals 2-partite to two-third, bearded .....**H. elwesii**
4. Leaves 2 or 3, adpressed to the ground.....5
4. Leaves many, cauline.....6
5. Leaves orbicular, thick, fleshy.....**H. crassifolia**
5. Leaves elliptic acute, membranous .....**H. periyarensis**
6. Floral bracts large, foliaceous.....**H. perrottetiana**
6. Floral bracts small to medium sized.....7
7. Mid-lobe of lip 2-lobulate, ends in filiform tails.....**H. crinifera**
7. Mid-lobe of lip entire, without any such tails.....8
8. Lip without spur.....**H. malintana**
8. Lip spurred.....9
9. Inflorescence secund or subsecund; bracts cucullate.....10
9. Inflorescence not secund; bracts not cucullate.....11
10. Side lobes of lip diverging at right angle to mid-lobe.....**H. barnesii**
10. Side lobes of lip inclined to mid-lobe.....**H. heyneana**
11. Side lobes of lip broadly oblong, dentate along margins.....**H. cephalotes**
11. Side lobes of lip not broadly oblong, dentate along margins.....12

12. Side lobes of lip linear-oblong ..... **H. ovalifolia**

12. Side lobes of lip semi-ovate, to recurved, cuneate or fimbriate..... 13

13. Ovary long-pedicelled; flowers 1-3..... **H. longicorniculata**

13. Ovary sessile; flowers more than 5..... 14

14. Sidelobes of lip obovate; oblong, dentate..... **H. longicornu**

14. Sidelobes of lip ovate, obtuse..... **H. plantaginea**

**Habenaria barnesii** Summerh. ex Fischer in Gamble, Fl. Pres. Madras 1887. 1936; Abraham & Vatsala, Intr. Orch. 236. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 443. 1996.

Leaves to 2.5 x o.5 cm, oblong-lanceolate, acute. Flowers in secund spikes; bracts 2.5 x 1 cm, cucullate, foliaceous, almost concealing flowers; dorsal sepal 3.5 x 2 mm, ovate, obtuse, 5-veined; lateral sepals 5 x 2.5 mm, falcately ovate-lanceolate, obtuse, 5-veined; petals 4 x 1.5 mm, falcately linear-lanceolate, obtuse, 2-veined; lip 10 x 15 mm, 3-lobed; lateral lobes linear; midlobe oblong, obtuse; spur 1.5 cm long, cylindric, obtuse, shorter than ovary.

*Fl.* : August-September

*Distr.* : Southern Western Ghats. Rare; in grasslands. Vellimala, *JA 17880.*

**Habenaria cephalotes** Lindl., Gen. Sp. Orch. 322. 1835; Wight, Ic. t. 1711. 1852; Hook. f., Fl. Brit. India 6: 139. 1890; Fischer in Gamble, Fl. Pres. Madras 1469. 1928; Abraham & Vatsala, Intr. Orch. 219. 1981; Manilal, Fl. Silent Valley 285. 1988. ***H. trichosantha*** Wall. ex Hook. f., Fl. Brit. India 6: 138. 1890.

Stem 6-20 cm high. Leaves 4-5 x 0.8-0.9 cm, oblong-lanceolate, acute. Flowers white, in 4-6 cm long, terminal, few flowered raceme; dorsal sepal 8 x 9 mm, broadly ovate, obtuse, hooded, 5-veined; lateral sepals 9 x 10 mm, elliptic, obtuse, 5-veined; petals 6 x 2 mm, oblanceolate, acute, 1-veined; lip 11 x 9 mm, 3-lobed; lateral lobes, 9 x 4 mm, oblanceolate, dentate along distal margins; midlobe 5 x 1.5 mm, oblong, acute; spur 4 cm long, cylindric, obtuse.

*Fl.* : July-September

*Distr.* : Southern Western Ghats. Rare; in grasslands. Mangaladevi, *JA 12464.*

**Habenaria crassifolia** A. Rich., Ann. Sci. Nat. 15. 72, t. 36. 1841; Hook. f., Fl. Brit. India 6: 151. 1890; Fischer in Gamble, Fl. Pres. Madras 1471. 1928; Abraham & Vatsala, Intr. Orch. 231. 1981. ***Platanthera brachyphylla*** Lindl., Gen. Sp. Orch. 293. 1835; Wight, Ic. t. 1694. 1851. ***Habenaria brachyphylla*** (Lindl.) Kraenz., Bot. Jahrb. 16: 153. 1803, non Reichb. f., 1886

Stem 10-50 cm high. Leaves to 2.5 x 2.5 cm, broadly ovate, subacute or acute, adpressed to the ground. Flowers white, in about 17 cm long spike; bracts 6.5 x 2 mm, oblong-lanceolate, 2-

veined; dorsal sepal 0.4 x 3 mm, broadly elliptic, obtuse, 5-veined; lateral sepals 5 x 3 mm, obliquely ovate, 3-veined; petals 3.5 x 2.1 mm, obliquely ovate-lanceolate, acute, 2-veined; lip 5 x 5 mm, 3-lobed; lobes unequal; lateral lobes 3 x 0.5 mm, oblong, obliquely truncate, dentate at apex; midlobe 3.5 x 1.0 mm, oblong-lanceolate, obtuse; spur 13 x 0.5 mm, cylindric, obtuse.

*Fl.* : August-September

*Distr.* : Peninsular India. Rare; in grasslands. Mangaladevi, *JA 12180.*

**Habenaria crinifera** Lindl., Gen. Sp. Orch. 323. 1835; Wight, Ic. t. 926. 1845; Hook. f., Fl. Brit. India 6: 142. 1890; Fischer in Gamble, Fl. Pres. Madras 1471. 1928; Abraham & Vatsala, Intr. Orch. 241, f. 36. 1981; Manilal, Fl. Silent Valley 285. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 443. 1996.

Stem 10-30 cm high. Leaves clustered towards base of stem, oblong-lanceolate, acute or acuminate. Scape to 25 cm long. Flowers white, towards the apex of scape; sepals 7 x 5 mm, ovate; petals 7 x 1.5 mm, linear; lip about 2 cm long, clawed, side lobes cuneiform, serrate, apex filiform; midlobe flabelliform, serrate, apex caudate.

*Fl.* : August-October

*Distr.* : India, Sri Lanka and Bhutan. Occasional; in evergreen forests. Sabarimala, *JA 12388* ; Koruthodu, *16246.*

**Habenaria elwesii** Hook. f., Bot. Mag. t. 7478. 1896; Fischer in Gamble, Fl. Pres. Madras 1468. 1928; Sald. in Sald. & Nicols., Fl. Hassan Dist. 832. 1976 [Fig. 65 B].

Herbs, 40-70 cm high; stem 20-40 cm high. Leaves 8-15 x 2.5-3.5 cm, elliptic or oblong, lanceolate, acuminate, scattered in the upper two third. Flowers 5 x 1 cm, in lax raceme; bracts 4-5 x 0.8 cm, lanceolate, acuminate, foliaceous; dorsal sepals green, 15 x 10 mm, elliptic, acute; laterals sepals green, 24 x 7 mm, elliptic, acuminate; petals white, 26 x 7 mm, bipartite, lobes linear; upper lobe bearded; lip greenish-white, 3 cm long, 3-lobed; lobes filiform; spur 23 mm long; ovary with pedicel 2.8 cm long.

*Fl.* : August-September

*Distr.* : Southern W. Ghats. Rare; in grasslands. Vallakkadavu, *JA 17842.*

**Habenaria heyneana** Lindl., Gen. Sp. Orch. 320. 1835; Wight, Ic. t. 923. 1844; Hook. f., Fl. Brit. India 6: 148. 1890; Fischer in Gamble, Fl. Pres. Madras 1471. 1928; Abraham & Vatsala, Intr. Orch. 231. 1981; Seidenf., in Matthew Fl. Tam. Carnatic 3: 1567. 1983; Manilal, Fl. Silent Valley 286. 1988.

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 15 x 6 mm, ovate-lanceolate, acute, foliaceous; dorsal sepal 9 x 4 mm, elliptic-oblong, acute, 5-veined; lateral sepals 10 x 3.5 mm, elliptic-oblong, obtuse-apiculate, 5-veined; petals 8.5 x 4.5 mm, obliquely ovate-lanceolate, obtuse, 3-veined; lip 10 x 6 mm, 3-lobed; lobes subsimilar; lateral lobes, 7 x 1.5 mm, obliquely oblong-lanceolate, obtuse; midlobe 7.5 x 2.5 mm, oblong-lanceolate, obtuse; spur, 13 x 1 mm, cylindric, subacute to obtuse.

*Fl.* : August-November

*Distr.* : Western Peninsular India. Occasional; in grasslands. Kumarikulam, *JA 12079*; Vallakkadavu, *JA & KPR 16312.*

**Habenaria longicorniculata** Grah., Cat. Bombay Pl. 202. 1839; Abraham & Vatsala, Intr. Orch. 238, f. 35. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1564. 1983; Manilal, Fl. Silent Valley 286. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 444. 1996. ***H. longicalcarata*** A. Rich., Ann. Sci. Nat. (Ser. 2) 15: 71, t. 3B. 1841; Hook. f., Fl. Brit. India 6: 141. 1890; Fischer in Gamble, Fl. Pres. Madras 1470. 1928.

Stem 20-60 cm high. Leaves clustered towards base of stem, to 15 x 2 cm, oblong-lanceolate or linear-lanceolate, acute. Scape to 40 cm long. Flowers white, 2.5 cm across; sepals 1 x 0.6 cm, obliquely ovate; dorsal sepal concave; petals 1 x 0.3 cm, spathulate, obtuse; lip 3-partite, side lobes 1 x 0.6 cm, oblong, subcuneate, oblique at apex, subentire, 1 x 0.6 cm; midlobe linear-oblong, little shorter than the side lobes, narrower; spur to 12 cm long, linear, subclavate, to 12 cm long.

*Fl.* : July-August

*Distr.* : Peninsular India. Occasional; in open grassy areas in moist deciduous forests and grasslands. Mangaladevi, *JA 12176.*

**Habenaria longicornu** Lindl., Gen. Sp. Orch. 322. 1835; Hook. f., Fl. Brit. India 6. 139. 1890; Fischer in Gamble, Fl. Pres. Madras 1470. 1928; Abraham & Vatsala, Intr. Orch. 229. f. 30. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1564. 1983; Manilal, Fl. Silent Valley 286. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 444. 1996 [Fig. 65 C].

Stem 10-40 cm high. Leaves to 12 x 2.5 cm, clustered towards the middle of the stem, linear-oblong, lanceolate, acute or acuminate. Scape to 25 cm tall. Flowers to 8, 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 1.2 x 0.5 cm, cuneate, apex obliquely truncate, fimbriate; midlobe linear, shorter; spur to 10 cm long, apex clavate.

*Fl.* : September-October

*Distr.* : Southern Western Ghats. Occasional; in moist deciduous forests in open rocky areas and also in grasslands. Mangaladevi, *JA & KPR 14207*; Koruthodu, *JA 16252.*

**Habenaria malintana** (Blanco) Merr., Bur. Sci. Publ. Manila 12: 112. 1918; Seidenf., Dansk. Bot. Ark. 31: 126. 1977; Manilal, Fl. Silent Valley 288. 1988. ***Thelymitra malintana*** Balnco, Fl. Filip. 642. 1837. ***Habenaria peloroides*** Par. & Reichb. f., Trans. Linn. Soc. 30: 135 & 139, t. 27. 1874; Hook. f., Fl. Brit. India 6: 166. 1890.

Leaves 7 x 1-2.5 cm, elliptic-lanceolate, acute, 2 or 3 towards apex of stem. Flowers white, in 35-40 cm long spike, including 30 cm long peduncle; bracts 23 x 3 mm, lanceolate, acuminate, 3-veined; dorsal sepal 12 x 4.5 mm, elliptic-lanceolate, apiculate, 3-veined; lateral sepals 12 x 4.5 mm, elliptic-lanceolate, acute, 3-veined; petals 11 x 3 mm, oblong-lanceolate, acute; lip 11 x 2 mm, oblong-lanceolate, acute, without spur.

*Fl.* : October-December

*Distr.* : Peninsular India. Occasional; in grasslands. Mangaladevi, *JA 12683*; Mangaladevi, *JA & KPR 14208.*

**Habenaria multicaudata** Sedgw., Rec. Bot. Surv. India 6: 352. 1919; Fischer in Gamble, Fl. Pres. Madras 1469. 1928; Sant. & Kap., Orch. Bombay 14. 1966; Sald. & Nicols., Fl. Hassan Dist. 833. 1976; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1563. 1983; Manilal, Fl. Silent Valley 288. 1988.

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, 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.

*Fl.* : August-November

*Distr.* : Endemic to Peninsular India. Rare; in evergreen forests. Pachakkanam, *JA 12294.*

**Habenaria ovalifolia** Wight, Ic. t. 1708. 1851; Hook. f., Fl. Brit. India 6: 149. 1890; Fischer in Gamble, Fl. Pres. Madras 1471. 1928; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1566. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 444. 1996.

Stem 30-60 cm high, robust. Leaves 15-18 x 4-5.5 cm, elliptic-oblong, acute, clustered to the middle of the stem. Flowers greenish-white, in 45-50 cm long, lax raceme, peduncle 30-35 cm long; bracts 11-12 x 2.5-3 mm, lanceolate, acuminate; dorsal sepal 4 x 5 mm, broadly elliptic,

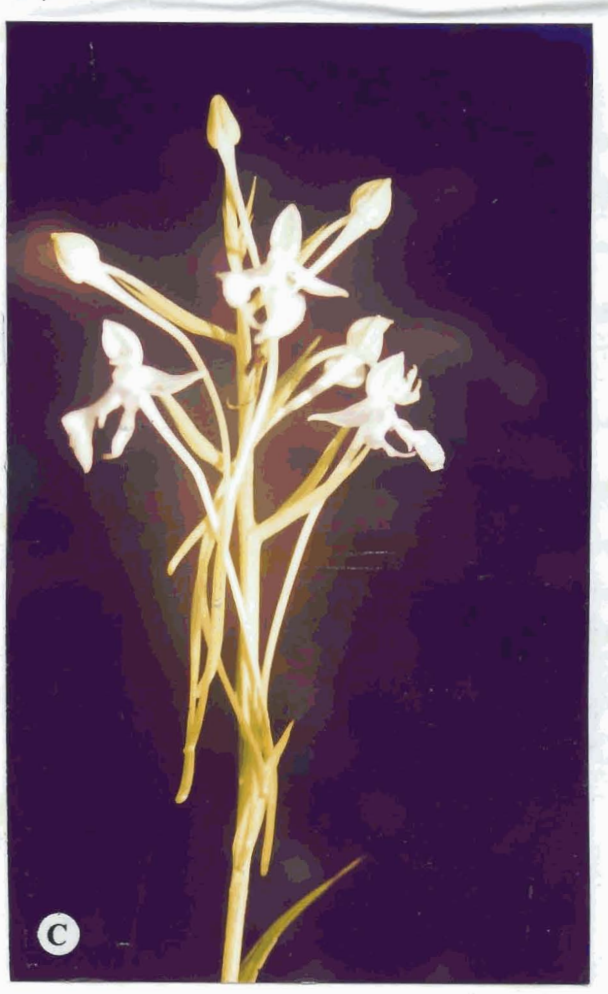



Fig. 65. A. *Eria reticosa* Wight;
B. *Habenaria elwesii* Hook. f.;
C. *Habenaria longicornu* Lindl.

obtuse, 5-veined; lateral sepals 4 x 2.5 mm, obliquely elliptic-oblong, subacute to obtuse, 3-veined; petals 5 x 2.5 mm, obliquely oblong-obtuse, 3-veined; lip, 6 x 11 mm, 3-lobed; lobes unequal, lateral lobes 6 x 1 mm, obliquely oblong-lanceolate, obtuse; spur 16 x 8 mm, cylindrical, subacute.

*Fl.* : July-August

*Distr.* : Peninsular India. Fairly common, in moist deciduous and semi-evergreen forests. Pambavalley, *JA & KPR 16222.*

**Habenaria periyarensis** Sasidharan, Rajesh *et* Jomy, Rheedea 8(2): 167. 1998 [Figs. 66 & 68 A].

Stem 10-15 cm high. Leaves to 5 x 2 cm, narrowly elliptic-lanceolate to elliptic-oblong, acute, mucronate, cuneate at base. Flowers greenish-white, in 15 cm long spike; dorsal sepal green, 10 x 6 mm, elliptic, acute, dorsally 3-ribbed, 3-5 veined; lateral sepals white, 12 x 6 mm, ovate, acute, 5-veined; petals green, 9 x 2 mm, linear-lanceolate, falcate, 2-veined; lip greenish-white, 3-partite; lateral lobes 17 x 0.9 mm, filiform, acute, recurved; midlobe 12 x 1 mm, linear, obtuse; spur white, 25 x 2 mm, cylindrical, longer than ovary; column 5 x 4 mm; anthers sac 2 x 1.5 mm, anther canal 2 mm long, straight; stigma dark green, reniform; ovary 1.5 cm long, shortly pedicellate.

*Fl.* : July-August

*Distr.* : Known only from the type locality. Rare; in grasslands among short grasses. Mangaladevi, *JA 12294, 17842.*

*Note* : This new species belongs to the section *Trimeroglossa* Hook. f. and resembles *H. diphylla* Dalz. and *H. viridiflora* (Rottl. ex Sw.) R. Br.

**Habenaria perrottetiana** A. Rich., Ann. Sci. Nat. 15: 74, t. 4B. 1841; Wight, Ic. t. 919. 1845; Hook. f., Fl. Brit. India 6: 164. 1890; Fischer in Gamble, Fl. Pres. Madras 1471. 1928; Abraham & Vatsala, Intr. Orch. 236. 1981.

Stem 20-50 cm high. Leaves to 7 x 3 cm, elliptic-oblong, acute. Flowers white, few, in about 15 cm long spike; bracts 3 x 1.7 cm, broadly elliptic, acute-apiculate, foliaceous, almost concealing the flowers; dorsal sepal 15 x 9 mm, ovate-oblong, obtuse, 5-veined; lateral sepals 15 x 9 mm, elliptic, obtuse, 7-veined; petals 15 x 4 mm, obliquely oblong, acute, 4-veined; spur 15 mm long, clavate.

*Fl.* : September-December

*Distr.* : Southern Western Ghats. Rare; in grasslands. Mangaladevi, *JA 14119.*

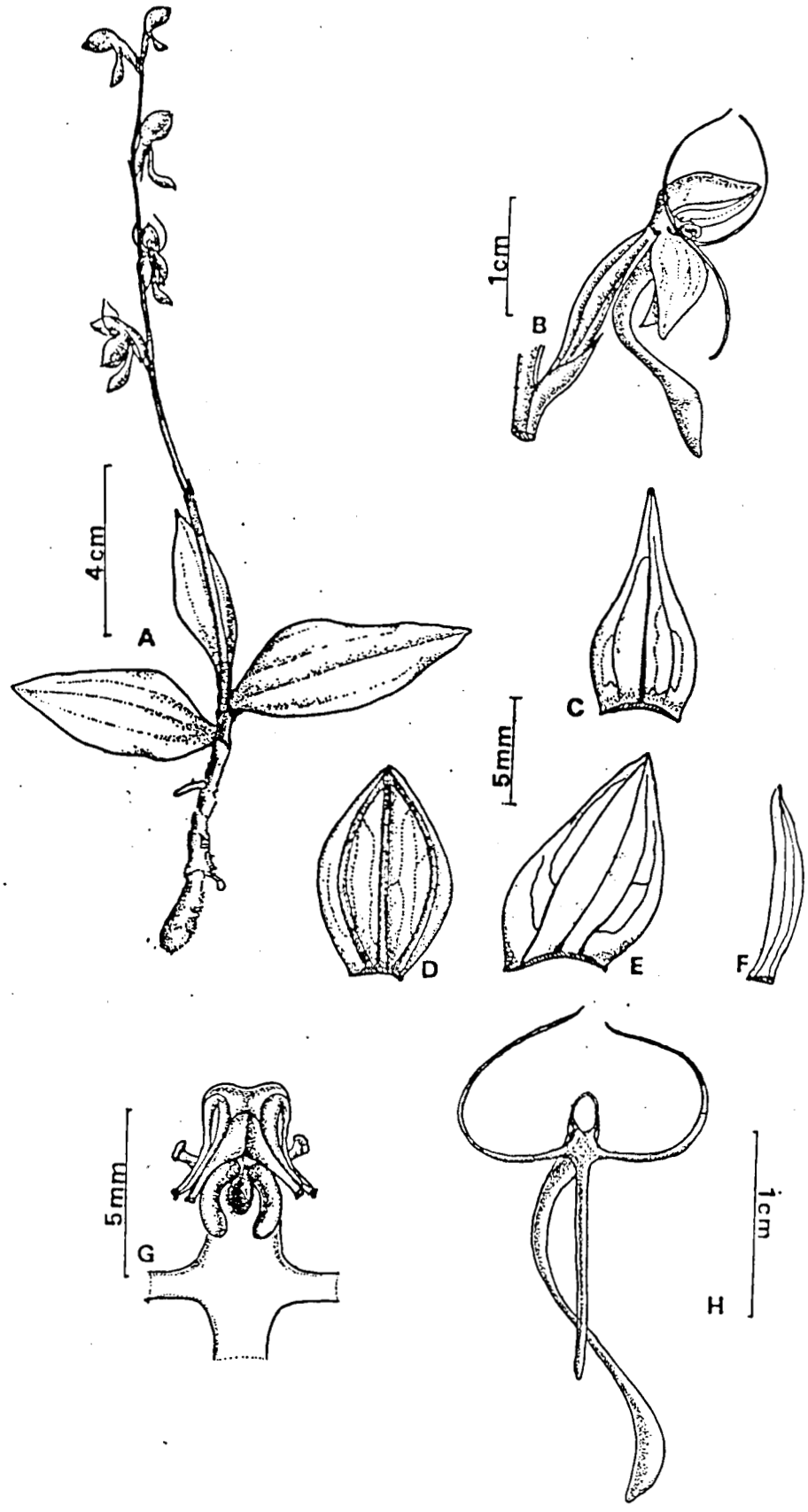



Fig. 66. *Habenaria periyarensis* Sasidharan, Rajesh *et* Jomy: **A.** habit; **B.** flower; **C.** bracts; **D.** dorsal sepal; **E.** lateral sepal; **F.** petal; **G.** column; **H.** lip.

**Habenaria plantaginea** Lindl., Gen. Sp. Orch. 323. 1835; Wight, Ic. t. 1710. 1851; Hook. f., Fl. Brit. India 6: 141. 1890; Fischer in Gamble, Fl. Pres. Madras 1470. 1928; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 355. 1981; Abraham & Vatsala, Intr. Orch. 238. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1565. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 444. 1996.

Herbs; stem 6-20 cm high. Leaves 3 or 4, 5.5-8.5 x 2-3 cm, elliptic or elliptic-oblong, acute, adpressed to the ground. Flowers white, in about 26 cm long, lax raceme; dorsal sepal 5 x 4 mm, broadly ovate, obtuse, 3-veined, hooded; lateral sepals 6 x 3.5 mm, obliquely elliptic, obtuse, 5-veined; petals 4 x 2 mm, obliquely elliptic-oblong, obtuse, 1-veined; lip 3-lobed; lateral lobes 6 x 7 mm, ovate, subacute, crenate; midlobe 6 x 2 mm, spathulate, subacute; spur 33 mm long, cylindric, acute.

*Fl.* : September-October

*Distr.* : India, Burma and Sri Lanka. Common; in evergreen and deciduous forests. Medakanam, *KPR 16826.*

**Habenaria rariflora** A. Rich., Ann. Sci. Nat. (Ser. 2) 15: 70, t. 2 D. 1841; Wight, Ic. t. 924. 1845; Hook. f., Fl. Brit. India 6: 136. 1890; Fischer in Gamble, Fl. Pres. Madras 1460. 1928; Abraham & Vatsala, Intr. Orch. 216. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1562. 1983.

Herbs; stem 10-12 cm high. Leaves 2.5-3.5 x 0.4 cm, linear, acute. Flowers white, 1 or 2, in 5-10 cm long, terminal raceme; dorsal sepal 6 x 6 mm, broadly ovate, obtuse, 5-veined; lateral sepals 7.5 x 3 mm, obliquely elliptic-oblong, subacute, 5-veined; petals 6 x 3 mm, unequally biparted, larger lobe 6 x 3 mm, ovate, acute; smaller lobe 11 x 0.5 mm, linear acute; lip 15 x 3 mm, 3-lobed; lateral lobes 11 x 0.5 mm, linear, acute, midlobe, 6 x 1 mm, oblong, obtuse; spur 40 x 2 mm, cylindric, obtuse.

*Fl.* : July-September

*Distr.* : Peninsular India. Rare; in grasslands. Mangaladevi, *JA 12032.*

## KINGIDIUM P. F. Hunt

Kew Bull. 24: 97. 1970

Epiphytic; stem short. Leaves few, coriaceous, flat. Flowers few-several, racemose, in lateral or axillary, simple or branched scapes; sepals and petals subsimilar, spreading; lip 3-lobed, with a saccate or spur-like mentum, adnate to the column foot; side lobes smaller, midlobe obovate with 2-awned plate; column narrowly winged, long with a foot; pollinia 2, sulcate or 2-partite.

1. Leaves 4-7 x 1-2 cm; petals 5-veined; rostellum 3-fid ..... **K. niveum**

1. Leaves 10-15 x 3-4 cm; petals 3-veined; rostellum 2-fid ..... **K. mysorensis**

**Kingidium mysorensis** (Sald.) Sathish, Cat. Indian Orch. 59. 1994. ***Phalaenopsis mysorensis*** Sald., Indian For. 100: 57. 1974 & in Sald. & Nicols., Fl. Hassan Dist. 842. 1976; Abraham & Vatsala, Intr. Orch. 464. 1981.

Leaves 10-15 x 3.4 cm, oblong, lanceolate, acute. Flowers white, 6-10, in 15-20 cm long racemes; dorsal sepals 8 x 4 mm, obovate, obtuse; lateral sepals 7 x 5 mm, ovate, acute; petals 7.5 x 3 mm, obovate, obtuse; lip 3-lobed, 6 x 5 mm; sidelobes rounded; midlobe ovate, acute; disc with a pair of antennae.

*Fl.* : March-June

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Sabarimala, *JA 15341.*

**Kingidium niveum** Sathish, in Sathish & Manilal, Cat. India Orch. 53. t. 16. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 445. 1996.

Leaves to 7 x 2 cm, oblong-elliptic, coriaceous, acute. Flowers white, 2-4, in 3-5 cm long, slender raceme; dorsal sepal 6 x 3.5 mm, elliptic-oblong, obtuse, 5-veined; lateral sepals 5 x 4.5, ovate, obtuse, 5-veined; petals 4.5 x 3 mm, obovate, obtuse, 5-veined; lip 4.5 x 6.5 mm, 3-lobed; side lobes, 2 x 1.5 mm, obovate, toothed along margins, fleshy, bilobulate, lamellate; midlobe 4 x 6.5 mm, triangular, base with fleshy callus, margins subentire, disc with 2 pairs of unequal antennae.

*Fl.* : October-November

*Distr.* : South India. Rare; in evergreen forests. Vellimala, *JA & KPR 16885.*

## **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. Epiphytes; leaves coriaceous, articulated at base with sheath on pseudobulb ..... 2

1. Terrestrials; leaves not articulated, thin and membranous ..... 4

2. Pseudobulb with single leaf; lip oblong ..... **L. caespitosa**

2. Pseudobulb with 2 leaves; lip triangular ..... 3

3. Pseudobulbs short, convex, with 3 winged edges; lip with ear-like marginal folds at the middle ..... **L. elliptica**

3. Pseudobulbs variable from short conical to slender long cylindrical; lip without any foldings in the middle ..... **L. viridiflora**

4. Plants 10-15 cm high ..... **L. wightiana**

4. Plants 15-25 cm high ..... 5

5. Lip obovate, cuneate ..... **L. paradoxa**

5. Lip orbicular ..... **L. walkeriae**

**Liparis caespitosa** (Thou.) Lindl., Bot. Reg. 11: sub. t. 882. 1825; Seidenf., Dansk. Bot. Ark. 31: 61. 1976; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 66. 1981. ***Malaxis caespitosa*** Thou., Orch. Ill. Afri. t. 89. 1822. ***Liparis pusilla*** Ridl., J. Linn. Soc. 22: 294. 1886; Hooker. f., Fl. Brit. India 5: 701. 1890; Fischer in Gamble, Fl. Pres. Madras 3: 1411. 1928.

Pseudobulb 1-1.5 x 0.8 cm, ovoid. Leaf 7-8 x 1.5 cm, with 1.5 cm long petiole, oblong, acute. Flowers white, 5 mm long, in about 10 cm long, terminal raceme; dorsal sepal 2 x 1 mm, oblong-lanceolate, 1-veined; lateral sepals 2 x 1 mm, ovate, acute, 1-veined; petals 2 x 0.4 mm, linear, retuse, 1-veined; lip 2 x 1 mm, oblong, acute, fleshy, glandular.

*Fl.* : August-September

*Distr.* : South India and Sri Lanka. Rare; in evergreen forests. Uppermanalar, *JA 13967.*

**Liparis elliptica** Wight, Ic. t. 1735. 1851; Abraham & Vatsala, Intr. Orch. 412, f. 115. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 446. 1996. ***L. viridiflora*** auct. non Lindl., 1830: Hook. f., Fl. Brit. India 5:704. 1890; Fischer in Gamble, Fl. Pres. Madras 1411. 1928.

Pseudobulb 2 x 1.5 cm, ovoid, laterally compressed, 2-leaved. Leaves 10-11 x 2.5-3 cm, linear-elliptic, acute; petiole 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 x 2 mm, ovate, subacuminate, with an ear like folding subapically.

*Fl.* : April-May

*Distr.* : India to Malesia. Rare; in evergreen shola forests. Chokkampetti, *JA & KPR 14777.*

**Liparis paradoxa** (Lindl.) Reichb. f., Walp. Ann. 6: 218. 1861; Seidenf., Dansk Bot. Ark. 31: 38. 1976. ***Empusa paradoxa*** var. ***parishii*** Hook. f., Fl. Brit. India 5: 698. 1890. ***L. parishii*** (Hook. f.) Hook. f., Fl. Brit. India 6 (Suppl. to Orch. Additions & Corrections): 182. 1890.

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 x 4-4.5 mm, obovate, fleshy, disc with 2 calli, margin crenate.

*Fl.* : August-September

*Distr.* : Southern Western Ghats. Rare; in grasslands. Vallakkadavu, *JA & KPR 16313.*

**Liparis viridiflora** (Bl.) Lindl., Gen. Sp. Orch. 31. 1830; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 68. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1585. 1983; Manilal, Fl. Silent Valley 291. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 446. 1996. ***Malaxis viridiflora*** Bl., Bijdr. 392. 1825. ***Liparis longipes*** Lindl. in Wall., Pl. Asiat. Rar. 1: 31, t. 35. 1830; Wight, Ic. t. 906. 1845; Hook. f., Fl. Brit. India 5: 703. 1890; Fischer in Gamble, Fl. Pres. Madras 1411. 1928.

Pseudobulb 8 x 2 cm, tapering towards apex. Leaves 2 per pseudobulb, 20-25 x 2 cm, linear, acuminate. Flowers creamy, in 20 mm long raceme; dorsal sepal oblong acute, 1-veined; lateral sepals obliquely oblong, obtuse, 1-veined; petals linear, acute, 1-veined; lip 2.5 x 2 mm, oblong, acute, obtuse.

*Fl.* : September-October

*Distr.* : Indo-Malesia and Sri Lanka. Common; in evergreen and semi-evergreen forests. Sabarimala, *JA & KPR 17843.*

**Liparis walkeriae** Grah. in Lindl., Edinb. New Philos. J. 20: 194. 1836; Hook. f., Fl. Brit. India 5: 698. 1890; Fischer in Gamble, Fl. Pres. Madras 3: 1410. 1928; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 59. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1584. 1983.

Herbs, to 25 cm tall. Leaves to 12 x 5 cm, ovate, subacuminate. Flowers purple, in 15 cm long raceme; dorsal sepal oblong, acute, 3-veined; lateral sepals subfalcate, oblong, obtuse, 5-veined; petals linear, retuse, 1-veined; lip 6.5 x 5 mm, ovate, orbicular, fleshy, margins crenate, disc with 2 fleshy calli.

*Fl.* : August-September

*Distr.* : Peninsular India. Rare; in grasslands. Kottamala, *JA 14006.*

**Liparis wightiana** Thw., Enum. Pl. Zeyl. 295. 1861; Hook. f., Fl. Brit. India 5: 695. 1890; Fischer in Gamble, Fl. Pres. Madras 1410. 1928; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 52. 1981; Abraham & Vatsala, Intr. Orch. 405. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1584. 1983; Manilal, Fl. Silent Valley 291. 1988. ***L. atropurpurea*** Wight, Ic. t. 904. 1844.

Herbs to 15 cm, base bulbous. Leaves to 5.5 x 2 cm, ovate, acuminate. Flowers yellowish with brown tinge, in about 4-8 cm long racemes; bracts 9 x 3.5 mm, lanceolate, acuminate; dorsal sepal lanceolate, obtuse, 3-veined; lateral sepals subfalcately lanceolate, acute, 3-veined; petals linear, obtuse, 1-veined; lip 7 x 6 mm, oblong-orbicular, auricled at base, disc with 2 tubercled calli, margins hairy.

*Fl.* : August-September

*Distr.* : South India and Sri Lanka. Rare; in grasslands. Kottamala, *JA 14007*; Vallakkadavu, *JA & KPR 16324.*

## 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. Petals as long as sepals; lip with unlobed epichile.....**L. zeylanica**
1. Petals longer than sepals; lip with 2-lobed epichile.....**L. birchea**

**Luisia birchea** (A. Rich.) Bl., Mus. Bot. Ludg. Bat. 1: 64. 1849; Seidenf., Dansk Bot. Ark. 27(4): 35. 1971; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1594. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 447. 1996. ***Luisia tenuifolia*** auct. non Bl., 1849: Hook. f., Fl. Brit. India 6: 24. 1890; Fischer in Gamble, Fl. Pres. Madras 1438. 1928.

Epiphyte, to 40 cm tall. Leaves 15-25 x 0.2 cm, linear, obtuse. Flowers brownish, axillary, solitary; dorsal sepal 9.5 x 4 mm, oblong-lanceolate, obtuse, keeled, 3-veined; lateral sepals oblong-lanceolate, obtuse, keeled, 3-veined; petals linear, subacute, obtuse, 3-veined; lip 16 x 7 mm, elliptic-oblong, apex 2-lobed, with 2 lateral smaller, fleshy ridges on the lip.

*Fl.* : July-September

*Distr.* : Southern Western Ghats. Occasional; in evergreen forests. Pachakkanam, *JA & KPR 15152.*

**Luisia zeylanica** Lindl., Fol. Orch. Luisia 3. 1853; Seidenf., Dansk Bot. Ark. 27(4): 62. 1971; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1594. 1983; Manilal, Fl. Silent Valley 292. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 447. 1996. ***Cymbidium tenuifolium*** sensu Wight,

Ic. t. 1689. 1851, non Willd., 1805-1806. ***Luisia teretifolia*** auct. non Gaud., 1826: Hook. f., Fl. Brit. India 6: 22. 1890; Fischer in Gamble, Fl. Pres. Madras 1438. 1928; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 210. 1981.

Epiphytes, to 20 cm tall. Leaves to 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 x 2-4 mm, 3-lobed; side lobes small, obliquely ovate, obtuse; midlobe 4 x 2.5, cordately ovate, obtuse, saccate at base.

*Fl.* : March-August

*Distr.* : Indo-Malesia. Common; in moist deciduous forests. Sabarimala, *JA 13549*; Thekkady, *JA 13623;* Thannikkudy, *JA & KPR 14831.*

## **MALAXIS** Solander ex Swartz

Prodr. 119. 1788.

Terrestrial or epiphytic herbs, often with elongated pseudobulbs. Leaves one to many, not jointed. Flowers small, in dense terminal racemes; sepals and petals free, recurved or incurved; petals narrower than sepals; lip sessile, base adnate and embracing the column base, 3-lobed, side lobes curved upwards or inconspicuous; midlobe pectinate or entire; column short, foot 0; pollinia 4, in pairs, sessile.

1. Side-lobes of lip auricled ..... **M. acuminata**
1. Side-lobes lacking, sides of lip laciniate ..... **M. rheedei**

**Malaxis acuminata** D. Don, Prodr. 29. 1825; Seidenf., Dansk Bot. Ark. 33(1): 55, f. 43. 1978; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1582. 1983; Manilal, Fl. Silent Valley 292. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 448. 1996. ***Microstylis wallichii*** Lindl., Gen. Sp. Orch. 20. 1830; Hook. f., Fl. Brit. India 5: 686. 1888; Fischer in Gamble, Fl. Pres. Madras 1407. 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 x 1 mm, lanceolate, acuminate, 1-veined. Flowers golden yellow or white, 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.

*Fl.* : April-May

*Distr.* : India to Philippines. Rare; in grasslands. Kumarikulam, *JA 12078*; Vallakkadavu, *JA 14142;* Vallakkadavu, *JA & KPR 16328.*

**Malaxis rheedei** Sw., Kongl. Vetensk. Acad. Nya. Handl. 21: 235. 1800; Seidenf., Bot. Tidsskr. 73: 97. 1978; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1582. 1983; Manilal, Fl. Silent Valley 293. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 448. 1996. ***Microstylis versicolor*** Lindl., Gen. Sp. Orch. 21. 1830; Fischer in Gamble, Fl. Pres. Madras 1408. 1928. ***M. rheedei*** (Sw.) Lindl., Gen. Sp. Orch. 21. 1830, p.p.; Wight, Ic. t. 902. 1845; Hook. f., Fl. Brit. India 5: 690. 1890. ***Malaxis versicolor*** (Lindl.) Abeywickr., Ceylon J. Sci. Biol. Sci. 2: 147. 1959; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 45. 1981.

Terrestrial herbs, to 40 cm tall. Leaves 15-18 x 5-6 cm, elliptic-lanceolate, acuminate. Flowers orange-yellow, turning purplish, 8 x 3.5 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 mm, subquadrate, pectinate, 9-10 toothed.

*Fl.* : July-September

*Distr.* : India and Sri Lanka. Fairly common, in moist deciduous forests, often in rocky areas among grasses. Vellimala, *JA 14060*; Kottamala, *14073.*

## **NERVILIA** Commerson ex Gaudichaud-Beaupre

in Freycinet Voyage Monde, Uranie Physicienne 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 petiolate, raised above ground ..... **N. aragoana**
1. Leaves adpressed to the ground ..... 2
2. Leaves green ..... **N. plicata**
2. Leaves brownish ..... **N. prainiana**

**Nervilia aragoana** Gaud. in Freyc., Voy. Bot. 422, t. 35. 1826; Fischer in Gamble, Fl. Pres. Madras 1459. 1928; Seidenf., Dansk Bot. Ark. 32(2): 164. 1978; Sasidh. & Sivar., Fl. Pl. Thrissur For. 448. 1996. ***Pogonia carinata*** Lindl., Gen. Sp. Orch. 414. 1840; Wight, Ic. t. 1220. 1851; Hook. f., Fl. Brit. India 6: 120. 1890. ***P. flabelliformis*** Lindl., Gen. Sp. Orch. 415. 1840; Hook. f., Fl. Brit. India 6: 121. 1890.

Tubers about 2 cm across, subglobose, white. Leaf 12 x 8 cm, cordate, broadly ovate, acuminate, with 15-20 cm long petiole. Scape 20 cm tall, lax-flowered. Flowers greenish; bracts 14 x 2 mm, linear-lanceolate, subacuminate; sepals 20 x 4 mm, oblanceolate, acute; petals 20 x 5

mm, similar to sepals; lip 22 x 5 mm, 3-lobed, obovate; lateral lobes oblong, acute; midlobe ovate, acute, crenulate, crimped, incurved, 8 mm long.

*Fl.* : April-May

*Distr.* : Indo-Malesia. Occasional; in moist deciduous forests. Thekkady, *KPR 17852.*

**Nervilia plicata** (Andr.) Schltr., Bot. Jahrb. Syst. 45: 403. 1911; Fischer in Gamble, Fl. Pres. Madras 1548. 1928; Sasidh. & Sivar., Fl. Pl. Thrissur For. 449. 1996. ***Arethusa plicata*** Andr., Bot. Rep. 5: t. 321. 1803. ***Pogonia biflora*** Wight, Ic. t. 1758. 1851; Hook. f., Fl. Brit. India 6: 119. 1890. ***Nervilia biflora*** (Wight) Schltr., Bot. Jahrb. Syst. 45: 403. 1911; Fischer in Gamble, Fl. Pres. Madras 1549. 1928.

Tubers 1.5 x 2 cm across, subglobose, white. Leaf green with purple blotches, 7 x 6 cm, sessile, cordate, orbicular, obtuse, hairy, margins wavy. Scape to 16 cm long, 2-flowered; bracts 5 x 2 mm, ovate-lanceolate; sepals and petals brownish, similar, 20 x 4 mm, oblong, lanceolate, acute; lip dark violet, 18 x 10 mm, elliptic, obtuse, margin wavy.

*Fl.* : February-March

*Distr.* : India. Occasional; in moist deciduous forests. Kalvarimala, *JA 14906.*

**Nervilia prainiana** (King & Pantl.) Seidenf., Dansk. Bot. Ark. 32: 149. 1978; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1571. 1983; Manilal, Fl. Silent Valley 293. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 449. 1996. ***Pogonia prainiana*** King & Pantl., J. Asiat. Soc. Bengal (Pt. 2) 65: 129. 1896. ***Nervilia monantha*** Blatt., J. Bombay Nat. Hist. Soc. 35: 724. 1932; Fischer in Gamble, Fl. Pres. Madras 1886. 1936.

Tubers about 2 cm across, subglobose. Leaves green, 6-7 x 7 cm, orbicular, cordate, velvety with short greenish white hairs on upper surface. Flowers pink, solitary; scape 10 cm long; bracts 2 x 1 mm, ovate, acute; sepals and petals similar, 30 x 5 mm, linear-oblanceolate, acute; petals slightly narrower; lip 20 x 15 mm, 3-lobed; lateral lobes oblong, obtuse; midlobe truncate, crisped; disc with purplish hairs.

*Fl.* : May-June

*Distr.* : India. Occasional; in moist deciduous forests. Thekkady, *JA & KPR 17851.*

## **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 articulated at base ..... 2
1. Leaves not articulated at base ..... 13
2. Scape flattened or 2-winged laterally ..... 3
2. Scape terete, not winged laterally ..... 9
3. Disc of lip saccate ..... 4
3. Disc of lip not saccate, but cushion like or indistinct ..... 6
4. Side-lobes of lip laterally elongated; disc crescent shaped ..... **O. sebastiana**
4. Lateral lobes of lip longitudinally elongate; disc ovate or triangular ..... 5
5. Lip papillose ..... **O. chandrasekharanii**
5. Lip glabrous ..... **O. brunoniana**
6. Lip directed upwards in flowers ..... 7
6. Lip directed downwards, reflexed in flowers ..... **O. anamalayana**
7. Petals ovate; lip deeply dentate along margins ..... **O. denticulata**
7. Petals linear or oblanceolate; lip entire or shallowly crenate along margins ..... 8
8. Leaves 6 x 1 cm; scape 3 cm long; spike 6-7 cm long; flowers pale greenish-yellow; lobules of mid-lobe orbicular, diverging; disc indistinct ..... **O. nayarii**
8. Leaves 15-18 x 1.5-2.5 cm; spike 10-20 cm; flowers orange red; lobules of mid-lobe oblong, converging; disc with a crescent shaped cushion like band ..... **O. santapaui**
9. Inflorescence longer than the leaves; lip glabrous ..... 10
9. Inflorescence smaller than the leaves; lip papillose ..... **O. ensiformis**
10. Lateral lobes of lip prominent, longitudinally elongated ..... 11
10. Lateral lobes of lip not prominent, orbicular ..... 12
11. Leaves narrowing towards the base from the middle; lateral lobes of the lip not interlocking ..... **O. arnottiana**
11. Leaves not narrowing towards the base from the middle; lateral lobes of lip interlocking ..... **O. wightiana**
12. Lobules of mid-lobe overlapping; petals oblong, obtuse ..... **O. verticillata**
12. Lobules of mid-lobe not overlapping; petals broadly ovate, subacute ..... **O. thwaitesii**
13. Lip with lateral lobes raised vertically above the column like two horns ..... **O. bicornis**
13. Lip without any vertically raised lateral lobes ..... 14
14. Lip 3-lobed ..... 15
14. Lip not lobed, suborbicular with two minute protuberances at apex ..... **O. proudlockii**

15. Bracts much longer than flowers; mid-lobe of lip suborbicular, truncate.....**O. longibracteata**

15. Bracts shorter than the flowers; mid-lobe of lip 2-lobulate.....16

16. Lateral lobes of lip dentate; petals dentate along margins.....**O. brachyphylla**

16. Lateral lobes of lip subentire; petals subentire along margins.....**O. recurva**

**Oberonia anamalayana** Joseph, J. Indian Bot. Soc. 42: 222. 1963; Abraham & Vatsala, Intr. Orch. 425. 1981; Manilal, Fl. Silent Valley 294. 1988; Ansari & Balakr., Orch. Monogr. 4: 19, f. 13. 1990 [Fig. 68 B].

Leaves to 20 x 4 cm, oblong, acute, tan brown. Scape up to 7 cm, flattened. Spike up to 40 cm long. Flowers greenish yellow brown, 5 x 2 mm, in verticils; dorsal sepal oblong, obtuse; lateral sepals oblong-ovate, obtuse; petals linear, obtuse, decurved along margins; lip 2.5 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.

*Fl.* : January-March

*Distr.* : Southern Western Ghats. Occasional; in evergreen forests. Arjunankotta, *JA 13627.*

**Oberonia arnottiana** Wight, Ic. t. 1628. 1851; Ansari & Balakr., Orch. Monogr. 4: 23. f. 18. 1990. ***O. wightiana*** Lindl. var. ***arnottiana*** (Wight) Ansari *et al.*, J. Econ. Tax. Bot. 3: 118. 1982. ***O. wightiana*** Lindl. var. ***nilgirensis*** Ansari *et al.*,, Ibid. 118. 1982.

Leaves to 9 x 1 cm, oblanceolate, falcate, acute, narrowed to base. Scape terete. Spike to 15 cm long. Flowers yellow, 2 mm across, in verticils; bracts 1.5 x 0.5 mm, ovate-acute, dentate, gland-dotted; sepals similar ovate, acute; petals linear, obtuse; lip 3-lobed, 2 x 1.5 mm; lateral lobes oblong, obtuse; midlobe 2-lobuled with a conical protuberance in between; lobules oblong, subacute; disc ovate, indistinct.

*Fl.* : September-November

*Distr.* South India and Sri Lanka. Occasional; in evergreen forests. Kottamala, *KPR 16879.*

**Oberonia bicornis** Lindl., Gen. & Sp. Orch. 16. 1830; Fol. Orch. Oberon. 4. 1859; Hook. f., Fl. Brit. India 5: 682. 1888; Seidenf., Dansk Bot. Ark. 25(3): 85. 1966; Manilal, Fl. Silent Valley 294. 1988; Ansari & Balakr., Orch. Monogr. 4: 31, f. 28. 1990.

Leaves up to 6 x 0.5 cm, linear-oblong, acute. Scape terete. Spike to 10 cm long. Flowers 2.5 x 2 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.

*Fl.* : August-November

*Distr.* : Peninsular India. Rare; in evergreen forests. Melmala, *JA & KPR 14406.*

**Oberonia brachyphylla** Blatt. & McCann, J. Bombay Nat. Hist. Soc. 35: 257. 1931; Seidenf., Dansk Bot. Ark. 25(3) : 91. 1968; Abraham & Vatsala, Intr. Orch. 416. 1981; Manilal, Fl. Silent Valley 295. 1988; Ansari & Balakr., Orch. Monogr. 4: 38, f. 35. 1990.

Leaves to 4 x 0.6 cm, oblong-ensiform, acuminate. Scape terete. Spike to 7 cm long. Flowers 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.

*Fl.* : January-April

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Thekkady, *KPR 14826.*

**Oberonia brunoniana** Wight, Ic. t. 1622. 1851; Hook. f., Fl. Brit. India 5: 681. 1888; Seidenf., Dansk Bot. Ark. 25(3):50.1968; Abraham & Vatsala, Intr. Orch. 422.1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2):1580.1983; Manilal, Fl. Silent Valley 296.1988; Ansari & Balakr., Orch. Monogr. 4: 15, f. 9.1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 449. 1996 [Fig. 67].

Leaves brownish, to 28 x 2.5 cm, oblong-ensiform, acute. Scape flattened, adnated to upper most leaf. Spike to 18 cm long, with a distinct reflexed sterile tip. Flowers brick red, 4 x 2.5 mm, pedicelled, in close verticils; bracts 2 x 1.8 mm, ovate, acute, denticulate; dorsal sepal oblong, obtuse; lateral sepals ovate, acute; petals lanceolate, acute; lip 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.

*Fl.* : December-January

*Distr.* : Southern Western Ghats. Fairly common; in evergreen and semi-evergreen forests. Mangaladevi, *JA 12677.*

**Oberonia chandrasekharanii** Nair *et al.*, Blumea 28: 361. 1983; Manilal, Fl. Silent Valley 296. 1988; Ansari & Balakr., Orch. Monogr. 4: 12, f. 5. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 450. 1996. ***O. ranganniana*** Murthy *et al.*, Curr. Sci. 56: 621. 1987.

Leaves articulated, to 15 x 2 cm, ensiform, acute. Scape flattened. Spike to 25 cm long, pendulous. Flowers greenish-yellow, 2 x 1 mm, in verticils; bracts 2 x 1.3 mm, ovate, acute, denticulate, gland-dotted; dorsal sepals ovate-obtuse; lateral sepals ovate, acute; petals linear,

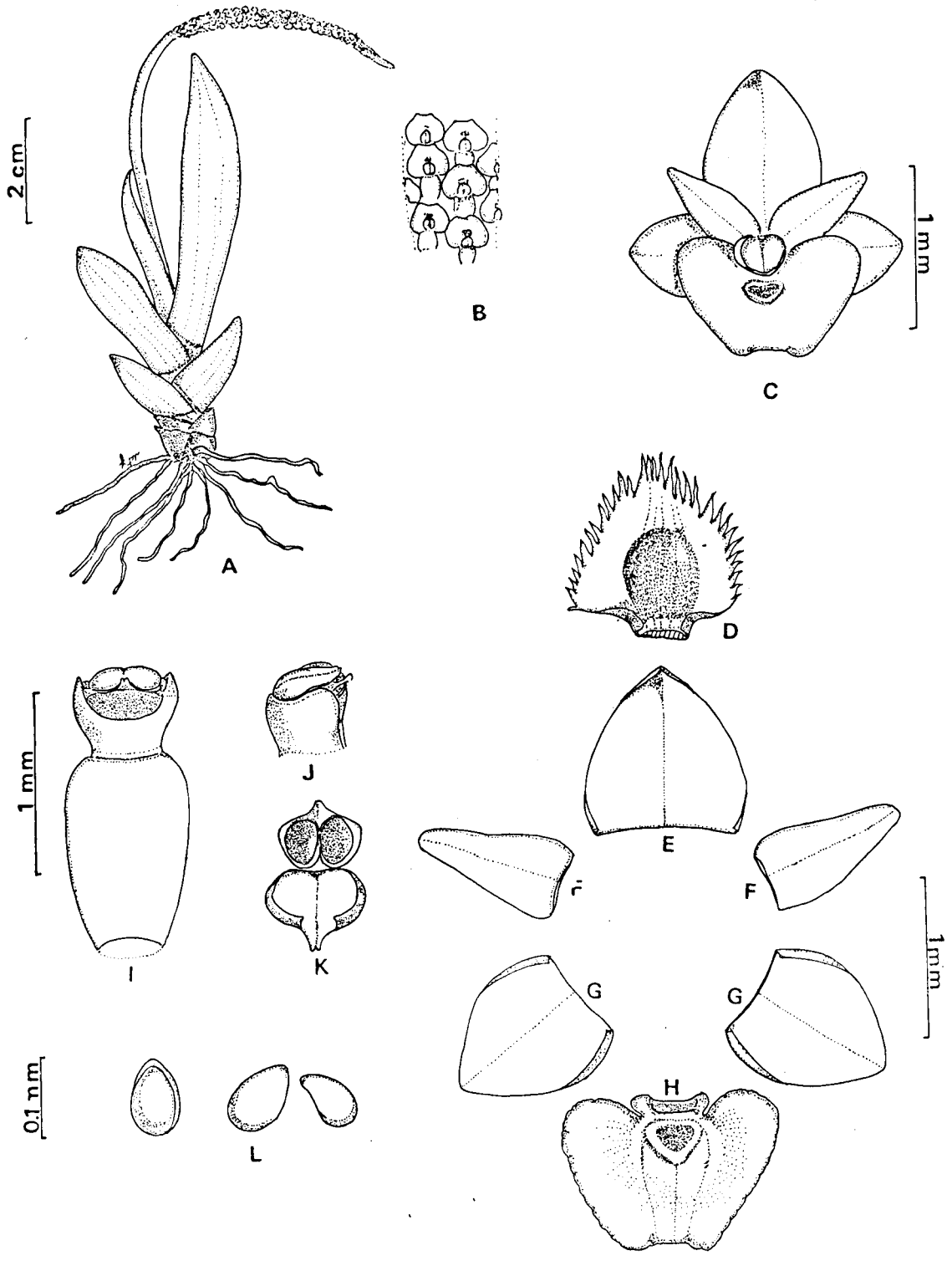



Fig. 67. *Oberonia brunoniana* Wight: **A**. habit; **B**. part of the spike; **C**. flower; **D**. bract; **E** & **G**. sepals; **F**. petals; **H**. lip; **I**. column : **J**. rostellum; **K**. pollinarium; **L**. pollinia.

truncate and denticulate at apex; lip 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

*Fl.* : December-September

*Distr.* : Southern Western Ghats (Kerala and Karnataka). Occasional; in evergreen forests, above 700 m. Pachakkanam, *JA 12267*; Thekkady, *JA & KPR 14257.*

**Oberonia denticulata** Wight, Ic. t. 1625. 1851; Ansari & Balakr., Orch. Monogr. 4: 20, f. 15. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 450. 1996. ***O. iridifolia*** Lindl. var. ***denticulata*** (Wight) Hook. f., Fl. Brit. India 5: 675. 1888; Fischer in Gamble, Fl. Pres. Madras 1406. 1928; Seidenf., Dansk Bot. Ark. 25(3): 42. 1968; Abraham & Vatsala, Intr. Orch. 416, t. 117. 1981.

Leaves articulated at base, to 20 x 2 cm, oblong-ensiform, acute. Scape flattened. Spike to 30 cm long. Flowers brownish yellow, 2.5 x 1 mm, in verticils; bracts 1.3 x 0.8 mm, oblong-lanceolate, obtuse, denticulate; sepals similar, ovate, acute; petals ovate, acute, denticulate; lip 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.

*Fl.* : November-December

*Distr.* : Indo-Malesia to Philippines. Occasional; in moist deciduous forests. Medakanam, *JA 12982.*

**Oberonia ensiformis** (Smith) Lindl., Fol. Orch. Oberonia 4. 1859; Hook. f., Fl. Brit. India 5: 679. 1888; Fischer in Gamble, Fl. Pres. Madras 3: 1405. 1928; Seidenf., Dansk Bot. Ark. 25(3): 53. 1968, *Ibid.* 33(1): 13. 1978; Abraham & Vatsala, Intr. Orch. 419. 1981; Ansari & Balakr., Orch. Monogr. 4: 27, f. 22. 1990. ***Malaxis ensiformis*** Smith., Rees Cyclop. 14: 22. 1812.

Leaves to 45 x 2 cm, ensiform, acute or acuminate. Scape terete. Spike to 15 cm long. Flowers 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.

*Fl.* : September-January

*Distr.* : India and Nepal. Common; in moist deciduous and evergreen forests. Vellimala, *KPR 16886.*

**Oberonia longibracteata** Lindl., Gen. & Sp. Orch. 15. 1830 & Fol. Orch. Oberonia 2. 1859; Hook. f., Fl. Brit. India 5: 676. 1888; Seidenf., Dansk Bot. Ark. 25(3): 83. 1968; Ansari & Balakr., Orch. Monogr. 4: 39, f. 37. 1990.

Leaves to 9 x 1 cm, linear-oblong, ensiform, acuminate. Scape flattened. Spike to 9 cm long. Flowers 2.5 x 2 mm, yellowish-brown, scattered; bracts much longer than the pedicel and ovary, linear-lanceolate, acuminate; dorsal sepal ovate-lanceolate, acute; lateral sepals ovate, acute; petals oblong, acute; lip quadrate in outline, 3-lobed; lateral lobes oblong, cuneate, wing like truncate, subentire; midlobe suborbicular; disc ovate, saccate.

*Fl.* : September-December

*Distr.* : South India and Sri Lanka. Rare; in evergreen forests. Vellimala, *KPR 14317.*

**Oberonia nayarii** Ansari & Balakr., Orch. Monogr. 4: 17, f. 11. 1990.

Leaves to 16 x 1 cm, oblong-ensiform, subacute. Scape minutely 2 winged. Spike up to 7 cm long. Flowers pale greenish-yellow in verticils; dorsal sepal oblong, obtuse; lateral sepals ovate, acute; petals oblanceolate, acute, subserrate; lip 2 mm across, 3-lobed; lateral lobes ear-like; midlobe 2-lobuled; lobules orbicular, diverging; sinus broad with a rounded protuberance; disc ovate, indistinct.

*Fl.* : December-July

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Thannikkudy, *JA 13030.*

**Oberonia proudlockii** King & Pantl., J. Asiat. Soc. Bengal. 11. 66. 560. 1897; Fischer in Gamble, Fl. Pres. Madras 3: 1406. 1928; Seidenf., Dansk Bot. Ark. 25(3): 22. 1968; Abraham & Vatsala, Intr. Orch. 422. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1578. 1983; Manilal, Fl. Silent Valley 297. 1988; Ansari & Balakr., Orch. Monogr. 4: 34, f. 29. 1990.

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, to 8 cm, rachis 3-4 cm, laterally winged. Spike terete, 4-5 cm long with a sterile apex. Flowers brownish-yellow, 2 x 1 mm, sessile, closely spirally set; bracts 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 1.1 x 1 mm, inferior, quadrate, apex obscurely 2-lobed; margins irregular, 3-veined; disc with ovate cavity.

*Fl.* : January-March

*Distr.* : Southern Western Ghats. Rare; in moist deciduous forests. Mangaladevi, *JA 12267;* Thannikkudy, *JA 16864.*

**Oberonia recurva** Lindl., Bot. Reg. 8. 1839 & Fol. Orch. Oberonia 5. 1859; Hook. f., Fl. Brit. India 5: 680. 1888; Seidenf., Dansk Bot. Ark. 25(3): 95. 1968; Ansari & Balakr., Orch. Monogr. 4: 38, f. 36. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 450. 1996.

Leaves to 2.5 x 0.6 cm, linear-ensiform, acute. Scape terete. Spike to 6 cm long. Flowers 1.5 x 1 mm, orange-yellow, in verticils; dorsal sepal oblong or ovate, obtuse; lateral sepals ovate, acuminate; petals oblong-ovate or oblanceolate, acute; lip 3-lobed; lateral lobes ear-like, curved upwards; midlobe oblong, 2-lobuled; lobules oblong-ligulate, diverging, sinus narrow, without any protuberance; disc obovate, concave.

*Fl.* : April-May

*Distr.* : Peninsular India and Sri Lanka. Fairly common; in semi-evergreen forests. Thekkady, *KPR 17976.*

**Oberonia santapaui** Kapad., J. Bombay Nat. Hist. Soc. 57: 265. 1960; Seidenf., Dansk Bot. Ark. 25(3): 50. 1968; Abraham & Vatsala, Intr. Orch. 429. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1581. 1983; Manilal, Fl. Silent Valley 297. 1988; Ansari & Balakr., Orch. Monogr. 4: 18, f. 12. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 450. 1996. ***O. 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. 1928.

Leaves to 17 x 2.5 cm, oblong, obtuse, dull brown. Scape flattened. Spike to 19 cm long, thick. Flowers 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.

*Fl.* : November-December

*Distr.* : Western Ghats. Fairly common; in evergreen and shola forests above 1,100 m. Vellimala, *KPR 14314*; *JA & KPR 14421.*

**Oberonia sebastiana** Shetty & Vivek., Bull. Bot. Surv. India 17: 157. 1975; Ansari & Balakr., Orch. Monogr. 4: 1, f. 4. 1990.

Leaves to 20 x 1.5 cm, ensiform, acute. Scape flattened. Spike to 30 cm long. Flowers 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.

*Fl.* : October-December

*Distr.* : Southern Western Ghats. Occasional; in evergreen forests. Vellimala, *JA & KPR 14346*; Melmala, *JA & KPR 14475.*

**Oberonia thwaitesii** Hook. f., Fl. Brit. India 5: 678. 1888; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 23. 1981; Manilal & S. Kumar, Curr. Sci. 33: 1106. 1984; Ansari & Balakr., Orch. Monogr. 4: 27, f. 23. 1990; Sasidh. & Sivar., Fl. Pl. Thrissur For. 451. 1996.

Leaves to 10 x 1 cm, oblong, ensiform, acute. Spike to 20 cm long. Flowers 2.5 x 1.5 mm, orange yellow, in verticils; dorsal sepal ovate, acute; lateral sepals obliquely ovate; petals ovate, subacute; lip 3-lobed; lateral lobes rounded, auricular; midlobe 2-lobuled; lobules oblong, toothed; disc indistinct.

*Fl.* : May-June

*Distr.* : South India and Sri Lanka. Occasional; in moist deciduous forests. Koruthodu, *KPR 15197.*

**Oberonia verticillata** Wight, Ic. t. 1626. 1851; Lindl., Fol. Orch. Oberon. 3. 1859; Hook. f., Fl. Brit. India 5: 677. 1888; Fischer in Gamble, Fl. Pres. Madras 3: 1405. 1928; Seidenf., Dansk Bot. Ark. 25(3): 30. 1968; Abraham & Vatsala, Intr. Orch. 419. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1579. 1983; Ansari & Balakr., Orch. Monogr. 4: 28, f. 24. 1990.

Leaves to 15 x 1.2 cm, oblong-ensiform, acute. Scape terete. Spike to 27 cm long. Flowers orange-yellow, 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.

*Fl.* : September-January

*Distr.* : Southern Western Ghats. Occasional; in evergreen forests. Vellimala, *KPR 17854.*

**Oberonia wightiana** Lindl., Bot. Reg. 25: Misc. 9. 1839; Wight, Ic. t. 1627. 1851; Hook. f., Fl. Brit. India 5: 683. 1888; Fischer in Gamble, Fl. Pres. Madras 1407. 1928; Seidenf., Dansk Bot. Ark. 25(3): 28. 1968; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1579. 1983; Manilal, Fl. Silent Valley 298. 1988; Ansari & Balakr., Orch. Monogr. 4: 24, f. 19. 1990.

Leaves to 15 x 1 cm, oblong-ensiform, acute. Scape terete. Spike to 15 cm long. Flowers 3.5 x 1.5 mm, orange yellow, scattered on the rachis; dorsal sepal oblong, obtuse, entire; lateral sepals ovate-oblong, subacute; petals linear, obtuse, entire; lip 2 mm across, 3-lobed; lateral lobes oblong, ligulate, wing like on spreading; midlobe 2-lobuled; lobules ligulate, toothed at apex, diverging; disc ovate, indistinct.

*Fl.* : August-November

*Distr.* : India and Sri Lanka. Occasional; in evergreen forests. Vellimala, *KPR 16872*; Kottamala, *JA 16875.*

## OECEOCLADES Lindley

Bot. Reg. sub t. 1522. 1832.

**Oeceoclades pulchra** (Thou.) Clements & Cribb in Clements, Cat. Austr. Orch. 99. 1989. ***Limodorum pulchrum*** Thou., Orch., Ill. Austr. Afri. t. 43. 1822. ***Eulophia pulchra*** (Thou.) Lindl., Gen. Sp. Orch. 183. 1833. ***Eulophia macrostachya*** Lindl., Gen. Sp. Orch. 183. 1833; Wight, Ic. t. 1667-68. 1851; Hook. f., Fl. Brit. India 6: 4. 1890; Fischer in Gamble, Fl. Pres. Madras 1435. 1928; Abraham & Vatsala, Intr. Orch. 298. 1981; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 173. 1981.

Terrestrial herbs, to 60 cm tall. Pseudobulb 10 x 2 cm, fusiform. Leaves to 50 x 6 cm, elliptic-oblong, lanceolate-acuminate, 3-ribbed, 2 per pseudobulb. Flowers purplish yellow, 2 x 1.5 cm, in about 85 cm long, lax raceme from the base of pseudobulb; bracts linear-lanceolate; dorsal sepal 11 x 3 mm, lanceolate, acuminate, 5-veined; lateral sepals 15 x 35 mm, falcate, lanceolate, acuminate, 5-veined; lip 11 x 17 mm, broader than long, 3-lobed; side lobes short, obtuse; midlobe obcordate, rounded; spur short, 3 x 2 mm, ampulliform; ovary with pedicel 1.8 mm long.

*Fl.* : September-December

*Distr.* : South India and Sri Lanka. Rare; in evergreen forests. Mlappara, *JA 13098.*

## PACHYSTOMA Blume

Bijdr. 376. 1825.

**Pachystoma pubescens** Bl., Bijdr. 376. 1825; Seidenf., Opera Bot. 95: 54. 1986; Sasidh. & Sivar., Fl. Pl. Thrissur For. 451. 1996. ***Apaturia senilis*** Lindl., Gen. Sp. Orch. 130. 1831. ***Pachystoma senile*** (Lindl.) Reichb. f., Bonplandia 3: 251. 1855; Hook. f., Fl. Brit. India 5: 812. 1890; Fischer in Gamble, Fl. Pres. Madras 1426. 1928.

Terrestrial herbs, with 'V'-shaped tuber, leafless when flowering. Leaves 1 or 2, linear, to 20 x 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 4 mm, ovate, long-acuminate; sepals pubescent outside, subsimilar; dorsal sepal 12.1 x 4.1 mm, elliptic-oblong, acute, 5-veined; lateral sepals 12.1 x 4 mm, oblong-lanceolate, acute, 5-veined; petals 13 x 1-2.5 mm, oblanceolate-oblong, obliquely acute, 3-5-veined; lip 11 x 4-8 mm, 3-lobed; side lobes obliquely ovate, obtuse; midlobe 4.5 x 4 mm, oblong, obtuse; disc ridged, base saccate.

*Fl.* : January

*Distr.* India, Malaya and China. Occasional; in grasslands. Kumarikulam, *JA 13116; KPR 14854.*

## PAPILIONANTHE Schlechter

Orchis 9: 78. 1915.

**Papilionanthe subulata** (Koen.) Garay, Bot. Mus. Leafl. Harvard Univ. 23(10): 372. 1974; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 202. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1596. 1983; Manilal, Fl. Silent Valley 299. 1988. ***Epidendrum subulatum*** Koen. in Retz., Obs. 6: 51. 1791. ***Aerides cylindricum*** Lindl., Gen. Sp. Orch. 240. 1833; Wight, Ic. t. 1744. 1851; Fischer in Gamble, Fl. Pres. Madras 1442. 1928; Abraham & Vatsala, Intr. Orch. 444. 1981.

Epiphytes, to 40 cm high; stem woody. Leaves scattered, 6-8 x 0.3 cm, linear, terete, acute. Flowers white, one or two in 1.5-2 cm long, short, leaf opposed racemes; dorsal sepal 11 x 8 mm, ovate, obtuse, 5-7-veined; lateral sepals 13 x 8 mm, obliquely ovate-lanceolate, obtuse, 7-veined; petals 11 x 9 mm, ovate, obtuse, 7-veined; lip 15 x 12 mm, 3-lobed; lateral lobes oblong, obtuse; midlobe tongue-shaped, recurved, obtuse; disc with 2-longitudinal calli.

*Fl.* : April-May

*Distr.* : India and Sri Lanka. Rare; in evergreen forests. Mlappara, *JA 13200*; Uppermanalar, *JA & KPR 15026.*

## PECTEILIS Rafinesque-Schmaltz

Fl. Tellur. 2: 37. 1836.

**Pecteilis gigantea** (J. E. Sm.) Rafin., Fl. Tellur. 2: 38. 1837; Manilal, Fl. Silent Valley 299. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 452. 1996. ***Orchis gigantea*** J. E. Sm., Exot. Bot. 2: 79, t. 100. 1805. ***Habenaria susannae*** auct. non (L.) R. Br. ex Spreng., 1826: Hook. f., Fl. Brit. India 6: 137. 1890. ***Platanthera susannae*** auct. non (L.) Lindl., 1835: Wight, Ic. t. 920. 1845; Fischer in Gamble, Fl. Pres. Madras 1475. 1928.

Terrestrial tuberous herbs, to 90 cm tall. Leaves to 10 x 7 cm, ovate-lanceolate, acute, sessile, scattered. Flowers white, 9-10 x 8 cm, racemes terminal, 2-4-flowered; bracts 7.5 x 3 cm, ovate-acuminate, foliaceous; dorsal sepal 4 x 5 cm, rhomboid, 7-9-veined; lateral sepals 5 x 2.5 cm, oblique at base, oblong, subacute, obtuse, 7-9-veined; petals 3.5 x 2-4 mm, linear, falcate, obtuse; lip 15 x 7 cm, including 12-13 x 0.5 cm cylindrical spur, 3-lobed; lateral lobes laciniate; midlobe oblong-lanceolate, obtuse; spur long, cylindrical; column short, foot absent; pollinia 2, granular, with long caudicle.

*Fl.* : September-October

*Distr.* : Indo-Malesia. Rare; in grasslands. Uppupara, *JA 17844.*

## 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 near the middle of the stem.....2
1. Leaves scattered throughout the stem .....4
2. Side-lobes of lip filiform, distinct from mid-lobe in size.....**P. aristatus**
2. Side-lobes of lip not filiform, similar to the mid-lobe.....3
3. Petals gibbously ovate; lip as long as the sepals .....**P. goodyeroides**
3. Petals obliquely orbicular; lip shorter than the sepals .....**P. plantagineus**
4. Spur slender, cylindrical, acute .....**P. densus**
4. Spur clavate.....**P. richardianus**

**Peristylus aristatus** Lindl., Gen. Sp. Orch. 300. 1835; Fischer in Gamble, Fl. Pres. Madras 3: 1474. 1928; Seidenf., Dansk. Bot. Ark. 31: 35. 1977; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 370. 1981; Abraham & Vatsala, Intr. Orch. 246. 1981; Manilal, Fl. Silent Valley 300. 1988. ***Habenaria aristata*** (Lindl.) Hook. f., in Trimen, Cat. Ceylon Pl. 91. 1885, non King & Pantl., 1898; Hook. f., Fl. Brit. India 6: 158. 1890.

Leaves 4-7 x 2 cm, elliptic-lanceolate, subacuminate. Flowers white, in 10-18 cm long, lax spike, peduncle 12-15 cm long; bracts 11.5 x 4 mm, lanceolate, acuminate, margins finely erose, 1-veined; dorsal sepal 5 x 1.8 mm, elliptic-oblong, obtuse, 1-veined; lateral sepals 4.1 x 1.8 mm, obliquely ovate-oblong, obtuse, 1-veined; petals 5.5 x 2.1-2.5 mm, oblanceolate-oblong, obtuse, 1-veined; lip 5 x 2 mm, 3-lobed; lobes very unequal; lateral lobes 7.5-8 x 0.5 mm, linear, acute, midlobe 2.5 x 0.9 mm, oblong, obtuse; spur 3.2 x 1.5 mm, ellipsoid, acute, with cylindric stalk.

*Fl.* : August-September

*Distr.* : India, Burma, Indochina and Sri Lanka. Rare; in evergreen forests. Thekkady, *KPR 16882.*

**Peristylus densus** (Lindl.) Sant. & Kapad., J. Bombay Nat. Hist. Soc. 57: 128, 1960; Seidenf., Dansk. Bot. Ark. 31: 32. 1977; Abraham & Vatsala, Intr. Orch. 243. 1981. ***Coeloglossum densum*** Lindl., Gen. Sp. Orch. 302. 1832. ***Habenaria peristyloides*** Wight, Ic. 1702. 1852.

***Habenaria stenostachya*** (Lindl. ex Benth.) Benth., Fl. Hougk. 362. 1861; Hook. f., Fl. Brit. India 6: 159. 1890. ***Peristylus stenostachya*** (Lindl. ex Benth.) Kraenzl., Orchid. Gen. Sp. 502. 1901; Fischer in Gamble, Fl. Pres. Madras 3: 1474. 1928.

Leaves 3 x 0.6 cm, oblong-lanceolate, acute, 4 or 5, scattered on the stem. Flowers white, in about 15 cm long, lax spike; dorsal sepal elliptic, subacute or obtuse, 3-veined; lateral sepals obliquely oblong, obtuse, 2-veined; lip 3.5 x 9.9 mm, 3-lobed; lobes unequal, lateral lobes linear, subacute, curved; midlobe oblong, obtuse; spur 5 x 0.5-1 mm, cylindric, acute, dialated subapically.

*Fl.* : August-September

*Distr.* : India and China. Rare; in evergreen forests. Vallakkadavu, *JA 14142.*

**Peristylus goodyeroides** (D. Don) Lindl., Gen. Sp. Orch. Pl. 299. 1835; Fischer in Gamble, Fl. Pres. Madras 1475. 1928; Seidenf., Dansk. Bot. Ark. 31(3): 53. 1977; Abraham & Vatsala, Intr. Orch. 249. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1559. 1983; Manilal, Fl. Silent Valley 300. 1988. ***Habenaria goodyeroides*** D. Don, Prodr. Fl. Nepal. 25. 1825; Hook. f., Fl. Brit. India 6: 161. 1890.

Herbs to 70 cm tall. Leaves 5-10 x 4-5 cm, broadly elliptic-ovate, acute. Spike densely flowered, 30 cm long, peduncle 15 cm long; bracts 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 3 mm, 3-lobed; lateral lobes oblong, obtuse, midlobe ovate, truncate or acute; spur globular.

*Fl.* : July-August

*Distr.* : India, Java and Philippines. Rare; in grasslands. Mangaladevi, *JA 12171.*

**Peristylus plantagineus** Lindl., Gen. Sp. Orch. 300. 1835; Wight, Ic. t. 921. 1845; Fischer in Gamble, Fl. Pres. Madras 1475. 1928; Sasidh. & Sivar., Fl. Pl. Thrissur For. 452. 1996. ***Habenaria wightii*** Trim., Cat. Pl. Ceylon 91. 1885; Hook. f., Fl. Brit. India 6: 162. 1890.

Tuberous terrestrial herbs, to 30 cm tall. Leaves 16 x 4.5 cm, oblong or broadly elliptic, acute, glabrous and glossy. Flowers creamy, many, in 20-25 cm long spikes; bracts 8-10 x 2 mm, linear-lanceolate; sepals pale brown, oblong, obtuse; petals 2.5 x 2 mm, orbicular; lip white, 2 x 2 mm, obscurely 3-lobed, broadly ovate-oblong.

*Fl.* : July-August

*Distr.* : South India and Sri Lanka. Fairly common; in moist deciduous forests. Mangaladevi, *JA 16305.*

**Peristylus richardianus** Wight, Ic. t. 1697. 1851; Fischer in Gamble, Fl. Pres. Madras 1474. 1928; Seidenf., Dansk. Bot. Ark. 31: 39. 1977; Abraham & Vatsala, Intr. Orch. 246. 1981. ***Habenaria bicornuata*** Hook. f., Fl. Brit. India 6: 150. 1890.

Herbs, 20-50 cm high. Leaves 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 6 x 18 mm, 3-lobed; lobes unequal; midlobe 3 x 1 mm, oblong, obtuse; lateral lobes 8 x 0.5 mm, linear, upcurved; spur clavate, acute at apex.

*Fl.* : August-September

*Distr.* : Western Ghats. Rare; in grasslands. Mangaladevi, *JA 14167.*

## PHOLIDOTA Lindley ex W. J. Hooker

Exot. Fl. 2: 138. 1825.

**Pholidota pallida** Lindl., Edward's, Bot. Reg. 21: sub. t. 1777. 1836; Abraham & Vatsala, Intr. Orch. 289. 1981; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 120. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1574. 1983; Manilal, Fl. Silent Valley 301. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 452. 1996. ***Pholidota imbricata*** sensu Lindl., Bot. Reg. 14: t. 1213. 1828; non Lindley., 1825; Wight, Ic. t. 907. 1845; Hook. f., Fl. Brit. India 5: 845. 1896; Fischer in Gamble, Fl. Pres. Madras 1431. 1928; Seidenf., Opera Bot. 89: 98. 1986.

Epiphytes, to 35 cm long. Pseudobulb 5 x 2 cm, sheathed, ovoid, subtetragonal smooth, crowded. Leaves to 40 x 5.5, 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 8 x 8.4 mm; saccate 5-veined; midlobe bifid, lobules rounded; column short, broadly winged; foot 0; pollinia 4, waxy, cohering in pairs.

*Fl.* : March-June

*Distr.* : India to Malaya. Common; in moist deciduous to evergreen forests. Thekkady, *JA 12193.*

## PHRAETIA Lindley

Gen. et Sp. Orch. Pl. 63. 1830.

**Phraetia elegans** Lindl., Gen. Sp. Orch. 63. 1830; Hook. f., Fl. Brit. India 5: 810. 1890; King & Pantl., Ann. Roy. Bot. Gard. Calcutta 251, t. 333. 1878; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 287. 1981; Abraham & Vatsala, Intr. Orch. 497. 1981.

Epiphytes, to 15 cm high, with small tufted pseudobulbs, 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 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 1.5 x 0.5-1 mm, obovate, obtuse, saccate at base; margins with short fleshy hairs.

*Fl.* : August-September

*Distr.* : India and Sri Lanka. Rare; in evergreen forests. Vellimala, *JA 13951.*

## **PODOCHILUS** Blume

Bijdr. 295. t. 12. 1825.

**Podochilus malabaricus** Wight, t. 1748. 1857; Hook. f., Fl. Brit. India 6: 80. 1880; Fischer in Gamble, Fl. Pres. Madras 1450. 1928. ***Podochilus falcatus*** Lindl., Gen. Sp. Orch. 234. 1833.

Epiphytes, to 15 cm tall. Leaves many, closely set, 7 x 1.2 mm, subulate, obtuse, equitant, distichous. Flowers white, in 4.5-5 cm long, slender, flexuous terminal racemes; bracts 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, 2.1 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.

*Fl.* : November-December

*Distr.* : South India and Sri Lanka. Rare; in evergreen forests. Pambavalley, *JA 17086.*

## **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; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1592. 1983; Manilal, Fl. Silent Valley 301. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 453. 1996. ***Epidendrum concretum*** Jacq., Enum. Pl. Carib. 30. 1760. ***Polystachya purpurea*** Wight, Ic. t. 1679. 1851; Hook. f., Fl. Brit. India 6: 21. 1890; Fischer in Gamble, Fl. Pres. Madras 1437. 1928. ***P. wightii*** Reichb. f. in Walp., Ann. 6: 640. 1861; Fischer in Gamble, Fl. Pres. Madras 1437. 1928. ***Onychium flavescens*** Bl., Bijdr. 325. 1825. ***P. flavescens*** (Bl.) J. J. Sm., Fl. Buitenz. 6: 284, f. 218. 1905.

Epiphytes, to 15 cm high with globose pseudobulb, 1 x 1 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 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.

*Fl.* : July-August

*Distr.* : South India and Sri Lanka. Occasional; in semi-evergreen forests. Mangaladevi, *KPR & JA 16309.*

## **POMATOCALPA** Breda

Gen. et Sp. Orch. et Asclep. Fasc. 3: t. 15. 1829.

**Pomatocalpa spicata** Breda., Gen. Sp. Orch. Kuhl. & Hasselt t. 15. 1827; Seidenf., Opera Bot. 95: 110. 1988. ***Cleisostoma manii*** Reichb. f., in Flora 4: 274. 1872; Hook. f., Fl. Brit. India 6: 74. 1790; Fischer in Gamble, Fl. Pres. Madras 1448, 1928.

Epiphyte, stem to 5 cm tall. Leaves distichous imbricating, 10-15 x 2 cm, oblong, obliquely bifid at apex, obtuse. Flowers creamy, 4 mm long, in 5-10 cm long, sometimes branched lateral stout spikes; bracts minute; dorsal sepal oblanceolate, obtuse; laterals oblanceolate or spathulate, obtuse; petals obovate or elliptic, obtuse; lip 2.5 x 5 mm, 3-lobed, midlobe 1 x 2 mm, elliptic-orbicular; side lobes obscure; spur 2.5 x 1.5 mm, saccate with a plate like tongue placed in it; column and foot very short; pollinia 2.

*Fl.* : April-May

*Distr.* : India. Rare; in evergreen forests. Sabarimala, *JA 17832.*

## **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 when flowering, oblong-orbicular; flowers orange brown tomentose outside.....**P. jerdoniana**
1. Leaves after flowering, obovate, spathulate; flowers reddish brown, glabrous outside.....**P. reticulata**

**Porpax jerdoniana** (Wight) Rolfe, Orch. Rev. 16: 18. 1908; Fischer in Gamble, Fischer in Gamble, Fl. Pres. Madras 1422. 1928; Sant. & Kapad., Orch. Bombay 150. 1966; Abraham &

Vatsala, Intr. Orch. 387. 1981; Manilal, Fl. Silent Valley 302. 1988. ***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. 1888.

Pseudobulbs discoid, 10 x 5 mm, with reticulately veined sheaths. Leaves 2, 2 x 2 cm, oblong-orbicular, mucronate. Flowers 2, orange brown, from the centre of leaves, tomentose outer side; bracts 3 x 5 mm, oblong-orbicular, gland-dotted, ciliolate; sepals united to form a tube; dorsal sepal 7 x 5 mm, obovate-oblong, obtuse; lateral sepals united, 9 x 5 mm, saccate at base; petals 6 x 2 mm, linear-oblong, obtuse; lip 3 x 1 mm, subtruncate, obscurely lobed, midlobe ovate, truncate, papillate.

*Fl.* April-May

*Distr.* South India. Rare; in semi evergreen and evergreen forests. Pambavalley, *JA & KPR 17977.*

**Porpax reticulata** Lindl., Bot. Reg. 31: Misc. 66. 1845; Fischer in Gamble, Fl. Pres. Madras 1422. 1928; Sant. & Kapad., Orch. Bombay 157. 1966; Abraham & Vatsala, Intr. Orch. 385. 1981; Manilal, Fl. Silent Valley 302. 1988.***Aggeianthus marchantoides*** Wight, Ic. t. 1737. 1852. ***Eria reticulata*** (Lindl.) Benth. in Benth. & Hook., Gen. Pl.3: 509. 1883; Hook. f., Fl. Brit. India 5: 786. 1888.

Pseudobulbs discoid, covered with long sheaths of reticulate nerves, 5 x 2 cm, broadly ovate, spathulate, obtuse. Flowers deep brownish red, from the base of pseudobulbs; bracts 6 x 7 mm, suborbicular, retuse, denticulate; sepals united to form a campanulate tube, 14 x 6 mm, saccate at base, 3-lobed at apex, densely papillose outside; lobes ovate, acute; petals 8 x 3 mm, subfalcately spathulate, acute, papillose; lip 5 x 4 mm, panduriform, 3-lobed, toothed; lateral lobes erect, ovate, obtuse; midlobe suborbicular, obtuse, denticulate, papillose.

*Fl.* April-May.

*Distr.* : South India, endemic. Rare; in semi evergreen and evergreen forests. Sabarimala, *JA & KPR 17833.*

## RHYNCHOSTYLIS Blume

Bijdr. 285. t. 49. 1825.

**Rhynchostylis retusa** (L.) Bl., Bijdr. 286, t. 49. 1825; Hook. f., Fl. Brit. India 6: 32. 1890; Fischer in Gamble, Fl. Pres. Madras 1440. 1928; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 199. 1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1597. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 454. 1996. ***Epidendrum retusum*** L., Sp. Pl. 953. 1753.

Epiphytes, to 40 cm tall; stems stout, woody. Leaves to 30 x 2 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 8 x 7 mm, obliquely ovate, subacute; petals 6 x 3 mm, oblong-ovate, obtuse; lip entire, oblong, pink; clawed; claw deflexed, deeply inflexed, cuneiform; disc 2-lobed; spur 5 mm long, laterally compressed, tip emarginate; puberulus inside; column short; foot very short; pollinia 2, globose, with long caudicle.

*Fl.* : June-July

*Distr.* : India to Philippine Islands. Fairly common; in moist deciduous forests. Koruthodu, *JA 12203.*

## **ROBIQUETIA** Gaudichaud-Beaupre

in Freycinet Voyage Monde, Uranie Physicienne Bot. 426. 1829.

**Robiquetia josephiana** Manilal & Sathish., Orch. Rev. 92: 293. 1984; Manilal, Fl. Silent Valley 304. 1988.

Epiphytes, to 8 cm tall. Leaves 4-7 x 0.3 cm, linear, grooved, blunt at apex. Flowers white, in about 5 cm long axillary lax raceme; bracts 2 x 1 mm, ovate, acuminate, 1-veined; sepals 3 x 2 mm, obovate, acute, 1-veined; sepals and petals gland dotted; lip 7 x 2.5 mm, obscurely 3-lobed with a conspicuous spur; side lobes insignificant; midlobe triangular.

*Fl.* : October-November

*Distr.* : South India. Very rare; in evergreen forests. Uppermanalar, *JA 13970.*

## **SATYRIUM** Swartz

Kongl. Vetensk. Acad. Nya Handl. 21: 214. 1800, *nom. cons.*

**Satyrium nepalense** D. Don, Prodr. Fl. Nepal. 26: 1825; Wight, Ic. t. 929. 1844; Fischer in Gamble, Fl. Pres. Madras. 1476. 1928; Sald. in Sald. & Nicols., Fl. Hassan Dist. 846. 1976; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1568. 1983. ***Satyrium perrottetianum*** A. Rich., Ann. Soc. Nat. Bot. 11. 15: 76. 1841; Wight, Ic. t. 1716. 1851. ***Satyrium wightianum*** Lindl., Gen. Sp. Orch. 340. 1838; Wight, Ic. t. 1718. 1851.

Terrestrial herbs, to 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, 21 x 6 mm, superior, concave, keeled, enclosing the column with two parallel spurs; column erect; foot 0; pollinia 2, with recurved caudicle.

*Fl.* : August-September

*Distr.* : India, Sri Lanka, Burma and China. Common; in grasslands. Mangaladevi, *JA 12181*; Kalvarimala, *JA 13892*; Uppupara, *JA 13190.*

## SCHOENORCHIS Blume

Bijdr. 6: t. 3, f. 23. 1825.

**Schoenorchis nivea** (Lindl.) Schltr., Fedde. Repert. Beih. 1: 986. 1913; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 245.1981. ***Saccolabium niveum*** Lindl., Gen. Sp. Orch. 224. 1833. ***Saccolabium gemmatum*** Lindl., Bot. Reg. Misc. 50. 1838; Abraham & Vatsala, Intr. Orch. 258. 1981.

Epiphytes, to 15 cm high, stem woody. Leaves 3.5 x 0.4 cm, subterete, linear, subacute or obtuse. Flowers white, minute, in 5-10 cm long, leaf opposed, panicle; bracts 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 1.9 x 0.5 mm, including 0.6 mm long cylindrical spur; midlobe spathulate.

*Fl.* : July-September

*Distr.* : South India and Sri Lanka. Rare; in evergreen and semi-evergreen forests. Mlappara, *JA 13331.*

## SEIDENFADENIELLA Sathish .

Cat. India Orch. 47. 1994

**Seidenfadeniella chrysantha** (Alston) Sathish, Cat. India Orch. 47. 1994. ***Saccolabium chrysanthum*** Alston in Trimen, Hand. Fl. Ceylon 6: 277. 1931. ***Sarcanthus filiformis*** sensu Wight, Ic. t. 1684. 1851, non Lindl., 1842. ***Schoenorchis filiformis*** (Wight) Schltr., Fedde. Repert. Beih. 1: 986. 1913. *nom. illeg.*; Abraham & Vatsala, Intr. Orch. 475. 1981 ***Saccolabium filiforme*** Lindl., J. Linn. Soc. 3: 36. 1859; Hook. f., Fl. Brit. India 6: 56. 1890; Fischer in Gamble, Fl. Pres. Madras 1446. 1928 [Fig. 68 C].

Pendulous epiphytes, to 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 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

Fig. 68. **A.** *Habenaria periyarensis* Sasidharan, Rajesh *et* Jomy:
**B**. *Oberonia anamalayana* Joseph;
**C**. *Seidenfadeniella chrysantha* (Alston.) Sathish.

7 x 1.5-4 mm, 3-lobed, lateral lobes rounded, orbicular; midlobe ovate, acute, papillate, deflexed; spur 5.5 x 1-2 mm, inflated, laterally compressed, rounded at base, thickened on backwall; column short and broad; foot 0; pollinia 2, entire.

*Fl.* : May-June

*Distr.* : Southern Western Ghats and Sri Lanka. Rare; in evergreen forests. Kottamala, *JA & KPR 15361.*

## 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 petioled, oblong-lanceolate; epichile of lip obscurely bifid at apex.....**S. lanceolata**
1. Leaves subsessile, broadly oblong, ovate or sub-rotund; epichile acute.....**S. latifolia**

**Sirhookera lanceolata** (Wight) O. Ktze., Rev. Gen. Pl. 681. 1891; Sald. in Sald. & Nicols., Fl. Hassan Dist. 848. 1976; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 266. 1981; Abraham & Vatsala, Intr. Orch. 258. 1981; Manilal, Fl. Silent Valley 305. 1988. ***Josephia lanceolata*** Wight, Ic. t. 1753. 1851; Hook. f., Fl. Brit. India 5: 823. 1890; Fischer in Gamble, Fl. Pres. Madras 1428. 1928.

Epiphytic stemless herbs. Leaves 13 x 3.5-4 cm, including 4-5 cm long; petiole, elliptic-oblong or oblanceolate-oblong, subacute at apex. Flowers white, in 20-25 cm long, compound racemes; branches slender; dorsal sepal 3 x 2.9 mm, elliptic-obtuse, 3-veined; lateral sepals 3 x 1.5 mm, oblong, obtuse, 3-veined; petals 3 x 1 mm, oblanceolate, obtuse, 1-veined; lip 35 x 1.5-2 mm, panduriform, 3-lobed; lateral lobes short, blunt; midlobe elliptic-oblong, bifid at apex.

*Fl.* : August

*Distr.* : South India and Sri Lanka. Common; in evergreen forests. Pachakkanam, *JA 12331.*

**Sirhookera latifolia** (Wight) O. Ktze., Rev. Gen. Pl. 681. 1891; Sald. in Sald. & Nicols., Fl. Hassan Dist. 848. 1976; Jayaw. in Dassan. & Fosb., Rev. Hand. Fl. Ceylon 2: 268. 1981; Manilal, Fl. Silent Valley 305. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 454. 1996. ***Josephia***

*latifolia* Wight, Ic. t. 1743. 1851; Hook. f., Fl. Brit. India 5: 823. 1890; Fischer in Gamble, Fl. Pres. Madras 1428. 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 4 x 2 mm, 3-lobed; lateral lobes smaller, oblong, obtuse, incurved; midlobe ovate, obtuse or acute.

*Fl.* : August-September

*Distr.* : Southern Western Ghats and Sri Lanka. Fairly common; in evergreen forests. Koruthodu, *JA 12264*; Pachakkanam, *KPR 14384;* Kottamala, *JA 13982.*

## SMITHSONIA Saldanha

J. Bombay. Nat Hist. Soc. 71: 75. 1975

**Smithsonia viridiflora** (Dalz.) Sald., J. Bombay. Nat Hist. Soc. 71: 75. 1975 & in Sald. & Nicols., Fl. Hassan Dist. 851. 1976. ***Micropera viridiflora*** Dalz., Hook.'s J. Bot. Kew. Gard. Misc. 3: 282. 1851. ***Sarcochilus dalzellianus*** Sant., Kew Bull. 1949: 498. 1949. ***Gastrochilus dalzellianus*** (Sant.) Sant. & Kapad., J. Bombay Nat. Hist. Soc. 59. 842. 1963.

Epiphytes; stem very short, to 1 cm high. Leaves 3-10 x 6-15 cm, oblong or elliptic-oblong, obliquely bilobulate at apex. Flowers greenish, in 1-1.5 cm long lateral raceme; sepals obovate, obtuse; petals 5.5 x 2, obovate, obtuse; lip 7 x 5 mm, 3-lobed; spurred; lateral lobes conical, obtuse; midlobe ovate, obtuse; spur conical, subacute.

*Fl.* : March-April

*Distr.* : Southern Western Ghats, endemic. Very rare; in evergreen forests. Koruthodu, *JA 13464.*

## SPIRANTHES Richard

Mem. Mus. Hist. Nat. 4: 42, 50, 58. 1818, *nom. cons.*

**Spiranthes sinensis** (Pers.) Ames, Orch. 2: 53. 1908; Fischer in Gamble, Fl. Pres. Madras 1454. 1928; Seidenf., Dansk Bot. Ark. 32: 105. 1978; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 312.1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1558. 1983; Manilal, Fl. Silent Valley 305. 1988. ***Neottia sinensis*** Pers., Syn. 2: 511. 1807. ***Neottia australis*** R. Br., Prodr. 319. 1810. ***Spiranthes australis*** (R. Br.) Lindl., Bot. Reg. 9. 1923; Hook. f., Fl. Brit. India 6: 102. 1890. ***S. lancea*** non (Thumb.) Baker, 1951; sensu Abraham & Vatsala, Intr. Orch. 206. 1981.

Terrestrial herbs, to 50 cm tall, with fleshy tuberous roots. Leaves 3-4, radical, 10-18 x 0.5-1 cm, oblanceolate-linear, acute. Flowers yellowish-white, in 20-30 cm long glandular, slender, spirally twisted spikes; bracts 6 x 1.6 mm, lanceolate, acuminate, 3-veined; dorsal sepal oblong-lanceolate, obtuse, 3-veined; lateral sepals subfalcate, linear-oblong, obtuse, 1-veined; petals oblong, obtuse, 1-veined; lip 4 x 2 mm, sides incurved, apex obcordate, papillate, base with 2 fleshy globose calli.

*Fl.* : April-May

*Distr.* : South East Asia and Australia. Rare; in grasslands. Uppupara *JA & KPR 14988.*

## **TAENIOPHYLLUM** Blume

Bijdr. 6: t. 3, f. 70. 1825.

**Taeniophyllum scaberulum** Hook. f., Fl. Brit. India 6: 77. 1890; Fl. Madras 1448. 1928; Rajesh *et al.*, Rheedea 7: 43-46. 1997 [Figs. 69 & 71 A].

Leafless epiphytic herbs, roots subterete, 5-8 x 0.1 cm. Flowers creamy white, 4 x 2 mm, in 1.5-2 cm long, flexuous spikes; bracts 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.

*Fl.* : February-June.

*Distr.* : Southern Western Ghats, endemic. Rare; in moist deciduous forests. Thekkady, *JA & KPR 16214, 16831.*

*Note* : This species was first collected in 1854 and considered extinct. The present collection is a rediscovery after a gap of more than 140 years (Rajesh, *et al., 1997*).

## **TAINIA** Blume

Bijdr. 354. 1825.

**Tainia bicornis** (Lindl.) Reichb. f., Bonplandia 5: 54. 1857; Hook. f., Fl. Brit. India 5: 820. 1890; Fischer in Gamble, Fl. Pres. Madras 1427. 1928; Seidenf. & Smitin., Orch. Thailand 743, t. 553. 1966; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 149. 1981; Manilal, Fl. Silent Valley 306. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 455. 1996. ***Ainia bicornis*** Lindl. in Edward's Bot. Reg. 28: 37. 1842; Wight, Ic. t. 914. 1844-1845.

Terrestrial herbs, to 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,

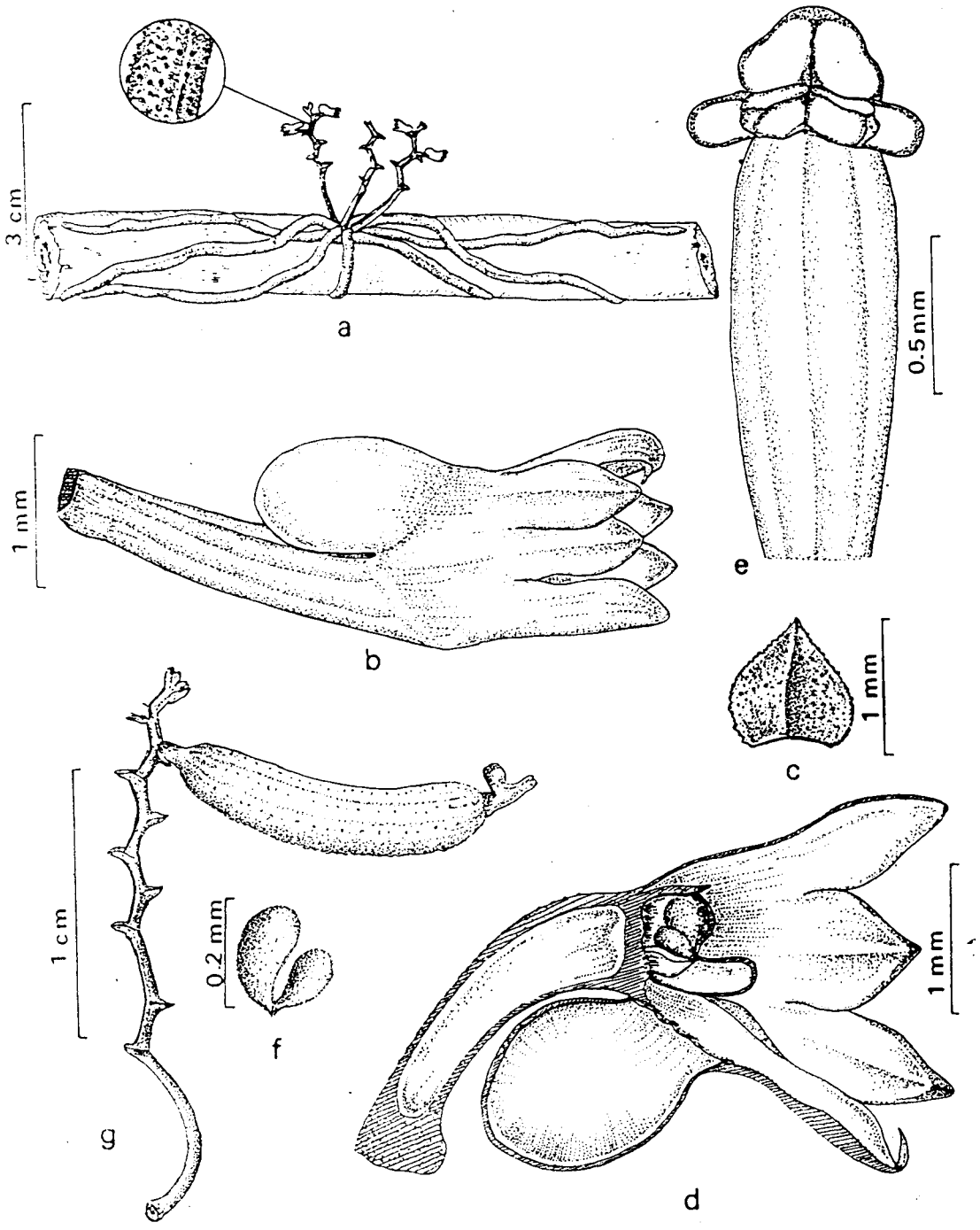



Fig. 69. *Taeniophyllum scaberulum* Hook. f.: **a.** habit; **b.** flower; **c.** bract; **d.** flower-L.S.; **e.** column; **f.** pollinia; **g.** fruit.

3-5-veined; petals linear-lanceolate, falcate, subacute, 3-7-veined; lip 18 x 1-9 mm, 3-lobed; lateral lobes ovate, obtuse; midlobe, obcordate or emarginate; disc with 3 parallel ridges.

*Fl.* : November-December

*Distr.* : South India and Sri Lanka. Occasional; in evergreen forests. Mlappara, *JA 13348.*

## **THELASIS** Blume

Bijdr. 8: 385. 1825.

**Thelasis pygmaea** Lindl., Bijdr. 385, t. 75. 1825; Hook. f., Fl. Brit. India 6: 86. 1888; King & Pantl., Ann. Roy. Bot. Gard. Calcutta 8: t. 331. 1898; Fischer in Gamble, Fl. Pres. Madras 3: 1450. 1928. ***Euphorboscis pygmaea*** Griff., Calcutta J. Nat. Hist. 5: 372, t. 26. 1845; Wight, Ic. t. 1732. 1851.

Epiphytes, 7-8 cm high, pseudobulb subglobose, 1-1.5 x 1 cm. Leaves 6.5 x 0.8-0.9 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 1.8 x 1.2 mm, 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 x 1-1.1 mm, oblong, acute, with orbicular small side lobes, 3-veined, glandular.

*Fl.* : March-April

*Distr.* : India and Nepal. Very rare; in evergreen forests. Arjunankotta, *JA 15100.*

## **TRIAS** Lindley

in Wallich, Cat. 1977. 1829.

Epiphytes with ovoid or subglobose pseudobulb, distantly placed on stout rhizome. Leaves, solitary, elliptic, acute. Flowers pinkish, one or two from the base of pseudobulb in short raceme; sepals similar, dorsal sepal free, laterals adnate to column foot; petals triangular, ovate, usually smaller than sepals; lip oblong obtuse, curved; column winged above; pollinia 4, paired.

1. Flowers 2 cm across; sepals 9-veined; petals broadened at base, shorter than column, 3-veined; lip glabrous.....**T. bonaccordensis**
1. Flowers less than 1-1.5 cm across; sepals 7-veined; petals narrowed, longer than the column, 1-veined; lip papillose on epichile region.....**T. stocksii**

**Trias bonaccordensis** Sathish., Blumea 34. 103. 1989.

Pseudobulb globose, 8-12 x 7-9 mm, distantly placed on stout rhizome. Leaves 2.5-3.5 x 1-1.5 cm, elliptic, acute, subsessile. Flower dull pink, 3 x 2 cm, solitary from the base of

pseudobulb; dorsal sepal 13 x 11 mm, ovate, obtuse, 9-veined; petals 3.5 x 2.5 mm, triangular at base, ovate, linear, acute, 3-veined; lip 12 x 5 mm, oblong, obtuse, slightly curved; column 5-6 x 3-5 mm, broadly winged; column teeth acute; foot 10 x 2-3 mm, slightly curved; operculum 4.2 x 2 including the 3.8 mm long prolongation, papillate at apex.

*Fl.* : December

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Melmala, *JA & KPR 14457.*

**Trias stocksii** Benth. ex Hook. f., Fl. Brit. India 5: 781. 1890; Sant. & Kapad., Orch. Bombay 200.1966; Manilal, Fl. Silent Valley 306.1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 455. 1996.

Pseudobulb subglobose, 1.5 x 1.5 cm, distantly placed on stout rhizome. Leaves solitary, 2.5-3.5 x 1.5 cm, elliptic, acute with 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 4 x 1 mm, oblong, acute, fleshy, puberulus; column 3 x 1.5 mm; wing oblong, truncate; stelidia minute, pointing; foot 2.8 x 1.8-2 mm; operculum 2.5 x 0.8 mm, including 1.5 mm long prolongation.

*Fl.* : December-January

*Distr.* : Southern Western Ghats. Occasional; in evergreen forests. Arjunankotta, *JA 13145.*

## **TRICHOGLOTTIS** Blume

Bijdr. 6: t. 3. 1825.

**Trichoglottis tenera** (Lindl.) Schltr., Bull. Herb. Boiss. (Ser. 2) 6: 471. 1906; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 238, f. 105. 1981; Manilal, Fl. Silent Valley 306. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 455. 1996. ***Oeceoclades tenera*** Lindl., Gen. Sp. Orch. 236. 1833; Wight, Ic. t. 1683. 1851. ***Cleisostoma tenerum*** (Lindl.) Hook. f., Fl. Brit. India 6: 73. 1890; Fischer in Gamble, Fl. Pres. Madras 1448. 1928 [Fig. 70].

Epiphytes, to 60 cm high, stem terete, woody, scandent. Leaves 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 x 7.5 mm, 3-lobed; lateral lobes oblong, lanceolate, obtuse; midlobe ovate, obtuse, 3-lobuled, rounded; spur 3 x 1 mm, cylindrical; column and foot very short; pollinia 2.

*Fl.* : April-May

*Distr.* : India ad Sri Lanka. Fairly common; in evergreen shola forests. Sunderamala, *JA 13585*; Uppermanalar, *JA, NS & KPR 15025.*

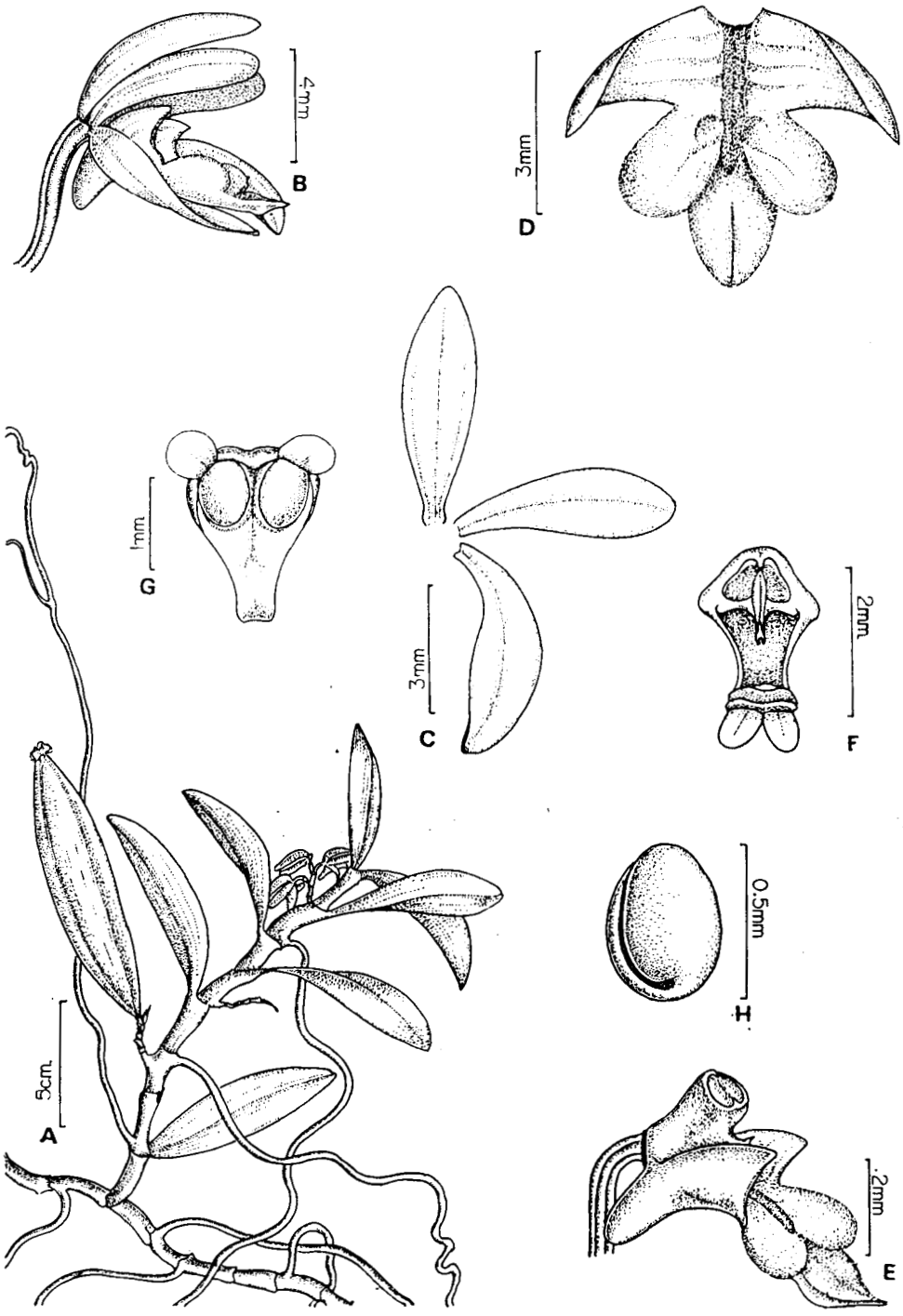



Fig. 70. *Trichoglottis tenera* (Lindl.) Schltr.: **A**. habit; **B**. flower; **C**. sepals; **D**. labellum; **E**. labellum-attached view; **F**. column; **G**. pollinarium; **H**. pollinium.

## **TROPIDIA** Lindley

in Wallich, Cat. 7376. 1831.

**Tropidia angulosa** (Lindl) Bl., Coll. Orch. Arch. Ind. 122. 1858; Hook. f., Fl. Brit. India 6: 92. 1890; Fischer in Gamble, Fl. Pres. Madras 1452. 1928; Seidenf., Dansk. Bot. Ark. 32: 108. 1978; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1556. 1983; Manilal, Fl. Silent Valley 307. 1988. ***Cnemidia angulosa*** Lindl., Bot. Reg. 19: t. 1618. 1833.

Terrestrial woody herbs, to 30 cm tall; stems sheathed below the leaves. Leaves 2 or 3, towards apex, 10 x 6 cm, elliptic, acute, sessile, membranous. Flowers white, in 8-10 cm long, in many-flowered terminal spike; bracts 21 x 1 mm, 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 20 x 1 mm, obpanduratus, obtuse; spur cylindric; column short; pollinia 2, clavate.

*Fl.* : August-September

*Distr.* : India & Burma. Very rare; in evergreen forests. Sabarimala, *JA 12374.*

## **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. Flowers greyish-green, 1 or 2; peduncle 10 cm long; mid-lobe of lip ovate, retuse.....**V. thwaitesii**
1. Flowers pinkish, many; peduncle 10-15 cm long, branched; lip obconical, emarginate.....**V. testacea**

**Vanda testacea** (Lindl.) Reichb. f., Gard. Chron. 2: 166. 1877; Sant. & Kapad., Orch. Bombay 219.1966; Abraham & Vatsala, Intr. Orch. 436,f.128.1981; Seidenf. in Matthew, Fl. Tamil Nadu Carnatic 3(2):1599.1983; Manilal, Fl. Silent Valley 307. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 456.1996. ***Aerides testacea*** Lindl., Gen. Sp. Orch. 238.1833. ***A. wightiana*** Lindl., Edward's Bot. Reg. 30: Misc. 57. 1844; Hook. f., Fl. Brit. India 6:50. 1890; Fischer in Gamble, Fl. Pres. Madras 1444.1928; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2:215.1981 [Fig. 71 B].

Stem stout, woody, to 25 cm high. Leaves 9-16 x 1 cm, strap-shaped, keeled, unequally lobed at apex. Flowers pinkish, in 10-15 cm long, few-branched erect, raceme; dorsal sepal obovate-

Fig. 71. **A**. *Taeniophyllum scaberulum* Hook. f.;
**B**. *Vanda testacea* (Lindl.) Reichb.

oblong or spathulate, obtuse, 5-veined; lateral sepals elliptic-subacute, 5-veined; petals spathulate, obtuse, 5-veined; lip 10 x 5 mm, 3-lobed; lateral lobes 3 x 1.5 mm, oblong, obliquely lanceolate, obtuse; midlobe 6.5 x 5 mm; obconical, emarginate, margins finely close-dentate, with 2 parallel fleshy ridges; spur cylindrical.

*Fl.* : April-May

*Distr.* : India, Sri Lanka and Burma. Fairly common; in moist deciduous forests. Koruthodu, *JA 13485*; Thekkady, *JA 13548.*

**Vanda thwaitesii** Hook. f., in Trim., Handb. Fl. Ceylon 4: 193. 1898; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 220. 1981. ***Aerides tessellatum*** sensu Thw., Enum. Pl. Zeyl. 305. 1861, non Wight, 1831 [Fig. 72].

Stem stout, woody, to 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 x 3.5 cm, in 9-10 cm long leaf-opposed racemes; dorsal sepal 21 x 11 mm, obovate, obtuse, margins wavy, 7-veined; lateral sepals 23 x 13 mm, elliptic, subacute, obtuse, margins wavy, 9-veined; petals 21 x 11 mm, obovate, obtuse, margins wavy, 7-veined; lip 20 x 18-20 mm, 3-lobed; lateral lobes 9 x 2-2.5 mm, oblong, lanceolate, acute, curved downwards; midlobe 15 x 13 mm, fleshy, broadly ovate, truncate at apex; lobules obtuse; medianly grooved; 2 bilobed calli at the mouth of the spur; spur 10 x 4-6 mm, conical, inflated, keeled, rounded.

*Fl.* April

*Distr.* : South India and Sri Lanka. Rare; in evergreen forests. Sabarimala, *JA 15083.*

*Note* : This Sri Lankan endemic species was considered extinct in its home country. Recently it was relocated from Manantody in Wyanad district by C. Sathish Kumar (1998).

## **VANILLA** Miller

Gard. Dict. Abr. ed. 4. 1754.

**Vanilla aphylla** Bl., Bijdr. 422. 1825; Seidenf., Dansk Bot. Ark. 32: 138. 1978; Sathish Kumar & Manilal, Amer. Orch. Soc. Bull. 62: 395. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 456. 1996. *V. **parishii*** Reichb. f., Otia Hamb. 1: 39. 1878; Hook. f., Fl. Brit. India 6: 90. 1890.

Climbing herbs, to 10 m or more high; stem green, 1-1.5 cm in diameter, terete, leafless. Scales 1.5-2 cm long, lanceolate. Flowers yellow, with pinkish disc, to 3.5 cm long, in axillary racemes; bracts 4 x 5 mm, ovate, acute, pedicel 2.5 cm long; dorsal sepal obovate, obtuse at apex, 11-veined; lateral sepals sub-falcately obtuse, apiculate at apex, 14-veined; petals elliptic, obtuse, 15-veined; lip 2.6 x 2 cm, 3-lobed; side lobes oblong, obtuse, crenulate; midlobe

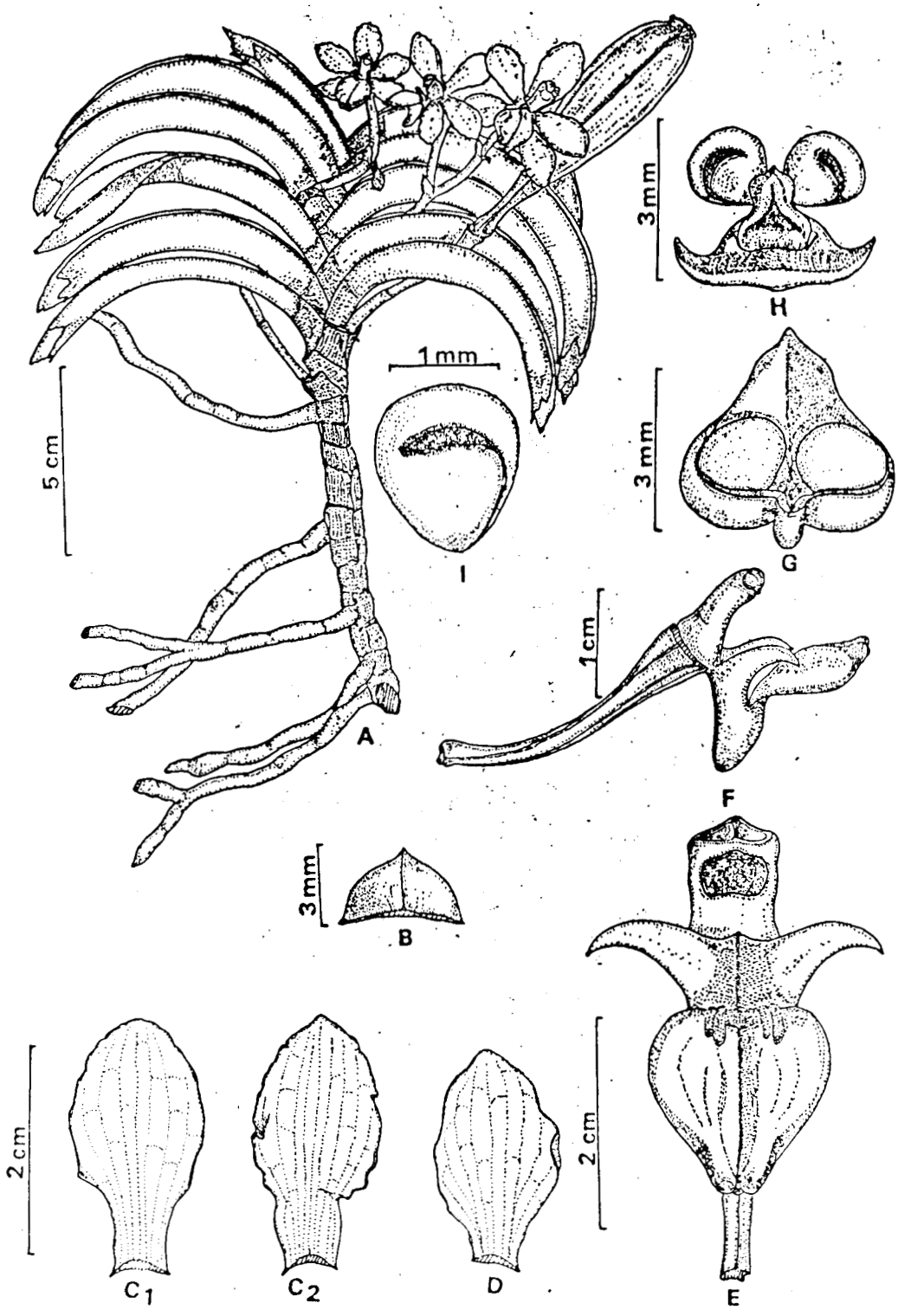



Fig. 72. *Vanda thwaitesii* Hook. f.: **A.** habit; **B.** bract; **$C_1$. & $C_2$.** lateral sepals; **D.** petal; **E.** lip and column - front view; **F.** lip and column - side view; **G.** operculum; **H.** pollinaria.

triangular with a tuft of violet tipped hairs, branched at apex; disc with batch of fat, many lobed overlapping scales in the center; column elongate; foot 0; pollinia 4, free.

*Fl.* February-March

*Distr.* : South India, endemic. Occasional; in semi-evergreen and evergreen forests. Koruthodu, *JA & KPR 14773.*

## **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. Lobules of lip irregularly toothed along outer margins ..... **Z. longilabris**
1. Lobules of lip not toothed ..... 2
2. Lip with yellow base ..... **Z. flava**
2. Lip with greyish base ..... **Z. cladestina**

**Zeuxine cladestina** Bl., Coll. Orch. Arch. Ind. 70. t. 39. 1958; Seidenf., Dansk Bot. Ark. 32: 88. 1978.

Stem to 30 cm high. Leaves elliptic, acute. Flowers whitish, 10 x 2 mm; bracts 6 x 1.9 mm, lanceolate, acuminate, margins erose, 1-veined; sepal similar, 3.5 x 2 mm, ovate, obtuse, 1-veined; lateral sepals 3.5 x 2 mm, ovate, obtuse, 1-veined; petals 3.5 x 1 mm, falcate, linear, obtuse, 1-veined; lip 5 x 4.2 mm; midlobe squarish, 2.5 x 2 mm; sac with two backwardly curved gland.

*Fl.* March-April.

*Distr.* : Southern Western Ghats. Very rare; in evergreen forests. Melmala, *JA & KPR 14473.*

**Zeuxine flava** (Wall ex Lindl.) Benth. ex Hook. f., Fl. Brit. India 6: 108. 1890. ***Etaeria flava*** Lindl., Wall. Cat. 7380, A & B, non C, 1832. *nom. nud.*; ***Monochilus flavum*** Wall. ex Lindl., Gen. & Sp. Orch. 437. 1840.

Stem to 36 cm high, rhizome creeping, 5-10 cm long. Leaves 5 x 2 cm, elliptic, acute; petiole 2 cm long, sheathed. Flowers white with orange base, in 5-10 cm long, dense spike; peduncle 15-18 cm long; bracts 10 x 45 mm, ovate, acuminate, 3-veined; dorsal sepal ovate-lanceolate, obtuse, 1-veined; lateral sepals elliptic, obtuse, 3-veined; petals subfalcate, oblong, obtuse, 1-

veined; lip 3 x 1.5-3.5 mm; midlobe 2-lobuled, each 1.5 x 1-1.8 mm, 'T' shaped on spreading, squarish; hypochile saccate, with backwardly curved glands; margins of mesochile incurved.

*Fl.*: February-March

*Distr.* : Southern Western Ghats. Occasional; in evergreen forests. Thekkady, *JA & KPR 14821;* Mangaladevi, *JA 17183.*

**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. 1928; Sald. in Sald. & Nicols., Fl. Hassan Dist. 855. 1976; Seidenf., Dansk Bot. Ark. 32: 91. 1978; Jayaw. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 319. 1981; Manilal, Fl. Silent Valley 308. 1988. ***Monochilus longilabris*** Lindl., Gen. Sp. Orch. 478. 1840.

Stem to 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 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 12 x 1.5-9 mm, saccate at base with, bilobed, backwardly curved glands inside; epichile 8 x 3.5 mm, 2-lobuled, each elliptic-oblong, falcate, with dentate margins.

*Fl.* March-April

*Distr.* : South India and Sri Lanka. Occasional; in semi-evergreen forests. Thekkady, *JA 13628.*

## 128. ZINGIBERACEAE

Lindl., Key Bot. 69. 1835.

1. Ovary 1-celled; placentation parietal ..... **Globba**
1. Ovary 3-celled; placentation axile ..... 2
2. Leaves spiral; filaments of stamen petalloid ..... **Costus**
2. Leaves distichous; staminal filaments not petalloid ..... 3
3. Anthers spurred at base; bracts curved out ..... **Curcuma**
3. Anthers not spurred at base; bracts not as above ..... 4
4. Inflorescence lateral, usually arising directly from rhizome ..... 5
4. Inflorescence terminal on leafy stem ..... 8
5. Flowers in lax trailing panicle ..... **Elettaria**
5. Flowers in dense strobilioid spike ..... 6
6. Anthers parallel, connective produced into a long tail at apex ..... **Zingiber**
6. Anthers diverging towards the apex, connective not developed into a tail ..... 7

7. Connectives developed into a broad crest.....**Amomum**

7. Connectives not developed .....**Alpinia abundiflora**

8. Inflorescence a panicle or raceme.....**Alpinia** (p.p.)

8. Inflorescence strobiloid spike.....9

9. Spike 1-sided; sheath saccate.....**Boesenbergia**

9. Spike radiate; sheath otherwise.....**Hedychium**

## **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. Inflorescence a globose spike on an erect leafless peduncle from rhizome.....**A. abundiflora**

1. Inflorescence a terminal panicle or raceme on leafy stem.....2

2. Fruit black; bracteoles closed; labellum reddish.....**A. nigra**

2. Fruit orange; bracteoles open; labellum white.....**A. galanga**

**Alpinia abundiflora** Burtt & Smith, Notes Roy. Bor. Gard. Edinburgh 34: 179. t. 5. 1975; Mohanan & Henry, Fl Thiruvananthapuram 473, 1994. ***Amomum involucratum*** *auct.* non Benth. ex Trimen, 1885: Fischer in Gamble, Fl. Pres. Madras 1487. 1928. **Vainokki elam**.

Leafy stem *ca.* 2 m high, erect, densely clumped. Leaves to 30 x 6 cm, oblong-lanceolate, acute at either ends, glabrous; petiole 1.5 cm long, channelled; ligule 5 mm long, rounded. Spike 7 x 6 cm, globose or oblong; peduncles 15-35 cm high, covered with sheaths; bracts 40 x 14 mm, elliptic, obtuse at apex, tomentose; bracteoles pubescent, lobes acute. Flowers densely packed; calyx tubular, lobes 2, acute, glabrous, corolla lobes equal, 10 mm long, glabrous; anthers 6 mm long, crest short, flat; lip 16 x 16 mm, orbicular, entire, yellow with red lines; ovary hairy; stigma with ciliate rim. Capsule yellow, 18 x 11 mm, ellipsoid, glabrous; seeds with vertical rows of epidermal cells.

*Fl. & Fr.* : January-May

*Distr.* : South India. Common; in evergreen forests at high elevations. Maddalakottithode, *JA 13747.*

**Alpinia galanga** (L.) Sw., Obs. 2. 1791; Baker in Hook. f., Fl. Brit. India 6: 253. 1892; Fischer in Gamble, Fl. Pres. Madras 1492. 1928; Burtt & Smith in Dassan. & Fosb. Rev. Handb. Fl. Ceylon 4: 516. 1983; Mangaly & Sabu, Rheedea 2(1): 43. 1992. ***Maranta galanga*** L., Sp. Pl. 3. 1762. ***Alpinia rheedii*** Wight, Ic. t. 2026. 1853. **Arathha** [Fig. 73 A].

Leafy stems clumped, erect, to 2.5 m tall; rhizome horizontal, to 3 cm thick, fragrant, light yellow inside. Leaves 30-40 x 10 cm, oblong, acute at apex, sessile, glabrous. Panicle 25 x 10 cm, densely branched, glabrous; bracts 1-2 cm long, chartaceous. Flowers 2-4 in a bract; calyx 1 cm long, glabrous; corolla greenish-white, lobes oblong, obtuse; lip 2 cm long, obovate, emarginate, long-clawed; ovary glabrous. Capsule 1 cm across, globose, hispid.

*Fl. & Fr.* : July-February

*Distr.* : South east Asia. Common; near water source in semi-evergreen and moist deciduous forests. Thaannikkudy, *JA 12155.*

*Ethnobotanical use* : Mannans use the rhizome for fungal infections; juice from the rhizome is extracted and applied externally.

**Alpinia nigra** (Gaertn.) Burtt, Notes Roy. Bot. Gard. Edinburgh 35: 213. 1977; Burtt & Smith, in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 516. 1983; Mangaly & Sabu, Rheedea 2(1): 48. 1992. ***Zingiber nigrum*** Gaertn., Fruct. 1: 35, t. 12. 1788. ***Alpinia allughas*** Rosc., Trans. Linn. Soc. London 8: 346. 1807; Baker in Hook. f., Fl. Brit. India 6: 253. 1893; Fischer in Gamble, Fl. Pres. Madras 1493. 1928.

Leafy stem loosely clumped, 1.5-2 m high; rhizome horizontal to 2 cm thick, dull cream inside. Leaves 30-50 x 10 cm, oblong-lanceolate, acuminate, sparsely hairy below. Panicle less branched, to 15 cm long, slightly oblique to the stem, densely tomentose; bracts spathaceous. Flowers usually solitary in a bract; bracteoles tubular; calyx 1 cm long, hairy, split on one side; corolla yellowish, lobes 1.5 cm long, oblong, pubescent outside; lip 2.5 cm, obscurely 3-lobed; ovary densely pubescent. Capsule 2 cm across, glabrescent.

*Fl. & Fr.* : January-May

*Distr.* : Indo-Malesia. Common; in semi-evergreen forests at low elevations. Sabarimala, *JA & KPR 14990.*

## **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. Capsule 9-ribbed, white.....**A. pterocarpum**
1. Capsule echinate, brown.....2
2. Calyx lobes strongly cuspidate; lateral lobes of lip as large as middle lobe.....**A. muricatum**
2. Calyx lobes obtuse; lateral lobes of lip very short.....**A. cannicarpum**

**Amomum cannicarpum** (Wight) Benth., Gen. Pl. 3: 644. 1876; Baker in Hook. f., Fl. Brit. India 240. 1892; Fischer in Gamble, Fl. Pres. Madras 1487. 1928; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 764. 1976; Manilal, Fl. Silent Valley 309. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 458. 1996. ***Elettaria cannicarpum*** 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 50 x 8 cm, oblong-lanceolate, acuminate, glabrous, nearly sessile, lower leaves smaller; ligule 1 cm long, orbicular, reddish. Spike 1-few, to 16 cm long, obovoid; peduncles covered with imbricating bracts; basal empty bracts 3.5 cm long, ovate, obtuse, formed into sheath at base, reddish brown; bracteoles 2 cm long, tubular. Flowers one or two in a bract; calyx lobes obtuse; corolla lobes equal, 2 x 1 cm, obtuse, glabrous. Capsule 1.5 cm across, dark brown.

*Fl. & Fr.* : January-May

*Distr.* : South-Western India. Very common; in evergreen forests. Sabarimala, *JA 14962.*

**Amomum muricatum** Bedd., Madras J. Sci. (Ser. 3) 1: 59. 1864; Fischer in Gamble, Fl. Pres. Madras 1487. 1928; Manilal, Fl. Silent Valley 310. 1988; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 27. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 458. 1996.

Leafy stem 1.5-3 m high, densely clumped, erect, straight. Leaves 30 x 7 cm, elliptic-oblong, acuminate, sessile, glabrous; ligule 3 mm long, truncate, Spike 2-5-together, 14-15 cm long, shortly peduncled; floral bracts 3.5 x 1.5 cm, obovate, obtuse, ciliate; yellow with brown lines; bracteoles 2 cm long, lobes obtuse. Flowers densely packed; calyx tube 2.5 cm long, lobes obtuse, cuspidate; corolla tube 2.8 cm long, lobes unequal, to 3 x 1.8 cm, oblong, obtuse, yellow with red lines; anthers 9 mm long, crest, 15 mm broad, auriculate; lip 4 x 3 cm; middle lobes emarginate, yellow, with brown streaks. Capsule 1.5-2 cm across, brown.

*Fl. & Fr.* : January-June

*Distr.* : Endemic to Western Ghats. Very Common; in evergreen forests. Kallidamkunnu, *KPR & JA 16225.*

**Amomum pterocarpum** Thw., Enum. Pl. Zeyl. 317. 1861; Baker in Hook. f., Fl. Brit. India 6: 241. 1892; Burtt & Smith in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 523. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 27. 1989. ***A. microstephanum*** Baker in Hook. f., Fl. Brit. India 6: 239. 1892; Fischer in Gamble, Fl. Pres. Madras 1487. 1928; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 764. 1976; Manilal, Fl. Silent Valley 310. 1988; Nayar & Sastry, Red Data Book Indian Pl. 2: 249. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 458. 1996.

Stem to 2 m high, clumped, erect; rhizome to 4 cm thick, old ones blue inside. Leaves to 50 x 12 cm, elliptic-oblong, acute at either ends, glabrous, usually clustered towards the apex; petiole 3 cm long; ligule 3 mm long, whitish. Spikes 5-15 cm long, 3-4 together, bracts 6-7 x 4 cm, broadly elliptic, obtuse, pale pink. Flowers solitary in a bract; lip 4 x 3 cm, obovate, white with yellow centre. Capsule 3 cm long, glabrous; wings 3-8 mm broad, entire.

*Fl. & Fr.* : January-May

*Distr.* : South India and Sri Lanka. Very common; in evergreen and semi-evergreen forests. Thekkady, *KPR & JA 15244.*

## **BOESENBERGIA** O. Kuntze

Rev. Gen. Pl. 2: 685. 1891.

**Boesenbergia pulcherrima** (Wall.) O. Ktze., Rev. Gen. Pl. 2: 685. 1891; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 766. 1976; Mangaly & Swarup., Bull. Bot. Surv. India 23: 235. 1981; Burtt. & Smith in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 508. 1983; Manilal, Fl. Silent Valley 310. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 458. 1996. ***Gastrochilus pulcherrima*** Wall., Pl. Asiat. Rar. 1:22, t. 24. 1829; Baker in Hook. f., Fl. Brit. India 6:217.1890 [Fig. 73 B].

Suberect herbs, to 15-25 cm long. Leaves few, scattered, to 13 x 6 cm, broadly elliptic, acute at both ends, thinly tomentose beneath; petiole to 2 cm long; sheath saccate. Spike to 5 cm long, terminal, one sided; bracts 20 x 8 mm, obovate, obtuse; bracteoles tubular, deeply cleft to the base. Flowers solitary in each bracts; calyx tube short, truncate; corolla tube 15 mm long; lobes equal, 10 x 4 mm, oblong; lip 20 x 15 mm, obovate, acute, white with brown spots; lateral staminodes 10 x 5 mm obovate; filaments 2 mm long; anthers parallel, not crested; ovary 3-celled, oblong; ovules few; style filiform. Fruit an oblong capsule.

*Fl. & Fr.* : July-November

*Distr.* : Endemic to South India. Fairly common; in evergreen forests at low elevations. Koruthode, *JA 12205.*

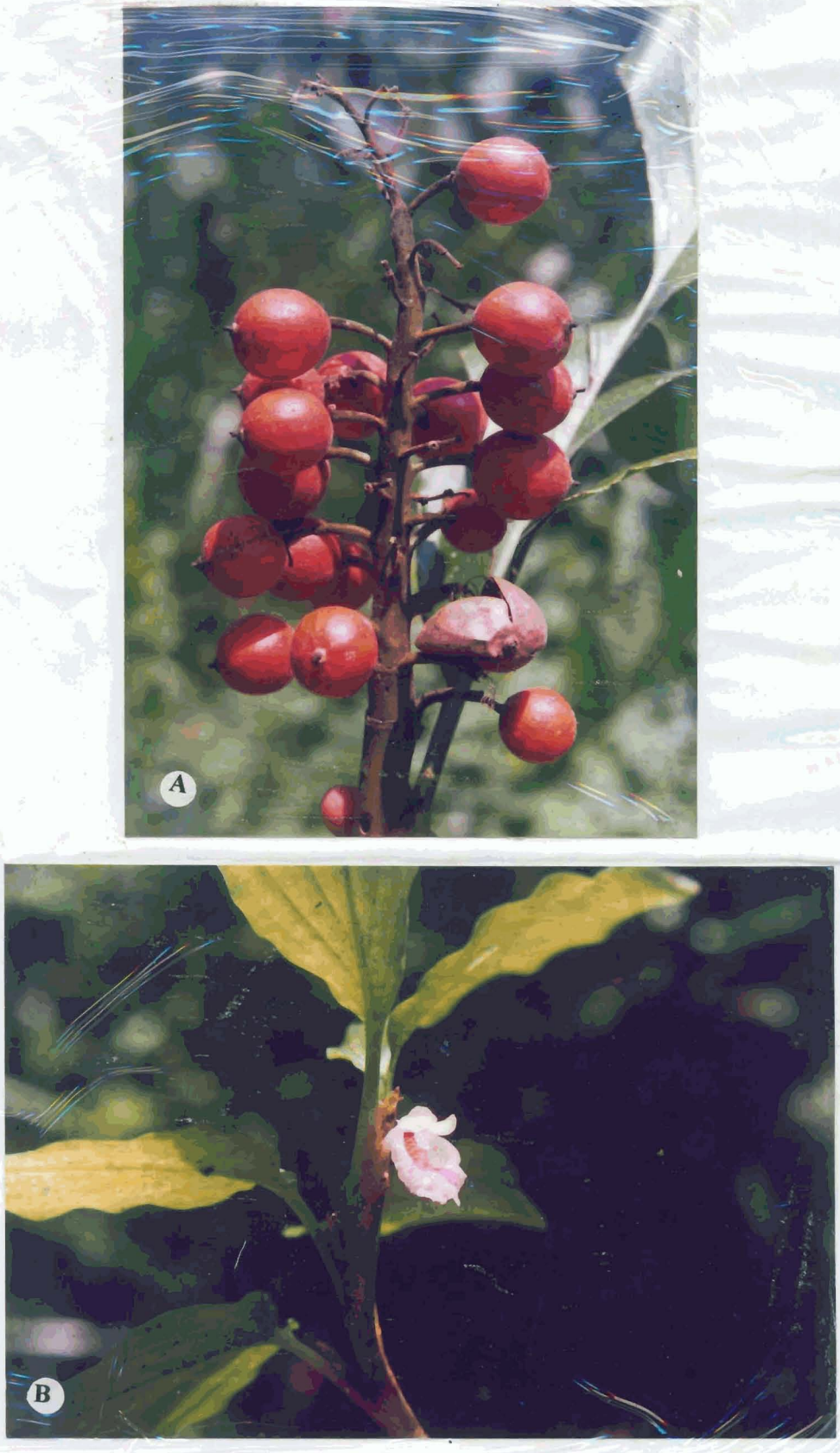



Fig. 73. A. *Alpinia galanga* (L.) Sw.;
B. *Boesenbergia pulcherrima* (Wall.) O. Ktze.

## COSTUS Linnaeus

Sp. Pl. 2. 1753

**Costus speciosus** (Koenig) Smith, Trans. Linn. Soc. London 1: 249. 1791; Baker in Hook. f., Fl. Brit. India 6: 249. 1892; Fischer in Gamble, Fl. Pres. Madras 1490. 1928; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 770 1976; Maas, Blumea 25(2): 546. 1979; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1613. 1983; Burtt & Smith in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 91. 1983; Manilal, Fl. Silent Valley 311. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 459. 1996. ***Banksea speciosa*** Koenig in Retz., Obs. 3: 75. 1783. **Kottam** (Mannan).

Stem 1-2 m tall, fleshy; rhizome horizontal, cylindrical. Leaves spiral, to 25 x 6 cm, oblong, acute, sessile, glabrous. Spike strobilioid, terminal, to 10 x 7 cm; bracts 3 cm long, oblong, mucronate, bright red. Flowers solitary in each bract, calyx 2 cm long, tubular; corolla 3-lobed, pinkish-white; lip 5 cm across, orbicular, white with yellow centre, entire; staminal filaments petalloid; anthers parallel. Capsule globose, reddish; seeds few, angled.

*Fl. & Fr.* : December-January

*Distr.* : Indo-Malesia. Common; in semi-evergreen forests at low elevations. Thekkady, *JA 13844.*

*Ethnobotanical use* : The fresh stem is heated to a bearable warmth and is twisted to extract the juice. One drop of this juice is good for eye disease.

## 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. Spikes arising from the centre of leaves; roots not ending in tubers.....2

1. Spikes lateral; roots ending in tubers.....4

2. Leaves pubescent; rhizome not fragrant.....3

2. Leaves glabrous; rhizome fragrant.....**C. aromatica**

3. Calyx tube deeply split at one side, hairy; lip entire.....**C. coriacea**

3. Calyx tube not as above, glabrous; lip deeply divided at apex.....**C. montana**

4. Leaves with reddish-brown patches along the midrib above, glabrous.....**C. zedoaria**

4. Leaves without reddish-brown patches above, pubescent.....**C. haritha**

**Curcuma aromatica** Salisb., Parad. Lond. t. 96. 1807; Wight, Ic. t. 2005. 1853; Baker in Hook. f., Fl. Brit. India 6: 216. 1890; Fischer in Gamble, Fl. Pres. Madras 1483. 1928; Burtt. & Smith in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 503. 1983; Manilal, Fl. Silent Valley 311. 1988; Mangaly & Sabu, Rheedea 3(2): 145. 1993. *Kasthoori manjal* (Mala Arayan).

Pseudostem with leaves 90-120 cm high; rhizome orange yellow inside. Leaves to 65 x 20 cm, elliptic, acute at either ends; petiole to 30 cm long; ligule membranous, obtuse. Spike 15-17 x 7 cm; crown purplish blue; bracts 4 x 3 cm, orbicular or obovate, yellowish green, tomentose. Flowers brownish-yellow; calyx 1.5 cm long, lobes obtuse, corolla lobes 1.2 x 0.8 cm, glabrous, brownish; anthers 4 mm long; tail 3.5 mm long, divaricating; lip yellowish, 1.5 x 1.5 cm, shallowly 3-lobed; midlobe emarginate; lateral staminode 1.2 x 1 cm.

*Fl. & Fr.* : August-December

*Distr.* : India and Sri Lanka. Occasional; in evergreen forests. Valiyakanam (Thekkady), *JA 13941.*

*Ethnobotanical use* : Rhizome of this is ground and pasted to skin for pimples (Mala Arayan, Mannan).

**Curcuma coriacea** Mangaly & Sabu, Notes Roy. Bot. Gard. Edinburgh 45: 429. 1989 & Rheedea 3: 148. 1993.

Rhizome very small, branching, yellowish-white inside. Leafy stem 30 to 40 cm high. Leaves 25 x 10 cm, elliptic, acuminate at either ends, densely tomentose on either surface; petiole to 3 cm long. Spike terminal, 12-13 x 3-4 cm; bracts 2.5 x 1.6 cm, ovate, obtuse, yellowish brown, pubescent. Flowers yellow; calyx tubular, hairy, deeply split on one side; corolla bright yellow, lobes unequal; lip 2 x 2 cm, 3-lobed; lobes rounded, deep yellow, ovary pubescent.

*Fl. & Fr.* : August-December

*Distr.* : South India and Sri Lanka. Rare; in moist deciduous forests. Thekkady, *JA 14118.*

**Curcuma haritha** Mangaly & Sabu, Rheedea 3: 152. 1993.

Rhizome pale yellow or white inside, branching with root tubers. Leaves 20-40 cm long, elliptic, acuminate, pubescent beneath. Spikes lateral, 15-18 x 4 cm, appearing before the leaves;

peduncle 14 cm long; bracts 4 x 2.5 cm, rounded at apex, pubescent, corona purple. Flowers few in each bracts; calyx 1.4 cm long, pubescent, lobes acute; corolla tube 3 cm long, glabrous, lobes 1.5 x 0.9 cm, oblong, obtuse, hairy, pale yellow; lip 2 x 1.7 cm, emarginate, or very obscurely 3-lobed, glabrous; lateral staminodes 2 x 1 cm, oblong, with a patch of glandular hairs at centre; anthers 6 mm long, glandular hairy; spur 3 mm long, acute, curved; ovary pubescent.

*Fl. & Fr.* : April-June

*Distr.* : Endemic to South India. Rare; in semi-evergreen forests. Vallakkadavu, *KPR & JA 15191.*

**Curcuma montana** Rosc., Trans. Linn. Soc. 8: 355. 1807; Baker in Hook. f., Fl. Brit. India 6: 214. 1890; Fischer in Gamble, Fl. Pres. Madras 1483. 1928; Mangaly & Sabu, Rheedea 3(2): 158. 1993.

Rhizome short, light yellow. Pseudostem to 30 cm high. Leaves 30 x 8 cm, elliptic, acute at either ends; petiole 6 cm long; sheath keeled, glabrous; ligule membranous, acute, glabrous. Spike terminal, 12 x 4 cm; bracts 3.5 x 1.5 cm, obovate, obtuse, purplish above, thinly pubescent. Flowers pinkish yellow; calyx tube 13 mm long, lobes truncate, glabrous; corolla tube 18 mm long, lobes unequal, larger lobes 2 x 0.8 cm, oblong, obtuse to shortly bifid at apex; lip 20 x 13 mm, obovate, deeply divided above, yellow; staminodes 1.3 x 0.7 cm, obovate, entire; anthers 5 mm long, spur divaricating, connective shortly producing; ovary pubescent.

*Fl. & Fr.* : June-August

*Distr.* : South India. Common; in grasslands. Vallakkadavu, *JA & KPR 14122.*

**Curcuma zedoaria** (Christm.) Rosc., Trans. Linn. Soc. London 8: 354. 1807; Baker in Hook. f., Fl. Brit. India 6: 210. 1890; Fischer in Gamble, Fl. Pres. Madras 1482. 1928; Burtt. & Smith in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 501. 1983; Mangaly & Sabu, Rheedea 3(2): 168. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 460. 1996.

Rhizome orange yellow inside; tubers ellipsoidal. Leafy stem 50-80 cm high. Leaves to 35 x 15 cm, elliptic, acute at both ends, deep blue patches along the midrib on both surfaces; petiole obscure; ligule 1 mm wide, membranous; sheath round. Spike lateral, 20-22 cm long, with a purple corona; peduncle to 10 cm long; bracts 5 x 3.5 cm, obovate, obtusely acute, deep purple at apex, glabrous; crown with acute bracts. Calyx 1.2 cm long, lobes obtuse; corolla lobes apiculate, pale yellow; lip 1.5 x 1.5 cm, orbicular, emarginate.

*Fl. & Fr.* : May-August

*Distr.* : Indo-Malaya. Common; in openings of evergreen forests at low elevations. Sabarimala. *JA 15181.*

## **ELETTARIA** Maton

Trans. Linn. Soc. London 10: 250. 1811.

**Elettaria cardamomum** (L.) Maton, Trans. Linn. Soc. London 10: 254. 1811; Baker in Hook. f., Fl. Brit. India 6: 251. 1892; Fischer in Gamble, Fl. Pres. Madras 1491. 1928; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 767. 1976; Burtt & Smith in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 529. 1983; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1616. 1983; Manilal, Fl. Silent Valley 312. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 460. 1996; ***Amomum cardamomum*** L., Sp. Pl. 1: 1. 1753. ***Alpinia cardamomum*** (L.) Roxb., Pl. Corom. 3: t. 226. 1819. **Kattelam**.

Rhizome branched, thick. Leafy shoots to 2 m high, tufted. Leaves bifarious, to 60 x 10 cm, elliptic-lanceolate, acute at either ends. Flowers in prostrate or erect, 30-50 cm long, panicles from the rhizome; bracts scarius, 3-4 cm long, carrying 2-7 flowers; calyx tubular, 1 cm long, split on 1 side; corolla white, tube equal to the calyx, lobes unequal, to 2 cm long, oblong; labellum 1 x 0.5 cm, obovate, white with red lines; stamen 1, filaments short; anther cells parallel, shortly spurred; staminodes short; ovary 3-celled, ovules many, style filiform, stigma funnel shaped. Capsule *ca.* 13 x 8 mm, ellipsoid, striate; seeds many, angular, fragrant.

*Fl. & Fr.* : Throughout the year

*Distr.* : South India and Sri Lanka. Occasional; in evergreen forests. Mlappara, *JA 16829.*

## **GLOBBA** Linnaeus

Mant. 2: 170. 1771.

**Globba marantina** L., Mant. Alt. 170. 1771; Baker in Hook. f., Fl. Brit. India 6: 206. 1890; Burtt. & Smith in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 499. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 462. 1996. ***Globba bulbifera*** Roxb., Asiat. Res. 11: 398. 1810; Baker in Hook. f., Fl. Brit. India 6: 206. 1890; Fischer in Gamble, Fl. Pres. Madras 1481. 1928; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 767. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1617. 1983; Manilal, Fl. Silent Valley 312. 1988.

Erect rhizomatous herbs; stem to 50 cm high, usually solitary, stem slender. Leaves bifarious, to 20 x 5 cm, oblong-lanceolate, acute at apex, sessile, glabrous. Spike terminal, to 10 cm long, often with bulbils towards the base; bracts 1-2 cm long, broadly ovate, greenish; bracteoles 1 cm long, ovate. Flowers solitary in each bracts; calyx 5 mm long, funnel shaped, 3-lobed; corolla 14 mm long, tube slender, lobes short, yellow; lip as long as the corolla, deeply 2-lobed, yellow; stamen 1, anthers broadly winged; lateral staminodes oblong; ovary 1-celled; ovules many on 3-parietal placentas; style 1, slender; stigma turbinate. Capsule 1 x 6 mm, oblong, glabrous, coarsely rugose.

*Fl. & Fr.* : July-December

*Distr.* : Indo-Malesia. Common; in moist deciduous forests. Thekkady, *JA 18462.*

## HEDYCHIUM Koenig

in Retzius, Observ. Bot. 3: 61. 1783.

Perennial herbs, rhizome thick and branching. Leafy stem clumped.; leaves bifarious, elliptic or oblong, ligulate. Flowers in strobilioid terminal spikes; bracts closely imbricating. Flowers 1-few-together; calyx tubular, usually split along one side; corolla tube slender, longer than calyx, lobes equal, linear; stamen 1, filaments narrow, anthers parallel, not crested; lip obovate, 2-lobed; lateral staminodes petalloid, broad; ovary 3-celled, ovules many; style slender; stigma hemispherical. Fruit a globose capsule, 3-valved; seeds arillate.

1. Bracts linear oblong, 0.5 cm wide; lobes of lip narrow, acuminate..... **H. venustum**
1. Bracts broadly ovate, 2 cm wide; lobes of lip broad, obtuse ..... 2
2. Leaves silky tomentose beneath; ligule 5 cm long ..... **H. flavescens**
2. Leaves thinly tomentose beneath; ligule 2 cm long..... **H. coronarium**

**Hedychium coronarium** Koenig in Retz., Obs. 3: 73. 1783; Baker in Hook. f., Fl. Brit. India 6: 225. 1892; Fischer in Gamble, Fl. Pres. Madras 1485. 1928; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 768. 1976; Burtt. & Smith in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 506. 1983; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1617. 1983; Manilal, Fl. Silent Valley 313. 1988.

Stem to 1.5 m high, robust, densely clumped; rhizome horizontal. Leaves to 30 x 10 cm, oblong, acuminate, glabrate; ligule 2 cm long, acuminate. Spike 15 x 7 cm, ovoid; bracts 5 x 2 cm, oblong, obtuse, glabrous. Flowers 2-4 in each bracts; calyx 4 cm long, not split, glabrous; corolla tube 9 cm long, narrow, glabrous, lobes 3.5 cm long, slender, glabrous; lip 6 x 6 cm; lobes emarginate, white; anthers 1.5 cm long, filaments shorter than lip.

*Fl. & Fr.* : All the season

*Distr.* : Indo-Malesia. Common; in damp shady localities in moist deciduous forests and margins of grasslands. Poonkavanam, *JA 14959.*

**Hedychium flavescens** Carey ex Rosc., Monandr. t. 50.1825; Wight, Ic. t. 2008.1853; Fischer in Gamble, Fl. Pres. Madras 1485.1928; Burtt & Smith in Dassan. &Fosb., Rev. Handb. Fl. Ceylon 4: 507. 1983; Manilal, Fl. Silent Valley 313. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 462. 1996. ***H. coronarium*** Koenig, var. ***flavescens*** (Rosc.) Baker in Hook. f., Brit. India 6:226. 1892.

Stem to 1.5 m high, robust, densely clumped. Leaves 40-50 x 8 cm, lanceolate, acuminate at apex, glabrous above; ligule acute, sparsely hairy. Spike 17 x 11 cm, ovoid; bracts 5 x 2.5 cm, closely imbricating. Flowers 2-6 in each bracts; calyx 4.5 cm long, split along one side; corolla tube 8 cm long, narrow, lobes linear oblong, 4 cm long, glabrous, filaments 5 cm long, narrow, anther 18 mm long, curved; lip 6 x 6 cm, lobes emarginate, sulphur yellow; lateral staminodes 5-6 x 2 cm, glabrous.

*Fl. & Fr.* : Throughout the year

*Distr.* : North-East Asia and Sri Lanka. Common; in damp shady places in moist deciduous forests. Cheriyakanam, *JA & KPR 16212.*

**Hedychium venustum** Wight, Ic. t. 2012. 1853; Baker in Hook. f., Fl. Brit. India 6: 226. 1892; Fischer in Gamble, Fl. Pres. Madras 1485. 1928; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 29. 1989.

Stem 60-120 cm high, oblique or suberect, densely clustered. Leaves to 40 x 12 cm, elliptic, caudate, base acute, glandular above, scarcely hairy below. Spike terminal, to 25 x 4-5 cm; bracts 2.5 x 0.5 cm, linear oblong, obtuse, glabrous, brownish, not closely placed. Flowers solitary in an axil; calyx 4.5 cm long, split on one side at apex, glabrous; corolla dull yellow, tube 4 cm long; lobes slender, 2.5 cm long; lip 2.5 cm long, acuminate, sulphur white, glabrous; anthers 1 cm long, divaricate at apex; ovary glabrous.

*Fl. & Fr.* : August-December

*Distr.* : Endemic to South India. Not common; along stream banks in semi-evergreen forests. Pachakkanam, *JA 12322.*

## **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. Rhizome purple or violet coloured; peduncles 3-5 cm long.....**Z. cernuum**
1. Rhizome yellow or colourless; peduncles 15 cm or more long.....2

2. Leaves to 4 cm broad, tip acuminate; bracts elliptic.....3

2. Leaves 8 cm broad, tip acute; bracts obovate or orbicular.....**Z. zerumbet**

3. Rhizome fragrant, 2-4 cm thick; leaves glabrous.....**Z. officinale**

3. Rhizome not fragrant, below 1 cm thick; leaves pubescent.....**Z. neesanum**

**Zingiber cernuum** Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 4: 342. 1852; Baker in Hook. f., Fl. Brit. India 6: 245. 1892; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 768. 1976; Sasidh. Fl. Pl. Thrissur Forests 463. 1996. ***Z. nimmonii*** Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 4: 341. 1852; Baker in Hook. f., Fl. Brit. India 6: 244. 1892; Fischer in Gamble, Fl. Pres. Madras 1489. 1928.

Leafy stem 60-100 cm high, erect; rhizome erect and branching, violet inside. Leaves to 30 x 8 cm, elliptic, acuminate, pubescent below, sessile; ligule 7 x 5 mm, ovate. Spikes 2-3, 7-12 cm long, ovoid, with few basal bracts; floral bracts 5-6 x 1.5 cm, oblong, obtuse, curved, green or white with red lines, glabrous. Flowers densely packed; calyx 2 cm long, lobes truncate, ciliate; corolla tube 5 cm long, white; lobes 3.5 x 1.5 cm, lanceolate, white with red lines; anthers 1.5 cm long; lip 4 x 3 cm, yellow with reddish brown lines, side lobes very short, rounded; ovary densely hairy.

*Fl. & Fr.* : July-August

*Distr.* : Endemic to Western Ghats. Common; in moist deciduous forests. Thekkady, *JA 12001*; Poonkavanam, *JA & KPR 15487.*

*Ethnobotanical use* : Rhizome of this plant is with high amount or water; Mannan press the rhizome and extract water in summer.

**Zingiber neesanum** (Grah.) Ramam. in Sald. & Nicols., Fl. Hassan Dist. 769. 1976; Manilal, Fl. Silent Valley 314. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 463. 1996. ***Alpinia neesana*** Grah., Cat. Pl. Bombay 207. 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. 1928.

Annual or perennial herbs. Leafy stem 40-70 cm high, solitary or 2-4 together, erect. Leaves 25-35 x 3.5 cm, elliptic-oblong, acute at base, sessile; ligule 8 mm long, ovate. Spikes to 25 cm long, enlarging in fruit, terete on erect peduncle of 30-35 cm long; floral bracts 3 x 1.4 cm, obtuse, reddish. Flowers solitary in each bract; calyx 2 cm long, glabrous; corolla tube 2 cm long, lobes unequal, larger lobe 3.5 x 1.5 cm, elliptic, acute, glabrous; lip 3.5 x 3.5 cm, 3-lobed; lobes obtuse, glabrous, middle lobe emarginate; ovary glabrous. Capsule 3-4 cm long, ellipsoid, smooth, red inside, 3-valved.

*Fl. & Fr.* : July-October

*Distr.* : Southern Western Ghats. Common; in moist deciduous forests. Cheriyakanam, *JA 12198.*

**Zingiber officinale** Rosc., Trans. Linn. Soc. London 8: 348. 1807; Baker in Hook. f., Fl. Brit. India 6: 246. 1892; Fischer in Gamble, Fl. Pres. Madras 1489. 1928; Burtt. & Smith in Dassan. & Fosb. Rev. Handb. Fl. Ceylon 4: 498. 1983; Manilal, Fl. Silent Valley 314. 1988; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 28. 1989. **Inchi**.

Rhizomatous herbs; rhizome thick, dull yellow. Leafy stem to 60 cm high. Leaves to 25 x 2 cm, elliptic-oblong, acuminate. Peduncles to 30 cm long, erect; spike 3-5 x 3 cm, obovoid; bracts 2.5 x 2 cm, obovate, green. Flowers few; calyx 2 cm long; corolla white, tube small; labellum 3 x 2.5 cm, white, obovate.

*Fl. & Fr.* : July-December

*Distr.* : Country of origin not known, widely cultivated throughout the World. Occasional; in moist deciduous forests. Thekkady, *JA 16850.*

**Zingiber zerumbet** (L.) Smith, Exot. Bot. 2: 105, t. 112. 1804; Baker in Hook. f., Fl. Brit. India 6: 247. 1892; Fischer in Gamble, Fl. Pres. Madras 1490. 1928; Burtt. & Smith in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 495 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 464. 1996. ***Amomum zerumbet*** L., Sp. Pl. 1. 1753.

Rhizome thick, fragrant, yellowish inside; leafy stem 40-90 cm high, arching out. Leaves 30 x 8 cm, oblong, acute at either ends, sessile, pubescent below. Spike to 15 cm long, cylindrical, on erect peduncle of 30-45 cm long, floral bracts 3.5 x 3 cm, obovate, thinly pubescent above, green, changing to red; margins furnished with black glands. Flowers white, solitary in each bract; corolla 2-3 cm long, lobes ovate-acuminate; lip 2.5 x 2 cm, white or pale yellow; midlobe orbicular. Capsule 2.5 cm long, ellipsoid, smooth.

*Fl. & Fr.* : August-December

*Distr.* : Pantropical. Common; in evergreen forests at low elevations. Koruthode, *JA & KPR 16247.*

## 129. MARANTACEAE

Petersen in Engler & Prantl, Nat. Pflanzenfam. 2(6): 33. 1888.

1. Inflorescence a large terminal panicle; large shrubs ..... **Schumannianthus**
1. Inflorescence a small spike from the rhizome ..... **Stachyphrynium**

## 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. 1928; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 773 1976; Manilal, Fl. Silent Valley 315. 1988; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 30. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 464. 1996. ***Phrynium virgatum*** Roxb., Asiat. Res. 11: 324. 1810. ***Maranta virgata*** (Roxb.) Wall. ex Wight, Ic. t. 2015. 1853. ***Clinogyne virgata*** (Roxb.) Benth. ex Baker in Hook. f., Fl. Brit. India 6: 258. 1892. **Channa, Kookkila** (Mannan, Paliyan, Thevan).

Erect shrubs, to 4 m high; stem thickened at nodes. Leaves bifarious, to 40 x 18 cm, ovate-oblong, cuspidate at apex, rounded at base; petiole to 1 cm long; sheath to 20 cm long, open. Panicle to 50 cm long, branches slender, dichotomous; bracts 3-5 x 0.6 cm, lanceolate. Flowers paired in each bract; sepals small; corolla white, tube short; lobes oblong; stamens 1, outer staminodes petalloid, white, to 1.5 cm long; inner staminodes smaller; ovary densely hairy, 3-celled, solitary in each cell, basal. Berry obovoid, rugose.

*Fl. & Fr.* : Throughout the year

*Distr.* : Endemic to South India. Fairly common; along the stream banks in moist deciduous forests. Kokkara, *JA 18465.*

*Ethnobotanical use* : The leaves are used as plates; Thevans and Paliyans are noticed collecting bundles of the leaves and the leaves along with stem are used in thatching huts.

## STACHYPHRYNIUM Schumann

in Engler's Pflanzenr. 4, 48 (Heft 11): 45. 1902, *nom cons.*

**Stachyphrynium spicatum** (Roxb.) Schum. in Engl., Pflanzenr. 11: 46. 1902; Fischer in Gamble, Fl. Pres. Madras 1494. 1928; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 773 1976; Manilal, Fl. Silent Valley 315. 1988; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 30. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 464. 1996. ***Phrynium spicatum*** Roxb., Fl. Ind. 1: 5. 1820.

Herbs, rhizome creeping, nodose. Leaves 2-5 together, lamina to 20 x 7 cm, ovate-oblong, abruptly acuminate at apex, rounded at base; nerves many; petiole to 30 cm long, sheathing at base. Spike 1 or 2, basal, 3-5 cm long, sessile or shortly peduncled. Flowers 3-8, sessile; bracts 15 x 7 mm, ovate; sepals 5 mm long, free; corolla dull white, 2.5 cm long; lobes oblong; stamen 1, petalloid; anthers adnate on the margin; staminodes obovate, clawed; ovary 3-celled; ovule solitary in each cell. Capsule 8 x 6 mm, ovoid; seeds wrinkled.

*Fl. & Fr.* : November-January

*Distr.* : South India. Common; in moist deciduous forests. Koruthode, *JA 16239.*

## 130. MUSACEAE

Juss., Gen. Pl. 61. 1789.

### ENSETE Bruce ex Horan

Prod. Monog. Scitam. 40. 1862.

**Ensete superba** (Roxb.) Cheesman., Kew Bull. 3: 100. 1948; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 761 1976; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 30. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 465. 1996. ***Musa superba*** Roxb., Pl. Corom. t. 223. 1811; Wight, Ic. t. 2017-18. 1853; Baker in Hook. f., Fl. Brit. India 6: 261. 1892; Fischer in Gamble, Fl. Pres. Madras 1497. 1928. **Kalluvazha** (Mannan).

Erect shrubs with unbranched globose leafsheaths formed into a pseudostem of 50-100 cm diam. Leaves spirally arranged, 3 x 0.8 m, oblong, entire with channelled midrib; lateral nerves many, parallel from midrib. Spadix 50-100 cm long, with 3-5 spathes at base; bracts several, to 20 x 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, 3.5 cm long, 5-lobed; third petals forms into a membranous sheath; stamens 5, perfect, anthers 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.

*Fl. & Fr.* : August-December

*Distr.* : South West India. Occasional; in rocky slopes in evergreen forests. Vallakkadavu, *JA 16805.*

*Ethnobotanical use* : The seeds are powdered and eaten for the treatment of kidney stones and other kidney disorders.

## 131. HAEMODORACEAE

R. Brown, Prodr. 299. 1810.

1. Leaves linear, flat; peduncle to 35 cm long; filaments free.....**Ophiopogon**
1. Leaves elliptic, plicate; peduncle below 15 cm long; filaments united into a ring.....**Peliosanthes**

### OPHIOPOGON Ker-Gawler

Bot. Mag. t. 1063. 1807.

**Ophiopogon intermedius** D. Don, Prodr. 48. 1825; Hook. f., Fl. Brit. India 6: 209. 1892; Fischer in Gamble, Fl. Pres. Madras 1499. 1928; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 799. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1645. 1983; Manilal,

Fl. Silent Valley 321. 1988; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 31. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 465. 1996. ***O. indicus*** Wight, Ic. t. 2050. 1853.

Densely tufted scapigerous perennial herbs; rootstock rhizomatous. Leaves clustered, 25-40 x 0.7 cm, linear-oblong, ribbed, narrowed to the base into a petiole. Scape to 35 cm long. Flowers 4-10 in raceme, pedicel 5 mm long; tepals 6, white with pink shades, 6 x 4 mm, 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 mm across, globose, glabrous, blue; seeds 1-3, globose or trigonous.

*Fl. & Fr.* : August-March

*Distr.* : India. Common; in evergreen forests. Pachakkanam, *JA 12310*; Melmanalar, *JA 13354.*

**PELIOSANTHES** Andrews

Bot. Rep. tt. 605, 634. 1808.

**Peliosanthes teta** Andr., Bot. Rep. 605. 1810, subsp. **humilis** (Andr.) Jessop, Blumea 23: 155. 1976 & in Steenis, Fl. Males. I. 9: 299. 1979; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 799. 1976; Manilal, Fl. Silent Valley 321. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 466. 1996. ***P. humilis*** Andr., Bot. Rep. 634. 1811. ***P. courtallensis*** Wight, Ic. t. 2051. 1853; Hook. f., Fl. Brit. India 6:266.1892; Fischer in Gamble, Fl. Pres.Madras 1498.1928. ***P. neilgherrensis*** Wight, Ic. t. 2052.1853; Hook. f., Fl. Brit. India 6:266.1892; Fischer in Gamble, Fl. Pres. Madras 1498.1928.

Scapigerous perennial herbs; stem solitary or loosely tufted, 5 cm high, erect or oblique, covered with roots. Leaves few, clustered, to 32 x 10 cm, elliptic, acute at either ends, plicate; petiole to 38 cm long. Racemes to 20 cm long, many-flowered; bracts 1 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 8 x 8 mm, top-shaped, glabrous, bluish black; seeds 1-3, globose.

*Fl. & Fr.* : August-February

*Distr.* : Indo-Malesia. Common; in evergreen forests. Sabarimala, *JA 12379*; Anakuthivayal, *JA & KPR 17787.*

## 132. AMARYLLIDACEAE

J. St.-Hil., Expos. Fam. Nat. 1: 134. 1805.

1. Staminal filaments webbed by corona; flowers pedicelled.....**Pancratium**

1. Staminal filaments free; flowers sessile.....**Crinum**

## **CRINUM** Linnaeus

Sp. Pl. 291. 1753

**Crinum latifolium** L., Sp. Pl. 291. 1753; Wight, Ic. tt. 2019 & 2020. 1853; Hook. f., Fl. Brit. India 6: 283. 1892; Fischer in Gamble, Fl. Pres. Madras 1504. 1928; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1625. 1983.

Perennial herbs; rootstock bulbous, 6 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 cm long, narrow, lobes 6, 8 x 2.5 cm, oblong, acute, pinkish white, spreading or deflexed; stamens 6, filaments long, attached at the throat of perianth tube; anthers 12 mm long, linear; ovary 3-celled, ovules many, axile; style linear; stigma terminal. Capsule oblong; seeds many.

*Fl. & Fr.* : March-June

*Distr.* : Tropical Asia and Africa. Occasional; on soil covered rocks in savannahs. Brandippara, *JA 14905.*

## **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. 1928; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1626. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 466. 1996. ***P. verecundum*** auct. non Ait., 1789: Wight, Ic. t. 2023. 1853; Hook. f., Fl. Brit. India 6: 286. 1892.

Herbs, rootstock a bulb formed by leaf sheaths, 4 cm across. Leaves clustered, to 30 x 2 cm, linear-oblong, flat, acute, glabrous; sheath membranous. Flowers umbellate, on 35 cm long scape, 3-7 together, covered by a membranous spathe; pedicels to 2 cm long; perianth funnel-shaped, tube 5 cm long, lobes 6, 2 cm long, 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.

*Fl. & Fr.* : January-May

*Distr.* : India and Sri Lanka. Occasional; in moist deciduous forests. Pamba, *JA 17152.*

## 133. AGAVACEAE

Endl., Ench. Bot. 105. 1841.

### 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. 1928; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 799. 1976; Manilal, Fl. Silent Valley 323. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 466. 1996. ***Dracaena terminalis*** Wight, Ic. t. 2054. 1853.

Stout perennial subshrubs; stem covered with annular leaf scars. Leaves spiral, closely packed, to 24 x 5.5 cm, elliptic-lanceolate, acuminate; petiole 5 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 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 cm across, 3-lobed.

*Fl. & Fr.* : December-March

*Distr.* : Indo-Malesia. Common; in evergreen forests. Sabarimala, *KPR & JA 14809;* Koruthode, *JA 14993.*

*Ethnobotanical use* : The roots are powered and applied externally for low poison snake bites.

## 134. HYPOXIDACEAE

R. Brown in Flinders, Voy. Terra. Austr. 2: 576. 1814.

1. Leaves linear, not plicate; fruits circumscissile ..... **Hypoxis**
1. Leaves elliptic, plicate; fruits indehiscent ..... **Curculigo**

### CURCULIGO Gaertner

Fruct. 1: 63, t. 16, f. 11. 1788.

Herbs with vertically elongated rootstock. Leaves radical, sessile or petioled, usually plicate. Flowers few to many, on axillary short raceme, usually yellow; perianth petalloid, 6-partite, lobes oblong, spreading; stamens 6, filaments erect or spreading; anthers similar, fertile; ovary 3-celled, inferior; ovules many, axile. Fruit a baccate capsule; seeds many, subglobose, striate or smooth.

1. Leaves sessile; ovary produced into a beak ..... **C. orchioides**
1. Leaves long-petioled; ovary not produced ..... **C. trichocarpa**

**Curculigo orchioides** Gaertn., Fruct. 1: 63, t. 16, f. 11. 1788; Hook. f., Fl. Brit. India 6: 279. 1892; Fischer in Gamble, Fl. Pres. Madras 1502. 1928; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 797. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1627. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 467. 1996. ***C. malabarica*** Wight, Ic. t. 2043A. 1853. **Nilappana** (Mala Arayan).

Perennial herbs; rhizome oblong, to 15 cm long, vertical. Leaves few, radical, to 15 x 1.5 cm, subsessile, elliptic-lanceolate, plicate, base sheathing, pilose. Flowers few, in small, axillary, short racemes; scape hidden among leaves underground; perianth yellow, 1.5 cm across; tube 3 cm long, narrow, sparsely pilose. Ovary villous. Capsule 1-2.5 cm long, ovoid.

*Fl. & Fr.* : August-January

*Distr.* : Indo-Malesia. Common; in grasslands and moist deciduous forests. Thekkady, *JA 18468.*

*Ethnobotanical use* : The fresh tubers are eaten for lactation.

**Curculigo trichocarpa** (Wight) Bennet & Raizada, Indian J. For. 4: 61. 1981; Sasidh. & Sivar., Fl. Pl. Thrissur For. 467. 1996. ***Hypoxis trichocarpa*** Wight, Ic. t. 2045. 1853. ***Molineria finlaysoniana*** (Wall.)Baker, J. Linn. Soc. Bot. 17: 121. 1878; Fischer in Gamble, Fl. Pres. Madras 1502. 1928. ***Curculigo finlaysoniana*** Wall. Cat. 5162. 1821; Hook. f., Fl. Brit. India 6: 279. 1892. ***Molineria trichocarpa*** (Wight) Balakr., J. Bombay Nat. Hist. Soc. 63: 330. 1966; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1628. 1983; Manilal, Fl. Silent Valley 316. 1988.

Perennial herbs; rhizome to 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 in a raceme, pedicels 2 cm long, hispid; tepals 10 x 4 mm, lanceolate, yellow, hispid; filaments shorter than tepals, glabrous; ovary hispid; style straight, stigma capitate. Berry 20 x 7 mm, ellipsoidal, irregular; seeds black, longitudinally and closely ribbed, glabrous.

*Fl. & Fr.* : Throughout the year

*Distr.* : Peninsular India and Sri Lanka. Common; in evergreen forests. Koruthode, *JA 12207, 14103*; Kokkara, *JA 13527*, Poonkavanam, *JA & KPR 15484.*

## **HYPOXIS** Linnaeus

Syst. ed. 10, 986. 1759.

**Hypoxis aurea** Lour., Fl. Cochinch. 1: 200. 1790; Hook. f., Fl. Brit. India 6: 277. 1892; Fischer in Gamble, Fl. Pres. Madras 1501. 1928; Fyson, Fl. South Indian Hill St. 2: t. 535. 1932; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 797. 1976; Sasidh. & Sivar., Fl. Pl. Thrissur For. 468. 1996.

Densely tufted perennial herbs; stem short, tuberous, covered with leaf sheath forming a bulb. Leaves many, radical. to 20 x 0.3 cm, sessile, linear, acuminate, hairy, strongly nerved. Flowers solitary or paired on 10 cm long axillary peduncle, bisexual; perianth yellow, lobes 6, 10 x 2.5 mm, lanceolate, free, hairy outside; stamens 6, free, filaments shorter than the tepals; ovary 3-celled, densely hispid, ovules many in each cell; style 1, slender, stigma terminal, capitate. Capsule 8 x 2.5 mm, circumscissile near the apex, with persistent sepals; seeds 9-12, globose, minutely, muriculate, brown.

*Fl. & Fr.* : Throughout the year

*Distr.* : Indo-Malesia. Occasional; in evergreen forests. Eravangalar, *JA & KPR 15271.*

## 135. DIOSCOREACEAE

R. Brown, 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 shirt 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; ovules 2 in each cell; 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 3-5-foliolate.....5
2. Leaves acute at base, 3-5-nerved, opposite.....3
2. Leaves cordate at base 9-11-nerved, alternate.....4
3. Stem tomentose; spikes stout.....**D. anguina**
3. Stem glabrous; spikes slender.....**D. oppositifolia**
4. Male tepals oblong; filaments longer than anthers.....**D. bulbifera**
4. Male tepals triangular; filaments very shorter than anthers.....**D. wallichii**
5. Leaves with strong ribs; fertile stamens 6.....**D. hispida**
5. Leaves without strong ribs; fertile stamens 3.....6
6. Bracts ca. 4 mm long; leaves very tomentose; capsule broader above.....**D. tomentosa**
6. Bracts minute; leaves not or thinly rusty tomentose; capsule not broader above.....**D. pentaphylla**

**Dioscorea anguina** Roxb., Fl. Ind. 3: 803. 1832; Hook. f., Fl. Brit. India 6: 293. 1872; Fischer in Gamble, Fl. Pres. Madras 1513. 1928.

Stem twining to the right, terete. Leaves very rarely alternate, to 7 x 3.5 cm, broadly elliptic, abruptly acuminate, 5-ribbed with coriaceous margins, glabrous. Male spikes 12 x 4 mm, solitary or 2-3 together, drooping; peduncle to 12 cm long, densely tomentose; bracts lanceolate. Flowers closely packed; tepals ovate, obtuse, glabrous; anthers oblong. Female spike and fruits not seen.

*Fl.*: March

*Distr.* : Pantropical. Rare; in semi-evergreen forests. Damsite, *JA & KPR 15125.*

**Dioscorea bulbifera** L., Sp. Pl. 1033. 1753; Wight, Ic. t. 878. 1844; Hook. f., Fl. Brit. India 6: 296. 1892, var. **vera** Prain & Burkill, J. Asiat. Soc. Bengal 10: 26. 1914; Fischer in Gamble, Fl. Pres. Madras 1511. 1928; Burkill in Steenis, Fl. Males. I, 3: 311. 1951; Santapau, J. Bombay Nat. Hist. Soc. 49: 628. 1951; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 808. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1633. 1983; Jayas. in Dassan., Rev. Handb. Fl. Ceylon 9: 52 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 468. 1996.

Stem ridged, twining to left, glabrous. Leaves to 20 x 15 cm, broadly ovate, acuminate, 11-nerved from the base; intercostae parallel; petiole 10-20 cm long; lower leaves much larger, to 32 cm across. Spike 4-8 cm long, slender, pendulous, 2-3 together or solitary; peduncle to 20 cm long, axillary. Flowers distant; bracts lanceolate, subulate at apex; tepals 1.5 x 0.5 mm, oblong, acute, glabrous; stamens 6, free.

*Fl.* November-January

*Distr.* : Pantropical. Fairly Common; in evergreen forests. Pambavalley, *JA 12735.*

**Dioscorea hispida** Dennst., Schluess. Hort. Ind. Malab. 15. 1818; Fischer in Gamble, Fl. Pres. Madras 1511. 1928; Sant., J. Bombay Nat. Hist. Soc. 49: 629. 1951; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 808. 1976; Sasidh. & Sivar., Fl. Pl. Thrissur For. 469. 1996. ***D. daemona*** Roxb., Fl. Ind. 3: 805. 1832; Wight, Ic. t. 811. 1844; Hook. f., Fl. Brit. India 6: 289. 1892.

Stems twining to the left, glabrous. Leaflets subequal, to 17 x 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 12 cm long. Panicles to 45 cm long, axillary. Racemes fascicled, shortly peduncled, to 1 cm long.

*Fl. & Fr.* : November-January

*Distr.* : Peninsular India. Occasional; in semi-evergreen forests. Koruthode, *JA 18494.*

**Dioscorea oppositifolia** L., Sp. Pl. 1033. 1753; Wight, Ic. t. 813. 1844; Hook. f., Fl. Brit. India 6: 292. 1892; Fischer in Gamble, Fl. Pres. Madras 1512. 1928; Santapau, J. Bombay Nat. Hist. Soc. 49: 632. 1951; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 808. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1634. 1983; Manilal, Fl. Silent Valley 316. 1988; Jayas. in Dassan., Rev. Handb. Fl. Ceylon 9: 65. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 469. 1996. ***D. oppositifolia*** L., var. ***linnaei*** Prain & Burkill, J. Asiat. Soc. Bengal 10: 30. 1914; Fischer in Gamble, Fl. Pres. Madras 1512. 1928. **Noorankizhangu** (Mannan). **Vellakkizhangu** (Malam pandaram)

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 to 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 1mm long, orbicular, glabrous. Capsule 20 x 30 mm, glabrous.

*Fl. & Fr.* : September-February

*Distr.* : Peninsular India and Sri Lanka. Very Common; in all types of forests. Koruthode, *JA 12439;* Uppupara, *JA 14157.*

*Ethnobotanical use* : The tubers are collected, cooked or roasted and eaten (Mannan)

**Dioscorea pentaphylla** L., Sp. Pl. 132. 1753; Wight, Ic. t. 814. 1844; Hook. f., Fl. Brit. India 6: 281. 1892; Fischer in Gamble, Fl. Pres. Madras 1511. 1928; Santapau, J. Bombay Nat. Hist. Soc. 49: 631. 1951; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 808. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1635. 1983; Manilal, Fl. Silent Valley 317. 1988 Jayas. in Dassan., Rev. Handb. Fl. Ceylon 9: 55. 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 469. 1996. ***D. pentaphylla*** L. var. ***linnaei*** Prain & Burkill, J. Asiat. Soc. Bengal 10: 23. 1914; Fischer in Gamble, Fl. Pres. Madras 1511. 1928. **Marakkizhangu** (Mannan).

Stem twining to the left, terete, glabrous. Leaves 5-foliolate, alternate, middle leaflets larger, to 10 x 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 2 x 1.5 mm, acute, rusty tomentose. Male spike slender, panicled. Male flowers closely packed; tepals 1 mm long, oblong; stamens 3. Capsule 25 x 13 mm, oblique at base, truncate at apex.

*Fl. & Fr.* : January

*Distr.* : Tropical Asia to Pacific. Fairly common; in evergreen forests. Koruthode, *JA & KPR 14713.*

*Ethnobotanical use* : The tubers are collected, cooked or roasted and eaten.

**Dioscorea tomentosa** Koen. ex Spreng. Pl. Min. Cogn. Pug. 2: 92. 1815; Hook. f., Fl. Brit. India 6: 289. 1892; Fischer in Gamble, Fl. Pres. Madras 1511. 1928; Santapau, J. Bombay Nat. Hist. Soc. 49: 630. 1951; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1636. 1983; Manilal, Fl. Silent Valley 317. 1988 Jayas. in Dassan., Rev. Handb. Fl. Ceylon 9: 59 1995; Sasidh. & Sivar., Fl. Pl. Thrissur For. 469. 1996. **Chavan kizhangu (Mannan).**

Stem twining to the left, terete, tomentose. Leaves 3-foliolate, leaflets subequal, to 13 x 10 cm, broadly ovate, oblique at base, abruptly acuminate; petiole 15-18 cm long. Spikes to 30 cm long, densely tomentose, distantly flowered fascicles at nodes on long peduncle. Female flowers sessile; bracts 4 mm long, ovate; tepals 2 x 1 mm, oblong, acute, hairy. Capsule 25 x 15 mm, oblong, tomentose. Male flowers not seen.

*Fl. & Fr.* : October-May

*Distr.* : Peninsular India and Sri Lanka. Occasional; in moist deciduous forests. Thekkady, *JA 12496;* Vallakkadavu, *KPR & JA 15431.*

*Ethnobotanical use* : The tuber is not edible due to high percentage of fibers. But it is cooked and given for children suffering from worms.

**Dioscorea wallichii** Hook. f., Fl. Brit. India 6: 295. 1892; Fischer in Gamble, Fl. Pres. Madras 1512. 1928; Sant., J. Bombay Nat. Hist. Soc. 49: 633. 1951; Sasidh. & Sivar., Fl. Pl. Thrissur For. 469. 1996. ***D. aculeata*** L., Sp. Pl. 1033. 1753, p.p.; Wight, Ic. t. 2060. 1853; Hook. f., Fl. Brit. India 6: 296. 1892.

Stem twining to the right, smooth or scarcely prickly towards the base. Leaves to 12 x 12 cm, orbicular, bluntly acuminate, widely cordate at base; nerves 12 pairs from the base, glabrous, intercostae parallel; petiole to 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 1 x 1 mm, ovate, acute; stamens 6.

*Fl.* November-January

*Distr.* : Peninsular India. Rare; in evergreen forests. Koruthode, *JA & KPR 16907.*

## 136. LILIACEAE

Juss., Gen. Pl. 48. 1789.

1. Climbers.....2
1. Erect herbs.....3
2. Branchlets modified into cladodes; armed trailing or climbing herbs; leaves absent .....**Asparagus**
2. Branchlets not as above; unarmed climbers; leaves present leaf-tips modified into hooks .....**Gloriosa**

3. Flowers more than 15 cm long ..... **Lilium**

3. Flowers less than 3 cm long ..... 4

4. Flowers in long racemes ..... **Chlorophytum**

4. Flowers solitary or in short racemes or cymes ..... 5

5. Leaves cordate at base, sessile, not sheathing ..... **Disporum**

5. Leaves not cordate at base; petiole sheathing at base ..... 6

6. Fruit a berry; stem with a tuber at base ..... **Dianella**

6. Fruit a capsule; stem without a tuber at base ..... **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. Cladodes ca. 12 mm long, trigonous ..... **A. racemosus**

1. Cladodes to 20 mm long, flat ..... **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. 1928; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 793. 1976; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 38. 1989.

Cladodes curved, acuminate, scale-leaf to 10 mm long, lanceolate. Racemes to 7 cm long, fascicled; pedicels 5 mm long. Perianth lobes dull yellow, 5 mm long, obovate, obtuse; style very short; stigmas 3, curved. Fruits not seen.

*Fl.* : February

*Distr.* : Peninsular India and Sri Lanka. Rare; in the openings of evergreen forests. Manaloda, *JA 13359.*

**Asparagus racemosus** Willd., Sp. Pl. 2: 152. 1799; Wight, Ic. t. 2056. 1853; Hook. f., Fl. Brit. India 6: 316. 1892; Fischer in Gamble, Fl. Pres. Madras 1517. 1928; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 793. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1639. 1983; Manilal, Fl. Silent Valley 318. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 470. 1996. **Sathaveri** (Mala Arayan).

Cladodes 3-angled, compressed, curved, 2-7 together; branches angled. Racemes 2-4 cm long; bracts minute, ovate; pedicel 4 mm long; tepals obovate, white. Berry 7 mm across, globose, smooth.

*Fl. & Fr.* : February-August

*Distr.* : Paleotropics. Common; in semi-evergreen and moist deciduous forests. Pachakkanam, *JA 12272*; Manaloda, *JA 13355*; Kalvarimala, *JA 13875.*

*Ethnobotanical use* : The root tubers are cooked and eaten for chest pain and stomach ache.

## 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. Seeds one in each locule of the fruit.....**C. laxum**
1. Seeds 5-9 in each locule of the fruit.....2
2. Leaves to 1 cm broad; racemes terminal.....**C. attenuatum**
2. Leaves to 5 cm broad; racemes axillary.....**C. heynei**

**Chlorophytum attenuatum** (Wight) Baker, J. Linn. Soc. Bot. 15: 332. 1876; Hook. f., Fl. Brit. India 6: 335. 1892; Fischer in Gamble, Fl. Pres. Madras 1526. 1928; Manilal, Fl. Silent Valley 318. 1988; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 38. 1989. ***Phalangium attenuatum*** Wight, Ic. t. 2037. 1853.

Tufted perennials. Leaves many, to 50 x 1 cm, linear-lanceolate, acuminate, glabrous, with a white patch along the midrib. Raceme terminal, to 30 cm long, slender, unbranched. Flowers many, densely packed; bracts ovate, acute, glabrous; perianth lobes white, to 8 x 3 mm, oblong, obtuse, spreading. Capsule to 7 x 7 mm, obovoid, obtusely 3-winged, glabrous; seeds many, orbicular, flat, black.

*Fl. & Fr.* : October-January

*Distr.* : Western Ghats. Rare; in grasslands along the higher altitudes. Uppermanalar, *JA 18495.*

**Chlorophytum heynei** Rottl. ex Baker, J. Linn. Soc. Bot. 15: 322. 1876; Fischer in Gamble, Fl. Pres. Madras 1525. 1928; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1641. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 470. 1996. ***Chlorophytum heyneanum*** Wall. ex Hook. f., Fl. Brit. India 6: 333. 1892.

Stem very short. Leaves 20 x 5 cm, oblanceolate, acute to apex, narrowed to base. Racemes to 18 cm long, stout, densely-flowered. Pedicel 5 mm long; tepals 8 mm long, elliptic-lanceolate; ovary obovoid, retuse; style slender; stigma terminal. Capsule 10 x 7 mm, obovoid, 3-lobed; seeds 2 x 2 mm, orbicular, irregular, obtusely muriculate, black.

*Fl. & Fr.* : August-October

*Distr.* : Peninsular India and Sri Lanka. Common; in evergreen forests. Koruthode, *JA 12258*; Sabarimala, *JA 17832.*

**Chlorophytum laxum** R. Br., Prodr. 277. 1810; Hook. f., Fl. Brit. India 6: 336. 1892; Fischer in Gamble, Fl. Pres. Madras 1526. 1928; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 795. 1976; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 39. 1989. ***Phalangium parviflorum*** (Dalz.) Wight, Ic. t. 2039. 1853. ***Chlorophytum parviflorum*** Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 2: 141. 1850.

Leaves 10-25 x 0.8 cm, linear-oblong, acute, glabrous, bifarious; sheath open. Racemes 10-20 cm long, slender. Flowers paired at nodes; pedicel 8 mm long, jointed at the middle; tepals 2 x 1 mm, oblong, chartaceous, white; ovary 3-lobed, ovules one in each cell, stigma terminal, entire. Capsule 5 x 6 mm, 3-lobed; seeds 2.5 x 2 mm, reniform, rugose.

*Fl. & Fr.* : August-December·

*Distr.* : Peninsular India and Sri Lanka. Common; in grasslands. Vallakkadavu, *JA & KPR 16322*; Damsite, *JA 16848.*

## **DIANELLA** Lamarck

Encycl. 2: 276. 1786.

**Dianella ensifolia** (L.) DC. in Redante, Liliac. t. 1. 1802; Hook. f., Fl. Brit. India 6: 337. 1892; Fischer in Gamble, Fl. Pres. Madras 1521. 1928; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 39. 1989. ***Dracaena ensifolia*** L., Mant. Pl. 63. 1767. ***Dracaena ensata*** Thunb., Diss. Bot. Drac. 4. 1808. ***Dianella ensata*** (Thunb.) Henderson, Taxon 26:136.1977.

Erect perennial herbs, to 1 m high. Leaves to 40 x 2.5 cm, linear-lanceolate, glabrous; sheath open, distichous. Flowers few, in panicled cymes; peduncle angled, smooth; pedicel 5 mm long, jointed; tepals 6, greenish white to blue, 6 x 4 mm, ovate; stamens 6, free, anthers oblong; ovary 3-celled, ovoid; ovules few; style slender. Berry ovoid, 7 mm across, smooth, blue; seeds few, compressed.

*Fl. & Fr.* : June-August

*Distr.* : India, eastwards to Australia and Pacific. Common; in evergreen forests. Mlappara, *JA 12082.*

**DISPORUM** Salisbury

Trans. Hort. Soc. 1: 332. 1812.

**Disporum leschenaultianum** D. Don, Proc. Linn. Soc. London 1: 45. 1839; Hook. f., Fl. Brit. India 6: 360. 1892; Fischer in Gamble, Fl. Pres. Madras 1522. 1928; Manilal, Fl. Silent Valley 319. 1988; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 40. 1989.

Erect herbs. Leaves to 8 x 4 cm, ovate-lanceolate, rounded or cordate at base, 3-5 ribbed, sessile, usually clustered towards the apex. Flowers 3-6 together, in sessile umbel in the axils of upper leaves; pedicels 10 mm long, slender; perianth lobes 6, free, 10 x 5 mm, obovate, acute; stamens 6, free, filaments 3 mm long, broadened below; anthers oblong; ovary ovoid; ovules few; style stout; stigma 3-lobed, curved. Berry, 7 x 7 mm, globose; 1-seeded.

*Fl. & Fr.* : March-August

*Distr.* : Western Ghats and Sri Lanka. Common; in evergreen forests at high elevations. Uppermanalar, *JA 13965*; Kottamala, *JA 15288*; Anakuthivayal, *JA 17765.*

**GLORIOSA** Linnaeus

Sp. Pl. 305. 1753

**Gloriosa superba** L., Sp. Pl. 305. 1753; Wight, Ic. t. 2047. 1853; Hook. f., Fl. Brit. India 6: 358. 1892; Fischer in Gamble, Fl. Pres. Madras 1519. 1928; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 797. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1643. 1983; Manilal, Fl. Silent Valley 320. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 471. 1996. **Menthonni** (Mala Arayan).

Climbing herbs, tuber horizontal. Leaves scattered, to 20 x 4 cm, lanceolate, acuminate into a tendril. Flowers axillary, solitary; pedicels 15 cm long, reflexed at tip; tepals 6, similar, 7 cm long, oblong, petalloid, variegated with uneven margins, yellow at lower half, red above; stamens 6, filaments slender, spreading; anthers 1 cm long, versatile; ovary 3-celled, ridged, ovules many; style filiform, deflexed, 3-fid at apex; stigmas 3. Capsule septicidal, many-seeded.

*Fl. & Fr.* : July-September

*Distr.* : Tropical Asia and Africa. Common; in moist deciduous forests. Mullakkudy, *JA 13842.*

*Ethnobotanical use* : The fresh or dried tubers are ground with water and made into a paste. This paste is used externally to accelerate childbirth; Mannan believes the tubers as poisonous

**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. 1928; Gandhi in Sald. & Nicols., Fl. Hassan

Dist. 798. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1643. 1983; Manilal, Fl. Silent Valley 320. 1988.

Erect leafy herbs from a globose tuber, 10-25 cm high, stem slender. Leaves to 18 x 1 cm, linear-lanceolate, glabrous; sheath closed. Flowers 1-6, in a leafy raceme; bracts lanceolate, to 5 cm long; pedicel to 1.5 cm long; tepals 6, 10 x 1 mm, lanceolate, brown, spreading; stamens 6, spreading; filaments flattened; anthers oblong, 2 mm long; ovary 6 x 4 mm, oblong, 3-lobed; style absent; stigmas sessile, 3, recurved. Capsule 1.5 x 0.8 cm, obovoid; seeds many, orbicular, compressed, brown.

*Fl. & Fr.* : June-August

*Distr.* : India, Malesia, Australia and Sri Lanka. Common; in grasslands. Mangaladevi, *JA 16215*; Vallakkadavu, *JA & KPR 16330.*

### **LILIUM** Linnaeus

Sp. Pl. 302. 1753

**Lilium wallichianum** Schultes & Schultes f. in L., Syst. Veg. 7(2): 1689. 1830, var. **neilgherrense** (Wight) Hara in Ohashi, Fl. East. Himal. 3: 132. 1975; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1644. 1983; Manilal, Fl. Silent Valley 320.1988; Ansari & Dwarakan, J. Econ. Tax. Bot. 14(3): 615. 1990. ***Lilium neilgherrense*** Wight, Ic. tt. 2031 & 2032.1853; Hook.f., Fl. Brit. India 6:350.1892; Fischer in Gamble, Fl. Pres. Madras 1523. 1928.

Erect unbranched herbs; stem leafy, to 1.5 cm high. Leaves scattered, to 10 x 2 cm, lanceolate, sessile, acute at apex, glabrous. Flowers 1-3 together, terminal; pedicel 3 cm long, glabrous. Perianth 20 cm long, campanulate; lobes 6, ovate, acute, white, lower tubular; stamens 6, filaments 16 cm long, free; anthers linear-oblong, versatile; ovary oblong; ovules many; style to 16 cm long constricted at base; stigma globose or 3-toothed. Capsule 3-valved; seeds many, compressed.

*Fl. & Fr.* : August-December

*Distr.* : Peninsular India and Nepal. Rare; in grasslands. Mangaladevi, *JA & KPR 16307.*

## 137. 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. Umbels many; stem unarmed.....**S. perfoliata**
1. Umbels 1-3; stems armed.....2
2. Leaves widely cordate at base.....**S. aspera**
2. Leaves acute or round at base, not cordate.....3
3. Peduncles to 10 cm long; berry globose.....**S. wightii**
3. Peduncles to 4 cm long; berry ovoid, acute.....**S. zeylanica**

**Smilax aspera** L., Sp. Pl. 1028. 1753; Hook. f., Fl. Brit. India 6: 306. 1892; Fischer in Gamble, Fl. Pres. Madras 1518. 1928; Manilal, Fl. Silent Valley 322. 1988; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 42. 1989. ***S. maculata*** Roxb., Fl. Ind. 3: 796. 1832; Wight, Ic. t. 2059. 1853.

Stout climbers, stem ridged, prickles few, scattered. Leaves to 10 x 7 cm, ovate, acuminate, coriaceous, 9-ribbed, densely reticulate, glabrous, midrib and petiole shortly prickled; petiole 3 cm long.

*Fl.* : Specimens at vegetative stage only could be collected.

*Distr.* : Paleotropic. Rare; in evergreen sholas at higher altitude. Vellimala, *JA 18496.*

**Smilax perfoliata** Lour., Fl. Cochinch. 2: 622. 1790; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 804. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1647. 1983. ***S. prolifera*** Wall. ex Roxb., Fl. Ind. 3: 795. 1832; Hook. f., Fl. Brit. India 6: 312. 1892; Fischer in Gamble, Fl. Pres. Madras 1519. 1928; Fyson, Fl. South India Hill St. 2: t. 542. 1932.

Branchlets 5-8-ribbed. Leaves to 15 x 7 cm, ovate-oblong, obtuse or retuse, strongly cuspidate; rounded at base, 5-ribbed; petiole 3 cm long, auricled at base, flagellate. Umbel 12-20, on an axillary peduncle; peduncle 10 cm long. Flowers greenish yellow, 5 mm across; pedicels 1 cm long, stigma densely papillose.

*Fl. & Fr.* : March-May

*Distr.* : India and Sri Lanka. Common; in moist deciduous forests. Vellimala, *JA 13818.*

**Smilax wightii** A. DC., Monogr. Phan. 1: 174. 1878; Hook. f., Fl. Brit. India 6: 310. 1892; Fischer in Gamble, Fl. Pres. Madras 1519. 1928; Fyson, Fl. South Indian Hill St. 2: t. 541. 1932; Manilal, Fl. Silent Valley 323. 1988; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 42. 1989.

Branches terete, armed with prickles. Leaves to 15 x 13 cm, broadly ovate, obtuse, cuspidate, cordate at base, 5-ribbed; petiole 1-3 cm long, sheath narrow, flagellate. Peduncle to 10 cm long;

umbels alternate, 2 or 3. Flowers many; pedicels 1.5 cm long, 2 cm in fruit. Berry 7 x 7 mm, globose.

*Fl. & Fr.* : November-May

*Distr.* : Southern Western Ghats. Occasional; in moist deciduous forests. Thekkady, *JA 15432.*

**Smilax zeylanica** L., Sp. Pl. 1029. 1753; Hook. f., Fl. Brit. India 6: 309. 1892; Fischer in Gamble, Fl. Pres. Madras 1518. 1928; Fyson, Fl. South Indian Hill St. 2: t. 539. 1932; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 804. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1648. 1983; Manilal, Fl. Silent Valley 323. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 471. 1996.

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, 0.7 cm long. Drupes 8 x 6 mm, ovoid, acute, glabrous.

*Fl. & Fr.* : March-July

*Distr.* : India Malaya, Java and Sri Lanka. Fairly common; in moist deciduous forests. Pachakkanam, *JA 12230*; Vellimala, *JA 14033.*

## 138. PONTEDERIACEAE

Kunth in Humboldt & al., Nov. Gen. Sp. 1, ed. 4: 265. 1816.

### 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. 1931; Baker in Steenis Fl. Males. Ser. 1, 4: 256. 1951; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 791. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1650. 1983. ***Pontederia vaginalis*** Burm. f., Fl. Ind. 80. 1768.

Marshy herbs; stems erect. Leaves few to several, lamina to 6 x 4 cm, ovate, acute at apex, cordate to hastate at base; petiole to 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, to 15 mm long; stamens 6, one larger than others; anthers oblong; ovary ellipsoid; ovules many; style 1, filiform. Capsule 8 x 6 mm, oblong; seeds many, ribbed, dull brown.

*Fl. & Fr.* : Throughout the year

*Distr.* : India, east to China Japan and Malesia. Common; in ditches and ponds especially in disturbed areas. Thekkady, *JA 12531*; Koruthode, *JA 16381.*

## 139. COMMELINACEAE

R. Brown, Prodr. 268. 1810.

1. Epiphytic herbs; branches prostrate ..... **Belosynapsis**
1. Terrestrial herbs; branches usually erect ..... 2
2. Petals united into a tube ..... 3
2. Petals free ..... 4
3. Flowers in axillary fascicles; leaf sheaths inflated ..... **Tonningia**
3. Flowers in peduncled scorpioid cymes; leaf sheaths not inflated ..... **Cyanotis**
4. Cymes panicled ..... 5
4. Cymes enclosed in spathaceous bracts ..... **Commelina**
5. Fertile stamens 6 ..... **Floscopa**
5. Fertile stamens 2 or 3 ..... 6
6. Cells of ovary 1-ovuled ..... **Dictyospermum**
6. Cells of ovary 2-many-ovuled ..... **Murdannia**

### BELOSYNAPSIS Hasskarl

Flora 4: 259. 1871.

**Belosynapsis vivipara** (Dalz.) Fischer, Kew Bull. 1928: 252. 1928 & in Gamble, Fl. Pres. Madras 1551. 1931; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 644. 1976; Manilal, Fl. Silent Valley 324. 1988; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 43. 1989; ***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, to 10 x 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, 1.5 x 1.5 mm, elliptic, acute, hairy; petals 3, free, 3 x 1.5 mm, obovate, acute, pink; stamens 6, filaments beard; ovary obovate, hairy, 3-celled, 2-ovules in each cell. Capsule 6-seeded.

*Fl. & Fr.* : August-December

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Chenthamarakokka, *JA 12283.*

### 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. Anthers equal ..... **C. benghalensis**
1. Anthers unequal ..... 2
2. Spathe funnel-shaped or cucullate ..... 3
2. Spathe ovate, acuminate, cordate at base ..... 5
3. Spathe pubescent; seeds with a longitudinal furrow at one side ..... **C. erecta**
3. Spathe glabrous; seeds not with such a furrow at one side ..... 4
4. Ovary 3-celled, glabrous; leaves 4-6 cm broad ..... **C. maculata**
4. Ovary 2-celled, pubescent; leaves to 0.6 cm broad ..... **C. ensifolia**
5. Ovary 3-celled; peduncle glabrous ..... **C. diffusa**
5. Ovary 2-celled; peduncle pubescent ..... **C. imberbis**

**Commelina benghalensis** L., Sp. Pl. 41. 1753; Hook. f., Fl. Brit. India 6: 370. 1892; Fischer in Gamble, Fl. Pres. Madras 1539. 1931; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 644. 1976; Matthew, Ill. Fl. Tam. Carnatic 2: 751. 1982 & Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1657. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 473. 1996.

Stem creeping or erect, pubescent. Leaves to 5 x 2.5 cm, ovate, acute or obtuse, rounded at base; sheath 1 cm long, mouth with red bristles. Spathe 1 x 1.5 cm, hairy. Flowers 10-12 mm across; sepals 3 mm long, obovate, red-glandular; petals 5 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.

*Fl. & Fr.* : October-January

*Distr.* : Paleotropics. Very common; on rocky soils in moist deciduous forests. Thaannikkudy, *NS & JA 12617*; Thekkady, *KPR 16340*.

**Commelina diffusa** Burm. f., Fl. Ind. 18. 1768; Gandhi in Sald. & Nicol., Fl. Hassan Dist. 644. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1658. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 474. 1996. *C. **nudiflora*** auct. non L., 1753: Hook. f., Fl. Brit. India 6: 369. 1892; Fischer in Gamble, Fl. Pres. Madras 1538. 1931.

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, 2 cm long, mouth ciliate, covered with red

glands. Peduncle terminal, 4 cm long; spathe 2.5 x 1.4 cm, ovate, cordate at base, margin ciliate; branches of cymes puberulus. Flowers 3-together; sepals 5.5 x 2.5 mm, free, red-glandular; petals 4 x 3 mm, blue with red glands; stamens 3, one anther longer, filaments glabrous; ovary oblong, pubescent, 3-celled. Seeds reticulate.

*Fl. & Fr.* : July-November

*Distr.* : Pantropical. Common; in Savannah forests. Thaannikkudy, *JA 12157*; Kavalappara, *KPR 14536.*

**Commelina ensifolia** R. Br., Prodr. 269. 1810; Hook. f., Fl. Brit. India 6: 374. 1892; Fischer in Gamble, Fl. Pres. Madras 1540. 1931; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 645. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1658. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 44. 1989.

Erect tufted herbs; stems terete, glabrous. Leaves 7-9 x 0.6 cm, linear-lanceolate, glabrous; sheath 1.5 cm long, glabrous, mouth oblique, glabrous or thinly ciliate. Spathe 1 x 1.5 cm, truncate, shortly divided at one side, glabrous. Cymes solitary or paired in each bract. Flowers 10 mm across; sepals 5 x 4 mm, obovate, obtuse; petals 8 x 4 mm, obtuse, blue; stamens 3, larger anthers coiled, deeply cleft at base; staminodes 3-lobed, yellow, filaments glabrous; ovary hairy, 2-cells one-ovuled, 3rd cell empty. Capsule 2-celled; seeds ellipsoid, brown.

*Fl. & Fr.* : June-August

*Distr.* : Peninsular India and Sri Lanka extending to Australia. Rare; in grasslands. Vallakkadavu, *JA & KPR 15402.*

**Commelina erecta** L., Sp. Pl. 41. 1753; Morton, J. Linn. Soc. Bot. 60: 183. 1967; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1659. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 474. 1996. ***Commelina undulata*** R. Br. Prodr. 270. 1810; Hook. f., Fl. Brit. India 6: 373. 1892. ***C. kurzii*** Clarke, J. Linn. Soc. Bot. 11: 11. 1869; Hook. f., Fl. Brit. India 6: 373. 1892; Fischer in Gamble, Fl. Pres. Madras 1540. 1931.

Decumbent herbs; stem 20-40 cm high, pubescent on one side. Leaves 8-12 x 2.5 cm, narrowly elliptic-lanceolate, acute at base, scabrid. Spathe 1 x 2 cm, acute on one side, shortly peduncled. Cymes few in a spathe, 2-4-flowered. Flowers 13 cm across; sepals 5 x 3 mm, obovate, acute; petals clawed, blue; stamens 3, one anther shorter than others; ovary 3-celled, 3-ovuled, glabrous. Capsule 3-celled, glabrous; seeds 4 x 3 mm, oblong, powdery.

*Fl. & Fr.* : September-December

*Distr.* : India, Australia and Africa. Common; in grasslands and moist deciduous forests. Koruthode, *JA 12443.*

**Commelina imberbis** Ehrenb. ex Hassk. in Schweinf., Beitr. Fl. Aethiop. 206. 1867; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 44. 1989. ***C. persicariaefolia*** Wight ex Clarke in DC., Mon. Phan. 3: 171. 1881; Hook. f., Fl. Brit. India 6: 372. 1892; Fischer in Gamble, Fl. Pres. Madras 1539. 1931.

Stem decumbent at base, glabrous. Leaves 10-13 x 3 cm, ovate-lanceolate, acuminate, rounded at base, pubescent, shortly petiolate; sheath 3.5 cm long, hirtus, margin ciliate, mouth oblique, red-glandular. Spathe 3.5 x 2.5 cm, broadly ovate, cordate at base, hairy; cymes solitary or paired, red-glandular. Flowers 15-16 mm across, 2-5 together; sepals 7 x 3 mm, lanceolate, acute; petals 7 x 4.5 mm, clawed, bluish red; stamens 3, one anther larger and coiled; staminodes 3, 4-lobed; ovary tomentose; one cell empty, others 2-ovuled.

*Fl. & Fr.* : August-October

*Distr.* : Peninsular India and Sri Lanka. Common; in open grasslands. Kalvarimala, *JA 13884.*

**Commelina maculata** Edgew., Trans. Linn. Soc. London 20: 89. 1851; R. Rao, Blumea 14: 353. 1966; Karthik., Fl. India Enum. 25. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 474. 1996. *C. **obliqua*** Hook. f., Fl. Brit. India 6: 372. 1892, non Bunch.-Ham ex D. Don, 1825: Fischer in Gamble, Fl. Pres. Madras 1539. 1931. ***Commelina obliqua*** sensu Hook.f., var. ***viscida*** Clarke in A. DC., Monogr. Phan. 3: 178. 1881. ***Commelina paludosa*** Bl., var. ***viscida*** (Clarke) R. Rao & Kammathy, Bull. Bot. Surv. India 3: 168. 1961.

Erect stout herbs; stem smooth. Leaves to 18 x 6 cm, ovate, acuminate, shortly petioled, glabrous; sheath 2 cm long; mouth oblique, ciliate with fulvous hairs. Spathe , 2-5 together, 2.5 x 3.5 cm, truncate above, glabrous. Flowers 1.5 cm across, 13-15 on each peduncle; sepals 6 x 4 mm, obovate, obtuse; petals 8 x 5 mm, blue; stamens 3, one anther larger; staminodes 3, 4-lobed. Capsule 3-celled, oblong; seeds one in each cell, wrinkled, brown.

*Fl. & Fr.* : July-October

*Distr.* : Indo-Malesia. Common; in evergreen forests. Mlappara, *JA 12143*; *JA & NS 12610.*

## 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. Cells of the capsule one-seeded ..... **C. arcotensis**
1. Cells of the capsule two-seeded ..... 2
2. Style glabrous ..... 3
2. Style bearded towards the tip ..... 4
3. Stem glabrous; bracts more than two times longer than the cymes ..... **C. cristata**
3. Stem villous; bracts equal to or little longer than the cymes ..... **C. villosa**
4. Plants covered with cottony hairs at least on the cymes ..... 5
4. Plants without cottony hairs ..... **C. tuberosa**
5. Cymes axillary; staminal filaments narrow near the apex ..... **C. fasciculata**
5. Cymes terminal; staminal filaments bulged near the apex ..... **C. arachnoidea**

**Cyanotis arachnoidea** Clarke in DC., Monogr. Phan. 3: 250. 1881; Hook. f., Fl. Brit. India 6: 386. 1892; Fischer in Gamble, Fl. Pres. Madras 1550. 1931; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1661. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 475. 1996.

Herbs suberect, densely covered with white-cottony hairs. Leaves to 20 x 1.5 cm, upper leaves much smaller, ovate to linear-lanceolate, cottony hairy. Cymes terminal; peduncle 4 cm long; bracts 1.7 x 1 cm, ovate, acute, hairy; bracteoles curved, falcate, 10-25 pairs, 6 x 1.5 mm, densely cottony hairy. Flowers densely packed; sepals 6 x 1.5 mm, united at the base, densely long hairy; corolla tube 7 mm long; lobes triangular, acute; filaments 12 mm long, bearded; ovary densely hairy at apex; style bearded. Capsule 2.5 mm long, oblong, hairy; seeds transversally rugose, black.

*Fl. & Fr.* : July-December

*Distr.* : Peninsular India and Sri Lanka. Common; in grasslands. Mangaladevi, *JA 12044*; Mullakkudy, *JA 13850*; Vallakkadavu, *JA & KPR 14121*; Mangaladevi, *14168.*

*Ethnobotanical use* : The bulbous basal part is pressed and water is collected in dry seasons for drinking water (Mannan).

**Cyanotis arcotensis** Rolla Rao, Blumea 14: 345. 1966; Manilal, Fl. Silent Valley 325. 1988. ***Cyanotis papilionacea*** auct. non (L.) Schultes f., 1830: Hook. f., Fl. Brit. India 6: 384. 1892; Fischer in Gamble, Fl. Pres. Madras 1549. 1931; Sasidh. & Sivar., Fl. Pl. Thrissur For. 475. 1996.

Procumbent herbs; stem sparsely hairy. Leaves 1-4 x 0.5-1 cm, lanceolate, acute, sparsely hairy; sheath to 1 cm long, hairy. Cymes peduncled, solitary or fascicled, terminal and upper axillary; bracts 8 x 5 mm, broadly ovate, abruptly acuminate; bracteoles 5 x 3 mm, curved, ciliate along the margins, 6-8 pairs in a cymes. Flowers few, densely; sepals 4.5 x 1.5 mm, united at the base, ciliate, hairy along the keels; corolla tube 4 mm long; lobes triangular, blue; filaments 6 mm long, bearded. Capsule 2 mm long, globose, hairy at apex; seeds solitary in a cell, obovate, trigonous, transversally rugose.

*Fl. & Fr.* : September-December

*Distr.* : Peninsular India. Common; in grasslands. Grambikokka, *JA 12436*; Vallakkadavu, *KPR 16900.*

**Cyanotis cristata** (L.) D. Don, Prodr. 46. 1825; Wight, Ic. t. 2085. 1853; Hook. f., Fl. Brit. India 6: 385. 1892; Fischer in Gamble, Fl. Pres. Madras 1549. 1931; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 646. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1662. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 475. 1996. ***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 mm long, oblanceolate, keeled; keel winged and ciliate; corolla tubular, tube 11 mm long, lobes obtuse; filaments 12 mm long, bearded. Capsule 3.5 mm long, glabrous with few apical hairs; seeds striate, with two pits on two faces, brownish black.

*Fl. & Fr.* : June-December

*Distr.* : Paleotropics. Common; in grasslands. Thaannikkudy, *JA 12346, 12616.*

**Cyanotis fasciculata** (Heyne ex Roth) Schultes f., Syst. Veg. 7: 1152. 1830; Wight, Ic. t. 2086. 1853; Hook. f., Fl. Brit. India 6: 387. 1892; Fischer in Gamble, Fl. Pres. Madras 1550. 1931; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 646. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1662. 1983; Manilal, Fl. Silent Valley 326. 1988; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 46. 1989. ***Tradescantia fasciculata*** Heyne ex Roth., Nov. Pl. Sp. 189. 1821.

Stem procumbent, tufted, covered with cottony hairs. Leaves to 3 x 0.7 cm, lanceolate, falcate, folded, rounded at base, long-hairy; sheath 1.5 cm long, saccate. Cymes axillary, solitary; peduncles 2 cm long; bracts 2 x 0.5 cm, lanceolate, acuminate; bracteoles 2-4 pairs, 10 x 4 mm,

falcate, acute. Flowers few, sessile; sepals 5 x 2 mm, united at the base, not keeled, hairy; corolla tube 6 mm long, campanulate, lobes obtuse, blue; filaments 8 mm long, bearded; style densely hairy, bulged below the stigma. Capsule 2.5 mm long, pilose at apex.

*Fl. & Fr.* : August-October

*Distr.* : Pantropical. Rare; on wet rocks in evergreen forests. Uppermanalar, *JA 13976*; Vallakkadavu, *KPR 16321*; Vallakkadavu, *JA & KPR 16323*.

**Cyanotis tuberosa** (Roxb.) Schultes f., Syst. Veg. 7: 1153. 1830; Hook. f., Fl. Brit. India 7: 386. 1892; Fischer in Gamble, Fl. Pres. Madras 1549. 1931; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 646. 1976; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 47. 1989. ***Tradescantia tuberosa*** Roxb., Pl. Corom. t. 108. 1799.

Perennial herbs with tuberous roots. Stem hairy on one side. Leaves basal, 20-35 x 1.5 cm, oblong, acute, margin white, serrulate, glabrous; cauline leaves much smaller. Cymes terminal, umbellate, 2-5 together, curved; bracts 2-2.5 x 0.7 cm, ovate, hairy; bracteoles numerous, 8 x 3 mm, falcate, hairy along the margins, many. Flowers many; sepals 7 x 2 mm, oblanceolate, hairy; corolla campanulate, tube 7-8 mm long, lobes acute, violet; filaments bearded on upper part; style bearded and bulged below stigma. Capsule ovoid, pilose above; seeds faintly rugose, black.

*Fl. & Fr.* : August-December

*Distr.* : Peninsular India. Rare; in grasslands. Thekkady, *JA 16352*.

**Cyanotis villosa** (Spreng.) Schultes f., Syst. Veg. 7: 1155. 1830; Hook. f., Fl. Brit. India 6: 387. 1892; Fischer in Gamble, Fl. Pres. Madras 1540. 1931; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1664. 1983; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 47. 1989. ***Tradescantia villosa*** Spreng., Syst. Veg. 2: 116. 1825.

Erect or procumbent herbs; stem terete, villous. Leaves 2-8 x 0.8-2 cm, ovate, sessile, cordate at base, villous above and below; sheath tubular, thickly villous. Cymes terminal and upper axillary, sessile; bracts 1.2 cm long, ovate-lanceolate, villous; bracteoles ovate, curved, ciliate along the margins. Flowers few; sepals 6-7 mm long, free, lanceolate, keel ciliate; corolla tube 6-7 mm long, lobes 4 mm long, obtuse, blue with red glands; filaments 11 mm long, bearded; style dialated below the stigma. Capsule 2-3 mm long, hairy at apex; seeds paired.

*Fl. & Fr.* : September-January

*Distr.* : Peninsular India and Sri Lanka. Common; in moist deciduous forests. Kumily, *JA 12500*; Mangaladevi, *JA 12540*; Kalvarimala, *JA 13881*.

## 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. Capsule pubescent; staminodes 2.....**D. protensum**
1. Capsule glabrous; staminodes absent.....2
2. Panicles longer than the leaves; seeds 2-2.5 mm long, rugose.....**D. montanum**
2. Panicles shorter than the leaves; seeds ca. 4 mm long, reticulate.....**D. ovalifolium**

**Dictyospermum montanum** Wight., Ic. t. 2069. 1853; Karthik. *et al.*, Fl. Ind. Enum. 21. 1989. ***Aneilema montanum*** (Wight) Clarke in DC., Monogr. Phan. 3: 217. 1881; Hook. f., Fl. Brit. India 6: 381. 1892; Fischer in Gamble, Fl. Pres. Madras 1546. 1931; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 643. 1976. **Thannikkanchi** (Mannan)

Erect or subscandent herbs. Stems 30-70 cm long, glabrous. Leaves to 18 x 4 cm, clustered towards the apex, elliptic-lanceolate, scabrid above; sheath to 2.5 cm long, pubescent on one side; mouth truncate. Panicle very lax, to 30 cm long; branches pubescent. Flowers 6 mm across, solitary, pedicelled; sepals 3 x 2 mm, oblong, obtuse, glabrous; petals white, 5 x 3 mm, obovate, obtuse; filaments 4 mm long, glabrous. Capsule 3-4 mm long, globose; seeds planoconvex, rugose, brown.

*Fl. & Fr.* : August-November

*Distr.* : Southern Western Ghats. Common; in evergreen and semi-evergreen forests. Mullakkudy, *JA 13846;* Karadikkavala, *JA & KPR 14178.*

*Ethnobotanical use* : The stems are twisted and the water extracted is used for persons suffering from fever.

**Dictyospermum ovalifolium** Wight, Ic. t. 2070. 1853. ***Aneilema ovalifolia*** (Wight) Hook. f. ex Clarke in DC., Memo. Phan. 3: 218. 1881; Hook. f., Fl. Brit. India 6: 382. 1892; Fischer in Gamble, Fl. Pres. Madras 1546. 1931; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 643. 1976.

Herbs; erect or decumbent at base. Leaves to 15 x 5 cm, scattered and upper ones verticillate, usually sessile, elliptic, acuminate, base acute, glabrous; sheath 2 cm long, glabrous; mouth oblique. Panicle pyramidal, congested; branches and pedicels recurved, puberulus. Flowers in a group of 3-6; sepals 3 x 2 mm, obovate, obtuse, glabrous; petals 3 x 2 mm, pale blue with red nerves; stamens 3, filaments naked. Capsule 7 x 5 mm, globose.

*Fl. & Fr.* : August-November

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Koruthode, *JA 12208*; Thaannikkudy, *JA & KPR 14212.*

**Dictyospermum protensum** Wight, Ic. t. 2071. 1853. ***Commelina scaberrima*** Bl., Enum. Pl. Java 1: 4. 1827. ***Aneilema scaberrimum*** (Bl.) Kunth, Enum. 4: 69. 1843; Hook. f., Fl. Brit. India 6: 382. 1892; Fischer in Gamble, Fl. Pres. Madras 1546. 1931; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 643. 1976. ***Dictyospermum scaberrimum*** (Bl.) Morton ex Hara *et al.*, Enum. Fl. Pl. Nepal 1: 82. 1982.

Herbs; erect or decumbent at base, covered with glochidiate hairs. Leaves to 20 x 5 cm, scattered, elliptic-lanceolate, acuminate, base acute, petiolate, hairy above and below; sheath 4 cm long, hairy; mouth oblique, ciliate. Panicle 10 x 10 cm, lax, long-peduncled; branches glochidiate-hairy. Flowers 10 mm across, solitary, shortly pedicelled; sepals 3 x 1 mm, obovate; petals 5 x 3 mm, blue or white; stamens 3, filaments naked, united at the base; staminodes 2-lobed, reddish; 6th stamen represented by a scale like filament only. Capsule 6-8 x 5 mm, obtusely 3-angled; seeds 3.5 x 3 mm; epidermal cells hexagonal, brown.

*Fl. & Fr.* : August-December

*Distr.* : Indo-Malaya. Occasional; in semi-evergreen forests. Kokkara, *JA 13529*; Vallakkadavu, *KPR & JA 16809.*

## **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. 1931; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 647. 1976; Manilal, Fl. Silent Valley 326. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 475. 1996. ***Dithyrocarpus rothii*** Wight, Ic. t. 208. 1839.

Creeping or suberect marshy herbs; stem terete, pubescent along one line. Leaves scattered, 5-10 x 2-1.5 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 3 x 2 mm, ovate, pubescent; petals 3 x 2 mm, 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.

*Fl. & Fr.* : October-January

*Distr.* : Indo-Malesia. Common; in marshy areas. Pachakkanam, *JA 12663; JA & KPR 14376.*

## 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. Leaves all basal; flowering shoot leafless ..... **M. glauca**
1. Leaves basal and/or cauline; flowering shoot leafy ..... 2
2. Staminal filaments glabrous; cymes axillary ..... **M. pauciflora**
2. Staminal filaments hairy; cymes terminal ..... 3
3. Staminodes absent; rudimentary stamens 3 with small anthers ..... **M. spirata**
3. Staminodes present; rudimentary stamens usually absent ..... 4
4. Seeds 2 in each cell of the capsule; fertile stamens 2 ..... 5
4. Seeds 3 or more in each cell of the capsule; fertile stamens 3 ..... 6
5. Roots tuberous; leaves usually clustered at base ..... **M. simplex**
5. Roots fibrous; leaves scattered along the stem ..... **M. nudiflora**
6. Seeds 5-6 in each cell of the capsule, 6-sided and pitted on each side ..... **M. zeylanica**
6. Seeds 3 in each cell of the capsule, not as above ..... 7
7. Leaves broadly oblong; roots tuberous ..... **M. japonica**
7. Leaves narrowly lanceolate; roots fibrous ..... **M. dimorpha**

**Murdannia dimorpha** (Dalz.) Brueck. in Engl. & Prantl, Pflanzenf. (ed. 2) 15a: 173. 1930; Karthik. *et al.*, Fl. Ind. Enum. 28. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 476. 1996. ***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. 1931. ***A. paniculata*** Wight, Ic. t. 2075. 1853.

Erect annuals, stems to 30 cm high, pubescent. Leaves to 8 x 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 7 mm long, slender; sepals 3 mm long, ovate, acute; petals 4 x 3 mm, obovate, glabrous; stamens 3, filaments bearded; staminodes 3-lobed, filaments naked. Capsule 6 x 3 mm, oblong, glabrous; seeds cubical, pitted.

*Fl. & Fr.* : July-October

*Distr.* : Peninsular India. Common; in grasslands. Mlappara, *JA 12087*; Vallakkadavu, *JA & KPR 16327.*

**Murdannia glauca** (Thw. ex Clarke) Brueck. in Engl. & Prantl, Pflanzenf. (ed. 2) 15a: 173. 1930; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 48. 1989. ***Aneilema glaucum*** Thw. ex Clarke in DC., Monogr. Phan. 3: 200. 1881; Hook. f., Fl. Brit. India 6: 375. 1892; Fischer in Gamble, Fl. Pres. Madras 1544. 1931.

Rosetted herbs on rocks. Leaves 15-18 x 2.5 cm, elliptic-ensiform, membranous, glabrous; sheath short, congested. Panicles on branched leafless scapes. Flowers solitary or 2-3 together, 6-8 mm across; sepals 3 x 2 mm, oblong; petals 3 x 3 mm, orbicular; stamens 3, filaments glabrous; rudimentary stamens 3, with small anthers. Capsule oblong, beaked; seeds 6-8 in a cell, cubical, glandular-hairy.

*Fl. & Fr.* : July-January

*Distr.* : Peninsular India and Sri Lanka. Common; on drifting rocks and on shady rock cuttings. Vellimala, *KPR & JA 18414.*

**Murdannia japonica** (Thunb.) Faden, Taxon 26: 142. 1977; Sasidh. & Sivar., Fl. Pl. Thrissur For. 476. 1996. ***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. 1931. ***A. latifolium*** Wight, Ic. t. 2072. 1853. ***Commelina elata*** Vahl, Enum. 2: 178. 1805. ***Murdannia elata*** (Vahl) Brueck. in Engl. & Prantl, Pflanzenf. (ed. 2), 15a : 173. 1930; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 648. 1976.

Obliquely erect stout herb; roots tuberous; stem rounded, smooth. Leaves to 23 x 6 cm basal and cauline, ovate, acute at apex, cordate at base, glabrous, coriaceous, sessile; cauline leaves smaller. Panicle to 20 x 10 cm, terminal, lax. Flowers 12 mm across, solitary or 2-3 together, pedicelled; sepals 4-5 x 2 mm, oblong-obtuse, red-glandular; petals white, 6 x 4 mm, obovate,

obtuse, pale blue or white; stamens 3, filaments bearded; staminodes 2-lobed, bearded. Capsule globose, beaked; seeds 2 x 1 mm, trigonous, with two round markings, tuberculate or reticulate, dark brown.

*Fl. & Fr.* : July-January

*Distr.* : Indo-Malesia. Common; in evergreen and semi-evergreen forests. Kokkara, *JA 12054*; Sabarimala, *JA 15476.*

**Murdannia nudiflora** (L.) Brenan, Kew Bull. 7: 189. 1952; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 648. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1666. 1983; Karthik. *et al.*, Fl. Ind. Enum. 29. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 477. 1996. ***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. 1931.

Creeping or decumbent herbs, rooting at lower nodes. Leaves to 10 x 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 3 x 1 mm, oblong, obtuse; petals 5 x 2 mm, 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.

*Fl. & Fr.* : July-December

*Distr.* : Tropical Asia. Common; in grasslands. Mlappara, *JA 12083*, Damsite, *14095;* Vallakkadavu, *KPR 16395.*

**Murdannia pauciflora** (Wight) Brueck. in Engl. & Prantl, Pflanzenf. (ed. 2) 15a: 173. 1930; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 649. 1976; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 49. 1989. ***Aneilema pauciflorum*** Wight, Ic. t. 2077. 1853; Hook. f., Fl. Brit. India 6: 378. 1892; Fischer in Gamble, Fl. Pres. Madras 1545. 1931. ***Murdannia wightii*** Rao & Kammathy, Notes Roy. Bot. Gard. Edinburgh 25: 184. 1964.

Creeping herbs, rooting at nodes; stem 15-25 cm long, hairy along one side. Leaves 0.8-3 x 0.5-1 cm, ovate, acute, cordate to amplexicaule at base, ciliate along the margins. Cymes axillary, 1-4-flowered. Flowers blue; sepals 3 mm long, elliptic, keeled, glandular; petals 4 mm long, broadly elliptic, acute, blue; stamens 3, filaments naked, staminodes 3, yellow, 3-lobed, yellow. Capsule 4.5 x 2 mm, oblong, sharply beaked, glabrous. Seeds 3-6 in a cell, cylindrical, wrinkled, rugose, grey-black.

*Fl. & Fr.* : October

*Distr.* : Peninsular India. Very common; in grasslands. Thaannikkudy, *JA & NS 12662, JA 12795.*

**Murdannia simplex** (Vahl) Brenan, Kew Bull. 7: 186. 1952; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 649. 1976; Karthik. *et al.*, Fl. Ind. Enum. 29. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 477. 1996. ***Commelina simplex*** Vahl, Enum. Pl. 2: 177. 1806. ***Aneilema sinicum*** Ker-Gawl. in Edgew., Bot. Reg. t. 659. 1822; Hook. f., Fl. Brit. India 6: 379. 1892; Fischer in Gamble, Fl. Pres. Madras 1545. 1931. ***A. secundum*** Wight., Ic. t. 2075. 1853.

Suberect herbs; roots tuberous; stem 40-65 cm high, terete, glabrous. Leaves basal and cauline, 10-20 x 1-1.5 cm, linear-lanceolate, acute; cauline leaves smaller; sheath open, 2 cm long, ciliate. Cymes 8 cm long, terminal, panicled; peduncle 8 cm long. Flowers 5-20 in a cymes; pedicel 5-6 mm long; sepals 6 x 3 mm, elliptic, acute at apex; petals 8 x 5 mm, obovate, obtuse, narrow; staminodes 3, yellow, 3-lobed. Capsule 6.5 x 3 mm, ellipsoid, acute, beaked; seeds 3 x 2 mm, ellipsoid, rugose, brown.

*Fl. & Fr.* : August-December

*Distr.* : Paleotropics. Common; in grasslands. Kalvarimala, *JA 13898.*

**Murdannia spirata** (L.) Brueck. in Engl. & Prantl, Pflanzenf. (ed. 2) 15a: 173. 1930; Panigr. & Kammathy, Proc. Nat. Acad. Sci. India 33: 495. 1963; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 649. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1667. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 477. 1996. ***Commelina spirata*** L., Mant. Pl. 176. 1771. ***Aneilema spiratum*** (L.) R. Br., Prodr. 271. 1810; Hook. f., Fl. Brit. India 6: 377. 1892; Fischer in Gamble, Fl. Pres. Madras 1546. 1931.

Creeping herbs with erect branches; stem angled, pubescent along one side. Leaves to 2.5 x 1.2 cm, ovate, acute, cordate at base, glabrous. Panicle terminal and upper axillary, 5-20-flowered. Flowers 4-5 mm across; sepals obovate, obtuse, 5-nerved; petals obovate, obtuse, 3-nerved, blue; stamens 3, filaments hairy, connective produced into short beak; rudimentary stamens 3, with small anthers. Capsule obovoid, 3-celled; seeds 2 in each cell, rugose, dark brown, with circular scar on one face.

*Fl. & Fr.* : October-December

*Distr.* : Indo-Malesia. Common; in grasslands. Thaannikkudy, *NS & JA 12619.*

**Murdannia zeylanica** (Clarke) Brueck. in Engler & Prantl, Pflanzenfam. (ed. 2), 15a : 173. 1930, var. **longiscapa** (Clarke) R. Rao. & Kammathy, Bull. Bot. Surv. India 3: 394. 1961; Manilal, Fl. Silent Valley 328. 1988; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 50. 1989. ***Aneilema zeylanica*** Clarke var. ***longiscapa*** Clarke in DC., Monogr. Phan. 3: 204. 1881; Hook. f., Fl. Brit. India 6: 376. 1892; Fischer in Gamble, Fl. Pres. Madras 1544. 1931.

Decumbent herbs, roots fibrous, from lower nodes. Leaves to 10 x 2.5 cm, oblong to lanceolate, acute at apex, cordate at base, all cauline, glabrous; sheath tubular, mouth oblique, ciliate. Panicle 12 x 12 cm, terminal, spreading; branches glabrous. Flowers 10 mm across, solitary; pedicels 6-8 mm long, slender; sepals 4-5 x 2 mm, oblong, acute, 3-nerved, glabrous; petals 5 x 2.5 mm, obovate, obtusely acute; stamens 3, filaments bearded; staminodes 3, yellow, 2-lobed. Capsule 6 x 3 mm, oblong, beaked; seeds cubical, 5 in each cell, each side with a pit, faintly rugose, dark brown.

*Fl. & Fr.* : February

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Chokkampetti, *JA 13363.*

**TONNINGIA** Necker ex A. H. L. Jussieu

Dict. Sci. Nat. 54: 505. 1829

**Tonningia axillaris** (L.) O. Ktze., Rev. Gen. Pl. 2: 721. 1891; Sasidh. & Sivar., Fl. Pl. Thrissur For. 478. 1996. ***Commelina axillaris*** L., Sp. Pl. 42. 1753. ***Cyanotis axillaris*** (L.) Schultes f., Syst. Veg. 7: 1154. 1830; Hook. f., Fl. Brit. India 6: 388. 1892; Fischer in Gamble, Fl. Pres. Madras 1550. 1931. ***Amischophacelus axillaris*** (L.) Rao & Kammathy, J. Linn. Soc. Bot. 59: 306. 1966; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 642. 1976.

Annuals, stems procumbent, terete, glabrous, succulent. Leaves 5-6 x 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.

*Fl. & Fr.* : November-February

*Distr.* : Indo-Malesia to Australia. Common; in moist-deciduous forests. Pamba, *JA & KPR 17174.*

## 140. JUNCACEAE

Juss., Gen. Pl. 43. 1789.

**JUNCUS** Linnaeus

Sp. Pl. 325. 1753.

Erect herbs, grass-like, stems tufted; rootstock shortly creeping. Leaves radical or cauline narrow, grass-like, terete, or compressed, sheathing at base. Flowers small, bisexual, clustered in

terminal spreading cymes, sessile, clustered; perianth lobes 6, 2-seriate, similar, glumaceous; stamens 3-6, adnate to the base of the perianth; ovary superior, unilocular, with many ovules on 3-parietal placentation. Fruit a capsule; seeds many.

1. Leaves absent; stem striate; panicles lateral.....**J. inflexus**
1. Leaves present; stem flattened; panicles terminal.....**J. prismatocarpus**

**Juncus inflexus** L., Sp. Pl. 326. 1753; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 50. 1989. ***J. glaucus*** Ehrh. ex Sibth., Fl. Oxon. 113. 1794; Hook. f., Fl. Brit. India 6: 393. 1892; Fischer in Gamble, Fl. Pres. Madras 1553. 1931; Fyson, Fl. South Indian Hill St. 2: 557. 1932.

Tufted herbs; stems to 50 cm long, 2 mm thick, terete, ridged, green, glabrous. Panicles 2-3 cm across, lateral, sessile, 3-6 cm below the apex of the stem. Flowers many, 2 mm long, globose, shortly pedicelled; perianth lobes 2 mm long, yellow. Capsule 2.5 x 1.5 mm, ovoid, obtuse; seeds 1 x 0.5 mm, curved-ellipsoid, acute, brown, closely striate.

*Fl. & Fr.* : November-April

*Distr.* : India, Europe, Africa and Malesia. Common; in marshy areas of grasslands. Uppermanalar, *JA 13731.*

**Juncus prismatocarpus** R. Br., Prodr. 259. 1810; Hook. f., Fl. Brit. India 6: 395. 1892, p.p.; Fischer in Gamble, Fl. Pres. Madras 1553. 1931; Fyson, Fl. South Indian Hill St. 2: t. 558. 1932; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 655. 1976; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1668. 1983; Manilal, Fl. Silent Valley 328. 1988; Harriman in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 389. 1991.

Densely tufted herbs; leafy stem to 30 cm high. Leaves to 9 x 0.3 cm, lanceolate, acuminate, septate; sheath keeled, compressed. Panicles 10 x 8 cm; umbellule globose, peduncled. Flowers 3-6 together; bracts cuspidate; perianth lobes 3.5 x 1 mm, lanceolate, glabrous. Capsule 5 x 2 mm, lanceolate, acute; seeds 0.5 x 0.25 mm, obovoid, brown.

*Fl. & Fr.* : Throughout the year

*Distr.* : South-East Asia and Australia. Common; in marshy areas of grasslands. Thaannikkudy, *JA & KPR 14517, 14837*; Kavalappara, *JA 14535.*

## 141. ARECACEAE

Schultz Sch., Nat. Syst. Pflanzenr. 317. 1832; *nom. alt.* **Palmae**

1. Climbing shrubs; fruit covered with scales.....**Calamus**
1. Erect trees or shrubs; fruits not covered with scales.....2

2. Leaves bipinnate; leaflets cuneate ..... **Caryota**

2. Leaves 1-pinnate; leaflets lanceolate..... 3

3. Leaflets with unequal auricles at base ..... **Arenga**

3. Leaflets not auricled at base..... 4

4. Tall trees; inflorescence below the caudex; leaflets not transformed into spines..... **Bentinckia**

4. Shrubs; inflorescence in the caudex; lower leaflets transformed into spines ..... **Phoenix**

## **ARENGA** Labillardiere

Mem. Inat. Par. 4: 209. 1801, *nom. cons.*

**Arenga wightii** Griff., Calcutta J. Nat. Hist. 5: 475. 1845; Hook. f., Fl. Brit. India 6: 422. 1892; Ramam. & Gandhi in Sald. & Nicols., Fl. Hassan Dist. 774. 1976; Fischer in Gamble, Fl. Pres. Madras 1588. 1931; Sasidh. & Sivar., Fl. Pl. Thrissur For. 478. 1996. **Aazham, Aazhuthum pana** (Malampandaram), **Kattu thengu** (Mannan).

Monoecious palms; trunk to 6 m tall, covered with persistent leafsheaths, caudex 10-15 m across. Leaves pinnatisect, to 8 m long; leaflets to 100 x 5 cm, linear, auricled at base, glaucous below; petiole to 3 m long. Spadices to 1 m long, basipetal, male flowers and female flowers on separate spadices. Male flowers : tepals 6, biseriate, outer 3 mm long, orbicular; stamens many, free. Female flowers : tepals 6, biseriate, similar, accrescent; ovary 3-celled. Fruit globose, 2 or 3 seeded.

*Fl. & Fr.* : Throughout the year

*Distr.* : Western Ghats, endemic. Fairly common; in evergreen forests. Arjunankotta, *JA 17999.*

*Ethnobotanical use* : The young spadices are cut frequently and the exudate is collected which is used as toddy. The flour obtained from the stem pith is mixed with roots of *Thottea siliquosa* is given for jaundice. It is a good food for ladies after childbirth.

## **BENTINCKIA** Berry ex Roxburgh

Fl. Ind. 3: 621. 1814.

**Bentinckia condapanna** Berry & Roxb., Fl. Ind. 3: 621. 1832; Beccari & Hook. f. in Hook. f., Fl. Brit. India 6: 418. 1892; Fischer in Gamble, Fl. Pres. Madras 1555. 1931; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 51. 1989. **Parappakku** (Mannan)

Monoecious palms to 20 m tall; stem 20 cm thick, annulate, caudex 2-3 m across. Leaves pinnately compound; leaflets 50-70 x 3-5 cm, linear-lanceolate, evenly scattered, sessile; petiole 30-60 cm long, sheath rounded, 55 cm long, 26 cm broad, encircling the stem. Spadix axillary, below the leaves, branched, 30-50 cm across; spathes many. Male flowers small or sunken in the

spirally arranged pits towards the tips of branches; perianth lobes 6, biseriate, outer smaller, 5 mm across, orbicular, inner longer; stamens 6, free. Female flowers larger, towards the base of the branches of spadix; ovary 3-celled, 1 cell larger with an ovule. Fruit subglobose, 1.2 x 0.9 cm, dark, pink.

*Fl. & Fr.* : Throughout the year

*Distr.* : Endemic to Western Ghats. Rare; in slopes along shola and cuttings in grasslands. Uppupara, *NS & JA 12712.*

## **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 grouped; fruits oblong ..... **C. thwaitesii**
1. Leaflets not grouped; fruit spherical to sub-ovoid ..... 2
2. Leaflets 6-veined ..... **C. vattayila**
2. Leaflets 3-veined ..... 3
3. Mouth of the sheath with narrow large spines ..... 4
3. Mouth of the sheath without large spines ..... **C. gamblei**
4. Plants up to 3 m long and stem with sheath 1.5 cm thick ..... **C. brandisii**
4. Plants more than 7 m long and stem with sheath more than 2 cm thick ..... 5
5. Mouth of the sheath with 3-4 pairs of long spines up to 10 cm long; fruits subovoid ... **C. pseudotenuis**
5. Mouth of the sheath with numerous spines up to 18 cm long; fruits subglobose ..... **C. hookerianus**

**Calamus brandisii** Becc. ex Becc. & Hook. f. in Hook. f., Fl. Brit. India 6: 448. 1892; Fischer in Gamble, Fl. Pres. Madras 1567. 1931; Henry *et al.*, Fl. Tamil Nadu Ser. 1, 3: 51. 1989. **Vallichooral** (Thevan, Paliyan).

Clustering small sized canes; stems to 4 m long, with sheath to 1.5 cm diam. without sheath, 0.6 cm; sheath pale green, densely armed with small spines and intermediate with large spines, to 2 cm long, flat, greenish-brown, inner sparsely brown-tomentose, knee conspicuous; ocrea short and bearing narrow spines; mouth of the sheath with long papery spines, to 8 cm long. Leaves to 60 cm long, greenish brown when dry; petiole to 10 cm long; armed with spines; spines to 2 cm long; leaflets alternate or subopposite, acuminate; tip and margins with small hairs, terminal pairs free at base; flagellum to 1 m long, armed with hooked spines. Male and female inflorescence up to 1 m long, carries 3 partial inflorescence to 20 cm long, arising above the mouth of the sheath. Rachillae 5-8 pairs, distichous, 3 cm long, involucrophorum not stalked, involucre cupular. Fruit 1 x 0.9 cm, sub-ovoid, scales 15 rows, broader than long, bordered with reddish brown line.

*Fl. & Fr.* : December-May

*Distr.* : Southern Western Ghats, endemic. Common; in evergreen forests above 1200 m altitude; Chokkampetti, *JA 14466.*

*Ethnobotanical use* : This cane is used for making baskets, chairs and other similar items; this rare cane is becoming rarer due indiscriminate over exploitation.

**Calamus gamblei** Becc. ex Becc. & Hook. f. in Hook. f., Fl. Brit. India 6: 493. 1893; Fischer in Gamble, Fl. Pres. Madras 1568. 1931; Sasidh. & Sivar., Fl. Pl. Thrissur For. 479. 1996.

Clustering moderate sized cane; stems to 30 m or more long, with sheaths ca 2.5 cm diam. sheaths green, armed with spines, spines bulbous based, knee present. Leaves to 1.2 m long. Inflorescence flagellate, arising well above the mouth of the sheath. Partial inflorescence 5-6, to 90 cm long. Fruit 2 cm across, spherical or slightly tapers at base; scales deeply channelled, pale yellow, shining.

*Fl & Fr.* : December-April

*Distr.* : Western Ghats; endemic. Common; in evergreen forests. Chokkampetti, *JA 17767.*

**Calamus hookerianus** Becc., Ann. Roy. Bot. Gard. Calcutta 11: 83, 226, t. 70. 1908; Fischer in Gamble, Fl. Pres. Madras 1568. 1931; Sasidh. & Sivar., Fl. Pl. Thrissur For. 479. 1996.

Clustering moderate sized canes; stems to 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 to 18 cm long. Leaves 2 m long; leaflets regular. Fruits *ca.* 1 x 0.8 cm, subglobose; scales yellowish-brown with a dark brown boarder. Endosperm not ruminate.

*Fl. & Fr.*: April

*Distr.* : Western Ghats. Common; in evergreen forests. Arjunankotta, *JA 15066.*

**Calamus pseudotenuis** Becc. ex Becc. & Hook. f. in Hook. f., Fl. Brit. India 6: 445. 1892; Fischer in Gamble, Fl. Pres. Madras 1567. 1931; Ramam. & Gandhi in Sald. & Nicols., Fl. Hassan Dist. 775. 1976; Manilal, Fl. Silent Valley 329. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 480. 1996.

Clustering moderate sized canes; stems to 7 m or more in length, with sheaths to 3.5 cm in diameter; sheath yellowish green, spines to 3.5 cm long, intermingled with thin smaller spines, brown-tomentose; mouth of the sheath with 3-4 longer spines, to 6 cm long; ocrea 10 cm long. Leaf to 1.6 m long; leaflets *ca.* 50 x 2.5 cm, regular, long-acuminate. Inflorescence 3 m long; partial inflorescence 70 cm long; rachillae 8 cm long. Fruit *ca.* 1.5 x 0.8 cm, subovoid.

*Fr.* December

*Distr.* : Western Peninsular India and Sri Lanka. Rare; in evergreen forests. Melmala, *JA 14440.*

**Calamus thwaitesii** Becc. & Hook. f., in Hook.f., Fl. Brit. India 6 441. 1892; Ramam. & Gandhi in Sald. & Nicols., Fl. Hassan Dist. 775. 1976; Sasidh. & Sivar., Fl. Pl. Thrissur For. 480. 1996. ***C. thwaitesii*** Becc. var. ***canaranus*** Becc., Ann. Roy. Bot. Gard. Calcutta 11: 138. t. 12. 1908; Fischer in Gamble, Fl. Pres. Madras 1567. 1931. **Pannichooral, Thadiyan chooral** (Mala Arayan)

Robust clustering and high climbing canes. Stems to 20 m or more in length, with sheath to 6 cm in diam; 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 m long; leaflets grouped. Fruit ca. 2 x 1.3 cm, ovoid, scales in 12 vertical rows, with median grooves, yellow with brown margins. Endosperm not ruminate.

*Fr.* April

*Distr.* : Western Ghats, endemic. Common; in evergreen forests. Chenthamarakokka, *JA 15135.*

*Ethnobotanical use* : This cane is used for making baskets and chairs (Mala Arayan).

**Calamus vattayila** Renuka, Curr. Sci. 56: 1012. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 480. 1996.

Solitary or climbing canes; stems to 30 m long, with sheaths to 2.5 cm in diam; sheath dark green, sparingly spiny; knee conspicuous. Leaf to 1 m long, leaflets alternate, to 40 x 8 cm, elliptic, ciliate at apex, 6-veined; petiole to 25 cm long; spines erect, to 1 cm long; flagellum to 4 m long, with grouped recurved spines. Female inflorescence in heavy branches, to 1 m long. Fruit *ca.* 2.5 x 0.8 cm, oblong, scales in 25-30 rows, longer than broad, chest nut brown.

*Fr.* February

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Arjunankotta, *JA 13390.*

## CARYOTA Linnaeus

Sp. Pl. 1189. 1753

**Caryota urens** L., Sp. Pl. 1189. 1753; Beccari & Hook. f. in Hook. f., Fl. Brit. India 6: 422. 1892; Fischer in Gamble, Fl. Pres. Madras 1560. 1931; Ramam. & Gandhi in Sald. & Nicols., Fl. Hassan Dist. 776. 1976; Moore & Dransfield, Taxon 28: 70. 1979; Sasidh. & Sivar., Fl. Pl. Thrissur For. 480. 1996. **Kappa** (Mannan), **Choondappana** (Malam pandaram).

Large palms; stem 30-60 cm thick, annular; caudex lax. Leaves to 6 x 4 m, spiral, bipinnate, leaflets to 40 x 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 cm long; sepals 3, 4 x 5 mm, orbicular; petals 3, 15 x 5 mm, oblong, calycine; stamens many, filaments united at base; Fruit globose, 1-2-seeded; seeds planoconvex; endosperm ruminate.

*Fl. & Fr.* : Throughout the year

*Distr.* : Indo-Malesia. Occasional; in evergreen forests. Umikuppan, *KPR 14889.*

*Ethnobotanical use* : The tender stems (pith) of younger palms are eaten; Malampandarams are found collecting the starchy pith of this palm, powdering it, dissolving in water and pressed through cloth, and the starch present in water is cooked and eaten.

## PHOENIX Linnaeus

Sp. Pl. 1188. 1753

**Phoenix loureirii** Kunth, Enum. 3: 257. 1841; Moore, Princeps 7: 157. 1963; Matthew & Britto in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1674. 1983; Karthik. *et al.*, Fl. Ind. Enum. 20. 1989; Sasha C. Barrow, Kew Bull. 53(3): 563. 1998. ***P. humilis*** Royle ex Beccari var. ***pedunculata*** Beccari, Males. 3: 379, 387, t. 44, ff. 13-15, 18-21. 1890; Beccari & Hook. f. in Hook. f., Fl. Brit. India 6: 427. 1892; Fischer in Gamble, Fl. Pres. Madras 1560. 1931; Ramam. & Gandhi in Sald. & Nicols., Fl. Hassan Dist. 776. 1976. **Chitteenthal** (Mannan).

Dioecious coarse bushy shrubs, to 2 m tall, stem 20 cm thick, densely covered with leaf sheaths. Leaves in a dense caudex, to 1 m long, 60-70 cm broad, pinnately compound; lower leaflets transformed into sharp spines; upper ones 4-8 together, to 30 x 1 cm, linear-oblong, acuminate, folded. Spadix axillary, 20-30 cm across; branches spreading, to 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 12 x 8 mm, obovoid, yellow.

*Fl. & Fr.* : Throughout the year

*Distr.* : India to Vietnam and China. Common; in hilltop grasslands. Kumarikulam, *JA 13028.*

*Ethnobotanical use* : The tender parts of the stems (pith) are eaten fresh.

## 142. PANDANACEAE

R. Brown, Prodr. 340. 1810.

### PANDANUS S. Parkinson

J. Voyage South Seas 46. 1773.

**Pandanus thwaitesii** Mart., Bull. Soc. Bot. Ital. 369. 1904; Fischer in Gamble, Fl. Pres. Madras 1570. 1931; Stone in Sald. & Nicols., Fl. Hassan Dist. 780. 1976; Manilal, Fl. Silent Valley 330. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 481. 1996.

Dioecious shrubs with stilt roots. Leaves spiral close, 150 x 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, to 20 cm long. Flowers closely arranged; perianth absent; ovary 1-celled; ovule solitary. Fruit an aggregate of drupe, to 6 x 5 cm; drupes obovoid, laterally connate with a hexagonal outer face.

*Fl. & Fr.* : September-March

*Distr.* : Southern Western Ghats. Common; in evergreen forests. Mlappara, *JA 18466.*

## 143. ARACEAE

Juss., Gen. Pl. 23. 1789.

1. Climbers.....2
1. Erect herbs or shrubs.....3
2. Flowers naked; leaves pinnatifid or perforate.....**Raphidophora**
2. Flowers tepellate; leaves entire.....**Pothos**
3. Leaves peltate.....4
3. Leaves not peltate.....6
4. Leaves orbicular, not cordate at base.....**Ariopsis**
4. Leaves ovate, cordate at base.....5
5. Plants produce bulbils on bulbiferous stalks; leafless during flowering.....**Remusatia**
5. Plants do not produce bulbils; leafy during flowering.....**Colocasia**
6. Leaves entire.....7
6. Leaves divided or deeply lobed.....10

7. Lower portion of the spathe separated by a transverse septum; leaves acute at base ..... 8

7. Lower portion of the spathe not separated by a transverse septum; leaves cordate at base ..... 9

8. Leaves grass-like ..... **Cryptocoryne**

8. Leaves broad ..... **Lagenandra**

9. Leaves over 20 cm ..... **Alocasia**

9. Leaves below 10 cm long ..... **Theriophonum**

10. Flowers bisexual ..... **Anaphyllum**

10. Flowers unisexual ..... 11

11. Leaves pedate or radiate; apex of the spathe horizontal; spadix and leaves seen together ..... **Arisaema**

11. Leaves variously cut; lobes decurrent at base; apex of the spathe not horizontal; spadix and leaves not seen together ..... **Amorphophallus**

## **ALOCASIA** (Schott) G. Don

in Sweet, Hort. Brit. ed. 3, 631. 1839, *nom. cons.*

Herbs with thick, cylindrical, rarely erect stem. Leaves few to many; petiole channeled and sheathing at base; blade cordate to sagittate at base, membranous; lateral nerves few to many, thick; nervules join at the middle forming a strong and parallel intercostae. Spadix peduncled, constricted at middle, lower part usually green, upper part white or yellow; spadix 3-parted, lower pistillate part, upper staminate part, middle constricted sterile part. Male flowers crowded; stamens 3-9, united into a truncate synandrium. Female flowers many; ovary 1-chambered, ovules few. Fruit an aggregate of berries.

1. Spadix 20-28 cm long; leaves cordate at base ..... **A. macrorrhizos**

1. Spadix to 13 cm long; leaves sagittate at base ..... **A. fornicata**

**Alocasia fornicata** (Roxb.) Schott, Oesterr. Bot. Wochenbl. 4: 410. 1854; Hook. f., Fl. Brit. India 6: 526. 1893; Balakr., Bull. Bot. Surv. India 6: 91. 1964; Nicols. in Sald. & Nicols., Fl. Hassan Dist. 783. 1976 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 57. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 482. 1996. ***Arum fornicatum*** Roxb., Fl. Ind. 3: 501. 1832, non Wight, 1834.

Perennial herbs; stems erect, to 10 cm long, 2.5 cm thick. Leaves 2-5 together; blade to 42 x 26 cm, ovate, acute, shortly peltate, proximal lobes triangular, acute; nerves to 8 pairs, lowest pair bear the lateral nerves of basal lobes, intercostae regular, parallel; petiole to 45 cm long, canaliculate, slender, base sheathing. Peduncle 2-4 together, to 40 cm long, slender; spathe yellow, 12-14 cm long, tubular part 5 cm long, limb ovate, acuminate to the apex; spadix 10-12

cm long, pistillate lower part 1.5 cm long, sterile middle portion 2 cm long, staminate part 2 cm long and appendix 6 cm long.

*Fl. & Fr.* : October-March

*Distr.* : India and Sri Lanka. Occasional; in evergreen forests. Sabarimala, *JA 14864.*

**Alocasia macrorrhizos** (L.) G. Don in Sweet, Hort. Brit. ed. 3, 631. 1839, "*macrorrhizon*"; Hook. f., Fl. Brit. India 6:526. 1893; Fischer in Gamble, Fl. Pres. Madras 1582. 1931; Nicols. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6:58.1987. ***Arum macrorrhizon*** L., Sp. Pl. 965. 1753.

Stout perennial herbs; stem horizontal or erect, 4-5 cm thick. Leaves several, to 48 x 33 cm; ovate, acute, proximal lobes rounded; nerves to 8 pairs, lowest pair bear the lateral nerves of the lobes, intercostae parallel, joining at the middle. Peduncle to 30 cm long, stout; spathe to 28 cm long, constricted at middle, yellowish green; spadix to 20 cm long, cylindrical, 1-1.5 cm thick, continuous. Male flowers in upper to 12 cm of the spadix; stamens 6, united into a hexagonal synandrium. Female flowers in basal 3 cm of the spadix; ovary 1-celled, ovules 3, basal. Neuter flowers flat, hexagonal.

*Fl. & Fr.* : October-December

*Distr.* : South-East Asia. Occasional; in disturbed forests. Koruthode, *JA 16373.*

## 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 at 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.Leaflets oblong; spathe to 8 cm broad; neuter flowers present between male and female zones.....**A. hohenackeri**

1.Leaflets ovate; spathe 20-45 cm broad; neuter flowers absent .....**A. paeoniifolius**

**Amorphophallus hohenackeri** (Schott) Engl. & Gehrm. in Engl., Pflanzenr. 48: 103. 1911; Fischer in Gamble, Fl. Pres. Madras 1587. 1931; Sivadas. in Jain & Rao, Threatened Pl. India

252. 1983; Karthik. *et al.*, Fl. Ind. Enum. 6. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 483. 1996. ***Raphidophyllus hohenackeri*** Schott, Gen. Aroid. t. 27. 1858.

Corm to 3 cm across, smooth, depressed globose, dull white inside; petiole 40-45 cm long, 1 cm across, brown, lamina to 45 cm across, leaflets to 12 x 2.5 cm, oblong-lanceolate, acuminate, decurrent into a narrow wings at base. Peduncle to 55 cm long; spathe to 8 cm across, ovoid, brown, convolute below. Spadix to 8 cm long, flowers along the lower 2.5 cm long portion, ovary globose, greenish, appendix white, cylindrical. Fruits now seen.

*Fl.* May

*Distr.* : Southern Western Ghats. Rare; along the margins of evergreen forests. Manakkavala, *JA 14102, JA 17814.*

**Amorphophallus paeoniifolius** (Dennst.) Nicols., Taxon 26: 338. 1977, var. **paeoniifolius** Sivadas., Taxon 32: 128. 1983; Nicols. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 39. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 484. 1996. ***Dracontium paeoniifolium*** Dennst., Schluess. Hort. Malab. 13, 38. 1818. ***Amorphophallus campanulatus*** Decne., Ann. Mus. Natl. Hist. Nat. 3: 366. 1834; Hook. f., Fl. Brit. India 6: 513. 1893, p.p.; Fischer in Gamble, Fl. Pres. Madras 1587. 1931; Nicols. in Sald. & Nicols., Fl. Hassan Dist. 783. 1976.

Corm to 20 cm across, depressed globose, tubercled, pale pink inside; petiole to 50 cm long, 3-4 cm thick, green with brown patches; lamina 70-120 cm across; lobes to 14 x 5.5 cm, ovate, acuminate, decurrent at base into a wing to the petiole; nerves impressed above. Peduncle 5-6 cm long, thick; spathe 38 cm across, 25-45 cm high, campanulate, undulate, dull greenish brown; spadix as long as spathe; appendage obovoid, 20-25 cm across, uneven, rugose, deep pink. Flowers on the lower half of the spadix. Berry 15 x 10 mm, oblong, obovoid, orange-red, glabrous.

*Fl & Fr.* : May-October.

*Distr.* : India and Sri Lanka. Occasional; in evergreen forests. Sabarimala, *JA 17830.*

*Ethnobotanical use* : the corm is cooked in curd and eaten for gastric ulcers.

## ANAPHYLLUM Schott

Gen. Aroid. t. 83. 1858.

**Anaphyllum wightii** Schott, Bonplandia 5: 127. 1857 & Gen. Aroid. t. 83. 1858; Hook. f., Fl. Brit. India 6: 551. 1893; Fischer in Gamble, Fl. Pres. Madras 1589. 1931; Sivadas. in Jain & Rao, Threatened Pl. India 252. 1983; Manilal, Fl. Silent Valley 330. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 484. 1996.**Keerikkizhangu** (Mala Arayan).

Tall herbs with a creeping rhizome. Leaves pinnatisect or pinnatipartite; lobes 3-8 pairs, to 28 x 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 cm long, 8-10 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.

*Fl. & Fr.* : July-January

*Distr.* : Western Ghats. Common; in evergreen forests. Mlappara, *JA 12152;* Koruthode, *JA 14115.*

*Ethnobotanical use* : Chewing the corm is good for snake bite.

## **ARIOPSIS** Nimmo

in J. Graham, Cat. Pl. Bombay 252. 1839

**Ariopsis peltata** Nimmo. in Grah., Cat. Pl. Bombay 252. 1839; Hook. f., Fl. Brit. India 6: 519. 1893; Fischer in Gamble, Fl. Pres. Madras 1580. 1931; Nicols. in Sald. & Nicols., Fl. Hassan Dist. 784. 1976; Manilal, Fl. Silent Valley 331. 1988. ***Remusatia vivipara*** sensu Wight, Ic. t. 900. 1845, non Schott, 1832 [Fig. 74 A].

Epiphytic or terrestrial annuals, rootstock globose, to 1 cm across. Leaves 1 or 2, peltate, lamina 5-9 cm across, orbicular, entire, membranous, glabrous; petiole to 8 cm long, slender. Peduncle 2-5 cm long, solitary; spathe yellow or white, 3 cm long, cymbiform, open, tube absent; spike 2.5 cm long, cylindrical, 3 mm, thick. 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.

*Fl. & Fr.* : October-January

*Distr.* : Tropical Himalayas and Western Ghats. Rare; in evergreen forests. Sabarimala, *JA & KPR 14926.*

## **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. Appendix of spadix much longer than the spathe; leaves pedately lobed ..... **A. tortuosum**
1. Appendix of spadix smaller than the spathe; leaves radiately lobed ..... 2
2. Spadix to 22 cm long; spadix appendix blunt at apex..... **A. leschenaultii**
2. Spadix to 10 cm long; spadix appendix narrowed at apex..... 3
3. Spadix Appendix curved near the apex ..... **A. tylophorum**
3. Spadix Appendix straight..... 4
4. Spathe purplish with white longitudinal stripes..... **A. barnesii**
4. Spathe greenish ..... **A. murrayi**

**Arisaema barnesii** Fischer, Kew Bull. 1933: 342. 1933 & in Gamble, Fl. Pres. Madras 1891. 1936; Manilal, Fl. Silent Valley 331. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 484. 1996.

Corm 1-2 cm across, globose; petiole 20-45 cm long, smooth, base sheathing. Leaflets 6, 16 x 3 cm, elliptic-oblong, acuminate, base acute, glabrous, petiolule 1-2 cm long. Peduncle slender; spathe 6-10 cm long, tube 1-1.5 cm broad, purple with white lines, glabrous; limb ovate, finely caudate-acuminate, horizontal, green with white lines. Spadix 6 cm long, straight, narrowed at apex into a short tail.

*Fl. & Fr.* : November-June

*Distr.* : Southern Western Ghats. Occasional; in evergreen forests. Mangaladevi, *JA 12023;* Melmanalar, *JA 13821.*

**Arisaema leschenaultii** Bl., Rumph. 1: 93. 1836; Hook. f., Fl. Brit. India 6: 504. 1893; Fischer in Gamble, Fl. Pres. Madras 1585. 1931; Fyson Fl. South Indian Hill St. 2: t. 562. 1932; Nicols. in Sald. & Nicols., Fl. Hassan Dist. 784. 1976; Sivadas. & Nicols. in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1688. 1983; Nicols. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 71. 1987; Manilal, Fl. Silent Valley 332. 1988.

Corm 1-6 cm across, depressed globose. Leaf one; leaflets 7-12, to 25 x 7 cm, lanceolate, acuminate; nerves many, close, parallel, forming an intramarginal vein, prominent, glabrous; petiole to 70 cm long, 1-3 cm thick, brownish. Spadix peduncled, below the level of leaf; 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 in lower 1-3 cm long; neuter flowers filiform, simple or bifurcate, to 1 cm long. Fruits not seen.

*Fl* : June-December

*Distr.* : South India and Sri Lanka. Occasional; along margins of evergreen forests. Mangaladevi, *JA 13822.*

**Arisaema murrayi** (Graham) Hook. in Bot. Mag. 74: t. 4388. 1848; Hook. f., Fl. Brit. India 6: 507. 1893; Fischer in Gamble, Fl. Pres. Madras 1585. 1931; Manilal, Fl. Silent Valley 332. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 485. 1996. ***Arum murrayi*** Graham, Cat. Pl. Bombay 229. 1839.

Corm globose, to 2.5 cm across. Leaf shortly pedatisect, lobes 5-6, elliptic or elliptic-lanceolate, acute, base cuneate, membranous, to 17 x 6 cm; petiole sheathing, to 40 cm long; peduncles as long as the petiole, spathe greenish, to 10 cm long, base tubular, to 3 x 1.5 cm; limb 6 x 5 cm, green with white streaks, reddish along margins; spadix 6 cm long; sterile appendages as long as spathe or shortly exserted. Berry obovoid, 3 or 4-angled at apex, 6 x 5 mm.

*Fl. & Fr.* : May-October

*Distr.* : Peninsular India. Rare; in evergreen forests at higher elevations. Vellimala, *JA 18497.*

**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. 1931; Nicols. in Sald. & Nicols., Fl. Hassan Dist. 785. 1976; Sivadas. & Nicols. in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1689. 1983; Manilal, Fl. Silent Valley 332. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 485. 1996. ***Arum tortuosum*** Wall., Pl. Asiat. Rar. 2: 10, t. 114. 1830. ***A. curvatum*** Roxb., Fl. Ind. 3: 506. 1832; Wight, Ic. t. 788. 1844 [Fig. 74 B].

Corms 2-3 cm across, globose. Leaves paired, pedatisect; leaflets 8-10, to 12 x 4 cm, oblanceolate, abruptly acuminate, base acute, sparsely hispid below, petiolulate; petiole to 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. Achenes 6 mm across, obovoid.

*Fl. & Fr.* : August-December

*Distr.* : India and Sri Lanka. Occasional; in evergreen forests. Mlappara, *JA 12190, 15276.*

**Arisaema tylophorum** Fischer, Kew Bull. 1933: 346. 1933 & in Gamble, Fl. Pres. Madras 1891. 1936; Manilal, Fl. Silent Valley 333. 1988.

Fig. 74. A. *Ariopsis peltata* Nimmo.;
B. *Arisaema tortuosum* (Wall.) Schott

Corm 1-2 cm across, globose. Leaflets 7, to 16 x 4 cm, elliptic-oblong, caudate-acuminate, base attenuate, glabrous; petiolule 1-2 cm long; petiole to 40 cm long, 0.8 cm thick, brown spotted. Spadix solitary, at the level of the leaves; peduncle from the petiole 10 cm long; spathe to 10 cm long; tube deep brown; limb ovate, horizontal, green with white lines, finely acuminate, acumen 4-5 cm long; spadix to 6 cm long, 3 mm thick, narrowed above; curved near the apex and terminated by a small knot of 3 mm thick.

*Fl. & Fr.* : Almost throughout the year

*Distr.* : Southern Western Ghats. Rare; in evergreen forests at higher elevations. Kottamala, *JA & KPR 15346.*

## **COLOCASIA** Schott

in Scott et Endlicher Melet. Bot. 18. 1832, *nom. cons.*

**Colocasia esculenta** (L.) Schott in Schott & Endl., Melet. Bot. 1: 18. 1832; Nicols. in Sald. & Nicols., Fl. Hassan Dist. 786. 1976; Sivadas. & Nicols. in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1691. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 485. 1996. ***Arum esculentum*** L., Sp. Pl. 965. 1753. ***Colocasia antiquorum*** Schott in Schott & Endl., Melet. Bot. 1: 18. 1832; Wight, Ic. t. 786, f. 1. 1844; Hook. f., Fl. Brit. India 6: 523. 1893; Fischer in Gamble, Fl. Pres. Madras 1580. 1931.

Stout herbs; rhizome stoloniferous. Leaves few to many, peltate, to 28 x 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 to 20 cm long, yellow, lanceolate, constricted above the base; limb acuminate. Spadix 10 cm long, cylindrical, appendages terete, obtuse. Male flowers above, to 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.

*Fl. & Fr.* : November-February

*Distr.* : South Asia, widely cultivated. Common; in waterlogged ditches and streamsides at moist deciduous forests. Vallakkadavu, *JA 16372.*

*Ethnobotanical use* : The petioles are boiled in coconut oil or *Madhuca* oil and the oil is good for tooth ache.

## **CRYPTOCORYNE** Fischer ex Wydler

Linnaea 5: 428. 1830.

**Cryptocoryne retrospiralis** (Roxb.) Kunth, Enum. Pl. 23: 12. 1841; Wight, Ic. t. 772. 1844; Hook. f., Fl. Brit. India 6: 493. 1893; Fischer in Gamble, Fl. Pres. Madras 1575. 1931; Nicols. in Sald. & Nicols., Fl. Hassan Dist. 786. 1976; Sivadas. & Nicols. in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1693. 1983. ***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; Wight, Ic. t. 774. 1844; Fischer in Gamble, Fl. Pres. Madras 1575. 1931.

Stoloniferous marshy herbs. Leaves many, to 16 x 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 6 cm long, limb 3 cm long, spirally twisted, acuminate, pale brown with deep brown spots; spadix 14 mm 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.

*Fl. & Fr.* : Throughout the year

*Distr.* : India and Burma. Common; along river banks and stream beds. Vallakkadavu, *JA 12766*; Koruthode, *JA 14436.*

## **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. Spathe 5-10 cm broad; leaves to 40 cm long ..... **L. ovata**

1. Spathe to 1.5 cm broad; leaves to 8 cm long ..... **L. meeboldii**

**Lagenandra meeboldii** (Engl.) Fischer in Gamble, Fl. Pres. Madras 1576. 1931; Sant., J. Bombay Nat. Hist. Soc. 54: 967. 1959; Nicols. in Sald. & Nicols., Fl. Hassan Dist. 787. 1976; Manilal, Fl. Silent Valley 333. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 486. 1996. ***Cryptocoryne meeboldii*** Engl., Pflanzenr. 4. 23F(73): 234. 1920.

Annual or biennials, rhizome 0.5-1 cm thick, creeping. Leaves clustered; lamina 8 x 4 cm, ovate, acute, rounded at base; nerves numerous, regularly arching; petiole 5-10 cm long. Peduncle to 2.5 cm long, concealed in the leaf sheath. Spathe to 10 x 1.5 cm, ellipsoidal, long-acuminate at apex, twisted once or twice, smooth, yellowish, purple, tubular part 5 cm, closed chamber 2-3 cm long. Spadix 2 cm long, produced above into a cusp. Female flowers in a clusters of 5 mm across; male flowers in a globose clusters of 3 mm across; stamens 1 or 2.

*Fl. & Fr.* : December-March

*Distr.* : South India, Endemic. Occasional; in marshy riversides in evergreen forests. Puthussery, *JA 13511.*

**Lagenandra ovata** (L.) Thw., Enum. Pl. Zeyl. 334. 1864; Fischer in Gamble, Fl. Pres. Madras 1570. 1931; Nicols. in Sald. & Nicols., Fl. Hassan Dist. 787. 1976 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 77. 1987. ***Arum ovatum*** L., Sp. Pl. 967. 1753. ***Lagenandra insignis*** Trimen, J. Bot. 23: 269. 1885; Hook. f., Fl. Brit. India 6: 496. 1893.

Perennial herbs; rhizome creeping, 4 cm thick, usually in mud, cylindrical. Leaves entire, to 40 x 13 cm, ovate-oblong, acute, at both ends; nerves many, erose; petiole 30-70 cm long. Peduncle axillary, erect, 15-20 cm long; spathe 15-20 x 5-10 cm, broadly ellipsoid, closed, coarsely warted on both surface, deep brown, twisted and acuminate at apex; spadix 3-5 cm long, included in the chamber. Male flowers many, in terminal globose head; stamens 1 or 2; female flowers many, basal, subglobose; ovary obovoid; ovule 1. Fruitlets obovoid, ridged; seed 1, brown.

*Fl. & Fr.* : Throughout the year

*Distr.* : South India and Sri Lanka. Common; in ditches and other marshy areas and stream sides. Thekkady, *JA 13845;* Koruthode, *JA 14156.*

## 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. Petioles winged; spadix subsessile, globose ..... **P. scandens**
1. Petioles wingless; spadix oblong, slender, elongated or cylindric stalked..... 2
2. Stems with prickles at nodes; leaf blade with 2 commissural veins on either sides of the midrib; spadix slender, with loosely arranged groups of flowers..... **P. armatus**
2. Stems unarmed; leaf blades with one commissural vein on either sides of the midrib; spadix cylindric with closely arranged flowers..... **P. thomsonianus**

**Pothos armatus** Fischer, Kew Bull. 1929: 126. 1929 & in Gamble, Fl. Pres. Madras 1592. 1931; Sivadas. in Jain & Rao, Threatened Pl. India 254. 1983; Pandur. & Nair, J. Econ. Tax. Bot. 17(1): 180. 1993; Sasidh. & Sivar., Fl. Pl. Thrissur For. 487. 1996.

Armed climbers, spines 2-4 mm long, few at nodes. Lowers leaves ovate-orbicular with cordate base, upper leaves to 18 x 4.5 cm, elliptic-oblong, acuminate at apex, acute at base; nerves many, irregular, prominent below; petiole 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 cm long, slender. Flowers 1.5 mm across, in distant groups of 3-5 together; bracts orbicular, puberulus; stamens 6; ovary obovoid, truncate above.

*Fl. & Fr.* : January-March

*Distr.* : Southern Western Ghats. Rare; in evergreen forests. Arjunankotta, *JA 13448.*

**Pothos scandens** L., Sp. Pl. 968. 1753; Wight, Ic. t. 776. 1844; Hook. f., Fl. Brit. India 6: 551. 1893; Fischer in Gamble, Fl. Pres. Madras 1592. 1931; Nicols. in Dassan. & Fosb. Rev. Handb. Fl. Ceylon 6: 65. 1987; Nicols. in Sald. & Nicols., Fl. Hassan Dist. 788. 1976; Manilal, Fl. Silent Valley 334. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 487. 1996. **Paruval** (Mala Arayan)

Large climbers; stem angled, 2-4 mm thick. Leaf blade to 9 x 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 to 0.5 cm long, spathe 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.

*Fl. & Fr.* : February-April

*Distr.* : South Asia. Very common; in evergreen forests. Vallakkadavu, *JA 14863.*

*Ethnobotanical use* : Five or seven leaves are cooked along with rice and eaten with coconut milk for body ache.

**Pothos thomsonianus** Schott, Aroideae 24, t. 51. 1856-1857; Hook. f., Fl. Brit. India 6: 55. 1893; Fischer in Gamble, Fl. Pres. Madras 1592. 1931.

Stems ridged, glabrous. Leaves to 20 x 4.5 cm, elliptic-oblong, acuminate at apex, obtusely acute at base; lateral nerves many, regular, parallel; commissural veins nearly marginal; petiole 1.5-2 cm long, channeled. Spadix on short lateral branches; peduncle solitary, 4-5 cm long, stout; spathe 1.5 x 0.6 cm, ovate-oblong, obtuse, mucronate; spadix 18 x 4 mm, cylindrical, uniform. Flowers compactly packed; bracts minute; stamens 6; ovary ovoid, stigma hexagonal. Fruit 6 x 5 mm, obovoid, black.

*Fl. & Fr.* : February-May

*Distr.* : Southern Western Ghats (Kerala). Rare; in evergreen forests. Arjunankotta, *JA 13167.*

## **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. 1931; Nicols. in Sald. & Nicols., Fl. Hassan Dist. 788. 1976; Sivadas. & Nicols. in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1697. 1983; Nicols. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 50. 1987; Manilal, Fl. Silent Valley 334. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 487. 1996. ***Arum viviparum*** Roxb., Hort. Bengal. 65. 1844; Wight, Ic. t. 798. 1844.

Epiphytic or lithophytic herbs with erect bulbiferous slender shoots. Leaves 20-30 cm across, ovate, acute, cordate at base, glossy above; nerves prominent; petiole to 40 cm long; spadix solitary, on erect, terminal peduncle, covered with large cataphylls; spathes obovate to rhomboid, spreading, yellowish white; tube short, 5 cm long, ellipsoid, limb to 10 x 7 cm, acute; spadix 5 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.

*Fl. & Fr.* : January-June

*Distr.* : India westward to Africa and eastward to Australia. Common; in evergreen forests. Kurisumala, *JA 13127.*

## **RAPHIDOPHORA** Hasskarl

Flora 25(2) Beibl. 1: 11. 1842.

**Raphidophora pertusa** (Roxb.) Schott, Bonplandia 5: 45. 1857; Hook. f., Fl. Brit. India 6: 546. 1893; Fischer in Gamble, Fl. Pres. Madras 1590. 1931; Nicols. in Sald. & Nicols., Fl. Hassan

Dist. 789. 1976; Sivadas. & Nicols. in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1698. 1983; Nicols. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 31. 1987; Sasidh. & Sivar., Fl. Pl. Thrissur For. 487. 1996. ***Pothos pertusa*** Roxb., Fl. Ind. 1: 455. 1820. ***Scindapsus pertusus*** (Roxb.) Schott in Schott & Endl., Melet. Bot. 21. 1832; Wight, Ic. t. 781. 1844.

Stout perennial climbers, stem cylindrical, 4 cm thick, fleshy. Leaves to 35 x 30 cm, broadly ovate, pinnatisect or rarely entire, rounded at base, acute at apex; petiole 20-35 cm long, channelled. Spadix solitary, axillary; spathe to 20 x 8 cm long, ovate-oblong, concave, acute, creamy white; spadix 12 cm long, 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.

*Fl. & Fr.* : April-December

*Distr.* : South India and Sri Lanka. Common; in evergreen forests. Arjunankotta, *JA 13163;* Koruthode, *JA & KPR 16275.*

### **THERIOPHONUM** Blume

Rumphia 1: 127. 1837.

**Theriophonum infaustum** N. E. Br., J. Linn. Soc. Bot. 18: 260. 1881; Hook. f., Fl. Brit. India 6: 513. 1893; Fischer in Gamble, Fl. Pres. Madras 1579. 1931; Sivadas. & Nicols., Kew Bull. 37: 282. 1982; Sasidh. & Sivar., Fl. Pl. Thrissur For. 488. 1996.

Annual herbs, corm globose, 1 cm across. Leaves few, radical, to 8 x 6 cm, ovate, hastate at base, acute at apex, lineolate; petiole to 15 cm long, slender. Spadix axillary, to 4 cm long; spathe globose below, constricted above, limb elliptic, greenish-yellow; spadix included, one third of the spathe. Male flowers many, stamens 1 or 2; anthers sessile. Female flowers few, ovary conical, 1-celled; ovules few, basal. Neuters filiform. Fruit a groups of globose, berries.

*Fl. & Fr.* : November-January

*Distr.* : South India. Common; in disturbed forest areas. Koruthode, *JA 16209.*

## 144. 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. 1931; de Wilde in Steenis, Fl. Males. I, 6: 166. 1962; Ramam. in Sald. & Nicols., Fl. Hassan

Dist. 638. 1976; Sivadas. & Nicols. in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1711. 1983; Manilal, Fl. Silent Valley 335. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 489. 1996. ***Cauline indica*** Willd., Mem. Acad. Roy. Sci. Hist. (Berlin) 89, t. 1, f. 3. 1801. ***Najas fasciculata*** a. Braun, J. Bot. 2: 278. 1864; Hook. f., Fl. Brit. India 6: 569. 1893; Fischer in Gamble, Fl. Pres. Madras 1604. 1931. *N. **lacerata*** Rendle, Trans. Linn. Soc. London 5: 416. 1899; Fischer in Gamble, Fl. Pres. Madras 1604. 1931.

Submerged herbs; stems to 10 cm long, slender. Leaves opposite and whorled, 1-2.5 x 0.1 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, 1 mm long, ellipsoidal, acute, white, reticulate in horizontal rows.

*Fl. & Fr.* : December-January

*Distr.* : Tropical Asia and Africa. Common; in ditches and ponds. Kumarikulam, *JA & KPR 16999, JA 17000.*

## 145. ERIOCAULACEAE

P. Beauv. ex Desv., 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 bisexual, 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. Heads 2 cm across; leaves ca. 2 cm broad; perennials.....**E. brownianum**
1. Heads to 1 cm across; leaves to 1 cm broad; annuals.....2
2. Seeds without appendages.....**E. pectinatum**
2. Seeds covered with appendages.....3
3. Male flowers with two sepals; female petals linear with glassy hairs.....**E. thwaitesii**
3. Male flowers with 3 sepals; female petals oblong or oblanceolate, without glassy hairs.....4
4. Epidermal cells of seeds isodiametric or hexagonal, not transversely elongate; appendages arise from the corners.....**E. vasudevanii**
4. Epidermal cells of seed transversely or vertically elongate; appendages not from corners.....5
5. Appendages on seeds wing-like on vertical walls; epidermal cell vertically elongate.....**E. truncatum**
5. Appendages on seeds along the transverse walls; epidermal cells transversally elongate.....6
6. Involucral bracts pubescent.....**E. trilobum**
6. Involucral bracts glabrous.....7
7. Male sepals tubular.....**E. sexangulare**
7. Male sepals united into a split sheath, or free.....8
8. Male petals unequal; one petals longer than the others.....9
8. Male petals equal or subequal.....10
9. Male sepals free; heads ca. 0.4 x 0.6 cm; peduncles up to 20 cm long.....**E. longicuspis**
9. Male sepals fused into split sheath; heads ca. 0.6 x 0.8-1 cm; peduncles 35-45 cm long...**E. odoratum**
10. Involucral bracts larger than floral bracts; peduncles 1-4 cm long.....**E. xeranthemum**
10. Involucral bracts equal to or smaller than floral bracts; peduncles more than 8 cm long.....11
11. Female sepals equal; appendages on seeds entire, rectangular on transverse walls.....12
11. Female sepals unequal, one smaller than others; appendages on seeds not as above.....13
12. Floral bracts black; female petals hairy.....**E. quinquangulare**
12. Floral bracts hyaline; female petals glabrous.....**E. conica**
13. Appendages on seeds 2 on transverse walls; male petals glabrous.....**E. nepalense**
13. Appendages on seeds many on transverse walls; male petals hairy.....**E. parviflorum**

**Eriocaulon brownianum** Mart. ex Wall., Pl. Asiat. Rar. 3: 25, t. 248. 1832; Hook. f., Fl. Brit. India 6: 576. 1893; Ansari & Balakr., Eriocaul. India. 27. 1994. ***Eriocaulon nilgiriensis*** Steud., Syn. Pl. Glumac. 2: 271. 1855; Gandhi. in Sald. & Nicols., Fl. Hassan Dist. 653. 1976. ***E. brownianum*** var. ***nilagiriensis*** (Steud.) Fyson, J. Indian Bot. Soc. 2: 262. 1921 & Fl. South Indian Hill St. 2: t. 565. 1932; Fischer in Gamble, Fl. Pres. Madras 1619. 1931.

Perennial herbs; rhizome stout, to 10 cm high, densely covered with leafsheaths. Leaves few to many, to 60 x 2 cm, linear-lanceolate, flat or folded, pubescent towards the base, widely sheathing. Peduncle solitary or few, to 75 cm high; heads depressed globose, 1-2 cm across; involucral bracts black, obovate, brown wooly at base; floral bracts spathulate, cuneate, acute,

white, papillose hairy. Female calyx spathaceous, split along one side, hairy; corolla lobes white-papillose hairy, glandular. Female sepals free, boat-shaped, hairy; petals oblong, pilose, black glandular.

*Fl. & Fr.* : November-May

*Distr.* : Peninsular India. Rare; along the grassy patches in evergreen forests above 1800 m altitude. Kottamala, *JA 18498.*

**Eriocaulon conica** (Fyson) Fischer in Gamble, Fl. Pres. Madras 1620. 1931; Ansari & Balakr., Eriocaul. India 109. 1994. ***E. dianae*** Fyson, var. ***conica*** Fyson, J. Ind. Bot. 2: 250. 1921.

Stems very short. Leaves to 4 x 0.1 cm, linear, glabrous. Peduncles several, slender; head 2 x 3 mm, globose; involucral bracts 1.5 x 1 mm, elliptic, acute, hyaline; floral bracts 1.5 x 1 mm, cuneate, acuminate at apex. Female sepals linear, glabrous, hyaline; petals linear, glabrous with a black gland at apex; appendages on seeds long, rectangular, one on each transverse wall. Male sepals 3, basally united, hyaline; petals 3, equal, glabrous, glandular at apex; anthers black.

*Fl. & Fr.* : September-December

*Distr.* : Endemic to Southern Western Ghats. Rare; in marshy grasslands. Thaannikkudy, *KPR & JA 14519.*

**Eriocaulon longicuspis** Hook. f., Brit. India 573. 1893; Fischer in Gamble, Fl. Pres. Madras 1618. 1931; Ansari & Balakr., Eriocaul. India 102. 1994.

Leaves to 5 x 0.3 cm, angustate, acute, glabrous. Peduncles 2-3 to 20 cm long; head 4 x 6 mm, 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. Appendages on seeds short, rectangular bits on transverse walls. Male sepals 3, free or basely connate, black; one petal larger, hairy; anthers black.

*Fl. & Fr.* : May-December

*Distr.* : Peninsular India and Sri Lanka. Rare; in swampy areas at higher elevations. Eravangalar, *KPR & JA 15269.*

**Eriocaulon nepalense** Prescott ex Bong., Act. Acad. Petrop. Ser. 6: 610. 1831. Hook. f., Fl. Brit. India 6: 581. 1893; Ansari & Balakr., Eriocaul. India 32. 1994.

Leaves to 7 x 0.6 cm, oblong, obtuse, glabrous. Peduncles many, to 23 cm high; limb of 2-3 bristle at the mouth of sheath; head 0.5 x 0.5 cm, globose; involucral bracts 2.5 x 1.5 mm,

obovate, obtuse, glabrous, brown; floral bracts 3 x 1.5 mm, obovate, acuminate at apex, base cuneate, black, thinly hairy. Female sepals 3, boat shaped, black, one narrow; petals 3, hyaline, hairy. Male sepals 3, united at base, black, hairy at apex; petals subequal, glabrous; anthers black. Appendages 2 on each transverse wall of the seeds.

*Fl. & Fr.* : September-January

*Distr.* : Nepal, India and Sri Lanka. Common; in damp localities in grasslands. Kavalappara, *KPR & JA 14558*; Thaannikkudy, *JA 16853.*

**Eriocaulon odoratum** Dalz. in Hook.'s J. Bot. Kew Gard. Misc. 3: 280. 1851; Hook. f., Fl. Brit. India 5: 574. 1893; Fischer in Gamble, Fl. Pres. Madras 1618. 1931; Sivadas. & Nicols. in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1720. 1983; Ansari & Balakr., Eriocaul. India 43. 1994. ***E. collinum*** Hook. f., Fl. Brit. India 6: 584. 1893; Fischer in Gamble, Fl. Pres. Madras 1620. 1931.

Leaves to 10 x 0.3 cm, lanceolate, acute at apex, glabrous. Peduncles many, 35-45 cm long, glabrous; sheath to 6 cm long, limb minute. Heads depressed globose; involucral bracts 3 x 2 mm, obovate, obtuse, hyaline; floral bracts 4 x 1.5 mm, deltoid, acuminate to a sharp point, sparsely or densely hairy. Female sepals 2 x 1 mm, ovate, concave, hairy along the keel; petals oblanceolate, hairy, white; seed oblong, appendages many, on transverse walls. Male sepals united into a 3-lobed sheath, black, hairy; petals 3, unequal, white, one larger anther black.

*Fl. & Fr.* : November-January

*Distr.* : Peninsular India and Sri Lanka. Common; in marshy places in grasslands at higher elevation. Brook's Peak, *JA & KPR 17025.*

**Eriocaulon parviflorum** (Fyson) Ansari & Balakr., Eriocaul. India 53. 1994. ***D. dianae*** Fyson var. ***parviflora*** Fyson, J. Ind. Bot. 2: 260. 1921. ***E. dianae*** Fyson var. ***triloboides*** Fyson, J. Ind. Bot. 2: 260. 1921.

Leaves to 7 x 0.6 cm, falcate, acute, glabrous. Peduncle many, to 30 cm long; sheath to 5 cm long, limb small. Head 5 x 5 mm, receptacle pilose; involucral bracts 2 x 1 mm, obovate, glabrous, straw-coloured; floral bracts 2 x 1 mm, cuneate, black. Female sepals unequal, grey or black, smaller one hyaline, petals oblanceolate, hyaline, hairy; seeds oblong; appendages many, on transverse walls. Male sepals, united into a split tube, black, hairy at apex; petals 3, equal, hairy; anthers black.

*Fl. & Fr.* : September-January

*Distr.* : peninsular India. Common; in marshy area in grasslands. Thaannikkudy, *JA & KPR 14518.*

**Eriocaulon pectinatum** Ruhl. in Engl., Pflanzenr. 13: 85.1903; Fyson, J. Indian Bot. 3:17. 1922; Fischer in Gamble, Fl. Pres. Madras 1620. 1931; Ansari & Balakr., Eriocaul. India 147. 1994.

Leaves 2-3.5 x 0.15 cm, linear, acuminate, glabrous. Peduncles 1-3, 12 cm long; sheath 2 cm long, limb minute. Head 5 x 7 mm, depressed globose; involucral bracts 2 x 1.5 mm, obovate, acute, glabrous, black; floral bracts 2.5 x 1 mm, deltoid, acute, hairy towards the apex, black. Female sepals 2 x 0.5 mm, densely hairy at apex, black; petals oblanceolate, hairy at apex, glandular; seeds ovoid; epidermal cells transversely elongate. Male sepals united into a split sheath, densely hairy at apex, truncate, black; petals hairy, one slightly larger, glandulose; anthers black.

*Fl. & Fr.* : September-December.

*Distr.* : Endemic to Southern Western Ghats. Common; in open grasslands with short grasses. Pachakkanam, *KPR & JA 17050.*

**Eriocaulon quinquangulare** L., Sp. Pl. 87. 1753; Hook. f., Fl. Brit. India 5. 582. 1893; Fischer in Gamble, Fl. Pres. Madras 1620. 1931; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 654. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1721. 1983; Ansari & Balakr., Eriocaul. India 104. 1994.

Leaves to 6 x 0.6 cm, falcate, acuminate, glabrous. Peduncles numerous, 10-30 cm high; sheath to 5 cm long, limb small. Head 6 x 5 mm, ovoid; involucral bracts 2 x 2 mm, obovate, toothed at apex, straw-coloured; floral bracts 2.5 x 1.2 mm, cuneate, abruptly acuminate, black, glabrous. Female sepals 3, equal, linear, sparsely hairy, black; petals linear-oblong, hairy, hyaline, glandulose; seeds oblong, appendages entire or cut up into rectangular strips on transverse walls. Male sepals black, united into a split sheath, minutely hairy, lobes truncate; petal equal, hairy; anthers black.

*Fl. & Fr.* :September-December

*Distr.* : India and Sri Lanka. Common; in damp places in grasslands. Thaannikkudy, *KPR & JA 14510.*

**Eriocaulon sexangulare** L., Sp. Pl. 87. 1753; Clarke in Hook. f., Fl. Brit. India 6: 580. 1893; Fischer in Gamble, Fl. Pres. Madras 1618. 1931; Manilal, Fl. Silent Valley 336. 1988; Ansari & Balakr., Eriocaul. India 79. 1994.

Leaves 5-6 x 0.5 cm, linear-lanceolate, acute. Peduncles few, 5-8 cm long, slender. Head depressed globose, 2 x 2 mm, 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; seeds ellipsoid; appendages solitary on transverse walls in

vertical rows. Male sepals oblanceolate, united into a close tube with 3 shallow teethes glabrous, petals glabrous, equal; anthers black.

*Fl. & Fr.* :September-January

*Distr.* : Indo-Malaya and Sri Lanka. Not common; in marshy areas. Kavalappara, *JA 14554.*

**Eriocaulon thwaitesii** Koern., Linnaea 27: 627. 1854; Clarke in Hook. f., Fl. Brit. India 583. 1893; Fischer in Gamble, Fl. Pres. Madras 1620. 1931; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1721. 1983; Ansari & Balakr., Eriocaul. India 63. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 490. 1996.

Leaves 6-8 x 0.5 cm, lanceolate, acuminate, glabrous. Peduncles several to many, 10-30 cm long; heads 2.5-4 x 4-6 mm, globose; receptacle pilose, involucral bracts 2 x 1.5 mm, oblong, rounded to truncate at apex, straw-coloured; floral bracts 2 x 1 mm, cuneate, acute, hairy at apex, brown. Female sepals 2, lanceolate, keeled, brown; petals linear, hyaline; seed walls in vertical raw. Male sepals 2, united at the base, glabrous, brownish; petals equal, hairy, glandulose.

*Fl. & Fr.* :August-December

*Distr.* : Southern Western Ghats (Kerala and Tamil Nadu). Common; in open grasslands. Chanthamarakokka, *JA 12291.*

**Eriocaulon trilobum** Buch.-Ham. ex Koern., Linnaea 27: 645. 1856; Clarke in Hook. f., Fl. Brit. India 6: 583. 1893; Ansari & Balakr., Eriocaul. India 46. 1994.

Stem stout, 2 cm high. Leaves 17 x 1.2 cm, lanceolate, flat, acute at apex. Peduncles 1-3, to 30 cm high, stout; sheath half as long. Head 10 x 13 mm, depressed globose; involucral bracts 4 x 3.5 mm, obovate or orbicular, black; floral bracts 5 x 3 mm, oblanceolate, bluntly acuminate and hairy at apex, black. Female sepals 4 x 2.5 mm, elliptic, densely hairy at apex, black; petals 3 x 0.5 mm, oblong, densely hairy, glandulose; seeds ovoid, appendages many, on transverse walls, longer than the breadth of epidermal cells. Male sepals united into a sheath, densely hairy at apex; petals equal, densely hairy.

*Fl. & Fr.* : September-December

*Distr.* : India. Very rare; in higher elevation grasslands. Kottamala, *JA & KPR 16976.*

**Eriocaulon truncatum** Buch.-Ham. ex Mart. in Wall., Pl. Asiat. Rar. 3: 29. 1831; Clarke in Hook. f., Fl. Brit. India 6: 578. 1893; Fischer in Gamble, Fl. Pres. Madras 1619. 1931; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 654. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu

Carnatic 3 (2): 1722. 1983; Manilal, Fl. Silent Valley 336. 1988; Ansari & Balakr., Eriocaul. India 118. 1994.

Leaves 3-4 x 0.4 cm, lanceolate, acuminate at apex. Peduncles many, to 15 cm long; heads 3 x 5 mm, hemispherical; involucral bracts 3 x 1.5 mm, oblong, obtuse, at apex, straw coloured; floral bracts 2 x 1.2 mm, oblanceolate, obtuse, pale brown, glabrous. Female sepals 2, 1.5 mm long, linear, black; petals 3, linear, white, glabrous, glandulose; seeds oblong. Male sepals united, lobes shallow, black, glabrous; petals equal, glandulose.

*Fl. & Fr.* : July-December

*Distr.* : Asia. Common; in damp places in grasslands. Mlappara, *JA 12086.*

**Eriocaulon vasudevanii** Ansari & Balakr., Eriocaul. India 68. 1994.

Leaves 6 x 0.5-0.6 cm, oblong-lanceolate, acute, glabrous. Peduncle 3-10, up to 17 cm high, slender, glabrous. Head 3 x 5 mm, flat, truncate above; involucral bract 2.5 x 1.5 mm, oblong, obtuse, straw-coloured, glabrous; floral bracts obovate, rounded at apex, black, glabrous. Receptacle glabrous. Male sepals 3, united into a split tube, lobes acute, glabrous, black; petals equal, glabrous with a black gland on each; anther black. Female sepals 3, unequal, one very small, colourless or absent; other two linear-oblong, acute at tip, glabrous, black; petals 3, equal, oblanceolate-oblong, pale, glandulose, sparsely hairy. Nut ovoid, epidermal cells isodiametric or hexagonal; appendages arise from corners only, setiform, solitary.

*Fl. & Fr.* : August-December

*Distr.* : Southern Western Ghats. Rare; in marshy areas of grasslands. Koruthode, *JA 16295.*

**Eriocaulon xeranthemum** Mart. in Wall., Pl. Asiat. Rar. 3: 29. 1832; Clarke in Hook. f., Fl. Brit. India 6: 584. 1893; Fischer in Gamble, Fl. Pres. Madras 1620. 1931; Ansari & Balakr., Eriocaul. India 58. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 490. 1996.

Leaves 0.8-2.5 x 0.15 cm, lanceolate, acuminate. Peduncles 1-few, 1-5 cm long; heads spreading, obconical; involucral bracts 3 x 1 mm, elliptic, acute, hyaline; floral bracts 1.2 mm long, oblanceolate, truncate and hairy at apex, black. Female sepals oblanceolate, one shorter and linear, brown; petals 3, oblong, hairy, glandulose; seeds oblong, appendages 2-3 on the base, lobes truncate, black; petals 3, subequal, glandulose.

*Fl. & Fr.* : August-December

*Distr.* : India, Nepal and Myanmar. Very common; in grasslands. Vellimala, *JA 16304.*

# 146. CYPERACEAE

Juss., Gen. Pl. 26. 1789.

1. Florets unisexual.....2
1. Florets bisexual.....4
2. Nut enclosed in utricle.....**Carex**
2. Nut not enclosed in utricle.....3
3. Disc present below the nut; spikelets in clusters of 3-5.....**Scleria**
3. Disc below the nut absent; spikelets spirally arranged in dense ovoid spikes.....**Hypolytrum**
4. Hypogynous bristles present.....5
4. Hypogynous bristles absent.....10
5. Leaves reduced to sheaths.....6
5. Leaves developed with blades.....7
6. Style base dilated and constricted above the ovary.....**Eleocharis**
6. Style base not dilated and not constricted above the ovary.....**Schoenoplectus**
7. Leaves with a prominent ligule.....**Fuirena**
7. Leaves eligulate.....8
8. Stigmas 3, curved inward; style 0.....**Rikliella**
8. Stigmas 2, linear; styles present.....9
9. Nut beaked with prominent persistent style-base; spikelets in panicles; bristles setaceous.....**Rhynchospora**
9. Nut not beaked; spikelets sessile, in simple umbel; bristles broad, hyaline.....**Lipocarpha**
10. Style-base dilated and constricted above the nut; glumes spiral or rarely distichous.....11
10. Style-base continuous with the nut; glumes distichous.....12
11. Style fimbriate or hairy, base conical.....**Fimbristylis**
11. Style glabrous, at most puberulus, base depressed globose.....**Bulbostylis**
12. Rachilla persistent.....13
12. Rachilla deciduous.....14
13. Nut trigonous; stigmas 3.....**Cyperus**
13. Nut biconvex; stigmas 2.....**Pycreus**
14. Keels of nut bearing glumes usually winged or serrulate; stigmas 2.....**Kyllinga**
14. Keels of nut bearing glumes not winged or serrulate; stigmas 3.....**Mariscus**

## BULBOSTYLIS Kunth

Enum. Pl. 2: 205. 1837, *typ. cons.*

Densely tufted annuals; rhizome zero. Culms erect, slender, filiform, ridged, smooth. Leaves narrow, capillary or 1-3-costate, glabrous; sheath tubular, keeled; mouth with long cilia. Inflorescence conjested or compound umbel; bracts filiform; rays 1-3, or absent. Spikelets

solitary or clustered, ovate or oblong, acute; glumes many, ovate, acute to aristate, keeled, 3-nerved, glabrous; stamens 1-3, filaments free; anthers acute. Nut obovate, obtuse, trigonous; style 1, glabrous; base bulged or depressed-globose and constricted above the ovary, persistent; stigmas 3, puberulus.

1. Umbel reduced to a single globose head; stamen 1.....**B. barbata**
1. Umbel developed and rayed; stamens 3.....**B. densa**

**Bulbostylis barbata** (Rottb.) Kunth ex Clarke in Hook. f., Fl. Brit. India 6: 651. 1893; Fischer in Gamble, Fl. Pres. Madras 1662. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 659. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1725.1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 327. 1985. ***Scirpus barbatus*** Rottb., Descr. Pl. Rar. 27. 1772.

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 2 x 1.2 mm, aristate, 6-12 in a spikelets, spirally disposed; arista curved out, scabrid. Nut 0.6 x 0.5 mm, trigonous, truncate at apex, thinly reticulate, pale brown.

*Fl. & Fr. :* June-December

*Distr.* : Old World Tropics. Common; in disturbed evergreen forests. Sabarimala, *JA & NS 15478.*

**Bulbostylis densa** (Wall. ex Roxb.) Hand. Mazz. in Karsten & Schenk, Veg. 20, 7: 16. 1930; Hooper in Sald. & Nicols., Fl. Hassan Dist. 659. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1726. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5. 324. 1985; Manilal, Fl. Silent Valley 337. 1988. ***Scirpus densus*** Wall. ex Roxb., Fl. Ind. 1: 231. 1820. ***Bulbostylis capillaris*** Kunth var. ***trifida*** Clarke in Hook. f., Fl. Brit. India 6: 652. 1893; Fischer in Gamble, Fl. Pres. Madras 1662. 1931.

Culms 10-30 cm high, slender, filiform, 4-8 ridged, capillary. Leaves 5-6 cm long, 3-costate; sheath keeled, scabrid along margins, mouth long-ciliate. Umbel 1-3 cm long; bracts 1-3, 5-10 mm long, base broad with a filiform tip; rays 1-2, 1-2 cm long; secondary rays rare. Spikelets 3-5 mm long, 2-6, solitary, ovoid, peduncled; glumes 2.5 x 1.8 mm, ovate, acute, fimbriate along the margin, dark brown; stamens 3. Nut 1.2 mm long, obovoid, smooth or faintly transversely rugose, brown.

*Fl. & Fr. :* July-December

*Distr.* : Old World from Tropical Africa to Australia. Common; in grasslands. Mangaladevi, *JA 12202.*

## **CAREX** Linnaeus

Gen. Pl. ed. 1, 280. 1737

Perennials or rarely annuals. Rhizome erect or horizontal. Stems tufted, erect, 3-angled. Leaves cauline or basal, linear-lanceolate, 1-3-costate, scabrid along the margins; sheath keeled or 3-angled, usually open, oblique at mouth. Inflorescence a panicle, raceme or the spikelet solitary. Spikelets unisexual or androgynous, cylindrical with spirally arranged glumes. Pistillate glume ovate to broadly ovate, acute or aristate, 1-nerved. Pistil solitary, ovary oblong; style 2; stigmas linear, puberulus; nut elliptic, trigonous. Staminate glumes oblong, obtuse or acute, cuspidate, 1-nerved; stamens 3, free;

1. Terminal spikelets with staminate flowers only.....2
1. All spikelets androgynous; lower portion with female and upper portion with male flowers.... .....4
2. Utricles not beaked; spikelets to 5 cm long.....**C. phacota**
2. Utricles beaked; spikelets not more than 2.5 cm long.....3
3. Basal leaves bladeless; spikelets solitary at each node, leaves ligulate.....**C. ligulata**
3. All leaves with blades; spikelets fascicled at each node; leaves eligulate.....**C. jackiana**
4. Spikelets up to 7 cm long, cylindrical.....5
4. Spikelets up to 2.5 cm long, ovate to lanceolate.....6
5. Utricle gibbous, broadly ovoid; rachilla smooth.....**C. baccans**
5. Utricle elliptic, not gibbous; rachilla scabrid.....**C. myosurus**
6. Stamens 2; spikelets up to 10; pistillate glumes muticous.....7
6. Stamens 3; spikelets numerous; pistillate glumes aristate.....8
7. Stigmas 5-6 mm long; utricle glabrous.....**C. longicruris**
7. Stigmas ca. 2 mm long; utricle hispid on nerves.....**C. lenta**
8. Utricle pubescent; partial panicles long-peduncled.....**C. leucantha**
8. Utricle glabrous; partial panicles short-peduncled or sessile.....**C. filicina**

**Carex baccans** Nees ex Wight, Contrib. 122. 1834; Clarke in Hook. f., Fl. Brit. India 6: 722. 1894; Fischer in Gamble, Fl. Pres. Madras 1169. 1931; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 371. 1985.

Perennials, culms to 60 cm high, stout. Leaves several, 50-80 x 1 cm, 3-costate. Panicles pyramidal; bracts to 30 cm long; bracteoles filiform, scabrid. Spikelets 4-5 x 0.8 cm; male portion 1 cm long; pistillate glumes 3.5 x 1.5 mm, deep red; utricle 3-4 mm long, beak 2-cleft, stigmas 3, scabrid. Nut 3 x 1.5 mm, dark brown; staminate glumes 4-4.5 mm long, many-nerved; stamens 3.

*Fl. & Fr. :* December-May.

*Distr.* : Indo-Malesia. Rare; in evergreen forests. Sunderamala, *KPR & JA 17811.*

**Carex filicina** Nees in Wight, Contrib. 123. 1834; Clarke in Hook. f., Fl. Brit. India 6: 717. 1894; Fischer in Gamble, Fl. Pres. Madras 1686. 1931; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1727. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 375. 1985; Manilal, Fl. Silent Valley 358. 1988.

Perennials, culms to 120 cm tall, slender. Leaves 30-60 x 0.8 cm, scabrous. Sheath rounded, closed. Partial panicles 8-10 x 3 cm; bracts to 30 cm long; bracteoles filiform. Spikelets 1.5 cm long; male portion 3-4 mm long, narrower; pistillate glumes 2 mm long, reddish brown; utricle 3.5 mm long, scabrid, blotched with red spots; beak 1.5 mm long, deeply bifid. Staminate glumes 3 x 1.5 mm, acute.

*Fl. & Fr.* : December-May

*Distr.* : India to Formosa. Common; in marshy areas. Nelliparakkandam, *NS & JA 13100.*

**Carex jackiana** Boott, Proc. Linn. Soc. London 1: 260. 1846; Clarke in Hook. f., Fl. Brit. India 6: 735. 1894; Fischer in Gamble, Fl. Pres. Madras 1686. 1931; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1729. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 391. 1985.

Tufted perennials; culms 25-45 cm high; flowering culms without much developed leaves. Leaves 20-40 x 0.3-0.8 cm, linear, flat, margins serrulate; sheath keeled, glabrous. Spikelets 3-5 together, in distant clusters. Female spikelets 1-1.5 cm long, many; pistillate glumes 4 x 2 mm, aristate, arista 2 mm long; utricle 5-6 mm long, ellipsoid, glabrous; beak 2-fid at tip; style base thickened, 3-fid above, scabrid. Nut 3-4 mm long, smooth, brown. Male spikelets 2.5 cm long, linear; glumes 6 x 2 mm; stamens 3; anthers 3 mm long.

*Fl. & Fr.* : December-March

*Distr.* : India, Eastward to Australia. Rare; in evergreen forests. Chokkampetti, *JA 13368.*

**Carex lenta** D. Don, Trans. Linn. Soc. London 14: 326. 1825; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 387. 1985. ***Carex brunnea*** auct. non Thunb., 1784: Clarke in Hook. f., Fl. Brit. India 6: 705; Fischer in Gamble, Fl. Pres. Madras 1686. 1931.

Tufted perennials; rhizome oblique, 3-4 cm long; culms 30-70 cm high, erect. Leaves 30-60 x 0.2-0.4 cm, linear, acuminate, 3-costate, scabrid; sheath closed, 3-angled, glabrous. Panicle interrupted, lax; bracts 5-12 x 0.1 cm, linear, filiform. Spikelets 1.5-2 cm long, few ; peduncled; pistillate glumes on the lower half of the spikelet, 3.5 x 1 mm, ovate-acuminate; utricle stalked, compressed, beaked, hirtus. Nut 2 x 1.5 mm, biconvex, white; staminate glumes 3.5 x 1.5 mm, lanceolate, muticous; anthers 2 mm long.

*Fl. & Fr.* : December-June

*Distr.* : South India, Sri Lanka and Australia. Rare; in evergreen forests at higher elevations. Kottamala, *JA & KPR 15385.*

**Carex leucantha** Arn. ex Boott, Trans. Linn. Soc. London 20: 135. 1846; Clarke in Hook. f., Fl. Brit. India 6: 721. 1894; Fischer in Gamble, Fl. Pres. Madras 1686. 1931; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 382. 1985.

Culms 30-50 cm high, loosely tufted, triquetrous. Leaves 30-50 x 0.8-1 cm, flat; sheath 3-angled, closed, 6-7 cm long. Partial panicles distant, long-peduncled; branches scabrid. Spikelets 1-1.5 cm long; male and female parts equal; pistillate glumes 2 x 1.5 mm, oblong, emarginate; cusp 3-4 mm long, scabrid; utricle 4-5 mm long, beaked. Nut 2.2 x 1.2 mm, pale brown; staminate glume 4 x 1 mm, obtuse; anthers 1.5 mm long.

*Fl. & Fr.* : December-April

*Distr.* : South India and Sri Lanka. Common; in open grasslands. Arjunankotta, *JA 13674.*

**Carex ligulata** Nees in Wight, Contrib. 127. 1834; Clarke in Hook. f., Fl. Brit. India 6: 747. 1894; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 397. 1985. ***Carex hebecarpa*** Mey., var. ***ligulata*** (Nees) Kukenth. in Engl. & Prantl, Pflanzenfam. 4: 745. 1909; Fischer in Gamble, Fl. Pres. Madras 1686. 1931.

Perennials, rhizome creeping. Culms 30-70 cm high. Leaves 20-25 x 0.3-0.8 cm, flat; ligule an oblique narrow membrane, red. Panicle unbranched; bracts 10-15 x 0.4 cm. Female spikelets 1.5-2 x 0.7 cm, peduncled; glumes ovate, emarginate, minutely puberulus; utricle 5 x 1.5 mm, pubescent, beak 1.7 mm long, deeply bifid. Nut 2.5 x 1.5 mm, white. Male spikelets terminal, solitary; glumes 3.2 x 2.7 mm, rhomboid; stamens 3.

*Fl. & Fr.* : January-June

*Distr.* : India, China, Japan and Sri Lanka. Rare; along the openings in the evergreen forests at high elevations. Kottamalaipallam, *KPR & JA 15215.*

**Carex longicruris** Nees in Wight, Contrib. 124. 1834; Clarke in Hook. f., Fl. Brit. India 6: 705. 1894; Fischer in Gamble, Fl. Pres. Madras 1686. 1931; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 388. 1985.

Tufted annuals, rhizome erect; culms 25-40 cm high, obtusely triangular. Leaves mostly basal, to 30 x 0.5 cm, linear-lanceolate, flat; sheath keeled. Panicle unbranched with two distant solitary spikelets; lower female, upper male, each 2.5 cm long; pistillate glumes 5-10 in number,

3 x 2 mm, broadly ovate, keeled, many-nerved; utricles 4 x 1.5 mm, ellipsoid, shortly beaked, 2-fid at apex. Staminate glumes 2.5 x 1.5 mm, oblong, many-nerved; stamens 3.

*Fl. & Fr.* : January-June

*Distr.* : India, China and Sri Lanka. Common; in semi-evergreen forests near water sources. Kokkara, *JA 13524.*

**Carex myosurus** Nees in Wight, Contrib. 122. 1834; Clarke in Hook. f., Fl. Brit. India 6: 723. 1894; Fischer in Gamble, Fl. Pres. Madras 1687. 1931; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1729. 1983.

Perennials, rhizome covered with brown sheath. Culms 50-90 cm high, 3-angled. Leaves 50-75 x 0.5-0.8 cm, cauline, linear-lanceolate, scabrid; sheath 15 cm long, brown. Panicle 15-25 cm long, scabrid. Spikelets solitary or paired at nodes, 5-7 cm long; male portion above, 1.5 to 2.5 cm long; pistillate glumes 3.5 x 2 mm, 1-nerved, aristate; utricle 3.5 x 1 mm; stigmas hairy; staminate glumes 5 x 1.5 mm, oblong, aristate; stamens 3; anthers 3 mm long.

*Fl. & Fr.* : November-April

*Distr.* : Southern Western Ghats. Rare; along the road cutting at high elevations. Vellimala, *NS & JA 12988.*

**Carex phacota** Sprengel, Syst. Veg. 3: 826. 1826; Clarke in Hook. f., Fl. Brit. India 6: 708. 1894; Fischer in Gamble, Fl. Pres. Madras 1686. 1931; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1730. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 402. 1985; Manilal, Fl. Silent Valley 338. 1988.

Perennials, culms 50-70 cm tall, triquetrous. Leaves cauline, 20-80 x 0.3-1 cm, linear, 3-costate; sheath keeled, open. Spikelets 5-7 in a terminal raceme, cylindrical; terminal one fully or partly male, others female, 5 cm long, 5 mm wide; pistillate glumes 2 x 1 mm, obovate, truncate at apex, aristate, blotched with red spots, hirtus; utricle 3 x 1.5 mm, puberulus, deep brown; staminate glumes 3 x 1.5 mm, obovate, emarginate, aristate; stamens 3;

*Fl. & Fr.* : October-February

*Distr.* : Indo-Malesia and Sri Lanka. Common; in marshy areas and streamside in evergreen forests. Arjunankotta, *JA 13152*; Sabarimala, *KPR 14967.*

## 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, lifelike, 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 broadly or narrowly winged on either side of the nut; wings often decurrent along the internodes.....2
1. Rachilla not conspicuously winged.....10
2. Spikelets arranged spicate or racemose, not clustered or digitate.....3
2. Spikelets digitate, clustered or in very congested spikes.....4
3. Rhizome stoloniferous; stigmas 3 mm long.....**C. rotundus**
3. Rhizome short or zero; stigmas to 1.5 mm long.....**C. compressus**
4. Spikelets more than 25 in each spike; spikes cylindrical.....5
4. Spikelets less than 25 in each spike; spikes not cylindrical.....6
5. Secondary rays usually present; spikes 10-12 mm broad; glumes red or reddish brown.....**C. exaltatus**
5. Secondary rays absent; spikes 6-8 mm broad; glumes yellowish brown.....**C. digitatus**
6. Rhizome creeping, branched; sheath usually open.....7
6. Rhizome short or zero; sheath closed by membranous margin.....8
7. Leaves reduced to sheath, or lamina scaly; wings on rachilla brick red.....**C. pangorei**
7. Leaves well developed; wings on rachilla white or hyaline.....**C. oatesii**
8. Glumes cuspidate; spikelets ca. 2.5 mm broad.....**C. zollingeri**
8. Glumes emarginate; spikelets ca. 1 mm broad .....9
9. Spikelets flexuous, ca. 7 mm long; glumes not white margined towards apex.....**C. nutans ssp. nutans**
9. Spikelets erect, ca. 20 mm long; glumes with white margins towards apex.....**C. distans**
10. Spikelets arranged in digitate clusters or on congested racemes.....11
10. Spikelets arranged on elongated spikes or racemes.....16
11. Glumes aristate or mucronate..,.....12
11. Glumes not aristate or mucronate.....14
12. Stigmas 2; nut planoconvex.....**C. pygmaeus**
12. Stigmas 3; nut trigonous.....13
13. Arista recurved; culms up to 20 cm high.....**C. cuspidatus**
13. Arista straight; culms 30-70 cm high..... **C. diffusus**
14. Rhizome stoloniferous; leaves sometimes reduced to sheaths.....**C. haspan**
14. Rhizome shorter or zero; leaves never reduced.....15
15. Nut rugose, globose; glumes 0.5-0.6 mm long.....**C. difformis**
15. Nut smooth, 3-angled; glumes 1-1.2 mm long.....**C. tenuispica**

16. Rhizome stoloniferous; margins of glumes distinctly hyaline.....17
16. Rhizome short or zero; margins of glumes not clearly hyaline.....18
17. Spikelets 1-2 cm long; rachis of spikes pilosus.....**C. pilosus**
17. Spikelets 0.7-1 mm long; rachis of spikes glabrous.....**C. procerus**
18. Spikelets 3-4 mm long; leaves up to 18 cm long.....**C. iria**
18. Spikelets 10 mm long; leaves 45-60 cm long.....**C. nutans** ssp. **eleusinoides**

**Cyperus compressus** L., Sp. Pl. 46. 1753; Clarke in Hook. f., Fl. Brit. India 6: 605. 1893; Fischer in Gamble, Fl. Pres. Madras 1640. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 663. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1734. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 194. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 491. 1996.

Culms to 30 cm high, obtusely trigonous, slender, smooth. Leaves 15-20 x 0.1-0.5 cm, linear, glabrous; sheath rounded, open. Umbels 5-10 cm across, compound; bracts 3-5, unequal, 7-8 x 0.4 cm; rays 2-3, spreading. Spikelets 2.5-3 x 0.3-0.4 cm, 3-6 in each spike, 30-40 flowered, much compressed; rachis narrowly winged; glumes 3 x 2.5 mm, ovate, cuspidate, many -nerved, keeled. Nut 1.5 mm long, trigonous, brown, smooth.

*Fl. & Fr. :* Throughout the year

*Distr.* : Cosmopolitan. Very common; in disturbed forest areas. Thekkady, *KPR 16345.*

**Cyperus cuspidatus** Kunth in H. B. K., Nov. Gen. Pl. 204. 1815; Clarke in Hook. f., Fl. Brit. India 6: 598. 1894; Hooper in Sald. & Nicols., Fl. Hassan Dist. 664. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1735. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Ceylon 5: 208. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 492. 1996. ***Cyperus uncinatum*** sensu Fischer in Gamble, Fl Madras 1639. 1931, non Poir., 1806.

Rhizome short. Culms 10-20 cm high, densely tufted. Leaves 5-10 x 0.1-0.2 cm, linear, folded; sheath keeled, closed, glabrous. Umbel 4 x 4 cm, compound; rays 3, secondary rays absent; bracts 3, unequal, longest 10 x 0.2 cm; spikes 1.2 x 0.8 cm, ovoid, oblong or globose. Spikelets 40-50 in a spike, ovate, 10-flowered; glumes 2 x 1 mm, lanceolate, keeled, curved; arista 1.5-2 mm long. Nut obovoid, obtuse, pale brown, smooth.

*Fl. & Fr. :* July-December

*Distr.* : Pantropical. Very common; in moist deciduous forests usually in shallow soil on wet rocks. Thekkady, *JA 13944.*

**Cyperus difformis** L., Cent. Pl. 2: 6. 1756; Clarke in Hook. f., Fl. Brit. India 6: 599. 1893; Fischer in Gamble, Fl. Pres. Madras 1640. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist.

664. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1736. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 206. 1985.

Tufted annuals with rhizome; culms 20-30 cm high, 3-angled. Leaves 10-20 x 0.3-0.6 cm, glabrous; sheath keeled, closed. Umbel 2-3 x 2-3 cm, compound; bracts unequal, longest bracts 18 cm long; rays 4-7; secondary rays absent. Spikes 0.8 x 0.8 cm, globose, congested. Spikelets 2-3 x 1 mm, ovate, densely packed, 10-16-flowered; glumes 0.6 mm long, broadly ovate, obtuse, 1-nerved, reddish-brown. Nut globose or obtusely trigonous, 0.5 x 0.4 mm, white, smooth.

*Fl. & Fr. :* July-December

*Distr.* : Eurasia. Common; in marshy areas of open grasslands. Thekkady, *KPR & JA 15061.*

**Cyperus diffusus** Vahl, Enum. Pl. 2: 321. 1806; Clarke in Hook. f., Fl. Brit. India 6: 603. 1894; Fischer in Gamble, Fl Madras 1639. 1931 Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 197. 1985.

Two subspecies are found in the study area:

Key to the subspecies:

14. Leaves up to 30 cm long, chartaceous; glumes gaping in fruit..... subsp. **diffuses**
14. Leaves 35-75 cm long, coriaceous; glumes imbricate in fruits..... subsp. **macrostachyus**

**Cyperus diffusus** Vahl, Enum. Pl. 2: 321. 1806, subsp. **diffusus**

Culms to 65 cm high, solitary, acutely 3-angled. Leaves mostly basal, 20-30 x 1-1.5 cm, lanceolate; sheath to 6 cm long, keeled, open. Umbel 15 x 15 cm, decompound; bracts 7, unequal, to 28 x 1.3 cm, oblong; rays 5-8, secondary rays present. Spikelets 7 x 2.5 mm, 2-3 together in digitate clusters, 12-flowered; glumes 1.5-2 x 1.5-2 mm, broadly ovate, aristate, rounded back; margins broadly hyaline. Nut 1.5 x 0.7 mm, elliptic, dark brown, smooth.

*Fl. & Fr. :* December-May

*Distr.* : India to Malesia. Not common; in marshy areas of evergreen forests. Sabarimala, *JA & KPR 15343.*

**Cyperus diffusus** Vahl subsp. **macrostachyus** (Boeckeler) Koyama, Gard. Bull. Singapore 30: 139. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 198. 1985. ***Cyperus diffuses*** Vahl var. ***macrostachyus*** Boeckeler, Linnaea 35: 533. 1868. ***Cyperus pubisquama*** Steud., Syn. Pl. Glum. 2: 20. 1855; Clarke in Hook. f., Fl. Brit. India 6: 604. 1893; Fischer in Gamble, Fl. Pres. Madras 1639. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 668. 1976.

Stout perennials; rhizome short; culms 40-70 cm high, robust, smooth. Leaves mostly basal, 3-costate. Umbel 5-35 cm across, compound; rays up to 15, secondary & tertiary rays present;

bracts unequal, similar to leaves. Spikelets 5 x 2 mm, in groups of 1-5, digitate, 8-16 flowered; glumes 1.75 x 1.2 mm, broadly ovate, cuspidate, red-dotted. Nut 1.2 mm long, shortly beaked, smooth, grey-brown.

*Fl. & Fr.* : October-January

*Distr.* : Indo-Malesia. Common; in evergreen forests. Pamba, *JA 12370.*

**Cyperus digitatus** Roxb., Fl. Ind. 1: 209. 1820; Clarke in Hook. f., Fl. Brit. India 6: 618. 1893; Fischer in Gamble, Fl. Pres. Madras 1642. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 664. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1736. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 170. 1985.

Stout perennials; rhizome woody; culms 60-120 cm high, sharply 3-angled, losely tufted or solitary. Leaves equaling the culms, usually basal, 5-15 mm broad, 3-costate. Umbel compound; bracts 3-9, unequal, to 35 cm long; rays 6-10, each with a digitate head of spikes. Spike 2-6 cm long, 0.8 cm thick, cylindrical. Spikelets numerous, 3-5 mm long, densely packed, 5-10-flowered; glumes 1.5 x 1 mm, obovate, cuspidate, keeled. Nut 1 x 0.5 mm, dark-grey, smooth.

*Fl. & Fr.* : October-February

*Distr.* : Pantropical. Common; in marshy fields. Mlappara, *JA 13092*

**Cyperus distans** L. f., Suppl. Sp. Pl. 103. 1781; Clarke in Hook. f., Fl. Brit. India 6: 607. 1894; Fischer in Gamble, Fl. Pres. Madras 1640. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 665. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1737. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 189. 1985.

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 25 cm; bracts unequal, to 35 x 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 2 x 1 mm, oblong, 1-nerved, red. Nut 1.2 mm long, curved, grey-brown, smooth.

*Fl. & Fr.* : July-December

*Distr.* : Pantropical. Common; along the stream sides in moist deciduous forests. Thekkady, *JA 13938.*

**Cyperus exaltatus** Retz., Obs. Bot. 5: 11. 1789, Clarke in Hook. f., Fl. Brit. India 6: 617. 1893; Fischer in Gamble, Fl. Pres. Madras 1642. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 665. 1976; Koyama, Gard. Bull. Singapore 30:129. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 173. 1985; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1737. 1983.

Stout perennials; culms 60-130 cm tall, 0.8 cm thick, obtusely trigonous. Leaves 30-60 x 0.8-1.3 cm, canaliculate; sheath keeled, open. Umbels 25-35 x 15-18 cm; bracts 5-7, unequal, longest 60-70 x 0.8-1 cm; rays 5-10, to 25 cm long; spikes sessile and peduncled. Spikelets 8 x 2 mm, compressed, 16-22-flowered; wing of rachilla pale red; glumes 2 x 1.2 mm, broadly elliptic, cuspidate, 5-nerved, reddish brown; keel green. Nut 0.7 x 0.5 mm, white.

*Fl. & Fr. :* October-January

*Distr.* : Pantropical. Common; in marshy fields. Thekkady, *JA & KPR 17039.*

**Cyperus haspan** L., Sp. Pl. 45. 1753; Clarke in Hook. f., Fl. Brit. India 6: 600. 1893; Fischer in Gamble, Fl. Pres. Madras 1640. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 665. 1976; Koyama, Gard. Bull. Singapore 30: 142. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 203. 1985; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1738. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 492. 1996.

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, 2-15 mm long, ovate, acute, 3-15-flowered, 1-5 together in umbellules; glumes ovate, keeled, 1-nerved. Nut trigonous, white, smooth.

*Fl. & Fr. :* August-December

*Distr.* : Pantropical. Common; in marshy grasslands. Uppupara, *JA 14146.*

**Cyperus iria** L., Sp. Pl. 45. 1753; Clarke in Hook. f., Fl. Brit. India 6: 606. 1893; Fischer in Gamble, Fl. Pres. Madras 1640. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 666. 1976; Koyama, Gard. Bull. Singapore 30: 139. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 196. 1985; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1738. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 492. 1996.

Annual or perennial; culms 30-45 cm high, loosely tufted or solitary, acutely 3-angled. Leaves 0.6 cm broad; sheath keeled, closed by a membrane. Umbels 16 x 10 cm; bracts unequal, to 23 x 0.4 cm, linear-oblong. Spikelets 3.5-4 x 2 mm, oblong, 6-8-flowered, 14-18 in a spike; glumes 1.2 x 1.2 mm, broadly ovate, obtuse, 1-nerved, keeled. Nut 1.25 x 1.5 mm, obovoid, dark brown, smooth.

*Fl. & Fr. :* August-January

*Distr.* : Asia, introduced in Africa and America. Very common; in savannahs and moist deciduous forests. Vallakkadavu, *KPR & JA 17881.*

**Cyperus nutans** Vahl, Enum. Pl. 2: 363. 1806; Clarke in Hook. f., Fl. Brit. India 6: 607. 1893; Fischer in Gamble, Fl. Pres. Madras 1640. 1931, subsp. **eleusinoides** (Kunth) Haines, Bot. Bihar Orissa 898. 1924; ; Hooper in Sald. & Nicols., Fl. Hassan Dist. 667. 1976 Koyama, Gard. Bull. Singapore 30: 136. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 191. 1985; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1740. 1983. ***C. eleusinoides*** Kunth, Enum. Pl. 2: 191. 1977; Clarke in Hook. f., Fl. Brit. India 6: 608; 1893; Fischer in Gamble, Fl. Pres. Madras 1640. 1931.

Perennials; rhizome thick, not stoloniferous; culms 60-110 cm high; base spongy; sharply 3-angled. Leaves 1 cm broad, flat, glabrous. Umbel compound; rays 4-6; spikes 12 mm across, dense, sessile and peduncled; rachis hairy and scabrid. Spikelets 10 x 2.5 mm, linear-oblong, 16-20-flowered; glumes 2 x 1.5 mm, oblong, obtuse, 5-nerved, reddish brown. Nut 1.2 mm long, sharply beaked, dark brown, smooth.

*Fl. & Fr.* : August-December

*Distr.* : Tropical Africa eastward to Malesia and Australia. Very common; in marshy fields. Uppupara, *JA 14152.*

**Cyperus nutans** Vahl, subsp. **nutans** Kern in Steenis, Fl. Males. I, 7: 609. 1974; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 190. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 492. 1996.

Perennials; rhizome thick, not stoloniferous; culms 40-70 cm high. Leaves to 45 x 0.6 cm, linear, glabrous; sheath round, closed. Umbels 24 x 15 cm, compound; bracts 6-10, unequal, to 60 x 1 cm, leaf-like; rays 5-8, filiform; spikes 3 x 2 cm, lax, with smooth rachis. Spikelets linear, 20-25 in a spike; glumes 2 x 1 mm, oblong, 3-5-nerved, distantly spaced on rachilla. Nut 2 mm long, oblong, trigonous, brown.

*Fl. & Fr.* : August-May

*Distr.* : Indo-Malesia. Not common; along marshy stream sides. Chenthamara, *KPR & JA 15138.*

**Cyperus oatesii** Clarke in Hook. f., Fl. Brit. India 6: 618. 1893.

Rhizome woody, branching. Culms 60-120 cm tall, base 2.5 cm across, sharply 3-angled. Leaves 30-70 x 1.2-2 cm, flat, glabrous. Umbel 15-45 cm long, compound; bracts unequal, to 65 x 1.5 cm; rays up to 10, secondary & tertiary rays also present. Spikes 6 cm long; rachis glabrous. Spikelets 10 x 0.5mm, linear, terete, 8-10-flowered; glumes 2 x 0.7mm, oblong, obtuse, 1-nerved, keeled, distantly spaced on rachilla. Nut 1.5-2 x 0.7 mm, oblong, 3-angled, grey.

*Fl. & Fr.* : August-December

*Distr.* : India. Common; in marshy grasslands. Thekkady, *NS & JA 13935.*

**Cyperus pangorei** Rottb., Descr. Ic. 31. 1773; Fischer in Gamble, Fl. Pres. Madras 1641. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 667. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1740. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 176. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 493. 1996. ***C. tegetum*** Roxb., Fl. Ind. 1: 211. 1820; Clarke in Hook. f., Fl. Brit. India 6: 613. 1893.

Stout tall perennials; rhizome creeping, thick, clothed with fibrous scaly leaves; culms 90-120 cm high, 3-angled, woody; base pinkish. Sheath, brownish. Umbel 10-15 x 8-10 cm, compound; bracts 3, to 20 x 0.6 cm; rays 7-8; secondary rays shorter. Spikes 6-7 cm long, broadly ovate; rachis filiform, with 8-10 spikelets. Spikelets 4 x 0.2 cm, linear, 20-40-flowered; glumes 4 x 1.5 mm, oblong, acute, 1-nerved, keeled, red; anthers 2 mm long. Nut 1 mm long, linear-oblong, brown.

*Fl. & Fr. :* October-January

*Distr.* : India, Sri Lanka and Burma. Common; in savannahs. Pachakkanam, *KPR & JA 17058.*

**Cyperus pilosus** Vahl, Enum. Pl. 2: 354. 1806; Clarke in Hook. f., Fl. Brit. India 6: 609. 1893; Fischer in Gamble, Fl. Pres. Madras 1641. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 668. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1741. 1983; Koyama, Gard. Bull. Singapore 30: 138. 1977, & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 193. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 493. 1996.

Stoloniferous perennials; culms 40-70 cm high, acutely 3-angled. Leaves 20-40 x 1 cm, linear-lanceolate; sheath keeled, closed. Umbel 7-20 cm long, compound; bracts 3-4, unequal, to 35 x 1.2 cm; rays 3-7, to 20 cm long; spikes sessile or peduncled. Spikelets linear-oblong, 15-30-flowered; glumes 2 x 1.5 mm, broadly elliptic, obtuse, keel 5-nerved. Nut 1.2 mm long, ellipsoid, dark brown, smooth.

*Fl. & Fr. :* September-January

*Distr.* : Old World Tropics. Very common; in riverbanks and marshy grasslands. Pamba, *KPR 17083.*

**Cyperus procerus** Rottb., Descr. Ic. 29. 1773; Clarke in Hook. f., Fl. Brit. India 6: 610. 1893; Fischer in Gamble, Fl. Pres. Madras 1641. 1931; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1741. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 192. 1985.

Annual or perennial; culms 35-55 cm high, usually solitary. Leaves 20-35 x 0.4-0.8 cm, mostly basal; sheath keeled. Umbel 2-3.5 cm across; bracts 3, unequal, to 30 x 0.5 cm; rays not much developed. Spikelets 6-9 mm long, 12-18-flowered, arranged in congested spikes; glumes 2

x 1.5 mm, elliptic, obtuse, keeled and with white margins; keel 7-nerved, reddish brown. Nut 1.2 mm long, brown, smooth.

*Fl. & Fr.* : September-March

*Distr.* : Indo-Malesia and Australia. Common; in marshy areas. Anakuthivayal, *JA & KPR 17808.*

**Cyperus pygmaeus** Rottb., Descr. Ic. 20. t. 14. 1773; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1742. 1983; Koyama, Gard. Bull. Singapore 30: 146. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 214. 1985. ***Juncellus pygmaeus*** (Rottb.) Clarke in Hook. f., Fl. Brit. India 6: 596. 1893; Fischer in Gamble, Fl. Pres. Madras 1629. 1931.

Annuals; culms 18-20 cm tall, acutely 3-angled. Leaves to 4-7 x 0.2 cm, 1-costate, scabrid; sheath rounded, closed, pinkish brown. Spike, 1.5 cm across, bracts 4-6, broaden at base, to 10 cm long. Spikelets 4-5 x 1 mm, elliptic, densely packed; glumes 2.5 x 0.5 mm, lanceolate, aristate, 3-nerved, 10-16 in a spikelets; stamen 1. Nut 1.2 x 0.3 mm, ellipsoid, acute at either ends, pale brown; style-1, stigmas 2, glabrous.

*Fl. & Fr.* : July-December

*Distr.* : Eurasia and Australia. Common; in open grasslands. Thekkady, *JA & KPR 16349.*

**Cyperus rotundus** L., Sp. Pl. 45. 1753; Clarke in Hook. f., Fl. Brit. India 6: 614. 1893; Fischer in Gamble, Fl. Pres. Madras 1641. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 669. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1742. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 181. 1985.

Rhizomatous annuals; culms 25-40 cm high, smooth. Leaves 10-22 x 0.1-0.25 cm, scabrous; sheath rounded, closed. Umbel 10 x 6 cm, compound; bracts 5 x 0.25 cm; rays up to 6. Spike congested; rachis 4--6 mm long, angled. Spikelets 12-16 x 2 mm, 5-7 in each spike, 14-18-flowered; wing of rachilla greenish-white; glumes 2.5 x 1.2 mm, obtuse at apex, reddish-brown. Nut oblong to obovate, 1.5 mm long, smooth.

*Fl. & Fr.* : August-March

*Distr.* : Cosmopolitan. Common; in marshy fields. Sabarimala, *JA 15172.*

**Cyperus tenuispica** Steud., Syn. Pl. Glum. 2: 11. 1855; Fischer in Gamble, Fl. Pres. Madras 1640. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 670. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1744. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 205. 1985. ***Cyperus flavidus*** sensu Clarke 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 mm, oblong, 10-40-flowered; glumes 1 x 0.5 mm, ovate, obtuse, 1-nerved, keeled, margins red. Nut orbicular, white, rugose.

*Fl. & Fr. :* August-April

*Distr.* : Tropical Africa eastward to Malesia. Common; in marshy grasslands along stream banks. Pamba, *KPR & JA 14982.*

**Cyperus zollingeri** Steud., Syn. Pl. Glum. 2: 17. 1885; Clarke in Hook. f., Fl. Brit. India 6: 612. 1893; Fischer in Gamble, Fl. Pres. Madras 1641. 1931; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 187. 1985.

Annuals or perennials; culms 30-80 cm high, triquetrous. Leaves to 40 x 0.4 cm, linear, acuminate. Umbel compound; bracts unequal, 5-20 cm long, leafy; rays 4-6; spike 1.5-3 cm long, dense. Spikelets oblong, perpendicular to the axis; rachis with deciduous wings on either side of the nut; glumes 3 x 2 mm, broadly ovate, obtuse, shortly cuspidate, margin hyaline; keel with several nerves. Nut obovate, smooth, dark brown.

*Fl. & Fr. :* July-December

*Distr.* : Tropical Africa eastward to Malesia and Australia. Occasional; in moist deciduous forests. Kokkara, *JA 12066.*

## **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. Culms cylindric.....2
1. Culms 3-4-angled.....4
2. Spikelets narrower than or equal to culms; culms transversely septate .....**E. dulcis**
2. Spikelets broader than the culms; culms not septate .....3

3. Spikelets 4-8-flowered; nut pitted.....**E. retroflexa** var. **chaetaria**

3. Spikelets more than 10-flowered; nut smooth.....**E. congesta**

4. Nut longitudinally striate; stem 3-angled.....**E. acutangula**

4. Nut smooth; stem 4-angled.....**E. tetraquetra**

**Eleocharis acutangula** (Roxb.) Schult., in Roem. & Schult., Mant. 2: 91. 1824; Hooper in Sald. & Nicols., Fl. Hassan Dist. 671. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1746. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 256. 1985. ***Scirpus acutangulus*** Roxb., Fl. Ind. 1: 216. 1820; ***Eleocharis fistulosa*** Schult. in Roem. & Schult., Mant. 2: 89. 1824; Clarke in Hook. f., Fl. Brit. India 6: 626. 1893; Fischer in Gamble, Fl. Pres. Madras 1648. 1931.

Partially submerged rhizomatous perennials; rhizome creeping, clothed with brown scales; culms 30-65 cm high, partially submerged and spongy. spikelets 30 x 3.5 mm, linear-oblong, cylindric; glumes 4.5 x 4 mm, broadly ovate, obtuse, 1-nerved, concave; margin striate with red lines; bristle 3.5 mm long, pale brown; stamens 3, anthers 2.5 mm long; style base wider than ovary. Nut 2 x 1.5 mm, obovoid, obtuse, longitudinally striate; epidermal cells transversely oblong.

*Fl. & Fr.* : August-December

*Distr.* : Pantropical. Common; in marshy grasslands. Kumarikulam, *JA & KPR 14862*; Thaannikkudy, *JA & KPR 16854.*

**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. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 672. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1747. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 263. 1985.

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 mm, ovate, 20-40-flowered; bracts 3 x 2 mm, ovate, acute; glumes 2 x 1 mm, acute, 1-nerved, upper margin red to pink, rest hyaline; bristles 2mm long, golden yellow. Nut 1-2 mm long, obtusely 3-angled, yellow.

*Fl. & Fr.* : July-March

*Distr.* : Indo-Malesia. Common; in marshy areas of open grasslands. Thaannikkudy, *JA & KPR 14835.*

**Eleocharis dulcis** (Burm. f.) Trim. ex Hensch., Vita Rumph. 186. 1833; Hooper in Sald. & Nicols., Fl. Hassan Dist. 672. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3

(2): 1747. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5. 259. 1985. ***Andropogon dulce*** Burm. f., Fl. Ind. 219. 1768. ***Scirpus plantaginea*** Retz., Obs. Bot. 5, 14. 1799. ***Eleocharis plantaginea*** (Retz.) Roem. & Schult., Syst. Veg. 2: 150. 1817; Clarke in Hook. f., Fl. Brit. India 6: 620. 1893; Fischer in Gamble, Fl. Pres. Madras 1647. 1931.

Rhizomatous marshy perennials; rhizome thick, creeping, clothed with brown sheaths; culms 70-120 cm high, smooth, lower half submerged. Spikelets 3-4 x 0.3 cm, linear, oblong, acute; glumes 6 x 4 mm, concave, 1-nerved, with a white margin on upper half, bristles equal to or longer than the nut, yellow; stamens 3 mm long. Nut 2 x 1.5 mm, biconvex, smooth, yellow.

*Fl. & Fr.* : June-December

*Distr.* : Old World Tropics. Common; in open marshy areas. Kokkarakkandam, *JA 12067.*

**Eleocharis retroflexa** (Poir.) Urban, Symb. Antill. 2: 165. 1900, subsp. **chaetaria** (Roem. & Schult.) Koyama, Bull. Nat. Sci. Mus. 17: 68. 1974 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 265. 1985; Hooper in Sald. & Nicols., Fl. Hassan Dist. 673. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1748. 1983. ***Scirpus retroflexus*** Poir. in Lam., Encycl. Meth. Bot. 6:753.1804. ***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. 1931.

Tufted annuals; culms 2.5-15 cm high, slender, filiform. Sheath and culms coated with red glands. Spikelets 3 x 3 mm, broadly ovate, 3-8-flowered; glumes 2.2 x 1.2 mm, ovate, obtuse, keeled, 2-4-nerved, reddish brown; nerves green; bristles as long as or longer than nut, filiform. Nut 1.2 x 1 mm, obovoid, truncate, trabeculate; style base spread and decurrent on the nut.

*Fl. & Fr.* : August-December

*Distr.* : Old World Tropics. Occasional; in marshy grasslands and riversides. Thekkady, *JA 12407*; Koruthode, *JA & KPR 14802.*

**Eleocharis tetraquetra** Nees in Wight., Contrib. 113. 1834; Clarke in Hook. f., Fl. Brit. India 6: 630. 1893; Fischer in Gamble, Fl. Pres. Madras 1648. 1931; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 262. 1985; Manilal, Fl. Silent Valley 342. 1988.

Tufted annuals; rhizome absent; culms 30-75 cm high, slender, 8-10-ridged. Spikelets solitary or two together, 15 x 5 mm, ellipsoid, acute at either ends, many-flowered; glumes 4 x 1.5 mm, acutely obtuse, 1-nerved, pale brown or hyaline; bristles 2 mm long, reddish brown, retrorsely barbed. Nut 1.3 x 1.2 mm, obtusely 3-angled, smooth; style persistent, base conical.

*Fl. & Fr.* : Throughout the year

*Distr.* : Tropical Asia, Malesia. Common; in marshy areas of open shrublands. Vellimala, *NS & JA 15335.*

## 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. Styles 2-fid ..... 2
1. Styles 3-fid ..... 6
2. Nut curved, with two rows of white glands on sides; culms stellate ..... **F. dipsacea**
2. Nuts and culms otherwise ..... 3
3. Spikelets clustered in a single head, sessile ..... **F. argentea**
3. Spikelets not clustered in a single head, peduncled ..... 4
4. Glumes not aristate ..... **F. dichotoma**
4. Glumes aristate ..... 5
5. Lower most glumes pubescent; bracts surpass the umbel ..... **F. aestivalis**
5. Lower most glumes glabrous; bracts never surpass the umbel ..... **F. bisumbellata**
6. Leaves reduced to sheaths ..... **F. aphylla**
6. Leaves well developed ..... 7
7. Leaves ligulate; ligule a row of hairs ..... 8
7. Leaves eligulate ..... 9
8. Stem 4-8 angled; bracts 4 ..... **F. glabra**
8. Stem 3-angled; bracts 2 ..... **F. complanata**
9. Leaves distichous, folded; midrib strongly keeled; spikelets globose ..... **F. littoralis**
9. Leaves spiral; midrib not keeled; spikelets acute ..... 10
10. Spikelets clustered into a single head, all sessile ..... **F. uliginosa**
10. Spikelets not as above, sessile and pedicelled ..... 11
11. Spikelets up to 6 on each plant ..... 12
11. Spikelets many on each plant ..... 15
12. Glumes spirally disposed ..... **F. tenera**
12. Glumes distichous, at least the lower few ..... 13
13. Nut to 1.5 mm long; glumes acute ..... 14
13. Nut ca. 2.5 mm long; glumes mucronate ..... **F. ovata**
14. All glumes distichous ..... **F. narayanii**
14. Lower glumes only distichous ..... **F. monticola**

15. Leaves ensiform, obtuse; rhizome thick; bracts shorter than the umbel.....16

15. Leaves not ensiform, acute; rhizome short or absent; bracts longer than the umbel.....17

16. Nut tubercled; lowest glumes aristate.....**F. falcata**

16. Nut not tubercled; lower glumes not aristate.....**F. eragrostis**

17. Leaves filiform, glabrous; lower glumes distichous.....**F. cinnamometorum**

17. Leaves flat; nerves scabrid below; lower glume spiral.....**F. dura**

**Fimbristylis aestivalis** (Retz.) Vahl, Enum. Pl. 2: 288, 1806; Clarke in Hook. f., Fl. Brit. India 6: 637. 1893; Hooper in Sald. & Nicols., Fl. Hassan Dist. 675. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1751. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 313. 1985.

Densely tufted annuals; culms to 20 cm high, obtusely 5-angled. Leaves 10-20 x 0.11 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 1.5 mm, acute, solitary, peduncled; glumes 1.7 x 0.9 mm, ovate, acute, 1-nerved. Nut 0.5 x 0.3 mm obovoid, smooth, dull brown.

*Fl. & Fr. :* August-February

*Distr.* : South-East Asia and North Australia. Common; in disturbed moist deciduous forests. Koruthode, *KPR & JA 14744.*

**Fimbristylis aphylla** Steud., Syn. Pl. Glum. 2: 114. 1855; Hooper in Sald. & Nicols., Fl. Hassan Dist. 675. 1976. ***F. 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. 1931; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 295. 1985.

Tufted perennials; rhizome creeping, woody; culms 60-90 cm tall, acutely 4-5-angled. Sheath rounded, restricted at the base of the stem, very rarely short-bladed. Umbel 7 x 10 cm, globose; bracts filiform; rays many, spreading. Spikelets 4-6 x 3 mm, mostly pedicelled, 50-60 in an inflorescence; glume 2.2 x 1.7 mm, obtuse, 3-nerved, reddish brown. Nut 0.5 x 0.3 mm, obovate, trabeculate, minutely tubercled.

*Fl. & Fr. :* August-December

*Distr.* : Old World Tropics. Common; in marshy areas of open grasslands. Vallakkadavu, *JA 14084.*

**Fimbristylis argentea** (Rottb.) Vahl, Enum. Pl. 2: 294. 1806; Clarke in Hook. f., Fl. Brit. India 6: 640. 1893; Fischer in Gamble, Fl. Pres. Madras 1659. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 676. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1752.

1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 314. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 494. 1996. ***Scirpus argenteus*** Rottb., Descr. Ic. 27. 1772.

Tufted annuals; rhizome short, oblique; culms to 10 cm high, slender, 10-15-ridged. Leaves 5-8 x 0.1 cm, narrow to filiform; margins folded. Spikelets 3-5 x 2 mm, oblong, cylindrical; many in digitate umbel; glumes many, 1.5 x 0.7 mm, ovate, acute, 1-nerved, spirally disposed. Nut 0.7 x 0.4 mm, biconvex, faintly trabeculate, yellowish green, to pale brown.

*Fl. & Fr.* : June-December

*Distr.* : Confined to South Eastern Asia. Common; in disturbed moist deciduous forests. Thekkady, *KPR & JA 16948.*

**Fimbristylis bisumbellata** (Forssk.) Bubani, Dodecanthea 30. 1850; Fischer in Gamble, Fl. Pres. Madras 1898. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 676. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1752. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 312. 1985. ***Scirpus bisumbellata*** Forssk., Fl. Aeg.-Arab. 15. 1775. ***Fimbristylis dichotoma*** sensu Clarke in Hook.f., Fl. Brit. India 6:635.1893, non (L.) Vahl, 1809.

Densely tufted annuals; culms to 20 cm high, slender. Leaves to 10 x 0.15 cm, linear, scabrous; sheath rounded, glabrous, mouth with a short membranous ligule. Umbel 3 x 2.5 cm; bracts setaceous; rays 2-5, erect. Spikelets 2-4 mm long, peduncled; 8-15-flowered; glumes 1.5 x 0.8 mm, boat-shaped, mucronate, yellowish brown. Nut biconvex, obovate, smooth, dull yellow; style 1.5 mm long.

*Fl. & Fr.* : July-December

*Distr.* : Tropical. Common; in the openings of moist deciduous forests. Poonkavanam, *KPR & JA 14971.*

**Fimbristylis cinnamometorum** (Vahl) Kunth, Enum. Pl. 2: 229. 1937; Hooper in Sald. & Nicols., Fl. Hassan Dist. 676. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1753. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 278. 1985; Manilal, Fl. Silent Valley 342. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 494. 1996. ***Scirpus cinnamometorum*** Vahl, Enum. Pl. 2: 278. 1806. ***Fimbristylis cyperoides*** R. Br., Prodr. 228. 1810, var. ***cinnamometorum*** (Vahl) Clarke in Hook. f., Fl. Brit. India 6: 650. 1893; Fischer in Gamble, Fl. Pres. Madras 1659. 1931.

Loosely tufted annuals; rhizome short; culms 20-35 cm high, ridged, slender. Leaves usually basal, 20-30 x 0.05 cm, linear. Umbel 5 x 3 cm, compound, lax; rays spreading; secondary and tertiary rays present, slender. Spikelets 4 x 1 mm, lanceolate, acuminate, solitary, peduncled; glumes 3.5 x 1.5mm, lanceolate, thickly brown-spotted. Nut oblong, obtuse, trabeculated, brown.

*Fl. & Fr.* : June-December

*Distr.* : India, Sri Lanka and eastward to Australia. Common; in open grasslands on hilltops. Mangaladevi, *JA 12177*; Kumarikulam, *NS & JA 13091.*

**Fimbristylis complanata** (Retz.) Link, Hort. Berol. Descr. 1: 292. 1827; Clarke in Hook. f., Fl. Brit. India 6: 646. 1893; Fischer in Gamble, Fl. Pres. Madras 1659. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 677. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1753. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon, 3: 284. 1985. ***Scirpus complanatus*** Retz., Obs. Bot. 5: 14. 1791.

Slender annuals; culms 10-20 cm high, tufted, trigonous at base, flat below the inflorescence, smooth. Leaves 8-12 x 0.2 cm, linear, flat, with recurved margins; sheath rounded; ligule a row of short hairs. Umbels 2.5 x 2 cm, contracted; rays 1-3, spreading. Spikelets 5 x 1.5 mm, lanceolate, solitary or 2-3 together, 15-flowered; glumes 2.2 x 1.5 mm, lanceolate, 3-nerved, dark brown. Nut 1 x 0.6 mm, obovate, sparsely tubercled, pale brown.

*Fl. & Fr. :* July-December

*Distr.* : Pantropical. Common; in open grasslands. Chenthamara, *JA 12292.*

**Fimbristylis dichotoma** (L.) Vahl, Enum. Pl. 2: 287. 1806; Fischer in Gamble, Fl. Pres. Madras 1658. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 677. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1754. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 306. 1985; Manilal, Fl. Silent Valley 342. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 494. 1996. ***Scirpus dichotomus*** L., Sp. Pl. 50. 1753. ***Scirpus diphyllus*** Retz., Obs. Bot. 5: 15. 1789. ***Fimbristylis diphylla*** (Retz.) Vahl, Enum. Pl. 2: 289. 1806; Clarke in Hook. f., Fl. Brit. India 6: 636. 1823.

Perennials; culms 40-70 cm high, 2-3 mm thick, ridged. Leaves 15-25 x 0.2-0.3 cm, basal or scattered, linear to flat; sheath rounded; ligule a fringe or short hairs. Umbel 12 x 7 cm; bracts longer than the umbel. Spikelets 8-11 x 2-4 mm, solitary & pedicelled, ovate-oblong, acute; glumes 3 x 2 mm, acute, 3-nerved. Nut 1 mm long, oblong, biconvex, trabeculate with transverse oblong cells arranged in 12-13 vertical rows.

*Fl. & Fr. :* July-December

*Distr.* : Cosmopolitan. Common; in open grasslands. Uppupara, *JA 14153.*

**Fimbristylis dipsacea** (Rottb.) Clarke in Hook. f., Fl. Brit. India 6: 635. 1893; Fischer in Gamble, Fl. Pres. Madras 1658. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 678. 1976;

Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1755. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 321. 1985. ***Scirpus dipsaceus*** Rottb., Descr. Ic. 56. 1773.

Small annuals, tufted; culms 2-5 cm tall, terete, spreading. Leaves 1-4 cm long; lower ones reduced to sheaths, usually basal, filiform, scabrid. Inflorescence a solitary spikelets or a simple umbel with 3 spikelets. Spikelets globose or top-shaped, 3 x 3 mm. few to several flowered, glumes acuminate-aristate, 7-nerved, greenish white. Nut 0.6 x 0.2 mm, brown.

*Fl. & Fr.* : January-May

*Distr.* : Tropical part of Asia and Africa. Common; along the muddy banks of the lakes, appear and flower when water level goes down. Thekkady, *JA 17883.*

**Fimbristylis dura** (Zoll. & Moritz.) Merr., Philipp. J. Sci. 11: 53. 1916; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 287. 1985. ***Isolepis dura*** Zoll. & Moritz. ex Moritz.,, Syst. Verz. Zollinger Java Pfl. 97. 1846. ***Fimbristylis asperrima*** Boeckeler., Linnaea 37. 40. 1871; Clarke in Hook. f., Fl. Brit. India 6: 643. 1893.

Perennials; culms 40-50 cm high, acutely 4-angled, asperate. Leaves 30-40 x 0.6 cm, flat, scabrid; sheath rounded, glabrous. Umbel 12 x 5 cm; rays 6-7, secondary rays present; bracts 3-4, largest surpass the umbel; peduncles scabrid. Spikelets numerous, 3.5 x 1.5 mm, elliptic, acute, solitary, peduncled; glumes 5-15, 2.2 x 1.2 mm, ovate, acute, 3-nerved, brown; connective of anthers penicillate. Nut 1 mm long, obovoid, trabeculate, white; style base conical.

*Fl. & Fr.* : July-March

*Distr.* : Indo-Malesia. Rare; in marshy areas of evergreen forests. Sabarimala, *KPR 14952.*

**Fimbristylis eragrostis** (Nees & Meyen ex Nees) Hance, J. Linn. Soc. Bot. 13: 132. 1873; Hooper in Sald. & Nicols., Fl. Hassan Dist. 678. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1755. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 275. 1985. ***Abildgaardia eragrostis*** Nees & Meyen ex Nees in Wight, Contrib. 95. 1834. ***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. 1931.

Perennials; rhizome vertical, 1-3 cm long, clothed with leaf sheaths; culms 15-30 cm high, solitary, slender, tetragonous. Leaves to 20 x 0.25 cm, flat, blunt at apex, glabrous. Umbels 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 mm, oblong, acute; glumes 15-20 in a spikelet, 3 x 2 mm, acute, 1-nerved, brown. Nut 1 x 0.5 mm, obovate, obtuse, trabeculate; style base depressed globose.

*Fl. & Fr.* : July-April

*Distr.* : India, Sri Lanka and China. Not common; in open grasslands. Uppupara, *KPR & JA 15007.*

**Fimbristylis falcata** (Vahl) Kunth, Enum. Pl. 2: 239. 1837; Hooper in Sald. & Nicols., Fl. Hassan Dist. 678. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1756. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 289. 1985. ***Scirpus falcatus*** Vahl, Enum. Pl. 2: 275. 1806. ***Fimbristylis junciformis*** Kunth, Enum. Pl. 2: 239. 1837; Clarke in Hook. f., Fl. Brit. India 6: 647. 1893; Fischer in Gamble, Fl. Pres. Madras 1660. 1931.

Perennials; rhizome 6-10 mm thick, creeping, covered with old sheaths; culms 30-50 cm high, solitary, 4-5-angled, smooth. Leaves to 15 x 0.4 cm, falcate, basal; sheath rounded, closed. Umbel 10 x 6 cm; bracts 4-5, to 1 cm long, filiform. Spikelets 5-7 x 2.5 mm, ovate, acute, 3-8 together; glumes many, 3 x 2 mm, ovate, acute, 5-nerved, reddish brown. Nut 1.2 x 1 mm, trigonous, minutely but thickly tubercled, reddish-brown; style base conical.

*Fl. & Fr. :* September-May

*Distr.* : Indo-Malesia. Occasional; in open grasslands. Chenthamara, *KPR 15242.*

**Fimbristylis glabra** Steud., Syn. Pl. Gl. 2: 111. 1855.

Annuals; culms 20-35 cm high, erect, 4-8-ridged, flat below the inflorescence. Leaves 10-20 x 0.2-0.5 cm, flat, glabrous; sheath rounded; ligule a tuft of hairs. Umbel 5-7 x 4-5 cm, bracts 5, shorter, never surpass the umbel, scabrid; rays 5-6; secondary rays present. Spikelets 6 x 1.2 mm, lanceolate, acute, mostly peduncled, solitary; glumes 2 x 1.2 mm, acute, keel raised at back. Nut 0.8 x 0.5 mm, obovoid, obtuse, tubercled, pale brown.

*Fl. & Fr. :* July-December

*Distr.* : India and China. Occasional; in moist deciduous forests along river banks. Koruthode, *JA & KPR 16240.*

**Fimbristylis littoralis** Gaud. in Freyc., Voy. Bot. 413. 1826; Karthik. *et al.,* Fl. India Enum. 53. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 495. 1996. ***F. miliacea*** auct. non Vahl, 1806: Benth., Fl. Australia 316. 1878; Clarke in Hook. f., Fl. Brit. India 6: 644. 1893; Fischer in Gamble, Fl. Pres. Madras 1660. 1931; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1757. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 296. 1985; Hooper in Sald. & Nicols., Fl. Hassan Dist. 679. 1976.

Annuals; culms 5-15 cm high, tetragonous, smooth. Leaves 10-16 x 0.1-0.3 cm, scabrid, midrib strongly flattened back and blade reduced to 2 ridges only; sheath keeled with white margins. Umbel 1-3 x 1 cm, dense; bracts filiform; rays very short. Spikelets 2.5 x 2-2.5 mm, solitary, peduncled, up to 30 in an umbel; glumes 1.2 x 1 mm, ovate, concave, acute, 3-nerved, obtusely keeled, brown. Nut 0.3-0.6 mm long, obovate, trabeculate, dull-white.

*Fl. & Fr.* : July-December

*Distr.* : Pantropical. Common; in marshy grasslands. Thaannikkudy, *KPR & JA 14507.*

**Fimbristylis monticola** Hochst. ex Steud., Syn. Pl. Glum. 2: 111. 1855; Clarke in Hook. f., Fl. Brit. India 6: 642. 1893; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 291. 1985.

Annuals; culms, densely tufted, slender. Leaves filiform, to 40 cm long, scabrid. Spikelets 3-5, peduncled, to 1 x 0.4 cm, ovoid; lower glumes bifarious, upper spiral, 3 x 2 mm. Nuts 1.5 x 1 mm, obovate, trigonous, yellow, epidermal cells oblong; stigmas 3.

*Fl. & Fr.* : August-December

*Distr.* : South India and Sri Lanka. Rare; in muddy areas of evergreen forests. Vellimala, *JA 14046.*

**Fimbristylis narayanii** Fischer, Kew Bull. 1931: 46. 1931 & in Gamble, Fl. Pres. Madras 1660. 1931; Manilal, Fl. Silent Valley 343. 1988.

Tufted annuals; culms 15-30 cm tall, acutely quadrangular. Leaves to 15 x 0.1 cm, narrowly ensiform, usually basal, glabrous. Umbel 4 x 2.5 cm; bracts 1-6, minute, scabrid; rays 2-5. Spikelets 1-3 together, 5-10 x 2 mm, compressed, elliptic, solitary, peduncled; glumes 3 x 1.5 mm, 1-nerved, 12-16 in the spikelets. Nut obovoid, obtuse, trabeculate and tubercled, pale brown; style base conical.

*Fl. & Fr.* : July-December

*Distr.* : South India. Rare; in moist deciduous forests, along river banks. Koruthode, *KPR & JA 16263.*

**Fimbristylis ovata** (Burm. f.) Kern, Blumea 15: 126. 1967; Hooper in Sald. & Nicols., Fl. Hassan Dist. 679. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1758. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 273. 1985. ***Carex ovata*** Burm. f., Fl. Ind. 194. 1768. ***Cyperus monostachyos*** L., Mant. 2: 180. 1771. ***Fimbristylis monostachyos*** (L.) Hassk., Pl. Jav. Rar. 61. 1848; Clarke in Hook. f., Fl. Brit. India 6: 649. 1893; Fischer in Gamble, Fl. Pres. Madras 1660. 1931;

Tufted perennial herbs; rhizome oblique, thick; culms 12-30 cm high, 5-6-angled. Leaves 10-20 x 0.5 cm, flat, scabrid along the margins; sheath rounded, closed, smooth. Spikelets solitary, on long-peduncle, 8-23 x 3-7 mm, ovate-oblong, acute, 6-25-flowered; bracts 2, glumaceous; glumes 6 x 4 mm, 3-nerved; margins with minute numerous reddish spots. Nut obovoid, stalked, tubercled, pale brown; style base conical, hairy.

*Fl. & Fr.* : June-December

*Distr.* : Pantropical. Rare; in open grasslands. Vallakkadavu, *JA 15401.*

**Fimbristylis tenera** Schult., Syst. Veg. 2, Mant. 57. 1824; Clarke in Hook. f., Fl. Brit. India 6: 642. 1893; Fischer in Gamble, Fl. Pres. Madras 1660. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 681. 1976; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 293. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 495. 1996.

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, 1.5 x 1.5 cm. Spikelets 1-5, mostly peduncled, terete, acuminate; glumes few to many, keeled, brown. Nut obovoid, 0.8 mm long, dull grey, verruculose.

*Fl. & Fr.* : July-November

*Distr.* : Tropical Africa, India and Sri Lanka. Common; in open grasslands with short grasses. Vallakkadavu, *KPR & JA 17882.*

**Fimbristylis uliginosa** Hochst. ex Steud., Syn. Pl. Glum. 2: 109. 1855; Clarke in Hook. f., Fl. Brit. India 6: 648. 1891; Fischer in Gamble, Fl. Pres. Madras 1660. 1931; Fyson, Fl. South Indian Hill. St. 2: t. 576. 1932; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1762. 1983.

Perennial herbs; culms solitary, thickened at base. Leaves many, clustered, basal, to 15 x 0.2 cm, narrowed from a broad base, scabrid. Peduncle to 20 cm high, solitary; umbel simple with 3-7 spikelets. Spikelets 6-8 x 3 mm, ovoid, sessile; glumes spiral, 5 x 3 mm, ovate, mucronate. Nut obovoid, 1.5 x 1 mm, trigonous, tuberculate, dark brown.

*Fl. & Fr.* : December-February

*Distr.* : Endemic to South India. Common; in grasslands. Kumarikulam, *JA 18469.*

## FUIRENA Rottboel

Descr. & Ic. Rar. 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. Leaves to 5 mm broad.....**F. ponmudiensis**

1. Leaves to 1-2 cm broad.....**F. umbellata**

**Fuirena ponmudiensis** Ravi & Anilkumar, Rheedea 4(2): 102. 1994.

Tufted perennials with woody rhizome; culms tufted, 5-15 together, to 50 cm tall, sharply 3-angled, 3 mm thick. Leaves to 8 x 0.5 cm, linear-lanceolate, scattered, coriaceous, 1-ribbed; sheaths 3-angled, hairy towards the mouth. Inflorescence short terminal panicles, 3-6 cm long, with disturbed groups of spikelets; bracts one for each partial panicle, 2-5 cm long. Spikelets 5-angled, 1-4 together, to 15 x 2.5 mm, many-flowered; glumes arranged in 5 vertical rows, 35-40 in each spikelet, 2.5 x 1.5 mm, oblong, 3-nerved, sharply aristate; stamens 3. Nut 2 x 1 mm, trigonous; stigmas 3; bristles 6, similar, linear, retrosely barbed.

*Fl. & Fr.* : October-December

*Distr.* : Southern Western Ghats (Kerala). Rare; in marshy grasslands. Manakkavala, *JA 14555*.

**Fuirena umbellata** Rottb., Descr. Ic. 70, t. 19. 1773; Clarke in Hook. f., Fl. Brit. India 6: 666. 1893; Fischer in Gamble, Fl. Pres. Madras 1669. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 683. 1976; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 149. 1985.

Stout perennials; rhizome creeping. Culms 40-70 cm high, 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 10 x 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 mm, ovoid; glumes 2.2 x 1.5 mm, ovate-oblong, emarginate at apex, cuspidate, glabrous, brown, outer bristle retrorsely barbed; inner bristle obovate, truncate. Nut 1.2 x 0.7 mm, obovoid.

*Fl. & Fr.* : October-December

*Distr.* : Pantropical. Common; in marshy grasslands. Thannikkudy, *JA 12161*; Thekkady, *JA 13608*.

## HYPOLYTRUM L. C. Richard

in Persoon, Syn. Pl. 1: 70. 1805.

**Hypolytrum nemorum** (Vahl) Spreng., Syst. Veg. 1: 233. 1825; Hooper in Sald. & Nicols., Fl. Hassan Dist. 685. 1976; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 138. 1985; Manilal, Fl. Silent Valley 343. 1988; Sasidh. & Sivar., Fl. Pl. Thrissur For. 495. 1996; ***Schoenus nemorum*** Vahl, Symb. Bot. 3: 8. 1794; ***Hypolytrum latifolium*** L. C. Rich. in Pers., Syn. Pl. 1: 70. 1805; Clarke in Hook. f., Fl. Brit. India 6: 678. 1893; Fischer in Gamble, Fl. Pres. Madras 1673. 1931. **Karakkora** (Mannan).

Stout perennials, rhizome creeping, woody. Culms 70-90 cm tall, robust, triquetrous, 0.4 cm thick. Leaves to 70 x 2 cm, lanceolate, flat, scattered through the stem, 3-costate; sheath keeled, open. Inflorescence a terminal panicle, 6 x 8 cm; bracts similar to the leaves; branchlets of panicle ending into ovate-oblong spikes, spikelets 3 mm long, ovoid, sessile, supported by a broad bracteole; glumes 5, lower two sterile, minute, upper two opposite, lanceolate, with a single stamens in each; upper most glume lanceolate, carries a pistil. Nut 3 x 2 mm, obovoid, terete, striate, beaked, dark brown, smooth; style 1, base continuous with the ovary, dilated; stigmas 2, linear, glabrous.

*Fl. & Fr. :* August-May

*Distr.* : Indo-Malesia and Sri Lanka. Common; in dense evergreen forests. Koruthode, *JA 12218*; Sabarimala, *KPR 14968.*

*Ethnobotanical use* : Nuts are eaten

## KYLLINGA Rottboel

Descr. & Ic. Rar. 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. Keels of nut -bearing glume serrulate or spinulose.....2
1. Keels of nut-bearing glume not serrulate or spinulose.....4
2. Culms robust, acutely 3-angled; stamens 2.....**K. melanosperma**
2. Culms slender, terete or ridged; stamens 3.....3
3. Rhizome very long, creeping; leaves up to 7 cm long, smooth .....**K. brevifolia**
3. Rhizome short, not creeping; leaves 20-30 cm long, scabrid along nerves and margins..**K. squamulata**
4. Glumes with a crest towards the upper part of the keel; rhizome creeping; stamens 3.....**K. nemoralis**
4. Glumes without a crest; rhizome short or absent; stamens 2.....5
5. Spikes lobed with lateral ones.....**K. bulbosa**
5. Spikes solitary, not lobed.....**K. odorata**

**Kyllinga brevifolia** Rottb., Descr. Ic. 13. 1773; Clarke in Hook. f., Fl. Brit. India 6: 588. 1893; Fischer in Gamble, Fl. Pres. Madras 1624. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 686. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1765. 1983; Koyama

in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 248. 1985. ***Cyperus brevifolia*** (Rottb.) Hassk., Cat. Hort. Bogor. 24. 1884; Kern, Fl. Males. 1, 7: 656. 1974.

Culms 30-35 cm high, solitary along the creeping rhizome. Leaves flaccid; basal sheaths bladeless. Spike 0.8 x 0.6 cm, globose; bracts foliar. Spikelets 3.5 x 1.2 mm, lanceolate; upper glumes 3 x 2 mm, aristate, 5-nerved, margins hyaline; stamens 3. Nut 1.2 x 0.8 mm, obtuse, apiculate, dark brown.

*Fl. & Fr. :* July-December

*Distr.* : Pantropical. Common; in marshy areas of moist deciduous forests. Thekkady, *JA 13946.*

**Kyllinga bulbosa** Beauv., Fl. d' Oware & Benin 1: 11, t. 8, f. 1. 1804; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 245. 1985; ***Cyperus triceps*** (Rottb.) Endl., Cat. Hort. Acad. Uindb. 1: 94. 1842; Manilal, Fl. Silent Valley 341. 1988; ***Kyllinga triceps*** Rottb., Descr. Ic. 14. 1773, *nom. illegit.*; Clarke in Hook. f., Fl. Brit. India 6: 587. 1893; Fischer in Gamble, Fl. Pres. Madras 1623. 1931; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1768. 1983; Sasidh. & Sivar., Fl. Pl. Thrissur For. 496. 1996.

Culms 5-10 cm high, densely tufted. Leaves 2-6 x 0.1-0.2 cm, scabrid along margin and costa. Vertical spike 0.7 x 0.5 cm, conical, lateral shorter; bracts foliar. Spikelets 2 mm long, lanceolate; lower glumes smaller, upper glumes 1.5 x 1 mm, acute, nerves greenish white. Nut 1.2 x 0.5 mm, oblique, truncate at apex, yellowish brown.

*Fl. & Fr. :* August-December

*Distr.* : Tropical Africa, Asia and Australia. Common; in marshy areas of open grasslands. Thekkady, *KPR 16944.*

**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. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 687. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1767. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 246. 1985. ***Cyperus melanospermus*** (Nees) Vakk., Sur. Gesl. Cyp. Mal. Arch. 50: t. 2, f. 8. 1898; Manilal, Fl. Silent Valley 340. 1988.

Rhizome creeping, woody. Culms 25-45 cm tall, triquetrous at apex. Leaves to 8 x 0.5 cm, rigid, serrulate. Spike 0.7 x 0.7cm, globose; bracts foliar. Spikelets 3 x 1 mm, lanceolate, curved; glumes 3 x 1 mm, aristate, 7-nerved, nerves red. Nut 1.5 x 0.5 mm oblong, obtuse, dark brown.

*Fl. & Fr. :* August-December

*Distr.* : Tropical Africa and Asia. Common; in marshy patches of open grasslands. Kavalappara, *JA 14556.*

**Kyllinga nemoralis** (J. R. & G. Forst.) Dandy ex Hutchins. & Dalziel, Fl. W. Trop. Africa 2: 486, 487. 1936; Hooper in Sald. & Nicols., Fl. Hassan Dist. 687. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1767. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 249. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 496. 1996. ***Thryocephalon nemoralis*** J. R & G. Forst., Char. Gen. Pl. 130. 1776; ***Kyllinga monocephala*** Rottb., Descr. Ic. 13. 1773; Clarke in Hook. f., Fl. Brit. India 6: 588. 1893; Fischer in Gamble, Fl. Pres. Madras 1624. 1931. ***Cyperus kyllinga*** Endl., Cat. Hort. Acad. Vindb. 1: 1842.

Rhizome slender, culms to 35 cm tall, closely arranged. Leaves to 30 x 0.3 cm, linear. Spikes to 4 x 7 mm, globose, white; bracts to 10 cm long. Spikelets 4 mm long, compressed, elliptic, densely packed; lower glumes 2 mm long, linear, upper glumes 2.5 mm long, concave, mucronulate, keel arcuate. Nut biconvex, yellowish.

*Fl. & Fr. :* Throughout the year

*Distr.* : Pantropical. Occasional; in disturbed forest areas. Koruthode, *JA 18467.*

**Kyllinga odorata** Vahl, Enum. Pl. 2: 382. 1906; Hooper in Sald. & Nicols., Fl. Hassan Dist. 687. 1976, subsp. **cylindrica** (Nees ex Wight) Koyama, Gard. Bull. Singapore 30. 161. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 244. 1985 ***K. cylindrica*** Nees ex Wight, Contrib. 91. 1834; Clarke in Hook. f., Fl. Brit. India 6: 588. 1893; Fischer in Gamble, Fl. Pres. Madras 1624. 1931.

Culms up to 35 cm tall, 2-3 together. Leaves 5-10 x 0.2 cm, few, flat. Spike 0.5-1.5 x 0.6 cm; bracts foliar. Spikelets 2.5 x 1.5 mm, broadly ovate; glumes acute, 9-nerved, white with green keel. Nut 1.2 x 1 mm, truncate, shortly cuspidate, minutely muriculate, dark brown.

*Fl. & Fr. :* July-December

*Distr.* : Tropical Africa, Asia and Australia. Common; in open grasslands and marshy areas of moist deciduous forests. Vallakkadavu, *KPR 16329.*

**Kyllinga squamulata** Vahl, Enum. Pl. 2: 381. 1806; Clarke in Hook. f., Fl. Brit. India 6: 589. 1893; Fischer in Gamble, Fl. Pres. Madras 1624. 1931.

Culms 20-36 cm long, rigid, 2-5 together. Spike 0.9 x 0.7 cm, globose; bracts 20 x 0.3 cm, foliar. Spikelets 3.5 x 1.5 mm, curved; glumes aristate, 7-nerved, with a toothed crest. Nut 1.5 x 0.6 mm, oblong, shortly cuspidate, dark brown.

*Fl. & Fr. :* August-December

*Distr.* : India. Rare; in the openings of semi-evergreen forests. Valiyakanam, *JA 13923.*

## 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. Spikelets 3; glumes dark brown, 7-nerved.....**L. sphacelata**
1. Spikelets 6-12; glumes yellowish brown, 1-nerved.....**L. chinensis**

**Lipocarpha chinensis** (Osbeck) Kern. Blumea, Suppl. 4: 167. 1958; Hooper in Sald. & Nicols., Fl. Hassan Dist. 688. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1769. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 251. 1985; Manilal, Fl. Silent Valley 343. 1988. ***Scirpus chinensis*** Osbeck, Dago. Ostind. Resa. 220. 1757. ***Hypaelytrum argenteum*** Vahl, Enum. Pl. 2: 283. 1806. ***Lipocarpha argentea*** (Vahl) R. Br. ex Nees, Linnaea 9: 287. 1835; Clarke in Hook. f., Fl. Brit. India 6: 667. 1893; Fischer in Gamble, Fl. Pres. Madras 1670, 1931.

Culms 40-65 cm high, 2 mm thick. Leaves 10-20 x 0.5 cm, stiff; margins scabrid towards the apex; bracts to 8 cm long. Spikelets 0.5-1 x 0.5 cm, obtuse; glumes 2.5 x 1 mm, obtusely acute, keeled, yellow or pale brown. Nut 1.2 x 0.4 mm, obtuse, hardly triquetrous, brown.

*Fl. & Fr. :* August-December

*Distr.* : Old World Tropics. Common; in marshy grasslands. Kavalappara, *JA & KPR 14552*

**Lipocarpha sphacelata** (Vahl) Kunth, Enum. Pl. 2: 267. 1837; Clarke in Hook. f., Fl. Brit. India 6: 667. 1893; Hooper in Sald. & Nicols., Fl. Hassan Dist. 688. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1769. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 252. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 496. 1996. ***Hypaelytrum sphacelatum*** Vahl, Enum. Pl. 2: 283. 1806. ***Tunga triceps*** Roxb., Fl. Ind. 1: 183. 1820. ***Lipocarpha triceps*** (Roxb.) Nees in Wight, Contrib. 92. 1834; Fischer in Gamble, Fl. Pres. Madras 1670. 1931.

Rhizome zero. Culms 10-20 cm high, 0.5-1 mm thick. Leaves 7-10 x 0.15 cm, 1-costate, glabrous. Involucral bracts 2, dilated at base, 3-4 cm long, scabrid at top. Spikelets 8 x 5 mm, acute; glumes 2.5 x 0.8 mm, clawed, acute, 4-5-nerved. Nut 1.5 x 0.4 mm, acute, slightly curved, dark brown.

*Fl. & Fr.* : August-December

*Distr.* : Pantropical. Common; in marshy grasslands. Koruthode, *KPR & JA 16936.*

## MARISCUS Vahl

Enum. Pl. 2: 372. 1806, *typ. cons.*

Annual or perennials; rhizome creeping, short or absent. Leaves linear-lanceolate, acuminate, scabrid along the margins. Inflorescence a simple or compound umbel or reduced to a solitary spike; bracts 3-7, leaf-like; rays 3-10 or absent; spikes peduncled or sessile, cylindric with densely packed spikelets. Spikelets sessile, lanceolate to linear-oblong, terete or compressed, 1-many-flowered; rachilla winged or wingless; glumes 4-many; lower 2 sterile, upper bisexual, male or empty; each ovate-lanceolate, keeled, 1-5-nerved, glabrous, stamens 1-3; anthers oblong, obtuse; nut obovoid, elliptic or oblong, usually trigonous, sharply or minutely muriculate; style-1, stigma 3, glabrous.

1. Spikes solitary, globose ..... **M. dubius**
1. Spikes 3-many, cylindric or flattened ..... 2
2. Spikelets with 1-2 nuts; umbel simple ..... 3
2. Spikelets with 4-many nuts; umbel compound ..... 5
3. Rhizome creeping ..... **M. paniceus**
3. Rhizome short or absent ..... **M. sumatrensis**
4. Stamens 1; glumes aristate; annuals ..... **M. squarrosus**
4. Stamens 3; glumes acute; stout perennials ..... **M. javanicus**

**Mariscus dubius** (Rottb.) Kukenth. ex Fischer in Gamble, Fl. Pres. Madras 1644. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 689. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1772. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 238. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 497. 1996. ***Cyperus dubius*** Rottb., Descr. Ic. 20. 1773. ***Mariscus dregeanus*** Kunth., Enum. Pl. 2: 120. 1837; Clarke in Hook. f., Fl. Brit. India 6: 620. 1893.

Culms to 15 cm tall, tufted. Leaves to 20 x 5 cm, linear, basal. Spikes 1.5 cm across, globose; bracts 4, unequal, to 25 cm long. Spikelets 5 mm long, lanceolate, densely packed; glumes 3 mm long, broadly ovate, many-nerved, keeled. Nuts trigonous, ellipsoid.

*Fl. & Fr.* : July-November

*Distr.* : Tropical Africa, Asia and Malesia. Common; in moist deciduous forests. Koruthode, *JA 17884.*

**Mariscus javanicus** (Houtt.) Merr. & Metcalfe, Lingnan Sci. J. 21: 4. 1945; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 227. 1985. ***Cyperus javanicus*** Houtt., Nat. Hist. 11, 13. Aanw. Pl. (1), t. 88, f. 1. 1782. ***C. pennatus*** Lam., 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*** (Lam.) Domin, Bibl. Bot. Heft 85: 440. 1915.

Rhizome creeping, nodulose. Culms 70-95 cm tall. Leaves 50-70 x 1 cm; flat, coriaceous; sheath rounded, brown. Umbel 15 x 25 cm; bracts 4-6, leaf-like, to 70 cm long; rays 7-10, very long, secondary rays present. Spikes 4-5 x 1 cm, cylindric, peduncled. Spikelets 10 x 1.5 mm, linear; rachilla winged; glumes 2 x 1.2 mm, acute, distantly spaced, brown with white margins. Nut 1.5 x 0.6 mm, obovate, obtusely acute, brown.

*Fl. & Fr.* : July-December

*Distr.* : Tropical Africa, Asia and Australia. Common; in marshy openings of evergreen forests. Nelliparakkandam, *JA 12165.*

**Mariscus paniceus** (Rottb.) Vahl, Enum. Pl. 2: 373. 1806; Clarke in Hook. f., Fl. Brit. India 6: 620. 1893; Fischer in Gamble, Fl. Pres. Madras 1644. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 690. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1774. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 235. 1985; Manilal, Fl. Silent Valley 344. 1988. ***Kyllinga panicea*** Rottb., Descr. Ic. 15. 1773; ***Cyperus paniceus*** (Rottb.) Boeckeler, Linnaea 36: 381. 1870.

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 0.8 cm. Spikelets 3-4 x 0.6 mm, terete; glumes 4, lower two glumes smaller; third glume 3 x 1.5 mm, lanceolate, fourth glume 3.5 x 0.5 mm; stamens 2. Nut 2.5 mm long, brown.

*Fl. & Fr.* : August-January

*Distr.* : India to Thailand. Common; in openings of evergreen forests. Koruthode, *KPR 16259.*

**Mariscus squarrosus** (L.) Clarke in Hook. f., Fl. Brit. India 6: 623. 1893; Fischer in Gamble, Fl. Pres. Madras 1645. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 690. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1774. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 229. 1985. ***Cyperus squarrosus*** L., Cent. Pl. 2: 6. 1756.

Culms 5-8 cm high, tufted, filiform. Leaves 5-10 x 0.1 cm, scabrid; whole plant red glandular. Umbel 3-5 x 3 cm; bracts 3-4 linear, 6-9 cm long; rays 1-5, secondary rays absent; spikes sessile, congested, head-like. Spikelets 10-11 x 2 mm, compressed, linear oblong, 5-12 together in a spike; rachilla winged; glumes 2-3 x 1 mm, 3-nerved. Nut 1.5 x 0.3 mm, pale brown.

*Fl. & Fr.* : June-December

*Distr.* : Pantropical. Common; on wet rocks in the openings of evergreen forests. Sabarimala, *KPR & JA 15480.*

**Mariscus sumatrensis** (Retz.) Raynal, Adansonia 15: 110. 1975; Hooper in Sald. & Nicols., Fl. Hassan Dist. 690. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1775. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 232. 1985. ***Kyllinga sumatrensis*** Retz., Obs. Bot. 4: 13. 1786. ***Mariscus sieberianus*** Nees ex Clarke in Hook. f., Fl. Brit. India 6: 622. 1893; Fischer in Gamble, Fl. Pres. Madras 1645. 1931. ***Scirpus cyperoides*** L., Mant. 2: 181. 1771. ***Cyperus cyperoides*** (L.) Kunth, Rev. Gen. Pl. 3(2): 333. 1898. ***Mariscus cyperoides*** (L.) Urban, Symb. Antill. 2(1): 164. 1900, non Dietrich, 1833.

Culms 35-40 cm high. Leaves to 36 x 0.7 cm, nearly basal, midrib strongly depressed, margins recurved, scabrid. Umbel 3-4 x 5-7 cm, simple; bracts to 7-8, 20 x 0.4 cm; spikes 2.5-3 x 1 cm. Spikelets 3.5 x 1 mm, densely packed, perpendicular to the spike; glumes 4, third glume 3.2 x 2 mm, 1-nerved, fourth glume 3.2 x 1 mm, aristate 1-nerved; stamens 2. Nut curved.

*Fl. & Fr.* : June-December

*Distr.* : Tropical Africa, Asia and Australia. Rare; along marshy patches and moist deciduous forests. Thekkady, *NS & JA 13812.*

## **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. Nut transversely ridged or wrinkled.....**P. stramineus**

1. Nut smooth or minutely muriculate, not ridged.....2

2. Stamen one.....3

2. Stamens 2 or 3.....4

3. Glumes aristate; rachilla straight, wingless ..... **P. pumilus**

3. Glumes not aristate; rachilla zig-zag, winged..... **P. sulcinux**

4. Leaves scattered along the lower half of the stem; stamens 3..... **P. sanguinolentus**

4. Leaves basal; stamens 2 ..... 5

5. Rachilla zig-zag, winged; wing broader at the junctions ..... 6

5. Rachilla straight, wingless ..... **P. flavidus**

6. Stem terete, to 30 cm high; glumes acute..... **P. polystachyos**

6. Stem 3-angled, usually solitary, 50-70 cm high; glumes aristate..... **P. unioloides** var. **angulata**

**Pycreus flavidus** (Retz.) Koyama, J. Jap. Bot. 51: 31. 1976 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 222. 1985; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1777. 1983. ***Cyperus flavidus*** Retz., Obs. Bot. 5: 13. 1788; Manilal, Fl. Silent Valley 340. 1988. ***Cyperus globosus*** All., Auctuar. Fl. Pedemont. 49. 1789. ***Pycreus capillaris*** Nees ex Clarke in Hook. f., Fl. Brit. India 6: 591. 1893. ***Pycreus globosus*** (All.) Reichb. f., Fl. Germ. Excurs. 140. 1830; Fischer in Gamble, Fl. Pres. Madras 1627. 1931.

Culms 30-45 cm tall. Leaves 10-20 x 0.1 cm, glabrous, mouth of sheath with two truncate flaps. Umbel 8 x 8 cm; bracts 2-3, to 18 cm long; rays spreading. Spikelets 12-16 x 2 mm oblong, obtuse, 12-15 in a spike; glumes 2 x 1.2 mm, 30-40 in a spikelets, 3-5-nerved; keel curved, green. Nut 0.8-0.5 mm, biconvex, distinctly cuspidate, minutely muriculate, dark brown.

*Fl. & Fr.* : August-January

*Distr.* : Cosmopolitan. Common; in marshy grasslands. Kavalappara, *NS, KPR & JA 14528.*

**Pycreus polystachyos** (Rottb.) P. Beauv., Fl. d' Oware & Benin 2: 48. 1807; Clarke in Hook. f., Fl. Brit. India 6: 592. 1893; Hooper in Sald. & Nicols., Fl. Hassan Dist. 693. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1777. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 219. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 498. 1996. *Cyperus* ***polystachyos*** Rottb., Descr. Ic. 21. 1772 & Icon. 39, t. 11. 1773; Manilal, Fl. Silent Valley 340. 1988. ***Pycreus odoratus*** Urb., Symb. Aitill 2: 164. 1900; Fischer in Gamble, Fl. Pres. Madras 1627. 1931.

Culms 10-30 cm high, terete, tufted. Leaves 3-10 x 0.3 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 15 x 2 mm, oblong, pedicelled; rachilla zig-zag, winged; glumes 2 x 1.5 mm, ovate, obtuse, 3-nerved, yellow brown, 26-34 in a spikelets. Nut 1.2 x 0.4 mm, oblong, obtuse, cuspidate, dark brown.

*Fl. & Fr. :* Throughout the year

*Distr.* : Cosmopolitan. Common; in marshy areas of grasslands. Thekkady, *JA & KPR 15059.*

**Pycreus pumilus** (L.) Nees, Linnaea 9: 283. 1835; Clarke in Hook. f., Fl. Brit. India 6: 591. 1893; Fischer in Gamble, Fl. Pres. Madras 1627. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 693. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1778. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 224. 1985. ***Cyperus pumilus*** L., Cent. Pl. 2: 6. 1756.

Culms 10-18 cm tall, slender, terete. Leaves up to 21 x 0.2 cm, linear, serrulate along the margins. Umbel 4 x 6 cm, spreading; bracts 4, unequal, longest 10-12 x 0.15 cm; rays 3-5, up to 2.5 cm long. Spikelets 1.2 x 0.3 cm, linear oblong; glumes 1.5 x 1 mm, aristate, keeled, 1-nerved, 26-34 in each spikelets. Nut 0.6-0.4 mm, truncate, cuspidate, glabrous, dark brown.

*Fl. & Fr. :* August-February

*Distr.* : India, south-eastward to Australia. Common; in marshy grasslands. Thekkady, *KPR & JA 16953.*

**Pycreus sanguinolentus** (Vahl) Nees ex Clarke in Hook. f., Fl. Brit. India 6: 590. 1893; Fischer in Gamble, Fl. Pres. Madras 1627. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 694. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1780. 1983; Koyama in Dassan. & Fosb., Rev.Handb. Fl. Ceylon 5:217.1985. ***Cyperus sanguinolentus*** Vahl, Enum.Pl. 2:351.1806.

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 0.25-0.35 cm, compressed, acute, sessile; rachilla narrowly winged, red glandular; glumes 2.5 x 1.8 mm obtuse, keeled 5-7 nerved, 16-22 in each spikelets. Nut 1.2 x 1 mm biconvex, minutely reticulate, dark brown.

*Fl. & Fr. :* August-January

*Distr.* : Old World Tropics. Rare; in the marshy fields. Thekkady, *KPR 14576*; Thaannikkudy, *JA 14836.*

**Pycreus stramineus** (Nees) Clarke in Hook. f., Fl. Brit. India 6: 589. 1893; Fischer in Gamble, Fl. Pres. Madras 1627. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 694. 1976; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 216. 1985. ***Cyperus stramineus*** Nees in Wight, Contrib. 74. 1834.

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 2.5 x 2 mm, ovate obtuse, keeled, 2-5-nerved, reddish brown; stamens 2, filaments persistent. Nut 1.2 x 0.9 mm, apiculate, deep grey.

*Fl. & Fr.* : August-January

*Distr.* : India, Sri Lanka and Malay Peninsula. Common; in open marshy places. Kumarikulam, *JA 13090*; Vellimala, *KPR 14351*; Manakkavala, *JA & KPR 17037.*

**Pycreus sulcinux** (Clarke) Clarke in Hook. f., Fl. Brit. India 6: 593. 1893; Fischer in Gamble, Fl. Pres. Madras 1627. 1931; Karthik *et al.*, Fl. India Enum. 66. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 498. 1996. ***Cyperus sulcinux*** Clarke, J. Linn. Soc. Bot. 21: 56. 1884.

Culms 10-22 cm high, terete. Leaves 5-10 x 0.15 cm, flat, flaccid, serrulate along margins; sheath rounded, open. Umbel 3-10 cm long; bracts 10 cm long, flaccid; rays 4-6, spreading. Spikelets 0.6-3 x 0.15-0.2 cm, elliptic, densely packed; glumes 2 x 1 mm, keeled, obtuse, 1-nerved, yellow, 25-45 in a spikelets. Nut 1.2 x 0.5 mm oblong curved at one side, cuspidate, dark brown.

*Fl. & Fr.* : July-November

*Distr.* : Tropical Africa eastward to Malesia. Occasional; in marshy areas. Thekkady, *JA 15059*, Sabarimala, *JA 15480.*

**Pycreus unioloides** (R. Br.) Makino, Bot. Mag. Tokyo 17: 49. 1912, var. **angulatus** (Nees) Dom., Bibl. Bot. 85: 417. 1915; Fischer in Gamble, Fl. Pres. Madras 1628. 1931. ***Cyperus unioloides*** R. Br. Prodr. 216. 1810. ***Pycreus angulatus*** Nees, Linnaea 9: 283. 1835; Clarke in Hook. f., Fl. Brit. India 591. 1893.

Culms 50-70 cm tall, solitary, triquetrous 2.5 mm thick, smooth. Leaves 35-42 x 0.3-0.4 cm, linear-lanceolate; midrib depressed and canaliculate above; sheath tubular, mouth split. Umbel 6-8 x 4-5 cm; bracts 5-7, unequal; the longest one to 30 x 0.3 cm; rays 5-6, each 5-7 cm long; base covered by a tubular bracteole with a short cusp at mouth. Spikelets 15-17 x 2 mm, oblong, 5-12 in a spike; glumes 2.2 x 1.2 mm, ovate, aristate, keeled, 1-nerved; keel green. Nut 1 x 0.5 mm, oblong, obtuse, dark brown.

*Fl. & Fr.* : August-January

*Distr.* : Endemic to South India. Common; on wet rocks in moist deciduous forests. Anchuruli, *JA 17119.*

## RHYNCHOSPORA Vahl

Enum. Pl. 2: 229. 1806, *orth. cons.*

Perennials. Rhizome globose or oblique, covered with leaf sheaths and roots. Culms erect, 2-5 together, sharply 3-angled. Leaves scattered along the stem, linear-lanceolate, 3-costate, margins

and costae scabrid; sheath 3-angled, closed, glabrous, ligules absent. Inflorescence large, interrupted panicle; partial panicles corymbose, distant, branches scabrid; bracts leaf-like, surpass the corymbs. Spikelets many, ovate to lanceolate, acute, glabrous; glumes 4-10, spiral, lower 3-5 sterile; fertile glumes ovate or lanceolate, acute or shortly aristate, 1-nerved, keeled, glabrous. Stamens 3, filaments free, glabrous; anthers oblong, obtuse, apiculate; nut biconvex, obovate to broadly elliptic with persistent and dilated style base; style-1; stigma 2, glabrous; hypogynous bristles 6-8, linear, filiform, barbate.

1. Nut with brown transverse striations; style base shorter than the nut.....**R. rugosa** subsp. **brownii**

1. Nut without transverse striations; persistent style base longer than the nut.....**R. corymbosa**

**Rhynchospora corymbosa** (L.) Brit., Trans. New York Acad. Sci. 11: 84. 1892; Fischer in Gamble, Fl. Pres. Madras 1672. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 695. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1781. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 336. 1985. ***Scirpus corymbosus*** L., Cent. Pl. 2: 7. 1756. ***Rhynchospora aurea*** Vahl, Enum. Pl. 2: 229. 1806; 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. Partial panicle corymbose. Spikelets 7-8 x 2.5 mm, clustered; all sessile; glumes 4, lower 3 sterile, uppermost one bisexual, 7.5 x 4 mm, shortly aristate, keeled with brown streaks, anthers 2.5 mm long, apiculate. Nut 3 x 1.5 mm, truncate, wrinkled with brown spots; style base 4.5 mm long conical with longitudinal depression on either sides, hypogynous bristle 8, 4.5 mm long.

*Fl. & Fr. :* Throughout the year

*Distr.* : Pantropical. Common; in wet grasslands. Damsite, *KPR & JA 15049.*

**Rhynchospora rugosa** (Vahl) Gale, Rhodora 46: 275, t. 835. 1944; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1781. 1983, subsp. **brownii** (Roem. & Schult.) Koyama in Hara, Stearn & Williams, Enum. Fl. Pl. Nepal. 1: 118. 1978 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 335. 1985. ***Schoenus rugosus*** Vahl, Eclog. Auer. 5. 1978. ***R. brownii*** Roem. & Schult., Syst. Veg. 2: 86. 1817. ***R. glauca*** Vahl, Enum. Pl. 2: 233. 1805; Clarke in Hook. f., Fl. Brit. India 6: 671. 1893; Fischer in Gamble, Fl. Pres. Madras 1672. 1931.

Rhizome oblique, woody. Culms 40-65 cm high, angles scabrid. Leaves 30-45 x 0.2-0.4 cm; midrib strongly depressed; margin recurved. Panicle 15-25 cm long bracts 6-12 cm long, filiform. Spikelets mostly pedicelled, 5-7 x 3 mm, solitary, acute; glumes 6-10, lower 3-5 sterile; fertile

glumes 4 x 2 mm, aristate, 1-nerved, brown; anthers 1.5 mm long, obtuse. Nut 2.5 x 1.5 mm biconvex, striated, brown spots in each striations; bristles 6, retrorsely barbed, golden yellow.

*Fl. & Fr.* : August-December

*Distr.* : Pantropical. Common; in wet grasslands and marshy areas in savannahs. Thaannikkudy, *JA 12365.*

## RIKLIELLA J. Raynal

Adansonia 13: 154. 1973.

**Rikliella squarrosa** (Linn.) Raynal, Adansonia 13: 154. 1973; Hooper in Sald. & Nicols., Fl. Hassan Dist. 696. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1782. 1983; Koyama in Dassan. & Fosb., Rev. Fl. Ceylon 5: 254. 1985; Sasidh. & Sivar., Fl. Pl. Thrissur For. 498. 1996. ***Scirpus squarrosus*** L., Mant. 2: 181. 1771; Clarke in Hook. f., Fl. Brit. India 6: 663. 1893; Fischer in Gamble, Fl. Pres. Madras 1666. 1931.

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 2 cm below the apex of stem, 0.5-0.7 x 0.3 cm, cylindrical, squarrose; glumes 0.8 mm long, 1-nerved, long aristate, yellow brown, spirally disposed; stamens 1 or 2, filaments free, short; anthers yellow. Nut 0.8 x 0.4 mm obovate, obtuse, obtusely trigonous, dark brown. minutely muriculate.

*Fl. & Fr.* : July-February

*Distr.* : South-East Asia. Common; in ditches in grasslands. Swamikkayam, *NS & JA 13111.*

## SCHOENOPLECTUS (Reichenbach) Palla

Sitzber. Zool. Bot. Ges. Wein 38: 49. 1888, *nom. cons.*

Marshy herbs. Culms erect, solitary or loosely tufted. Leaves reduced to sheaths. Inflorescence a cluster of sessile spikelets, lateral on the stem, below the apex each ovoid to oblong, acute, cylindrical; bracts zero; glumes broadly ovate, concave, not keeled, obtuse or orbicular, 1-nerved; stamens 3, filaments long, free, glabrous; anthers oblong, connective produced into an acute tip; hypogynous bristles 6, setaceous, retrorsely barbed; nut planoconvex, obovoid to orbicular, stalked, faintly transversely rugose. Style 2, stigma 2-3, linear, puberulus.

1. Culms terete; rhizome zero.....**S. juncoides**

1. Culms triquetrous; rhizome creeping.....**S. mucronatus**

**Schoenoplectus juncoides** (Roxb.) Palla, Bot. Jahrb. Syst. 10: 229. 1889; Hooper in Sald. & Nicols., Fl. Hassan Dist. 697. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1784. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 160. 1985. ***Scirpus juncoides*** Roxb., Fl. Ind. 1: 228. 1820. ***Scirpus erectus*** Poir. ex Clarke in Hook. f., Fl. Brit. India 6: 656. 1893; Fischer in Gamble, Fl. Pres. Madras 1666. 1931.

Culms 30 cm high, usually solitary, 1 mm thick, mouth of sheath shortly cuspidate. Spikelets solitary or 3-6 in a cluster, 2.5-3.5 cm below the apex of culms; glumes ovate, obtuse, mucronate, 1-nerved, streaked with brown. Nut 2 x 2 mm, biconvex, apiculate, thinly transversely rugose, brown; bristles as long as nut, brown.

*Fl. & Fr. :* Throughout the year

*Distr.* : Indo-Malesia. Common; in marshy areas of grasslands. Manakkavala, *KPR & JA 17813.*

**Schoenoplectus mucronatus** (L.) Palla, Bot. Jahrb. Syst. 10: 299. 1889; Hooper in Sald. & Nicols., Fl. Hassan Dist. 699. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1785. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 160. 1985. ***Scirpus mucronatus*** L., Sp. Pl. 50. 1753; Clarke in Hook. f., Fl. Brit. India 6: 657. 1893; Fischer in Gamble, Fl. Pres. Madras 1666. 1931; Manilal, Fl. Silent Valley 344. 1988.

Culms 40-60 cm high, few together, spongy below, mouth of sheath acute. Spikelets 0.6-1 x 0.6 cm, oblong, 10-25 in a cluster 2.5 cm below the tip of the stem; glumes 4 x 3 mm, obovate, shortly mucronate, pale brown. Nut 2 x 1.7 mm, plano-convex, truncate, apiculate, dark brown; bristles equal to the nut brown.

*Fl. & Fr. :* Throughout the year

*Distr.* : Eurasia. Common; in water logged areas of grasslands. Thaannikkudy, *JA 12337*; Kumarikulam, *KPR 14861.*

## **SCLERIA** Bergius

Kongl. Vetensk. Acad. Handl. 26: 142, tt. 4,5. 1765.

Annuals or perennials, rhizome creeping or short. Stem erect, solitary or 2-5 together, triquetrous. Leaves scattered throughout the stem, linear, acuminate, 3-costate, glabrous, retrorsely scabrid along the margins. Sheath tubular, 3-angled, mouth truncate with a small lobe. Inflorescence a disturbed panicle or raceme. Spikelets in groups of 3-6, dissimilar, unisexual or androgynous, usually one female and other male spikelets. Female spikelets ovoid, acute; lower 2-3 glumes empty, ovate, acute, 1-nerved keeled; upper one contains a pistil; upper most one or two empty or contains stamens; ovary elliptic-ovoid with a lobed hypogynous disc; styles 3, linear;

nut ovoid or globose, bony, smooth or sculptured in various patterns. Male spikelets smaller, with many glumes, each glume oblong, obtuse or acute, 1-nerved; lower 2-3 vacant, upper ones contains 2-3 stamens; filaments free; anthers apiculate.

1. Spikelets unisexual.....**S. caricina**
1. Spikelets bisexual.....2
2. Culms scabrid.....3
2. Culms smooth.....6
3. Sheath winged.....4
3. Sheath not winged.....5
4. Rhizome horizontal; lobes of disc acute.....**S. levis**
4. Rhizome very short; lobes of disc hemispherical or obtuse.....**S. rugosa**
5. Nut smooth, white; glumes reddish pink.....**S. annularis**
5. Nut scrobiculate, hispid; glumes dark brown.....**S. terrestris**
6. Inflorescence unbranched racemose; spikelets clustered in groups, androgynous.....**S. pergracilis**
6. Inflorescence a branched panicle; spikelets unisexual.....**S. parvula**

**Scleria annularis** Nees ex Steud., Syn. Pl. 2: 176. 1855; Verma & Chandra, Bull. Bot. Surv. India 32: 78. 1990(1992).

Rhizome short, horizontal. Culms 50-65 cm high erect. Leaves 20-25 x 0.5 cm, scabrid along the margins and nerves. Sheath glabrous, mouth with an ovate flap. Panicle to 15 cm long, with short or no partial panicle; branches scabrid. Spikelets in groups of 4, one female, others male; glumes ovate, cuspidate, keeled, glabrous. Nut 3 x 1.7mm, obovate, obtuse, smooth; disc annular. *Fl. & Fr.* : September-January

*Distr.* : South Asia. Rare, along stream sides in evergreen forests. Koruthode, *JA 14748*; Vallakkadavu, *KPR & JA 16319*

*Note*: The present collection is the first authentic record of its occurrence in Kerala

**Scleria caricina** (R. Br.) Benth., Fl. Austral. 7: 426. 1878; Clarke in Hook. f., Fl. Brit. India 6: 688. 1894. ***Diplacrum caricinum*** R. Brown., Prodr. Fl. Nov. Holl. 1: 241. 1810; Fischer in Gamble, Fl. Pres. Madras 1678. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 670. 1976; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 367. 1985.

Tufted annual herbs, rhizome zero. Culms 10-20 cm high, sub-erect, weak. Leaves scattered, 1-5 x 0.1-0.3 cm, lanceolate, scabrid along the nerves & margins; sheath rounded, closed, truncate at mouth. Cymes axillary, sessile. Female spikelets obovate, glumes 4, opposite each other, 2 mm long, aristate, 3-nerved, with a broad midrib; margins form into an appendages

towards the base. Nut 0.6 x 0.4 mm, broadly ovate, obtuse, obscurely trigonous, striate, brown; disc 3-lobed; style 1; stigmas 3, linear, glabrous. Male spikelets ovate with four glumes; lower two glumes empty, upper opposed, aristate; stamens 2; filaments free; anthers 1 mm long, acute.

*Fl. & Fr. :* October-January

*Distr.* : Tropical Asia and Australia. Common; in marshy fields. Thaannikkudy, *JA & KPR 14516.*

**Scleria levis** Retz., Obs. 4: 13. 1786; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 345. 1985; Verma & Chandra, Bull. Bot. Surv. India 32: 78. 1990(1992); Sasidh. & Sivar., Fl. Pl. Thrissur For. 499. 1996. ***S. hebecarpa*** Nees in Wight, Contrib. 117. 1834; Clarke in Hook. f., Fl. Brit. India 6: 694. 1894; Fischer in Gamble, Fl. Pres. Madras 1678. 193. 1931.

Rhizome creeping, woody. Culms 40-70 cm high, tufted, 0.1-0.3 cm across. Leaves 20-30 x 0.7 cm, smooth; sheath winged, mouth with a ovate hairy flap. Panicle 10-25 cm long, partial panicles distant, bracts leaf-like; branches scabrid. Spikelets 5-6 mm long, ovate-lanceolate, glabrous; glumes ovate, cuspidate, 1-nerved, yellowish to pale brown. Nut 4 x 3 mm, broadly ovate cuspidate, smooth or faintly rugulose; disc lobes reach 1/2 of the nut; stigma 4-5 mm long, pubescent; anthers 1 mm long.

*Fl. & Fr. :* August-December

*Distr.* : Indo-Malesia and Australia. Common; in evergreen forests at lower elevations. Koruthode, *JA & KPR 16289.*

**Scleria pergracilis** (Nees) Kunth, Enum. Pl. 2: 354. 1837; Clarke in Hook. f., Fl. Brit. India 6: 685. 1894; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 365. 1985; Verma & Chandra, Bull. Bot. Surv. India 32: 61. 1990(1992). ***Hypoporun pergracile*** Nees, Edinburgh New Philos. J. 17(34): 267. 1834.

Fragrant annuals. Culms tufted, slender, 50-70 cm high, 0.1 cm across, smooth. Leaves basal, and along culms, 10-30 x 0.1-0.3 cm, linear, 1-costate, glabrous; sheath closed, trigonous, mouth truncate, glabrous. Raceme solitary, terminal, 10-25 cm long, unbranched; spikelets 3.5-4 mm long, bisexual, androgynous, in groups of 4-6; glumes brown, ovate, acute, 1-nerved. Nut 1.2 x 1 mm, elliptic, stalked, white, tuberculate or muricate; stamens 2, free; anthers 1 mm long, apiculate.

*Fl. & Fr. :* September-January

*Distr.* : Old World Tropics. Common; in open grasslands near water course. Thaannikkudy, *JA 12338.*

*Note* : Not reported from Kerala till the present collection

**Scleria parvula** Steud., Syn. Pl. 1: 174. 1855; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 360. 1985; Verma & Chandra, Bull. Bot. Surv. India 32: 76. 1990(1992).

Annuals, rhizome short. Culms to 35 cm tall, 0.1 cm thick, tufted. Leaves to 20 x 0.3 cm, acute at tip, hairy below; sheath pubescent on one face. Panicle 20-25 cm long, partial panicles 4-5, distant, 2-3 cm long, branches glabrous, 3-winged; bracts leafy. Female spikelets 5-6 mm long, ovate, acute; glumes 3, 4.5 mm long, shortly aristate, pale brown. Nut 2.2 x 1.2 mm, shortly apiculate, tessellate in vertical lines; lobes of disc sub-obtuse. Male spikelets 4 mm long, oblong; glumes oblong; stamens 2, free, anthers 1.5 mm long.

*Fl. & Fr.* : September-January

*Distr.* : Indo-Malesia. Common; in open grasslands near water course. Chenthamara, *KPR & JA 17096.*

**Scleria rugosa** R. Br., Prodr. 240. 1810; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 363. 1985; Verma & Chandra, Bull. Bot. Surv. India 32: 78. 1990(1992). ***S. flaccida*** Clarke in Hook. f., Hook. f., Fl. Brit. India 6: 688. 1894, non Steud., 1855.

Annuals, culms 30-55 cm high, 1-3 mm thick. Leaves 30-35 x 0.5 cm, linear, obtuse at tip; margins and nerves and wings of sheath retrorsely scabrid. Panicle 10-20 cm long; partial panicle 3-4; each 2-4 cm long, bracts leafy, terminal one erect. Spikelets 3 together, 2 female and one male. Female spikelets 5 mm long, ovate, acute, glumes 4, ovate, acuminate, yellowish brown. Nut 3 x 2 mm, ovoid, acute, rugulose, white; disc 3-lobed, hemispherical or orbicular. Male spikelets 4.5 x 1.5 mm, ovate, glumes 3.5 x 1 mm, oblong; stamens 3, free, anthers 2 mm long.

*Fl. & Fr.* : September-January

*Distr.* : Asia and Australia. Common; in open grasslands. Vallakkadavu, JA & *KPR 16894.*

**Scleria terrestris** (L.) Fassett, Rhodora 26: 159. 1924; Koyama in Dassan. & Fosb. Rev. Handb. Fl. Ceylon 5: 346. 1985; Manilal, Fl. Silent Valley 345. 1988; Verma & Chandra. Bull Bot. Surv. India 32: 68. 1990(1992). ***Zizania terrestris*** L., Sp. Pl. 991. 1753. ***Diaphora cochinchinensis*** Lour., Fl. Cochinch. 578. 1790. ***Scleria radula*** Hance., Ann. Sci. Nat. Bot. 18: 232. 1862; Hook. f., Fl. Brit. India 6: 691. 1894. ***S. elata*** Thw., Enum. Pl. Zeyl. 353. 1864; Clarke in Hook. f., Fl. Brit. India 6: 690. 1894; ***S. cochinchinensis*** (Lour.) Druce, Bot. Exch. Club. Brit. Isles Rep 4: 646. 1917; Fischer in Gamble, Fl. Pres. Madras 1678. 1931.

Perennials, rhizome horizontal. Culms 90-150 cm high, 0.6-0.8 cm thick, 2-4 together. Leaves 30-60 x 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 3.5 mm, broadly ovate; glumes 4; the upper most ovate, aristate, dark brown, carries nut. Nut 3.5 x 2.5

mm, obtuse, scrobiculate, minutely hispid, lobes of disc obtuse. Male spikelets pedicelled, shorter than female ones; glumes oblong; stamens 3; anthers 1.5 mm long.

*Fl. & Fr.* : July-December

*Distr.* : Asia and Australia. Common; in evergreen forests. Mlappara, *JA 12127*; Kottamala, *JA 14022.*

## 147. POACEAE

(R. Brown) Burnhart, Bull. Torrey Bot. Club 22: 7. 1895; *nom. alt.* **Gramineae**

1. Spikelets bisexual, similar or dissimilar....2
1. Spikelets unisexual, dissimilar....75
2. Stamens 6 or more....3
2. Stamens 3 or less....7
3. Large perennial shrubs or small trees; leaves with transverse nervules....4
3. Annual herbs; leaves without transverse nervules....6
4. Staminal filaments free....**Bambusa**
4. Staminal filaments united into a tube....5
5. Stamens more than 16; glumes apiculate....**Ochlandra**
5. Stamens 6; glumes not apiculate....**Pseudoxytenanthera**
6. Glumes absent; nodes hairy....**Leersia**
6. Glumes present; nodes glabrous....**Oryza**
7. Glumes persistent; spikelets 1-many-flowered....52
7. Glumes deciduous along with the entire spikelets; spikelets strictly 2-flowered....8
8. Spikelets usually laterally compressed, often in pairs, one sessile and one pedicelled, usually dissimilar and awned....9
8. Spikelets usually dorsally compressed, often solitary, similar and usually awnless....35
9. Inflorescence a panicle....10
9. Inflorescence of 1-many, digitate or subdigitate racemes....21
10. Spikelets in groups of 3, one sessile and two pedicelled....11
10. Spikelets paired or rarely solitary....13
11. Inflorescence much contracted, densely covered with long silky hairs....**Spodiopogon**
11. Inflorescence lax; not covered with long silky hairs....12
12. One of the pedicelled spikelets reduced to broad pedicel; panicles interrupted by spathes....**Apluda**
12. Both pedicelled spikelets developed; panicles not interrupted by spathes....**Chrysopogon**
13. Spikelets solitary....**Cleistachne**
13. Spikelets paired, one sessile and other pedicelled....14

14. Panicles densely covered with long silky hairs; spikelets awnless ..... 15

14. Panicles not covered by long silky hairs spikelets awned or awnless ..... 16

15. Glumes covered with long hairs; panicles cylindrical, spiciform ..... **Imperata**

15. Glumes glabrous; panicles lax ..... **Saccharum**

16. Spikelets awnless; branches of panicle whorled ..... **Sorghum**

16. Spikelets awned; branches of panicle not as above ..... 17

17. Panicles of paired racemes, one sessile and one peduncled; aromatic grasses ..... **Cymbopogon**

17. Panicles not as above; plants not fragrant ..... 18

18. Panicles interrupted by spathes ..... 19

18. Panicles not interrupted by spathes ..... 20

19. Sessile spikelets with two pedicelled spikelets; racemes with two pairsof involucral spikelets at base... ..... **Themeda**

19. Sessile spikelets with one pedicelled spikelets; racemes without two pairs of involucral spikelets at base ..... **Pseudanthistiria**

20. Upper lemma of sessile spikelets reduced to the base of the awn; joints and pedicels with translucent median line ..... **Capillipedium**

20. Upper lemma of sessile spikelets well developed, often cleft at apex and awned in the sinus; joints and pedicels without translucent median line ..... **Pseudosorghum**

21. Spikelets solitary, similar ..... **Dimeria**

21. Spikelets paired, dissimilar or rarely similar ..... 22

22. Raceme solitary ..... 23

22. Racemes 2-many ..... 29

23. Second lemma of sessile spikelets awned ..... 24

23. Second lemma of sessile spikelets awnless ..... 27

24. Lower spikelets of the raceme awnless; awns of upper spikelets twisted together ..... **Heteropogon**

24. All spikelets of the raceme awned; awns not as above ..... 25

25. Upper glumes awned; spikelets similar ..... **Pogonatherum**

25. Upper glumes not awned; spikelets dissimilar ..... 26

26. Second lemma cleft to below the middle; awn in the sinus ..... **Schizachyrium**

26. Second lemma reduced to form the base of the awn ..... **Dichanthium** (*D. oliganthum*)

27. Lower glume of sessile spikelets smooth; racemes breaking up at nodes ..... **Rottboellia**

27. Lower glume of sessile spikelets rugose or with hooks; racemes not braking up at nodes ..... 28

28. Racemes fascicled at upper leaf axils forming a pseudopanicle; lower glume of sessile spikelets orbicular, not cleft at apex ..... **Hackelochloa**

28. Racemes not fascicled; lower glume of sessile spikelets lanceolate, 2 -cleft at apex ..... **Glyphochloa**

29. Racemes 2 on each peduncle ..... 30

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**

31. Spikelets of each pair similar.....32

31. Spikelets of each pair dissimilar.....33

32. Second lemma 2-cleft at apex, awned in the sinus; lower glume without a median furrow on dorsal surface.....**Eulalia**

32. Second lemma reduced to form the hyaline base of the awn; lower glume with a median furrow on dorsal surface.....**Microstegium**

33. Lower glume of sessile spikelets pitted; joints and pedicels with translucent line.....**Bothriochloa**

33. Lower glume of sessile spikelets not pitted; joints and pedicels opaque.....34

34. Second lemma of sessile spikelets deeply cleft and awned at the back.....**Arthraxon**

34. Second lemma reduced to form the hyaline base of the awn.....**Dichanthium** (p. p.)

35. Spikelets awned or aristate.....36

35. Spikelets not awned or aristate.....39

36. Inflorescence an open panicle; spikelets thickly covered with long silky hairs.....**Rhynchelytrum**

36. Inflorescence of digitate racemes or racemes arranged on a central axis; spikelets not as above.....37

37. Racemes more than 8 cm long, arranged digitately; spikelets often paired.....**Alloteropsis**

37. Racemes up to 5 cm long, arranged on a central axis; spikelets crowded.....38

38. Lower glumes awned; leaves lanceolate.....**Oplismenus**

38. Lower glumes awnless; leaves linear.....**Echinochloa**

39. Lower glume absent or reduced to a minute scale.....40

39. Lower glume well developed.....42

40. Lemma of upper floret crustaceous; spikelets solitary.....41

40. Lemma of upper floret thin with hyaline margins; spikelets usually paired.....**Digitaria**

41. Spikelets oblong-lanceolate; lower glume strictly absent.....**Axonopus**

41. Spikelets ovate or orbicular; lower glume a minute scale or absent.....**Paspalum**

42. Spikelets subtended by bristles.....43

42. Spikelets not subtended by bristles.....45

43. Bristles involucrate, deciduous; inflorescence cylindrical.....**Pennisetum**

43. Bristles not involucrate, persistent; inflorescence not cylindrical.....44

44. Second lemma transversely rugose; bristles few to many.....**Setaria**

44. Second lemma smooth; bristles solitary at the ends of branchlets of panicle.....**Pseudoraphis**

45. Inflorescence of racemes arranged on a central axis.....46

45. Inflorescence of lax or contracted panicle.....48

46. Spikelets adaxial, oblong.....**Brachiaria**

46. Spikelets abaxial, ovoid.....47

47. Rachis of racemes with glassy bristles; second lemma mucronate.....**Urochloa**

47. Rachis of racemes glabrous; second lemma not mucronate.....**Paspalidium**

48. Panicle very much contracted, cylindrical. ..... **Sacciolepis**

48. Panicle lax, not cylindrical ..... 49

49. Second lemma with two basal scars ..... **Ichnanthus**

49. Second lemma without such scars ..... 50

50. Spikelets gibbous and laterally compressed ..... **Cyrtococcum**

50. Spikelets not gibbous and not laterally compressed ..... 51

51. Branches of panicles bifarious; spikelets crowded in groups of 2-10 ..... **Ottochloa**

51. Branches of panicles not bifarious; spikelets not crowded ..... **Panicum**

52. Leaves tessellately nerved ..... 53

52. Leaves not tessellately nerved ..... 56

53. Perennial reed-like shrubs with cluster of branchlets at nodes ..... **Sinarundinaria**

53. Annuals, habit and branches not as above ..... 54

54. Stigmas retrorsely barbed ..... **Streptogyna**

54. Stigma feathery or plumose ..... 55

55. Spikelets with one fertile floret; upper lemmas empty, mucronate ..... **Lophatherum**

55. Spikelets with 2-3 fertile florets; upper lemmas not as above ..... **Centotheca**

56. Spikelets awned ..... 57

56. Spikelets not awned ..... 63

57. Spikelets with one floret ..... 58

57. Spikelets with 2-many-florets ..... 60

58. Awns of the spikelets trifid ..... **Aristida**

58. Awns of the spikelets simple ..... 59

59. Inflorescence a panicle; mostly perennials ..... **Garnotia**

59. Inflorescence a solitary raceme; annuals ..... **Perotis**

60. Spikelets with one fertile floret ..... 61

60. Spikelets with 3-7 fertile florets ..... **Tripogon**

61. Inflorescence of 3-15 digitate racemes; upper lemmas empty or reduced into bristles. ..... **Chloris**

61. Inflorescence a panicle or of racemes arranged on a central axis; upper floret bisexual ..... 62

62. Panicles much contracted, spiciform; base of leaves amplexicaule ..... **Jansenella**

62. Panicles lax or slightly contracted, but never spiciform; base of leavesnot cordate or amplexicaule ..... **Arundinella**

63. Inflorescence of solitary, digitate or subdigitate racemes ..... 64

63. Inflorescence a panicle ..... 69

64. Spikelets with one floret ..... 65

64. Spikelets with 2-many florets ..... 67

65. Upper glumes covered with strong glochidiate hairs ..... **Tragus**

65. Upper glumes glabrous ..... 66

66. Raceme solitary; spikelets seated in a concave surface along the sides of the rachis.....**Oropetium**

66. Racemes 3-10, digitate; spikelets not as above.....**Cynodon**

67. Upper glumes aristate; rachis ends in a sharp point.....**Dactyloctenium**

67. Upper glumes not aristate; rachis ends in a spikelets.....68

68. Racemes solitary; spikelets bifarious; leaves linear.....**Eragrostiella**

68. Racemes 3-20; spikelets not bifarious; leaves flat.....**Eleusine**

69. Spikelets with one floret.....70

69. Spikelets with 2-many florets.....71

70. Paleas 2-keeled.....**Leptochloa**

70. Paleas not 2-keeled.....**Sporobolus**

71. Glumes equal to or longer than the spikelets.....**Isachne**

71. Glumes shorter than the spikelets.....72

72. Paleas 2-keeled; keels often hairy or scabrid.....**Eragrostis**

72. Paleas not 2-keeled; glabrous.....73

73. Spikelets with one bisexual floret.....**Coelachne**

73. Spikelets with 2-many bisexual florets.....74

74. Upper florets distinctly exerted; spikelets with 3-5 flowers.....**Poa**

74. Upper florets not exerted; spikelets with 2 flowers.....**Zenkeria**

75. The protective case of female spikelets thin, split on one side.....**Chionachne**

75. The protective case of female spikelets thick, not split on one side.....**Coix**

## **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. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 276.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 707. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1799. 1983; Sreekumar & Nair, Fl. Kerala Grass. 214. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 29. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 502. 1996. ***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 to 7 x 1.2 cm, lanceolate, cordate at base; margin ciliate; sheath rounded, hairy; ligule a row of hairs. Racemes 6-8, digitate, to 15 cm long; rachis triquetrous, serrulate. Spikelets similar, ovate, acuminate, pedicelled; pedicels unequal; lower glume 2 x 1 mm, acuminate 3-nerved; upper 3.5 x 2 mm, acute, 5-nerved, ciliate along margins. Lower floret male, upper bisexual; first lemma 2.5 x 1

mm, ovate, obtuse, 5-nerved; palea hyaline, oblong; second lemma ovate, aristate, 3-nerved; palea 1.5 x 1 mm, 2-nerved. Stamens 3, free; ovary oblong; styles 2, free; stigmas feathery.

*Fl. & Fr.* : Throughout the year

*Distr.* : Tropical Africa, South Asia and Australia. Common; in moist deciduous forests as well as in disturbed areas. Mangaladevi, *JA & KPR 17184.*

## **APLUDA** Linnaeus

Sp. Pl. 82. 1753

**Apluda mutica** L., Sp. Pl. 82. 1753; Fischer in Gamble, Fl. Pres. Madras 1750. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 93.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 707. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1800. 1983; Manilal, Fl. Silent Valley 346. 1988; Sreekumar & Nair, Fl. Kerala Grass. 32. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 36. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 502. 1996. *A. varia* Hack. in DC., Monogr. Phan. 6:197. 1889; Hook. f., Fl. Brit. India 7: 150. 1896.

Perennials; culms 30-150 cm high, erect, 2-5-together. Leaves 10-30 x 1.2 cm, linear-lanceolate, narrowed to the base; ligule membranous. Panicle lax; raceme enclosed by a boat shaped spathe. One sessile spikelets and two pedicelled spikelets in each raceme. Sessile spikelets 7 x 3 mm; glumes subequal, 5 x 1 mm, lanceolate; first lemma 5 x 1 mm, oblong, chartaceous, 3-nerved, paleate containing 3 stamens; second lemma 4 x 1.5 mm, 2-cleft and awned at the sinus, hyaline; awn 10-15 mm 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.

*Fl. & Fr.* : October-February

*Distr.* : India, South East Asia and Australia. Common; in moist deciduous forests. Thannikkudy, *NS & JA 13072.*

## **APOCOPIS** Nees

Proc. Linn. Soc. London 1: 93. 1841.

**Apocopis mangalorensis** (Hochst.) Henr., Blumea 4: 523. 1941; Bor, Grass. Burma, Ceylon, India & Pakistan 96.1960; Sreekumar & Nair, Fl. Kerala Grass. 33, t. 34. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 37. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 503. 1996. ***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, 2 cm long, compressed. Spikelets similar 4 x 2.5 mm, obovate, dorsiventrally compressed, brown; callus hairs brown; lower glume 3 x 3 mm, oblanceolate, 9-nerved; upper glume 4 x 1.5 mm, oblong, 2-keeled, 3-nerved; lower floret empty, upper bisexual; first lemma 2.5 x 2 mm, oblong, hyaline; palea oblong, hyaline; second lemma 4.5 x 0.7 mm, bifid at apex and awned; palea ciliate along the margins; stamens 3; ovary oblong; styles 2, free; stigmas plumose.

*Fl. & Fr.* : September-February

*Distr.* : South India and Sri Lanka. Common; in hill top grasslands. Mangaladevi, *KPR & JA 14203.*

## **ARISTIDA** Linnaeus

Sp. Pl. 82. 1753

**Aristida hystrix** L. f., Suppl. Pl. 113. 1781; Hook. f., Fl. Brit. India 7: 225. 1896; Fischer in Gamble, Fl. Pres. Madras 1809. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 410.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 709. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1802. 1983; Sreekumar & Nair, Fl. Kerala Grass. 326. 1991.

Annuals or perennials; culms to 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 7 cm, lax; branches filiform, glabrous. Spikelets similar, 7-8 mm long, lanceolate, solitary, pedicelled; lower glume 4 x 0.5 mm, 1-nerved, glabrous; upper glume 7 x 0.5 mm, acuminate, 1-nerved, keeled; floret one; lemma 7-8 x 1 mm, lanceolate, 3-nerved, awned; awns 10-15 mm long; palea minute, hyaline; stamens 3; ovary elliptic; styles 2, free; stigma plumose.

*Fl. & Fr.* : October-January

*Distr.* : India. Rare; along disturbed margins of moist deciduous forests. Thekkady, *KPR & JA 16968.*

## **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. Fertile stamens 2; spikelets 2-4 mm long ..... 3
2. Fertile stamens 3; spikelets 4.5-7.5 mm long ..... 4
3. Pedicelled spikelets reduced to minute hook-like pedicel ..... **A. quartinianus**
3. Pedicelled spikelets well developed ..... **A. lancifolius**
4. Lower glume of sessile spikelets with two rows of tubercles along the keels; anthers ca. 3 mm long ..... **A. meeboldii**
4. Lower glume of sessile spikelets with one row of tubercles along the keels; anthers ca. 2 mm long ..... **A. lanceolatus**

**Arthraxon lanceolatus** (Roxb.) Hochst., Flora 39: 188. 1856; Hook. f., Fl. Brit. India 7: 143. 1896; Fischer in Gamble, Fl. Pres. Madras 1728. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 100.1960; Sreekumar & Nair, Fl. Kerala Grass. 36., fig. 3. 1991. ***Andropogon lanceolatus*** Roxb., Fl. Ind. 1: 262. 1820.

Culms to 60 cm high, nodes glabrous or hairy. Leaves 1.5-5 x 0.2-1.2 cm, ovate-lanceolate, amplexicaule at base, strongly ciliate along margins; sheath rounded, ciliate along one margin, ligule a fimbriate membrane. Racemes few together, 3-6 cm long. Sessile spikelets 5-6 mm long, callus hairy; lower glume 5-6 x 1 mm, lanceolate, acute, 5-7 nerved, 2-keeled, spinulose, margins infolded; upper glume to 5 x 1.5 mm, boat shaped; first lemma hyaline; upper lemma awned; awn geniculate; stigmas 2 mm long. Pedicelled spikelets developed with one barren and one male florets.

*Fl. & Fr. :* August-January

*Distr.* : Peninsular India. Rare; along the margins of open grasslands. Uppermanalar, *JA 13965*; Anchuruli, *JA & KPR 17123.*

**Arthraxon lancifolius** (Trim.) Hochst., Flora 39: 188. 1856; Fischer in Gamble, Fl. Pres. Madras 1729. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 100.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 709. 1976; Manilal, Fl. Silent Valley 347. 1988; Sreekumar & Nair, Fl. Kerala Grass. 38. 1991. ***Andropogon lancifolius*** Trim., Mem. Acad. Sci. Petersb. Ser. 6(2) : 271. 1832.

Culms procumbent; lower nodes rooting, nodes hairy. Leaves to 1.5 x 0.5 cm, ovate, acute, margins minutely serrulate, glabrous, base rounded with few long hairs; ligule a row of hairs. Racemes 2, up to 2 cm long. Sessile spikelets 2.5-3 mm long, lanceolate, acuminate; lower glume 2-3 mm long, shortly bifid, smooth; upper glume shorter, aristate; first lemma 1 mm long; awn 8 mm long, geniculate, from the base of second lemma.

*Fl. & Fr. :* October-January

*Distr.* : Tropical Africa, India and Malesia. Common; along the cuttings in open grasslands. Vallakkadavu *NS & JA 12723.*

**Arthraxon meeboldii** Stapf, Kew Bull. 1908: 449. 1908; Fischer in Gamble, Fl. Pres. Madras 1728. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 101.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 710. 1976.

Culms 20-40 cm high, nodes glabrous. Leaves 2-5 x 0.5-1 cm rigid, margin coriaceous, serrate; lower serrations spinulose; ligule membranous, 2-3 mm long. Racemes 4-6 cm long. Sessile spikelets 7 mm long; callus hairy; lower glume 7 x 1.5 mm; keels with penicillate tubercles towards the apex; upper glume 7.5 x 2 mm, keel serrate; first lemma linear-oblong; second lemma cleft at the apex; awn 15-20 mm long. Lower pedicelled spikelets reduced to pedicels; upper developed, 4 mm long, lanceolate; pedicel 3 mm long, ciliate; lower glume 4 x 1 mm, lanceolate, with two rows of tubercles along the keels; upper glume, lanceolate, 3-nerved, keeled. Florets two; lower barren, upper male, second lemma bifid at apex and with a small protuberance in the sinus.

*Fl. & Fr. :* October-January

*Distr.* : Peninsular India. Very rare; along the margins of evergreen forests. Sabarimala, *JA & KPR 17101.*

**Arthraxon nudus** (Steud.) Hochst., Flora 39: 188. 1856; Bor, Grass. Burma, Ceylon, India & Pakistan 101.1960; Manilal, Fl. Silent Valley 347. 1988; Sreekumar & Nair, Fl. Kerala Grass. 39. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 503. 1996. ***Andropogon nudus*** Steud., Syn. Pl. Glum. 1: 383. 1854. ***A. ciliaris*** sensu Hook. f., Fl. Brit. India 7: 145. 1896, non P. Beauv., 1812. ***Arthraxon hispidus*** auct. non Makino, 1912: Fischer in Gamble, Fl. Pres. Madras 1728. 1934.

Annuals; culms 30-45 cm high, geniculate; nodes bearded. Leaves to 4 x 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 4 mm long; lower glume 4 x 1 mm, 7-9 nerved, hirtus along the nerves; upper glume 4 x 1.5 mm; keel ciliate on the upper half; awn 9 mm long. Pedicelled spikelets reduced to a naked pedicel.

*Fl. & Fr.* : September-February

*Distr.* : India and South East Asia. Rare; along the margins and openings of evergreen forests. Koruthode, *JA 17855.*

**Arthraxon quartinianus** (A. Rich.) Nash, N. Amer. Fl. 17: 99. 1912; Fischer in Gamble, Fl. Pres. Madras 1728. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 102.1960; Sreekumar & Nair, Fl. Kerala Grass. 41. 1991. ***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 3.5 x 1 mm; lower glume 3mm long, ovate, glabrous, 5-nerved; upper glume 3.5 mm long, lanceolate, not keeled; first lemma hyaline, 1-nerved; second lemma 1.5 mm long, epaleate; awn 8 mm long.

*Fl. & Fr.* : November-February.

*Distr.* : Peninsular India. Common; in disturbed moist deciduous forests. Thekkady, *JA & KPR 16947.*

## 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. Spikelets awned ..... 2
1. Spikelets not awned ..... **A. leptochloa**
2. Second lemma with seta on either side of the awn ..... 3
2. Second lemma without seta ..... 4
3. Panicles effuse; spikelets glabrous ..... **A. setosa**
3. Panicles with 5-15 congested racemes; spikelets covered with tubercled hairs ..... **A. mesophylla**
4. Spikelets 1.5 mm long; panicles effuse ..... **A. pumila**
4. Spikelets over 2 mm long; panicles contracted ..... 5

5. Nodes bearded; glumes covered with bulbous based hairs; annuals.....**A. ciliata**

5. Nodes glabrous; glumes glabrous; perennials.....**A. purpurea**

**Arundinella ciliata** (Roxb.) Nees ex Miq., Verh., Kon. Ned. Inst. 3:30. 1851; Bor, Grass. Burma, Ceylon, India & Pakistan 421.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 710. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1806. 1983; Manilal, Fl. Silent Valley 348. 1988; Sreekumar & Nair, Fl. Kerala Grass. 335. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 504. 1996. ***Holcus ciliatus*** Roxb., Fl. Ind. 1: 321. 1820. ***A. agrostoides*** auct. non Trin., 1836: Hook. f., Fl. Brit. India 7: 71. 1896. ***Arundinella holcoides*** auct. non Trin., 1836: Fischer in Gamble, Fl. Pres. Madras 1801. 1934.

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 4 x 1 mm, lanceolate, pedicelled; glumes similar, 4 mm long, ovate, acuminate, 5-nerved; first lemma 2.5 x 1 mm, lanceolate, 3-nerved, empty; second lemma 1 x 0.5 mm, hyaline; awn 5 mm long.

*Fl. & Fr. :* November-May

*Distr.* : Peninsular India. Common; in open grasslands and on hilltops. Methaganam, *JA 13641.*

**Arundinella leptochloa** (Nees ex Steud.) Hook. f., Fl. Brit. India 7: 76. 1890; Fischer in Gamble, Fl. Pres. Madras 1802. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 423.1960; Sreekumar & Nair, Fl. Kerala Grass. 336. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 62. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 504. 1996. ***Panicum leptochloa*** Nees ex Steud., Syn. Pl. Glum. 1:62. 1854.

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; glumes glabrous; lower 2.5 x 1.5 mm, ovate, acute; upper 3.5 x 2 mm, ovate, acuminate; first lemma 3 x 1.5 mm, ovate-lanceolate, 5-nerved, second lemma ovate, obtuse, 2-fid at apex, awnless. Anthers 1 mm long; stigmas 5 mm long.

*Fl. & Fr. :* September-January.

*Distr.* : Peninsular India and Sri Lanka. Common; in open grasslands. Uppupara, *JA 12391.*

**Arundinella mesophylla** Nees ex Steud., Pl. Glum. 1: 115. 1854; Hook. f., Fl. Brit. India 7:69. 1896; Fischer in Gamble, Fl. Pres. Madras 1801. 1934; Bor, Grass. Burma, Ceylon, India &

Pakistan 423.1960; Manilal, Fl. Silent Valley 348. 1988; Sreekumar & Nair, Fl. Kerala Grass. 337. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 504. 1996.

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 3 x 1 mm, lanceolate, acute, reddish brown; palea smaller, hyaline; second lemma 2 x 1 mm, subcoriaceous, with seta on either sides of the awn; awn 5-6 mm long; anther 1.5 mm long.

*Fl. & Fr. :* October-January

*Distr.* : Peninsular India. Common; in grasslands of hilltops. Kumarikulam, *JA 13020.*

**Arundinella pumila** (Hochst. ex A. Rich.) Steud., Syn. Pl. Glum. 1:114. 1854; Fischer in Gamble, Fl. Pres. Madras 1801. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 423.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 711. 1976; Manilal, Fl. Silent Valley 348. 1988; Sreekumar & Nair, Fl. Kerala Grass. 342. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 64. 1994. ***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, 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, 1.5 x 0.5 mm ovate, acute; first lemma similar to upper glume; second lemma 0.7-1 x 0.5 mm, lanceolate; awn 2.5 mm long.

*Fl. & Fr. :* September-December

*Distr.* : Africa, Asia and Australia. Common; along the cuttings in open grasslands. Pachakkanam, *NS & JA 12654.*

**Arundinella purpurea** Hochst. ex Steud., Syn. Pl. Glum. 1:115. 1854; Bor, Grass. Burma, Ceylon, India & Pakistan 424.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 711. 1976; Manilal, Fl. Silent Valley 349. 1988; Sreekumar & Nair, Fl. Kerala Grass. 343. 1991. ***A. fuscata*** auct. non Nees ex Buese, 1854: Hook. f., Fl. Brit. India 7: 74. 1896; Fischer in Gamble, Fl. Pres. Madras 1802. 1934 [Fig. 75].

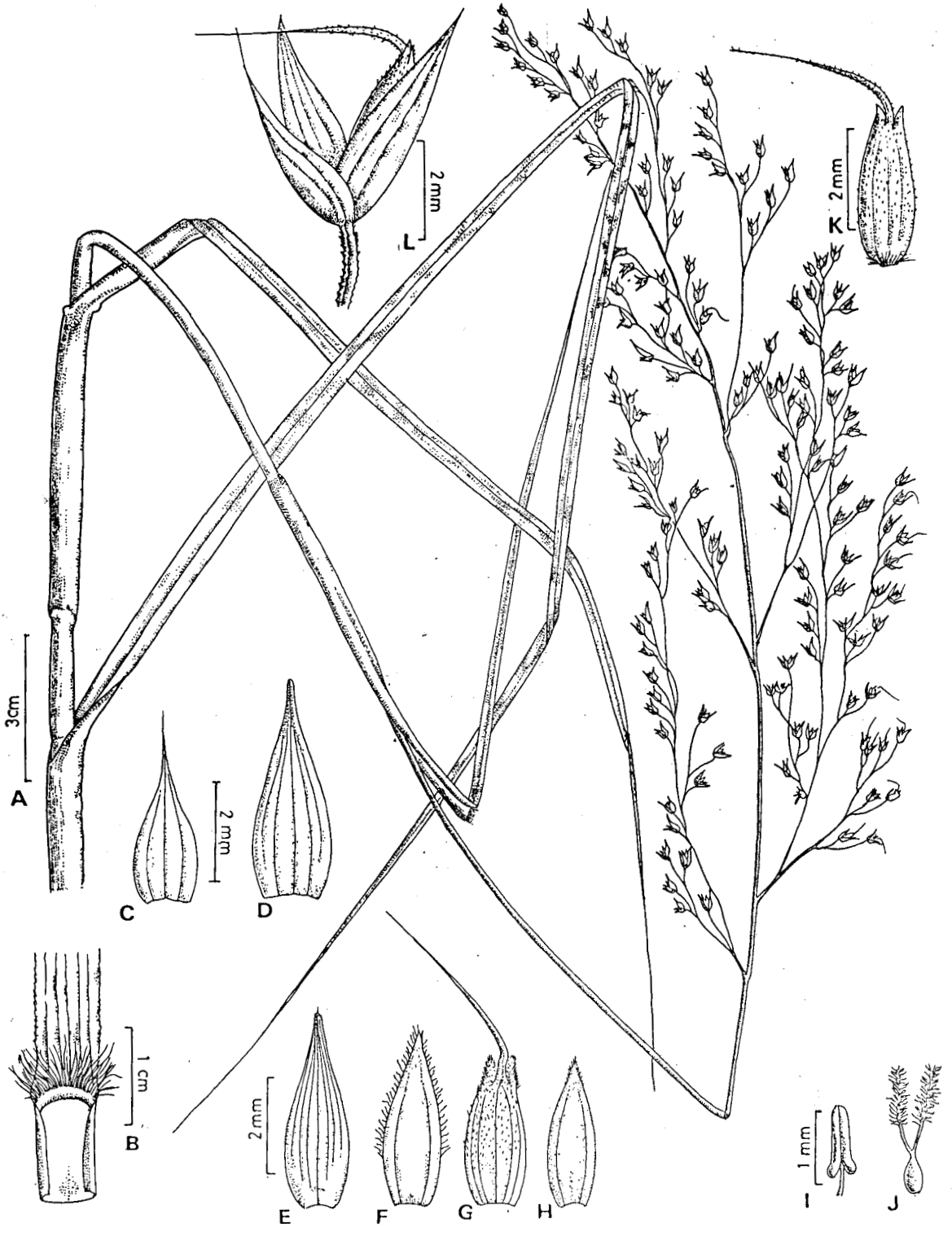



Fig. 75. *Arundinella purpurea* Hochst. ex Steud.; **A**. habit; **B**. sheath with ligule; **C**. lower glume; **D**. upper glume; **E**. first lemma; **F**. palea; **G**. second lemma; **H**. palea; **I**. stamens; **J**. pistil; **K**. second floret ; **L**. spikelet.

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 3 x 1 mm, elliptic, scabrid along the nerves, 3-nerved; upper glume 4 x 1.5 mm, acuminate, 5-nerved; first lemma 3 mm long, empty; second lemma ovate, 1.5 x 1 mm, tuberculate on the upper half; awn 3-3.5 mm long; anther 1 mm long.

*Fl. & Fr. :* November-February

*Distr.* : Southern Western Ghats. Common; in open grasslands. Ponnambalamedu, *JA & KPR 16997.*

**Arundinella setosa** Trin., Gram. Panic. 63. 1826; Hook. f., Fl. Brit. India 7: 70. 1896; Fischer in Gamble, Fl. Pres. Madras 1801. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 424.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 711. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1807. 1983; Sreekumar & Nair, Fl. Kerala Grass. 344. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 64. 1994.

Annuals; culms tufted, 20-40 cm high; nodes glabrous. Leaves 3-10 x 0.5 cm, lanceolate; rounded at base, densely hairy; sheath rounded, hairy; ligule a fimbriate membrane. Panicle 5-20 cm long; effuse, branches scabrid. Spikelets 6 x 2 mm, glabrous; lower glume 5 x 1.5 mm; upper glume 6 x 1.5 mm, ovate, acuminate; first lemma 3 x 1 mm, ovate, acute; second lemma elliptic, 2 x 1 mm, with arista on either sides of the awn; awn 8 mm long; palea 2 x 1 mm, 2-keeled; anthers 1.5 mm long.

*Fl. & Fr. :* October-January.

*Distr.* : South East Asia. Common; in rocky grasslands. Pachakkanam, *JA & KPR 17051.*

## AXONOPUS P. Beauvois

Ess. Agrost. 12, 154. 1812.

**Axonopus compressus** (Sw.) P. Beauv., Ess. Agrost. 12: 154. 1812; Bor, Grass. Burma, Ceylon, India & Pakistan 278.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 712. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1808. 1983; Sreekumar & Nair, Fl. Kerala Grass. 216, t. 44. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 71. 1994. ***Milium compressum*** Sw., Prodr. Veg. Ind. Orc. 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 2 x 1 mm, ovate, 5-7 nerved, glabrous; Flowers two; lower empty or staminate, upper bisexual; first lemma ovate, acute, 3-nerved, epaleate; second lemma 2 x 0.75 mm, oblong, hyaline; palea oblong; stamens 3.

*Fl. & Fr.* : July-February

*Distr.* : Native of South America, now spread to other tropical countries. Common; in disturbed moist deciduous forests. Ponnambalamedu, *KPR & JA 17001.*

## **BAMBUSA** Schreber

Gen. Pl. ed. 8, 1: 236. 1789, *nom cons.*

**Bambusa bambos** (L.) Voss, Vilmorin Blumengartnerei 1: 1189. 1896; McClure, Blumea (Suppl.) 3: 39. 1946; Nicols. *et al.*, Interp. Hort. Malab. 306. 1988; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 74. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 505. 1996. ***Arundo bambos*** L., Sp. Pl. 81. 1753. ***Bambos arundinacea*** Retz., Obs. Bot. 5: 24. 1788. ***Bambusa arundinacea*** (Retz.) Roxb., Fl. Cor. t. 79. 1796; Hook. f., Fl. Brit. India 7: 395; Fischer in Gamble, Fl. Pres. Madras 1286. 1934; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 712. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1808. 1983. **Mula**

Large shrubs or trees with branched rhizome; culms to 25 m high, 7-14 cm across, thorny, cylindric, hollow; branches from each node, clustered, horizontal. Culm sheaths glabrous; margin hairy; blade triangular, 15 x 10 cm, thickly hairy within. Leaves to 20 cm long, oblong-lanceolate, serrate along the margins; sheath rounded, ligule membranous; contraligule present. Panicle to 35 cm long, terminal and axillary; branches spreading. Spikelets 10-18 mm long, crowded, glabrous. Glumes 2, subequal, 6-10 x 3-5 mm, 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.

*Fl. & Fr.* : Flowering specimen could not be collected and the description were taken from the specimens collected by N. Sasidharan NS 00016 (KFRI).

*Distr.* : Native of S. E. Asia. Very common; along rocky slopes and in moist deciduous forests. Koruthodu *KPR & JA 16236*

*Ethnobotanical use* : The culms are used in building houses.

## **BOTHRIOCHLOA** O. Kuntze

Rev. Gen. Pl. 2: 762. 1891.

Perennial stoloniferous herbs. Leaves lanceolate; sheath keeled, glabrous or thinly pubescent. Racemes 3-8, digitately disposed; joints and pedicels with translucent median line. Spikelets

dissimilar, sessile and pedicelled. Sessile spikelets lanceolate; lower glume elliptic, coriaceous, 6-nerved, pitted; upper glume boat-shaped, 3-nerved; florets 2, lower empty, upper bisexual; first lemma hyaline, epaleate; second lemma forms the base of the awn, epaleate; stamens 3; ovary oblong; style 2, free; stigma plumose. Pedicelled spikelet oblong; glumes similar, glabrous; florets two, both empty or the upper male; lemma awnless.

1. Lower glume of sessile spikelets with one circular pore; glumes densely hairy.....**B. pertusa**
1. Lower glume of sessile spikelets with 1-4 circular pores; glumes glabrous.....**B. insculpta**

**Bothriochloa insculpta** (Hochst. ex A. Rich.) A. Camus, Ann. Soc. Linn. Lyon 76: 165. 1931; Bor, Grass. Burma, Ceylon, India & Pakistan 107.1960; Sreekumar & Nair, Fl. Kerala Grass. 51. 1991. ***Andropogon insculptus*** Hochst. ex A. Rich., Tent. Fl. Abyss. 2: 458. 1851. ***Amphilophis insculpta*** (Hochst. ex A. Rich.) Stapf. in Prain, Fl. Trop. Africa. 9: 176. 1917; Fischer in Gamble, Fl. Pres. Madras 1732. 1934.

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 mm; callus hairy; lower glume equaling the spikelets, glabrous, 1-4 pitted; upper glume hyaline; first lemma 2 x 1 mm, oblong; awn 1.5 cm long; anthers 2 mm long. Pedicelled spikelets 5 x 2 mm; lower glume 1-3 pitted.

*Fl. & Fr.* : October-January

*Distr.* : Eastern Tropical Africa and Peninsular India. Common; in open grasslands of short grasses. Thekkady, *JA 16949.*

**Bothriochloa pertusa** (L.) A. Camus, Ann. Soc. Linn. Lyon 76: 164. 1931; Bor, Grass. Burma, Ceylon, India & Pakistan 109.1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2):1809. 1983; Sreekumar & Nair, Fl. Kerala Grass. 54. 1991; Clayton in Dassan., Rev. Handb. Fl.Ceylon 8:83.1994. ***Holcus pertusus*** L., Mant. 2:301.1771. ***Andropogon pertusus*** (L.) Willd., Sp. Pl. 4: 922. 1806; Hook. f., Fl. Brit. India 7: 173. 1896. ***Amphilophis pertusa*** (L.) Nash ex Stapf., Agr. News. Bridge. 15: 179. 1916; Fischer in Gamble, Fl. Pres. Madras 1731. 1934.

Perennials with creeping stolon; culms 15-50 cm tall; nodes bearded. Leaves 6-8 x 0.2-0.4 cm, linear, with long bulbous based hairs towards the base; sheath keeled, pubescent near the mouth, ligule a narrow membrane. Racemes 2-6 cm long, densely villous, partially spreading. Sessile spikelets 3-4 mm long; lower glume coriaceous, densely hairy below the middle; upper glume boat shaped; awn 1.2-1.6 cm long; anthers 2 mm long. Pedicelled spikelet 3-4 mm long.

*Fl. & Fr.* : October-January

*Distr.* : South East Asia and Tropical Africa. Common; in open grasslands. Thekkady, *JA 14574.*

**BRACHIARIA** (Trinius) Grisebach

in Ledeb., Fl. Ross. 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 bearded; ligule a row of hairs.....2
1. Nodes glabrous; ligule fimbriate membrane.....3
2. Rachis covered with glassy bristles; leaves densely pubescent.....**B. semiundulata**
2. Rachis not as above; leaves glabrous.....**B. ramosa**
3. Spikelets 5 mm long; leaves pubescent.....**B. brizantha**
3. Spikelets 3 mm long; leaves glabrous.....**B. subquadripara**

**Brachiaria brizantha** (Hochst. ex A. Rich.) Stapf in Prain, Fl. Trop. Africa 9: 531. 1919; Bor, Grass. Burma, Ceylon, India & Pakistan 281. 1960. ***Panicum brizanthum*** Hochst. ex A. Rich., Tent. Fl. Abyss. 2: 363. 1851.

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 5 x 2 mm; lower floret male; upper bisexual.

*Fl. & Fr. :* October-January

*Distr.* : Tropical Africa. Common; in old tribal settlements in evergreen forests. Mlappara *JA 12578*

*Note* : An introduced fodder grass, native of Tropical America.

**Brachiaria ramosa** (L.) Stapf. in Prain, Fl. Trop. Africa 9: 542. 1919; Fischer in Gamble, Fl. Pres. Madras 1770. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 284.1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1812. 1983; Sreekumar & Nair, Fl. Kerala Grass. 223. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 91. 1994. ***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, 2.5 x 1-2 mm, ovate; lower glume 1 x 1.5 mm, orbicular; upper glume 2.5 x 1.5 mm, ovate, thinly pubescent; second lemma 2 x 1 mm, coriaceous, rugose, 5-nerved.

*Fl. & Fr.* : September-January

*Distr.* : Old World Tropics. Common; in open grasslands and moist deciduous forests. Thannikkudy, *JA 13078*; Thekkady, *JA & KPR 16355.*

**Brachiaria semiundulata** (Hochst.) Stapf. in Prain, Fl. Trop. Africa 9: 556. 1919; Fischer in Gamble, Fl. Pres. Madras 1770. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 285.1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1814. 1983; Sreekumar & Nair, Fl. Kerala Grass. 224. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 96. 1994. ***Panicum semiundulatum*** Hochst., Flora 24: 715. 1841.

Annuals or perennials; culms 20-30 cm high, rooting from lower nodes; nodes bearded. Leaves 2-5 x 0.5-1.2 cm, ovate-lanceolate, densely hairy; sheath keeled, densely pubescent; ligule a tuft of hairs. Racemes 5-15, 0.5-2 cm long, secund; rachis triquetrous, densely covered with glassy bristles. Spikelets solitary or paired, 2 x 1 mm; lower glume 0.5 x 1 mm, 1-nerved, hirtus; upper glume 1.5 x 1 mm, hirtus; first lemma similar to upper glume, second lemma 2 x 1 mm, ovate, concave, hirtus; anthers 0.5-1 mm long.

*Fl. & Fr.* : July-December

*Distr.* : Southern Western Ghats, endemic. Common; in shady marshy places in grasslands. Kokkarakandom, *JA 12053*

**Brachiaria subquadripara** (Trin.) A. Hitchc., Lingnan Sci. J. 7: 214. 1931; Bor, Grass. Burma, Ceylon, India & Pakistan 286.1960; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 98. 1994. ***Panicum subquadriparum*** Trin., Gram. Panic. 145. 1826. ***Panicum miliforme*** J. Presl ex C. Presl, Red. Haenk. 1: 300. 1830; Hook. f., Fl. Brit. India 7: 37. 1896. ***Brachiaria miliiformis*** (J. S. Presl ex C. Presl) A. Chase, Contrib. U.S. Nat. Herb. 22: 35. 1920; Fischer in Gamble, Fl. Pres. Madras 1769. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 283.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 714. 1976; Sreekumar & Nair, Fl. Kerala Grass. 220. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 505. 1996.

Annuals or perennials; culms 30-100 cm high, rooting from lower nodes, nodes glabrous. Leaves 10-20 x 5-1-2 cm, linear, glabrous; ligule a fimbriate membrane with tuft of hairs. Racemes 3-10, distant; rachis flat, glabrous. Spikelets 3.5 x 1.2 mm, closely packed, glabrous; lower glume 1.5 x 2 mm, broadly ovate; upper glume 3 x 1.5 mm, ovate, acute, coriaceous; first

lemma similar to upper glume; second lemma 3 x 1.5 mm, ovate, transversely rugose; anthers 1.2 mm long; stigma plumose, violet.

*Fl. & Fr. :* July-January

*Distr.* : India, Malesia and Sri Lanka. Common; in disturbed evergreen and moist deciduous forests. Thekkady, *JA 12389.*

## CAPILLIPEDIUM Stapf

in Prain, Fl. Trop. Africa 9: 169. 1917.

**Capillipedium assimile** (Steud.) A. Camus in Lecomte, Fl. Gen. Indo-China 7: 314. 1892; Bor, Grass. Burma, Ceylon, India & Pakistan 110.1960; Sreekumar & Nair, Fl. Kerala Grass. 55. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 506. 1996. ***Andropogon assimilis*** Steud. in Zoll., Syst. Verz. 58. 1854; Hook. f., Fl. Brit. India 7: 179. 1896. ***Capillipedium glaucopsis*** Stapf. in Hook., Icon. Pl. 31: t. 3085. 1922; Fischer in Gamble, Fl. Pres. Madras 1730. 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 3 x 1.5 mm, oblong; lower glume 3 x 1.5 mm, ovate, 5-nerved, ciliate along margins; upper glume ovate, keeled, 3-nerved; lower floret empty, upper bisexual; first lemma 1.5 x 1 mm, ovate, obtuse; second lemma forms the base of the awn; paleas absent; stamens 3; styles 2, free; stigma plumose. Pedicelled spikelets 3 x 1.5 mm; pedicels glabrous; lower glume 3 x 1 mm, 8-nerved; upper glume hyaline; first lemma oblong, hyaline; stamens 3; upper floret absent.

*Fl. & Fr. :* August-December

*Distr.* : India, Japan and China. Very common; in savannahs and disturbed deciduous forests. Thannikkudy, *JA 14015.*

## 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. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 457.1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1817. 1983; Manilal, Fl. Silent Valley 349. 1988; Sreekumar & Nair, Fl. Kerala Grass. 354. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 110. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 507. 1996. ***Cenchrus lappaceus*** L., Sp. Pl. ed. 2, 1488. 1763.

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, 2.5 x 1 mm, 5-nerved, keeled; florets 2-3, similar; lemma 3.5 x 0.4-1.5, lanceolate, obtuse, mucronate, 7-nerved, densely bristled along the dorsal surface; palea 2.5 x 0.5 mm, 2-nerved, 2-keeled; stamens 2; ovary elliptic; styles 2, free; stigmas plumose; the terminal floret usually reduced to a rachilla only.

*Fl. & Fr. :* July-December

*Distr.* : South East Asia and Tropical Africa Common; in evergreen forests. Mlappara, *JA 12123.*

## CHIONACHNE R. Brown

in Benn. Pl. Jav. Rar. 15, 18. 1838.

**Chionachne koenigii** (Spreng.) Thw., Enum. Pl. Zeyl. 357. 1864; Fischer in Gamble, Fl. Pres. Madras 1706. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 262.1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1818. 1983; Manilal, Fl. Silent Valley 350. 1988; Sreekumar & Nair, Fl. Kerala Grass. 205. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 112. 1994. ***Coix koenigii*** Spreng., Syst. Veg. 1: 239. 1825. ***Polytoca barbata*** Stapf. ex Hook. f., Fl. Brit. India 7: 102. 1896.

Stout perennials; culms to 250 cm high; nodes bearded. Leaves 10-75 x 0.5-2 cm, linear, cordate at base, scabrous; sheath rounded, glabrous; ligule a fimbriate membrane. Inflorescence an interrupted panicle; 1-few racemes subtended by a leafy spathe; each raceme 2-4 cm long with a single female spikelet at base and many male spikelets above. Female spikelet 6 x 4 mm, obovate, enclosed in an involucre; ovary oblong; styles 2, basely connate stigmas 2, plumose, 6-8 mm long. Male spikelets 8-10 x 2 mm; lower glume 8 x 1.5 mm, 13-nerved; upper glume similar, 6-nerved; florets 2, similar, lower one with shorter anthers; stamens 3, free; anthers 4 mm long.

*Fl. & Fr. :* August-December.

*Distr.* : Peninsular India and Sri Lanka. Common; along stream sides in moist deciduous forests. Mullakkudy, *JA 13851.*

## CHLORIS Swartz

Prodr. 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. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan

465.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 715. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1820. 1983; Sreekumar & Nair, Fl. Kerala Grass. 357. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 113. 1994.

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 x 0.5 mm, 1-nerved; upper glume 2 x 0.5 mm, 1-nerved; lower floret bisexual, upper barren; first lemma 2 x 1 mm, obovate, 3-nerved, awn 5-6 mm long; palea oblanceolate, 2-nerved; stamens 3, free; ovary elliptic; styles 2, free; stigmas plumose. Upper lemmas obovate, truncate, 3-nerved, epaleate; awn 6 mm long.

*Fl. & Fr.* : August-January

*Distr.* : Tropical and South East Asia. Common; in disturbed areas in all types of forests. Pamba, *JA & KPR 17084.*

## **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. Sessile spikelets awnless; leaves 1-5 cm long ..... **C. aciculatus**
1. Sessile spikelets distinctly awned; leaves more than 10 cm long..... 2
2. Ligule a tuft of hairs; pedicelled spikelets 4-5 mm long..... **C. hackelii**
2. Ligule a fimbriate membrane; pedicelled spikelets 8-13 mm long ..... 3
3. Pedicelled spikelets awnless; lower glume of sessile spikelets with rows of bristles near the margin..... **C. nodulibarbis**
3. Pedicelled spikelets awned; lower glume of sessile spikelets without such bristles..... **C. asper**

**Chrysopogon aciculatus** (Retz.) Trin., Fund. Agrost. 181. 1820; Fischer in Gamble, Fl. Pres. Madras 1738. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 115.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 716. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3

(2): 1822. 1983; Sreekumar & Nair, Fl. Kerala Grass. 59, t. 9. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 118. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 507. 1996. ***Andropogon aciculatus*** Retz., Obs. Bot. 5: 22. 1789; Hook. f., Fl. Brit. India 7: 188. 1896.

Perennials; culms decumbent or creeping, to 30 cm long; nodes glabrous. Leaves to 5 x 0.5 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 4 x 1 mm, lanceolate, 2-fid at apex; upper glume similar, mucronate; second lemma 3 mm long lanceolate, arista 5-8 mm long. Pedicelled spikelet 5 mm long, lanceolate, muticous; pedicels glabrous.

*Fl. & Fr.* : Throughout the year

*Distr.* : Paleotropics. Common; in disturbed deciduous forests and lake shores; Manakkavala, *KPR & JA 17815.*

**Chrysopogon asper** (Heyne ex Hook.f.) Blatt. & McCann, Bombay Grass. 68. 1935; Fischer in Gamble, Fl. Pres. Madras 1738. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 116.1960; Sreekumar & Nair, Fl. Kerala Grass. 61. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 508. 1996. ***Andropogon asper*** Heyne ex Hook. f., Fl. Brit. India 7: 189. 1896.

Perennials; culms 50-100 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 6 x 1 mm, oblong, round along back, apex hirtus, brownish; upper glume similar to lower, awned; awn 15 mm long; first lemma hyaline, epaleate; second lemma 4 x 0.5 mm, delicate; awn 70 mm long; stamens 3, anthers 4 mm long. Pedicelled spikelets 9-10 mm long; glumes similar; lower 9-10 x 2 mm, awned; florets 2; lower empty, upper male.

*Fl. & Fr.* : November-February

*Distr.* : Peninsular India; endemic. Very common, in open grasslands. Kumarikulam, *NS & JA 13021.*

**Chrysopogon hackelii** (Hook.f.) Fischer in Gamble, Fl. Pres. Madras 1739. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 117.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 716. 1976; Sreekumar & Nair, Fl. Kerala Grass. 62. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 508. 1996. ***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 5 x 1.5 mm, lanceolate; lower glume 5 x 1.5 mm, glabrous, aristate, arista 5 mm long; upper glume 5 mm long, linear-oblong; first lemma 3 x 1 mm, hyaline, ciliate along margins; second lemma oblong; awn 20 mm long; anther 2.5 mm long; pedicelled spikelets 4-5 mm long, acute, awnless.

*Fl. & Fr. :* September-January

*Distr.* : South India; endemic. Very common; in open grasslands. Mangaladevi, *JA 12465*; Thaannikkudy, *JA & KPR 16858.*

**Chrysopogon nodulibarbis** (Steud.) Henrard, Blumea 4: 543. 1941; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 120. 1994. ***Andropogon nodulibarbis*** Steud., Syn. Pl. Glum. 1: 396. 1854. ***Andropogon zeylanicus*** Nees ex Steud., Syn. Pl. Glum. 1: 397. 1854; Hook. f., Fl. Brit. India 7: 192. 1896. ***Chrysopogon zeylanicus*** (Nees ex Steud.) Thw., Enum. Pl. Zeyl. 366. 1864; Fischer in Gamble, Fl. Pres. Madras 1739. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 119.1960; Sreekumar & Nair, Fl. Kerala Grass. 65. 1991.

Perennials; culms 80-150 cm high; nodes glabrous. Leaves usually collected at base, 20-30 x 0.4-1 cm, linear-lanceolate; sheath sharply keeled; ligule a fimbriate membrane. Panicle 10-20 cm long, lax with few spikelets. Sessile spikelets 6-8 mm long; lower glume 6 x 1.5 mm with two lines of bristles on dorsal side near the margins; upper glume similar but not with bristles; second lemma delicate, 1-nerved; awn 40 mm long; anthers 3 mm long. Pedicelled spikelets to 14 mm long; glumes unequal, awnless; upper floret male; lemmas awnless.

*Fl. & Fr. :* July-December

*Distr.* : South India and Sri Lanka. Common; in hilltop grasslands. Mangaladevi, *JA 12035.*

## **CLEISTACHNE** Bentham

in Hooker, Ic. Pl. t. 1379. 1882.

**Cleistachne sorghoides** Benth. in Hooker's Icon. Pl. t. 1379. 1882; Bor, Grass. Burma, Ceylon, India & Pakistan 119.1960; Sreekumar & Nair, Fl. Kerala Grass. 66. 1991. *C. stocksii* Hook. f., Fl. Brit. India 7: 162. 1896; Fischer in Gamble, Fl. Pres. Madras 1708. 1934.

Perennials, culms to 80 cm high, erect; nodes glabrous. Leaves 15-40 x 0.5-1.2 cm, narrowed to the base, scabrid; sheath keeled; ligule membranous, 5-8 mm long. Panicle 10-30 cm long. Spikelets similar, pedicelled, 4 x 1 mm; lower glume 4 x 1.5 mm, not keeled, coriaceous, brown; upper glume smaller; lower floret empty, upper bisexual; first lemma 3.5 x 1.5 mm, hyaline; palea 2.5 x 1 mm, hyaline; second lemma 3 x 2 mm, ovate, shortly bifid at apex; awn 22 mm

long; palea 1.2 mm, ovate, hyaline; stamens 3; anthers 2 mm long; ovary obovoid; styles 2, free; stigmas 2, plumose.

*Fl. & Fr.* : October-January.

*Distr.* : India and E. Tropical Africa Not common; in open grasslands along hill slopes; Koruthodu, *JA & KPR 16925.*

## **COELACHNE** R. Brown

Prodr. 1: 187. 1810.

**Coelachne simpliciuscula** (Wight & Arn. ex Steud.) Benth., J. Linn. Soc. 19: 93. 1881; Bor, Grass. Burma, Ceylon, India & Pakistan 576.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 717. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1824. 1983; Sreekumar & Nair, Fl. Kerala Grass. 415. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 124. 1994. ***Panicum simpliciusculum*** Wight & Arn. ex Steud., Syn. Pl. Glum. 1: 96. 1854.

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, 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 2 x 1 mm, ovate, acute, hyaline; palea 2 x 1 mm elliptic; stamens 3, free; ovary elliptic; stigma plumose; upper floret exerted.

*Fl. & Fr.* : November-January

*Distr.* : India, China, Sri Lanka, South East Asia and Madagascar. Common; in waterlogged areas and ditches of grasslands. Swamikkayam, *JA 13110.*

## **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. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 264.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 718. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1826. 1983; Manilal, Fl. Silent Valley 350. 1988; Sreekumar & Nair, Fl. Kerala Grass. 207. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 128. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 508. 1996.

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 3-10 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 5-15 x 2-4 mm, 2-4 in each raceme, lanceolate; lower glume 5-15 x 2-4 mm, lanceolate; upper glume oblong; lower floret male, upper empty, first lemma 5-10 mm long, hyaline; palea delicate; stamens 3, free; anthers 3 mm long.

*Fl. & Fr. :* November-January

*Distr.* : Native of Tropical Asia, now widely spread to Old and New world Tropics. Common; along stream sides in semi-evergreen forests. Thannikkudy, *JA 14226.*

## **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. Lower glume of sessile spikelets with a narrow slit on dorsal surface; leaves 10-25 cm long, base cordate ..... **C. caesius**
1. Lower glume of sessile spikelets without a narrow slit on dorsal surface; leaves 20-60 cm long, not cordate at base ..... 2
2. Pedicel of lowest pedicelled spikelets of sessile raceme swollen; panicle effuse ..... **C. travancoricus**
2. Pedicel of lowest pedicelled spikelets not swollen; panicle flexuous ..... **C. flexuosus**

**Cymbopogon caesius** (Nees ex Hook.f. & Arn.) Stapf, Kew Bull. 1906: 360.1906; Fischer in Gamble, Fl. Pres. Madras 1757. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 125.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 718.1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1827. 1983; Sreekumar & Nair, Fl. Kerala Grass. 69. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 129.1994. ***Andropogon caesius*** Nees ex Hook. & Arn., Bot. Beach Voy. 244.1838. ***A. schoenanthus*** L. var. ***gracillimus*** Hook.f., Fl. Brit. India 7:205. 1896.

Annuals or Perennials; culms 50-100 cm high, erect; nodes glabrous. Leaves 10-30 cm long, lanceolate, rounded or cordate at base, glaucous below, glabrous; sheath glabrous; ligule 5 mm wide, membranous. Panicles 10-15 cm long, contracted. Racemes 1.5 cm long. Sessile spikelets 4 x 1.5 mm, oblong; lower glume 4 x 1.5 mm, oblong, narrowly winged along margins on upper half; upper glume boat-shaped, keeled; first lemma 3 mm long, oblong; second lemma 2-cleft; awn 12 mm long. Pedicelled spikelets 4 x 1 mm, elliptic, awnless.

*Fl. & Fr. :* October-January

*Distr.* : South India, Sri Lanka, extending to Somalia. Common; in grasslands on hilltops. Swamikkayam, *JA 13109;* Thannikkudy, *KPR 14515.*

**Cymbopogon flexuosus** (Nees ex Steud.) Wats., Atk. Gaz. N. W. Prov. Ind. 392. 1882; Fischer in Gamble, Fl. Pres. Madras 1756. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 127.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 718. 1976; Sreekumar & Nair, Fl. Kerala Grass. 71. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 509. 1996. ***Andropogon flexuosus*** Nees ex Steud., Syn. Pl. Glum. 1; 388. 1854. ***A. nardus*** L. var. ***flexuosus*** (Nees ex Steud.) Hack. in DC., Monogr. Phan. 6: 603. 1889; Hook. f., Fl. Brit. India 7: 207. 1896. **Inchipullu** (Mannan)

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 4 x 1 mm, lanceolate; lower glume 4 x 1 mm, oblong, winged at apex, margins infolded; first lemma hyaline, 3 mm long; second lemma with filiform lobes; awn 12 mm long; anthers 2 mm long. Pedicelled spikelets 4 mm long; pedicels hairy.

*Fl. & Fr. :* November-January.

*Distr.* : Indo-Malesia. Common; in open grasslands with tall grasses. Vallakkadavu, *NS & JA 12728.*

*Ethnobotanical use* : The leaves are used as mild insecticide.

**Cymbopogon travancorensis** N. L. Bor, J. Bombay Nat. Hist. Soc. 52: 174. 1954 & Grass. Burma, Ceylon, India & Pakistan 132.1960; Sreekumar & Nair, Fl. Kerala Grass. 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 mm long, membranous. Panicle 15-50 cm long, lax, leaves intermixed with partial panicles. Racemes 0.8-1.2 cm long; sessile spikelets 3.5-4 mm long; lower glume 3.5 x 1.2 mm, 4-nerved,

2-keeled; margins incurved; upper glume boat shaped, 1-nerved; first lemma hyaline, 3 mm long, oblong; second lemma 3 x 0.5 mm; awn 6-9 mm long; anthers 1.5 mm long. Pedicelled spikelets 3 mm long, elliptic; pedicels 2 mm long, hairy along the margins.

*Fl. & Fr. :* October-January.

*Distr.* : Southern Western Ghats (Kerala), endemic. Rare; in open grasslands on hilltops. Mangaladevi, *JA 12492, 14078.*

## CYNODON Richard

in Persoon, Syn. Pl. 1: 85. 1805, *nom. cons.*

**Cynodon dactylon** (L.) Pers., Syn. Pl. 1: 85. 1805; Hook. f., Fl. Brit. India 7: 288. 1896; Fischer in Gamble, Fl. Pres. Madras 1835. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 469.1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1829. 1983; Sreekumar & Nair, Fl. Kerala Grass. 360. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 137. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 510. 1996. ***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, 2.5 mm long, ovate-lanceolate, glabrous; lower glume 1 x 0.5 mm, 1-nerved; upper glume 1.5 x 0.5 mm, 1-nerved; floret one; lemma 2 x 1.5 mm, 1-nerved, strongly keeled; keel ciliate; palea 2 x 0.5 mm, 2-nerved, curved; stamens 3, free; ovary elliptic; styles 2, free; stigmas 2, plumose.

*Fl. & Fr. :* Throughout the year

*Distr.* : Cosmopolitan. Very common; in openings of moist deciduous forests. Kokkarakandom, *JA 12058.*

## 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; spikelets ca. 4 mm long.....**C. muricatum**

1. Upper glume and lower lemma without glochidiate hairs; spikelets ca. 3 mm or less long.....2

2. Sheath ciliate along one margins; panicles erect.....3

2. Sheath glabrous along the margins; panicles large, drooping .....**B. longipes**

3. Panicles contracted; pedicels shorter than the spikelets.....4

3. Panicle lax, effuse; pedicels longer than the spikelets.....5

4. Nodes bearded; leaves up to 5 cm long.....**C. trigonum**

4. Nodes glabrous; leaves up to 15 cm long.....**C. oxyphyllum**

5. Spikelets few in panicle; leaves to 13 cm long, thinly hairy.....**C. deccanensis**

5. Spikelets numerous; leaves to 7 cm long, glabrous.....**C. patens**

**Cyrtococcum deccanense** N. L. Bor, Kew. Bull. 1956: 256. 1956; Bor, Grass. Burma, Ceylon, India & Pakistan 291.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 720. 1976; Sreekumar & Nair, Fl. Kerala Grass. 227. 1992; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 139. 1994. ***Panicum patens*** auct. non L., 1753: Hook. f., Fl. Brit. India 7: 57. 1896.

Annuals; culms 20-60 cm high, rooting from lower nodes; nodes sparsely hairy. Leaves 5-13 x 0.4-0.9 cm, lanceolate, slightly narrowed to base, thinly hairy; sheath keeled, ciliate along one margin; ligule membranous, narrow. Panicle 5-15 x 10 cm, lax. Pedicels very long, filiform. Spikelets few, 2 x 1.5 mm; glumes subequal, glabrous to 1 mm long, upper one larger; first lemma 2 x 1 mm, lanceolate, 5-nerved; second lemma broadly ovate, crustaceous, callused at apex, 5-nerved; palea 2 x 1 mm, coriaceous.

*Fl. & Fr.* : Throughout the year

*Distr.* : South India and Sri Lanka. Common; in evergreen forests. Uppermanalar, *JA 13703.*

**Cyrtococcum longipes** (Wight & Arn. ex Hook.f.) A. Camus, Bull. Mus. Hist. Nat. Paris 27: 118. 1921; Fischer in Gamble, Fl. Pres. Madras 1786. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 291.1960; Manilal, Fl. Silent Valley 351. 1988; Sreekumar & Nair, Fl. Kerala Grass. 229. 1992. ***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 2 x 1 mm; glumes subequal, 1.2-1.5 x 0.7-1 mm; upper one cuspidate; first lemma 1.5 mm long, ovate, epaleate; second lemma 1.5 x 1 mm, concave, crustaceous, 3-nerved; palea oblong, 2-nerved.

*Fl. & Fr.* : Throughout the year

*Distr.* : Southern Western Ghats. Very common; in evergreen forests. Thannikkudy *JA 13088.*

**Cyrtococcum muricatum** (Retz.) Bor, Grass. Burma, Ceylon, India & Pakistan 291. 1960; Sreekumar & Nair, Fl. Kerala Grass. 230. 1992. ***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 4 x 2 mm, few in each raceme; lower glume 3 x 1 mm, cuspidate; upper glume 4 x 2 mm, curved, glochidiate hairy; first lemma 4 x 2.5 mm, paleate; second lemma 3 x 1 mm, ovate, acute, 3-nerved; palea ovate, acute, 2-nerved.

*Fl. & Fr. :* Throughout the year

*Distr.* : South East Asia. Very common; in moist deciduous forests. Thekkady, *JA 13626.*

**Cyrtococcum oxyphyllum** (Steud.) Stapf. in Hooker's Ic. Pl. t. 3096. 1922; Fischer in Gamble, Fl. Pres. Madras 1786. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 291.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 720. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1830. 1983; Manilal, Fl. Silent Valley 351. 1988; Sreekumar & Nair, Fl. Kerala Grass. 231. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 140. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 510. 1996. ***Panicum oxyphyllum*** Steud., Syn. Pl. Glum. 1: 65. 1854.

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 1.5 x 1 mm, with smaller pedicels; glumes sub-equal, lower one 1 x 1 mm, ovate, glabrous, upper larger; first lemma 1.5 x 1 mm, epaleate; second lemma 1 x 1 mm, 3-nerved; palea 1 x 0.5 mm, 2-nerved.

*Fl. & Fr. :* Throughout the year

*Distr.* : India, China, South East Asia extending to Pacific Islands. Common; in moist deciduous forests. Pachakkanam, *KPR & JA 17052.*

**Cyrtococcum patens** (L.) A. Camus, Bull. Mus. Hist. Nat. Paris 27: 118. 1921; Fischer in Gamble, Fl. Pres. Madras1786. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 292.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 721. 1976; Sreekumar & Nair, Fl. Kerala Grass. 231. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 142. 1994. ***Panicum patens*** L., Sp. Pl. 58. 1753. ***Panicum radicans*** Retz., Obs. Bot. 4: 18. 1786. ***Cyrtococcum radicans*** (Retz.) Stapf. in Hook.'s Ic. Pl. t. 3096. 1922; Fischer in Gamble, Fl. Pres. Madras 1786. 1934.

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 one margin; ligule membranous. Panicle 10-25 x 5-12 cm, lax; rachis and pedicels filiform. Spikelets 1.5 x 1 mm; glumes equal, 1 x 0.5 mm, concave, acute; first lemma 1.5 x 1 mm, ovate, acute, 3-nerved; second lemma 1.5 x 1 mm, ovate, acute, crustaceous, 3-nerved palea, 1.5 x 1 mm, oblong, subcoriaceous.

*Fl. & Fr. :* September-December

*Distr.* : Tropical Asia. Common; in moist deciduous forests. Kokkarakandom, *JA 12418*

**Cyrtococcum trigonum** (Retz.) A. Camus, Bull. Mus. Hist. Nat. Paris 27: 118. 1921; Fischer in Gamble, Fl. Pres. Madras 1785. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 292.1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1800. 1931; Sreekumar & Nair, Fl. Kerala Grass. 232. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 143. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 510. 1996. ***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 2 x 1 mm; glumes subequal, lower 1 x 1 mm, ovate, glabrous, keeled; upper 1.5 x 1 mm, concave, hairy; first lemma 1.5 x 1 mm, 3-nerved; second lemma 1.5 x 1 mm, 3-nerved; crustaceous; palea 1 x 0.5 mm, crustaceous.

*Fl. & Fr. :* Throughout the year

*Distr.* : India and Sri Lanka, introduced in many Tropical Countries. Common; in moist deciduous forests. Kokkarakandom, *JA 12057.*

## **DACTYLOCTENIUM** Willdenow

Enum. Pl. Hort. Berol. 1029. 1809.

**Dactyloctenium aegyptium** (L.) P. Beauv., Ess. Agrost. 15. 1812; Fischer in Gamble, Fl. Pres. Madras 1840. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 489.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 721. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1831. 1983; Sreekumar & Nair, Fl. Kerala Grass. 367. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 146. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 511. 1996. *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, 4 x 2.5 mm, ovate, acute; lower glume 3 x 1.5 mm, ovate, 1-nerved; upper glume 2.5 x 1.5 mm, ovate, aristate, 1-nerved; keeled; florets 3-4; lemmas 3 x 1.5 mm, 3-nerved, keeled, mucronate; palea ovate, 2-nerved, 2-keeled; stamens 3, free; ovary oblong; styles 2, free; stigmas plumose.

*Fl. & Fr.* : Throughout the year

*Distr.* : Old World Tropics. Common; in disturbed moist deciduous forests. Thekkady, *JA 13833.*

## **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. Nodes bearded; pedicelled spikelets with glumes only.....**D. annulatum**
1. Nodes glabrous; pedicelled spikelets with fertile florets or empty.....2
2. Raceme solitary; leaves to 7 cm long.....**D. oliganthum**
2. Raceme 5-15; leaves to 30 cm long.....**D. foulkesii**

**Dichanthium annulatum** (Forssk.) Stapf. in Prain, Fl. Trop. Africa 9: 1917; Fischer in Gamble, Fl. Pres. Madras 1741. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 133.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 722. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1833. 1983; Sreekumar & Nair, Fl. Kerala Grass. 76. 1991. ***Andropogon annulatus*** Forssk., Fl. Aeg.-Arab. 173. 1775; Hook. f., Fl. Brit. India 7: 196. 1896.

Perennials; culms 50-100 cm high; nodes bearded. Leaves 5-20 x 0.6 cm, linear-lanceolate, lower ones with rounded base, sheath keeled, ligule membranous with long hairs. Racemes 2-5 cm long, joints and pedicels ciliate. Sessile spikelets 3 x 1.5 mm, ovate, glabrous; lower glume 3 x 1.5 mm, oblong, 13 nerved; upper glume 1-nerved; First lemma oblong epaleate; second lemma awned; awn geniculate. Pedicelled spikelet 3 x 1.5 mm; lower glume 3 x 1.5 mm, ciliate along the margins, upper glume hyaline.

*Fl. & Fr.* : August-December

*Distr.* : Tropical Africa and Asia. Rare; along forest margins. Vellimala, *JA 14051.*

**Dichanthium foulkesii** (Hook.f.) Jain & Desh Pande, Bull. Bot. Surv. India 20: 134. 1978; Sreekumar & Nair, Fl. Kerala Grass. 77. 1991. ***Andropogon foulkesii*** Hook. f., Fl. Brit. India 7: 174. 1896. ***Amphilophis foulkesii*** (Hook.f.) Fischer in Gamble, Fl. Pres. Madras 1732. 1934. ***Bothriochloa foulkesii*** (Hook.f.) Henr., Blumea 3: 457. 1940; Bor, Grass. Burma, Ceylon, India & Pakistan 107.1960.

Perennials; culms 50-70 cm tall, tufted; nodes glabrous. Leaves 15-30 x 0.4-0.7 cm, linear-lanceolate, glabrous. Racemes 5-15, each 7-8 cm long, sub-digitate; rachis and pedicels ciliate. Sessile spikelets 4-5 x 1 mm, lanceolate; lower glume 4 x 1 mm, lanceolate, 5-nerved, upper glume similar, 3-nerved; first lemma 3 mm long, epaleate; second lemma awned, awn 12-15 mm long. Pedicelled spikelets with equal glumes and a lower barren and upper male florets; lemmas awnless.

*Fl. & Fr. :* July-December

*Distr.* : Southern Western Ghats. Common; along margins of grasslands. Mlappara, *JA 12088.*

**Dichanthium oliganthum** (Hochst. ex Steud.) Cope, Kew Bull. 35: 703. 1980; Sreekumar & Nair, Fl. Kerala Grass. 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.) Bor, Kew Bull. 1954 : 79. 1954 & Grass. Burma, Ceylon, India & Pakistan 171.1960. ***Heteropogon oliganthus*** (Hochst.) Blatt. & McCann, J. Bombay Nat. Hist. Soc. 32: 623. 1928; Fischer in Gamble, Fl. Pres. Madras 1744. 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 2 mm wide, membranous. Raceme solitary, terminal, 2-4 cm long. Sessile spikelets 4 x 1.5 mm, glabrous; lower glume 4 x 1.5 mm, margins incurved, coriaceous; upper glume similar, 1-nerved; awn 40-45 mm long. Pedicelled spikelets 6-7 mm long; glumes subequal, truncate to obtuse, 13-nerved; florets absent.

*Fl. & Fr. :* October-January

*Distr.* : Peninsular India, endemic. Rare; along forest margins at higher elevations. Brook's Peak, *JA & KPR 17027.*

## **DIGITARIA** Heister ex Fabricus

Enum. ed. 1, 207. 1759, *typ. cons.*

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. Upper glume with two longitudinal patches of long hairs; racemes 2-3.....**D. bicornis**
1. Upper glume glabrous; racemes 2-10.....2
2. Lower glume absent; racemes to 5 cm long.....3
2. Lower glume a minute scale; racemes over 5 cm long.....5
3. Rachis triquetrous; racemes verticillate or opposite.....**D. wallichiana**
3. Rachis flat; racemes digitate or sub-digitate.....4
4. Leaves to 5 cm long; spikelets to 1.5 mm long; racemes 2.....**D. longiflora**
4. Leaves to 15 cm long; spikelets to 2.5 mm long; racemes 3-10.....**D. setigera**
5. Sheath keeled, glabrous; rachis triquetrous .....**D. griffithii**
5. Sheath rounded, tubercle based hairy; rachis flat.....**D. ciliaris**

**Digitaria bicornis** (Lam.) Roem. & Schult., Hort. Brit. 24. n. 1578. 1830; Henr., Monogr. Gen. Digit. 71. 1950; Bor, Grass. Burma, Ceylon, India & Pakistan 299.1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1836. 1983; Sreekumar & Nair, Fl. Kerala Grass. 235. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 162. 1994. ***Paspalum bicorne*** Lam., Tab. Meth. Bot. 1: 176. 1791. ***Digitaria biformis*** Willd., Enum. Pl. Hort. Berol. 92. 1809. ***Paspalum heterantherum*** sensu Hook. f., Fl. Brit. India 7: 16. 1896; non Nees et Meyen, 1843.

Annuals; culms 15-25 cm tall, tufted, rooting at lower nodes, nodes glabrous. Leaves 2-5 x 0.2-0.7 cm, lanceolate, sparsely hairy; sheath rounded, thickly covered with bulbous based hairs; ligule membranous, truncate. Racemes 2 or 3 together, 5-10 cm long, rachis flat. Spikelets 3 x 0.5 mm, lanceolate; lower glume minute; upper glume 2 x 0.5 mm, ciliate along the margins, first lemma 3 x 1 mm, lanceolate, hairy on back, empty; second lemma 3 x 1 mm, lanceolate, acuminate, coriaceous; palea similar to second lemma; anthers 1 mm long.

*Fl. & Fr.* : Throughout the year

*Distr.* : Tropical Asia. Common; along disturbed moist deciduous forests. Thekkady, *JA 16969.*

**Digitaria ciliaris** (Retz.) Koeler, Descr. Gram. 27. 1802; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 723. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1837. 1983; Sreekumar & Nair, Fl. Kerala Grass. 237. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 163. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 511. 1996. ***Panicum ciliare*** Retz., Obs. Bot. 4: 16.1786. ***Panicum adscendens*** H.B.K., Nov. Gen. et Sp. 1: 97. 1816. ***Digitaria adscendens***

(H.B.K.) Henr., Blumea 1: 92. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 304.1960. ***Digitaria marginata*** Link., Enum. Hort. Berol. 1: 102. 1821; Fischer in Gamble, Fl. Pres. Madras 1764.1934. ***Panicum sanguinale*** L., Sp. Pl. 57. 1753. ***Digitaria sanguinalis*** (L.) Scop., Flor. Carn. ed.2, 1: 52. 1772 var. ***ciliaris*** Rang. & Tad., Handb. South Ind. Grass. 53, t. 71-72. 1921. ***Paspalum sanguinale*** (L.) Lam. var. ***rottleri*** Hook. f., Fl. Brit. India 7: 15. 1896. p.p.

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, 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 2 x 0.5 mm, oblong, 7-nerved; first lemma 3 x 1 mm, lanceolate, ciliate along margins, empty; second lemma 3 x 1 mm, margins folded; palea 2 keeled, lanceolate.

*Fl. & Fr. :* August-December

*Distr.* : Cosmopolitan. Very common; in moist deciduous forests and savannahs; Kokkarakandom, *JA 12056, 12168, 13856.*

**Digitaria griffithii** (Hook.f.) Henr., Blumea 1: 100. 1934; Fischer in Gamble, Fl. Pres. Madras 1765. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 301.1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1837. 1983; Sreekumar & Nair, Fl. Kerala Grass. 238. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 166. 1994. ***Paspalum sanguinale*** (L.) Lam. 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, 3 x 1 mm, brown; lower glume minute; upper glume 2.5 x 1 mm, brown, ciliate along the nerves; first lemma similar to upper glume, glabrous, epaleate, second lemma 2 x 1 mm, ovate, nerves obscure; palea similar to lemma.

*Fl. & Fr. :* August-December

*Distr.* : South India and Sri Lanka. Very common; in savannahs and moist deciduous forests. Thekkady, *JA & KPR 16357.*

**Digitaria longiflora** (Retz.) Pers., Syn. Pl. 1: 85. 1805; Fischer in Gamble, Fl. Pres. Madras 1765. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 302.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 724. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1838. 1983; Manilal, Fl. Silent Valley 351. 1988; Sreekumar & Nair, Fl. Kerala Grass. 239. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 167. 1994. ***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, to 5 cm long, slender, on erect axis. Spikelets 1.5 x 0.5 mm; lower glume absent; upper glume 1.5 x 5 mm, ovate, glabrous; first lemma 1.5 x 0.5 mm, elliptic, 9-nerved, epaleate. Second lemma and palea similar, 1.5 x 0.5 mm, ovate, coriaceous.

*Fl. & Fr. :* Throughout the year

*Distr.* : Old World Tropics. Very common; in savannahs. Kokkarakandom, *JA 12060.*

**Digitaria setigera** Roth. ex Roem. & Schult., Syst. Veg. 2: 474. 1817; Bor, Grass. Burma, Ceylon, India & Pakistan 305.1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1839. 1983; Manilal, Fl. Silent Valley 352. 1988; Sreekumar & Nair, Fl. Kerala Grass. 241. 1991. ***Paspalum sanguinale*** (L.) Lam. var. ***extensum*** Hook. f., Fl. Brit. India 7: 15. 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 1 x 0.5 mm, ovate, first lemma 2.5-3 x 1 mm, 5-nerved, epaleate; second lemma and palea similar, 2 x 1 mm, lanceolate, 3-nerved, coriaceous.

*Fl. & Fr. :* July-December

*Distr.* : Tropical Asia. Common; in moist deciduous forests. Kokkarakandom, *JA 12062*; Thekkady, *KPR & JA 14598.*

**Digitaria wallichiana** (Wight & Arn. ex Steud.) Stapf. in Prain, Fl. Trop. Africa 9: 436. 1919; Fischer in Gamble, Fl. Pres. Madras 1765. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 307.1960; Sreekumar & Nair, Fl. Kerala Grass. 243. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 170. 1994. ***Paspalum wallichianum*** Wight & Arn. ex Steud., Syn. Pl. Glum. 1: 41. 1854. ***Paspalum perrottetii*** Hook. f., Fl. Brit. India 7: 20. 1896.

Annuals; culms 30-60 cm high, decumbent, nodes thinly hairy. Leaves to 15 x 0.6 mm, linear-lanceolate, narrowed to base, thinly pubescent; sheath rounded, glabrous, ligule ovate, 4 mm broad. Racemes many, panicled, each 2-4 cm long; rachis triquetrous, scabrid. Spikelets 2 x 1 mm, lanceolate; upper glume 2 x 0.5 mm, ovate, 3-nerved; first lemma 2 x 1 mm, ovate, 7-nerved, empty; second lemma and palea similar, 2 x 1 mm, margins folded, coriaceous.

*Fl. & Fr. :* July-December

*Distr.* : South India and Sri Lanka. Rare; along the margins of forests. Vellimala, *JA 12476.*

## 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. Racemes 3-6; perennials.....**D. fuscescens**
3. Racemes 3; annuals .....4
4. Rachis angular.....**D. ornithopoda**
4. Rachis flat.....5
5. Leaves to 35 cm long; spikelets 5-6 mm long.....**D. mooneyi**
5. Leaves to 13 cm long; spikelets 2-4 mm long.....6
6. Upper glume winged along the upper half of the keel; margin of rachis ciliate.....**D. connivens**
6. Upper glume wingless; margin of rachis scabrid.....7
7. Spikelets ca. 4 mm long.....**D. kanjirapallilana**
7. Spikelets to 3 mm long.....**D. deccanensis**

**Dimeria connivens** Hack. in DC., Monogr. Phan. 6: 689. 1889; Hook. f., Fl. Brit. India 7: 104. 1896; Bor, Grass. Burma, Ceylon, India & Pakistan 140.1960; Sreekumar & Nair, Fl. Kerala Grass. 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, 1 mm broad, margins densely ciliate. Spikelets 4-5 x 2 mm, shortly pedicelled; callus hairy; lower glume 4 x 1 mm, oblanceolate, acute; upper glume 4.5 x 2 mm, oblanceolate-oblong, winged along the keel, keel thinly hairy; second lemma cleft at the apex, awned; stamens 2; anther 1.2-0.2 mm long.

*Fl. & Fr.* : October-December

*Distr.* : Peninsular India. Common; in rocky grasslands. Vallakkadavu, *KPR & JA 17861.*

**Dimeria deccanensis** Bor, Kew Bull. 1952: 578. 1952; Bor, Grass. Burma, Ceylon, India & Pakistan 140.1960; Manilal, Fl. Silent Valley 352. 1988; Sreekumar & Nair, Fl. Kerala Grass. 89. 1991.

Annuals; culms 30-40 cm tall, densely tufted; nodes hairy. Leaves to 10 x 0.4 cm, linear-lanceolate, glabrous; sheath keeled, glabrous, ligule membranous, 1.5 mm broad. Racemes paired, 4-8 cm long; rachis flat; margins scabrid. Spikelets 3.5-4 mm long; callus hairy; lower glume 3.5 x 0.5 mm, linear-oblong, keeled, keel not winged, slightly ciliate; upper glume 4 x 1.5 mm, keeled, wingless or winged just below the tip only; first lemma 1.5 mm long, hyaline; awn 7-10 mm long; anthers 1.5 mm long; styles basely united.

*Fl. & Fr. :* November-January

*Distr.* : South India, endemic. Common; in rocky grasslands. Kumarikulam, *JA 13075.*

**Dimeria fuscescens** Trim., Mem. Acad. Imp. Sci. St. Petersbourg, Ser. 6, Sci. Math. 2: 335. 1832; Hook. f., Fl. Brit. India 7: 105. 1896; Bor, Grass. Burma, Ceylon, India & Pakistan 140. 1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1841. 1983; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 174. 1994 [Fig. 76].

Perennial herbs, densely tufted, culms to 75 cm high, nodes glabrous. Leaves to 20 x 0.4 cm, linear-lanceolate, acuminate, glabrous; sheath keeled, glabrous, ligule membranous. Racemes 3-7 together, to 12 cm long, rachis triangular, zig-zag, glabrous; spikelets to 7 mm long, glumes acute, lower glume winged along the keel, keel ciliate, scabrid; awn to 1 cm long.

*Fl. & Fr. :* November-January

*Distr.* : Northern India and Sri Lanka. Rare; in marshy grasslands. Mangaladevi, *JA 17948.*

*Note:* The present collections is the first record of its occurrence in Kerala.

**Dimeria kanjirapallilana** K. C. Jacob, J. Bombay Nat. Hist. Soc. 47(1): 48. 1947; Manilal & Sivar., Fl. Calicut 238. 1982.

Culms to 45 cm high, tufted, nodes glabrous. Leaves to 8 x 0.4 cm, linear-lanceolate, bulbous based hairy; sheath keeled, ligule membranous. Racemes to 2-7 cm long, rachis zig-zag, sparsely ciliate. Spikelets to 4 mm long; calyx hairy; lower glume, 3.5 mm long, scabrid; upper glume acuminate, narrowly winged along the keel.

*Fl. & Fr. :* October-December

*Distr.* : Southern Western Ghats(Kerala), endemic. Rare; in hilly grasslands at higher elevations. Mangaladevi, *JA 17945.*

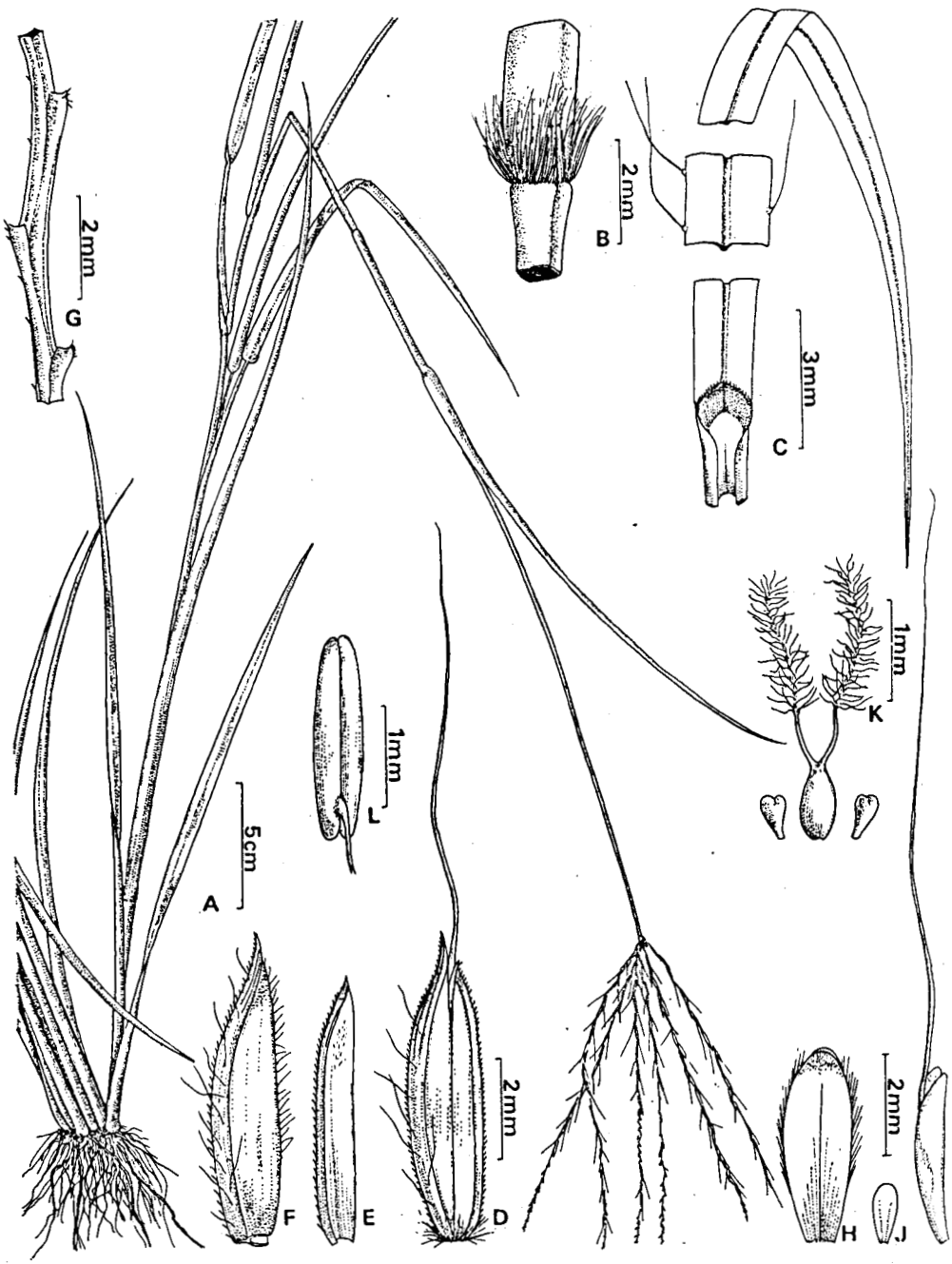



Fig. 76. *Dimeria fuscescens* Trim.; **A**. habit; **B**. node; **C**. leaf; **D**. spikelet; **E**. lower glume; **F**. upper glume; **G**. rachis of raceme; **H**. first lemma; **I**. second lemma; **J**. palea; **K**. pistil and lodecules; **L**. anther.

**Dimeria lawsonii** (Hook.f.) Fischer in Gamble, Fl. Pres. Madras 1713. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 142.1960; Sreekumar & Nair, Fl. Kerala Grass. 97. 1991.

Annuals; culms to 35 cm tall, densely tufted; nodes bearded. Leaves to 12 x 0.5 cm, linear-lanceolate, acuminate, sparsely hairy; sheath slightly keeled, glabrous, ligule membranous, narrow. Raceme solitary, 5-7 cm long; rachis 0.5 mm broad, flat, densely ciliate along margins. Spikelets 4-6 mm long; callus hairy; lower glume 4 x 1 mm, lanceolate, acuminate, keeled, winged along the keel, wings ciliate; upper glume 5 x 1.5 mm, elliptic, acuminate, aristate, aristae 1.5 mm long, first lemma oblanceolate, hyaline; second lemma 3 x 1 mm, hyaline; awn 9-11 mm long; stamens 2.

*Fl. & Fr. :* September-January

*Distr.* : South India; endemic. Common; in hilltop grasslands. Swamikkayam, *JA 13022.*

**Dimeria mooneyi** Raizada ex Mooneyi, Suppl. Bot. Bihar and Orissa 263. 1950; Bor, Grass. Burma, Ceylon, India & Pakistan 142. 1960.

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 1.5 mm broad, ciliate, hairy; lower glume 5 x 1 mm, winged along the keels; margin of wing ciliate; upper glume 5.5 x 1.5 mm, oblanceolate, broadly winged along the keels; wing ciliate along margins; first lemma 3.5 -4 x 0.5 mm, oblong, hyaline, ciliate along the margins, epaleate; second lemma 4.5 x 1 mm, cleft at apex; awn 12 mm long; stamens 2; anthers 2 mm long, brown; ovary glabrous; stigma plumose, 1.5 mm long.

*Fl. & Fr. :* November-January

*Distr.* : India. Rare; in rocky grasslands. Chenthamarakokka, *JA & KPR 17099.*

*Note* : The present collection is the first authentic record of its occurrence in Kerala.

**Dimeria ornithopoda** Trim., Fund. Agrost. 167. t. 14. 1820; Hook. f., Fl. Brit. India 7: 104. 1896; Fischer in Gamble, Fl. Pres. Madras 1713. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 142, t. 3, f. 8. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 725. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1842. 1983; Manilal, Fl. Silent Valley 351. 1988; Sreekumar & Nair, Fl. Kerala Grass. 98. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 512. 1996.

Annuals, culms to 50 cm high, tufted, slender, nodes sparsely bearded. Leaves to 6 x 0.4 cm, linear lanceolate, sparsely hairy. Racemes paired, 1-5 cm long, spreading; rachis triquetrous, glabrous. Spikelets 2 mm long; lower glume 2 mm long, linear-lanceolate, wingless or shortly

winged below the apex; upper glume similar; lower floret empty; upper floret bisexual; awn 5-12 mm long.

*Fl. & Fr. :* August-March

*Distr.* : Indo-Malesia to Australia. Common; along the margins of grasslands. Varayattumudi, *JA 17944.*

**Dimeria thwaitesii** Hack. in DC., Monogr. Phan. 6: 78. 1889; Fischer in Gamble, Fl. Pres. Madras 1713. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 142.1960; Sreekumar & Nair, Fl. Kerala Grass. 100. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 177. 1994. ***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 cm, glabrous. Raceme 3-4.5 cm long, solitary or paired; rachis flat, straight; margins ciliate. Spikelets 4-5.5 mm long; callus hairs 1 mm long; lower glume 4 x 1 mm, hairy along the keel; upper glume 5 x 1.5 mm, aristate, keels with long hairs; first lemma 1.5 x 0.5 mm, 1-nerved; second lemma 3 x 1 mm, awned; awn 9-11 mm long; stamens 2.

*Fl. & Fr. :* November-January

*Distr.* : South India and Sri Lanka. Common; in rocky openings of evergreen forests. Vellimala, *KPR & JA 14350.*

## ECHINOCHLOA P. Beauvois

Ess. 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. colona**
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. crusgalli**

**Echinochloa colona** (L.) Link, Hort. Berol. 2: 209. 1833; Fischer in Gamble, Fl. Pres. Madras 1776. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 308.1960; Ramam. in Sald. &

Nicols., Fl. Hassan Dist. 726. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1845. 1983; Sreekumar & Nair, Fl. Kerala Grass. 245. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 181. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 513. 1996. ***Panicum colonum*** L., Syst. Nat. ed. 10, 2:870. 1759; Hook. f., Fl. Brit. India 7: 32. 1896.

Annuals; culms 20-50 cm high, sub-erect; nodes glabrous. Leaves 3-10 x 0.5 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 1 x 1.5 mm, broadly ovate, acute, 5-nerved; margin ciliate; upper glume 2 x 2 mm, hirtus; first lemma 2.5 x 1.5 mm, shortly cuspidate; palea oblong, hyaline, 2-keeled; second lemma 1.5 x 1 mm, ovate, acute; palea hyaline.

*Fl. & Fr.* : Throughout the year

*Distr.* : Tropical Asia and Africa. Common; in marshy areas of moist deciduous forests. Thekkady, *JA & KPR 14575.*

**Echinochloa crusgalli** (L.) P. Beauv., Ess. Agrost. 53: 161. 1812; Fischer in Gamble, Fl. Pres. Madras 1777. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 310.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 726. 1976; Sreekumar & Nair, Fl. Kerala Grass. 246. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 183. 1994. ***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, 4 mm long; lower glume 1.5 x 2.5 mm, broadly ovate, bulbous based hairy along the nerves; upper glume 4 mm long, ovate, acuminate; first lemma 3.5 x 2 mm, ovate, awned; awn 6-8 mm long; palea 3 mm long; second lemma 3.5 x 2 mm, concave, smooth, crustaceous; palea similar to lemma, 2-nerved.

*Fl. & Fr.* : November-January

*Distr.* : Cosmopolitan. Common; in marshy fields (old paddy cultivated areas of tribal inhabited areas). Thekkady, *JA 16989.*

**Echinochloa stagnina** (Retz.) P. Beauv., Ess. Agrost. 53: 162. 1812; Fischer in Gamble, Fl. Pres. Madras 1777. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 311.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 726. 1976; Sreekumar & Nair, Fl. Kerala Grass. 248. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 187. 1994. ***Panicum stagninum*** Retz., Obs. Bot. 5: 7. 1786. ***P. 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 5 mm long, arranged in 4 rows; lower glume 2 x 2.5 mm, broadly ovate, thinly hairy; upper glume 5 x 3.5 mm, ovate, tubercled hairy along the nerves; first lemma 4 x 2.5 mm, lanceolate, aristate, arista 2 mm long; palea 3.5 x 1.5 mm, 2-keeled, carries a male floret; anthers 1.5 mm long; second lemma 3 x 2 mm, ovate, concave, coriaceous; palea 3 x 1.5 mm, 2-keeled.

*Fl. & Fr.* : November-January

*Distr.* : Tropical Africa and Asia. Common; in waterlogged areas. Thekkady, *JA 14577*; *KPR & JA 16980.*

## **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. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 493.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 727. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1848. 1983; Manilal, Fl. Silent Valley 353. 1988; Sreekumar & Nair, Fl. Kerala Grass. 371. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 193. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 513. 1996.

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 2 x 1 mm, ovate, keeled, 1-nerved; upper glume 3-4 x 1.5 mm, 6-nerved, keeled; florets 5-8, all bisexual, lemmas 3.5 x 1.5 mm, keeled; palea 2.5 x 1 mm, 2-nerved, 2-keeled; stamens 3, free; ovary elliptic; styles 2, free; stigmas plumose; violet.

*Fl. & Fr.* : Throughout the year

*Distr.* : Pantropical. Common; in open shrublands, lake shores etc. Thekkady, *JA & KPR 16988.*

## **ERAGROSTIELLA** N. L. Bor

Indian Forester 66: 269. 1940.

**Eragrostiella bifaria** (Vahl.) Bor, Ind. For. 66: 269. 1940 & Grass. Burma, Ceylon, India & Pakistan 494.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 728. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1851. 1983; Sreekumar & Nair, Fl. Kerala Grass. 374. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 199. 1994. ***Poa bifaria*** Vahl, Syn. Bot. 2: 19. 1791. ***Eragrostis bifaria*** (Vahl) Wight ex Steud., Nom. Bot. ed. 2, 1: 562. 1840; Hook. f., Fl. Brit. India 7: 325. 1896; Fischer in Gamble, Fl. Pres. Madras 1828. 1934.

Densely tufted perennials; culms 30-80 cm high; nodes glabrous. Leaves many, 15-30 x 0.2-0.5 cm, linear, mostly basal; sheath rounded, glabrous; ligule a narrow membrane. Raceme solitary, 20-30 cm long; spikelets 20 x 2-3 mm, linear-oblong, arranged in two rows; glumes subequal, ovate, acute, 1-nerved, upper larger; florets 20-40, all bisexual; lemmas 2 x 2 mm, broadly ovate, 3-nerved; palea 2 x 1 mm, obovate, 2-keeled, hyaline; stamens 3, anthers 1 mm long; ovary elliptic, styles 2, free; stigmas plumose.

*Fl. & Fr.* : November-January

*Distr.* : India, Burma and Sri Lanka. Common; in hill top grasslands. Kumarikulam, *JA 13079.*

## **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. Ligule a row of hairs.....2
1. Ligule a rim only or a membrane.....3
2. Lemmas not deciduous; spikelets with 2-5 florets.....**E. tef**
2. Lemmas deciduous; spikelets with 5-20 flowers.....**E. nutans**
3. Spikelets grey or black.....4
3. Spikelets white, purplish or olive green.....7
4. Lemmas to 1.5 mm long; culms glandular below the panicles.....**E. pilosa**
4. Lemmas over 1.5 mm long; culms not as above.....5
5. Pedicels with glandular bands; spikelets serrate by gapping of lemmas, black.....**E. tenuifolia**
5. Pedicels without glandular bands; spikelets not serrate, grey or black.....6
6. Spikelets black, 5-8-flowered; palea smooth.....**E. nigra**
6. Spikelets grey, 15-40-flowered; palea scabrid.....**E. atrovirens**
7. Spikelets breaking up basipetally; culms below the panicle with viscid glands.....**E. viscosa**
7. Spikelets breaking acropetally; culms without viscid glands.....**E. unioloides**

**Eragrostis atrovirens** (Desv.) Trin. ex Steud., Nom. Bot. ed. 2, 1: 562. 1840; Bor, Grass. Burma, Ceylon, India & Pakistan 503.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 729. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1854. 1983; Manilal, Fl. Silent Valley 353. 1988; Sreekumar & Nair, Fl. Kerala. Grass. 377.1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 207. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 513. 1996.

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, 10 mm long, ovate-oblong, grey, 15-40-flowered; glumes 1.5 mm long, ovate, acute, 1-nerved; lemma 2.5 x 1.25 mm, ovate, acute, 3-nerved, grey; palea 1.5 x 0.5 mm, curved, keel scabrid; stamens 3, anthers 0.5 mm long.

*Fl. & Fr.* Throughout the year

*Distr.* : Africa, Asia to Malesia. Common; along the river banks in savannahs. Thannikkudy, *KPR & JA 14904.*

**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. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 511.1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1856. 1983; Sreekumar & Nair, Fl. Kerala Grass. 384. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 214. 1994.

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, 2.2 x 0.5 mm, 1-nerved, keeled; florets 5-8, all bisexual; lemma 2.2 x 1 mm, ovate, acute, 3-nerved; palea 2 x 1 mm, oblong, curved, keels smooth.

*Fl. & Fr. :* Throughout the year

*Distr.* : India, China and Sri Lanka. Occasional; in disturbed places of evergreen forests at higher elevations. Uppermanalar, *JA 13957.*

**Eragrostis nutans** (Retz.) Nees ex Steud., Nom. Bot. ed. 2, 563. 1840; Fischer in Gamble, Fl. Pres. Madras 1826. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 511.1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1856. 1983; Sreekumar & Nair, Fl. Kerala Grass. 385. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 216. 1994. ***Poa nutans*** Retz., Obs. Bot. 4: 19. 1786. ***Eragrostis elegantula*** Nees ex Steud., Syn. Pl. Glum. 1: 266. 1854; Hook. f., Fl. Brit. India 7: 318. 1896.

Tufted annuals; culms 15-35 cm high, suberect. Leaves 5-10 x 0.2-0.5 cm, linear-lanceolate, glabrous; sheath hairy near the mouth; ligule a row of hairs. Panicle 5-7 x 1-2 cm, contracted; branches and pedicels scabrid. Spikelets oblong, grey, 6-30 flowered; glumes similar, 1 x 0.5 mm, keeled, 1-nerved; lemma 1.2 x 1 mm, ovate, acute, 3-nerved; palea 1 x 1 mm, curved, hairy along the keels; anthers 0.5 mm long.

*Fl. & Fr.* : October-January

*Distr.* : Peninsular India and Sri Lanka. Common; along the lake shores. Thekkady, *KPR & JA 16954.*

**Eragrostis pilosa** (L.) P. Beauv., Ess. Agrost. 162, 175. 1812; Hook. f., Fl. Brit. India 7: 323. 1896; Fischer in Gamble, Fl. Pres. Madras 1827. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 512.1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1856. 1983; Sreekumar & Nair, Fl. Kerala Grass. 385. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 217. 1994.

Slender annuals; culms 15-35 cm tall, erect, tufted; nodes glabrous. Leaves 5-15 x 0.1-0.3 cm, linear-lanceolate, base rounded, glabrous; sheath rounded, ligule obscure. Panicle 10-20 cm long, lax; branches filiform, glabrous. Spikelets 4 x 1 mm, linear-oblong, 5-10-flowered, black; glumes equal, 1 x 1 mm, acute, keeled; lemma 1.2 x 1 mm, ovate, acute, 3-nerved, glabrous; palea 1.2 x 0.5 mm, lanceolate, keels smooth; anthers 0.5 mm long.

*Fl. & Fr.* : Throughout the year

*Distr.* : Old World Tropics. Very common; in disturbed forests. Vellimala, *JA 14047.*

**Eragrostis tef** (Zucc.) Trotter, Bull. Soc. Bot. Ital. 62. 1918; Bor, Grass. Burma, Ceylon, India & Pakistan 513.1960; Sreekumar & Nair, Fl. Kerala Grass. 388. 1991. ***Poa tef*** Zucc., Diss. Ist. Pianta Panizz. Abiss. 1774.

Annuals; culms 20-40 cm high, sub-erect, loosely tufted. Leaves 5-20 x 0.2-0.5 cm, linear, base rounded, glabrous; sheath rounded, ligule a row of hairs. Panicles 5-18 cm long, effuse; branches filiform, axils of branches with long hairs. Spikelets 2 x 1 mm, solitary, pedicelled, black; glumes similar, 1 x 0.5 mm, ovate, acute, keeled; florets 3-5; lemmas 1.2 x 0.5 mm, ovate; palea 0.7 mm long, ciliate along the keels.

*Fl. & Fr.* : November-January

*Distr.* : Native of Ethiopia, now spread to Tropical countries. Rare; in disturbed forests. Koruthode, *JA 14763.*

**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. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 514.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 730. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1858. 1983; Manilal, Fl. Silent Valley 353. 1988; Sreekumar & Nair, Fl. Kerala Grass. 391. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 222. 1994. ***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 2.25 x 1.5 mm, broadly ovate, mucronate, greyish black; palea curved, truncate at apex, persistent; anthers 1 mm long.

*Fl. & Fr.* : November-January

*Distr.* : South India and Tropical Africa. Frequent; along lake shores. Thekkady, *JA 13082.*

**Eragrostis unioloides** (Retz.) Nees ex Steud., Syn. Pl. Glum. 1: 264. 1854; Fischer in Gamble, Fl. Pres. Madras 1826. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 515.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 730. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1858. 1983; Manilal, Fl. Silent Valley 354. 1988; Sreekumar & Nair, Fl. Kerala Grass. 392. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 224. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 514. 1996. ***Poa unioloides*** Retz., Obs. Bot. 5: 19. 1789. ***Eragrostis amabilis*** auct. non Wight & Arn. ex Nees, 1838: Hook. f., Fl. Brit. India 7: 317. 1896.

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, 1.5-2 x 0.5 mm, ovate-lanceolate; floret 20-60, similar; lemmas 2.25 x 1.5 mm, ovate, acute; palea curved, keel scabrid; anthers 0.5 mm long.

*Fl. & Fr.* : Throughout the year

*Distr.* : India and South East Asia. Very common; in marshy grasslands. Thaannikkudy, *JA 12362, 13077;* Thekkady, *JA & KPR 15009.*

**Eragrostis viscosa** (Retz.) Trin., Mem. Acad. Imp. Sci. St.-Petersb., Ser. 6, 1: 397. 1830; Fischer in Gamble, Fl. Pres. Madras 1826. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 515.1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 730. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1859. 1983; Sreekumar & Nair, Fl. Kerala Grass. 393. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 227. 1994. ***Poa viscosa*** Retz., Obs. Bot. 4: 20. 1786. ***Eragrostis tenella*** (L.) P. Beauv., ex Roem. & Schult. var. ***viscosa*** (Retz.) Stapf. in Hook. f., Fl. Brit. India 7: 315. 1896.

Tufted annuals; culms 10-35 cm high, suberect or decumbent, slender. Leaves 5-10 x 0.2-0.4 cm, lanceolate, base rounded; ligule a narrow rim only. Panicle 10-15 x 3-4 cm, contracted, branches filiform, glabrous; axis below the panicle viscid. Spikelets 4-5 x 1-1.5 mm, oblong,

white; glumes equal, 1 x 0.5 mm, 1-nerved; florets 10-14, similar; lemmas 1 x 1 mm, broadly ovate, acute; palea, 1 x 0.5 mm; keels ciliate.

*Fl. & Fr. :* Throughout the year.

*Distr.* : India and Tropical Africa. Very common; in disturbed moist deciduous forests. Thekkady, *JA 12406.*

## EULALIA Kunth

Revis. Gram. 1: 160. 1829.

Perennials; culms tufted, erect, nodes glabrous. Leaves linear-lanceolate, scattered along the stem or collected at the base; sheath round, glabrous; ligule membranous. Racemes 2-20, digitate, densely hairy. Spikelets similar, paired, one sessile and one pedicelled; lower glume oblong, truncate at apex, hairy; upper glume ovate, acute, keeled; lower floret empty, upper bisexual; first lemma oblong, acute, epaleate; second lemma 2-cleft and awned in the sinus, epaleate; stamens 3, free; ovary elliptic; styles 2, free; stigmas plumose.

1. Base of the culms covered with fulvous hairs.....**E. phaeothrix**
1. Base of the culms glabrous.....**E. trispicata**

**Eulalia phaeothrix** (Hack.) O. Ktze., Rev. Gen. Pl. 2: 775. 1891; Fischer in Gamble, Fl. Pres. Madras 1715. 1934; Bor, Grass. Bur. Ceyl. Ind. Pak. 156. 1960; Sreekumar and Nair, Fl. Kerala Grass. 103. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 236. 1994. ***Pollinia phaeothrix*** Hack. in DC., Monogr. Phan. 6: 168. 1819; Hook. f., Fl. Brit. India 7: 112. 1896.

Perennials, culms to 100 cm high, tufted, nodes glabrous. Leaves 5-40 x 0.8 cm, linear-lanceolate, densely hairy above; ligule a tuft of white hairs. Racemes 3-15 cm long, yellowish-brown, densely hairy, sessile. Spikelets 5 mm long, awned, densely villous with golden brown hairs; florets 2, lower empty, upper bisexual; second lemma awned, awn to 15 mm long. Pedicelled spikelets to 4.5 mm long, awned or not.

*Fl. & Fr. :* October-January

*Distr.* : South India and Sri Lanka. Common; in open grasslands. Kathiramudi, *JA 18499.*

**Eulalia trispicata** (Schult.) Henr., Blumea 3: 453. 1940; Bor, Grass. Burma, Ceylon, India & Pakistan 157. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 732. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1860. 1983; Manilal, Fl. Silent Valley 354. 1988; Sreekumar and Nair, Fl. Kerala Grass. 104. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 237. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 515. 1996. ***Andropogon trispicatus*** Schult.,

Syst. Veg. 2: 452. 1824. ***Pollinia argentea*** Trin., Bull. Acad. Sci. Petersb. 1: 71. 1836; Hook. f., Fl. Brit. India 7: 11. 1896. ***Eulalia tristachya*** O. Ktze., Rev. Gen. Pl. 2: 775. 1891; Fischer in Gamble, Fl. Pres. Madras 1715. 1934.

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, to 15 cm long, reddish or purple; joints and pedicels hairy. Spikelets many, densely packed, 4 mm long, oblong; lower glume 4 mm long, oblong, truncate, hairy, brown, margins incurved; upper glume acute; first lemma 3 mm long; oblong; second lemma 2.5 mm long, awned, epaleate; anthers 2.5 mm long, yellow.

*Fl. & Fr. :* September-January

*Distr.* : India, Nepal, Australia, and Sri Lanka. Very common; in hilly grasslands. Mangaladevi, *JA 12457.*

## 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. Nodes glabrous; leaves over 30 cm long ..... 2
1. Nodes bearded; leaves under 20 cm long ..... 3
2. Spikelets awnless; ligule a narrow membrane..... **G. exaristata**
2. Spikelets awned; ligule a tuft of hairs..... **G. elata**
3. Branches of the panicle fascicled; lower glume shorter than upper one, tip acute..... **G. courtallensis**
3. Branches of panicles not fascicled; lower glume longer than or equal to the upper glume, aristate..... 4
4. Leaves rounded or cordate at base; lower glume equal to upper glume..... **G. arundinacea**
4. Leaves narrowed to the base; lower glume longer than the upper glume..... **G. tenella**

**Garnotia arundinacea** Hook. f., Fl. Brit. India 7: 243. 1896; Fischer in Gamble, Fl. Pres. Madras 1812. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 567. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 733. 1976; Sreekumar & Nair, Fl. Kerala Grass. 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, congested, branches angled, scabrid. Spikelets 2.5 x 1 mm, pedicelled; glumes equal, 2.5 x 1 mm, aristate, 3-nerved, scabrid along the nerves; lemma similar to glumes, bifid at tip, awned; awn 7 mm long; palea 2 x 0.5 mm, oblong; anthers 1.2 mm long.

*Fl. & Fr. :* November-January.

*Distr.* : South India. Rare; in grasslands with sheer rocky cuttings. Chenthamarakokka, *JA & KPR 17095.*

**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. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 567. 1960; Manilal, Fl. Silent Valley 355. 1988; Sreekumar & Nair, Fl. Kerala Grass. 409. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 240. 1994. ***Miquelia courtallensis*** Arn. & Nees, Nov. Act. Nat. Cur. 19: 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, 4 mm long, lanceolate; glumes subequal, 3-3.5 x 1 mm, acute, 3-nerved; upper glume larger; lemma 3 x 1 mm, elliptic, brown; awn 4 mm long; palea oblong, 2-nerved; stamens 3.

*Fl. & Fr. :* November-January

*Distr.* : Southern Western Ghats and Sri Lanka. Common; in rocky openings of evergreen forests. Vellimala, *JA 12990.*

**Garnotia elata** (Arn. ex Miq.) Janowski, Fedde. Repert. Sp. Nov. 17: 86. 1921; Bor, Grass. Burma, Ceylon, India & Pakistan 567. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 733. 1976; Sreekumar & Nair, Fl. Kerala Grass. 410. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 515. 1996. ***Berghausia elata*** Arn. ex Miq., Verh. Kon. Ned. Inst. 3: 4: 32. 1851. ***Garnotia scoparia*** Stapf. ex Hook. f., Fl. Brit. India 7: 242. 1896; Fischer in Gamble, Fl. Pres. Madras 1812. 1934.

Perennials; culms 100-140 cm high, robust; nodes glabrous. Leaves 60 x 0.4 cm, linear, channelled, glabrous; sheath keeled; ligule a tuft of hairs. Panicle 40-60 cm long, lax; branches filiform, glabrous. Spikelets 4 mm long, glabrous; glumes subequal, 3-4 x 1 mm, lanceolate, acute, 3-nerved, lower larger; lemma 2.5 x 1 mm, lanceolate; awn 4-5 mm long; palea 2.5 x 1 mm, hyaline, 2-nerved; anthers 1.5 mm long.

*Fl. & Fr. :* October-January

*Distr.* : Southern Western Ghats. Common; along sheer rocky cuttings. Koruthodu, *JA & KPR 17132.*

**Garnotia exaristata** Gould, Kew Bull. 27: 558. 1972; Sreekumar & Nair, Fl. Kerala Grass. 410. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 241. 1994. ***G. tectorum*** Hook. f., Fl. Brit. India 7: 242. 1896, *nom. illegit.*; Fischer in Gamble, Fl. Pres. Madras 1812. 1934. ***G. mutica*** sensu Bor, Grass. Burma, Ceylon, India & Pakistan 568. 1960, non Druc., 1916.

Stout perennials; culms 40-200 cm high, 8-10 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 6 mm long, lanceolate; glumes equal, 3 x 1 mm, acuminate, 1-nerved; lemma 4-5 x 1 mm, oblong, acute; palea 3-4 x 1 mm, oblong, 2-nerved; anthers 2 mm long.

*Fl. & Fr.* : June-December

*Distr.* : India, Burma and Sri Lanka. Rare; along riversides of moist deciduous forests. Vallakkadavu, *JA & KPR 15428.*

**Garnotia tenella** (Arn. ex Miq.) Janowski, Fedde. Repert Sp. Nov. 17: 86. 1921; Bor, Grass. Burma, Ceylon, India & Pakistan 569. 1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1861. 1983; Manilal, Fl. Silent Valley 355. 1988; Sreekumar & Nair, Fl. Kerala Grass. 413. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 515. 1996. ***Berghausia tenella*** Arn. ex Miq. in Verh. Kon. Ned. Inst. III, 4: 34. 1851. ***Garnotia stricta*** auct. non Brongn., 1832: Hook. f., Fl. Brit. India 7: 243. 1896; Fischer in Gamble, Fl. Pres. Madras 1812. 1934.

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 mm, lanceolate, glabrous; glumes subequal, 3-3.5 x 1 mm, aristate, 3-nerved; lemma 2.5 x 1 mm, lanceolate, 3-nerved; palea 2 x 0.5 mm, hyaline; stamens 3.

*Fl. & Fr.* : October-January

*Distr.* : South East Asia. Very common; in moist deciduous forests and savannahs. Vallakkadavu, *JA 12653, 12657.*

## GLYPHOCHLOA W. D. Clayton

Kew Bull. 35(4): 814. 1981.

**Glyphochloa forficulata** (Fischer) Clayton, Kew Bull. 35: 815. 1981; Sreekumar & Nair, Fl. Kerala Grass. 109. 1991. ***Manisuris forficulata*** Fischer, Kew Bull. 1933: 353. 1933 & in Gamble, Fl. Pres. Madras 1761. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 192. 1960 [Fig. 77].

Tufted annuals; culms 5-10 cm high, erect; nodes bearded. Leaves 5 x 0.2-0.3 cm, linear, acuminate, ciliate along the margins; sheath keeled, covered by tubercle based hairs; ligule

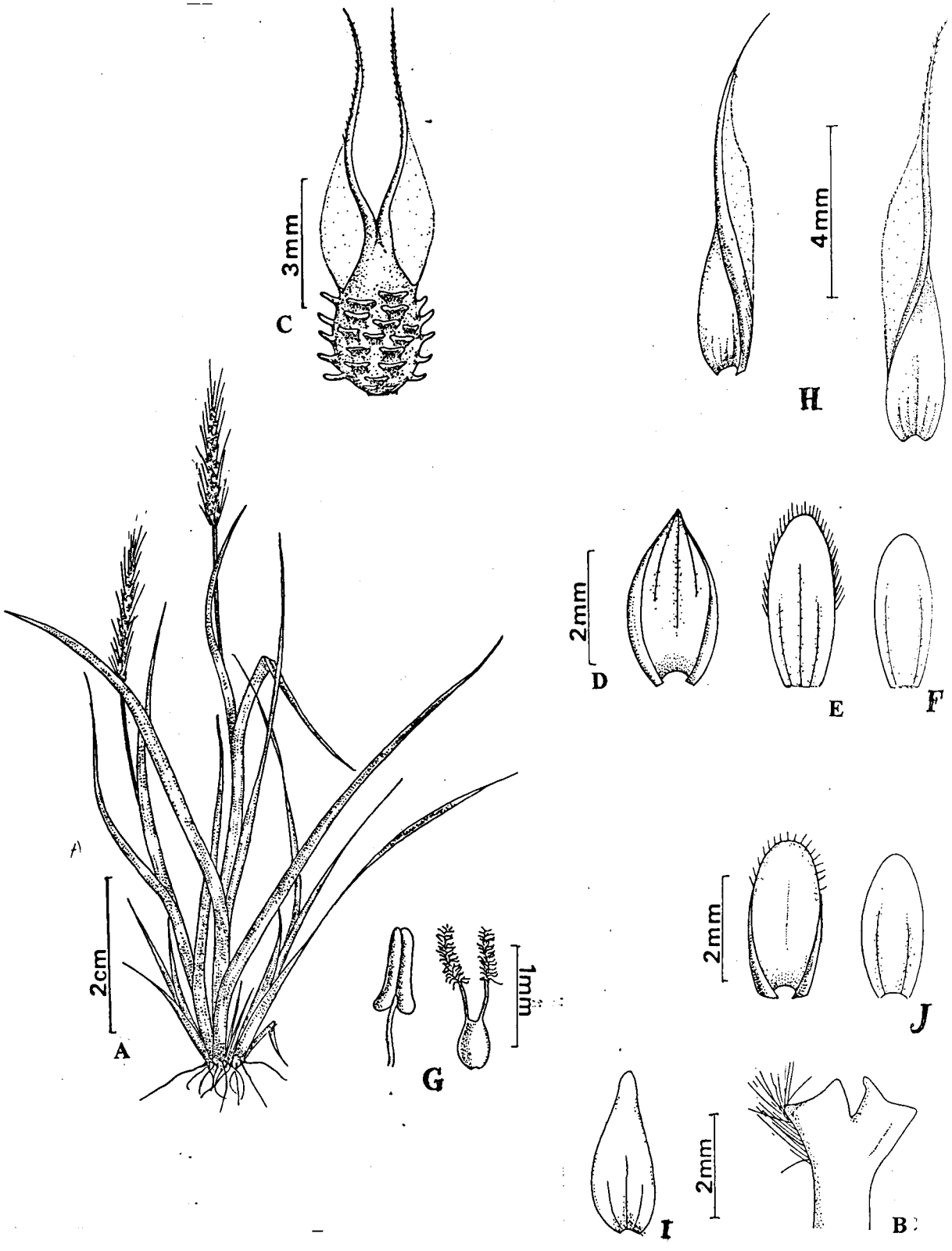



Fig. 77. *Glyphochloa forticulata* (Fischer) Clayton: **A**. habit; **B**. node of rachis; **C**. lower glume: **D**. upper glume; **E**. lemma; **F**. palea; **G**. stamen and pistil; **H**. lower glume of pedicelled spikelet; **I**. upper glume; **J**. palea.

membranous. Raceme solitary, 2.5 cm long; joints clavate, glabrous. Spikelets paired, dissimilar. Sessile spikelets 5 mm long, ovate-oblong; lower glume 5 x 1 mm, 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 2.5 x 1.5 mm, oblong, acuminate, smooth; palea 1.5 x 1 mm, oblong, acuminate; second lemma 1 x 0.5 mm, oblong, obtuse; stamens 3, free; ovary elliptic; styles 2, basely united; stigmas 2, feathery.

*Fl. & Fr.* : November-January

*Distr.* : South India. Rare; in rocky grasslands. Varayattumudi, *JA 12433.*

## HACKELOCHLOA O. Kuntze

Rev. Gen. Pl. 2: 776. 1891.

**Hackelochloa granularis** (L.) O. Ktze., Rev. Gen. Pl. 2: 776. 1891; Fischer in Gamble, Fl. Pres. Madras 1758. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 159. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 733. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2):1862.1983; Sreekumar & Nair, Fl. Kerala Grass. 111.1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 245. 1994. ***Cenchrus granularis*** L., Mant. Pl. Altera 575. 1771. ***Manisuris granularis*** (L.) L. f., Nov. Gram. Gen. 40. 1779; Hook. f., Fl. Brit. India 7: 150. 1896.

Tufted annuals; culms 20-40 cm high, erect; nodes bearded. Leaves 5-15 x 0.5-1.5 cm, rounded at base, covered with bulbous based hairs; sheath keeled, hairy; ligule a narrow membrane. Racemes 1-few, in axillary or terminal fascicles. Spikelets dissimilar. Sessile spikelets 1.2 mm long, globose, awnless; lower glume 1.2 x 1.5 mm, crustaceous and tubercled; upper glume 1.2 x 1 mm, oblong, adnated to the joints of raceme; florets 2, lower empty and upper bisexual; first lemma broadly ovate, hyaline, epaleate; second lemma ovate, hyaline; palea similar to lemma; stamens 2; ovary oblong; styles 2, free; stigmas feathery. Pedicelled spikelets with pedicels adnated to the joints; lower glume broadly ovate, winged on one side; upper glume wingless, keeled; lower floret empty, upper male.

*Fl. & Fr.* : July-January

*Distr.* : Pantropical. Very common; in savannahs. Mangaladevi, *JA 12173.*

## 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. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 163. 1960;

Ramam. in Sald. & Nicols., Fl. Hassan Dist. 734. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1862. 1983; Sreekumar & Nair, Fl. Kerala Grass. 112. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 252. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 516. 1996. ***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 8-10 mm long, lanceolate; lower glume 8-9 x 1.5 mm, 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; anthers 4 mm long. 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, 6-7 x 1.5 mm, truncate at apex, crustaceous, brown; second lemma forms the hyaline base of the awn, awn 70-80 mm long, twisted each other at ends; ovary oblong; styles 2; stigmas plumose, to 6 mm long.

*Fl. & Fr. :* September-December

*Distr.* : Pantropical. Very common; in hilltop grasslands. Mangaladevi, *JA 12455.*

## ICHNANTHUS P. Beauvois

Ess. Agrost. 56. 1812.

**Ichnanthus vicinus** (Bail.) Merr., Enum. Philipp., Fl. Pl. 1: 70. 1923; Bor, Grass. Burma, Ceylon, India & Pakistan 314. 1960; Sreekumar & Nair, Fl. Kerala Grass. 253. Pl. 51. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 261. 1994. ***Panicum vicinum*** Bail., Syn. Queens. Fl. Suppl. 3: 82. 1890. ***Ichnanthus pallens*** auct. non Munro, 1861: Hook. f., Fl. Brit. India 7: 60. 1896.

Annuals; culms 20-30 cm high, decumbent at base, rooting from lower nodes; nodes glabrous. Leaves 2-7 x 0.8-1.5 cm, ovate, lanceolate, cuneate at base, glabrous; sheath rounded, ciliate along outer margin; ligule membranous, fimbriate. Panicle congested, glabrous. Spikelets similar, 4-5 mm long; lower glume 2.5-3 x 1.5 mm, ovate-lanceolate, 5-nerved; upper glume 3.5 x 1.5 mm, lanceolate, 5-nerved; florets 2; lower male; upper bisexual; first lemma similar to the upper glume; palea 2.5 x 1 mm, oblong, hyaline; second lemma 2 x 1 mm, oblong, crustaceous, shining; palea 2 x 1 mm, smooth, crustaceous; stamens 3, free; ovary ellipsoid; stigma plumose, brown.

*Fl. & Fr. :* August-December

*Distr.* : Indo-Malesia and Australia. Rare; along the margins of evergreen forests. Vellimala, *JA 14015.*

## IMPERATA Cyrillo

Pl. Rar. Neapol. 2: 26, t. 11. 1792.

**Imperata cylindrica** (L.) Raeuchel, Nom. Bot. ed. 3, 10. 1797 var. **major** (Nees) C.E. Hubb. ex Hubb. et Vaughan, Grass. Maur. 96. 1940; Bor, Grass. Burma, Ceylon, India & Pakistan 169. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 734. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1865. 1983; Manilal, Fl. Silent Valley 355. 1988; Sreekumar & Nair, Fl. Kerala Grass. 114. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 263. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 516. 1996. ***Lagurus cylindrica*** L., Syst. Nat ed. 10. 878. 1759. ***I. koenigii*** (Retz.) P. Beauv. var. ***major*** Nees., Fl. Africa Austr. 90. 1841. ***I. arundinacea*** Cyrillo, Pl. Rar. Neap. 2: 26. 1792; Hook. f., Fl. Brit. India 7: 106. 1896. ***I. cylindrica*** (L.) P. Beauv. var. ***koenigii*** Dur. & Schinz., Consp. Fl. Africa 5: 694. 1894; Fischer in Gamble, Fl. Pres. Madras 1708. 1934.

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 30 x 1.5 cm, cylindrical; rachis glabrous. Spikelets 4 x 1 mm, similar, lanceolate, pedicelled; callus with long hairs. Glumes equal, 3 x 1 mm, lanceolate, with long silky white hairs on dorsal surface; lower floret empty, upper bisexual; first lemma 2 x 1 mm, oblong, hyaline, epaleate; second lemma 1.5 x 1 mm, hyaline, 3-lobed, paleate; stamens 2, free; ovary oblong, styles 2, free; stigma plumose, 2 mm long.

*Fl. & Fr.* : February-May

*Distr.* : Cosmopolitan. Fairly common; along fire affected grasslands. Manakkavala, *JA 17812.*

*Note* : This species is the first plant coming up in fire affected grasslands.

## 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. Florets equal in size and texture; perennials.....2
1. Florets unequal, the lower one twice as long as upper; annuals.....3

2. Leaves 15-25 cm long; nodes glabrous; pedicel with glandular bands.....**I. walkeri**

2. Leaves up to 5 cm long; nodes bearded; pedicels without glandular bands.....**I. kunthiana**

3. Glumes obtuse, smooth; pedicels with glandular bands.....**I. globosa**

3. Glumes acute or acuminate, densely or sparsely covered with tubercled hairs; pedicels eglandular.....4

4. Spikelets 3-4 mm long; leaf margin thickened.....**I. bourneorum**

4. Spikelets 2.5 mm long; leaf margins not thickened.....**I. setosa**

**Isachne bourneorum** Fischer, Kew Bull. 1932: 324. 1932 & in Gamble, Fl. Pres. Madras 1796. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 579. 1960; Sreekumar & Nair, Fl. Kerala Grass. 4172. 1991.

Slender perennials; culms 30-70 cm high, geniculate or trailing, rooting from lower nodes; nodes bearded. Leaves 2-5 x 0.3-1.3 cm, lanceolate, rounded at base; margin coriaceous, serrulate, glabrous; sheath glabrous or hairy; ligule a row or hairs. Panicle 5-15 cm long, branches angled, serrulate. Spikelets 3-4 mm long, lanceolate; glumes 4 x 1 mm, ovate, acuminate, sparsely bulbous based hairy; lower floret empty; upper bisexual; first lemma 3 x 1.5 mm, ovate, hyaline, epaleate; second lemma 1 x 1 mm, hirtus; palea 1 x 1 mm, chartaceous; stamens 3.

*Fl. & Fr. :* Throughout the year

*Distr.* : Endemic to South India. Common; in open and marshy grasslands. Kalvarimala, *JA 13901, 14488.*

**Isachne globosa** (Thunb.) O. Ktze., Rev. Gen. Pl. 2: 778. 1891; Bor, Grass. Burma, Ceylon, India & Pakistan 580. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 736. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1866. 1983; Sreekumar & Nair, Fl. Kerala Grass. 421. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 265. 1994; ***Milium globosum*** Thunb., Fl. Japon. 49. 1784. ***Isachne australis*** R. Br., Prodr. Fl. Nos. Holl. 1: 196. 1810; Hook. f., Fl. Brit. India 7: 24. 1896. [Fig. 78]

Trailing perennials; culms 30-60 cm high, trailing; nodes glabrous. Leaves 4-10 x 0.2-0.6 cm, ovate-lanceolate, glabrous, base rounded, margin serrulate; sheath glabrous; ligule a tuft of hairs. Panicle 4-10 cm long, branches serrulate. Spikelets 2-2.5 x 1.5-2 mm, globose; glumes similar, 1.5-2 x 1 mm, broadly ovate; first lemma 2 x 1 mm, obtuse, glabrous; palea 2-nerved; second lemma 1.25 x 1 mm, broadly ovate, obtuse, ciliate along the margin; palea 1 x 1 mm, 2-keeled; stamens 3; anthers 1.5-2 mm long.

*Fl. & Fr. :* November to January

*Distr.* : South East Asia and Australia. Common; in marshy areas. Brook's Peak, *JA 17030.*

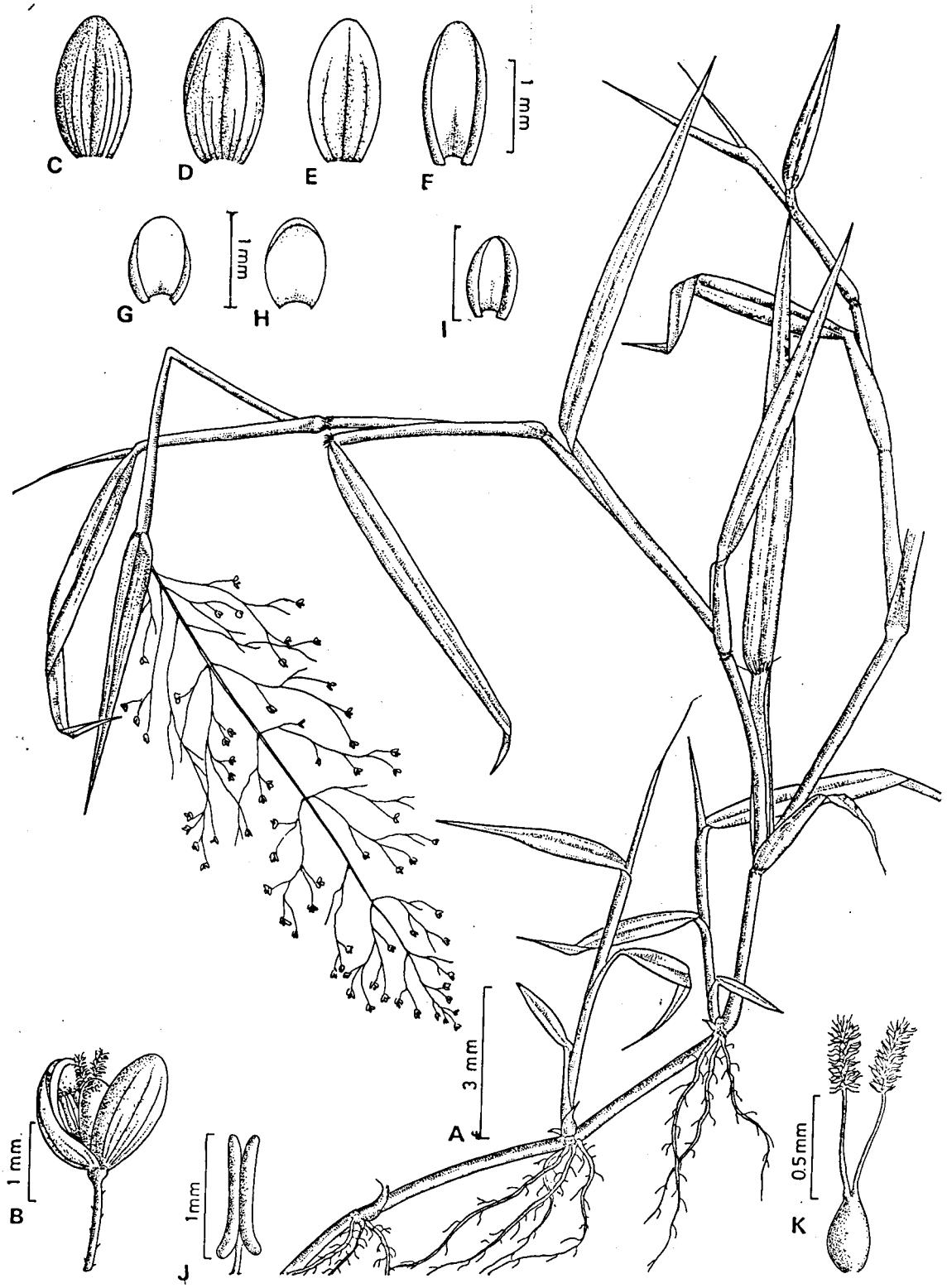



Fig. 78. *Isachne globosa* (Thunb.) O. Ktze.: **A**. habit; **B**. spikelet; **C**. lower glume; **D**. upper glume; **E**. first lemma; **F**. palea; **G** & **H**. second lemma; **I**. palea; **J**. stamen; **K**. pistil.

**Isachne kunthiana** (Wight & Arn. ex Steud.) Wight & Arn. ex Thw., Enum. Pl. Zeyl. 362. 1864; Hook. f., Fl. Brit. India 7: 21. 1896; Fischer in Gamble, Fl. Pres. Madras 1796. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 581. 1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1866. 1983; Sreekumar & Nair, Fl. Kerala Grass. 422. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 267. 1994. ***Panicum kunthianum*** Wight & Arn. ex Steud., Syn. Pl. Glum. 1: 96. 1854. ***Isachne elatior*** Hook. f., Fl. Brit. India 7: 22. 1896.

Geniculate perennials; culms 20-40 cm high; nodes thickened, bearded. Leaves 2-5 x 0.5-2 cm, ovate, acute, densely covered with bulbous based hairs; margins coriaceous; sheath glabrous or hairy; ligule a tuft of hairs. Panicle 5-8 cm long; branches smooth. Spikelets 2.5 cm long, ovate, acute; glumes similar, 2.5 mm long, ovate, acute, 7-nerved; lemmas similar, 1.5 x 1 mm, ovate, obtuse, concave; palea 1.5 x 1 mm, oblong; stamens 3; anthers 1 mm long.

*Fl. & Fr.* : Throughout the year

*Distr.* : South East Asia. Common; in small patches of grasslands in evergreen forests. Kottamala, *JA & KPR 15356*; Sunderamala, *JA 17809.*

**Isachne setosa** Fischer, Kew Bull. 1932: 247. 1932 & in Gamble, Fl. Pres. Madras 1797. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 582. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 736. 1976; Sreekumar & Nair, Fl. Kerala Grass. 425. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 517. 1996.

Tufted annuals; culms slender, 10-35 cm high; nodes hairy. Leaves 0.7-3 x 0.8 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, 2.5 x 1 mm, ovate, acuminate, setose; lower floret empty; first lemma 2 x 1 mm, ovate-oblong, hyaline; palea similar, 2-nerved; second lemma 1 x 1 mm, coriaceous, hirtus; palea ovate, 2-keeled; stamens 3; anthers 1 mm long.

*Fl. & Fr.* : Throughout the year except the driest months

*Distr.* : Southern Western Ghats.(Kerala). Common; in open grasslands. Varayattumudi, *JA 12432, 13073.*

**Isachne walkeri** (Arn. ex Steud.) Wight & Arn. ex Thw., Enum. Pl. Zeyl. 361. 1864; Hook. f., Fl. Brit. India 7: 26. 1896; Fischer in Gamble, Fl. Pres. Madras 1797. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 582. 1960; Manilal, Fl. Silent Valley 357. 1988; Sreekumar & Nair, Fl. Kerala Grass. 426. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 271. 1994. ***Panicum walkeri*** Arn. ex Steud., Syn. Pl. Glum. 1:97. 1854.

Stout perennials; culms trailing or erect, 60-120 cm high, robust; nodes glabrous, rooting from lower ones. Leaves 15-25 x 1.5-2.5 cm, lanceolate, subcoriaceous, glabrous; margins

cartilaginous; sheath rounded, ligule a tuft of hairs. Panicle very lax; branches with glandular bands. Spikelets 3-4 mm long, pedicelled, ovate, acute; glumes equal, 3 x 1 mm, ovate, obtuse, glabrous; lemmas 3 x 1.5 mm, ovate, obtuse, coriaceous; palea 3 x 1 mm; stamens 3; ovary elliptic, stigma plumose.

*Fl. & Fr.* : November-February

*Distr.* : South India and Sri Lanka. Common; in evergreen forests. Thannikkudy, *JA 13086*; Karinkalthode, *JA 13344*.

## **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. Upper glume 2-cleft at apex, aristate in the sinus. ..... **I. timorense**
1. Upper glume entire, apex acuminate or aristate. ..... 2
2. Racemes 3-many, densely hairy ..... **I. nilagiricum**
2. Racemes 2, not densely hairy ..... 3
3. Lower glume of the sessile spikelets broadened towards the base; pedicelled spikelets awned ..... 4
3. Lower glume of the sessile spikelets not broadened at base; pedicelled spikelets not awned ..... 5
4. Nodes bearded; lower glume of sessile spikelets winged towards the apex ..... **I. indicum**
4. Nodes glabrous; lower glume of sessile spikelets not winged ..... **I. zeylanicolum**
5. Leaves hairy; lower glume of sessile spikelets smooth, 2-winged at apex ..... **I. commutatum**
5. Leaves glabrous; lower glume of sessile spikelets with 2-3 side nodules, winged along one side ..... **I. mangaluricum**

**Ischaemum commutatum** Hack. in DC., Monogr. Phan. 6: 209. 1889; Hook. f., Fl. Brit. India 7: 131. 1896; Fischer in Gamble, Fl. Pres. Madras 1722. 1934; Bor, Grass. Burma, Ceylon, India

& Pakistan 178. 1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1868. 1983; Sreekumar & Nair, Fl. Kerala Grass. 129. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 276. 1994.

Tufted perennials; culms 20-40 cm high; nodes glabrous. Leaves 3-8 x 1.5 cm, lanceolate, petiolate, cordate at base, covered with bulbous based hairs; sheath keeled; ligule a fimbriate membrane. Racemes 2-5 cm long; joints and pedicels clavate, ciliate. Sessile spikelets 6 x 2.5 mm; lower glume 6 x 2 mm, flat, smooth, two winged at apex; first lemma 5.5 x 1.5 mm; oblong; palea 5 x 1 mm, hyaline; second lemma hyaline; awn 7 mm long; stamens 3; anthers 1.5 mm long. Pedicelled spikelets 5.5 x 2 mm, oblong; lower glume winged along one side; florets 2, lower male, upper empty; lemmas not awned.

*Fl. & Fr. :* November-May

*Distr.* : Peninsular India and Sri Lanka. Common; in savannahs and deciduous forests. Kalvarithode, *JA 13630.*

**Ischaemum indicum** (Houtt.) Merr., J. Arnold Arbor. 19: 320. 1938; Bor, Grass. Burma, Ceylon, India & Pakistan 180. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 737. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1869. 1983; Sreekumar & Nair, Fl. Kerala Grass. 136. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 279. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 517. 1996. ***Phleum indicum*** Houtt., Nat. Hist. 2, 13: 198, t. 90, fig. 2. 1782. ***Ischaemum aristatum*** auct. non L., 1753: Fischer in Gamble, Fl. Pres. Madras 1721. 1934. ***I. 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.

**Ischaemum indicum** (Houtt.) Merr. var. **indicum** with two sub-varieties were collected from the study area.

Key to the sub-varieties:

1. Leaves densely hairy.....var. **indicum** subvar. **villosum**
1. Leaves glabrous.....var. **indicum** subvar. **scrobiculatum**

**Ischaemum indicum** (Houtt.) Merr. var. **indicum** subvar. **scrobiculatum** (Nees ex Steud.) Bor, Grass. Burma, Ceylon, India & Pakistan 180. 1960; Sreekumar & Nair, Fl. Kerala Grass. 138.

1991. ***Spodiopogon scrobiculatus*** Nees ex Steud., Syn. Pl. Glum. 1: 373. 1854. ***Ischaemum ciliare*** Retz. var. ***scrobiculatum*** (Nees ex Steud.) Hack. In 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 & 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 7-10 mm long; stamens 3. Pedicelled spikelets 4 x 2 mm; lower glume winged along the keel on upper half; florets 2; second lemma awned.

*Fl. & Fr.* : October-February

*Distr.* : South India and Sri Lanka. Common; along the forest margins. Thekkady, *JA 16990*

**Ischaemum indicum** (Houtt.) Merr. var. **indicum** subvar. **villosum** (Nees) Bor, Grass. Burma, Ceylon, India & Pakistan 180. 1960; Sreekumar & Nair, Fl. Kerala Grass. 138. 1991. ***Spodiopogon villosum*** Nees in Hook. et Arn., Bot. Beech. Voy. 242. 1838. ***Ischaemum ciliare*** Retz. var. ***villosum*** (Nees) Hack. in DC., Monogr. Phan. 6: 227. 1889; Hook. f., Fl. Brit. India 7: 134. 1896.

Perennials; culms 40-70 cm high; nodes bearded. Leaves 15 x 1 cm, lanceolate, acuminate, thickly pubescent; sheath keeled, glabrous; ligule membranous. Racemes 4-8 cm long; sessile. Spikelets 4-5 mm long; lower glume 2-winged at apex, glabrous; upper glume narrowly winged along the keel; first lemma oblong, 1-nerved; second lemma hyaline; awn 5-9 mm long. Pedicelled spikelets 4 x 2 mm, ovate-lanceolate, similar to lower spikelets.

*Fl. & Fr.* : October-February

*Distr.* : Peninsular India and Sri Lanka. Common; in open grasslands. Mangaladevi, *JA 14206.*

**Ischaemum mangaluricum** (Hack.) Stapf. ex Fischer in Gamble, Fl. Pres. Madras 1723. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 182. 1960; Sreekumar & Nair, Fl. Kerala Grass. 147. 1991. ***I. aristatum*** sensu Hack. subsp. ***imberbe*** var. ***mangaluricum*** Hack. in 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 5 x 2 mm, oblong, flat with 2-3 obscure side nodules; apex winged on one side; upper glume 3.5 x 1 mm, 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.

*Fl. & Fr. :* November-May

*Distr.* : Peninsular India and Sri Lanka. Common; in open grasslands. Vallakkadavu, *JA & KPR 15193.*

**Ischaemum nilagiricum** Hack., Oesterr. Bot. 51: 150. 1901; Fischer in Gamble, Fl. Pres. Madras 1722. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 183. 1960; Manilal, Fl. Silent Valley 357. 1988; Sreekumar & Nair, Fl. Kerala Grass. 153. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 517. 1996. ***I. hirtum*** sensu Hook. f., Fl. Brit. India 7: 135. 1896, non Hack., 1889.

Densely tufted perennials; culms 30-100 cm tall, rigid; nodes glabrous. Leaves 10-20 x 1 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 2 mm; lower glume 3.5 x 1.5 mm, bifid at apex, hairy; upper glume 4.5 x 1.5 mm, 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.

*Fl. & Fr. :* October-February

*Distr.* : Endemic to Southern Western Ghats. Common; along river banks. Thannikkudy, *JA 13056*; Pachakkanam, *JA 14377.*

**Ischaemum timorense** Kunth, Rev. Gram. 1: 369. 1830; Hook. f., Fl. Brit. India 7136. 1896; Fischer in Gamble, Fl. Pres. Madras 1722. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 185. 1960; Sreekumar & Nair, Fl. Kerala Grass. 164. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 289. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 518. 1996 [Fig. 79].

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 2 mm; lower glume 3 x 1.5 mm, ovate, broaden below, bicuspidate at apex, densely hairy; upper glume 3 x 1.5 mm, aristate, thickly hairy; first lemma 1-nerved, hyaline; second lemma cleft above the middle, awned in the sinus. pedicelled spikelets smaller.

*Fl. & Fr. :* October-February

*Distr.* : Indo-Malesia. Common; in open grasslands and savannahs. Vallakkadavu, *JA 14213* Dam Site, *JA & KPR 17144.*

**Ischaemum zeylanicolum** (Hack.) Bor, Grass. Burma, Ceylon, India & Pakistan 186. 1960; Sreekumar & Nair, Fl. Kerala Grass. 169. 1991. ***I. timorense*** Kunth, var. ***zeylanicolum*** Hack. in DC., Monogr. Phan. 6: 230. 1889; Hook. f., Fl. Brit. India 7: 136. 1896.

Fig. 79. *Ischaemum timorense* Kunth A. habit; B. pedicel; C. sessile spikelet; D. lower glume; E. upper glume-side view; F. upper glume-ventral view; G. first lemma; H. palea; I. second lemma-side view; J. second lemma-ventral view; K. palea; L. lodicule; M. stamen; N. ovary; O. pedicelled spikelet; P. lower glume; Q. upper glume; R. first lemma; S. palea; T. second lemma; U. palea

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 mm; lower glume 4.5 x 2 mm, bicuspidate at apex, 9-nerved; upper glume aristate, 5-nerved; first lemma 4 x 1 mm, oblong; palea 3.5 x 1 mm; stamens 3; second lemma 4 x 1.5 mm; awn 8-10 mm long; palea 2-keeled. Pedicelled spikelets similar, smaller.

*Fl. & Fr. :* November-May

*Distr.* : Peninsular India and Sri Lanka. Rare; along forest margins. Dam Site, *JA & KPR 15170.*

## JANSENELLA N. L. Bor

Kew Bull. 10: 96. 1955.

**Jansenella griffithiana** (C. Muell.) Bor, Kew Bull. 10: 98. 1955 and Bor, Grass. Burma, Ceylon, India & Pakistan 426. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 738. 1976; Manilal, Fl. Silent Valley 357. 1988; Sreekumar & Nair, Fl. Kerala Grass. 348. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 294. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 518. 1996. ***Danthonia griffithiana*** C. Muell., Bot. Zeitung 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. 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 3-4 x 1 mm, lanceolate, keeled, 3-nerved, keel ciliate; upper glume 6.5 x 1 mm, acuminate, 5-nerved; florets 2; lower empty; upper bisexual; first lemma elliptic, acute cuspidate, 3-nerved; palea oblong, obtuse; second lemma 3-3.5 mm long, oblong, densely ciliate towards the bifid apex, awned in the sinus; awn 9 mm long; palea oblanceolate, hairy at apex, 2-keeled; stamens 3; ovary elliptic; styles 2, free; stigmas plumose.

*Fl. & Fr. :* October-January

*Distr.* : India and Sri Lanka. Common; in open grasslands. Kumarikulam, *JA 13074.*

## LEERSIA Swartz

Prodr. 21. 1788, *typ. cons.*

**Leersia hexandra** Sw., Prodr. Veg. Ind. Occ. 21. 1788; Hook. f., Fl. Brit. India 7: 94. 1896; Fischer in Gamble, Fl. Pres. Madras 1845. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 599. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 738. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1871. 1983; Sreekumar & Nair, Fl. Kerala Grass. 430. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 295. 1994.

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, 4 x 1.5 mm, oblong; pedicelled; glumes absent; florets one; lemma 4 x 2 mm, obovate, laterally compressed, 5-nerved, keeled; keel ciliate; palea 4 x 1 mm, oblong, laterally compressed, 3-nerved, keeled; stamens 6, free; anthers 2.5 mm long; ovary ellipsoid; styles 2, free; stigmas 2 mm long, plumose.

*Fl. & Fr. :* October-January

*Distr.* : Pantropical. Common; in marshy grasslands. Dam Site, *JA 14093;* Kavalappara, *KPR 14537.*

## **LEPTOCHLOA** P. Beauvois

Ess. Agrost. 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. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 517. 1960; Sreekumar & Nair, Fl. Kerala Grass. 396. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 301. 1994.

Annuals; culms creeping or geniculate, rooting from lower nodes, glabrous. Leaves 7 x 1.5 cm, ovate, acute, cordate at base, glabrous; sheath rounded, glabrous; ligule a fimbriate membrane. Panicle up to 30 cm long, with 40-50 racemes scattered along a central axis; rachis trigonous, scabrid. Spikelets 2.5 mm long, similar, lanceolate; glumes similar, 2.5 x 0.5 mm, lanceolate, 1-nerved, glabrous; floret one; lemma 2 x 0.5 mm, 3-nerved, nerves hairy; palea 1.5 x 0.5 mm, linear-oblong; stamens 3, free; long; ovary ovoid; styles 2; stigma plumose.

*Fl. & Fr. :* October-January

*Distr.* : South India, Tropical Africa and Sri Lanka. Common; in small patches of grasslands in evergreen forests. Kottamala, *JA & KPR 15356*; Sunderamala, *JA 17809.*

## **LOPHATHERUM** Brongniart

in Duperrey, Voy. Monde 49, t. 8. 1831.

**Lophatherum gracilis** Brogn. in Duper, Voy. Cog. Bot. 50. 1831; Hook. f., Fl. Brit. India 7: 331. 1896; Fischer in Gamble, Fl. Pres. Madras 1847. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 460. 1960; Sreekumar & Nair, Fl. Kerala Grass. 354. Pl. 72. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 309. 1994.

Perennials; culms 30-120 cm tall; tufted; nodes glabrous. Leaves 15-25 x 3-4 cm, elliptic, distinctly petiolate, glabrous; sheath keeled, glabrous; ligule a fimbriate membrane. Panicle 20-40 cm long, with distinct small clusters of racemes. Spikelets 10 x 2-3 mm, lanceolate; lower glume 3 x 1.5 mm, ovate, acute, 5-nerved; upper glume 4-5 x 2 mm, 5-nerved; fertile lemma 7 x 3 mm, 7-nerved, cuspidate; palea 6 x 2 mm, hyaline, 2-nerved; stamens 3; anthers 2 mm long; ovary obovoid; stigma plumose; sterile lemmas several, above the fertile lemma, 3 x 1.5 mm, terminated into bristles, epaleate.

*Fl. & Fr. :* October-January.

*Distr.* : South East Asia and Sri Lanka. Common; in evergreen forests. Pambavalley, *JA 12763.*

## **MICROSTEGIUM** Nees

in Lindley, Nat. Syst. ed. 2, 447. 1836.

**Microstegium ciliatum** (Trin.) A. Camus, Ann. Soc. Linn. Lyon 68: 201. 1921; Fischer in Gamble, Fl. Pres. Madras 1716. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 193. 1960; Sreekumar & Nair, Fl. Kerala Grass. 172. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 314. 1994. ***Pollinia ciliata*** Trin., Mam. Acad. Sci.-Petersb. Ser. 6, 2: 306. 1834; Hook. f., Fl. Brit. India 7: 116. 1896.

Annuals; culms 50 cm tall, geniculate; nodes glabrous. Leaves 10 x 1.5 cm, lanceolate, acute to either ends, aristate, glabrous. Racemes 5-10, slender, sub-digitate, 6-7 cm long. Spikelets similar, 4-5 x 1 mm, paired, one pedicelled and one sessile; lower glume 4 x 1 mm, elliptic, shortly 2-cleft at apex, 4-nerved, glabrous; upper glume 4 x 1 mm, boat-shaped, acuminate, 4-nerved; lower floret absent; upper bisexual; second lemma forms the hyaline base of the awn; awn 5-6 mm long; palea 0.5 mm long, hyaline; stamens 3; ovary elliptic, glabrous, stigma plumose.

*Fl. & Fr. :* July-December

*Distr.* : India and Burma. Common; along margins of evergreen forests. Mlappara, *JA 12150.*

## **OCHLANDRA** Thwaites

Enum. Pl. Zeyl. 376. 1864.

**Ochlandra travancorica** Benth. ex Gamble, Ann. Roy. Bot. Gard. Calcutta 7: 125, t. 111. 1896 & in Hook. f., Fl. Brit. India 7: 419. 1896; Fischer in Gamble, Fl. Pres. Madras 1863. 1934.

Tall reed-like grasses; rootstock rhizomatous, branched; culms to 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, to 5 cm long, lanceolate, mucronate, smooth; florets one, bisexual; lemmas 5 cm long, elliptic-oblong, muticous; palea membranous, stamens 20-40, filaments monadelphous; style long; stigma 4-6; fruit ovoid, 2-3 x 1.5 cm, beaked, smooth.

*Fl. & Fr.* : November-May

*Distr.* : Southern Western Ghats (Kerala). Common; along the riversides in evergreen forests. Pambavalley, *JA 17726.*

## **OPLISMENUS** P. Beauvois

Fl. Oware 2: 14, t. 68, f. 1. 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. Upper glume not awned; first lemma 9-11-nerved, tip acute.....**O. compositus**
1. Upper glume awned; first lemma 5-nerved, aristate.....**O. undulatifolius**

**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. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 317. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 742. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1877. 1983; Manilal, Fl. Silent Valley 358. 1988; Sreekumar & Nair, Fl. Kerala Grass. 257. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 322. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 520. 1996. ***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 4 mm long; lower glume 2 x 1 mm, awned; awn 4 mm long; upper glume 3 x 1.5 mm, 7-nerved, awnless; first lemma 3 x 2.5 mm, 9-11-nerved; awnless; palea oblong; second lemma 3 x 0.5 mm, lanceolate, 3-nerved; palea 3 x 0.5 mm, hyaline; stigma plumose, 1 mm long.

*Fl. & Fr.* : October-January

*Distr.* : Pantropical. Common; along moist deciduous forests. Pachakkanam, *JA 12668.*

**Oplismenus undulatifolius** (Ard.) P. Beauv. ex Roem. & Schultes, Syst. 2: 482. 1817; Hook. f., Fl. Brit. India 7: 66. 1896; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 324. 1994. ***Panicum undulatifolius*** Ard., Animadv. Bot. Spec. Alt. 14, t. 4. 1764.

Annuals; culms 30-50 cm tall, creeping or trailing, lower nodes rooting. Leaves 5-15 x 0.5-0.8 cm, lanceolate, oblique at base, glabrous; sheath rounded; ligule membranous. Panicle 5-10 cm long; racemes short. Spikelets 4-6 mm long; lower glume 3 x 1 mm, 5-nerved; upper glume 2.5 mm long, 5-nerved, aristate or awned; first lemma 4 x 1.5 mm, aristate, epaleate; second lemma 3 x 1 mm, hyaline; palea similar, 2-nerved; ovary oblong; stigma plumose, pale yellow.

*Fl. & Fr.* : August-January

*Distr.* : Pantropical. Common; along the margin of evergreen forests. Vellimala, *JA 14053.*

## **OROPETIUM** Trinius

Fund. Agrost. 98. 1822.

**Oropetium thomaeum** (L.f.) Trin., Fund. Agrost. 98. 1820; Fischer in Gamble, Fl. Pres. Madras 1830. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 474. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 743. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1878. 1983; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 325. 1994.

Tufted annuals; culms erect, 5 cm high, branched; nodes glabrous. Leaves few, scattered, blade 1-2.5 cm long, filiform or conduplicate, margins with tubercle based hairs; sheaths small, shortly keeled; ligule narrow, membranous. Spikes terminal, solitary. 2.5-4 cm long. cylindrical; rachis compressed, scabrous. Spikelets solitary, biseriate, sunken in the cavities of the rachis along the sides; glumes persistent, unequal, lower one minute, broadly triangular, upper glume 1.5 mm long, lanceolate, smooth, muticous; floret one, bisexual; lemma similar but shorter than the upper glume, cymbiform, obtuse or emarginate; palea similar to lemma, bicuspidate; stamens 3; styles 2, free, stigmas plumose.

*Fl. & Fr.* : November-December

*Distr.* : South East Asia and Africa. Rare; in open shrublands. Thekkady, *KPR & JA 17859.*

## **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. Lemmas awned; panicles with spreading branches.....**O. rufipogon**

1. Lemmas awnless; panicles without spreading branches.....**O. meyeriana** ssp. **granulata**

**Oryza meyeriana** (Zoll. & Mor. ex Steud.) Baill., Hist. Pl. 12: 166. 1894, subsp. **granulata** (Nees & Arn. ex Watt) Taleoka, Bot. Tokyo 75: 460. 1962; Sreekumar & Nair, Fl. Kerala Grass. 431. 1991. ***O. granulata*** Nees et Arn. ex Watt, Dict. Econ. Prod. Ind. 5: 500. 1891; Hook. f., Fl. Brit. India 7: 93. 1896; Bor, Grass. Burma, Ceylon, India & Pakistan 604. 1960; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 328. 1994. ***O. meyeriana*** Baill., Hist. Pl. 12: 160. 1894; Fischer in Gamble, Fl. Pres. Madras 1845. 1934.

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 2.5 mm; glumes similar, reduced to very minute scales; lemma 5 x 3.5 mm, broadly ovate, granulate crustaceous; palea 5 x 2 mm, oblong, 3-nerved, margins hyaline; anthers-2.5 mm long.

*Fl. & Fr. :* June-January

*Distr.* : Indo-Malesia. Common; in moist deciduous and semi evergreen forests. Sabarimala, *JA 15464.*

**Oryza rufipogon** Griff., Notul. 3: 5. 1851; Bor, Grass. Burma, Ceylon, India & Pakistan 605. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 743. 1976; Sreekumar & Nair, Fl. Kerala Grass. 432. 1991. ***O. sativa*** sensu Hook. f., Fl. Brit. India 7: 92. 1896, non L., 1753.

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 7 x 2.5 mm; lower glume 2.5 x 1 mm, ovate, acute; upper glume 4 x 1 mm, keeled; keel scabrous; lemma 7 x 2 mm, obtuse, 3-5-nerved, awned; awn 3-4 cm long; palea 6 x 2 mm, crustaceous, awnless, hirtus; anthers 3 mm long; stigma deep pink.

*Fl. & Fr. :* November-February

*Distr.* : India. Rare; in marshy grasslands. Thannikkudy, *JA & KPR 14509.*

## **OTTOCHLOA** Dandy

J. Bot. 69: 54. 1931

**Ottochloa nodosa** (Kunth) Dandy, J. Bot. 69: 55. 1931; Fischer in Gamble, Fl. Pres. Madras 1778. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 318. 1960; Sreekumar & Nair, Fl. Kerala Grass. 258. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 330. 1994. ***Panicum nodosum*** Kunth. 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 13 x 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 3.5 x 1 mm, lanceolate, glabrous; lower glume 2 x 1 mm, lanceolate, 5-nerved. upper glume similar, 7-nerved; florets 2; lower barren, upper bisexual; first lemma 3 x 1 mm, ovate-lanceolate, 4-9-nerved, epaleate; second lemma elliptic, crustaceous, 3-nerved, margins incurved; palea ovate; stamens 3; ovary ellipsoid; styles 2; stigma purple.

*Fl. & Fr.* : June-December

*Distr.* : Indo-Malesia. Common; in moist deciduous and semi-evergreen forests. Kokkarakandom, *JA 12068.*

## **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. Nodes bearded; upper lemma transversely rugose ..... **P. maximum**
1. Nodes glabrous; upper lemma not transversely rugose ..... 2
2. Plants with branching rhizome; leaves 2-ranked..... **P. repens**
2. Plants without branching rhizome; leaves not 2-ranked..... 3
3. Leaves broadly ovate, base cordate and amplexicaule..... **P. brevifolium**
3. Leaves lanceolate, ovate-lanceolate, base rounded or acute, not amplexicaule..... 4
4. Lower glume broader than long, obtuse or acute..... 5
4. Lower glume longer than broad, acute or cuspidate..... 6
5. Leaves ca. 0.6 cm wide; sheath keeled; culms to 20 cm high..... **P. psilopodium**
5. Leaves ca. 1.5 cm wide; sheath rounded; culms to 60 cm high..... **P. sumatrense**
6. Plants densely covered with bulbous based hairs; lower glume cuspidate..... **P. trypheron**
6. Plants glabrous or sparsely hairy; lower glume otherwise..... 7
7. Leaves linear-lanceolate, ca. 35 cm long; ligule a row of hairs..... **P. antidotale**
7. Leaves ovate or lanceolate, up to 20 cm long; ligule a membrane..... 8
8. Spikelets 3.5-5.5 mm long; upper glume 7-nerved..... **P. gardneri**
8. Spikelets 2.5 mm long; upper glume 3-nerved..... **P. notatum**

**Panicum antidotale** Retz., Obs. Bot. 4: 17. 1786; Hook. f., Fl. Brit. India 7: 2. 1896; Fischer in Gamble, Fl. Pres. Madras 1783. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 322. 1960; Sreekumar & Nair, Fl. Kerala Grass. 260. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 332. 1994.

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 3 x 2 mm, in groups of three; lower glume 1.8 x 1.5 mm, broadly ovate, 5-nerved; upper glume 2.2 x 1.5 mm, 9-nerved; first lemma 2.2 x 1.5 mm, ovate, acute, 7-nerved, palea 2-nerved; second lemma 2 x 1 mm, ovate, coriaceous, shiny; palea 2 x 1 mm, margins folded.

*Fl. & Fr. :* August-January

*Distr.* : South Asia. Common; in savannahs at lower elevations. Karadikkavala, *JA 13924.*

**Panicum brevifolium** L., Sp. Pl. 59. 1753; Fischer in Gamble, Fl. Pres. Madras 1783. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 324. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 744. 1976; Sreekumar & Nair, Fl. Kerala Grass. 263. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 333. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 521. 1996. ***Panicum ovalifolium*** Poir. in Lam., Encycl. Suppl. 4: 279. 1816; Hook. f., Fl. Brit. India 7: 44. 1896.

Annuals; culms 20-40 cm tall, erect or decumbent; Leaves 6 x 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 1.5 x 0.5 mm, lanceolate, 1-nerved; upper glume 1.5-2 x 1 mm, ovate, 3-nerved; lower floret male, upper bisexual; first lemma 2 x 1 mm, 5-nerved, acute, paleate; second lemma 1.2 x 0.5 mm, 3-nerved; palea similar, flat, 2-nerved; stamens 3; anthers 1 mm long.

*Fl. & Fr. :* Throughout the year.

*Distr.* : Tropical Asia and Africa. Common; in savannahs and moist deciduous forests and openings in evergreen forests. Mlappara, *NS & JA 12611.*

**Panicum gardneri** Thw., Enum. Pl. Zeyl. 359. 1864; Fischer in Gamble, Fl. Pres. Madras 1783. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 326. 1960; Manilal, Fl. Silent Valley 358. 1988; Sreekumar & Nair, Fl. Kerala Grass. 264. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 335. 1994. ***Isachne gardneri*** (Thw.) Benth. in Benth & Hook.f., Gen. Pl. 3: 100. 1883; Hook. f., Fl. Brit. India 7: 26. 1896.

Perennials; culms 80-100 cm high, rooting from lower nodes. Leaves 10-15 x 2-2.5 cm, lanceolate, base rounded or cordate, glabrous; sheath rounded, margins ciliate; ligule a

membrane. Panicle effuse, glabrous. Spikelets 4-5.5 mm long, solitary; lower glume 2.5 x 1 mm, lanceolate, 1-nerved; upper glume 4 x 1.5 mm, ovate, 7-nerved; lower floret empty; first lemma 3.5 x 1.5 mm, 7-9-nerved; palea oblong; second lemma 2.5 x 1.5 mm, ovate, concave; palea 2.5 x 1 mm, ovate, coriaceous, margins recurved.

*Fl. & Fr.* : November-May.

*Distr.* : South India and Sri Lanka. Common; in semi-evergreen forests. Inchippara, *JA 12604*; Mlappara, *JA 13195.*

**Panicum maximum** Jacq., Coll. Bot. 1: 76. 1786; Hook. f., Fl. Brit. India 7: 49. 1896; Fischer in Gamble, Fl. Pres. Madras 1783. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 327. 1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1879. 1983; Sreekumar & Nair, Fl. Kerala Grass. 266. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 336. 1994.

Robust perennials; culms tufted, 80-300 cm tall, nodes bearded. Leaves 20-50 x 0.5-2 cm, linear, glabrous; sheath rounded, glabrous; ligule a fimbriate membrane. Panicle 10-40 cm long, branches angular, smooth. Spikelets 3 x 1.5 mm, ovate; lower glume 1 x 1 mm, 3-nerved; upper glume 2.5 x 1.5 mm, oblong, 5-nerved; lower floret male, upper bisexual; first lemma 3 x 1.5 mm, 5-nerved, paleate; second lemma 2 x 1 mm, transversely rugose; palea 2 x 1 mm, 2-keeled; stamens 3, anthers 1 mm long.

*Fl. & Fr.* : August-December.

*Distr.* : Native of Tropical Africa, introduced in Tropical countries. Common; in open shrublands at highest elevations. Vellimala, *JA 14036.*

**Panicum notatum** Retz., Obs. Bot. 4: 18. 1786; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1881. 1983; Sreekumar & Nair, Fl. Kerala Grass. 267. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 339. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 521. 1996. ***Panicum montanum*** Roxb., Fl. Ind. 1: 315. 1820; Hook. f., Fl. Brit. India 7: 53. 1896; Fischer in Gamble, Fl. Pres. Madras 1783. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 329. 1960.

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 mm, ellipsoid, glabrous; glumes almost equal, 2.2 x 1.5 mm, ovate, 3-nerved; first lemma similar to upper glume, epaleate; second lemma 2 x 1 mm, coriaceous, shining; palea similar, flat, 2- nerved.

*Fl. & Fr.* : June-January

*Distr.* : S. E. Asia. Common; in moist deciduous forests. Thannikkudy, *KPR & JA 14223.*

**Panicum psilopodium** Trin., Gram. Panic. 217. 1826. var. **coloratum** Hook. f., Fl. Brit. India 7: 47. 1896; Bor, Grass. Burma, Ceylon, India & Pakistan 330. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 744. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1882. 1983; Sreekumar & Nair, Fl. Kerala Grass. 269. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 342. 1994.

Tufted annuals; culms 15-20 cm tall, nodes glabrous. Leaves 4-8 x 0.2-0.6 cm, lanceolate, flat; sheath keeled, glabrous; ligule a fimbriate membrane. Panicle to 15 cm long, lax, scabrid. Spikelets 2.5-3 mm long, acute; lower glume 1 x 1.5 mm, broadly ovate, 3-nerved; upper glume 3 x 1 mm, lanceolate, 11-nerved; lower floret empty, first lemma similar to upper glume, paleate; second lemma 2 x 1 mm, coriaceous, 3-nerved; palea 2 x 1 mm, flat.

*Fl. & Fr. :* November-April.

*Distr.* : India, Malesia and Sri Lanka. Rare; in marshy areas of grasslands. Thannikkudy, *JA 14843.*

**Panicum repens** L., Sp. Pl. ed. 2, 87. 1762; Hook. f., Fl. Brit. India 7: 49. 1896; Fischer in Gamble, Fl. Pres. Madras 1783. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 330. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 745. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1882. 1983; Sreekumar & Nair, Fl. Kerala Grass. 271. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 343. 1994.

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 3 x 1 mm, lanceolate; lower glume 1 x 1.5 mm, broadly ovate, 5-nerved; upper glume 2.5-3 x 1.5 mm, lanceolate, 13-nerved; first lemma similar to upper glume, paleate, empty; second lemma 2 x 1 mm, ovate, concave; palea 2 x 1 mm, oblong.

*Fl. & Fr. :* Throughout the year.

*Distr.* : Pantropical. Common; in marshy grasslands and lake shores. Nellipparakandom, *JA 12170.*

*Ethnobotanical use* : The rhizome of this perennial grass is used for fever; the rhizome is beaten and boiled in water and the water is given for fever patients.

**Panicum sumatrense** Roth ex Roem. & Schult., Syst. Veg. 2: 434. 1817; Bor, Grass. Burma, Ceylon, India & Pakistan 329. 1960; Manilal, Fl. Silent Valley 359. 1988; Sreekumar & Nair, Fl. Kerala Grass. 272. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 345. 1994. ***Panicum miliare*** auct. non Lam., 1791: Hook. f., Fl. Brit. India 7: 46. 1896. Fischer in Gamble, Fl. Pres. Madras 1782. 1934.

Annuals or perennials; culms 20-60 cm high; nodes glabrous. Leaves 30 x 1.5 cm, linear-lanceolate, base rounded, glabrous; ligule a fimbriate membrane. Panicle to 30 cm long, contracted. Spikelets 3 x 1.5 mm, ellipsoid; lower glume 1 x 1.5 mm, broadly ovate, 3-nerved; upper glume 2.5 x 1.5 mm, ovate, 13-nerved; lower floret empty; first lemma similar to upper glume; palea hyaline; second lemma 2 x 1 mm, ovate, coriaceous; palea 2 x 1 mm, coriaceous, margins folded; stamens 3.

*Fl. & Fr. :* October-February

*Distr.* : South East Asia and Malesia. Rare; in savannahs and open grasslands. Uppupara, *JA 14144.*

**Panicum trypheron** Schult., Mant. 2: 244. 1824; Hook. f., Fl. Brit. India 7: 47. 1896; Fischer in Gamble, Fl. Pres. Madras 1783. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 330. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 745. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1883. 1983; Sreekumar & Nair, Fl. Kerala Grass. 273. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 346. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 521. 1996.

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 4 mm long, ovoid; lower glume 1.5 x 1 mm, cuspidate; upper glume 3 x 1.5 mm, 7-nerved, awnless; lower floret empty; first lemma 3 x 2.5 mm, similar to upper glume; 9-11-nerved; awnless; palea oblong; second lemma 3 x 0.5 mm, 3-nerved; palea 3 x 0.5 mm, margins folded, hyaline.

*Fl. & Fr. :* October-January

*Distr.* : India and South East Asia. Common; in open grasslands. Kumarikulam, *JA 13016.*

## PASPALIDIUM Stapf

in Prain, Fl. Trop. Africa 9: 582. 1920.

**Paspalidium flavidum** (Retz.) A. Camus, Lecomte, Fl. Gen. Indo-China 7: 419. 1922; Fischer in Gamble, Fl. Pres. Madras 1774. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 333. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 745. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1884. 1983; Sreekumar & Nair, Fl. Kerala Grass. 278. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 349. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 521. 1996. ***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 mm; ovate, acute; lower glume orbicular, obtuse, 5-nerved; upper glume 1.5 x 2 mm, 7-nerved, acute, florets 2, lower empty or male; upper bisexual; first lemma 2.5 x 1.5 mm, ovate, acute, 5-nerved; palea oblong, 2-keeled; second lemma 2 x 1.5 mm, ovate, acute, 5-nerved, crustaceous; palea oblong, 2-nerved; stamens 3; anthers 1 mm long; ovary oblong; styles 2, free; stigmas plumose.

*Fl. & Fr.* : July-December

*Distr.* : Tropical Asia. Common; in moist deciduous forests and savannahs. Kokkarakandom, *JA 12199.*

## **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. Plants densely covered with tubercle based hairs; leaves cordate; ligule obscure.....**P. canarae**
1. Plants glabrous; leaves not cordate; ligule membranous.....2
2. Culms creeping; spikelets acute, lower glume a minute scale.....**P. distichum**
2. Culms erect; spikelets obtuse; lower glume absent.....3
3. Racemes 2; upper glume long-ciliate along the margins; spikelets 1-2 mm long.....**P. conjugatum**
3. Racemes 3-5; upper glume not ciliate, crustaceous; spikelets 2-4 mm long..... **scrobiculatum**

**Paspalum canarae** (Steud.) Veldk., Blumea 21: 72. 1973; Manilal, Fl. Silent Valley 359. 1988. Sreekumar & Nair, Fl. Kerala Grass. 282. 1991. ***Panicum canarae*** Steud., Syn. Pl. 1: 58. 1853. ***Paspalum compactum*** auct. non Roth, 1821: Hook. f., Fl. Brit. India 7: 12. 1896; Fischer in Gamble, Fl. Pres. Madras 1772. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 336. 1960.

Annuals; culms 10-30 cm high, trailing; nodes hairy. Leaves 2-5 x 0.5-1.2 cm, ovate, acute, cordate and decurrent at base, densely hairy; sheath keeled, hairy; ligule a small ridge only. Racemes 8-15, rachis covered with bulbous based hairs. Spikelets 1.2 x 1 mm, usually paired at

the basal part of the raceme; upper glume 1 x 0.5 mm, elliptic, 3-nerved, glabrous; first lemma 1.2 x 1 mm, 3-nerved; second lemma 1 x 0.9 mm, nerveless, crustaceous; palea similar to lemma.

*Fl. & Fr.* : August-December

*Distr.* : India. Common; along cuttings in open grasslands. Vallakkadavu, *JA 12769.*

**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. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 336. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 746. 1976; Manilal, Fl. Silent Valley 359. 1988; Sreekumar & Nair, Fl. Kerala Grass. 285. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 352. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 522. 1996.

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. Spikelets 1.5-2 x 1.2 mm, broadly ovate, acute, in two rows along the raceme; upper glume 1.5 x 1.2 mm, 2-nerved; lower florets empty; first lemma similar to upper glume, ovate, epaleate, hairy along the margins; second lemma 1.5 x 1.2 mm, obtuse, 1-nerved, coriaceous; palea similar to lemma, 2-nerved; stamens 3.

*Fl. & Fr.* : June-December

*Distr.* : Old World Tropics. Common; in marshy areas of open shrublands. Thekkady, *JA 13834.*

**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; Sreekumar & Nair, Fl. Kerala Grass. 286. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 355. 1994. ***Digitaria paspaloides*** Michaux, Fl. Borr. Amer. 1: 46. 1803. ***Paspalum paspaloides*** (Michaux) Scribn., Mem. Torr. Bot. Club. 5: 29. 1894.

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 2.5 x 1 mm, oblong, acute, in two rows; lower glume reduced into a scale; upper glume 2.5 x 1 mm, oblong, acute; lower floret empty; first lemma 2.5 x 1 mm, 3-nerved, acute, epaleate; second lemma 2 x 1 mm, oblong; palea similar; margins incurved; anthers 1 mm long.

*Fl. & Fr.* : Throughout the year.

*Distr.* : Pantropical. Common; in marshy grasslands and along lake shores. Dam Site, *JA 12569.*

**Paspalum scrobiculatum** L., Mant. Pl. 1: 29. 1767; Hook. f., Fl. Brit. India 7: 10. 1896; Fischer in Gamble, Fl. Pres. Madras 1772. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 340.

1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 747. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1887. 1983; Manilal, Fl. Silent Valley 360. 1988; Sreekumar & Nair, Fl. Kerala Grass. 287. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 356. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 522. 1996. ***P. orbiculare*** Forst., Fl. Ins. Aust. Prodr. 7. 1786.

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 2.5 x 2 mm, obtuse; upper glume 2.5 x 2 mm, orbicular, 3-nerved; lower floret empty; **first lemma similar to upper glume, epaleate; second lemma 2.5 x 1.5 mm, 3-nerved, crustaceous;** palea 1.5 x 1.5 mm, lower half expanded and incurved.

*Fl. & Fr.* : Throughout the year.

*Distr.* : India and Sri Lanka. Common; in marshy grasslands. Kokkarakandom, *JA 12055;* Nellipparakandom, *JA 12162.*

## **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. Involucral bristles glabrous; spikelets ca. 8 mm long.....**P. hohenackeri**
1. Involucral bristles hairy and scabrid; spikelets ca. 5 mm long.....**P. polystachyon**

**Pennisetum hohenackeri** Hochst. ex Steud., Syn. Pl. Glum. 1: 102. 1854; Fischer in Gamble, Fl. Pres. Madras 1792. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 344. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 747. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1888. 1983; Sreekumar & Nair, Fl. Kerala Grass. 289. 1991. ***P. 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 0.8 cm, linear-lanceolate, prominently channelled, hairy above; sheath keeled; ligule a tuft of hairs. Raceme 10-20 cm long; rachis ribbed; bristles unequal, glabrous, 3-20 mm long. Spikelets 8 mm long, solitary in the involucre; lower glume 1.5 x 1.5 mm, orbicular, nerveless; upper glume 3 x 1.5 mm, ovate,

obtuse, 3-nerved; lower floret empty; first lemma 7 x 1.5 mm, obtuse, 9-nerved; second lemma similar, 5-6-nerved; palea 6 x 1.5 mm, 2-nerved; anthers 3 mm long; stigmas 5-6 mm long.

*Fl. & Fr. :* October-May

*Distr.* : Western India. Common; in marshy areas. Kumarikulam, *JA 14879.*

**Pennisetum polystachyon** (L.) Schult., Syst. Veg. Mant. 2: 146. 1824; Fischer in Gamble, Fl. Pres. Madras 1792. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 346. 1960; Manilal, Fl. Silent Valley 360. 1988; Sreekumar & Nair, Fl. Kerala Grass. 291. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 366. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 522. 1996. ***Panicum polystachyon*** L., Syst. Nat. ed. 10, 2: 870. 1759. ***Digitaria paspaloides*** Michaux, Fl. Borr. Amer. 1: 46. 1803. ***Pennisetum setosum*** (Sw.) L.C. Rich. in Pers., Syn. Pl. 1: 72. 1805; Hook. f., Fl. Brit. India 7: 87. 1896.X ***Cenchrus setosus*** Sw., Prodr. Veg. Ind. Occ. 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 5 mm long, solitary in the involucre; lower glume minute; upper glume 3-4 x 1.5 mm, ovate, acute, 5-nerved, puberulus; lower floret barren; first lemma 3 x 1.5 mm, 3-nerved, puberulus, epaleate; second lemma 2 x 1 mm, 3-5-nerved, glabrous; palea 2 x 1 mm, 2-nerved; anthers 2 mm long.

*Fl. & Fr. :* November-January

*Distr.* : Old World Tropics. Common; in disturbed moist deciduous forests. Puthussery, *JA & KPR 17068.*

## **PEROTIS** Aiton

Hort. Kew. ed. 1, 1: 85. 1789.

**Perotis indica** (L.) O. Ktze., Rev. Pl. 2: 787. 1891; Fischer in Gamble, Fl. Pres. Madras 1814. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 611. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 748. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1889. 1983; Sreekumar & Nair, Fl. Kerala Grass. 434. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 370. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 523. 1996. ***Anthoxanthum indicum*** L., Sp. Pl. 28. 1753. ***Perotis latifolia*** Ait., Hort. Kew. 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 3

mm long, similar, pedicelled; glumes equal, 2.5-3 x 1 mm, lanceolate, 1-nerved, ciliate along the margins, awned; awn 8-10 mm long; floret one; lemma 1 mm long, oblong, hyaline; palea lanceolate, 2-nerved; stamens 3, free; ovary oblong; styles 2, free; stigma plumose.

*Fl. & Fr. :* August-December

*Distr.* : South East Asia. Common; in shrublands. Thekkady, *KPR & JA 17856.*

## **POA** Linnaeus

Sp. Pl. 67. 1753

**Poa annua** L., Sp. Pl. 68. 1753; Hook. f., Fl. Brit. India 7: 345. 1896; Fischer in Gamble, Fl. Pres. Madras 1850. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 555. 1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1891. 1983; Sreekumar & Nair, Fl. Kerala Grass. 406. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 374. 1994.

Annuals; culms 15-20 cm high, tufted; nodes glabrous. Leaves 5-10 x 0.2-0.3 cm; rounded at base, glabrous; sheath keeled, glabrous; ligule membranous. Panicle 5-6 x 2 cm, contracted; branches filiform, glabrous. Spikelets similar, 5-6 mm long, ovate, glabrous; lower glume 2 x 0.5 mm, lanceolate, 1-nerved; upper glume 2.5 x 1 mm, ovate, acute, 3-nerved; florets 2-4, similar; upper florets exerted; lemmas 3 x 1 mm, ovate-lanceolate, 3-5-nerved, hairy along the nerves; palea 3 x 0.75 mm, lanceolate, 2-nerved; stamens 3; ovary oblong; style short or absent.

*Fl. & Fr. :* Throughout the year

*Distr.* : Cosmopolitan. Rare; in open places at higher elevations. Vellimala, *JA 14020.*

## **POGONATHERUM** P. Beauvois

Ess. Agrost. 56. 1812.

**Pogonatherum crinitum** (Thunb.) Kunth, Enum. Pl. 1: 476. 1833; Hook. f., Fl. Brit. India 7: 141. 1896; Bor, Grass. Burma, Ceylon, India & Pakistan 200. 1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1881. 1983; Manilal, Fl. Silent Valley 360. 1988; Sreekumar & Nair, Fl. Kerala Grass. 176. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 376. 1994. ***Andropogon crinitum*** Thunb., Fl. Jap. 40. 1784. ***Pogonatherum paniceum*** auct. non Hack., 1906: Fischer in Gamble, Fl. Pres. Madras 1713. 1934.

Tufted annuals; culms to 30 cm high, erect; nodes glabrous. Leaves 4-5 x 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 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.

*Fl. & Fr.* : November-May

*Distr.* : India, Afghanistan and Sri Lanka. Very common; along cuttings of open grasslands. Attathodu, *NS & JA 12743.*

## 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. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 204. 1960; Manilal, Fl. Silent Valley 361. 1988; Sreekumar & Nair, Fl. Kerala Grass. 181. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 381. 1994. ***Andropogon umbellatus*** Hack. in DC., Monogr. Phan. 6: 401. 1889.

Creeping or geniculate annuals; culms rooting from lower nodes. Leaves to 5 x 0.5 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 5 mm long, oblong, lanceolate, 2 in each raceme; callus hairy; lower glume 5 x 1 mm, oblong, truncate; upper glume 4 x 1 mm, oblong, acute, 3-nerved; lower floret absent; second lemma reduced to form the base of the awn; awn 20-25 mm long; stamens 3, free; ovary oblong; styles 2, free; stigmas 2, plumose. Pedicelled spikelet 5-7 mm long, lanceolate, awnless; floret one, male.

*Fl. & Fr.* : October-February

*Distr.* : Peninsular India and Sri Lanka. Common; in hill tops and disturbed forests. Vallakkadavu, *JA 12725.*

## PSEUDORAPHIS Griffith

Not. Pl. Asiat. 3: 29. 1851.

**Pseudoraphis spinescens** (R. Br.) Vickery, Proc. Ray. Soc. Queensland 62(7): 69. 1952; Bor, Grass. Burma, Ceylon, India & Pakistan 353. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 750. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1892. 1983; Sreekumar & Nair, Fl. Kerala Grass. 296. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 384. 1994. ***Panicum spinescens*** R. Br., Prodr. 193. 1810. ***Chamaeraphis spinescens*** (R. Br.) Poir. in Lam., Encycl. Suppl. 2: 189. 1811; Hook. f., Fl. Brit. India 7: 62. 1896. ***Pseudoraphis***

***aspera*** Pilger, Notizbl. Bot. Gard. Berlin 10: 210. 1928; Fischer in Gamble, Fl. Pres. Madras 1790. 1934.

Marshy annuals; culms 20-40 cm high, rooted in marshes or floating; nodes villous. Leaves 2-6 x 0.2-0.6 cm, lanceolate, thinly pubescent above; sheath keeled; ligule a fimbriate membrane. Panicle 5-10 cm long, effuse; branches terminating into a single spine or bristle. Spikelets 7 mm long, lanceolate, sessile and solitary; lower glume 0.5 x 0.5 mm, hyaline, obtuse; upper glume 7 x 1 mm, lanceolate, coriaceous, many-nerved, hairy outside; florets 2; lower male, upper bisexual; first lemma 6 x 1 mm, lanceolate, 7-nerved; palea oblong, hyaline; second lemma 2-2.5 x 1 mm, hyaline; palea 1.5 x 0.5 mm, hyaline; stamen in lower floret 3, developed, in upper floret rudimentary; ovary elliptic; style 2, free; stigma 2, plumose.

*Fl. & Fr. :* June-December

*Distr.* : South East Asia and Australia. Common; along the lake shores. Thekkady, *JA & KPR 16974.*

## **PSEUDOSORGHUM** A. Camus

Bull. Mus. Hist. Nat. Paris 20: 662. 1920.

**Pseudosorghum fasciculare** (Roxb.) A. Camus, Bull. Mus. Hist. Nat. Paris 26: 662. 1920; Fischer in Gamble, Fl. Pres. Madras 1734. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 205. 1960; Sreekumar & Nair, Fl. Kerala Grass. 182. 1991. ***Andropogon fascicularis*** Roxb., Fl. Ind. 1: 265. 1820; Hook. f., Fl. Brit. India 7: 177. 1896.

Perennials; culms 90-100 cm high, loosely tufted; nodes glabrous. Leaves 15-40 x 0.8-1.2 cm, linear-lanceolate, glabrous; sheath keeled; ligule membranous. Panicle 5-13 cm long, congested. Spikelets dissimilar, sessile spikelets 4-5 mm long, lanceolate; callus hairy; lower glume 4 x 1.5 mm, lanceolate; florets 2; lower floret empty, upper bisexual; first lemma oblong, chartaceous, epaleate; second lemma 2-cleft at apex, awned; awn 14-18 mm long; stamens 3; styles 2, free; stigmas plumose. Pedicelled spikelets 4-5 mm long, lanceolate; floret one, male.

*Fl. & Fr. :* October-January

*Distr.* : India, Burma South East Asia. Common; in open grasslands along hilltops and savannahs. Mangaladevi, *NS & JA 12671.*

## **PSEUDOXYTENANTHERA** Soderstrom & Ellis

Smithsonian Contr. Botany 72: 52. 1988.

Tall unarmed grasses; rootstock rhizomatous, branched, creeping, underground; culms densely tufted, thick, stout; fresh culms covered by tubular culm sheaths with short limb. Inflorescence of

panicled spike. Spikelets densely packed in globose heads at nodes of branches, compressed; glumes 1-3, coriaceous, ovate, mucronate, equal or unequal; florets 1-3, lemmas similar, ovate, mucronate; paleas 2-keeled, upper ones convoluted; stamens 6, monadelphous; ovary ovoid, styles 1-3, excerted; stigmas 1-3.

1. Mouth of the culm-sheath with a ring of bristles.....**P. monadelpha**

1. Mouth of the culm-sheath glabrous.....**P. bourdillonii**

**Pseudoxytenanthera bourdillonii** (Gamble) Naithani, J. Bombay Nat. Hist. Soc. 87: 440. 1990. ***Oxytenanthera bourdillonii*** Gamble, Ann. Roy. Bot. Gard. Calcutta 7: 76, t. 67. 1896; Hook. f., Fl. Brit. India 7: 403. 1896; Fischer in Gamble, Fl. Pres. Madras 1861. 1934. ***Pseudotenanthera bourdillonii*** (Gamble) Majumdar in Karthik. *et al.*, Fl. India Enum. 280. 1989; Sasidh. & Sivar., Fl. Pl. Thrissur For. 524. 1996. **Eetta**

Robust perennials; culms 3-5 m high, smooth; culm sheath blade to 15 cm long, glabrous. Leaves 15-35 x 2-5 cm, sessile, acute at base, glabrous; margin entire; sheath keeled, glabrous. Spikelets 2.5 cm long, glabrous; lower glume 3.5 x 2.5 mm, acute; upper glume 10-11 x 6-7 mm, glabrous; florets 3-5, all bisexual; lemmas 20 x 6 mm, glabrous; palea 10-13 x 4 mm, hairy along the keels; staminal tube short; anthers 6-7 mm long, apiculate; styles 2, linear, hairy; stigmas 2, filiform, hairy.

*Fl. & Fr.* : December-January

*Distr.* : Endemic to Southern Western Ghats. Rare; in evergreen Sholas at higher elevations. Kurisumala, *JA 13050*

*Ethnobotanical use* : The leaves and the culms are used in thatching houses.

**Pseudoxytenanthera monadelpha** (Thw.) Sodestrom & Ellis, Smiths. Contrib. Bot. 72: 52. 1988; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 386. 1994. ***Dendrocalamus monadelphus*** Thw., Enum. Pl. Zeyl. 376. 1864. ***Oxytenanthera monadelpha*** (Thw.) Alston in Trim., Handb. Fl. Ceylon 6 (Suppl.) 342. 1931; Fischer in Gamble, Fl. Pres. Madras 1861. 1934. **Eetta, Cheethu** (Mannan)

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; anthers 4-5 mm long.

*Fl. & Fr.* : December-February

*Distr.* : South India and Sri Lanka. Very common; in evergreen forests with reedbrakes. Vellimala, *NS & JA 12992; JA 13334.*

*Ethnobotanical use* : The leaves and the culms are used in thatching houses.

## RHYNCHELYTRUM Nees

in Lindley, Intr. Nat. Syst. Bot. ed. 2. 446. 1836.

**Rhynchelytrum repens** (Willd.) C.E. Hubb., Kew Bull. 1934: 110. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 355. 1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1893. 1983; Sreekumar & Nair, Fl. Kerala Grass. 297. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 388. 1994. ***Saccharum repens*** Willd., Sp. Pl. ed. 4, 1: 322. 1798. ***Tricholaena wightii*** Nees & Arn. ex Steud., Syn. Pl. Glum. 1: 93. 1854, pro syn.; Hook. f., Fl. Brit. India 7: 65. 1896. ***Rhynchelytrum villosum*** Chisu, Annuar R. Inst. Bot. Roma 8: 310. 1908; Fischer in Gamble, Fl. Pres. Madras 1791. 1934.

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 1 x 0.5 mm, oblong, obtuse; upper glume 4-5 x 2 mm, aristate, 5-nerved; florets 2; lower floret male, upper bisexual; first lemma similar to upper glume, keeled; palea 3 x 1 mm, lanceolate, 2-keeled; second lemma 2 x 1 mm, 3-nerved, hyaline; palea 2-keeled, chartaceous; stamens 3; ovary elliptic; styles 2, free; stigma plumose.

*Fl. & Fr.* : August-May

*Distr.* : Native of South Africa. Common; along lake shores and in disturbed grasslands. Vallakkadavu, *JA 16379.*

## ROTTBOELLIA Linnaeus f.

Suppl. Pl. 13, 114. 1781, *nom. cons.*

**Rottboellia cochinchinensis** (Lour.) W. D. Clayton, Kew Bull. 35: 817. 1981; Bor, Grass. Burma, Ceylon, India & Pakistan 206. 1960; Sreekumar & Nair, Fl. Kerala Grass. 183. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 389. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 524. 1996. ***Stegosia cochinchinensis*** Lour., Fl. Cochinch. 1: 51. 1790. ***Rottboellia exaltata*** L. f., Suppl. Pl. 114. 1781; Hook. f., Fl. Brit. India 7: 156. 1896; Fischer in Gamble, Fl. Pres. Madras 1759. 1934; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1894. 1983, non (L.) L. f., 1779.

Annuals; culms 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 x 1 mm; palea 3 x 1.5 mm, ovate, 2-nerved; second lemma 3 x 2 mm, keeled; palea lanceolate, hyaline; stamens 3, free; ovary oblong; styles 2; stigma plumose. Pedicelled spikelets oblong; glumes and first lemma only are seen.

*Fl. & Fr.* : November-February.

*Distr.* : Tropical. Very common; in savannahs. Koruthodu, *KPR & JA 14741.*

## **SACCHARUM** Linnaeus

Sp. Pl. 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. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 214. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 751. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1895. 1983; Sreekumar & Nair, Fl. Kerala Grass. 185. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 393. 1994.

Perennials; culms 100-300 cm, tufted, erect; nodes glabrous. Leaves 30-100 x 1 cm, linear-lanceolate, acuminate, rounded at base, glabrous; sheath rounded; ligule membranous, 3-6 mm long. Panicle to 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 2.5 x 1 mm, 3-nerved, epaleate; second lemma linear-lanceolate; palea membranous; stamens 3, free; style basely connated; stigmas 2, plumose.

*Fl. & Fr.* : November-May

*Distr.* : Old World Tropics. Common; in stream banks in moist deciduous forests. Koruthode, *JA 13392.*

## **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. Spikelets 4-5 mm long; leaves to 1 cm broad.....**S. interrupta**
1. Spikelets to 3.5 mm long; leaves to 0.6 cm broad.....2
2. Panicles 10-20 cm long; lower glume 3-nerved; spikelets to 1.5 mm long.....**S. myosuroides**
2. Panicles to 8 cm long; lower glume 5-nerved; spikelets 1.5-3.5 mm long.....**S. indica**

**Sacciolepis indica** (L.) A. Chase, Proc. Biol. Soc. Wash. 21: 8. 1908; Fischer in Gamble, Fl. Pres. Madras 1787. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 357. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 751. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1896. 1983; Manilal, Fl. Silent Valley 362. 1988; Sreekumar & Nair, Fl. Kerala Grass. 298. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 396. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 525. 1996. ***Aira indica*** L., Sp. Pl. 63. 1753. ***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 1.5 x 0.5 mm, acute, 5-nerved; upper glume 2 x 1 mm, 9-nerved; lower floret barren; first lemma 1.5 x 1 mm, thinly hairy; second lemma 1.5-2 x 1 mm; palea similar to lemma; anthers 1 mm long.

*Fl. & Fr.* : Throughout the year

*Distr.* : India, introduced in other tropical countries. Very common; in marshy grasslands. Brandippara, *JA & KPR 14907.*

**Sacciolepis interrupta** (Willd.) Stapf in Prain, Fl. Trop. Africa 9: 757. 1920; Fischer in Gamble, Fl. Pres. Madras 1787. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 358. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 751. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1897. 1983; Sreekumar & Nair, Fl. Kerala Grass. 299. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 397. 1994. ***Panicum interruptum*** Willd., Sp. Pl. ed. 4, 1: 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 1 x 1 mm, broadly ovate; upper glume 4 x

2 mm, 9-nerved; lower floret male; first lemma 4.5 x 1.2 mm, 9-nerved; palea oblong; second lemma 3 x 1 mm, ovate, acute; palea similar to lemma; anther 1.5 mm long.

*Fl. & Fr.* : Throughout the year.

*Distr.* : Tropics of South East Asia. Common; in marshy fields. Sivaloda, *JA 12510*; Swamikkayam, *JA 13112*.

**Sacciolepis myosuroides** (R. Br.) A. Camus in Lecomte, Fl. Gen. Indo-China 7: 460. 1922; Fischer in Gamble, Fl. Pres. Madras 1787. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 358. 1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1897. 1983; Sreekumar & Nair, Fl. Kerala Grass. 300. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 397. 1994. ***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 0.5 cm, narrow, cylindrical, interrupted at the base. Spikelets 1.5 x 1 mm; lower floret barren; upper bisexual; first lemma 1.5 x 1 mm, 5-nerved; palea linear; second lemma 1 x 0.5 mm, nerves faint; palea smaller; stamens 3; stigmas 2, 5 mm long.

*Fl. & Fr.* : October-January

*Distr.* : Tropics of Asia and Africa. Rare; in marshy fields. Kumarikulam, *JA 14243*.

## SCHIZACHYRIUM Nees

in C. Martius, Fl. Bras. Enum. Pl. 2(1): 331. 1829.

**Schizachyrium brevifolium** (Sw.) Nees ex Buese in Miq., Plant. Jungh. 359. 1854; Fischer in Gamble, Fl. Pres. Madras 1752. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 215. 1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1898. 1983; Sreekumar & Nair, Fl. Kerala Grass. 186. 1991. ***Andropogon brevifolius*** Sw., Prodr. Veg. Ind. Occ. 26. 1788; Hook. f., Fl. Brit. India 7: 165. 1896.

Slender annuals, erect or decumbent, 10-30 cm high; nodes glabrous, rooting from lower ones. Leaves 1-3 x 0.2-0.6 cm, oblong, obtuse at apex, rounded at base, glabrous; sheath rounded; ligule membranous. Raceme 1-2 cm long, solitary. Spikelets in pairs, dissimilar. Sessile spikelets 3 mm long, lanceolate; lower glume 3 x 0.5 mm, 5-nerved; upper glume 3 x 1 mm, 3-nerved; lower floret empty, upper bisexual; first lemma 2 x 0.5 mm, oblong, delicate, epaleate; second lemma 2 x 0.5 mm; cleft to below the middle and awned at the sinus, epaleate; awn 9 mm long; stamens 3; ovary oblong. Pedicelled spikelets reduced to a long pedicel or with one two aristate glumes.

*Fl. & Fr.* : October-December

*Distr.* : Old World Tropics. Common; in open grasslands at hilltops. Mangaladevi, *JA 16976.*

**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. Panicle cylindrical; bristles in cluster.....**S. pumila**
1. Panicle not cylindrical; contracted or effuse; bristles not in clusters.....2
2. Bristles retrorsely barbed.....**S. verticillata**
2. Bristles not retrosely barbed.....3
3. Panicles contracted, narrow; spikelets sessile.....4
3. Panicles lax; spikelets pedicelled.....5
4. Bristles few; panicles of congested racemes; lower glume 3- nerved.....**S. barbata**
4. Bristles many; panicles interrupted; lower glume 1-nerved.....**S. intermedia**
5. Ligule a row of hairs; nodes hairy; bristles less than 2 times the length of spikelets.....**S. palmifolia**
5. Ligule a fimbriate membrane; nodes glabrous; bristles more than 5 times the length of spikelets.....**S. paniculifera**

**Setaria barbata** (Lam.) Kunth., Rev. Gram. 1: 47. 1829; Bor, Grass. Burma, Ceylon, India & Pakistan 360. 1960; Sreekumar & Nair, Fl. Kerala Grass. 303. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 403. 1994. ***Panicum barbatum*** Lam., Tab. Encycl. Meth. Bot. 1: 171. 1791. ***P. flavescens*** auct. non Sw., 1788: Hook. f., Fl. Brit. India 7: 56. 1896.

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 2.5 x 1.5 mm, ovate; lower glume ovate, 3-nerved; upper glume 1.5 x 1 mm, 7-nerved; lower floret male; first lemma 2.5 x 1.5 mm, 7-nerved; palea hyaline; second lemma 2 x 1 mm, ovate, 3-nerved; palea 2 x 1 mm, margins incurved; anthers 1 mm long.

*Fl. & Fr.* : September-January

*Distr.* : Tropics of Asia and Africa. Rare; along river banks. Poonkavanam, *JA 12392.*

**Setaria intermedia** Roem. & Schult., Syst. Veg. 2: 489. 1817; Hook. f., Fl. Brit. India 7: 79. 1896; Fischer in Gamble, Fl. Pres. Madras 1789. 1934; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 752. 1976; Sreekumar & Nair, Fl. Kerala Grass. 306. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 407. 1994. ***Panicum tomentosum*** Roxb., Fl. Ind.1: 303. 1820. ***Setaria tomentosa*** (Roxb.) Kunth., Rev. Gram. 1: 47. 1829; Bor, Grass. Burma, Ceylon, India & Pakistan 365. 1960.

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 2 x 1.5 mm, broadly elliptic; lower glume 1-nerved; upper glume 1.2 x 1 mm, elliptic, obtuse; lower floret empty; first lemma 2 x 1.5 mm, acute, 5-nerved; palea ovate; second lemma 2 x 1.2 mm, ovate, coriaceous; palea faintly rugate; anthers 1 mm long.

*Fl. & Fr. :* September-January

*Distr.* : Indo-Malesia. Common; in moist deciduous forests and savannahs. Uppupara, *JA 14145.*

**Setaria palmifolia** (Koen.) Stapf., J. Linn. Soc. 42: 186. 1914; Fischer in Gamble, Fl. Pres. Madras 1789. 1935; Bor, Grass. Burma, Ceylon, India & Pakistan 363. 1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1900. 1983; Manilal, Fl. Silent Valley 362. 1988; Sreekumar & Nair, Fl. Kerala Grass. 307. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 409. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 525. 1996. ***Panicum palmaefolium*** Koen., Naturf. 23: 208. 1788. ***P. plicatum*** Willd., Enum. Pl. 1033.1809; Hook. f., Fl. Brit. India 7: 55. 1896, p.p., non Lam., 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 3 mm long, pedicelled, crowded on small branches; lower glume 1.5 mm across, orbicular, obtuse, 5-nerved; upper glume 2.5 x 1.5 mm, 7-nerved; lower floret barren; first lemma 3 x 1.5 mm; palea oblong; second lemma 2.5 x 1.5 mm, acute; palea ovate, acute; anthers 1.5 mm long.

*Fl. & Fr. :* October-December

*Distr.* : Old World Tropics. Common; in moist deciduous and semi evergreen forests along river sides. Pachakkanam, *KPR & JA 17043.*

**Setaria paniculifera** (Steud.) Fourn. ex Hemsl., Biol. Centr. Amer. Bot. 3. 505. 1855; Bor, Grass. Burma, Ceylon, India & Pakistan 363. 1960; Sreekumar & Nair, Fl. Kerala Grass. 308. 1991. ***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 3 x 1 mm; lower glume ovate, obtuse, 3-nerved; upper glume 2 x 1.5 mm, ovate, obtuse, 7-nerved; Lower floret barren; first lemma ovate, 5-nerved, acute; palea lanceolate; second lemma 3 x 1 mm; palea subcoriaceous; anthers 2mm long.

*Fl. & Fr.* : July-December

*Distr.* : Old World Tropics. Very common; in semi evergreen forests. Mlappara, *JA 12085, 12164.*

**Setaria pumila** (Poir.) Roem. & Schult., Syst. Veg. 2: 891. 1817; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1901. 1983; Manilal, Fl. Silent Valley 363. 1988; Sreekumar & Nair, Fl. Kerala Grass. 309. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 411. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 526. 1996. ***Panicum pumilum*** Poir., Encycl. Meth. Bot. (Suppl.) 4: 273. 1816. ***Panicum pallida-fuscum*** Schum., Beskr. Guin. Pl. 58. 1827.

***Setaria glauca*** sensu Hook. f., Fl. Brit. India 7: 78. 1896. non P. Beauv., 1812. ***Setaria pallida-fusca*** (Schum.) Stapf & Hubb., Kew Bull. 1930: 259. 1930; Fischer in Gamble, Fl. Pres. Madras 1789. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 363. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 753. 1976.

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 5-10 mm long, in clusters; spikelets 2.5 mm long, sessile, acute; lower glume 1 mm long, 3-nerved; upper glume 1.5 mm long, 5-nerved; lower floret barren; first lemma 2.5 mm long, 3-nerved, paleate; second lemma coriaceous, rugose.

*Fl. & Fr.* : Throughout the year.

*Distr.* : Old World Tropics. Common; in moist deciduous forests and savannahs. Mangaladevi, *JA 12178*; Thaannikkudy, *JA 12349.*

**Setaria verticillata** (L.) P. Beauv., Ess. Agrost. 51. 178. 1812; Hook. f., Fl. Brit. India 7: 80. 1896; Fischer in Gamble, Fl. Pres. Madras 1789. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 365. 1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1902. 1983; Manilal, Fl. Silent Valley 362. 1988; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 413. 1994.

Tufted annuals; culms slender, to 40 cm high, nodes glabrous. Leaves 5-15 x 0.5-1.2 cm, lanceolate, glabrous; ligule a fimbriate membrane. Panicle 3-8 cm long, contracted, spiciform; bristles many, retrorsely barbed . Spikelets 2-2.5 mm long, elliptic; lower glume 1 x 1 mm, ovate,

triangular, 3-nerved; upper glume 2 x 1 mm, 7-nerved; lower floret empty; first lemma similar to upper glume; palea 1 x 0.5 mm, ovate, hyaline; second lemma 2 x 1 mm, ovate, concave, rugose; palea coriaceous, smooth.

*Fl. & Fr.* : October-January

*Distr.* : Old World Tropics. Rare; in moist deciduous forests. Thaannikkudy, *JA & KPR 16970.*

## SINARUNDINARIA Nakai

J. Jap. Bot. 11: 1. 1935

Perennial shrubs to small trees; rhizome sympodial. Culms erect, clumped, slender with prominent nodes; culm-sheaths straw-coloured, persistent. Leaves usually lanceolate with tessellate nerves. Spikelets numerous compressed usually enclosed in sheath, arranged in paniculate or racemose inflorescence; glumes 2, unequal. Florets 1-many, fertile; lemmas coriaceous, concave, many-nerved; paleas 2-keeled; lodecules 3, ciliate; stamens 3 or 6, excerted; ovary usually hairy; style short; stigmas 2 or 3. Fruit of grain with a furrow on back, enclosed in persistent lemma and palea.

1. Spikelets with one floret; leaves thin without coriaceous margins.....**S. densifolia**
1. Spikelets with 4 or 5 florets; leaves thick with coriaceous margins.....**S. walkeriana**

**Sinarundinaria densifolia** (Munro) Chao & Renv., Kew Bull. 44: 354. 1989. ***Arundinaria densifolia*** Munro, Trans Linn. Soc. London26: 32. 1868; Hook.f., Fl. Brit. India 7: 379. 1896; Gamble, Fl. Pres. Madras 1857. 1934; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 52. 1994.

Shrubby bamboo with densely clumped culms; culms to 1 cm diam., with slender, densely packed lateral branches at nodes, to 60 cm long. Culm sheath persistent with small, erect blade. Foliage leaves 5-10 on each lateral branch, above several persistent overlapping sheaths, 5-7 x 0.5-0.8 cm, lanceolate, entire, sharply acuminate at apex, acute to rounded at base, sessile or with a short petiole, glabrous. Spikelets 1 cm long, 10-15 together, terminal to lateral branches in small panicle; glumes purplish; lower glume ovate, attenuate into a small awn, upper glume triangular, 7-nerved; lemma 8-10 mm long, ovate-lanceolate, 7-nerved.

*Fl. & Fr.* : November-May.

*Distr.*: South India and Sri Lanka. Rare; in evergreen shola forests. Kottamala, JA 18615.

**Sinarundinaria walkeriana** (Munro) Chao & Renv., Kew Bull. 44: 354. 1989. ***Arundinaria walkeriana*** Munro, Trans. Linn. Soc. London 26: 21. 1868; Hook. f., Fl. Brit. India 7: 377.

1896; Gamble, Fl. Pres. Madras 1857. 1934; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 58. 1994.

Shrubby bamboo; rootstock rhizomatous, sympodial; culms hollow, densely clumped, to 2 m high, 3 cm across; lateral branches densely clustered at nodes, to 30 cm long, rarely rebranching, upper part leafy, lower part covered with persistent leaf sheaths; culm sheath light green, ribbed, ciliate along the overlapping margins; culm sheath blades 2-3 x 0.5 cm, linear-lanceolate. Leaves 10-20 on each lateral branch, to 16 x 3.5 cm, ovate-oblong, acuminate at apex into a pointed tip, margins cartilaginous, scabrous; nervules transverse, prominent; sheath short; ligule a fimbriate membrane. Inflorescence a large terminal spreading panicle, 20-30 cm long, glabrous. Spikelets 14-20 mm long, purplish, solitary on long pedicel; glumes 2, unequal, lower shorter, 5.5 mm long, ovate-lanceolate; upper glume 6.5 mm long. Flowers 4 or 5; lowest flower bisexual and large; upper ones aborted; first lemma 7 mm long, ovate, apiculate; palea shorter; stamens 3, anthers 5 mm long; stigmas 2 or 3, plumose.

*Fl. & Fr.* : March-June

*Distr.* : Southern Western Ghats and Sri Lanka. Rare; in evergreen sholas. Kottamala, *JA 17779.*

## **SORGHUM** Moench

Methodus 207. 1794, *nom. cons.*

**Sorghum nitidum** (Vahl) Pers., Syn. Pl. 1: 101. 1805; Fischer in Gamble, Fl. Pres. Madras 1735. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 245. 1960; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 415. 1994. ***Holcus nitidus*** Vahl, Symb. Bot. 2: 102. 1791. ***Andropogon serratus*** Thunb., Fl. Jap. 41. 1784; Hook. f., Fl. Brit. India 7: 185. 1896.

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, pyramidal; branches whorled. Spikelets in pairs, dissimilar. Sessile spikelets 4 x 2 mm, oblong; callus with long hairs; lower glume 4 x 2 mm, oblong, 5-nerved, dark brown; upper glume 4 x 1.5 mm, ovate, acute, 3-nerved, dark brown; lower floret empty; upper bisexual; first lemma broadly ovate, hyaline; palea absent; stamens 3; ovary oblong; styles 2, free; stigmas 2, plumose; pedicelled; lower glume coriaceous; upper chartaceous; lower floret male; upper floret absent.

*Fl. & Fr.* : October-January

*Distr.* : India, Indo-China and Australia. Common; in savannahs along hill slopes. Kumarikulam, *JA 13025.*

## SPODIOPOGON Trinius

Fund. Agrost. 192, t. 17. 1920.

**Spodiopogon rhizophorus** (Steud.) Pilger in Engl. & Prantl, Pflanzenf. 14: 119. 1940; Bor, Grass. Burma, Ceylon, India & Pakistan 246. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 753. 1976; Sreekumar & Nair, Fl. Kerala Grass. 193. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 526. 1996. ***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. 1934.

Annuals; culms to 50 cm high; nodes glabrous. Leaves to 15 x 1.5 cm, elliptic, acuminate at either ends, glabrous; sheath keeled, glabrous; ligule membranous. Panicle to 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, 4 x 1.5 mm, 12-nerved, lower florets male; upper bisexual; first lemma 2.5 x 1 mm, oblong-acuminate, 1-nerved, chartaceous; palea lanceolate, 2-nerved; second lemma elliptic, notched and awned from the sinus; awn 7 mm long; palea obovate, truncate; stamens 3; ovary elliptic, styles 2, basely united; stigmas 2, plumose.

*Fl. & Fr. :* November-January

*Distr.* : Endemic to Peninsular India. Common; in cuttings of semi-evergreen forests. Pandianthavalam, *JA 13099.*

## 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
1. Lower glume much shorter than the spikelets; panicle lax.....**S. indicus**
2. Lower glume as long as the spikelets; panicle contracted.....**S. virginicus**

**Sporobolus indicus** (L.) R. Br., Prodr. 170. 1810.

There are two varieties in the study area.

Key to the varieties:

1.Stamens 2.....var. **diander**

1.Stamens 3.....var. **fertilis**

**Sporobolus indicus** (L.) R. Br., Prodr. 170. 1810, var. **diander** (Retz.) Jovet & Guedes, Taxon 22:163. 1973; Sreekumar & Nair, Fl. Kerala Grass. 437. 1991. ***Agrostis diandra*** Retz., Obs. Bot. 5: 19. 1789. ***Sporobolus diander*** (Retz.) P. Beauv., Ess. Agrost. 26:147. 1812; Fischer in Gamble, Fl. Pres. Madras 1817. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 629. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 754. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1904. 1983; Manilal, Fl. Silent Valley 364. 1988; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 422. 1994.

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 1.5 x 0.5 mm, lanceolate, glabrous; lower glume very small, 0.5 x 0.25 mm, hyaline, ovate, obtuse; upper glume hyaline, 1-nerved; lemma 1.5 x 0.5 mm, ovate-lanceolate, nerves not clear; palea 1.5 x 0.7 mm, oblong, stamens 2; anthers 0.5 mm long.

*Fl. & Fr.* : Throughout the year

*Distr.* : India, Burma, Sri Lanka and Australia. Very common; in savannahs and moist deciduous forests. Thekkady, *JA 12417.*

**Sporobolus indicus** (L.) R. Br. var. **fertilis** (Steud.) Jovet & Guedes Taxon 22: 164. 1973; Sreekumar & Nair, Fl. Kerala Grass. 438. 1991. ***Agrostis fertilis*** Steud., Syn. Pl. Gl. 1: 170. 1894. ***Sporobolus indicus*** sensu Hook. f. Fl. Brit. India 7: 247. 1896, non (L.) R. Br., 1810; Fischer in Gamble, Pres. Madras 1817. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 630. 1960. ***Sporobolus fertilis*** (Steud.) Clayton, Kew Bull. 19 (2): 291. 1965 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 8: 423. 1994; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 754. 1976.

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 0.8 cm, contracted; branches filiform. Spikelets 2.5 x 1 mm, pedicelled, lanceolate, glabrous; lower glume 1 x 0.5 mm, acute; upper glume 2 x 5 mm, 1-nerved; lemma 2.5 x 1 mm, hyaline; palea similar to lemma; stamens 3; anthers 0.5 mm long.

*Fl. & Fr.* : October-January

*Distr.* : India and Burma. Rare; in moist deciduous forests. Thannikkudy, *JA 12624.*

**Sporobolus piliferus** (Trin.) Kunth, Enum. Pl. 1: 211. 1833; Fischer in Gamble, Fl. Pres. Madras 1817. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 632. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 754. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1906. 1983; Manilal, Fl. Silent Valley 365. 1988; Sreekumar & Nair, Fl. Kerala Grass. 438. 1991; Sasidh. & Sivar., Fl. Pl. Thrissur For. 527. 1996. ***Vilfia 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 1.5 x 0.5 mm, lanceolate, acute; glumes hyaline; lower glume 1 mm long, narrowly lanceolate, acute; upper glume slightly larger 1-nerved; lemma 1.5 x 1 mm, 3-nerved; palea similar to lemma, 2-nerved; stamens 2.

*Fl. & Fr. :* October-December

*Distr.* : India, East Africa and Sri Lanka. Common; in open grasslands. Mangaladevi, *JA 12678.*

**Sporobolus virginicus** (L.) Kunth, Rev. Gram. 1:67. 1829; Fischer in Gamble, Fl. Pres. Madras 1818. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 634. 1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1907. 1983; Sreekumar & Nair, Fl. Kerala Grass. 440. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 427. 1994. ***Agrostis virginica*** L., Sp. Pl. 63. 1753.

Tufted perennials; culms 8-20 cm high, decumbent; nodes glabrous. Leaves 2-4 cm long, bifarious, acuminate; base rounded, glabrous; sheath rounded; ligule a membrane. Panicle 2-6 cm long, congested with few to many racemes. Spikelets many, 2 x 1 mm long, glabrous; glumes subequal, 2 x 0.5-1 mm, lower glume nerveless; lemma 2 x 1 mm, ovate, obtuse, 2-nerved; palea similar to lemma, 2-nerved; stamens 3; anthers 0.5 mm long.

*Fl. & Fr. :* July-December

*Distr.* : Pantropical. Rare; in open grasslands at hilltops. Mangaladevi, *JA 17857.*

## STREPTOGYNA P. Beauvois

Ess. Agrost. 80, t. 16, f. 8. 1812.

**Streptogyna crinita** P. Beauv., Ess. Agrost. 80. 1812; Bor, Grass. Burma, Ceylon, India & Pakistan 649. 1960; Sreekumar & Nair, Fl. Kerala Grass. 441. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 431. 1994. ***S. gerontogaea*** Hook. f., Trim., Handb. Fl. Ceylon 5:301. 1900; Fischer in Gamble, Fl. Pres. Madras 1854. 1934.

Densely tufted rhizomatous perennials. Rhizome covered with scale leaves; culms 30-70 cm high; nodes glabrous. Leaves 15-30 x 1.5 x 2.5 cm, glabrous; sheath keeled, ciliate; ligule a fimbriate membrane. Panicle 10-30 cm long. Spikelets elliptic-lanceolate, glabrous; lower glume 8 x 1 mm, acuminate, 3-nerved; upper glume 20 x 5 cm, 3-notched at apex with 3 arista; florets 2, similar; rachilla produced beyond the upper florets; lemma 20-25 x 1-3 mm, coriaceous; awn 10-20 mm long; palea 10-20 mm long, 2-nerved; stamens 2 or 3; ovary linear-oblong; style single; stigma 3, 30 mm long, retrorsely hooked.

*Fl. & Fr.* : November-March

*Distr.* : South India and Sri Lanka. Rare; in evergreen forests. Koruthode, *KPR & JA 16983.*

## **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 to 4 mm long; involucral spikelets at different levels ..... 2
1. Sessile spikelets 6-10 mm long; involucral spikelets at same or different levels..... **T. triandra**
2. Pedicelled spikelet covered with tubercle-based hairs; leaves rounded at base; sessile spikelets 2 in each raceme..... **T. tremula**
2. Pedicelled spikelets glabrous; leaves narrowed towards the base; sessile spikelet one in a raceme..... **T. cymbaria**

**Themeda cymbaria** (Roxb.) Hack. in DC., Monogr. Phan. 6:668. 1889; Fischer in Gamble, Fl. Pres. Madras 1746. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 251. 1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1908. 1983; Manilal, Fl. Silent Valley 365. 1988; Sreekumar & Nair, Fl. Kerala Grass. 196. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 433. 1994.

Perennials; culms 60-250 cm high, stout, densely tufted. Leaves up to 120 x 1 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 4 x 1 mm, at different levels; glumes subequal, glabrous; containing a male florets. Sessile bisexual spikelets 4-5 x 1 mm, with dense white callus hairs; lower glumes 4 x 1 mm, lanceolate, hirtus, coriaceous; first lemma oblong, chartaceous; second lemma awned; awn to 20 mm long.

*Fl. & Fr. :* November-February

*Distr.* : Peninsular India and Sri Lanka. Very common; in savannahs and hill slopes. Thaannikkudy, *JA 13057.*

*Ethnobotanical use* : The leaves are used in thatching houses (Mannan)

**Themeda tremula** (Nees ex Steud.) Hack. in DC., Monogr. Phan. 6:667. 1889; Fischer in Gamble, Fl. Pres. Madras 1746. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 254. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 756. 1976; Sreekumar & Nair, Fl. Kerala Grass. 198. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 434. 1994.

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 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 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.

*Fl. & Fr. :* November-March

*Distr.*: Peninsular India and Sri Lanka. Common; in open grasslands and savannahs. Vallakkadavu, *JA 12768.*

**Themeda triandra** Forssk., Fl. Aeg.-Arab. 178. 1775; Fischer in Gamble, Fl. Pres. Madras 1746. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 254. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 756. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1908. 1983; Manilal, Fl. Silent Valley 366. 1988; Sreekumar & Nair, Fl. Kerala Grass. 202. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 435. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 527. 1996.

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 mm; lower glume 8 mm long, winged along one side; upper glume oblong, 3-nerved. Bisexual spikelets, 6-10 mm long, solitary in a raceme, callus with brown hairs; lower glume 5-9 mm, brown, thinly pubescent; upper glume 6-8 mm long, hirtus; first lemma 3 mm long, oblong, brown; second lemma stipitate, awn 5-9 cm long.

*Fl. & Fr.* : November-February

*Distr.* : Old World Tropics. Very common; in disturbed forests and grasslands. Kumarikulam, *JA 13026.*

## **TRAGUS** A. Haller

Hist. Strip. Helv. 2: 203. 1767, *nom. cons.*

**Tragus biflorus** Schult., Syst. Veg. 2: 205. 1824; Hook. f., Fl. Brit. India 7: 97; Fischer in Gamble, Fl. Pres. Madras 1813. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 682. 1960.

Rhizomatous perennials; culms 15-30 cm high; nodes glabrous. Leaves 2-6 x 0.5 cm, lanceolate, ciliate along the margins; sheath keeled; ligule a row of hairs. Racemes solitary, 2-7 cm long, terminal; rachis and pedicels tomentose. Spikelets in opposing pairs, 4 mm long, lanceolate; lower glume absent; upper glume 4 x 1.5 mm, lanceolate, acuminate, 5-nerved; covered with glochidiate sharp bristles. Floret 1; lemma 2.5 x 1 mm, lanceolate, 3-nerved; palea 2 x 1 mm, lanceolate, 2-nerved; stamens 3, free; ovary oblong, style 2, free; stigma linear, slightly plumose, 1.2 mm long.

*Fl. & Fr.* : November-May

*Distr.* : East Africa, India, Sri Lanka eastwards to Malay Peninsula. Rare; in disturbed moist deciduous forests. Thekkady, *JA & KPR 15307.*

## **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. Awns capillary, to 25 mm long.....**T. capillatus**

1. Awns not capillary, to 7 mm long.....2

2. Leaves up to 10 cm long; lemmas cleft into 2 lobes.. ..... **T. pauperculus**

2. Leaves 10-40 cm long; lemmas cleft into 4 lobes.. ..... **T. bromoides**

**Tripogon bromoides** Roem. & Schult., Syst. Veg. 2: 600. 1817; Fischer in Gamble, Fl. Pres. Madras 1834. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 521. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 757. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1911. 1983; Manilal, Fl. Silent Valley 366. 1988; Sreekumar & Nair, Fl. Kerala Grass. 399. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 443. 1994.

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 3 x 0.5 mm, 1-nerved, keeled; upper glume 5-6 x 1 mm, notched below the apex on one side, 3-nerved. Flowers 10-16; lemma 3-4 x 1-2 mm, 4-lobed at apex, 3-awned; one median and two laterals; median one twice the length of laterals; palea 3 x 1 mm, scabrid along the keels; anthers 1 mm long.

*Fl. & Fr.* : November-January

*Distr.* : Western Ghats and Sri Lanka. Very common; in rocky grasslands. Kumarikulam, *NS & JA 13089.*

**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. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 521. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 757. 1976 [Fig. 80].

Annuals, culms slender, to 30 cm high, loosely tufted or solitary; nodes glabrous. Leaves filiform, to 10 x 0.1 cm, glabrous, sheath rounded; ligule membranous. Racemes to 20 cm long, slender. Spikelets linear-lanceolate, 3-4-flowered, lower glume 3 x 1.5 mm, 3-lobed at apex, awned; awn to 25 mm long, capillary; paleas elliptic, 2-keeled; stamens 3.

*Fl. & Fr.* : October-January

*Distr.* : Southern Western Ghats. Rare; in open grasslands. Mangaladevi, *JA 18500.*

**Tripogon pauperculus** Stapf, Hook. f., Ic. Pl. t. 2442. 1896; Fischer in Gamble, Fl. Pres. Madras 1833. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 522. 1960.

Annual herbs; culms 10 cm high, loosely tufted, nodes glabrous. Leaves 3-7 x 0.1-0.2 cm, lanceolate, glabrous; sheath rounded, ligule membranous. Raceme to 5 cm long. Spikelets 1-1.5 cm long, lanceolate, 4-8-flowered; lower glume 3 x 1 mm, lanceolate, acute, 1-nerved; upper

Fig. 80. *Tripogon capillatus*. Jaub. & Spach: **A**. habit; **B**. spikelet; **C**. lower glume; **D**. upper glume; **E**. lemma; **F**. palea: **G**. stamen; **H**. pistil.

glume 5-6 x 1 mm, lanceolate, mucronate, 1-nerved; lemmas 6 x 1.5, lanceolate, notched at apex, awned in the sinus; lobs aristate, awn 14-20 mm long; palea 4 x 1 mm, elliptic, not keeled; stamens 3, anthers 1 mm long.

*Fl. & Fr. :* September-December

*Distr.* : Endemic to Western Ghats. Rare; in grasslands. Grampykokka, *JA 12434.*

*Note*: The present collection is the first authentic record of its occurrence in Kerala state

**UROCHLOA** P. Beauvois

Ess. Agrost. 52, t. 11, f. 1. 1812.

**Urochloa panicoides** P. Beauv., Ess. Agrost. 53. 1812; Fischer in Gamble, Fl. Pres. Madras 1775. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 372. 1960; Ramam. in Sald. & Nicols., Fl. Hassan Dist. 757. 1976; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1912. 1983; Sreekumar & Nair, Fl. Kerala Grass. 316. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 447. 1994.

Annuals, culms 25-50 cm high, loosely tufted; nodes bearded. Leaves 6-10 x 1-2.5 cm, ovate-lanceolate, cordate and amplexicaule at base, pubescent below; sheath rounded, densely hairy; ligule a row or hairs. Panicles covered with glassy bristles. Spikelets 2.5 x 3.5 mm long, ovate; lower glume 1 x 1 mm, broadly ovate, 3-nerved, hirtus; upper glume 3 x 1 mm, lanceolate, pubescent; florets 2; lower barren or male, upper bisexual; first lemma 3 x 1 mm, lanceolate; palea oblong, 2-nerved; second lemma 2 x 1 mm, ovate, apiculate, crustaceous, transversely rugose, 3-nerved; style 2, free; stigma plumose.

*Fl. & Fr. :* October-January

*Distr.* : India and Sri Lanka. Common; in disturbed openings of evergreen forests. Thekkady, *JA 12550.*

**ZENKERIA** Trinius

Linnaea 11: 150. 1837.

Annuals or perennials; culms densely tufted. Leaves elliptic to linear-lanceolate, flat; sheath keeled. Spikelets many in terminal panicle, 2-flowered; glumes sub-equal, lanceolate, villous; flowers similar bisexual; lemmas lanceolate, awnless, densely hairy; palea lanceolate, 2-nerved, densely hairy; stamens 3, free; styles 2, free; stigmas 2, plumose.

1. Leaves glabrous above, up to 60 cm long; lemmas sparsely hairy.....**Z. elegans**
1. Leaves hairy above, up to 25 cm long; lemmas densely hairy.....**Z. sebastinei**

**Zenkeria elegans** Trin., Linnaea 11:150. 1837; Fischer in Gamble, Fl. Pres. Madras 1805. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 482. 1960; Britto & Matthew in Matthew, Fl. Tamil Nadu Carnatic 3 (2): 1914. 1983; Sreekumar & Nair, Fl. Kerala Grass. 363. 1991; Clayton in Dassan., Rev. Handb. Fl. Ceylon 8: 454. 1994; Sasidh. & Sivar., Fl. Pl. Thrissur For. 528. 1996.

Densely tufted perennials; culms 40-100 cm high, nodes glabrous. Leaves 30-60 x 0.3-0.8 cm, linear-lanceolate, flat, glabrous; margins serrulate, glabrous; sheath keeled, glabrous; ligule a row of hairs. Panicles 20-28 cm long, pyramidal, lax; branches filiform, glabrous. Spikelets 5-6 x 3 mm, pedicelled, glabrous; glumes equal, 3 x 1 mm, lanceolate, 1-nerved; lemma 5 x 1 mm, lanceolate, acuminate, sparsely hairy; palea 3 x 1 mm, 2-nerved, sparsely hairy; stamens 3, anthers 2 mm long.

*Fl. & Fr.* : June-December

*Distr.* : South India and Sri Lanka. Rare; in open grasslands at hilltops. Vallakkadavu, *JA 15419.*

**Zenkeria sebastinei** Henry & Chandrab., Bull. Bot. Surv. India 15: 142. 1973; Sreekumar & Nair, Fl. Kerala Grass. 364. 1991.

Tufted perennials; culms, 50 cm high; nodes sparsely hairy. Leaves 20-25 x 1 cm, elliptic-lanceolate, acute, narrowing towards the base, pubescent above; sheath keeled, glabrous; ligule a row of hairs. Panicle 15 x 7-8 cm, effuse; axis and branches hairy. Spikelets 4-5 x 3 mm, ovate-lanceolate, pedicelled; glumes sub-equal, 2.5-3 x 1.5 mm, ovate, acute; lemma 5 x 1 mm, lanceolate, 7-nerved, densely hairy; palea 4 x 1 mm, lanceolate, 2-nerved,
densely hairy; anthers 3 mm long; style very short; stigma 1.5 mm long.

*Fl. & Fr.* : August-December

*Distr.* : Endemic to South India. Rare; along rocky cuttings. Vellimala, *JA 13999.*

## 148. CYCADACEAE

Benth. & Hook. f., Gen. Pl. 443. 1880.

### CYCAS Linnaeus

Hort. Cliff. 482. 1737.

**Cycas circinalis** L., Sp. Pl. 1188. 1753; Dyer in Hook. f., Fl. Brit. India 5: 656. 1888; Fischer in Gamble, Fl. Pres. Madras 1394. 1928.

Small dioecious trees, scarcely branched; stems clothed with thick leaf bases. Leaves collected into a terminal caudex, pinnate, 1-2.5 m long; leaflets many, to ,30 x 1.5 cm, linear, acuminate at apex, acute at base. Female reproductive organs or loose axillary cluster of ovuliferous scales, 10-20 cm long, subterete, with a terminal rhomboid serrate appendage, densely pubescent. Ovules 4- 10, arranged in two rows. Male reproductive organs of terminal strobilus of microsporosphylls, rhomboid to cuneate with a sharp upturned tip. Sporangia densely packed along the lower surface. Seeds to 4.5 x 2.5 cm, oblong to ellipsoid.

*Fl. & Fr.* : Strobilus appeared in February.

*Distr.* : Tropical Africa, South-East Asia. Occasional; in moist deciduous forests. Koruthode, *JA 18616.*

## 149. PODOCARPACEAE

Benth. & Hook. f., Gen. Pl. 433. 1880.

### NAGEIA Gaertner

Fruct. 1: 191, t. 39. 1788.

**Nageia wallichiana** (Persl.) Kuntze, Rev. Gen. Pl. 2:800.1891. ***Podocarpus wallichianus*** Persl. Bot. Bremek. 110.1844; Fischer in Gamble, Fl. Pres. Madras 1392. 1928. ***Podocarpus latifolia*** Wall., Pl. Asiat. Rar. 1:26.t.30.1830, non (Thunb.) R.Br. 1825; Dyer in Hook. f., Fl. Brit. India 5: 649. 1888. ***Decussocarpus wallichianus*** (Persl.) Laubenf. in Arnold Arbor. 50:349.1969.

Dioecious evergreen trees. Leaves opposite, simple, 7-15 x 2-5 cm, elliptic-oblong. acute at both ends, coriaceous, shining above, nerves parallel. Male strobilus axillary, solitary, to 3 cm long, cylindrical; microsporophylls many, imbricate; sporangia 2, sessile. Female strobilus much reduced to single ovuliferous scale with two ovules. Seeds globose.

*Fl. & Fr.* : October- May

*Distr.*: Indo-Malesia. Common; in Evergreen forests. Chokkampetti, *JA 18617.*

## 150. GNETACEAE

Benth. & Hook. f., Gen. Pl. 417. 1880.

### GNETUM Linnaeus

Mant. 1: 18. n. 1278. 1767.

**Gnetum ula** Brongn. in Duper, Voy. Coquille 7: 12. 1829; Bharadwaj, J. Ind. Bot. Soc. 36: 415. 1957: Mahashwari & Vasil Bot. Monogr. C. S. I. R. New Delhi 1: 9. 1961. ***G. scandens*** sensu Brandis, For. Fl. 502. 1874, non Roxb., 1832; Hook.f., Fl. Brit. India 5: 642. 1888, *p.p.*: Fischer in Gamble, Fl. Pres. Madras 1885. 1936. ***G. funiculare*** Smith ex Wight, Ic. t. 1955. 1853 **Ondal, Ondakkody** (Mannan).

Large woody lianus; branchlets terete, smooth with swollen nodes. Leaves opposite, simple, elliptic-ovate, to 15 x 7 cm, glabrous, nerves 3-5 pairs, reticulate. Strobilus axillary or terminal, to 7 cm long, with whorls of ovules in female cone and stamens in male cone, both supported by cupular bracts. Seeds to 3.5 x 1.5 cm, oblong, smooth, shining.

*Fl. & Fr.*: February-June.

*Distr.* : India & Malaya. Common; in moist deciduous and semi-evergreen forests. Thekkady, *JA 18618.*

*Ethnobotanical use* : The seeds are roasted and eaten (Mannan).

# 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 Antarctica, 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 polytopic species (Wood, 1974). 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 possess more than 4000 species including many paleo-endemics (Nayar, 1982). In the present study area, Periyar Tiger Reserve, also this fact is evidently proved.

## Floristic Diversity

In the Periyar Tiger Reserve there are 1978 species of flowering plants and 3 Gymnosperms. The magnitude of the species diversity is clear when this is compared with that of other regional and district Floras of Kerala. See Table 2.

The total number of 1978 species belonging to 147 families recorded from the area of present study form more than half of the flora of the Kerala state (3,800 species) and is nearly half of the flora of the Western Ghats (Fig. 81) and more than 10% of the flora of India. Of the 1978 species Dicotyledons are represented by 1449 species belonging to 621 genera under 124 families, and Monocotyledons by 529 species belonging to 210 genera under 23 families. Except Asclepiadaceae, which is represented in Western Ghats by 30 genera and 90 species, all the top ten families of Western Ghats are well represented in Periyar Tiger Reserve also. Asclepiadaceae is poorly represented with only 13 genera and 30 species. Poaceae with 164 species in 76 genera is the largest family; Fabaceae with 155 species in 52 genera comes next; Orchidaceae is the third largest with 148 species in 60 genera. Among the rest of the families Cyperaceae has 91 species in 15 genera, Rubiaceae with 90 species in 34 genera, Asteraceae with 88 species in 44 genera, Euphorbiaceae with 83 species in 37 genera, Acanthaceae with 70 species in 21 genera, Lamiaceae with 47 species in 14 genera, and Lauraceae with 36 species in 9 genera. Among the 147 families, 26 dicot and 6 monocot families are represented by single species each. The relative abundance of the top ten families of the Tiger Reserve and the Western Ghats is given in Table 3.

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

| Name of the Flora | Number of species | Area $km^2$ | References |
|---|---|---|---|
| Flora of Calicut District | 983 | 600 | Manilal & Sivarajan, 1982 |
| Flora of Cannanore District | 1132 | 3,670 | V. J. Nair & Ramachandran, 1988 |
| Flora of Palghat District | 1355 | 4,400 | Vajravelu, 1990 |
| Flora of Pathanamthitta District | 1250 | 2,697 | Anilkumar, 1993 |
| Flowering Plants of Thrissur Forests | 1225 | 1,041 | Sasidharan, 1996 |
| Flora of Silent Valley | 966 | 90 | Manilal, 1988 |
| Flora of Malappuram District | 813 | 3,548 | Babu,1990 |
| Flora of Nilambur | 1132 | 150 | Sivarajan & Philip Mathew, 1997 |
| Flora of Shenduruny W.L. Sanctuary | 951 | 100 | Sasidharan, 1996 |
| Flora of Chinnar W.L. Sanctuary | 965 | 90.5 | Sasidharan, 1998 |
| Flora of Thiruvananthapuram District | 1270 | 2,191 | Mohanan & Henry, 1994 |
| Floristic studies of Agasthyamala, Western Ghats | 1084 | 200 | Mohanan & Henry, 1995 |
| Periyar Tiger Reserve | 1978 | 777 | Present study |

A comparison of the relative dominance of families of South India and that of the Tiger reserve shows some interesting data (Fig. 82). The first two largest families of South India namely Poaceae and Fabaceae are well represented in the study area also. Orchidaceae stands third in the order of dominance in South India. Cyperaceae, the 4$^{th}$ dominant family in the study area is 5$^{th}$ in South India. Rubiaceae is the 5$^{th}$ dominant family in Tiger Reserve and is the 9$^{th}$ dominant family in South India. Asteraceae and Euphorbiaceae which are the 6$^{th}$ and 7$^{th}$ dominant families respectively in the study area are 7th and 6th in South India. Acanthaceae, the 8th dominant family in the Periyar Tiger Reserve is the 4th dominant family of South India. Lamiaceae and Lauraceae are the 9th and 10th dominant families respectively in the Tiger

Reserve. Except Asclepiadaceae which is the 10th dominant family of South India, all the other 9 families are dominant in the study area, though their ranks are slightly different.

**Fig. 81. Comparison of flora of Periyar Tiger Reserve (PTR) with flora of Western Ghats and Kerala State**

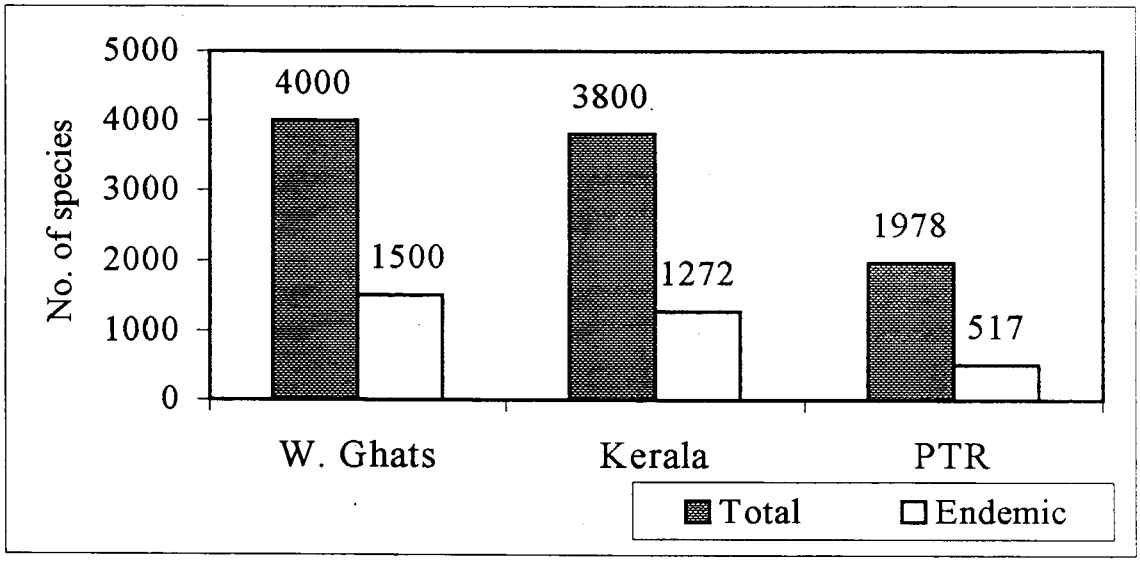
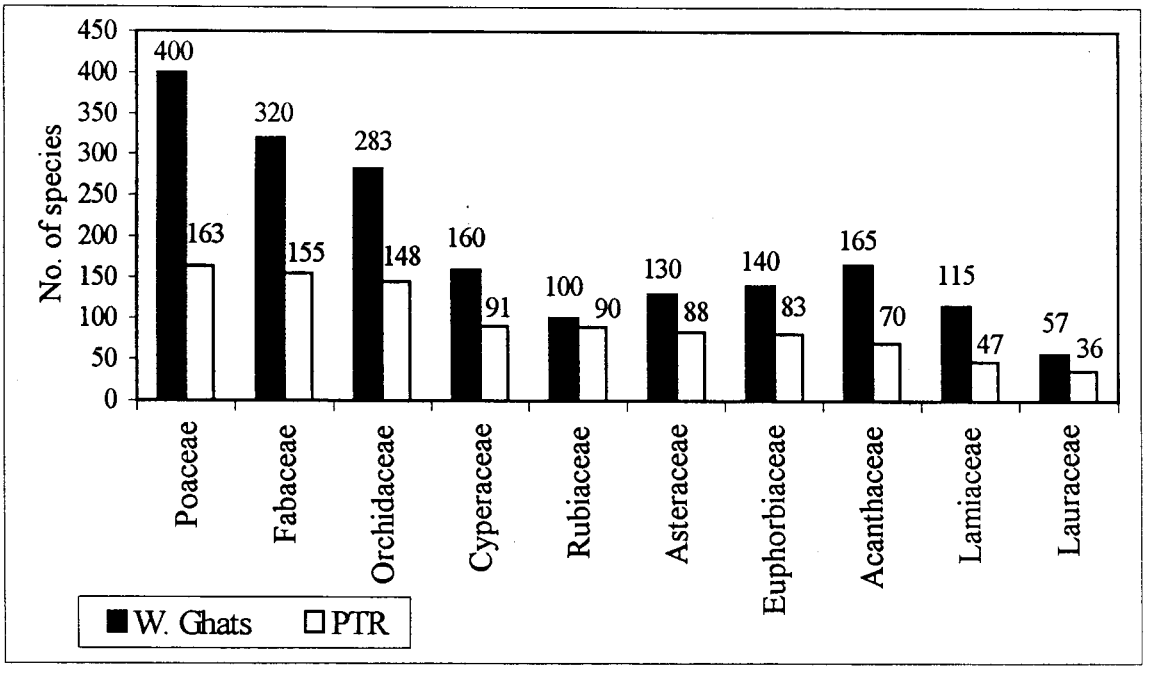



**Table 3. Relative abundance of top 10 families PTR and the Western Ghats**

| Sl. No. | Family | Periyar Tiger Reserve | | Western Ghats | |
|---|---|---|---|---|---|
| | | Genera | Species | Genera | Species |
| 1. | Poaceae | 76 | 164 | 120 | 400 |
| 2. | Fabaceae | 52 | 155 | 85 | 320 |
| 3. | Orchidaceae | 60 | 148 | 75 | 283 |
| 4. | Cyperaceae | 15 | 91 | 21 | 160 |
| 5. | Rubiaceae | 34 | 90 | 40 | 100 |
| 6. | Asteraceae | 44 | 88 | 57 | 130 |
| 7. | Euphorbiaceae | 37 | 83 | 55 | 140 |
| 8. | Acanthaceae | 21 | 70 | 45 | 165 |
| 9. | Lamiaceae | 14 | 47 | 25 | 115 |
| 10. | Lauraceae | 9 | 36 | 11 | 57 |

**Fig. 82. Comparison of 10 dominant families of PTR with Western Ghats**




# Analysis of the first three major families

## 1. Poaceae

Poaceae stands first in the order of dominance and is well represented by 163 species belonging to 76 genera. The 164 species collected from the Periyar Tiger Reserve belong to 75 genera of 17 tribes. The subfamily *Panicoideae* is represented by 48 genera and 109 species; *Pooideae* by 23 genera and 49 species, and *Bambusoideae* by 4 genera and 6 species. Among the 75 genera, *Eragrostis* and *Panicum* have the highest representation with 9 species each. The genera *Arundinella, Cyrtococcum, Digitaria, Isachne, Ischaemum* and *Setaria* have 6 species each. Genera with 5 species each are *Arthraxon, Dimeria* and *Garnotia;* with 4 species each are *Brachiaria, Chrysopogon, Paspalum* and *Sporobolus;* with 3 species are *Cymbopogon, Dichanthium, Echinochloa, Sacciolepis, Themeda* and *Tripogon;* and with 2 species are *Bothriochloa, Oplismenus, Oryza, Pennisetum, Pseudoxytenanthera* and *Zenkeria*. Forty eight genera are represented by one species each.

Sreekumar and Nair (1991) recorded the occurrence of 296 species of 103 genera belonging to 24 tribes, excluding species of *Bambusoideae* from Kerala. Among the 24 tribes, members of *Aleuropodeae, Arundineae, Phareae, Thysanolaeneae* and *Zoysieae* are confined to the

wetlands and backwater habitats and the tribe *Agrostideae* is specific to montane grasslands of above 2000m altitude. Since the Periyar Tiger Reserve does not contain these habitats, the members of these tribes are hardly represented. Further 107 species prefer the plains including coastal belts. Thus excluding the species belonging to the above groups, the occurrence of 163 species in the Periyar Tiger Reserve shows the richness and diversity of the grass flora.

Among the 164 species recorded, 33 species are endemic to Peninsular India (Ahmedullah & Nayar, 1987; Sreekumar & Nair, 1991), of which *Arthraxon lanceolatus, Cleistachne sorghoides, Dimeria connives, D. deccanensis* and *Streptogyna crinita* are considered rare and threatened. The collections of *Arthraxon meeboldii* from the Tiger Reserve forms a new record for South India, and that of *Brachiaria brizantha, Dimeria fuscescens, D. mooneyi, Tripogon pauperculus, Oplismenus undulatifolius, Oropetium thomaeum, Setaria verticillata*, and *Tragus biflorus* are new records of their occurrence in Kerala. Relative abundance of grasses occurring in the study area and that in whole of Kerala State and Sri Lanka is shown in Table 4.

**Table 4. Relative abundance of grasses of Periyar Tiger Reserve (PTR) with Kerala State and Sri Lanka**

| Area | Tribe | Genera | Species |
|---|---|---|---|
| P. T. R | 17 | 76 | 164 |
| Kerala | 24 | 24 | 296* |
| Sri Lanka | 21 | 136 | 340 |
| Taxa Common to PTR and Sri Lanka | 12 | 12 | 112 |

* excluding *Bambusoideae*

## 2. Fabaceae

Fabaceae, a predominantly tropical family with diverse group of plants, stands second in the order of dominance with 52 genera and 155 species under 3 subfamilies. This family is well represented in Western Ghats with 85 genera and more than 400 species. The members of this family except some species of *Crotalaria, Derris benthamii, Atylosia trinervia, Desmodium ferrugineum* ssp. *wynaadense, Flemingia grahamiana, F. wallichii, Indigofera spicata, Parochetus communis* and *Archidendron clyperia* occupy in all habitats and comparatively less

in higher altitudes Though Fabaceae is considered a herbaceous family there are 18 trees and 8 lianas and some of them are top canopy species *viz.*, *Kingiodendron pinnatum, Albizia lebbeck, A. odoratissima, Xylia xylocarpa, Pterocarpus marsupium, Ormosia travancorica, Erythrina stricta, Dalbergia sissoides, D. latifolia*, etc. Some of the notable climbers are *Derris brevipes, D. benthamii, Spatholobus parviflorus, Kunstleria keralensis, Dalbergia volubilis, D. beddomei, Entada rheedei, Caesalpinia bonduc, Millettia rubiginosa, Mucuna monosperma*, etc. Larger genera are *Crotalaria* (22 species), *Desmodium* (20 species), *Cassia* (10 species) and *Indigofera* (9 species). An analysis of the family and its constituent members is given in Table 5. Table 6 contains the list of genera with 5 or more than 5 species and the endemics out of them.

**Table 5. Analysis of the family Fabaceae represented in PTR**

| | |
|---|---|
| Genera | 52 |
| Species | 155 |
| Faboideae | 122 |
| Caesalpinioideae | 20 |
| Mimosoideae | 13 |
| Genera with more than 5 species | 7 |
| Species endemic to Western Ghats | 37 |
| Species restricted to S. India and Sri Lanka | 29 |
| Number of Tree members | 18 |
| Shrubs or erect herbs | 97 |
| Climbers or twiners | 40 |
| Rare and threatened species | 14 |
| No of species considered extinct | 3 |

Of the 155 species of Leguminous plants, 37 species are endemic to Western Ghats which harbour 58 endemic legumes. There are 14 rare and threatened species belonging to Fabaceae in the Tiger Reserve of which *Crotalaria peduncularis, Humboldtia bourdillonii* and *Smithia venkobarowii* are considered possibly extinct (Nayar, 1997). *Crotalaria peduncularis*, a herb or small shrub is found in margins of grasslands at an altitude of 1200 m. *Humboldtia bourdillonii*, originally collected and described from Peermedu, Idukki district of Kerala was not collected

**Table 6. Genera with 5 or more than 5 species and the number of endemics ( Fabaceae)**

| Genera | Number of species | Endemic species |
|---|---|---|
| *Crotalaria* | 22 | 10 |
| *Desmodium* | 20 | 2 |
| *Cassia* | 10 | 0 |
| *Indigofera* | 9 | 0 |
| *Flemingia* | 6 | 2 |
| *Smithia* | 6 | 2 |
| *Dalbergia* | 5 | 2 |
| *Atylosia* | 5 | 1 |

after the type collection ( Nayar, 1997; Sasidharan, 1998). This small tree is usually found along stream sides in dense evergreen forests at 100-200 m altitudes. *Smithia venkobarowii* is an annual herb found along the rocky cuttings in grasslands at 700-900 m altitudes. Sasidharan and Sivarajan (1996) collected this species from Sholayar of Thrissur District.

## 3. Orchidaceae

The third largest family of the study area stands with 60 genera and 148 species. The present record of 148 species of orchids from the Reserve is the highest number recorded from a District or Sanctuary in Kerala state (Table 7). This include 88 epiphytes and 59 terrestrials. *Oberonia* with 17 species is the largest genus followed by *Habenaria* with 15 species. *Bulbophyllum* and *Dendrobium* are represented by 11 species each. Other genera with 5 or more species are *Eria*, *Liparis* and *Peristylus* (Table 8). Among the 142 endemics of Peninsular India (Sathish Kumar & Manilal, 1994), 58 species occur in the Reserve. Occurrence of three species *viz.*, *Dendrobium herbaceum, Eria reticosa* and *Habenaria longicorniculata* extend up to N E India. Thirty six species are common to South India and Sri Lanka and 51 species extend to Malesia. A summary of the number of genera, species, their distribution etc, are given in Table 9.

Among the endemics, many are listed under the various threat categories (Nayar & Sastry, 1987, 1988, 1990 and Nayar, 1996, 1997). *Taeniophyllum scaberulum* Hook. f., which was considered as extinct is relocated from the Reserve after a gap of more than 140 years (Rajesh *et al.*, 1997). *Vanda thwaitesii* Hook. f., considered extinct in its home country, Sri Lanka, is also recorded from the Reserve. *Bulbophyllum macraei* (Lindl.) Reichb. f., *B. mysorensis* Wt., *B.*

*xylophyllum* Par. & Reichb. f., *Eulophia pratensis* Lindl. and *Cheirostylis parvifolia* Lindl. are new distribution records for Kerala state.

**Table 7. Abundance of genera and species of Orchidaceae in various regions in Kerala State**

| Area | Species | Genera | Reference |
|---|---|---|---|
| Kerala State | 216 | 70 | Manilal & Sathish Kumar (1993) |
| Periyar Tiger Reserve | 148 | 60 | Present study |
| Silent Valley | 108 | 49 | Manilal (1988) |
| Thiruvananthapuram District | 74 | 43 | Mohanan & Henry (1994) |
| Agastyamalai Forests | 74 | 41 | Mohanan, *et al.* (1997) |
| Palghat District | 73 | 42 | Vajravelu (1990) |
| Shenduruny Wildlife Sanctuary | 70 | 44 | Sasidharan (1997) |
| Thrissur Forests | 69 | 39 | Sasidharan & Sivarajan (1996) |
| Cannanore District | 47 | 35 | Ramachandran & Nair (1988) |
| Nilambur Forests | 39 | 28 | Sivarajan & Mathew (1996) |
| Thenmala Forest Division | 25 | 18 | Subramanian (1995) |
| Calicut District | 10 | 9 | Manilal & Sivarajan (1982) |

**Table 8. Genera of Orchidaceae of PTR with 5 or more species**

| Genera | species |
|---|---|
| *Oberonia* | 17 |
| *Habenaria* | 15 |
| *Bulbophyllum* | 11 |
| *Dendrobium* | 10 |
| *Eria* | 6 |
| *Liparis* | 6 |
| *Peristylus* | 5 |

**Table 9. Orchids of Periyar Tiger Reserve - an analysis**

| | |
|---|---|
| Genera | 60 |
| Species | 148 |
| Epiphytes | 88 |
| Terrestrials | 58 |
| South Indian endemics | 58 |
| Species with extended distribution up to NE India | 3 |
| Species common to South India and Sri Lanka. | 36 |
| Indo-Malesian | 51 |

## Analysis of the genera of Periyar Tiger Reserve

Of the 823 genera there are 26 genera with more than 10 species in each. They are *Impatiens* (28), *Strobilanthes* (23), *Crotalaria* (22), *Cyperus* (20), *Desmodium* (20), *Fimbristylis* (18), *Ficus* (18), *Oberonia* (17), *Habenaria* (15), *Syzygium* (15), *Diospyros* (15), *Eriocaulon* (14), *Vernonia* (13), *Ipomoea* (13), *Phyllanthus* (12), *Litsea* (12), *Hedyotis* (12), *Solanum* (12), *Psychotria* (11), *Blumea* (11), *Bulbophyllum* (11), *Dendrobium* (11), *Justicia* (10), *Cassia* (10), *Symplocos* (10) and *Lindernia* (10). There are 467 genera represented by single species each.

In the Western Ghats, *Impatiens* with 86 species is the largest genus. In the study area also it is the largest genus among the 814 genera. 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 Tirunelveli-Agasthyamala Hills. Of the 86 species recorded from Western Ghats, 67 are reported to occur in Kerala. The Periyar Tiger Reserve, with its major part in the Anamudi High Range, is one of the centres with a high percentage of endemism. In the Anamudi High Range centre, there are 23 endemic species of *Impatiens*. Of these, 10 species are considered rare and threatened. Among the 30 species collected from the Tiger Reserve, 26 are Western Ghat endemics. *Impatiens leptura* and *I. verecunda* are collected for the first time after their type collections. The collection of *Impatiens acaulis*, *I. rupicola* and *I. trichocarpa* during the course of present study are new records of their occurrence in Kerala.

*Strobilanthes* (Acanthaceae) with 46 species in Western Ghats is well represented in the study area also. There are 23 species of *Strobilanthes* in the Tiger Reserve. As Bremekamp (1944) has not sufficiently studied the Indian materials (Matthew, 1970), his scheme of treatment cannot be treated as a perfect one and hence the broad generic circumscription of the genus by Anderson (1864 & 1867) is followed in the present study. Though all the 23 species of this shrubby monocarpic genus are seen well flourished in the evergreen forests throughout the reserve, there is significant abundance of *S. luridus, S. sessilis, S. micranthus, S. foliosus, S. asperrimus*, etc. in higher altitudes. All the species found in the study area are endemic to W. Ghats except two species viz., *S. anceps* and *S. asperrimus*. *S. jeyporensis* is a critically endangered species.

The genus *Ficus* L. is reported to have 37 taxa including infraspecific taxa in South India (Fischer, 1928; Rani, 1985; Henry *et al.*, 1987), and of these, 30 are indigenous and the rest

exotics. Among the 30 indigenous, 17 taxa occur in Sri Lanka also (Corner, 1981) showing the affinity between the floras of these two regions. In the study area there are 18 species of which *Ficus beddomei and F. rigida var. bracteata and F. virens* are endemic to southern Western Ghats. Two species viz., *F. caulocarpa* and *F. costata,* are new additions to the flora of India (Sasidharan & Jomy, 1999). The former has a distribution from Sri Lanka to Solomon Islands, through Myanmar, Malaysia and Indonesia, and the latter is confined to Sri Lanka (Corner, 1981).

*Vernonia* (Asteraceae) with more than 30 species recorded from W. Ghats (Nair & Daniel, 1986) is well represented in the study area also with 13 species. The only two tree species of this genus in Western Ghats, viz., *V. arborea* and *V. travancorica* are also seen in the study area with viable populations. The former is confined to the shola forests of high altitudes. There are 8 endemic vernonias in the Tiger Reserve. The species *Vernonia heynei, V. multibracteata, V. peninsularis, V. saligna* and *V. salvifolia* are rare and threatened and *Vernonia multibracteata* was considered critically endangered (Nayar & Sastry, 1990) or possibly extinct (Nayar, 1997). There are 35 species of *Ceropegia* (Asclepiadaceae) in Western Ghats (Ansari, 1984) and 8 species are seen in the study area; of the 8 species, 6 are endemic to southern Western Ghats. *Ceropegia beddomei* and *C. pusilla* are threatened species. Of the 15 species of *Piper* (Piperaceae) in Western Ghats, 9 occur in Periyar Tiger Reserve; of the 9 species 5 are endemic to southern Western Ghats. Of the 12 species of *Garnotia* (Poaceae) in India 9 species occur in W. Ghats (Prakash & Jain, 1979) and 5 species in the study area. *Garnotia courtallensis* and *G. elata* are endemic to southern Western Ghats.

The flora of Western Ghats shows strong affinity with Sri Lankan flora as indicated by the distribution of many endemic species in both the regions. The study area, Periyar Tiger Reserve, also has a number of such endemics. Notable among them are *Clematis gouriana, Naravelia zeylanica, Filicium decipiens, Gordonia obtusa, Olax scandens, Gouania microcarpa, Crotalaria nana, Pterocarpus marsupium, Osbeckia wightiana, Begonia malabarica, Neurocalyx calycina, Hedyotis nitida, Tarenna asiatica, Maesa indica, Canscora wallichii, Teucrium tomentosum, Apama siliquosa, Litsea deccanensis, Helixanthera hookeriana, Schumannianthus virgatus, and Calamus pseudo-tenuis.* Some species hitherto considered as Sri Lankan endemics like *Ficus costata, Vanda thwaitesii,* and *Symplocos obtusa* var. *pedicellata* have been collected from the study area and their occurrence are reported for the first time in India by the present study

## Endemic plants

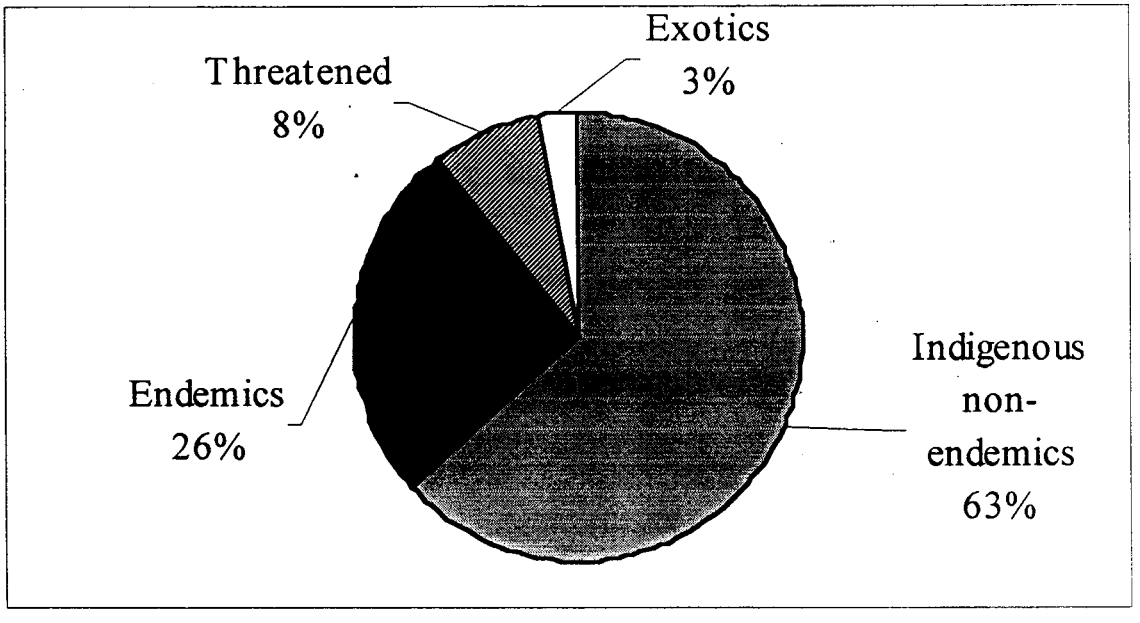
Peninsular India especially the windward side of the Western Ghats has the maximum aspects of vegetation due to moderate to high rainfall during the two monsoon seasons, which favor a unique flora. The highly undulating slopes with sheer cuttings along the western side make it a birth-place and cradle of many species. Hence the endemism along this hilly tracts are comparatively very high. There are 1,923 taxa of flowering plants endemic to Peninsular India (Ahmedullah & Nayar, 1987). Out of the estimated 3,800 species of flowering plants in Kerala, 1272 are endemic to the southern Western Ghats (Nayar, 1996). There are no endemic families in South India. Of the 58 endemic genera of Western Ghats, *Anaphyllum, Aenhenrya, Helicanthes, Indobanalia, Indotristicha, Otonephelium Smithsonia* and *Solenocarpus* are found in the study area. The endemic genera like *Nilgirianthus, Phlebophyllum, Taeniandra* and *Xenacanthus* of Acanthaceae are treated here under *Strobilanthes* following the broader concept of the genus.

Among the 1978 species of flowering plants collected from the Tiger Reserve, 517 are southern Western Ghats endemics which form about 26 percent. In the study area the family Orchidaceae stands first with 55 endemic species; Rubiaceae have 35, Acanthaceae have 32, Poaceae and Fabaceae have 25 each, Lauraceae, Balsaminaceae and Euphorbiaceae have 25 each, Lamiaceae have 19, Melastomataceae have 18, and Asteraceae have 11 endemic species.

There are 86 species of *Impatiens* in South India of which 78 are endemics and 20 of them are confined to the Anamalai High Ranges. Out of the 28 species of *Impatiens* collected during the study, 26 are endemic to South India. The genus *Strobilanthes* shows a high percentage of endemism, *i.e.*, 43 out of the 46 species and 5 varieties in South India are endemics. In Periyar Tiger Reserve, the genus is represented by 23 species of which 21 are endemic to Western Ghats. *Crotalaria* is reported to have 75 species in South India and 36 of them are endemics. From the Tiger Reserve 22 species were collected including 9 endemics. *Syzygium* is represented in South India by 33 species of which 21 are endemics. From the Tiger Reserve 14 species were collected including 6 endemics. *Sonerila* has a relatively high percentage of endemism, *i.e.*, out of the 27 species reported from South India, 25 are endemics. All the 8 species collected from the Tiger Reserve are endemics. Out of the 16 endemic species of *Litsea*, 10 are found in the study area. There are 31 species of *Ceropegia* including 27 endemics in South India. From the Periyar Tiger Reserve 8 species were collected including 6 endemics. The

genus *Hedyotis* is fairly well represented in South India by 51 species with 30 endemics. Twelve species of *Hedyotis* including 9 endemics were collected from the Tiger Reserve. There are 30 species of *Vernonia* reported from South India and 25 of them are endemics. Out of the 13 species collected from the study area, 11 are endemics to South India. *Oberonia* has 17 species in the Tiger Reserve including 10 endemics. Fifteen species of *Habenaria* could be collected from the study area of which 11 are endemic to South India. The genus *Bulbophyllum* is represented by 11 species including 9 endemics. *Dendrobium* has 11 species, of which 8 are endemic to South India. The pie diagram (Fig. 83) shows the percentage of endemics, threatened species, exotics and indigenous non-endemics are represented in the study area. A comparison of number of species belonging to tree genera with 5 or more than 5 species occurring in the study area with that of Western Ghats is given in Table 10.

**Fig. 83. Relative abundance of endemics, threatened species, exotics and indigenous non-endemics in the PTR.**




Nayar (1996) has identified 5 centres of endemism in southern Western Ghats namely **Agasthymalai Hills, Anamalai High Ranges, Palani Hills, Nilgiri-Silent Valley-Wyanad-Kodagu** and **Shimoga-Kanara**. The Tiger Reserve falls within the Anamalai High Range centre. Nayar (1996) estimated that there are 94 species exclusively endemic to this region. During the present study 25 species endemic to the Anamalai-High Ranges were collected.

**Table 10. Analysis of the tree genera with 5 or more species and the number of endemics in PTR and that of Western Ghats**

| Genera | Total no. of species in PTR | Endemic species | Endemic species in Western Ghats* |
|---|---|---|---|
| *Litsea* | 12 | 9 | 15 |
| *Syzygium* | 15 | 9 | 11 |
| *Symplocos* | 10 | 7 | 14 |
| *Diospyros* | 13 | 7 | 8 |
| *Cinnamomum* | 7 | 6 | 12 |
| *Memecylon* | 8 | 6 | 9 |
| *Drypetes* | 6 | 5 | 6 |
| *Actinodaphne* | 5 | 5 | 9 |
| *Glochidion* | 6 | 3 | 9 |
| *Grewia* | 8 | 2 | 8 |

* Nair & Daniel, 1986.

Among the 515 endemic species collected from Tiger Reserve, *Actinodaphne campanulata, Euonymus paniculata, Memecylon subcordatum, Eugenia calcadensis, Syzygium parameswaranii, Pothos thomsonianus, Marsdenia tirunelvelica, Pogostemon travancoricus, Trias bonaccordensis, Phyllanthus beddomei* and *Impatiens viridiflora* were hitherto considered restricted to the Agasthyamala regions. *Photinia serratifolia, Actinodaphne salicina, Symplocos macrophylla* ssp. *microphylla, Symplocos pulchra* var. *pulchra, Paracroton integrifolius, Curcuma haritha, Bulbophyllum aureum, B. elegantulum, Eria polystachya, Habenaria cephalotes, Spiranthes sinensis* and *Arisaema tylophorum* considered to be restricted to the Nilgiri-Silent Valley-Kodagu region were also collected from the Tiger Reserve. *Vaccinium neilgherrense* and *Anisochilus argenteus* considered to be confined to the Palni Hills were also collected from the Tiger Reserve.

## Rare and Threatened plants

The rare and threatened plants of South India are relatively well documented by Joseph (1977), Henry *et al.* (1979), Jain and Sastry (1984), Ahmedullah and Nayar (1987), and Nayar

and Sastry (1987, 1988, 1990). Nayar (1997) listed out 1272 endemic taxa of Kerala, and 460 of them were placed under the threat categories. Vivekananthan (1978) published a list of 12 rare and threatened plants of the Periyar Tiger Reserve. During the present study 150 taxa that have been placed under various threat categories could be collected and are listed in the Appendix I.

Among the 150 threatened category species collected, the following 17 viz., *Ardisia blatteri* Gamble, *Cordia octandra* DC., *Ceropegia maculata* Bedd., *Anacolosa densiflora* Bedd., *Casearia rubescens* Dalz., *Coffea crassifolia* Gamble, *Crotalaria peduncularis* Grah. ex Wight & Arn., *Diplocentrum congestum* Wight, *Humboldtia bourdillonii* Prain, *Ilex gardneriana* Wight, *Nothopegia racemosa* (Dalz.) Ramam., *Osbeckia aspera* Blume var. *travancorica* (Gamble) Hansen, *Smithia venkobarowii* Gamble, *Symplocos monantha* Wight, *Syzygium bourdillonii* (Gamble) Rathakr. & Nair, *Taeniophyllum scaberulum* Hook.f. and *Vernonia multibracteata* Gamble were considered 'possibly extinct' (Nayar. 1997). Of these *Ardisia blatteri* Gamble, *Cordia octandra* DC., *Ceropegia maculata* Bedd., *Coffea crassifolia* Gamble, *Diplocentrum congestum* Wight, *Osbeckia aspera* var. *travancorica* Hansen, *Smithia venkobarowii* Gamble were recently relocated (Sasidharan & Sivarajan, 1996; Sasidharan, 1997). The rest of the taxa are collected for the first time during the period of the present study after their type collections.

## Non-endemics and Exotics

The indigenous non-endemic plants in the study area constitute about 63% of the total species. Plants of humid Tropical-Asiatic elements in Indian vegetation came through the Assam Gateway, and another - Asiatic, Mediterranian and African elements through the North-West. The plants from Australia and America were mainly introduced in India by man during the past two centuries (Mani, 1974). The non-endemics and exotics of Periyar Tiger Reserve can be divided into American elements, Australian elements, Tropical Asiatic elements, Tropical African and Madagascan elements, and Pleistocene relicts.

American elements seen in the study area are: *Senebiera didyma, Anacardium occidentale, Cassia hirsuta, C. occidentalis, C. alata, Mimosa pudica, Passiflora foetida, Tridax procumbens, Erigeron mucronatum, Ipomoea phoenicia, Datura metel, Solanum seaforthianum, Lantana camara, Hyptis suaveolens, Gomphrena decumbens, Peperomia pellucida, Croton bonplandianum,* etc. Most of the American elements are in fact, fast spreading weeds.

Tropical Asiatic elements in the study area are more related to Indo-Chinese and Malayan elements. Temperate zone elements from Europe found in the Tiger Reserve are *Clematis* spp.. *Thalictrum javanicum, Ranunculus wallichianus, Viola pratensis, Viburnum punctatum, Anagallis pumilus, Senecio* spp., *Launaea acaulis, Lysimachia procumbens*, etc. Mediterranian elements found in the study area are *Erythroxylon monogynum, Plumbago zeylanica, Pseudarthria viscida, Peristrophe montana, Vicoa indica,* etc. Pleistocene relicts i.e., plants spread from Himalayas during Pleistocene Glaciatioin, found in the Tiger Reserve are *Clematis* spp., *Ranunculus wallichianus, Cardamine africana, Capsella bursa-pastoris, Polygala* spp., *Stellaria media, Parochetus communis, Indigofera pulchella, Heracleum candolleanum, Exacum* spp., *Swertia corymbosa, Pedicularis zeylanica, Teucrium tomentosum, Celtis* spp., etc.

Tropical African elements present in the Tiger Reserve are : *Abrus pulchellus, Albizia lebbeck, A. amara, Canavalia mollis, Cassia* spp., *Combretum ovalifolium, Crotalaria* spp., *Dolichos trilobus, Indigofera* spp., Ipomoea spp., *Striga* spp., *Coleus barbatus, Boerhavia* spp., *Peperomia* spp., etc. Australian elements found in the study area are: *Limnophila* spp., *Lindernia* spp., *Utricularia* spp., *Carex jackiana, Scleria* spp., *Apluda mutica*, etc. South American element are : *Ipomoea hederifolia, I. nil, Nicandra physalodes, Physalis peruviana, Solanum* spp., *Mecardonia procumbens, Scoparia dulcis, Hyptis suaveolens, Alternanthera* spp., *Gomphrena procumbens, Pupalia lappacea, Axonopus compressus,* etc. *Rhinacanthus nasuta, Stachytarpheta indica*, etc. are Malagasy elements found in the study area.

There are 1006 species of plants common to the Flora of Sri Lanka and that of Periyar Tiger Reserve. This includes 341 species of plants restricted to these regions. The occurrence of several Sri Lankan species like, two species of *Ficus* namely, *Ficus caulocarpa and Ficus costata,* one small tree, *Symplocos obtusa* var. *pedicellata* and an orchid, Vanda thwaitesii are new report of their occurrence in India.

It is estimated that there are 105 species of tropical weed plants (Mani, 1974) where there are 57 species were recognised in the study area which constitute about 3% of the floristic elements (Fig. 83). Most of them are very aggressive weeds which more or less disturb the natural vegetation to a large extent. Species like *Ageratina adenophora* (Crofton weed) *Lantana camara, Mikania cordata* (mile a minute), *Parthenium hysterophorus, Mimosa diplotricha* (the giant sensitive plant) (Fig. 84 A),*Chromolaena odorata* (siam weed), *Clidemia hirta* (Fig. 84 B), *Bidens pilosa* (beggars tick) etc. are major exotic invasive weeds which spread and cause singe species dominance to large extents in many places in the study area. Species like *Ageratina*

*adenophora, Pteridium aquilinum, Imperetta cylindrica*, etc. are usually found in burnt grasslands. Species like *Mikania cordata* (Bhaskaran Nair, 1967), *Lantana camara and Mimosa diplotricha* (Nair, 1964) form impenetrable thickets in moist deciduous or even evergreen forests which smother the local vegetation in some places especially along the traditional pilgrim route to Sabarimala temple. Old and abandoned cardamom plantations and large openings in evergreen forests created by Ganja (*Cannabis sativa*) planters are also with a dominance of exotic alien weeds.

## Wild relatives of cultivated plants

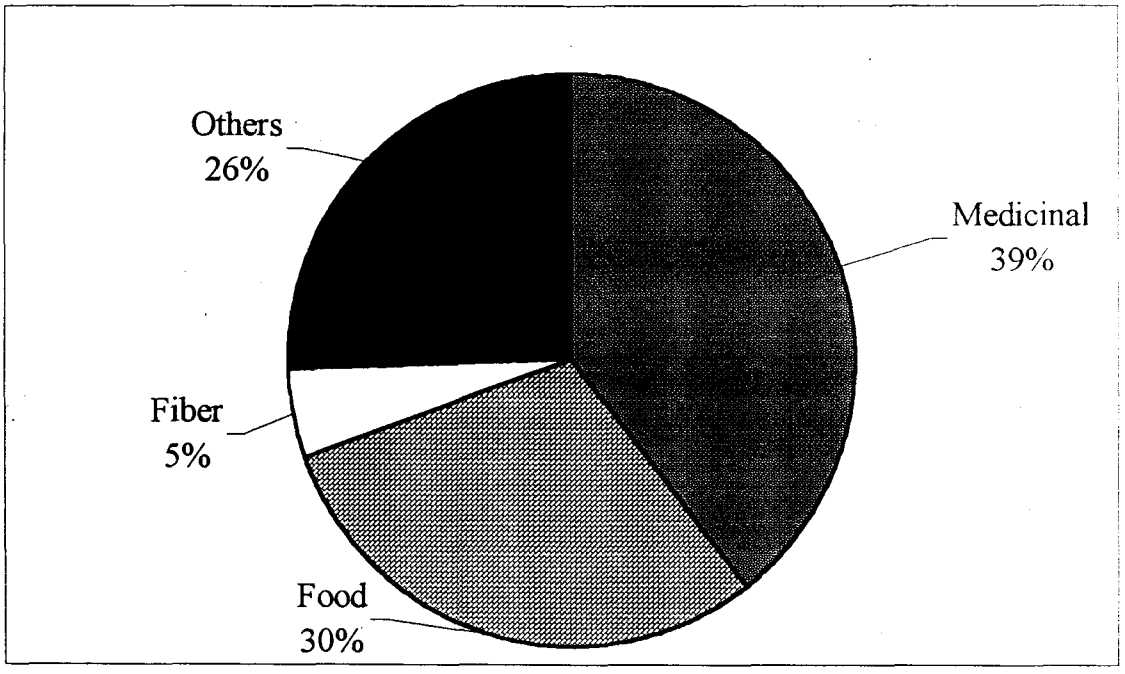
Arora & Roshini (1983) have given a detailed list of wild relatives of crop plants in India. They categorized the wild relatives of crop plants into cereals, pulses (leguminous plants), fruit crops, vegetables, oilseeds, fiber crops, spices and condiments. Jayaraman, *et el.*, (1987) has listed the edible species of the genus *Diospyros* in India. There are 107 plants recognised as related to cultivated plants and most of them are now utilized by the tribesmen in the study area. They are listed in the Appendix II. Of the 107 plants 29 species are fruit yielding plants (Appendix III). The fruits of *Solanum lasiocarpum, Passiflora foetida, Elaeagnus conferta, Spondias pinnata, Aporusa acuminata, Artocarpus gomezianus, Baccaurea courtallensis, Ziziphus rugosa, Rubus ellipticus*, etc. are edible and are used by the tribesmen of the study area. There are 28 species of plants related to cultivated vegetables, of which *Abelmoschus moschatus, Alocasia fornicata, Amorphophallus paeoniifolius, Colocasia esculenta, Dioscorea bulbifera, Dolichos trilobus, Luffa cylindrica, Momordica dioica, Solanum Melongena* var. *insanum, Vigna radiata, V. vexillata and Zehneria thwaitesii* are recommendable for improving the qualities of cultivated plants through breeding programmes. Wild relatives of spices collected from the study area are 23 species of which 8 species are belonged to the genus *Piper*. *Piper wightii* and *P. trichostachyon* with larger fruits and *Piper hymenophyllum* with longer spike are attracting resources for many Pepper breeders. Genera like *Amomum, Alpinia, Cinnamomum, Curcuma, Heracleum, Myristica, Zingiber*, etc. have species related to spices. Nine species of plants are recognised as wild relatives of cereals of which noticeable ones are *Eleusine indica, Hypolytrum nemorum, Oryza meyeriana* var. *granulata, O. rufipogon, Leersia hexandra, Sorghum nitidum*, etc. There are 18 species related to cultivated or wild medicinal plants and most of them are utilized by the tribesmen for medicinal purpose.

Fig. 84. A. *Mimosa diplotricha* C. Wight & Sanvalle
B. *Clidemia hirta* D. Don

# ETHNOBOTANICAL ANALYSIS

There are 180 plants recognised as of tribal use in Periyar Tiger Reserve of which 71 are of medicinal use, 54 are of food use, 9 species are used for extracting fibres and 46 plants are recorded for other uses like bait in angling, fish poisoning, canes, resins and other Minor Forest Produces. Relative percentage of various uses of the plants by the tribesmen of the study area is shown in Fig. 85.

**Fig. 85. Plants of ethnobotanical interest**




## Medicinal use

There are 71 species of plants (Table 11) recognised as being used for medicinal purposes including plants whose medicinal importance are hither to unknown and new uses of many medicinal plants and their mode of uses. Ten species of plants are used for easing child birth and mother care, 8 species are used for dysentery, 5 species each for body pain and fever, 4 species each for rheumatism and wound healing and 3 species are used for urinary disorders. The various new medicinal uses of plants like *Anamirta cocculus, Arenga wightii, Begonia albo-coccinia, Costus speciosus, Dictyospermum montanum, Ensete superba, Gloriosa superba, Heracleum candolleanum, Hibiscus hispidissimus, Kingiodendron pinnatum, Lantana camera,*

*Meliosma simplicifolia, Pittosporum tetraspermum, Polypleurum stylosum, Swertia corymbosa, Tephrosia pulcherrima* and *Terminalia paniculata* and their mode of uses are new information to science.

## Food use

There are 54 species of plants (Table 12) are used as food by these 5 tribal groups. Fruits of 33 plants are eaten, of which 29 fruits are eaten afresh. Tubers of 4 species and leaves of 8 species are used. Stem pith of 3 species namely, *Arenga wightii, Caryota urens and Ensete superba* are also used as food. The knowledge of the edible fruits of plants like *Antidesma acidum, Clausena dentata* and *Solanum lasiocarpum* and that of the edible pith of *Arenga wightii, Caryota urens* and *Phoenix loureirii* are addition to the genetic resource data base of the Agriculture.

## Other uses

The plants of other uses (Table 13 & 14) includes those plants used for fibre extraction, used as bait in angling, for fish poisoning, cane collection, resins, staining the fishing net, poles, insect repellent, thatching houses, etc. This include 8 species used for the extraction of fibres, 6 species for insect repellence, 7 species as bait in angling, 4 species for fish poisoning, etc.

**Table 11. List of Medicinal plants used by the Tribes indicating the parts used, particular disease for which it is used, and the name of the tribe who use them**

| | Species | Part(s) | Uses | Tribe* |
|---|---|---|---|---|
| 1. | *Acacia caesia* | seeds | repellant for lice | MA |
| 2. | *Acacia pennata* | bark | tonsillitis | MA |
| 3. | *Acacia sinuata* | seeds | rheumatism | M |
| 4. | *Ageratina adenophora* | leaves | wound heeling | M |
| 5. | *Ageratum conyzoides* | leaves | diarrhea | M |
| 6. | *Amorphophallus paeoniifolius* | corm | piles | MA |
| 7. | *Anamirta cocculus* | seeds | childbirth | MA |
| 8. | *Anaphyllum wightii* | tuber | antidote | MA |
| 9. | *Andrographis paniculata* | entire | fever | MA |

Table 11. *Contd..*

| | Species | Part(s) | Uses | Tribe* |
|---|---|---|---|---|
| 10. | *Arenga wightii* | pith-starch | jaundice | MP |
| 11. | *Aristolochia indica* | root, stem | diarrhea | M |
| 12. | *Artemisia nilagirica* | stem | worm, lice | M |
| 13. | *Asparagus racemosus* | tuber | chest pain | MA |
| 14. | *Begonia albo-coccinea* | entire | syphilis | M |
| 15. | *Caesalpinia bonduc* | seeds | stomach ache | MA |
| 16. | *Callicarpa tomentosa* | leaves | rheumatism | M |
| 17. | *Centella asiatica* | entire | fever | M |
| 18. | *Chromolaena odorata* | tender parts | wound heeling | MA |
| 19. | *Cissus discolor* | root tubers | wound heeling | MA |
| 20. | *Colocasia esculenta* | corm | rheumatism | MA |
| 21. | *Costus speciosus* | stem juice | eye diseases | MA |
| 22. | *Curculigo orchioides* | tuber | increase lactation | MA |
| 23. | *Cyathula prostrata* | entire | inflammation | MA |
| 24. | *Cyclea fissicalyx* | stem | reduce fatigue | MP |
| 25. | *Cyclea peltata* | stem | diarrhea | M |
| 26. | *Cymbopogon flexuosus*. | leaves | insect repellant | M |
| 27. | *Dictyospermum montanum* | stem | water for fever patients | M |
| 28. | *Diploclisia glaucescens* | leaves & stem | nerve tonic | MA |
| 29. | *Dracaena terniflora* | stem | for nerve tonic | MP |
| 30. | *Elephantopus scaber* | root | migraine | MA |
| 31. | *Emilia sonchifolia* | entire | heart diseases | MA |
| 32. | *Ensete superba* | seeds | kidney stones | M |
| 33. | *Gloriosa superba* | tuber | delivery problems | MA |
| 34. | *Heracleum candolleanum* | seeds | gastric problems | M |
| 35. | *Hibiscus hispidissimus* | leaves | fever | M |
| 36. | *Hiptage benghalensis* | leaves | body pain | M |
| 37. | *Kingiodendron pinnatum* | oil | body pain | MA |
| 38. | *Lagerstroemia microcarpa* | bark | for after care of mother | M |
| 39. | *Lannea coromandelica* | bark | for after care of mothers | M |
| 40. | *Lantana camara* | leaves | fever | MP |

Table 11. *Contd...*

| | Species | Part(s) | Uses | Tribe* |
|---|---|---|---|---|
| 41. | *Lobelia nicotianifolia* | leaves | insect repellant | M |
| 42. | *Meliosma simplicifolia* | bark | after care for mother | M |
| 43. | *Mussaenda belilla* | bark | after care for mother | M |
| 44. | *Myxopyrum smilacifolium* | leaves | headache | MP |
| 45. | *Naravelia zeylanica* | leaves | rheumatic | M |
| 46. | *Ocimum gratissimum* | leaves | viral fever | M |
| 47. | *Pittosporum tetraspermum* | bark | antidote | M |
| 48. | *Polygonum chinensis* | stem | mother care | M |
| 49. | *Polypleurum stylosum* | whole plant | childbirth | MA |
| 50. | *Pothos scandens* | leaves | body pain | U |
| 51. | *Psidium guajava* | leaves | diarrhea | M |
| 52. | *Rotula aquatica* | stem, root | urinary troubles | M, MP |
| 53. | *Rubia cordifolia* | roots | ulcers in mouth | U |
| 54. | *Salacia fruticosa* | roots | diabetes | MA |
| 55. | *Schleichera oleosa* | fruit | for pregnant women | MA |
| 56. | *Scoparia dulcis* | whole plant | urinary troubles | M |
| 57. | *Solanum anguivi var. anguivi* | roots | heart diseases | M |
| 58. | *Solanum torvum* | leaves | for abortion | M |
| 59. | *Sphaeranthus indicus* | roots | fever | M |
| 60. | *Swertia corymbosa* | rots | diarrhea | M |
| 61. | *Synedrella nodiflora* | leaves | wound heeling | M |
| 62. | *Tephrosia pulcherrima* | leaf | tooth ache | MA |
| 63. | *Terminalia elliptica* | bark | loose motion | M |
| 64. | *Terminalia paniculata* | bark | loose motion | M |
| 65. | *Tetracera akara* | roots | body pain | MA |
| 66. | *Thottea siliquosa* | roots | dysentery | M |
| 67. | *Vateria indica* | resin | insect repellant | MP |
| 68. | *Vitex altissima* | bark | mother care | MA |
| 69. | *Vitex leucoxylon* | bark | mother care | MP |
| 70. | *Wrightia tinctoria* | leaf | tooth ache | MP |

* M : Mannan; MA: Mala arayan; MP: Malampandaram; U: Urali.

**Table 12. List of Plants used as food by the Tribes including the parts used , the kind of use and the name of the tribe who use them**

| | Species | Part(s) | Uses | Tribe* |
|---|---|---|---|---|
| 1. | *Alternanthera sessilis* | whole plant | salad (cooked) | M |
| 2. | *Antidesma acidum* | fruit | edible (fresh) | MP |
| 3. | *Antidesma menasu* | fruit | edible (fresh) | MA, MP |
| 4. | *Aporusa acuminata* | fruit | edible (fresh) | M |
| 5. | *Aporusa lindleyana* | fruit | edible (fresh) | MP |
| 6. | *Arenga wightii* | stem pith | starch & liquor | MP |
| 7. | *Artocarpus gomezianus* | fruit | edible (fresh) | M |
| 8. | *Artocarpus hirsuta* | fruit | edible (fresh) | MP |
| 9. | *Asparagus racemosus* | tubers | edible (cooked) | MP |
| 10. | *Baccaurea courtallensis* | fruit | edible (fresh) | MA |
| 11. | *Basella alba* | stem, leaves | salad (cooked) | M |
| 12. | *Caryota urens* | stem pith | starch (processed) | MP |
| 13. | *Chrysophyllum roxburghii* | fruit | edible (fresh) | M, MA, MP |
| 14. | *Cinnamomum malabatrum* | bark, leaf petiole | to stop hunger (eaten fresh) | MA |
| 15. | *Clausena dentata* | fruit | edible (fresh) | M |
| 16. | *Clausena indica* | fruit, leaves | add to curries | M |
| 17. | *Cordia wallichii* | fruit | edible (eaten fresh) | M |
| 18. | *Cullenia exarillata* | seeds | edible (grilled) | M |
| 19. | *Dendrophthoe falcata* | flowers | edible (fresh) | M |
| 20. | *Dimocarpus longum* | fruit | edible (fresh) | M |
| 21. | *Dioscorea oppositifolia* | tubers | edible (cooked) | MP |
| 22. | *Dioscorea pentaphylla* | tubers | edible (cooked) | MP, MA |
| 23. | *Dioscorea tomentosa* | tubers | for worms (cooked) | MP |
| 24. | *Diplocyclos palmatus* | fruit | prepared into curries | M |
| 25. | *Elaeagnus conferta* | fruit | edible (fresh) | M |
| 26. | *Ensete superba* | stem pith, seed | edible (cooked) | M |
| 27. | *Flacourtia montana* | fruit | edible (fresh) | MA, MP |

Table 12. *Contd...*

| | Species | Part(s) | Uses | Tribe* |
|---|---|---|---|---|
| 28. | *Grewia tiliifolia* | fruit | edible (fresh) | MP |
| 29. | *Hibiscus hispidissimus* | leaves | edible (fresh, cooked) | MP |
| 30. | *Hypolytrum nemorum* | nuts | edible (fresh) | M |
| 31. | *Lantana camara* | fruit | edible (fresh) | MP |
| 32. | *Madhuca neriifolia* | flower, fruit | edible (fresh) | MA |
| 33. | *Maesa indica* | fruit | edible (fresh) | M |
| 34. | *Meliosma simplicifolia* | bark | eaten by women | M |
| 35. | *Momordica dioica* | fruit | edible (cooked) | M |
| 36. | *Oreocnide integrifolia* | fruit | edible (fresh) | M |
| 37. | *Palaquium ellipticum* | fruit, flower | edible (fresh) | MA |
| 38. | *Passiflora foetida* | fruit | edible (fresh) | MA |
| 39. | *Phoenix loureirii* | fruit, tender leaves | edible (fresh) | M |
| 40. | *Polygonum chinensis* | stem | edible (fresh, cooked) | M |
| 41. | *Psidium guajava* | fruit | edible (fresh) | M |
| 42. | *Schleichera oleosa* | fruit | edible (fresh) | MP |
| 43. | *Solanum americanum* | whole plant | salad | M |
| 44. | *Solanum lasiocarpum* | fruit | edible (fresh) | M |
| 45. | *Solanum melongena var. insanum* | fruit | edible (cooked) | M |
| 46. | *Syzygium cumini* | fruit | edible (fresh) | M |
| 47. | *Syzygium gardneri* | fruit | edible (fresh) | MP |
| 48. | *Syzygium jambos* | fruit | edible (fresh) | M |
| 49. | *Vernonia cinerea* | whole plant | made into curry | M |
| 50. | *Vigna umbellata* | fruit, leaves | made into curry | MP |
| 51. | *Zehneria thwaitesii* | fruit | made into curry | M |
| 52. | *Ziziphus rugosa* | fruit | edible (fresh) | M |

* M : Mannan; MA: Mala arayan; MP: Malampandaram; U: Urali.

**Table 13. List of plants from which the tribes extract fibers and the mechanism of the use**

| | Species | Part(s) | Uses | Tribe* |
|---|---|---|---|---|
| 1. | *Acacia caesia* | bark | bathing | MA |
| 2. | *Antiaris toxicaria* | bark | cordage | MA |
| 3. | *Calycopteris floribunda* | stem | basket making | MA |

Table 13 *Contd...*

| | Species | Part(s) | Uses | Tribe* |
|---|---|---|---|---|
| 4. | *Debregeasia longifolia* | bark | cordage and thread | M |
| 5. | *Luffa cylindrica* | fruit | bathing | MA |
| 6. | *Luvunga eleutherandra* | stem | basket making | M |
| 7. | *Sterculia guttata* | bark | cordage | M |
| 8. | *Sterculia villosa* | bark | cordage | M |

* M : Mannan; MA: Mala arayan; MP: Malampandaram; U: Urali.

**Table. 14. List of plants used by the tribes for various purposes including the parts used, the purpose of the use, and the name of the tribe**

| | Species | Part(s) | Uses | Tribe* |
|---|---|---|---|---|
| 1. | *Acacia sinuata* | seed | leach repellant | M |
| 2. | *Actinodaphne malabarica* | fruit | used in angling | M |
| 3. | *Agrostistachys borneensis* | stem | for building poles | M |
| 4. | *Anamirta cocculus* | fruit | for fish poisoning | MA |
| 5. | *Anogeissus latifolia* | stem | for poles | M |
| 6. | *Bambusa arundinacea* | stem | for poles | M |
| 7. | *Bischofia javanica* | bark | staining fishing nets | M |
| 8. | *Calamus brandisii* | stem | for basket making | MP |
| 9. | *Calamus thwaitesii* | cane | for basket making | MP |
| 10. | *Canarium strictum* | resins | insect repellant | M |
| 11. | *Cannabis sativa* | inflorescence | smoking | M |
| 12. | *Chenopodium ambrosioides* | whole plant | insect repellant | M |
| 13. | *Cyanotis arachnoidea* | stem | water | M |
| 14. | *Derris brevipes* | bark | fish poison | U |
| 15. | *Dimocarpus longan* | fruit | angling | U |
| 16. | *Dipterocarpus bourdillonii* | resin | smoking the house | M |
| 17. | *Drypetes venusta* | tree | usually planted near houses | M |
| 18. | *Ficus tinctoria* | fruit | for angling | M |
| 19. | *Filicium decipiens* | fruit | for angling | M |
| 20. | *Gordonia obtusa* | fruit | for angling | M |
| 21. | *Hibiscus hispidissimus* | stem | cordage | MA |

Table 14. *Contd...*

| | Species | Part(s) | Uses | Tribe* |
|---|---|---|---|---|
| 22. | *Hiptage benghalensis* | fruit | bait in angling | M |
| 23. | *Lannea coromandelica* | bark | for staining net | M |
| 24. | *Macrosolen parasiticus* | flower | bait for angling | M |
| 25. | *Myristica beddomei* | oil mace | collection and sale | M |
| 26. | *Ochlandra travancorica* | culms | pole for house building | M, |
| 27. | *Peperomia pellucida* | whole plant | believes the food of tortoises | MP |
| 28. | *Persia macrantha* | bark | smoking | MA |
| 29. | *Phyllanthus emblica* | fruit | making liquor | M |
| 30. | *Pseudoxytenanthera bourdillonii* | culm | building | M |
| 31. | *Pseudoxytenanthera monadelpha* | culm | building | M |
| 32. | *Rubus glomeratus* | leaves | chewing | M |
| 33. | *Santalum album* | stem bark | chewing | M |
| 34. | *Sapindus laurifolius* | fruits | fish poisoning | MP |
| 35. | *Schumannianthus virgatus* | leaf | as plate for dining | U |
| 36. | *Solanum torvum* | fruit | as bait in angling | M |
| 37. | *Themeda cymbaria* | leaves | thatching | M |
| 38. | *Turpinia malabarica* | fruit | as bait in angling | M |
| 39. | *Vateria indica* | resin | smoking houses | MP, MA |
| 40. | *Vernonia arborea* | nectar | honey yielding | M |
| 41. | *Vernonia travancorica* | nectar | honey yielding | M |
| 42. | *Zingiber cernuum* | rhizome | water when summer | M |

* M : Mannan; MA: Mala arayan; MP: Malampandaram; U: Urali.

The mode of administration and other details of the ethnobotany are described along with the taxonomic description of respective species.

# SUMMARY

Jomy Augustine “Floristic and ethnobotanical studies of Periyar tiger reserve” Thesis. Department of Botany, University of Calicut, 2000

# SUMMARY

Idukki district, the land of peaks and dams, with its incomparable mountainous land configuration and very fertile soil is the real birth place for many plant species. The study area, Periyar Tiger Reserve situated in Idukki district is the largest protected area in Kerala State. Part of the Tiger Reserve, comes under the **Anamalai-High Range** centre of endemism which is one of the highest rain fed area of Western Ghats . Due to the varied climatic conditions and wide range in the altitude, seven major vegetation types are found in the region and is luxuriant with all types of plant groups.

The present work, however, covers only the flowering plants of the Tiger Reserve. There are 1978 taxa of Angiosperms, belonging to 815 genera under 151 families. Among the 1978 taxa, 515 are southern Western Ghats endemics and 151 of them belong to various threat categories including 15 species which are considered as 'possibly extinct'.

The occurrence of 1978 species in an area of 777 $km^2$ indicates the richness and diversity of the flora of the Tiger Reserve. Nayar (1997) has estimated that there are about 3,800 flowering plants in Kerala. Thus the flora of the Tiger Reserve form more than half of the estimated flora of the state. The major families and genera are fairly well represented in the flora of the study area. The family Poaceae, which is the top dominant family in South India is represented by 163 species. Sreekumar and Nair (1991) reported 296 species of grasses from Kerala, belonging to 24 tribes. Of these, members of *Aleuropodeae, Arundineae, Phareae, Thysanolaeneae* and *Zoysieae* are confined to lowlands and backwater habitats. Further, 107 species prefer the plains including coastal belts. Excluding the species belonging to the above habitats, the occurrence of 163 species in the Tiger Reserve is perhaps the richest assemblage of grass flora in the state. The habitat of most of the grasses were in the grasslands itself which extends over an area of 57 $km^2$. Major part of the grasslands are changed to Eucalyptus plantations since 1955 which considerably affect the natural vegetation. Most of the grasses were collected from the rest of the grasslands and grasslands under Eucalyptus plantation are comparatively devoid of many species of grasses. Similarly the conversion of grasslands into Eucalyptus plantations have reduced the population of threatened species like *Ceropegia maculata, C. beddomei, C. pussila, Lilium wallichianum, Habenaria* spp., *Peucedanum anamallayense, Pecteilis gigantea, Rotala ritchiei, Smithia venkobarawii, Vernonia multibracteata,* etc., which are found in the grasslands.

The presence of 145 orchids out of the 216 reported from Kerala (Manilal & Sathish Kumar, 1993) is the highest number from a District. *Taeniophyllum scaberulum* Hook. f., which was considered as extinct is relocated from the Reserve after a gap of more than 140 years (Rajesh *et al.*, 1997). *Vanda thwaitesii* Hook. f., considered extinct in its home country, Sri Lanka, is also recorded from the Reserve. *Bulbophyllum macraei* (Lindl.) Reichb. f., *B. mysorensis* Wt., *B. xylophyllum* Par. & Reichb. f., *Eulophia pratensis* Lindl. and *Cheirostylis parvifolia* Lindl. are new distribution records for Kerala state. The orchid diversity may be due to the heavy rainfall by both South West and North East monsoons.

The strong similarity of the Flora of Periyar Tiger Reserve with that of Sri Lanka is much interesting since Sri Lanka was along with the main land of India in late Pleistocene glaciation (Mani,1974). More than 50 % of the floristic elements of the Tiger Reserve are common to the flora of Sri Lanka. The genera namely, *Humboldtia, Lagenandra* and *Theriophonum* are restricted to Sri Lanka and South India, where there are 30 common endemic genera for both the regions. This finding support the 'land-bridge theory in botany' of van Steenis (1962).

The finding of 153 species belonging to the various threat categories including 15 'possibly extinct' plants indicates the undisturbed nature of the study area. Species like *Symplocos monantha, Salacia malabarica, Smithia venkobarawii, Rotala ritchiei, Anacolosa densiflora,* etc. are with viable populations. It reveals the need for further quantification studies to ascertain their correct status. The forests of the Tiger Reserve are relatively less disturbed and virtually undistributed forests are found at Kottamala, Uppermanalar, Chokkampetti, Sunderamala, Aladi and Poonkavanam.

The collection of 58 exotic invasive alien weeds is also significant for that may cause many problems to the indigenous plants. The invasion of these weeds to the Tiger Reserve may be due to mass inflow of pilgrims to Sabarimala temple, seasonal tourism at Thekkady, and due to weed-contaminated soil filled bags brought to the Eucalyptus plantations in the Tiger Reserve. Four large cardamom plantations, which were abandoned later, and the occurrence of seasonal fire in the grasslands are also paved way to the intrusion of many weeds to the Tiger Reserve.

Waller (1973) stated that the Periyar Wildlife Sanctuary holds all the potential for a future first class national park. Though the preliminary notification for declaring the sanctuary as a national park was issued in 1982, the second notification for elevating the status has not been issued until now. The present study on the angiosperm flora of the Tiger Reserve brought out 1978 species and this makes the Periyar Tiger Reserve, as one among the most species-rich area in Peninsular India.

The tribesmen in Periyar Tiger Reserve belong to 5 tribal groups; namely Mannan, Paliyan, Urali, Mala Arayan and Malampandaram and except the Malampandaram all are well settled in 5 tribal colonies outside the Tiger Reserve. Since 1945 they are in the present settlement areas and most of the tribesmen are now engaged in agriculture and other occupation including day-labourers in urbanised areas. The tribesmen of the study area have not been in continuous contact with the wild plants and very few people are knowing the uses of them. Though most of the families depend on the forest for firewood-collection for their personal use, it is the occupation of many of them. Families engaged in other jobs like thelly-collection, honey-collection, fishing, etc. also depend on the nearby city Kumily, for trading their collection and purchases. Tribal physicians were also consulted during the study to have detailed information on medicinal plants, but their knowledge is seemed to be only fragmentary.

There are 180 species of plants recognised as of tribal use from the study area, of which 71 are of medicinal use, 54 are of food use, 9 species are used for extracting fibres, and 46 plants are recorded for other uses like bait in angling, fish poisoning, canes, resins and other Minor Forest Produces. The information about the uses of 180 species of plants generated from the study is, in fact, only a fraction of the knowledge which has existed several decades ago among these tribesmen. The information regarding the use of many medicinal plants are now not fully known among the present day tribesmen due to their gradual migration from the forests and involving with the activities of the civilized people.

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**thyrsoidea** (Schultes) Steud. 402
**Wrightia** R. Brown 506
**arborea** (Dennst.) Mabber. 506
**tinctoria** (Roxb.) R. Br. 506

## *X*

**Xanthium** Linnaeus **450**
**indicum** Koen. **450**
**XANTHOPHYLLACEAE** **57**
**Xanthophyllum** Roxburgh **57**
**arnottianum** Wight **57**
**Xantolis** Rafinesque – Schmaltz **473**
**tomentosa** (Roxb.) Raf. **473**
**Xylia** Bentham **278**
**xylocarpa** (Roxb.) Taub. **278**

## *Y*

**Youngia** Cassini **451**
**japonica** (L.) DC. **451**

## *Z*

**Zanonia** Linnaeus **340**
**indica** L. **340**
**Zanthoxylum** Linnaeus **138**
**ovalifolium** Wight **138**
**rhetsa** (Roxb.) **138**
**tetraspermum** Wight & Arn. **138**
**Zehneria** Endlicher **340**
**maysorensis** (Wight & Arn.) Arn. var.
**mysorensis** **341**
**maysorensis** (Wight & Arn.) Arn. var.
**umbellata** (Chakravarthy) Kumari **341**
**scabra** (L. f.) Sond. **342**
**thwaitesii** (Schweinf.) Jeffrey **342**
**Zenkeria** Trinius **1116**
**elegans** Trin. **1117**
**sebastinei** Henry & Chandrab. **1117**
**Zeuxine** Lindley **901**
**cladestina** Blume **901**
**flava** (Wall ex Lindl.) Benth. ex Hook. f. **901**
**longilabris** (Lindl.) Benth. ex Hook. f. **902**
**Zeylanidium** (Tulasne) Engler **684**
**lichenoides** (Kurz) Engl. **684**
**Zingiber** Boehmer apud Ludwig **914**
**cernuum** Dalz. **915**
**neesanum** (Grah.) Ramam. **915**
**officinale** Rosc. **916**
**zerumbet** (L.) Smith **916**
**ZINGIBERACEAE** **902**
**Ziziphus** P. Miller **168**
**oenoplia** (L.) Mill. **168**
**rugosa** Lam. **169**
**Zornia** J. F. Gmelin **258**
**gibbosa** Span. **258**

# Appendix -I

## Taxa considered under various threat categories relocated during the present study

| Species | Family | Status | References |
|---|---|---|---|
| *Actinodaphne campanulata* Hook. f. | Lauraceae | Rare | Nayar, 1997 |
| *Aenhenrya rotundifolia* Gopalan | Orchidaceae | Rare | Nayar, 1997 |
| *Aglaia barberi* Gamble | Meliaceae | Rare | Ahmedullah & Nayar, 1987 |
| *Allophylus concanicus* Radlk. | Sapindaceae | Rare | Nayar & Sastry, 1988 |
| *Amomum pterocarpum* Thw. | Zingiberaceae | Rare | Nayar & Sastry, 1988 |
| *Anacolosa densiflora* Bedd. | Olacaceae | Possibly extinct | Nayar, 1997 |
| *Anaphyllum wightii* Schott | Araceae | Threatened | Nayar, 1997 |
| *Andrographis explicata* (Clarke) Gamble | Acanthaceae | Rare | Nayar, 1997 |
| *Anisochilus argenteus* Gamble | Lamiaceae | Rare | Nayar & Sastry, 1990 |
| *Anisochilus sericeus* Benth. | Lamiaceae | Critical | Nayar, 1997 |
| *Ardisia blatteri* Gamble | Myrsinaceae | Possibly extinct | Nayar, 1997 |
| *Ardisia sonchifolia* Mez | Myrsinaceae | Insufficiently known | Nayar, 1997 |
| *Ardisia stonei* Sasidh. & Sivar. | Myrsinaceae | Rare | Nayar, 1997 |
| *Arisaema barnesii* Fischer | Araceae | Threatened | Nayar, 1997 |
| *Arthraxon lanceolatus* (Roxb.) Hort. | Poaceae | Threatened | Nayar, 1997 |
| *Aspidopterys canarensis* Dalz. | Malpighiaceae | Vulnerable | Nayar, 1997 |
| *Begonia albo-coccinea* Hook. f. | Begoniaceae | Vulnerable | Nayar, 1997 |
| *Begonia trichocarpa* Clarke | Begoniaceae | Vulnerable | Nayar & Sastry, 1990 |

*Contd...*

| Species | Family | Status | References |
|---|---|---|---|
| *Belosynapsis vivipara* (Dalz.) Sprag. et Fish. | Commelinaceae | Rare and Threatened | Nayar & Sastry, 1987 |
| *Bentinckia condapanna* Berry ex Roxb. | Arecaceae | Threatened | Nayar, 1997 |
| *Boesenbergia pulcherrima* (Wall.) O. Ktze. | Zingiberaceae | Threatened | Nayar, 1997 |
| *Bulbophyllum aureum* (Hook. f.) J. J. Sm. | Orchidaceae | Endangered | Nayar, 1997 |
| *Bulbophyllum elegantulum* (Rolf.) Smith. | Orchidaceae | Vulnerable | Nayar & Sastry, 1987 |
| *Bulbophyllum fusco-purpureum* Wight | Orchidaceae | Threatened | Nayar, 1997 |
| *Bulbophyllum kaitiense* (Wight) Reich. | Orchidaceae | Vulnerable | Nayar & Sastry, 1988 |
| *Calamus brandisii* Becc. | Arecaceae | Threatened | Nayar & Sastry, 1988 |
| *Calamus vattayila* Renuka | Arecaceae | Fragmented populations | Nayar, 1997 |
| *Capparis* fusifera Dunn | Capparaceae | Rare | Nayar, 1997 |
| *Casearia* rubescens Dalz. | Flacourtiaceae | Possibly extinct | Nayar, 1997 |
| *Cayratia* pedata (Lam.) Juss. ex Gagnep. var. *glabra* Gamble | Vitaceae | Vulnerable | Nayar & Sastry, 1988 |
| *Ceropegia beddomei* Hook. f. | Asclepiadaceae | Endangered | Nayar & Sastry, 1988 |
| *Ceropegia maculata* Bedd. | Asclepiadaceae | Possibly extinct | Nayar & Sastry, 1988 |
| *Ceropegia metziana* Miq. | Asclepiadaceae | Rare | Nayar & Sastry, 1988 |
| *Ceropegia pusila* Wight & Arn. | Asclepiadaceae | Rare | Nayar & Sastry, 1987 |
| *Coffea crassifolia* Gamble | Rubiaceae | Possibly extinct | Nayar, 1997 |

*Contd...*

| Species | Family | Status | References |
|---|---|---|---|
| *Cordia octandra* DC. | Boraginaceae | Possibly extinct | Nayar, 1997 |
| *Crotalaria barbata* Grah. ex Wight & Arn. | Fabaceae | Rare | Nayar, 1997 |
| *Crotalaria clarkei* Gamble | Fabaceae | Threatened | Sanjappa, 1991 |
| *Crotalaria fysonii* Dunn. | Fabaceae | Rare | Nayar & Sastry, 1988 |
| *Crotalaria grahamiana* Wight & Arn. | Fabaceae | Rare | Nayar, 1997 |
| *Crotalaria obtecta* Grah. ex Wight & Arn. | Fabaceae | Rare | Sanjappa, 1991 |
| *Crotalaria peduncularis* Grah. ex Wight & Arn. | Fabaceae | Possibly extinct | Nayar & Sastry, 1987 |
| *Cyclea fissicalyx* Dunn | Menispermaceae | Insufficiently known | Nayar, 1997 |
| *Dalbergia beddomei* Thoth. | Fabaceae | Endangered | Nayar, 1997 |
| *Debregeasia ceylanica* Hook. f. | Urticaceae | Threatened | Vivekananthan, 1968 |
| *Dendrobium haemoglossum* Thw. | Orchidaceae | Threatened | Vivekananthan, 1968 |
| *Derris benthamii* (Thw.) Thw. var. wightii Thoth. | Fabaceae | Endangered | Nayar, 1997 |
| *Desmodium ferrugineum* Wall. ex Thoth. | Fabaceae | Vulnerable | Nayar, 1997 |
| *Desmos viridiflorus* (Bedd.) Safford | Annonaceae | No recent collections | Nayar, 1997 |
| *Dictyospermum ovalifolium* Wight | Commelinaceae | Rare | Nayar & Sastry, 1987 |
| *Didymocarpus fischeri* Gamble | Gesneriaceae | Vulnerable | Nayar, 1997 |
| *Didymocarpus ovalifolia* Wight | Gesneriaceae | Vulnerable | Nayar, 1997 |
| *Diplocentrum congestum* Wight | Orchidaceae | Possibly extinct | Nayar, 1997 |
| *Dipterocarpus bourdillonii* Brandis | Dipterocarpaceae | Endangered | Nayar, 1997 |

*Contd...*

| Species | Family | Status | References |
|---|---|---|---|
| *Drypetes malabarica* (Bedd.) Airy Shaw | Euphorbiaceae | Threatened | Nayar, 1997 |
| *Dysoxylum beddomei* Hiern | Meliaceae | Vulnerable | Nayar, 1997 |
| *Dysoxylum ficiforme* (Wight) Gamble | Meliaceae | Rare | Nayar, 1997 |
| *Elaeocarpus munronii* (Wight) Mast. | Elaeocarpaceae | Rare | Nayar & Sastry, 1990 |
| *Embelia adnata* Bedd. | Myrsinaceae | Narrow distribution | Nayar, 1997 |
| *Epithema carnosum* (G. Don) Benth. var. *hispida* Clarke | Gesneriaceae | Rare | Nayar, 1997 |
| *Euonymus paniculatus* Wight ex Laws. | Celastraceae | Critical | Nayar, 1997 |
| *Euonymus serratifolius* Bedd. | Celastraceae | Critical | Nayar & Sastry, 1987 |
| *Exacum anamalayanum* Bedd. | Gentianaceae | Rare | Nayar, 1997 |
| *Exacum courtallense* Arn. | Gentianaceae | Rare | Nayar, 1997 |
| *Garcinia wightii* Anders. | Clusiaceae | Endangered | Nayar, 1997 |
| *Glochidion bourdillonii* Gamble | Euphorbiaceae | Rare | Nayar, 1997 |
| *Glochidion johnstonei* Hook. f. | Euphorbiaceae | Rare (isolated population) | Nayar, 1997 |
| *Glycosmis macrocarpa* Wight | Rutaceae | Rare | Ahmedullah & Nayar 1987 |
| *Goniothalamus rhynchantherus* Dunn. | Annonaceae | Rare | Nayar, 1997 |
| *Hedyotis anamalayana* (Gamble) R. Rao & Hemad. | Rubiaceae | Critical | Nayar, 1997 |
| *Hedyotis bourdillonii* (Gamble) R. Rao & Hemad. | Rubiaceae | Vulnerable | Nayar & Sastry, 1988 |
| *Hedyotis swertioides* Hook. f. | Rubiaceae | Rare | Nayar & Sastry, 1988 |
| *Helichrysum perlanigerum* Gamble | Asteraceae | Critical | Nayar & Sastry, 1987 |

*Contd..*

| Species | Family | Status | References |
|---|---|---|---|
| *Hoya retusa* Dalz. | Asclepiadaceae | Threatened | Vivekananthan, 1968 |
| *Hoya wightii* Hook. f. | Asclepiadaceae | Threatened | Vivekananthan, 1968 |
| *Humboldtia bourdillonii* Prain | Caesalpiniaceae | Possibly extinct | Nayar & Sastry, 1987 |
| *Ilex gardneriana* Wight | Aquifoliaceae | Possibly extinct | Nayar & Sastry, 1990 |
| *Impatiens herbicola* Hook. f. | Balsaminaceae | Vulnerable | Nayar, 1997 |
| *Impatiens leptura* Hook. f. | Balsaminaceae | Endangered | Nayar, 1997 |
| *Impatiens rupicola* Hook. f. | Balsaminaceae | Endangered | Nayar, 1997 |
| *Impatiens verecunda* Hook. f. | Balsaminaceae | Critical | Nayar, 1997 |
| *Isachne setosa* Fischer | Poaceae | Threatened | Nayar, 1997 |
| *Isonandra stocksii* Clarke | Sapotaceae | Endangered | Nayar & Sastry, 1990 |
| *Ixora johnsoni* Hook. f. | Rubiaceae | Rare | Nayar, 1997 |
| *Ixora monticola* Gamble | Rubiaceae | Vulnerable | Nayar, 1997 |
| *Kingiodendron pinnatum* (Roxb. ex DC.) Harms | Caesalpiniaceae | Rare | Nayar, 1997 |
| *Kunstleria keralensis* Mohanan & Nair | Fabaceae | Rare | Nayar, 1997 |
| *Lasianthus strigillosus* Hook. f. | Rubiaceae | Vulnerable | Nayar, 1997 |
| *Marsdenia tirunelvelica* Henry & Subram. | Asclepiadaceae | Rare | Nayar & Sastry, 1988 |
| *Medinilla malabaricum* Bedd. | Melastomataceae | Vulnerable | Nayar, 1997 |
| *Memecylon flavescens* Gamble | Melastomataceae | Endangered | Nayar & Sastry, 1990 |
| *Memecylon lawsonii* Gamble | Melastomataceae | Rare and Endangered | Ahmedullah & Nayar, 1987 |
| *Mesua ferrea* L. ssp. *pulchella* Vesque var. *coromandeliana* Mahesh. | Clusiaceae | Endangered | Nayar, 1997 |
| *Mycetia acuminata* (Wight) O. Ktze. | Rubiaceae | Rare | Nayar, 1997 |

*Contd...*

| Species | Family | Status | References |
|---|---|---|---|
| *Myriactis wightii* DC. var. *bellidioides* Hook. f. | Asteraceae | Endangered | Nayar, 1997 |
| *Myristica malabarica* Lamk. | Myristicaceae | Rare | Ahmedullah & Nayar, 1987 |
| *Nothopegia racemosa* (Dalz.) Ramam. | Anacardiaceae | Possibly extinct | Nayar, 1997 |
| *Oberonia bicornis* Lindl. | Orchidaceae | Rare | Stephan & Vajravelu, 1991 |
| *Octotropis travancorica* Bedd. | Rubiaceae | Rare | Ahmedullah & Nayar, 1987 |
| *Orophea uniflora* Bedd. | Annonaceae | Rare | Nayar & Sastry, 1988 |
| *Osbeckia aspera* (L.) Blume var. *travancorica* (Gamble) Hansen | Melastomataceae | Possibly extinct | Nayar, 1997 |
| *Pavetta calophylla* Bremek. | Rubiaceae | Rare | Nayar, 1997 |
| *Pecteilis gigantea* (Smith) Rafin. | Orchidaceae | Threatened | Vivekananthan, 1968 |
| *Peucedanum anamallayense* Clarke | Apiaceae | Endangered | Nayar & Sastry, 1990 |
| *Phaeanthus malabaricus* Bedd. | Annonaceae | Vulnerable | Nayar & Sastry, 1990 |
| *Piper barberi* Gamble | Piperaceae | Vulnerable | Henry et al 1979 |
| *Plectranthus rivularis* Wight ex Hook. f. | Lamiaceae | Critical | Nayar, 1997 |
| *Pogostemon travancoricus* Bedd. | Lamiaceae | Vulnerable | Nayar & Sastry, 1990 |
| *Pothos armatus* Fischer | Araceae | Threatened | Nayar, 1997 |
| *Pothos thomsonianus* Schott | Araceae | Threatened | Nayar, 1997 |
| *Premna glaberrima* Wight | Verbenaceae | Rare | Nayar, 1997 |
| *Psychotria anamalayana* Bedd. | Rubiaceae | Rare | Nayar, 1997 |
| *Psychotria keralensis* Deb & Gang. | Rubiaceae | Rare(insufficiently known) | Nayar, 1997 |

*Contd...*

| Species | Family | Status | References |
|---|---|---|---|
| *Psychotria macrocarpa* Hook. f. | Rubiaceae | Rare | Nayar, 1997 |
| *Pterospermum reticulatum* Wight. & Arn. | Sterculiaceae | Rare | Nayar, 1997 |
| *Rauvolfia micrantha* Hook. f. | Apocynaceae | Rare | Nayar, 1997 |
| *Rhododendron arboreum* Smith ssp. *nilagiricum* Tagg. | Ericaceae | Rare | Nayar, 1997 |
| *Rotala ritchiei* (Clarke) Kochne | Lythraceae | Vulnerable | Nayar & Sastry, 1987 |
| *Sageraea grandiflora* Dunn | Annonaceae | Endangered | Nayar, 1997 |
| *Salacia beddomei* Gamble | Hippocrateaceae | Rare | Nayar, 1997 |
| *Salacia macrosperma* Wight | Hippocrateaceae | Rare | Nayar, 1997 |
| *Schefflera bourdillonii* Gamble | Araliaceae | No recent collection | Nayar, 1997 |
| *Semecarpus auriculata* Bedd. | Anacardiaceae | Vulnerable | Nayar, 1997 |
| *Semecarpus travancorica* Bedd. | Anacardiaceae | Rare | Nayar, 1997 |
| *Smilax wightii* DC. | Smilacaceae | Rare | Nayar & Sastry, 1987 |
| *Smithia venkobarowii* Gamble | Fabaceae | Possibly extinct | Nayar, 1997 |
| *Solenocarpus indica* Wight & Arn. | Anacardiaceae | Rare | Nayar, 1997 |
| *Sonerila grandiflora* R. Br. ex Wight & Arn. | Melastomataceae | Rare | Nayar, 1997 |
| *Sonerila sahyadrica* Giri & Nayar | Melastomataceae | Rare | Nayar, 1997 |
| *Sonerila speciosa* Zenk. | Melastomataceae | Vulnerable | Nayar, 1997 |
| *Strobilanthes jeyporensis* Bedd. | Acanthaceae | Endangered | Nayar & Sastry, 1987 |
| *Strobilanthes lawsonii* Gamble | Acanthaceae | Rare | Nayar, 1997 |
| *Symplocos monantha* Wight | Symplocaceae | Possibly extinct | Nayar, 1997 |
| *Symplocos wynaadense* (O. Ktze.) Nooteb. | Symplocaceae | Rare | Ahmedullah & Nayar, 1987 |

*Contd....*

| Species | Family | Status | References |
|---|---|---|---|
| *Symplocos macrophylla* Wall. ex A. DC. ssp. *macrophylla* | Symplocaceae | Rare | Henry *et al*, 1987 |
| *Syzygium benthamianum* (Wight ex Duthie) Gamble | Myrtaceae | Rare | Nayar, 1997 |
| *Syzygium bourdillonii* (Gamble) Rathakr. & Nair | Myrtaceae | Possibly extinct | Nayar, 1997 |
| *Syzygium mundagam* (Bourd.) Chitra | Myrtaceae | Rare | Ahmedullah & Nayar, 1987 |
| *Syzygium occidentalis* (Bourd.) Gandhi | Myrtaceae | Rare | Nayar, 1997 |
| *Taeniophyllum scaberulum* Hook. f. | Orchidaceae | Possibly extinct | Nayar, 1997 |
| *Tarenna monosperma* (Wight & Arn.) Raju | Rubiaceae | Critical | Nayar, 1997 |
| *Trichosanthes anamalaiensis* Bedd. | Cucurbitaceae | Rare | Nayar, 1997 |
| *Tylophora rotundifolia* Buch.-Ham. ex Wight | Asclepiadaceae | Rare | Stephan & Vajravelu, 1991 |
| *Vanasushava pedata* (Wight) Mukh. & Const. | Apiaceae | Rare | Nayar & Sastry, 1988 |
| *Vernonia heynei* Bedd. ex Gamble | Asteraceae | Vulnerable | Nayar, 1997 |
| *Vernonia multibracteata* Gamble | Asteraceae | Possibly extinct | Nayar & Sastry, 1997 |
| *Vernonia peninsularis* (Clarke) Clarke ex Hook. f. | Asteraceae | Vulnerable | Nayar, 1997 |
| *Vernonia saligna* DC. | Asteraceae | Vulnerable | Nayar, 1997 |
| *Vernonia salvifolia* Wight | Asteraceae | Endangered | Nayar, 1997 |

# Appendix - II

## Wild relatives of cultivated plants

*Abelmoschus moschatus*

*Alocasia fornicata*

*Alocasia macrorrhizos*

*Alpinia galanga*

*Amaranthus viridis*

*Amorphophallus paeoniifolius*

*Andrographis paniculata*

*Arenga wightii*

*Aristolochia tagala*

*Artocarpus gomezianus*

*Artocarpus integrifolius*

*Artocarpus hirsuta*

*Asparagus racemosus*

*Baccaurea courtallensis*

*Bambusa bambos*

*Begonia albo-coccinea*

*Boerhavia diffusa*

*Brassica juncea*

*Calamus thwaitesii*

*Calanthe masuca*

*Canavalia mollis*

*Cannabis sativa*

*Carissa inermis*

*Caryota urens*

*Cassia fistula*

*Chrysophyllum roxburghii*

*Cinnamomum malabatrum*

*Clausena indica*

*Coffea crassifolia*

*Colocasia esculenta*

*Costus speciosus*

*Crinum latifolium*

*Croton tiglium*

*Cucumis prophetarum*

*Curcuma aromatica*

*Curcuma zedoaria*

*Cymbopogon caesius*

*Cymbopogon flexuosus*

*Dioscorea bulbifera*

*Dioscorea oppositifolia*

*Dioscorea pentaphylla*

*Diospyros buxifolia*

*Dolichos trilobus*

*Elettaria cardamomum*

*Eleusine indica*

*Flacourtia montana*

*Garcinia cowa*

*Garcinia gummi-gutta*

*Gloriosa superba*

*Heracleum candolleanum*

*Hibiscus hispidissimus*

*Hibiscus surattensis*

*Hypolytrum nemorum*

*Indigofera tinctoria*

*Leersia hexandra*

*Luffa cylindrica*

*Mangifera indica*

*Mimusops elengi*

*Momordica dioica*

*Murraya paniculata*

*Myristica malabarica*

*Ochlandra travancorica*

*Ocimum americanum*

*Ocimum gratissimum*

*Oryza meyeriana* var. *granulata*

*Oryza rufipogon*

*Panicum gardneri*

*Panicum notatum*

*Passiflora edulis*

*Passiflora foetida*

*Phoenix loureirii*

*Phyllanthus emblica*

*Piper argyrophyllum*

*Piper galeatum*

*Piper hymenophyllum*

*Piper longum*

*Piper mullesua*

*Piper nigrum*

*Piper trichostachyon*

*Piper wightii*

*Pseudosorghum fasciculare*

*Pseudoxytenanthera bourdillonii*

*Pseudoxytenanthera monadelpha*

*Psidium guajava*

*Rauvolfia serpentina*

*Ricinus communis*

*Rubus glomeratus*

*Saccharum spontaneum*

*Santalum album*

*Schumannianthus virgatus*

*Sesamum orientale*

*Solanum anguivi*

*Solanum melongena* var. *insanum*

*Sorghum nitidum*

*Spondias pinnata*

*Syzygium jambos*

*Tinospora sinensis*

*Tylophora macrantha*

*Vanilla aphylla*

*Vigna radiata*

*Vigna umbellata*

*Vigna vexillata*

*Wrightia tinctoria*

*Zehneria maysorensis*

*Zehneria thwaitesii*

*Zingiber cernuum*

*Zingiber officinale*

*Zingiber zerumbet*

*Ziziphus oenoplea*

# Appendix - III

## Edible fruit yielding plants

*Antidesma menasu*

*Antidesma acidum*

*Aporusa acuminata*

*Aporusa lindleyana*

*Artocarpus gomezianus*

*Artocarpus hirsuta*

*Artocarpus integrifolia*

*Baccaurea courtallensis*

*Clausena anisata*

*Cordia wallichii*

*Chrysophyllum roxburghii*

*Elaeagnus conferta*

*Flacourtia montana*

*Garcinia gummi-gutta*

*Grewia tiliifolia*

*Lantana camara*

*Madhuca neriifolia*

*Mangifera indica*

*Passiflora edulis*

*Passiflora foetida*

*Phyllanthus emblica*

*Phoenix loureirii*

*Psidium guajava*

*Solanum lasiocarpum*

*Spondias pinnata*

*Syzygium jambos*

*Ziziphus rugosa*

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