STUDIES ON FLOWERING PLANTS DIVERSITY OF ALAPPUZHA DISTRICT, KERALA

THESIS
submitted to the
University of Calicut
in partial fulfilment of the
requirements for the degree of
DOCTOR OF PHILOSOPHY

by

C.N. SUNIL

Supervising teacher

Dr. M. Sivadasan

DEPARTMENT OF BOTANY
UNIVERSITY OF CALICUT
KERALA, INDIA

October 2000

Dedicated
to the cherished memory of
Late Dr. V.V. Sivarajan

Department of Post-Graduate Studies and Research in Botany
UNIVERSITY OF CALICUT

Dr. M. Sivadasan
Professor

Calicut University P.O., 673 635
Kerala, India

23rd, October, 2000

CERTIFICATE

This is to certify that the thesis entitled, 'Studies on Flowering Plants Diversity in Alappuzha District, Kerala' submitted by Mr. C.N. Sunil for the degree of Doctor of Philosophy in Botany of the University of Calicut is a record of bona fide research work carried out by him during the period of his study under my guidance, and that the thesis has not previously formed the basis for award of any degree, diploma, associateship, fellowship or other similar titles or recognition.

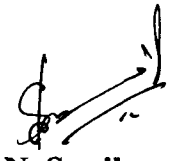
Mr. C.N. Sunil has successfully completed the Qualifying Examination prescribed by the University of Calicut as part of the Ph.D. programme of the University.

(M. Sivadasan)

E-mail: siva@unical.ac.in; Phone: 0494-400275; Fax: 0494-400269; Telegram:UNICAL
Res.: Staff Qrs. C-14, University of Calicut, Calicut University P.O, 673 635, Kerala. Ph.: 0494-400947

DECLARATION

I hereby declare that the thesis entitled **"Studies on flowering plants diversity of Alappuzha District, Kerala"** submitted by me in part-fulfilment for the degree of Doctor of Philosophy of the University of Calicut has not been submitted by me for the award of any other degree or diploma, and it represents the original work done by me.



C.N. Sunil
Department of Botany
S.N.M. College
Maliankara
Ernakulam, Kerala.

Calicut University
10.10.2000

ACKNOWLEDGEMENTS

I have great pleasure to express my deep sense of gratitude and indebtedness towards my supervising teacher, Dr. M. Sivadasan, Professor, Department of Botany, University of Calicut, for his excellent guidance, expertised opinion, continuous encouragement and consistent supervision during this study.

I thankfully remember the late Dr. V.V. Sivarajan, Professor, Department of Botany, University of Calicut, for the proposal of this topic for study. Actually he was a source of constant encouragement and assistance to me during the earlier parts of this study. Introducing me to the intricacies of research, he helped me a lot to build up my research career. Words fail to express the eternal and reverent feelings of gratitude that I owe to him.

I am extremely grateful to Professor N. Ravi, Emeritus Scientist, Tropical Botanic Garden and Research Institute, Palode, Thiruvananthapuram, who introduced me to the field of taxonomy. I am also thankful to him for providing me with authentic identification of Cyperaceae and Poaceae specimens and for his constant encouragement and valuable suggestions.

I feel very happy in recording the words of gratitude to Dr. K. Unnikrishnan, former Head of the Department of Botany, University of Calicut and Dr. N. Neelakandan, the present Head of the Department of Botany, University of Calicut for providing me the facilities of the department for my research work.

I am highly indebted to Dr. A.K. Pradeep, Curator, Calicut University Herbarium, for his valuable suggestions, help for identification and advice in carrying out this study.

Let me express my sincere thanks to N. Anilkumar, Scientist-in-charge of Agrobiodiversity Centre of the M.S. Swaminathan Research Foundation, Kalpetta, Wayanad, for the valuable suggestions and advice rendered by him during the course of this work.

Dr. V.J. Nair, the former Deputy Director and Dr. P. Daniel, the present Deputy Director, Botanical Survey of India (Southern Circle), Coimbatore are also remembered here with thanks for permitting me to study the authentic specimens available at the Madras Herbarium (MH).

I am thankful to Dr. Paul Kessler, Rijksherbarium, Leiden, The Netherlands and Dr. N.P. Balakrishnan, Emeritus Scientist, Madras Herbarium, Botanical Survey of India (Southern Circle), Coimbatore, for their help in identification of some taxa.

Dr. N. Sasidharan, Scientist, Kerala Forest Research Institute, Peechi, Thrissur, helped me with the identification of some tree specimens. I am also thankful to him.

I am extremely indebted to my friend Mr. Dinil Kumar, who accompanied me during most of the field trips.

Prof. V.R. Ajith Kumar, Principal, Prof. C.G. Dharman, former Principal, S.N.M. College, Maliankara are remembered here with thanks for providing necessary facilities for this work.

My special words of thanks are also extented to the retired Professors K.P. Subrahmanian and P.K. Sreevatsan, Department of Botany, S.N.M. College, Maliankara for their constant encouragement and blessings.

I feel very happy in recording the words of gratitude to Smt. Vanaja, Smt. Beena, Sri. Joshi, Smt. Suma, Sri. Suseelan, Smt. Girija, Smt.Mini, Sri. Rajiv and Sri. Sreejith, Department of Botany, S.N.M. College Maliankara for their valuable support and encouragements.

I express my sincere thanks to Messrs. K.P. Rajesh, V. Abdul Jaleel, C. Abdul Hameed, K. Mohana Kurup, N. Unnikrishnan and K.P. Prasanth, Department of Botany, University of Calicut and Mr. K.K. Sajeev of KFRI, Peechi, Thrissur, for their various helps during this study.

I am extremely thankful to Dr. M. Sabu and Dr. K.T. Joseph, Department of Botany, Calicut University and to Dr. C.R. Suresh for their help in identification of some specimens.

I gratefully acknowledge the services of Mr. Balu, Bina Computer Institute, Chenakkal for word-processing the manuscript and that of Mr. V.B. Sajeev, Parayakad, N. Paravoor, Ernakulam, for preparation of the illustrations.

My sincere thanks are also extended to Mr. Amithabachan, for his help in out-door photography.

Last, but not the least, I express my sincere gratitude to my parents, wife and son for their continuous help and support during the study.

C.N. Sunil

CONTENTS

INTRODUCTION i

AREA OF STUDY iii

Location iii

Topography iv

Climate vii

Temperature vii

Rainfall vii

Geology and Soil viii

Rivers xi

Lakes xi

Vegetation xii

Sacred Grove Vegetation xii

Aquatic and semi-aquatic vegetation xix

Mangrove and semi-mangrove vegetation xxii

Sea-coast vegetation xxv

Vegetation in cultivated and waste lands xxvi

Specialised angiosperms xxvii

Agriculture xxvii

Ornamental plants xxviii

REVIEW OF EARLIER WORK xxix

METHODOLOGY xxxi

PLAN OF PRESENTATION OF DATA xxxiii

Abbreviations and symbols used in the thesis xxxiv

FLORISTIC ANALYSIS xxxvi

Analysis of the first three major families xliv

1. Poaceae xliv
2. Fabaceae xlv
3. Cyperaceae xlvii

Endemism xlvii

Rarity/Vulnerability of species xlviii

Alien species xlviii

Wild relatives of Crop Plants xlviii

Medicinal plants li

New distributional records and reports li

Extended distribution of species lii

THREATS OF FLORA liii

SUMMARY lvii

SYSTEMATIC TREATMENT 1

APPENDIX-I 1185

List of common ornamental plants in the study area

APPENDIX-II 1188

List of endemic plants

APPENDIX-III 1190

List of rare plants

APPENDIX-IV 1193

List of alien species

APPENDIX-V 1195

List of wild relatives of crop plants

APPENDIX-VI 1197

List of medicinal plants

REFERENCES 1200

INDEX TO FAMILIES AND GENERA 1207

INTRODUCTION

C.N.Sunil “Studies on flowering plants diversity of Alappuzha district, Kerala ”
Thesis. Department of Botany , University of Calicut, 2000

INTRODUCTION

If the plants, animals and micro-organisms re-create the quality of the air that we breathe, the water we drink, the soil which produces our food and if plants provide the natural ingredients for medicines which cure human illnesses for over three-fourths of human population, we have reasons to be concerned with destruction of biodiversity. Biodiversity has made life possible, but human history has tended to erode this diversity (Ashish Kothari, 1997). In recent years there developed a global realization towards the need for conservation of biodiversity which attained its peak with the UN Conference of Environment and Development (UNCED) held at Rio de Janiero, in June 1992.

The mere fact that biodiversity has been diminishing where as human population is escalating reflects that the number of human heads are increasing at the coast of biodiversity. The tropical rain forests of the world are getting depleted at an estimated rate of 2,45,000 km^2 per year (Meyers, 1980). Around 10 percent of the plant species in temperate regions and 11 percent of world's 9,000 bird species are threatened with extinction. The destruction and shrinkage of habitats and fragile ecosystems have resulted in the disappearance of many important species thus causing a serious genetic erosion of crop, medicinal and other valuable plants. This picture appears more alarming when we find that each plant species along with its extinction also leads to disappearance of several dependent species of insects, birds and mammals thus leading to thinning of biodiversity and gene pool beyond repair. At global level, thinning of the ozone layer, acid rains and global warming, etc. have adverse effect on biodiversity. Intensive and industrialised agriculture, favouring single-crop techniques also reduces the genetic diversity of animal and plant species. Intentional or accidental introduction of exotic species which compete with indigenous species can undermine an ecosystem's equilibrium.

India has the world's greatest range of altitude, rainfall and geological conditions. These features have given rise to an enormous diversity of ecosystems – forests, wetlands, coasts, grasslands, seas, deserts, etc. Each of these major ecosystems display great

internal diversity. This habitat – diversity supports a recorded figure of 45,0000 plant species and 81,000 animal species. Eventhough India has only 2% of the world's land mass, it is housing 6.5 to 7% of the recorded species world-wide. Endemism amongst India's biodiversity is high. According to the Botanical Survey of India, about 33 percent of the flowering species and 18 percent of the total plants are considered to be found only within our boundaries. Biological diversity is essential for proper functioning of food chain and hence providing security to the food system of the nation. Any species is a repository of high number of genes that produce innumerable chemical compounds, antibiotics, enzymes, etc. which may solve humanity's many health and agriculture problems. In this context any biological species, no matter how inconspicuous, may provide the substance we are looking for.

In India, since the publication of *Flora of British India* (Hooker, 1875-1897), over 3400 species have been added, from the present Indian territory (Henry & Daniel, 1988). Over 150 new species and 15 new genera have been discovered during the last 3 decades from Western Ghats alone (Nair & Daniel, 1986). Manilal and Raveendrakumar (1998) have listed 625 new taxa discovered from Kerala state, coming under 103 different families since the publication of the *Flora of the Presidency of Madras* by Gamble (1915-1936). Of these new taxa, 240 are new to the world flora, with six new genera, 190 new species, three new sub-species and 41 new varieties. Arora and Nayar (1986) added more than 300 wild relatives of crop plants from the country.

Due to waning interest in taxonomy, the correct assessment of biodiversity has become more difficult. Of the expected 30 million species on planet earth, only 1.4 million could be identified, named and categorised so far. As our knowledge of biodiversity is limited, the knowledge on the loss of biodiversity is also very much limited. In 1970's FAO estimated that 46% of tropical forests have already been lost and remainder were being clear-cut at the rate of 1.1% every year. By the distruction of tropical forests alone, we may loose 25% of our total species by the year 2015 (Raven, 1988).

Over the years all the discussions on biodiversity and species extinctions are concentrated around tropical forests. It is true that the tropical forests are richer in biodiversity and loss or degradation of such high diverse area has drastic impact on the environment. At the same time each individual or species is equally important in an ecological point of view. But less attention is paid to the local level extinctions or habitat degradations. The habitats like wetlands, mangroves, sacred groves, etc. are also depleting or degrading fastly. Very fragmentary informations are available on these types of ecosystems. Many species are exclusive of these kind of habitats. These unique habitats which play key roles in the local environment are usually found in the thickly populated areas. The pressure on these habitats are hence mounting up and they are considered as mere wastelands by the policy makers. Due weightage is not given to them.

We are loosing many species, even before they are recorded and made known to the world. Hence an immediate documentation of our biodiversity is essential. An up-to-date comprehensive flora is a prerequsite for knowing our plant resources, their correct identity, distribution, present status and extend of threat if any, endemism, wild relatives of known economic plants, and their inter-relationships and so on. It is with this intention that the present work on flowering plant diversity of Alappuzha district in Kerala state consisting the vast stretches of wetlands, mangroves, sacred groves, etc. has been undertaken, and hope that this flora would enable us to have a better understanding and management of the local flora. This may be useful in local level planning also.

AREA OF STUDY

Location

Alappuzha, commonly known as the "Venice of the East" was the first planned town of Kerala. The origin of the word "Alappuzha" is not clear. According to one view it means "a river bend under or near a banyan tree," but the significance of the derivation is not obvious. The word "Alappuzha" seems to be a compound of the words "Alam" and "pazha". According to Dr. Gundert Alan, it means 'broad' while some others would make it 'Azham' means 'depth'. The word 'Puzha' means 'river'. Considering the geographical

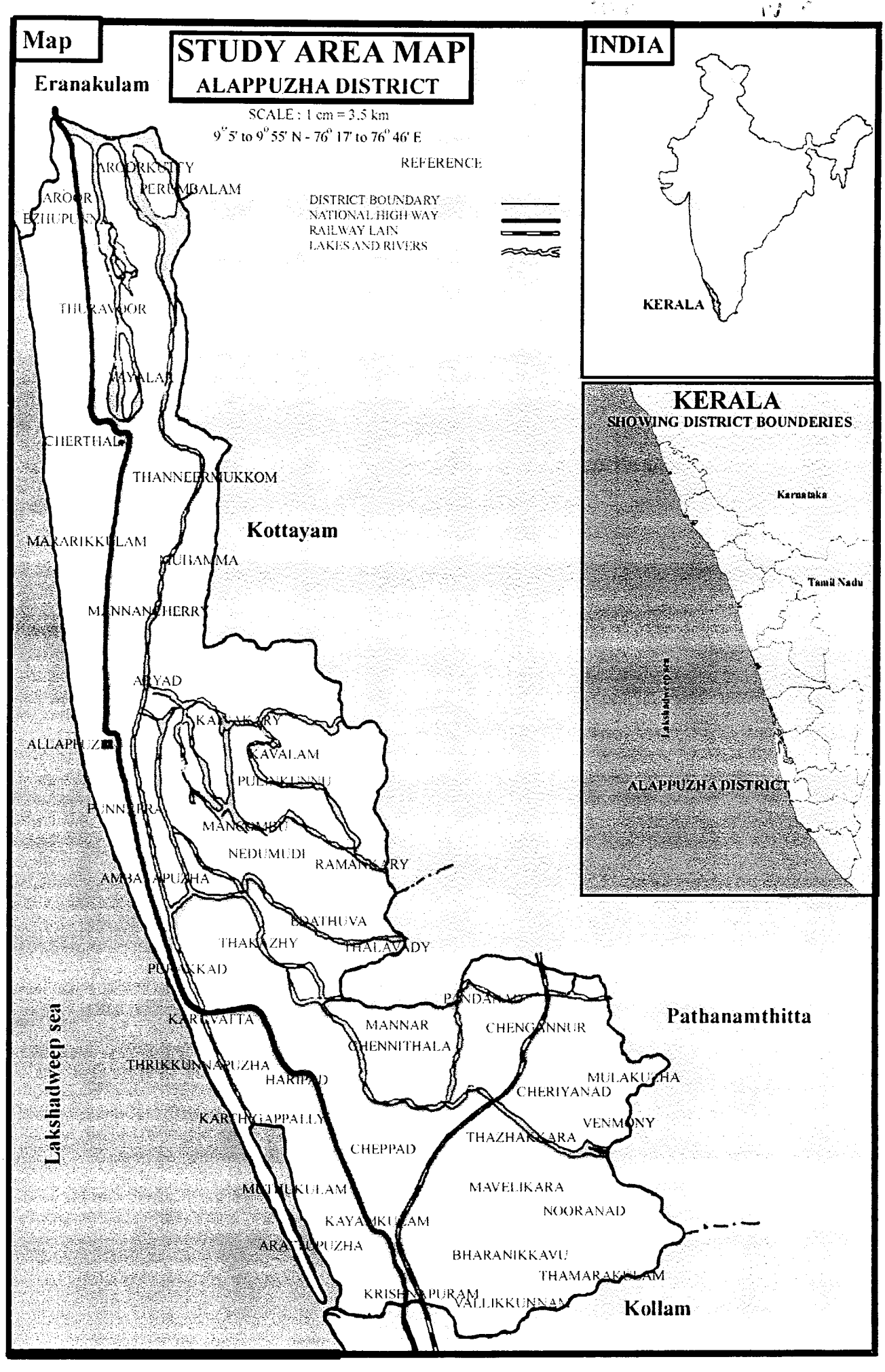
position and physical features of the District, it may be assumed that the word 'Alappuzha' means the land between sea and a network of rivers flowing into it. The district by the name 'Aleppey', which is now officially re-named as Alappuzha, was formed by the Govt. with effect from August 17, 1957 (Chingam 1, 1133). But later for the formation of Pathanamthitta district in 1982, Tiruvalla taluk was transferred from Aleppy District. The district is situated on the South West Coast of India between 9°5' to 9°55' North latitude and 76°17' to 76°46' East longitude. The district is bounded on the north by the Ernakulam district, on the east by the Kottayam and Pathanamthitta districts, on the south by the Kollam district, and on the west by the Arabian sea (Map 1).

Alappuzha district is one of the unique districts in Kerala, in the sense that it is the only one which does not have any mountain ranges of the Western Ghats in Kerala. It is mainly a coastal district and the major part of the district is occupied by wetland, either as cultivated fields or as marshy lands.

The total area of the district is 1414 sq. km. and is only 3.64% of the total geographical area of the state. According to the census of 1991, the total population of district is 20,01,270. With respect to the extend of area, the Alappuzha district gets the last rank among the 14 districts of Kerala, while with respect to the population density, it gets first rank. The district consists of 6 taluks viz., Cherthala, Ambalapuzha, Kuttanadu, Karthikapally, Mavelikkara and Chengannur.

Topography

On the basis of its physical features, Kerala state is divided into three natural divisions, viz., low-lands, mid-lands and high-lands. Alappuzha district doesn't have high-lands in the absence of any mountain ranges of the Western Ghats. It has only low-land and mid-land regions. It is mainly a coastal district having 82 km of sea-shore. Major part of the district is wetland. The low-land (narrow coastal belt) with stretches of sand and backwaters forms a considerable portion of the district. Extensive paddy fields and numerous coconut plantations are the common features of this area. The taluks of Cherthala, Ambalapuzha, Karthikappilly, Kuttanadu and western portions of Chengannur


Map
STUDY AREA MAP
ALAPPUZHA DISTRICT
SCALE : 1 cm = 3.5 km
9°5' to 9°55' N - 76° 17' to 76° 46' E
REFERENCE
DISTRICT BOUNDARY
NATIONAL HIGH WAY
RAILWAY LAIN
LAKES AND RIVERS
INDIA
KERALA
KERALA
SHOWING DISTRICT BOUNDERIES
Karnataka
Tamil Nadu
Lakshadweep sea
ALAPPUZHA DISTRICT
Eranakulam
Kottayam
Pathanamthitta
Kollam
Lakshadweep sea
CHERTHALA
ALLAPPUZHA
AMBALAPUZHA
HARIPAD
CHENGANNUR
MAVELIKARA
NOORANAD
KAYAMKULAM
KRISHNAPURAM

and Mavelikkara lie entirely in this region. Kuttanadu is considered as the major area of rice resource of Kerala and about 40% of the people here are involved in agriculture. Most portions of Kuttanadu region lies between 0.6 to 2.2 m below Mean Sea Level. These low-lying areas have been reclaimed by constructing bunds. The Kuttanadu with a network of these bunds and canals is known as the "Holland of Kerala."

The mid-land regions lying to the east of the coastal tract present an undulating land of lateritic soil cut across by rivers. Eastern portions of Chengannur and Mavelikkara taluks are included in this region. Here rice is the most common crop in the valleys, while tapioca and rubber are being cultivated in the slopes and uplands. There are no high hills or mountains in Alappuzha district. But some rocky formations viz., Pandavanpara and Nuttavanpara are included in the Chengannur Taluk of the district.

Climate

The district has a tropical humid climate with an oppressive summer and plentiful seasonal rainfall. The period from March to May is the hot season. This is followed by the South-West monsoon season which commences by June and continues till the end of September. Then the South-West monsoon retreats giving place to the North-East monsoon which begins October and lasts till the end of February.

a. Temperature

Temperature varied from 27°C to 35°C, with February to May being the hottest period. Whereas, December and January are the coldest months with temperature variation of 20-26°C. Graphical representation of average monthly maximum and minimum temperature data for the period from 1993 to 1998 has been given in figure 1.

b. Rainfall

Both South-West and North-East monsoons provide fairly good rain to the area. Yearly rainfall varies from 1700 to 3800 mm. The following table (Table 1) shows the annual rainfall in mm recorded for the period from 1993-1998 at representative rain gauge stations in the district.

Table 1. Rainfall data (in mm) for the period from 1993-'98.

Sl. No.	Stations	Year					
		1993	1994	1995	1996	1997	1998
1.	Alappuzha	3273.3	2907.9	2849.5	2723.5	3333.1	3176.9
2.	Chengannur	3728.4	3583.4	3826.5	2885.1	3736.7	3569.1
3.	Cherthala	2530.1	2818.0	2479.4	2230.5	2498.6	3162.7
4.	Haripad	2970.4	2770.6	2323.1	1773.0	3159.1	3117.4
5.	Kayamkulam	2546.6	2893.3	2230.0	1724.9	2917.3	2471.0
6.	Mancompu	3090.0	2747.0	2924.0	2432.4	3452.2	3470.8
7.	Mavelikara	3028.4	2877.3	2834.5	1972.3	3146.3	2698.9

Geology and Soil

The western or coastal tract of the district comprises recent sediments, viz. Alluvium, blown sands, etc. At Alappuzha, Cherthala and other places in the neighbourhood, coherent layer of sand is found to overlie mud. The mud is highly acidic in reaction and sulphurous incrustations have been noted in several areas. The mud-bank near Alappuzha which is known as "Chakara" is an interesting phenomenon. In western part of the Kuttanadu area soil is highly acidic and sediments consist of alternating beds of loose sand and hard, stiff clay of variegated colours. The southern parts of the Kuttanadu area lying to the east of Purakkad and Thottapally, and south of Thakazhi are known as "Kari" lands.

Inland exposures of lateritized sands of the Warkali formations lies on the eastern side of this coastal tract especially near Mavelikkara, Chengannur, Bharanikavu, etc. There are a few rocky formations in the eastern part of the Chengannur Taluk.

There are glass-sand deposits (Plate I, A) in and around Cherthala (9° 41' N; 76°20' E) on the Alappuzha coast. The average thickness of the deposits is about 1.524 metres.

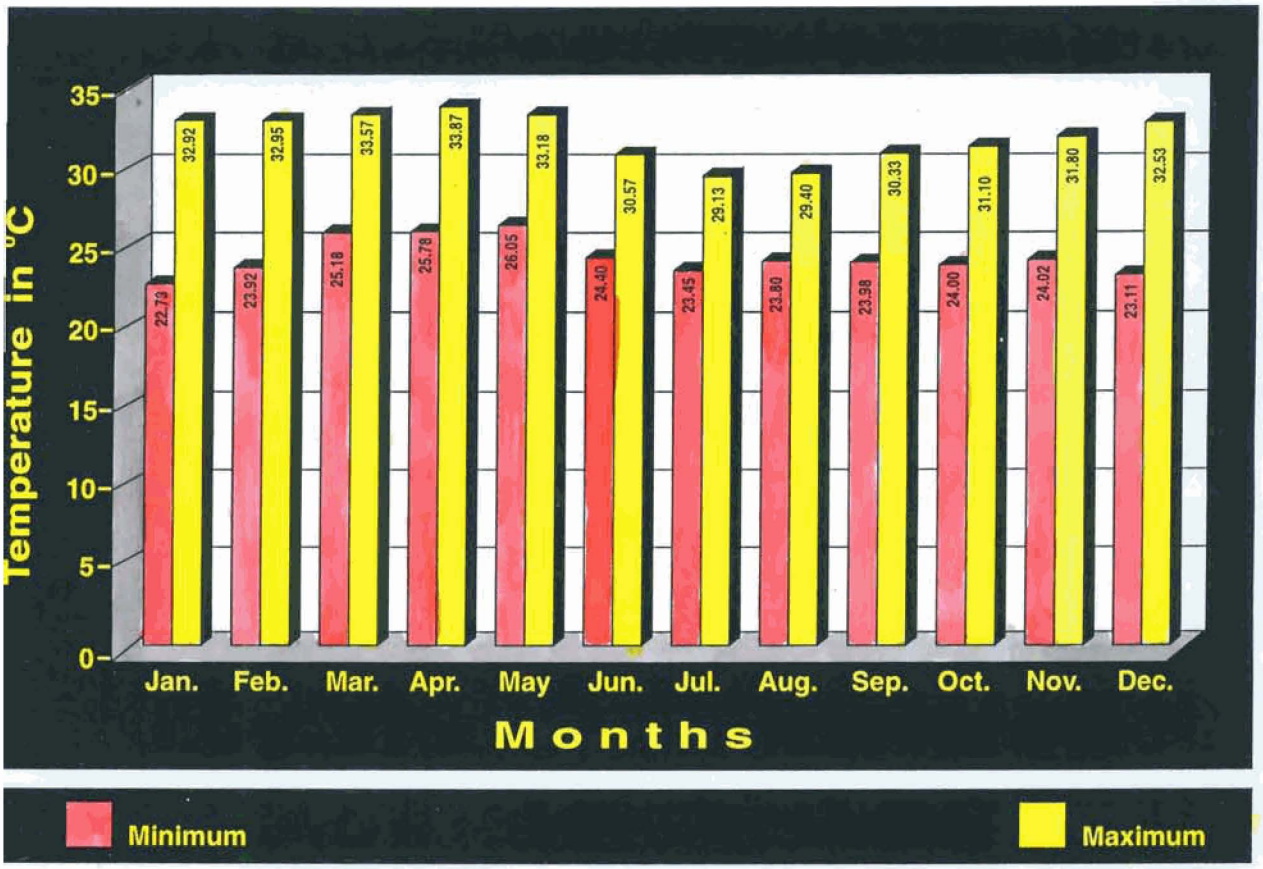


Fig. 1 Average monthly temperature for the years from 1993-1998

Rivers

There are 3 important rivers flowing through this district. They are Achankovil, Mnimala and Pamba. But they are inter-district rivers and do not flow entirely in the Alappuzha District. The Pamba river with a length of about 177 km is formed by the confluence of Pambayar, Arudai Aar, Kakkiar and Kakkad Aar. It descends from Sabarimala, flows mainly through various parts of Ranni taluk of Pathanamthitta district enters Alappuzha district after joining with river Manimala and river Achankovil (129 km) and empties into the Vembanad lake. The river Achankovil is formed by the confluence of several small streams originating from Rishimala, Pasukiamettu and Ramakkalteri and joins the Pamba river at Veeyapuram in Alappuzha district. The river Manimala (92 km) originates from the Mothavara hills in Kottayam district, flows through Tiruvalla taluk of Pathanamthitta district and Kuttanadu taluk of Alappuzha district, and it confluences with the river Pamba at Valanjavattam.

Lakes

There are two important lakes in this district, viz., the Vembanad lake and Kayamkulam lake. The Vembanad lake (Plate I, B) is the vast expanse of backwater, which stretches from Alappuzha to Cochin. Its length is about 60 km, and its breadth 8 km in some places. The lake covers an area of about 256 sq. km and its depth varies from 3 to 5 m. Five important rivers discharge their waters into this lake, namely, Muvattupuzha, Meenachil, Manimala, Pamba and Achenkovil rivers. In order to prevent the intrusion of saline water as well as the effect of tides into the lake, a bed-regulator across the neck of Vembanad lake between Thanneermukkam and Vechur has been constructed in 1974. During December, when the saline water begins to intrude into the lake, the shutters of Thanneermukkam regulator will be closed and it will be reopened in June when the monsoon begins. This regulator is the longest regulator of its kind in India. There are many pretty places along the borders of Vembanad lake perpetually clothed with beautiful groves of cocunut and other trees. From here to Cochin the backwater is of varying bredths, depths containing small patches of land here and there, always adorned with coconut trees. Pathiramanal or "the mysterious sand of midnight" is the beautiful

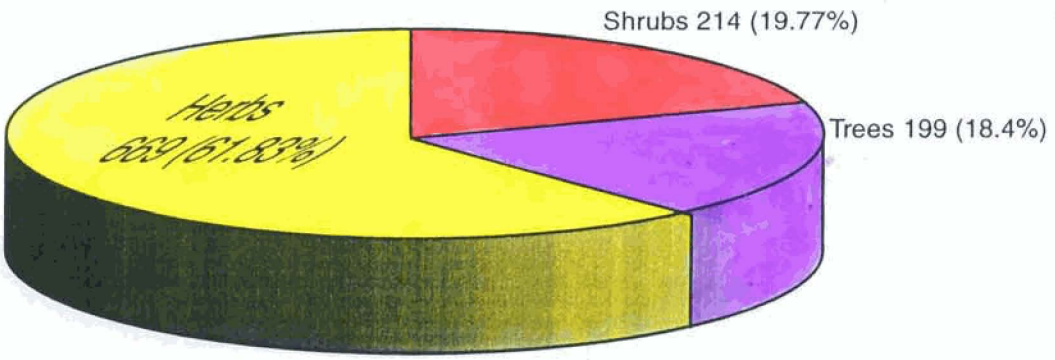


Fig.5 Composition of Flora of the Alappuzha District with respect to habit

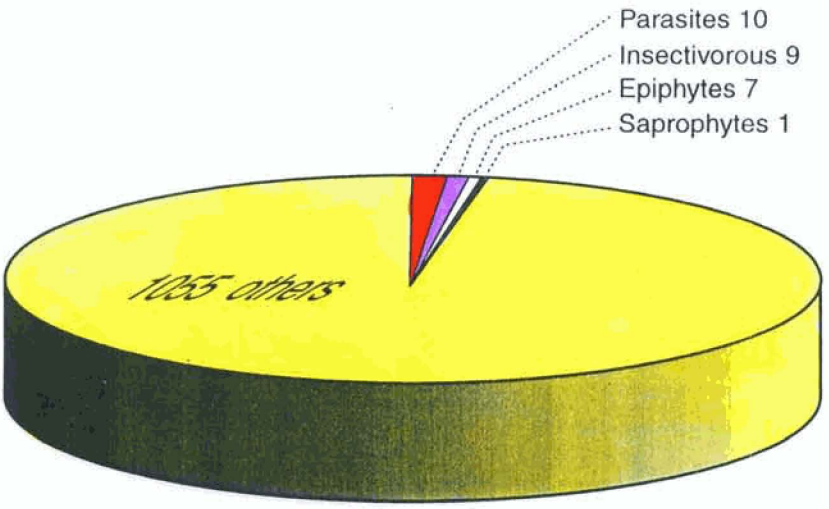


Fig.6 Relative abundance of special groups of plants of Alappuzha District

island in this lake filled with coconut plantations and luxurient vegetations. Pallipuram and Perumbalam are the two other islands in this lake.

Kayamkulam lake is 30 km long including its expansions at the southern and northern extremities and has an average breadth of 2.4 km. It extends from Panmana to Karthikapally and has an area of 59.57 sq. km. It is very shallow and has an outlet at the Kayamkulam bar.

Vegetation

Alappuzha district is one of the unique districts in Kerala, which does not have any forests and high lands. Most of the lands here are used for agriculture and housing. Eventhough there are no forests in this district, many well protected sacred groves are seen which contain many forest plants, usually found in Western Ghats. The major part of the district is occupied by wetland either as cultivated field or marshy lands. Consequently these areas are well represented by aquatic or semi-aquatic plants. Mangroves, semi-mangroves, sea-coast plants, etc. can be seen in the coastal area of the disrict. Cultivated and wastelands here are also housing a variety of vegetations.

Hence the vegetation of the district can be broadly classified as follows:

1. Sacred grove vegetation
2. Aquatic or semi-aquatic vegetation
3. Mangrove or semi-mangrove vegetation
4. Seacoast vegetation
5. Vegetation in cultivated and wastelands.

Sacred Grove Vegetation

Sacred groves are known under different names as 'Sarpakkavu' and 'kavu'. These groves are small patches of native vegetation types traditionally protected and managed by the local communities. A variety of taboos and prohibitions serve to conserve biodiversity within 'sacred groves'. Many of them are linked to temples premises. These 'kavus' contain all the rare and endangered species of the Western Ghats and rare medicinal plants

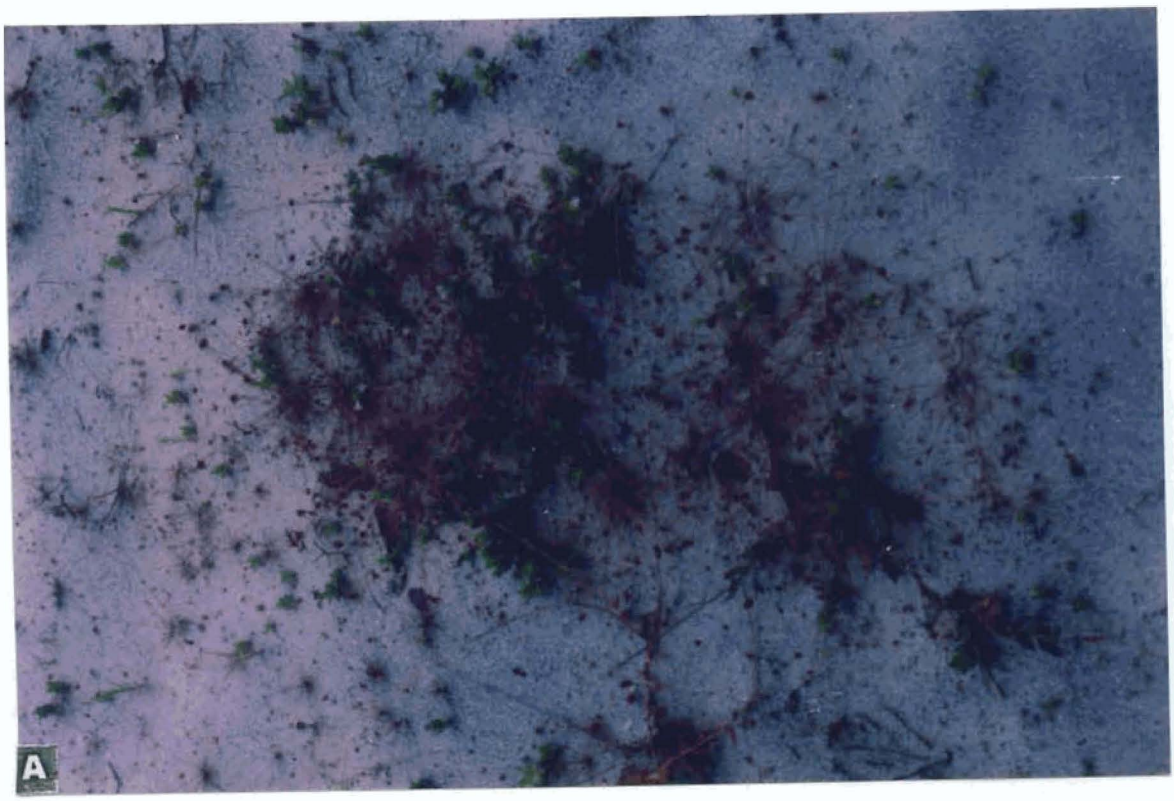




Plate I. Various habitats of the study area. A. Glass sand at Cherthala; B. Vembanad lake.

of the region. All sacred groves are dedicated to Gods or Goddesses or to certain ancestral or natural sprits. It is believe that the groves are the property of the Gods and must not be damaged in any way. No one is allowed to cut or remove any plants or kill animals. Even the fallen twigs, branches of trees or leaves are not removed. Violation of the rules disturb or dispel the sanctity of the sacred grove and its immediate surroundings and were considered to be unpardonable sins that will invite the wrath of the patron deity or spirits by bringing epidemic disease, famine, natural calamities or sufferings to the people. This faith and belief guided non-interference in such islands of biodiversity, is an excellent example of microlevel *in situ* conservation. So sacred groves are patches of virgin forests preserved and protected by the local people on religious grounds. They are thus *sanctum sanctorum* of rare, endangered and endemic plant species, many of which have disappeared from the region outside the groves.

'Kavus' are distributed similarly in low-land and mid-land regions of Alappuzha district. The groves varied in size. Some were with only a few trees around a temple. There are about 52 sacred groves in Alappuzha district. Among these Vandanam (Plate II, A), Sharangakau (Plate II, B), Elanjimelvallikavu and Mannarsala are larger, each of which spreading over an area of 2 acres. Kurathikadu, Kallikkadu, Pokkadkavu, Kanjoorkavu, Panayannarkavu, Bhajanamadom, Kuriyankavu, Thattekadu, Pathiyoor kavu, Kozhikkal kavu, Kooritharakavu, Kopparakavu, Malayakavu, Mudirakala, Areeparambukavu (Plate II, C), Krishnapuram kavu, Kursikkal, Mangalam kavu, Vettathukavu, Poopully kavu, Navurath, Kattiparambu, Konattussery kavu, Muthukunnathu kavu, Nulayakadu kavu, Pattathikavu madom, Mundankavu, Paraeppadikavu, Nagamkulangara, Thamarakulamkavu, Thazhakkarakavu, etc. are other kavus each of which spreading below 2 acres. According to Chand Basha (1998), Kasargode is the first district in Kerala having greatest number of Kavus with 60, Kannur is the second with 54, and Alappuzha is the third with 49 kavus.

Out of 1082 species found in Alappuzha district about 218 species (20.14%) are commonly found in sacred groves. The sacred groves of Alappuzha comprise trees, shrubs and herbs, climbers and stragglers, epiphytes and parasites. Common emergent







Plate II. Sacred groves of different temples ('Kavus'). A. Vandanam Kavu; B. Sharanga Kavu; C. Areeparambu Kavu

tree species are *Artocarpus hirsutus, Alstonia scholaris, Hopea ponga, Hopea parviflora, Mimusops elengi, Calophyllum calaba, Xanthophyllum flavescens, Vateria indica, Holigarna arnottiana, Carallia brachiata, Syzygium caryophyllatum, Tarenna asiatica, Diospyros malabarica, Strychnos nux-vomica, Vitex altissima, Vitex pinnata, Myristica malabarica, Cinnamomum malabatrum, Litsea coriacea, Persea macrantha, Aporosa lindleyana, Sterculia balanghas, Olea dioica, Samadera indica,* and *Caryota urens.* Climbers and stragglers are one of the most conspicuous features of the sacred groves of Alappuzha district. *Tetracera akara, Artabotrys zeylanicus, Uvaria narum, Uvaria zeylanica, Anamirta cocculus, Cissampelos pareira, Cyclea peltata, Tinospora sinensis, Capparis floribunda, Capparis moonii, Hugonia mystax, Cansjera rheedii, Sarcostigma kleinii, Salacia fruticosa, Ziziphus rugosa, Tetrastigma leucostaphylum, Connarus monocarpus, Rourea minor, Dalbergia horrida, Derris thyrsiflora, Acacia torta, Combretum latifolium, Zanonia indica, Schefflera venulosa, Morinda reticulata, Embelia basaal, Jasminum azoricum, Myxopyrum smilacifolium, Anodendron manubriatum, Chonemorpha fragrans, Kamettia caryophyllata, Strychnos minor, Erycibe paniculata, Mallotus rependus, Calamus travancoricus*, etc. are common climbers and stragglers found in sacred groves. The epiphytic plants include *Acampe praemorsa, Bulbophyllum neilgherrense, Bulbophyllum rheedei, Dendrobium ovatum, Oberonia bicornis,* and *Pholidota pallida. Syzygium travancoricum, Ochna gamblei, Morinda reticulata, Kamettia caryophyllata, Strophanthus wightianus, Bulbophyllum rheedei,* and *Oberonia bicornis* are rare species found in the sacred groves of Alappuzha.

Ecologically, sacred groves tend to be fragments of the original ecosystem in a given region and can be considered as a self-generating and self-sustaining ecosystem. These ecosystems with their complex array of interaction, influence the flora and fauna of the region as well as microclimate of that locality. A further factor that amplifies the significance of sacred groves is the fact that almost all of them contain water bodies in the form of ponds, lakes or rivers. Not only that, but the vegetative mass of the grove itself conserves water, soaking it up like a sponge during wet periods and releasing it slowly in times of drought. It is evident that one of the functions of groves in preserving biodiversity is to provide a more dependable source of water for the organisms inside

be good source of live stock feed, human food, fish food, medicines, organic or biofertilizers, energy, fibre and paper. They have the capacity to purify waste water through the uptake of dissolved nitrogen, phosphorous and undesirable excessive minerals including heavy metals. The wetlands also support many birds, amphibians, reptiles and mammales. Apart from these, the wetlands are of great aesthetic beauty. Above factors are indicative of the value of wetlands, their productivity and diversity.

Out of 1082 species found in the district, 202 species (i.e. 18.5%) are aquatic and semi-aquatic plants. Fresh water habitats in Alappuzha district can broadly be divided into two types: 1. Stagnant waters (Plate III, A) like lakes, ponds, pools, flooded lowlands, etc., and 2. Running waters like streams, rivers, rivulets, irrigation canals, etc. Besides these, there are the wet-lands or marshes or swamps which are wet for most part of the year and harbour a large number of wet-land or amphibious species. To give a rough idea about the habit-forms of the aquatic and semi-aquatic plants of Alappuzha district, they would be tentatively classified as follows:

1. *Free-floating hydrophytes*: These are plants which usually live on the surface of water in contact with air. They mainly occur in sheltered habitats and stagnant waters. These are represented by *Hygroryza aristata, Lemna perpusilla, Spirodela polyrhiza, Wolffia globosa, Pistia stratiotes* and *Eichhornia crassipes.*

2. *Suspended hydrophytes*: These plants live well below the surface of water, but are usually not anchored. This group is represented in Alappuzha district by *Utricularia aurea* and *U. exoleta. Ceratophyllum demersum, Hydrilla verticillata* and *Eriocaulon setaceum* are anchored-submerged to begin with, but often get detached from their roots, and thereafter lead suspended life. Suspended hydrophytes, cannot survive in fast-flowing waters and are hence usually found in stagnant ponds and pools.

3. *Submerged-anchored hydrophytes*: These plants live well below the surface of water and are usually anchored. This can be divided in to two types: caulescent and acaulescent (rosette type). *Eriocaulon setaceum, Najas graminea, N. indica,*

Cabomba caroliniana, *Potamogeton octandrus* and *Hydrilla verticillata* belong to the former, and *Blyxa octandra*, *B. aubertii*, *Ottelia alismoides*, *Vallisneria natans* and *Aponogeton appendiculatus* belong to the latter type.

4. *Anchored hydrophytes with floating leaves*: These plants usually live in shallow, stagnant waters mostly in ponds, pools and flooded low-lands subject to seasonal submergence. They tide over the unfavourable periods by perennating organs like rhizomes, tubers or stolons. Representative members of this group in the area of the present study are *Aponogeton natans*, *Nelumbo nucifera*, *Nymphaea nouchali*, *N. pubescens*, *Nymphoides aurantiacum*, *N. hydrophylla*, *N. indica*, *N. macrospermum*, *N. parvifolium*, *N. sivarajanii*, and *Sagittaria guayanensis*. Some species of *Nymphoides* are also characterised by dimorphic leaves, a basal rosette of submerged sterile leaves, and floating fertile leaves.

5. *Anchored hydrophytes with floating shoots*: These are plants which inhabit shallow, stagnant waters and are anchored to the substrate. But they produce branches which rise to the water surface which thereafter trail or creep along the water surface, often rooting at nodes. Many of them are provided with specialised structures to adapt to this way of life. They are represented by *Neptunia prostrata*, *Ludwigia adscendens*, *Alternanthera philoxeroides*, *Hydrocera triflora*, *Geissaspis cristata* and *Ipomoea aquatica*. At times, *Bacopa monnieri* also behave in this manner.

6. *Emergent-anchored hydrophytes*: These are plants which live most part of their life in water, but produce aerial representative organs. In Alappuzha district, the important representatives of this group are: *Limnophila aquatica*, *L. heterophylla*, *L. aromatica*, *L. indica*, *Typha angustata*, *Aeschynomene aspera*, *Acorus calamus*, *Eriocaulon cuspidatum*, *Dopatrium junceum*, *Sacciolepis interrupta*, *Eleocharis spiralis*, *E. dulcis*, *Schoenoplectus grossus*, *S. articulatus*, *Bergia capensis*, *Limnocharis flava*, *Hygrophila triflora* and *Monochoria vaginalis*. Several members of this group are characterised by heterophylly.

them and in the neighborhood. In addition, transpiration will increase the humidity in the immediate vicinity and produce a more favourable microclimate for many organisms. When forest litter is allowed to accumulate, organic material builds the soil and is returned to the biomass of the standing forest. In the process, many microorganisms, invertebrates, fungi, etc. will flourish.

The biodiversity potential of sacred groves was found to be very high when compared to well protected evergreen formations of South India. For example, 90 km^2 Silent Valley harbours only 960 species of angiosperms compared to 722 species in 1.4 km^2 of the area occupied by the sacred groves (Balasubramanyan & Induchoodan, 1996).

The sacred grove-soils show high porosity and low bulk density compared to the soils of nearby areas (Rajendraprasad, 1995). The soil-moisture retention characteristics of sacred groves are higher when compared to the adjacent areas (Rajendraprasad, 1995).

All of these factors indicate that the preservation of sacred groves is of key importance in maintaining biodiversity and the comprehensive health of a landscape. They provide greater benefits than their small size would indicate.

Aquatic and semi-aquatic vegetation

Alappuzha district provides a wide variety of aquatic habitats like rivers, streams, pools, ponds, puddles, lakes, etc., harbouring characteristic types of vegetation of their own. The major part of the district is occupied by wetland either as cultivated fields or as marshy lands.

Apart from the geomorphological importance of wetlands as storage basins during floods, the socio-economic and biological values including gene pool conservation are extremely significant. They support an appreciable assemblage of rare, vulnerable species or sub-species of plants or animals, or have an appreciable number of individuals of any one or more of these species. But the aquatic plants are still regarded as a menace and a nuisance because of the unawareness of their great potential and economic value. They are more productive than conventional terrestrial crops. These plants have been proved to

7. *Wetland or marsh plants*: The coastal low lands, the valleys of hillocks, margins of ponds, pools, rivers, lakes, canals and paddy fields provide ideal habitat for a number of wet-land species which require water-saturated soil for their survival. At times, the species listed under the emergent-anchored types are also found to grow as wetland plants. The important representatives of this group are: *Impatiens diversifolia, Aeschynomene indica, Crotalaria quinquefolia, Smithia sensitiva, Ammania baccifera, Nesaea brevipes, N. lanceolata, Rotala densiflora, R. indica, R. malampuzhensis, R. rosea, Ludwigia hyssopifolia, L. perennis, L. prostrata, Hydrolea zeylanica, Sphenoclea zeylanica, Limnophila repens, Lindernia anagallis, L. antipoda, L. hyssopioides, L. procumbens, L. rotundifolia, L. tenuifolia, Microcarpaea minima, Dentella repens, Hygrophila schulli, H. ringens, Epaltes divaricata, Grangea maderaspatana, Struchium spargnophorum,* species of *Polygonum* and *Xyris, Tonningia axillaris, Colocasia esculenta, Cryptocoryne spiralis* and *Lagenandra toxicaria.* Most members of Cyperaceae, Eriocaulaceae, Lentibulariaceae and some species of Poaceae also characteristically live in wet-lands.

Mangrove or semi-mangrove vegetation

In the past, mangroves were considered as wastelands with little or no value. Hence, in the tropics, they were used either as dumping grounds, or reclaimed. However, in recent years the ecological and socio-economic significance of the mangrove ecosystem has been recognised. Global efforts are being made to conserve and protect mangrove resources and to use them on a sustainable basis. Coastal populations depend on mangrove-related resources for their socio-economic needs such as fuel and fisheries, as well as for other by-products like honey, timber, coal, fruits and fodder. The mangrove ecosystem is a great repository of both plants and animals of various economic importance. While the gigantic mangrove trees effectively resist the oceanic cyclones, the herbaceous elements check soil erosion and at the same time act as a bulwork against the landward encroachment of the sea. The mangrove habitat is very sensitive as well as fragile, and it forms an important constituent of coastal wetlands.

XXI A



Plate III. Various vegetation types. A. Vegetation of the aquatic habitat; B. Mangrove at Kayamkulam fisheries farm; C. Mangrove at Manjadichira

The coastal areas of Alappuzha district contain several backwaters and salt marshes which support small and large populations of true and semi-mangrove vegetations. Although highly distubed and degraded, mangroves of Alappuzha coast are rich in species diversity. Mangrove vegetations are mainly seen in Kayamkulam, Kumbolichira, Manjadichira (Plate III, C), Kayamkulam fisheries farm (Plate III, B) etc. Small populations of mangroves are also seen in Thrikunnapuzha, Arattupuzha, Andhakaranazhi, Pallithodu, Aroor, Arukutty, Perumbalam, Thannermukkom, etc. The true mangrove species found in Alappuzha district are: *Acanthus ilicifolius, Avicennia marina, A. officinalis, Aegiceras corniculatum, Bruguiera cylindrica, B. gymnorhiza, Derris trifoliata, Excoecaria agallocha, E. indica, Kandelia candel, Lumnitzera racemosa, Rhizophora apiculata, R. mucronata* and *Sonneratia caseolaris*.

The semi-mangrove species found in Alappuzha district are: *Ardisia littoralis, Calophyllum inophyllum, Hibiscus tiliaceus, Thespesia populnea, Dalbergia candenatensis, Derris scandens, Erythrina fusca, Caesalpinia nuga, Terminalia catappa, Barringtonia racemosa, Sphaeranthus africanus, Cerbera odollam, Parsonsia alboflavescens, Tylophora tetrapetala, Dolichandrone spathacea, Clerodendrum inerme, Premna latifolia, Sauropus bacciformis, Crinum defixum, Cyperus malaccensis, Fimbristylis cymosa, F. ferruginea, F. polytrichoides, F. pubisquama, Mariscus javanicus, Schoenoplectus littoralis, Brachiaria distachya, Diplachne fusca, Paspalum distichum, Phragmites karka, Sporobolus virginicus, Zoysia matrella, Morinda citrifolia, Annona glabra, Sesuvium portulacastrum, Aniseia martinicensis, Wedelia chinensis*, etc.

Sea-coast vegetation

The district has 82 km stretch of seashore. The coastal region of this district presents a very rich vegetation. Some of the interesting plants of the region are: *Spinifex littoreus, Canavalia rosea, Indigofera linnaei, I. uniflora, Rothia indica, Launaea sarmentosa, Ipomoea pes-caprae, I. alba, Cyperus arenarius, C. rotundus, Remiera maritima, Bulbostylis barbata, Mariscus javanicus, Martynia annua, Pedalium murex, Phyla nodiflora, Zoysia matrella, Tephrosia maxima, Crotalaria nana, C. verrucosa, Gisekia pharnaceoides, Wedelia biflora, Xanthium strumarium*, etc.

Vegetation in cultivated and waste lands

Places along the roads or railway tracks are occupied by a large number of species during rainy seasons. *Sida fryxellii, S. acuta, S. rhomboidea, S. cordifolia, Pennisetum polystachyon, Cleome viscosa, Urena lobata, Corchorus aestuans, Tephrosia purpurea, Cassia tora, Hedyotis herbacea, Tridax procumbens, Indigofera hirsuta, Sesamum radiatum, Hyptis suaveolens, Bulbostylis puberula, Perotis indica, Sacciolepis indica, Euphorbia hirta*, etc. are common plants frequently growing in large isolated patches in pure or combined formations.

In the midland regions the vegetation is slightly different. The common plants found in this area are: *Eragrostis japonica, Zingiber zerumbet, Aristida setacea, Cinnamomum malabatrum, Litsea coriacea, Breynia retusa, Macaranga peltata, Mallotus philippensis, Securinega virosa, Bombax ceiba, Helicteres isora, Glycosmis pentaphylla, Ziziphus oenoplia, Caesalpinia mimosoides, Cassia hirsuta, Acacia torta, Careya arborea, Osbeckia muralis, O. virgata, Blumea barbata, Olea dioica, Pajanelia longifolia, Gmelina arborea, Leucas indica*, etc., whereas those found in lowland regions are *Mollugo disticha, Indoneesiella echioides, Acrocephalus hispidus, Mitracarpus hirtus, Turnera subulata, Geniosporum menthoides, Leucas aspera, L. stricta, Melochia corchorifolia, Crotalaria pallida, Desmodium biarticulatum, D. hetrophyllum, D. triflorum, Micrococca mercurialis, Polycarpaea corymbosa, Croton hirtus, C. bonplandianus, Euphorbia heterophylla, Cleome gynandra, Urginea indica, Commelina attenuata, C. diffusa, Cyanotis cristata, Fuirena ciliaris, Apocopis mangalorensis, Eragrostis tef, Panicum repens, Amaranthus spinosus*, etc.

Fences or hedges are also supporting a large number of plants. Common plants used for making these fences or hedges are *Sterculia balanghas, Lannea coromandelica, Erythrina variegata, Gliricidia sepium, Lophopetalum wightianum, Hibiscus rosa-sinensis var. rosa-sinensis, Malvaviscus penduliflorus, Citharexylum spinosum, Thespesia populnea, Hibiscus tiliaceus, Cerbera odollam, Clerodendrum inerme, Dolichandrone spathacea, Samadera indica, Lawsonia inermis*, etc.

Specialised angiosperms

1. Epiphytes

The most common epiphytes seen in this area are *Acampe praemorsa, Bulbophyllum neilgherrense, B. rheedei, Dendrobium ovatum, Luisia zeylanica, Oberonia bicornis* and *Pholidota pallida.*

2. Parasites

The main root parasites are *Striga angustifolia, Christisonia tubulosa* and *Santalum album.* The important stem parasites are *Dendrophthoe falcata, Helicanthes elastica, Cuscuta chinensis, C. reflexa* and *Cassytha filiformis.*

3. Carnivores

This group is represented by *Drosera burmanni, D. indica, Utricularia aurea, U. exoleta, U. bifida, U. caerulea, U. minutissima, U. reticulata* and *U. uliginosa.*

Agriculture

Agriculture is the main occupation of the people of the district. About 80% of the population depend on it directly or indirectly. The crops raised are rice, coconut, tapioca, arecanut, cashew, banana and rubber. The total cultivated area in the district is estimated to be 1403.53 sq. km (140353 ha).

The main cultivation in the district is that of paddy, and the district was once known as the "Nellara" (store-house of paddy) of Kerala. Cultivation of paddy is mainly concentrated in the Kuttanadu region. Here most of the paddy fields are lying even below sea level which is an exception compared to other paddy fields of the world. Here in each time for cultivation, the paddy fields had to be regained by dewatering, and after cultivation these fields will be again immersed in water and there was no possibility of growing weeds in the rice fields.

Tapioca is the major food crop next to paddy. The main cash crop of the district is coconut and it is cultivated in about 69668 hectares of land. Eventhough an increase of 10% has occured in this cultivation after 1990, coconut cultivation is facing the threats of various infections and attack of insects. The important crops and the extent of area of cultivation of each in the district are given below:

Name of crops		Area of cultivation
Paddy	-	44850 ha
Coconut	-	69668 ha
Cashew	-	6194 "
Tapioca	-	3911 "
Banana	-	4335 "
Pepper	-	1982 "
Arecanut		1818 "
Rubber	-	3573 "
Ginger	-	204 "
Sugarcane	-	55 "
Cocoa	-	433 "
Gingely	-	1589 "
Betal	-	1703 "
Mulberry	-	38 "

Besides these oil palm, vegetables, and flowers are also cultivated in some areas of the district.

Ornamental plants

A large numbr of herbs, shrubs, climbers and trees of different families are grown in public gardens, parks and house premises for their ornamental importance (Appendix I).

A number of plants, originally under cultivation in gardens and agricultural fields are frequently met in rural areas such as canals, river banks, road sides and unused lands.

REVIEW OF EARLIER WORK

C.N.Sunil “Studies on flowering plants diversity of Alappuzha district, Kerala ” Thesis. Department of Botany , University of Calicut, 2000

REVIEW OF EARLIER WORK

Systematic floristic exploration in India started with the arrival of westerners on the scence. Even before the publication of Linnaeus's *Species Plantarum* (1753), several important books on Indian plants were published, mainly from medicinal point of view, which attracted the attention of western scholars on the plant wealth of India. Thus in his "Oscoloquios . . ." published from Goa (1565), Garcia de Orta, the personal physician of the then Portuguese Governor, described several medicinal plants from this part of the world; but this is more of a medical man's notes than that of a botanist. The first published work on the botany of Indian plants had to wait more than another century, when the then Dutch Governor of Cochin, Henrich van Rheede (1678-1703) published his monumental 12 volume work, *Hortus Indicus Malabaricus* containing description and beautiful illustrations of plants of Kerala. This work is not only a land mark in the plant resource studies in Asia (Manilal, 1980) but is intimately implicated in the history of botany in general, as it was consulted and accepted by Linnaeus as a source book on Indian plants. He adopted 265 Indian plant names into botanical nomenclature and many of them are lectotypified by Rheedian figures (Moore & Dransfield, 1979; Majumdar & Bakshi, 1979; Vaczy, 1980).

Major contributions towards the floristic studies in India were made by the Britishers. Among those who contributed to the botany of Peninsular India, Robert Wight's (1830-1853) name is the most important. His contributions include 28 publications, and among them the *Illustrations of Indian Botany* (1840) and *Icones Plantarum Indiae Orientalis* (1838-1853) are the most important. Together with Arnott, he published the *Prodromus Florae Indiae Peninsularis* (1834). This was followed by the works of Richard Boddome - *Flora Sylvatica of South India* (1969-1874) and *Icones Plantarum Indiae Orientalis* (1868-1874).

Joseph Dalton Hooker, for the first time in India brought out the complete floristic data of Indian plants in the form of a flora, the *Flora of British India* in 7 volumes (1872-

1897). This distinguished work inspired many botanists. After the publication of the *Flora of British India*, comprehensive regional floras were published. As the Britishers divided India into presidencies and provinces, the regional floras were known after the names of presidencies and provinces; and the *Flora of the Presidency of Bombay* by Cooke (1901-1908) and the *Flora of the Presidency of Madras* by Gamble and Fischer (1915-1936) were published. The other notable contributions on the South Indian flora are the *Forest Trees of Travancore* (Bourdillon, 1908), *Flowering Trees of Travancore* (Rama Rao, 1914), *Vernacular List of Trees, Shrubs and woody climbers of the Madras Presidency* (Lushington, 1915), *Flora of Anamalais* (Fischer, 1921) and *Flora of South Indian Hill Stations* (Fyson, 1932).

The *Flora of Presidency of Madras* still remains the basic identification manual of plant taxonomic studies in Peninsular India. After this, exploration in South India was mainly undertaken by the Southern Circle of the Botanical Survey of India, Coimbatore. This has resulted in the discovery of several new and interesting taxa. Karthikeyan *et al.* (1983), Nair (1986a, 1986b) and Manilal and Raveendrakumar (1998) have compiled lists of such new additions since the publication of the *Flora of the Presidency of Madras.*

As far as the floristics of Kerala state is concerned, Botanical Survey of India, the Taxonomy division of the Botany Department of University of Calicut, and Kerala Forest Research Institute have made substantial interesting and useful contributions. Floristic studies of several districts of the state have been completed, in most cases as part of Ph.D research programmes. In Kerala, the flora of most of the districts have been studied, and that of the rest are being completed. *The Flora of Calicut* (Manilal & Sivarajan, 1982), *Flora of Cannanore* (Ramachandran & Nair, 1988), *Flora of Silent Valley* (Manilal, 1988), *Flora of Palghat* (Vajravelu, 1990), *Flora of Kerala: Grasses* (Sreekumar & Nair, 1991), *Flora of Thiruvananthapuram* (Mohanan & Henry, 1994), *Flora of Nilambur* (Sivarajan & Mathew, 1996) and *Flowering Plants of Thrissur Forest* (Sasidharan & Sivarajan, 1996) the hitherto floras of various areas of the state. The other district floras that have been completed are that of Quilon district (Mohanan, 1984), Malappuram district (Babu, 1990), Kottayam district (Antony, 1989) and Pathanamthitta district

(Anilkumar, 1993). The aquatic and wetland flora of Northern Kerala has been studied by Joseph (1991) and the sedge flora of Kerala by Rejani (1991). Several other areas and districts are active 'surveillance' and this might ultimately lead to a '*Flora of Kerala*' which is the fond hope of all taxonomists, teachers and students of this region.

The area of the present study was not subjected to systematic exploration in the past. Among the present day plant collectors of the district, mention must be made of P.V. Sreekumar (1991) who studied the flora of Kerala grasses, resulting in the discovery of some new and interesting taxa (Sreekumar Nair & Nair, 1981). The other plant collectors of this regions were the scientists like M.S. Swaminathan, Prasad and Bhargavan of the Botanical Survey of India (Southern circle), Coimbatore. Another notable plant collector of this region is Prof. N. Ravi (1996) of the Tropical Botanic Garden and Research Institute, Palode.

METHODOLOGY

The area of present study - **Alappuzha district** - could be reached here by bus, train or even boats. Most of the areas of this district could be reached by train or bus, but the Kuttanadu region, most areas of which are surrounded by water, could be reached only by boats. Several field trips of duration ranging from 1 to 5 days were made at regular intervals to various parts of the district for a period of about 6 years from 1993 and made intensive and extensive collection of plants. A total of about 3100 plants have been collected. Collection trips were repeated till full data on each species have been gathered. Usually 5 specimens of each species were collected from all the available localities in view to have a knowledge on range of variation, the local distribution and commonness/rarity of the taxa.

For collection and preservation, the procedures given by Jain and Rao (1977) and van Balgooy (1987) were generally followed. Usually specimens were collected in generative state - in flowering/fruiting or both. But where generative stages could not be observed during the period of study, vegetative specimens were also collected. Tree-

climbers were employed for collecting specimens from tall trees, large lianas and epiphytes. Specimens from smaller trees were collected by using hooked-poles. In case of dioecious species both male and female specimens were collected separately. Parasites were collected along with their hosts, wherever possible. Special techniques given by Fosberg and Sachet (1965) were employed for collecting plants of families such as Araceae, Arecaceae, Bambusaceae and Pandanaceae. Living specimens of orchids and other interesting taxa were collected and grown at the garden of the S.N.M. College, Maliankara and further observations and studies were made.

Field notes such as date of collection, locality, altitude, habit, habitat, nature of bark and root, exuadate if any, colour of juvenile leaves, flowers, fruits, etc., species frequency and dominance, associations, etc. were made during the exploration trips. For preservation at field, wet method (Fosberg & Sachet, 1965) using 70% methylated alcohol was employed. It was experienced that this method was very effective and also time and space saving. For drying and poisoning the standard method was followed. Identification and description were made from fresh, dried specimens as well as specimens pickled in 70% alcohol. Drawings were most often made from fresh or herbarium specimens and also from pickled specimens. Often compound light microscope was used for observation of microscopic characters like indumentum, placentation details, etc. Almost all specimens cited were self collected, except for a few relevant specimens deposited at the Southern circle of the Botanical Survey of India at Coimbatore (MH) and at the Calicut University Herbarium (CALI). The herbarium specimens prepared during the present study were deposited in the Herbarium of the Calicut University (CALI), and S.N.M. College.

Materials collected were provisionally identified using the *Flora of the Presidency of Madras* (Gamble & Fischer, 1915-1936), *Flora of Hassan District* (Saldanha & Nicolson, 1976), *Flora of Tamil Nadu, Carnatic* (Matthew, 1983), and the *Revised Handbook to the Flora of Ceylon* (Dassanayake & Fosberg, 1980-1991; Dassanayake, Fosberg & Clayton, 1994 and 1995). Available monographs, revisions and other relevant literature were also referred. Confirmation of the identification of some of the difficult

taxa were made by matching with authenticated specimens available at the Madras Herbarium (MH). Critical problematic specimens were got identified by experts of respective families, notably from Kew, Rijksherbarium, Southern and Central circles of the Botanical Survey of India, TBGRI and KFRI.

PLAN OF PRESENTATION OF DATA

The format proposed by Radford *et al.* (1974) was followed for general presentation of the flora. The families were classified according to Bentham and Hooker's system of classification (1862-1883). But, with regard to delimitation of taxa, some deviations were made so as to bring it consonance with the current understanding of the concerned taxa.

Artificial keys were provided for families, genera, species and varieties. Keys are strictly dichotomous and intended, and are relevant only to the taxa included. As far as possible, both vegetative and generative characters readily observable were utilized for the keys. Full citation of the family and generic names have been given referring to *Index Nominum Genericorum* (Farr *et al.*, 1979) and *International Code of Botanical Nomenclature* (Tokyo Code - 1993) (Greuter *et al.*, 1994). Genera with more than one species were provided with a short generic description covering only the characters of the included species. In genera with single species, the generic description was omitted and a detailed description of the species was given. Alphabetical order is followed in the treatment of genera within families, and species within genera. Each species was provided with detailed nomenclatural citations including reference from *Flora of British India* (Hooker, 1872-1897), *Flora of the Presidency of Madras* (Gamble & Fischer, 1915-1936), *Flora of Hassan District* (Saldanha & Nicolson, 1976), *Flora of Calicut* (Manilal & Sivarajan, 1982), *Flora of Tamil Nadu Carnatic* (Matthew, 1983), *Flora of Silent Valley* (Manilal, 1988), *Flora of Cannanore* (Ramachandran & Nair, 1988), *Flora of Palghat District* (Vajravelu, 1990), *Flora of Thiruvananthapuram* (Mohanan & Henry, 1994), *Flora of Nilambur* (Sivarajan & Mathew, 1996) and *Flowering Plants of Thrissur Forest* (Sasidharan & Sivarajan, 1996). Besides these floras, relevant monographs, revisions, etc. were also referred to. *Icones* of Wight (1839-1853) and Beddome (1968-

1874) were cited wherever applicable. *Revised Handbook to the Flora of Ceylon* (Dassanayake & Fosberg, 1980-1991; Dassanayake, Fosberg & Clayton, 1994 and 1995) was also cited to assess the Sri Lankan affinity of the flora. Synonyms relevant to Peninsular Indian Flora were given in italics. Local names, if available, were given in italic bold at the end of nomenclatural citation. For the abbreviations of periodicals, *Botanico Periodicum Huntianum* (B-P-H) (Lawrence *et al.*, 1968) was followed.

The nomenclatural citations were followed by precise species description in the following sequence: habit; leaves; inflorescence; flowers; calyx; corolla; stamens; pistils; fruit and seed. The characters like glabrous and entire have not been specified unless they were key characters. Species description was followed by data on phenology; the world-wide distribution, information on frequency, habitat, rarity/endemism if applicable, and specimen citation. Notes on medicinal or other economic importance, taxonomic or nomenclatural problems if any, have been provided at the end in separate paragraph. Illustrations and photographs of very few selected plants were also provided.

The following abbreviations and symbols were used in the thesis.

c.	-	more or less (±) / about
cm	-	centimeter
Fl. & Fr.	-	Flowering and Fruiting
ha	-	hectare
m	-	meter
mm	-	millimeter
CALI	-	Calicut University Herbarium
MH	-	Madras Herbarium (Botanical Survey of India, Coimbatore, Tamil Nadu)

CNS	-	C.N. Sunil
O	-	absent
SNMCH	-	Sree Narayana Mangalam College Herbarium (Maliankara, N. Paravoor, Ernakulam Dist., Kerala)
BSI	-	Botanical Survey of India
TBGRI	-	Tropical Botanic Garden and Research Institute (Palode, Thiruvananthapuram, Kerala)
KFRI	-	Kerala Forest Research Institute (Peechi, Thrissur, Kerala)

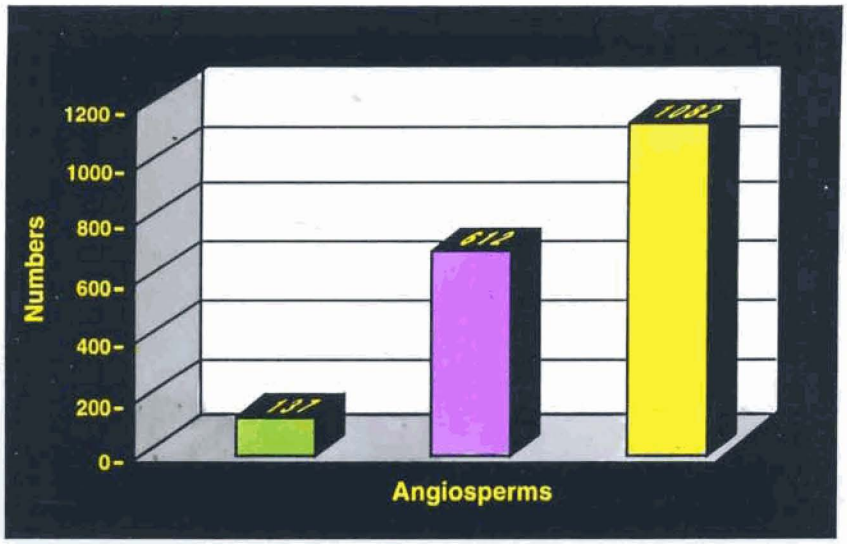


Fig.2 Number of families, genera and species of Angiosperms of Alappuzha District.

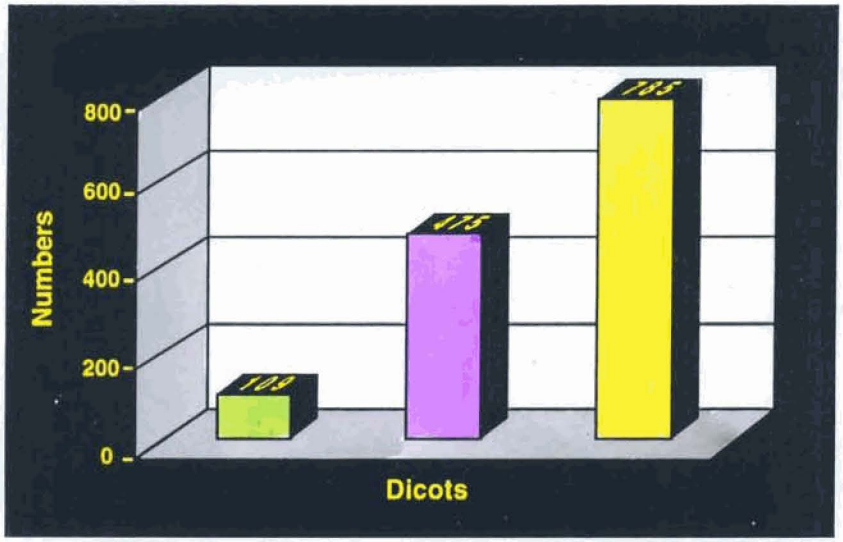


Fig. 3 Number of families, genera and species of Dicotyledons

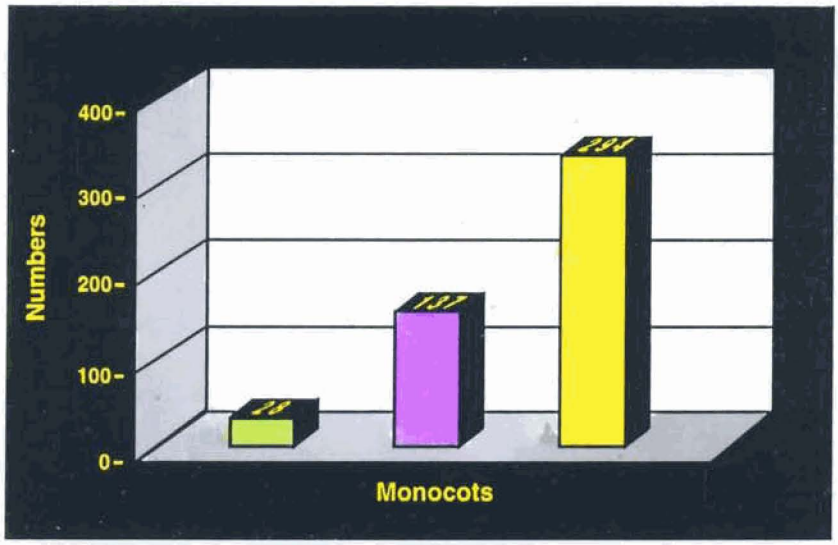


Fig. 4 Number of families, genera and species of Monocotyledons



FLORISTIC ANALYSIS

C.N.Sunil “Studies on flowering plants diversity of Alappuzha district, Kerala ” Thesis. Department of Botany , University of Calicut, 2000

FLORISTIC ANALYSIS

It is an established view that Indian land mass had past connection with Sri Lanka, South America, Africa, Malesian Islands, Madagascar, Australia and Antartica of the Gondwanaland and had floristic similarities between these regions. Nayar (1982) had brought out several examples to substantiate this view and the origin of Indian flora. He was of the view that characteristic flora of India is that of Peninsular India which actually is relicts of a bygone age as demonstrated by the presence of more paleo-endemics and the affinity of the flora of the Western Ghats in Peninsular India with that of Malesian region and Sri Lanka. The present study also substantiate these views by the findings of many species from the area of the present study with their distribution extended to the above said regions.

From a comparatively small area of 1414 sq.km. studied (compared to other districts in Kerala), a total of about 3100 field numbers were collected. On analysis, they were found to be belonging to 1082 species coming under 612 genera, spread over 137 families (Fig. 2). The total number of species collected from Alappuzha district forms about 28% of the flora of the Kerala State and more than 6% of the flora of India. A better estimation shows that the entire Kerala region with 38,863 sq.km. may harbour about 3800 species of flowering plants. Analysis of flora of Tamil Nadu showed that the state with 1,30,069 sq.km. harbours c. 5640 species, whereas the whole country is estimated to have a total of 17,000 species distributed in an area of 32,87,263 sq.km. Alappuzha district contains roughtly 765 species/1000 sq.km. The Kerala region contains about 97 species/1000 sq.km., whereas Tamil Nadu contains only 43 species/1000 sq.km. The country's total species concentration is only 5.1/1000 sq.km. From this analysis the floristic richness of the district relative to the state, neighbouring state and the whole country is very clear. A comparative floristic analysis of other districts of Kerala is given in the Table 2. From this it is clear that even though it is the smallest district with little altitudinal variation, no forests with high population densities, it is floristically rich in diversity and number of species.

Table 2. Comparison of the Flora of Alappuzha with Other District Floras of Kerala

Name of the Flora	Number of species	Area (sq.km.)	Species concentration (per 1000 sq.km.)	References
Flora of Cannanore District	1132	3,670	308 species/1000 sq.km.	Nair & Ramachandran, 1988
Flora of Calicut District	983	600	1638 species/1000 sq.km.	Manilal & Sivarajan, 1982
Flora of Palghat District	1355	4,400	308 species/1000 sq.km.	Vajravelu, 1990
Flora of Malappuram District	813	3,548	229 species/1000 sq.km.	Babu, 1990
Flora of Kottayam District	1151	2,204	522 species/1000 sq.km.	Antony, 1989
Flora of Pathanamthitta District	1250	2,697	463 species/1000 sq.km.	Anilkumar, 1993
Flora of Thiruvananthapuram District	1270	2,191	579 species/1000 sq.km.	Mohanan & Henry, 1995
Flowering Plant Diversity of Alappuzha District	1082	1414	765 species/1000 sq.km.	Present study

The number of families, genera and species with respect to dicots and monocots are given in the Table 3 and represented in figures 3 and 4.

Table 3. Number of families, genera and species of the study area

	Families	Genera	Species
I. Dicotyledons	109	475	788
a. Polypetalae	64	217	351
b. Gamopetalae	28	197	318
c. Monochlamydeae	17	61	119
II. Monocotyledons	28	137	294
Total	137	612	1082

Dicotyledons dominate with 788 species belonging to 475 genera and 109 families. Monocotyledons have 294 species, 137 genera and 28 families. Among dicotyledons 65 families belong to Polypetalae, 28 to Gamopetalae and 17 to Monochlamydeae. *Cyperus* L. (23 spp.) and *Fimbristylis* Vahl (18 spp.) are the two largest genera in terms of numerical strength of species. A total of 58 out of 137 families are represented by one genus each and 43 with one species each. Of the total species, 61.83% is composed of herbs (669 species) and 38.2% woody plants (413 species). Among the woody plants, there are 199 species of trees (18.39%) and 214 species of shrubs (19.77%), including shrubby climbers and lianas (Fig. 5). Following table (Table 4) and Fig. 6 give details of number of plants of special groups represented in the area of present study.

Table 4. Number of species of special groups of plants

Groups	No. of species	Families with number of species in each
Epiphytes	7	Orchidaceae - 7
Parasites	10	Convolvulaceae - 2 Loranthaceae - 2 Lauraceae - 1 Orobanchaceae - 1 Scrophulariaceae - 3 Santalaceae - 1
Insectivorous plants	9	Droseraceae - 2 Lentibulariaceae - 7
Saprophytes	1	Orchidaceae - 1

The top 12 families representing more than 20 species are given in the table below.

Family	No. of genera	No. of species
Poaceae	58	118
Fabaceae	51	107
Cyperaceae	16	86
Euphorbiaceae	25	56
Asteraceae	33	41
Rubiaceae	22	40
Acanthaceae	17	33
Scrophulariaceae	16	29
Convolvulaceae	9	28
Apocynaceae	20	23
Malvaceae	11	23
Verbenaceae	11	21

A comparison of 10 largest families of the present study area in the order of species content, with that of the *Flora of the Presidency of Madras* (Gamble & Fischer, 1915-1936) and *Flora of British India* (J.D. Hooker, 1872-1897) is given below.

	Alappuzha District (present study)		Flora of the Presidency of Madras		Flora of British India
1.	Poaceae	1.	Fabaceae	1.	Orchidaceae
2.	Fabaceae	2.	Poaceae	2.	Fabaceae
3.	Cyperaceae	3.	Rubiaceae	3.	Poaceae
4.	Euphorbiaceae	4.	Acanthaceae	4.	Rubiaceae
5.	Asteraceae	5.	Euphorbiaceae	5.	Euphorbiaceae
6.	Rubiaceae	6.	Orchidaceae	6.	Acanthaceae
7.	Acanthaceae	7.	Asteraceae	7.	Asteraceae
8.	Scrophulariaceae	8.	Cyperaceae	8.	Cyperaceae
9.	Convolvulaceae	9.	Lamiaceae	9.	Lamiaceae
10.	Apocynaceae	10.	Asclepiadaceae	10.	Urticaceae

Altitude is a major factor controlling species diversity; as elevation increases, the montane and temperate elements increase. In the study area, these elements are rather rare due to the low elevation with the highest point being 50 m above MSL.

Analysis of the first three major families

1. Poaceae

In the order of dominance, the family Poaceae ranks first with 118 species belonging to 58 genera. Most of the grasslands in Alappuzha district are wet grasslands. Mostly they are with annual or perennial herbs, rarely shrubs and *Bambusa bambos* (L.) Voss is the only one tree-representative of this group. The subfamily *Panicoideae* is represented by 38 genera and 84 species; Pooideae by 19 genera and 33 species, and Bambusoideae by one genus and one species. Among the 58 genera, *Eragrostis* and *Ischaemum* have the highest representation with 12 and 9 species respectively. The genera *Panicum* and *Brachiaria* have 7 species and 6 species respectively. The genera *Digitaria* and *Dimeria* have 5 species each and *Echinochloa* has 4 species. Genera with 3 species each are *Cyrtococcum, Pennisetum, Sacciolepis, Saccharum, Sporobolus, Paspalum* and

Paspalidium; with 2 species each are *Eleusine, Oplismenus, Oryza, Pogonatherum* and *Setaria*. Thirty nine genera are represented by one species each.

The 8 endemic species viz., *Arundinella leptochloa, Dimeria copeana, D. copei, D. lawsonii, D. kalavoorensis, Ischaemum travancorense, I. vembanadense* and *I. thomsonianum* of Peninsular India are present in the district. Of these, *Dimeria copeana,D. copei* and *D. kalavoorensis* were found to be locally endemic to the Alappuzha district. The family showed about 6.8% of endemism. All the endemic species are with very restricted distribution and most of them are rare.

About 13.5% of the total species of this family are rare. The collection of *Cenchrus echinatus* from the district forms a new record for Peninsular India and another rare grass - *Sacciolepis curvata* - forms a new record for Kerala. *Dimeria copeana*, a new species reported by Sreekumar *et al.* (1981) from Thrikkunnapuzha could not be located during the present study. The most common grass species include *Alloteropsis cimicina, Chrysopogon aciculatus, Brachiaria miliiformis, B. ramosa,Cynodon dactylon, Digitaria ciliaris, D. longiflora, Panicum repens, Eragrostis unioloides, Dactyloctenium aegyptium, Eleusine indica*, etc. The relative abundance of grasses of Alappuzha district with that of Kerala state and Sri Lanka is given in the following table.

Area	No. of genera	No. of species
Alappuzha District	58	118
Kerala state	103	296*
Sri Lanka	136	340

* excluding Bambusoideae

2. Fabaceae

This family is the second dominant one represented by 51 genera and 107 species under 3 subfamilies. Of this, the subfamily Faboideae alone contains 71 species under 34 genera.

This family is with a high degree of diversity in habit and habitat. It includes trees, herbs and climbers. The common tree species are: *Dalbergia latifolia, Erythrina variegata, Pongamia pinnata, Gliricidia sepium, Cassia fistula, C. siamea, Delonix regia, Tamarindus indica, Acacia auriculiformis* and *Samanea saman.* There are 24 climbing or twining species of which the notable are: *Centrosema pubescens, Derris trifoliata, D. scandens, D. thyrsiflora, Clitoria ternatea, Mucuna pruriens, Caesalpinia mimosoides, C. nuga* and *C. bonduc.* The largest genus is *Cassia*, having 9 species, followed by *Desmodium* and *Crotalaria* with 8 species each. In this family there are about 19 species which are very rare with restricted populations. Out of the total 107 species, 2 are endemic to Peninsular India. These species are *Zornia quilonensis* and *Dalbergia horrida.* The subfamily Caesalpinioideae is represented by 21 species. The subfamily Mimosoideae is represented by 15 species of which almost all species are pantropical in distribution. A general analysis of the family Fabaceae with its constituent taxa represented in Alappuzha district is given in the following table.

No. of genera	51
No. of species	107
No. of species of Faboideae	71
No. of species of Caesalpinoideae	21
No. of species of Mimosoideae	15
Genera with 5 or more species	4
Species endemic to Peninsular India	2
Number of Tree members	26
Shrubs and Climbers	36
Herbs	45
Rare species	25

3. Cyperaceae

The third rich and diverse family is Cyperaceae represented by 16 genera and 86 species. Among the 16 genera, *Cyperus* and *Fimbristylis* have the highest representation with 23 and 18 species respectively. The genera *Eleocharis* and *Mariscus* have 6 species each. Genera with 5 species each are *Scleria, Schoenoplectus, Pycreus* and *Kyllinga*; with 3 species each are *Fuirena* and *Bulbostylis*; with 2 species is *Rhynchospora*. The genera with single species are *Remirea, Rikliella, Lipocarpha, Hypolytrum* and *Diplacrum*.

The representative species exhibit all forms as herbaceous annuals or perennials, and are confined to restricted habitats, mostly on the wet or marshy lowlands. Among these, *Diplacrum caricinum, Fimbristylis cinnamometorum, F. insignis, Kyllinga polyphylla, Rhynchospora wightiana, Scleria sumatrensis,Cyperus bifax, Pycreus macrostachyos* and *Remirea maritima* are extremely rare. *Fimbristylis narayanii* is the only one endemic species representative of this family. The collection of *Eleocharis lankana* and *Kyllinga polyphylla* form new records for India.

Endemism

The word 'endemic' is ascribed to any taxonomic unit or taxon which occurs in a restricted area, usually isolated by geographical or temporal barriers. Turrill's (1964) contention that next to islands, the peninsular regions provide favourable conditions for endemism is acceptable so far Peninsular India is concerned. Ahemedullah and Nayar (1986) listed 1932 taxa out of the estimated 6500 species as endemic to Peninsular region, which form about 29.7%. There is no endemic family but 58 genera are endemic of which 47 are monotypic.

Present analysis of the flora of Alappuzha shows that 59 species (Appendix-II) are endemic to Peninsular India which form 5.45% (Fig. 7) of the total 1082 species. Of these, 4 species were found to be locally endemic to the Alappuzha district. Poaceae has maximum endemics with 8 species. Rubiaceae has 5, and Dipterocarpaceae and Lythraceae have 3 species each.

Rarity/Vulnerability of species

Critical analysis of the flora was done with respect to the species rarity/vulnerability, on the basis of their range of distribution, strength of population and threats faced. The analysis showed that 133 species (Appendix-III) are extremely rare, with very few scattered populations or even few individuals. The percentage of total rarity of the flora is 12.1 which is fairly a high (Fig. 8). These state of affairs demand immediate conservation measures to be undertaken to save those species. It is interesting to note that, during the present study, 3 species viz., *Aponogeton appendiculatus, Syzygium travancoricum* and *Strophanthus wightianus* listed in the *Red Data Book of Indian Plants* (Sastry & Nayar, 1987-1990) under the category 'rare and endangered' were located.

Alien species

During the study, it is noted that a large number of exotic plants have spread to this area. Introduced exotic species often become aggressive colonisers and they threaten the habitat of the native species. In such cases native species are on the run for survival. There are 83 species listed in this category (Appendix-IV). Most of these plants are native of Tropical America. The family Asteraceae is the largest in this regard, with 16 alien species. Among these, *Mikania cordata* has become a serious threat to native species especially to those plants in sacred groves. *Chromolaena odorata* and *Ageratum conyzoides* are other 2 members of this family which are well established. Another troublesome weed is *Eichhornia crassipes*. This species is well established in wetlands. *Centrosema pubescens*, another well established alien species has occupied almost all areas. The other well established weedy species are *Croton hirtus, Euphorbia heterophylla, Sesamum radiatum, Hiptis suaveolens, Alternanthera philoxeroides, A. tenella, Synedrella nodiflora, Spermacoce latifolia, Scoparia dulcis, Tridax procumbens* and *Mitracarpus hirtus*.

Wild relatives of Crop-Plants

It is also accepted that man needs a reservoir of wild species in order to prevent genetic erosion of his cultivated crops. A species once lost cannot be recreated and this results in the loss of millions of years of evolution.

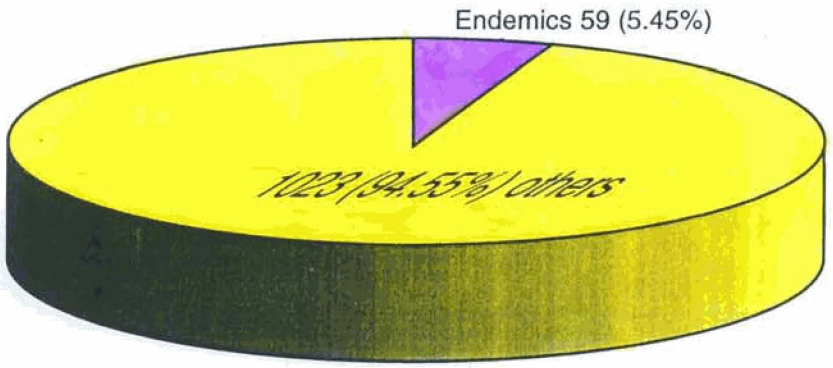


Fig.7 Relative abundance of endemic species

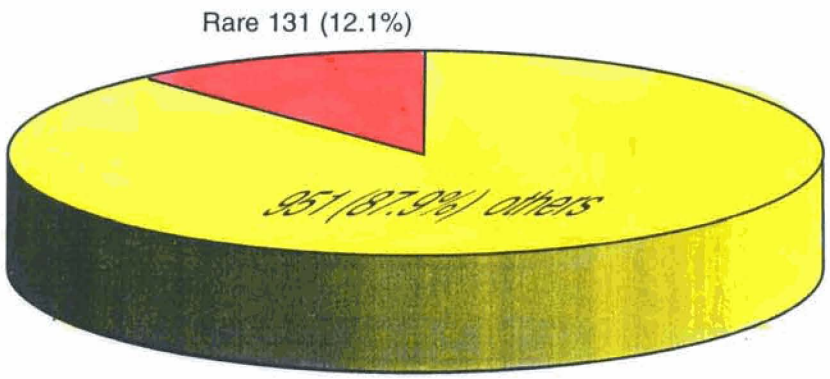


Fig.8 Relative abundance of rare species

About 88 species which are closely related to cultivated crop-plants have been collected from the district (Appendix-V). Among these 7 are wild relatives of cereals and millets, 4 species are of leguminous crops. There are 16 species of fruit-crop relatives. In fruit crops, *Madhuca neriifolia* is very rare. Many species belonging to Cucurbitaceae, Amaranthaceae, Solanaceae and Dioscoreaceae are wild relatives of existing cultivars. *Momordica dioica* is a close relative of bittergourd. There are four species of *Trichosanthes* which are closely related to the cultivated snake gourd. *Luffa aegyptiaca* is another wild relative of smooth gourd. A close relative of nutmeg (*Myristica fragrans*), *Myristica malabarica*, is with large fruits and brightly coloured aril, and is very rare and endemic. Spice relatives are represented by 8 species belonging to *Alpinia, Cinnamomum, Curcuma, Piper* and *Zingiber*. Relatives of vegetative crops such as *Abelmoschus, Amaranthus, Solanum*, etc. and that of tuber crops such as *Dioscorea* are also represented.

Medicinal Plants

A large number of medicinal plants also occur in the district (Appendix-VI). The medicinal application of these species ranges from their use in simple disease like headache to even cases of cancer. Many of the medicinal plants are becoming more and more rare because of their over exploitation by drug industries. For example, the wild populations of the plants like *Rauvolfia serpentina, Sida alnifolia, Desmodium gangeticum, Trichosanthes cucumerina, Phyllanthus amarus, Aerva lanata, Gloriosa superba, Aristolochia indica, Indigofera tinctoria*, etc. have become critically reduced.

New distributional records and reports

The following plants collected from the district form new records for India, South India and Kerala.

I. For India

The finding of the species *Kyllinga polyphylla* Willd. ex Kunth and *Eleocharis lankana* Koyama (Cyperaceae) during the present study from the district formed new reports of the taxa from the country.

II. For South India

The finding of the species *Voacanga grandifolia* (Miq.) Rolfe (Apocynaceae) and *Cenchrus echinatus* L. (Poaceae) during the present study from the district formed new reports of the taxa from South India.

III. For Kerala

The following species indicated below have been recorded for the first time from Kerala during the present study: *Sacciolepis curvata* (L.) Chase (Poaceae), *Glossostigma diandra* (L.) Kuntze (Scorphulariaceae), *Spilanthes uliginosa* Sw. (Asteraceae), *Cassia sericea* Sw. (Fabaceae), Rom. and *Croton hirtus* L'Herit. (Ephorbiaceae).

Extended distribution of Species

Some newly reported species like *Diodia teres* Walt (Rubiaceae), *Desmodium scorpiurus* (Swartz) Desvaux and *Staurogyne glutinosa* (Wall. ex Clarke) O. Kuntze (Acanthaceae) from other districts of the state were collected from Alappuzha district during the present study.

New species discovered by other workers

1. *Aponogeton appendiculatus* V. Bruggen (Blumea 16:265.1968)(Aponogetonaceae), collected from Alappuzha brackish waters.

2. *Dimeria copeana* Sreekumar, *et al.*, (J. Bombay Nat. Hist. Soc. 78(3): 577. 1981) (Poaceae), collected from Thrikkunnapuzha.

3. *Dimeria copei* Ravi (Blumea 41: 251. 1996) (Poaceae), collected from AIR Campus, Kalavoor.

4. *Dimeria kalavoorensis* Ravi (Blumea 41: 253. 1996) (Poaceae), collected from AIR Campus, Kalavoor.

THREATS TO THE FLORA

As anywhere else, the most serious threat to the flora is from man. Being the smallest district with thickly populated area, the threat to the flora is highest here compared to other districts of Kerala. The increase in demand of land for housing, industrialization, construction of roads, railway-line, etc. has affected the natural vegetation in the area.

Many sacred groves of the district are now threatened and altered both in terms of size,vegetation structure and species composition. Some of the groves are completely devoid of vegetation and only the temples exist although still known as 'kavus'. There were many instances where even the worship places were removed by a process called 'Avahichu kudiyiruthal' (absorb the spirit and rehabilitate) where in the temple deity is transferred to a new place after conducting special 'poojas' (Unnikrishnan, 1995). Thus the grove was freed from the power of the God and the vegetation cleared for conversion to alternate landuse. Sacred groves are relatively small and are therefore island-like. Studies of island biogeography have shown that such fragments may suffer extinctions of species. Ownership of the groves and the beliefs of the people on the God/Gods "living" inside the groves are two decisive factors which decide the conservation of the sacred groves. More than 99% of the sacred groves are privately owned (Family owned, where management will be looked after by a single family as in Mannarassala and Sharangakavu). Vandanamkavu is the only one controlled by Devaswom Board. The break-up of the old joint families into nuclear families has resulted in a lack of man power to protect family sacred groves. There is a gradual erosion in the beliefs of the people in the power of the deities reigning the groves. Such erosion has lead to the gradual decline in the extent of the groves and their gradual disappearance. Exotic weeds like *Mikania cordata, Chromolaena odorata,* etc. also cause destruction of vegetation of kavus. Encroachment, grazing, collection of firewood, preparation of green manure, construction of roads, felling of trees, etc. are the other factors those lead to the destruction of kavus.

Mangroves of Alappuzha district have been severely degraded due to many reasons. The constant and indiscriminate cutting of mangroves for fire wood, reclamation

of mangroves for cultivation and various construction activities, conversion of the mangrove into coconut husk retting, etc. are some of the reasons for degradation of mangroves. Large-scale hatcheries and fish farm activities also pose a threat to the coastal zone in general, and to mangroves in particular. Although these activities do yield economic gains for the coastal people, the mangrove ecosystem itself is under threat in certain areas due to aquaculture. Actually studies reveal that mangroves provide suitable ecosystem for the development of prawn farms and fish farms.

Indeed, the recent history of Alappuzha wetlands-especially fresh-water wetlands-are dominated by the invasions of aquatic weeds, notably *Salvinia* (*Salvinia molesta* Mitchell) and water hyacinth (*Eichhornia crassipes* Mart.). *Salvinia* is popularly known as 'curse of Alappuzha'. Alappuzha district has also witnessed a veritable tug-of-war between these two weeds. When the environmental conditions favour one weed, it subduces the other; when the conditions shift, the pattern is reversed. Why did weeds come in and got entrenched in the water bodies which have been free from such weed dominance for the past hundreds of years?. The single most important factor has been the increasing pollution of the wetlands by organic waste. Increased use of the ponds, lakes, tanks and canals for bathing and laundry, human-generated waste getting increasingly washed in with rain water run-off, increasing use of fertilizers in agriculture, also end up in the wetlands. All have contributed to the greater availability of 'food' for the aquatic weeds. Aquatic weeds are seen enormously in Kuttanadu area. Thanneermukkam regulator will be closed for the period from December to June every year. Water will be stagnated in this zone during this time and entry of salt water will be prohibited. Besides these usage of excessive pesticides and fertilizers, disposal of human generated wastes, retting of coconut husk and leaves, etc. cause to the serious pollution of water here and consequently weed growth will increase. The following table gives the comparison between the recommended and actual usage of fertilizers for paddy in the area.

Fertilizers	Recommended quantity (kg/ha)	Actual usage (kg/ha)
N	90	91
P_2O_5	45	49
K_2O	45	61

In each year about 500 to 1000 tons of pesticides (organic chlorides and organophosphates) were used exclusively in Kuttanadu area. The rest of the country can draw a lesson from Kerala's Thaneermukkam bund system which showed that man should not interfere with the natural system (Untawale & Jagtap, 1998). The bund was constructed to increase the yield of paddy. However, it created a problem as a consequence of eutrophication which resulted in the growth of the Salvinia, water hyacinth and other aquatic weeds. *Salvinia* and water hyacinth are the world's fastest growing plants, as also among the hardiest. In favourable situations these plants are capable of thriving and out-competing other plants by the sheer force of their frenzied growth-rate. These weeds came to India much after other aquatic weeds (such as *Nelumbo*, *Pistia* and *Lemna*) did. Being recently arrived exotics, these weeds encountered no resistance from their natural enemies, whereas the same weeds are held in check in their native habitats of Latin America by grazers and competitors adopted to these weeds. Therefore three factors - pollution (which provides 'food' for the weeds and reduces competition by weakening less tolerant vegetation), fast growth-rate of the weeds (accompanied with hardiness and competitiveness), and absence of natural forces which could control the weeds - have all contributed to the dominance of these weeds, and the devastation caused by these two to the wetland flora of Alappuzha district. The threat to wetlands posed by aquatic weeds, especially Salvinia and water hyacinth, takes several forms. They add to the loss of water from streams, ponds, lakes, canals and other water-bodies through evapo-transpiration. The water-loss from a reservoir infested with Salvinia is 30%-40% greater than from weed-free one (Abbasi *et al.*, 1988). The evapo-transpiration losses of water perpetuated by water hyacinth are even higher. They out-

compete the other plants for nutritive elements and space (Abbasi, 1997) and cause eutrophication. The thick mats of the weeds prevent sunlight from reaching the submerged flora and fauna, thereby cutting off their energy source and disturbing the ecosystem (Gupta, 1979). They decay slowly, through aging and dying, in the water body. The decaying process adds to the depletion of dissolved oxygen and spoils the water quality by increasing the BOD, COD, pathogenic organisms, etc. The conditions become unfavourable for the survival of useful aquatic organisms (Abbasi, 1997). In agricultural fields, they use the fertilizers applied to the crops, multiply much faster than the crops and render large areas out of production.

Over grazing has severely affected the vegetation of Alappuzha district especially those belong to herbaceous and shruby plants. As per the census data of 1991 cattle population in the district was 1192 (Bhaimy Sadasivan, 1997). Plants like *Habenaria viridiflora, Xyris complanata, Diplacrum caricinum, Fimbristylis cinnamometorum, F. eragrostis, F. insignis, Scleria biflora, Dimeria copei, D. kalavoorensis, Rhamphicarpa longiflora,* etc. can be seen in All India Radio Station campus in Kalavoor where the grazing has been prohibited, whereas these plants can't be found outside the campus due to various reason including grazing.

Most of the hills in the midland regions have been cleared for rubber plantation. The waste land area now supports only very few tree species and there is a definite preponderance of herbaceous taxa. In these disturbed conditions, the recent immigrants from other parts of tropics have found a good opportunity to outsmart the indigenous species and dominating and ultimately eradicating the former from the area. Common examples of such successfully established plants are *Mikania cordata, Chromolaena odorata, Croton hirtus, C. bonplandianus*, etc. The coir retting practiced throughout coastal area for the extraction of coir from coconut husk, is another major threat to the vegetation of the backwaters of Alappuzha district.

SUMMARY

C.N.Sunil “Studies on flowering plants diversity of Alappuzha district, Kerala ” Thesis. Department of Botany , University of Calicut, 2000

SUMMARY

A detailed floristic study of Alappuzha district of Kerala state was carried out with an intention to have a thorough knowledge of the diversity of flowering plants, their distribution, correct identity, wild relatives of the crop-plants, endemism, extent of threat to various species and utilization of genetic resources.

The area consisted of about 1414 sq.km., with altitudes ranging from 2.5 m below M.S.L. to 50 m above M.S.L. The area has a tropical humid climate, with maximum temperature ranging from 27°C to 35°C. The South-West monsoon from June to September and North-East monsoon from October to December provide fairly good rain and annual rainfall range between 1700 and 3800 mm. There are 3 important rivers flowing through the district viz., Achankovil, Manimala and Pamba; and two lakes viz., Vembanad and Kayamkulam.

Being a coastal zone with no highlands and forests, the vegetation in the district is consisted of sacred groves, aquatic or semi-aquatic vegetation, mangroves or semi-mangroves, sea coast vegetation and vegetation in cultivated and wastelands. One of the main attractive features of this district is the presence of well protected sacred groves containing several forest, medicinal, rare and endangered species which manifest the once existed dense evergreen forests of this area. A total of 52 sacred groves were observed during the study which are equally distributed in lowland and midland areas. Of these, Vandanam, Sharangakavu, Elanjimelvallikavu and Mannarsala are larger. Aquatic and semi-aquatic plants are distributed in the wide spread network of canals, rivers, lakes, backwaters, paddy fields, marshy lands, etc. of the district. Marshy lands of the coastal area is predominated by several mangroves and semi-magroves. Coastal area also includes characteristic sea-coast vegetations containing several sand binding plants. Cultivated lands and waste lands support a large number of plants, majority of which are herbaceous. Low-land areas are predominated by coconut and arecanut plantations and paddy fields. Mid-land areas are predominated by coconut, arecanut and rubber plantations.

Intensive and extensive collection of plants were made for a period of about 6 years. A total of 3100 field numbers were collected, representing 1082 species. Plants were classified according to Bentham and Hooker's system of classification (1862-1883) of flowering plants with current concepts of delimitation. Artificial keys were provided for families, genera, species and infraspecific taxa. Keys are strictly dichotomous and intended. Genera with more than one species were provided with a short generic description, while for genera with single species, species-description alone was provided. The genera and species are arranged in alphabetical sequence. Each species was provided with detailed up-dated nomenclatural citations. Local names if available, were given at the end of nomenclatural citations. All species were provided with a diagnostic and precise description. This was followed by data on phenology, world-wide distribution, informations on frequency, habitat, endemism/rarity if applicable, specimens examined, and special notes on taxonomic and nomenclatural problems, if any, medicinal and other economic importance, etc. Illustrations of about 71 selected plants and few colour photographs on the vegetation types and interesting plants were also provided.

The 1082 species belonged to 612 genera of 137 families, and the species index of the district was registered as 765/1000 sq.km. The Kerala state has a species index of about 97/1000 sq.km. The country's total species index is only 5.1/1000 sq.km. From this analysis the floristic richness of the district relative to the state and the whole country is very clear. The top 4 families with more than 50 species were Poaceae (118 species), Fabaceae (107 species), Cyperaceae (86 species) and Euphorbiaceae (56 species). Dicotyledons dominated with 788 species belonging to 475 genera and 109 families. Monocotyledons had 294 species, 137 genera and 28 families. *Cyperus* L. (23 spp.) and *Fimbristylis* Vahl (18 spp.) are the two largest genera in terms of numerical strength.

The flora showed very good affinity towards Sri Lankan and Malaysian floras. An analysis of the flora of the district showed that 59 species are endemic to Peninsular India which formed 5.45% of the total species. The present collection included 2 species listed in the *Red Data Book of Indian Plants*, under the category, 'Rare and Threatened'.

A total of 62 wild relatives of crop-plants and about 128 very important medicinal plants currently used in Ayurveda and modern medicine were also located. A total of 12% of the flora was found to be extremely rare and threatened.

During the present study two species formed new distributional record for the country, while two species formed new records for Peninsular India, and five species to the Kerala state.

The present study indicated that the flora of the district is very rich and diverse, with endemic plants,many crop relatives and medicinal plants and new reports and records of extended distribution of many species. The study has also realised the serious threats that the flora is facing and the immediate need for implementing conservation steps to be undertaken to protect the rich and diverse natural heritage of our country.

SYSTEMATIC TREATMENT

Key to major categories of Angiosperms

1a. Bark separable; leaves dorsiventral, reticulately veined; flowers usually 5 or 4-merous, rarely 3-merous; embryo almost always with 2 cotyledons ..... **DICOTYLEDONS**

1b. Bark not separable; leaves usually isobilateral with parallel veins (except in Araceae and Dioscoreaceae); flowers usually 3-merous; embryo almost always with 1 cotyledon ..... **MONOCOTYLEDONS**

Key to Divisons of Dicotyledons

1a. Perianth whorls distinguishably 2 or more seriate, outer sepaloid, inner petaloid (except in Magnoliaceae and Annonaceae) ..... **Dichlamydeae**

1b. Perianth whorls not distinguishable and may be 1-seriate, 2-seriate or 0 ..... **Monochlamydeae**

Key to Divisions of Dichlamydeae

1a. Petals free; stamens free from petals ..... **Polypetalae**

1b. Petals connate; stamens epipetalous ..... **Gamopetalae**

KEY TO THE FAMILIES OF POLYPETALAE

1a. Stamens hypogynous (except in Nymphaeaceae).

2a. Sepals usually imbricate in bud.

3a. Sepals free to base.

4a. Stamens many (more than 10).

5a. Aquatic plants.

6a. Carpels free, superior, ovules 1 or 2 per cell; stigma peltate ..... **6. Nelumbonaceae**

6b. Carpels connate, half inferior or half superior, ovules many per cell; stigma radiating ..... **8. Nymphaeaceae**

5b. Terrestrial plants.

7a. Petals indefinite; receptacle elongate, coulmnar ..... **3. Magnoliaceae**

7b. Petals 4-12; receptacle not elongate and columnar.

8a. Sepals 2; placentas free-central ..... **16. Portulacaceae**

8b. Sepals 4 or more; placentas otherwise.

9a. Sepals persistent.

10a. Leaves opposite; flowers unisexual or polygamous .... **18. Clusiaceae**

10b. Leaves alternate; flowers bisexual.

11a. Climbing shrubs; carpels distinct; ovules many in each cell; disk 0; fruit follicles; seeds with a fimbriate aril ..... **2. Dilleniaceae**

11b. Erect shrubs or small trees; carpels united, ovule 1 in each cell; fruit of distinct drupes seated on the enlarged disk; seeds without aril .... **31. Ochnaceae**

9b. Sepals deciduous.

12a. Carpels quite free when ripe with persistent feathery, twisted style; ovule 1; leaves 3-foliolate, terminal leaflet transformed in to a tendril ..... **1. Ranunculaceae**

12b. Carpels cohering in a 1-locular ovary with parietal or intruded placentas; ovules 2-many; leaves simple or if compound then without tendril.

13a. Herbs, or if shrubs or trees, then with ovary and fruit borne on a long gynophore; sepals 4 .... **10. Capparaceae** (p.p.)

13b. Trees or shrubs with sessile ovary and fruit; sepals usually 5.

14a. Anthers narrowly horse sheo-shaped; fruit covered with soft prickles .... **12. Bixaceae**

14b. Anthers not horse shoe-shaped; fruit not covered with soft prickles .... **13. Flacourtiaceae**

4b. Stamens few (10 or less than10).

15a. Flowers 3-merous; carpels solitary or free.

16a. Aquatic herbs; leaves highly dissected; flowers bisexual, solitary ..... **7. Cabombaceae**

16b. Terrestrial climbing herbs or shrubs; leaves entire; flowers unisexual, in racemes or panicles ..... **5 Menispermaceae**

15b. Flowers 4-5-merous; carpels 2-5,united.

17a. Ovary 1-celled.

18a. Flowers regular.

19a. Petals 4; stamens 6; placentas parietal .... **10. Capparaceae** (p.p.)

19b. Petals 5; stamens 5 or less; placentas free-central .... **15. Caryophyllaceae**

18b. Flowers irregular.

20a. Trees; anterior petal keeled; fruit indehiscent, 1-seeded .. .. **14. Polygalaceae** (p.p.)

20b. Herbs; anterior petal not keeled; fruit capsular, many-seeded ..... **11. Violaceae**

17b. Ovary 2-5-celled.

21a. Erect or straggling shrubs or trees; if herbs, then tendril-climbers.

22a. Leaves simple ..... **25. Linaceae**

22b. Leaves compound.

23a. Stamens 10; filaments of stamens more or less united; ovary 5-celled ..... **27. Oxalidaceae** (p.p.)

23b. Stamens 8 or fewer; filaments of stamens free; ovary 2-3-celled ..... **40. Sapindaceae**

21b. Erect or prostrate herbs.

24a. Leaves 3-many-foliolate ..... **27. Oxalidaceae** (p.p.)

24b. Leaves simple.

25a. Ovary 5-celled.

26a. Flowers irregular, pedicelled; stamens 5 .... **28. Balsaminaceae**

26b. Flowers regular, sessile; stamens 10 .... **17. Elatinaceae**

25b. Ovary 2-celled.

27a. Flowers irregular; stamens 8; filaments connate; fruit compressed; seeds caruncled ..... **14. Polygalaceae** (p.p.)

27b. Flowers regular; stamens 6; filaments free; fruit terete; seeds non-caruncled .... **9. Brassicaceae**

3b. Sepals connate at base.

28a. Leaves gland-dotted ..... **29. Rutaceae**

28b. Leaves not gland-dotted.

29a. Leaves opposite.

30a. Climbing shrubs; stamens 3 or 10.

31a. Stamens 10; fruit a samara; petiole with glands .... **26. Malpighiaceae**

31b. Stamens 3; fruit a berry; petiole without glands .... **36. Hippocrateaceae**

30b. Erect trees; stamens 5 ..... **37. Celastraceae**

29b. Leaves alternate.

32a. Climbing shrubs.

33a. Plants with leaf-opposed tendrils ..... **40. Vitaceae**

33b. Plants without tendrils.

34a. Stamens alternate with petals; flowers dioecious in elongate interrupted pendulous lateral spikes .... **34. Icacinaceae**

34b. Stamens opposite with petals; flowers hermaphrodite in short, erect axillary spikes ..... **35. Opiliaceae**

32b. Erect herbs or trees.

35a. Leaves compound.

36a. Filaments united in to a tube.

37a. Stipules large, foliaceous; flowers in leaf-opposed corymbose cymes; stamens opposite with petals ..... **39. Leeaceae**

37b. Stipules 0; flowers in axillary or terminal panicles orrarely solitary; stamens alternate with petals ..... **32. Meliaceae**

36b. Filaments free.

38a. Leaves 2-3-pinnate; seeds winged .... **42. Moringaceae**

38b. Leaves 1-pinnate; seeds not winged.

39a. Fruit winged ..... **30. Simaroubaceae** (p.p.)

39b. Fruit not winged .... **41. Anacardiaceae** (p.p.)

35b. Leaves simple.

40a. Flowers in long-peduncled pendulous umbels; carpels 4-5, free ..... **30. Simaroubaceae** (p.p.)

40b. Flowers in panicles; carpels syncarpous, 1-3-celled.

41a. Ovary 1-celled; ovules 1 in each cell; stamens 1-10; calyx not accrescent or winged ..... **41. Anacardiaceae** (p.p.)

41b. Ovary 3-celled; ovules 2 in each cell; stamens more than 10; calyx accrescent or winged ..... **19. Dipterocarpaceae**

2b. Sepals usually valvate in bud.

42a. Sepals free; perianth 3-merous (sepaloid) ..... **4. Annonaceae**

42b. Sepals connate; perianth 5-merous.

43a. Staminal filament variously connate.

44a. Stamens polyadelphous ..... **21. Bombacaceae**

44b. Stamens monadelphous.

45a. Anthers 1-celled; staminal column basally coherent with petals ..... **20. Malvaceae**

45b. Anthers 2-celled; staminal column free from petals .... **22. Sterculiaceae**

43b. Staminal filaments free.

46a. Stamens 5, enclosed by petals, ovary immersed in the disc ..... **37. Rhamnaceae**

46b. Stamens 10 or more, not enclosed by petals; ovary not immersed in disc.

47a. Herbs or shrubs; stamens borne on a torus; fruit capsular ..... **23. Tiliaceae**

47b. Trees; stamens not borne on torus; fruit berry or drupe ..... **24. Elaeocarpaceae**

1b. Stamens epi-or perigynous (hypogynous in Molluginaceae).

48a. Ovary superior.

49a. Fruit a legume or lomentum; placentation marginal ..... **44. Fabaceae**

49b. Fruit not a legume or lomentum; placentation otherwise.

50a. Plants insectivorous ..... **46. Droseraceae**

50b. Plants not insectivorous.

51a. Plants climbers.

52a. Tendril climbers; gynandrophore present; fruit an indehiscent berry; corona present ..... **56. Passifloraceae**

52b. Non-tendrillar climbers; gynandrophore absent; fruit a follicle; corona absent ..... **43. Connaraceae**

51b. Plants not climbers.

53a. Carpels free.

54a. Erect succulent herbs; petals present ..... **45. Crassulaceae**

54b. Prostrate non succulent herbs; petals absent .... **60. Molluginaceae** (p.p., *Gisekia)*

53b. Carpels connate.

55a. Flowers dioecious; leaves palmately lobed, subpeltate; sap milky ..... **57. Caricaceae**

55b. Flowers bisexual; leaves entire or serrate; sap watery.

56a. Ovary 1-celled; placentae parietal; leaves alternate; petiole with discoid foliar glands ..... **55. Turneraceae**

56b. Ovary 2 or more celled; placentae otherwise; leaves opposite or whorled; petiole without glands.

57a. Calyx-lobes valvate in bud; petals usually present.

58a. Flowers axillary or in terminal panicles; petals usually wrinkled; ovary quite free, 2-6-celled ..... **52. Lythraceae**

58b. Flowers solitary, terminal; petals not wrinkled; ovary slightly adnate at the base to the calyx-tube, 10-15-celled .... **53. Sonneratiaceae**

57b. Calyx-lobes imbricate in bud; petals absent.

59a. Calyx-tube elongate; stamens perigynous; capsule circumscissile ..... **61. Aizoaceae**

59b. Calyx deeply 5-partite; stamens hypogynous; capsule loculicidal .... **60. Molluginaceae** (p.p.)

48b. Ovary inferior.

60a. Leaves highly reduced or absent; stem fleshy and with spines ..... **59. Cactaceae**

60b. Leaves well developed; stem herbaceous or woody without spines.

61a. Flowers unisexual; tendril climbers ..... **58. Cucurbitaceae**

61b. Flowers bisexual; plants erect or prostrate herbs, shrubs or trees, if climbers then without tendrils.

62a. Ovary 1-celled.

63a. Ovules 6-12, free central .... **51. Melastomataceae** (p.p., *Memecylon)*

63b. Ovules 1-5, pendulous.

64a. Ovule solitary; flowers in clusters ..... **64. Alangiaceae**

64b. Ovules 2-5; flowers in spikes..... **48. Combretaceae**

62b. Ovary 2 or more celled, or if 1-celled, then petals apically 2-fid and seeds viviparous.

65a. Anthers dehiscing by apical pores; connectives with appendages ..... **51. Melastomataceae** (p.p.)

65b. Anthers longitudinally dehiscent; connectives without appendages.

66a. Herbs.

67a. Flowers in simple or compound umbels; styles 2; fruit of 2 mericarps ..... **62. Apiaceae**

67b. Flowers solitary, axillary; style 1; fruit a capsule .... **54. Onagraceae**

66b. Shrubs or trees.

68a. Climbing shrubs; leaves digitately pinnate, leaf base sheathing; flowers umbellate . **63. Araliaceae**

68b. Erect shrubs or trees; leaves simple, leaf base not sheathing; flowers not umbellate.

69a. Leaves with intramarginal nerve and dotted with pellucid glands ..... **49. Myrtaceae**

69b. Leaves without intramarginal nerve and not gland-dotted.

70a. Leaves alternate ..... **50. Lecythidaceae**

70b. Leaves opposite ..... **47. Rhizophoraceae**

KEY TO THE FAMILIES OF GAMOPETALAE

1a. Ovary completely or partially inferior.

2a. Inflorescence an involucrate head (capitulum); calyx reduced to pappus; ovary 1-loculed ..... **66. Asteraceae**

2b. Inflorescence other than involucrate head; calyx normal with sepals; ovary 2-many-loculed.

3a. Leaves opposite ..... **65. Rubiaceae**

3b. Leaves alternate.

4a. Trees; stamens many, variously grouped; ovary 3-celled; ovules 2-4 in each cell ..... **73. Symplocaceae**

4b. Herbs; stamens 5; ovary 2-celled; ovules many in each cell.

5a. Corolla zygomorphic, 2-lipped; anthers connate by their margin, around style; flowers axillary, solitary ..... **67. Lobeliaceae**

5b. Corolla actinomorphic; anthers free, away from style; flowers in a dense cylindric spike ..... **68. Sphenocleaceae**

1b. Ovary superior.

6a. Ovary 1-celled.

7a. Insectivorous aquatic or semi-aquatic herbs with insectivorous bladders; corolla spurred at the back; stamens 2 ..... **86. Lentibulariaceae**

7b. Non-insectivorous aquatic or terrestrial plants without insectivorous bladders; corolla not spurred; stamens 4-5, rarely 2.

8a. Aquatic plants; leaves peltate ..... **79. Menyanthaceae**

8b. Terrestrial plants; leaves not peltate.

9a. Leafless root parasitic, non-chlorophyllous herbs ..... **85. Orobanchaceae**

9b. Leafy, non-parasitic, chlorophyllous plants.

10a. Leaves opposite; stems 4-angled and slightly winged ... . **78. Gentianaceae**

10b. Leaves alternate; stem terete and not winged.

11a. Herbs or undershrubs; calyx beset with stalked glands; ovule solitary; fruit a capsule .... **69. Plumbaginaceae**

11b. Erect or climbing shrubs; calyx not bearing stalked glands; ovule 2-many; fruit a berry .... **70. Myrsinaceae**

6b. Ovary 2-many-celled, or if 1-celled then stamens 2.

12a. Stamens opposite with petals or stamens, more than the number of corolla-lobes.

13a. Plants with milky sap; flowers bisexual ..... **71. Sapotaceae**

13b. Plants without milky sap; flowers unisexual ..... **72. Ebenaceae**

12b. Stamens alternate with petals, same the number of corolla lobes.

14a. Corolla actinomorphic; stamens as many as the corolla-lobes or 2 and alternate with carpels (Oleaceae).

15a. Leafless parasitic climbing plants .... **82. Convolvulaceae** (p.p, *Cuscuta*)

15b. Leafy, non-parasitic plants.

16a. Leaves opposite, rarely whorled, or if alternate then erect shrubs or trees with milky latex and with free carpels and united styles.

17a. Stamens 2 ..... **74. Oleaceae**

17b. Stamens 4-5.

18a. Carpels free at base.

19a. Carpels united only at stigmatic disc; stamens united with style forming a gynostegium or stamens conniving

by anthers over the stigma; pollens aggregated in pollinia ..... **76. Asclepiadaceae**

19b. Carpels united by styles; stamens free from the carpels; pollens granular ..... **75. Apocynaceae** (p.p.)

18b. Carpels connate.

20a. Plants with milky latex ..... **75. Apocynaceae** (p.p.)

20b. Plants without milky latex.

21a. Stipules present; ovules many; fruit a berry, or if capsule then small erect herbs ..... **77. Loganiaceae**

21b. Stipules absent; ovules 4; fruit a compressed capsule ..... **91. Avicenniaceae**

16b. Leaves alternate.

22a. Ovary cells many-ovuled; seeds many.

23a. Styles 2, distinct, blue; calyx glandular-pubescent .... **80. Hydrophyllaceae**

23b. Style single, not blue; calyx not glandular-pubescent .... **83. Solanaceae**

22b. Ovary cells 1-2 or 4-ovuled.

24a. Climbers; corolla plicate; fruit 4-seeded capsule or berry .... **82. Convolvulaceae** (p.p)

24b. Erect or prostrate plants; corolla not plicate; fruit of 4 nutlets or drupe ..... **81. Boraginaceae**

14b. Corolla zygomorphic, usually 2-lipped; stamens less than the number of corolla-lobes.

25a. Leaves pinnately compound; seeds winged ..... **87. Bignoniaceae**

25b. Leaves simple, rarely digitate and then fruit a drupe; seeds not winged.

26a. Fruit a capsule; seeds a few to many; placenta axile.

27a. Leaves 2-glandular at base ..... **88. Pedaliaceae** (p.p, *Sesamum*)

27b. Leaves eglandular at base.

28a. Fruit elastically dehiscent; seeds often supported by retinacula; placenta never swollen ..... **89. Acanthaceae**

28b. Fruit dehiscence not as above; seeds not supported by retinacula; placenta swollen ..... **84. Scrophulariaceae**

26b. Fruit a drupe, pyrene or nutlet; seeds 4; placenta basal or parietal.

29a. Aromatic herbs; ovary 4-lobed; style gynobasic; fruit of 4 nutlets ..... **92. Labiatae**

29b. Non or scarcely aromatic herbs, shrubs or trees; ovary entire; style terminal; fruit a drupe or pyrenes.

30a. Plants mucilaginous; fruit horned or spiny .... **88. Pedaliaceae** (p.p)

30b. Plants not mucilaginous; fruit smooth, not horned or spiny ..... **90. Verbenaceae**

KEY TO THE FAMILIES OF MONOCHLAMYDEAE

1a. Aquatic submerged herbs ..... **109. Ceratophyllaceae**

1b. Terrestrial plants.

2a. Plants parasitic.

3a. Leafless twiners; perianth limb campanulate, less than 5 mm long; anther dehiscence valvular; ovary superior ..... **101. Lauraceae** (p.p)

3b. Leafy erect, stout plants; perianth limb tubular, more than 1.5 cm long; anther dehiscence longitudinal; ovary inferior ..... **102. Loranthaceae**

2b. Plants non-parasitic.

4a. Ovary inferior.

5a. Ovary 4-6-celled; ovules many; stamens 6; fruit a septicidal capsule; perianth limb irregular; climbers ..... **98. Aristolochiaceae**

5b. Ovary 1-celled; ovules 2-3; stamens 4 or 5; fruit a drupe; perianth limb regular; erect trees ..... **103. Santalaceae**

4b. Ovary superior.

6a. Perianth absent.

7a. Plants with milky sap; ovary 3-celled; inflorescence a cyathium ..... **104. Euphorbiaceae** (p.p, *Euphorbia*)

7b. Plants without milky sap; ovary 1-celled; inflorescence a spike ..... **99. Piperaceae**

6b. Perianth present, 1 or 2-whorled.

8a. Flowers unisexual.

9a. Leafless trees with jointed, green, branchlets with whorls of small scaly leaves at the nodes .. **108. Casuarinaceae**

9b. Leafy herbs, shrubs or trees; leaves sometimes much reduced and then sap milky.

10a. Ovary 1-celled.

11a. Seeds arillate; stamens with anthers adnate to fleshy column, filaments 0 .... **100. Myristicaceae**

11b. Seeds not arillate; stamens with anthers at the apex of distinct filaments.

12a. Shrubs or trees.

13a. Plants with milky latex; style undivided ..... **107. Moraceae**

13b. Plants without milky latex; style 2-branched ..... **106. Ulmaceae**

12b. Annual herbs, if subshrubs then plants with stinging hairs ..... **105. Urticaceae**

10b. Ovary most commonly 3-celled, rarely 2-celled ..... **104. Euphorbiaceae** (p.p)

8b. Flowers bisexual.

14a. Stipules ochreate ..... **97. Polygonaceae**

14b. Stipules not ochreate, or absent.

15a. Trees; stamens in 3 or 4 whorls; anther dehiscence through valves .... **101. Lauraceae** (p.p)

15b. Herbs or subshrubs; stamens in one whorl; anther dehiscence by lateral slits.

16a. Plants sub-succulent twiners ..... **95. Basellaceae**

16b. Plants not twiners.

17a. Fruit a capsule, or dehiscent or indehiscent utricle; perianth scarious ..... **94. Amaranthaceae**

17b. Fruit an anthocarp or pseudoberry; perianth not scarious.

18a. Leaves opposite; flowers actinomorphic; stamens basally connate; fruit an anthocarp ..... **93. Nyctaginaceae**

18b. Leaves alternate; flowers zygomorphic; stamens free; fruit a pseudoberry ..... **96. Phytolaccaceae**

KEY TO THE FAMILIES OF MONOCOTYLEDONS

1a. Ovary inferior.

2a. Pollen combined in to pollen masses (Pollinia) ..... **111. Orchidaceae**

2b. Pollen free, not in pollinia.

3a. Plants aquatic, submerged herbs ..... **110. Hydrocharitaceae**

3b. Plants terrestrial.

4a. Plants climbers ..... **118. Dioscoreaceae**

4b. Plants not climbers.

5a. Stamen 1 fertile, the remainders transformed in to petaloid staminodes often more conspicuous than the inner perianth.

6a. Both series of perianth united, tubular or spathaceous; anthers 2-celled ..... **112. Zingiberaceae**

6b. Outer perianth-series of 3 free lobes, inner 3 lobes united into a tube below; anther 1-celled, laterally adnate to a broad petaloid filament ..... **113. Cannaceae**

5b. Stamens 5-6, all fertile.

7a. Flowers unisexual, irregular; calyx split down on one side, 3-5 dentate at the apex; fertile stamens ..... **114. Musaceae**

7b. Flowers bisexual, regular; calyx not split down on one side; fertile stamens 6.

8a. Leaves armed; inflorescence capitate, crowned by leaf-tufts; fruit a syncarp; bracts brightly coloured .. **115. Bromeliaceae**

8b. Leaves unarmed; inflorescence umbellate or racemose, rarely solitary, not crowned by leaf-tufts; fruit a capsule; bracts not coloured.

9a. Flowers umbellate; perianth-segments connate; leaves flat, succulent, never plicate ..... **116. Amaryllidaceae**

9b. Flowers solitary or racemed; perianth segments free; leaves rigid and plicate ..... **117. Hypoxidaceae**

1b. Ovary superior.

10a. Perianth present, or if small or very reduced or modified, or absent, then flowers not accompanied by glumaceous bracts or bracteoles (glumes).

11a. Carpels free or gynoecium reduced to 1 carpel with 1 stigma; aquatic or semi-aquatic plants.

12a. Plants laticiferous; inflorescence a raceme or umbel; flowers bracteate.

13a. Submerged or floating-leaved aquatics; stamens 9; inflorescence a raceme; leaf base deeply cordate ..... **130. Alismataceae**

13b. Amphibious or wet-land plants; stamens numerous surrounded by whorls of staminodes; inflorescence an umbel; leaf base rounded ..... **131. Butomaceae**

12b. Plants non-laticiferous; inflorescence otherwise; flowers without bracts.

14a. Flowers in spikes.

15a. Flowers unisexual; male and female spikes on a single axis separated by a considerable naked barren zone; perianth 0, leaves distichous ..... **127. Typhaceae**

15b. Flowers bisexual; contiguous; perianth present; leaves not distichous.

16a. Rhizome tuberous; leaves radical; spikes terminal; tepals 2; stamens6, anthers on fairly long filaments .... **132. Aponogetonaceae**

16b. Rhizome creeping; leaves cauline; spikes axillary or leaf-opposed; tepals 4; stamens 4, anthers sessile .... **133. Potamogetonaceae**

14b. Flowers not in spikes.

17a. Free-floating stemless plants with green frond-like plant body; roots 0, 1 or more ..... **129. Lemnaceae**

17b. Submerged plants with elongated branched, filiform stem, rooting at lower nodes ..... **134. Najadaceae**

11b. Carpels more or less completely united, into an ovary with usually more than 1 stigma; rarely aquatic.

18a. Perianth composed of separate calyx and corolla, the former often green, the latter usually petaloid.

19a. Leaves radical, distichous; flowers in bracteate heads; style trifid with dilated stigma ..... **122. Xyridaceae**

19b. Leaves radical and cauline, not distichous; flowers usually in cymes, panicles or rarely solitary, but not in bracteate heads; style 1, entire .... **123. Commelinaceae**

18b. Perianth composed of similar or subsimilar segments in two or one series, or perianth sepaloid or dry and glumaceous, or absent.

20a. Perianth composed of similar or subsimilar segments in two or one series, usually very conspicuous and petaloid, some times (when inflorescence a spadix) very small and inconspicuous.

21a. Flowers in spadix subtended by or enclosed in a spathe, very small and inconspicuous and often unisexual ..... **128. Araceae** (p.p)

21b. Flowers not in spadix and without a spathe, unisexual or bisexual.

22a. Aquatic erect or floating herbs; inflorescence terminating in a 1-leafed scape ..... **121. Pontederiaceae**

22b. Terrestrial climbing plants, if erect the root stock a bulb; inflorescence not terminating in a 1-leafed scape.

23a. Leaves cirrhose at the tip.

24a. Fruit a capsule; perianth-segments linear, reflexed, margins undulate .... **119. Liliaceae** (p.p, *Gloriosa*)

24b. Fruit drupaceous; perianth-segments suborbicular or ovate, not reflexed, margins entire .... **124. Flagellariaceae**

23b. Leaves not cirrhose at the tip.

25a. Leaf-petiole tendrillar; flowers in umbels, unisexual; leaves 3-5-nerved with reticulate venation ..... **120. Smilacaceae**

25b. Leaf-petiole not tendrillar; flowers in racemes, bisexual; leaves with parallel nerves .... **119. Liliaceae** (p.p)

20b. Perianth sepaloid or dry and glumaceous, usually very small or absent.

26a. Inflorescence a spadix.

27a. Spadix branched; stem woody; leaves plicate in bud .... **125. Arecaceae**

27b. Spadix unbranched; stem not woody; leaves not plicate in bud .... **128. Araceae** (p.p)

26b. Inflorescence a capitate head or spike.

28a. Shrubs or small trees; leaf-margins spinulose; inflorescence spikes; fruits syncarpic ..... **126. Pandanaceae**

28b. Scapigerous herbs; leaf-margins not spinulose; inflorescence capitate heads; fruits capsular ..... **135. Eriocaulaceae**

1b. Perianth absent or represented by hypogynous setae or scales or lodicules, with the flowers minute, arranged in spikelets and in the axils of scaly bracts (glumes).

29a. Flowers in the axils of a single bract and collected into spikelets, the latter variously arranged, from the solitary to umbellate, paniculate or capitate; anthers basifixed; leaves usually with closed sheaths; stems mostly solid and triquetrous ..... **136. Cyperaceae**

29b. Flowers enclosed by a bract and bracteole (lemma and palea), arranged in spikelets; anthers mostly dorsifixed and versatile; leaves usually with open sheaths; stems mostly with hollow internodes and usually terete .... **137. Poaceae**

1. RANUNCULACEAE Juss.

Gen. Pl. 231. 1789.

NARAVELIA Andanson

Fam. Pl. 2:460, 581. 1763.

Naravelia zeylanica (L.) DC., Syst. Nat. 1: 67. 1817; 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. 62. 1976; Mani. & Sivar., Fl. Calicut 25. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 2. 1983; Ramach. & Nair, Fl. Cannanore 35. 1988; Mani., Fl. Silent Valley 1. 1988; Vajravelu, Fl. Palghat Dist. 44. 1990; Rau in Sharma *et al.*, Fl. India 1: 106. 1993; Mohanan & Henry, Fl. Thiruvananthapuram 4. 1994; Sivar. & Mathew, Fl. Nilambur 33. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 24. 1996. *Atragene zeylanica* L., Sp. Pl. 542. 1753.

Climbing shrubs; young stem, leaves and buds densely villous; roots tuberous. Leaves 2-3-foliolate; leaflets 4-12 x 3-8 cm, elliptic-ovate, base rounded, margins distantly dentate, apex acute or acuminate, pubescent beneath, glabrous above, basally 5-ribbed; terminal leaflet transformed into a 3-fid, hooked tendril, up to 9 cm long; petioles 5-10 cm long. Flowers c. 1.5 cm across, bisexual, in terminal and axillary divaricately branched, up to 15 cm long panicles. Sepals 4-5, greenish yellow, 0.8-1 cm long, elliptic, pubescent without. Petals 6-12, greenish yellow, 0.7-0.9 x 1-1.5 mm, linear to spathulate. Stamens many; filaments ligulate; staminodes 10-14, petaloid. Carpels many; ovule 1per carpel; style 1.5-2 mm long; stigma clavate. Achenes many; 0.8-1 cm long, linear, stalked, with spirally twisted, 3-4 cm long, feathery persistent style.

Fl. & Fr.: Oct. - Jan.

Distr.: Tropical Himalayas to Peninsular India, Burma and Sri Lanka. Stem used as tooth stick. *CNS 2039* (Cherthala).

2. DILLENIACEAE Salisb.

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

TETRACERA Linnaeus

Sp. Pl. 533. 1753.

Tetracera akara (Burm. f.) Merr., Philipp. J. Sci. 19: 366. 1921; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 101. 1988; Majumdar in Sharma *et al.*, Fl. India 1: 158. 1993; Mohanan & Henry, Fl. Thiruvananthapuram 42. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 25. 1996. *Calophyllum akara* Burm. f., Fl. Ind. 121. 1768. *Tetracera rheedii* DC., Syst. Nat. 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. **Acara-patsjotti** Rheede, Hort. Malab. 5: 15, t. 8. 1685.

Large woody climbers; stem and leaves very scabrid. Leaves 8-12 x 3-5 cm, elliptic-oblong, base attenuate, margins entire to serrate, apex acuminate, coriaceous; lateral nerves 7-9 pairs; petiole 4-8 mm long. Flowers white in terminal and lateral panicles, 2-2.5 cm across; pedicels 1-1.5 cm long. Sepals 4, 6-8 x 5-7 mm, orbicular, reddish, often reflexed in fruit. Petals 4, 0.8-1.1 x 0.7-0.9 cm, orbicular, pinkish-white. Stamens many, 7-8 mm long; filaments yellowish white. Carpels 3-5, c. 1.5 x 1 mm; ovules many; style c. 5 mm long. Follicles 2-3 or more, 6-8 mm long, globose, with 1-3 mm long beak, scabrid; calyx lobes accrescent on follicles. Seeds 1-2, c. 2 x 3 mm, ovoid, black; aril c. 6 mm long, red, fimbriate.

Fl. & Fr.: Mar. - May.

Distr.: Peninsular India, Sri Lanka, Java, Cambodia Malaysia, Celebes, and Borneo. Occasional in sacred groves. *CNS 1881* (Elangimelvallikavu).

3. MAGNOLIACEAE Juss.

Gen. Pl. 280. 1789.

MICHELIA Linnaeus

Sp. Pl. 536.1753.

Michelia champaca L., Sp. Pl. 536. 1753; 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; Mani. & Sivar., Fl. Calicut 26. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 3. 1983; Nooteboom in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 155. 1987; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 169. 1988; Vajravelu, Fl. Palghat Dist. 45. 1990; Raju in Sharma *et al.*, Fl. India 1: 175. 1993; Mohanan & Henry, Fl. Thiruvananthapuram 43. 1994. *Michelia rheedii* Wight, Ill. 1: 14. 1840. **Champacam** Rheede, Hort. Malab. 1: 31-32, t. 19. 1678. ***Champakam.***

Ever green tree; bark thick, grey; branches ascending. Leaves 9-18 x 3-7 cm, ovate-lanceolate, base subacute or cuneate, apex acuminate, thinly coriaceous; lateral nerves 12-18 pairs; petiole to 2.5 cm long; stipule adnate to petiole, up to 3 cm long. Flowers axillary, solitary, 3.5-5 cm across, very fragrant, pale yellow, becoming orange, each enclosed in bud by a greyish-yellow pubescent, spathaceous, c. 2.5 cm long deciduous bract; pedicel jointed, to 2.5 cm long. Perianth 9-15, pale yellow, in 3 series, 3-4 x 1-1.5 cm; outer ones oblong or ovate; inner ones linear. Stamens many; anthers 6-8 mm long, linear, apiculate. Carpels 8-10 x 3-4 mm, ovoid; ovules 2 or more per cell; stigmatic crest curved. Follicle - cluster to 7 cm across; fruitlets to 2 cm across, ovoid to ellipsoid, warty, white-speckled, dehiscing by 2 valves. Seeds 1-12, to 1 x 0.7 cm, subglobose, enclosed by fleshy red aril.

Fl. & Fr.: Mar. - July.

Distr.: India, Nepal, Bhutan, Bangladesh, Myanmar, S.W. China to Malesia. *CNS 1762* (Purakkad).

4. ANNONACEAE Juss.

Gen. Pl. 283. 1789.

1a. Ripe carpels united, forming many - loculed syncarpous fruits ..... **Annona**

1b. Ripe carpels free, forming apocarpous fruits.

2a. Sepals imbricate; petals imbricate in one or both series ..... **Uvaria**

2b. Sepals valvate; petals valvate in both series.

3a. Peduncles flattened and hooked.; petals conniving at the concave base, covering the stamens and carpels ..... **Artabotrys**

3b. Peduncle not flattened and hooked; petals flat, spreading from the base, not covering the stamens and carpels.

4a. Petals upto 1 cm long; stamens less than 3 mm long; connectives flat- topped or convex; flowers not scented .... **Polyalthia**

4b. Petals more than 2 cm long; Stamens c. 3 mm long; connective apiculate, pointed; flowers strongly scented .... **Cananga**

ANNONA Linnaeus

Sp. Pl. 536. 1753.

Small to medium-sized trees. Flowers bisexual, axillary, leaf-opposed or terminal, solitary or fascicled. Sepals 3, small, valvate. Petals 6 (3 + 3), valvate, coriaceous; outer ones lanceolate or ovate, concave at base, fleshy, inner ones rudimentary or absent. Stamens numerous; anthers narrow, dorsal, ovoid at top of the connectives. Carpels many, subconnate; ovule 1, erect, basal; style oblong. Ripe carpels confluent into a many-loculed ovoid or globose fruit, sometimes with spines. Seeds many, enclosed by a membranous aril.

1a. Petals 6, broadly ovate, the inner 3 conspicuous.

2a. Fruit dark green, covered with soft spines; pulp white; seeds blackish- brown ..... **A. muricata**

2b. Fruit yellowish or orange, smooth; pulp yellow; seeds straw-coloured .... **A. glabra**

1b. Petals 3, oblong to linear, inner rudimentary or absent.

3a. Leaves acuminate; fruit smooth, reticulate, areoles flat ..... **A. reticulata**

3b. Leaves obtuse; fruits tuberculate ..... **A. squamosa**

Annona glabra L., Sp. Pl. 537. 1753; Bailey, Cycl. Hort. 1:293. 1958; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5 : 74. 1985 ; Kadavil & Antony, J. Swamy Bot. Club 5 (2): 117 - 118, ff. 1 - 6. 1998; Sivar. & Sunil, Rheedea 3 (1) : 90 - 93. 1993; Debika Mitra in Sharma *et al.*, Fl. India 1: 206. 1993. *Annona palustris* L., Sp. Pl. ed. 2, 757. 1762. ***Kattatha*** (Fig. 9).

Small, glabrous trees, 5-6 m tall; bark grey outside and red within, cracked. Leaves distichous, 7-20 x 4-9 cm, ovate, oblong or elliptic, base rounded or cuneate, apex acute, coriaceous, glabrous, green above, paler beneath; secondary veins 7-9 pairs; petiole to 2 cm long. Flowers on short extra-axillary tubercles, solitary or paired; young buds subglobose; open flowers to 2 cm across, broadly ovoid, creamy yellow, fragrant; pedicel 1.5-2 cm long, recurved at anthesis. Sepals 3, to 3 x 3 mm, ovate-orbicular, acute. Petals 6 in two whorls, creamy yellow, thick and fleshy, broadly ovate-acute; the outer three larger, c. 2 x 1.5 cm, base inflexed and somewhat subcordate, margins thickened towards apex; the inner three smaller, to 1.7 x 1.2 cm, often with reddish blotches within. Stamens numerous, to 3 mm long; filaments short; connective prolonged, concealing the anthers. carpels many, free, 1-ovuled. Fruits to 7 x 5 cm, subglobose or ovoid, smooth, lemon-yellow when ripe. Seeds many, straw-coloured, to 1.8 x 0.8 cm, ovoid, obovoid or oblong, often strongly margined, rounded at ends, smooth, embedded in a yellow pulp.

Fl. & Fr.: Jan. - Apr.

Distr.: Native of Tropical America and West Indies. Reported as introduced in some Asiatic countries; this taxon has, of late, been recorded from Sri Lanka also. *CNS 1461* (Thannermukkom); *CNS 2401* (Pallithode).

Annona muricata L., Sp. Pl. 536. 1753; Brandis, Indian Trees 22. 1911; Mani. & Sivar., Fl. Calicut 27. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 7. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 72. 1985; Debika Mitra in Sharma *et al.*, Fl. India 1: 206. 1993; Sivar. & Mathew, Fl. Nilambur 45. 1996.

Small trees, branches pubescent with appressed fulvous hairs when young, soon glabrate. Leaves 8-14 x 4-5 cm, obovate-oblong, base acute, apex shortly acuminate, glabrous; petioles to 5 mm long. Flowers greenish-yellow, solitary, terminal or leaf-opposed; pedicels to 1.5 cm long. Sepals 3, 3-5 x 5-6 mm, triangular, persistent. Petals 6 (3+3), ovate-acute, thick, glabrous; outer ones 2.8-3.2 x 2-2.4 cm; inner ones 1.4-1.8 x 1-1.3 cm. Stamens numerous, 4-5 mm long, linear; connectives broad. Carpels many, c. 4 mm long, linear, often connate; ovule solitary; style oblong; stigma entire. Ripe fruit 10-25 cm long, upto 15 cm in diam., ovoid or irregularly ovoid, dark green, covered with soft spines about 6 mm long and usually curved; pulp white. Seeds numerous, blackish-brown.

Fl. & Fr.: Apr. - Oct.

Distr.: Tropical America and West Indies, introduced in India. *CNS 2402* (Kayamkulam).

Annona reticulata L., Sp. Pl. 537. 1753; Hook. f., Fl. Brit. India 1: 78. 1872; Dunn in Gamble, Fl. Pres. Madras 20. 1915; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 40. 1976; Mani. & Sivar., Fl. Calicut 27. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 8. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 73. 1985; Ramach. & Nair, Fl. Cannanore 42. 1998; Debika Mitra in Sharma *et al.* Fl. India 1: 207. 1993 ***Anona-maram*** Rheede, Hort. Malab. 3: t. 30-31. 1682. ***Aatha***

Small trees. Leaves 10-16 x 3-4.5 cm. oblong-lanceolate, base rounded, apex acute or acuminate, minutely pubescent beneath when young, later glabrous; lateral veins 9-13 pairs; petioles 1.5 cm long. Flowers greenish-yellow in extra-axillary or terminal cymes, 2-3 together; pedicels to 1.5 cm long. Sepals 3, 1.5-3 x 0.4-0.5 cm, narrowly

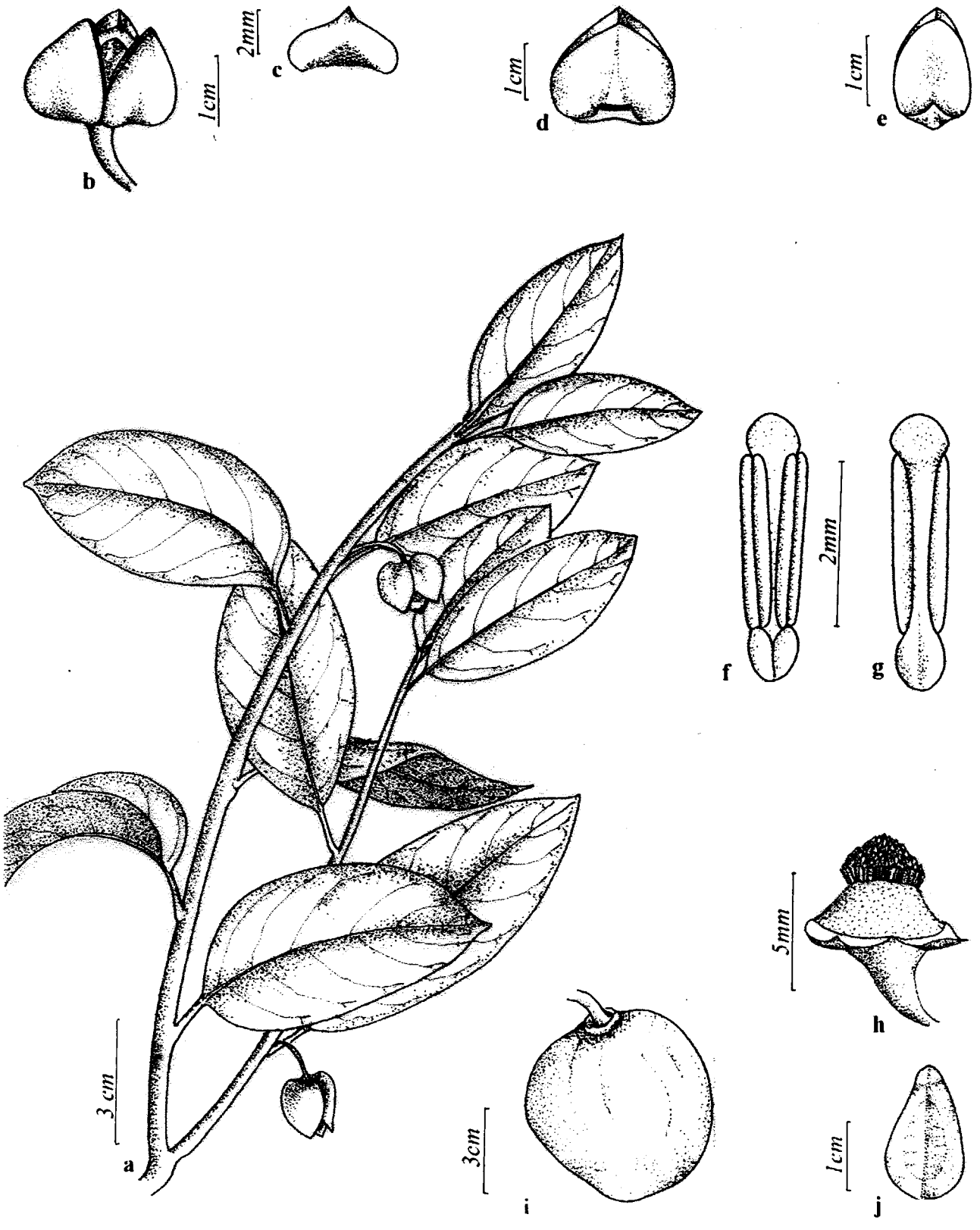


Fig. 9. *Annona glabra* L.: a. Twig with flowers; b. Single flower; c. Sepal; d. Outer petal; e. Inner petal; f & g. Stamen-ventral and dorsal views ; h. Receptacle with carpels; i. Fruit; j. Seed.

oblong, triquetrous, concave at base, reddish at base inside, pubescent without. Petals apparently 3: outer ones 1.5-2 x 0.4-0.5 cm, narrowly oblong, triquetrous, concave at base, reddish at base inside, pubescent without; inner whorls 3, minute. Stamens numerous, each c. 1 mm long. Carpels may, each c. 1 mm long, linear, 1-ovuled. Fruits upto 10 cm in diam., ovoid to subglobose, reticulate, many-seeded, turning yellow or reddish. Seeds blackish brown, arillate.

Fl. & Fr.: Mar. - Sept.

Distr.: West Indies, Tropical america and introduced in India. Commonly cultivated for its fruits. Occasionally seen as an escape. *CNS 2403* (Aroor).

Annona squamosa L., Sp. Pl. 537. 1753; Hook. f., Fl. Brit. India 1: 78. 1872; Dunn in Gamble, Fl. Pres. Madras 20. 1915; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 40. 1976; Mani. & Sivar., Fl. Calicut 27. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 8. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 74. 1985; Debika Mitra in Sharma *et al.*, Fl. India 1: 207. 1993; Sivar. & Mathew, Fl. Nilambur 45. 1996. **Atamaram** Rheede, Hort. Malab. 3: t. 29. 1682. ***Sitapazham.***

Shrubs or small trees; young branches pubescent. Leaves 6-11 x 2.5-4.5 cm, elliptic-oblong, base acute or cuneate, apex obtuse or slightly acute, glabrous, glaucous beneath, thin coriaceous; petiole to 1.5 cm long. Flowers axillary; pedicels 1-2 cm long; bracts 1-3 mm long, pubescent. Sepals 3, 2-3 x 3-4 mm, broadly ovate, acuminate, pubescent without. Petals 3 + 3, in two whorls; outer whorl greenish yellow, 1.5-2.5 x 0.3-0.5 cm, narrowly oblong, thick, reddish at base inside, pubescent without; inner whorl rudimentary or absent. Stamens numerous, c. 1 mm long; connectives ovoid. Carpels many, c. 1 mm long, subconnate, ovoid, 1-ovuled; style oblong. Fruits 7-9 cm diam., ovoid-globose, tuberculate with rounded tips, glaucous; pulp white. Seeds many, c. 12 x 7 mm, black, shiny, arillate.

Fl. & Fr.: May - Aug.

Distr.: West Indies. Tropical America and India. Common in plains, often cultivated for its fruits. *CNS 2404* (Kayamkulam).

ARTABOTRYS R. Brown

Bot. Reg. 5: 423. 1820.

Shrubs, climbing by means of persistent hook like peduncle. Leaves shiny, coriaceous. Flowers on leaf-opposed hooked peduncles. Sepals 3, valvate, cohering at base. Petals 6, biseriate, subsimilar, constricted and curved over the stamens and carpels at base and then spreading. Stamens numerous, oblong, cuneate; connectives prolonged and truncate. Carpels several; ovules 2, erect, collateral. Fruitlets sessile, glabrous or tomentose. Seeds 2, rarely 1.

1a. Petals glabrous, c. 1 cm broad; fruitlet 3-4 cm long, glabrous, produced into a conical beak about 3 mm long ..... **A. hexapetalus**

1b. Petals brown tomentose, c. 5 mm broad; fruitlets 2-2.5 cm long, tomentose, rounded or minutely apiculate at apex ..... **A. zeylanicus**

Artabotrys hexapetalus (L. f.) Bhandari, Baileya 12(4): 147. 1964; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 8. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 51 1985; Debika Mitra in Sharma *et al.*, Fl. India 1: 251. 1993. *Annona hexapetala* L. f., Suppl. Pl. 270. 1781. *Annona uncinata* Lam., Eencycl. 2: 127. 1786. *Artabotrysodoratissimus* R. Brown in Edward's. Bot. Reg. 5: t. 423. 1819; Hook. f. & Thomson in Hook. f., Fl. Brit. India 1: 54. 1872; King, Ann. Roy. Bot. Gard. Calcutta 4:44, t. 55. 1893. *Uvaria odoratissima* (R. Brown) Roxb., Fl. Ind. 2: 66. 1824. *Artabotrys uncinatus* (Lam.) Merr., Philipp. J. Sci. (Bot.) 7: 234. 1912. ***Madana-poo.***

Scandent shrubs; young branches puberulous. Leaves 6-18 x 2.5-5 cm, oblong, lanceolate, base acute, apex acuminate, glabrous, thinly coriaceous; petiole c. 5 mm long. Flowers c. 2 cm across, on hooked peduncle, solitary or in pairs, drooping, sweet-scented; pedicels 8-12 mm long. Sepals 3, 5-7 x 6 mm, ovate, connate at base, acute and reflexed at tip, puberulous. Petals 6 (3 + 3), 1.5-2.5 x 0.5-1.2 cm, ovate-lanceolate, spreading from clawed saccate coherent base, greenish yellow. Stamens many, each c. 1.5 mm long; connectives triangular, peltate. Carpels few, 1-2 mm long, sickle shaped; ovules 2; style curved; stigma blunt. Fruitlets 3-4 cm long, ovoid, apiculate, yellow when mature. Seeds 1-2, 1.5-2 cm long, oblong, deeply grooved on one side, brownish, smooth.

Fl. & Fr.: Apr. - Sept.

Distr.: Said to be native of South India; cultivated as well as naturalised throughout the country, reported from Sri Lanka, Bhutan, Bangladesh, Myanmar and Malesia. *CNS 2405* (Kayamkulam).

Artabotrys zeylanicus Hook. f. & Thoms., Fl. Ind. 128. 1855 & 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; Mani. & Sivar., Fl. Calicut 26. 1982; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 52. 1985. Ramach. & Nair, Fl. Cannanore 37. 1988; Vajravelu, Fl. Palghat Dist. 45. 1990; Debika Mitra in Sharma *et al.*, Fl. India 1: 253. 1993; Mohanan & Henry, Fl. thiruvananthapuram 45. 1994; Sivar. & Mathew, Fl. Nilambur 36. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 26. 1996 (Fig. 10).

Woody climbers. Leaves 10-20 x 3-5 cm, oblong to elliptic-lanceolate, base rounded to broadly attenuate, shortly acuminate at apex, glabrous; petiole 0.5 cm long. Flowers solitary or in few-flowered clusters on leaf opposed hooked peduncles, hooks compressed; pedicels c. 1 cm long. Sepals 3, c. 5.5 mm long, broadly triangular, ovate, densely pubescent without. Petals 6, 3 + 3, 2-3.5 x 0.5 - 0.8 cm, oblong, lanceolate, greenish-yellow, tomentose on both sides. Stamens many; connectives hooded. Carpels many, each c. 3 mm long, subglobose; ovules 2 in each carpel; stigma flat, oblong. Fruit an aggregate of subglobose berries, 2-2.5 cm across, sessile regulose, tomentose. Seeds 2, oblong-ovoid, c. 1 cm long, brownish.

Fl. & Fr.: Mar. - May.

Distr.: South West India and Sri Lanka. Not common. In sacred groves. *CNS 1518* (Sharangakavu at Venmony).

CANANGA (A.P. de Candolle) J.D. Hooker *et* Thomson
Fl. Ind. 129. 1855 (*nom. cons.*).

Cananga odorata (Lam.) Hook. f. & Thom., Fl. Ind. 130. 1855 & in Fl. Brit. India 1: 56. 1872; Mani. & Sivar., Fl. Calicut 27. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 9. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 70. 1985;

Debika Mitra in Sharma *et al.*, Fl. India 1: 254. 1993. *Uvaria odorata* Lam., Encycl. 1: 595. 1785; Roxb., Fl. Ind. 2: 661. 1832. ***Kattuchempagam.***

Tree to 15 m tall, bark grey, smooth. Leaves 10-20 x 3.5-10 cm, oblong to broadly elliptic, base obtuse, often unequal, apex acuminate, membraneous, glabrescent, nerves 7-9-paired; petiole 1-2 cm long. Flowers pendulous, in clusters, often from older branches, greenish-yellow, very fragrant; bract subulate, cauducous; pedicel to 3 cm. Sepals 3, 4-6 mm long, triangular, pubescent. Petals 6, 3-5 x 0.5-1.5 cm, linear or lanceolate, puberulous, a purple blotch at the base inside. Torus sub-convex. Stamens many, each to 3.5 mm long; connectives broadly appendaged, acute, concealing anthers. Carpels numerous; ovules several, 2-seriate. Fruitlets c. 1.5 cm long, oblong, stipitate. Seeds 6-12 in 2 rows, transversely flat, pale brown with pitted surface.

Fl. & Fr.: June. - Nov.

Distr.: Myanmar, Indo - China, Thailand, Malesia to Australia and New Zealand *CNS 2406* (Aroor).

POLYALTHIA Blume

Fl. Javae Anonac. 68. 1830.

Shrubs or trees. Flowers solitary, fascicled or in cymes, axillary, leaf-opposed, terminal or on tubercle from old stem. Sepals 3, valvate. Petals 3 + 3. Torus convex. Stamens many, connective overlapping the anther cells. Carpels several; ovules 1-2 per carpel. Fruitlets clustered, stalked, each 1-seeded.

1a. Trees, leaf-margins strongly undulate; flowers greenish yellow, numerous in subumbellate clusters at axils of fallen leaves ..... **P. longifolia**

1b. Shrubs; leaf-margins not undulate; flowers green, solitary or rarely 1-3 together from leaf-axils ..... **P. korinti**

Polyalthia korinti (Dun.) Thw., Enum. Pl. Zeyl. 398. 1864; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 64. 1872; Dunn in Gamble, Fl. Pres. Madras 16. 1915; Mani. & Sivar. Fl. Calicut 28. 1982; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 36. 1985; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 50. 1988; Debika Mitra in Sharma *et*

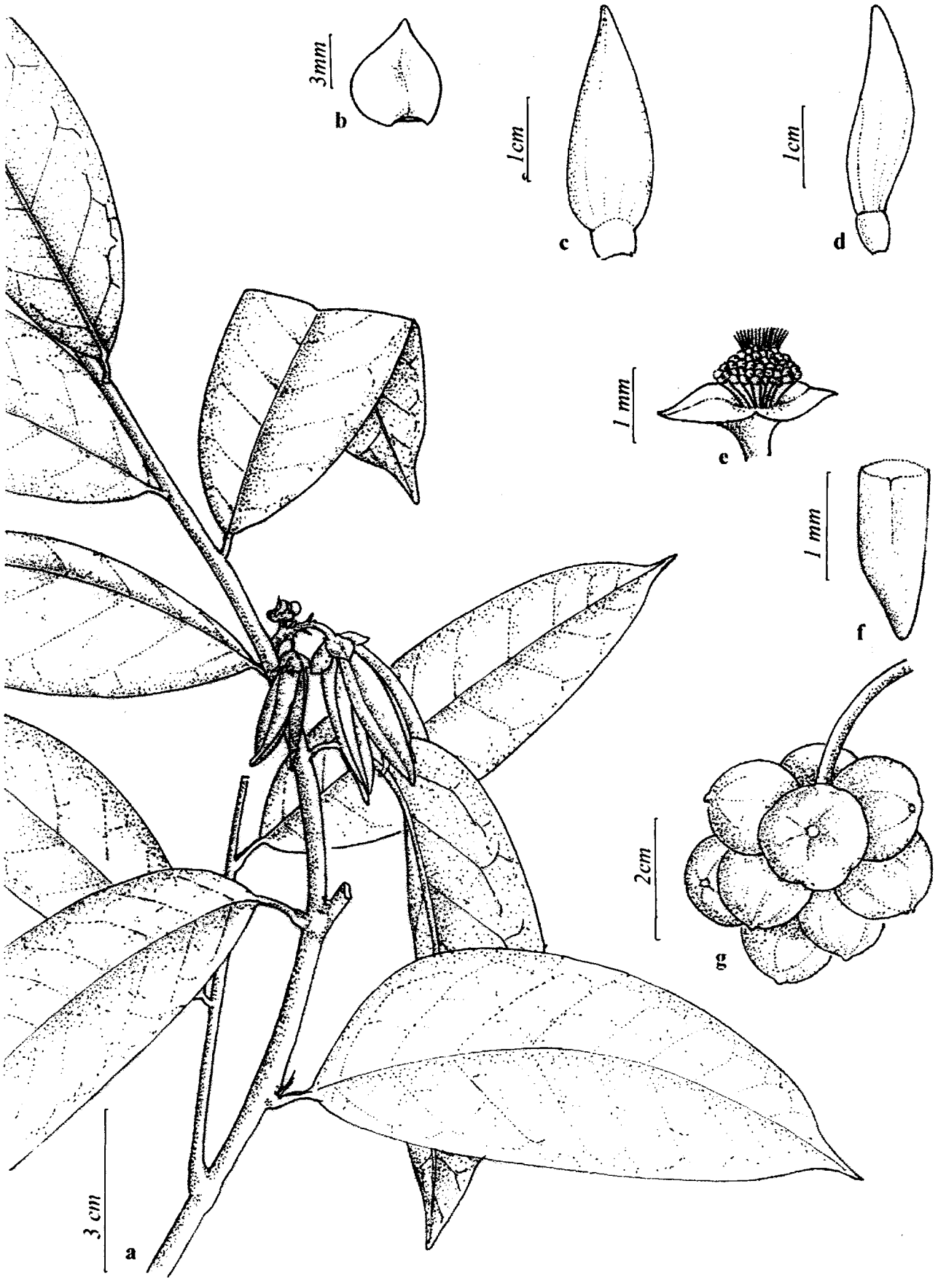


Fig. 10. *Artabotrys zeylanicus* Hook. f. & Thoms.: a. Flowering twig; b. Sepal ; c. Outer petal; d. Inner petal; e. Receptacle with carpels; f. Single carpel; g. Infrutescence.

al., Fl. India 1: 273. 1993. *Guatteria korinii* Dun., Monogr. Anonac. 133. 1817; Wight, Ic. t. 398. 1840. *Corinti-panel* Rheede, Hort. Malab. 5: 27, t. 14. 1685. *Tyjerou-panel* Rheede, Hort. Malab. 5: 31, t. 16. 1985. *Katsjau-panel* Rheede, Hort. Malab. 5: 35, t. 18. 1685.

Erect bushy shrubs, branchlets and buds brown pubescent. Leaves 4-10 x 2-4 cm, ovate to elliptic-lanceolate, attenuate at base, apex acuminate, slightly pubescent on midrib towards base on both sides, glabrous, shining. Petiole to 5 mm long; flowers solitary, axillary; pedicels 2-2.5 cm long, pellucid-dotted, sparsely hairy. Sepals 3, 0.15-0.2 x 0.2-0.25 cm, broadly ovate, pellucid-dotted. Petals 6, 3+3, of almost same size, spreading, 0.7-1 x 0.4-0.5 cm, oblong, pellucid-dotted, sparsely hairy. Stamens many. c. 1 mm long, oblong, concealed. Carpels many, ovoid; ovules 1-2 per carpel. Fruit an aggregate of many, 1-seeded globose berries, each 0.4-0.5 cm across, pellucid-dotted, sprasely hairy, crimson coloured; stalks c. 7 mm long. Seed 1, smooth.

Fl. & Fr.: Throughout the year.

Distr.: Peninsular India, Sri Lanka. Not common. In sacred groves. *CNS 1024* (Vandanam), *CNS 2407* (Kadakarappally).

Polyalthia longifolia (Sonn.) Thw., Enum. Pl. Zeyl. 398. 1864, Hook. f., Fl. Brit. India 1: 62. 1872; Dunn in Gamble, Fl. Pres. Madras 16. 1915; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 40. 1976; Mani. & Sivar., Fl. Calicut 28. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 12. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 32. 1985; Debika Mitra in Sharma *et al.*, Fl. India 1: 274. 1993. *Uvaria longifolia* Sonn., Voy. Ind. 2: 233, t. 131. 1782. *Guatteria longifolia* Wall., Cat. 6442. 1832; Wight, Ic. t. 1. 1838. ***Aranamaram***.

Trees upto 20 m, tall; bark greyish-brown. Leaves 14-20 x 2-4 cm, lanceolate, rounded at base, strongly undulate along margins, apex long acuminate, glabrous on both sides; petiole 1-1.5 cm long. Flowers greenish-yellow, 10-12 mm long, numerous, in subumbellate clusters at axils of fallen leaves; pedicels slender, 2-3 cm long. Sepals 3, 1-2 x 1-1.8 mm, ovate-triangular, apex acute, connate at base. Petals 6, in two rows, subequal, acuminate; inner ones 10-12 x 2-3 mm. Stamens numerous, c. 1 mm long; connective

convex at top. Carpels many, c. 1 mm long, linear; stigma sessile. Fruitlets 1.5-2 x 1-1.5 cm, ovoid to ellipsoid, purple, stipitate; stalk 10-12 mm long. Seed solitary, 1.2-1.7 mm long, ovoid, pale brown.

Fl. & Fr.: Mar. - Jul.

Distr.: India, Sril Lanka. Common in plains, often cultivated in gardens. *CNS 1593* (Aroor).

UVARIA Linnaeus

Sp. Pl. 503. 1753.

Scandent or climbing shrubs. Flowers solitary or in few-flowered cymes, terminal or leaf-opposed. Sepals 3, often united. Petals 6 (3+3), free or connate at base, imbricate. Stamens numerous; connective widened above the anthers, concealing the anther. Carpels numerous, oblong; ovules several, 2-seriate or rarely 1-seriate; style short. Torus depressed, pubescent or tomentose. Fruitlets few to many-seeded, globose. Seeds few to many, 1-2-seriate.

1a. Branches and petioles densely tomentellus when young; flowers c. 2 cm across or less; pedicels to 7 mm long; petals distinct, scarlet; ripe fruitlets brownish-red, velvety with yellow tomentum, subsessile ..... **U. zeylanica**

1b. Branches and petioles glabrate when young; flowers c. 3 cm across or more; pedicels 1-3 cm long; petals connate atbase, brownish; ripe fruitlets scarlet, glabrous, stalk up to 5 cm long ..... **U. narum**

Uvaria narum (Dun.) Blume, Fl. Java 5. 1828; Hook. f. & Thoms., Fl. Brit. Ind. 1 : 50. 72; King, Ann. Roy. Bot. Gard. (Calcutta) 4 : 20, t : 21. 1893; Dunn in Gamble, Fl. Pres. Madras 13. 1915; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 40. 1976; Mani. & Sivar., Fl. Calicut 26. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3 : 14. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5 : 18. 1985; Ramach. & Nair, Fl. Cannanore 41. 1988; Vajravelu, Fl. Palghat Dist. 49. 1990; Debika Mitra in Sharma *et al.*, Fl. India 1 : 292.1993; Sivar. & Mathew, Fl. Nilambur 42 .1996; Sasi. & Sivar., Fl. Pl. Thrissur For.

34. 1996; *Unona narum* Dun., Monogr. Anonac. 99.1817; ***Narum-panel*** Rheede, Hort. Malab. 2 : t.10.1679.

Woody climbers. Leaves 10-15 x 2-5 cm, oblong - lanceolate, base cuneate or acute, apex acuminate, glabrous, brownish beneath when dry, coriaceous; petiole to 5 mm long. Flowers c. 3 cm across, solitary, leaf-opposed or terminal; bracts oblong; pedicels c. 1 cm long. Sepals 3, c. 5 mm in diam., orbicular, stellate-tomentose, reflexed at apex. Petals 6, (3+3), 1 - 2 x 0.8-1.2 cm, ovate to suborbicular, coriaceous, apex incurved, flesh-coloured, minutely tomentose. Stamens numerous, c. 1.5 mm long; connective broad, truncate. Carpels many, c. 4 mm long, oblong; ovules many; stigma broad. Fruitlets numerous, 1.2-3 x 1-2 cm, ovoid to oblong, scarlet; stalk 2.5-5 cm long. Seeds c. 1 cm long, ovate, plano-convex, orange brownish.

Fl. Fr.: Jan. - May.

Distr.: Peninsular India, Sri Lanka. *CNS 1025* (Aryad).

Uvaria zeylanica L., Sp. Pl. 536. 1753; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1 : 51.1872; Bedd., Ic. t. 75. 1868 - 1874; King, Ann. Roy. Bot. Gard. (Calcutta) 4 : 26, t. 19. 1893; Dunn in Gamble, Fl. Pres. Madras 13. 1915; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5 : 16. 1985; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 51. 1988; Debika Mitra in Sharma *et al.*, Fl. India 1 : 295. 1993. *Guatteria malabarica* Dun., Monogr. Anonac. 134. 1817. ***Kaltsjerou - Panel*** Rheede, Hort. Malab. 5 : 33, t.17. 1685 (Plate IV: A).

Slender climbers; young branches ferrugineous tomentose. Leaves 6-15 x 2.5-4 cm, elliptic or oblong-lanceolate, base acute, apex acuminate, thinly coriaceous, glabrous; petioles to 4mm long. Flowers c. 2 mm across, solitary or paired, terminal or leaf-opposed; pedicels 3-5 mm long; bracts 2-3 x 1-2 mm, ovate. Sepals 3, 5-7 x 4-5 mm, orbicular-ovate, pubescent, reflexed at apex. Petals 6 (3 + 3), 7-10 x 4-5 mm, oblong or narrowly elliptic, apex acute or obtuse, dull red, pubescent without. Stamens many, c.1 mm long; connective truncate. Carpels many, c.1 mm long; ovoid or oblong, pubescent; stigma subcapitate. Fruitlets 1.4-2.2 x 0.8-1.2 cm, ovoid, brownish, sessile or very shortly

stipitate, brownish-red, minutely velvety with yellow tomentum. Seeds 4-7 x 3-5 mm, ovoid, compressed, light reddish-brown or black.

Fl. & Fr. : Jan. - Aug.

Distr. : Peninsular India, Sri Lanka. Apparently scarce, occasionally in certain sacred groves. *CNS 1019, 2408* (Vandanam).

5. MENISPERMACEAE Juss.

Gen. Pl. 284. 1789.

1a. Perianth scarcely differentiated into sepals and petals; seeds globose ..... **Anamirta**

1b. Perianth very frequently differentiated into sepals and petals; seeds not globose.

2a. Stamens united or at least partly connate at the base.

3a. Leaves suborbicular; sepals free; bracts and bracteoles broadly ovate-orbicular; petals connate into a cup ..... **Cissampelos**

3b. Leaves triangular-ovate; sepals connate; bracts and bracteoles minute; petals free or slightly joint at the base ..... **Cyclea**

2b. Stamens all free.

4a. Inner three sepals valvate; seeds horse-shoe shaped ..... **Tiliacora**

4b. Inner 3 sepals imbricate; seeds curved ..... **Tinospora**

ANAMIRTA Colebrooke

Trans. Linn. Soc. London 13:52, 66.1821.

Anamirta cocculus (L.) Wight & Arn., Prodr. Fl. Ind. Orient. 1: 446.1834; Hook. f., Fl. Brit. India. 1: 98. 1872; Dunn in Gamble, Fl. Pers. Madras 27. 1915; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 66.1976; Forman, Kew Bull. 32:392. 1978; Mani. & Sivar., Fl. Calicut 29.1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3:17.1983; Pramanik & Gangopathyay in Sharma *et al.*, Fl. India 1:311.1993; Forman in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 9: 311. 1995; Sivar. & Mathew, Fl. Nilambur 46.1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 35.1996. *Menispermum cocculus* L., Sp. Pl. 340.1753. *Anamirta paniculata* Colebr., Trans. Linn. Soc. 13:66.1822.

Woody Climbers. Leaves 12-18 x 10-13 cm, broadly ovate or orbicular, base truncate or cordate, acute or acuminate at apex, coriaceous, glabrous; petiole 7-15 cm long. Inflorescence on old branches, paniculate, drooping, 12-30 cm long. Flowers white, c. 6 mm across. Male flowers: pedicels 2-3 mm long; perianth white or pale green; outer 2 scarcely 1 mm long; inner ones 2-3 x c. 22 mm, broadly elliptic; stamens connate into a globose cluster, transversely dehiscing. Female flowers: pedicels 2-3 mm long; staminodes 6; carpels 3-4, 1.5-2 mm long, curved-ellipsoid; style lateral; stigma subcapitate, recurved. Drupe c.1 x 0.8 cm, white, turning purple. Seeds globose, smooth, black.

Fl. & Fr. : Aug. - Dec.

Distr. : India, Sri Lanka, Bangladesh, Myanmar, Indo-China, Thailand to Malasia. Common in sacred groves. *CNS 2408* (Kayamkulam).

CISSAMPELOS Linnaeus

Sp. Pl. 1031.1753.

Cissampelos pareira L., Sp. Pl. 1031. 1753, var. **hirsuta** (Buch.-Ham. ex DC.) Forman, Kew Bull. 22:356.1968; Rhodes, Phytologia 30:446.1975; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 66.1976; Matthew & Britto in Matthew., Fl. Tam. Carnatic 3:18.1883; Mani., Fl. Silent Valley 4. 1988; Pramanik & Gangopadhyay in Sharma *et al.*, Fl. India 1: 317.1993; Mohanan & Henry, Fl. Thiruvananthapuram 80. 1994; Forman in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 9: 306. 1995; Sasi. & Sivar., Fl. Pl. Thrissur For. 35. 1996. *C. hirsuta* Buch.-Ham. ex DC., Syst. Nat. 1: 535. 1817. *C. convolvulacea* var. *hirsuta* (Bunch.-Ham. ex. DC.) Hassk., Pl. Jav. Rar. 171. 1848. *C. tarribra* L., Sp. Pl. 1031. 1753, p.p.; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1:103. 1872; Dunn in Gamble, Fl. Pres. Madras 30.1915.

Slender tomentose climbers. Leaves 2-4 x 2.5-5 cm, ovate-orbiculate or reniform, base cordate, apex emarginate, hirsute and glaucous below, glabrous above; petiole to 2.5 cm. long. Male flowers in axillary cymes, green to yellow; sepals 4, minute; petal 4, c. 1 mm long, greenish white, connate; stamens 4, connate on a staminal column. Female flowers, in long axillary racemes, 1-1.5 mm. across, clustered at axils and bracts on the racemes; bracts large, foliaceous, 0.5-1 x 0.6-1.2 cm, hirsute; sepals 2, adnate to bracts;

petal one; carpel 1, densely hairy outside; style 3-fid at tip. Drupe 0.4-0.5 cm diam., ovoid, scarlet. Seeds 3-4 mm across, curved, tuberculate.

Fl. & Fr.: Throughout the tropics.

Distr.: Common in sacred groves. *CNS 1120* (Vandanam).

CYCLEA Arnott ex R. Wight
Ill. Ind. Bot. 1:22.1840.

Cyclea peltata (Poir.) Hook. f. & Thoms., Fl. Ind. 1: 104 201.1855 & in Hook.f., Fl. Brit. India 1:104.1872, p.p.; Dunn in Gamble, Fl. Pres. Madras 31.1975; Sant. & Janardh., Bull. Bot. Surv. India 10: 369. 1969; Gandhi in Sald. & Nicols., Fl Hassan Dist. 67. 1976; Mani. & Sivar., Fl. Calicut 29. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3:19.1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 179. 1988; Ramach. & Nair, Fl. Cannanore 42. 1988; Pramanik & Gangopadhyay in Sharma *et al.*, Fl. India 1:325.1993; Mohanan & Henry, Fl. Thiruvananthapuram 50. 1994; Forman in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 9: 308. 1995; Sivar. & Mathew, Fl. Nilambur 46. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 36. 1996. *Menispermum peltatum* Poir. in Lam., Encycl. Meth. Bot. 4:96. 1797. *Cocculus burmannii* DC., Syst. Nat. 1: 517. 1817. *Cyclea burmannii* (DC.) Hook. f. & Thoms., Fl. Ind. 201. 1885 & in Hook. f., Fl. Brit. India 1: 104. 1872; Trimen, Handb. Fl. Ceylon 1: 47. 1893. ***Pada-Valli*** Rheede, Hort. Malab. 7: 93, 49. 1688. ***Pada-kelengu***.

Climbing shrubs. Stem pubescent when young, glabrous or sparsely hairy on maturity. Leaves very variable, 4-14 x 2-8 cm, peltate, broadly triangular-ovate, base truncate, obtuse or subcordate, acute at apex, densely pubescent on both sides when young; petioles to 4 cm long. Male flowers in axillary and lateral lax panicles, green, c. 2 mm across; peduncles hirsute; bracts leafy, 0.3-0.5 cm long. Calyx broadly campanulate, 4-5-lobed. Petals 4-8, connate, green. Stamens 6-8, connate into a peltate synandial column. Female flowers in dense axillary and lateral panicles, 4-8 cm long, 4.5 cm across. Calyx campanulate, 4-5-lobed. Petal 1, orbicular. Ovary 1-celled, densely hairy outside, stigma 3-5-lobed. Drupe ovoid, 0.4-0.5 x 0.3-0.35 cm, white. Seeds 3-4 mm long, curved.

Fl. & Fr. : Apr. - May.

Distr. : India, Sri Lanka to Malesia. Very common along hedges and thickets. *CNS 1375* (Kadakarapally).

TILIACORA Colebrooke

Trans. Linn. Soc. London 13: 53, 67.1821.

Tiliacora acuminata (Lam.) Miers ex Hook.f. & Thoms., Fl. Ind.187. 1855; Dunn in Gamble, Fl. Pres. Madras 28. 1915; Forman, Kew Bull. 30:90. 1975; Mani. & Sivar., Fl. Calicut 30. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3:23.1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 180.1988; Pramanik & Gangopadhyay in Sharma *et al.*, Fl. India 1:343. 1993; Forman in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 9:312.1995; Sivar & Mathew, Fl. Nilambur 50. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 37. 1996. *Menispermum acuminatum* Lam., Encyl. 4: 101. 1797. *Tiliacora racemosa* Coleb., Trans. Linn. Soc. London 13:67.1821; Hook.f. & Thoms. in Hook. f., Fl. Brit. India 1: 99. 1872. *Cocculus acuminatus* Wight & Arn., Prodr. Fl. Ind. Orient. 12. 1834. ***Vallicaniram*** Rheede, Hort. Malab. 7: t. 3.1688.

Woody climbing shrubs. Leaves 6-13 x 3-6 cm, ovate-lanceolate, base truncate or cordate, apex acuminate, basically 3-5-nerved, coriaceous; petiole to 1.5 cm long. Flowers yellow in axillary pendulous racemes or panicles. Sepals 6 in two series; outer sepals c. 1.5 mm long, ovate; inner c. 3.5 mm long, oblong, acute. Petals 6, 1-1.5 mm long, obovate-obtuse, yellow. Male flowers: stamens free, 2-3 mm long, dehiscing vertically. Female flowers: carpels 3-12, c. 1mm long; style subulate. Drupes 10-13 x 6-7 mm, oblong-avoid to obovoid, orange- red dish, endocarp thin.

Fl. & Fr : Apr. - Dec.

Distr. : India, Sri Lanka and S.E. Asia. Extensive climbers, on way side thickets in plains. Stem used for making baskets by locals. *CNS 1525* (Venmony).

TINOSPORA Miers

Ann. Mag. Nat. Hist. (Ser.2) 7:35.1851.

Woody climbing shrubs; bark exfoliating on drying. Leaves ovate, subcordate; lateral nerves distal, 1-3 pairs, some times with glandular patches. Flowers in racemes or panicles, axillary or from the old stem. Male flowers: sepals free, rarely connate at base, 6 in 2 whorls; petals 3-6, obovate, with inrolled margins, glandular papillose; stamens 6, free, anthers dehiscing longitudinally. Female flowers: sepals and petals as in male ones; staminodes 6; carpels 3, curved-ellipsoid; style short; stigma peltate. Drupes 3, ovoid or ellipsoid; endocarp bony, dorsally convex and ventrally concave.

1a. Leaves glabrous; endocarp rounded at both ends ..... **T. cordifolia**

1b. Leaves hairy; endocarp obtusely pointed at base, broadly keeled at apex ..... **T. sinensis**

Tinospora cordifolia (Willd.) Hook. f. & Thoms., Fl. Ind. 184. 1855 & in Hook. f., Fl. Brit. India 1: 97.1972; Dunn in Gamble, Fl. Pres. Madras 26.1915; Sant. & Janardh., Bull. Bot. Surv. India 10: 378. 1969; Forman, Kew Bull. 36: 403. 1981; Mani. & Sivar., Fl. Calicut 29.1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 23. 1983; Prmanik & Gangopadhyay in Sharma *et al.*, Fl. India 1: 347 1993; Forman in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 9: 319. 1995. *Menispermum cordifolium* Willd., Sp. Pl. 4: 826. 1806; Roxb., Fl. Ind. 3: 811. 1832. *Cocculus cordifolius* DC., Prodr. 1:97. 1824; Wight, Ic. t. 485 & 486. 1841. ***Cit-Amerdu*** Rheede, Hort. Malab. 7: t.21. 1688. ***Chittamruthu***.

Deciduous woody climbers; stem striate when young; bark corky, flaking off with age, sometimes with aerial roots. Leaves 4-10 x 4.5-9 cm, broadly ovate-cordate, sinuate at base, apex acuminate; basal nerves 5-7; domatia usually present on lower surface in nerve-axils; petioles to 5 cm. Inflorescence pseudo-racemose, axillary or on leafless branches. Male flowers fascicled, yellow; pedicles 2-3 mm long; outer 3 sepals c. 1.5 mm long, ovate; inner 3 elliptic, concave, 3-4 mm long ; petals 6, 2-2.5 mm long, obovate, greenish-yellow; stamens 6, free; filaments clavate; anthers longitudinally dehiscent. Female flowers: pedicles c. 4 mm long; petals c. 1.5 mm long, ellipsoid; stigma capitate,

Drupes globose, red; endocarp thinly bony, broadly elliptic to subrotund in outline, 6-7 mm long.

Fl. & Fr.: Feb.-May.

Distr. : India, Sri Lanka, Bangladesh and Myanmar. *CNS 2409* (Mannancherry).

Tinospora sinensis (Lour.) Merr., Sunyatsenia 1:139. 1934 & in Trans. Amer. Phil. Soc. Philad. 24:158.1935; Forman, Kew Bull.36:386.1981; Mani. & Sivar., Fl. Calicut 30. 1982; Pramanik & Gangopadhyay in Sharma *et al.*, Fl. India 1: 349. 1993; Forman in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 9: 317. 1995; Sivar. & Mathew, Fl. Nilambur 51.1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 39. 1996.*Campylus sinensis* Lour., Fl. Cochinch. 113.1790. *Tinospora malabarica* (Lam.) Hook.f. & Thoms., Fl. Ind. 183. 1855 & in Hook. f., Fl. Brit. India 1: 96. 1872. *Menispermum malabaricum* Lam., Enc. 4: 96. 1797. *T. tomentosa* (Coleb.) Hook. f. & Thoms., Fl. Ind. 183.1855 & in Hook. f., Fl. Brit. India 1:96. 1872. ***Pee-amerdu*** Rheede, Hort. Malab. 7: t.19-20.1688. ***Katt-amruthu***

Woody climber ; stem puberulous when young, later glabrescent . Leaves 7-13 x 4.5-11 cm, ovate to suborbicular, base truncate or subcordate, apex acuminate, sparingly pubescent above, pilose beneath with glandular patches in basal nerve axils, membranous; basal nerves 5-7; petioles to 8 cm long, puberulous. Inflorescence pseudo-racemose, 3-7 cm long, slender. Male flowers: pedicels 2-4 mm long; sepals yellowish green; outer 3 c. 1.5 mm long, ovate; inner 3 broadly elliptic, 3-4 x 2-4 mm; petals 6, 3-4 x 1-3 mm, rhomboid-ovate; stamens c. 3 mm long. Female flowers: pedicels 3-6 mm long; staminodes c. 2 mm long; carpels 1-2 mm long; stigma flat, lobed. Drupes 0.8 - 1.2 cm across, globose, scarlet; endocarp 6-8 x 4-5 mm, broadly elliptic-tuberculate.

Fl. & Fr.: Feb. - May.

Distr. : India, Sri Lanka, Nepal, Bangladesh, Myanmar, China Thailand, Vietnam and Cambodia. *CNS 2410* (Vandanam).

Stems, leaves and roots are used medicinally for various ailments.

6. NELUMBONACEAE (DC.) Dumort

Anal. Fam. Pl. 53. 1829.

NELUMBO Adanson

Fam. 2:76.1763.

Nelumbo nucifera Gaertn., Fruct. 1:73, t. 19, f. 2. 1788; Maheshwari in Mani., Bot. Hist. Hort. Malab. 123.1980; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3:26.1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 197.1988; Mitra in Sharma *et al.*, Fl. India 1:441.1993. *Nymphaea nelumbo* L., Sp.Pl.511.1753. *Nelumbium speciosum* Willd., Sp.Pl. 2:1258.1799; Wight & Arn., Prodr. 16.1834; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1:116.1872; Gamble, Fl. Pres. Madras 34.1915. ***Tamara*** Rheede, Hort. Malab. 11:59-60, t.30.1962. ***Tamara.***

Rhizomatous aquatic herbs, rhizome creeping. Leaves flat when floating, somewhat cup like when emerged, 30-50 cm across, suborbicular, shallowly notched at one side, with minute apicula at opposite side, glabrous and glaucous on both surfaces, coriaceous, veins radiating; petiole to 1.5 m long, beset with scattered hard minute papillae. Flowers to 20 cm across, emergent, rose-pinkish, fragrant; scape up to 1.5 m long, beset with scattered hard minute papillae. Perianth segments many, free; outer 2.5-4.5 x 1.2-3 cm, ovate or elliptic, concave, pinkish-green; inner petal-like, rose-pinkish, 4-10 x 2-5 cm, elliptic, obtuse. Stamens numerous; filaments to 2 cm long; anthers to 1.2 cm long, linear; connectives projecting into clavate appendages. Receptacles 2-3.5 cm across, spongy. Carpels many, free, 6-8 x 2-3 mm, oblong, loosely embedded in pits on receptacle; stigma peltate. Ripe carpels nut-like. Seeds smooth.

Fl. & Fr.: Mar. - Dec.

Distr.: India, S. and E. Asia to far eastern Russia and N. Australia. In fresh water ponds, lakes and in flooded lowlands, also grown as an ornamental plant. *CNS 2411* (Haripad).



Plate IV. A. *Uvaria zeyalnica* L.; B. *Nymphaea nouchali* Burm. f.; C. *Cabomba caroliniana* Gray

7. CABOMBACEAE A. Rich.

Nouv. Elem. Bot. ed. 4: 420. 1828.

CABOMBA Aubl.

Hist. Pl. Guiane Franc. 1: 321.1775.

Cabomba caroliniana Gray, Ann. Lyc. N.Y. 4: 46. 1837; Mitra in Nayar *et al.*, Fasc. Fl. India 20: 6. 1990; Orgaard, Nord. J. Bot. 11: 199, f. 2D. 1991; Mitra in Sharma *et al.*, Fl. India 1: 439. 1993. *Cabomba aquatica* auct., non Aubl., 1775: Aleykutty & Inamdar, Curr. Sci. 47: 136, ff. 1-5. 1978; Mohanan & Henry, Fl. Thiruvananthapuram 54. 1994 (Plate IV: C; Fig. 11).

Submerged aquatic herbs; stem up to 1.6 m long, branched, thinly mucilaginous; shoots green or reddish-brown. Submerged leaves finely dissected, flabellate in outline, 2-5 cm wide; terminal segments slightly spathulate, to 1 mm broad; petiole 1-2 cm long. Floating leaves 7-18 x 2-3.5 mm, linear-oblong to linear-elliptic, peltate; petiole to 3.5 cm long. Flowers 1-1.5 cm across, 0.7-1.2 cm long, creamy white, axillary, solitary; pedicels 1.5-6 cm long. Sepals 3, elliptic. Petals 7-12 mm long, obovate, base auriculate with a pair of yellow spots, apex rounded. Stamens 3-6. Carpels 2-4, divergent at maturity, puberulous. Seeds 1.5-3 x 1-2 mm, ovoid, covered with hygroscopic hairs.

Fl. & Fr.: Nov. - May.

Distr.: Native of N. America; introduced in India. In fresh water canals and rivers. *CNS 1924* (R. Block).

8. NYMPHAEACEAE Salisb.

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

NYMPHAEA Linnaeus

Sp. Pl. 510. 1753 (*nom. cons.*).

Perennial, stoloniferous, aquatic herbs. Leaves long-petiolate, alternate, broadly elliptic to orbicular and deeply cleft near or upto petiole-base, peltate, floating; veins radiating from centre and bifurcating at periphery, margins sharply or obscurely dentate or entire. Flowers solitary on long peduncle, regular, bisexual, floating or emersed, showy. Sepal 4, free, hypogynous. Petals numerous, a few outermost ones sometimes sepaloid, innermost ones often transitional to stamens. Stamens many, laminate, incurved in bud, dorsiventrally flattened with or without distal sterile appendages; outer stamens with broad, petaloid filaments and reduced anthers; anthers linear, introrse. Pistil of loosely united carpels, enclosed in hollow receptacle, many-locular; ovules numerous, arising from all over septa; stigma many, sessile, radiating over the top of the ovary. Fruit a globose berry, often crowned with persistent, green filaments, ripening under water. Seeds many, arillate.

1a. Leaves glabrous; sepals obscurely veined, persistent in fruit; stamens with distal sterile appendage ..... **N. nouchali**

1b. Leaves pubescent beneath; sepals conspicuously veined, decaying after flowering; stamens without sterile appendages ..... **N. pubescens**

Nymphaea nouchali Burm. f., Fl. Ind. 120. 1768; Backer & Bakh. f., Fl. Java 1: 149.1963; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 57.1976; Maheswari in Mani., Bot. Hist. Hort. Malab. 125. 1980; Mani. & Sivar., Fl. Calicut 31.1982; Nicols., Suresh & Mani., An Interpr. Hort. Malab.198. 1988; Ramach. & Nair, Fl. Cannanore 44. 1988; Mitra in Sharma *et al.*, Fl. India 1: 430. 1993; Mohanan & Henry, Fl. Thiruvananthapuram 53.1994. *Nymphaea stellata* Willd., Sp. Pl. 2: 1153. 1799; Wight, Ic. t. 178. 1839; Hook. f. & Thoms. in Hook.f., Fl. Brit. India 1: 114. 1872; Trimen, Handb. Fl. Ceylon 1: 50.1893; Dunn in Gamble, Fl. Pres. Madras 33. 1915; Matthew & Britto in Matthew, Fl.

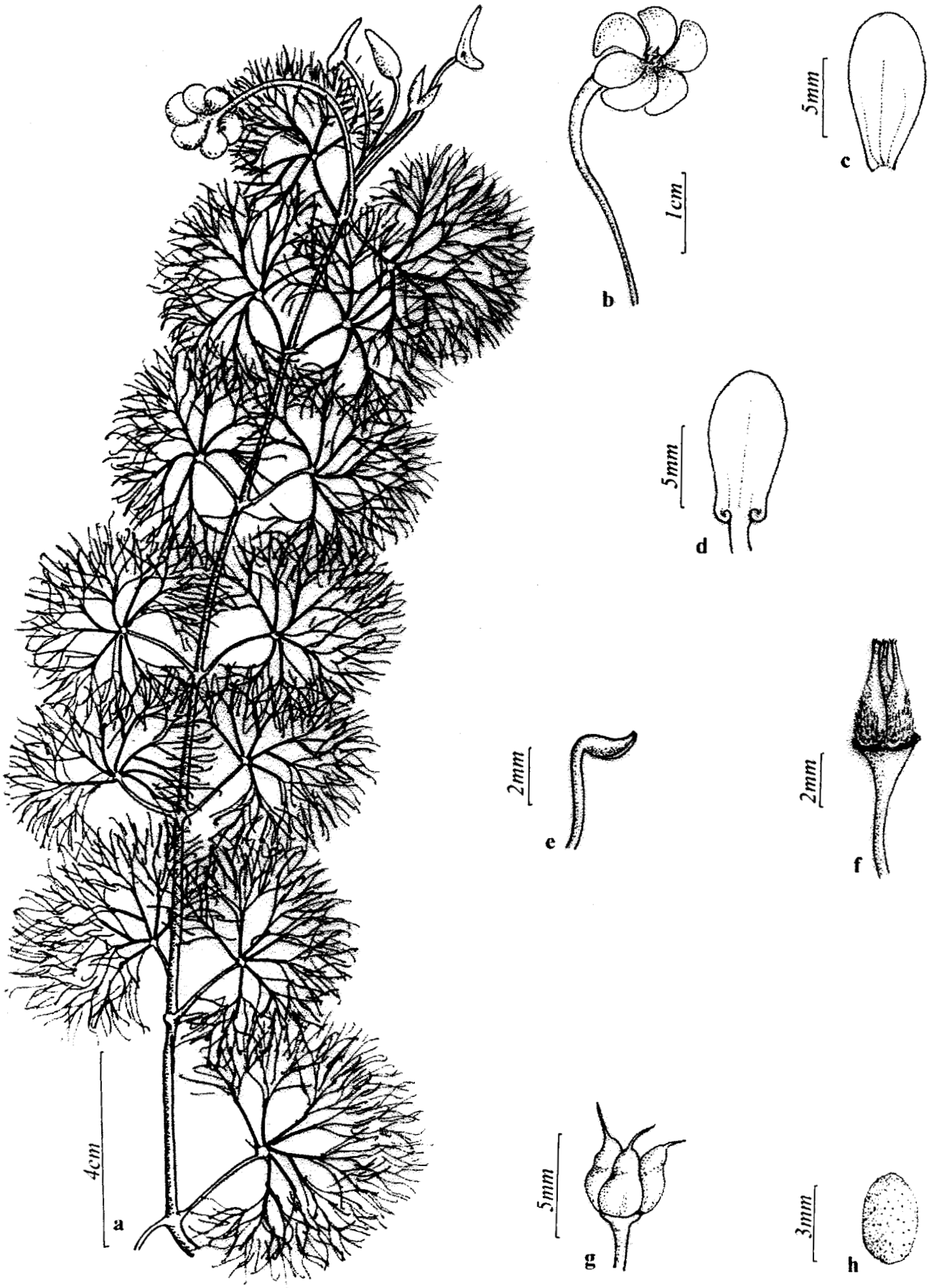


Fig. 11. *Cabomba caroliniana* Gray: a. Flowering branch; b. Flower; c. Sepal; d. Petal; e. Stamen; f. Receptacle with carpels; g. Infrutescence; h. Seed.

Tam. Carnatic 3: 28. 1983. ***Cit-ambel*** Rheede, Hort. Malab. 11: 53; t. 27. 1692 (Plate IV: B).

Aquatic, perennial stoloniferous herbs. Leaves floating, 10-25 x 8-20 cm, orbicular, margins sharply to obscurely dentate or entire, base cordate with a deep sinus up to the attachment of petiole; nerves radiating and dichotomously branching towards the periphery, reddish purple beneath. Flowers white, on long axillary scapes, sheathing at base. Sepals 4, 2.5-5.5 x 1.7-2.2 cm, triangular-ovate. Petals many, arising from below receptacle; outer ones 2-5 x 0.8-1.5 cm, lanceolate to oblong-lanceolate. Stamens many; filaments 1.5-2.0 cm long, petaloid, attached towards the upper edges of receptacles, appendage white. Carpels many, connate, sunk in the receptacle forming a many-celled ovary; ovules many; stigma sessile, incurved, radiating over the ovary. Fruit a fleshy berry, 1.5-3.0 cm across, globose. Seeds many, c.1.5 mm long, ellipsoid, longitudinally ribbed.

Fl. & Fr.: Almost throughout the year.

Distr.: India, Sri Lanka, Myanmar, Taiwan, Thailand, Laos, Cambodia, Vietnam, Malaysia and New Guinea. Very common in fresh water pools, ponds, lakes and flooded paddy fields. *CNS 1242* (S.L. Puram), *CNS 2412* (Cherthala).

Nymphaea pubescens Willd., Sp. Pl. 2: 1154. 1798; Dunn in Gamble, Fl. Pres. Madras 34. 1915; Maheshwari in Mani., Bot. Hist. Hort. Malab. 125. 1980; Mani. & Sivar., Fl. Calicut 31. 1982; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 198. 1988; Ramach. & Nair, Fl. Cannanore 44.1988; Mitra in Sharma *et al.*, Fl. India 1: 431.1993. *Nymphaea lotus* var. *pubescens* (Willd.) Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 114. 1872. ***Ambal.***

Leaves 15-36 x 12-25 cm, broadly ovate-elliptic, or reniform to orbicular, sinus to 8 cm deep, margins sharply dentate, dark-green and glabrous above, dull purplish-green and pubescent below. Flowers to 15 cm across, slightly fragrant. Sepals 4, 3-5 x 1-2 cm, ovate-lanceolate or elliptic-oblong, subacute or obtuse at apex, puberulous and green with 5-7 prominent white veins outside, white inside. Petals many, pink or white; outer ones 3-5 x 1-2 cm, linear-oblanceolate, obtuse or subacute at apex. Stamens many; outer ones

1.5-3.0 cm long, yellow, unappendaged. Ovary 13-18-loculate; stigmatic appendages 15-20, 5-8 mm long, oblong, inflexed, yellow. Berry 2.5-3.0 cm across. Seeds many, c.1.5 mm long, ellipsoid.

Fl. & Fr.: Aug. - Jan.

Distr.: India, Sri Lanka, Thailand, Laos, Cambodia, Vietnam, Malaysia, Indonesia, New Guinea and Philippines. Common in fresh water pools, ponds, lakes and flooded paddy fields. *CNS 2413* (Thotappally).

9. **BRASSICACEAE** Burnett,

Outl. Bot. 854, 1123. 1835.

(CRUCIFERAE,*nom. alt.*)

1a. Petals more than 5 mm long; disc-nectaries 4; seeds in one row ..... **Brassica**

1b. Petals upto 3 mm long; disc - nectaries 6; seeds in 2 rows ..... **Rorippa**

BRASSICA Linnaeus

Sp. Pl. 666. 1753.

Brassica juncea (L.) Cosson, Bull. Soc. Bot. France 6: 609. 1859; Hook. f. & Thoms., J. Proc. Linn. Soc. Bot. 5: 170. 1861; Hook. f., Fl. Brit. India 1: 157. 1872; Gamble, Fl. Pres. Madras 38. 1915; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 32. 1983; Hajra, Chowdhery & Bhaumik in Sharma *et al.*, Fl. India 1: 134.1993; Philcox in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 3.1995. *Sinapis juncea* L., Sp. Pl. 668. 1753. ***Kaduku.***

Erect annual herb to 1 m tall; branchlets subglaucous. Lower and basal leaves petiolate with lamina upto 15 x 7 cm, lyrate to pinnatifid, irregularly dentate, with 1 - 3 pairs of lateral lobes; upper lamina 5.0-8.0 x 1.5-3.0 cm, petiolate to subsessile, lanceolate or oblanceolate and acute, to obovate and obtuse, coarsely dentate to subentire. Racemes terminal, to 25 cm long. Flowers c. 7 mm across; pedicel to 1. 2 cm long. Sepals 4, 3-4

mm long, oblong. Petals 4, bright yellow, 5-8 mm long, clawed with obovate limb. Disc with 4 glands. Stamens 6; filaments 3-5 mm long; anthers c. 1.5 mm long, oblong. Ovary c. 4 mm long, oblong, stipitate; stigma capitate. Fruit 2.5 - 4 cm long, 2 - 2.5 mm broad, terete with conical beak. Seeds 12 - 20, c.1 mm across, globose, dark reddish-brown.

Fl. & Fr.: Sept. - Dec.

Distr.: Origin uncertain, but possibly Central Asia.; now cultivated all over the world. In waste land. *CNS 2414* (Alappuzha town).

RORIPPA Scopoli

Fl. Carn. 520. 1760.

Rorippa dubia (Pres.) Hara, J. Jap. Bot. 30: 196. 1955 & Fl. E. Himal. 1: 110. 1996; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 35.1983; Hajra & Chowdhery in Sharma *et al.*, Fl. India 1: 29. 1993. *Sisymbrium dubium* Pers., Syn. Pl. 2: 199. 1806. *Nasturtium indicum* auct., non DC., 1824: Hook. f., Fl. Brit. India 1: 134. 1872; Gamble, Fl. Pres. Madras 37.1915. *N. madagascariense* auct., non DC., 1821: Wight & Arn., Prodr. Fl. Ind. Orient. 19. 1834.

Herbs to 35 cm tall. Leaves 3.0-12.0 x 1.5-4.0 cm: lower often lyrate or pinnatifid, petiolate; upper ones simple, base attenuate or amplexicaule, margin sinuate or irregularly toothed, apex obtuse or acute. Racemes terminal, to 10 cm long. Flowers c. 3 mm across, pedicel to 2 mm long. Sepals 4, c. 2 mm long, elliptic, concave. Petals 4, yellow, to 3 mm long, clawed. Disc-nectaries 6. Stamens 6; filaments 1.5-2 mm long. Ovary c. 2 mm long; ovules many; stigma obscurely 2-lobed. Fruit 0.8-1.2 cm long, subterete, beaked. Seeds many in 2 rows, globose.

Fl. & Fr.: Feb. - Apr.

Distr.: India to Japan, South to Java; naturalised in N. & S. Americas. Damp stream banks. *CNS 1552* (Venmony).

10. CAPPARACEAE Juss.

Gen. Pl. 242. 1789.

1a. Herbs; fruits siliqua ..... **Cleome**

1b. Shrubs or trees; fruits berry.

2a. Armed scandent shrubs with simple leaves ..... **Capparis**

2b. Unarmed trees with trifoliolate leaves ..... **Crateva**

CAPPARIS Linnaeus

Sp. Pl. 503. 1753.

Erect or scandent shrubs; shoots generally armed with stipular spines. Leaves alternate, simple, petiolate. Flowers bisexual, arranged in panicles, racemes, corymbs or umbels; bracts early caducous. Sepals 4, in two unequal whorls of two each; the outer concave and overlapping inner ones, caducous. Petals 4, unequal, oblong or obovate, caducous. Receptacle flat with small adaxial disc. Stamens 8 to many, inserted on torus. Ovary ovoid or spherical on a gynophore, 4-many-ovuled; placentae 2-6; style short; stigma capitate. Berry on a slender or thickened stipe, globose or ovoid; pericarp leathery or corky, indehiscent. Seeds 1-many, reniform.

1a. Flowers in dense-flowered panicles, small, 6-10 mm across; stamens 8-12; fruits up to 2 cm across ..... **C. floribunda**

1b. Flowers in few-flowered corymbs, large, 8-10 cm across; stamens 80-120; fruits up to 14 cm across ..... **C. moonii**

Capparis floribunda Wight, Illus. 1:33, t. 14. 1840; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1:177. 1872; Dunn in Gamble, Fl. Pres. Madras 46. 1915; Raghavan in Sharma & Balakrishnan, Fl. India 2: 271. 1993. *Capparis andamanica* King, Ann. Roy. Bot. Gard. (Calcutta) 5:119, t. 137. 1896.

Woody, scandent shrubs; stipular thorns small, recurved. Leaves 4-8 x 3-4.5 cm, oblong or elliptic, base rounded, apex obtuse, subcoriaceous, glossy; petiole to 1 cm long. Panicles terminal, 10-18 cm long. Flowers fragrant, 6-10 mm across, white; bracts 3-4

mm long, linear; pedicel to 1 cm long. Sepals subequal, 3-4 x 2-2.5 mm, ovate or orbicular. Petals 4-6 mm long, ovate, apex obtuse. Gynophore 4-6 mm long; ovary c. 1.5 mm long, ovoid. Fruits 1.5-2 cm across, globose, orange-red; stipe to 2 cm long. Seeds 1-3, c. 1 cm long.

Fl. & Fr.: Apr. - Jun.

Distr.: India, Sri Lanka, Myanmar, extending to S.E. Asia. Rare, once collected from sacred grove. *CNS 1574* (Elangimel Vallikavu).

Capparis moonii Wight, Ill. 1:35. 1840; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1:175. 1872; Gamble, Fl. Pres. Madras 45. 1915; Vajravelu, Fl. Palghat Dist. 56. 1990; Raghavan in Sharma & Balakrishnan, Fl. India 2: 277. 1993.

Woody, scandent, armed shrubs; stipular thorns recurved. Leaves 5-14 x 3-5 cm, elliptic-oblong, base rounded, apex acuminate, twisted, coriaceous; petiole to 1.5 cm long. Corymbs terminal or subterminal, 4-10-flowered. Flowers white, turning rose, showy, fragrant; pedicel up to 4 cm long. Sepals subequal, 1.5-2 x 1-1.5 cm, orbicular, cup-shaped, concave, puberulous without. Petals 3-3.5 x 2-2.5 cm, obovate or oblong. Stamens many; filaments white, turning rose, 5-6 cm long. Gynophore 5-7 cm long; ovary 3-4 x 2-3 mm, ovoid or ellipsoid; stigma discoid. Fruits up to 14 x 10 cm, subglobose, pendent, reddish brown. Seeds many, obovoid, pink.

Fl. & Fr.: April - Dec.

Distr.: India, Sri Lanka. Rare, in sacred groves. *CNS 1601* (Sharangakavu at Venmony).

CRATEVA Linnaeus

Sp. Pl. 444. 1753.

Crateva magna (Lour.) DC., Prodr. 1:243. 1824; Jacobs, Blumea 12: 206. 1964; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:51. 1983; Ramch. & Nair, Fl. Cannanore 47. 1988; Vajravelu, Fl. Palghat Dist. 58. 1990; Sivar. & Mathew, Fl. Nilambur 54. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 42. 1996. *Capparis magna* Lour., Fl. Cochinch. 1:331. 1790. *Crateva nurvala* Buch.-Ham., Trans. Linn. Soc. London 15: 121. 1827; Wight &

Arn., Prodr. 23. 1834; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 187. 1976; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 78. 1988. *Crateva religiosa* var. *nurvala* (Buch.-Ham.) Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1:172. 1872. *Crateva religiosa* auct., non Forster f., 1786: Beddome, Fl. Sylv. S. India t. 116. 1871; Gamble, Fl. Pres. Madras 47. 1915, in part; Mani. & Sivar., Fl. Calicut 32. 1982. ***Niirvala*** Rheede, Hort. Malab. 3: 49-50, t. 42. 1682. ***Neer-mathalam.***

Trees or shrubs; branchlets greyish-brown, lenticellate. Leaves palmately trifoliate; leaflets 8-20 x 2-5 cm, ovate-elliptic, elliptic-lanceolate or rhomboid, base cuneate, apex acuminate, chartaceous, glossy, glaucous beneath; petiole to 10 cm long. Corymbs terminal, many-flowered. Flowers creamy, polygamous, fragrant, 3-4 cm across; pedicels 3-5 cm long. Sepals 2.5-3 x 1-1.5 cm, ovate-oblong, acute. Petals 2.5-3.3 x 1.5-1.8 cm, obovate-obtuse, clawed. Stamens many; filaments 4-4.5 cm long, lilac. Gynophore 4-5 cm long; ovary 4-5 mm long, oblong-ellipsoid. Fruits 4-5 x 3-4 cm, oblong-ellipsoid. Seeds dark brown, tubercled.

Fl. & Fr.: Apr. - Aug.

Distr.: India, Bangladesh, Myanmar, China and Sri Lanka, extending to Malaysia and Indonesia. Along streams and lakes. *CNS 1581* (Thazhakkara).

CLEOME Linnaeus

Sp. Pl. 671. 1753.

Annual herbs; stem foetid, generally striate, glabrous to viscid-glandular, occasionally with scattered prickles. Leaves simple or digitately 3-7-foliolate. Flowers actinomorphic or slightly zygomorphic, in terminal racemes or solitary, axillary, pedicellate; bracts foliaceous or membranous. Sepals 4, free, valvate, often glandular pubescent. Petals 4, mostly clawed. Stamens 6 to many, borne on a short or long androgynophore; filaments equal or subequal. Ovary sessile or on a short gynophore, 1-loculed; ovules many on 2 parietal placentae; style short or absent; stigma capitate. Capsules linear, oblong, terete or flattened, striate, dehiscing by 2 valves. Seeds discoid, reniform or orbicular, smooth, reticulate-foveolate or rugose, warty or ridged on surface.

1a. Leaves simple ..... **C. monophylla**

1b. Leaves compound, 3-7-foliolate.

2a. Stamens 12-18 ..... **C. viscosa**

2b. Stamens 6.

3a. Plants pubescent with gland-tipped hairs, foetid; leaflets 3-7; androgynophore 9-16 mm long ..... **C. gynandra**

3b. Plants glabrous or thinly short hairy; leaflets 3; androgynophore absent.

4a. Leaflets linear or oblong-lanceolate, up to 5 mm broad; flowers creamy yellow; stem prickly ..... **C. aspera**

4b. Leaflets rhomboid or ellipsoid, upto 2 cm broad; flowers pink or bluish-violet; stem not prickly ..... **C. rutidosperma**

Cleome aspera Koenig ex DC., Prodr. 1: 241. 1824; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1:169. 1872; Dunn in Gamble, Fl. Pres. Madras 41. 1915; Mani. & Sivar., Fl. Calicut 34. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 45. 1983. Raghavan in Sharma & Balakrishnan, Fl. India 2:303. 1993. *Cleome diffusa* Roxb., Fl. Ind. 3:129. 1832.

Prostrate, decumbent annual herbs; stem with scattered short compressed hooked minute prickles. Leaves 3-foliolate; leaflets subsessile, 1-2 x 0.4-0.5 cm, linear-oblong or lanceolate, base cuneate, apex subobtuse, mucronate or retuse, ciliate along margins. Flowers axillary, solitary, c. 3 mm across; pedicel 3-5 mm long, filiform. Sepals 1-2 mm long, linear-lanceolate, apex obtuse. Petals creamy yellow, 3-4 x 1-1.5 mm, oblanceolate, apex rounded. Stamens 6; anthers linear. Ovary 2-3 mm long, linear. Capsule 1.5-2.5 x 0.15-0.2 cm, linear, terete. Seeds 10-15, c. 1.5 mm across, suborbicular, ribbed, dark brown.

Fl. & Fr.: Jul. - Sept.

Distr.: India and Sri Lanka. In wastelands, sandy soil. *CNS 2554* (Krishnapuram).

Cleome gynandra L., Sp. Pl. 671. 1753; Mani. & Sivar., Fl. Calicut 33. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 46. 1983; Raghavan in Sharma & Balakrishnan,

Fl. India 2: 309. 1993; Mohanan & Henry, Fl. Thiruvananthapuram 57. 1994. *Gynandropsis pentaphylla* DC., Prodr. 1:238. 1824; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1:171. 1872; Dunn in Gamble, Fl. Pres. Madras 40. 1915. *Gynandropsis gynandra* (L.) Briq., Annuaire Conserv. Jard. Bot. Geneve 17: 382. 1914; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 79. 1988. ***Cara-veela*** Rheede, Hort. Malab. 9: 43, t. 24. 1689.

Annual erect herbs up to 80 cm high, strongly foetid; stem glandular pubescent. Leaves 3-5(-7)-foliolate; leaflets unequal, 1-6 x 0.8-3 cm, obovate-elliptic or oblanceolate, base cuneate, apex acute or obtuse; petiole up to 10 cm long, glandular puberulous. Racemes terminal, lax, 10-25 cm long, corymbose, many-flowered. Flowers 1-2 cm across; pedicel up to 2 cm long, pubescent; bracts foliaceous, much reduced and sessile upwards. Sepals 2-4 x 1-1.5 mm, ovate or oblanceolate, acuminate, puberulous. Petals 8-15 x 3-6 mm, obovate to oblanceolate, clawed. Androphore 1-2 cm long; stamens 6; filaments subequal, to 1.5 cm long; anthers linear. Gynophore 1-1.5 cm long; ovary 3-4 mm long, oblong-cylindric, glandular-pubescent; stigma discoid, purple. Capsule 3-8 x 0.4 - 0.6 cm, cylindric, striate, glandular-pubescent. Seeds 1-1.5 mm across, reniform, tuberculate, dark brown.

Fl. & Fr.: Throughout the year.

Distr.: Pantropics. In wastelands. *CNS 14443* (Thrikunnapuzha), *CNS 1185* (Alappuzha).

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; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 187. 1976; Mani. & Sivar., Fl. Calicut 34. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:48. 1983; Ramach. & Nair, Fl. Cannanore 46. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 78. 1988; Vajravelu, Fl. Palghat Dist. 57. 1990; Raghavan in Sharma & Balakrishnan, Fl. India 2:312. 1993; Sivar. & Mathew, Fl. Nilambur 53. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 42. 1996. ***Tsjeru-Vela*** Rheede, Hort. Malab. 9: 63, t. 34. 1689.

Erect annual herbs, up to 40 cm high, glandular-pubescent; stem branched, angled, striate. Leaves simple, 1.5-5 x 1-2.5 cm, ovate-oblong, or linear-lanceolate, base truncate, margins ciliate, apex acute; petiole up to 3.5 cm long. Racemes terminal, lax, up to 15 cm long. Flowers 1-1.5 cm across; pedicel up to 8 mm long, glandular pubescent. Sepals 3-4 mm long, linear, acuminate. Petals pink or light purple, 6-10 x 1.5-2 mm, obovate or spathulate, base clawed, apex rounded. Stamens 6; filaments 5-8 mm long, unequal. Ovary 5-8 mm long, linear. Capsule 7-10 cm long, linear, subcylindric, beaked, strongly ribbed, glandular, hairy. Seeds c. 2 mm across, subobicular, ridged, dark brown.

Fl. & Fr.: Sept. - Feb.

Distr.: India, Sri Lanka and Tropical Asia.

Common in wastelands, roadsides and in cultivated fields. *CNS 1414* (Kanichukulangara).

Cleome rutidosperma DC., Prodr. 1:241. 1824; Mukherjee in Ind. For. 95: 237. 1969; Raghavan in Sharma & Balakrishnan, Fl. India 2: 313. 1993; *Cleome burmanii* sensu Mani. & Sivar., Fl. Calicut 34. 1982, non Wight & Arn., 1834; Mohanan & Henry, Fl. Thiruvananthapuram 57. 1994.

Erect or decumbent annual herbs; stem weak, ribbed. Leaves 3-foliolate; leaflets subsessile, 1-4.5 x 0.8-2 cm, elliptic-rhomboid, obovate or oblong-lanceolate, base attenuate, margins obscurely crenulate and purple, apex acute or acuminate; petiole at base up to 3 cm long, gradually diminishing upwards to nearly absent. Racemes terminal, lax, few-flowered. Flowers pink or bluish-violet; pedicel 1-1.5 cm long; bracts foliaceous. Sepals 3-4 mm long, linear-lanceolate, acuminate. Petals 8-10 x 2-3 mm, oblanceolate to elliptic, base attenuate, clawed. stamens 6; filaments 5-7 mm long. Ovary 7-10 mm long, linear; stigma sessile, capitate. Capsule 3-6 x 0.3-0.4 cm, linear-cylindric. Seeds 1.5-2 mm across, suborbicular to reniform, ridged, orange-brown.

Fl. & Fr.: Sept. - Feb.

Distr.: India, Tropical America, Trop. Africa, Maldives, Sri Lanka, Bangladesh, Myanmar, Thailand, Malaysia and Philippines. Common in waste lands. *CNS 1144* (Alappuzha).

Cleome viscosa L., Sp. Pl. 672. 1753; Roxb., Fl. Ind. 3:128. 1832; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1:170. 1872; Dunn in Gamble, Fl. Pres. Madras 41. 1915; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 187. 1976; Mani. & Sivar., Fl. Calicut 34. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:49. 1983; Ramach. & Nair, Fl. Cannanore 47. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 78. 1988; Vajravelu, Fl. Palghat Dist. 57. 1990. Raghavan in Sharma & Balakrishnan, Fl. India 2:317. 1993; Mohan & Henry, Fl. Thiruvananthapuram 57. 1994; Sivar. & Mathew, Fl. Nilambur 53. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 42. 1996. *Cleome icosandra* L., Sp. Pl. 672. 1753. *Polanisia icosandra* (L.) Wight & Arn., Prodr. 22. 1834; Wight, Ic. t. 2. 1838. ***Aria-veela*** Rheede, Hort. Malab. 9:41, t. 23. 1689. ***Patti-veela***.

Erect profusely branched woody annual herbs. The whole plant viscous with stalked glandular hairs. Leaves 3-5(-7)-foliolate; leaflets subsessile, 0.6-3.5 x 0.3-2 cm, elliptic-oblong or obovate to spathulate, base cuneate, margins ciliate, apex obtuse, membranous, glandular pubescent; petiole up to 5 cm long. Racemes terminal, lax, few-flowered, corymbiform. Flowers 1-1.5 cm across; pedicels to 1 cm long, elongate during fruiting. Sepals 4, 4-8 x 2-3 mm, lanceolate, apex acute, glandular hairy without. Petals 4, yellow, 6-12 x 3-5 mm, obovate to oblong-spathulate, apex rounded. Stamens 12-18; filaments 6-8 mm long, broadened at tip; anthers linear. Ovary sessile, 5-7 mm long, oblong-cylindric, glandular-hairy; stigma cpitate. Capsules 5-6.5 x 0.3-0.5 cm, linear-oblong, terete, striate, densely glandular hairy. Seeds many, 1-1.5 mm across, reniform, transversely ridged, reddish-brown.

Fl. & Fr.: Throughout the year.

Distr.: Throughout the tropics. Common on open disturbed areas. *CNS 1781* (Devikulangara), *CNS 2555* (Kodamthuruthu).

11. VIOLACEAE Batsch.

Tab. Affin. Regni Veg. 57. 1802.

HYBANTHUS N. J. Jacquin

Enum. Pl. Carib. 2: 17: 1760 (*nom. cons.*).

Hybanthus enneaspermus (L.) F. Muell., Fragm. Phyt. Austr. 10: 81. 1876; Tennant, Kew Bull. 16: 431. 1963; Ramamoorthty in Sald. & Nicols., Fl. Hassan Dist. 165. 1976; Mani. & Sivar., Fl. Calicut 34. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 53. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 267. 1988; Ramach. & Nair, Fl. Cannanore 47. 1988; Banerjee & Pramanik in Sharma & Balakrishnan, Fl. India 2: 343. 1993; Mohanan & Henry, Fl. Thiruvananthapuram 58. 1994; Sivar. & Mathew, Fl. Nilambur 55. 1996. *Viola enneasperma* 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; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 185. 1872; Dunn in Gamble, Fl. Pres. Madras 49. 1915. ***Nelam - parenda*** Rheede, Hort. Malab. 9: 117, t. 60. 1689.

Annual herbs to 30 cm high; stem woody at base, scabrous. Leaves subsessile, 0.6-3 x 0.3-1 cm, linear-lanceolate or elliptic-lanceolate, base attenuate, margins distantly crenate, crenations scabrous hairy, apex acute, hirsute; stipules 1-2 mm long, linear-lanceolate. Flowers axillary, solitary; pedicel 0.6-1.5 cm long, slender. Sepals 5, subequal, 2-3 x 1 mm, lanceolate, acute, ciliate. Petals 5, pinkish, unequal; lower one 0.8-1.5 cm long, suborbicular, clawed, other 4 smaller, 3-5 mm long, elliptic or triangular-oblong. Stamens 5, c. 2 mm long. Ovary ovoid, 1-celled; ovules many; style clavate; stigma oblique. Capsules 5-8 mm long, ovoid. Seeds many, ovoid.

Fl. & Fr.: Aug. - Dec.

Distr.: Throughout tropical Asia, Africa and Australia. Coastal areas in grassy places, in cultivated fields, roadsides, railway tracks and in wastelands. *CNS 2556* (Kayamkulam).

12. BIXACEAE Link.

Handbuch 2: 371. 1831.

BIXA Linnaeus

Sp. Pl. 512. 1753.

Bixa orellana L., Sp. Pl. 512. 1753; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 190. 1872; Gamble, Fl. Pres. Madras 51. 1915; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 171. 1976; Mani. & Sivar., Fl. Calicut 35. 1982; Ramach. & Nair, Fl. Cannanore 48. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 59. 1994; Dassan. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 121.1985; Sivar. & Mathew, Fl. Nilambur 56. 1996.

Shrubs or small trees; young branches densely dark scaly. Leaves 8-20 x 5-14 cm, ovate, base subcordate or truncate, apex long-acuminate, glossy above, densely red-dotted; petiole 5-8 cm long. Inflorescence terminal, corymbs or panicles. Flowers 4-5 cm across; pedicel to 1 cm long. Sepals broadly ovate to suborbicular, purple, scaly. Petals 5-7, unequal, 2-3 x 1-2 cm, obovate, apex rounded, pink. Filaments slender; anthers purple. Ovary densely covered with thick red bristles; style 1-1.5 cm long, red. Capsules 2-5 x 2-4 cm, broadly ovoid, apex short acuminate, covered with dense, long, stiff, brownish red bristles. Seeds c. 4 mm across, subglobose, orange-reddish.

Fl. & Fr.: Aug. - Jan.

Distr.: Native of tropical America, now widespread in tropics. Cultivated as an ornamental plant. *CNS 1966* (Olakettiyambalam).

13. FLACOURTIACEAE Rich. ex DC.

Prodr. 1: 255. 1824.

1a. Petals absent.

2a. Flowers bisexual ..... **Casearia**

2b. Flowers unisexual ..... **Flacourtia**

1b. Petals present ..... **Hydnocarpus**

CASEARIA N.J. Jacquin

Enum. Pl. Carib. 4. 1760.

Casearia rubescens Dalz., Hook., J. Bot. Kew Gard. Misc. 4: 108. 1852; Clarke in Hook. f., Fl. Brit. India 2: 594. 1879; Gamble, Fl. Pres. Madras 520. 1919. *Casearia bourdillonii* Mukherjee, Bull. Bot. Soc. Bengal 19: 109. 1965.

Evergreen shrubs or small trees; bark greyish-brown. Leaves 4-11 x 2.8-6 cm, oblong or elliptic-oblong, base cuneate or attenuate, margins revolute, apex obtusely acuminate, coriaceous; petioles 7-12 mm long. Flowers c. 4 mm across, greenish white, clustered in axillary fascicles; pedicels c. 1.5 mm long. Tepals c. 2 mm long, elliptic, hairy outside. Stamens 8; filaments c. 1 mm long, hairy; staminodes shorter than filaments, scale-like. Ovary c. 1.5 mm long, ovoid; style absent; stigma capitate. Capsule 2-2.5 cm long, ellipsoid, orangish-yellow when ripe.

Fl. Fr.: Feb. - March.

Distr.: S.E. Asia and India. In sacred groves. *CNS 1760* (Vandanam).

FLACOURTIA Commerson ex L'Heritier de Brutelle

Stirp. Nov. 59. 1786.

Flacourtia indica (Burm. f.) Merr., Interpr. Rumph. Herb. Amb. 377. 1917; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 162. 1976; Mani. & Sivar., Fl. Calicut 35. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 59. 1983; Mani., Fl. Silent Valley 9. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 147. 1988; Ramach. & Nair, Fl. Cannanore 49. 1988; Vajravelu, Fl. Palghat Dist. 60. 1990; Mitra in Sharma & Balakrishnan, Fl. India 2: 402. 1993; Mohanan & Henry, Fl. Thiruvananthapuram 61. 1994. *Gmelina indica* Burm. f., Fl. Ind. 132. 1768. *Flacourtia sepiaria* Roxb., Pl. Corom. t. 68. 1796 & Fl. Ind. 3: 835. 1832; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 194. 1872; Dunn in Gamble, Fl. Pres. Madras 54. 1915. ***Couro-moelli*** Rheede, Hort. Malab. 5: 77, t. 39. 1685.

Dioecious shrubs or small trees, often armed with simple and branched thorns. Leaves variable in shape and size, 1.5-4 x 1-3 cm, elliptic-ovate, obovate, oblong or suborbicular, base cuneate, margins coarsely crenate, apex obtuse or emarginate, subcoriaceous; petiole to 8 mm long. Flowers c. 4 mm across, yellowish green, solitary or in few-flowered axillary racemose clusters. Sepals 4-5, slightly connate at base, ovate. Male flowers: stamens numerous; anthers versatile; disc lobed. Female flowers: ovary c. 1 mm long, globular, 3-locular; ovules 2-per locule; stigma bilobed, recurved. Berries 0.5-1 cm across, subglobose, dark purple when ripe. Seeds obovoid, pale yellow.

Fl. & Fr.: Dec. - May.

Distr.: India, Africa, S.E. Asia and Malesia. *CNS 2038* (Aravukadu).

HYDNOCARPUS J. Gaertner

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

Hydnocarpus pentandra (Buch.-Ham.) Oken, Allg. Naturgesch. 3(2): 1381. 1841; Mukh., Bull. Bot. Surv. India 14: 183. 1972; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 147. 1988; Mitra in Sharma & Balakrishnan, Fl. India 2: 422. 1993. *Chilmoria pentandra* Buch.-Ham., Trans. Linn. Soc. London 13(2): 501. 1822. *Munnicksia laurifolia* Dennst., Schluess. Hort. Ind. Malab. 27. 1818, *nom. nud. Hydnocarpus wightiana* Bl., Rumph. 4: 22. 1849; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 196. 1872; Dunn in Gamble, Fl. Pres. Madras 52. 1915. *Hydnocarpus laurifolia* (Dennst.) Sleum., Bot. Jahrb. 69: 33. 1938; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 164. 1976. ***Marotti*** Rheede, Hort. Malab. 1: 65-66, t. 36. 1678. ***Marotti***.

Evergreen dioecious trees; bark brownish, rough; young parts brown pubescent. Leaves 8-20 x 3.5-7 cm, ovate-elliptic or elliptic-oblong, base cuneate to rounded, margins crenate-serrate, apex acuminate, pubescent on nerves below; petiole to 1.5 cm long; stipules linear, caducous. Male flowers c. 5 mm across, greenish, in axillary fascicles; pedicel to 6 mm long. Sepals 5, unequal, 2-3 mm across, broadly ovate or orbicular, rusty puberulous without. Petals 5, yellow, smaller than sepals, suborbicular, scales brown, broadly ovate, margins fimbriate. Stamens 5; anthers reniform. Female flowers c. 1 cm

across, axillary, solitary. Staminodes 5. Ovary globose, obscurely 5-ribbed, wooly. Berry 5-8 cm across, globose, reddish-brown. Seeds 15-20, embeded in pulp, 1.5-2 x 1-1.5 cm, ovoid-oblong.

Fl. : Most of the seasons (male flowers); *Fr.*: Oct. - Dec.

Distr.: Western Ghats. Endemic. Seeds yield an yellow oil used for burning lamps and in medicine. *CNS 1880* (Valavanadu).

14. POLYGALACEAE R. Br.

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

1a. Herbs; flowers irregular; capsule loculicidal, 2-celled, 2-seeded, compressed ..... **Polygala**

1b. Trees; flowers regular; fruit indehiscent, 1-celled, 1-seeded, globose ..... **Xanthophyllum**

POLYGALA Linnaeus

Sp. Pl. 701. 1753.

Polygala arvensis Willd., Sp. Pl. 3(2): 876. 1803; Burtt, Notes Roy. Bot. Gard. Edinburgh 32: 404. 1973; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 410. 1976; Chandrabose & Nair, Proc. Ind. Acad. Sci. (Plant Sci.) 90: 123. 1981; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 65. 1983; Mani., Fl. Silent Valley 14. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 210. 1988; Banerjee in Sharma & Balakrishnan, Fl. India 2: 460. 1993; Sivar. & Mathew, Fl. Nilambur 62. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 47. 1996. *Polygala chinensis* auct., non L., 1753: Bennett in Hook. f., Fl. Brit. India 1: 204. 1872, p.p.; Dunn in Gamble, Fl. Pres. Madras 58. 1915; Mukh., Bull. Bot. Soc. Bengal 12: 40. 1958. ***Katu-vistna-clandi*** Rheede, Hort. Malab. 9: 119, t. 61. 1689. ***Kodatsjeri*** Rheede, Hort. Malab. 9: 131, t. 67. 1689.

Procumbent herbs; branches arising from base. Leaves subsessile, 1-2.5 x 0.4-1.2 cm, obovate, oblanceolate to oblong, base cuneate, apex obtuse or emarginate and mucronate, glabrous to slightly hirsute. Flowers c. 4 mm long, yellow, solitary or in 2-7-flowered, 6-12 mm long axillary or lateral racemes; bracts c. 1 mm long, ovate-acute. Pedicel c. 2 mm long. Sepals persistent; outer sepals 1.5-2 x 1 mm, ovate-acuminate, ciliate along margins; wing sepals 4-5 x 2-3 mm, obliquely ovate, falcate, membranous and hairy along margins. Petals yellow; middle lobe keeled, auricled at base; lateral lobes of petals c. 3 mm long, broadly obovate. Staminal sheath free, 1.5-2 mm long. Ovary c. 1 mm across, obovoid, hairy along margins; style curved, dilated and hooked at apex; stigma capitate. Capsules 3-5 x 2-3 mm, obliquely obcordate, compressed, apex emarginate. Seeds c. 3 mm long, oblong, black, pilose; caruncle hood-shaped, 3-fid.

Fl.& Fr.: Jun. - Dec.

Distr.: India, Nepal, Bangladesh, Myanmar and S.E. Asia to N. Australia. *CNS 1316* (Chengannur).

XANTHOPHYLLUM Roxburgh

Pl. Corom. 3: 81. 1820 (1819), (*non. cons.*).

Xanthophyllum flavescens Roxb., Pl. Corom. 3: 81, t. 284. 1820; Wight & Arn., Prodr. 39. 1834; Benn. in Hook. f., Fl. Brit. India 1: 209. 1874; Dunn in Gamble, Fl. Pres. Madras 59. 1915; Ramach. & Nair, Fl. Cannanore 51. 1988; Vajravelu, Fl. Palghat Dist. 66. 1990; Banerjee & Balakrishnan in Sharma & Balakrishnan, Fl. India 2: 497. 1993; Mohanan & Henry, Fl. Thiruvanathapuram 66. 1994. *Xanthophyllum angustifolium* Wight, Ill. 1: 50, t. 23, figs. 1-8. 1840. *Xanthophyllum arnottianum* Wight, Ill. 1: 50, t. 23, fig. 9. 1840; Van der Meijden, Leiden Bot. Ser. 7: 79. 1982; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 210. 1988; Mani., Fl. Silent Valley 16. 1988; Sivar. & Mathew, Fl. Nilambur 64. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 48. 1996. *Xanthophyllum flavescens* var. *angustifolium* (Wight) Benn. in Hook. f., Fl. Brit. India 1: 209. 1874. ***Karin-Kara*** Rheede, Hort. Malab. 4: 49-50, t. 23. 1683. ***Madakka.***

Small evergreen trees; bark grey, warty and corky; branchlets puberulous. Leaves 5-15 x 2.5-5 cm, ovate to elliptic-lanceolate, base attenuate, apex acute to acuminate, coriaceous, glossy above, yellowish green on drying; petiole to 1 cm long. Panicles terminal or axillary, 4-10 cm long. Flowers white or yellowish, 1-1.2 cm across; pedicel c. 4 mm long. Sepals 5, 2-4 x 1.5-2 mm, triangular-ovate, subequal, finely pubescent. Petals 4-5, subequal, 5-8 x 3-4 m, narrowly oblong, obtuse, yellowish; lower petals keeled. Stamens 8, 2 hypogynous, 6 adnate to base of petals; filaments 7-8 mm long, green; anthers white. Ovary 3-4 mm across, globose, shortly stalked, densely brown pubescent, 1-celled; ovules many; style covered with brown hairs. Fruits 1.5-2.0 cm across, globose, rugose when dry, greenish, yellow when mature. Seeds c. 1 cm across, ovoid.

Fl. & Fr.: Feb. - Oct.

Distr.: India, Sri Lanka, Bangladesh, Myanmar and Malaysia. Common in secred groves. *CNS 1505* (Elangimelvallikavu).

15. CARYOPHYLLACEAE Juss.

Gen. Pl. 299. 1789.

1a. Leaves orbicular-ovate; stamens 2-3 ..... **Drymaria**

1b. Leaves linear-spathulate; stamens 5.

2a. Sepals keeled, scarious along the margins only ..... **Polycarpon**

2b. Sepals not keeled, thin,scarious throughout ..... **Polycarpaea**

DRYMARIA Willdenow ex J.A. Schultes

in J.J. Romer & J.A. Schultes, Syst. Veg. 5: 406. 1819-1820.

Drymaria cordata (L.) Willd. ex Roem. & Schult. in L., Syst. Veg. (ed. 16) 5: 406. 1820; Edgw. & Hook. f. in Hook. f., Fl. Brit. India 1:244. 1874; Dunn in Gamble, Fr. Pres. Madras 63. 1915; Majumdar, Bull. Bot. Surv. India 10:294. 1969; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 99. 1976; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3:76. 1983; Mani., Fl. Silent Valley 17. 1988; Ramach. & Nair, Fl. Cannanore 51. 1988;

Vajravelu, Fl. Palghat Dist. 67. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 66. 1994; Sivar. & Mathew, Fl. Nilambur 64. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 49. 1996. *Holosetum cordatum* L., Sp. Pl. 88. 1753. *Drymaria diandra* Blume, Bijdr. 62. 1825; Majumdar in Sharma & Balakrishnan, Fl. India 2: 533. 1993. *Drymaria cordata* ssp. *diandra* (Blume) Duke, Ann. Missouri Bot. Gard. 48: 253. 1961; Majumdar, Bull. Bot. Surv. India 10: 294. 1969.

Annual prostrate herbs; branches rooting at nodes, slender. Leaves 1-2 x 1-1.8 cm, ovate, suborbicular or reniform, base cordate; stipules interpetiolar, 1-2 mm long, lacerate. Flowers in terminal or axillary lax cymes; pedicels 2-4 mm long; bracts 2-3 mm long, lanceolate. Sepals 5, 2-4 mm long, oblong, keeled. Petals 3-5, 2-fid, white, 2-3 mm long, oblong. Stamens 2-3. Ovary trigonous; ovules 5-6; style 3-fid. Capsule c. 2 mm long, trigonous, 2-3-valved. Seeds orbicular, cohleate, tuberculate.

Fl. & Fr.: Dec. - May.

Distr.: Pantropical. In damp places. *CNS 2551* (Cheriyanad).

POLYCARPAEA Lamarck

J. Hist. Nat. 2:3 ("Polycarpea"), 5. 1792 (*nom. cons.*).

Polycarpaea corymbosa (L.) Lamk., Tab. Encycl. 2: 129. 1797; Wight, Ic. t. 712. 1843; Edgew. & Hook. f. in Hook. f., Fl. Brit. India 1: 245. 1874; Dunn in Gamble, Fl. Pres. Madras 65. 1915; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 99. 1976; Mani. & Sivar., Fl. Calicut 38. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 77. 1983; Ramch. & Nair, Fl. Cannanore 52. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 80. 1988; Majumdar in Sharma & Balakrishnan, Fl. India 2: 549. 1993; Mohanan & Henry, Fl. Thiruvananthapuram 67. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 49. 1996. *Achyranthes corymbosa* L., Sp. Pl. 205. 1753. ***Katu-mailosina*** Rheede, Hort. Malab. 10: t. 66. 1690.

Erect annual herbs with long tap root, densely tomentose to glabrescent. Leaves pseudoverticillate, 5-18 x 1-3 mm, linear to linear-oblong or linear-lanceolate, apex

apiculate; stipules 2-4 mm long, lanceolate, fimbriate, scarious. Flowers in deanse, terminal dichasial cymes, arranged in corymbs; pedicels c. 3 mm long; bracts white, ovate, acute. Sepals 5, 3-5 mm long, lanceolate, acuminate, scarious-margined, silvery-white. Petals 5, c. 1 mm long, ovate-suborbicular, obtuse, reddish, persistent. Stamens 5; filaments c. 1 mm long. Ovary ovoid, 1-loculed; ovules many on free-central placenta. Capsules c. 2 mm long, ovoid, 3-valved. Seeds many, reniform, light brown.

Fl. & Fr.: Aug.-Dec.

Distr.: Asia. Fairly common on sandy soil and coastal areas. *CNS 1015* (Ambalapuzha).

POLYCARPON Linnaeus

Syst. (ed. 10). 881, 1360. 1759.

Polycarpon prostratum (Forsskal) Asch. & Schweinf., Oesterr. Bot. Zeitschr. 39: 128. 1889; Milnoe-Redhead, Bull. Misc. Inform. 1948: 451. 1948; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 99. 1976; Mani. & Sivar., Fl. Calicut 39. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 78. 1983; Ramach. & Nair, Fl. Cannanore 52. 1988; Vajravelu, Fl. Palghat Dist. 67. 1990; Majumdar in Sharma & Balakrishnan, Fl. India 2: 553. 1993; Mohanan & Henry, Fl. Thiruvananthapuram 67. 1994; Sivar. & Mathew, Fl. Nilambur 65. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 49. 1996. *Alsine prostrata* Forsskal, Fl. Aegypt-Arab. 207. 1775. *Hepalosia loeflingiae* Wight & Arn., Prodr. 358. 1834. *Polycarpon loeflingiae* (Wright & Arn.) Benth. in Benth. & Hook. f., Gen. Pl. 1: 153. 1862; Edgew. & Hook. f. in Hook. f., Fl. Brit. India 1:245. 1874; Dunn in Gamble, Fl. Pres. Madras 64. 1915 (Plate V: A).

Prostrate annual pubescent herbs; branches to 20 cm long. Leaves subsessile, 6-15 x 2-4 mm; linear-oblong, obovate or spathulate, base attenuate, apex subacute or obtuse, puberulous; stipules 2-3 mm long, lanceolate, scarious. Flowers in terminal dichasial paniculate cymes, c. 6 mm long. Sepals 5, subequal, 3-5 mm long, linear-oblong or ovate-oblong, keeled, margins scarious. Petals c. 1 mm long, linear, notched or dentate at apex.

Stamens 3-5. Ovary 1-celled; style 3-fid. Capsules 1.5-2 mm long, ovoid. Seeds many, c. 0.5 mm, subcylindrical, pale brown, reticulate.

Fl. & Fr.: Jan. - Jul.

Distr.: India, Bangladesh, Tropical Asia and Africa. In paddy fields, road sides and on river banks during summer. *CNS 2552* (Nangiarkulangara).

16. PORTULACACEAE Juss.

Gen. Pl. 312. 1789.

1a. Ovary semi-inferior; capsules circumscissile; seeds tuberculate ..... **Portulaca**

1b. Ovary superior; capsules valvular; seeds smooth ..... **Talinum**

PORTULACA Linnaeus

Sp. Pl. 445. 1753.

Herbs, usually succulent, roots sometimes swollen and tuberous. Leaves opposite or alternate, entire, often fleshy; stipules scarious or hairy. Flowers solitary or in terminal clusters, subsessile. Sepals usually 2, free. Petals 4-6, rarely more, free or connate at base, entire, imbricate, fugacious. Stamens 4-many, often adnate to the petals at base. Ovary half inferior, 1-celled; ovules usually many on free central placentum; style 2-3-fid. Capsule membranous, circumscissile below middle. Seeds many, compressed, minutely tuberculate.

1a. Plants with fusiform tuberous roots; leaves linear, terete ..... **P. tuberosa**

1b. Plants without fusiform tuberous roots; leaves obovate, spathulate, elliptic to ovate-lanceolate, flat.

2a. Erect or decumbent herbs; leaves ovate to spathulate, apex obtuse; nodes without silvery white hairs; flowers clustered ..... **P. oleracea**

2b. Creeping herbs with profuse branches and rooting at nodes; leaves elliptic to ovate-lanceolate, apex acute; nodes with silvery white hairs; flowers solitary ... . **P. quadrifida**

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; Geesink, Blumea 17: 292. 1969; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 100. 1976; Sivar., J. Bombay Nat. Hist. Soc. 78: 257. 1981; Mani. & Sivar., Fl. Calicut 40. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 81. 1983; Ramach. & Nair, Fl. Cannanore 52. 1988; Mani., Fl. Silent Valley 17. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 212. 1988; Vajravelu, Fl. Palghat Dist. 68. 1990; Rao in Sharma & Sanjappa, Fl. India 3: 4. 1993; Mohanan & Henry, Fl. Thiruvananthapuram 68. 1994; Sivar. & Mathew, Fl. Nilambur 66. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 50. 1996. ***Kara-tsjira*** Rheede, Hort. Malab. 10: 71, t. 36. 1690. ***Manalcheera***.

Annual, decumbent, succulent herbs. Leaves alternate or subopposite, 1-3 x 0.5-1.8 cm, obovate to spathulate, base attenuate, apex rounded or truncate, fleshy, subsessile. Flowers in sessile clusters at the tips of branches, bright yellow. Sepals 2, unequal, upto 7 x 7 mm, connate below. Petals 5, 3-8 x 5-6 mm, obovate, obtuse or truncate. Stamens 7-10; filaments c. 4 mm long. Ovary obovoid; styles upto 5 mm long with 3-5 arms. Capsules c. 4 x 3 mm, ovoid. Seeds many, reniform, black, tuberculate.

Fl. & Fr.: Mar.-Jun.

Distr.: Pantropical. A weed in waste places, sea shores and waysides. Often used as a leafy vegetable. *CNS 1169* (Alappuzha beach).

Portulaca quadrifida L., Mant. Pl. 1: 73. 1767; Dyer in Hook. f., Fl. Brit. India 1: 247. 1874; Dunn in Gamble, Fl. Pres. Madras 66. 1915; Gees., Blumea 17: 290. 1969; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 82. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 212. 1988; Rao in Sharma & Sanjappa, Fl. India 3: 6. 1993; Mohanan & Henry, Fl. Thiruvananthapuram 68. 1994. ***Nelatsjera*** Rheede, Hort. Malab. 10: 61, t. 31. 1690.

Annual or perennial prostrate herbs; stem much branched, reddish, creeping, profusely, rooting at nodes; nodes with a whorl of dense silvery white hairs. Leaves opposite, 0.5-1.5 x 0.2-0.6 cm, elliptic to ovate-lanceolate, apex acute, fleshy, green above, reddish below, sessile. Flowers solitary, terminal, subtended by four leaves and encircled by hairs. Sepals 3-4 mm long. Petals 4, yellow, 5-6 x 3-4 mm, obovate. Stamens 8 or 12; filaments c. 3 mm long. Capsules 3-4 mm long, obovate-conical. Seeds many, c. 0.5 mm across, black, minutely tubercled.

Fl. & Fr.: Throughout the year.

Distr.: Pantropical. In waste places, sea shores and waysides. *CNS 1255* (Thottappally), *CNS 2548* (Vandanam).

Portulaca 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. Tam. Carnatic 3: 83. 1983; Rao in Sahrma & Sanjappa, Fl. India 3: 7. 1993. *Portulaca suffruticosa* Wallich ex Wight & Arn., Prodr. 356. 1834; Dyer in Hook. f., Fl. Brit. India 1: 247. 1874. *Portulaca pilosa* L. subsp. *pilosa* 'race' *tuberosa* Geesink, Blumea 17: 296. 1969. *Portulaca pilosa* L. var. *tuberosa* (Roxb.) Sivar., J. Bombay Nat. Hist. Soc. 78: 259. 1981; Mani. & Sivar., Fl. Calicut 39. 1982; Vajravelu, Fl. Palghat Dist. 68. 1990; Sasi. & Sivar., Fl. Pl. Thrissur For. 50. 1996.

Perennial succulent herbs with fusiform tuberous roots; stem often reddish, erect or decumbent. Leaves 6-20 x 1-4 mm, oblong or linear, terete, apex obtuse; stipules hairy. Flowers terminal, solitary or 2-4, sessile, subtended by an involucre of 3-6 cauline leaves. Sepals 2-4 x 1-2.5 mm. Petals 4-6, bright yellow, 5-10 x 3-8 mm, obovate. Stamens 10-20 or more; filaments c. 3 mm long. Styles 3-5-armed. Capsules 2-3 mm across, globose. Seeds black, granulate.

Fl. & Fr.: Mar.-May.

Distr.: Pantropical. Common in sandy waste soil. *CNS 2549* (Vandanam).

TALINUM Adanson

Fam. 2: 245. 1763.

Talinum portulacifolium (Forssk.) Asch. ex Schweinf., Bull. Herb. Boiss. 4, App. 2: 172. 1896; Shah, J. Bombay Nat. Hist. Soc. 66: 231. 1969; Mani. & Sivar., Fl. Calicut 40. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 84. 1983; Vajravelu, Fl. Palghat Dist. 68. 1990; Rao in Sharma & Sanjappa, Fl. India 3: 9. 1993; Mohanan & Henry, Fl. Thiruvananthapuram 68. 1994. *Orygia portulacifolia* Forssk., Fl. Aegypt.-Arab. 103. 1775. *Portulaca cuneifolia* Vahl, Symb. Bot. 1: 33. 1790. *Talinum cuneifolium* Willd., Sp. Pl. 2: 864. 1799; Roxb., Fl. Ind. 2: 465. 1832; Hook. f., Fl. Brit. India 1: 247. 1874; Dunn in Gamble, Fl. Pres. Madras 66. 1915. ***Sambarcheera***.

Erect semi-succulent, glabrous herbs to 1 m tall; rootstock tuberous. Leaves subsessile, alternate, 4-8 x 1.5-3 cm, obovate or oblanceolate, base cuneate, apex obtuse or rounded. Inflorescence terminal, paniculate. Flowers 1.5-2 cm across; pedicels to 1.2 cm long; bracts 2-4 mm long, linear. Sepals 2, 4-6 x 2-3 mm, ovate-lanceolate, acuminate. Petals 5, pink, 8-10 x 4-5 mm, obovate. Stamens many; filaments unequal. Ovary c. 2 mm long, globose, 1-loculed; styles 3-armed. Capsules 4-6 mm across, globose. Seeds ovoid, black, striate.

Fl. & Fr.: Feb. - Aug.

Distr.: Pantropical. Often used as a leafy vegetable. *CNS 2550* (Mayithara).

17. ELATINACEAE Dumort.

Anal. Fam. Pl. 44, 49. 1829.

BERGIA Linnaeus

Mant. Pl. 2: 152, 241. 1771.

Bergia capensis L., Mant. Pl. 2: 241. 1771; Gamble, Fl. Pres. Madras 69. 1915; Milne - Redhead, Kew Bull. 1948: 450. 1948; Sohmer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon

1: 425. 1980; Mani. & Sivar., Fl. Calicut 40. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 90. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 103. 1988; Bhattacharya in Sharma & Sanjappa, Fl. India 3: 34. 1993. *Bergia verticillata* Wild., Sp. Pl. ed. 4, 2: 770. 1799; Roxb., Fl. Ind. 2: 456. 1832; Dyer in Hook. f., Fl. Brit. India 1: 252. 1874. *Bergia aquatic* Roxb., Pl. Corom. t. 142. 1800. *Elatine verticillata* Wight & Arn., Prodr. 40. 1834, *nom. illeg.* ***Pola- tsjira*** Rheede, Hort. Malab. 9: 153, t. 78. 1689.

Erect or decumbent herbs, often rooting at lower nodes; stem succulent, reddish. Leaves 2-5 x 0.7-2 cm, elliptic, oblong or oblanceolate, base attenuate, margins serrulate, apex acute or subobtuse; petiole 2-3 mm long; stipules ovate-triangular with pectinate membranous margin. Flowers 8-20 in axillary cymes, c. 2 mm across; bracts ovate. Sepals 5, c. 2 mm long, broadly elliptic, red at margin, persistent. Petals 5, greenish-white, slightly shorter than sepals, linear-oblong. Stamens 10. Ovary c. 1 mm long, globose; styles recurved. Capsules 2-3 mm across, subglobose, furrowed, septicidal. Seeds many, oblong, curved, reticulate.

Fl. & Fr.: Sept. - Dec.

Distr.: Pantropical. In fallow fields, along the banks of ponds, lakes and canals. *CNS 1081* (Near Aroor R.S).

18. CLUSIACEAE Lind.

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

(GUTTIFERAE, *nom. alt.*)

1a. Leaf-nerves many, close and parallel; ovary 1-celled with 1 ovule, or 2-celled with 2 ovules in each cell; styles distinct, long, slender with peltate stigma.

2a. Flowers in racemes; sepals caducous; ovary 1-celled, 1 ovuled; fruit non-dehiscent ..... **Calophyllum**

2b. Flowers solitary or in pairs; sepals persistent and enlarged; ovary 2-celled, ovules 2 in each cell; fruit dehiscent ..... **Mesua**

1b. Leaf-nerves reticulate; ovary with 2-many 1-ovuled cells; stigma more or less sessile, broadly peltate, radiately lobed ..... **Garcinia**

CALOPHYLLUM Linnaeus

Sp. Pl. 513.1753.

Trees. Young stem 4-angled. Leaves opposite, coriaceous; veins numerous, close and parallel. Flowers polygamous, in axillary or terminal, paniculate or racemose, sometimes fascicled inflorescences. Sepals 4. Petals 4, sometimes absent. Stamens many, free or in phalanges. Ovary 1-celled; ovule solitary; style slender; stigma peltate. Drupe 1-seeded.

1a. leaves 4-7 cm long, new leaves crimson red turning pink; petals absent; drupes 1-2 cm across ..... **C. calaba**

1b. Leaves 10-18 cm long, new leaves light green; petals present; drupes 2.5- 4 cm across ..... **C. inophyllum**

Calophyllum calaba L., Sp. Pl. 514.1753; Lam., Encyl 1: 533.1785; Kostermans in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 95.1980; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 81.1988; Sivar. & Mathew, Fl. Nilambur 67.1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 51.1996. *Calophyllum apetalum* Willd., Ges. Naturf. Freunde Berlin Mag. Nuest. 5: 79.1811, p.p; Maheshwari, Bull. Bot. Surv. India 2:143.1960; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 124.1976; Vajravelu, Fl. Palaghat Dist. 69.1990; Singh in Sharma & Sanjappa, Fl. India 3: 88.1993; Mohanan & Henry, Fl. Thiruvananthapuram 69.1994. *Calophyllum decipiens* Wight, Ic. t. 106.1839; Dunn in Gamble, Fl. Pres. Madras 76.1915. *Calophyllum wightianum* Wall. ex Planch. & Triana, Ann. Sci. Nat. Bot. Ser. 4, 15: 256.1862; Ander. in Hook. f., Fl. Brit. India 1: 274.1874. ***Tsjerou-ponna*** Rheede, Hort. Malab. 4: 81,t.39.1683. ***Cherupunna*** (Plate V: C; Fig. 12).

Trees; bark yellowish, rough, fissured; branchlets quadrangular. Leaves variously coloured from scarlet when young to dark green on ageing, 4-7 x 3-4.5 cm, obovate, ovate or oblong to elliptic, base broadly attenuate, margins slightly recurved, apex obtuse, retuse or emarginate, coriaceous; venation close; petiole to 5 mm long. Racemes 3.5-7 cm long, axillary and sometimes from scars of defoliated leaves. Flowers white, bisexual, c. 2 cm across. Sepals 4, biseriate, subequal, 3-6 x 3-4 mm, ovate, inner slightly larger. Petals

absent. Stamens numerous, many-seriate. Ovary c.1.5 mm long; style flexuous; stigma peltate. Drupes 1-1.5 cm across, subglobose or ovoid; red when ripe. Seed 4-6 mm long, ovoid, endosperm oily.

Fl. & Fr.: Sept. - May.

Distr.: Western Ghats. In sacred groves. *CNS 1217* (Kanichukulangara).

Calophyllum inophyllum L., Sp. Pl. 513.1753; Wight, Ic. t. 77. 1838; Anderson in Hook. f., Fl. Brit. India 1: 273.1874; Gamble, Ind. Timb. 25. 1881 & in Fl. Pres. Madras 76.1915; Maheshwari, Bull. Bot. Surv. India 2: 145.1960; Kostermans in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 90.1980; Mani. & Sivar., Fl. Calicut 41.1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 93.1983; Ramach. & Nair, Fl. Cannanore 54.1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 82. 1988; Singh in Sharma & Sanjappa, Fl. India 3: 92.1993; Mohanan & Henry, Fl. Thiruvananthapuram 70.1994. *Balsamaria inophyllum* Lour., Fl. Cochinch. 2: 470. 1790. *Calophyllum bintagor* Roxb., Fl. Ind. 2:606.1832. *Calophyllum blumii* Wight, Ill. Ind. Bot. 1: 128. 1840. ***Ponna*** Rheede, Hort. Malab. 4: 79 - 80, t. 38.1683. ***Punna***.

Trees; bark pale greyish to blackish grey, deeply fissured; exudation yellow, sticky. Leaves 10 - 18 x 4 - 8 cm, broadly elliptic-oblong or obovate, base cuneate or rounded, apex rounded, shallowly emarginate or retuse, coriaceous, dark green, shiny; venation distinct, close, raised on both surfaces; petiole 1-2 cm long. Racemes 6-12 cm long, axillary. Flowers polygamous, 2-2.5 cm across, fragrant; pedicels 1.5-3 cm long. Sepals 4, 4-8 x 3-5 mm, ovate to suborbicular, concave, inner petaloid, slightly larger. Petals 4, 7-14 x 3-6 mm, obovate to elliptic, reflexed. Stamens numerous; filaments 4 - 6 mm long, cream coloured; anthers yellow. Ovary 2-3 mm across, depressed globose, pinkish after pollination; stigma peltate. Drupes 2.5 - 4 cm across, globose, greenish yellow, pericarp pulpy.

Fl. & Fr.: Dec. - May.

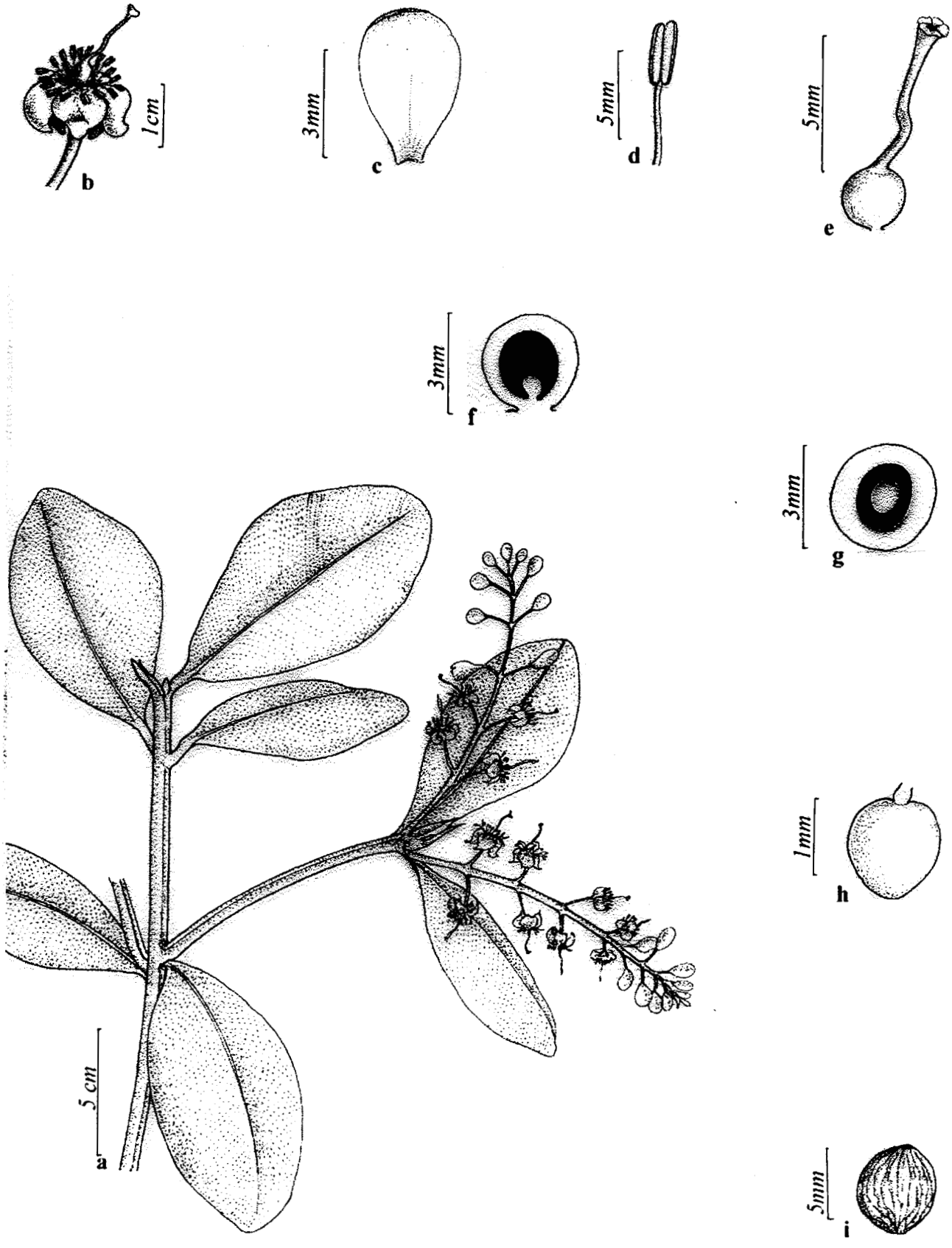


Fig. 12. *Calophyllum calaba* L.: a. Flowering twig; b. Flower; c. Sepal; d. Stamen; e.Pistil; f. Ovary-L.S; g. Ovary-T.S; h. Fruit; i. Seed.



Plate V. A. *Polycarpon prostratum* (Forsskal) Asch. & Schweinf.;
B. *Garcinia xanthochymus* Hook. f. ex Ander; C. *Calophyllum calaba* L.

Distr.: India, Sri Lanka, tropical E. Africa to Taiwan, the Ryukyu and Live Islands and New Caledonia; native of E. Africa. Common on sandy coast. *CNS 2600* (Kayamkulam).

GARCINIA Linnaeus

Sp. Pl. 443.1753.

Trees, often with yellow sap. Leaves opposite, coriaceous. Inflorescence axillary or in terminal cymes, umbels or racemes. Flowers dioecious or polygamous. Sepals 4-5. Petals 4-5. Stamens many, free or united in clusters; anthers 2-4-celled, reniform. Ovary 2-12-celled, each locule with a solitary axile ovule; stigmas as many as locules, radiate, entire or lobed, smooth or tubercled. Berry smooth or ribbed. Seeds few to many, enclosed in pulpy aril.

1a. Leaves 6-12 cm long; branchlets terete; pedicels up to 1 cm long; stigmatic rays 8-10; fruits longitudinally grooved ..... **G. gummi-gutta**

1b. Leaves 15-45 cm long; branchlets 6-8-angular; pedicles 2-3 cm long; stigmatic rays 5; fruits not longitudinally grooved, smooth ..... **G. xanthochymus**

Garcinia gummi-gutta (L.) Robson, Brittonia 20: 103. 1968; Kostermans, Ceylon J. Sci. Bio. Sci. 12 (1): 55. 1976; Mani., Fl. Silent Valley 19.1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 82. 1988; Ramach. & Nair, Fl. Cannanore 54. 1988; Vajravelu, Fl. Palghat Dist. 70.1990; Singh in Sharma & Sanjappa, Fl. India 3: 109. 1993; Mohanan & Henry, Fl. Thiruvananthapuram 71.1994; Sivar. & Mathew, Fl. Nilambur 68.1996; Sasi. & 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.) Desr. in Lam., Encyl. 3: 701. 1792; Ander. in Hook. f., Fl. Brit. Ind. 1: 261. 1874; Dunn in Gamble, Fl. Pres. Madras 73. 1915, p.p; Maheshwari, Bull. Bot. Surv. India 6: 128.1964; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 126.1976. ***Coddam-pulli*** Rheede, Hort. Malab. 1: 41-42, t. 24.1678. ***Kodapuli.***

Evergreen trees; bark grey or dark brown, rugose, exudate yellow gum; branches drooping. Leaves 6-12 x 2.5-4 cm, elliptic to oblong- lanceolate, base cuneate, apex acute, dark green, acidic, coriaceous, shining. Flowers in axillary and terminal umbellate

clusters, pale yellow. Male flowers many; female flowers solitary or 2-3 together. Sepals 4-5, 3-5 x 3-4 mm, ovate, fleshy. Petals 4-5, yellow, 7-10 x 5-8 mm, obovate or oblong, concave. Stamens 12-20 or more inserted on a prominent receptacle, forming a globular head; pistillode minute. Ovary 5-7 mm across, globose, 8-10-grooved; stigma 8-10-rayed, tubercled. Berry 4-6 cm across, globose, 8-10-grooved, yellow. Seeds 8-10, 2-3 cm long, ovoid, compressed, pale brown, surrounded by a succulent, white, sweet aril.

Fl. & Fr.: Apr. - Aug.

Distr.: Peninsular India. Endemic. In open ground. *CNS 2601* (Vandanam).

Garcinia xanthochymus Hook. f. ex T. Ander. in Hook. f., Fl. Brit. India 1: 269. 1874; Rama Rao, Fl. Pl. Travancore 30. 1914; Sinclair, Bull. Bot. Soc. Bengal 9: 87. 1955; Santapau, Rec. Bot. Surv. India (ed. 2.) 16: 14. 1960; Maheshwari, Bull. Bot. Surv. India 6: 114. 1960; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 127. 1976; Kostermans, Ceylon J. Sci. Bio. Sci. 12 (1): 67. 1976 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 87. 1980; Singh in Sharma & Sanjappa, Fl. India 3: 129. 1993; Mohanan & Henry, Fl. Thiruvananthapuram 72. 1994. *Xanthochymus pictorius* Roxb., Pl. Corom. 2: 51, t. 196.1805. *Xanthochymus tinctorius* DC., Prodr. 1: 562. 1824, *'pictorius'. Garcinia tinctoria* (DC.) W.F. Wight in U.S. Dept. Agric. Bur. Pl. Indus. Bull. 137: 50. 1909. *Garcinia pictorius* (Roxb.) D' Arcy, Ann. Missouri Bot. Gard. 6: 998. 1980. ***Monthanpuli*** (Plate V: B).

Trees; bark blackish or dark grey; latex milky, turning yellowish when exposed, thick, sticky; barnches 6-8-angular, often dilated just below nodes. Leaves 20-45 x 4-9 cm, linear-oblong or oblong- lanceolate, base cuneate or rounded, apex acute, coriaceous, dark green, shiny; petioles to 2 cm long; stipules fleshy, adnate, intrapetiolar. Flowers in fascicles of 4-10 in axils of leaves or fallen leaves; 1.5-2 cm across, white or cream-coloured; pedicels to 3 cm long. Sepals 5, greenish white, suborbicular, concave, margin fimbriate, the two outer ones 4-6 mm long, inner 3, 6-7 mm long, persistent. Petals 5, 7-9 mm long, orbicular, greenish-white. Male flowers: stamens 15-20 in bundles of 3-5, alternating with 5 fleshy glands. Female flowers: staminodes few. Ovary ovoid; stigmatic

rays 5, persistent. Berries 5 -7 cm across, subglobose, slightly oblique, yellow, sweet-acidic juicy. Seeds 1-3, 3-3.5 x 1.2-1.8 cm, oblong, brown.

Fl. & Fr.: Dec. - May.

Distr.: India, Sri Lanka, Bangaldesh, Myanmar, China, Thailand and Malay Peninsula. The acidic, pleasant fruits are edible. *CNS 2602* (Kadakkarappally).

MESUA Linnaeus

Sp. Pl. 515. 1753.

Mesua ferrea L., Sp. Pl. 515. 1753; Ander. in Hook. f., Fl. Brit. India 1: 277. 1874; Dunn in Gamble, Fl. Pres. Madras 77. 1915; Maheshwari, Bull. Bot. Surv. India 5: 336. 1963; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 128. 1976; Mani. & Sivar., Fl. Calicut 41. 1982; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 84. 1988; Singh in Sharma & Sanjappa, Fl. India 3: 136. 1993; Sivar. & Mathew, Fl. Nilambur 70. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 53. 1996. *Calophyllum nagassarium* Burm. f., Fl. Ind. 121. 1768. *Mesua roxburghii* Wight, Ill. Ind. Bot. 1: 127. 1840. *Mesua nagana* Gardner, Calcutta J. Nat. Hist. 8: 4. 1847. *Mesua nagassarium* (Burm.f.) Kostermans, Ceylon J. Sci. Bio. Sci. 12 (1): 71. 1976 & in Dassan. & Fosb., Rev. Rev. Handb. Fl. Ceylon 1: 107. 1980; Ramach. & Nair, Fl. Cannanore 55. 1988; Mani., Fl. Silent Valley 21. 1988; Vajravelu, Fl. Palghat Dist. 72. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 73. 1994. ***Bellutta-tsjampakam*** Rheede, Hort. Malab. 3: 63 - 64, t. 53. 1682. ***Nagapoo***.

Evergreen trees; bark ash or grey coloured, reddish when cut. Leaves red and pendulous when young, 8-12 x 2-4.5 cm, elliptic to oblong- lanceolate, base broadly attenuate or rounded, apex acuminate or cuspidate, coriaceous, shiny above, glaucous beneath and generally covered with a wax-like white powder beneath; nerves many, close and parallel; petiole to 1 cm long. Flowers white, sweet scented, solitary or in pairs at axils, bisexual, 4.5-5.5 cm, across. Sepals 4 in two pairs, 1.3-1.6 cm long, broadly ovate, persistent. Petals 4, white with brown veins, 2.5-3.5 x 1.3-1.5 cm, obovate or obcordae, margins curled. Stamens numerous; anthers yellow. Ovary 4-6 mm long, ovoid; ovules 2

in each locule; stigma peltate. Fruits 2-2.5 x 1.5-2 cm, ovoid. Seeds 1-4, pyriform, dark brown.

Fl. & Fr.: Mar. - Aug.

Distr.: India, Nepal, Bangaldesh, Myanmar, Sri Lanka, Malaysia, Indonesia, Vietnam, Cambodia, Thailand and Malacca. *CNS 2543* (Chettikulangara).

19. DIPTEROCARPACEAE Blume

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

1a. Fruit sepals imbricate with a thickened saccate base appressed to the nut; anthers with long awns ..... **Hopea**

1b. Fruit sepals valvate without thickened base; anther with short awns or none.

2a. Flowers in terminal panicles; sepals linear, obtuse; stamens nearly 50; calyx scarcely enlarged in fruit; stigma obscure ..... **Vateria**

2b. Flowers in axillary racemes; sepals ovate-lanceolate, acuminate; stamens 15; calyx enlarged in fruit; stigma conical ..... **Vatica**

HOPEA Roxburgh

Pl. Corom. 3: 7. 1819 (*nom. cons.*).

Evergreen trees; trunk buttressed. Leaves entire, coriaceous, often with hairs or pore-like domatia in the axils of lateral nerves; stipules small. Flowers small, in terminal and axillary panicles of unilateral racemes. Calyx-tube very short, lobes imbricate, in fruit 2 enlarged and wing-like or all enlarged and accrescent. Petals imbricate, oblong, fleshy. Stamens 10 or 15, connective subulate or cuspidate. Ovary 3-celled; ovules many in 2 rows on axile placenta; style short; stigma thick. Fruit nut-like, globose, 1-seeded, tightly enveloped by the base of accrescent calyx lobes, 2 of which develop into linear wings.

1a. Panicle tomentose; petals glabrous; domatia present at the axils of lateral nerves on lower surface ..... **H. parviflora**

1b. Panicle glabrous; petals tomentose; domatia absent ..... **H. ponga**

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; Ramach. & Nair, Fl. Cannanore 57. 1988; Vajravelu, Fl. Palghat Dist. 74. 1990; Janardhanan in Sharma & Sanjappa, Fl. India 3: 228. 1993; Mohanan & Henry, Fl. Thiruvananthapuram 75. 1994; Sivar. & Mathew, Fl. Nilambur 73. 1996; Sasi. & Sivar., Fl. Pl. Trissur For. 56. 1996. ***Thambagam.***

Evergreen trees; bark rusty brown or greyish; branchlets reddish-brown. Leaves 4-7 x 1.5-3.5 cm, elliptic-oblong to ovate, base subcordate or acute, apex acuminate; nerves 6-8 pairs, domatia present in the axils of nerves beneath; petiole to 1 cm long. Flowers in axillary and terminal, densely pubescent panicles. Sepals subequal, c. 2 mm long, lanceolate, brown. Petals 5, cream coloured, c. 6 mm long, oblong-acute, glabrous. Stamens 15 or rarely 10; connective of anthers produced in to a subulate point. Ovary 3celled; style short, subulate. Fruit 0.6-1 cm across, subglobose, 2-seeded; wings 4.5-6 cm long, linear-oblong, straw-coloured.

Fl. & Fr.: Dec. - May.

Distr.: Endemic to Western Ghats. Rare, in open ground. *CNS 1566* (Mararikulam).

Hopea ponga (Dennst.) Mabberly, Taxon 28: 587. 1979; Mani. & Sivar., Fl. Calicut 42. 1982; Ramach. & Nair, Fl. Cannanore 58. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 101. 1988; Vajravelu, Fl. Palghat Dist. 74. 1990; Janardhanan in Sharma & Sanjappa, Fl. India 3: 230. 1993; Mohanan & Henry, Fl. Thiruvananthapuram 75. 1994; Sivar. & Mathew, Fl. Nilambur 73. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 56. 1996. *Artocarpus ponga* Dennst., in 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; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 118.1976. ***Ponga, Pongu*** Rheede, Hort. Malab. 4: t. 35. 1683. ***Thambagam.***

Medium sized evergreen trees; bark dark coloured, thin, exfoliating in large, rectangular plates, yellowish inside. Leaves 10-18 x 4-7 cm, ovate, oblong or oblanceolate, base rounded or subcordate, apex obtuse or subacute; petioles 1-1.5 cm long. Flowers creamy white with pink tinge, 8-12 mm across, in axillary, secund racemose panicles; bracts lanceolate. Sepals ovate, glabrous, two outer sepals obtuse and larger than acute inner ones. Petals c. 5 mm long, ovate-lanceolate or falcate-oblong, pubescent without. Stamens 10 or 15. Fruit c. 1 cm long, ovoid, apiculate; two longer fruit-calyx lobes 5-7 x 1-1.5 cm, oblong-ovate, reddish when ripe.

Fl. & Fr.: March - May.

Distr.: Western Ghats. Endemic. Common in sacred groves. *CNS 2539* (Olakettyambalam).

VATERIA Linnaeus

Sp. Pl. 515. 1753.

Vateria indica L., Sp. Pl. 515. 1753; Dyer in Hook. f., Fl. Brit. India 1:313. 1874; Dunn in Gamble, Fl. Pres. Madras 85. 1915; Ramamoorthy in Sald . & Nicols., Fl. Hassan Dist. 119. 1976; Mani. & Sivar., Fl. Calicut 42.1982; Ramach. & Nair, Fl. Cannanore. 58.1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 102. 1988; Mani., Fl. Silent Valley 24. 1988; Vajravelu, Fl. Palghat Dist. 75. 1990; Janardhanan in Sharma & Sanjappa, Fl. India 3:245. 1993; Mohanan & Henry, Fl. Thiruvananthapuram. 75. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 56.1996. ***Paenoe*** Rheede, Hort. Malab. 4: 33-34, t.15.1683. ***Payin***

Large evergreen trees; bark white to grey, smooth. Leaves 10-20 x 6-12 cm, elliptic-oblong, base rounded to cordate, apex acuminate; nerves 12-15 pairs; petioles 1-1.5 cm long. Flowers in axillary and terminal panicles, fragrant. Peduncles and pedicles stellate tomentose. Calyx-lobes 5, 5-8 mm long, ovate, obtuse, reflexed. Corolla white, 0.8-1 cm long; lobes 5, elliptic-oblong, obtuse, united at extreme base and falling as a single piece. Stamens 40-50. Ovary 3-celled, ovoid-oblong; ovules 2 in each cell. Capsule 3-6 cm long, 3-4 cm across, elliptic-oblong, obscurely 3-ridged, obtuse, pale brown, coriaceous. Seed 1.

Fl. & Fr.: Mar. - Apr.

Distr.: Western Ghats. Endemic. The resin from the trunk makes good varnish like copal, and emits good smell on burning. *CNS 1567* (Aroorkutty).

VATICA Linnaeus

Mant. Pl. 2: 152. 1771.

Vatica chinensis L., Mant. Pl. 2: 242. 1771; Ashton in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 422. 1980; Janardhanan in Sharma & Sanjappa, Fl. India 3: 248. 1993. *Vateria roxburghiana* Wight & Arn. in Ann. Nat. Hist. Ser. 1, 3: 155. 1839. *Vatica roxburghiana* (Wight & Arn.) Blume, Mus. Bot. 2: 31, t. 7. 1852; Dyer in Hook. f., Brit. India 1: 302. 1874.

Evergreen tress; bark pale grey, smooth. Leaves 7-20 x 3.5-9 cm, ovate to lanceolate, base rounded, apex acuminate. Panicles axillary, c. 20 cm long, spreading. Calyx lobes c. 2 cm long, ovoid-deltoid to lanceolate, acute. Petals white, oblong. Stamens 15 in two rows; anthers oblong, apiculate. Ovary covered with large, shallow pits; styles ribbed; stigma obscurely 3-lobed. Fruit indehiscent, c. 2.5 cm across, subglobose, puberulous; pericarp coriaceous; fruiting calyx-lobes ovate, acute, recurved.

Fl. & Fr.: Jan. - May.

Distr.: India, Sri Lanka. In sacred groves. *CNS 2540* (Venmony).

20. MALVACEAE Juss.

Gen. Pl. 271. 1789.

1a. Flowers do not spread open; petals prominently auriculated towards base ..... **Malvaviscus**

1b. Flowers spread open; petals not prominently auriculated towards base.

2a. Fruits schizocarpic.

3a. Staminal column filamentiferous at apex; style as many as carpels.

4a. Involucel absent.

5a. Mericarps -seeded; flower opening in the morning ..... **Sida**

5b. Mericarps 3 or more seeded; flowers opening in the evening ..... **Abutilon**

4b. Involucel present ..... **Malvastrum**

3b. Staminal column 5-toothed at apex; style twice as many as carpels.

6a. Leaves with prominent abaxial nectaries; flowers solitary; corolla rose to pink; mericarp with numerous glochidiate spines ..... **Urena**

6b. Leaves without nectaries; flowers in heads; corolla yellow; mericarps without glochidiate spines ..... **Malachra**

2b. Fruits capsular.

7a. Herbaceous parts covered with peltate scales ..... **Thespesia**

7b. Herbaceous parts not covered with peltate scales.

8a. Involucellar bracts 3, foliaceous, laciniate or denate; ovary 3-celled; seeds comose ..... **Gossypium**

8b. Involucellar bracts 6 to many, linear; ovary 5-celled; seeds not comose.

9a. Capsules winged ..... **Fioria**

9b. Capsules not winged.

10a. Calyx symmetrical, 5-merous, persistent in fruit ..... **Hibiscus**

10b. Calyx asymmetrical, spathaceous, splitting laterally at anthesis, deciduous in fruit ..... **Abelmoschus**

ABELMOSCHUS Medikus

Malvenfam. 45. 1787.

Abelmoschus moschatus Medik., Malvenfam. 46. 1787; Borss., Blumea 14: 90. 1966; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 149. 1976; Fryxell, Syst. Bot. Monogr. 25: 22. 1988; Paul & Nayar in Nayar *et al.*, Fasc. Fl. India 19: 77. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 170. 1988; Vajravelu, Fl. Palghat Dist. 77. 1990; Paul in Sharma & Sanjappa, Fl. India 3: 308. 1993; Sivar. & Pradeep, Malvaceae South. Penins. India 70. 1996; Sivar. & Mathew, Fl. Nilambur 77. 1996; Sasi. & Sivar., Fl. Pl. Thrissur. For. 58. 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. *Hibiscus moschatus* (Medik.) Salisb., Prod. Strip. 387. 1796. *Abelmoschus officinalis* Endl., Cat. Hort. Vindob. 2: 253. 1894. ***Cattu-gasturi*** Rheede, Hort. Malab. 2: 71-72, t. 38. 1679. ***Kasthurivenda.***

Erect herbs or undershrubs, 1-2 m tall; stems clothed with long deflexed hairs. Leaves plamately 3-7-lobed or parted, 7-20 x 6-20 cm, the lobes often narrowly linear, coarsely serrate-dentate, apex acuminate, upper leaves narrower, often hastate or sagittate, upper surface prominently simple hairy, lower surface with both stellate and simple hairs; petioles to 15 cm long; stipules linear to filiform. Flowers axillary, solitary; pedicels slender, to 5 cm long. Involucral bracts 7-9, c. 10 x 2 mm, linear hispid, caducous. Calyx 2 -3 cm long, c. 2.5 cm across, spathaceous, splitting at one side, shortly 3 -5-toothed at apex. Corolla 7-9 cm across, yellow with purple center; petals 5, c. 6 x 5 cm, obovate, margins entire. Staminal column c. 1.5 cm long; antheriferous throughout; filaments c. 5 mm long, anthers c. 5 mm long, yellow. Ovary c.7 mm long, ovoid; stylar branches 5; stigma purple, hairy. Capsules 6-8 cm long, oblong-lanceolate, strongly 5-angular, appressed hairy, blackish when ripe. Seeds c. 3.5 x 3 mm, reniform, concentrically ribbed, blackish.

Fl. & F.: Sept.-Mar.

Distr.: South East Asia and Pacific Islands. Along roadsides and waste places. *CNS 1689* (Nooranad).

ABUTILON P. Miller

Gard. Dict. Abr. ed. 4. 1754.

Abutilon indicum (L.) Sweet, Hort. Brit. 54. 1826; Dunn in Gamble, Fl. Pres. Madras 91. 1915; Borss., Blumea 14: 170. 1966; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 149. 1976; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 170. 1988; Paul & Nayar in Nayar *et al.*, Fasc. Fl. India 19: 87. 1988; Vajravelu, Fl. Palghat Dist. 78. 1990; Paul in Sharma & Sanjappa, Fl. India 3: 266. 1993; Sivar. & Mathew, Fl. Nilambur 79. 1996, ssp. **indicum** Borss., Blumea 14: 171. 1966; Mani. & Sivar., Fl. Calicut 45. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 107. 1983; Paul in Sharma & Sanjappa, Fl. India 3: 267. 1993; Sivar. & Pradeep, Malvaceae South. Penins. India 193. 1996. *Sida*

indica L., Cent. Pl. 2: 26. 1756. *Sida populifola* Lam., Encycl. 1: 7. 1783. *Abutilon populifolium* (Lam.) Sweet, Hort. Brit. 53. 1826. *Abutilon populifolium* var. *populifolium* (Lamk.) Wight & Arn. ex Mast. in Hook. f., Fl. Brit. India 1: 326. 1874. ***Beloeren*** Rheede, Hort. Malab. 6: 77, t. 45. 1686. ***Uram.***

Shrubs to 2 m tall; stem terete, green, densely clothed with minutely short stellate-pubescent and simple hairs. Leaves 3-8 x 4-7 cm, ovate-orbicular, base cordate, margins crenate-dentate, apex acute or acuminate, 5-7-nerved from base, velvety, sparsely stellate-hairy above, glaucous beneath with dense stellate indumentum; petioles 2-6 cm long; stipules up to 4 mm long, linear. Flowers axillary, solitary; pedicels 4-5 cm long, jointed very near the top. Calyx tube c. 4 mm long; lobes 5, c. 4 mm long, ovate, pubescent with minute stellate hairs, apex acuminate. Corolla 2-2.5 cm across, orangish-yellow; petals 5, c. 1 x 1.2 cm, obovate, rounded or emarginate at apex. Staminal column c. 6 mm long, antheriferous at apex. Ovary c. 4 mm across, globose, densely pubescent with silvery white hairs; styles 15-20, to 1 cm long; stigma capitate. Schizocarp to 1.2 x 2 cm, globular with a flattened apex; mericarps 15-20, to 12 x 9 mm, reniform, flattened, densely stellate-hairy, upper part rounded mucronate, blackish when mature. Seeds to 3 mm long, ovoid or reniform, warty, black.

Fl. & Fr.: Nov.-June.

Distr.: Pantropical. Common along roadsides and waste places. *CNS 1190* (Alappuzha town).

FIORIA Mattei

Boll. Reale Orto Bot. Giardino Colon. Palermo Ser. 2, 2: 71. 1917.

Fioria vitifolia (L.) Mattei, Boll. Reale Orto Bot. Giardino Colon. Palermo Ser. 2, 2: 71. 1917; Kundu & Biswas, Bull. Bot. Surv. India 16: 125-138. 1974; Paul & Nayar in Nayar *et al.*, Fasc. Fl. India 19: 109. 1988; Paul in Sharma & Sanjappa, Fl. India 3: 310. 1993; Sivar. & Pradeep, Malvaceae South. Penins. India 75. 1996. *Hibiscus vitifolius* L., Sp. Pl. 696. 1753; Roxb., Fl. Ind. 3: 200. 1832; Wight & Arn., Prodr. Fl. Ind. Orient. 58. 1834; Mast. in Hook. f., Fl. Brit. India 1: 338. 1874; Dunn in Gamble, Fl. Pres. Madras 98. 1915; Rakshit & Kundu, Bull. Bot Surv. India 12: 166. 1972; Mani. & Sivar., Fl. Calicut 47.

1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 119. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 172. .1988; Vajravelu, Fl. Palghat Dist. 80. 1990; Sivar. & Mathew, Fl. Nilambur 86. 1996. *Hibiscus tripartitus* Forssk., Fl. Aegypt. Arab. 126. 1775. ***Katu-beloeren*** Rheede, Hort. Malab. 6: 79, t. 46. 1686. ***Velipparuthi.***

Erect branched under shrubs to 1.5 m tall; stems terete, green, densely clothed with glandular and stellate hairs. Leaves 4-8 x 3-8 cm, broadly ovate or more commonly 3-5-lobed, with triangular segments, base cordate, margins coarsely dentate to serrate, apex acute, basally 5-7-nerved, minutely stellate above, tomentose below; petioles 4-13 cm long; stipules to 2 mm long, linear to filiform. Flowers solitary or 3-5 in a cluster, c. 4 cm across; pedicel to 3 cm long, articulated above the middle. Involucral bracts 6-8, 1-1.5 cm long, linear. Calyx c. 3 cm across, campanulate, 5-lobed, the lobes ovate-triangular, acute. Corolla 6-7 cm across, yellow with a dark purple center; petals 5, 4-5 x 3-4 cm, obovate. Staminal column c. 2 cm long, antheriferous throughout, apex 5-toothed; filaments to 3 mm long; anthers c. 2 mm long, purplish. Ovary c. 4 x 3 mm, ovoid, pentangular, 5-celled; stylar branches 5, purplish, glandular hairy; stigmas 5, capitate, purplish, glandular hairy. Capsules 1.5-2 cm across, depressed globose, strongly 5-winged. Seeds c. 3 mm long, reniform, minutely tubercled, brown, glabrous.

Fl. & Fr.: Aug.-Jan.

Distr.: Tropical India, Sri Lanka, Tropical Africa, and Australia. It is found growing as a weed along roadsides and waste lands. *CNS 1143* (Kalavoor).

GOSSYPIUM Linnaeus

Sp. Pl. 693. 1753.

Gossypium arboreum L., Sp.Pl. 693. 1753; Wight, Ic. t. 198. 1838; Mast. in Hook. f., Fl. Brit. India 1: 347. 1874; Borss., Blumea 14: 121. 1966; Paul & Nayar in *Nayar et al.*, Fasc. Fl. India 19: 112. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 170. 1988; Fryxell, Rheedea 2(2): 146. 1992; Paul in Sharma & Sanjappa, Fl. India 3: 387. 1993; Sivar. & Pradeep, Malvaceae South. Penins. India 27. 1996. *Gossypium perenne* Blanco, Fl. Filipp. 537. 1837. *Gossypium cernuum* Todaro, Oss. Sp. Cot. 31. 1863.

Gossypium purpurascens Miq., Fl. Ind. Bat. I, 2: 163. 1858, non Poir., 1811. ***Cudu-pariti*** Rheede, Hort. Malab. 1: 55-56, t. 31. 1678. ***Panji.***

Shrubs to 3 m tall; stems branched, more or less gland-dotted throughout. Leaves palmately 3-5-lobed, 5-12 x 9-12 cm, the lobes lanceolate, usually with an extra tooth between lobes, gland-dotted above, sparsely stellate-hairy to glabrous beneath; petioles 3-10 cm long, gland-dotted; stipules 5 -7 mm long, lanceolate. Flowers axillary, solitary; pedicles 1-1.5 cm long, jointed above the middle. Involucral bracts c. 2.5 x 2 cm, ovate-cordate, foliaceous, 3-5-toothed towards the apex or subentire, gland-dotted, accrescent in fruits. Calyx c. 6 x 7 mm, truncate, glabrous. Corolla 4-5 cm across, campanulate, pale yellow with a purplish center; petals 3-4 x 2.5-3 cm, broadly obovate with rounded apex. Staminal column 1.5-2 cm long, antheriferous throughout; filaments c. 1 mm long. Ovary c. 4 mm long, trigonous, 3 -celled; style 1.5-2 cm long; stigmas 3. Capsules c. 3.5 cm long, ovoid with an apical beak, loculicidally dehiscent. Seeds 5-8 mm across, subglobose, covered with white cotton not readily seperable from the seed.

Fl. & Fr.: Throughout the year.

Distr.: Tropical and subtropical parts of the Old World. In waste lands. *CNS 1551* (Angadikkal).

HIBISCUS Linnaeus

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

Herbs, subshrubs, shrubs or trees, glabrescent, pubescent or hispid. Leaves ovate, cordate, sometimes variously lobed or parted, abaxial foliar nectary present or absent; stipules ovate-lanceolate, rarely auricled. Flowers axillary, solitary, often in racemes or panicles; pedicel usually jointed above or below middle. Involucellar bracts 8-10. Calyx tube campanulate, 5-lobed or parted. Petal 5, showy. Staminal column apically 5-dentate, antheriferous throughout or only at apex. Ovary usually 5-celled; ovules 3 or many per cell; styles 5; stigma capitate. Fruit loculicidally dehiscent 5-celled capsule, ovoid or oblong. Seeds many in each locule, globose or reniform.

1a. Rambiling or trailing undershrubs; stem prickled.

2a. Stipules foliaceous, ear-shaped ..... **H. surattensis**

2b. Stipules lanceolate or linear ..... **H. hispidissimus**

1b. Erect subshrubs, shrubs or trees; stem not prickled.

3a. Calyx lobes with prominent marginal costae and nectaries on midveins, becoming fleshy and purplish ..... **H. sabdariffa**

3b. Calyx lobes without marginal costae and nectaries, not becoming fleshy and purplish.

4a. Trees; stipules large, foliaceous, enclosing developing shoots; capsules 10-lobed ..... **H. tiliaceus**

4b. Shrubs; stipules small, linear or lanceolate, not enclosing developing shoots; capsules 5-loculed.

5a. Leaves suborbicular, palmately 3-7-angled or lobed, stellate-puberulent beneath; staminal column included ..... **H. mutabilis**

5b. Leaves ovate to elliptic, unlobed, glabrous; staminal column exserted.

6a. Flowers more or less erect; petals erect, entire; involucel manifested ..... **H. rosa-sinensis** var. **rosa-sinensis**

6b. Flowers pendent; petals reflexed, deeply dissected; involucel minute ..... **H. rosa-sinensis** var. **schizopetalous**

Hibiscus hispidissimus Griffith, Not. Pl. Asiat. 4: 521. 1854; Pradeep & Sivar., Taxon 40: 634. 1991; Sivar. & Pradeep, Malvaceae South. Penins. India 106. 1996; Sivar. & Mathew, Fl. Nilambur 82. 1996; Sasi. & Sivar., Fl. Pl. Thrissur. For. 59. 1996. *Hibiscus furcatus* sensu Roxb. [Hort. Beng. 51. 1814, *nom. nud.*] ex DC., Prodr. 1: 448. 1824; Roxb., Fl. Ind. ed. Carey 3: 204. 1832; Wight & Arn., Prodr. Fl. Pen. Ind. Orient. 1: 48. 1834; Mast. in Hook. f., Fl. Brit. India 1: 335. 1874; Dunn in Gamble, Fl. Pres. Madras 97. 1915; Rakshit & Kundu, Bull. Bot. Sur. India 12: 161. 1972; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 151. 1976; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 113. 1983, non Willd., 1809. *Hibiscus aculeatus* sensu Roxb., Fl. Ind. ed. Carey 3: 206. 1832; Paul & Nayar, Bull. Bot. Surv. India 22: 194. 1980 & in Nayar *et al.* Fasc. Fl. India

19: 123. 1988; Mani., Fl. Silent Valley 26. 1988; Ramach. & Nair, Fl. Cannanore 60. 1988; Paul in Sharma & Sanjappa, Fl. India 3: 323. 1993, non Walter, 1788.

Rambling or climbing shrubs; stems, petioles and pedicels armed with recurved prickles, often intermingled with dense stellate indumentum. Leaves entire to 3-5-angled or lobed, 4-8 x 3-7 cm, cordate or truncate at the base, margins coarsely serrate, apex acuminate, prickly on the nerves beneath; petiole 4-7 cm long, prickly; stipules c. 7 x 3 mm, lanceolate, ciliate. Flowers axillary, solitary; pedicels 1.5-5 cm long, jointed above middle, prickly. Involucral bracts 10-12, c. 15 x 3 mm, bifurcate, apex spathulate. Calyx tube c. 1 cm long, nerves densely pubescent with long stellate and simple hairs; lobes 5, c. 10 x 4 mm, lanceolate. Corolla c. 8 cm across, yellow with deep purple center; petals 5, 4-5 x 3-4 cm, obovate. Staminal column up to 1.5 cm long, antheriferous throughout; filaments c. 3 mm long, purplish; anthers purplish. Ovary c. 5 mm long, ovoid, 5-celled, densely apprssed hairy; stigma 5, capitate. Capsule c. 1.5 cm long, ovoid or conical, bristly hairy. Seeds c. 4 mm long, 3-gonous, dark brown, concentrically tubercled.

Fl. & Fr.: Nov.-Feb.

Distr.: Tropical Africa, India, Sri Lanka, Myanmar and China. Among the bushes in wastelands. *CNS 1180* (Kalavoor).

Hibiscus mutabilis L., Sp. Pl. 694. 1753; Roxb., Fl. Ind. ed. Carey 3: 201. 1832; Mast. in Hook. f., Fl. Brit. India 1: 334. 1874; Dunn in Gamble, Fl. Pres. Madras 99. 1915; Borss., Blumea 14: 66. 1966; Rakshit & Kundu, Bull. Bot. Sur. India 12: 167. 1972; Fryxell, Syst. Bot. Monogr. 25. 215. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 171. 1988; Paul & Nayar in Nayar *et al.*, Fasc. Fl. India 19: 140. 1988; Paul in Sharma & Sanjappa, Fl. India 3: 390. 1993; Sivar. & Pradeep, Malvaceae South. Penins. India 148. 1996. *Hibiscus sinensis* Miller, Gard. Dict. ed. viii. no. 2. 1768, *nom. superfl. Ketmia mutabilis* (L.) Moench, Methodus 617. 1794. *Abelmoschus mutabilis* (L.) Wall. ex Hassk., Cat. Hort. Bot. Bogor. 198. 1844. ***Hina-Pariti*** Rheede, Hort. Malab. 6: 69-72, t. 38-42. 1686.

Shrubs to 3 m tall; young branches stellate-pubescent, intermixed with glandular hairs. Leaves 10-18 cm long, suborbicular, base cordate, palmately 3-7-angled or lobed, margins serrate-crenate, apex acute to acuminate, stellate-puberulent beneath, sparsely so

above; petioles to 15 cm long; stipules 6-10 mm long, linear-lanceolate. Flowers axillary, solitary; pedicels 5-8 cm long, articulated. Involucellar bracts 8-10, 6-20 x 1-2 mm, linear-lanceolate, stellate-pubescent. Calyx 2-2.5 cm long, divided to the middle; lobes 5, ovate-lanceolate, stellate-pubescent. Corolla 10-15 cm across, white, fading to pink, double; petals 5-6 cm long, suborbicular, stellate-pubescent without. Staminal column c. 1.5 cm long; filaments 3-4 mm long. Ovary c. 5 mm long, subglobose, puberulent with white silky hairs; stigmas 5. Capsules 2-2.5 cm long, subglobose, hispid. Seeds c. 2 mm long.

Fl. & Fr.: Throughout the year.

Distr.: Native of China, and is widely cultivated in tropical, subtropical and sometimes temperate regions of the world. *CNS 2626* (Muthukulam).

Hibiscus rosa-sinensis L., Sp. Pl. 694. 1753, var. **rosa-sinensis**: Roxb., Fl. Ind. ed. Carey 3: 194. 1832; Mast. in Hook. f., Fl. Brit. India 1: 334. 1874; Dunn in Gamble, Fl. Pres. Madras 99. 1915; Borss., Blumea 14: 72. 1966; Rakshit & Kundu, Bull. Bot. Sur. India 12: 105. 1972; Mani. & Sivar., Fl. Calicut 48. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 117. 1983;Fryxell, Syst. Bot. Monogr. 25. 222. 1988; Paul & Nayar in Nayar *et al.*, Fasc. Fl. India 19: 147. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 171. 1988; Paul in Sharma & Sanjappa, Fl. India 3: 391. 1993; Sivar. & Pradeep, Malvaceae South. Penins. India 122. 1996. ***Schem-pariti*** Rheede, Hort. Malab. 2: 25-26, t. 17. 1679. ***Ain-pariti*** Rheede, Hort. Malab. 6: 73, t. 43. 1686 ***Chemparuthi***.

Erect, branched shrubs to 2.5 m tall. Leaves 4-8 x 2-5 cm, ovate, base truncate or cuneate, margins serrate-dentate or entire, apex acute or subobtuse; petioles to 7 cm long; stipules 3-8 mm long, subulate. Flowers axillary, solitary, erect or pendent; pedicles to 8 cm long, articulated above the middle. Involucellar bracts 6-9, 7-12 mm long, subulate or lanceolate. Calyx tubular, 1.5-2.5 cm long, divided to middle; lobes triangular to lanceolate. Corolla 8-12 cm across; petals obovate or oblong. Staminal column exserted, antheriferous in the upper half; filaments c. 7 mm long. Fruit (setting rare) oblong. Seeds c. 4 mm long, renifrom, brownish black.

Fl.: Throughout the year. *Fr.*: Fruit setting very rare.

Distr.: Tropical and subtropical regions of the world. *CNS 2119* (Kuthiyathodu).

Hibiscus rosa-sinensis var. **schizopetalus** Dyer, Gard. Chron. n.s. 11: 568. 1879; Mast., Gard. Chron. n. s. 12: 272, f. 45. 1879; Fryxell, Syst. Bot. Monogr. 25. 224. 1988; Sivar. & Pradeep, Malvaceae South. Penins. India 123. 1996. *Hibiscus schizopetalous* (Dyer) Hook. f.., Bot. Mag. 106. t. 6524. 1880; Borss., Blumea 14: 73. 1966; Rakshit & Kundu, Bull. Bot. Sur. India 12: 166. 1972; Mani. & Sivar., Fl. Calicut 48. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 117. 1983; Paul & Nayar in Nayar *et al.*, Fasc. Fl. India 19: 150. 1988 '*schizopetalous*'; Paul in Sharma & Sanjappa, Fl. India 3: 392. 1993. ***Tookuchemaprathi***

Erect, branched shrubs to 3 m tall. Leaves 3-6.5 x 2-3.5 cm, ovate-lanceolate, base truncate, margins coarsely serrate, apex acute; petioles to 2.5 cm long. Flowers axillary, solitary, pendent; pedicels to 12 cm long, slender, articulated at about middle. Involucellar bracts 5-8, 1-2 mm long. Calyx 1.5-2 cm long, tubular, 5-toothed. Corolla 5-6 cm across, red with pink streaks; petals strongly reflexed and deeply dissected. Staminal column 8-10 cm long, slender, antheriferous in the upper half. Stigmas capitate. Fruit setting not seen.

Fl.: Throughout the year.

Distr.: Native to East Africa, now widely cultivated throughout the tropics. *CNS 2487* (Chandiroor).

Hibiscus sabdariffa L., Sp. Pl. 695. 1753; Wight & Arn., Prodr. Fl. Pen. Ind. Orient. 52. 1834; Mast. in Hook. f., Fl. Brit. India 1: 340. 1874; Dunn in Gamble, Fl. Pres. Madras 99. 1915; Borss., Blumea 14: 64. 1966; Rakshit & Kundu, Bull. Bot. Sur. India 12: 162. 1972; Mani. & Sivar., Fl. Calicut 7. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 117. 1983; Fryxell, Syst. Bot. Monogr. 25. 225. 1988; Paul & Nayar in Nayar *et al.*, Fasc. Fl. India 19: 148. 1988; Paul in Sharma & Sanjappa, Fl. India 3: 391. 1993; Sivar. & Pradeep, Malvaceae South. Penins. India 114. 1996. *Hibiscus fraternus* L., Pl. Surin. 12. 1775. *Hibiscus cruentus* Bertol., Fl. Guatimal. 28, t. 10. 1840. ***Polechi.***

Erect subshrubs to 2.5 m tall; stems glabrous, terete, usually reddish-purple. Leaves 7-12 cm long, ovate to palmately 3-5-lobed, lower leaves entire; lobes oblong-

lanceolate, mid-lobe longest, margin serrate, apex acute, glandular on midrib below; petioles 3-6 cm long, reddish-purple or green; stipules to 1 cm long, linear. Flowers axillary, solitary; pedicels stout, very short, jointed near the base, purple. Involucral bracts 7-9, c. 1.5 cm long, lanceolate, connate basally. Calyx 1.5-3 cm long; lobes lanceolate, with prominent nectary at midrib of each lobe, becoming enlarged and fleshy in fruits, usually bright red. Corolla 5-6 cm across, pale yellow with purplish center; petals 5, c. 5 cm long. Staminal column 1.5 cm long, antheriferous throughout, glabrous. Ovary c. 3 mm diam., ovoid; stigma 5. Capsules c. 2.5 cm long, ovoid; beaked, pubescent. Seeds 3 -4 mm long, subreniform, blackish-brown, minutely scabridulous.

Fl. & Fr.: Oct.-Jan.

Distr.: Probably native to tropical Africa and widely distributed throughout the tropics and subtropics as a cultigen. The flowers open at about 8.00 am and wither by 12.00 noon. *CNS 1405* (Pallipuram), *CNS 2627* (Eramallur).

Hibiscus surattensis L., Sp. Pl. 696. 1753; Roxb., Fl. Ind. ed. Carey 3: 205. 1832; Wight & Arn., Prodr. Fl. Pen. Ind. Orient. 1: 48. 1834; Mast. in Hook. f., Fl. Brit. India 1: 334. 1874; Dunn in Gamble, Fl. Pres. Madras 97. 1915; Borss., Blumea 14: 57. 1966; Rakshit & Kundu, Bull. Bot. Surv. India 12: 161. 1972; Mani. & Sivar., Fl. Calicut 47. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 118. 1983; Paul & Nayar in Nayar *et al.*, Fasc. Fl. India 19: 153. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 172. 1988; Ramach. & Nair, Fl. Cannanore 61. 1988; Vajravelu, Fl. Palghat Dist. 80. 1990; Paul in Sharma & Sanjappa, Fl. India 3: 327. 1993; Sivar. & Pradeep, Malvaceae South. Penins. India 119. 1996; Sivar. & Mathew, Fl. Nilambur 85. 1996; Sasi. & Sivar., Fl. Pl. Thrissur. For. 59. 1996. ***Narinam-Poulli*** Rheede, Hort. Malab. 6: 75-76, t. 44. 1686. ***Pulichai*** (Fig. 13).

Scandent or trailing undershrubs; stems, petioles and pedicels armed with recurved prickles. Leaves 5-10 x 5-12 cm, ovate-suborbicular, 3-5-palmilobed, lobes lanceolate, shallowly cordate to subtruncate at base, margins coarsely serrate to dentate, apex acute, basally 5-7-nerved, prickly below on the nerves; petiole 4-10 cm long; stipules 8-12 x 3-5 mm, foliaceous, auricled at base, margins ciliate. Flowers axillary, solitary; pedicels

4-7 cm long, jointed at the base of flower, prickly. involucral bracts 10 -12, 18-22 x 2-3 mm, spathulate, bifurcate, spreading; appendage erect, up to 1 cm long, linear, pubescent. Calyx tube to 6 mm long; lobes 5, 1-1.5 cm long, ovate, long-acuminate, prickly. Corolla c. 5 cm across, creamy-yellow with dark purplish center; petals 2.5-5 x 2-4 cm, obovate, apex rounded. Staminal column 1.5-2 cm long, glandular hairy, antheriferous throughout; filaments 1-2 mm long. Ovary 3-4 mm long, subconical, densely appressed hairy; stigma capitate, pruplish. Capsules c. 2 cm long, ovoid or conical enclosed within accrescent calyx, densely covered with closely appressed hairs. Seeds c. 3 mm long, angular, brownish-black.

Fl. & Fr.: Nov.-Jan.

Distr.: Tropics of the Old World. In wastelands. *CNS 1128* (Vandanam), *CNS 2120* (Thumboli).

Hibiscus tiliaceus L., Sp.Pl. 694. 1753; Roxb., Fl. Ind. ed. Carey 3: 192. 1832; Mast. in Hook. f., Fl. Brit. India 1: 343. 1874; Dunn in Gamble, Fl. Pres. Madras 98. 1915; Borss., Blumea 14: 29. 1966; Rakshit & Kundu, Bull. Bot. Surv. India 12: 157. 1972; Mani. & Sivar., Fl. Calicut 48. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 118. 1983; Fryxell, Syst. Bot. Mongr. 25: 228. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 172. 1988; Paul & Nayar in Nayar *et al.*, Fasc. Fl. India 19: 157. 1988; Paul in Sharma & Sanjappa, Fl. India 3: 322. 1993; Sivar. & Pradeep, Malvaceae South. Penins. India 91. 1996. *Paritium tiliaceum* (L.) Juss. in St.-Hilaire, Fl. Bras. Mer. 1: 156. 1827; Wight & Arn., Prodr. Fl. Pen. Ind. Orient. 1: 52. 1834. *Hibiscus circinnatus* Willd., Enum. Pl. Hort. Berol. 735. 1809. ***Pariti Tali-Pariti***, Rheede, Hort. Malab. 1: 53-54, t. 30. 1678. ***Pooparuthi, Velipparuthi.***

Trees to 14 m tall; branchlets stellate-tomentose. Leaves 7-15 x 5-15 cm, cordate-orbicular, base cordate, margin crenate-serrate or dentate, apex acute, basally 7-9-nerved, upper surface green, glabrous or minutely stellate-hairy, lower surface greyish, densely stellate-tomentose; foliar nectaries 3, linear, on principal nerves close to the base beneath; petioles 4 -12 cm; stipules c. 2 x 1 cm, foliaceous, ovate, subobtuse at apex, soon deciduous leaving prominent scars. Flowers axillary, solitary or in apparent terminal



Fig. 13. *Hibiscus surattensis* L.: a. Flowering branch; b. Nodal region showing stipules; c. Flower; d. Staminal column; e. Pistil; f. Fruit with accrescent involucel and calyx.

racemes; pedicel 1.5-2.5 cm long, stout, thickened and lenghtened in fruits. Involucel cupular, segments 8 -11, 5-6 x 2-3 mm, ovate-triangular, divided to the middle, apex acute to acuminate. Calyx tube to 7 mm long, campanulate, lobes 5, 1.5-2 x 0.5-0.6 cm, lanceolate, coriaceous. Corolla 6-8 cm across, bright yellow with a deep purple center fading to pink; petals 4.5-6.5 x 3.5-4.5 cm, obovate. Staminal column c. 3 cm long, yellow, antheriferous throughout. Ovary c. 5 mm long, globose, 10-celled; stylar branches 5, glandular hairy; stigmas purplish, capitate. Capsules c. 2.5 x 1.5 cm, ovoid, woody, densely pubescent. Seeds c. 5 mm long, reniform, minutely papillose.

Fl. & Fr.: Throughout the year.

Distr.: Widespread in the tropics and subtropics of the world. *CNS 1529.* (Champakulam).

MALACHRA Linnaeus

Syst. Nat. ed. 12, 2: 458. 1767 & Mant. 13. 1767.

Malachra capitata (L.) L., Syst. Nat. ed. 12, 2: 458. 1767; Mast. in Hook. f., Fl. Brit. India 1: 329. 1874; Dunn in Gamble, Fl. Pres. Madras 102. 1915; Borss., Blumea 14: 146. 1966; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 121. 1983; Fryxell, Syst. Bot. Monogr. 25: 265. 1988; Paul & Nayar in Nayar *et al.*, Fasc. Fl. India 19: 163. 1988; Paul in Sharma & Sanjappa, Fl. India 3: 367. 1993; Sivar. & Pradeep, Malvaceae South. Penins. India 163. 1996. *Sida capitata* L., Sp. Pl. 685. 1753. *Malachra palmata* Moench, Methodus. 615. 1794. *Malachra mexicana* Schrader, Ind. Sem. Hort. Goett. 3. 1830.

Subshrubs to 1.5 m tall; stem densely covered with prickly stellate hairs. Leaves 3-8 x 3-7 cm, orbicular to ovate, shallowly 3-5-angular or lobed, base subcordate or rounded, margins crenate -serrate, apex obtuse or rounded, basally 3-5-nerved, sparsely stellate-hairy; petioles to 8 cm long; stipules 0.8-1.5 cm long, filiform. Cymes axillary, capitate, 3-6-flowered; peduncle 3-6 cm long, 2-5 per axil. Flowers 1.5-2 cm across; bracts subtending the head usually 3, to 2 x 2.5 cm, ovate, cordate, folded along the midrib, margins serrate-crenate. Calyx 5-7 mm long, accrescent; lobes 5, ovate-acuminate. Petals 5, sulphur-yellow, 0.7-1 cm long, obovate. Staminal column c. 1 cm long, pubescent with glandular hairs, antheriferous throughout. Ovary 5-celled; style c. 1 cm long; stylar

branches 10; stigma capitate. Schizocarp 5-6 mm across, enclosed within the accrescent calyx; mericarps 5, to 3 x 2 mm, trigonous, brownish. Seeds c. 2 mm long, obovoid, brown.

Fl. & Fr.: Throughout the year.

Distr.: Tropical America and also as an adventitious in the Old World tropics. Rare; wastelands and dumping grounds. *CNS 2488* (near Chengannur R.S.).

MALVASTRUM A. Gray

Mem. Amer. Acad. Arts. Ser. 2, 4: 21. 1849 (*nom.cons.*).

Malvastrum coromandelianum (L.) Garcke, Bonplandia 5: 295. 1857; Dunn in Gamble, Fl. Pres. Madras 88. 1915; Borss., Blumea 14: 152. 1966; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 153. 1976; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 121. 1983, Fryxell, Syst. Bot. Monogr. 25: 287. 1988; Paul & Nayar in Nayar *et al.*, Fasc. Fl. India 19: 180. 1988; Ramach. & Nair, Fl. Cannanore 62. 1988; Vajravelu, Fl. Palghat Dist. 81. 1990; Paul in Sharma & Sanjappa, Fl. India 3: 277. 1993; Sivar. & Pradeep, Malvaceae South. Penins. India 219. 1996. *Malva coromandeliana* L., Sp. Pl. 687. 1753. *Malva domingensis* Sprengel ex DC., Prodr. 1: 341. 1824. *Malva lindheimeriana* Scheele, Linnaea 21: 470. 1848. *Malvastrum tricuspidatum* (R. Br. ex Aiton) A. Gray, Smiths. Contrib. knowl. 3 (art: 5, Pl. Wright, Pl. 1): 16. 1852; Mast. in Hook. f., Fl. Brit. India 1: 321. 1875. *Sida oahuensis* A. Leveille, Repert. Spec. Nov. Regni Veg. 10: 120. 1911.

Herbs to 50 cm tall; stem with appressed stellate hairs. Leaves 2-8 x 1-3 cm, ovate or lanceolate, unlobed or shallowly 3-lobed, broadly rounded to cuneate at base, margins dentate to nearly serrate, acute to acuminate at apex, 3-5-nerved at base, petioles 2-3 cm long, stellate-hairy; stipules 3-5 mm long, lanceolate, acuminate, early deciduous. Flowers axillary, solitary, often clustered; pedicels slender, 5-8 mm long. Involucellar bracts shorter than calyx, 4-6 x 7-10 mm, lanceolate, acuminate, strigose-hairy. Calyx 4-6 mm long in flower, and 8-12 mm long in fruit; lobes 5, 3-4 x 2-4 mm, deltoid, acuminate, fused to the middle, hirsute. Corolla 1-1.5 cm in diam., widely campanulate, pale yellow; petals 6-8 x 4-5 mm, obliquely obovate, exceeding the calyx lobes. Staminal column 3-4

NB4461 580.95483 TH SUN/S

mm long, glabrous. Schizocarps 5-6 mm diameter, enclosed within the calyx; mericarps 10 -12, 3-4 x 3-4 mm, setose with a single conspicuous apical and two dorsal cusps.

Fl. & Fr.: Throughout the year.

Distr.: Pantropical. In wastelands. Flowers open at about 2.00 p.m. and close before 5.00 p.m. *CNS 2121* (Alappuzha town).

MALVAVISCUS P.C. Fabricius

Enum. 155. 1759.

Malvaviscus penduliflorus DC., Prodr. 1: 445. 1824; Fryxell, Syst. Bot. Monogr. 25: 297. 1988; Turner & Mendenhall, Ann. Missouri Bot. Gard. 80: 449. 1993; Sivar. & Pradeep, Malvaceae South. Penins. India 167. 1996. *Malvaviscus longifolius* Garcke, Allg. Gartenzeitung 22: 321. 1854. *Malvaviscus arboreus* Dillen. ex Cav. var. *penduliflorus* (DC.) Schery, Ann. Missouri Bot. Gard. 29: 233. 1942; Borss., Blumea 14: 133. 1966; Mani & Sivar., Fl. Calicut 45. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 122. 1983; Paul in Sharma & Sanjappa, Fl. India 3: 394. 1993. *Malvaviscus arboreus* Dillen. ex Cav. ssp. *penduliflorus* (DC.) Hadae, Folia Geobot. Phytotax. 5: 432. 1970. ***Molakuchembarathy.***

Erect branched shrubs to 4 m tall; stem green, younger parts pubescent. Leaves 6-10 x 3-6 cm, elliptic or ovate, often slightly 3-angular, truncate or shallowly cordate at base, margins serrate-dentate to wavy, apex acute or acuminate; petiole 2-5 cm long; stipules to 4 mm long, linear, caducous. Flowers axillary, solitary; pedicel to 5 cm long; pubescent. Involucral bracts 5-8, 3-7 x 4-5 mm, lanceolate to spathulate, connate at base. Calyx c. 2 cm long, tubular, divided above the middle; lobes 5, ovate-acute. Corolla crimson-red; petals erect, c. 6 cm long, obovate, prominently auriculate towards base. Staminal column 7-8 cm long, 5-toothed at apex, antheriferous near the apex; filaments c. 2 mm long; anthers c. 2 mm long, purplish. Ovary c. 3 mm across, depressed globose, 5-celled; style arms 10; stigma dark purple, hairy. Fruit-setting absent.

Fl.: Throughout the year.

Distr.: Widespread cultivar probably a native of South-Central Mexico. It is widely grown in gardens throughout India. *CNS 2628* (Cheppad).

SIDA Linnaeus

Sp. Pl. 683. 1753.

Herbs or subshrubs, erect or prostrate; branchlets stellate-tomentose or simple hairy, sometimes viscid or glabrous. Leaves simple, petiolate to subsessile. Flowers axillary, solitary or clustered into lax racemes; pedicel slender, articulated. Involucel absent. Calyx 5-lobed, widely campanulate, angular, plicate in bud. Petals rotate, yellow. Staminal column included, antheriferous at apex. Ovary ovoid, 5-14-celled; ovule 1 per cell; styles 5-14; stigmas capitate. Fruits schizocarpic, exceeding calyx or not; mericarps 3-gonous or 4-hedral, as many as ovaries, often prominently reticulate, beaked or awned above, apically dehiscent. Seeds solitary, glabrous.

1a. Leaves and branching pattern distichous; stipules of each pair different, one lanceolate or falcate, the other linear to filiform; leaves nearly glabrous ..... **S. acuta**

1b. Leaves and branching pattern not distichous; stipules of every pair not different; leaves pubescent.

2a. Styles and mericarps 5.

3a. Plants erect, viscid, aromatic; flowers initially solitary, finally in apparent racemes or panicles ..... **S. mysorensis**

3b. Plants prostrate, not viscid nor aromatic; flowers usually solitary ..... **S. cordata**

2b. Styles and mericarps 7 or more.

4a. Leaves broadly ovate or orbicular, basally cordate, margins dentate throughout; mericarps distinctly awned.

5a. Leaves dimorphic; awns of mericarps stellate-hairy, as long or slightly exceeding calyx-lobes ..... **S. fryxellii**

5b. Leaves monomorphic; awns of mericarps retrorsely simple-hairy, far exceeding calyx-lobes ..... **S. cordifolia**

4b. Leaves elliptic or rhomboid, basally truncate, margins basally entire and distally serrate; mericarps beaked.

6a. Leaves towards stem-base always retuse or truncate at apex; mericarps dehiscent at apex, beak 2-dentate ..... **S. alnifolia**

6b. Leaves towards stem-base not retuse at apex; mericarps indehiscent, beak solitary ..... **S. rhomboidea**

Sida acuta Burm.f., Fl. Ind. 147. 1768; Roxb., Fl. Ind. ed. Carey 3: 171. 1832; Wight & Arn., Prodr. Fl. Pen. Ind. Orient. 57. 1834; Wight, Ic. t. 95. 1838; Dunn in Gamble, Fl. Pres. Madras 90. 1915; Borss., Blumea 14: 186. 1966; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 154. 1976; Mani. & Sivar., Fl. Calicut 45. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 127. 1983; Fryxell, Syst. Bot. Monogr. 25: 380. 1988; Mani., Fl. Silent Valley 28. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 173. 1988; Paul & Nayar in Nayar *et al.*, Fasc. Fl. India 19: 202. 1988; Ramach. & Nair, Fl. Cannanore 63. 1988; Vajravelu, Fl. Palghat Dist. 82. 1990; Paul in Sharma & Sanjappa, Fl. India 3: 281. 1993; Sivar. & Pradeep, Malvaceae South. Penins. India 238. 1996; Sivar. & Mathew, Fl. Nilambur 88. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 61. 1996. *Sida frutescens* Cav., Diss. 1: 12, t. 10, f. 1. 1785. *Sida scoparia* Lour., Fl. Cochin. 11: 414. 1790. *Sida balbisiana* DC., Prodr. 1: 460. 1824. *Sida carpinifolia* var. *acuta* (Burm.f.) Kurz, J. Asiat. Soc. Bengal 45: 119. 1876. *Sida lancea* Gandoger, Bull. Soc. Bot. France 71: 629. 1924. ***Tsjeru-parua*** Rheede, Hort. Malab. 10: 105, t. 53. 1680. ***Kurunthotti.***

Erect subshrubs to 70 cm tall; branches distichous. Leaves 3-6 x 1-2 cm, lanceolate to ovate, base truncate, margins serrate, entire towards base, apex acute or acuminate, sparsely hirsute to glabrate on both surfaces, 3-nerved at base; petiole to 4 mm long; stipules 5-8 x 1-1.5 mm, unequal, one lanceolate, the other linear. Flowers solitary, axillary; pedicels to 5 mm long. Calyx 6-8 mm long, campanulate, ciliate on margins, divided to the middle. Petals creamy-yellow, 6-8 mm long, obliquely obovate. Staminal column c. 2 mm long; filaments to 1.5 mm long; anthers pale yellow. Ovary c. 1.5 mm long, ovoid; styles 6-8; stigma globose, yellow. Schizocarp to 5 mm long; mericarps 6-8, c. 3 x 2 mm, trigonous, reticulate, apically 2-awned. Seeds c. 2 mm long, trigonous.

Fl. & Fr.: Through out the year.

Distr.: Pantropical. The plants grow along roadsides, wastelands and sandy sea-coast. The flowers open at about 9.00 am and wither by 11.00 am. *CNS 1146* (Alappuzha town), *CNS 2122* (Paruthikulam).

Sida alnifolia L., Sp. Pl. 2, 684. 1753; Wight & Arn., Prodr. Fl. Pen. Ind. Orient 1: 58. 1834; Sivar. & Pradeep, Sida 16 (1): 69. 1994; Sivar. & Pradeep, Malvaceae South. Penins. India 241. 1996. *Sida retusa* L., Sp. Pl. ed. 2, 961. 1763; Wight & Arn., Prodr. Fl. Pen. Ind. Orient 1: 58. 1834. *Sida rhombifolia* var. *retusa* (L.) Mast. in Hook. f., Fl. Brit. India 1: 324. 1874. *Sida rhombifolia* ssp. *retusa* (L.) Borss., Blumea 14: 198. 1966; Mani. & Sivar., Fl. Calicut 44. 1982; Paul & Nayar in Nayar *et al.*, Fasc. Fl. India 19: 216. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 173. 1988; Paul in Sharma & Sanjappa, Fl. India 3: 289. 1993, non Ugborogho, 1980. Sida *rhombifolia* ssp. *alnifolia* Ugborogho, Bol. Soc. Brot. Ser. 54: 70. 1980. ***Kurundoti*** Rheede, Hort. Malab. 10: 33, t. 18. 1690. ***Kurunthotti.***

Woody subshrubs to 40 cm tall, strongly branched. Leaves 1-3 x 0.8-2.5 cm, obovate to elliptic-lanceolate, base obtuse or rounded, margins irregularly serrate-dentate or crenate to the distal half, entire towards the proximal half, apex retuse, emarginate, rounded or subacute, upper surface sparsely pubescent, lower surface densely greyish tomentose; petiole to 4 mm long, stellate-pubescent; stipules c. 3 mm long, linear. Flowers axillary, solitary; pedicels 3-4 mm long in flowers, to 2.5 cm in fruits, jointed at about the middle. Calyx 5-6 mm long, c. 6 mm across, pubescent without, 5-lobed; lobes c. 2 mm long, ovate to triangular. Petals yellow, 6-7 x 5-6 mm, obliquely obovate. Staminal column to 3 mm long, antheriferous at apex. Ovary c. 1.5 mm across, depressed globose; styles 7-10; stigma capitate, creamy-yellow. Schizocarp to 4 mm long; mericarps 7-10, included in the calyx, with a pair of short obtuse mucro at apex. Seeds c. 2 mm long, black.

Fl. & Fr.: Aug.-Apr.

Distr.: Southern Peninsular India. A weed along roadsides and wastelands. *CNS 1034* (Andhakaranazhi).

Sida cordata (Burm. f.), Borss., Blumea 14: 182. 1966; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 155. 1976; Mani. & Sivar., Fl. Calicut 43. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 128. 1983; Fryxell, Sida 11(1): 69. 1985; Paul & Nayar in Nayar *et al.*, Fasc. Fl. India 19: 206. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 173. 1988; Vajravelu, Fl. Palghat Dist. 83. 1990; Paul in Sharma & Sanjappa, Fl. India 3: 283. 1993; Sivar. & Pradeep, Malvaceae South. Penins. India 266. 1996; Sivar. & Mathew, Fl. Nilambur 90. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 61. 1996. *Melochia cordata* Burm. f., Fl. Ind. 143. 1768. *Sida veronicaefolia* Lam., Encycl. 1: 5. 1783; Dunn in Gamble, Fl. Pres. Madras 89. 1915. *Sida radicans* Cav., Diss. 1: 8, t. 9, f. 3. 1785; Wight & Arn., Prodr. Fl. Pen. Ind. Orient. 1: 59. 1834. *Sida humilis* Cav., Diss. 5: 277. t. 134. f. 2. 1788; Mast. in Hook. f., Fl. Brit. India 1: 322. 1874; *Sida humilis* var. *veronicaefolia* (Lam.) Mast. in Hook. f., Fl. Brit. India 1: 322. 1874. ***Nela-Vaga***, Rheede, Hort. Malab. 10: 137, t. 69. 1690.

Prostrate herbs; branches slender, trailing. Stem, petioles and pedicels pubescent with minute stellate hairs intermingled with simple hairs. Leaves 2-5.5 x 1.5-4.5 cm, broadly ovate or orbicular, base cordate, margins serrate-crenate, apex acute to acuminate, basally 5-7-nerved, stellate-tomentose on both sides; petioles to 3 cm long; stipules 1-2 mm long, linear. Flowers axillary, solitary; pedicels to 2 cm long, filiform, articulated above the middle. Calyx c. 5 mm long, campanulate, divided to the middle, stellate-tomentose without; lobes 5, triangular. Corolla 8-10 mm across, yellow; petals to 6 x 5 mm, obovate, apex rounded or slightly emarginate. Staminal column c. 2 mm long; anthers numerous, yellow. Ovary c. 2 mm across, subglobose; styles 5; stigmas 5, globose, yellowish. Schizocarp to 2.5 mm long; mericarps 5, to 3 x 2 mm, trigonous with rounded angles, apex shortly 2-beaked, completely enclosed in accrescent calyx. Seeds c. 2 mm long, reniform, brownish-black.

Fl. & Fr.: Almost throughout the year.

Distr.: Tropical and subtropical parts of the World. Common along waste places and sandy sea-coast. *CNS 1136* (Vandanam).

Sida cordifolia L., Sp. Pl. 684. 1753; Roxb., Fl. Ind. ed. Carey 3: 177. 1832; Wight & Arn., Prodr. Fl. Pen. Ind. Orient. 58. 1834; Mast. in Hook. f., Fl. Brit. India 1: 324. 1874; Dunn in Gamble, Fl. Pres. Madras 89. 1915; Borss., Blumea 14: 199. 1966; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 155. 1976; Mani. & Sivar., Fl. Calicut 43. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 128. 1983; Fryxell, Sida 11: 69. 1985 & Syst. Bot. Monogr. 25: 389. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 173. 1988; Paul & Nayar in Nayar *et al.*, Fasc. Fl. India 19: 207. 1988; Ramach. & Nair, Fl. Cannanore 63. 1988; Vajravelu, Fl. Palghat Dist. 83. 1990; Paul in Sharma & Sanjappa, Fl. India 3: 285. 1993; Sivar. & Pradeep, Malvaceae South. Penins. India 256. 1996; Sivar. & Mathew, Fl. Nilambur 91. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 62. 1996. *Sida rotundifolia* Lam., Encycl. 1: 5. 1783. *Sida micans* Cav., Diss. 1: 19, t. 3, f. 1. 1785. *Sida holosericea* Willd. ex Sprengel, Syst. 3: 112. 1826. *Sida ampla* Jones, Contr. W. Bot. 15: 146. 1929. ***Katu-uren*** Rheede, Hort. Malab. 10: 107, t. 54. 1690. ***Vankurundoti.***

Erect, branched subshrubs to 1.5 m tall; stem green, densely tomentose with minute stellate and spreading simple hairs. Leaves 1.5-5.5 x 1-3.5 cm, ovate, rarely suborbicular, base cordate, margins serrate to the base, apex subobtuse or acute, basally 3-5 nerved, densely stellate-tomentose beneath with simple hairs on nerves and soft tomentose above; petiole to 3.5 cm long, pubescent; solitary or aggregated terminally in to congested corymbiform inflorescence; pedicel to 3 mm long in flower, to 1.2 cm in fruits, articulated above the middle. Calyx 6-7 mm long, prominently 10-ribbed, densely tomentose without. Corolla c. 1 cm across, yellow; petals to 8 x 6 mm, obliquely obovate, apex truncate or slightly emarginate. Staminal column c. 3 mm long. Ovary subglobose, pubescent; styles 8-10; stigma capitate, yellow. Schizocarp 6-7 mm diam., pubescent towards apex; mericarps 8-10, to 3 x 2 mm, trigonous with acute angles, apically 2-awned. Seeds brownish or black.

Fl. & Fr.: Jul.-Sept.

Distr.: Pantropical. Common along roadsides and waste places. The flowers open at about 9.00. am and wither off by 2 p.m. The roots, leaves and seeds are used in medicine. *CNS 1029* (Vandanam).

Sida fryxellii Sivar. et Pradeep, Kew Bull. 45: 725. 1990; Sivar. & Pradeep, Malvaceae South. Penins. India 259. 1996. ***Vankurunthotti.***

Erect branched undershrubs to 2.5 m tall; stem green, densely stellate-pubescent with occasional simple hairs. Leaves 3-5 x 3.5-7 cm, dimorphic, early ones obovate-orbicular, obtuse, retuse or emarginate at apex, later ones ovate or elliptic, obtuse, rounded or acute at base, all crenate-serrate on margin, 3-5-nerved from base, sparsely pubescent below; petiole to 4 cm long; stipules to 1.5 cm long, linear, cauducous. Flowers solitary in the axils of upper leaves, sometimes in apparent terminal racemes due to reduction of distal leaves; pedicel to 1.5 cm long, articulated, densely stellate-hairy. Calyx 5-8 mm across, campanulate, 5-lobed with 10 prominent nerves, stellate-pubescent without and sparsely within; lobes triangular. Corolla 1-1.5 cm across, yellow; petals to 8 mm long, obliquely obovate, truncate or retuse at apex. Staminal column c. 3 mm long, stellate-hairy; antheriferous at apex. Ovary subglobose, stellate-hairy; styles 8-10; stigma capitate, purplish. Mericarps 8-10, trigonous, reticulate, 2-awned. Seeds brownish to black.

Fl. & Fr.: Sept.-Jan.

Distr.: Kerala. Common along roadsides and waste places in the sandy coastal belt. The flowers open at about 9.00 a.m. and close before 3.00 p.m. *CNS 1145* (Alappuzha town), *CNS 2489* (Arooor).

Sida mysorensis Wight & Arn., Prodr. Fl. Pen. Ind. Orient 1: 59. 1834; Mast. in Hook. f., Fl. Brit. India 1: 322. 1874. Borss., Blumea 14: 180. 1966; Paul & Nayar in Nayar *et al.*, Fasc. Fl. India 19: 209. 1988; Paul in Sharma & Sanjappa, Fl. India 3: 286.1993; Sivar. & Pradeep, Malvaceae South. Penins. India 271. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 62. 1996. *Sida hirta* sensu Wall., Cat. n. 1855. 1828, non Lam., 1783. *Sida glutinosa* auct. mult., non Cav., 1785: Roxb., Fl. Ind. ed. Carey 3: 172. 1832; Dunn in Gamble, Fl. Pres. Madras 89. 1915; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 130. 1983; Ramach. & Nair, Fl. Cannanore 64. 1988; Vajravelu, Fl. Palghat Dist. 83. 1990.

Erect subshrubs, aromatic; stem viscid, green, densely invested with stellate, gland-tipped and simple patent hairs. Leaves 3-5 x 2-3.5 cm, broadly ovate, base cordate, margins serrate-crenate, apex acute to acuminate, 5-7-nerved at base, pubescent with

stellate and simple hairs intermingled with gland-hairs on both surfaces; petioles to 3 cm long; stipules c. 5 mm long, linear, pubescent. Flowers axillary, solitary or often in 5-7-flowered, lax racemes; pedicels to 5 mm long, filiform, jointed above middle. Calyx to 7 mm long, campanulate, divided to the middle; lobes 5, triangular, densely covered with both stellate and simple hairs externally. Corolla c. 8 mm across, orangish-yellow; petals c. 5 x 3 mm , obovate, emarginate or retuse at apex. Staminal column to 3 mm long; anthers 10-14, yellow. Ovary c. 2 mm across, subglobose; styles and stigmas 5, yellow. Schizocarp c. 3 mm long; mericarps 5, to 3 x 2 mm, trigonous. Seeds c. 2 mm long, reniform, brownish-black.

Fl. & Fr.: Aug.-Feb.

Distr.: South and South East Asia. Usually in shaded sites and also grows along waysides. *CNS* 1688 (Champakulam).

Sida rhomboidea Roxb. ex Fleming, Asiat. Res. 11: 178. 1810; Roxb., Hort. Beng. 50. 1814 & Fl. Ind. ed. Carey 3: 176. 1832; Wight & Arn., Prodr. Fl. Pen. Ind. Orient. 57.1834; Dunn in Gamble, Fl. Pres. Madras 90. 1915; Sivar. & Pradeep, Sida 16 (1): 73. 1994; Sivar. & Pradeep, Malvaceae South. Penins. India 246. 1996; Sivar. & Mathew, Fl. Nilambur 93. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 62. 1996. *Sida rhombifolia* var. *rhomboidea* (Roxb. ex Fleming) Mast. in Hook. f., Fl. Brit. India 1: 324. 1874. *Sida rhombifolia* ssp. *rhombifolia* sensu Borss., Blumea 14: 193. 1966; Mani. & Sivar., Fl. Calicut 44. 1982; Fryxell, Syst. Bot. Monogr. 25: 403. 1988; Mani., Fl. Silent Valley 28. 1988., Paul & Nayar in Nayar *et al.*, Fasc. Fl. India 19: 214. 1988; Vajravelu, Fl. Palghat Dist. 84. 1990; Paul in Sharma & Sanjappa, Fl. India 3: 73. 1993.

Erect, much branched subshrubs to 1.2 m tall; stem usually purplish. Leaves 1.5-5 x 1-3 cm, obovate, rhomboid to lanceolate, base rounded, margins coarsely serrate to crenate, entire towards base, apex subobtuse or acute, 3-nerved from base, sparsely pubescent above and densely stellate-tomentose beneath; petiole to 8 mm long; stipules c. 6 mm long, linear, caducous. Flowers axillary, solitary; pedicels c. 5 mm in flowers, to 3 cm in fruits, filiform, articulated at about the middle. Calyx c.7 mm across, campanulate, 5-lobed; lobes c. 3 mm long, triangular, tomentose without. Petals yellow, 6-7 x 4-5 mm,

obliquely obovate, retuse or emarginate at apex. Staminal column to 3 mm long, stellate-pubescent, antheriferous at apex. Ovary c. 1.5 mm across, depressed globose; styles 8-10; stigmas capitate. Schizocarp 3-4 mm long; mericarps 8-10, c. 3 x 2 mm, trigonous, apex beaked, completely included. Seeds c. 2 mm long, brownish-black.

Fl. & Fr.: Throughout the year.

Distr.: Peninsular India. It occurs along roadsides and wastelands. *CNS 2123* (Alappuzha town).

THESPESIA Solander ex Correa

Ann. Mus. Nat. Hist. Nat. 9: 290. 1807 (*nom. cons.*).

Thespesia populnea (L.) Soland. ex Corr., Ann. Mus. Hist. Nat. Paris 9: 290, t. 8, f. 2. 1807; Wight & Arn., Prodr. Fl. Pen. Ind. Orient. 1: 32.1834; Wight, Ic. t. 8. 1838; Beddome, Fl. Sylv. S. India t. 63. 1870; Mast. in Hook. f., Fl. Brit. India 1: 345. 1874; Dunn in Gamble, Fl. Pres. Madras 101. 1915; Borss., Blumea 14: 106. 1966; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 156. 1976; Mani. & Sivar., Fl. Calicut 49. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 133. 1983; Fryxell, Syst. Bot. Monogr. 25: 441. 1988; Paul & Nayar in Nayar *et al.*, Fasc. Fl. India 19: 225. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 174. 1988; Ramach. & Nair, Fl. Cannanore 65. 1988; Vajravelu, Fl. Palghat Dist. 84. 1990; Paul in Sharma & Sanjappa, Fl. India 3: 352. 1993; Sivar. & Pradeep, Malvaceae South. Penins. India 37. 1996; Sivar. & Mathew, Fl. Nilambur 95. 1996. *Hibiscus populneus* L., Sp. Pl. 694. 1753. *Hibiscus populifolius* Salisb., Prodr. 383. 1796, *nom. superfl. Bupariti populnea* (L.) Rothmaler, Fedd. Repert. Spec. Nov. Reg. Veg. 53: 6. 1944. ***Baupariti*** Rheede, Hort. Malab. 1: 51-52, t. 29. 1678. ***Poovarasu, Pupparuthi.***

Trees to 12 m tall; young branches covered with peltate scales, older trunk with fissured bark. Leaves 8-15 x 8-12 cm, broadly ovate, base cordate, apex acuminate, 5-7-nerved from base, peltate-scaly or glabrescent; petiole 4-10 cm long, scaly; stipules c. 6 mm long, linear-lanceolate, cauducous. Flowers solitary, axillary, erect or drooping; pedicels 2-8 cm long, jointed at base. Involucral bracts 0 or 3, to 1 cm long, lanceolate. Calyx tube 1.2-1.4 cm long, cupular, subtruncate or obscurely 5-dentate at apex, covered

with minute peltate scales. Corolla 5-7 cm across, campanulate, yellow, usually with a dark purple center; petals to 7 x 6 m, broadly obovate with rounded apex. Staminal column 2.5 cm long; filaments c. 4 mm long; anthers c. 2 mm diam. Ovary 6-8 mm across, ovoid; styles c. 4 cm long. Capsules c. 2.5 cm across, globose, indehiscent, mucronate. Seeds 2-4 per cell, 8-15 x 6-9 mm, obovoid, pubescent or glabrous.

Fl. & Fr.: Throughout the year.

Distr.: Pantropical. Common along canal bunds, near sea coasts, etc. Widely cultivated as roadside shade-trees and on living fence-posts. Flowers opening by 10 am and closing in the evening. *CNS 1528* (Aroor), *CNS 2630* (Kayamkulam).

URENA Linnaeus

Sp. Pl. 692. 1753.

Erect, branched subshrubs, more or less covered with rigid stellate hairs. Leaves angular or 3 -5-lobed, with 1-3 nectaries on main nerves beneath. Flowers usually axillary, solitary, sometimes 2-3-fasiculate. Pedicels short, not articulated. Involucral bracts 5, connate at the base. Sepals 5, connate into a cup-shaped calyx. Corolla rose to deep pink; petals 5, connate below, united to the staminal-tube. Staminal column bearing subsessile anthers below the truncate or 5-toothed apex. Ovary 5-celled; cells 1-ovuled; style branches 10; stigmas 10, capitate. Fruit schizocarpic, 5-lobed; mericarps 5, indehiscent, covered with glochidate spines.

1a. Lower leaves shallowly lobed; epicalyx cupular and appressed to mericarps .... **U. lobata**

1b. Lower leaves deeply lobed; epicalyx spreading or reflexed in fruit .... **U. sinuata**

Urena lobata L., Sp. Pl. 692. 1753; Roxb., Fl. Ind. ed. Carey 3: 182. 1832; Wight & Arn., Prodr. Fl. Pen. Ind. Orient. 46.1834; Mast. in Hook. f., Fl. Brit. India 1: 329. 1874; Dunn in Gamble, Fl. Pres. Madras 92. 1915; Borss., Blumea 14: 138. 1966; Fryxell, Syst. Bot. Monogr. 25: 443. 1988; Mani., Fl. Silent Valley 29. 1988; Sivar. & Pradeep, Malvaceae South. Penins. India 180. 1996. *Urena trilobata* Vellozo, Fl. Flum. 7: t. 44. 1825. *Urena*

lobata ssp. *lobata* Borss., Blumea 14: 140. 1966; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 156. 1976; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 134. 1983; Ramach. & Nair, Fl. Cannanore 65. 1988; Vajravelu, Fl. Palghat Dist. 85. 1990; Sivar. & Mathew, Fl. Nilambur 95. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 63. 1996. *Urena lobata* ssp. *lobata* var. *lobata* Borss., Blumea 14: 140. 1966; Paul in Sharma & Sanjappa, Fl. India 3: 380. 1993.

Erect branched subshrubs to 2m tall; stems densely stellate-pubescent. Leaves 3-10 x 3-9 cm, broadly to narrowly ovate, upper most leaves sometimes lanceolate, 3-5 angular to shallowly lobulate, truncate or cordate at base, margin obscurely crenate-serrate, 5-7-nerved from base, sparsely stellate-pubescent above, densely stellate-pubescent below, with 1-3 elliptic nectaries on principal nerves, lobes generally acute or acuminate, varying in size; petioles 3-8 cm long, stellate-pubescent; stipules up to 4 mm long, linear to subulate. Flowers axillary, usually solitary, sometimes 2 or 3 in a cluster; pedicels 3-8 mm long. Involucral bracts 5, 5-6 x 1.5-2 mm, spathulate, connate at base, clothed with rigid hairs. Calyx 5-9 mm long, campanulate, 5-parted; lobes ovate-elliptic, margins pubescent. Corolla pink with dark center; petals to 15 x 9 mm, obovate with rounded apex, stellate-hairy without. Staminal column 8-10 mm long, pinkish; anthers pale pink. Ovary to 4 mm across, subglobose, stiff-hirsute; Stigmas capitate. Schizocarp 10-12 mm across, globose; mericarps 5, to 8 x 5 mm, trigonous, densely stellate-pubescent, also with many glochidate spines. Seeds to 4 mm long, reniform, angular.

Fl. & Fr.: Aug.-Feb.

Distr.: Tropical parts of both the hemispheres. Common weed along roadsides and wastelands. The flowers open at about 9.00 am and wither off by noon. *CNS 1160* (Alappuzha town).

Urena sinuata L., Sp. Pl. 692. 1753; Roxb., Fl. Ind. ed. Carey 3: 182. 1832; Wight & Arn., Prodr. Fl. Pen. Ind. Orient. 46. 1834; Mast. in Hook. f. Fl. Brit. India 1: 329. 1874; Dunn in Gamble, Fl. Pres. Madras 92. 1915; Sivar. & Pradeep, Malvaceae South. Penins. India 184. 1996. *Urena paradoxa* H.B.K., Nov. Gen. Sp. 5: 278. 1822. *Urena scabriuscula* DC., Prodr. 1: 441. 1824, non Wight & Arn., 1834. *Urena lobata* var.

scabriuscula (DC.) Mast. in Hook f., Brit. India 1: 329. 1874. *Urena lobata* ssp. *sinuata* (L.) Borss., Blumea 14: 142. 1966; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 157. 1976; Mani. & Sivar., Fl. Calicut 46. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 135. 1983; Paul & Nayar in Nayar *et al.*, Fasc. Fl. India 19: 230. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 174. 1988; Ramach. & Nair, Fl. Cannanore 65. 1988; Vajravelu, Fl. Palghat Dist. 85. 1990; Paul in Sharma & Sanjappa, Fl. India 3: 382. 1993; Sivar. & Mathew, Fl. Nilambur 96. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 63. 1996. ***Uren*** Rheede, Hort. Malab. 10: 3-4, t. 2. 169. 1678.

Erect branched subshrubs, 0.5-2 mm tall; stem densely stellate-pubescent. Leaves 3-5-angular to palmately 5-parted, 3-10 x 3-9 cm; lobes dilated upwards, with rounded sinuses, obscurely crenate-serrate, both surfaces densely clothed with minute stellate hairs, a single linear nectary on the mid-nerve beneath and sometimes one or both of the adjoining nerves; petioles 3-10 cm long; stipules c. 2 mm long, subulate. Flowers axillary, solitary or paired; pedicels 3-5 mm long. Involucral bracts 5, c. 5 mm long, spathulate, divided below the middle. Calyx campanulate, 5-parted; lobes c. 5 x 2 mm, elliptic-acute, stellate hairy without. Corolla rose to pink with a dark center; petals to 10 x 6 mm, obovate. Staminal column to 7 mm long, pinkish; anthers pink. Ovary c. 3 mm across, depressed globose, densely pubescent; styles 10; stigmas capitate. Schizocarp to 10 mm across, globose; mericarps 5, densely stellate-pubescent, also with numerous glochidiate spines. Seeds to 4 mm long, black.

Fl. & Fr.: Aug.-Jan.

Distr.: Tropical parts of both hemispheres. A weed along roadsides and waste lands. *CNS 2489* (Aroor).

21. BOMBACACEAE Kunth

Malvac. Buttner. Tiliac. 5. 1822.

1a. Stems armed; flowers large, red, above 7 cm long ..... **Bombax**

1b. Stems unarmed; flowers small, yellowish white, below 5 cm long ..... **Ceiba**

BOMBAX Linnaeus

Sp. Pl. 511. 1753.

Bombax ceiba L., Sp. Pl. 511. 1753 p.p.; Robyns, Taxon 10: 160.1961 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1:64 .1980; Mani. & Sivar., Fl. Calicut 50. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:136. 1983; Ramach. & Nair, Fl. Cannanore 66. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 74. 1988; Vajravelu, Fl. Palghat Dist. 86. 1990 ; Nayar & Biswas in Sharma & Sanjappa, Fl. India 3: 398. 1993; Mohanan & Henry, Fl. Thiruvananthapuram 83.1994; Sivar. & Mathew, Fl. Nilambur 96. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 64.1996. *Bombax malabaricum* DC., Prodr. 1:479. 1824; 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; Nicols. & Sald. in Sald. &Nicols., Fl. Hassan Dist. 145.1976. ***Moul-elavou*** Rheede, Hort. Malab. 3:61-62, t. 52. 1682. ***Ilavu.***

Large deciduous trees with buttress roots; trunk with conical prickles. Leaves digitate, 5-7- foliolate; leaflets 10-20 x 2.5-7 cm, elliptic or oblong, tapering at base, apex long caudate; petiole to 20 cm long. Flowers solitary or in clusters towards tips of leafless branchlets, 4-6 cm across, bright red; pedicels to 1.5 cm long. Calyx campanulate, irregularly 2-5- lobed; lobes 1.5-2 x 2-2.5 cm, coriaceous, silky inside. Petals 5,4-4.5 x 1.5-2 cm, ovate-elliptic, apex rounded, densely stellate - pubescent without. Stamens 60-80, grouped in 5 bundles of 10-12, opposite to petals; filaments 2.5-3 cm long. Ovary 5-6 mm across, conical; style 3-4 cm long, slightly 5-lobed at tip. Capsules drooping, 10-12x2.5-3.5 cm, oblong. Seeds many 2-3 mm across, pyriform, dark brown, embedded in creamy white silky fibers.

Fl. & Fr.: Nov.- Feb.

Distr.: Tropical Asia and New Guinea. In waste places. *CNS 1562* (Cheriyanad).

CEIBA P.Miller

Gard. Dict. Abr. ed., 4. 1754.

Ceiba pentandra (L.) Gaertn., Fruct. Sem. Pl. 2: 244, t. 133. 1791; Mani. & Sivar., Fl. Calicut 50. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 137. 1983; Ramach. & Nair, Fl. Cannanore 67.1988; Nicols., Suresh &Mani., An Interpr. Hort. Malab. 74. 1988; Mani., Fl. Silent Valley 30. 1988; Vajravelu, Fl. Palghat Dist. 87. 1990; Nayar & Biswas in Sharma & Sanjappa, Fl. India 3: 400. 1993; Sivar. & Mathew, Fl. Nilambur 97. 1996. var. **pentandra** Robyns in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 70. 1980. *Bombax pentandrum* L., Sp. Pl. 511. 1753. *Eriodendron anfractuosum* DC., Prodr. 1:479. 1824; Mast. in Hook. f., Fl. Brit. India 1:350.1874. *Eriodendron pentandrum* (L.) Kurz, J. Asiat. Soc. Beng. 43:113.1874. *Ceiba pentandra* (L.) Gaertn. var. *indica* (DC.) Bakh. f., Bull. Jard. Bot. Buitenz. Ser. 3, 6: 195. 1924. ***Panja, Panjala*** Rheede, Hort. Malab. 3:59-60, t. 49-51.1682. ***Panji.***

Deciduous trees; bark green. Leaves digitate, 5-9- foliolate; leaflets 6-10x2.5-3 cm, narrowly ovate- oblong, base narrowed, apex acuminate; petioles to 16 cm long. Flowers usually in clusters towards ends of leafless branchlets. Calyx c.1 cm long, campanulate, irregularly 5-lobed, coriaceous. Petals 5, yellowish white, 2.5-3.5 x 1-1.5 cm, oblong to oblanceolate, apex rounded, villous to tomentose outside. Staminal tube divided into 5 phalanges; filaments 2-2.5 cm long. Ovary globular. 5-locuiar; ovules many in each locule. Capsules 10-20 x 3-4 cm, ellipsoid, coriaceous. Seeds numerous, 4-6 mm across, globose, black with copious white silky fibres.

Fl. & Fr.: Dec.- Mar.

Distr.: Native of tropical America. Common along fences. *CNS 2544* (Pathirappally).

22. STERCULIACEAE (DC.) Bartl.

Ord. Nat. Pl. 225, 340. 1830.

1a. Herbs or subshrubs.

2a. Flowers pink; ovary 5-celled; stylar lobes 5; capsules 5-valved ..... **Melochia**

2b. Flowers yellow; ovary 1 - celled; style 1; capsules 2 - valved ..... **Waltheria**

1b. Trees or Shrubs.

3a. Petals present; flowers bisexual.

4a. Ovary stipitate or supported on an androgynophore.

5a. Inflorescence many-flowered, terminal, paniculate; petals yellow; capsule membranous, inflated ..... **Kleinhovia**

5b. Flowers axillary, solitary or fasciculate; petals crimson; follicles spirally twisted ..... **Helicteres**

4b. Ovary not stipitate.

6a. Flowers cauliflorous; capsule more than 5 cm long, oblong-ellipsoid, smooth ..... **Theobroma**

6b. Flowers axillary; capsule less than 2.5 cm long, subglobose, tubercled ..... **Guazuma**

3b. Petals absent; flowers unisexual or polygamous ..... **Sterculia**

GUAZUMA P. Miller

Gard. Dict. Abr. ed. 4. 1754.

Guazuma ulmifolia Lam., Encycl. 3:52.1789; Robyns, Ann. Missouri Bot. Gard. 51:102. 1964; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:143.1983; Malick in Sharma *et al.*, Fl. India 3: 424.1993; Verdcourt in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9:421.1995. *Theobroma guazuma* L., Sp.Pl. 782.1753. *Guazuma tomentosa* Kunth, Nov. Gen. Sp.5:320. 1823; Beddome, Fl. Sylv. t. 107.1871; Hook.f., Fl. Brit. India 1:375.1874; Gamble, Fl. Pres. Madras 111.1915.

Small trees; branchlets stellate-tomentose. Leaves 6-16 x 3-6 cm, ovate to oblong-lanceolate, base unequally cordate, margin serrulate, apex long-acuminate, more or less scabrous above and tomentose below, basally 6-nerved; petiole to 2 cm long. Cymes axillary and terminal, 2-4 cm long. Flowers to 8 mm across; pedicel 3-6 mm long. Calyx 3-lobed, 2-3 mm long, subequal, tomentose without. Petals 5, yellow, 3.5-5 x 2 mm, obovate, cucullate, puberulous without; appendage 4-5 mm long, divded more than half way. Staminal column c. 2 mm long, campanulate; stamens 15. Ovary sessile, c. 2 mm long, globose, stellate - tomentose, 5-celled; ovules many; style 5, basally connate. Capsule purplish black, 1.5-2.2 x 1.4-1.8 cm, globose or ellipsoid, woody, tuberculate, indehiscent. Seeds 2-3 x 1.5-2 mm.

Fl. & Fr. : Aug. - Dec.

Distr.: Native of tropical America but naturalised in the Old World, particularly in India. *CNS 2415* (Kayamkulam town).

HELICTERES Linnaeus

Sp.Pl.963.1753.

Helicteres isora L., Sp. Pl. 963.1753; Wight, Ic. t. 180.1839; Bedd., Fl. Sylv. t. 5, f. 1.1871; Mast. in Hook .f., Fl. Brit. India 1:365.1874; Dunn in Gamble, Fl. Pres. Madras 107.1915; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 141.1976; Mani. & Sivar., Fl. Calicut 51. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 144.1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 253. 1988; Ramach. & Nair, Fl. Cannanore 67.1988; Mani., Fl. Silent Valley 31.1988; Malick in Sharma *et al.*, Fl. India 3: 426.1993; Mohanan & Henry, Fl. Thiruvananthapuram 85.1994; Verdcourt in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 426.1995; Sivar. & Mathew, Fl. Nilambur 99.1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 66. 1996. ***Isora - murri*** Rheede, Hort. Malab. 6:55-56, t.30.1686. ***Idampiri-valampiri***

Large shrubs or small trees; bark pale greyish, finely wrinkled; young shoots stellate- tomentose. Leaves 5-12 x 3-8 cm, obovate to suborbicular, base cordate, margin irregularly crenate- serrate, apex acute or acuminate, 3-5-nerved at the base, scabrous above and stellately tomentose below; petioles to 1.2 cm long. Flowers axillary, solitary

or in few-flowered cymes; bracts 2-3 mm long, linear, 2 brown glands present in the axil of bracts; pedicel to 6 mm long. Calyx slightly yellow, persistent, tubular, splitting in to 5 irregular lobes; tube 1.5-2 cm long , densely stellate hairy without. Petals 5, unequal, 2-2.5 cm long, obovate, clawed, crimson, fading to pale blue. Staminal column 3-3.5 cm long, cylindric; stamens 10 ; staminodes 5. Ovary 2-2.5 mm long, placed at tip of gynophore, 5-lobed, 5-celled; ovules many; style 5; stigma subulate. Follicles 5, 4-6 cm long, spirally twisted, stellate-tomentose, beaked. Seeds 2-3 mm long, angular, black, wrinkled.

Fl. & Fr.: Nov. - Jan.

Distr. : Indo-Malaysia. Occasional on roadsides and wastelands. The bark and fruits are used in Ayurvedic medicines to cure flatulence and scabies. *CNS 2416* (Alappuzha town).

KLEINHOVIA Linnaeus

Sp.Pl.ed.2.1365.1763.

Kleinhovia hospita L., Sp. Pl. ed. 2, 1365.1763; Roxb., Fl. Ind. 3 : 141.1832; Hook. f., Fl. Brit. India 1 : 364. 1874; Gamble, Fl. Pres. Madras 113.1915; Blatter *et al.*, Beautif. Ind. Trees (ed.2) 95.1954; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3 : 146.1983; Malick in Sharma *et al.*, Fl. India 3 : 434.1993; Verdcourt in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 428.1995.

Trees to 20 m tall. Leaves 9-17 x 7-14 cm, broadly ovate, base subcordate or rounded, apex acute to long - acuminate; petiole to 14 cm long; stipules c. 6 mm long, linear. Flowers 4-7 mm wide, in terminal lax drooping panicles; pedicels 3-5 mm long; bracteoles 3-4 mm long, lanceolate. Sepals pink, 6-8 x 2-2.5 mm, linear-lanceolate, tomentose. Petals yellow, unequal, 4-6 x 2-2.5 mm, ovate-oblong. Stamens c.15, united into a broadly campanulate column; anthers c.1mm long. Ovary c.1.5 mm long, ovoid, tomentose. Gynophore 6-8 mm long. Capsule pink, 1.5-2.5 cm across, obovoid. Seeds white, tuberculate.

Fl. Fr. : Mar. - Sept.

Distr. : India to Indo China, China, Malesia, Polynesia and E. tropical Africa. *CNS2417* (Alappuzha).

MELOCHIA Linnaeus

Sp. Pl. 674 ("774"). 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; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 143.1976; Mani. & Sivar., Fl. Calicut 51.1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:147.1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 254.1988; Ramach. & Nair, Fl. Cannanore 68.1988; Malick in Sharma *et al.*, Fl. India 3 : 441.1993; Mohanan & Henry, Fl. Thiruvananthapuram 86.1994; Verdcourt in Dassan., Fosb. & Clayton, Rev. Handb. Fl, Ceylon 9 : 414.1995; Sivar. & Mathew, Fl. Nilambur 100.1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 67.1996; ***Tsjerou - uren*** Rheede, Hort. Malab. 9 : 143, t.73.1689.

Erect branched herbs. Young stem, petioles, bracts and calyx lobes stellate hairy mixed with simple hairs. Leaves varying in size and shape, 2 - 5 x 1 - 2.5 cm, ovate-oblong, cordate or attenuate at base, margin serrate, acute at apex, sparsely hairy on nerves on both sides; petioles to 1 cm long. Flowers in terminal, capitate cymes. Bracts 2-3 mm long, linear-lanceolate, ciliate on margins. Calyx 5-lobed, campanulate, 2-3 mm long; lobes lanceolate, ciliate, Corolla pink, 5, 2-4 mm, obovate, obtuse or retuse at apex. Stamens 5, filaments united at base. Ovary c. 1 mm long, ovoid, 5-celled; ovules 2 in each cells; styles 5. Capsule 3-4 mm, sub - globose, 5- valved. Seeds angular or plano-convex, dark brown or greyish.

Fl. & Fr.: Throughout the year.

Distr. : Pantropical. Common weed on wastelands and wet fields. *CNS 1142* (Alappuzha Town), *CNS 2418* (Aroor).

STERCULIA Linnaeus

Sp. Pl. 1007. 1753.

Trees, usually deciduous. Leaves simple, entire or digitately lobed. Inflorescence axillary to terminal racemes or panicles. Flowers male or hermaphrodite. Calyx usually coloured, tube campanulate or cupular; lobes 5. Petals absent. Receptacles produced in to

elongate gynandrophore. Staminal column bearing 10-15 anthers. Carpels 3-6, free, sometimes cohering; ovules 2 - many. Follicles 3 - 6, free, spreading, woody. Seeds 2 - many, smooth, arillate.

1a. Leaves palmately compound ..... **S. foetida**

1b. Leaves simple

2a. Petioles and nervules rusty-stellate - tomentose; pedicels c. 5 mm long; calyx segments broadly ovate, erect, apices not connivent; follicles obovoid ..... **S. guttata**

2b. Petioles and blades glabrescent; pedicels 1.2 - 2.5 cm long; calyx segments linear, apices connivent; follicles oblong with acuminate tip... **S. balanghas**

Sterculia balanghas L., Sp. Pl. 1007.1753; Mast. in Hook. f., Fl. Brit. India 1:358.1874; Gamble, Fl. Pres. Madras 106. 1915; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 255. 1988; Malick in Sharma *et al.*, Fl. India 3 : 458.1993; Vedcourt in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9 : 434. 1995.

Small trees to 10 m tall; bark grey, cracked. Leaves crowded at the branch ends, 8 - 15.5 x 4.5 - 8 cm, elliptic or ovate - oblong, base rounded to subcordate, apex acute to acuminate, stellate-hairy to glabrous beneath; petiole to 4 cm long. Flowers scented, purple, in drooping axillary slender inflorescence, 6-14 cm long; pedicels 1-2.2 cm long. Calyx tube 1-2 mm long, obconic; lobes 5-7 mm long, lanceolate, densely hairy inside, the apices connivent. Male flowers with staminal column 2-3 mm long; anthers 15, yellow, forming a globose head. Bisexual flowers with gynandrophore c. 7 mm long; ovary 2-2.5 mm long, globose, densely hairy; stigmas 5, oblong, c.1mm long. Follicles c.5, orange - scarlet, spreading, 5-7 x 3.5-4.5cm. oblong with acuminate tip, brownish tomentose. Seeds 1-1.5 cm long, ovoid, black.

Fl. & Fr.: Jun. - Dec.

Distr. : India, Sri Lanka, Burma, Malay Peninsula, Langkawi and Timor. Common on roadsides and sacred groves, and also as a fence plant. *CNS 1543* (Kadakarappally), *CNS 2419* (Aroor).

Sterculia foetida L., Sp. Pl. 1008. 1753; Roxb., Fl. Ind. 3 : 154. 1832; Wight, Ic. t. 181. 1839 & 364. 1840; Mast. in Hook.f., Fl. Brit. India 1 : 354. 1874; Gamble, Fl. Pres. Madras 105. 1915; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3 : 151.1983; Malick in Sharma *et al.*, Fl. India 3 : 459. 1993; Verdcourt in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9 : 431. 1995.

Large deciduous trees to 30 m tall; bark thin, rough, pale grey. Leaves clustered at the ends of the branchlets, palmately 5-8- foliolate; leaflets 10 - 18 x 3.5 - 5 cm, elliptic to lanceolate, base cuneate, apex acute to long acuminate, stellate-hairy at first but soon become glabrous; petiole to 35 cm long. Flowers dull violet-red or brownish purple, c. 25 cm across in axillary panicles, foetid. Calyx tube 4-5 mm long, obconic, villous within; lobes 5, to 1.3 cm long, lanceolate. Male flowers with staminal column c.1 cm long, curved, stellate-tomentose; stamens c. 15. Bisexual flowers with gynandrophore. c. 7 mm long. Ovary c. 2 mm long, globose, 5-celled; ovules many. Follicles 5, scarlet, woody, 8-13 x 5-6 cm, boat-shaped, beaked. Seeds many, 1.8 - 2.3 cm, long, ellipsoid, black; aril yellow.

Fl. & Fr.: Mar. - Oct.

Distr. : India, Sri Lanka, Burma, Thailand, Malesia from Malaya to W. New Guinea, N. Australia. *CNS 2420* (Aroor).

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; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 144.1976; Mani. & Sivar., Fl. Calicut 51.1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:152.1983; Ramach. & Nair, Fl. Cannanore 69.1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 255.1988; Mani., Fl. Silent Valley 33.1988; Malick in Sharma *et al.*, Fl. India 3: 462.1993; Mohanan & Henry, Fl. Thiruvananthapuram 88.1994;Sivar. & Mathew, Fl. Nilambur 103.1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 70.1996. ***Ramena - pou - maram*** Rheede, Hort. Malab. 4:125, t. 61. 1683

Trees; bark brownish; young shoots and inflorescence rusty stellate-tomentose. Leaves 15-25 x 12-14 cm, oblong or elliptic-oblong, subcordate at base, caudate -

acuminate at apex, glabrous above and stellate-tomentose below; petioles to 5 cm long. Racemes in terminal clusters, to 17 cm long, woolly. Flowers c. 2 cm across, foetid; pedicel to 8 mm long. Calyx greenish outside and reddish inside; tube cupular; lobes 5, 7-10 x 4-5 mm, lanceolate, densely stellate-pubescent without and simple hairs mixed with yellow glands within. Petals absent. Stamens many; anthers sessile on an androphore in male flowers; bisexual with a short androgynophore. Carpels 5, apocarpous, to 3 mm long, globose; ovules many in each carpel. Follicles 2-5, 4-8 x 2.5-3.5 cm, obovoid, bright red. Seeds black, 1-1.2 x 0.6-0.8 cm, ovoid, smooth.

Fl. & Fr. : Oct. - Feb.

Distr.: Peninsular India, Sri Lanka, Malaya. *CNS 2421* (Thamarakulam).

THEOBROMA Linnaeus

Sp. Pl. 782.1753.

Theobroma cacao L., Sp. Pl. 782.1753; Gamble, Fl. Pres. Madras 113.1915; Purseglove, Trop. Crops, Dicots. 571-598. 1968; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:154.1983; Malick in Sharma *et al.*, Fl. India 3:476.1993; Verdcourt in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9:420.1995.

Trees to 8 m tall; young branchlets sparsely pubescent. Leaves 14-40 x 6-14 cm, ovate-oblong or elliptic-oblong, base rounded to obtuse, apex acuminate or cuspidate; lateral nerves 10-13 pairs; petiole 1.5-3 cm long. Inflorescence on trunks and branches; peduncle 2-3 mm long; pedicels 1-2 cm long. Sepals 5, 4-7 x 2-3 mm, lanceolate, glabrous to pubescent. Petal-hoods white with two purple veins, 3-4 mm long, obovate, curved; appendage creamy-yellow, 4-5 x 2-2.5 mm, obovate, clawed. Stamens 5, opposite to the petals; filaments short, curved; staminodes 5, 4-6 mm, linear, purple with yellowish acuminate tip. Ovary c.1.5 mm long, oblong, 5-angled; styles 5. Fruit variable in shape and colour, 10-18 x 5-8 cm, oblong-ellipsoid, ridged. Seeds 20-40, arranged in 4-5 rows, 2.5-3.5 cm long, ovoid, the surrounding pulp white, sweet.

Fl. & Fr. : Jun. - Mar.

Distr.: Native of Central America. It is now widely cultivated in many tropical countries. *CNS 2422* (R. Block).

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; Mani. & Sivar., Fl. Calicut 52.1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:154.1983; Ramach. & Nair, Fl. Cannanore 69.1988; Malick in Sharma *et al.*, Fl. India 3:473. 1993; Mohanan & Henry, Fl. Thiruvananthapuram 89.1994; Verdcourt in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9:418.1995; Sivar. & Mathew, Fl. Nilambur 104.1996. *Waltheria americana* L., Sp. Pl. 673.1753; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 144.1976.

Erect, branching herbs or under shrubs; densely stellate-tomentose all over. Leaves 2-5 x 1-2.5 cm, elliptic-ovate to oblong, base cordate, margin serrate, apex rounded, venation impressed above and prominent beneath; petiole to 2.3 cm long. Flowers in axillary and terminal subsessile clusters. Calyx tube 2-4 mm long, campanulate; lobes 5. Petals 5, yellow, 4-5 mm long, obovate-obtuse. Stamens 5, connate below. Ovary villous, 1-celled; ovules 2; style c.1.5 mm long; stigma penicillate. Capsule 3-4 x 2 mm, obovoid, 2-valved, enclosed in calyx. Seed 1, c. 2 mm long, obovoid.

Fl. & Fr.: Through out the year.

Distr.: Pantropical. Common in waste lands. An early coloniser in disturbed ground. *CNS 1076* (Aroor), *CNS 2423* (Mannancherry).

23. TILIACEAE Juss.

Gen. Pl. 289. 1789.

1a. Erect shrubs; fruit a drupe ..... **Grewia**

1b. Erect herbs or subshrubs; fruit a capsule.

2a. Petals glandular at base; basal pair of serrations of leaves not prolonged into filiform process; capsules echinate ..... **Triumfetta**

2b. Petals not glandular at base; basal pair of serrations of leaves prolonged into filiform process or setae, capsules not echinate ..... **Corchorus**

CORCHORUS Linnaeus

Sp. Pl. 529. 1753.

Herbs, undershrubs or shrubs, covered with simple and stellate hairs. Leaves alternate, petiolate, serrate; stipules filiform. Inflorescence axillary or leaf-opposed, pedunculate, 1-few-flowered cymes. Flowers small, subsessile. Sepals 5, valvate. Petals 5, free, yellow, imbricate. Stamens 5-many, free. Carpels 2-5, syncarpous; ovary superior, 2-5-loculed; ovules many in each locule; style short; stigma simple, papillate. Capsules long or subglobose, loculicidally 2-5-valved. Seeds pendulous or horizontal.

1a. Capsules globose to subglobose ..... **C. capsularis**

1b. Capsules elongate.

2a. Capsules 3-loculed, 6-angled, 3 angles prominently winged, terminating into 3, 2-fid, spreading tips .....**C. aestuans**

2b. Capsules 5-loculed, subcylindric, 10-ribbed, not winged, not terminating into 3, 2-fid, spreading tips ..... **C. olitorius**

Corchorus aestuans L., Syst. Nat. ed. 10, 2: 1079. 1759; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 132. 1976; Mani. & Sivar., Fl. Calicut 53. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:157. 1983; Ramach. & Nair, Fl. Cannanore 69. 1988; Vajravelu, Fl. Palghat Dist. 92. 1990; Daniel & Chandrabose in Sharma & Sanjappa, Fl. India 3:485. 1993; Mohanan & Henry, Fl. Thiruvananthapuram 89. 1994; Sivar. & Mathew, Fl. Nilambur 105. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 71. 1996. *Corchorus acutangulus* auct. non Forsskal, 1755: Mast. in Hook. f., Fl. Brit. India 1: 398. 1874; Dunn in Gamble, Fl. Pres. Madras 121. 1915.

Annual, much branched, spreading herbs; stems pilose, often reddish. Leaves 2.5-7 x 1.5-3.5 cm, ovate to elliptic-lanceolate, base rounded, margins serrate, the basal pair of serrations ending in setae or not, apex acute, basally 3-5-nerved; petioles upto 3 cm long; stipules 4-8 mm long, setaceous. Flowers 2-3 in leaf-opposed, shortly pedunculate cymes; pedicels c. 2 mm long. Sepals 5, 3-4 mm long, linear-oblong, hooded and apiculate.

Petals 5, yellow, 3-5 mm long, obovate, obtuse. Stamens many. Ovary c. 2 mm long, cylindric, 3-loculed; style 3-fid; stigma 2-lobed. Capsules 1-3 x 0.4-0.6 cm, 6-angled, 3 of the angles winged, 3-loculed. Seeds numerous, dark brown.

Fl.& Fr.: Sept. - Jan.

Distr.: Pantropical. Common in exposed wastelands, in moist situations. CNS 1129 (Vandanam).

Corchorus capsularis L., Sp. Pl. 529. 1753; Mast. in Hook. f., Fl. Brit. India 1:397. 1874; Dunn in Gamble, Fl. Pros. Madras 122. 1915; Mani. & Sivar., Fl. Calicut 54. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 158. 1983; Daniel & Chandrabose in Sharma & Sanjappa, Fl. India 3: 485. 1993; Mohanan & Henry, Fl. Thiruvananthapuram 89. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 71. 1996.

Annual, much branched, erect, robust subshrubs. Leaves 6-12 x 2-5 cm, ovate-lanceolate or linear-lanceolate, base rounded, margins serrate, basal most serrations prolonged into filiform processes, apex acute to acuminate, basally 3-5-nerved; petioles upto 3.5 cm long; stipules 0.5-1 cm long, linear. Flowers c. 1 cm across, in short axillary or leaf-opposed cymes, subsessile, bracts 2-3 mm long, linear-ovate. Sepals 5, free, 4-5 mm long, linear-oblong. Petals 5, yellow, 4-5 mm long, oblong-obtuse. Stamens many. Ovary subglobose, 5-loculed. Capsules 1-1.5 cm across, subglobose, wrinkled, muricate or tuberculate. Seeds 2-3 mm long, cuneiform, brown.

Fl. & Fr.: Sept. - Nov.

Distr.: Pantropical. Found along roadsides and waste places as weed. *CNS 1055* (Ambalapuzha), *CNS 2547* (Pallithode).

Corchorus olitorius L., Sp. Pl. 529. 1753; Roxb., Fl. Ind. 2: 581. 1832; Wight & Arn., Prodr. 73. 1834; Mast. in Hook. f., Fl. Brit. India 1: 397. 1874; Dunn in Gamble, Fl. Pres. Madras 122. 1915; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 160. 1983; Daniel & Chandrabose in Sharma & Sanjappa, Fl. India 3: 487. 1993.

Erect, annual, subshrubs, up to 1.5 m high. Leaves 5-11 x 2.5-4 cm, ovate-lanceolate, base rounded, margins serrate, basal most serrations prolonged into filiform processes, apex acuminate, basally 3-5-nerved; petioles upto 3 cm long; stipules 6-10 mm long, subulate. Cymes opposite to leaves, few-flowered. Flowers 1-1.2 cm across, subsessile. Sepals 5, 4-6 mm long, linear-oblong, apiculate. Petals 5, yellow, 5-6 mm long, oblong-spathulate, obtuse. Stamens many. Ovary cylindric, 5-loculed; stigma 5-lobed. Capsules 2-4 cm long, subcylindric, 10-ribbed, 5-loculed. Seeds trigonous, black.

Fl. & Fr.: Aug. - Jan.

Dist.: Pantropical. A weed of wastelands. *CNS 2553* (Kanjikuzhi).

GREWIA Linneaus

Sp. Pl. 964. 1753.

Grewia nervosa (Lour.) Panigr., Taxon 34: 702. 1985; Ramach. & Nair., Fl. Cannanore 71. 1988; Daniel & Chandrabose in Sharma & Sanjappa, Fl. India 3:502. 1993; Mohanan & Henry, Fl. Thiruvananthapuram 90. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 72. 1996. *Fallopia nervosa* Lour., Fl. Cochinch. 336. 1790. *Microcos paniculata* L., Sp. Pl. 514. 1753, non *Grewia paniculata* Roxb. ex DC. 1824; Burret, Notizbl. Bot. Gart. Berlin-Dahlem 9:773. 1926; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 257. 1988. *Grewia microcos* L., Syst. Nat. ed. 12, 602. 1767, *non. illeg.*; Mast. in Hook. f., Fl. Brit. India 1: 392. 1874; Dunn in Gamble, Fl. Pres. Madras 116. 1915; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 136. 1976; Mani. & Sivar., Fl. Calicut 53. 1982. *Grewia ulmifolia* Roxb., Fl. Ind. 2:592. 1832; Wight, Ic. t. 84. 1838. ***Schageri-cottam*** Rheede, Hort. Malab. 1:105-106, t. 56. 1678. ***Kottam***

Erect bushy shrubs. Young stem, petioles, peduncles and calyx densely stellate pubescent. Leaves 6-18 x 3-5.5 cm, elliptic-oblong or ovate-lanceolate, base rounded or cordate, margins subentire to serrulate, apex acute to acuminate, densely stellate hairy when young, glabrous on ageing except the nerve on both sides, 3-ribbed; petioles upto 1 cm long. Flowers in axillary and terminal panicles; pedicels c. 1 mm long; bracts 5-6 mm long, linear-lanceolate. Sepals 5, free, 4-6 mm long, oblong-obovate, tomentose without. Petals 5, yellow, 2-3 mm long, ovate. Stamens many; filaments 3-4 mm long. Ovary c. 1

mm across, globose, 2-4-celled; ovules 2 in each cell. Drupe 6-10 mm across, globose, purple on ripening. Seeds 1-2.

Fl. & Fr.: Mar. - Jun.

Distr.: India, Sri Lanka, Java, China. Common in exposed wastelands and sacred groves. *CNS 1191* (Alappuzha).

TRIUMFETTA Linnaeus

Sp. Pl. 444. 1753.

Triumfetta rhomboidea Jacq., Enum. Syst. Pl. 22. 1760; Mast. in Hook. f., Fl. Brit. India 1:395. 1874; Dunn in Gamble, Fl. Pres. Madras 120. 1915; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 138. 1976; Mani. & Sivar., Fl. Calicut 52. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 176. 1983; Ramch. & Nair, Fl. Cannanore 72, 1988; Mani., Fl. Silent Valley 35. 1988; Vajravelu, Fl. Palghat Dist. 95. 1990; Daniel & Chandrabose in Sharma & Sanjappa, Fl. India 3: 520. 1993; Mohanan & Henry, Fl. Thiruvananthapuram 92. 1994; Sivar. & Mathew, Fl. Nilambur 111. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 73. 1996. *Bartramia indica* L., Sp. Pl. 378. 1753, *nom. illeg. Triumfetta bartramia* L., Syst. Nat. ed. 10, 2: 1044. 1759, *nom. illeg. Triumfetta trilocularis* Roxb., Fl. Ind. 2:462. 1832. *Triumfetta tungarensis* Billore, J. Econ. Tax. Bot. 3: 621. 1982.

Erect, much-branched undershrubs; stem hairy, stellate hairs mixed with simple hairs. Leaves 2.5-7 x 2.5-6 cm, generally rhomboid-ovate, base rounded or cordate, margins irregularly serrate, apex acute or acuminate, stellate-pubescent to glabrescent; basal ones palmately 3-lobed; petioles up to 4 cm long; stipules 3-4 mm long, subulate. Flowers in terminal or leaf-opposed cymes, 5-6 mm across, shortly pedicellate. Sepals 4-5 mm long, lanceolate, hairy without. Petals yellow, 4-5 mm long, oblong-obovate. Stamens 8-15. Ovary c. 1.5 mm long, ovoid, setose. Capsules 4-5 mm across, subglobose, stellate hairy outside, setose; setae c. 2 mm long, hooked at tip.

Fl. & Fr.: Aug. Jan.

Distr.: Pantropical. Common in exposed wastelands. *CNS 1192* (Panavally), *CNS 1387* (Kandamangalam).

24. ELAEOCARPACEAE Juss. ex DC.

Prodr. 1: 519. 1824.

1a. Flowers in racemes; petals laciniate; ovary 3-celled; drupe more than 2 cm across, green when ripe ..... **Elaeocarpus**

1b. Flowers solitary or in pairs; petals entire; ovary 5-celled; berry less than 1 cm across, red when ripe ..... **Muntingia**

ELAEOCARPUS Linnaeus

Sp.Pl. 515.1753.

Elaeocarpus serratus L., Sp. Pl. 515.1753; Mast. in Hook .f., Fl. Brit. India 1:401.1874; Dunn in Gamble, Fl. Pres. Madras 123.1915; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 131.1976; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3:178.1983; Ramach. & Nair, Fl. Cannanore 74.1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 103.1988; Murti in Sharma *et al.*, Fl. India 3:553.1993; Mohanan & Henry, Fl. Thiruvananthapuram 93.1994; Meijer in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9:82.1995; Sivar. & Mathew, Fl. Nilambur 112.1996 Sasi. & Sivar., Fl. Pl. Thrissur For 74.1996. *Elaeocarpus cuneatus* Wight, Ill. 1: 83.1840; Mast. in Hook .f., Fl. Brit. India 1:402.1874. ***Perin-kara*** Rheede, Hort. Malab. 4:51-52, t. 24.1683. ***Kara***.

Medium sized trees; bark brown. Leaves 8-12 x 2-5 cm, elliptic-oblong or obovate-oval, base attenuate, margin distantly serrate, acute or obtuse at apex, glabrous on both sides; nerve angles glandular below, brownish on drying ; petioles 1-2 cm long. Flowers in axillary and lateral racemes, c.1.5 cm across. Sepals 5, free, c. 4 mm long, lanceolate, acute. Petals 5, white, 4-5 mm long, lanceolate. Anthers linear, black with 4-5 bristles at apex. Ovary c. 1mm across, silky outside, 3 celled. Drupe 1.2-1.5 cm diam., c. 3 cm long, ovoid or globose; pyrenes strongly tubercled, ovoid-oblong, 1-seeded.

Fl. & Fr.: Jan.-May.

Distr.: Throughout India, Sri Lanka, Malaya, Peninsula and Java. *CNS 2424* (Aroor).

MUNTINGIA Linnaeus

Sp.Pl. 509.1753.

Muntingia calabura L., Sp.Pl. 509.1753; Hutch., Gen. Fl. Pl. 2:485.1967; Mani. & Sivar., Fl. Calicut 54.1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3:179.1983; Murti in Sharma *et al.*, Fl. India 3:570.1993.

Trees; branchlets densely villous, glandular, viscid. Leaves 5-10.5 x 3-5 cm, ovate-oblong, base rounded, margin serrate, apex acuminate, 3-5-nerved; petiole to 5 mm; stipules c. 4 mm, linear. Flowers in pairs or sometimes solitary, 2.2-2.6 cm across; petiole to 1.6 cm long. Sepals 5, lanceolate. Petals 5, white, 0.8-1.2 x 0.7-0.9 cm, ovate or suborbicular. Stamens numerous, inserted on the disc; filaments to 1 cm long. Ovary c. 5 cm long, ellipsoid, 5-celled; ovules many; stigma sessile. Berry c. 8 mm across, globose, red when ripe. Seeds many.

Fl. & Fr.: Throughout the year.

Distr.: India and Sri Lanka. Cultivated in gardens and plains. Edible berries attract birds. *CNS 2425* (Poonamveli).

25. LINACEAE DC. ex Gray

Nat. Arr. Brit. Pl. 2: 622, 639. 1821.

HUGONIA Linnaeus

Sp. Pl. 675. 1753.

Hugonia mystax L., Sp. Pl. 675. 1753; Hook. f., Fl. Brit. India 1:413. 1874; Dunn in Gamble, Fl. Pres. Madras 126. 1915; Mani. & Sivar., Fl. Calicut 54. 1982; Hajra in Jain *et al.*, Fasc. Fl. India 13: 6. 1983; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 180. 1983; Ramch. & Nair, Fl. Cannanore 75. 1988; Nicols., Suresh & Mani., An Interpr. Hort.



Fig. 14. *Hugonia mystax* L.: a. Flowering twig; b. Flower; c. Sepal; d. Petal; e. Pistil with staminal tube; f. Pistil; g. Fruit; h. Seed.

Malab. 162. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 93. 1994. ***Modira-canni*** Rheede, Hort. Malab. 2: t. 19. 1679. ***Modirakanni*** (Fig. 14).

Scandent shrubs with hooks; branchlets yellow tomentose. Leaves 3-6 x 1-3 cm, oblong, elliptic or obovate, base tapering, apex obtuse or subacute, coriaceous; petiole c. 4 mm long, hairy; stipules c. 1 mm long, subulate. Cymes terminal or axillary; peduncle c. 1 cm long, yellow tomentose. Flowers c. 2.5 cm across, yellow; bracts c. 7 mm long, subulate. Sepals 5, 5-7 x 2-3 mm, ovate-lanceolate, fulvous pubescent. Petals 5, yellow, c. 12 x 7 mm, obovate. Stamens 10, 8-10 mm long, connate into a short tube at base; glands alternate with petals. Ovary globular; styles 5, filiform. Drupe c. 1 cm across, globose, fleshy, red.

Fl. & Fr.: Feb. - April.

Distr.: India, Sri Lanka. In sacred groves. *CNS 1040* (Vandanam).

26. MALPIGHIACEAE Juss.

Gen. Pl. 252. 1789.

HIPTAGE J. Gaertner

Fruct. 2: 169. 1790.

Hiptage benghalensis (L.) Kurz., J. Asiat. Soc. Bengal 43(2): 136. 1874; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 410. 1976; Mani. & Sivar., Fl. Calicut 55. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 183. 1983; Mani., Fl. Silent Valley 38. 1988; Ramach. & Nair, Fl. Cannanore 75. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 169. 1988; Harriman in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 394. 1991; Sasi. & Sivar., Fl. Pl. Thrissur For. 75. 1996. *Banisteria benghalensis* L., Sp. Pl. 427. 1753. *Hiptage madablota* Gaertn., Fruct. 2: 169, t. 116. 1790; Hook. f., Fl. Brit. India 1: 418. 1874; Gamble, Fl. Pres. Madras 128. 1915. ***Sida-pou*** Rheede, Hort. Malab. 6: 105 ("109"), t. 59.1686.

Large woody climbers. Leaves opposite 7-12 x 2.5-5 cm, elliptic-oblong to lanceolate, base attenuate or obtuse, apex acuminate, with a pair of glands on petioles at the base of lamina. Flowers 5-merous, bisexual, in axillary or terminal racemes; peduncles articulated with pedicels. Sepals 5, 6-7 mm long, oblong, one larger with a large gland at the base outside. Petals 5, white, 1.5-2 x 1.2-1.5 cm, clawed, reflexed, margin crisped. Stamens 10, unequal, 0.8-1.5 cm long; filaments united at base. Ovary 3-celled, 3-lobed, 4-6 mm long; style c. 1.8 cm long; stigma capitate. Fruit a 3-winged samara, one wing larger, c. 4 x 2 cm. Seeds 0.8-1 cm across, globose.

Fl. & Fr.: May - Aug.

Distr.: Sri Lanka, India, China and Malesia. Rare. *CNS 1883* (Thamarakulam).

27. OXALIDACEAE R.Br.

in Tuckey, Narr. Exped. Zaire 433. 1818.

1a. Herbs; fruit capsular.

2a. Leaves digitately 3-foliolate; apex of leaflets emarginate; valves of capsules adnate to the central column ..... **Oxalis**

2b. Leaves pinnate; apex of leaflets obtuse; valves of capsules spreading .... **Biophytum**

1b. Trees; fruit indehiscent, fleshy ..... **Arerrhoa**

AVERRHOA Linnaeus

Sp. Pl. 428. 1753.

Trees. Leaves imparipinnate; leaflets opposite or alternate, 4-17 pairs, inequilateral; stipules absent. Flowers 5-merous, regular, in panicled cymes, often from the old wood. Sepals 5, imbricate. Petals 5, twisted or occasionally imbricate. Stamens 10, all perfect, or 5 staminodes, united at base. Disc absent. Ovary 5-celled; ovules many per cell; stigma capitate. Berry oblong, 5-ridged or lobed. Seeds arillate or not.

1a. Leaflets 7-11; inflorescence axillary; berry with acutely angled ridges; seeds arillate ..... **A. carambola**

1b. Leaflets 15-35; inflorescence cauliflorous; berry obtusely angled; seeds exarillate ..... **A. bilimbi**

Averrhoa bilimbi L., Sp. Pl. 428. 1753; Roxb., Fl. Ind. 2:451. 1832; Wight & Arn., Prodr. 142.1834; Hook. f., Fl. Brit. India 1: 439. 1874; Gamble, Fl. Pres. Madras 133. 1915; Mani. & Sivar., Fl. Calicut 56. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 192. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 204.1988; Vajravelu, Fl. Palghat Dist. 99. 1990. ***Bilimbi*** Rheede, Hort. Malab. 3: 55-56, t. 45-46. 1682.

Trees; branchlets pubescent. Leaves 18-40 cm long; leaflets 15-35, subopposite, 3-9 x 2-3.7 cm, oblong, ovate or lanceolate, base rounded or subtruncate, apex acuminate, glabrescent above, pubescent below. Panicles cauliflorous or from old branchlets, clustered, 5-11 cm long; pedicels 2-5 mm long. Sepals to 5 mm long, oblong. Petals to 1 cm long, obovate, dark-purple. Stamens 10. Berry 4-6.5 cm long, oblong, with obtuse angles.

Fl. & Fr.: Most of the seasons.

Distr.: Native country unknown; widely cultivated. The fruit is eaten fresh, cooked or pickled. *CNS 2153* (Aroor).

Averrhoa carambola L., Sp. Pl. 428. 1753; Roxb., Fl. Ind. 2: 450. 1832; Wight & Arn., Prodr. 141. 1834; Hook. f., Fl. Brit. India 1: 439.1874; Gamble, Fl. Pres. Madras 133.1915; Mani. & Sivar., Fl. Calicut 56. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 193. 1983. Nicols., Suresh & Mani., An Interpr. Hort. Malab. 204.1988. ***Tamara-tonga*** Rheede, Hort. Malab. 3: 51-53, t. 43-44. 1682.

Small trees; bark smooth; branchlets downy-pubescent. Leaflets 7-11, subopposite, 2.5-7 x 1.8-3.5 cm, ovate, oblong or elliptic-lanceolate, base cuneate to rounded, apex acuminate, glabrous above, glaucous and pubescent on nerves below; petiolule to 1.5 mm long. Panicles axillary, 5-9.5 cm long. Flowers pink, 5-7 mm long, campanulate. Sepals 5, to 4 mm long, oblong. Petals 5, to 7 mm long, oblong-obovate. Stamens 10, often 5

fertile, alternating with 5 staminodes. Ovary oblong. Berry 5-8.5 cm long, oblong or ellipsoid, 5-ridged. Seeds with 2-lobed lacerate aril.

Fl. & Fr.: Feb. - Jul.

Distr.: Cultivated throughout the hotter parts of India. Passibly native of C. and E. Java. The fruit is eaten fresh, cooked or pickled. *CNS 19698* (Charummoodu).

BIOPHYTUM A.P. de Candolle

Prodr. 1: 689. 1824.

Biophytum reinwardtii (Zucc.) Klotzsch in Peters, Reise Mossamb. Bot. 1: 85. 1862; Edgew. & Hook. f., Fl. Brit. India 1: 437. 1874; Gamble, Fl. Pres. Madras 133. 1915; Mani. & Sivar., Fl. Calicut 55. 1982; Ramach. & Nair, Fl. Cannanore 76. 1988; Vajravelu, Fl. Palghat Dist. 98. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 95. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 76. 1996. *Oxalis reinwardtii* Zucc., Abh., Malth. - Phys. Cl. Koenigl. Bayer Akad. Wiss. 1: 274. 1829-1830.

Erect herbs. Stem 2-20 cm tall, unbranched. Leaves with rachis 3-8 cm long; leaflets 5-15 pairs, basal smaller, 3-5 x 2-3 mm, ovate, terminal pair largest, 5-10 x 4-6 mm, oblong, base oblique, sparsely ciliate on margins, apex obtuse; rachis hirsute. Flowers in terminal, long-peduncled clustered umbels, each 7-10-flowered; peduncles slender, 2.5-10 cm long, glandular-hispid; bracts 2-3 x 1-1.5 mm, lanceolate, pubescent without. Pedicels 3-5 mm long, longer than bracts, glandular-hispid. Sepals 5, 3-4 mm long, lanceolate, glandular-pubescent. Corolla yellow with red veins, funnel shaped; lobes 5, 6-8 mm long, obovate, retuse. Stamens 10, dimorphic; filaments connate below. Capsule 3-4 mm long, ovoid, glandular-pubescent. Seeds ovoid, tubercled in spiral lines, red.

Fl. & Fr.: July - Nov.

Distr.: Throughout India, China, Java. Common in opens areas. *CNS 2270* (Maithara), *CNS 2225* (Kanjikuzhi).

OXALIS Linnaeus

Sp. Pl. 433. 1753.

Oxalis corniculata L., Sp. Pl. 435. 1753; Hook. f., Fl. Brit. India 1: 436. 1874; Trimen, Handb. Fl. Ceylon 1: 196. 1893; Gamble, Fl. Pres. Madras 132. 1915; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 399. 1976; Mani. & Sivar., Fl. Calicut 55. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 190. 1983; Mani., Fl. Silent Valley 38. 1988; Ramach. & Nair, Fl. Cannanore 77. 1988; Vajravelu, Fl. Palghat Dist. 98. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 96. 1994; Sivar. & Mathew, Fl. Nilambur 115. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 76. 1996.

Prostrate herbs with creeping stem, rooting at lower nodes. Leaves digitately 3-foliolate; leaflets 0.5-1.5 x 0.6-2 cm, broadly obcordate, base cuneate, apex emarginate; petioles 1.5-3 cm long. Flowers yellow, solitary or in axillary umbels; peduncles 4-10 cm long; pedicels 0.5-1 cm long; bracts 2, 3-4 mm long, linear-lanceolate. Sepals 5, 2-3 mm long, ovate-lanceolate. Petals 5, 5-6 x 3-4 mm, ovate-lanceolate. Stamens 10, in two rows. Ovary 5-celled; ovules many; styles 5, distinct. Capsules 0.8-1.5 x 0.3-0.5 cm, linear, puberulous outside. Seeds many, minute, brown.

Fl. & Fr.: Throughout the year.

Distr.: Pantropics. A very common weed in moist shady places. It is used as an astrignent and vermifuge. *CNS 1396* (Kayamkulam).

28. BALASAMINACEAE A. Rich.

in Bory, Dict. Class. Hist. Nat. 2: 173. 1822.

1a. Petals all free one another; anthers longitudinally dehiscent; fruit a pentagonal pseudoberry ..... **Hydrocera**

1b. Petals not all free; anthers opening by terminal pore; fruit ovoid or ellipsoid dehiscent capsule ..... **Impatiens**

HYDROCERA Blume

Bijdr. 241. 1825.

Hydrocera triflora (L.) Wight & Arn., Prodr. 140. 1834; Hook. f., Fl. Brit. India 1: 483. 1875; Gamble, Fl. Pres. Madras 146. 1915; Dutt, J. Bombay Nat. Hist. Soc. 58(2): 544-546. 1961; Subram., Aquact. Ang. 12. 1962; Grey-Wilson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 77. 1985; Vivekananthan *et al.* in Hajra, Nair & Daniel, Fl. India 4: 96. 1997. *Impatiens triflora* L. , Sp. Pl. 938. 1753. *Impatiens natans* Willd., Sp. Pl. 1: 175. 1798. *Tytonia triflora* (L.) C.E. Wood, J. Arn. Arb. 56(4) : 413. 1975 (Plate VI: A, B & C; Fig. 15).

Semi-aquatic glabrous perennial herbs; stem erect, pink, succulent, 5-angular, the portion below the water surface thick and spongy, internodes hollow, nodes bearing long fibrous roots. Leaves alternate, 10-25 x 0.6-3.5 cm, linear-lanceolate or linear-elliptic, base cuneate, margins serrate, apex acute to long acuminate, deep-green above, pale beneath; lateral nerves 10-17 pairs; petiole up to 1 cm long, with a pair of small glands at base. Inflorescence axillary, 3-7-flowered racemes or cymes. Flowers pink, inside of throat yellowish with reddish-purple nerves; pedicels 1.2-2.5 cm long; bracts 6-9 mm long, lanceolate, acute. Sepals 5, petaloid; lateral sepals 4, in 2 pairs, elliptic to oblanceolate, obtuse; lower sepal navicular, spurred; spur 6-8 mm long, curved. Petals 5, free; lower and outer narrowly oblong, bilobed; upper lobe entire. Stamens 5; filaments broader and united towards connective; anthers connate. Ovary 5-locular; stigma 5, sessile. Fruit a fleshy pseudoberry, 8-10 x 7-8 mm, globose, 5-angular, purplish red. Seeds curved, corrugated.

Fl. & Fr. : Aug. - Jan.

Distr. : Sri Lanka, South India, south China, Thailand, Cambodia, Laos, Malay Peninsula, S.W. Celebes and Java. A rare taxon in marshes and stagnant pools. *CNS 1511* (Elangimelvallikavu), CNS 2575 (Vayalar).

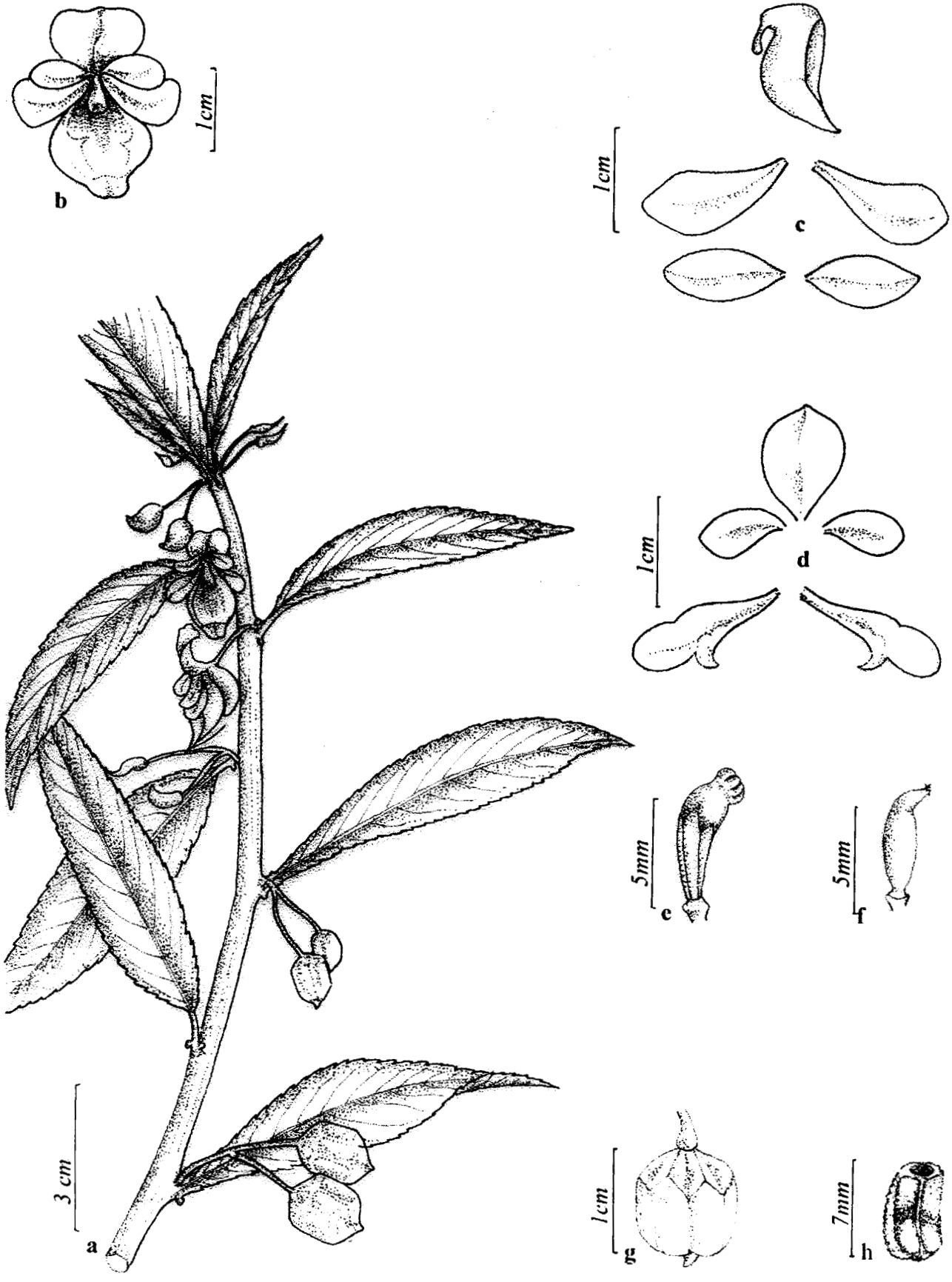


Fig. 15. *Hydrocera triflora* (L.)Wight & Arn.: a. Twig with flowers and fruits; b. Single flower; c. Sepals; d. Petals; e. Stamens; f. Pistil; g. Fruit; h. Seed.

IMPATIENS Linnaeus

Sp. Pl. 937. 1753.

Terrestrial annual or perennial herbs, growing in moist shaded places; stem often succulent and swollen. Leaves spirally arranged, opposite or alternate. Flowers in axillary fascicles or solitary, zygomorphic. Sepals 3; lateral ones small; lower one large, petaloid and often spurred. Petals 3; upper dorsal one free, small; lateral ones large, often fused in pairs to form 2-3-lobed wings. Stamens 5; filaments very short and fused; anthers coherent, covering stigmas over the ovary. Ovary superior, 5-celled; ovules many on axile placenta; stigma sessile, 5-toothed. Capsule ellipsoid, loculicidally 5-valved and exploding on ripening. Seeds many, globose, smooth or reticulate.

1a. Leaves alternate; distal lobes of lateral petals deeply notched; capsules pubescent; seeds tubercled ..... **I.balsamina**

1b. Leaves opposite; distal lobes of lateral petals enire; capsules glabrous; seeds smooth and shining ..... **I. diversifolia**

Impatiens balsamina L., Sp. Pl. 938. 1753; Wight & Arn., Prodr. 135. 1834; Hook. f. , Fl. Brit. India 1: 453. 1874; Gamble, Fl. Pres. Madras 142. 1915; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 400. 1976; Mani. & Sivar., Fl. Calicut 57. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 195. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 70. 1988; Sivar. & Mathew, Fl. Nilambur 116. 1996; Vivekananthan *et al.* in Hajra, Nair & Daniel, Fl. India 4: 123. 1997. *Impatiens dahlii* Warb. in K.Schum. & Lauterb, Nachtr. Fl. Deutsch. Sudsee 313. 1905. ***Tilo-onapu, Notenga*** Rheede, Hort. Malab. 9: 101,t. 52. 1689.

Erect annual herbs up to 60 cm tall; stems simple or branched. Leaves alternate, 2.5-9 x 0.8-2.2 cm, lanceolate-elliptic, base narrowed, margins serrate, apex acute to acuminate; petioles 1-4 cm long, glandular. Flowers solitary or 2-3 in axillary fascicles, rose or white; pedicels to 1.5 cm long. Lateral sepals 2-3 mm long, ovate; lip 1-1.6 cm long, cymbiform, petaloid; spur 1.2-2.2 cm long, incurved. Standard petal c. 1 cm long, ovate; wings c. 2 cm long, obovate, deeply notched; auricles ovate-rounded. Capsules 1-1.5 cm long, ellipsoid, tomentose. Seeds globose, tubercled.

Fl. & Fr. : Aug. - Dec.

Distr. India, Central, S. & S.E. Asia, Europe, New Guinea. Common in wasteland and hills lopes. *CNS 1320* (Paramada at Angadikkal).

Impatiens diversifolia Wall. ex Wight & Arn., Prodr. 139. 1834; Hook. f., Fl. Brit. India 1: 446. 1874; Gamble, Fl. Pres. Madras 140. 1915; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist 402. 1976; Ramach. & Nair, Fl. Cannanore 79. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 97. 1994; Vivekananthan *et al.* in Hajra, Nair & Daniel, Fl. India 4: 141. 1997 (Plate VI: D).

Erect, flaccid herbs up to 35 cm tall; stems rooting at lower nodes. Leaves opposite, sessile or shortly petiolate, 1.8-3.8 x 0.6-1 cm, elliptic, oblong or linear-oblong, base truncate to cordate, margins serrate, apex acute, green above, glaucous beneath. Flowers axillary, solitary or binate, c. 2 cm across; pedicels 1-2 cm long, deflexed in fruits. Lateral sepals, linear, acuminate. Spur 1-1.5 cm long, filiform. Corolla rose-purplish or dark pink; standard petal small; wings c. 1 x 0.8 cm, obovate. Capsules c. 8 mm long, ellipsoid. Seeds globose, dark-brownish, smooth, shining.

Fl. & Fr. : Aug. - Dec.

Distr. : Peninsular India. Endemic.

Frequent in streams and canals and other wet marshy places. *CNS 1413* (Kanichukulangara), *CNS 2576* (Thamarakulam).

29. RUTACEAE Juss.

Gen. Pl. 296. 1789.

1a. Leaves unifoliolate.

2a. Plants armed.

3a. Petiole winged; stamens usually at least 20 ..... **Citrus**

3b. Petiole not winged; stamens 8 ..... **Atalantia**

2b. Plants unarmed ..... **Acronychia**

1b. Leaves 3-or more-foliolate.









Plate VI. A - C. *Hydrocera triflora* (L.) Wight & Arn.; A. Habit; B. Flowering twig; C. Flower enlarged; D. *Impatiens diversifolia* Wall. ex Wight & Arn.

4a. Plants armed.

5a. Evergreen shrubs; flowers trimerous with 6 stamens; fruit a small fleshy red berry ..... **Triphasia**

5b. Deciduous trees; flowers 4-5-merous with numerous stamens; fruit a rather large woody berry ..... **Aegle**

4b. Plants unarmed.

6a. Ovary 2-celled; alternate filaments shorter ..... **Murraya**

6b. Ovary 4-5-celled; filaments all equal ..... **Glycosmis**

ACRONYCHIA J. R. Forster & J.G. A. Forster

Char. Gen. 53. 1776, (*nom. cons.*).

Achronychia pedunculata (L.) Miq., Fl. Ind. Bat. Suppl. 532. 1861; Rau, Bull. Bot. Surv. India 10 (Suppl. 2): 18. 1968; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 381. 1976; Stone in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 412. 1985; Ramach. & Nair, Fl. Cannanore 81. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 230. 1988; Mani., Fl. Silent Valley 42. 1988; Vajravelu, Fl. Palghat Dist. 102. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 101. 1994; Sivar. & Mathew, Fl. Nilambur 120. 1996; Sasi.& Sivar., Fl. Pl. Thrissur For. 80. 1996. *Jambolifera pedunculata* L., Sp. Pl. 349. 1753. *Achronychia laurifolia* Bl., Cat. Gew. Buitenz. 63. 1823; Hook. f., Fl. Brit. India 1: 498. 1875; Gamble, Fl. Pres. Madras 152. 1915. ***Perin-panel*** Rheede, Hort. Malab. 5: 29-30, t. 15. 1685.

Small, evergreen trees; bark pale grey, smooth. Leaves 7-15 x 3-5.5 cm, oblong-lanceolate or elliptic-lanceolate, narrowly attenuate at base, margin entire, acuminate at apex, thin-coriaceous, glabrous; petiole to 5cm long. Flowers in axillary, long-peduncled, corymbose cymes, yellowish; pedicels 3-4 mm long. Calyx 4-lobed; lobes c. 1 mm long, triangular, ciliate on margins. Petals 4, 5-6 x 1-1.5 mm, linear-lanceolate, hairy within. Stamens 8; filaments alternating with shorter and longer, hairy on the base. Disc 8-angled. Ovary c. 2 mm across, ovid-oblong, 4-celled; ovules 2 in each cell; style shout, 1-1.5 mm; stigma 4-grooved. Drupe 6-12 mm across, subglobose, white when ripe. Seeds 3-7 mm long.

Fl. & Fr.: May - Aug.

Distr.: Indo-Malesia. *CNS 1033* (Vandanum).

The barks and roots are used in external application as paste for sores and ulcers.

AEGLE Correa

Trans. Linn. Soc. London 5: 222. 1800 (*nom. cons.*).

Aegle marmelos (L.) Corr., Serr. Trans. Linn. Soc. London 5: 223. 1800; Hook. f., Fl. Brit. India 1: 516. 1875; Gamble, Fl. Madras 161. 1915; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 382. 1976; Mani. & Sivar., Fl. Calicut 58. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 199. 1983; Stone in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 414. 1985; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 231. 1988; Vajravelu, Fl. Palghat Dist. 102. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 101. 1994. *Crateva marmelos* L., Sp. Pl. 444. 1753. ***Covalam*** Rheede, Hort. Malab. 3: t. 37. 1682.

Deciduous trees; branches armed; spines axillary. Leaves 3-5-foliolate; leaflets 2.5 - 6 x 2-4.2 cm, elliptic, lanceolate or oblong-obovate, base cuneate, margin crenulate, apex obtuse, sometimes acuminate, chartaceous, glandular-punctate; petiole to 3 cm long. Panicles axillary. Flowers c. 2 cm across; pedicel to 2 mm long. Calyx-tube cupular, lobes 4-5, triangular. Petals 5, white, 1-1.2 x 0.6-0.8 cm, oblong, subequal. Disc obscure. Stamens numerous; filaments 4-7 mm long, basally subconnate; anthers oblong. Ovary ovoid, many-celled; ovules many; stigma subsessile, oblong. Fruit to 8 x 7 cm, subglobose, with a hard woody shell, with usually 6-10 seeds in a sticky, edible pulp. Seeds to 8 x 4 mm, oblong, woolly-pubescent.

Fl. & Fr.: Mar. - Dec.

Distr.: Indo-Malesia. Often cultivated in home-yards and as a medicinal plant, and temple premises. The leaves are used in temples for 'pujas'. *CNS 2448* (Kayamkulam).

ATALANTIA Correa

Ann. Mus. Natl. Hist. Nat. 6:383, 385, 386. 1805 (*nom. cons.*).

Atalantia monophylla (L.) Corr., Ann. Mus. Natl. Hist. Nat. 6: 383. 1805; Wight & Arn., Prodr. Fl. Ind. Orient. 91. 1834; Hook. f., Fl. Brit. India 1: 511. 1875; Gamble, Fl. Pres. Madras 159. 1915; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 200. 1983; Stone in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:418. 1985; Mani., Fl. Silent Valley 42. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 231. 1988. *Limonia monophylla* L., Mant. Pl. 237. 1771; Roxb., Pl. Coromandel t. 82. 1798 & Fl. Ind. 2: 378. 1832. *Atalantia floribunda* Wight, Ic. t. 1611. 1850. ***Mal-naregam***. Rheede, Hort. Malab. 4: 27-28, t. 12. 1683.

Small glabrous armed trees; spines to 2 cm long. Leaves 3-7 x 2-4 cm, ovate or elliptic, base broadly cuneate, margins entire to obscurely undulate, apex obtuse or emarginate, coriaceous; petiole to 1 cm long. Racemes axillary, contracted. Flowers to 1 cm across; pedicels to 1.5 cm long. Calyx irregularly lobed or spathiform, c. 3 mm long. Petals 4 or 5, white, 7-9 x 3-4 mm, obovate. Stamens 8 or 10, unequal, base connate and forming a tube. Ovary 4-5 mm long, oblong, 4-celled; ovule 1 or 2 per cell; style to 3 mm long. Fruit c. 1.5 cm across, globose, yellowish-green, glandular dotted. Seeds few, c. 6 mm long.

Fl. & Fr.: Nov. - Mar.

Distr.: India and Sri Lanka to Indo-China, Malaya, north to North Vietnam. In sacred groves. *CNS 2449* (Sharangakavu at Venmony).

CITRUS Linnaeus

Sp. Pl. 782. 1753.

Citrus grandis (L.) Osbeck, Dagb. Ostind. Resa 98. 1757; Swingle, Citrus Ind. 1: 382. 1967; Stone in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 426. 1985. *Citrus aurantium* var. *grandis* L., Sp. Pl. 2: 783. 1753. *Citrus pamplemos* Risso, Hist. Nat. Orang. 33. 1826. *Citrus maxima* Merr., Interp. Rumph. Herb. Amboin. 296. 1918.

Small to medium sized trees; young parts pubescent; young branchlets angular. Leaves 4.5-14 x 3.5 - 8 cm, obovate to elliptic, base rounded or subcordate, apex obtusely acute or retuse, gland-dotted; petiole obcordately winged, to 3 cm long. Inflorescence a cluster of few flowers, 3-8.5 cm long, axillary. Flowers white, fragrant, 1.8-2.2 cm long; pedicel to 1.6 cm long, pubescent; bracts c. 3 mm long, caducous. Calyx 4-6 mm long, cupular, irregularly 3-5-lobed. Petals 1.9-2.2 x 0.8-1.2 cm, oblong-obovate, apex obtuse, thick, gland-dotted. Stamens 20-25; anthers 3-4 mm long, linear, yellow. Ovary 4-5 mm across, globose, pubescent; style 4-5 mm long, thick; stigma capitate. Fruit 10-18 cm across, subglobose, the pericarp pale green to pale yellowish, smooth to rather gland-pitted. Seeds wrinkled.

Fl. & Fr.: Apr. - Nov.

Distr.: A native of Malesia; now widely cultivted in various tropical and warm-temperate countries. *CNS 2450* (Thuravoor).

GLYCOSMIS Correa

Ann. Mus. Natl. Hist. Nat. 6:384. 1805.

Glycosmis pentaphylla (Retz.) DC., Prodr. 1:538. 1824 (*nomen solum*); Mitra & Subram., J. Arnold Arbor. 50: 155. 1969; Stone in Matthew, Fl. Tam. Carnatic 3: 207. 1983; Stone in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 449. 1985; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 232. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 104. 1994; Sivar. & Mathew, Fl. Nilambur 123. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 82. 1996. *Limonia pentaphylla* Retz., Obs. Bot. 5:24. 1788. *Limonia arborea* Roxb., Pl. Corom. t. 85. 1798. *Glycosmis arborea* (Roxb.) DC., Prodr. 1: 538. 1824; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 384. 1976; Mani. & Sivar., Fl. Calicut 60. 1982; Ramach. & Nair, Fl. Cannanore 83. 1988; Vajravelu, Fl. Palghat Dist. 104. 1990. *Glycosmis cochinchinensis* auct. non Pierre ex Engler, 1896: Gamble, Fl. Pres. Madras 153. 1915, p.p. ***Panal*** Rheede, Hort. Malab. 2: 9-10, t, 9, 1679.

Small erect shrubs. Leaves 3-7-foliolate; leaflets subopposite, 7-15 x 2-5.5 cm, elliptic-lanceolate, attenuate at base, entire to minutely crenulate-serrate on the margins, acute to round at apex, glandular on both sides, glabrous; rachis 6-10 cm long; petiolule c.

2 mm long. Flowers in terminal or axillary, spiciform panicles. Sepals 5(4), 1-1.5 mm long, ovate-acute, ciliate on margins. Petals 5(4), white, 4-5 x 2-2.5 mm, obovate, surface gland-dotted. Stamens 8-10, longer and shorter filaments of longer ones c. 3 mm long, shorter, c. 2 mm long. Disc prominent, annular. Ovary 2-2.5 mm across, ovoid, 5-celled; stigma flat or obscurely lobed. Berry 1-1.2 cm diam., ovoid, white turning pink, 1-2-seeded.

Fl. & Fr.: Jan. - Apri.

Distr.: India, Sri Lanka to Malaysia. *CNS 1400* (Cheriyanadu).

MURRAYA J.G. Koenig ex Linnaeus

Mant. 2:554, 563. 1771 ("*Murraea*") (*nom. cons.*).

Unarmed trees or shrubs. Leaves alternate, imparipinnate, leaflets alternate. Flowers 5-merous in axillary or terminal panicles. Sepals free. Petals linear to ovate-lanceolate, imbricate. Stamens 10, alternate filaments shorter. Disc annular to shortly cylindric. Ovary 2-5-celled; cells 2 or 1-ovuled; style elongate; stigma capitate. Berry globose or ellipsoid.

1a. Leaflets small and asymmetrical; flowers many per inflorescence; fruit 2-celled, subglobose, black ..... **M. koenigii**

1b. Leaflets symmetrical; flowers few per inflorescence; fruit 1-celled, ellipsoid, red ..... **M. paniculata**

Murraya koenigii (L.) Spreng., Syst. 2: 315. 1826; Bedd., Fl. Sylv. 44. 1878; Hook. f., Fl. Brit. India 1: 503. 1875; Gamble, Fl. Pres. Madras 111. 1915; Tanaka, J. Ind. Bot. Soc. 16: 231. 1937; Swingle, Citrus Ind. 1: 236. 1967; Mani. & Sivar., Fl. Calicut 60. 1982; Stone in Matthew, Fl. Tam. Carnatic 3: 209. 1983; Stone in Dassan. & Fosb., Rev. Handb.Fl. Ceylon 5: 458. 1985; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 233. 1988. *Bergera koenigii* L., Mant. Pl. 1: 563. 1771; Wight, Ic. t. 13. 1838. ***Kari-beepou*** Rheede, Hort. Malab. 4: t. 53. 1683.

Shrubs or small trees. Leaves pinnate, crowded at twig-ends; leaflets 15-25, asymmetrical, oblique, 1.5-4 x 0.8-2 cm, oblong-lanceolate, margin entire, apex acute.

Panicles terminal, corymbose, many-flowered. Flowers small, white; pedicels c. 3 mm long. Sepals c. 1 x 1 mm. Petals 5, white, 6-8 x c. 1.5 mm, linear, sparsely glandular, rounded and slightly recurved at apex. Stamens 10, 5 longer than the others; anthers oblong. Ovary c. 1 mm long, globose; stigma capitate. Berry 8-11 mm across, subglobose, purplish-black when ripe. Seeds 1-2, green, globular-ovoid.

Fl. Fr.: Mar. - Jun.

Distr.: Sri Lanka, India, Burma. Commonly cultivated for its aromatic leaves known as 'curryvepila'. *CNS 2451* (Thycattussery).

Murraya paniculata (L.) Jack, Mal. Misc. 1(5): 31. 1820; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 386. 1976; Mani. & Sivar., Fl. Calicut 60. 1982; Stone in Matthew, Fl. Tam. Carnatic 3: 210. 1983; Stone in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 459. 1985; Vajravelu, Fl. Palghat Dist. 105. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 105. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 83. 1996. *Chalcas paniculata* L., Mant. Pl. 68. 1767. *Murraya exotica* auct. non, L., 1753: Roxb. Fl. Ind. 2:374. 1832; Wight, Ic. t. 96. 1838; Hook. f., Fl. Brit. India 1: 502. 1875; Gamble, Fl. Pres. Madras 155. 1915.

Shrubs or small trees; bark pale greyish to white. Leaves 3-7-foliolate; leaflets 3-5 x 1.5-3 cm, ovate to elliptic-ovate or rhomboid, attenuate at base, shortly acuminate at apex, glabrous. Panicles few-flowered, from the axils of upper leaves; peduncle 2-3 cm long. Calyx lobes 5, 2.5-3 mm long, ovate. Petals 5, 1-1.5 cm long, elliptic to ovate-elliptic, white. Stamens 10. Disc annular. Ovary c. 3 mm across, oblong, 2-celled; ovules 1 in each cell; stigma capitate. Berry 1-1.2 cm long, ellipsoid, acute, red.

Fl. & Fr.: Mar. - Jul.

Distr.: Indo-Malesia, Australia. *CNS 2452* (Alappuzha town).

TODDALIA A.L. Jussieu

Gen. 371. 1789 (*nom. cons.*).

Toddalia asiatica (L.) Lam., Tab. Encyl. Meth. 2: 116. 1797, var. **floribunda** Gamble, Fl. Pres. Madras 151. 1915; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 388. 1976; Mani. &

Sivar., Fl. Calicut 59. 1982; Stone in Matthew, Fl. Tam. Carnatic 3: 214. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 234.1988; Ramach. & Nair, Fl. Cannanore 85. 1988; Mani., Fl. Silent Valley 46. 1988; Vajravelu, Fl. Palghat Dist. 106. 1990; Sivar. & Mathew, Fl. Nilambur 126. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 84. 1996. *Paullinia asiatica* L., Sp. Pl. 365. 1753. *Toddalia aculiata* Pers., Syn. 1: 249. 1805; Wight & Arn., Prodr. 149. 1834; Hook. f., Fl. Brit. India. 1: 497. 1875. **kaka-toddali** Rheede, Hort. Malab. 5: 81-82, t. 41. 1685.

Stragglers, the stem scrambling by the sharp, recurved prickles. Leaves trifoliolate; leaflets sessile, 3-6 x 1.5-2.5 cm, ovate to oblong-lanceolate, base acute, margins shallowly crenulate, apex obtuse or acute, thin-coriaceous; petiole to 2.5 cm, often prickly beneath. Panicles axillary, to 5 cm long. Flowers c. 4 mm across. Sepals small, deltoid. Petals c. 3 x 1.5 cm, oblong, cream coloured, glandular. Stamens c. 3 mm long. Ovary in the pistillate flowers on a short gynophore. Fruit c. 5 mm across, subglobose, apiculate, glandular, orange colour when ripe. Seeds 3 or 4, subreniform.

Fl. & Fr.: Oct. - Dec.

Distr.: India and Sri Lanka to Malesia, also in Mauritius and Madagascar. *CNS 2453* (Kanichukulangara).

TRIPHASIA Loureiro

Fl. Cochinch. 152. 1790.

Triphasia trifolia (Burm. f.) Wilson, Torreya 9:33. 1909. *Limonia trifolia* Burm. f., Fl. Ind. 103, t. 35, f. 1. 1768. *Triphasia aurantiola* Lour., Fl. Cochinch. 1: 153. 1790; Gamble, Fl. Pres. Madras 156. 1915. *Triphasia trifoliolata* DC., Prodr. 1:536. 1824; Hook. f., Fl. Brit. India 1: 507. 1875.

Armed shrubs with strong, straight spines. Leaf 3-foliolate; leaflets 1.8-3.5 x 1-1.8 cm, elliptic-ovate or rhomboid, base attenuate, margins crenate, apex obtuse or retuse, lateral ones smaller than the terminal. Flowers solitary or in 2-3-flowered cymes, axillary, sweet-scented. Calyx 3-lobed. Petals 3, oblong. Stamens 6, inserted around the disc; filaments dilated below; anthers oblong. Ovary ovoid-oblong, 3-celled; ovules 1 in each

cell; style articulated; stigma cpitate, 3-lobed. Berry 0.8-1.2 cm across, ovoid, gland-dotted, red, 1-3-seeded. Seeds ovoid-oblong, immersed in mucilage.

Fl. & Fr.: Most of the seasons.

Distr.: Introduced from China. *CNS 1371* (Kadakkarappally).

30. SIMAROUBACEAE DC.

in Ann.Mus. Natl. Hist. Nat. 17: 422. 1811.

1a. Leaves pinnatly compound; flowers in lax panicles ..... **Ailanthus**

1b. Leaves simple; flowers in pendulous, pseudo-umbels ..... **Samadera**

AILANTHUS Desfontaines

Mem. Acad. Sci. (Paris) 1786:265. 1788 (*nom. cons.*).

Ailanthus triphysa (Dennst.) Alston in Trimen, Handb. Fl. Ceylon 6 (Suppl.): 41. 1931; Basak in Jain *et al.*, Fasc. Fl. India 4: 5. 1980; Mani. & Sivar., Fl. Calicut 61. 1982; Ramach. & Nair, Fl. Cannanore 86. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 245. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 105. 1994; Sivar. & Mathew, Fl. Nilambur 128. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 86. 1996. *Adenanthera triphysa* Dennst., Schluess. Hort. Ind. Malab. 15, 18, 32. 1818. *Ailanthus malabarica* DC., Prodr. 2: 89. 1825; Bennet in Hook. f., Fl. Brit. India 1: 518. 1875; Gamble, Fl. Pres. Madras 163. 1915. ***Pongelion perimaram*** Rheede, Hort. Malab. 6: t. 15. 1686.

Deciduous trees; bark smooth, lenticular. Leaves crowded towards the apex of branches, alternate, imparipinnate, to 1 m long; leaflets 11-20 pairs, 8-12 x 2.5 - 4 cm, falcate-lanceolate, base unequal sided, apex acuminate, glabrous; petiolule to 1 cm long. Flowers polygamous in terminal or axillary panicles, greenish yellow; pedicels c. 4 mm long. Calyx lobes 5, c. 1 mm long, ovate, acute. Petals 5, 3-5 x 1-1.5 mm, ovate-lanceolate, reflexed. Stamens 10, on a 10-lobed disc, absent in female flowers. Carpels c.

2 mm long; styles free below, connate above. Fruits of 5, one-seeded samaras, 5-6 x 1.5-2.5 cm, oblong, reddish-brown, rounded at both ends.

Fl. & Fr.: Jan. - Apri.

Distr.: India, Sri Lanka, Burma, Malaysia, Thailand, Cambodia, Vietnam, Indonesia, China, Australia.

Common in waste land. A viscous aromatic resin obtained from incisions on the bark is used locally as incense. Wood is used for making packing cases. *CNS 2598* (Chepad).

SAMADERA J. Gaertner

Fruct. 2: 352. 1791 (*nom. cons.*).

Samadera indica J. Gaertn., Fruct. 2: 352. 1791; Bennett in Hook. f., Fl. Brit. India 1: 519. 1875; Gamble, Fl. Pres. Madras 163. 1915; Basak in Jain *et al.*, Fasc. Fl. India 4: 15. 1980; Ramach. & Nair, Fl. Cannanore 86. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 106. 1994. *Niota lucida* Wall., Pl. As. Rar. 2: 54, t. 168. 1831. *Samadera lucida* (Wall.) Planchon in Hook., Lond. J. Bot. 5: 562. 1846; Parkinson, For. Fl. Andamans 112. 1923. *Quassia indica* (Gaertn.) Nooteboom in Fl. Mal. I , 6: 199. 1962 & in Blumea 11(2): 517. 1962; Mani. & Sivar., Fl. Calicut 61. 1982; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 245. 1988. ***Karin-njota*** Rheede, Hort. Malab. 6: t. 18. 1686. ***Karingotta***

Evergreen small trees, 3.5 - 8 m high. Leaves 14-26 x 4-9 cm, oblong, base rounded, apex obtusely acute, coriaceous and glossy; petiole to 1.5 cm long. Flowers 4-merous, greenish-white, umbelled on long, pendulous axillary peduncle; peduncle 10-24 cm long; pedicels 1-1.5 cm long. Calyx lobes 2-2.5 mm long, suborbicular, pubescent without, persistent in fruit. Petals 4, 1.6-2.2 x 0.4 - 0.5 cm, oblanceolate, pale yellow, pubescent without. Stamens 8, 1-1.2 cm long; anthers 2-3 mm long. Ovary c. 2 x 2 mm, free; style up to 2.2 cm long. Drupes 1-4, 3.5 - 5.5 x 2.5-3.5 cm, oblong, flattened, keeled.

Fl. & Fr. : Dec. – Mar.

Distr.: India, Malagasy, Sri Lanka, Burma, Malaysia, Cambodia, Thailand, Laos, Vietnam, Indonesia, Philippines, Solomon Islands. *CNS 1538* (Kalarcodu).

Notes: Nooteboom (*l.c.*) reduced the genus to a section under *Quassia*. However, *Samadera* with simple leaves, small prolate spheroidal pollen grains and total absence of foliar sclerids, is treated here as distinct from *Quassia* which is characterised by compound leaves, medium-sized suboblate pollen grains and diffuse sclereids of 4 categories.

31. OCHNACEAE DC.

in Ann. Mus. Natl. Hist. Nat. 17: 410. 1811.

1a. Leaves with distinct intramarginal nerves; stamens 10, anthers opening by terminal pores; drupes reniform ..... **Gomphia**

1b. Leaves without intramarginal nerves; stamens many, anthers opening longitudinally; drupes not reniform ..... **Ochna**

GOMPHIA Schreber

Gen. 291.1789.

Gomphia serrata (Gaertn.) Kanis, Taxon 16: 422. 1967 & Blumea 16: 53. 1968; Mani. & Sivar., Fl. Calicut 62. 1982; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 199. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 106. 1994. *Meesia serrata* Gaertn., Fruct. 1: 344, t. 70, f. 6. 1788. *Gomphia angustifolia* Vahl, Symb. Bot. 2: 49. 1791; Bennett in Hook. f., Fl. Brit. India 1: 525. 1875. *Ouratia angustifolia* (Vahl) Baill. ex Laness., Fl. Util. Col. Fr. 607. 1886; Gamble, Fl. Pres. Madras 167. 1915. *Ouratia serrata* (Gaertn.) Robson, Taxon 11: 51. 1962. ***Tsjocatti*** Rheede, Hort. Malab. 5: 95-96, t. 48. 1685. ***Poea-tsjetti*** Rheede,Hort. Malab. 5: 103-104, t. 52. 1685 (Plate VII: A).

Woody erect shrubs. Leaves alternate, 6-16 x 2.5-5 cm, elliptic-oblong, base acute, margins sharply serrulate, apex shortly acuminate, shiny, coriaceous, lateral nerves many, close, parallel, united into an intramarginal vein; stipules 2, lanceolate. Inflorescence an

axillary or terminal raceme or panicle. Flowers c. 1.5 cm across; bracts triangular. Sepals 5, elliptic-ovate. Petals 5, bright yellow, narrowly obovate. Disc lobed. Stamens 10, subsessile; anthers linear, dehiscing by terminal pores. Ovary deeply 4-5-lobed, reddish; ovule 1-per locule. Drupes 4-5, seated on disc, reniform, reddish brown.

Fl. & Fr.: Jan. - Jun.

Distr.: Sri Lanka, Peninsular India and Philippines. Seen in sacred groves. *CNS 2379* (Elagimelvallikavu), *CNS1902* (Thamarakulam).

OCHNA Linnaeus

Sp. Pl. 513. 1753.

Ochna gamblei King ex Brandis, Indian Trees 128. 1906; Gamble; Fl. Pres. Madras166. 1915. *Ochna obtusata* DC. var. *gamblei* (King ex Brandis) Kanis, Blumea 16(1): 34. 1968; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 116.1976; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 222. 1983. *Ochna beddomei* Gamble, Fl. Pres. Madras166. 1915 & in Bull. Misc. Inform. 1916: 34. 1916 (Plate VII: B; Fig. 16).

Large shrubs; branchlets stout; bark thick, whitish. Leaves crowded at ends of branchlets, almost sessile, 5-12 x 3.2-6 cm, obovate or broadly elliptic, base subcordate, margins serrate, apex obtuse or rounded, coriaceous, waxy, glaucous; stipules 3-4 mm long. Inflorescence many-flowered in axillary or lateral corymbose racemes. Flowers 3-4.3 cm across; pedicels 2-3 cm long, slender, longer in fruiting. Sepals 5,1-2 x 0.5-1 cm, ovate-oblong. Petals 5-8, obovate, yellow. Stamens many; anthers 6-8 mm long, more than twice the length of filaments. Ovaries 5-10, lobed; styles 8-12 mm long. Drupes 3-5, seated on enlarged, globose reddish disc, c. 1 cm long, ovoid, black when ripe.

Fl. & Fr.: Jan. - May.

Distr.: Central and Peninsular India. In sacred groves. *CNS 232, CNS 1898* (Vandanam).

32. MELIACEAE Juss.

Gen. Pl. 263. 1789.

1a. Herbs; leaves 3-foliolate, petioles winged ..... **Naregamia**

1b. Shrubs or trees; leaves pinnate, petioles not winged.

2a. Leaves 2-or 3-pinnate ..... **Melia**

2b. Leaves 1-pinnate.

3a. Fruit a capsule.

4a. Stamens 6; ovary 3-celled; seeds not winged, arillate ..... **Aphananmixis**

4b. Stamens 10; ovary 5-celled; seeds winged, exarillate ..... **Swietenia**

3b. Fruit a drupe.

5a. Margins of leaflets entire; stamens 5; ovary 2-celled ..... **Aglaia**

5b. Margins of leaflets dentate; stamens 10; ovary 3- or 5-celled.

6a. Trees; ovary 3-celled, drupe 1-seeded .... **Azadirachta**

6b. Shrubs; ovary 5-celled; drupe 5-seeded. .... **Cipadessa**

AGLAIA Loureiro

Fl. Cochinch. 98, 173. 1790 (*nom. cons).*

Aglaia elaeagnoidea (A. Juss.) Benth. Fl. Austral. 1: 383. 1863; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 392. 1976; Mani. & Sivar., Fl. Calicut 63. 1982; Mani., Fl. Silent Valley 48. 1988; Pannell, Kew Bull. Add. Ser. 16: 1992 & in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 256. 1995. *Nemebra elaeagnoidea* A. Juss., Bull. Sci. Nat. Geol. 23: 239. 1830. *Milnea roxhurghiana* Wight & Arn., Prod. 119. 1834; Wight, Ic. t. 166. 1839. *Aglaia roxburghiana* (Wight & Arn.) Miq., Ann. Mus. Bot. Lugd. Bat. 4: 41.

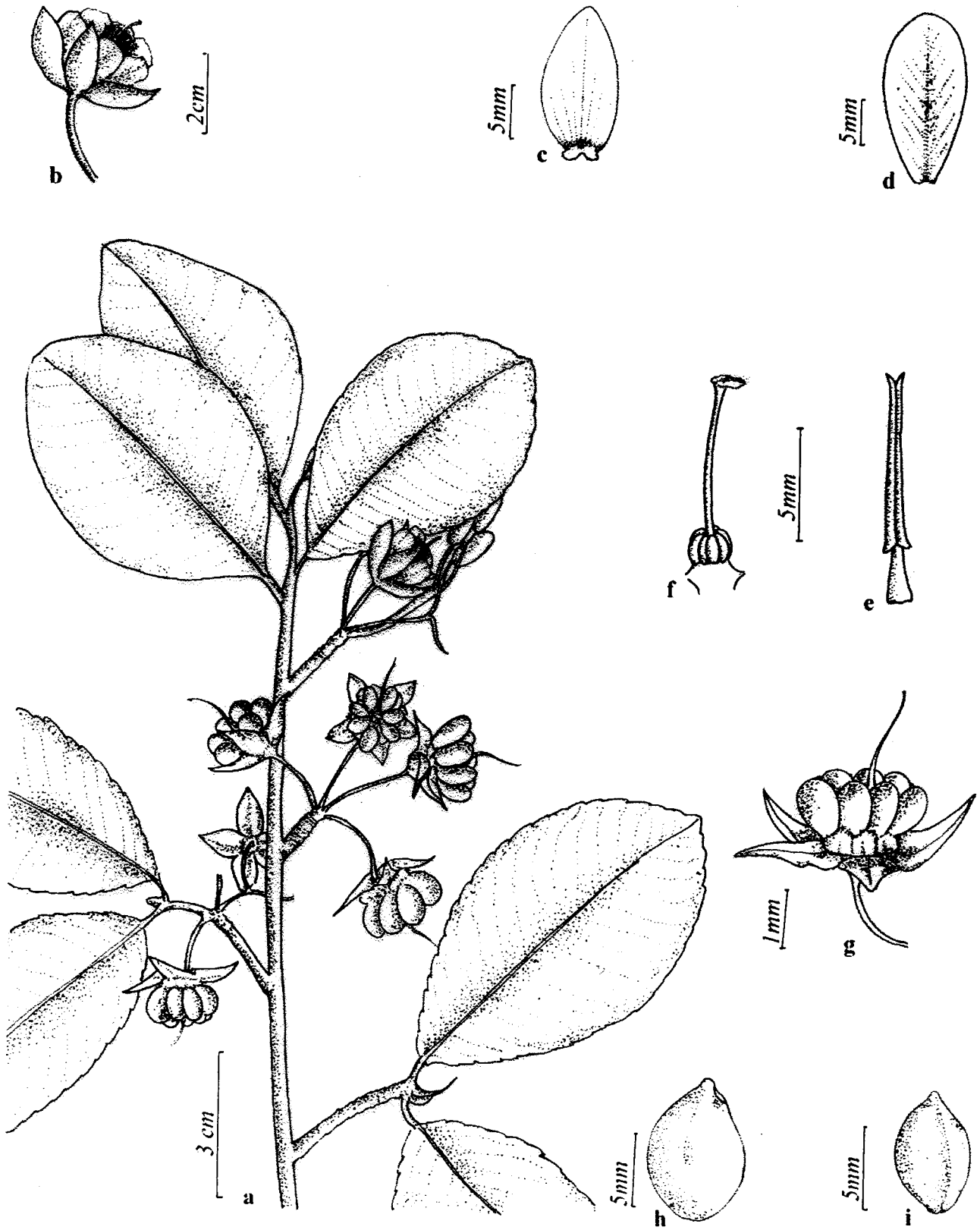


Fig. 16. *Ochna gamblei* King ex Brandis: a. Twig with flowers and fruits ; b. Single flower; c. Sepal; d. Petal; e. Stamen; f. Pistil; g. Fruits with persistent calyx and style ; h.Single fruit; i. Seed.

1868; Hiern in Hook. f., Fl. Brit. India 1: 555. 1875; Gamble, Fl. Pres. Madras 180. 1915; Matthew & Britto in Mathew, Fl. Tam. Carnatic 3: 231. 1983.

Small trees; bark brown, greyish-brown or yellowish-grey, reddish inside; branchlets pale brown, with dense pale brown peltate scales. Leaves imparipinnate, 10-25 cm long; leaflets 3-7, 4-10 x 2-4 cm, elliptic-oblong or obovate, base cuneate, apex rounded or acute, glabrous above, tomentose below, subcoriaceous, rachis and petiolules with dense peltate or stellate scales like those on the twigs. Panicles axillary; peduncle and branches with indumentumn like the twigs. Flowers 5-merous, polygamo-dioecious, fragrant. Calyx tube campanulate, tomentose; lobes ovate, obtuse. Petals 5, yellowish, c. 2 mm long, obovate. Staminal tube subglobose, yellow; stamens 5. Ovary c. 1 mm long subglobose with dense stellate scales, 2-celled. Berry 1-1.5 cm long, subglobose, brown, with dense scales like those on the twigs. Seeds 1, ellipsoid.

Fl. & Fr.: Dec. - Apr.

Distr.: India Sri Lanka, China, Taiwan, Vietnam, Cambodia, Thailand, Malay, Peninsula, Australia, Philippines. In sacred groves *CNS 2426* (Thazhakkara), *CNS 2328* (Ambalapuzha).

APHANAMIXIS Blume

Bijdr. 165. 1825.

Aphanamixis polystachya (Wall.) Parker, Ind. For. 57: 486. 1931; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 393. 1976; Mani & Sivar. Fl. Calicut 63. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 233. 1983; Mabb., Taxon 26: 528. 1977 & Blumea 31: 136. 1985; Panigrahi & Mishra, Ind. J. For. 11: 135. 1988; Mani., Fl. Silent Valley 48. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 109. 1994; Mabberley in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 250. 1995; Sivar. & Mathew, Fl. Nilambur 131. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 94. 1996. *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.

Trees, bark brown. Leaves large, imparipinnate; rachis 20-35 cm long; leaflets 9-15, 7-16 x 4-6 cm, elliptic-lanceolate, base oblique, entire, acute or caudate at apex, glabrous; petiolule to 1 cm long. Flowers polygamodioecious, in axillary branched racemes. Calyx - tube cupular, c. 3 mm long, 3-5-lobed; lobes 2-3 mm across, subrotund, ciliate on margins. Petals 3-5 mm diam., subrotund, cream to yellow, sometimes pinkish tinged. Staminal tube globose, yellow; stamens 6-10, included, black. Ovary minute, 3-celled; ovules 1-2 in a cell; styles absent; stigma conical, 3-lobed. Capsule 3-4 cm long, pyriform, yellowish at first, pink or red at maturity. Seeds 1-3, 1. 7-2 cm long, planoconvex, covered with brownish-red or scarlet oily aril, testa dark brown or black.

Fl. & Fr.: Jul. - Sep.

Distr.: India, Sri Lanka, Malaysia. In sacred groves. *CNS 2427* (Aroor).

AZADIRACHTA A.H.L. Jussieu

Mem. Mus. Hist. Nat. 19: 220. 1830.

Azadirachta indica Juss., Mem. Mus. Hist. Nat. 19: 221, t. 2, f. 5. 1832; Gamble, Fl. Pres. Madras 177. 1915; Penn., Blumea 22: 461, t. 4e. 1975; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 393. 1976; Mani. & Sivar., Fl. Calicut 64. 1982, Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 234. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 178. 1988; Panigrahi & Mishra, Ind. J. For. 11: 135. 1988; Mabberley in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 280. 1995. *Melia azadirachta* L., Sp. Pl. 385. 1753; Hook. f., Fl. Brit. India 1: 544. 1875. ***Aria-bepou*** Rheede, Hort. Malab. 4: t. 52. 1683. **Veppu.**

Trees. Leaves simple-pinnate; leaflets 13-15, sub-opposite 4-7 x1.5-2.5 cm, lanceolate or falcate, inequilateral, base oblique, margin serrate, apex acuminate, subcoriaceous. Flowers in axillary racemose panicles, 5-merous. Sepals 5, c. 1 mm long, ovate, ciliolate. Petals 5, white, 4-6 mm long, obovate or linear-spathulate. Staminal tube

apically 10-lobed; stamens 10. Ovary 3-celled; ovules 2-per cell; stigma 3-lobed. Drupes 1-1.5 cm long, ovoid, yellow when ripe. Seed solitary, ellipsoid.

Fl. & Fr.: Dec. – Feb.

Distr.: Tropical Asia, Australia, Africa. Often grown as an avenue tree. The leaf and stem are widely used in Ayurvedic medicines. *CNS 2428* (Ponnamveli).

CIPADESSA Blume

Bijdr. 162. 1825.

Cipadessa baccifera (Roth) Miq., Ann. Mus. Bot. Lugd. Bat. 4:6. 1868; Gamble, Fl. Pres. Madras 176. 1915; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 394. 1976; Mani. & Sivar., Fl. Calicut 64. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 235. 1983; Ramach. & Nair, Fl. Cannanore 88. 1988; Panigrahi & Mishra, Ind. For. 11: 136. 1988; Mani., Fl. Silent Valley 49. 1988; Malabberly in Dassan.,Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 270. 1995 Sivar. & Mathew, Fl. Nilambur 133. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 95. 1996. *Melia baccifera* Roth, Nov. Sp. Pl. Ind. Or. 215. 1821; DC., Prod. 1: 622. 1824. *Cipadessa fruticosa* Blume, Bijdr. 162. 1825; Hiern in Hook. f., Fl. Brit. India 1: 545. 1875. *Ekebergia indica* Roxb. ex Hoffsgg., Verz. Suppl. 2:9, 34. 1828; Roxb., Fl. Ind. 2: 392. 1832. *Mallea rothii* A. Juss., Mem. Mus. Hist. Nat. 19: 222, t. 13, f. 6. 1832, *nom. illeg.*; Wight & Arn., Prodr. 1: 118. 1834.

Shrubs to 3 m tall; branchlets tomentose. Leaves odd-pinnate; leaflets 3-5 pairs, opposite, 3-7 x 2-3.5 cm, narrowly oblong to ovate, base acute or rounded, margins irregularly dentate towards apex, apex acuminate; petiolule to 8 mm long. Panicles axillary, corymbose; peduncle to 7 cm long. Calyx-lobes c. 1 mm long, triangular, spreading, pubescent. Petals 3.5-4 mm long, ovate, cream or c. 3 mm long; stamens 10; anthers yellow. Ovary 5-6-angular, ovules 2 per cell; stigma turbinate. Drupe c. 5 mm across, globose, longitudinally grooved, reddish brown.

Fl. & Fr.: Apr. - Oct.

Distr.: India, Sri Lanka, Nepal, Indochina and Java. In sacred groves. *CNS 2429* (Thazhakkara).

MELIA Linnaeus

Sp. Pl. 384. 1753.

Melia azedarach L., Sp. Pl. 384. 1753; Roxb., Fl. Ind. 2: 395. 1832; Wight, Ic. t. 160. 1839; Bedd. Fl. Sylv. t. 13. 1869; Hook. f., Fl. Brit. India 1: 544. 1875; Gamble, Fl. Pres. Madras 176. 1915; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 237. 1983; Mabberley in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 278. 1995; Sivar. & Mathew, Fl. Nilambur 134. 1996. *Melia azedarach* var. *sempervirens* L., Sp. Pl. 384. 1753. *Melia commelini* Medik., Bot. Beobacht. 1782: 164. 1783.

Small trees. Leaves 2-or 3-pinnate; leaflets opposite, 4.5-6.5 x 1.5-3.5 cm, ovate-obovate or lanceolate, base oblique, margin irregularly serrate, apex acuminate; petiolule to 1 cm long. Panicles axillary; peduncle to 10 cm long. Flowers sweet-scented, c. 1 cm across; pedicel to 2 mm long. Calyx-lobes 5, c. 1.5 mm long, ovate, pubescent without. Petals 5, lilac or blue, to 8 x 3 mm, lanceolate-obovate. Staminal tube dark purple, c. 6 mm long, puberulous, 10-toothed; stamens 10-12. Ovary c. 1 mm long, ovoid; ovules 2 per cell. Drupe to 2 x 1 cm, oblong, 1-seeded, yellow.

Fl. & Fr.: Jan. - Aug.

Distr.: Native of W. Himalaya and naturalized in China, Myanmar, India, Pakistan, Iran, Turkey. In roadsides and other wastelands. *CNS 2430* (Karumadi); *CNS 1484* (Edathala).

NAREGAMIA R. Wight *et* 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; Mani. & Sivar., Fl. Calicut 64. 1982; Ramach. & Nair, Fl. Cannanore 90. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 174. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 110. 1994;

Sivar. & Mathew, Fl. Nilambur 135. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 98. 1996. ***Nela-Naregam*** Rheede, Hort. Malab. 10: 43, t. 22. 1960.

Prostrate woody herbs. Leaves 3-foliolate; leaflets 1.5-2.5 x 0.6-1.2 cm, obovate, laterals oblique, base cuneate, margins entire to serrate, apex obtuse; petioles 1.5-2.5 cm long, winged. Flowers axillary, solitary; pedicel short. Calyx 5-lobed; lobes 3-4 mm long, lanceolate. Petals 5, white, 1.5-1.8 cm long, spathulate. Disc annular. Staminal tube 1.8-2 cm long, cylindric, inflated at top, white with 10 yellow teeth at margins; anthers 10, sessile at the apex of the tube. Ovary 3-celled; ovules 2 in each cell; style filiform; stigma capitate. Capsule 4-5 mm diam., ovoid to subglobose, 3-valved. Seeds c. 1 mm across. curved, truncate at both ends.

Fl. & Fr.: Mar. - Jun.

Distr.: Peninsular India. A common weed. *CNS 1456* (Angadikkal).

This is widely used against rheumatism, acute dysentery etc.

SWIETENIA N.J. Jacquin

Enum. Pl. Carib. 4: 20: 1760.

Swietenia macrophylla King in Hook., Icon. Pl. t. 1550. 1886; Butterworth, Madras trees 128. 1911; Styles, Fl. Neotrop. 28: 395, f. 80. 1981; Matthew & Britto in Matthew Fl. Tam. Carnatic 3: 239. 1983; Mabberley in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 233. 1995; Sivar. & Mathew, Fl. Nilambur 136. 1996.

Deciduous trees. Leaves paripinnate, to 40 cm long; leaflets 3 or 4 pairs subopposite, 5.5-12 x 3-5 cm, ovate-lanceolate, falcate, base oblique, apex acuminate or abruptly subacute, glossy above, dull below, coriaceous; petiolule to 1 cm long. Panicles axillary, to 18 cm long. Flowers c. 7 mm across. Calyx-lobes minute, suborbicular. Petals 5, cream, c. 3 mm long, oblong. Staminal tube 2.5-3 mm long, apically 10-lobbed; stamens 10. Ovary 5-celled; ovules many per cell; stigma lobed. Capsule 6-9 x 4.5-7 cm, subglobose, rusty. Seeds to 7 cm long, winged.

Fl. & Fr.: Apr. - Dec.

Distr.: Native of Honduras; now widely cultivated in the tropics. *CNS 2431* (Alappuzha town).

33. OPILIACEAE (Benth.) Valeton

Crit. Overz. Olacin. 136.1886.

CANSJERA A.L. Jussieu

Gen. 448. 1789 (*nom. cons.*).

Cansjera rheedii Gmelin in L., Syst. Nat. (ed. 13) 2: 280. 1791; Wight, Ic. t. 1861. 1852; Hook. f., Fl. Brit. India 1: 582. 1875; Gamble, Fl. Pres. Madras 193. 1915; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 302. 1976; Mani. & Sivar., Fl. Calicut 64. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 248. 1983; Ramach. & Nair, Fl. Cannanore 92. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 203. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 112. 1994.*Cansjera scandens* Roxb., Pl. Corom. t. 103. 1799 & Fl. Ind. 1: 441. 1832. ***Tsjereu-caniram*** Rheede, Hort. Malab. 7: t. 2. 1688.

Climbing shrubs, armed with spines; old trunks with white lenticels; young branches pubescent. Leaves 2.8-7.5 x 1.5-4 cm, ovate or lanceolate, base rounded, apex acuminate, shining green above, pale below; petiole to 5 mm long. Spikes axillary, solitary or 2 or 3, 1.5-2.8 cm long, tomentose; bracts minute, subulate. Perianth yellowish-green, c. 3 mm across, urceolate, 4-lobed. Disc glandular, 4-lobed. Stamens 4, free. Ovary ovoid, unilocular; ovule solitary; stigma 4-lobed. Drupe 8-12 mm long, ovoid, scarlet.

Fl. & Fr.: Nov. - Feb.

Distr.: India, Malesia, Australia. In sacred groves. *CNS 1702* (Pallippuram).

34. ICACINACEAE (Benth.) Miers

in Ann. Mag. Nat. Hist., ser. 2, 8: 174. 1851.

SARCOSTIGMA R. Wight *et* Arnott

Edinburgh New Philos. J. 14: 299. 1833.

Sarcostigma kleinii Wight & Arn., Edinburgh New Philos. J. 14: 229. 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; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 326. 1976; Mani. & Sivar., Fl. Calicut 65. 1982; Ramach. & Nair, Fl. Cannanore 94. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 114. 1994; Sivar. & Mathew, Fl. Nilambur 141. 1996; Sasi & Sivar., Fl. Pl. Thrissur For. 104. 1996.

Stout woody climbers. Leaves 8-20 x 3.5-8 cm, elliptic to oblong-lanceolate, base rounded to broadly attenuate, apex acute to slightly acuminate, coriaceous, finely reticulate, reticulations prominent below; petiole to 1.5 cm long. Flowers unisexual, fascicled on lateral 7-18 cm long pendulous spikes. Calyx minute, cupular, unequally 4-6-lobed. Petals 4-6, yellow, 2-3 mm long lanceolate, reflexed on opening, slightly connate at extreme base. Stamens 4-6, free, in female flowers reduced to staminodes. Ovary 1-locular; ovules 2, pendulous. In male flowers pistillode present. Drupe 1.2-2.5 x 1-1.5 cm, ellipsoid, yellow on ripening. Stone tubercled; endosperm oily.

Fl. & Fr.: Oct. - Mar.

Distr.: Peninsular India, Malaysia. In sacred groves. Fruits edible. *CNS 1380* (Kadakkarappally).

Seed-oil used for curing itches and piles.

35. CELASTRACEAE R. Br.

in Flinders, Voy. Terra Austr. 2: 554. 1814.

LOPHOPETALUM R. Wight & Arnott.

Ann. Nat. Hist. 3: 150. 1839.

Lophopetalum wightianum Arn., Ann. Nat. Hist. 3: 151. 1839; Wight, Ic. t. 162. 1839; Bedd., Fl. Sylv. t. 142. 1871; Lawson in Hook. f., Fl. Brit. India 1:615. 1875; Gamble, Fl. Pres. Madras 205. 1918; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 319. 1976; Mani., Fl. Silent Valley 55. 1988; Ramach. & Nair, Fl. Cannanore 96. 1988; Vajravelu, Fl. Palghat Dist. 119. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 116. 1994 (Fig. 17).

Large evergreen trees; bark grey, mottled with yellow, dull-red inside. Leaves 10-16 x 4-7 cm, broadly elliptic to oblong, round to broadly attenuate at base, obtuse to slightly acute at apex; petiole 1.5-2 cm long. Flowers in terminal panicles, c. 1.5 cm across. Calyx flat at base, 5-6 mm diam., lobes 5, c. 1 mm long, c. 3 mm wide, rounded. Petals 5, pinkish-white, attached to the disc, 5-6 mm long, sub-orbicular, cristate above, Disc flat, 6-8 mm diam., 5-lobed, purplish-red. Stamens 5. Ovary partially sunk in the disc, 3-celled; ovules many in each cell; style short; stigma capitate. Capsule 8-10 x 2.5-3.5 cm, 3-angled, 3-valved. Seeds winged, 6-8 x 1.1.5 cm, laterally compressed, pappery.

Fl. & Fr.: Dec. - Mar.

Distr.: Indomalaysia. In wasteland and sacred groves. *CNS 1754* (Kanichukulangara Jn.), *CNS 2034* (Thiruvizha).

36. HIPPOCRATEACEAE Juss.

Ann. Mus. Natl. Hist. Nat. 18: 486. 1811.

SALACIA Linnaeus
Mant. Pl. 159. 1771.

Salacia fruticosa Heyne ex Lawson in Hook. f., Fl. Brit. India 1: 628. 1875; Gamble, Fl. Pres. Madras 215. 1918; Nair & Ramach., Ind. J. For. 5: 331. 1982; Mani. & Sivar., Fl.

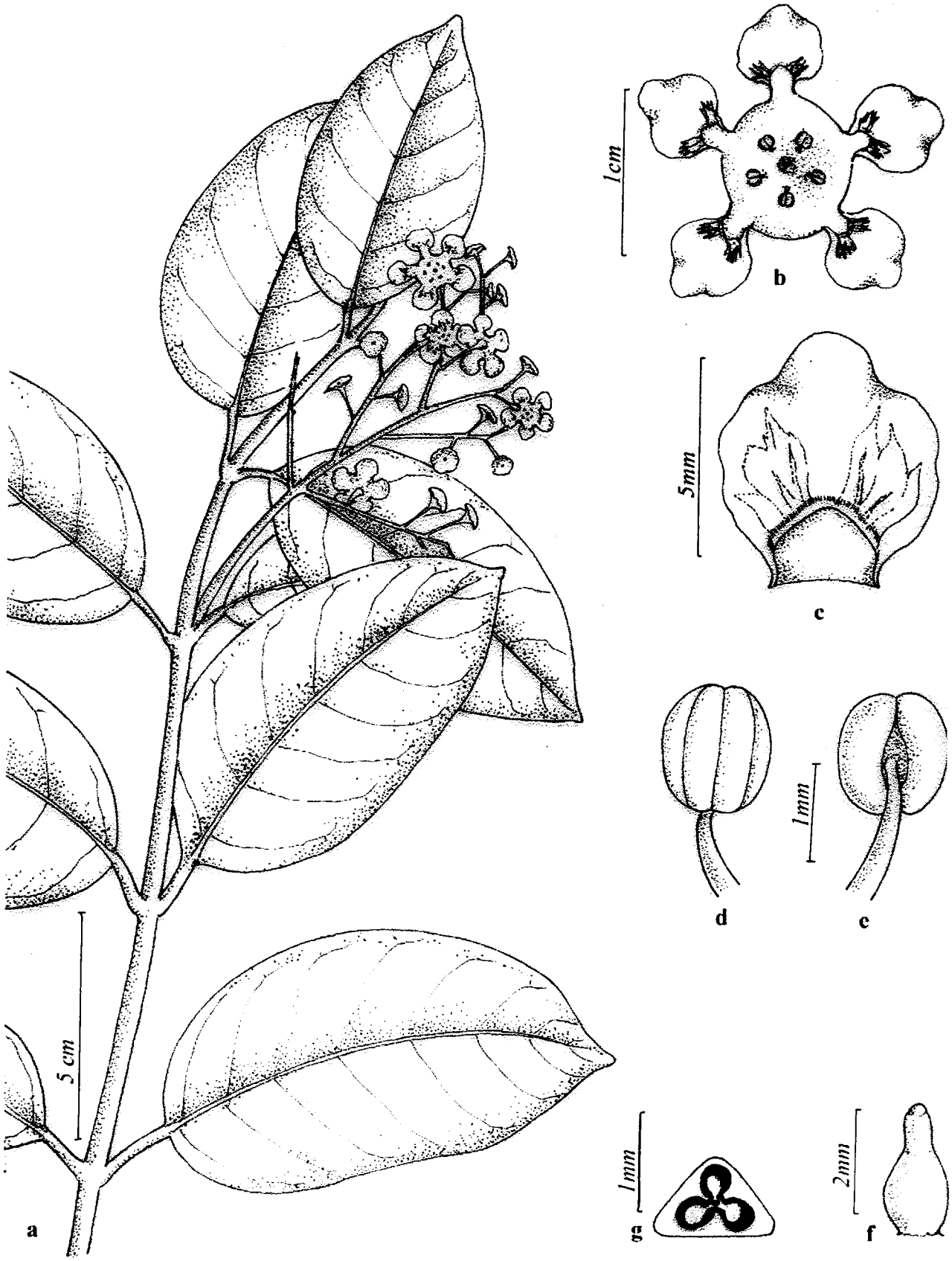


Fig. 17. *Lophopetalum wightianum* Arn.: a. Flowering Twig ; b. Flower; c. Petal; d. Stamen-ventral view; e. Stamen-dorsalview ; f. Pistil; g. Ovary-C.S.

Calicut 66. 1982; Ramach. & Nair, Fl. Cannanore 98. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 118. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 108. 1996.

Woody climbing shrubs; branchlets looped; young shoots puberulous. Leaves 3.8 - 7 x 2-4 cm, elliptic-ovate or elliptic-oblong, base rounded or cuneate, apex obtusely acuminate, coriaceous; petiole c. 5 mm long. Cymes axillary; pedicels 3-5 mm long. Calyx 5-lobed, minute; lobes minutely ciliate on margins. Petals 5, brownish-yellow, c. 2 mm across, orbicular. Disc fleshy. Stamens 3, inserted on the inner margin of the disc; filaments broad, curved. Ovary globose, minute, partially sunk in the disc, 3-celled; ovules 2-8 in each cell; style very short; stigma capitate, obscurely 3-lobed. Berry 2-2.5 cm across, globose, red. Seeds 1-3.

Fl. & Fr.: Jan. - May.

Distr.: Endemic to Western Ghats. Rare; in some sacred groves. *CNS 1474* (Vandanam).

37. **RHAMNACEAE** Juss.

Gen. Pl. 376. 1789.

1a. Plants armed; leaves 3-5-ribbed; flowers greenish or greenish-yellow; fruit a drupe ..... **Ziziphus**

1b. Plants unarmed; leaves not ribbed; flowers reddish; fruit a capsule ..... **Colubrina**

COLUBRINA Richard ex Brongniart

Ann. Sci. Nat. (Paris) 10: 368. 1827.

Colubrina travancorica Bedd., Ic. Pl. Ind. Or. 1:43, t. 188. 1874; Lawson in Hook. f., Fl. Brit. India 1: 643. 1875; Gamble, Fl. Pres. Madras 224. 1918; Brandis, Ind. Trees 174. 1971; Bhandari & Bhansal in Nayar *et al.*, Fasc. Fl. India 20: 34. 1990.

Unarmed shrubs; young branches appressed golden silky hairy. Leaves alternate or subopposite, 8-13 x 3-4.5 cm, elliptic or lanceolate, base rounded, margins crenate, apex

acuminate-mucronate, densely pubescent beneath when young, nerves impressed above and raised below; petioles to 1 cm long; stipules 2-3 mm long, subulate. Flowers reddish, 5-6 mm across, in axillary cymose fascicles; pedicels 4-6 mm long, golden silky hairy. Calyx lobes 5, 1.5-2 mm long, deltoid; tube campanulate, sparsely hispid. Petals 5, 1.5-2 mm long, obovate, cucullate, clawed at base. Stamens 5, shorter than petals. Disc 10-lobed, pitted. Ovary 3-loculed; style 3-cleft. Capsule 6-8 mm across, globose. Seeds obovoid, compressed.

Fl. & Fr.: Oct. - Feb.

Distr.: Confined to Kerala. Endemic. *CNS 1755* (Chengannur).

ZIZIPHUS P. Miller

Gard. Dict. Abr. ed. 4. 1754.

Trees or shrubs, often climbing, armed. Leaves alternate, basally 3-5-ribbed. Flowers in axillary fascicles or few-flowered cymes or panicles. Calyx tube with 5 triangular lobes, keeled within. Petals 5 or 0. Disc flat, 5-10-lobed. Stamens 5, opposite and enclosed within the petals. Ovary sunk or adnate at base of the disc, 2-4-celled; ovule 1 in each cell; styles free or connate basally; stigma papillose. Drupe globose to oblong. Seeds stony.

1a. Petals 0 ..... **Z. rugosa**

1b. Petals present.

2a. Trees ..... **Z. mauritiana**

2b. Straggling shrubs ..... **Z. oenoplia**

Ziziphus mauritiana Lam., Encycl. Meth. Bot. 3:319. 1789; Sant., J. Bombay Nat. Hist. Soc. 51:802. 1953 & Fl. Khandala. 39. 1960; Fosb., Phytologia 15(7): 502. 1968; Mani. & Sivar., Fl. Calicut 67. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3:271. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 214. 1988; Bhandari & Bhansal in Nayar *et al.*, Fasc. Fl. India 20: 99. 1990. *Ziziphus jujuba* (L.) Gaertn., Fruct. Sem. Pl.

1:203. 1788, non Miller, 1768; Wight, Ic. t. 99. 1838; Hook. f., Fl. Brit. India 1: 632. 1875; Gamble, Fl. Pres. Madras 219. 1918. ***Perin toddali*** Rheede, Hort. Malab. 4: t. 41. 1683.

Trees; bark nearly black, reddish inside; branches armed with hooked spines. Leaves 2-3 x 1-2 cm, orbicular or elliptic, base oblique, subcordate, margin denticulate, obtuse at apex, 3-nerved from base, white velvetty-tomentose below, glabrous above. Flowers in axillary fascicles, 4-6 mm across, greenish-white; pedicel, to 4 mm long. Calyx lobes c. 1 mm long, ovate; tube wooly. Petals 1-1.5 mm long, ovate, green. Disc 10-lobed, grooved. Stamens to 1 mm. Ovary embedded in disc, 2-celled; ovules solitary; styles 2; stigma 2-fid. Drupe 7-10 mm across, globose, yellow.

Fl. & Fr.: Oct. - Nov.

Distr.: India and Sri Lanka. Common on plains. *CNS 1877* (Alappuzha Town).

Ziziphus oenoplia (L.) Miller, Gard. Dict. ed. 8, 3. 1768; Bedd., Fl. Sylv. 69. 1870; Lawson in Hook. f., Fl. Brit. India 1: 634. 1875; Trimen, Handb. Fl. Ceylon 1: 280. 1893; Gamble, Fl. Pres. Madras 220. 1918; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 354. 1976; Mani. & Sivar., Fl. Calicut 67. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 273. 1983; Ramach. & Nair, Fl. Cannanore 101. 1988; Vajravelu, Fl. Palghat Dist. 121. 1990; Bhandari & Bhansal in Nayar *et al.*, Fasc. Fl. India 20: 108. 1990; Mahanan & Henry, Fl. Thiruvananthapuram 118. 1994; Sivar. & Mathew, Fl. Nilambur 147. 1996; Sasi. & Sivar., Fl. Pl. Trissur For. 110. 1996. *Rhamnus oenoplia* L., Sp. Pl. 194. 1753.

Woody stragglers with sharp recurved spines; branchlets brown tomentose. Leaves 2-6 x 1.2-3 cm, ovate or elliptic, base oblique, margins entire, acute or acuminate at apex, basally 3-ribbed, densely silky-brown pubescent on both surfaces when young, glaberescent on ageing. Flowers in axillary fascicles, c. 3 mm across. Calyx lobes 1.5-2 mm long, triangular-ovate. Petals greenish-yellow, c. 1 mm long, obovate, cuneate. Stamens 5. Disc orangish-red, pitted, 10-lobed. Ovary embedded in the disc; styles 2; stigma 2-fid. Drupes c. 4 mm across, globose, purple.

Fl. & Fr.: Nov.- Mar.

Distr.: Throughout the hotter parts of India, Sri Lanka, Malacca, Tropical Asia and Australia. In wasteland and sacred groves. Ripe fruits are edible. *CNS 1466* (Cherthala).

Ziziphus rugosa Lam., Encycl. 3: 319. 1798; Wight, 1c. t. 339. 1840; Lawson in Hook. f., Fl. Brit. India 1: 636. 1875; Trimen, Handb. Fl. Ceylon 1: 282. 1893; Gamble, Fl. Pres. Madras 221. 1918; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 354. 1976; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 273. 1983; Mani. & Sivar., Fl. Calicut 67. 1982; Mani., Fl. Silent Valley 58. 1988; Ramach. & Nair., Fl. Cannanore 101. 1988; Vajravelu, Fl. Palghat Dist. 121. 1990; Bhandari & Bhansal in Nayar *et al.*, Fasc. Fl. India 20: 108. 1990;Mohanan & Henry, Fl. Thiruvananthapuram 119. 1994; Sivar. & Mathew, Fl. Nilambur 148. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 110. 1996.

Large woody stragglers; stem prickly. Leaves 5-10 x 3-6 cm, broadly elliptic or orbicular, cordate to round at base, margin crenate-serrate, obtuse at apex, basally 3-5-ribbed, glabrous above, fulvous-tomentose beneath; petiole 1-1.5 cm long. Flowers 5-6 mm across, in terminal and axillary long peduncled tomentose panicles. Pedicels 5-7 mm long, densely tomentose. Calyx lobes 5, 2-3 mm long, triangular-ovate, pubescent without; petals o. Stamens 5, 1-2 mm long. Disc cupular, 5-lobed. Ovary sunk in the disc, 2-celled; ovules one in each cell; style 2; stigma 2-fid. Drupe 6-8 mm long, ovoid, white when ripe. Seeds compressed, black.

Fl. & Fr.: Nov. - Apr.

Distr.: Western Peninsular India. In sacred groves. *CNS 2035* (Angadikkal).

38. VITACEAE Juss.

Gen. Pl. 267. 1789.

1a. Inflorescences borne on tendrils; flowers 5-merous ..... **Ampelocissus**

1b. Inflorescences not borne on tendrils, flowers 4-merous.

2a. Berries 1-seeded; leaves simple, angular to lobed (3-foliolate in *Cissus trilobata*) ..... **Cissus**

2b. Berries 2-4-seeded; leaves 3-7-foliolate.

3a. Flowers bisexual; stigma minute; seeds deeply pitted ..... **Cayratia**

3b. Flowers polygamo-dioecious; stigma 4-lobed; seeds deeply furrowed ..... **Tetrastigma**

AMPELOCISSUS J.E. Planchon

Vigne Amer. Vitic. Eur. 8: 371. 1884 (*nom. cons.*).

Ampelocissus indica (L.) Planch., Vigne Amer. 8: 275. 1884; Shetty & Singh, Taxon 37: 169. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 267. 1988; Mabberley in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 449. 1995; Sasi. & Sivar., Fl. Pl. Thrissur For. 111. 1996. *Vitis indica* L., Sp. Pl. 202. 1753; Burm. f., Fl. Ind. 62. 1768; Roxb., Fl. Ind. 2: 473. 1824 & ed. 2, 1:660. 1832; Wight & Arn., Prodr. 1:131. 1834; Lawson in Hook. f., Fl. Brit. India 1: 653. 1875; Trimen, J. Linn. Soc. Bot. 24: 138. 1887. *Vitis ericolada* sensu Wight & Arn., Prodr. 1: 130. 1834, non Wight & Arn. 1833; Lawson in Hook. f., Fl. Brit. India 1: 651. 1875, p.p. *Ampelocissus erioclada* sensu Planch., Vigne Amer. 8: 375. 1884; Gamble, Fl. Pres. Madras 231. 1918. *Ampelocissus arnottiana* Planch. in DC., Mon. Phan. 5: 379. 1887; Gamble, Fl. Pres. Madras 231. 1918; Mohanan *et al.*, Bull. Bot. Surv. India 22: 106. 1982.

Large climbers; leafy stems terete, woolly-floccose. Leaves simple, 10-22 x 7-19 cm, ovate to suborbicular, sometimes shallowly 3-lobed, base cordate, margin coarsely dentate, teeth glandular, apex acuminate, upper surface subglabrous to woolly on veins, lower surface woolly-floccose, purplish; petiole to 9 cm long, more or less woolly-floccose. Inflorescence 4-11 cm long, arising from axil of bract on tendril, paniculate, bearing almost sessile cymules of congested 5-merous flowers. Calyx c. 1.5 mm across, salver-form, 5-lobed, cottony. Petals c. 1.5 mm long, oblong-ovate. Stamens c. 1 mm long. Disk 5-grooved, covering most of the ovary. Stigma sessile, 10-grooved. Fruit c. 1.5 cm across, globose, purple. Seeds 2-4, c. 1 cm long, trigonous, smooth, yellow.

Fl. & Fr.: Nov. - Feb.

Distr.: India and Sri Lanka. In sacred groves. *CNS 2454* (Vandanam).

CAYRATIA A.L. Jussieu

Dict. Sci. Nat. 10:103. 1818 (*nom. cons.*).

Climing shrubs, sometimes with tuberous rootstocks. Tendrils simple or bifid, leaf-opposed. Leaves compound; leaflets serrate, crenate or entire. Flowers 4-merous, hermaphrodite, in axillary corymbose cymes. Calyx cupular. Petals 4, valvate, erect or reflexed at anthesis. Disc entire or lobed, adnate to ovary. Stamens 4, inserted around disc. Ovary 2-celled; ovules 2 per cell; style subulate; stigma capitate. Berries spherical to ovoid, 1-4-seeded. Seeds obovoid or ovoid, smooth and shiny; endosperm in cross-section shaped like 'T'.

1a. Leaves trifoliolate, not pedate; berries black ..... **C. trifolia**

1b. Leaves 5-7-foliolate, pedate; berries white ..... **C. pedata**

Cayratia pedata (Lam.) Juss. ex Gagnep., Not. Syst. 1:346. 1911; Gamble, Fl. Pres. Madras 236. 1918; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 359. 1976; Mani. & Sivar., Fl. Calicut 69. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 279. 1983; Shetty & Singh, Kew Bull. 42: 935. 1987; Shetty & Singh, Taxon 37: 171. 1988; Mani., Fl. Silent Valley 59. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 268. 1988; Ramach. & Nair, Fl. Cannanore 103. 1988; Vajravelu, Fl. Palghat Dist. 123. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 120. 1994; Mabberley in Dassan., Fosb., & Clayton Rev. Handb. Fl. Ceylon. 9: 453. 1995; Sivar. & Mathew, Fl. Nilambur 150. 1996. *Cissus pedata* Lam., Encyl. 1: 31. 1783. *Vitis pedata* (Lam.) Wall. ex Wight & Arn., Prodr. 1:128. 1834; Lawson in Hook. f., Fl. Brit. India 1: 661. 1875. *Vitis canarensis* Dalz., Hooker's J. Bot. Kew Gard. Misc. 3: 123. 1851; Lawson in Hook. f., Fl. Brit. India 1: 655. 1875. ***Belutta-tsjori-valli***. Rheede, Hort. Malab. 7: 19, t. 10. 1688.

Weak-stemmed vine; young stem, petioles, tendrils and peduncles densely pubescent. Leaves pedately 5-7-foliolate; leaflets 5-13 x 3-6 cm, lanceolate to obovate,

base cuneate, that of laterals usually oblique, margin subentire or serrate, apex acuminate, pubescent, membranous; petiole to 9 cm long; petiolules 0.5-2 cm long. Flowers in axillary dense corymbs; peduncles 2-3.5 cm long; pedicels 3-4 mm long. Calyx cupular, 1-2 mm long, margin irregularly 4-lobed. Petals 4, 1.5-2 mm long, ovate-acute, greenish white, reflexed, apices hooded. Disk creamy white. Stamens 4, attached to the disc. Ovary c. 1 mm, 2-celled; ovules 2 in each cell; style subulate. Berry 0.5-1 cm across, depressed-globose, creamy white. Seeds 1-4, hemispherical, flattened ventrally.

Fl. & Fr.: Sep. - Nov.

Distr.: Tropical Asia to Western Pacific. In wayside thickets *CNS 1193* (Alappuzha Town).

Cayratia trifolia (L.) Domin, Biblioth. Bot. 89: 370 1927; Mani. & Sivar., Fl. Calicut 69. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 279. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 268. 1988; Shetty & Singh, Taxon 37: 171. 1988; Vajravelu, Fl. Palghat Dist. 124. 1990; Mabberley in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 457. 1995. *Vitis trifolia* L., Sp. Pl. 203. 1753. *Cissus carnosa* Lam., Enc. 1: 31. 1783. *Vitis carnosa* (Lam.) Wall. ex Wight & Arn., Prodr. Fl. Ind. Orient. 127. 1834; Hook. f., Fl. Brit. India 1: 654. 1875. *Cayratia carnosa* (Lam.) Gagnep., Nat. Syst. 1: 347. 1911; Gamble, Fl. Pres. Madras 237. 1918. ***Tsjori-Valli*** Rheede, Hort. Malab. 7: t. 9. 1688.

Glabrous tendril climbers; tendril simple, bifid or more branched. Leaves 3-foliolate; leaflets 2.5-6 x 2-3.5 cm, ovate or elliptic, base cuneate or rounded, margin serrate, apex acute or obtuse, thin-coriaceous; petiole to 6 cm long. Cymes umbellate or corymbose, axillary; peduncle to 8 cm long. Calyx tube c. 0.5 long, lobes 4. Petals 4, greenish-white, 1.5-2 mm long. Disk white. Stamens 4; filaments c. 1 mm long. Ovary c. 0.5 mm long, 2-celled; ovules 2 per cell; style to 1.5 mm long. Berry c. 1 cm across, depressed globose, dark purplish-black. Seeds 1-4, pyriform.

Fl. & Fr.: Jul. - Nov.

Distr.: Sri Lanka, India, Malesia, China and Indo-China. Way side thickets and sacred groves. *CNS 1099* (Alappuzha town).

CISSUS Linnaeus

Sp. Pl. 117. 1753.

Climbing or erect shrubs. Tendrils opposite to the leaves. Leaves mostly simple, entire or lobed. Flowers bisexual, 4-merous in umbellate cymes, opposite to the leaves. Calyx cup-shaped, entire or obscurely 4-lobed. Petals 4, valvate. Stamens 4. Disc 4-lobed, adnate to base of ovary. Ovary 2-celled; ovules 2 in each cell; style subulate. Berry fleshy, 1-2 or 4-seeded. Seeds ellipsoid or pyriform with an encircling raphe.

1a. Leaves 3-foliolate ..... **C. trilobata**

1b. Leaves simple.

2a. Stems fleshy, quadrangular, 4-winged ..... **C. quadrangularis**

2b. Stems not fleshy, terete, not winged.

3a. Seeds with a faint crescent ridge on the face; stem wrinkled .... **C. repanda**

3a. Seeds tessellated on sides of raphe; stem not wrinkled.

4a. Branchlets and leaves very tomentose; leaves 5-angular or deeply lobed ..... **C. vitiginea**

4b. Branchlets and leaves glabrous; leaves broadly ovate, not angled or lobed ..... **C. latifolia**

Cissus latifolia Lam., Ency. 1: 39. 1783 & Tabl. 1:331. 1792 & Suppl. 104. 1810; Shetty & Singh, Taxon 37: 172. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 269. 1988; Mabberley in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 469. 1995; Sasi. & Sivar., Fl. Pl. Thrissur For. 113. 1996. ***Cissus glauca*** Roxb., Fl. Ind. 1:425. 1820; Gamble, Fl. Pres. Madras 234. 1918; Mani. & Sivar., Fl. Calicut 68. 1982; Ramach. & Nair, Fl. Cannanore 104. 1988; Vajravelu, Fl. Palghat Dist. 125. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 121. 1994; Sivar. & Mathew, Fl. Nilambur 152. 1996. *Vitis*

glauca (Roxb.) Wight & Arn., Prodr. 126. 1834; Lawson in Hook. f., Fl. Brit. India 1: 648. 1875.

Large, climbing shrubs. Stem thick; branchlets glaucous; tendrils usually forked. Leaves 8-16 x 6-13 cm, broadly ovate-cordate or orbicular, margin serrate, serrations with bristly tip, acuminte at apex, glaucous below; petiole to 15 cm. Cymes leaf-opposed. Calyx cupular, c. 2 mm long, fringed on margins. Petals 4, greenish-white, c. 2.5 mm long, hooded at apex. Stamens 4. Disc 4-lobed, adnate to ovary, yellow. Ovary tomentose; style thick; stigma truncate. Berries c. 1 cm across, ovoid, purplish, 1-seeded.

Fl. & Fr.: Jun. - Aug.

Distr.: Western Peninsular India and Sri Lanka. In way side thickets, fences and sacred groves. The stem is highly fibrous and is used for making swings. CNS 2455(Vandanam).

Cissus quadrangularis L., Mant. Pl. 39. 1767; Gamble, Fl. Pres. Madras 233. 1915; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 360. 1976; Matthew & Britto in Matthew, Fl. Carnatic 3: 282. 1983; Nicols., Suresh & Mani., An. Interpr. Hort. Malab. 269. 1988; Mabberley in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 476. 1995. *Vitis quadrangularis* (L.) Wall. ex Wight, Cat. Ind. Pl. 26. 1833; Hook. f., Fl. Brit. India 1: 645. 1875.***Tsjamgelam-parenda*** Rheede, Hort. Malab.7: t .41. 1688. ***Changalamparanda***.

Rambling, succulent, glabrous, deciduous shrubs; stem 4-angular, winged or ridged at angles, constricted at nodes; tendril simple. Leaves simple, entire or 3-lobed, 2-5 x 2-5 cm, ovate-suborbicular or subreniform, base truncate, margin distantly spinulose-crenate, apex obtuse, thick-coriaceous; petiole to 1 cm long. Flowers in leaf-opposed, peduncled, umbellate cymes. Calyx-tube obscurely 4-lobed, c. 2 mm long, reddish. Petals c. 2.5 mm long, ovate, acute, greenish-yellow, recurved. Stamens 4; filaments to 2 cm long; anthers yellow. Disk 4-lobed, yellow. Ovary c. 1mm long, 2-celled; ovules 2 per cell. Berry c. 7 mm across, subglobose. Seeds black, smooth.

Fl. & Fr.: Jun. - Aug.

Distr.: Tropical Africa and Arabia, Madagascar, Mascarenes, India and Sri Lanka. Introduced to Thailand, Java and Philippines where naturalized. *CNS 2456* (Thottappally).

Cissus repanda Vahl, Symb. Bot. 3: 18. 1794; Gamble, Fl. Pres. Madras 234. 1918; Suessenguth in Engl. & Prantl, Pflanzenfam. (ed.2) 20 d: 264. 1953; Vajravelu, Fl. Palghat Dist. 125. 1990. *Vitis repanda* (Vahl) Wight & Arn., Prodr. Fl. Ind. Orient. 125. 1834; Lawson in Hook. f., Fl. Brit. India 1: 648. 1875.

Climbing shrubs; branches terete, subglaucous, tomentose when young; tendrils twisted and forked or rarely absent. Leaves 6-15.5 x 4.5 - 14.5 cm, broadly-ovate or orbicular, base cordate, margins repand-crenate, apex acuminate, tomentose when young; petioles 2.5-6 cm long. Flowers greenish in leaf-opposed solitary or grouped umbellate cymes. Berries 6-8 mm long, pyriform, shortly mucronate, green. Seed one, obovoid, smooth.

Fl. & Fr.: Jan. - May.

Distr.: Endemic to India. In wasteland and fences. *CNS 1756* (Pathiyoor).

Cissus trilobata Lam., Encycl. 1:31. 1783; Gamble, Fl. Pers. Madras 233. 1918; Shetty & Singh, Taxon 37: 173. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 270. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 122. 1994; Mabberley in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 463. 1995. *Vitis rheedii* Wight & Arn. in Wight, Cat. 27. 1833 & Prodr. 127. 1834; Lawson in Hook. f., Fl. Brit. India 1: 653. 1875; Trimen, Handb. Fl. Ceylon 1: 293. 1893. *Puria trilobata* (Lam.) Nair in Puri *et al.*, Biol. Land Pl. 127. 1974; Ramach. & Nair, Fl. Cannanore 105. 1988.

Climbing shrubs; stem terete to slightly angled; tendril simple. Leaves trifoliolate, trilobed to entire; leaflets 7-11 x 3-4 cm, elliptic, cordate at base, distantly dentate on margins, acuminate at apex; petioles 4-5 cm long; petiolule 2-3 cm long. Flowers in supra axillary leaf-opposed cymes. Calyx campanulate, c. 1 mm long, truncate at tip. Petals 4, 1.5-2 mm, obtuse, pinkish purple. Disc cupular, red, adnate to ovary. Stamens 4;

filaments swollen in middle. Ovary 2-celled; ovules 2 in each cell; styles subulate. Berry 0.8-1 cm across, subglobose or ovoid, maroon in colour. Seeds obovoid.

Fl. & Fr.: Jun. - Aug.

Distr.: Western Peninsular India, Sri Lanka. Common in way sides and hedgerows. *CNS 1075* (Aroor), *CNS 2457* (Muhamma).

Cissus vitiginea L., Sp. Pl. 117. 1753; Gamble, Fl. Pres. Madras 234. 1915; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 284. 1983; Vajravelu, Fl. Palghat Dist. 126. 1990; Mabberley in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 472. 1995. *Vitis linnaei* Wall. ex Wight & Arn., Prodr. Fl. Ind. Orient. 126. 1834; Hook. f., Fl. Brit. India 1: 649. 1875.

Climbing, foetid shrubs; bark blackish to reddish; branchlets densely pubescent, swollen at nodes; tendril simple, bifid or branched. Leaves simple, 5-angular or deeply lobed, 4-8 x 4-7.5 cm, ovate-orbicular, base truncate to cordate, margin irregularly dentate, apex acute or obtuse, pubescent, basally 3-nerved; petiole to 6 cm long; stipules c. 2.5 mm long, triangular, pubescent. Flowers in axillary or leaf-opposed umbellate cymes; peduncle to 5 cm long. Calyx c. 2 mm long, cupular, pubescent. Petals 4, yellow; c. 2.5 mm long ovate, obtuse, recurved. Stamens 4; filaments green; anthers rotund, yellow. Disk more or less 4-lobed, yellow. Berry c.1 cm long, ovoid to obovoid, purplish-blue, pendulous. Seed 1, c. 7 mm long, ovoid.

Fl. & Fr.: Jun. - Nov.

Distr.: Sri Lanka and S. India to Thailand. In sacred groves. *CNS 1027* (Vandanam).

TETRASTIGMA (Miquel) Planchon
in Alph. de Candolle *et* A.C. de Candolle,
Monogr. Phan. 5: 320, 423. 1887.

Tetrastigma leucostaphylum (Dennst.) Alston ex Mabberley, Taxon 26: 539. 1977; Mani. & Sivar., Fl. Calicut 69. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3:

285. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 270. 1988; Mani., Fl. Silent Valley 60. 1988; Ramach. & Nair, Fl. Cannanore 106. 1988; Sivar. & Mathew, Fl. Nilambur 154. 1996. *Cissus leucostaphyla* Dennst., Schluess. Hort. Ind. Malab. 17, 19, 33. 1818. *Vitis muricata* Wight & Arn., Prodr. Fl. Ind. Orient. 128. 1834; Wight, Ic. t. 740. 1844. *Vitis lanceolaria* sensu Lawson in Hook. f., Fl. Brit. India 1: 660. 1875, p.p. non Roxb., 1832. *Tetrastigma muricatum* sensu Gamble, Fl. Pres. Madras 229. 1918, p.p.; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 360. 1976. ***Vallia-tsjori-valli*** Rheede, Hort. Malab. 7: 15, t. 8. 1688.

Woody scandent shrubs; stems strongly verrucose with elongated lenticels; tendril simple, woody with age. Leaves pedately 5-foliolate, trifoliolate or simple, sometimes all three types found on same plant; leaflets 4-13 x 2-6 cm, oblong-lanceolate, base cuneate, margin coarsely serrate, especially distally, apex acute, coriaceous, the laterals unequal sided; petiole to 8 cm long, warty-lenticellate, base swollen; petioules 5-14 mm long. Flowers c. 4 mm across, in short axillary cymes. Calyx lobes 4, c. 1 mm long, more or less ciliolate. Petals 4, white, 1-1.5 mm long, ovate, acute, apically thickened. Disk lobed. Stamens 4. Ovary subglobose; stigma lobed. Berry c. 1.3 cm across, subglobose, creamy white. Seeds 2-4, oblong, transversely rugose.

Fl. & Fr.: Jan. - Apr.

Distr.: Sri Lanka, Peninsular India and Malesia. In sacred groves. *CNS 2458* (Kadakarappally).

39. LEEACEAE (DC.) Dumort.

Anal. Fam. Pl. 21, 27. 1829.

LEEA D. Van Royen ex Linnaeus

Syst. Nat. ed. 12, 2: 608, 627. 1767.

Herbs, shrubs or small trees, often with tuberous roots. Leaves simple or 1 or 2 pinnate, leaflets serrate to repand, glandular between the serrations. Flowers in leaf-opposed terminal corymbose cymes. Calyx cupular, 5-lobed. Corolla lobes united at base

and adnate with the staminal tube, lobes 5, valvate. Staminal tube 5-lobed. Stamens 5, attached between the lobes of the staminal tube. Ovary 3-6-celled; cells 1-ovuled. Berry depressed-globose, 3-6-lobed; seeds 3-6, endosperm ruminate.

1a. Stem and leaves pubescent; lobes of staminal tube entire at apex ..... **L. robusta**
1b. Stem and leaves glabrous; lobes of staminal tube notched at apex ..... **L. indica**

Leea indica (Burm. f.) Merr., Philipp. J. Sci. Bot. 14: 245. 1919; Ridsdale, Blumea 22: 95. 1974; Sald. in Sald. & Nicols., Fl. Hassan Dist. 356. 1976; Mani. & Sivar., Fl. Calicut 70. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 287. 1983; Mani., Fl. Silent Valley 61. 1988; Ramach. & Nair, Fl. Cannanore 107. 1988; Vajravelu, Fl. Palghat Dist. 127. 1990; Harriman in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 392. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 122. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 114. 1996; Sivar. & Mathew, Fl. Nilambur 157. 1996. *Staphylea indica* Burm. f. , Fl. Ind. 75, t. 23, f. 2. 1768. *Aquilicia sambucina* L., Mant. Pl. 211. 1771, *nom. illegit. Leea sambucina* (L.) Willd., Sp. Pl. 1: 1177. 1798; Lawson in Hook. f., Fl. Brit. India 1: 666. 1875; Trimen, Handb. Fl. Ceylon 1: 297. 1893; Gamble, Fl. Pres. Madras 240. 1918. ***Parili*** Rheede, Hort. Malab. 3: 6, t. 3. 1685.

Large shrubs or small trees, usually with stilt roots; stem often hollow. Leaves large, 2 or 3-pinnate; leaflets 8-16 x 3-6 cm, oblong or elliptic-lanceolate, broadly attenuate at base, margins serrate-dentate, acuminate at apex, lateral nerves 12-15 pairs; stipules broad, obovate-obtuse, amplexicaul, 2-3 x 1-2 cm, sheathing, deciduous; young leaves, bright-red. Flowers in leaf-opposed or lateral corymbose panicles, 0.5-0.6 cm across. Calyx cup-shaped, lobes 5, 0.1- 0.15 cm, triangular. Corolla of 5 free petals, 0.2-0.3 cm, ovate, greenish white, connate with staminal tube at the base. Disc annular. Staminal tube cylindric, 0.2-0.3cm, 5-lobed, lobes notched; stamens 5, attached between lobes of the tube. Ovary 3-6-lobed; ovules 1 in each cell; style short; stigma capitate. Berry c. 0.7 cm diam., 3-6-lobed, depressed globose on ripening. Seeds 3-6.

Fl. & Fr. : Nov. - Feb.

Distr. : India, China, Malesia to Australlia. In waste land. *CNS 2082* (Nooranad). A polymorphic species, often segregated into several species based on leaflet characters.

Leea robusta Roxb., Fl. Ind. 2: 468. 1824; Laws. in Hook. f. , Fl. Brit. India 1: 667. 1875; Gamble, Fl. Pres. Madras 240. 1918; Mathew & Umadevi, Rheedea 2: 67. 1992; Sivar. & Mathew, Fl. Nilambur 159. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 114. 1996. *Leea venkobarowii* Gamble, Kew Bull. 1917: 26. 1917 & Fl. Pres. Madras 240. 1918. *Leea macrophylla* sensu Ridsd., Blumea 22: 85. 1974, non Roxb. ex Hornem. 1813, p.p.; Mani. & Sivar., Fl Calicut 70. 1982; Ramach. & Nair, Fl. Cannanore 108. 1988; Vajravelu, Fl. Palghat Dist. 127. 1990.

Shrubs, stem pubescent. Leaves 1 or 2 pinnate; leaflets ovate-oblong or elliptic, margin serrate, acuminate apex, to 15 x 7 cm; lateral nerves 8-12 pairs; petioles and rachis angled; stipules 2.5 cm long, ovate-oblong. Flowers greenish-white in branched cymes. Staminal tube deeply divided, lobes rounded or turncate. Berry depressed globose, 5 mm across.

Fl. & Fr. : Sept. - Jan.

Distr. : Indo-Malaya. Rare. In hill slopes. *CNS 2386* (Nootavanpara).

Note: Ridsdale (Blumea 22: 57-100. 1974) in his revision of the monogeneric family Leeaceae, has adduced that the nature of leaves in *Leea macrophylla-robusta* complex varies from unifoliolate to 1-3 pinnate and that the separation of these two on distinct species is un-warranted. So he has conceived *L. macrophylla* as a highly polymorphic species and included L. *robusta* in the former.

Recently, Mathew and Umadevi (*l.c.*, 64-68) have studied live and herbarium specimens of these taxa and have found that the two taxa differ not only in foliage characters, but also in floral features. They have reinstated *L. robusta* as a distinct species. This concept is followed here.

40. SAPINDACEAE Juss.

Gen. Pl. 246. 1789.

1a. Climbing or trailing herbs; inflorescence tendrillar ..... **Cardiospermum**

1b. Shrubs or trees; inflorescene non-tendrillar.

2a. Leaves 3-foliolate ..... **Allophylus**

2b. Leaves pinnate.

3a. Flowers apetalous ..... **Schleichera**

3b. Flowers with petals.

4a. Inflorescence terminal panicles; flowers regular; disc annular ..... **Sapindus**

4b. Inflorescence axillary cluster of raceme; flowers irregular; disc lobed ..... **Lepisanthes**

ALLOPHYLUS Linnaeus

Sp. Pl. 348. 1753.

Allophylus cobbe (L.) Raeusch., Nomencl. Bot. ed. 3, 108. 1797; Hiern in Hook. f., Fl. Brit. India 1: 673. 1875, p.p.; Leenh., Blumea 15: 322. 1968; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 365. 1976; Mani., Fl. Silent Valley 62. 1988; Ramach. & Nair, Fl. Cannanore 109. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 236. 1988; Vajravelu, Fl. Palghat Dist. 129. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 123. 1994; Sivar. & Mathew, Fl. Nilambur 160. 1996. *Rhus cobbe* L., Sp. Pl. 167. 1753. *Schmidelia rheedii* Wight, Ic. t. 964. 1845, *nom. illeg. Allophylus rheedii* (Wight) Radlk. in Engl. & Prantl., Pflanzenfam. 3(5): 313. 1895; Gamble, Fl. Pres. Madras 246. 1918. ***Malago-maram*** Rheede, Hort. Malab. 5: 491, t. 25. 1685.

Large shrubs to small trees. Young stem and peduncles densely yellowish brown pubescent. Leaves trifoliolate; leaflets 8-12 x 5-7 cm, ovate or elliptic-ovate or rhomboid-ovate, cuneate at base, margins serrate towards the distal half, acute at apex, tomentose on both sides, domatia present in the axils of nerves; terminal leaflet larger; petiole to 11 cm

long. Thyrses axillary, branched, longer than leaves, 12-16 cm long. Sepals 4, 0.5-1 mm long, ovate-obtuse. Petals 4, unequal, 0.5-1 mm long, white. Fruits c. 4 mm across, globose.

Fl. & Fr.: Jul. - Sept.

Distr.: Peninsular India, Sri Lanka, S.E. Asia. In sacred groves. *CNS 2040* (Panayannar Kavu at Thazhakkara).

CARDIOSPERMUM Linnaeus

Sp. Pl. 366. 1753.

Cardiospermum helicacabum 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; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 366. 1976; Mukn., J. Econ. Tax. Bot. 1: 80. 1980; Mani. & Sivar., Fl. Calicut 70. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 292. 1983; Ramach. & Nair, Fl. Cannanore 111. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 237. 1988; Vajravelu, Fl. Palghat Dist. 130. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 124. 1994; Sivar. & Mathew, Fl. Nilambur 161. 1996. ***Ulinga*** Rheede, Hort. Malab. 8: t. 28. 1688.

Climbing or trailing herbs. Leaves alternate, bi-ternate; leaflets 2-4 x 1-2.5 cm, ovate-lanceolate, deeply dentate or lobed, apex acute to acuminate, membranous; petiole to 3 cm long. Flowers white, polygamous in 3-7-flowered axillary tendril-bearing peduncles; peduncle up to 5 cm long. Sepals 4, in 2-pairs, outer pair smaller. Petals 4, white, unequal, with basal scales. Stamens 8; filaments unequal, pilose. Ovary 3-locular; ovule 1-per locule; stigma 3-fid. Capsule papery, inflated, 3-lobed, winged. Seeds one in each chamber, black with a white eye.

Fl. & Fr.: Sept. - Jan.

Distr.: Tropical and subtropical Africa, America, Sri Lanka, India and Pakistan. Common in wastelands. *CNS 1763* (Karuvatta).

LEPISANTHES Blume

Bijdr. 237. 1825.

Lepisanthes tetraphylla (Vahl) Radlk., Sitzungsber. Math.-Phys. Cl. Bayer. Akad. Wiss. Muenchen 8: 276. 1878; Gamble, Fl. Pres. Madras 247. 1918; Leenhouts, Blumea 17: 63. 1969; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 367. 1976; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 296. 1983; Mani., Fl. Silent Valley 64. 1988; Ramach. & Nair, Fl. Cannanore 113. 1988; Vajravelu, Fl. Palghat Dist. 132. 1990; Sivar. & Mathew, Fl. Nilambur 164. 1996. *Sapindus tetraphylla* Vahl, Symb. Bot. 3:54. 1794. *Molinaea canescens* Roxb., Pl. Corom. t. 60. 1796. *Sapindus deficiens* Wight & Arn., Prodr. 111. 1834. *Hemigyrosa canescens* (Roxb.) Bl., Rumphia 3: 166. 1849; Bedd., Fl. Sylv. t. 151. 1871; Hiern in Hook. f., Fl. Brit. India 1: 671. 1875. *Hemigyrosa deficiens* (Wight & Arn.) Bedd., Fl. Sylv. t. 231. 1872; Hiern in Hook. f., Fl. Brit. India 1: 671. 1875. *Lepisanthes deficiens* (Wight & Arn.) Radlk., Sitzungsber. Math.-Phys. Cl. Bayer. Akad. Wiss. Muenchen 8: 270. 1878; Gamble, Fl. Pres. Madras 247. 1918.

Small trees. Leaves paripinnate; leaflets 4-6 pairs, sub-opposite, 6-20 x 3-5 cm, elliptic-oblong, base obtuse, apex acuminate; rachis 18-30 cm long. Inflorescence axillary cluster of raceme or rarely lateral, densely pubescent with yellow hairs. Flowers polygamo-dioecious, irregular. Sepals 5, 3-5 mm long. Petals 4-5, cream coloured, attached with scales, hairy at base outside. Male flowers: disc 3-angled; stamens 6-8; filaments hairy. Female flowers: Ovary 3-angled, 3-celled; ovule 1-per locule; style simple; stigma oblique. Drupes 2-2.5 cm across, globose, tomentose out side. Seed 1, non-arillate.

Fl. & Fr.: Mar. - May.

Distr.: S.W. India, Sri Lanka, Burma. In sacred groves. *CNS 1782* (Sharanga kavu at Venmony).

SAPINDUS Linnaeus

Sp. Pl. 367. 1753.

Sapindus trifoliata L., Sp. Pl. 367. 1753; Hook. f., Fl. Brit. India 1: 682. 1875; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 237. 1988; Sivar. & Mathew, Fl. Nilambur 165. 1996. *Sapindus laurifolia* Vahl, Symb. 3: 54. 1794; Gamble, Fl. Pres. Madras 250. 1918, "laurifolius"; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 368. 1976; Mani. & Sivar., Fl. Calicut 71. 1982; Ramach. & Nair, Fl. Cannanore 114. 1988; Vajravelu, Fl. Palghat Dist. 132. 1990, *nom. illeg.* ***Poerinsii*** Rheede, Hort. Malab. 4: 43-44, t. 19. 1683. ***Soapumka***

Small to medium sized trees; bark smooth, grey. Young buds and peduncles brown stellate pubescent. Leaves paripinnate; leaflets 3-4 pairs, subopposite, 10-16 x 4-6 cm, elliptic-lanceolate or elliptic, round to broadly attenuate at base, acuminate at apex, glabrous. Panicles terminal, rusty-pubescent. Sepals 5, 2.5-3 x c. 2 mm, broadly ovate, densely pubescent on both sides. Petals 5, 3-4 x 1-1.5 mm, linear-lanceolate, villous without. Disc lobed, densely hairy. Stamens 8, inserted within disc; filaments hairy. Ovary c. 1 mm long, 2-4-lobed, 2-4-celled, densely hairy; ovules one in each cell; style stout; stigma 2-4-lobed. Pistillode present in male flowers. Fruit fleshy, combined drupes, up to 3.5 cm across, black when dry. Seeds globose, black.

Fl. & Fr.: Feb. - Mar.

Distr.: India and Sri Lanka. In waste land and fences. *CNS 2098* (Kakkazham).

SCHLEICHERA Willdenow

Sp. Pl. 4: 1096. 1806 (*nom. cons.*).

Schleichera oleosa (Lour.) Oken. Allg. Naturgesch. 3(2): 1341. 1841; Merr., Interpr. Herb. Amboin. 337. 1917; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 396. 1976; Mani. & Sivar., Fl. Calicut 71. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 299. 1983; Mani., Fl. Silent Valley 64. 1988; Ramach. & Nair, Fl. Cannanore 114. 1988; Vajravelu, Fl. Palghat Dist. 133. 1990; Sivar. & Mathew, Fl. Nilambur 166. 1996. *Pistacia oleosa* Lour., Fl. Cochinch. 615. 1790. *Schleichera trijuga* Wild., Sp. Pl. 4: 1096.

1806; Bedd., Fl. Sylv. t. 119. 1871; Hiern in Hook. f., Brit. India 1: 681. 1875; Trimen, Handb. Fl. Ceylon 1: 304. 1893; Gamble, Fl. Pres. Madras 248. 1918. ***Puvam***.

Deciduous trees; bark grey, reddish inside. Leaves paripinnate; leaflets 3-5, usually 3, lower pair smaller, larger towards the tip, 8-15 x 3.5-6 cm, oblong or oblong-elliptic, base cuneate or subcordate, obtuse to shortly acute at apex, sparsely hairy on nerves below, rachis and nerves pubescent beneath; young leaves bright red. Flowers 3-4 mm across, polygamodioecious, fascicled in interrupted slender racemes or panicles, greenish. Calyx lobes 5, creamy-yellow, c. 0. 1 cm, triangular, pubescent on both sides. Petals 0. Stamens 7-8, filaments 0.3 - 0.4 cm, inserted within the disc; anthers oblong; Disc flat, wavy on margins, pubescent. Ovary c. 0.2 cm, 3-celled; ovule 1 in each cell; style slender; stigma 2-3-lobed. Drupe c. 2 cm across, ovoid, sparsely echinate. Seeds arillate.

Fl. & Fr.: Feb. - May.

Distr.: Indo-Malaysia. In waste land. CNS 1905 (Thuravoor).

41. ANACARDIACEAE Lindl.

Instr. Nat. Syst. Bot. 127. 1830.

1a. Leaves pinnately compound.

2a. Leaves with prominent intra-marginal nerve; petals valvate; ovary 5-celled; drupes more than 2 cm across, pericarp fibrous ..... **Spondias**

2b. Leaves without intra-marginal nerve; petals imbricate; ovary 1-celled; drupes less than 1 cm across, pericarp fleshy ..... **Lannea**

1b. Leaves Simple.

3a. Petiole with 2-4 spur-like appendages; inflorescence golden-brown tomentose; ovary inferior ..... **Holigarna**

3b. Petiole without spur-like appendages; inflorescence without golden-brown tomentum; ovary superior.

4a. Leaves oblong-lanceolate, apex acuminate; fruit a fleshy drupe .... **Mangifera**

4b. Leaves broadly obovate, apex obtuse or retuse; fruit a reniform nut on a fleshy hypocarp ..... **Anacardium**

ANACARDIUM Linnaeus

Gen. Pl. ed. 5, 180. 1754;

Sp. Pl. 383. 1753.

Anacardium occidentale L., Sp. Pl. 383. 1753; Bedd., Fl. Sylv. t. 163. 1871; Hook. f., Fl. Brit. India 2: 20. 1876; Gamble, Fl. Pres. Madras 260. 1918; Ramamoorthy in Sald. & Nicols., Fl. Hassan. Dist. 374. 1976; Mani. & Sivar., Fl. Calicut 73. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 305. 1983; Meijer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4:8. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 47. 1988; Ramach. & Nair, Fl. Cannanore 120. 1988; Sivar. & Mathew, Fl. Nilambur 167. 1996. ***Kapa-mava*** Rheede, Hort. Malab. 3: t. 54. 1682.

Trees. Leaves 9.5-20 x 5.5-10 cm, obovate-oblong, base cuneate, apex rounded to retuse, coriaceous, lateral nerves 8-13 pairs, raised below. Flowers polygamous, in terminal and subterminal compound panicles. Sepals 5, to 5 mm, lanceolate, cauducous. Petals 5, greenish with red stripes, to 1 x 0.2 cm, lanceolate, deflexed. Stamens 10, inserted on the disc, 1 or 2 fertile, others sterile; filaments unequal, base connate; in male flowers pistillode rudimentary. Ovary1-celled; style single, exentric; stigma minute. Fruit pedicel yellow or red, 3.5-7.5 cm long, obconical, fleshy. Fruit a reniform nut, 2-3 x 1.5-2 cm.

Fl. & Fr.: Jan. - Apr.

Distr.: Native of South America, now widely cultivated for its nuts. *CNS 2432* (Punnapra).

The oil extracted from the pericarp is highly corrosive and is used for various purposes. A local alcoholic beverage, distilled from the juice of the cashew apple is very popular. It is also used for preparing jams.

HOLIGARNA (Hamilton ex Roxburgh)

Pl. Corom. 3: 79. 1820 (*nom. cons.*).

Holigarna arnottiana Hook. f., Fl. Brit. India 2: 36. 1876; Gamble, Fl. Pres. Madras 286. 1918; Mani. & Sivar., Fl. Calicut 73. 1982; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 48. 1988; Ramach. & Nair, Fl. Cannanore 116. 1988; Sivar. & Mathew, Fl. Nilambur 169. 1996. *Holigarna longifolia* Wight & Arn., Prodr. 169. 1834, non Roxb., 1820; Bedd., Fl. Sylv. t. 167. 1871. ***Katou-iseroe, Cheru*** Rheede, Hort. Malab. 4: 19-21. t. 9. 1683.

Large trees; bark smooth, pale brown withgrey blotches, dull red inside, latex milky; young shoots brown tomentose. Leaves 8-18 x 4-7 cm, oblanceolate, narrowly attenuate at base, margin entire, obtusely acute at apex, sparsely hairy on midrib and lower side when young; petiole to 1.5 cm long. Flowers in terminal panicles, yellowish-white, 2-4 mm across. Calyx tube c. 0.5 mm long, 5-toothed, densely fulvous-tomentose without. Petals 5, 1-1.5 mm long, cohering at base with edge of disc, tomentose without, densely villous within. Stamens 5, inserted outside disc. Disc annular. Ovary 1-celled; ovule 1; styles 3; stigma capitate. Drupe 1.8-2.2 cm long, ovoid, compressed, dark purple.

Fl. & Fr.: Jan. - May.

Distr.: Endemic to Peninsular India. Common in sacred groves. *CNS 2433* (Thazhakkara).

LANNEA A. Richard

in J.B.A. Guillemin and Perrottet, Fl. Seneg. Tent. 153. 1831. (*nom. cons).*

Lannea coromandelica (Houtt.) Merr., J. Arnold Arbor. 19: 353. 1939; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 376. 1976; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 307. 1983; Meijer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 21. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 48. 1988; Ramach. & Nair, Fl. Cannanore 117. 1988; Mani., Fl. Silent Valley 66. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 128. 1994. *Dialium coromandelicum* Hourtt., Nat. Hist. Ser. 2, 2:

39, t. 5, f. 2. 1774. *Odina wodier* Roxb., Fl. Ind. 2: 293. 1832; Wight, Ic. 60. 1838; Bedd., Fl. Sylv. t. 123. 1871; Hook. f., Fl. Brit. India 2: 29. 1876; Gamble, Fl. Pres. Madras 263. 1918. ***Kalesjan*** Rheede, Hort. Malab. 4: 67-68, t. 32. 1683. ***Kalasan***.

Deciduous trees; bark dark brown, flacking off as thin irregular scales, crimson red inside. Leaves imparipinnate, clustered towards end of branchlets; leaflets 7-11, 8-12 x 4-6 cm, elliptic to ovate-lanceolate, base oblique, acuminate at apex; leafless on flowering. Flowers yellow in terminal panicles. Calyx lobes 4, c. 1 mm long, ovate-triangular. Petals 4, 2-3 mm long, lanceolate, reflexed. Disc annular. Stamens with filaments 1 mm long, attached on back of anthers. Ovary 1.5-2 mm, subglobose 1-celled; styles 4. Drupe to 1 cm long, ovoid, slightly compressed, red. Seed 1.

Fl. & Fr.: Feb. - Apr.

Distr.: South Asia, Indo-Malaysia. Very common in wastelands, fences and sacred groves. *CNS 2330* (Arookutty).

MANGIFERA Linnaeus

Sp. Pl. 200. 1753.

Mangifera indica L., Sp. Pl. 200. 1753; Roxb., Fl. Ind. 1: 641. 1832; bedd., Fl. Sylv. t. 162. 1871; Hook. f., Fl. Brit. India 2: 13. 1876; Gamble, Fl. Pres. Madras 259. 1918; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 376. 1976; Mani. & Sivar., Fl. Calicut 73. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 308. 1983; Meijer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 6. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 48. 1988; Ramach. & Nair, Fl. Cannanore 117. 1988; Mani., Fl. Silent Valley67. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 129. 1994; Sivar. & Mathew, Fl. Nilambur 169. 1996. ***Mau*** Rheede, Hort. Malab. 4: 1-4, t. 1-2. 1683.

Evergreen trees, bark dark grey, rough, exudation yellowish. Leaves 8-25 x 2.5-5 cm, elliptic to linear-lanceolate, attenuate at base, acute to acuminate at apex, glabrous, coriaceous, nerves 14-20 pairs; petioles 2-3 cm long. Flowers polygamodioecious, in terminal panicles, pale yellow. Sepals 5, 1-2 mm, ovate, hairy outside. Petals 5, cream in

colour, c. 4 mm long, oblong-obovate, subequal. Disc cupular, 4-5-lobed. Stamens 5, fertile stamen 1 or some times 2. Ovary c. 3 x 1 mm, oblique, ovoid, 1-celled; ovule 1; stigma simple Drupe 5-8 cm long, ovoid to ellipsoid.

Fl. & Fr.: Dec. - Apr.

Distr.: India, Burma, Thailand, Indo-China and some islands of W. Malesia. Cultivated throughout the country for its edible fruits. *CNS 2434* (Mavelikara).

SPONDIAS Linnaeus

Sp. Pl. 371. 1753.

Spondias pinnata (L. f.) Kurz, Prelim. Rep. Forest. Veg. Pegu A. 44 & B. 42. 1875; Airy Shaw & Forman, Kew Bull. 21: 8. 1967; Ramamoorthy Sald. & Nicols., Fl. hassan Dist. 379. 1976; Ding Hou in Steenis, Fl. Males. 1, 8: 483. 1978; Mani. & Sivar., Fl. Calicut 72. 1982; Meijer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 23. 1983; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 311. 1983 Nicols., Suresh & Mani., An Interpr. Hort. Malab. 49. 1988; Sivar. & Mathew, Fl. Nilambur 171. 1996. *Mangifera pinnata* L. f., Suppl. 156. 1781. *Spondias mangifera* Willd., Sp. Pl. 2: 751. 1799; Bedd., Fl. Sylv. t. 169. 1872; Hook. f., Fl. Brit. India 2: 42. 1876; Gamble, Fl. Pres. Madras 161. 1918.

Deciduous trees; bark greyish brown, smooth, pink inside. Leaves odd-pinnate; leaflets opposite or subopposite, 5-10 x 4-7 cm, oblong or oblong ovate, base rounded, acuminate at apex, coriaceous, nerves numerous, close and parallel. Flowers in terminal panicles, polygamous, yellowish-white. Calyx lobes 5, triangular, cauducous. Petals 5, yellow, 1.5-2 mm long, ovate-valvate. Stamens 10, inserted below the disc; filaments to 1 mm, equal; anthers oblong. Ovary ovoid, 5-celled; styles 5, connivent. Drupe c. 3.5 x 2 cm, ovoid.

Fl. & Fr.: Feb. - Mar.

Distr.: South and South East Asia. Commonly cultivated for its fruits which is used to make pickle. *CNS 2435* (Vayalar).

42. MORINGACEAE R. Br. ex Dumort.

Anal. Fam. Pl. 43, 48. 1829.

MORINGA Adanson

Fam. 2: 318. 1763.

Moringa oleifera Lam., Encycl. 1: 398. 1785; Bedd., Fl. Sylv. t. 80.1871; Gamble, Fl. Pres. Madras 269. 1918; Mani. & Sivar., Fl. Calicut 73. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 314. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 188. 1988; Vajravelu, Fl. Palghat Dist. 140. 1990. *Moringa pterygosperma* Gaertn. Fruct. 2: 314. 1791; Wight & Arn., Prodr. 178. 1834; Hook. f., Fl. Brit. India 2: 45. 1876. ***Mouringou*** Rheede, Hort. Malab. 6: 19-20, t. 11. 1686.

Small deciduous trees; bark greyish or whitish, corky; twigs lenticellate. Leaves 2-4-pinnate, 22-50 cm long; rachis thickened and articulated at base; pinnae and pinnules opposite; leaflets 8-22 mm long, elliptic, ovate or obovate, base cuneate, apex rounded, glaucous beneath, pubescent when young. Panicles axillary, 15-22 cm long. Flowers white, c. 1.5 cm long. Sepals linear-lanceolate, puberulous without. Petals spathulate or obovate. Capsule 26-48 cm long, terete, pendulous. Seeds winged.

Fl. & Fr.: Feb. - Jun.

Distr.: Indigenous to N.W. India, and cultivated elsewhere throughout India. Leaves and fruits are eaten as vegetable. *CNS 2157* (Danapady).

43. CONNARACEAE R. Br.

in Tuckey, Narr. Exped. Zaire 431. 1818.

1a. Panicles rusty pubescent; calyx persistent on the pedicel; pistil 1 ..... **Connarus**

1b. Panicles glabrous; calyx accrescent, clasping the fruit-base; pistils 5 ..... **Rourea**



Plate VII. *A. Gomphia serrata* (Gaertn.) Kanis; B. *Ochna gamblei* King ex Brandis; C. *Crotalaria retusa* L.; D. *Crotalaria laburnifolia* L.

CONNARUS Linnaeus

Sp. Pl. 675. 1753.

Connarus monocarpus L., Sp. Pl. 675. 1753; Hook. f., Fl. Brit. India 2: 50. 1876; Gamble, Fl. Pres. Madras 272. 1918; Tirvengadum in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 283. 1980; Mani. & Sivar., Fl. Calicut 74. 1982; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 86. 1988; Vajravelu, Fl. Palghat Dist. 141. 1990; Mohanan & Henry, Fl Thiruvnanthapuram 130. 1994. *Rhus radaelijawael* Miller, Gard. Dict. ed. 8, n.13 .1768. *Connarus pinnatus* Lam., Encycl. 2(1): 95 1786. *Omphalobium indicum* Gaertn., Fruct. 1 :217, t.46, f. 3. 1788. ***Kuriel, Perim-Kurigil*** Rheede, Hort. Malab. 6: 43- 44, t. 24.1686.

Scandent shrubs; young parts ferrugineous tomentose. Leaves imparipinnate; leaflets 3 or 5, 4-8 x 2.5-4 cm, elliptic or elliptic-ovate, base rounded, apex acuminate, thin-coriaceous; young flush coppery brown; petiolule upto 4 mm long. Flowers in terminal, pyramidal paniculate cymes, ferrugineous-tomentose; pedicel c. 4 mm long. Sepals upto 3 mm long, narrowly triangular or oblong, puberulous without. Petals 6-8 mm long, linear-oblanceolate, creamy white. Stamens in 2 whorls; filaments with glandular appendages. Ovary subglobose, densely pubescent, brownish, 1-locular; ovules 2. Fruit a follicle, 2.5-4 x 1.5 -2 cm, obovoid, fusiform, compressed, more or less falcate, scarlet red. Seed single, c.1.5 cm long, ovoid, surrounded at base with a large, pulpy, bright yellow aril.

Fl. & Fr.: Apr.-Jun.

Distr.: Sri Lanka and Peninsular India. Often in sacred groves. *CNS 2541* (Vandanam).

ROUREA Aublet

Hist. Pl. Guiane 467. 1775 (*nom.cons*).

Rourea minor (Gaertn.) Alston in Trimen, Handb. Fl. Ceylon 6: 67. 1931, "minus"; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 363. 1976; Tirvengadum in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 280. 1980; Mani. & Sivar., Fl. Calicut 74. 1982; Nicols.,

Suresh & Mani., An Interpr. Hort. Malab. 86. 1988; Ramach. & Nair, Fl. Cannanore 120. 1988; Vajravelu, Fl. Palghat Dist. 141. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 131. 1994. *Aegiceras minus* Gaertn., Fruct. 1: 216, t. 46. 1788. *Connarus santaloides* Vahl, Symb. Bot. 4: 87. 1794. *Rourea santaloides* (Vahl) Wight & Arn., Prodr. 144. 1834; Hook f., Fl. Brit. India 2: 47. 1876; Gamble, Fl. Pres. Madras 271. 1918. ***Curigi-tali*** Rheede, Hort. Malab. 7: 49, t. 26. 1688. ***Kuriel.***

Large woody climbing shrubs; stem and peduncles black; leaves imparipinnate; leaflets 3-7, subopposite or alternate 3-7 x 2.5-4 cm, ovate or elliptic, base rounded, apex acute, thin-coriaceous; vein-reticulations prominent. Flowers in axillary panicled cymes. Calyx lobes 5, upto 3 mm long, ovate or orbicular, enlarging in fruits. Petals 5, 3-4 mm long, oval-oblong, yellowish. Stamens 10, alternating ones longer and shorter. Ovary more or less ovoid; ovules 2; style covered with stipitate glands. Follicles 1-2 cm long, oblong, slightly curved, accrescent calyx and basal portion of style persistent. Seed 1, to 1 cm long, obovate; aril red, sheathing at base.

Fl. & Fr.: Jan. - April.

Distr.: Indo-malaysia. Common in secred groves. *CNS 14 92* (Nagamkulangara).

44. FABACEAE Lindl.

Intr. Nat. Syst. Bot., ed. 2:148. 1836.

(LEGUMINOSAE, *nom. alt.*).

Key to subfamilies

1a. Flowers zygomorphic; perianth segments predominantly imbricate in bud.

2a. Corolla papilionaceous, aestivation imbricate-descending; the posterior petal outermost, the two anterior petals often basally connate ..... **Faboideae**

2b. Corolla caesalpiniaceous, aestivation imbricate-ascending; the posterior petal innermost, the petals typically 5, distinct ..... **Caesalpinioideae**

1b. Flowers actinomorphic; perianth segments valvate in bud ..... **Mimosoideae**

Subfamily: **PAPILIONOIDEAE**

1a. Leaves paripinnate.

2a. Climbers; stamens 9; seeds blood red in colour, with a black lateral blotch ..... **Abrus**

2b. Trees, shrubs or herbs; stamens 10; seed colour not as above.

3a. Leaflets 2-8; diffuse herbs; pods lomentose, 1-many-articulate, usually breaking into 1-seeded articles at maturity.

4a. Flowers and pods concealed in closely imbricating, orbicular-reniform, ciliate, persistent bracts; corolla purplish; pods 1-2-jointed ..... **Geissaspis**

4b. Flowers and pods not concealed; bracts not as above; corolla yellow; pods 2-6-jointed.

5a. Bracts peltate, glandular-punctate; calyx not 2-lipped; pods glochidiate, not twisted and enclosed in calyx; stamens 9+1; leaflets 2, gland-dotted ..... **Zornia**

5b. Bracts basifixed, not glandular-punctate; calyx 2-lipped; pods glabrous, twisted, enclosed in the calyx, stamens 5+5; leaflets 4-8, not gland-dotted ..... **Smithia**

3b. Leaflets many; shrubs or trees; pods not articulated, dehiscent .... **Sesbania**

1b. Leaves simple or imparipinnate (3-many-foliolate).

6a. Pods lomentose, 1-many-articulate, usually breaking into 1-seeded articles at maturity.

7a. Leaves with many, close leaflets; stamens 5+5; calyx 2-lipped .... **Aeschynomene**

7b. Leaves simple or 3 - foliolate; stamens 9+1 or monadelphous; calyx not 2-lipped.

8a. Leaflets exstipellate, nerves parallel and close; pods fully enclosed in calyx; stipules adnate to petiole ..... **Stylosanthes**

8b. Leaflets stipellate; nerves reticulate; pods well exserted; stipules not adnate to petiole.

9a. Pods turgid; calyx glumaceous; leaves 1-foliolate .... **Alysicarpus**

9b. Pods flattened; calyx not glumaceous; leaves 3-foliolate or if 1-foliolate then the petiole winged or flowers white .... **Desmodium**

6b. Pods not articulated, dehiscent or indehiscent.

10a. Pods with oblique or transverse lines between seeds; leaves gland-dotted beneath.

11a. Twiners; seeds with large strophiole ..... **Atylosia**

11b. Erect shrubs; seeds without strophiole ..... **Cajanus**

10b. Pods neither obliquely nor transversely lined between seeds; leaves gland-dotted or not.

12a. Trees.

13a. Leaves 3-foliolate; flowers orangish-red or bright red.

14a. Stem with prickles; petals very unequal in length .... **Erythrina**

14b. Stem without prickles; petals nearly equal in length .... **Butea**

13b. Leaves 5- many - foliolate; flowers other than reddish.

15a. Leaflets alternate.

16a. Flowers yellow; pods orbicular, with a broad wing ..... **Pterocarpus**

16b. Flowers not yellow; pods oblong-lanceolate, rarely reniform, not winged ..... **Dalbergia**

15b. Leaflets opposite.

17a. Plants leafless during flowering; stamens diadelphous; pods not woody, dehiscent with the valves twisting spirally, many-seeded .... **Gliricidia**

17b. Plants leafy during flowering; stamens monadelphous; pods woody, indehiscent, 1-seeded ..... **Pongamia**

12b. Herbs or shrubs, erect or climbing.

18a. Erect or postrate herbs or shrubs.

19a. Pods turgid, inflated.

20a. Stamens monadelphous, anthers dimorphic; flowers yellow or if blue or white, then the leaf simple and stipule semi-lunate ..... **Crotalaria**

20b. Stamens diadelphous, anthers uniform; flowers white, reddish or purplish.

21a. Trailing herbs; leaves 3-foliolate ..... **Pycnospora**

21b. Erect shrubs; leaves 1-foliolate or if 3-foliolate then the petiole winged and the pods covered with powdery red glands ..... **Flemingia**

19b. Pods flat, terete or subtetragonous.

22a. Pubescence of medifixed hairs; anthers apiculate; pods terete or subtetragonous ..... **Indigofera**

22b. Pubescence of basifixed hairs; anthers not apiculate; pods flat.

23a. Leaflets 7-17, with many closely parallel nerves ..... **Tephrosia**

23b. Leaflets 3, with netted venation.

24a. Leaflets ovate or rhombic; flowers purple in terminal or axillary branched racemes; pods pubescent with hooked hairs ..... **Pseudarthria**

24b. Leaflets obovate or oblanceolate; flowers yellow, axillary, solitary or fascicled; pods pubescent with straight hairs ..... **Rothia**

18b. Climbers.

25a. Leaves 3-foliolate.

26a. Pods conspicuously hooked at the apex by the persistent style; alternate stamens sterile ..... **Teramnus**

26b. Pods not hooked at the apex; all stamens fertile.

27a. Racemes pendulous; anthers dimorphic, alternately dorsifixed; pods 's'- shaped, covered with irritant bristles ..... **Mucuna**

27b. Racemes not pendulous; anthers uniform; pods not 's'-shaped and not covered with irritant bristles.

28a. Nodes of racemes swollen.

29a. Pods ribbed on upper suture, more than 2 cm across, glabrous; standard appendaged ..... **Canavalia**

29b. Pods not ribbed on upper suture, less than 8 mm across, hairy; standard unappendaged ..... **Pueraria**

28b. Nodes of racemes not swollen.

30a. Pods densely brown pilose; style not bearded below the stigma ..... **Calopogonium**

30b. Pods glabrous, if hairy then petals yellow; style bearded below the stigma.

31a. Standard appendaged at back; pods with 4 raised ribs near margins, apical horn to 1 cm long, pointed ..... **Centrosema**

31b. Standard appendaged within; pods without raised ribs near margins, apical horn absent or very short ..... **Vigna**

25b. Leaves 5-11-foliolate, rarely 3-foliolate then pods indehiscent.

32a. Pods dehiscent; bracteoles foliaceous, auricled. standard above 3.5 cm long; style bearded below the stigma ..... **Clitoria**

32b. Pods indehiscent; bracteoles small, not foliaceous and auricled; standard upto 1.2 cm long; style not bearded below the stigma.

33a. Leaflets alternate ..... **Dalbergia**

33b. Leaflets opposite ..... **Derris**

ABRUS Adanson

Fam. 2: 327, 511. 1763.

Abrus precatorius L. , Syst. Nat. (ed. 12) 2: 472. 1767; Wight & Arn., Prodr. 236. 1834; Baker in Hook. f., Fl. Brit. India 2: 175. 1876; Gamble, Fl. Pres. Madras 349. 1918; Breteler, Blumea 10: 617. 1960; Verdc., Kew Bull. 24: 240. 1970; Gandhi in Slad. & Nicols., Fl. Hassan Dist. 235. 1976; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 446. 1980; Britto in Matthew, Fl. Tam. Carnatic 3: 333. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 119. 1988; Vajravelu, Fl. Palghat Dist. 145. 1996; Mohanan & Henry, Fl. Thiruvananthapuram 133. 1994; Sivar. & Mathew, Fl. Nilambur 173. 1996; Sasi & Sivar., Fl. Pl. Thrissur For. 129. 1996. ***Konni*** Rheede, Hort. Malab. 8: t. 39. 1688. ***Kunnikuru*** (Plate VIII: A).

Woody perennial twining shrubs; young stems puberulent. Leaves even-pinnate; leaflets 12-16 pairs, 0.8-2.5 x 0.4-1 cm, oblong to elliptic, base and apex obtuse, lower surface sparsely pubescent. Flowers pink, in axillary racemes; bracts deltoid, minute; bracteoles c. 1mm across, suborbicular. Calyx 2-4 mm long, hispid. Petals 9-12 mm long. Stamens 9, monadelphous. Ovary subsessile, many ovuled; style incurved. Pods 3-4 x 1-1.5 cm, oblong, slightly inflated, fulvo-puberulent. Seeds many, 5-7 x 4-5 mm, subglobose, scarlet red with black eyes.

Fl. & Fr. : Sept. - Feb.

Distr. : Tropical Asia. Usually climbing on bushes and trees. *CNS 1199* (Thazhakkara).

AESCHYNOMENE Linnaeus

Sp. Pl. 713. 1753.

Herbs or subshrubs. Stem erect, creeping or floating, internodes often swollen when submerged or floating; stipules usually persistent. Leaves alternate, 1-pinnate. Inflorescence a lax raceme, axillary, rarely terminal. Calyx tube 2-lipped; upper lip 2-fid; lower lip 3-fid. Corolla yellow; petals clawed; standard petal orbicular, shortly clawed; wings obliquely obovate, subequal to standard; keels oblong and slightly incurved, apex

obtuse or acute. Stamens 5+5; anthers uniform. Ovary stipitate; ovules many; style incurved; stigma terminal. Pods linear-oblong, compressed, joined, transversely septate between seeds. Seeds reniform, estrophiolate.

1a. Mature stem more than 1 cm across, pith-like; flowers 15-20 mm long; peduncle and calyx hispid; pods over 5cm long and 7 mm broad, indented on both margins ..... **A. aspera**

1b. Mature stem up to 8 mm across, not pith-like; flowers 7-10 mm long; peduncle and calyx glabrous; pods under 5 cm long and 4 mm broad; indented on lower margin ..... **A. indica**

Aeschynomene aspera L., Sp. Pl. 173. 1753; Wight & Arn., Prodr. 219. 1834; Baker in Hook. f. , Fl. Brit. India 2: 152. 1834; Gamble, Fl. Pres. Madras 331. 1918; Rudd, Reinwardtia 5: 29. 1959; Subram., Aquat. Ang. 14. 1962; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 236. 1978; Britto in Matthew, Fl. Tam. Carnatic 3: 334. 1983; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 162. 1991. *Aeschynomene lagenaria* Lour., Fl. Cochinch. 446. 1790. *Hedysarum lagenarium* (Lour.) Roxb., Fl. Ind. ed. 2, 3: 365. 1832.

Marshy herbs or shrubs 1-2.5 m tall; stem spongy, pith-like, often 1.5 cm or more in diam. Leaves 7-15 cm long; leaflets sessile, 25-50 pairs, 0.6-1 x 0.1-0.2 cm, linear-oblong, base obtuse, oblique, margins ciliolate, apex obtuse, apiculate, stipules 0.7-1.5 cm long, lanceolate, peltate. Racemes axillary, 2-4-flowered, to 5 cm long. Flowers 15-20 mm long; bracts 3-5 x 1.5-3 mm, cordate, hispid; bracteoles 4-5 mm long, ovate, acute, ciliolate. Calyx 5-7 mm long, hispid. Corolla yellow; standard petal c.1.8 x 1.5 cm; wings c. 8 x 4 mm; keels 1.8 x 0.8 cm, hirsute without. Staminal sheath to 7 mm long; anthers c. 2 mm long, ovoid. Ovary to 1 cm long, tomentose; ovules many; style to 6 mm long. Pods 5-7 x 0.7-0.8 cm, compressed, 4-8-articulate, echinate over seeds, indented along both margins, dark brown. Seeds 5-6 x 3-4 mm, reniform, black.

Fl.& Fr. : Aug. - Dec.

Distr. : Sri Lanka, S. and E. India, Burma, Malay Peninsula, Siam, Java. In marshes and paddy fields and banks of ponds etc. *CNS 1512* (Elangimelvallikkavu).

Aeschynomene indica L. , Sp. Pl. 713. 1753; Wight & Arn., Prodr. 219. 1834; Wight. Ic. t. 405. 1840; Baker in Hook. f. , Fl. Brit. India 2: 151. 1876; Gamble, Fl. Pres. Madras 331. 1918; Rudd, Reinwardtia 5: 30. 1959; Subram., Aquat. Ang. 14. 1962; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 236. 1976; Mani. & Sivar., Fl. Calicut 84. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 334. 1983; Ramach. & Nair, Fl. Cannanore 124. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 121. 1988; Vajravelu, Fl. Palghat Dist. 145. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 163. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 134. 1994. *Aeschynomene pumila* L. , Sp. Pl. ed. 2, 1061. 1763; Brum. f. , Fl. Ind. 170. 1768. *Smithia aspera* Roxb., Hort. Beng. 56. 1814 & Fl. Ind. ed. 2, 3: 343. 1832. ***Neli-tali*** Rheede, Hort. Malab. 9: 31-32, t. 18. 1689.

Erect, annual herbs upto 1 m tall; branchlets glabrous to hispid. Leaves 4-10 cm long; leaflets 15-30 pairs, subsessile, 2.5-7 x 1-2 mm, linear-oblong or elliptic-oblong, base oblique, apex obtuse, apiculate; stipules 5-10 mm long, lanceolate, acuminate, peltate. Flowers 7-10 mm long in 1-4-flowered axillary racemes; pedicel to 5 mm long; bracts c. 5 mm long, ovate, acuminate, bracteoles 2-3 mm long, c. 1 mm wide, ovate-lanceolate. Calyx 4-5 mm long, deeply 2-lipped, glabrous. Corolla exserted, pale yellow; standard orbicular, red-striped; wing obovate; keel to 7x3 mm, oblong. Staminal sheath to 4 mm long. Ovary to 6 mm long; ovules many; style c. 3 mm long. Pods 2.5-3.7 x 0.4-0.5 cm, linear, compressed, straight or curved with 4-8 joints, long stalked, sometimes muricate. Seeds 2.5-3.5 mm long, reniform, dark brown.

Fl. & Fr.: Aug.-Dec.

Distr. : Pantropics. Along margins of lakes, marshy lowlands and shallow waters. *CNS 1174* (Pattanakadu).

ALYSICARPUS Necker ex Desvaux

J. Bot. Agric. 1: 120. 1813 (*nom. cons.*).

Prostrate or erect herbs. Leaves 1-foliolate, dimorphic; stipules scarious, free or connate. Flowers in terminal or rarely axillary racemes. Pedicels often paired. Calyx 2-lobed, the upper 2-lobes connate at the apex. Standard petal orbicular or obovate, clawed; keel petals often with membranous lateral appendage. Stamens 9+1, anthers uniform. ovary sessile or shortly stipitate; ovules numerous; style filiform, incurved; stigma capitate. Pods constricted between seeds. Seeds suborbicular or globose.

1a. Pods not veined, hairy, distinctly moniliform ..... **A. monilifer**

1b. Pods veined, not hairy, subterete, not moniliform ..... **A. vaginalis**

Alysicarpus monilifer (L.) DC., Prodr. 2: 353. 1825; Baker in Hook. f. , Fl. Brit. India 2: 157. 1876; Gamble, Fl. Pres. Madras 338. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 237. 1976; Mani. & Sivar., Fl. Calicut 85. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 336. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 135. 1994. *Hedysarum moniliferum* L., Mant. Pl. 102. 1767; Roxb., Fl. Ind. 3: 345. 1832.

Diffuse or prostrate much branched herbs; branchlets with elongate, spreading, pilose hairs. Leaves 0.8-2.5 x 0.5-1 cm, broadly oblong or elliptic-oblong, base subcordate, apex obtuse or rounded, mucronate, glabrous or sparsely hairy; petiole 3-6 mm long; stipules 3-5 mm long, lanceolate, striate. Flowers close in axillary racemes; pedicel to 2 mm long. Calyx-tube longer than the first joint of the pod; lobes lanceolate, ciliate. Corolla pink to violet; standard to 5 x 2 mm; wings to 4 x 2 mm; keels to 6 mm long. Pods 3-7-jointed, 1.2-2 cm long, moniliform, turgid, with hooked hairs.

Fl. & Fr. : Nov. - Dec.

Distr. : East Africa, India and Burma. In waste land *CNS 1913* (Punnamada).

Alysicarpus vaginalis (L.) DC. , Prodr. 2: 353. 1825; Baker in Hook. f., Fl. Brit. India 2: 158. 1876; Gamble, Fl. Pres. Madras 338. 1918; Mani. & Sivar., Fl. Calicut 86. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 339. 1983; Ramach. & Nair, Fl. Cannanore 125.

1988; Vajravelu, Fl. Palghat Dist. 146. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 135. 1994; Sivar. & Mathew, Fl. Nilambur 189. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 130. 1996. *Hedysarum vaginalis* L., Sp. Pl. 746. 1753; Roxb., Fl. Ind. 3: 345. 1832.

Diffuse herbs; branches sparsely hairy. Basal leaves 0.8-3.5 x 0.7-1.5 cm, ovate-orbicular, base cordate, apex rounded, apiculate; upper leaves to 5 x 1.8 cm, oblong to linear-lanceolate, base subcordate, apex acuminate, petiole to 6 mm long; stipules to 1.8 cm long, lanceolate, striate, scarious; stipels minute. Flowers in terminal racemes up to 7 cm long; pedicels c. 2 mm long. Calyx c. 4 mm long, equalling or slightly longer than the first joint of pod; segments linear, striate. Corolla pink to purple; standard c. 5 mm long. Staminal tube to 5 mm long; anthers uniform. Ovules many; style filiform, incurved at apex. Pods 1.3-2 cm long, subterete, not constricted between the joints, reticulately veined, joints 4-8.

Fl. & Fr.: Sept. - Jan.

Distr. : India, tropics of the Old World. Very common along roadsides and other waste land. *CNS 1344* (Alappuzha town), *CNS 1935* (Kakkazham).

ATYLOSIA R. Wight *et* Arnott

Prodr. 257. 1834.

Atylosia scarabaeoides (L.) Benth. in Miq., Pl. Jungh. 243. 1852; Baker in Hook. f., Fl. Brit. India 2: 215. 1876; Gamble, Fl. Pres. Madras 369. 1918; Mani. & Sivar., Fl. Calicut 92. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 342. 1983; Ramach. & Nair, Fl. Cannanore 127. 1988; Vajravelu, Fl. Palghat Dist. 147. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 355. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 136. 1994; Sivar. & Mathew, Fl. Nilambur 204. 1996. *Dolichos scarabaeoides* L., Sp. Pl. 726. 1753. *Catharospermum pauciflorum* Wight & Arn., Prodr. 1: 255. 1834. *Rhynchosia scarabaeoides* (L.) DC. , Prodr. 387.1825.

Slender twining herbs. Branches, petioles and leaf on both sides densely pubescent. Leaves 3-foliolate; leaflets 2-4 x 0.8-2 cm, obovate or elliptic, base cuneate,

apex obtuse, yellow-glandular, basally 3-nerved, reticulations prominent; petioles 1.5-2 cm long. Flowers 2-6 in axillary clusters, c. 8 mm long; pedicels 3-4 mm long. Calyx-tube c. 2 mm long; lobes 5, long acuminate, densely pubescent without. Corolla yellow; standard c. 6 mm long, obovate, yellow with reddish brown striations, short-clawed; wings and keels adherent. Stamens diadelphous; staminal tube to 6 mm long. Ovary c. 5 mm long, densely pubescent; style 5-6 mm long, curved; stigma capitate. Pods 1-2 x 0.6-0.8 cm, 4-6 - seeded, transversely grooved, covered with spreading golden hairs.

Fl.& Fr. : Nov. - Feb.

Distr. : S.E. Asia, China, Madagascar. Common in wasteland. *CNS 1117* (Alappuzha beach).

BUTEA Roxburgh ex Willdenow

Sp. Pl. 3: 917. 1802 (*nom. cons.*).

Butea monosperma (Lam.) Taub. in Engler & Prantl, Pflanzenfam. 3(3): 366. 1894; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 238. 1976; Mani. & Sivar., Fl. Calicut 90. 1982; Britto in Matthew, Fl. Carnatic 3: 344. 1983; Ramach. & Nair, Fl. Cannanore 127. 1988; Mani., Fl. Silent Valley 70. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 124. 1988; Vajravelu, Fl. Palghat Dist. 147. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 266. 1991; Sivar. & Mathew, Fl. Nilambur 205. 1996. *Erythrina monosperma* Lam., Encycl. 1: 391. 1785. *Butea frondosa* Koenig ex Roxb., Asiat. Res. 3: 469. 1792 & Pl. Corom. 1: 21, t. 21. 1795; Baker in Hook. f. , Fl. Brit. India 2: 194. 1876; Gamble, Fl. Pres. Madras 357. 1918. ***Plasa*** Rheede, Hort. Malab. 6: t. 16-17. 1686. ***Chamatha.***

Deciduous trees; bark dark-brown, rough. Leaves 3-foliolate; leaflets 10-18 x 8-14 cm, terminal broadly obovate or rhomboid, base cuneate, apex rounded or emarginate, coriaceous, glabrous and green above, pale and grey tomentose below, lateral ones obliquely ovate or elliptic and smaller; petiole to 16.2 cm long; stipels subulate. Flowers large in racemes, usually borne on the trunk and leafless branchlets; pedicels 1.2-2.5 cm long. Calyx tube to 1 cm long, urceolate, velvetty, upper lobes connate. Corolla bright

orange-red, 3.7-5 cm long; standard up to 5 x 2.5 cm, ovate-lanceolate, silky-pubescent outside; wings falcate, adnate to keel; keels incurved, beaked. Stamens 9+1; staminal sheath c. 5 cm long, curved. Ovary c. 2.2 cm long, villous. Pods distinctly stalked, c. 15 x 4 cm, falcate-oblong, flat, velvety brown. Seeds ovoid, brown.

Fl. & Fr. : Jan. - Apr.

Distr. : Indo-malesia. Rare, in wasteland. *CNS 1913* (Karumadi).

CAJANUS Adanson

Fam. Pl. 2: 326, 529. 1763, (*nom. cons.*).

Cajanus cajan (L.) Mill., Sp. Publ. Field Columbian Mus. Bot. Ser. 2: 53. 1900; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 239. 1976; Mani. & Sivar., Fl. Calicut 91. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 345. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 126. 1998; Vajravelu, Fl. Palghat Dist. 177. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 348. 1991; Sivar. & Mathew, Fl. Nilambur 206. 1996. *Cytisus cajan* L. , Sp. Pl. 739. 1753. *Cajanus indicus* Spreng. , Syst. Veg. (ed. 16) 3: 248. 1826; Hook. f., Fl. Brit. India 2: 217. 1876; Gamble, Fl. Pres. Madras 369. 1918. ***Thora-paerou*** Rheede, Hort. Malab. 6: 23-24, t. 13. 1686.

Adpressed-tomentose shrubs; branches angular and ribbed. Leaves 3-foliolate; leaflets 3.7-6.5 x 2-3.2 cm, elliptic-lanceolate, base narrowed, apex acute to acuminate, puberulent above, densely silky-pubescent below; petiole 2-3.7 cm long. Flowers in axillary racemes; pedicels 3-5 mm long. Calyx-tube 3-5 mm long, velvety-pubescent; upper lobes connate, apex 2-fid, the lowest lobe longest, c. 3 mm long. Corolla c. 1.8 cm long, yellow, sometimes veined with red; standard 1.2-1.6 cm long, suborbicular, auriculate; wings oblanceolate, adherent with keels; keels oblanceolate-falcate. Stamens diadelphous, the vexillary free. Ovary to 5 mm long, villous; style pubescent, apex thickened; stigma capitate. Pods 4-7 x 0.8-1 cm, linear-oblong, compressed, silky, often with dark purple spots. Seeds 3-4.

Fl. & Fr. : Sept. - Feb.

Distr. : Probably a native of Africa. Now widely cultivated in the tropics. Commonly cultivated for the seeds, and occasionally escaping. *CNS 1906* (Olathala).

CALOPOGONIUM Desvaux

Ann. Sci. Nat. (Paris) 9: 423. 1826.

Calopogonium mucunoides Desv., Ann. Sci. Nat. (Paris) 9: 423. 1826; Hepper in Hutch. & Dalz., Fl. West Trop. Africa 2: 563. 1958; D'Arcy, Ann. Missouri Bot. Gard. 67: 560. 1980; Ramach. & Nair, Fl. Cannanore 127. 1988; Sanjappa, Leg. India 104. 1992; Sasi. & Sivar., Fl. Pl. Thrissur For. 132. 1996.

Densely strigose-hairy climbers. Leaves 3-foliolate; leaflets 2.8-6.8 x 2-4 cm, elliptic-rhomboid, base rounded or oblique, apex obtuse and slightly apiculate, lateral nerves c. 4 pairs; petiole to 8 cm long; stipels to 3 mm long, linear. Flowers pale blue, in axillary racemes; bracts and bracteoles small, caducous; pedicels to 3 mm long. Calyx lobes unequal, 4-6 mm long; upper 2 calyx lobes free or connate, the other lobes linear-lanceolate. Standard petal obovate, appendaged with 2 inflexed auricles at base; keel petals shorter than wing petals. Stamens 9+1. Ovary densely villous, sessile; ovules many; style slender; stigma capitate. Pods 1.6-3 x 0.4-0.6 cm, narrowly oblong, compressed, very densely brown pilose, 4-6-seeded.

Fl. & Fr. : Dec. - May.

Distr. : Native of Tropical America; introduced as a cover crop in rubber plantations, now getting naturalized. Among bushes. *CNS 2570* (Aroor).

CANAVALIA Adanson

Fam. Pl. 2: 325, 531. 1763. (*nom. cons.*).

Climbing or trailing vines. Leaves 3-foliolate, mostly ovate to suborbicular; stipules small, sometimes wart-like; stipels subulate. Flowers showy, in elongated peduncled axillary racemes, fascicled on a nodose rachis; bracts minute; bracteoles small, roundish; caducous. Calyx campanulate, 2-lipped, upper lip entire or 2-lobed, lower 3-toothed. Corolla much exerted; standard suborbicular, reflexed; wings narrow, free from

and equalling the obtuse, incurved keel. Stamens monadelphous or the posterior free at base. Ovary many-ovuled; style incured. Pods large, linear or linear-oblong or oblong, compressed or turgid, upper suture with 2 closely parallel ribs. Seeds ovoid-oblong, compressed, enclosed in a thin papery endocarp.

1a. Prostrate, trailling sea-coast herbs; leaflets orbicular-obovate, apex rounded or retuse; seeds 4-6 ..... **C. rosea**

1b. Perennial lowland climbers; leaflets ovate, ovate-elliptic or elliptic, apex acute to acuminate; seeds 6-12.

2a. Pods turgid, 6-8-seeded ..... **C. cathartica**

2b. Pods flattened, not turgid, 8-12-seeded ..... **C. ensiformis**

Canavalia cathartica Thouars, J. Bot. (Desvaux) 1: 81. 1813 'Canavali' ; Sauer, Brittonia 16(2): 158. 1964; St. John, Israel J. Bot. 19: 216, fig. 21. 1970; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 275. 1991. *Lablab microcarpus* DC., Prodr. 2: 402. 1825. *Canavalia turgida* Grah. ex A. Gray, Bot. U.S. Expl. Exped. 1: 440. 1854; Prain, J. Asiat. Soc. Bengal 66(2): 417. 1897. *Canavalia ensiformis* (L.) DC. var. *turgida* Baker in Hook f. , Fl. Brit. India 2: 196. 1876. *Canavalia obtusifolia,* non (Lam.) DC.,1825: Gamble, Fl. Pres. Madras 360. 1918.

Perennial climbers; stems sparesely pubescent or glabrous. Leaflets 6-12.5 x 4.2-8 cm, broadly ovate to suborbicular, base broadly cuneate to rounded, apex abruptly acute to acuminate, sparsely pubescent or glabrous; stipules c. 3 mm long, lanceolate. Racemes axillary, up to 25 cm long, pendant, tuberculate. Flowers 2.5-3 cm long; pedicles c. 2 mm long. Calyx tube 8-10 mm long, puberulent, the upper lobes rounded. Corolla pink; standard 2.5-3 cm long, obovate or suborbicular; wings and keels lanceolate, claws c. 5 mm long. Pods 7-12 x 3-4 cm, oblong, turgid, 6-8-seeded. Seeds c. 1.5 cm long, oblong-ellipsoid, reddish-brown.

Fl. & Fr. : Most of the seasons.

Distr. : East Africa, Tropical Asia, India, Malaysia through Polynesia, Ryukyu Islands, N. Queensland in Australia and the New World tropics. Banks of canals and back waters. *CNS 1322* (Thrikkunnapuzha).

Canavalia ensiformis (L.) DC., Prodr. 2: 404. 1825; Baker in Hook. f., Fl. Brit. India 2: 193. 1876; Gamble, Fl. Pres. Madras 359. 1918; Sauer, Brittonia 16(2): 142. 1964; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 279. 1991. *Dolichos ensiformis* L., Sp. Pl. 725. 1753. ***Valanga.***

Perennial climbers; stems sparsely pubescent or glabrous. Leaflets 6-18 x 3-9 cm, elliptic or ovate-elliptic, base cuneate, apex acute or acuminate; stipules deciduous. Racemes 15-37 cm long, tuberculate. Flowers c. 3 cm long; pedicels 2-4 mm long; bracteoles c. 2 mm long, obtuse. Calyx tube 6-7 mm long, sparsely pubescent; upper lobes 4-5 mm long, turncate; lower c. 3 mm long. Corolla pink; standard c. 2.8 x 3 cm, suborbiclar; wings long-clawed. Pods 15-32 x 3-3.3 cm, linear-oblong. Seeds 1.5-2 x 1-1.5 cm long, oblong, compressed, white.

Fl. & Fr. : Oct. - Mar.

Distr. : A native of the Old World tropics. Cultivated pantropically. Commonly cultivated and sometimes found as an escape. *CNS 1986* (Puliyoor).

Canavalia rosea (Sw.) DC., Prodr. 2: 404. 1825; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 274. 1991. *Dolichos roseus* Sw., Prodr. Veg. Ind. Occ. 105. 1788. *Dolichos maritimus* Aubl., Hist. Pl. Guian. F. 765. 1775. *Dolichos obtusifolius* Lam., Enc. Menth. 2: 295. 1786. *Dolichos rotundifolius* Vahl , Symb. Bot. 2: 81. 1791; Roxb., Fl. Ind. 3: 302. 1832. *Canavalia maritima* (Aubl.) Thouars in Desv., J. Bot. 1: 80. 1813; Sauer, Brittonia 16(2): 163. 1964. *Canavalia obtusifolia* (Lam.) DC., Prodr. 2: 404. 1825; Wight & Arn., Prodr. 1: 253. 1834; Baker in Hook. f. , Fl. Brit. India 2: 196. 1876. *Canavalia lineata* auct., non DC., 1825: Gamble, Fl. Pres. Madras 360. 1876; Britto in Matthew, Fl. Tam. Carnatic 3: 348. 1983; Ramach. & Nair., Fl. Cannanore 128. 1988.

Prostrate, trailing herbs; stems sparsely pubescent, becoming glabrescent. Leaflets 3-8 x 3-5.5 cm, orbicular-obovate to suborbicular, base broadly cuneate or rounded, apex rounded or retuse, sparsely pubescent above, glabrous to densely pubescent below, thin-coriaceous; rachis up to 5 cm long; stipules c. 4 mm long, lanceolate; stipels small. Racemes to 15 cm long, tuberculate. Flowers to 3 cm long; pedicels c. 3 mm long; bracts orbicular. Calyx tube c. 8 mm long, pubescent, shortly lobed; upper lobes 3-4 mm long. Corolla pink, exerted; standard c. 2.5 x 2 cm, orbicular to elliptic. Pods 6-10 x 2.2-2.8 cm, oblong, compressed, shortly beaked. Seeds 4-6, 1.5-2 cm, ellipsoid, dark.

Fl. & Fr. : Nov. - Mar.

Distr. : Pantropical on beaches and with littoral vegetation. Common in sandy sea-shores. *CNS 1931* (Ambalapuzha beach).

CENTROSEMA (A.P. de Candolle) Bentham

Commentat. Legum. Gener. 53. 1837 (*nom. cons.*).

Centrosema pubescens Benth., Comm. Legum. Gen. 55. 1837; D'Arcy, Ann. Missouri Bot. Gard. 67: 576. 1980; Britto in Matthew, Fl. Tam. Carnatic 3: 349. 1983; Bairing *et al.*, J. Econ. Tax. Bot. 7: 254. 1985; Mani., Fl. Silent Valley 70. 1988; Vajravelu, Fl. Palghat Dist. 178. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 302. 1991; Sanjappa, Leg. India 111. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 137. 1994; Sivar. & Mathew, Fl. Nilambur 208. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 133. 1996. *Centrosema virginianum* auct. non (L.) Benth., 1838: Subram., Bull. Bot. Surv. India 3: 201. 1961; Thoth. & Prasad, Curr. Sci. 39: 353. 1970; Mani. & Sivar., Fl. Calicut 89. 1982; Ramach. & Nair, Fl. Cannanore 128. 1988.

Pubescent twiners. Leaves 3-foliolate; leaflets 3-6.2 x 1.5-4 cm, ovate or elliptic, base rounded, apex acuminate, the terminal larger than the laterals, pubescent; petiole to 5 cm long; stipules persistent. Racemes axillary, 5-8-flowered; peduncles 4-5 cm long. Flowers 2.5-3.2 cm long; pedicels 7-10 mm long; bracts connate, 5-8 mm long, ovate-lanceolate, deciduous; bracteoles 6-8 mm long, ovate. Calyx-tube 3-4 mm long, campanulate, 2-lipped, upper lip emarginate, adpressed tomentose. Corolla violet;

standard c. 3 cm long, ovate-suborbicular, gibbous at the back above the claw, emarginate, pubescent without; wings falcate, the auricle curved back. Stamens 9+1. Style basally pubescent. Pods 7-12 x 0.4-0.6 cm, linear, compressed with 4-raised ribs near sutures, 15-18 seeded, apical horn to 1 cm long. Seeds 4-6 mm long, oblong, brown with darker mottling.

Fl. & Fr. : Sept. - Dec.

Distr. : Native of Tropical America, introduced as a cover crop in plantations, now found throughout the tropics. *CNS 1467* (Cherthala), *CNS 1907* (Laxmithop).

CLITORIA Linnaeus

Sp. Pl. 753. 1753.

Clitoria ternatea L. , Sp. Pl. 753. 1753; Hook f. , Fl. Brit. India 2: 208. 1876; Gamble, Fl. Pres. Madras 365. 1918; Gamble in Sald. & Nicols., Fl. Hassan Dist. 239. 1976; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 132. 1988; Vajravelu, Fl. Palghat Dist. 148. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 305. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 137. 1994. *Ternatea vulgaris* H.B.K. , Nov. Gen. Sp. 6: 415. 1824. ***Schanga-cuspi*** Rheede, Hort. Malab. 8: t. 38. 1688. ***Sankupushpam.***

Slender twiners. Leaves odd-pinnate; leaflets 5-7, 2.2-4.5 x 1.5-2.8 cm, broadly elliptic, ovate or obovate, base cuneate to rounded, apex obtuse to rounded, pubescent; stipules c. 4 mm long, ovate-lanceolate, persistent. Flowers solitary, axillary; pedicels to 1 cm long; bracts 2-3 mm long, persistent; bracteoles foliaceous, auricled. Calyx tube 5-7 mm long, pubescent; lobes acuminate. Petals blue or white, clawed; standard 3.5-4.3 cm long, obovate, emarginate; wings oblong, falcate, adnate to keel; keels obovate, incurved. Stamens diadelphous; filaments unequal. Ovary c. 7 mm long, pubescent; style curved, apex dilated. Pods 5-9 x 0.6-0.9 cm, linear, compressed, apically beaked. Seeds many, 5-7 mm long, compressed, reniform, black.

Fl.& Fr. : Sept. - Jan.

Distr. : Pantropical. Commonly grown in gardens and often found as an escape along fences and thickets. This is also used as one of the ingredient in indgienous medicines. *CNS 1915* (Karthikappally).

CROTALARIA Linnaeus

Sp. Pl. 714. 1753.

Herbs or shrubs. Leaves simple, usually 1-foliolate, rarely 3 or more-foliolate; stipules filiform to foliaceous or sometimes absent. Flowers in terminal, leaf-opposed or axillary racemes, sometimes in umbels or heads, rarely solitary. Bracts and bracteoles small. Calyx tube short, lobes 5, linear, lanceolate. Corolla equal or exceeding calyx lobes; petals clawed; standard orbicular to ovate, callose above the claw; wings oblong to obovate, shorter than standard, with a few rows of transverse folds between nerves; keels as long as wings, connate, beaked. Stamens monadelphous; staminal sheath cleft above, alternating anthers long and short, long anthers basifixed with flat filaments, and short versatile with slender filaments. Ovary sessile or stalked, 2-many ovuled; style incurved, bearded towards apex. Pods oblong-globose, turgid or inflated, continuous within. Seeds 1-2 or many, reniform, estrophiolate.

1a. Leaves simple.

2a. Flowers blue or white; stipules semi-lunate; stems 4-angled ..... **C. verrucosa**

2b. Flowers yellow,sometimes with reddish or brownish markings; stipules linear or absent; stems terete or striate.

3a. Pods pubescent ..... **C. juncea**

3b. Pods glabrous.

4a. Stems relatively robust, erect, shrubby; racemes more than 8-flowered; flowers 1.5-2 cm long; pods more than 3 cm long .... **C. retusa**

4b. Stems relaively slender, usually procumbent or decumbent; raemes less than 5-flowered; flowers up to 8 mm long; pods less than 2 cm long.

5a. Racemes subumbellate or capitate, usually terminal; pods globose-ovoid, up to 6 mm long; black when mature, 6-12-seeded ..**C. nana**

5b. Racemes elongate up to 5 cm long, usually leaf-opposed or lateral; pods oblong, 1-1.8 cm long, not black, 12-20-seeded .... **C. prostrata**

1b. Leaves compound, 3-5-foliolate.

6a. Leaves 5-foliolate ..... **C. quinquefolia**

6b. Leaves 3- foliolate.

7a. Stipe of pods 2-3 cm long; flowers 3-3.5 long; pedicels more than 1 cm long ..... **C. laburnifolia**

7b. Stipe of pods less than 1 cm long; flowers up to 1.5 cm long; pedicels less than 8 mm long ..... **C. pallida**

Crotalaria juncea L., Sp. Pl. 714. 1753; Roxb., Pl. Corom. t. 193. 1805; Wight & Arn., Prodr. 185. 1834; Baker in Hook. f., Fl. Brit. India 2: 79. 1876; Gamble, Fl. Pres. Madras 297. 1918; Munk, Reinwardtia 6: 206. 1962; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 242. 1976; Mani. & Sivar., Fl. Calicut 78. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 373. 1983; Ramach. & Nair, Fl. Cannanore 131. 1988; Nicols., Suresh & Mani., An Intepr. Hort. Malab. 132. 1988; Vajravelu, Fl. Palghat Dist. 150 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7:194. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 140. 1994. ***Tandale- cotti*** Rheede, Hort. Malab. 9: 47, t. 26. 1689.

Annual erect herbs to 2.3 m tall; stems striate, silky-pubescent. Leaves 3-8 x 0.5-1.5 cm, oblong-elliptic to oblanceolate, base usually acute, apex obtuse to subacute, apiculate, clothed on both sides with appressed hairs; petiole to 3 mm long; stipules minute. Inflorescence teminal, racemose, many-flowered, 15-30 cm long. Flowers yellow, 1.5-2 cm long; pedicels c. 5 mm long; bracts 3-4 mm long, lanceolate; bracteoles linear. Calyx c. 1.8 cm long, fulvous hairy, teeth linear-lanceolate. Petals 1.5-2 cm long; standard c. 2 cm long and broad, ovate, veined red, silky without; wings shorter than keel and standard. Pods sessile, 2.5-3x 1-1.3 cm, oblong-cylindrical, fulvous silky hairy. Seeds 8-15, c. 4 mm long, obliquely-cordiform.

Fl. & Fr. : Aug. - Feb.

Distr. : A nattive of India; now spread to most tropical countries as a green manure. *CNS 1352* (Pallipuram).

Crotalaria laburnifolia L., Sp. Pl. 715. 1953; Hook. f., Fl. Brit. India 2: 84. 1876; Gamble, Fl. Pres. Madras 301. 1918; Munk, Reinwardtia 6: 206. 1962; Britto in Matthew, Fl. Tam. Carnatic 3: 357. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 133. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl.Ceylon 7: 214. 1991. ***Nella-tandale-cotti*** Rheede, Hort. Malab. 9: t. 27. 1689. ***Kilukilikki*** (Plate VII: D; Fig. 18).

Erect shrubs to 180 cm tall. Leaves 3-foliolate; leaflets 1.5-4 x 1.4-3 cm, obovate or elliptic-ovate, base cuneate, apex obtuse or subacute, membranous, glaucous below; petiole to 6 cm long. Racemes terminal and lateral, to 17 cm long. Flowers pendulous, 3-3.5 cm long; bracts c. 3 x 1 mm, linear; pedicels to 2 cm long. Calyx-tube 4-5 mm long, campanulate; lobes 5, 6-8 mm long, ovate. Petals yellow; standard c. 3 x 2 cm, ovate; wings c. 2 x 1 cm, oblong; keels longer than wings, curved and beaked. Staminal sheath to 1.5 cm long. Ovary stalked, 4-6 mm long; style 3-3.5 cm long, bearded towards apex. Pods 3.5-4 x 1-1.2 cm, oblong, cylindrical; stipe 2.5-3 cm long. Seeds 15-20.

Fl. & Fr. Jun. -Dec.

Distr. : Africa, S.E Asia and Malesia. Very rare, in waste land. CNS 1004 (Vandanam)

Crotalaria nana Burm. f. , Fl. Ind. 156, t. 48, f. 2. 1768; Baker in Hook f. , Fl. Brit. India 2: 71. 1876, p.p. ; Gamble, Fl. Pres. Madras 294. 1918; Munk, Reinwardtia 6: 210. 1962; Saxena, J. Bombay Nat. Hist. Soc. 73: 553. 1976; Mani. & Sivar., Fl. Calicut 78. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 366. 1983; Ramach. & Nair, Fl. Cannanore 132. 1988; Vajravelu, Fl. Palghat Dist. 151. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 207.1991; Sanjappa, Leg. India 125. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 141. 1994; Sivar. & Mathew, Fl. Nilambur 181. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 135. 1996. *Crotalaria umbellata* Wight & Arn., Prodr. 191. 1834;

Gamble, Fl. Pres. Madras 294. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 244. 1976.

Erect or diffuse, pubescent herbs, 10-20 cm tall. Leaves subsessile, 0.8-2 x 0.4-0.8 cm, elliptic to oblong, base cuneate, apex obtuse, apiculate, loosely villous above and densely villous below; stipules minute. Flowers 1-4 in terminal or leaf-opposed, subumbellate racemes; bracteoles minute, filiform. Calyx 3-4 mm long, densely villous, upper 2 lobes connate near the tip, the lower lobes ovate-acute. Corolla yellow, 4-5 mm long, standard c. 4 mm long, oblong-acute; wings narrower; keels connate. Ovary 1-1.5 mm long. Pods 5-6 x 3-4.5 mm, globose-ovoid, black when mature. Seeds 6-12, subreniform, brown.

Fl. & Fr. : Aug. - Nov.

Distr. : Peninsular India , Malesia, Sri Lanka. A common weed in grassy places and waste places. *CNS 1014* (Thumboli).

Crotalaria pallida Ait., Hort. Kew. 3: 20. 1789; Polhill, Kew Bull. 22: 262. 1968; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 243. 1976; Mani. & Sivar., Fl. Calicut 78. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 358. 1983; Ramach. & Nair, Fl. Cannanore 132. 1988; Mani., Fl. Silent Valley 72. 1988; Vajravelu, Fl. Palghat Dist. 152. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 211. 1991; Sanjappa, Leg. India 126. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 142. 1994; Sivar. & Mathew, Fl. Nilambur 182. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 135. 1996. *Crotalaria mucronata* Desv., J. Bot. 3: 76. 1814; Munk, Reinwardtia 6: 209. 1962. *Crotalaria striata* DC., Prodr. 2: 131. 1825; Baker in Hook. f. , Fl. Brit. India 2: 84. 1876; Gamble, Fl. Pres. Madras 301. 1918. ***Kilukilukki.***

Erect undershrubs, up to 1.6 cm tall; branches puberulous. Leaves 3-foliolate; leaflets subequal, 3-7 x 1.8-4 cm, obovate or elliptic-ovate, base cuneate, apex obtuse or acute, membranous, glaucous below; petiole 3-7 cm long; stipules 1-3 mm long, setaceous, deciduous. Flowers c. 1.3 cm long, in teminal many-flowered racemes, up to 25 cm long; pedicels 3-4 mm long; bracts to 3 mm long, subulate. Calyx 5-7 mm long,

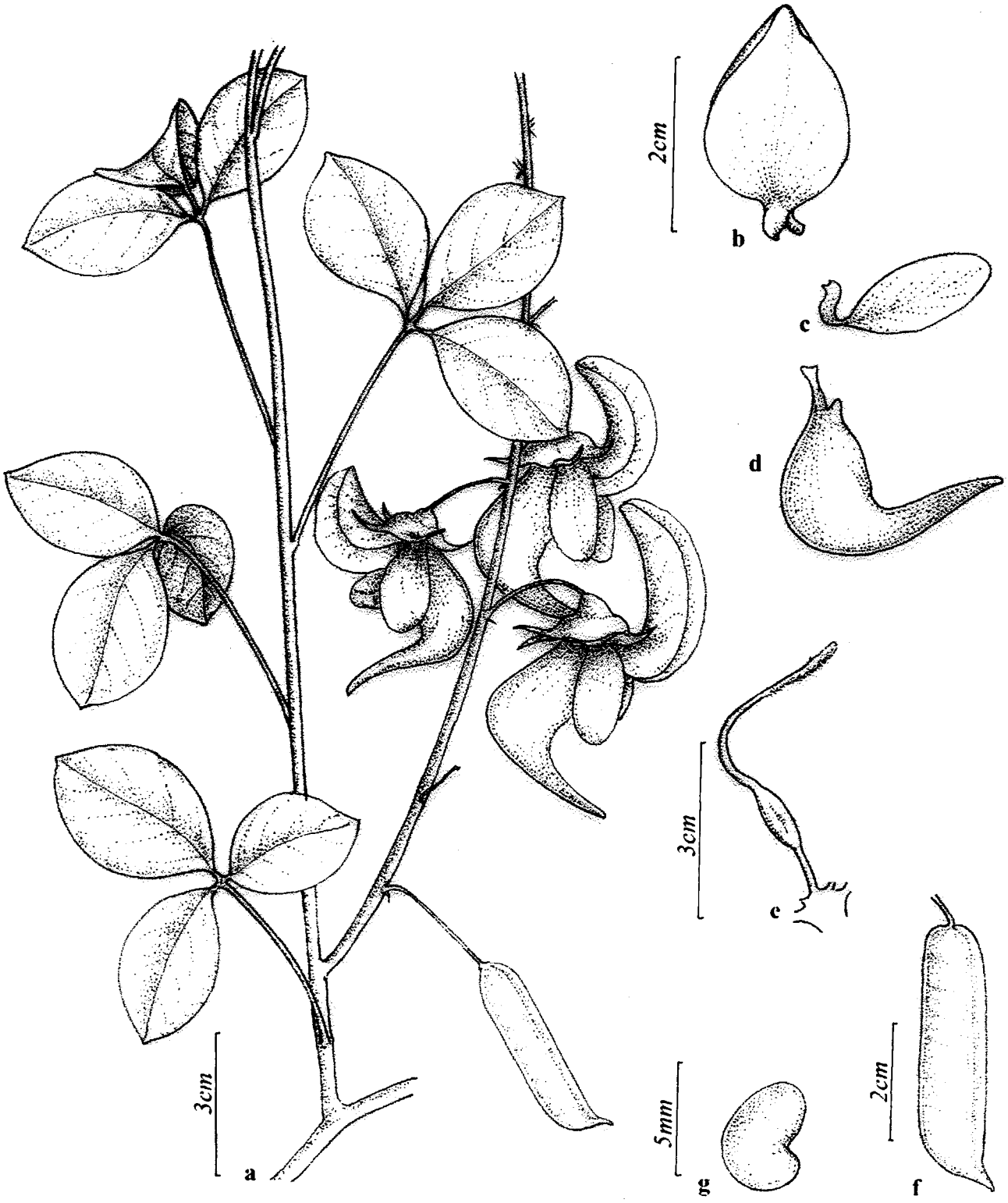


Fig. 18. *Crotalaria laburnifolia* L.: a. Flowering branch; b. Standard petal; c. Wing petal; d. Keel petal; e. Pistil; f. Pod; g. Seed;

upper 2-lobes united, other lobes lanceolate, adpressed tomentose. Petals yellow with prominent reddish veins; standard c. 1.2 cm long, broadly elliptic; keels curved and beaked. Stamens 10, monadelphous. Style abruptly incurved at the base; stigma oblique. Pods 3-4.2 x 0.6-0.8 cm, oblong-cylindrical. Seeds 18-30, brown.

Fl. & Fr. : Nov. - Apr.

Distr. : Throughout the tropics. A common weed along roadside and open wastelands. *CNS 1377* (Komana).

Crotalaria prostrata Rottl. ex Willd., Enum. Hort. Berol. 747. 1809; Roxb., Fl. Ind. 3: 270. 1832; Wight & Arn., Prodr. 189. 1834; Baker in Hook f. , Fl. Brit. India 2: 67. 1876; Gamble, Fl. Pres. Madras 292. 1918; Munk, Reinwardtia 6: 211. 1962; Mani. & Sivar., Fl. Calicut 78. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 361. 1983; Ramach. & Nair, Fl. Cannanore 133. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 204. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 142. 1994.

Prostrate herbs with spreading or long trailing slender branches, covered with yellowish silky hairs. Leaves 0.6-2.8 x 0.6-1.6 cm, suborbicular to oblong-elliptic or elliptic-lanceolate, base rounded, apex obtuse, subacute or retuse, yellowish silky on both sides; petiole to 2 mm long; stipules 0. Racemes lateral or leaf-oppsed, up to 5 cm long, 2-4-flowered. Flowers yellow, 5-8 mm long; pedicels up to 3 mm long; bracts 1-2 mm long, subulate; bracteoles filiform. Calyx 5-6 mm long, softly pubescent; lobes lanceolate, ciliate; upper lobes connate half to three-fourths way up. Petals slightly exserted; standard oblong, apex deeply emarginate. Staminal sheath c. 1 mm long. Ovary sessile, c. 1.5 mm long. Pods 1.2-1.8 x 0.5-0.7 cm, oblong, 12-20-seeded, glabrous.

Fl. & Fr. : Oct. - Feb.

Distr. : S.E. Asia, Malesia. Rare, a weed along railway line. *CNS 1928* (Kayamkulam).

Crotalaria quinquefolia L., Sp. Pl. 716. 1753; Wight, Ic. t. 16. 1838; Baker in Hook. f., Fl. Brit. India 2: 84. 1876; Gamble, Fl. Pres. Madras 301. 1918; Munk, Reinwardtia 6: 212. 1962; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 243. 1976; Nicols., Suresh &

Mani., An. Interpr. Hort. Malab. 133. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 216. 1991. *Crotalaria heterophylla* L. f. , Suppl. 323. 1781. ***Wellia- tandale-cotti*** Rheede, Hort. Malab. 9: 51, t. 28. 1689.

Erect annual herbs, 30-100 cm tall; branches ribbed, subglabrous. Leaves 5-foliolate; leaflets subsesile, 2.5-8.5 x 0.6-2.2 cm, oblanceolate to elliptic, base cuneate, apex obtuse to subacute, sometimes shallowly emarginate, glabrous above, appressed-pubescent beneath. Inflorescence terminal, racemose, many-flowered, up to 18 cm long. Flowers 1.5-1.8 cm long; pedicels 5-10 mm long; bracts 4-5 mm long, lanceolate, acuminate; bracteoles filiform. Calyx c. 1 mm long, companulate; lobes triangular, acute. Petals bright yellow, usually with red or purplish streaks. Pods 3.6-5.8 cm long including stipe, 1.2-2 cm wide, 25-40-seeded. Seeds c. 5 mm long, subreniform, light brown.

Fl. & Fr. : Sept. - Jan.

Distr. : A native of tropical Asia; introduced in Jamaica, and possibly in other islands of the West Indies. Common in marshy areas. *CNS 1973* (Kanichukulangara Jn.).

Crotalaria retusa L., Sp. Pl. 715. 1753; Baker in Hook. f., Fl. Brit. India 2: 75. 1876; Gamble, Fl. Pres. Madras 293. 1918; Munk, Reinwardtia 6: 212. 1962; Polhill, Kew Bull. 22: 310. 1968; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 243. 1976; Mani. & Sivar., Fl. Calicut 78. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 365. 1983; Ramach. & Nair, Fl. Cannanore 133. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 133. 1988; Vajravelu, Fl. Palghat Dist. 152. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 192. 1991; Sanjappa, Leg. India 128. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 143. 1994; Sivar. & Mathew, Fl. Nilambur 183. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 135. 1996; ***Tandale-cotti*** Rheede, Hort. Malab. 9: 45-46, t. 25. 1689 (Plate VII: C).

Erects herbs or subshrubs up to 1.75 m tall; branches striate, minutely pubescent. Leaves 2-8 x 1-3 cm, oblanceolate or obovate, base cuneate, apex obtuse or retuse, glabrous above, puberulent and glaucous below; stipules minute, subulate. Flowers in few to many-flowered terminal racemes; bracts 4-6 mm long, subulate. Calyx 0.8-1 cm long,

puberulous without; lobes 5, broadly ovate, acuminate. Corolla 1.5-2 cm long, yellow with red striations; standard orbicular; wings with scaly folds; keels with a line of cottony hairs on inner margin. Staminal sheath 6-7 mm long; filaments 5-7 mm long. Ovary 0.8-1 cm long; ovules many; style 1-1.5 cm long; stigma pubescent. Pods 3-4 x 0.8-1 cm, oblong, cylindrical, slightly broader upwards. Seeds 15-20, c. 3 mm long, light brown to black.

Fl. & Fr. : Nov. - Jan.

Distr. : Throughout the tropics. A common weed along roadside and open waste lands. *CNS 1236* (Karumadi), *CNS 1236* (Pattanakkad).

Crotalaria verrucosa L., Sp. Pl. 715. 1753; Baker in Hook. f., Fl. Brit. India 2: 77. 1876; Gamble, Fl. Pres. Madras 297. 1918; Munk, Reinwardtia 1: 217. 1962; Mani. & Sivar., Fl. Calicut 78. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 373. 1983; Ramach. & Nair, Fl. Cannanore 134. 1988; Mani., Fl. Silent Valley 74. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 133. 1988; Vajravelu, Fl. Palghat Dist. 153. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 188. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 143. 1994. ***Pee-tandale-cotti*** Rheede, Hort. Malab. 9: t. 29. 1689.

Erect, branched herbs, up to 75 m tall; stems striate, 4-angled, appressed-pubescent. Leaves 2.5-7 x 2.5-4.5 cm, ovate-rhomboid or ovate-deltoid, base acute, apex obtuse or acute, appressed-pubescent on both surfaces; petiole 2-3 mm long; stipules foliaceous, 5-10 mm long, ovate to falcate. Flowers up to 1.5 cm long, terminal or leaf-opposed racemes; pedicels 3-5 mm long; bracts lanceolate. Calyx 0.7-1 cm long, pubescent, with deltoid, acute lobes longer than the tube. Corolla blue or white; standard c. 1.2 cm long, broadly ovate; wings obovate; keels oblong. Staminal sheath to 6 mm long; filaments c. 5 mm long. Ovary stipitate, appressed pubescent; style geniculate. Pods 2.5-3.5 x 0.8-1 cm, oblong-cylindrical, inflated, 10-16-seeded. Seeds 3-4.5 x 3-4 mm, obliquely cordiform, yellowish to brownish.

Fl. & Fr. : Aug. - Dec.

Distr. : Pantropical. Common in sandy coastal areas. *CNS 1204* (Chandiroor), *CNS 1896* (Kumbolichira).

DALBERGIA Linnaeus f.

Suppl. 52, 316. 1782 (*nom. cons.*).

Trees or woody climbers. Leaves imparipinnate; leaflets mostly alternate. Stipules small, deciduous. Flowers small, in axillary or terminal panicles or cymes; bracteoles small. Calyx campanulate; lobes 5, unequal, upper 2 lobes small and connate, lower lobes longer. Corolla exerted; petals clawed; standard with few transverse folds; keels obtuse, connate at tip. Stamens 9-10, monadelphous or diadelphous; anthers uniform. Ovary stalked; ovule 1 or more, usually few; style incurved; stigma capitate. Pods indehiscent, samaroid and compressd, 1-few seeded.

1a. Trees.

2a. Leaflets 3-5, cuspidate or acuminate at apex; leaf-rachis zigzag; pods c. 1 cm across ..... **D. sissoo**

2b. Leaflets 5-9, obtuse or emarginate at apex; leaf-rachis straight; pods 1.5-2 cm across ..... **D. latifolia**

1b. Lianes or stragglers.

3a. Leaflets 5-7, 2-4.5 cm long; pods falcate-lunate ..... **D. candenatensis**

3b. Leaflets 11-15, 0.8-1.8 cm long; pods broadly oblong or strap-shaped .... **D. horrida**

Dalbergia candenatensis (Dennst.) Prain, J. Asiat. Soc. Bengal 70: 49. 1901; Gamble, Fl. Pres. Madras 382. 1918; Thoth. & Nair, Taxon 30: 45. 1981; Thoth., Tax. Rev. Dalbergieae Ind. Subcont. 187. 1987; Nicols., Suresh. & Mani., An Interpr. Hort. Malab. 134. 1988; Nair, J. Econ. Tax. Bot. 13(3): 581. 1989; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 220. 1991. *Cassia candenatensis* Dennst., Schluess. Hort. Malab. 12. 1818. *Dalbergia monosperma* Dalz., Hook. J. Bot. 2: 36. 1850; Baker in Hook. f. , Fl. Brit. India 2: 237. 1876. *Dalbergia torta* Graham (in Wall., Cat. no. 5873. 1832, *nom. nud.*) ex Gray, Bot. U.S. Expl. Exped. 1: 458. 1854; Prain, J. Asiat. Soc. Bengal 66(2):

120. 1897 & in Ann. Roy. Bot. Gard. (Calcutta) 10: 64, tab. 42. 1904. ***Karin-tagera*** Rheede, Hort. Malab. 6: 45, t. 25. 1686.

Scandent shrubs climbing by means of divaricate lateral twigs often hooked at the ends. Leaflets 5-7, 2-4.5 x 1-1.5 cm, elliptic to obovate, base acute, apex rounded or emarginate, sparsely adpressed hairy beneath; petiolules c. 2 mm long; rachis 2-5 cm long. Inflorescence a simple or branched raceme, 1.8-3.7 cm long, axillary and on lateral abbreviated branchlets. Flowers 5-8 mm long, white. Calyx c. 4 mm long; lobes rounded or obtuse. Petals with claws longer than the calyx; standard ovate, slightly auricled. Ovary linear, stipitate 1-2-ovuled. Pods 2-3 x 1-1.5 cm, falcate-lunate, flat, acute, thick, 1-seeded. Seeds reniform, compressed.

Fl. & Fr. : May-Nov.

Distr. : Sri Lanka, India, Malaysia, Philippines, Polynesia, China and northern Australia.

Among mangrove swamps. *CNS 1919* (Mangadichira), CNS 1637 (Kumbolichira).

Dalbergia horrida (Dennst.) Mabberley, Taxon 25: 538. 1977; Thoth. & Nair, Taxon 30: 46. 1981; Nicols., Suresh & Mani., An Interpr. Hort. Malab.134. 1988; Nair, J. Econ. Tax. Bot. 13(3): 582. 1989. *Amerimnon horridum* Dennst., Schluess. Hort. Malab. 34. 1818. *Dalbergia sympathetica* Nimmo in Grah., Cat. Bombay Pl. 55. 1839; Benth., J. Proc. Linn. Soc. Bot. Suppl. 4: 42. 1860; Baker in Hook. f., Fl. Brit. India 2: 234. 1876; Rama Rao, Fl. Pl. Travancore 129. 1914; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 246. 1976; Vajravelu, Fl. Palghat Dist. 154. 1990. *Dalbergia multiflora* Heyne ex Prain, J. Asiat. Soc. Bengal 70(2): 59.1901 & Ann. Roy. Bot. Gard. (Calcutta) 10(1): 43, Pl. 18. 1904; Gamble, Fl. Pres. Madras 381. 1918. ***Ana-mullu*** Rheede, Hort. Malab. 8: 73-74, t. 40. 1688.

Straggling shrubs, climbing by means of hooked branchlets. Leaves 4-9 cm long; leaflets 11-15, 0.8-1.8 x 0.5-1.2 cm, ovate-oblong or elliptic-oblong, base cuneate, apex emarginate, subcoriaceous. Flowers in axillary cymose panicles. Stamens 9. Ovary linear. Pods 3-5 x 1.3-2 cm, broadly oblong or strap-shaped, 1-4-seeded.

Fl. & Fr. : Dec. - Apr.

Distr. : Endemic to India. In sacred groves. *CNS 1947* (Vandanam).

Dalbergia latifolia Roxb., Pl. Corom. t. 113.1799; Wight, Ic. t. 1156. 1848; Baker in Hook. f. , Fl. Brit. India 2: 231. 1876; Prain, Ann. Roy. Bot. Gard. (Calcutta) 10: 80.1904; Gamble, Fl. Pres. Madras 383. 1918; Gandhi in Sald. & Nicols., Fl. Hassn Dist. 245. 1976; Britto in Matthew, Fl. Tam. Carnatic 3: 384. 1983; Thoth., Tax. Dalbergieae Ind. Subcont. 46. 1987; Ramach. & Nair, Fl. Cannanore 134. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 134. 1988; Nair, J. Econ. Tax. Bot. 13(3): 583. 1989; Sanjappa, Leg. India 137.1992; Vajravelu, Fl. Palghat Dist. 154. 1990; Mohanan & Henry, Fl. Thiruvnanthapuram 144. 1994; Sivar. & Mathew, Fl. Nilambur 185. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 137. 1996. ***Biti*** Rheede, Hort. Malab. 5: 115, t. 58. 1685. ***Etti***

Large deciduous trees; bark brown, yellow inside. Leaves imparipinnate; leaflets 5-9, 2-5 x 2-4 cm, broadly obovate to orbicular, base attenuate, apex obtuse to emarginate, sub-coriaceous, glaucous below; petiolule 6-10 mm long. Flowers in corymbose short panicles, axillary or from the axils of fallen leaves of previous years; pedicels 3-3.5 mm long. Calyx tube 3.5-4 mm long; lobes 5, subequal, to 1.5 mm long. Corolla white or cream, 5-6 mm long; standard obovate; wings and keels oblong. Stamens 9, monadelphous. Ovary 3-3.5 mm long; style curved, 4-5 mm long. Pods 4-7 x 1.5-2 cm, oblong, narrowed to both ends, 1-3-seeded, sometimes constricted at the sutures between the seeds.

Fl.& Fr. : Feb. - Apr.

Distr. : Indo-Malaysia. It is one of the most valuable timber trees. Generally known as 'Indian rose-wood'. *CNS 1425* (Cherthala), *CNS 1406* (Kanichukulangara).

Dalbergia sissoo Roxb., Fl. Ind. 3: 223. 1832; Wight & Arn., Prodr. 264. 1834; Bedd., Fl. Sylv. t. 25. 1869; Baker in Hook. f., Fl. Brit. India 2: 237. 1876; Gamble, Fl. Pres. Madras 384. 1918; Britto in Matthew, Fl. Tam. Carnatic 3: 386. 1983; Thoth., Tax. Rev. Dalbergieae Ind. Subcont. 37. 1987; Nair, J. Econ. Tax. Bot. 13(3): 586. 1989.

Medium-sized trees; bark greyish or pale brown, thick; branchlets pilose. Leaves imparipinnate; leaflets 3-5, 2.5-6 x 2-5.5 cm, ovate, obovate or orbicular, base rounded to cuneate, apex cuspidate or acuminate, coriaceous, puberulous to pubescent when young, glabrous when mature; petiolules 3-5 mm long. Panicles axillary and/or terminal, 5-7 cm long, densely pubescent. Flowers cream coloured, 6-8 mm long, subsessile. Calyx 4-6 mm long, campanulate, puberulous without; lobes oblong. Petals exserted; standard to 8 x 5 mm, obovate, long-clawed. Stamens 9, monadelphous. Ovary long-stipitate, pubescent. Pods 2.5-7 x 0.8-1 cm, linear-oblong, base cuneate, apex acute. Seeds 1-3.

Fl. & Fr. : Feb. - Jun.

Distr. : A native of tropical Himalaya to N.E. India, but cultivated in tropical to subtropical Africa, W.Asia. Planted. *CNS 1980* (Thottappally).

DERRIS Laureiro

Fl. Cochinch. 432. 1790 (*nom.cons.*).

Woody climbing shrubs. Leaves imparipinnate; leaflets opposite; stipules and stipels present or absent. Flowers fascicled on axillary or terminal racemes or panicles. Bracts small, caducous; bracteoles adnate to the base of calyx. Calyx tube campanulate, truncate or minutely toothed. Corolla exserted; petals clawed; standard obovate to orbicular, not appendaged; wings obliquely oblong, often appendaged; keels obtuse, incurved. Stamens 10, usually monadelphous, rarely diadelphous (9+1). Ovary subsessile; ovules 2 or few; style filiform, incurved; stigma capitate. Pods compressed, oblong or orbicular, the upper or both sutures narrowly winged, indehiscent. Seeds solitary to few: compressed, orbicular to reniform.

1a. Leaflets 3-5 ..... **D. trifoliata**

1b. Leaflets 5-11.

2a. Inflorescence terminal panicles; flowers solitary and not fascicled on the rachis; leaflets 2.5-4 cm wide ..... **D. thyrsiflora** var.**eualata**

2b. Inflorescence axillary racemes; flowers fascicled on the rachis; leaflets 1-2.5 cm wide ..... **D. scandens**

Derris scandens (Roxb.) Benth., J. Linn. Soc. Bot. 4 (suppl.):103. 1860; Baker in Hook. f. , Fl. Brit. India 2: 240. 1876; Gamble, Fl. Pres. Madras 387. 1918; Thoth., Bull. Bot. Surv. India 3: 177. 1962& 13: 165. 1971 & Fasc. Fl. India 8: 27. 1982; Mani. & Sivar., Fl. Calicut 81. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 388. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 135. 1988; Vajravelu, Fl. Palghat Dist. 155. 1990; Rudd in Dassan. & Fosb., Fl. Nilambur 223. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 138. 1996. *Dalbergia scandens* Roxb., Pl. Corom. t. 192. 1805; Wight, Ic. t. 275. 1840. *Brachypterum scandens* (Roxb.) Benth., Ann. Wien Mus. 2: 101. 1838; Geesink, Leiden Bot. Ser. 8: 80. 1984. ***Noel-valli, Panni-valli*** Rheede, Hort. Malab. 6: 39, t. 22. 1686.

Large climbing shrub; branchlets brown, lenticellate. Leaflets 5-11, 2-5 x 1-2.5 cm, elliptic, lanceolate or ovate-oblong, base rounded to cuneate, apex obtuse, acute, sometimes emarginate, subcoriaceous; lateral nerves 7-9 pairs, slender. Racemes axillary, 8-25 cm long, with flowers clustered on brown-pubescent rachis. Flowers 7-9 mm long; pedicels c. 4 mm long, slender. Calyx 2.5-3 mm long, shortly adpressed tomentose, lobes obscure. Petals pink or white; standard 7-8 mm long; ovate-orbicular. Stamens 10, alternate ones short. Pods 2.5-6.5 x 1-1.4 cm, oblong, narrowly winged on the upper suture, minutely adpressed tomentose, 2-4-seeded. Seeds c. 8 mm long, reniform, compressed, dark brown.

Fl. & Fr. : Jul. - Dec.

Distr. : Indo-Malesia to Australia and China. Banks of backwater. *CNS 1494* (Thrikunnapuzha).

Derris trifoliata Lour., Fl. Cochinch. 433. 1790; Thoth. & Nair, Taxon 30: 44. 1981 & in Fasc. Fl. Ind. 8: 30. 1982; Mani. & Sivar., Fl. Calicut 80. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 389. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 135. 1988; Ramach. & Nair, Fl. Cannanore 136. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7:232. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 145. 1994. *Derris uliginosa* (Roxb. ex Willd.) Benth. in Miq., Pl. Jungh. 1: 152. 1852; Baker in Hook. f., Fl. Brit. India 2: 241. 1978; Gamble, Fl. Pres. Madras 387. 1918; Thoth., Bull. Bot. Surv.

India 3: 181. 1962. *Pongamia uliginosa* (Roxb. ex Willd.) DC., Prodr. 2: 416. 1825. ***Tsjeria-camettivalli*** Rheede, Hort. Malab. 8: t. 46. 1688.

Climbing shrubs; branches brown, marked with prominent white lenticels. Leaves 3-5-foliolate; leaflets 3.5-9 x 2-4 cm, elliptic or oblong, base rounded to subcordate, apex acuminte, subcoriaceous; petiole to 10 cm long. Flowers 9-12 mm long, in axillary racemes. Calyx tube 3-4 mm long, lobes minute. Corolla rose or white; standard petal to 1.2 cm long, orbicular. Staminal sheath to 8 mm long. Pods 3-4 x 2-3 cm, broadly oblong, orbicular or ovate-orbicular, flat, obtuse at both ends, beaked at the tip, prominently reticulate, very narrowly winged on the dorsal suture. Seeds 1-2, 1.2-1.8 cm long, reniform, compressed, brown.

Fl. & Fr. : Jan. - Apr.

Distr. : Africa, Australia,Tropical and Subtropical Asia. Common along banks of back water. *CNS 1450* (Thrikunnapuzha), *CNS 1994* (Andhakaranazhi).

Derris thyrsiflora (Benth.) Benth. J. Linn. Soc. Bot. 4 (Suppl.): 114. 1860, var. **eualata** (Bedd.) Thoth., Bull. Bot. Surv. India 3: 195. 1962; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 248. 1976; Mohanan & Henry, Fl. Thiruvananthapuram 144. 1994. *Derris eualata* Bedd., Ic. t. 186. 1874; Gamble, Fl. Pres. Madras 388. 1919. *Derris platyptera* Baker in Hook. f., Fl. Brit. India 2: 245. 1878.

Large woody climbing shrubs. Leaflets 7-9, 4-10 x 2.5-4 cm, elliptic-ovate, base rounded, apex acuminate. Flowers in axillary and terminal large panicles of racemes; peduncles and pedicels densely pubescent. Calyx 2.5-3 mm long, campanulate, truncate, densely pubescent without. Corolla white, 5-7 mm long. Stamens with filaments 5-6 mm long, united half-way. Ovary 5-6 mm long, laterally compressed, densely hairy, winged on both sutures, reticulate without. Seeds 1-3, compressed.

Fl. & Fr. : Apr. - Jun.

Distr. : Western Peninsular India. In sacred groves. *CNS 9154* (Elangimelvallikkavu).

DESMODIUM Desvaux

J. Bot. Agric. 1: 122. 1813 (*nom. cons.*).

Herbs or shrubs. Leaves 1-3-foliolate, teminal leaflet longer. Stipules lanceolate, striate, free or united; stipels subulate, small. Flowers usually in terminal or axillary racemes, rarely umbels or solitary. Bracts lanceolate, striated; bracteoles persent or 0. Calyx tube companulate, 4-5-lobed, upper 2 free or connate, lower lobes longer. Corolla exserted; standard obovate to orbicular, not appendaged; wings obliquely oblong, more or less adhering to keels; keels oblique, incurved, spurred towards the claw. Stamens 10, usually diadelphous (9+1), rarely monadelphous, anthers uniform. Ovary sessile or stipitate; ovules 2-many; style incurved, mostly indehiscent and breaking off at the joints. Seeds reniform, estrophiolate.

1a. leaves 1-foliolate.

2a. Petiole winged; flowers pink; pods compressed, flat, loosely appressed hairy ..... **D. triquetrum**

2b. Petiole not winged; flowers white; pods moniliform, pubescent with hooked hairs ..... **D. gangeticum**

1b. Leaves 3-foliolate.

3a. Flowers hidden between persistent, orbicular, bifarious leafy bracts .... **D. pulchellum**

3b. Flowers not hidden; bracts not orbicular leafy.

4a. Pods 2-jointed ..... **S. biarticulatum**

4b. Pods 3-7-jointed.

5a. Pods indented along both margins, densely hooked hairy; stems clothed with hooked hairs; stipules amplexicaul and auriculate ..... **D. scorpiurus**

5b. Pods indented only along lower margins, not hooked hairy; stems glabrescent to loosely villous, not hooked hairy; stipules not amplexicaul and auriculate.

6a. Flowers many in terminal, simple or panicled racemes; undershrubs with woody, creeping rootstock ..... **D. heterocarpon**

6b. Flowers 1-4 in axillary racemes or clusters; prostrate herbs, rooting at nodes.

7a. Stem glabrescent; leaflets turncate or emarginate at apex; flowers 1-4 together in leaf-axils, pedicels 4-6 mm long ..... **D. triflorum**

7b. Stem loosely villous; leaflets obtuse or rounded at apex; flowers in axillary lax racemes; pedicels 0.6-1.2 cm long ..... **D. heterophyllum**

Desmodium biarticulatum (L.) F.V. Muell., Fragm. Phyt. Austr. 2: 121. 1861; Baker in Hook. f., Fl. Brit. India 2: 163. 1876; Gamble, Fl. Pres. Madras 344. 1918; Mohanan & Henry, Fl. Thiruvananthapuram 146. 1994. *Hedysarum biarticulatum* L., Sp. Pl. 747. 1753. *Dicerma biarticulatum* (L.) DC., Mem. Leg. 7: 328. 1825; Wight, Ic. t. 419. 1841; Ohashi, Ginkgoana 1: 252. 1973 (Plate VIII: B).

Diffuse undershrubs; stems spreading, brownish, adpressed hairy; root-stock woody. Leaves digitately 3-foliolate, 0.8-1.3x 0.4-0.6 cm, obovate-oblong, base cuneate, apex rounded or somewhat retuse, glabrous above, scabrous below; petiole 3-4 mm long; petiolules c. 1 mm long; stipules 3-4 mm long, 2-3 lobed at apex, striate. Racemes terminal, 1.5-11 cm long, often branched. Flowers 5-6 mm long, 1-3 per node; pedicels c. 2 mm long; bracts 1-2 mm long, subulate; bracteoles adnate to calyx tube, c.1 x 0.5 mm, lanceolate. Calyx tube c. 1.5 mm long; 2 upper lobes connate, to 2 mm long, 3 lower lanceolate, pubescent. Corolla reddish-purple; standard 5-6 x 3-4 mm, obovate; wings 5-6 mm long; keels equalling wings. Staminal tube 5-6 mm long. Ovary c.1 mm long, biarticulate, hirsute, 2-ovuled; style 4-6 mm long; stigma capitate. Pods 2-jointed, rarely 1-jointed, 0.5-1 x 0.4-0.5 cm, compressed, densely appressed hairy; joints orbicular.

Fl.& Fr. : Aug. - Dec.

Distr.: India, Sri Lanka, Myanmar, Thailand, Indo-China, China, Malaysia, south-eastern Sumatra, N. Australia. Along sandy waste lands. *CNS 1009* (Vandanam), *CNS 2099* (Punnapra).

Desmodium gangeticum (L.) DC. , Prodr. 2: 327. 1825; Wight, Ic. t. 271. 1839; Baker in Hook. f., Fl. Brit. India 2: 168. 1876; Gamble, Fl. Pres. Madras 345. 1918; van Meeuwen, Reinwardtia 6: 249. 1962; Ohashi, Ginkgoana 1: 184. 1973; Britto in Matthew, Fl. Tam. Carnatic 3: 394. 1983; Ramach. & Nair, Fl. Cannanore 137. 1988; Vajravelu, Fl. Palghat Dist. 157. 1990; Sanjappa, Leg. India 153. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 113. 1994; Sivar. & Mathew, Fl. Nilambur 193.1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 139. 1996. *Hedysarum gangeticum* L. , Sp. Pl. 746. 1753. *Desmodium collinum* Wight, Ic. t. 272. 1840.

Erect undershrubs, up to 1.2 m tall; stem angled, hairy when young, glabrescent on ageing. Leaves 1-foliolate, 5-10 x 1-5 cm, ovate to elliptic, base rounded, apex acute, glabrescent above, densely appressed hairy below, often blotched with grey; petiole to 2.5 cm long; stipules to 8 mm long; linear-lanceolate. Flowers white, fascicled in terminal and axillary, 15-25 cm long racemes; pedicels 3-4 mm long; bracts subulate. Calyx campanulate; lobes 1.5-2 mm long, triangular, tomentose without. Corolla c. 4 mm across. Stamens diadelphous. Ovary 3-4 mm long, compressed, hairy without; stigma capitate. Pods 1.2-2.3 x 0.1-0.15 cm, moniliform, 4-7-jointed, reticulate, slightly pubescent with hooked hairs, constricted in ventral suture.

Fl. & Fr. : Sept. - Dec.

Distr. : Tropical Asia, Africa and Australia. Common along lateritic hill slopes.*CNS 1314* (Chengannur).

Desmodium heterocarpon (L.) DC., Prodr. 2:337. 1825; van Meeuwen, Reinwardtia 6: 251. 1962; Ohashi, Ginkgoana 1: 213. 1973; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 249. 1976; Britto in Matthew, Fl. Tam. Carnatic 3: 396. 1983; Ramach. & Nair, Fl. Cannanore 137. 1988; Mani., Fl. Silent Valley 76. 1988; Vajravelu, Fl. Palghat Dist. 157. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 146. 1994; Sivar. & Mathew, Fl.

229A

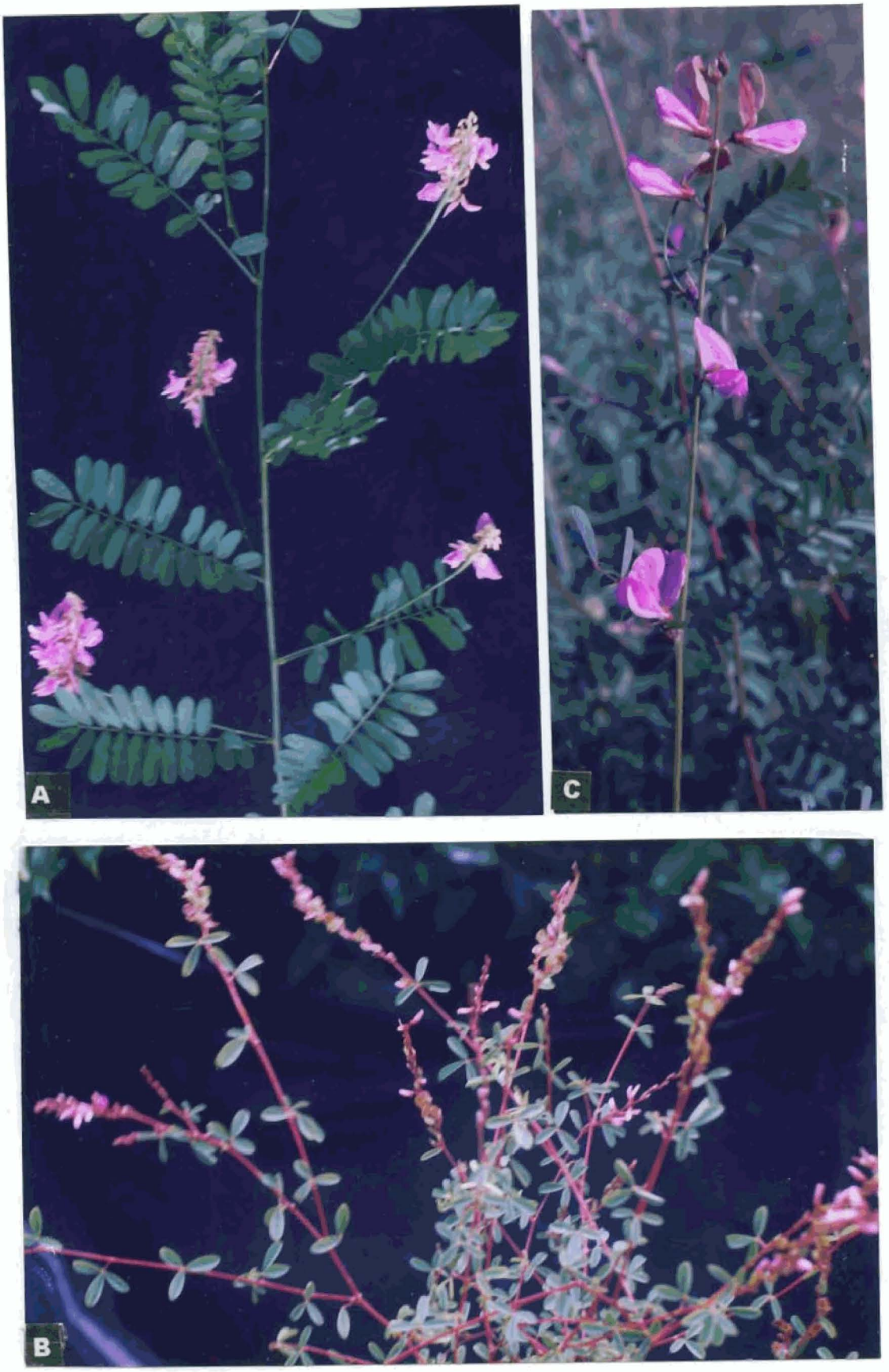


Plate VIII. *A. Abrus precatorius* L.; B. *Desmodium biarticulatum* (L.) Muell.; C. *Tephrosia maxima* (L.) Pers.

Nilambur 193. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 139. 1996. *Hedysarum heterocarpon* L., Sp. Pl. 747. 1753. *Hedysarum polycarpum* Poir. in Lam., Encycl. 6: 413. 1805. *Desmodium polycarpum* (Poir.) DC., Prodr.2: 334. 1825; Wight & Arn., Prodr. 227. 1834; Wight, Ic. t. 406.1840; Baker in Hook. f., Fl. Brit. India 2: 171. 1876; Gamble, Fl. Pres. Madras 346. 1918.

Ascending undershrubs; root stock creeping; branches adpressed hairy. Leaves 3-foliolate; leaflets 1.5-4 x 1-2.2 cm, obovate or broadly elliptic-oblong, base obtuse, apex rounded or retuse, glabrous above, appressed-pubescent below; petiole to 2 cm long; stipules c. 5 mm long; subulate. Racemes terminal, panicled 2.5-4.5 cm long; densely covered with appressed straight hairs. Flowers 5-6 mm long; pedicels 3-5 mm long; bracts c. 3-4 mm long; lanceolate. Calyx-tube 2-2.5 mm long; 2 upper lobes connate, 3-lower narrower, acuminate, longer than tube. Corolla purple; standard 5-6 mm long; obovate-orbicular. Pods 1.2-2 x 0.3-0.4 cm, lower margin indented, upper straight, 5-7-jointed; joints about as broad as long.

Fl. & Fr. : Sept. - Jan.

Distr. : India to Indo-China, Japan, China, Formosa, Malesia. Rare, in open waste lands. *CNS 1960* (Kalavoor)

Desmodium heterophyllum (Willd.) DC., Prodr. 2: 334. 1825; Baker in Hook. f., Fl. Brit. India 2: 173. 1876; 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; Mani. & Sivar., Fl. Calicut 84. 1982; Ramach. & Nair, Fl. Cannanore 138. 1988; Vajravelu, Fl. Palghat Dist. 157. 1990; Sanjappa, Leg. India 155. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 147. 1994; Sivar. & Mathew, Fl. Nilambur 194. 1996; Sasi. & 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. 229. 1840.

Prostrate herbs, up to 40 cm long; branches loosely villous, slender. Leaves 3-foliolate; leaflets 1-2.2 x 0.5-1 cm, ovate-elliptic or obovate, base obtuse, apex rounded,

hairy when young, glabrescent on ageing; petiole to 2 cm long; stipules 2-5 mm long, ovate-lanceolate, striate, ciliate on margins. Flowers in axillary 1-4-flowered racemes; pedicels 6-12 mm long. Calyx tube broad; lobes 2-2.5 mm long, triangular with subulate tip, loosely villous without. Corolla pink, 3-4 mm long. Ovary 1.5-2 mm long, hairy. Pods 1.5-2 x 0.4-0.5 cm, 4-5-jointed, compressed, dorsal suture continuous, ventral constricted.

Fl. & Fr. : Aug. - Nov.

Distr. : Indo-Malesia, China. Very common in open wastelands. *CNS 1335* (Noottavanpara).

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; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 251. 1976; Ramach. & Nair, Fl. Cannanore 139. 1988; Vajravelu, Fl. Palghat Dist. 158. 1990; Sanjappa, Leg. India 160. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 148. 1994; Sivar. & Mathew, Fl. Nilambur 195. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 140. 1996. *Hedysarum pulchellum* L., Sp. Pl. 747. 1753. *Phyllodium pulchellum* (L.) Desv., J. Bot. (Desvaux) Ser. 2, 1: 124, t. 5, f. 24. 1813; Ohashi, Ginkgoana 1: 276. 1973; Britto in Matthew, Fl. Tam. Carnatic 3: 440. 1983. *Dicerma pulchellum* (L.) DC., Ann. Sci. Nat. 4: 236. 1825; Wight, Ic. t. 418. 1840-43.

Undershrubs or shrubs up to 2 m tall; branchlets downy-pubescent. Leaves 3-foliolate; leaflets 2.5-11 x 2-5 cm, ovate, elliptic or ovate-oblong, base subacute, margins wavy, apex obtuse or subacute, glabrescent and subrugose above, finely downy and pale beneath, thin-coriaceous, lateral less than half as long as the terminal, inequilateral; petiole to 2 cm long; stipules c. 5 mm long, ovate. Racemes terminal or axillary, 7-16 cm long; primary bracts 10-18, leafy, 1.2-1.5 x 1.2-1.5 cm, orbicular, each enclosing 1-5 flowers, stipellate; secondary bracts c. 1 mm long, ovate; bracteoles to 2 mm long. Calyx c. 2 mm long, puberulous, teeth lanceolate. Corolla yellowish; standard 4-5 mm long,

obovate; wings c. 4 mm long, elliptic. Pods 4-6 x 3-4 mm, indented on both sutures, sessile; joints usually 2, slightly longer than broad, pubescent. Seeds orbicular.

Fl. & Fr. : Oct. - Feb.

Distr.: India, Sri Lanka, Myanmar, Thailand, Indo-China, Malaysia, China, Taiwan, Ryukyu and N. Australia. In hill slopes. *CNS 1970* (Angadikkal).

Desmodium scorpiurus (Swartz) Desvaux, J. de. Bot. Ser. 2, 1: 122. 1813; Merr., Philip. J. Sci. 5: 81. 1910 & Enum. Philip. Pl. 2: 289. 1923; van Meeuwen, Reinwardtia 6:101. 1961 & 258. 1962; Liu & Chaung, Thaiwania 8: 26, fig. 19. 1962; Ohashi, Ginkgoana 1: 95. 1973; Dhruvan & Mathew, Rheedea 5(2): 177. 1995. *Hedysarum scorpiurus* Swartz, Prodr. Veg. Ind. Occ. 107. 1788.

Slender, trailing herbs up to 1.2 m long; stems clothed with minute hooked hairs. Leaves 3-foliolate; leaflets 1.4-5.2 x 1-2.8 cm, elliptic to ovate, base rounded, apex obtuse, the terminal leaflet often larger, rachis 1.7-6 cm long, minutely hooked hairy; stipules connate, amplexicaul, auriculate at base, acuminate at apex, pubescent and ciliate; stipels c. 2 mm long, subulate. Racemes 5-12 cm long, leaf-opposed, minutely pubescent. Flowers to 5 mm long; pedicels 3-4 mm long, filiform, hairy. Calyx to 3 mm long, campanulate; 2 upper lobes connate except at the 2-toothed apex, others linear-lanceolate. Corolla pink or white; standard c. 4 x 4 mm, broadly obovate, apex emarginate; wings to 3 mm long, elliptic; keels to 4 mm long; clawed, turncate at the apex. Staminal column to 3 mm long; style c. 1 mm long; stigma capitate. Pods to 3 cm long, linear, slightly turgid, indented on both the sutures, 4-7-jointed, densely hooked hairy. Seeds oblong, brown.

Fl. & Fr. : Dec. - Jul.

Distr. : Native of tropical America; introduced and naturalized in the pacific region of Asia and India. A weed along railway line. *CNS 1497* (Chengannur).

Desmodium triflorum (L.) DC. , Prodr. 2: 334. 1825; 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. & Niucols., Fl. Hassan Dist. 251. 1976;

Mani. & Sivar., Fl. Calicut 84. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 399. 1983; Ramach. & Nair, Fl. Cannanore 140. 1988; Mani., Fl. Silent Valley 79. 1988; Vajravelu, Fl. Palghat Dist. 159. 1990; Sanjappa, Leg. India 163. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 149. 1994; Sivar. & Mathew, Fl. Nilambur 197. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 141. 1996. *Hedysarum triflorum* L., Sp. Pl. 749. 1753. *Desmodium triflorum* var. *minus* Wight & Arn., Prodr. 229. 1834; Wight, Ic. t. 292. 1840. ***Nilapulladi.***

Much branched glabrescent prostrate herbs, rooting at nodes. Leaves 3-foliolate; leaflets 0.3-1.5 x 0.3-1.4 cm, obovate, base cuneate, apex turncate or emarginate, lateral leaflets smaller than the terminal one; petiole 1.5 cm long; stipule c. 5 mm long, ovate-lanceolate. Flowers 3-4 mm long, 1-4 together in the axils of leaves; pedicels 4-6 mm long, capillary; bracts c. 2 mm long, ovate, ciliate. Calyx c. 3 mm long, covered with long silky hairs; lobes unequal, lanceolate. Petals pink to violet; standard c. 3 mm long, obovate; wings c. 2 mm long; keels to 4 mm long. Pods 1-1.5 cm long, 3-5-jointed, lower margin deeply indented, upper entire; joints hairy or glabrous, reticulate-veined, longer than broad.

Fl. & Fr. : Most of the seasons.

Distr. : Tropical Asia, Pecific Islands, Australia, Africa and America. A common weed along open waste lands. *CNS 1987* (Kariyilakulangara).

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; van Meeuwen, Reinwardtia 6: 292. 1962; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 256. 1976; Mani. & Sivar., Fl. Calicut 85. 1982; Ramach. & Nair, Fl. Cannanore 141. 1988; Mani., Fl. Silent Valley 79. 1988; Vajravelu, Fl. Palghat Dist. 159. 1990; Sanjappa, Leg. India 162. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 149. 1994; Sivar. & Mathew, Fl. Nilambur 198. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 141. 1996. *Hedysarum triquetrum* L., Sp. Pl. 746. 1753. *Tadehagi triquetrum* (L.) Ohashi, Ginkgoana 1: 296. 1973.

Erect subshrubs to 1 m tall; branches trigonous, ciliate with stiff hairs on angles. Leaves 1-foliolate, 5-15 x 1.5-4 cm, ovate-lanceolate or oblong, base subcordate, apex acuminate, glabrous above and tomentose below; petiole to 3.5 cm long; stipules 1-1.8 x 0.4-0.5 cm, subulate at apex, striated. Racemes terminal, 10-28 cm long; bracts 3-6 x 3-5 mm, subulate; pedicels 4-6 mm long. Calyx c. 4 mm long, campanulate; lobes lanceolate, acuminate. Corolla pink, 6-7 mm long. Stamens monadelphous. Ovary 3-4 mm long, pubescent without; style curved; stigma capitate. Pods 1.8-3.5 x 0.5-0.7 cm, laterally compressed, 5-7-jointed, loosely appressed hairy.

Fl. & Fr. : Aug. - Dec.

Distr. : India, Sri Lanka, Myanmar, Thailand, Indo-china, China, Malaysia, Pacific Islands, New Caledonia, N. Australia. Along road sides and open wastelands. *CNS 1441* (Valiyaveetilkavu).

ERYTHRINA Linnaeus

Sp. Pl. 706. 1753.

Trees; stems armed. Leaves pinnately trifoliolate, sometimes absent at flowering; stipules small; stipels gland-like. Inflorescence teminal or axillary racemes. Flowers red and showy, in pairs or fascicles on the rachis; bracts and bracteoles small. Calyx tube spathaceous or 2-lipped. Corolla long-exserted, the standard much exceeding the wings and keel, reflexed. Stamens 10, vexillary free or connate below, anthers uniform. Ovary stipitate, many-ovuled; style curved; stigma capitate. Pods stipitate, linear, turgid, septate, more or less torulose. Seeds ovoid.

1a. Calyx oblique, spathaceous and splitting; leaflets ovate-rhomboid, apex acute; plants leafless at flowering ..... **E. variegata** var. **orientalis**

1b. Calyx not spathaceous but 2-lipped; leaflets elliptic or ovate, apex obtuse or rounded; leaves present at flowering ..... **E. fusca**

Erythrina fusca Lour., Fl. Cochinch. 427. 1790; Krukoff, J. Arnold Arbor. 53(1): 130. 1972; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 245. 1991. *Erythrina glauca*

Willd., Ges. Naturf. Freunde Berlin, Neue Schriften 3: 428. 1801; Krukoff, Brittonia 3:224. 1939. *Erythrina ovalifolia* Roxb., Fl. Ind. 3: 254. 1832; Wight, Ic. t. 247. 1840; Baker in Hook. f., Fl. Brit. India 2: 189. 1876.

Moderate-sized much branched trees with scattered pale prickles; bark pale brown, thick and fluted. Leaflets 8-15 x 4.5-8 cm, elliptic or ovate, base rounded, apex obtuse or rounded, subcoriaceous, lateral nerves 6-8 pairs; stipels c. 1 mm long, persistent. Flowers crimson, mostly 3-nate on the ferruginous hairy rachis of the racemes; bracts and bracteoles c. 2.5 x 2 mm, ovate; pedicels 8-15 mm long. Calyx 1.4-1.7 cm long, campanulate, ferruginous pubescent, often irregularly splitting. Standard 3.5-4.5 long, rounded-rhomboid, the claw c. 1.5 cm long; wings c. 2 x 1.3 cm, obliquely obovate; keels c. 3 x 1.5 cm, ovate-falcate. Ovary long-stipitate; ovules many. Pods 8-15 x 1.2-1.8 cm, linear, torulose, beaked, adpressed hairy, 5-8-seeded. Seeds 1-1.5 x 0.5-0.8 cm, oblong-ellipsoid, blackish.

Fl. & Fr. : Jan. - May.

Distr. : West Indies, Central America, Tropical South America, India, Malaysia, Indonesia, Philippines and other Pacific Islands. Rare, along banks of back waters. *CNS 1963* ((Punnamada), *M.S. Swaminathan 95645* (MH) (Thanneermukkom).

Erythrina variegata L., Herb. Amb. 10. 1754 & Amoen. Acad. 4: 122. 1759; Krukoff, J. Arnold Arbor. 53:132. 1972; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 251. 1991, var. **orientalis** (L.) Merrill, Interpr. Herb. Amboin. 276. 1917; Maheswari, Bull. Bot. Surv. India 3: 46. 1961; Bullock, Kew Bull. 20: 294.1966; Mani. & Sivar., Fl. Calicut 90. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 406. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 136. 1988; Vajravelu, Fl. Palghat Dist. 161. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 150. 1994. *Erythrina corollodendron* L. , var. *orientalis* L., Sp. Pl. 706. 1753. *Erythrina indica* Lam., Encycl. 2: 391. 1786; Baker in Hook. f., Fl. Brit. India 2: 188. 1876; Gamble, Fl. Pres. Madras 353. 1918; Ramach. & Nair, Fl. Cannanore 142. 1988. ***Mouricou, Muricu*** Rheede, Hort. Malab. 6: 13-14, t. 7. 1686. ***Muricu.***

Deciduous trees, usually with dark-coloured prickles; shoots at first densely tomentose, bark smooth and greenish after the papery exfoliation. Leaves 3-foliolate; leaflets 5-15 x 5.5-17 cm, ovate-rhomboid, base turncate or rounded, apex acute or acuminate, more or less stellate pubescent when young, glabrescent with age; stipels globose. Flowers in teminal 10-28 cm long racemes; pedicels to 1 cm long; bracts 2-3 mm long, oblong. Calyx to 2 cm long, spathaceous, with fugacious stellate tomentum, split on one side, recurved, apically 5-toothed. Corolla c. 5 cm long, bright red; standard much exserted, c. 5 x 2 cm, elliptic-oblong; wings and keels much smaller, unequal. Stamens 10, the vexillary stamen free or connate at base, others connate to middle. Ovary long-stipitate, with stellate pubescence. Pods 10-18 x 2-2.5 cm, linear to narrowly oblong, turgid, woody; tomentose when young then glabrous on maturity. Seeds 5-8, 1.5-1.8 cm long, purplish-red.

Fl. & Fr. : Mar. - Apr.

Distr. : Throughout the tropics. Commonly grown as a fence plant, sometimes found to run wild. *CNS 2162* (Madakkal).

FLEMINGIA Roxburgh ex W. Aiton et W.T. Aiton

Hortus Kew. ed. 2, 4: 349. 1812 (*nom. cons.*).

Shrubs or subshrubs. Leaves 1 or 3-foliolate, gland-dotted below; stipules striate; stipels 0. Flowers in axillary or terminal simple or branched racemes. Bracts foliaceous or narrow; bracteoles absent. Calyx campanulate, lobes 5, lanceolate, unequal. Corolla exserted or not, petals clawed; standard obovate to orbicular, auricled at base, wings obliquely obovate-oblong, adhering to keel; keels straight or incurved. Stamens 10, diadelphous (9+1); anthers uniform. Ovary subsessile, ovules 2; styles incurved, thickened apically; stigma capitate. Pods oblong-ovoid, turgid, often covered with red glands, 1-2-seeded.

1a. Leaves unifoliate; bracts broadly ovate, wider than long, enclosing the short few-flowered cymes; pods not covered with powdery red coating, petiole not winged ..... **F. strobilifera**

1b. Leaves 3-foliolate; bracts lanceolate, never wider than long, not enclosing the inflorescence; pods covered with powdery red coating; petiole narrowly winged ..... **F. semialata**

Flemingia semialata Roxb., Fl. Ind. 3: 338. 1832; Wight, Ic. t. 326. 1840; Gamble, Fl. Pres. Madras 378. 1918; Mani., Fl. Silent Valley 82. 1988; Vajravelu, Fl. Palghat Dist. 161. 1990; Sanjappa, Leg. India 178. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 151. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 143. 1996. F. *prostrata* Roxb. Fl. Ind. 3: 338. 1832; *Flemingia congesta* Roxb. var. *semialata* (Roxb.) Baker in Hook. f., Fl. Brit. India 2: 229. 1876, p.p. *Moghania prostrata* (Roxb.) Mukh., Bull. Bot. Soc. Bengal 6: 19. 1953.

Erect shrubs; branchlets trigonous, adpressed tomentose. Leaflets subequal, 5-14 x 2-5 cm, elliptic-lanceolate, base cuneate to rounded, apex acute to acuminate, tomentose along the nerves on both surfaces or glabrescent above, basally 3-nerved; petiole to 7 cm long, narrowly winged. Racemes axillary, clustered or single, 2.5-5.5 cm long, villous. Flowers 7-10 mm long; pedicels c. 2 mm long; bracts 4-7 mm long, lanceolate. Calyx lobes linear-lanceolate, the lower longest, much exceeding the tube, pubescent. Petals reddish; standard 7-8 mm long, oblong-obovate; wings and keels long-clawed. Pods 0.8-1.2 x 0.4-0.6 cm, oblong, turgid, covered with powdery red coating.

Fl. & Fr. : Oct. - Feb.

Distr. : Tropical Asia. Along hill slopes. *CNS 2139* (Nootavanpara).

Flemingia strobilifera (L.) R. Br. in Ait. f. , Hort. Kew. ed. 2, 4:350. 1812; Wight, Ic. t. 262. 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; Ramach. & Nair, Fl. Cannanore 144. 1988; Mani., Fl. Silent Valley 83. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 360. 1991; Sanjappa, Leg. India 178. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 151. 1994; Sivar. & Mathew, Fl. Nilambur 213. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 143. 1996. *Hedysarum strobiliferum* L., Sp. Pl. 746. 1753. H. *bracteatum* Roxb., Fl. Ind. 3: 351. 1832. *Flemingia bracteata* (Roxb.) Wight, Ic. t. 286.

1840; Gamble, Fl. Pres. Madras 378. 1918; Vajravelu, Fl. Palghat Dist. 161. 1990. *Moghania strobilifera* (L.) J.St. Hill. ex. O. ktze., Rev. Gen. Pl. 1: 199. 1891; Nooteb., Reinwardtia 5: 433. 1960.

Erect shrubs, upto 1 m tall; branchlets tomentose. Leaves 1-foliolate, 6-15 x 2.5-7 cm, ovate, elliptic to broadly lanceolate, base broadly cuneate or rounded, apex acute to acuminate, glabrous above, pubescent or hairy on the nerves beneath; lateral nerves 5 or 6 pairs; petiole 1-1.5 cm long, tomentose; stipules to 1 cm long, linear-lanceolate, scarious. Racemes axillary and terminal, simple or branched, flexuous, tomentose; bracts to 2 x 2.5 cm, ovate-cordate, folded, membranous, each enclosing short few-flowered cymes. Flowers c. 1 cm long; pedicels c. 2 mm long. Calyx-tube c. 2 mm long; lobes 6-7 mm long, lanceolate. Petals white; standard 6-7 mm long, oblong-obovate; wings oblanceolate; keels obliquely oblong. Pods enclosed by the bracts. 6-10 x 4-0.6 cm, oblong, pubescent.

Fl. & Fr. : Feb. - Mar.

Distr.: Tropical Asia and America. In wastelands. *CNS 2371* (Panayannarkavu at Thazhakkara).

GEISSASPIS R. Wight & Arnott

Prodr. 217. 1834.

Geissaspis cristata Wight & Arn., Prodr. 218. 1834; Baker in Hook. f., Fl. Brit. India 2: 141. 1876; Gamble, Fl. Pres. Madras 324. 1918; Mani. & Sivar., Fl. Calicut 83. 1982; Ramach. & Nair, Fl. Cannanore 145. 1988; Vajravelu, Fl. Palghat Dist. 162. 1990; Sanjappa, Leg. India 181. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 151. 1994; Sivar. & Mathew, Fl. Nilambur. 175. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 144. 1996.

Slender prostrate herbs on marshy areas, rooting at lower nodes. Leaves even-pinnate; leaflets 4, 0.5-1 x 0.2-0.6 cm, obovate, obtuse to emarginate at tip, sessile; petiole 0.5-1 cm long; stipules c. 6 mm long, ovate, spurred at base, ciliate along margins. Flowers in long-peduncled spikes, concealed in closely imbricating bracts; peduncle to 4.5

cm long; bracts 0.8-1 cm diam., reniform, reticulate, imbricate, persistent, margins with many long stiff brown cilia. Calyx c. 2.5 mm long, deeply 2-lipped; upper lip entire, lower 3-toothed. Corolla 3-5 mm long, purplish; standard to 5 x 3 mm, broadly obovate; wings to 3 x 1.5 mm, obliquely obovate; keel incurved, obtuse. Stamens monadelphous; filaments free in the upper portion. Ovary c. 1 mm long, suborbicular; style incurved; stigma minute. Pods 1-2-jointed; joints c. 4 x 3 mm, orbicular, reticulately veined, beaked. seed c. 2.5 mm long, brown.

Fl. & Fr. : Aug. - Oct.

Distr. : Peninsular India, Sri Lanka and Burma. Common in moist rice fields and marshy fields. *CNS 1366* (Pallippuram).

GLIRICIDIA Humboldt, Bonpland *et* Kunth
Nova. Gen. Sp. ed. 6: fol. 309. 1824.

Gliricidia sepium (Jacq.) Kunth ex Walp., Repert. 1: 679. 1842; Blatter *et al.*, Beautif. Ind. Trees (ed. 2) 87. 1954; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 268. 1976; Mani. & Sivar., Fl. Calicut 89. 1982; Britto in Matthew, Fl. Tam. Carnatic. 3: 411. 1983; Vajravelu, Fl. Palghat Dist. 178. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 143. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 152. 1994; Sivar. & Mathew, Fl. Nilambur 220. 1996. *Robinia sepium* Jacq., Enum. Syst. Pl. 28. 1760. *Gliricidia maculata* (H.B.K.) Walp., Repert. 1: 679. 1842. ***Seemakonna.***

Deciduous small trees; bark greyish or brownish with white lenticels. Leaves imparipinnate; leaflets 7-17, opposite, 2-6 x 1-3 cm, ovate to elliptic or lanceolate, base rounded or acute, apex acute or acuminate, thinly coriaceous; stipules c. 2 mm long, ovate, pubescent. Flowers racemose, many-flowered in the axils of fallen leaves. Calyx-tube 4-6 mm long, campanulate, truncate; lobes obscure. Petals exserted, pinkish-white, 1.5-2 cm long, clawed; standard orbicular; wing oblong, auricled; keels obovate, incurved, apex obtuse. Stamens 9+1; filaments unequal; anthers uniform. Stigma capitate. Pods 8-15 x 1-1.8 cm, compressed. Seeds c. 1 x 0.8 cm, lenticular, compressed, brown.

Fl.& Fr. : Jan. - Mar.

Distr.: Native of South America. Introduced in this part as a green manure, now widely cultivated in fields and along fances. *CNS 2186* (Andhakaranazhi).

INDIGOFERA Linnaeus

Sp. Pl. 751. 1753.

Herbs or subshrubs usually with appressed, laterally attached hairs, sometimes mixed with basifixed hairs. Leaves imparipinnate, or 1-3-foliolate; leaflets alternate to opposite; stipules small and setaceous; stipels setaceous or 0. Flowers in axillary spikes or racemes, rarely solitary. Bracts caducous; bracteoles 0. Calyx campanulate, lobes 5, unequal, lower one larger. Corolla smaller or longer than calyx; petals clawed; standard ovate to orbicular; wings oblong, slightly adherent to keel; keels erect, obtuse, spurred. Stamens 9+1, anthers uniform, gland-tipped. Ovary subsessile, 1-2 or many-ovuled; style incurved; stigma capitate or penicillate. Pods linear, cylindric or 4-gonous, sepate between seeds. Seeds 1-2 or many, globose to cylindric, estrophiolate.

1a. Leaves simple; pods semilunate, echinate ..... **I. nummulariifolia**

1b. Leaves compound; pods linear, oblong or subglobose, not echinate.

2a. Flowers solitary; pedicels filiform, c. 4 mm long ..... **I. uniflora**

2b. Flowers in racemes; pedicels less than 2 mm long.

3a. Leaves 3-foliolate, leaflets gland-dotted ..... **I. prostrata**

3b. Leaves pinnately 5-many-foliolate or few only 3-foliolate; leaflets not gland-dotted.

4a. Pods oblong or subglobose, 3-4 mm long, 2-seeded ..... **I. linnaei**

4b. Pods linear, over 1 cm long, more than 4-seeded.

5a. Prostrate herbs; racemes up to 2 cm long, 2-5-flowered .... **I. glabra**

5b. Erect herbs or subshrubs; racemes more than 3 cm long, many-flowered.

6a. Leaflets brown hirsute; pods subtetragonous, densely hirsute ..... **I. hirsuta**

6b. Leaflets glabrous; pods terete, glabrous ..... **I. tinctoria**

Indigofera glabra L., Sp. Pl. 751. 1753; Gamble, Fl. Pres. Madras 311. 1918; Ramach. & Nair, Fl. Cannanore 146. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 133. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 153. 1994. *Indigofera pentaphylla* Murr., Syst. Veg., ed. 13, 564. 1774, non Burch. ex Harvey & Sond., 1862; Wight, Ic. t. 385. 1840; Baker in Hook. f., Fl. Brit. India 2: 95. 1876. *Indigofera fragrans* Retz., Obs. Bot. 4: 29. 1786.

Annual diffuse herb; stems many, sparsely hairy all over, often reddish. Leaves imparipinnate; leaflets 3-7, opposite, 5-15 x 3-10 mm, elliptic to suborbicular or obovate, base rounded to acute, apex obtuse, subappressed-pubescent on both surfaces; stipules c. 5 mm long, acicular, ciliate. Inflorescence axillary, racemose, 2-5-flowered; peduncles capillary, 0.7-2 cm long. Flowers c. 5 mm long, reddish. Calyx c. 2 mm long, pubescent; lobes setaceous. Petals reddish-pink; standard 3-3.5 mm long. Pods 1.5-2 cm long, c. 1.5 mm diam., linear, subtetragonous, 8-12-seeded. Seeds c. 1 mm across, cubiform, yellowish with dark motlings.

Fl. & Fr. : Jul. - Dec.

Distr. : Throughout India, Sri Lanka and tropical Africa. Common in sandy waste areas. *CNS 1010* (Vandanam).

Indigofera hirsuta L., Sp. Pl. 751. 1753; Baker in Hook. f., Fl. Brit. India 2: 98. 1876; Gamble, Fl. Pres. Madras 312. 1918; Gillett, Kew Bull. 14: 290. 1960; Verdc., Kew Bull. 24: 500. 1970; Mani & Sivar., Fl. Calicut 88. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 420. 1983; de Kort & Thijsse, Blumea 30: 121. 1984; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 137. 1988; Ramach. & Nair, Fl. Cannanore 146. 1988; Vajravelu, Fl. Palghat Dist. 164. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 133. 1991; Sanjappa, Leg. India 191. 1992; Mohanna & Henry, Fl. Thiruvananthapuram 153. 1994;

Sivar. & Mathew, Fl. Nilambur 202. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 145. 1996. ***Kattu-tagera*** Rheede, Hort. Malab. 9: 55, t. 30. 1689.

Annual erect herbs to 1 m tall, whole plant densely brown hirsute. Leaves imparipinnate; leaflets 5-11, opposite, 1-2 x 0.5-1 cm, elliptic-oblong or obovate, base rounded to attenuate, apex obtuse, hirsute on both sides; stipules 0.8-1 cm long, filiform, hairy. Flowers c. 5 mm long, in axillary many-flowered, 4-13 cm long, dense racemes. Calyx tube c. 1 mm long; lobes c. 4 mm long, subulate, hirsute. Petals brick-red; standard to 4 mm long, obovate, pubescent without. Ovary 2-3 mm long, cylindric, densely hairy; ovles many; style slightly curved; stigma capitate. Pods reflexed, 1-2 cm long, c. 2 mm wide, linear, subtetragonous, densely hirsute. Seeds 5-8, angular, pitted.

Fl. & Fr. : Sept. - Dec.

Distr. : Pantropical. Common on road sides. CNS 2068 (Pallarimangalam).

Indigofera linnaei Ali, Bot. Notiser 111: 549. 1958; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 257. 1976; Mani. & Sivar., Fl. Calicut 88. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 421. 1983; Sanjappa, Reinwardtia 10: 225. 1985; Ramach. & Nair, Fl. Cannanore 147. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 120. 1991; Sanjappa, Leg. India 192. 1992; Sasi. & Sivar., Fl. Pl. Trissur For. 145. 1996. *Hedysarum prostratum* L., Mant. 1: 102. 1767. *Indigofera enneaphylla* L., Mant. 2: 272. 1771, *nom. illeg.;* Wight, Ic. t. 403. 1840; Baker in Hook. f., Fl. Brit. India 2: 94. 1876; Gamble, Fl. Pres. Madras 309. 1918. *Indigofera prostrata* (L.) Domin, Bibl. Bot. Stuttg. 187. 1926, non Willd., 1803.

Trailing, branched, slender annual or perennial herbs with woody rootstock, sparsely grey-pubescent. Leaves imparipinnate; leaflets 5-9, subsessile, 3-8 x 2-4 mm, oblong-obovate, base cuneate, apex obtuse to emarginate, appressed pubescent on both surfaces; stipules c. 3 mm long, ovate, cuspidate, scarious. Flowers 3-4.5 mm long, in 10-15-flowered axillary subcapitate racemes, 1-1.5 cm long; bracts c. 2 mm long, deltoid, hyaline. Calyx-tube c.1 mm long; lobes 2-3 mm long, setaceous. Corolla exserted, red; standard obovate; wings and keels oblong. Staminal sheath to 3 mm; style apically

incurved. Pods 3-4 x 1.5-2.5 mm, oblong-cylindrical or subglobose, adpressed hairy. Seeds 2.

Fl. & Fr. : Aug. - Oct.

Distr. : Indo-Malesia to Australia and West Africa. Common in waste lands near sea shore. *CNS 1984* (Alappuzha beach).

Indigofera nummulariifolia (L.) Livera ex Alston in Trimen, Handb. Fl. Ceylon 6: 72. 1931; Gillett, Kew Bull., Addit. Ser. 1: 8. 1958; Britto in Matthew, Fl. Tam. Carnatic 3: 424. 1983; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 118. 1991; Mohanan & Henry , Fl. Thiruvananthapuram 154. 1994. *Hedysarum nummulariifolium* L., Sp. Pl. 746. 1753, *'nummularifolium'*. *Indigofera echinata* Willd., Sp. Pl. 3: 1222. 1802; Wight & Arn., Prodr. 198. 1834; Wight, Ic. t. 316. 1840; Baker in Hook. f., Fl. Brit. India 2: 92. 1876; Gamble, Fl. Pres. Madras 308. 1918. *Onobrychis rotundifolia* Desv., J. Bot. 3: 84. 1814 (Fig. 19).

Herbaceous annuals; stem usually prostrate, spreading, sometimes rooting at the nodes. Leaves simple, 1.2-2 x 0.8-1.5 cm, suborbicular to obovate, base cuneate, apex obtuse and apiculate, subglabrous above, appressed-pubescent and gland-dotted below; petiole c. 1 mm long; stipules 2-3 mm long, lanceolate-subulate. Inflorescence axillary, racemose, 6-15-flowered, 1.8-3 cm long. Flowers 3-3.5 mm long; bracts subulate. Calyx c. 2.5 mm long, with linear lobes, hispidly hairy. Petals reddish; standard c. 2.5 mm long, elliptic, pubescent without. Ovary c. 1 mm long; ovule 1 or 2. Pod indehiscent, 5-7 mm long, reniform to semilunate, beset with hooked spines, 1(-2)-seeded. Seeds 2-2.5 mm long, oblong-subreniform.

Fl. & Fr. : Sept. - Feb.

Distr. : Widespread in India, Sri Lanka, Madagascar, and Tropical Africa. Rare, in lateritic hill slopes. *CNS 2230* (Koorithara kavu at Chathiyara).

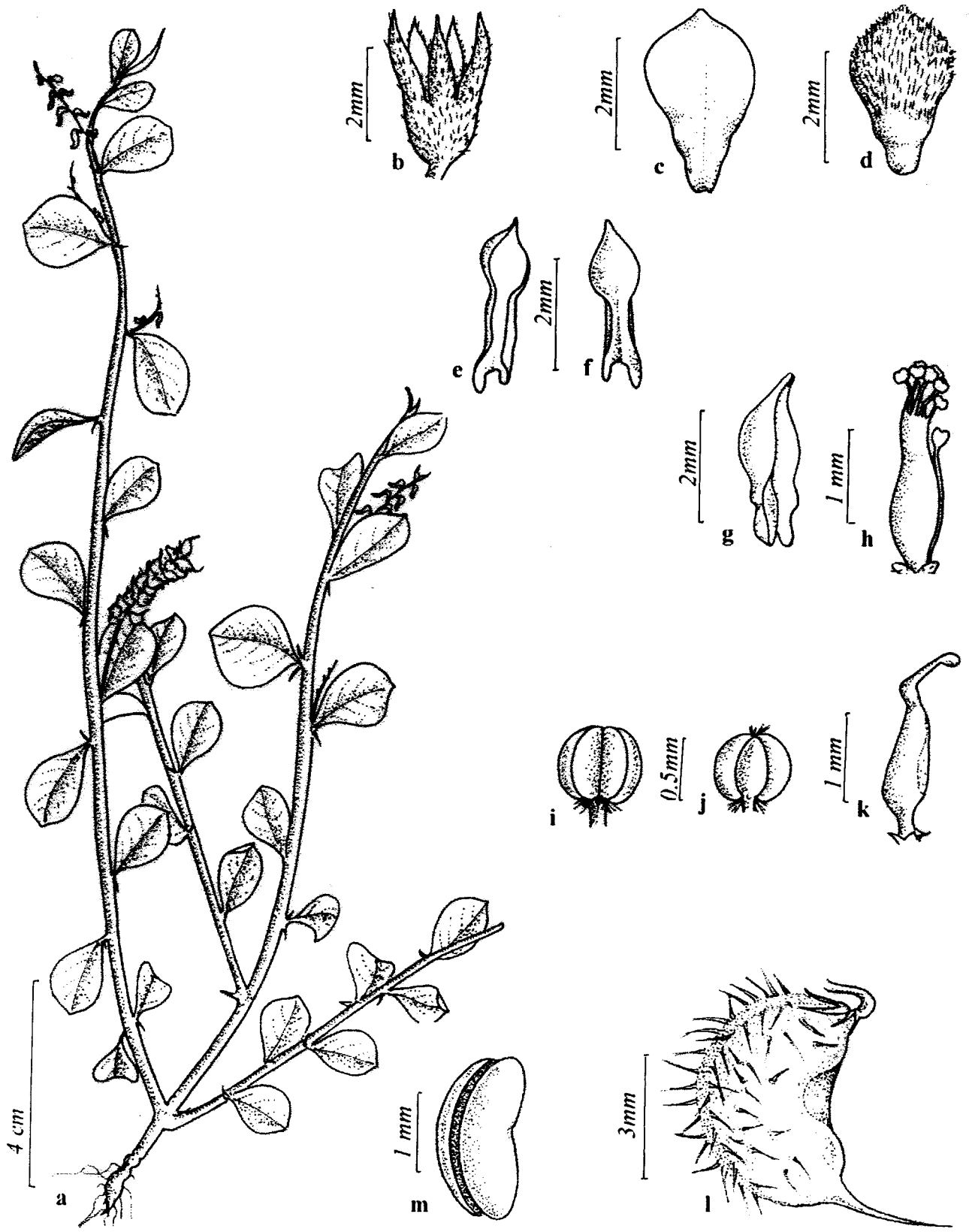


Fig. 19. *Indigofera nummulariifolia* (L.) Livera ex Alston: a. Habit; b. Calyx ; c & d. Standard petal-ventral and dorsal views; e. & f. Wing petals; g. Keel petal; h. Staminal column; i & j. Anthers - ventral and dorsal views; k. Pistil; l. Pod; m. Seed.

Indigofera prostrata Willd., Sp Pl. 3: 1226. 1803; Gamble, Fl. Pres. Madras 310. 1918; Sant., Rec. Bot. Surv. India 16(ed. 3) : 55. 1967; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 257. 1976; Britto in Matthew, Fl. Tam. Carnatic 3: 427. 1983. Ramach. & Nair, Fl. Cannanore 147. 1988; Vajravelu, Fl. Palghat Dist. 164., 1990; Sivar. & Mathew, Fl. Nilambur 203. 1996. *Indigofera trifoliata* auct. non L.,1753; Baker in Hook. f., Fl. Brit. India 2: 96. 1876, p.p.

Prostrate spreading branched herbs; stems appressed pubescent. Leaves 3-foliolate; leaflets 0.8-1.8 x 0.4-0.8 cm, obovate or elliptic-obovate, base cuneate, apex obtuse, apiculate, appressed-pubescent, gland-dotted beneath; petiole 0.8-1.3 cm long; stipules subulate. Racemes axillary, c. 5 mm long, 3-6-flowered. Flowers pink or brick-red; pedicels c. 2 mm long. Calyx-tube c. 0.5 mm long; lobes c. 1 mm long, setaceous. Corolla exserted; standard c. 5 mm long, obovate; wings oblong; keels to 4 mm long. Staminal sheath c. 3 mm long. Pods 1-1.5 cm long, terete, slender, deflexed, slightly winged, appressed-pubescent. Seeds 4-8, oblong.

Fl. & Fr. : Oct. - Jan.

Distr. : Himalaya, India, Sri Lanka, S.E. Asia, China, Japan, Malesia and Australia. Lateritic hill slopes. *CNS 2322* (Chathiyara).

Indigofera tinctoria L., Sp. Pl. 751. 1753; Wight & Arn., Prodr. 202. 1834; 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; Ramach. & Nair, Fl. Cannanore 148. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 137. 1988; Vajravelu, Fl. Palghat Dist. 165. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 128. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 154. 1994. *Indigofera indica* Lam., Encyl. Menth. 3: 245. 1789. *Indigofera sumatrana* Gaertn., Fruct. 2: 307, t. 148. 1791. ***Ameri*** Rheede, Hort. Malab. 1: 101-102, t. 54. 1678. ***Neelaamari.***

Suffrutescent herbs, to 1.5 m tall; stem erect, appresed-pubescent. Leaves pinnately 5-13-foliolate; leaflets opposite, 5-22 x 5-12 mm, elliptic to obovate, base and apex rounded, darkening on drying; stipules c. 2 mm long, subulate. Inflorescence

axillary, spicate-racemose, many-flowered. Flowers 5-7 mm long, red; pedicels c. 1 mm long. Calyx 2-3 mm long, pubescent; lobes narrow lanceolate, acuminate. Petals reddish; standard c. 4 mm long, suborbicular. Ovary 8-12-ovuled, hairy. Pods 2-3 cm long, c. 2 mm wide, linear, straight or slightly curved, 8-12-seeded.

Fl. & Fr. : Aug. - Dec.

Distr. : Wide spread in Old World Tropics and introduced in America. This species was formerly a major source of blue dye. *CNS 1366* (Harippad).

Indigofera uniflora Buch.-Ham. ex Roxb., Fl. Ind. 3: 374. 1832; Wight, Ic. t. 333. 1840; Baker in Hook. f., Fl. Brit. India 2: 94. 1876; Gamble, Fl. Pres. Madras 309. 1918; Mani. & Sivar., Fl. Calicut 88. 1982; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 137. 1988; Vajravelu, Fl. Palghat Dist. 165. 1990; Sanjappa, Leg. India 198. 1992; Sasi. & Sivar., Fl. Pl. Thrissur For. 146. 1996. ***Tsjovanna-manneli*** Rheede, Hort. Malab. 9: t. 38. 1689.

Prostrate herbs with slender elongate much branched reddish stem. Leaves 3-5-foliolate; leaflets to 7 x 3 mm, linear-oblong, apex acute, minutely adpressed hairy; stipules minute, cauducous. Flowers usually solitary in the axils; pedicel to 4 mm long, slender filiform. Calyx lobes lanceolate, subequal, sparsely hairy. Petals red, clawed; standard obovate; wings slightly coherent with keels. Stamens 9+1. Ovary sessile. Pods 1-1.3 cm long, linear, straight. Seeds 4-7.

Fl. & Fr. : Jul. - Oct.

Distr. : South West India. Endemic. Rare. In sandy sea coasts. *CNS 2242* (Mararikkulam north).

MUCUNA Adanson

Fam. 2: 325, 579. 1763 *(nom. cons.)*.

Mucuna pruriens (L.) DC., Prodr. 2: 405. 1825; Baker in Hook. f. Fl. Brit. India 2: 187. 1876; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 259. 1976; Mani. & Sivar., Fl. Calicut

92. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 435. 1983; Wilmot-Dear, Kew Bull. 39:61. 1984 & 42: 40. 1987; Ramach. & Nair, Fl. Cannanore 149. 1988; Nicols., Suresh & Mani., An Intepr. Hort. Malab. 138. 1988; Mani., Fl. Silent Valley 84. 1988; Vajravelu, Fl. Palghat Dist. 167. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 262. 1991; Sanjappa, Leg. India 217. 1992; Sivar. & Mathew, Fl. Nilambur 216. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 147. 1996. *Dolichos pruriens* L. in Stickman, Diss. Herb. Ambion. 23. 1754 & Syst. Nat. (ed. 10), 1162. 1759. *Mucuna prurita* Hook., Bot. Misc. 2: 348. 1831, *nom. superfl.:* Gamble, Fl. Pres. Madras 356. 1918. *Carpopogon capitatum* Roxb., Fl. Ind. 3: 284. 1832. ***Nai-corana*** Rheede, Hort. Malab. 8: t. 35. 1688.

Large climbers; branchlets densely clothed with rigid hairs. Leaves 3-foliolate; leaflets 5-13x 2.5-8 cm, the terminal leaflets ovate-rhomboid or elliptic, the lateral ones broadly ovate, base rounded or truncate, apex obtuse or acute, adpressed pubescent; petiole to 10 cm long; stipules c. 4 mm long, linear; stipels setaceous. Flowers c. 3.5 cm long, in axillary tomentose, pendulous racemes; pedicels 2-4 mm long. Calyx-tube 4-7 mm long, pubescent, 4-lobed. Petals dark purplish; standard 2-2.5 x 1.5-2 cm, ovate. Anthers dimorphous, alternately dorsifixed and basifixed. Pods 5-7.5 x 1.2-1.5 cm, linear-oblong, somewhat s-shaped, turgid, densely covered with shining irritant bristly hairs. Seeds 4-6, to 8 x 7 mm , ovoid, brown or black.

Fl. & Fr. : Oct. - Apr.

Distr. : India, Sri Lanka and Burma. In open wastelands. *CNS 2253* (Thottappally).

PONGAMIA Adanson

Fam. Pl. 2: 322, 593. 1763 (*nom. cons.).*

Pongamia pinnata (L.) Pierre, Fl. Forest. Cochinch. Sub. t. 385. 1899; Thoth., Bull. Bot. Surv. India 3: 418. 1962; Verdc., Kew Bull 32: 250. 1977; Thoth. & Nair, Taxon 30:44. 1981; Mani. & Sivar., Fl. Calicut 79. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 441. 1983; Ramach. & Nair, Fl Cannanore 151. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 140. 1988; Vajravelu, Fl. Palghat Dist. 167. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 225. 1991; Sanjappa, Leg. India 230. 1992; Mohanan & Henry,

Fl. Thiruvananthapuram 156. 1994; Sivar. & Mathew, Fl. Nilambur 224. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 148. 1996. *Cytisus pinnatus* L., Sp. Pl. 741. 1753. *Galedupa indica* Lam., Encyl. 2: 594. 1786. *Pongamia glabra* Vent., Jard. Malm. 28, t. 28. 1803; Wight., Ic. t. 59. 1838; Baker in Hook. f., Fl. Brit. India 2: 240. 1876; Gamble, Fl. Pres. Madras 385. 1918. *Derris indica* (Lamk.) Bennet, J. Bombay Nat Hist. Soc. 68: 303. 1971. ***Pongam, Minari*** Rheede, Hort. Malab. 6: 5-6, t. 3. 1686. ***Peenari***.

Small to medium sized trees; bark grey, mottled with brown, dull yellow inside. Leaves imparipinnate, to 20 cm long; leaflets 3-9, opposite, 3-8 x 2-4 cm, elliptic-oblong, base rounded to broadly attenuate, apex acuminate, glabrous and glossy above; petiole 5-7 mm long. Flowers in axillary to terminal racemose panicles; pedicels 3-5 mm long. Calyx 3-4 mm long, companulate, turncate to slightly 5-toothed, rufous hairy without. Corolla pinkinsh-white, exserted. 0.6-1 cm long; standard to 1 cm long, orbicular; wings oblong, adherent to keel; keels obtuse. Stamens 10, monadelphous. Ovary 5-6 mm long, oblong, densely hairy without; style incurved; stigma capitate. Pods 3-5 x 2-2.5 cm, obliquely oblong or elliptic, attenuate at both ends, compressed. Seed usually 1 in a pod, c. 2 x 1 cm, reniform, compressed, brown.

Fl. & Fr. : Jan. - Mar.

Distr. : S.E. Asia, N. Australia and Polynesia. Common along the banks of rivers. *CNS 2568* (Kuttamangalam).

PSEUDARTHRIA R. Wight *et* 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 im Matthew, Fl. Tam. Carnatic 3: 442. 1983; Ramach. & Nair, Fl. Cannanore 151. 1988; Vajravelu, Fl. Palghat Dist. 168. 1990; Sanjappa, Leg. India 230. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 156. 1994; Sivar. & Mathew, Fl. Nilambur 199. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 149. 1996.

Hedysarum viscidum L., Sp. Pl. 747. 1753. *Desmodium viscidum* (L.) DC., Prodr. 2: 336. 1825.

Viscid pubescent subshrubs up to 75 cm tall. Leaves 3-foliolate; terminal leaflet 5-8 x 4-6 cm, ovate-rhomboid; laterals 3-4 x 2-3.5 cm, obliquely ovate, base cuneate or obtuse, apex acute, glabrescent above and densely woolly below; petioles 4-6 cm long; stipules 5-6 mm long, subulate. Flowers in axillary or terminal, often branched racemes; bracts and bracteoles 4-5 mm long, subulate, hairy. Calyx-tube 1-1.5 mm long; lobes 2-3 mm long, subulate, hairy. Corolla purplish; standard 4-5 mm long, ovate-obtuse. Stamens 9+1; staminal sheath c. 4 mm long. Ovary 3.5-4 mm long, terete, densely pubescent without; style subulate, incurved; stigma capitate. Pods 1-2 x 0.4-0.5 cm, linear-oblong, compressed, pubescent with hooked hairs. Seeds 4-6, reniform.

Fl. & Fr. : Oct. - Dec.

Distr. : Indo-Malesia and Jamaica. In open waste lands. *CNS 1959* (Mavelikkara).

Widely used in Indian medicine against rheumatism, fever, asthma and piles.

PTEROCARPUS N.J. Jacquin

Sel. Stirp. 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; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 261. 1976; Britto in Matthew, Fl. Tam. Carnatic 3: 445. 1983; Ramach. & Nair, Fl. Cannanore 152. 1988; Vajravelu, Fl. Palghat Dist. 168. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 223. 1991; Sanjappa, Leg. India 232. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 156. 1994; Sivar. & Mathew, Fl. Nilambur 187. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 149. 1996. *Pterocarpus bilobus* Roxb. ex G. Don, Gen. Hist. 2: 376. 1832. *Lingoum marsupium* (Roxb.) Kuntze, Rev. Gen. 1: 193. 1891. ***Venga.***

Trees; bark brown or greyish-brown, exudes a red sap when cut. Leaves imparipinnate; leaflets 5-7, 4-10 x 3-6 cm, oblong or elliptic-oblong, base rounded or

broadly attenuate, apex retuse or obtuse, coriaceous, glabrous and glossy above and glaucous beneath; lateral nerves many, parallel; petiolule to 1 cm long. Flowers in terminal large panicles of racemes. Calyx 6-8 mm long, campanulate; lobes unequal, upper two broader, lower 2 smaller, all densely black pubescent without. Corolla bright yellow, sweet-scented, curled, 1-1.5 cm long. Stamens 10, monadelphous. Ovary 5-6 mm long; oblong, densely balck pubescent without; stigma truncate. Pods 3.5-4.5 cm, orbicular, laterally compressed, broadly winged; stripe 7-10 mm long. Seeds 1 or rarely 2 inside a fibrous seed coat.

Fl. & Fr. : Apr. - Aug.

Distr. : Peninsular India and Sri Lanka. Planted as avenue tree. *CNS 2400* (Cherthala).

PUERARIA A.P. de Candolle

Ann. Sci. Nat. (Paris) 4: 97. 1825.

Pueraria tuberosa (Roxb. ex Willd.) DC., Ann. Sci. Nat. (Paris) 4: 97. 1825; Wight, Ic. t. 412. 1840; Baker in Hook. f., Fl. Brit. India 2: 197. 1876; Gamble, Fl. Pres. Madras 360. 1918; Britto in Matthew, Fl. Tam. Carnatic 3: 446. 1983; van der Maesen, Agri. Univ. Wagen. 85-1: 105. 1985; Ramach. & Nair, Fl. Cannanore 152. 1988; Mani., Fl. Silent Valley 85. 1988; Vajravelu, Fl. Palghat Dist. 168. 1990; Sanjappa, Leg. India 235. 1992; Sasi. & Sivar. , Fl. Pl. Thrissur For. 150. 1996. *Hedysarum tuberosum* Roxb. ex Willd., Sp. Pl. 3: 1197. 1803.

Large climbing shrubs with tuberous roots; branchlets appressed-velvety. Leaves 3-foliolate; leaflets 5-18 x 5-12.5 cm, ovate or the terminal rhomboid, base obtuse or acute, laterals oblique at base, apex acuminate, scattered hairy above, appressed hairy beneath; lateral nerves 7 or 8 pairs, reticulations prominent; petiole to 18 cm long; stipules c. 5 mm long, ovate. Racemes axillary, 15-35 cm long; rachis silky. Flowers c. 1.3 cm long, bluish-purple, ternate on the nodes of racemes; pedicels c. 3 mm long. Calyx c. 7 mm long, tomentose; tube campanulate; lobes ovate. Standard c. 1.2 cm, long, orbicular, base auricled, apex emarginate; wings c. 1.2 cm long, with spur above base; keels long-clawed. Stamens 9+1, vexillary stamen apically fused, free at base. Ovary to 8 mm long,

oblong, densely brown-hirsute; style incurved; stigma capitate. Pods 2.5-5.5 x 0.5-0.6 cm, linear, hairy.

Fl. & Fr. : Mar. - Apr.

Distr. : India, also in tropical Himalayas. Common in rubber plantation. *CNS 2104* (Kappakada).

PYCNOSPORA R. Brown ex R. Wight *et* Arnott
Prodr. 197. 1834.

Pycnospora lutescens (Poir.) Schind., J. Bot. 64: 145. 1926; van Meeuwen in Reinwardtia 5: 437. 1961; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 262. 1976; Britto in Matthew, Fl. Tam. Carnatic 3: 447. 1983; Ramach. & Nair, Fl. Cannanore 153. 1988; Mani., Fl. Silent Valley 85. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 142. 1988; Vajravelu, Fl. Palghat Dist. 169. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 157. 1994; Sivar. & Mathew, Fl. Nilambur 200. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 150. 1996. *Hedysarum lutescens* Poir. in Lam. Encycl. 6: 417. 1805. *Pycnospora hedysaroides* R. Br. ex Baker in Hook. f., Fl. Brit. India 2: 153. 1876.; Gamble, Fl. Pres. Madras 333. 1918. ***Nir-pullari*** Rheede, Hort. Malab. 9: 67, t. 36. 1689.

Trailing herbs, upto 75 cm long. Young stem, petioles and peduncles pubescent with short hooked hairs. Leaves 3-foliolate; middle leaflet 1-1.5 x 0.8-1.2 cm, ovate-obovate, cuneate at base, obtuse or slightly emarginate at tip; laterals 0.8-1.2 x 0.6-0.8 cm, elliptic, glabrous above, pubescent beneath; stipules 5-7 mm long, lanceolate, acuminate. Flowers in 2-5-flowered terminal racemes. Calyx minute, lobes deeply 2-cleft; teeth subulate. Corolla 2-3 mm long, purple. Ovary c. 1 mm long, oblong; ovules many. Pods 6-8 x 5-6 mm, oblong, turgid, hirsute, black when mature.

Fl. & Fr. : Nov.- Jan.

Distr. : Tropical Asia, Africa and N. Australia. In hill slopes. *CNS 2398* (Nootavanpara).

ROTHIA Persoon

Syn. Pl. 2: 638, (659). 1807 (*nom. cons.*).

Rothia indica (L.) Druce, Bot. Exch. Club. Soc. Brit. Isles 3: 423. 1914; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 263. 1976; Mani. & Sivar., Fl. Calicut 76. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 456. 1983; Vajravelu, Fl. Palghat Dist. 170. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 184. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 158. 1994. *Trigonella indica* L., Sp. Pl. 778. 1753; Roxb., Fl. Ind. 3: 389. 1832. *Dilwynia trifoliata* Roth, Cat. Bot. 3: 71. 1806. *Rothia trifoliata* (Roth.) Pers., Syn. Pl. 2: 302, 659. 1807; Wight & Arn., Prodr. 195. 1834; Wight, Ic. t. 199. 1839; Hook. f., Fl. Brit. India 2: 63. 1876; Gamble, Fl. Pres. Madras 279. 1918.

Prostrate annual herbs; stems pubescent. Leaves 3-foliolate; leaflets 0.7-1.8 x 0.3-0.7 cm, obovate or oblanceolate, base cuneate, apex obtuse or rounded, mucronate, appressed hairy beneath; stipules c. 3 mm long, linear-lanceolate; petiole 1-1.5 cm long. Flowers subsessile, axillary, solitary or fascicled; bracts 2-3 mm long, lanceolate. Calyx tube to 3 mm long, turbinate; lobes c. 2.5 mm long, lanceolate, sparsely ciliate. Petals yellow, clawed; standard c. 6 mm long, ovate-oblong; wings narrow; keels cohering, falcate. Stamens 10, monadelphous. Ovary c. 3 mm long, linear, hirsute; stigma capitate. Pods 2.5-5 x 0.15-0.2 cm, linear, compressed, mucronate, pubescent. Seeds many, c. 1.5 mm long, reniform.

Fl. & Fr. : Jul. - Nov.

Distr.: Pakistan, India, Sri Lanka, South East Asia and Northern Australia. A common weed on coastal areas, fallow fields and road sides. *CNS 1167* (Ambalapuzha beach).

SESBANIA Scopoli

Introd. Hist. Nat. 308. 1777 (*nom. cons.*).

Trees, shrubs or herbs; unarmed or with prickles. Leaves paripinnate; leaflets usually numerous; stipules present, usually caducous. Inflorescence axillary, racemose. Flowers small to large and showy; bracts and bracteoles present, usually caducous. Calyx

campanulate, lobed, truncate or sub-bilabiate. Petals commonly yellow, sometimes red or white; vexillum sometimes appendaged on the inner surface near the base. Stamens diadelphous 9+1, with vexillary filament free; anthers uniform, dorsifixed. Ovary many-ovuled, sessile or stipitate; stigma capitate. Fruit linear, 2-valved, compressed or cylindric, transversely sepate between the seeds. Seeds reniform to oblong.

1a. Trees; flowers large, 7.5-10 cm long, white or sometimes pink..... **S. grandiflora**

1b. Subshrubs or shrubs; flowers up to 2.6 cm long , yellow.

2a. Branches and leaf-rachis prickly; standard petal not appendaged ... **S. bispinosa**

2b. Branches and leaf-rachis not prickly; standard petal appendaged .... **S. javanica**

Sesbania bispinosa (Jacq.) W. F. Wight in U.S.D.A. Bur. Pl. Industr. Bull. no. 137: 15.1909; Gillett, Kew Bull. 17: 129. 1963; Britto in Matthew, Fl. Tam Carnatic 3: 457. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 143. 1988; Vajravelu, Fl. Palghat Dist. 171. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 139. 1991; Sivar. & Mathew, Fl. Nilambur 221. 1996. *Aeschynomene bispinosa* Jacq., Ic. Pl. Rar. 3: 13, t. 564. 1792. *Coronilla aculeata* Willd., Sp. Pl. 3: 1147. 1803. *Sesbania aculeata* (Willd.) Poir. in Lam, Encycl. 7: 128. 1806, *nom. illeg.*; Wight & Arn., Prodr. 214. 1834; Baker in Hook. f., Fl. Brit. India 2: 114. 1876; Gamble, Fl. Pres. Madras 323. 1918. ***Kedangu*** Rheede, Hort. Malab. 6: 49-50, t. 27. 1686.

Erect shrubs; branchlets and leaf-rachis muricate or with small weak prickles. Leaves to 23 cm long; leaflets 15-40 pairs, 5-16 x 2-4 mm, oblong, base cuneate, apex obtuse, apiculate; stipules to 1 cm long, lanceolate. Racemes lax, to 7 cm long, erect or drooping. Flowers 10-13 mm long; pedicels 6-10 mm long; bracts and bracteoles linear, caducous. Petals yellow with brown blotches; standard to 1.2 x 1 cm, orbicular, not appendaged. Ovary to 1.5 cm long. Pods 15-25 x 0.2-0.3 cm, subterete, very slender, with a beak c. 1 cm long, subtorulose, pendulous. Seeds 30-40, c. 3 x 1.5 mm, brown.

Fl. & Fr. : Oct. - Jan.

Distr. : Tropical Africa, Asia; probably a native of tropical Asia. In waste lands. *CNS 1985* (Pathirappilly).

Sesbania grandiflora (L.) Poir. in Lam., Encycl. 7: 127. 1806; Baker in Hook. f., Fl. Brit. India 2: 115. 1876; Gamble, Fl. Pres. Madras 323. 1918; Gillett, Kew Bull. 17: 105. 1963; Britto in Matthew, Fl. Tam. Carnatic 3: 458. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 143. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 136. 1991. *Robinia grandiflora* L. , Sp. Pl. 722. 1753. *Aeschynomene grandiflora* (L.) L., Sp. Pl. ed. 2, 1060. 1762. *Coronilla grandiflora* (L.) Willd., Sp. Pl. 3: 1145. 1802. *Agati grandiflora* (L.) Desv., J. Bot. 2, 1: 120. 1813. ***Agaty*** Rheede, Hort. Malab. 1: 95-96, t. 51. 1678.

Small soft-wooded trees; up to 7 m tall; branchlets pubescent. Leaves 18-30 cm long; leaflets 12-25 pairs, 1.5-3.5 x 0.6-1.2 cm, oblong, base rounded, apex obtuse, emarginate, glabrous to appressed-pubescent on both surfaces, glaucous beneath; stipules 5-8 mm long, ovate. Racemes to 8 cm long, lax, 2-4-flowered. Flowers 7.5-10 cm long, pendulous; pedicels to 2 cm long; bracts and bracteoles 3-4 mm long, linear-oblong. Calyx 2-3 cm long, campanulate; lobes triangular. Corolla pink or white, 7.5 -10 cm long; standard to 10 x 6 cm, reflexed. Staminal sheath 3.5-6 cm long. Pods 30-45 cm long, 5-8 mm wide, slender, falcate or straight. Seeds c. 30, reddish-brown.

Fl. & Fr. : Dec. - Feb.

Distr.: Cultivated and naturalized in tropical Africa and Asia; probably a native of Indonesia. Planted in gardens and road sides. *CNS 2194* (Cherthala).

Sesbania javanica Miq., Fl. Ind. Bat. 1: 228. 1855; Panda & Patnaik, J. Orissa Bot. Soc. 6: 25. 1984. *Aeschynomene paludosa* Roxb., Fl. Ind. 3: 333. 1832, *nom. illeg. Sesbania paludosa* (Roxb.) Prain, J. Asiat. Soc. Bengal. 66:82. 1897; Gamble, Fl. Pres. Madras 323. 1918, non DC., 1825. *Sesbania aculeata* (Willd.) Pers. var. *paludosa* (Roxb.) Baker in Hook. f., Fl. Brit. India 2: 115. 1876.

Erect annual subshrubs, to about 3 m tall; lower part of stem swollen and pith like. Leaves 11-25 cm long; leaflets 10-23 pairs, 1.5-3.2 x 0.4-0.7 cm, oblong, base cuneate,

apex obtuse and apiculate, thinly hairy beneath; stipules lanceolate-caducous. Racemes lax, to 14 cm long, drooping. Flowers 2-2.6 cm long, yellow, fragrant; pedicels 0.8-1.5 cm long. Calyx 6-8 mm long, campanulate; lobes triangular. Standard to 2.2 x 1.8 cm, obovate, purple dotted; appendages triangular. Staminal sheath 1.5-1.8 cm long. Pods 18-26 cm long, linear, pendulous, somewhat twisted, slightly torulose.

Fl. & Fr. : Sept. - Dec.

Distr. West coast of India. Common on bunds of paddy fields. *CNS 1282* (Mancombu), *CNS 2569* (Thottappally).

SMITHIA W. Aiton

Hortus Kew. ed. 1, 3: 496. 1789 (*nom. cons.).*

Smithia sensitiva Ait., Hort. Kew 3: 496. 1789; Baker in Hook. f., Fl. Brit. India 2: 148. 1876; Gamble, Fl. Pres. Madras 232. 1918; van Meeuwan, Reinwardtia 5: 44. 1961; Verdcourt, Kew Bull. 24: 16. 1970; Mani. & Sivar., Fl. Calicut 83. 1982; Ramach. & Nair, Fl. Cannanore 154. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 171. 1991; Sivar. & Mathew, Fl. Nilambur 176. 1996. *Petagnana sensitiva* (Ait.) Gmel., Syst. 1119. 1791.

Prostrate trailing herbs, simple or much branched. Leaves paripinnate, to 2.5 cm long; leaflets 4-12 x 2-4 mm, linear-oblong, apex obtuse, bristly-ciliate along the margins and midrib on lower surface; rachis ending in a bristle; stipules c. 5 mm long. Flowers yellow in axillary 1-6-flowered capitate racemes; peduncle to 1 cm long. Calyx to 1 cm long, equally 2-lipped, 5-7 mm long, scarious, with close, parallel nerves. Corolla 7-9 mm long; petals clawed; standard to 7-9 mm, ovate; keels incurved, to 5x3 mm, apex obtuse. Stamens 5+5; anthers reniform. Ovary to 3 mm; style filiform; stigma simple. Fruit a lomentum, enclosed in calyx, 4-6-articulate; articles minutely papillose.

Fl. & Fr. : Aug. - Dec.

Distr. : Madagascar, Abyssinia, java, China and India. A profuse weed in the harvested fields, bunds of paddy fields and moist places. *CNS 2078* (Nangiarkulangara).

STYLOSANTHES O. Swartz

Prodr. Veg. Ind. Occ. 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; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 265. 1976; Britto in Matthew, Fl. Tam. Carnatic 3: 463. 1983; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 178. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 158. 1994. *Arachis fruticosa* Retz., Obs. Bot. 5: 26. 1788. *Stylosanthes mucronata* Willd., Sp. Pl. 3: 1166. 1802, *nom. illeg.;* Bedd., Ic. t. 294. 1874; Baker in Hook. f., Fl. Brit. India 2: 148. 1876; Gamble, Fl. Pres. Madras 326. 1918.

Procumbent herbs or undershrubs; root-stock woody. Stem, peduncles and pedicels loosely villous. Leaves 3-foliolate; leaflets 8-20 x 2.5-5 mm, oblong-elliptic or linear-lanceolate, acute at base and apex, mucronate at tip, pubescent on both sides, ciliate on margins; nerves parallel and close; stipules 8-13 mm long, lanceolate, adnate to base of petiole, sheathing, villous without. Flowers yellow 3-5 in terminal heads; bracts and bracteoles 0.8-1.2 cm long, linear-lanceolate, densely hairy. Calyx lobes 2-4 mm long, densely brown hairy. Petals yellow, 4-6 mm long. Stamens monadelphous. Ovary 2-3 mm long, suborbicular, woolly; style filiform. Pods 5-8 mm long, monoiliform, 1or 2-articulate; articles pilose, reticulate, fully enclosed in calyx, beak curved. Seeds c. 2.5 mm long, reniform.

Fl. & Fr. : Nov. - Feb.

Distr. : India, Sri Lanka, Africa and Madagascar. Along roadsides and other waste places. *CNS 1708* (Thiruvizha).

TEPHROSIA Persoon

Syn. Pl. 2: 328. 1807 (*nom. cons.).*

Shrubs or herbs. Leaves imparipinnate; leaflets opposite, few to many, with close parallel nerves; stipules various, stipels absent. Flowers in terminal leaf-opposed or axillary racemes, bracteoles absent. Calyx lobes subequal or upper 2 connate. Petals

clawed. Stamens 10, the vexillary stamen free at base. Ovary sessile; ovules many; style incurved, often flattened, glabrous or bearded; stigma terminal, penicillate or glabrous. Pods linear-oblong, compressed. Seeds sometimes with a small strophiole.

1a. Pods densely villous ..... **T. villosa**

1b. Pods glabrous.

2a. Flowers to 7 mm; style not bearded; seeds ovoid ..... **T. purpurea**

2b. Flowers 1.4-1.7 cm long; style bearded; seeds orbicular ..... **T. maxima**

Tephrosia maxima (L.) Pers., Syn. Pl. 2: 329. 1807; Wight & Arn., Prodr. 213. 1834; Gamble, Fl. Pres. Madras 319. 1918; Mani. & Sivar., Fl. Calicut 87. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 466. 1983; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 149. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 159. 1994. *Galega maxima* L., Syst. (ed. 10), 1172. 1759. *Tephrosia purpurea* var. *maxima* (L.) Baker in Hook. f., Fl. Brit. India 2: 113. 1876 (Plate VIII: C).

Erect or ascending perennial undershrubs to 120 cm long; stem often purplish, pubescent. Leaves imparipinnate, 4-13 cm long; leaflet 9-17, 1-2.4 x 0.5-1 cm, oblanceolate or obovate-oblong, base acute to cuneate, apex obtuse or truncate, apiculate, glabrous above, appressed-pubescent beneath, thin-coriaceous; stipules 4-7 x 2-4 mm, lanceolate, acuminate. Inflorescence racemose, axillary or pseudoterminal, to 14 cm long, few-flowered. Flowers 1.4-1.7 cm long; pedicels 2-3 mm long; bracts 4-5 x 1-1.5 mm, ovate to lanceolate, acuminate. Calyx-tube 2-3 mm long, campanulate, pubescent; lobes unequal, 3-6 mm long, lanceolate, appressed-pubescent. Corolla rose to pinkish white; standard 1.5-1.7 x 1-1.3 cm, obovate; wings 1-1.2 x 0.4-0.6 cm, obovate; keels 1.3-1.5 x 0.4-0.6 cm, oblong, falcate. Staminal sheath 1-1.4 cm long. Ovary 1-1.2 cm long, linear, compressed, hirsute; style 5-6 mm long, hirsute. Pods 4-6.5 x 0.4-0.6 cm, linear, slightly curved upward toward the apex. Seeds 3-4 mm long, orbicular, dark-brown.

Fl. & Fr.: Aug.- Dec.

Distr. : India and Sri Lanka. Commonly seen in sandy sea coasts and waste places. *CNS 1084* (Aroor R.S.), *CNS 1940* (Valavanadu).

Tephrosia purpurea (L.) Pers., Syn. Pl. 2: 329. 1807; Baker in Hook. f., Fl. Brit. India 2: 112. 1876; Gamble, Fl. Pres. Madras 320. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 266. 1976; Mani. & Sivar., Fl. Calicut 87. 1982; Bosman & Haas, Blumea 28: 464. 1983; Britto in Matthew, Fl. Tam. Carnatic 3: 470. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 143. 1988; Vajravelu, Fl. Palghat Dist. 174. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 152. 1991; Sanjappa, Leg. India 258. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 159. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 155. 1996. *Cracca purpurea* L., Sp. Pl. 752. 1753. *Tephrosia hamiltonii* Drumm. ex Gamble, Fl. Pres. Madras 320. 1918. ***Colinil*** Rheede, Hort. Malab. 1: 103-104, t. 55. 1678.

Perennial erect or decumbent herbs or subshrubs, up to 50 cm tall. Leaves imparipinnate; leaflets 7-15, 1-2.8 x 0.3-1 cm, oblanceolate or obovate, base cuneate, apex obtuse to emarginate or truncate, mucronate; stipules 3-6 mm long, lanceolate. Flowers c. 7 mm long, in few-flowered, leaf-opposed, pseudoracemes; pedicels 3-4 mm long; bracts c. 2 mm long. Calyx 3-4 mm long., pubescent; lobes subulate. Corolla pink to purplish; standard c. 4 mm broad, orbicular. Staminal tube to 4 mm long. Pods 2.5-4 x 0.3-0.4 cm, linear-oblong, 5-7-seeded. Seeds ellipsoid, dark brown.

Fl. & Fr. : Most part of the year.

Distr. : Indo-Malesia.Fairly common and often gregarious in waste land, along roadsides, etc. *CNS 1013* (Poopullykavu).

Tephrosia villosa (L.) Pers., Syn. Pl. 2: 329. 1807; Wight & Arn., Prodr. 212. 1834; Baker in Hook. f., Fl. Brit. India 2: 113. 1876; Bosman & Haas, Blumea 28: 476. 1983; Britto in Matthew, Fl. Tam. Carnatic 3: 473.1983; Vajravelu, Fl. Palghat Dist. 174. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 155. 1991; Sanjappa, Leg. India 260. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 160. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 155. 1996. *Cracca villosa* L., Sp. Pl. 752. 1753. *Tephrosia hirta* Buch.-Ham., Trans. Linn. Soc. London 13:546. 1822; Gamble, Fl. Pres. Madras 318. 1918; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 265. 1976; Mani. & Sivar., Fl. Calicut 87. 1982. *Galega incana*

Roxb., Fl. Ind. 3: 385. 1832. *Tephrosia incana* (Roxb.) Wight & Arn., Prodr. 212. 1834; Wight, Ic. t. 371. 1840-43.

Much branched annual or perennial herbs or subshrubs; branchlets densely pubescent with white appressed-hairs. Leaves imparipinnate, to 6 cm long; leaflets 9-15, 1-2 x 0.5-1 cm, obovate or oblanceolate, base acute to cuneate, apex obtuse or retuse, glabrous above and sericeous below; stipules 3-6 mm long, subulate. Inflorescence pseudoracemose, terminal or leaf-opposed, to 7 cm long. Flowers 8-10 mm long, subsessile; bracts linear-deltoid. Calyx c. 5 mm long; lobes filiform, ciliate. Petals pink or white; standard 8-10 mm long, orbicular; wings to 1 cm long, oblong-obovate; keels c. 8 mm long, beaked. Pods 2.5-3.5 x 0.4-0.5 cm, oblong-falcate, densely villous, 5-8-seeded. Seeds c. 3 x 2 mm, reniform, dark brown.

Fl. & Fr. : Nov. - Mar.

Distr. : Widespread in tropical Asia and Africa. Common in wastelands and road sides. *CNS 1012* (Nangiarkulangara).

TERAMNUS P. Browne

Civ. Nat. Hist. Jamaica 290. 1756.

Teramnus labialis (L. f.) Spreng., Syst. Veg. 3: 235. 1826; Baker in Hook. f., Fl. Brit. India 2: 184. 1876; Gamble, Fl. Pres. Madras 352. 1918; Verdcourt, Kew Bull. 24: 267. 1970; Britto in Matthew, Fl. Tam. Carnatic 3: 474. 1983; Ramach. & Nair, Fl. Cannanore 157. 1988; Vajravelu, Fl. Palghat Dist. 175. 1990; Rudd in Dassan. & Fosb. Rev. Handb. Fl. Ceylon 7: 296. 1991; Sanjappa, Leg. India 261. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 160. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 156. 1996. *Glycine labialis* L. f. , Suppl. Pl. 325. 1782; Wight, Ic. t. 168. 1839.

Slender climbers; branches appressed pubescent. Leaves 3-foliolate; leaflets 1.5-3.5 x 1.5-2.2 cm, ovate or elliptic, base rounded, apex acute, membranous, puberulent below; petiole to 4 cm long. Racemes axillary, up to 6 cm long, with distant clusters or solitary flowers in the axils of 2-3 mm long subulate bracts. Flowers c. 4 mm long;

pedicels c. 2 mm long; bracts 2-3 mm long. Calyx-tube 2-3 mm long, campanulate; lobes acuminate, about equalling the tube, villous. Petals pink, clawed; standard c. 4 mm long, obovate; wings c.3 mm long, narrow-oblong; keels oblanceolate. Stamens monadelphous; anthers alternately fertile and sterile. Ovary tomentose; stigma capitate. Pods 3-4.2 x 0.25-0.3 cm, linear, compressed, thinly adpressed pubescent, ending in a hook formed by the persistent style. Seeds dark brown.

Fl. & Fr. : Sept.- Feb.

Distr.: Tropical and South Africa, India, Sri Lanka, Malaya, Indo-China, Philippines, New Guinea, Guam, E. Indian Ocean Islands, West Indies and Guyana. Rare. In wastelands. *CNS 2399* (Pathiyoor).

VIGNA Savi

Pisa Nuov. Giorn. Lett. 8:113. 1824.

Climbing herbs or subshrubs. Leaves 3-foliolate; stipules peltate or basifixed; stipels present. Flowers in axillary racemes or in subumbellate clusters; bracts and bracteoles deciduous. Calyx-tube campanulate, 5-lobed, 2-lipped; upper lip of 2 lobes completely or partly united; lower lip 3-lobed. Petals yellow or purple; standard orbicular, with basal inflexed auricles and appendages, wings shorter than standard; keels obtuse or with an incurved or twisted beak. Stamens 9+1, the vexillary stamen free; anthers uniform, Ovary sessile; ovules many; style upcurved, variously twisted, upper portion thickened and hairy; stigma subterminal. Pods linear-oblong, terete or flattened. Seeds oblong or subreniform.

1a. Keel petals twisted; style coiled.

2a. Stipules peltately fixed; corolla yellow; pods terete, densely hiruste ..... **V. sublobata**

2b. Stipules basifixed; standard petal cream-coloured, wings pink; pods compressed, sparsely pubescent ..... **V. adenantha**

1b. Keel petals not twisted; style not coiled ..... **V. unguiculata**

Vigna adenantha (G. Meyer) Marechal *et al.*, Taxon 27: 202. 1978; Lackey & D'Arcy, Ann. Missouri Bot. Gard. 67(3): 792. 1980; Babu *et al.*, Bull. Bot. Surv. India 27: 12. 1985; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 144. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 340. 1991. *Phaseolus adenanthus* G. Meyer, Prim. Fl. Esseq. 239. 1818; Baker in Hook. f., Fl. Brit. India 2: 200. 1876; Gamble, Fl. Pres. Madras 362. 1918. *Phaseolus rostratus* Wall. , Pl. Asiat. Rar. 1: 50, t. 63. 1830; Wight & Arn., Prodr. 1: 244. 1834; Wight, Ic. t. 34. 1838. *Phaseolus alatus* Roxb., Fl. Ind. 3: 288. 1832. ***katu-paeru*** Rheede, Hort. Malab. 8: 79-81, t. 42. 1688.

Twining or trailing perennial herbs; stems glabrescent. leaflets 3-8 x 1.8-4 cm, ovate, ovate-elliptic or elliptic-lanceolate, base rounded, apex acute or acuminate, both surfaces with adpressed sparse pubescence; petiole 3-8 cm long; stipules 4-7 mm long, lanceolate, basifixed. Racemes 5-14 cm long, 6-10-flowered. Flowers 2-3 cm long; pedicels 2-3 mm long; bracts ovate-oblong. Calyx tube 3-4 mm long, sparsely pubescent; upper lobes partially connate; lower lobe c. 4 mm long, lanceolate. Petals dark pink or cream-coloured; standard 2.2-2.8 x 2.3-2.5 cm, suborbicular, emarginate, cream-coloured; wings obovate, pink; keels spirally incurved. Ovary linear, pubescent; style deflexed, hairy towards apex. Pods 6-11 x 0.6-15-seeded. Seeds reniform, black.

Fl. & Fr. : Sept. - Dec.

Distr.: Pantropical. Native of South America. In Wayside thickets. *CNS 1938* (Kanjikuzhi).

Vigna sublobata (Roxb.) Bairiy *et al.*, J. Econ. Tax. Bot. 7(2): 274. 1985; Babu *et al.*, Bull. Bot. Surv. India 27:21. 1985. *Phaseolus sublobatus* Roxb., Fl. Ind. 3: 288. 1832; Gamble, Fl. Pres. Madras 363. 1918. *Phaseolus trinervius* Heyne ex Wight & Arn., Prodr. 245. 1834; Baker in Hook. f., Fl. Brit. India 2: 203. 1876. *Vigna radiata* (L.) Wilczek var. *sublobata* (Roxb.) Verdc., Kew Bull. 24: 559. 1970; Mani. & Sivar., Fl. Calicut 92. 1982; Ramach. & Nair, Fl. Cannanore 159. 1988; Nicols., Suresh. & Mani., An Interpr. Hort. Malab. 145. 1988; Mani., Fl. Silent Valley 89. 1988; Vajravelu, Fl. Palghat Dist. 176. 1990. ***Putsja-paeru*** Rheede, Hort. Malab. 8: 67-68, t. 37. 1688.

Annual twining herbs; stems, petioles and peduncles clothed with ferruginous, deflexed hairs. Leaflets 3.5-7.5 x 2.8-5 cm, ovate-deltoid, base cuneate to subtruncate, apex obtuse, acute or acuminate, hirsute, the terminal leaflets sometimes lobed; stipules 5-8 x 3-4 mm, falcate-lanceolate or ovate-oblong, peltately fixed; stipels linear. Racemes axillary, capitate, long peduncled, 2-6-flowered. Calyx-lobes c. 2 mm long, ovate-triangular, hairy. Corolla yellow. Pods 2.5-5 cm long, linear-oblong, terete, clothed with ferruginous hairs, 4-10-seeded. Seeds 2.5-3 mm long, greyish brown.

Fl. & Fr. : Sept. - Dec.

Distr. : Pantropical. Common inwastelands and road sides. *CNS 1323* (Pallipuram).

Vigna unguiculata (L.) Walp., Rep. 1: 779. 1842; Verdcourt, Kew Bull. 24(3): 542. 1970; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 268. 1976; Marechal *et al.*, Taxon 27:200.1978; Mani. & Sivar., Fl. Calicut 93. 1982; Britto in Mathew, Fl. Tam. Carnatic 3: 480. 1983; Babu *et al.*, Bull. Bot. Surv. India 27: 26. 1985; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 145. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 327. 1991. *Dolichos unguiculatus* L., Sp. Pl. 725. 1753. *Dolichos sinensis* L., Herb. Amboin. 23. 1754; Roxb., Fl. Ind. 3:: 302. 1832; Wight & Arn., Prodr. 1: 250. 1834. *Dolichos catjang* Burm. f., Fl. Ind. 161. 1768. *Vigna catjang* (Brum. f.) Walp., Linnaea 13: 533. 1839; Baker in Hook. f., Fl. Brit. India 2: 205. 1876; Gamble, Fl. Pres. Madras 365. 1918. *Vigna sinensis* (L.) Hassk., Cat. Pl. Hort. Bogor. 279. 1844. *Vigna cylindrica* (L.) Skeels, USDA Bur. Pl. Industr. Bull. 282: 32. 1913. ***Paeru*** Rheede, Hort. Malab. 8: 75-77, t. 41. 1688.

Trailing or climbing annual herbs. Leaflets 8-17 x 3-9 cm, ovate, rhomboid or ovate-lanceolate, base cuneate or somewhat rounded, apex acute or obtuse, lateral ones deltoid-subtruncate at base; stipules peltate. Racemes axillary, capitate; peduncle to 18 cm long. Flowers 2.8-3.2 cm long; pedicels 2-3 mm long; bracts 3-4 mm long, lanceolate. Calyx tube 3-4 mm long, campanulate; lobes acute, the upper lobes emarginate. Petals purplish; standard 2.5-3 cm long, orbicular, basally inflexed, biauriculate; keels obliquely

Fl. Ind. ed. 2, 2: 347. 1832. *Senna siamea* (Lam.) Irwin & Barneby, Mem. New York Bot. Gard. 35:98. 1982.

Trees; young stems puberulent. Leaves 11-20 cm long; leaflets 6-12 pairs, 3-6 x 1-2 cm, elliptic-oblong to oblong-lanceolate, base rounded, apex obtuse or acute, glaucous beneath; stipules subulate, caducous. Inflorescence terminal panicles, 15-32 cm long, many-flowered. Flowers yellow; pedicels c. 2 cm long; bracts 3-6 mm long, linear, curved. Sepals 5-7 mm long, suborbicular. Petals yellow, 1-1.4 cm long, ovate-elliptic. Stamens 10, upper 3 staminodes. Pods 18-28 x 1-2 cm, linear, compressed. Seeds 8-16, 6-8 x 5-6 mm. ovoid, light brown.

Fl. &Fr. : Oct.-May.

Distr. : Apparently native of India and regions from Pakistan to Malaysia; introduced in other tropical areas of the New and Old Worlds. Commonly grown on roadsides as an avenue tree. *CNS 1765* (Purakkad).

Cassia sophera L., Sp. Pl. 379. 1753; Baker in Hook. f., Brit. India 2: 262. 1878; de Wit, Webbia 11: 265. 1955; Ramach. & Nair, Fl. Cannanore 166. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 130. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 74. 1991. *Senna sophera* (L.) Roxb., Fl. Ind. ed. 2, 2: 347. 1832, *sophora*; Irwin & Barneby, Mem. New York Bot. Gard. 35: 440. 1982. ***Ponnam-tagera*** Rheede, Hort. Malab. 2: 101-102, t. 52. 1679.

Shrubs or subshrubs to 2.5 m tall. Leaves 15-22 cm long; leaflets 6-10 pairs, 2.5-6 x 1-2.5 cm, lanceolate, base rounded, apex acute or acuminate; rachis bearing a clavate gland at base; stipules c. 6 mm long, ovate, caducous. Inflorescence axillary or terminal, 4-10-flowered, corymbose raceme. Flowers yellow; pedicels 0.8-1.4 cm long; bracts 4-5 mm long, ovate-acute. Sepals 5-6 mm long, ovate-obtuse. Petals yellow, 1-1.5 cm long, orbicular to obovate, obtuse. Stamens 10, the 3 lower with longer filaments. Pods 5-8 x 0.5-0.9 cm, linear-oblong, compressed. Seeds c. 4 x 3.5 mm, suborbicular, compressed, brownish.

oblong, about equalling the wings, untwisted. Pods 10-40 cm long, linear-oblong, turgid, c.15-seeded. Seeds 6-8 mm long, rounded-oblong.

Fl. & Fr. : Most of the seasons.

Distr. : Probably a native to the Old World. Cultivated and grown throughout the tropics. Commonly cultivated and also found wild. *CNS 2299* (R. Block).

ZORNIA J.F. Gmelin

Syst. Nat. 2: 1076, 1096. 1792.

Diffuse herbs. Leaves digitately 2-foliolate; exstipellate; stipules subfoliaceous, peltate. Flowers in terminal and axillary spikes or racemes, enclosed by a pair of basal foliaceous gland-dotted bracts. Calyx hyaline, upper 2 lobes connate. Standard petal clawed; keels incurved. Stamens monadelphous, tube split above, alternate anthers long and basifixed, shorter ones versatile. Ovary sessile; ovules, many, style filiform. Fruit a lomentum of several 1-seeded joints, sinuate along the lower suture, smooth or prickly.

1a. Leaves isophyllous; petiole longer than the leaflets ..... **Z. quilonensis**

1b. Leaves anisophyllous; petiole shorter than the leaflets ..... **Z. gibbosa**

Zornia gibbosa Spanoghe, Linnaea 15: 192. 1841; Mohlenbrock, Webbia 16: 112. 1961; Dandy & Milne, Kew Bull. 17: 73-74. 1963; Wagh, J. Bombay Nat. Hist. Soc. 61: 214. 1964; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 268. 1976; Ravi in Bull. Bot. Surv. India 21: 198. 1979; Mani. & Sivar., Fl. Calicut 76. 1982; Britto in Matthew, Fl. Tam. Carnatic 3:482. 1983; Nicols., Suresh & Mani., An Intepr. Hort. Malab. 146. 1988; Ramach. & Nair, Fl. Cannanore 160. 1988; Vajravelu, Fl. Palghat Dist. 177. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 175. 1991; Sanjappa, Leg. India 280. 1992; Sivar., & Mathew, Fl. Nilambur 177. 1996; Sasi. & Sivar., Fl. Pl. Thrissur. For. 158. 1996. *Zornia diphylla* auct, non (L.) Pers., 1807: Baker in Hook. f. , Fl. Brit. India 2: 147. 1876, p.p.; Gamble, Fl. Pres. Madras 325. 1918. ***Nelam- mari*** Rheede, Hort. Malab. 9: 161, t. 82. 1689.

Diffuse or prostrate annual herbs. Leaves 2-foliolate; leaflets 8-25 x 2-8 mm, ovate or lanceolate, base rounded, apex acute, apiculate, punctate; petiole to 1.5 cm long; stipules 5-8 mm long, lanceolate, peltate, acuminate at both ends, punctate. Inflorescence terminal or axillary, bracteate racemes, 4-8 cm long; bracts peltate, 5-11 x 3-4 mm, ovate-lanceolate, acute, ciliated along margin, gland-dotted. Calyx c. 3 mm long; lobes subequal, membranous. Petals yellow, sometimes with red stripes; standard orbicular-cordate; wings obovate-obtuse; keels curved, oblong-obtuse, connate at base. Stamens monadelphous; anthers dimorphic. Ovary pubescent. Pods with 4-6-articulate, c.1.3 cm long, strongly reticulate with retrorsely barbed bristles.

Fl. &Fr. : Sept. - Dec.

Distr. : India, China, Malesia and Australia. Common in open grassy places. *CNS 1002* (Karuvatta).

Zornia quilonensis Ravi, J. Bombay Nat. Hist. Soc. 66. (3):489. 1970.

Prostrate perennial branched herbs to 30 cm long. Leaves 2-foliolate; leaflets 5-10 x 3-6 mm, obliquely oblong-ovate, apex acute or obtuse, mucronate, punctate, 1-nerved; petioles longer than the leaflets; stipules peltate, upto 6 x 3 mm, 5-7-nerved, punctate. Inflorescence axillary or terminal zig-zag spike; bracts to 7 x 3 mm, broadly elliptic-lanceolate, acute, sparsely ciliate at the margins, punctate. Calyx c. 3 mm long. Petals yellow; standard c. 7 mm long. Lomentum with 2-6 articles, exserted; articles c. 3 x 2.5 mm, reticulate, punctate, puberulent, with numerous retrorsely scabrous prickles. Seeds c. 2 mm long, subreniform, yellowish brown.

Fl. & Fr. : Sept. - Dec.

Distr. : Endemic to Kerala. Rare. In waste lands. *CNS 1515* (Elanjimel Vallikavu).

Subfamily: **CAESALPINIOIDEAE**

1a. Leaves simple, usually bilobed ..... **Bauhinia**

1b. Leaves simple-pinnate or bipinnate.

2a. Leaves simple-pinnate.

3a. Petals absent; flowers orangish-scarlet ..... **Saraca**

3b. Petals present; flowers yellow.

4a. Stamens 3, connate, dehiscence of anthers longitudinal; petals 3; pods with pulpy mesocarp ..... **Tamarindus**

4b. Stamens 6-10, free, dehiscence of anthers by apical pores; petals 5; pods without pulpy mesocarp ..... **Cassia**

2b. Leaves bipinnate.

5a. Sepals valvate, fleshy; pods 25-60 cm long ..... **Delonix**

5b. Sepals imbricate, thin; pods less than 13 cm long.

6a. Petals hairy at base; stigma peltate; pods coppery-red ..... **Peltophorum**

6b. Petals glabrous at base; stigma not peltate; pods balck or grey ..... **Caesalpinia**

BAUHINIA Linnaeus

Sp. Pl. 374. 1753.

Trees or shrubs. Leaves with 2 leaflets, usually adnate fully or partially by adjaent margins into a simple 2-lobed leaf, palmately ribbed; stipules small, cauducous. Flowers in terminal, axilliary or lateral racemes or panicles; bracts and bracteoles small, caducous. Calyx spathaceous, 5-lobed or partite. Petals 5, subequal, imbricate. Stamens 10, sometimes some reduced to staminodes, free or basally connate; anthers versatile, dehiscing longitudinally. Ovary stipitate, 2-many-ovuled; style filiform; stigma peltate or oblique. Pods linear or oblong, flattened, dehiscent or not. Seeds orbicular or ovate, compressed.

1a. Flowers white; filaments pubescent at base; leaf-lobes acute or acuminate at apex ..... **B. acuminata**

1b. Flowers not white; filaments glabrous; leaf-lobes subacute or rounded at apex.

2a Stamens 10; flowers yellow; pods puberulous ..... **B. tomentosa**

2b. Stamens 5; flowers rose to pink; pods glabrous ..... **B. purpurea**

Bauhinia acuminata L., Sp. Pl. 376. 1753; Hook. f., Fl. Brit. India. 2: 276. 1878; Gamble, Fl. Pres. Madras 408. 1919; de Wit, Reinwardtia 3: 394. 1956; Mani. & Sivar., Fl. Calicut 94. 1982; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 122. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 37. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 163. 1994. ***Velutta- mandaru*** Rheede, Hort. Malab. 1: 61-62, t. 34. 1678. ***Mandaram***

Shrubs to 2.5 m tall; young stem puberulent. Leaves of 2 leaflets, connate to two third of their longth, 4-11 x 3.5-8cm, ovate to subrotund, base subcordate, apex acute to acuminate, palmately nerved, tomentose beneath; stipules 1-1.8 cm long, puberulent, caducous. Flowers large, in few-flowered, lateral or axillary racemes. Calyx c. 3 cm long, spathaceous, pubescent. Petals white, 2- 2.8 cm long, broadly elliptic-obtuse. Stamens 10; filaments connate at base, free above, 1.5- 2.2 cm long, pubescent at base. Ovary stipitate, oblong; ovules many; stigma peltate. Pods 5-12 x 1.2-2 cm linear-oblong, 3-9-seeded, compressed, septate within, ridged on both sutures. Seeds 8-10 x 5-6 mm, compressed, black.

Fl. & Fr.: Aug.- Sept.

Distr. : South East Asia.

Widely cultivated as an ornamental; and also found running wild. *CNS 1884* (Veeyapuram).

Bauhinia purpurea L., Sp. Pl. 375. 1753; Hook. f., Fl. Brit. India 2: 284. 1878; Gamble, Fl. Pres. Madras 407. 1919; deWit, Reinwardtia 3: 406. 1956; Mani. & Sivar., Fl. Calicut 94. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 485. 1983; Nicols., Suresh & Mani., An

Interpr. Hort. Malab. 122. 1988; Vajravelu, Fl. Palghat Dist. 179. 1990. ***Chovanna-mandaru*** Rheede, Hort. Malab. 1: 59-60, t. 33. 1678.

Trees. Leaves of 2 leaflets, connate about half way, 6-11 x 6.5-11.5 cm, base subcordate, apex obtuse or subacute, thin-coriaceous, 11-13-nerved; petiole to 3 cm long; stipules triangular. Flowers 6-7.5 cm across, in terminal or axillary, dense-tomentose paniculate racemes; bracts 3-4 cm long, ovate. Calyx-tube c. 2 cm long, turbinate, apex 2-cleft. Petals 5, rose to pink, c.3 x 1.5 cm, obovate, obtuse. Stamens 5; filaments to 2 cm long; anthers c.5 mm long, oblong. Ovary 1.2-1.4 cm long, compressed; ovules many; style to 1cm long; stigma capitate. Pod oblong, compressed, narrowed at base. Seeds c. 10, to 1.5 x 1 cm , ovoid.

Fl. & Fr. : Sept. - Jan.

Distr. : South East Asia. Often cultivated in Gardens. *CNS 2041* (Cherthala)

Bauhinia tomentosa L., Sp. Pl. 375. 1753; Roxb., Fl. Ind. 2: 323. 1832; Hook. f., Fl. Brit. India 2: 275. 1878; Gamble, Fl. Pres. Madras 406. 1919; de Wit, Reinwardtia 3: 410. 1956; Mani. & Sivar., Fl. Calicut 94. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 486. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 124. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7:38. 1991. *Alvesia bauhinioides* Welw., Apont. 47: 587. 1859 ('1858'). *Alvesia tomentosa* (L.) Britt. & Rose, No. Am. Fl. 23: 208. 1930. ***Canschena-pou*** Rheede, Hort. Malab. 1: 63-64, t. 35. 1678.

Shrubs; young stem tomentulose. Leaves 3-8 x 2-6 cm, base subcordate, lobes rounded at tip, dense-tomentose, 7-nerved; petiole to 2.5 cm long; stipules linear. Racemes terminal or axilliary, 2-4-flowered; bracts and bracteoles linear, puberulent, caducous. Calyx c. 2 cm long, spathaceous, bifid at apex, puberulent. Petals 5, yellow, 4-6 x 3-4 cm, obovate. Stamens 10; filaments free, c. 2 cm long. Ovary pubescent; ovules many; style 2-2.5 cm long; stigma peltate. Pods 5-9 x 1.5-2 cm, oblong. Seeds 10-12, 6-8 x 4-5 mm, sublenticular, black.

Fl.& Fr. : Most of the seasons.

Distr. : Sri Lanka, India and Tropical Africa; introduced elsewhere as an ornamental. *CNS 2057* (Neerkunnam).

CAESALPINIA Linnaeus

Sp. Pl. 380. 1753.

Trees, shrubs or climbers, usually armed with prickles. Leaves bipinnate; leaflets few to many, opposite, stipules various. Flowers usually large and showy, in racemes or racemose panicles, terminal and from the axils of upper leaves. Calyx lobes unequal, the outer larger. Petals 5, subequal. Stamens 10, declinate; filaments usually villous at base. ovary sessile or shortly stipitate; ovules few; style subulate or long; stigma turncate or clavate, sometimes ciliolate. Pods compressed, dehiscent or not, beaked by the style.

1a. Plants unarmed; shrubs or trees.

2a. Flowers in dense panicles; petal cream-coloured, 4-10 mm long; pedicles 3-6 mm long; stamens not exserted; pods indehiscent, twisted ..... **C.coriaria**

2b. Flowers in corymbose racemes; petals yellow or crimson, 1.5-2.5cm long; pedicels 3-7cm long; pods dehiscent, not twisted .....**C. pulcherrima**

1b. Plants armed with sharp prickles; stragglers.

3a. Twigs glandular hairy; pinnae 12-18 pairs; leaflets 10-15 pairs, upto 4 mm wide ..... **C. mimosoides**

3b. Twigs not glandular hairy; pinnae 3-5 pairs, leaflets 2-8 pairs, above 8 mm wide.

4a. Leaves with large foliaceous stipules; leaflets 5-8 pairs; pods covered with prickles ..... **C. bonduc**

4b. Leaves without large foliaceous stipules; leaflets 2-3 pairs; pods smooth, not covered with prickles .....**C. nuga**

Caesalpinia bonduc (L.) Roxb., Fl. Ind. 2: 362. 1832; Hattink, Reinwardtia 9: 17. 1974; Britto in Matthew, Fl. Tam. Carnatic 3: 488. 1983; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 48. 1991; Sanjappa, Leg. India 9. 1992; Sivar. & Mathew, Fl. Nilambur 229. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 161. 1996. *Guilandia bonduc* L., Sp. Pl. 381.

1753. *Caesalpinia bounducella* (L.) Flem., Asiat. Res. 11: 159. 1810; Baker in Hook. f., Fl. Brit. India 2: 254. 1878. *Caesalpinia cristata* auct. non L., 1753: Gamble, Fl. Pres. Madras 393. 1919.

Scandent shrubs; stems armed with recurved prickles. Leaves bipinnate, to 50 cm long; pinnae 4-5 pairs; leaflets 5-8 pairs per pinna, 2-5 x 0.8-2.2 cm, ovate or elliptic-oblong, base rounded, apex obtuse, mucronate; petiole to 15 cm long; stipules 0.8-1.7 cm long, foliaceous, lobed or pinnate. Racemes supra-axillary or terminal, many-flowered, to 15 cm long. Flowers c.1.5 cm across; pedicels 2-5 mm long; bracts 6-8 x 1-2 mm, lanceolate, caducous. Calyx lobes 5, separate almost to the base, 5-8 mm long, oblong or obovate, pubescent. Petals yellow as long as the sepals, oblanceolate, reflexed; upper one smaller. Stamens 10; filaments villous. Ovules 2. Pods 4.5-9 x3.5-4.5 cm, elliptic, turgid, beaked, covered with straight, puberulent spines. Seeds 1 or 2, 1-1.5 cm across, subglobose, greyish-white.

Fl. & Fr. : Oct.- Feb.

Distr.: Throughout the Tropics. Rare, once collected from wasteland. *CNS 2149* (Allappuzha town).

Caesalpinia coriaria (Jacq.) Willd., Sp. Pl. 2:532. 1799; Gamble, Fl. Pres. Madras 394. 1919; Mani. & Sivar., Fl. Calicut 99. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 489. 1983; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 55. 1991. *Poinciana coriaria* Jacq., Select. Strip. Amer. Hist. 123, t. 175. 1763.

Unarmed trees; branches tomentose. Leaves bipinnate; pinnae 4-8 pairs, subopposite; leaflets 17-25 pairs, c. 7 x 2 mm, linear-oblong, base obliquely cordate, apex emarginate, punctate. Flowers c. 8 mm across in dense axillary and terminal panicles. Sepals 5, oblong. Petals 5, cream coloured, 4-10 mm long, ovate-orbicular, clawed; upper one smaller, c. 3 mm long. Stamens 10; filaments subequal, basally villous. Ovary 2-3 mm long, stipitate; stigma capitate. Pods twisted. Seeds oblong.

Fl. & Fr. : Dec. - Apr.

Distr. : Tropical America; now cultivated in other tropical parts of the world. Commonly grown on roadsides as an avenue tree. *CNS 1911* (Thottappally).

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; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 218. 1976; Mani. & Sivar., Fl. Calicut 98. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 492. 1983; Mani., Fl. Silent Valley 90. 1988; Ramach. & Nair, Fl. Cannanore 163. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 126. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7:55. 1991; Sanjappa, Leg. India 12. 1992; Sivar. & Mathew, Fl. Nilambur 230. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 161. 1996. ***Kal-todda-vaddi*** Rheede, Hort. Malab. 6: 15-16, t. 8. 1686.

Straggling shrubs with tuberous root stock, prickly all over; twigs glandular hairy. Leaves to 40 cm long; pinnae 12-18 pairs; leaflets 10-15 pairs, c. 6 x 3 mm, oblong or elliptic, base unequal, apex obtuse; rachis prickly and glandular hairy. Flowers upto 2.5 cm across, bright yellow, in terminal and leaf-opposed racemes up to 40 cm long. Calyx-tube c. 2 mm long; lobes 5, 0.9-1.2 cm long, oblong or obovate, glandular. Petals 5, yellow, c. 1.2 x 1 cm , orbicular; upper petal c. 1.2 x 0.5 cm , obovate, spathulate, clawed. Stamnes 10; filaments subequal, hairy at base. Ovary stipitate, oblong, 2-4-ovuled; stigma entire. Pods c. 4.5 x 2.5 cm, oblong-obvoid, turgid. Seeds 2.

Fl. & Fr. : Dec. - Feb.

Distr. : Peninsular India and Sri Lanka. In waste lands. *CNS 1785* (Mavelikkara).

Caesalpinia nuga Ait., Hort. Kew. (ed. 2) 73: 32. 1811; Hook. f., Fl. Brit. India 2: 255. 1878; Gamble, Fl. Pres. Madras 394. 1919; Mani. & Sivar., Fl. Calicut 98. 1982.

Large straggling shrubs; stems and leaf-rachis with recurved prickles. Leaves bipinnate,16-50 cm long, pinnae 3-5 pairs; leaflets 2-3 pairs, 1.5-5 x 1-2.5 cm, ovate or elliptic, base rounded or turncate, apex acute or obtuse, coriaceous, glaucous beneath. Panicles terminal. Flowers fragrant, 1.5-1.8 cm long, c. 2 cm across; pedicels 0.8-1.2 cm long; bracts 2- 2.2 x 1-1.5 mm, obovate, margins ciliate, deciduous. Sepals yellowish

green, unequal; lower one 0.8-1 cm long, linear-oblong, concave, acute; others 4-6 x 2-3 mm, oblong, obtuse. Petals 5, yellow; upper petal c. 5 x 4 mm, obovate-spathulate, clawed, yellow with red shade at base; claw 3-4 mm long; others 0.8-1 x 0.5-0.6 cm, ovate-orbicular. Stamens 10; filaments to 1.5 cm long, hairy towards base; anthers c.1.5 mm long. Ovary c. 3 x 2 mm, compressed, pubescent, stalked; style 6-8 mm long. Pod 5.5-7 x 2.5- 3.5 cm, obliquely ovoid, compressed, beaked, 1-seeded.

Fl. & Fr.: Most of the seasons.

Distr.: Malayisles, Philippines, China, N. Australia, Polynesia, Sri Lanka and India. Rare, among mangrove swamps. *CNS 1471* (Perumbalam).

Caesalpinia pulcherrima (L.) Swartz, Obs. Bot. 166. 1791; Hook. f., Fl. Brit. India 2: 255. 1 878; Gamble, Fl. Pres. Madras 394. 1919; Bor & Raiz., Beatif. Ind. Climbers & Shrubs 56. 1954; Mani. & Sivar., Fl. Clicut 99. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 493. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 126. 1988; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7:46.1991. *Poinciana pulcherrima* L., Sp. Pl. 380. 1753. ***Tsjetti-mandaru*** Rheede, Hort. Malab. 6: 1-2, t. 1. 1686. **Rajamalli.**

Branching shrubs to 5 m tall. Leaves bipinnate; rachis 20-30 cm long; pinnae 4-8 pairs; leaflets 6-8 pairs on each pinna, 1-2 x 0.5-1.2 cm, elliptic to obovate, base cuneate, apex rounded or emarginate; stipules, c. 2 mm long, subulate, caducous. Flowers in terminal corymbose racemes, 20-50 cm long; pedicles 3-7 cm long. Calyx 1-1.5 cm long, outer lobe cucullate, enclosing the flower bud. Petals 1.5-2.5 cm long, subequal, commonly flame-red but sometimes yellow. Stamens 10; filaments reddish, 0.5 cm long, exserted. Pods 6-12 x 1.5-2 cm, obliquely oblong, compressed, short-stipitate, beaked at apex, 8-10-seeded. Seeds 8-10 x 6-8 mm, obovate, compressed, black.

Fl. &. Fr.: Most of the seasons.

Distr. : Presumably a native of tropical America but is widely distributed pantropically as an ornamental and as an escape. *CNS 2177* (Karthigappally).

CASSIA Linnaeus

Sp. Pl. 376. 1753.

Trees, shrubs or herbs. Leaves paripinnate; leaflets opposite or subopposite, often with glands on rachis or petioles; stipules various or absent. Inflorescnece terminal, axillary or supra-axillary racemes, panicles or rarely solitary; bracts and bracteoles present. Calyx deeply cleft, lobes 5, imbricate. Petals 5, usually yellow, upper smaller, clawed. Stamens 10, sometimes reduced, all perfect or few forming staminodes; anthers of 3 lowest stamens largest, dehiscing by apical pores or slits. Ovary sessile or stipitate; ovules many; style incurved; stigma truncate or ciliolate. Pods terete or flat, membranous or woody, dehiscent or indehiscent, sometimes septate between seeds. Seeds usually compresed, discoid to ovoid.

1a. Leaves with glands on petiole or rachis.

2a. Leaves with one sessile gland just above the base of the petiole, none between the leaflets.

3a. Leaflets 20 or more pairs, less than 3 mm wide ..... **C. mimosoides**

3b. Leaflets 3-10 pairs, more than 1cm wide.

4a. Plants glabrous or subglabrous; pods, flat, compressed, straight.

5a. Leaflets 6-10 pairs; glands clavate ..... **C. sophera**

5b. Leaflets 4-5 pairs; glands hemispherical ..... **C. occidentalis**

4b. Plants hirsute; pods subterete, curved .....**C. hirsuta**

2b. Leaves with subulate or stipitate glands between the leaflets, none on the petiole base.

6a. Whole plant rufous hairy; stamens intermingled with stalked glands; pods 1-4 cm long, straight ..... **C. sericea**

6b. Whole plant glabrous; stamens not intermingled with stalked glands; pods 8-14 cm long, curved ..... **C. tora**

1b. Leaves eglandular.

7a. Pods 4-winged, erect; flowers in spicate racemes .....**C. alata**

7b. Pods not 4-winged, drooping; flowers in panicles or in drooping racemes.

8a. Inflorescence a drooping raceme; fertile stamens 10; pods 25-52 cm long, terete; leaflets 4-7pairs ..... **C. fistula**

8b. Inflorescence a terminal panicle; fertile stamens 7; Pods 18-28 cm long, linear, compressed; leaflets 6-12 pairs ..... **C. siamea**

Cassia alata L., Sp. Pl. 378. 1753; Wight, Ic. t. 253. 1840; Baker in Hook. f., Fl. Brit. India 2: 264. 1878; de Wit, Webbia 11: 231. 1955; Mani. & Sivar., Fl. Calicut 96. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 497. 1983; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 68. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 164. 1994; Sivar. & Mathew, Fl. Nilambur 232.1996. *Senna alata* (L.) Roxb., Fl. Ind. ed. 2, 2: 349. 1832; Irwin & Barneby, Mem. New York Bot. Gard. 35: 460. 1982.

Erect shrubs to 4 m tall. Leaves 28-60 cm long; leaflets 6-12 pairs, 4-13 x 2-6 cm, oblong to obovate-oblong, base rounded to subcordate, apex rounded; stipules 1-2 cm long, deltoid, base auriculate, apex acute to acuminate. Inflorescence terminal or axillary, many-flowered spicate raceme, 40-60 cm long. Flowers yellow; pedicels 4-8 mm long; bracts petaloid, yellow, 1-2 cm long, ovate-elliptic, subacute. Sepals 1-1.5 cm long, yellow. Petals yellow, 1.5-2 cm long, obovate. Stamens 10, anthers 2 large, 5 medium-sized, and 3 small. Pods 9-14 x 1.5-2 cm, linear, 4-winged, septate, dehiscent. Seeds many, 5-7 x 4-5 mm, rhomboid, compressed, dark brown.

Fl. & Fr.: Most of the seasons.

D*istr. :* Native to tropical America but introduced pantropically. *CNS 1275* (Nedumudi).

Cassia fistula L., Sp. Pl. 377. 1753; Baker in Hook. f., Fl. Brit. India 2: 261. 1878; Gamble, Fl. Pres. Madras 400. 1919; de Wit, Webbia 11: 207. 1955; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 219. 1976; Mani. & Sivar., Fl. Calicut 96. 1982; Britto in Matthew, Fl. Tam. Carnatic 3:498. 1983; Mani., Fl. Silent Valley 91. 1988; Ramach. & Nair, Fl. Cannanore 164. 1988; Vajravelu, Fl. Palghat Dist. 181. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 62.1991; Sanjappa, Leg. India 15. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 165. 1994; Sivar. & Mathew, Fl. Nilambur 223. 1996;

Sasi. & Sivar., Fl. Pl. Thrissur For. 163. 1996. *Cassia rhombifolia* Roxb., Fl. Ind. 3: 334. 1832; Wight, Ic. t. 269. 1840. ***Conna*** Rheede, Hort. Malab. 1: 37-38, t. 22. 1678. ***Konna***.

Deciduous small trees; bark smooth, yellowish-brown, reddish inside. Leaves 15-40 cm long; leaflets 4-7 pairs, opposite to subopposite, 6-12 x 3-4 cm, ovate-lanceolate, base rounded to attenuate, apex acute to slightly acuminate; stipules small, caducous. Flowers bright yellow, c. 4 cm across, in many flowered drooping, 15-35 cm long racemes; pedicels 3-4 cm long. Calyx lobes 5, 0.7-1 x 0.4-0.6 cm, broadly ovate. Petals 5, 1.5-2 x 0.7-1 cm , ovate-elliptic. Stamens 10, all fertile, unequal. Ovary 1.5-2 cm long, sickle shaped; ovules numerous; stigma punctiform. Pods 25-52 cm long, 1-1.5 cm diam., oblong-terete, woody, drooping, black on drying, indehiscent, septate within. Seeds many, 3-4 mm diam., discoid, embedded in blackish pulp.

Fl. & Fr. : Mar. - Jun.

Distr. : Probably native to South East Asia, but distributed pantropically as an ornamental. Often planted as an ornamental as an avenue trees. *CNS 2077* (Haripad).

The flowers are very usually used in Hindu religious ceremonies. Root is used to treat skin diseases, leprosy and tuberculosis.

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; Mani. & Sivar., Fl. Calicut 97. 1982; Britto in Matthew, Fl. Tam. Carnatic 3:501. 1983; Mani., Fl. Silent Valley 91. 1988; Vajravelu, Fl. Palghat Dist. 181. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 76. 1991; Sanjappa, Leg. India 15. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 165. 1994; Sivar. & Mathew, Fl. Nilambur 223. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 163. 1996. *Senna hirsuta* (L.) Irwin & Barneby, Phytologia 44: 449. 1979 & in Mem. New York Bot. Gard. 35: 425. 1982.

Erect undershrubs, densely hirsute all over. Leaves to 18 cm long, usually with 3-5 pairs of leaflets; leaflets 3.5-6 x 2-3.5 cm, ovate or elliptic, base rounded, apex acuminate,

silky hairy on both sides; rachis 8-12 cm long, a large black gland on the rachis just below the lowest leaflets; stipules 5-8 mm long, linear-lanceolate. Flowers yellow, c.1.5 cm across, in axillary and terminal few-flowered racemes; pedicels 1-1.4 cm long; bracts linear. Sepals 5, 5-8 mm long, oblong, densely hairy without. Petals 5, 0.8-1 cm long, obovate, obtuse. Stamens 10 , unequal, 6 or 7 fertile. Ovary 2-2.5 mm long, tomentose; ovules many; style glabrous. Pods 10-15 x 0.6-0.8 cm, linear, subterete, curved, densely hirsute. Seeds many, c. 3 x 2.5 mm, orbicular, compressed, light brown.

Fl. & Fr.: Nov. - Jan.

Distr.: Native of Tropical America, now getting naturalised throughout Old World tropics. Common in wastelands. *CNS 1315* (Chengannur).

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; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 220. 1976; Vijendra Singh. J. Bombay Nat. Hist. Soc. 75: 439.1979; Mani. & Sivar., Fl. Calicut 95. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 502. 1983; Mani., Fl. Silent Valley 92. 1988; Ramach. & Nair, Fl. Cannanore 165. 1988; Vajravelu, Fl. Palghat Dist. 181. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7:89. 1991; Sanjappa, Leg. India 17. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 165. 1994; Sivar. & Mathew, Fl. Nilambur 234. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 163. 1996. *Cassia angustissima* Lam., Encycl. Meth. 1: 650. 1783; Wight & Arn., Prodr. 292. 1834.

Erect annual herbs up to 1.2 m tall; young stem, rachis and peduncles appressed hairy. Leaves 4-8 cm long; leaflets 25-55 pairs, 3-7 x 1-2mm, linear-oblong, base oblique, ciliate on margins, apex subacute, midrib excentric, sensitive to touch and strock; rachis with a sessile gland near the base; stipules 5-10 mm long , linear. Flowers solitary or in axillary or supra-axillary racemes of 2 or 3; peduncle 1-2 cm long; bracts 3-6 mm long, ovate; bracteoles scarious; pedicels 0.5-1.5 cm long. Sepals 5, 4-5 mm long, lanceolate, hairy without. Petals 5, yellow, 5-8 mm long, obovate. Stamens 10, alternating long and short. Ovary c. 5 mm long, linear, densely white lhairy; stigma truncate. Pods 3-6 x 0.4-

0.5cm, linear-oblong or linear, flattened, thickened on margins, appressed hairy. Seeds c. 20, 2-3 x 1-2 mm, ellipsoid.

Fl. & Fr. : Sept. - Dec.

Distr. : Throughout Old World tropics. In waste places and road sides. *CNS 1891* (Kanichukulangara Jn.).

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. 1855; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 220. 1976; Mani. & Sivar., Fl. Calicut 97. 1982; Britto in Matthew , Fl. Tam. Carnatic 3: 505. 1983; Ramach. & Nair, Fl. Cannanore 165. 1988; Vajravelu, Fl. Palghat Dist. 182. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 75. 1991; Sanjappa, Leg. India 19. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 166. 1994; Sivar. & Mathew, Fl. Nilambur 235. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 163. 1996. *Senna occidentalis* (L.) Roxb., Fl. Ind. 2: 343. 1832.

Erect subshrubs up to 2 m tall. Leaves up to 22 cm long; leaflets 4-5 pairs, 2.5-7 x 1.5-3.5 cm , ovate-lanceolate, base rounded, apex acute or acuminate, glabrous or pubescent; rachis to 18 cm long with a sessile, hemispherical gland at base; stipules 4-7 mm long, linear-lanceolate, acuminate, caducous. Flowers c. 2 cm across, in terminal and axillary racemes, to 3 cm long; pedicels 0.8-1.2 cm long; bracts linear-lanceolate. Sepals 6-10 mm long, ovate, obtuse, mucronate. Petals 5, yellow, 1-1.5 cm long, obovate. Stamens 10, unequal, only 7 fertile. Pods 5-9 x 0.6-0.8 cm, linear, compressed. Seeds 20-25, 4-5 x 3-4 mm, ovate or suborbicular, compressed, brown.

Fl. & Fr. : Oct.- Feb.

Distr.: Pantropical. Common in open waste lands. *CNS 1147* (Alappuzha beach), *CNS 1389* (Kayamkulam).

Roots are used against ring-worm infestations and leaves against cough and asthma.

Cassia sericea Sw., Fl. Ind. Occ. 2(1) : 724. 1798; Griseb., Fl. Brit. W. Ind. Is. 3:209. 1860; Gooding *et al.*, Fl. Barbados 181. 1965; Singh, Bull. Bot. Surv. India 21: 203. 1979; Raghavan, Bull. Bot.Surv. India 22: 225. 1982 (Fig. 20).

Erect annual subshrubs to 150 cm tall. Whole palnt rufous hairy, especially the younger parts. Leaves paripinnate; rachis with stipitate yellow glands between each pair of leaflets; leaflets 3-4 pairs, opposite, subsessile, 2-5 x 1.5-3.5 cm, obovate-oblong, lowest pair smallest, base cuneate, apex rounded, apiculate, rufous hairy. Raceme axillary, 3-7-flowered; peduncle up to 1.5 cm long. Flowers yellow, c. 1 cm across; pedicel 3-5 mm long with a single stipitate gland near the base; bracts 5-10 mm long, linear, rufous hairy. Sepals 5, orbicular-cupular; outer 3 c. 3 mm long, with rufous long hairs externally; inner 2 c. 5 mm long, glabrous, margin ciliate. Petals 5, 5-6 x 4-5 mm, obovate, obtuse or rounded at apex; posterior one oblong with turncate or emerginate apex, shortly clawed at base. Fertile stamens 6-7, intermingled with stalked glands; filaments c. 2 mm long; anthers 1.5-2 mm long. Staminodes 3-4, 1.7-2.6 mm long, apex spathulate. Ovary sessile, c. 3 mm long, hirsute; style incurved; stigma turncate. Pods 3-6 in clusters, 10-40 x 3-4 mm, linear, slightly 4-gonous, very hairy when young, lesser afterwards, 3-9-seeded, beaked. Seeds 4-5 x 2.5-2 mm, sub-quadrangular- rhomboidal, brown.

Fl. & Fr. : Oct.- Dec.

Distr. : A native of tropicl South America, particularly the West Indies and the Bahamas; probabaly recently introduced in India. *CNS 2101* (Chengannur R.S. surroundings).

Cassia siamea Lam., Encycl. 1: 648. 1783; Baker in Hook. f., Fl. Brit. India 2: 264. 1874; de Wit , Webbia 11: 263. 1955; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 221. 1976; Mani. & Sivar., Fl. Calicut 97. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 508. 1983; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon7: 71. 1991; Sivar. & Mathew, Fl. Nilambur 235. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 164. 1996. *Cassia sumatrana* Roxb., Hort. Beng. 31. 1814, *nom. nud.*, Moon, Cat. 33. 1824. *Senna sumatrana* Roxb.,

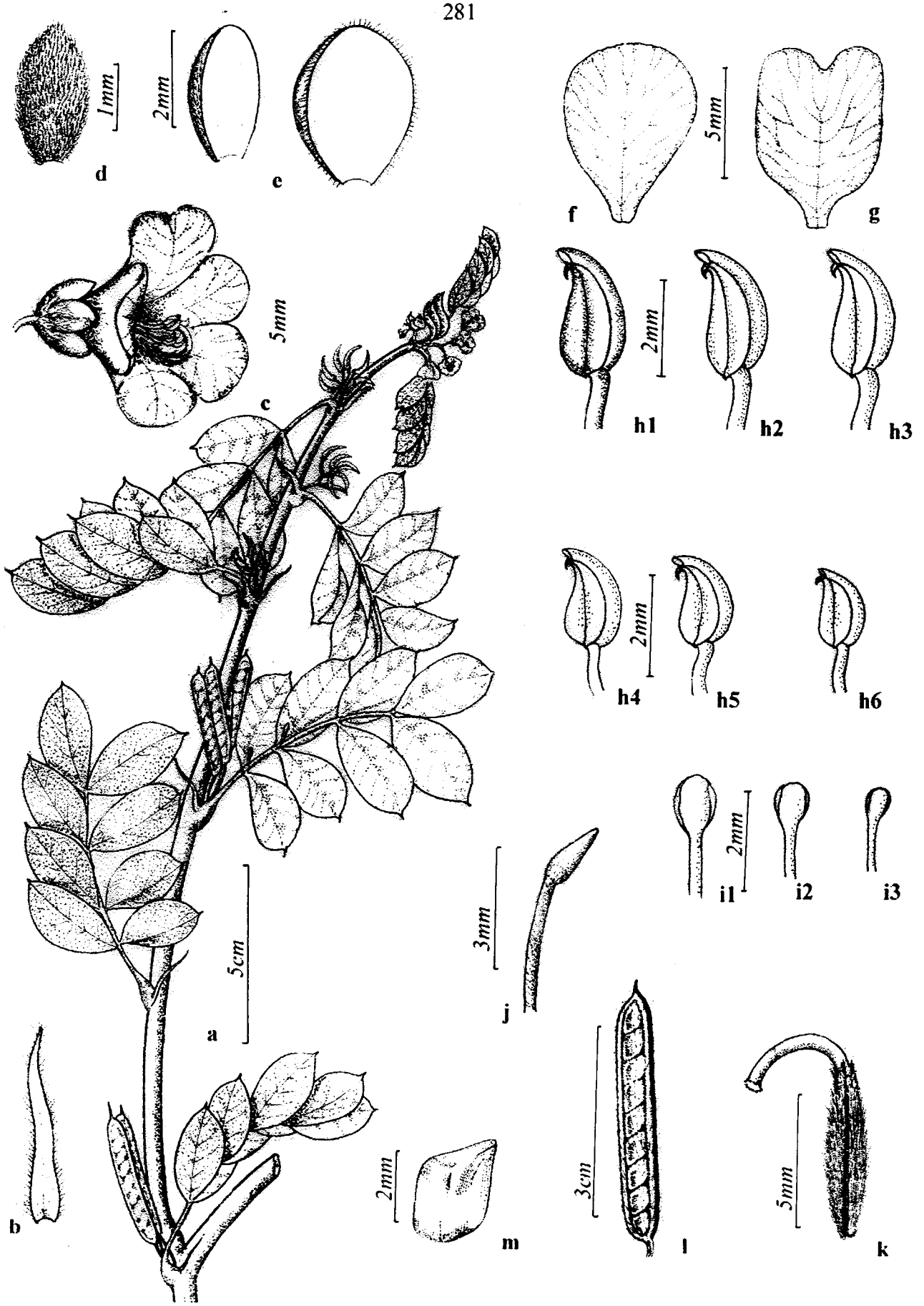


Fig. 20. *Cassia sericea* Sw.: a. Twig with flowers and fruits; b. Bract ; c. Flower; d. Outer sepal-inner and outer views; e. Inner sepal; f. Petal; g. Posterior petal; h1-h6. Stamens; i1-i3. Staminodes; j. Stalked gland; k. Pistil; l.Pod; m. Seed.

Fl. & Fr.: Nov.-Mar.

Distr.: Pantropical. In wastelands. *CNS 1390* (Kayamkualm).

Cassia tora L., Sp. Pl. 376. 1753; Baker in Hook. f., Fl. Brit. India 2: 263. 1878, p.p., Gamble, Fl. Pres. Madras 401. 1919; de Wit, Webbia 11:276. 1955; Brenan, Kew Bull. 13: 248. 1958; Gandhi in Sald. & Nicols.,Fl. Hassan Dist. 221. 1976; Mani. & Sivar., Fl. Calicut 96. 1982; Britto in Matthew, Fl. Tam. Carnatic 3:510. 1983; Ramach. & Nair, Fl. Cannanore 166. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 130. 1988; Vajravelu, Fl. Palghat Dist. 182. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 83. 1991; Sanjappa, Leg. India 22. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 166. 1994; Sivar.& Mathew, Fl. Nilambur 236./ 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 164. 1996. ***Tagera*** Rheede, Hort. Malab. 2: 103, t. 53. 1679. ***Takara***

Annual, glabrous subshrubs up to 1 m tall. Leaves to 15 cm long, bearing a slender cylindric gland on the rachis between the leaflets of the lower 2 pairs; leaflets 2-4 pairs, 1.5-4.5 x 1.5-2.5 cm, obovate-oblong, base somewhat oblique, apex obtuse, pubescent below; stipules 1-1.5 x 0.1- 0.2 cm, linear. Flowers c. 1.5 cm across, in few-flowered axillary racemes; pedicels 4-6 mm long; bracteoles 2, 2-3 mm long. Sepals 5, 5-6 mm long, obovate-obtuse. Petals 5, yellow, 8-12 mm long, obovate-obtuse. Stamens 10, unequal, only 7 fertile, 3 large, 4 medium, 3 staminodal. Ovary subsessile, pubescent; ovules numerous. Pods 8-14 x 0.3-0.6 cm, linear, subtetragonous, septate between seeds, indehiscent. Seeds 20-30, 4-5 mm long, oblong, compressed, chestnut-brown.

Fl. Fr : Jul.- Nov.

Distr.: Indo-Malesia to Polynesia. A common weed along road sides and waste lands. *CNS 1151* (Thakazhy).

DELONIX Rafinesque

Fl. Tell. 2: 92. 1837 ("1836").

Delonix regia (Bejer ex Hook.) Rafin., Fl. Tell. 2: 92. 1836; Gamble, Fl. Pres. Madras 396. 1919; Mani. & Sivar., Fl. Calicut 99. 1982; Britto in Matthew, Fl. Tam. Carnatic 3:

512. 1983; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 104. 1991. *Poinciana regia* Boj. ex Hook. in Curtis, Bot. Mag. t. 2884. 1829; Hook. f., Fl. Brit. India 2: 260. 1878.

Deciduous trees. Leaves bipinnate; pinnae 8-20 pairs; leaflets 10-25 pairs, c. 7 x 3 mm, elliptic to linear-oblong; stipules small. Flowers showy in terminal corymbose racemes, scarlet-red with a mottled odd petal. Calyx-lobes 5, connate in bud. Petals 5, 4-7 cm long, orbicular, clawed. Stamens 10. Ovary sessile; ovules many; style filiform. Pods 25-60 x 4-7 cm, linear-oblong, pendulous.

Fl. & Fr.: Apr. - Aug.

Distr.: A native of Madagascar, now cultivated throughout the tropics. Commonly cultivated as an avenue tree. *CNS 1784* (Alappuzha town).

PELTOPHORUM (Vogel) Bentham

J. Bot. (Hooker) 2: 75. 1840 (*nom.cons.*).

Peltophorum petrocarpum (DC.) Backer ex Heyne, Nutt. Pl. Ned.-Ind. ed. 2, 2:755. 1927; Blake, Austr. J. Bot. 2: 112. 1954; Mani. & Sivar., Fl. Calicut 97. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 514. 1983; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 57. 1991. *Inga pterocarpa* DC., Prodr. 2: 441. 1825. *Peltophorum ferrugineum* Benth., Fl. Austr. 2: 279. 1864; Hook. f., Fl. Brit. India 2: 257. 1878.

Trees, young shoots rusty tomentose. Leaves bipinnate; pinnae 4-14 pairs; leaflets 8-17 pairs, 1-2 x 0.3-1 cm , oblong, base acute or rounded, apex obtuse. Inflorescence terminal, paniculate. Flowers fragrant, yellow; pedicels 7-10 mm long; bracts deltoid. Sepals 7-10 mm long. Petals bright yellow, 1.7-2.5 cm long, obovate, hairy at base. Stigma peltate. Pods 4.5-8.8 x 1.7-2.5 cm, oblong-elliptic, copper-red. Seeds 1-4, c. 1 x 0.5 cm, lenticular, compressed, light brown.

Fl. & Fr. : Mar. - Jun.

Distr. : Sri Lanka, Australia, India and Maleysia; introduced elsewhere in the tropics. Commonly cultivated as an ornamental and as an avenue tree. *CNS 1951* (Kakkazham).

SARACA Linnaeus

Mant. 13, 98.1767.

Saraca asoca (Roxb.) de Wilde, Blumea 15: 393. 1968; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 224. 1976; Mani. & Sivar., Fl. Calicut 94. 1982; Ramach. & Nair, Fl. Cannanore 167. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 142. 1988; Vajravelu, Fl. Palghat Dist. 184. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 99. 1991; Sanjappa, Leg. India 35. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 170. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 166. 1996. *Jonesia asoca* Roxb., Asiat. Res. 4: 365. 1799; Wight, Ic. t. 206. 1839. *Saraca indica* auct. non L., 1769. Beddome, Fl. Sylv. t. 57. 1870; Baker in Hook . f., Fl. Brit. India 2: 271. 1878; Gamble, Fl. Pres. Madras 409. 1919. ***Asjogam*** Rheede, Hort. Malab. 5: 117, t. 59. 1685. **Asokam.**

Small to medium sized trees. Leaves to 25 cm long; leaflets 4-6 pairs, 4-20 x 2-6.5 cm, oblong to lanceolate, base cuneate, apex acute or acuminate, subcoriaceous; stipules scarious, to 2 cm long, ovate. Inflorescence compact corymbose panicles, axillary and terminal. Flowers c. 4 cm long; bracts 2-5 x 2-3 mm, ovate; bracteoles c. 4 x 2 mm, oblong-spathulate, ciliolate. Calyx orangish-scarlet; tube 1-1.7 cm long; lobes 7-10 x 5-8 mm, elliptic to obovate, apex rounded. Petals lacking. Stamens 6-8; filaments reddish, 1.5-2.2 cm long, much exserted. Ovary pubescent; style incurved. Pods 6-18 x 2-4 cm, elliptic-oblong. Seeds 4-8, 3-4 cm wide, ellipsoid-oblong.

Fl. & Fr.: May- Jul.

Distr. : India and Myanmar.

According to de Wilde (1.c.) *Saraca indica* L. occurs in Thailand, Malay Peninsula, Sumatra and Java and the species occurring in India is *Saraca asoca* (Roxb) de Wilde. *CNS 1969* (Chingoli).

TAMARINDUS Linnaues

Sp. Pl. 34. 1753.

Tamarindus indica L., Sp. Pl. 34. 1753; Beddome, Fl. Sylv. t. 184. 1872; Baker in Hook. f., Fl. Brit. India 2: 273. 1878; Gamble, Fl. Pres. Madras 409. 1919; Gandhi in Sald.& Nicols., Fl. Hassan Dist. 224. 1976; Mani. & Sivar., Fl. Calicut 94. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 516. 1983; Ramach. & Nair, Fl. Cannanore 168. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 143. 1988; Vajravelu, Fl. Palghat Dist.184. 1990; Rudd in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 96. 1991; Sanjappa, Leg. India 36. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 170. 1994; Sivar. & Mathew, Fl. Nilambur 237. 1996; Sasi. & Sivar., Fl Pl. Thrissur For. 166. 1996. *Tamarindus occidentalis* Gaertn., Fruct. 2:310, t. 146., fig. 2. 1791. *Tamarindus officinalis* Hook., Bot. Mag. t. 4563. 1851. ***Balam-pulli, Madiram-pulli*** Rheede, Hort. Malab. 1: 39-40, t. 23. 1678. **Valam-puli.**

Trees; bark brownish-black, rough with vertical fissures. Leaves even pinnate, to 8 cm long; leaflets 8-17 pairs, 1.2-2.2 x 0.4-0.7 cm, oblong-elliptic, base rounded, apex rounded to truncate, sessile. Inflorescence racemose, terminal or lateral, 2-8-flowered. Flowers c. 1 cm across; pedicels 4-8 mm long. Calyx lobes 4, 8-10 mm long, oblong, reddish, subequal. Petals 3, yellow with reddish venation, 10-13 mm long, odd one smaller than laterals, 2 petals reduced to scales. Stamens 3; staminodes 2, bristly. Pods 5-13 x 1.5-2.5 cm, oblong, torulose, often curved, indehiscent, light brown, scurfy outside. Seeds 5-8, 1-1.5 x 0.5-0.8 cm, compressed, brown.

Fl. & Fr.: Mar.-May.

Distr. : Native of Tropical West Africa; widely cultivated and naturalised in many countries. Common in plains and coasts. Cultivated for its fruits which is used in culinary purposes. *CNS 2154* (Muttar).

Subfamily: **MIMOSOIDEAE**

1a. Free-floating aquatic herbs with thick, white, spongy floats ..... **Neptunia**

1b. Terrestrial, trees, shrubs, stragglers or woody herbs.

2a. Plants armed, rarely unarmed but then the leaves reduced to phyllodes.

3a. Flowers 4-merous; stamens 4-8; pods bristly or spinous on margins ..... **Mimosa**

3b. Flowers 5-merous; stamens 10 or indefinite; pods unarmed.

4a. Stamens 10 ..... **Prosopis**

4b. Stamens indefinite, more than 10.

5a. Filaments connate at the base into a tube; pinnae-pairs 2; leaflets 2 ..... **Pithecellobium**

5b. Filaments free; pinnae-pairs 3 or more; leaflets 10 or more or leaves reduced to phyllodes .....**Acacia**

2b. Plants unarmed.

6a. Flowers in spiciform raceme; seeds bright red ..... **Adenanthera**

6b. Flowers in globose heads; seeds not bright red.

7a. Stamens 10, filaments free.

8a. Pinnae 1 pair, leaflets 2 pairs; anthers gland-crested at least in an early stage; pod thick, woody, falcate ..... **Xylia**

8b. Pinnae 4 or more pairs; leaflets 8-20 pairs; anthers not gland-crested; pod thin, not woody, strap-shaped ..... **Leucaena**

7b. Stamens indefinite, more than 10, filaments basally connate.

9a. Pods with thick mesocarp, turgid, septate between the seeds, indehiscent ..... **Samanea**

9b. Pods without thick mesocarp, compressed, not septate between the seeds, dehiscent ..... **Albizia**

ACACIA P. Miller

Gard. Dict. Abr. ed. 4. 1754.

Erect or scandent, armed or unarmed shrubs or trees. Leaves alternate, bipinnate, some times modified into phyllodes; pinnae a few to several pairs, basal ones smallest terminal ones largest; leaflets even-pinnate, opposite, subsessile; foliar glands often present at the insertion of pinnae and on the upper side of the petiole; stipules various. Flowers in peduncled spikes or globose heads; sometimes arranged in large panicle. Flowers 5-merous, bisexual or polygamous. Calyx-tube campanulate, 5-lobed. Corolla gamopetalous with 5 lobes. Stamens indefinite, shortly connate at base. Ovary stipitate or sessile; ovules 2 to many; stigma capitate. Pod straight or curved, flattened, rarely turgid. Seeds ovoid or compressed.

1a. Unarmed trees; leaves reduced to falcate phyllodes; flowers in elongate spike ... . **A. auriculiformis**

1b. Armed stragglers or trees; leaves well developed, phyllodes absent; flowers in globose heads.

2a. Trees with stipular spines; pods moniliform, glaucous ... **A. nilotica** ssp. **indica**

2b. Stragglers with spines on internodes and leaf rachises, no stipular spines; pods neither moniliform nor glaucous ..... **A. torta**

Acacia auriculiformis A. Cunn. ex Benth. in Hook., Lond. J. Bot. 1: 377. 1842; Chatterjee, Bull. Bot. Soc. Bengal 12: 107. 1958; Anon. (U.S.A.), Trop. Legum.: Resources for Future 165. 1979; Britto in Matthew, Fl. Tam. Carnatic 3: 521. 1983.

Unarmed trees to 10 m tall. Phyllodes alternate, 9-15 x 1.5 - 2.5 cm, elliptic, falcate, base attenuate, apex obtuse, thick-coriaceous, palminerved; petiole to 1.5 cm long. Spikes axillary, solitary or paired, to 7 cm long. Flowers c. 2.5 mm across, yellow, sessile. Calyx-tube c. 0.5 mm long, 5-lobed. Petals 5, yellow, c. 2 mm long, lanceolate. Filaments basally united. Ovary subsessile, c. 1 mm long, globose. Pod c. 3 cm long, spirally twisted.

Fl. & Fr.: Dec.- Apr.

Distr.: Native of tropical Australia. Introduced. *CNS 1858* (Bhagavathipady).

Acacia nilotica (L.) Del., Descr. Egypte, Hist. Nat. Ill. 79. 1813, ssp. **indica** (Benth.) Brenan, Kew Bull. 12: 84. 1957; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 227. 1976; Kosterm. in Dassan. & Fosb., Rev. Hand. Fl. Ceylon 1: 488. 1980; Britto in Matthew, Fl. Tam. Carnatic 3: 528. 1983; Vajravelu, Fl. Palghat Dist. 185. 1990. *Mimosa nilotica* L., Sp. Pl. 521. 1753. *Mimosa arabica* Lam., Encycl. 1: 19. 1783; Roxb., Pl. Corom. t. 149. 1800 & Fl. Ind. 2: 557. 1832. *Acacia arabica* (Lam.) Willd., Sp. Pl. 4: 1085. 1806; Wight & Arn., Prodr. 1: 277. 1834; Beddome, Fl. Sylv. S. India t. 47. 1870; Hook. f., Fl. Brit. India 2: 293. 1878; Gamble, Fl. Pres. Madras 425. 1919, var. *indica* Benth. in Hook. Lond. J. Bot. 1: 500. 1842.

Trees up to 5 m high; bark dark brown, fissured, orangish-yellow inside, branchlets grey-pubescent. Leaves bipinnate; pinnae 3-5 pairs, 2-4 cm long; leaflets 10-16 pairs, subsessile, 3-4 x 1-1.5 mm, narrowly oblong, base obtuse, oblique, apex obtuse; rachis 3-8 cm long, with several glands; stipular spines straight, to 2.5 cm long, white. Flowers sessile, dark yellow, fragrant, in peduncled globose heads, c. 1 cm across, 2-5 in each axil; peduncle 1-2 cm long; involucel of 2 bracteoles near or above the mid peduncle. Calyx-tube c. 1 mm long. Corolla twice as long. Stamens 60-70; filaments basally connate. Ovary terete, stipitate. Pods to 15 x 2 cm, moniliform, constricted, stipitate, glaucous, apex horned. Seeds flat, black.

Fl. & Fr.: Sept. - Dec.

Distr.: Egypt, Arabia, India and Sri Lanka. Cultivated and naturalized in many countries. *CNS 1609* (Kavalam).

Acacia torta (Roxb.) Craib, Bull. Misc. Inform. 1915: 410. 1915; Gamble, Fl. Pres. Madras 428. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 229. 1976; Britto in Matthew, Fl. Tam. Carnatic 3: 533. 1983; Ramach. & Nair, Fl. Cannanore 169. 1988; Vajravelu, Fl. Palghat Dist. 186. 1990; Sivar. & Mathew, Fl. Nilambur 240. 1996; Sasi. & 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. ***Kat-inja***.

Stragglers, to 5 m long; branchlets yellowish-pubescent; internodal thorns c. 5 mm long, straight. Leaves bipinnate; pinnae 10-14 pairs, 4-8 cm long; leaflets 25-35 pairs, 4-8 x 1.5-2 mm, elliptic, base truncate, apex subacute; rachis with a gland on upperside, pubescent, prickled on the underside. Heads c. 1 cm across, in terminal panicles. Flowers c. 2 mm across, white. Calyx-tube c. 1 mm long, 5-lobed. Petals 5, c. 2 mm long. Stamens many; filaments to 4 mm long, basally connate. Pod 6-10 x 1.5-2 cm, flat, thin, base attenuate, apex obtuse.

Fl. & Fr.: Nov. - Apr.

Distr.: Pakistan and India. In sacred groves. *CNS 2212* (Panayannarkavu at Thazhakkara).

ADENANTHERA Linnaeus

Sp. Pl. 384. 1753.

Adenanthera pavonina L., Sp. Pl. 384. 1753; Roxb., Fl. Ind. 2: 370. 1832; Wight & Arn., Prodr. 1: 271. 1834; Bedd., Fl. Sylv. t. 46. 1870; Hook. f., Fl. Brit. India 2: 287. 1878; Gamble, Fl. Pres. Madras 418. 1919; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 470 1980; Mani. & Sivar., Fl. Calicut 102. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 534. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 120. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 172. 1994. ***Mandsjadi*** Rheede, Hort. Malab. 6: 25, t. 14. 1686. ***Manjadi***.

Trees up to 15 m high; bark dark grey, smooth. Leaves bipinnate; pinnae 3-6 pairs, opposite, 8-20 cm long; leaflets 4-8 pairs, subopposite, 2-4 x 1-2.8 cm, elliptic to ovate or obovate, base rounded or broadly cuneate, oblique, apex rounded or emarginate; petiolule to 2 mm long; rachis up to 40 cm long. Racemes axillary spiciform, solitary or in panicles, up to 25 cm long; bracts to 5 mm long, linear; pedicel c. 3 mm long. Flowers white, then yellowish, c. 6 mm across, 5-merous. Calyx-tube c. 1 mm long, 5-toothed. Petals 4-4.5 mm long, linear-lanceolate, acute. Stamens 10, free; filaments 2.5-3.5 mm long; anthers gland-crested. Ovary c. 3 mm long, flat. Pods 10-22 x 1-1.5 cm, straight to falcate, spirally coiled after dehiscence. Seeds 6-14, 7-10 mm across, lenticular, glossy red.

Fl. & Fr.: Jan. - May.

Distr.: Sri Lanka, India, Burma, Thailand, Malesia and China. In wastelands and road sides. *CNS 2586* (Kumarapuram).

ALBIZIA Durazzini

Mag. Tosc. 3(4): 13. 1772.

Trees. Leaves alternate, 2-pinnate; leaflets even pinnate. Flowers in globose heads in axillary or terminal panicles or clusters. Bracts present or not. Calyx-tube 5-lobed. Petals 5, connate into a tubular corolla. Stamens many, exserted; filaments connate at base into a tube, coloured. Ovary sessile or stalked; ovules many; stigma minute. Pods large, flat, thin, compressed, dehiscent or not. Seeds ovoid or orbicular, compressed.

1a. Pods 4-5 cm across; leaflets 1.5-2.5 cm broad; pinnae 2 or 3 pairs ..... **A. lebbeck**

1b. Pods 3-4 cm across; leaflets 2-7 mm broad; pinnae 3-14 pairs.

2a. Stipules very large; pinnae 6-14 pairs; flowers pedicellate; filaments pink .... **A. chinensis**

2b. Stipules minute, pinnae 3-5 pairs; flowers sessile; filaments white .... **A. odoratissima**

Albizia chinensis (Osbeck) Merr., Interpret. Rumph. Herb. Amboin. 49. 1917; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 500. 1980; Mani. & Sivar., Fl. Calicut 100. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 536 . 1983; Vajravelu, Fl. Palghat Dist. 187. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 173. 1994. *Mimosa chinensis* Osbeck, Dagb. Ostind Resa 233. 1757. *Albizia marginata* Lam., Encycl. 1: 2. 1783. *Mimosa stipulata* Roxb., Fl. Ind. 2: 549. 1832, *'stipulacea'*. *Albizia stipulata* (Roxb.) Boivin, Encycl. XIXme Siecle 2:33. 1834; Bedd., Fl. Sylv. t. 55. 1870; Hook. f., Fl. Brit. India 2: 300. 1878; Bhattacharyya & Maheshwari, J. Ind. Bot. Soc. 52: 283, f. 6E. 1973. *Albizia marginata* (Lam.) Merr., Phillipp. J. Sci. 5: 23. 1910; Gamble, Fl. Pres. Madras 433. 1919. ***Puli-vaga***.

Trees to 25 cm tall; bark grey, lenticellate, pinkish inside; branchlets tomentellous. Leaves to 26 cm long; pinnae 6-14 pairs, 4-11 cm long; leaflets 20-32 pairs, 5-10 x 2-2.5 mm, falcate-lanceolate, base truncate, oblique, margin ciliate, apex acute, midrib close to the upper margin, glaucous beneath, sessile; stipules large, caducous, 2.5-4 x 1-2 cm, ovate-cordate, crisped, pinkish-orange, pubescent; glands opposite to all pinnae. Flower-heads in axillary or terminal racemes. Flowers white; pedicels 0.5-1 mm long. Calyx-tube c. 5 mm long, funnel-shaped, with very short teeth. Corolla c. 5 mm long, funnel-shaped. Staminal tube yellowish; upper half of the filaments light red. Pod 6-20 x 3-4 cm, strap-shaped, flat, thin, reddish-brown. Seeds 5-8, 7-10 x 5-6 mm, ovate, flat, dark brown.

Fl. & Fr.: Mar. - Aug.

Distr.: Sri Lanka, India, Burma, Thailand, Indo-China, S. China and Malesia. Planted as shade trees. *CNS 1610* (Nangiarkulangara).

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. 1876; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 502. 1980; Britto in Matthew, Fl. Tam. Carnatic 3: 538. 1983; Ramach. & Nair, Fl. Cannanore 170. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 173. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 168. 1996. *Mimosa lebbeck* L., Sp. Pl. 516. 1753. *Acacia speciosa* Willd., Sp. Pl. 4: 1066. 1806. ***Vaga***.

Deciduous trees, up to 25 m high; bark yellowish-brown, rough, fissured, reddish inside. Leaves 15-25 cm long; pinnae 2-3 pairs, 5-11 cm long; leaflets 4-8 pairs, 2.5-4 x 1.5-2.5 cm, oblong-elliptic, the apical ones much larger, up to 5 x 3 cm, obovate, base oblique, one-half cuneate, the other rounded, apex obtuse to retuse, mid-nerve nearer the upper margin, sparsely pubescent below, subsessile; main rachis up to 20 cm long, with an oval, disk-like gland near its base. Flowers in pedunculate sub-globose heads, white, fragrant, axillary, solitary or in umbellate clusters. Calyx-tube 2-3 mm long, funnel-shaped, 5-lobed, pubescent without. Corolla 5-7 mm long, infundibuliform; lobes ovate-

lanceolate. Filaments to 2.5 cm long, pink. Pod 10-20 x 4-5 cm, oblong, flat, thin, pale straw coloured, obtuse at both ends. Seeds 5-10, ovoid.

Fl. & Fr.: Mar. - May.

Distr.: Sri Lanka, India, S.E. Asia and S. China. Often planted, occasionally seen as wild. *CNS 1859* (Thottappally).

Leaves used as green manure. Seeds used in the treatment of piles.

Albizia odoratissima (L.f.) Benth. in Hook., Lond. J. Bot. 3: 88. 1844; Bedd., Fl. Sylv. t. 54. 1870; Hook. f., Fl. Brit. India 2: 299. 1878; Gamble, Fl. Pres. Madras 43. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 230. 1976; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 499. 1980; Britto in Matthew, Fl. Tam. Carnatic 3: 539. 1983; Ramach. & Nair, Fl. Cannanore 170. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 121. 1988; Mani., Fl. Silent Valley 93. 1988; Vajravelu, Fl. Palghat Dist. 187. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 173. 1994. *Mimosa odoratissima* L. f., Suppl. Sp. Pl. 437. 1781; Roxb., Pl. Corom. 2: 12, t. 120. 1798 & Fl. Ind. 2: 546. 1832. *Acacia odoratissima* Willd., Sp. Pl. 4(2): 1063. 1806; Wight & Arn., Prodr. Fl. Ind. Orient. 275. 1834. ***Waga*** Rheede, Hort. Malab. 6: 9, t. 5. 1986.

Trees to 25 m tall; bark smooth, yellowish-grey, light red inside; branchlets appressed-pubescent. Leaves 15-20 cm long; pinnae 3-5 pairs, 6-15 cm long; leaflets 6-18 pairs, 0.8-2 x 0.4-0.7 cm, obliquely oblong, base truncate, apex obtuse, mid-nerve closer to upper margin, sessile, glaucous below, terminal ones obovate; rhachis to 8 cm long with a large, oval gland near its base; stipules very small, caducous. Flower-heads to 1 cm across, in umbellate to corymbose panicles; bracts c. 4 mm long, subulate. Flowers sessile, greenish white with white stamens. Calyx tube c. 1 mm long, 5-lobed. Corolla c. 4 mm long, broadly funnel-shaped; lobes 5, ovate-lanceolate. Ovary stipitate. Pod 10-15 x 3-3.5 cm, strap-shaped, flat, thin, reddish-brown. Seeds 1-1.5 cm long, ovoid.

Fl. & Fr.: Jan. - May.

Distr.: India, Sri Lanka, Burma, Thailand, Indo-China and Western Malesia. Planted. *CNS 2213* (Alappuzha town).

LEUCAENA Bentham

in Hook. Lond. J. Bot. 4: 416. 1842.

Leucaena leucocephala (Lam.) de Wit, Taxon 10:54. 1961 & 24: 352. 1975; Shaw & Schubert, J. Arnold Arb. 57: 117. 1976; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1:472. 1980; Britto in Matthew, Fl. Tam. Carnatic 3: 543. 1983; Sivar. & Mathew, Fl. Nilambur 243. 1996. *Mimosa leucocephala* Lam., Encycl. 1:12. 1783. *Leucaena glauca* Benth. in Hook. J. Bot. 4: 416. 1842; Hook. f., Fl. Brit. India 2: 290. 1878; Gamble, Fl. Pres. Madras 419. 1919; Williams, Taxon 13: 300. 1964; Matthew, Rec. Bot. Surv. India 20: 87. 1969. *Mimosa latisiliqua* L., Sp. Pl. 519. 1753. *Leucaena latisiliqua* (L.) Gillis, Taxon 23: 191. 1974; Mani. & Sivar., Fl. Calicut 101. 1982; Mohanan & Henry, Fl. Thiruvananthapuram 174. 1994.

Shrubs or small trees. Leaves bipinnate; pinnae c. 6 pairs, 4-10 cm long; leaflets 8-20 pairs, subsessile, 8-14 x 3-4 mm, linear-oblong, base attenuate, oblique, apex acute, pubescent and glaucous below; rachis up to 18 cm long. Head solitary or in pairs, axillary; peduncle 3-5 cm long. Flowers white; bracteoles ovate. Calyx funnel-shaped; teeth triangular, ciliate. Petals 3-4 mm long; finely pubescent. Stamens 10, free, exserted. Ovary stipitate; stigma minute. Pod up to 18 x 1.5 cm, strap-shaped, flat. Seeds 14-18, c. 6 mm long, oval, brown.

Fl. Fr.: Nov. - Apr.

Distr.: Originally from tropical America, now Pantropical. Planted as shade trees. *CNS 2587* (Kayippuram).

MIMOSA Linnaeus

Sp. Pl. 516. 1753.

Armed stragglers or spreading herbs. Leaves alternate, bipinnate; leaflets even pinnate, often sensitive to touch; rachis prickly or bristly. Flowers in globose heads,

axillary clusters, sometimes forming a terminal raceme, polygamous, usually 4-merous, sessile. Calyx campanulate with short teeth. Petals 4, connate at base. Stamens 4 or 8; filaments hardly connate at the base, much exserted. Ovary stipitate, many-ovuled; style filiform; stigma indistinct. Pods flat, made up of one-seeded joints, oblong, flat, clustered, spinous or bristly along margins. Seeds ovoid, flat.

1a. Pinnae 2 or 3 pairs; stamens as many as petals; diffuse undershrubs; stem terete .... **M. pudica**

1b. Pinnae 5-10 pairs; stamens twice as many as petals; straggling shrubs; stem 4-angular ..... **M. invisa**

Mimosa invisa Mart., Herb. Fl. Bras. 121. 1837; Nair, J. Bombay Nat. Hist. Soc. 61(2): 470. 1964; Fosberg, Phytologia 15: 499. 1968; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 464. 1980; Mani. & Sivar., Fl. Calicut 101. 1982; Mani., Fl. Silent Valley 94. 1988; Ramach. & Nair, Fl. Cannanore 171. 1988; Vajravelu, Fl. Palghat Dist. 190. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 175. 1994.

Straggling undershrubs; stem 4-angular, sparsely hairy, with recurved prickles. Leaves bipinnate, up to 12 cm long; rachis prickled; pinnae 5-10 pairs, pinnately arranged; leaflets c. 20 pairs, 3-7 x 1-1.5 mm, oblong, base oblique-truncate, apex acute-mucronate, sessile, overlapping, sensitive. Heads 1-1.5 cm across, globose, pink, arranged in terminal racemes. Lomentum flat, margin with recurved prickles.

Fl. & Fr.: Sep. - Dec.

Distr.: Malesia and Sri Lanka and introduced in India. In waste places. *CNS 1613* (Mancombu).

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; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 463. 1980; Mani. & Sivar., Fl. Calicut 101. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 545. 1983; Ramach. & Nair, Fl. Cannanore 171. 1988; Mani., Fl. Silent Valley 94. 1988; Vajravelu, Fl. Palghat Dist.

188. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 175. 1994; Sivar. & Mathew, Fl. Nilambur 245. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 171. 1996.

Diffuse or spreading herbs; stem terete with distant, recurved prickles. Leaves bipinnate, sensitive; pinnae 2-3 pairs, palmately arranged, 4-6 cm long; leaflets 14-20 pairs, 4-8 x 1-2 mm, elliptic-oblong, base truncate, margin ciliate, apex acute, overlapping; petiole 2-5 cm long; stipule up to 8 mm long, linear-lanceolate, acute. Flower-heads axillary, 2-3 in a cluster, globose; peduncles 2-2.5 cm long. Flowers pink. Calyx minute, campanulate, 4-lobed. Petals 4, c. 1 mm long, adenate in the lower half; lobes ovate, obtuse, pilose. Stamens 4, exserted; filaments 6-8 mm long, pink. Ovary linear, hairy. Pods 3-5-jointed, 1-1.5 x 0.3-0.4 cm, flat, slightly recurved, bristly. Seeds 2-5, c. 2 mm long, ovoid, compressed.

Fl. & Fr.: Aug. - Jan.

Distr.: Throughout the tropics. Frequent in fallow fields, way sides etc. *CNS 2214* (Kaithavana).

NEPTUNIA Loureiro

Fl. Cochinch. 641, 653. 1790.

Neptunia prostrata (Lam.) Baill., Bull. Soc. Linn. Paris 1: 356. 1883; Merr., Trans. Amer. Philos. Soc. New Ser. 24(2): 187. 1935; Panigrahi, Taxon 35: 352. 1986; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 139. 1988; Vajravelu, Fl. Palghat Dist. 188. 1990. *Mimosa prostrata* Lam., Encycl. 1:10. 1783. *Neptunia oleracea* Lour., Fl. Cochinch. 564. 1790; Benth. in Hook., Lond. J. Bot. 435. 1805; Baker in Hook. f., Fl. Brit. India 2: 285. 1878; Gamble, Fl. Pres. Madras 416. 1919; Subram., Aquat. Ang. 15. 1962; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 460. 1980; Britto in Matthew, Fl. Tam. Carnatic 3: 546. 1983; *Momosa natans* Roxb., Pl. Corom. 2: 11, t. 119. 1799 & Fl. Ind. 2: 553. 1832. ***Niti-todda-vaddi*** Rheede, Hort. Malab. 9: 35-36, t. 20. 1689. ***Neer-totta-vaddi*** (Fig. 21).

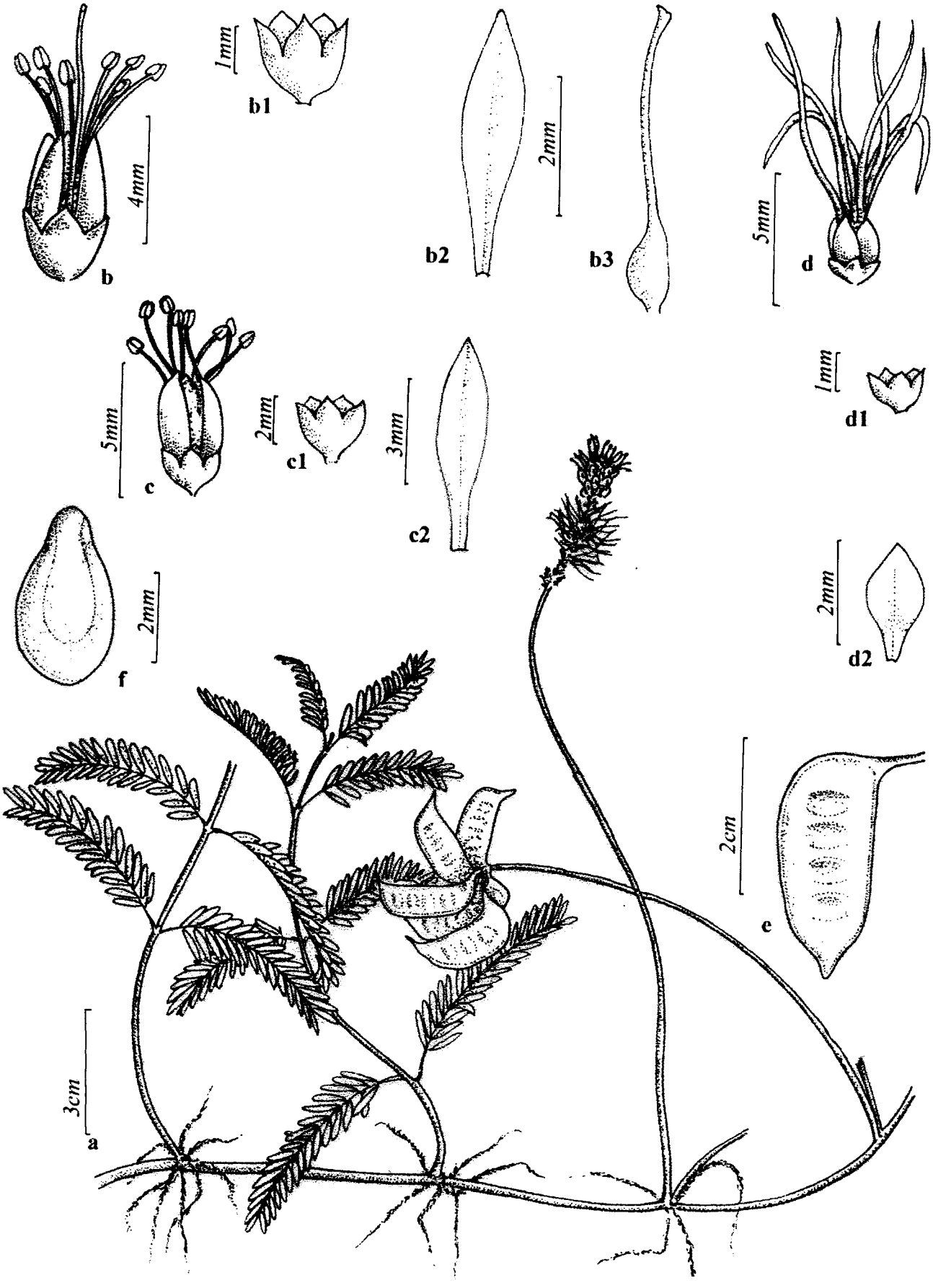


Fig. 21. *Neptunia prostrata* (Lam.) Baill.: a. Flowering twig; b. Bisexual flower: b1. Calyx; b2. Petal; b3. Pistil; c. Male flower; c1 Calyx; c2. Petal; d. Sterile flower; d1. Calyx; d2. Petal; e. Pod; f. Seed.

Floating annual herbs; stem terete, purplish, fistular, floating freely in stagnant water, often provided with thick, spongy white floater tissue at the internodes. Leaves bipinnate; pinnae 2-3 pairs, 4.5-8 cm long; leaflets 8-18 pairs, sensitive, 4-12 x 1.5-3 mm, narrowly oblong, base truncate, apex obtuse, sessile; stipules 5-8 mm long, obliquely ovate-cordate, persistent; petiole to 4 cm long. Flower-head axillary, solitary, 1.5-2.5 cm long, oblong; peduncle to 12 cm long, acrescent. Flowers 5-merous, polygamous, yellow, sessile, bisexual apically, male in the middle and sterile ones at base. Calyx tube c. 2 mm long, 5-lobed. Corolla 4-6 mm long, yellow, oblanceolate. Stamens 10, free; filaments filiform; anthers gland-tipped. Ovary stipitate, c. 1.5 mm long; stigma concave. Staminodes in sterile flowers strap-shaped, yellow. Pod stalked, deflexed, to 2.5 x 0.8 cm, broadly oblong, falcate, beaked. Seeds 6-10, 4-5 mm long, ovoid, compressed.

Fl. & Fr.: Dec. - Mar.

Distr.: Pantropical. Rare. In still waters. *CNS 2019* (Kariyilakulangara), *CNS 1860* (Kanichukulangara Jn.)

PITHECELLOBIUM C.F.P. Martius

Flora 20(2, Beibl.) 114. 1837 (*Pithecolobium*), (*nom. cons*).

Pithecellobium dulce (Roxb.) Benth. in Hook., Lond. J. Bot. 3: 199. 1844; Beddome, Fl. Sylv. S. India t. 188. 1872; Baker in Hook. f., Fl. Brit. India 2: 302. 1878; Gamble, Fl. Pres. Madras 434. 1919; Kosterm., Monogr. Pithecolobium 8. 1954 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 495. 1980; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 232. 1976; Mani. & Sivar., Fl. Calicut 100. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 548. 1983; Vajravelu, Fl. Palghat Dist. 189. 1990. *Mimosa dulcis* Roxb., Pl. Corom. t. 99.1798 & Fl. Ind. 2: 556.1832. *Inga dulcis* (Roxb.)Willd., Sp. Pl. 4: 1005. 1806; Wight, Ic. t. 198. 1839. *Mimosa edulis* Gagnep. (sphalm.) in Lecomte, Fl. Indoch. 2: 105.1913.

Armed trees to 15 m tall; bark grey, fissured, brown inside; branchlets with stipular thorns, densely tomentose. Leaves bipinnate; pinnae 2 pairs; leaflets paired,1.5-3.5 x 1-2 cm, obovate-oblong, base oblique, apex obtuse-apiculate; petiole to 1.5 cm long, with a solitary apical, concave gland. Flower-heads in panicled spikes, terminal or axillary.

Calyx-tube c. 1 mm long, campanulate, 5-lobed. Corolla white, 3-4 mm long; tube funnel-shaped; lobes 5, ovate, acute, tomentose without. Staminal tube slightly longer than corolla tube; stamens many; anthers eglandular. Ovary sessile; stigma minute. Pod 7-10 x 1 cm, strap-shaped, turgid, sometimes curled in to a circle or falcate, moniliform. Seeds orbicular with white aril.

Fl. & Fr.: Dec. - May.

Distr.: Originally from Mexico; naturalized in dry areas of all tropics. *CNS 2215* (Thottappally).

PROSOPIS Linnaeus

Mant. Pl. 1: 10, 68.1767.

Prosopis juliflora (Sw.) DC., Prodr. 2: 447. 1825; Johnston, Brittonia 14: 83. 1962; Towns., Kew Bull. 21: 436. 1968; Burkart, J. Arnold Arbor. 57: 499. 1976; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 468. 1980; Britto in Matthew, Fl. Tam. Carnatic 3: 549. 1983. *Mimosa juliflora* Sw., Prod. 85. 1788. *Algaroba juliflora* (Sw.) Benth. ex Heyne, Nomencl. 2: 18. 1840.

Armed shrubs or small trees; spines axillary to 2 cm long. Leaves bipinnate; pinnae 1 or 2 pairs, 5-8 cm long; leaflets 11-18 pairs, opposite, sessile, 8-17 x 2-3 mm, oblong-linear, base and apex obtuse; rachis with a solitary gland. Spike axillary, solitary or 2-4 in a cluster, up to 12 cm long. Flowers 5-merous, greenish-yellow, subsessile. Calyx-tube c. 1 mm long, campanulate, 5-toothed. Corolla c. 2 mm long, pilose within. Stamens 10, free; anthers with a deciduous gland. Ovary stipitate. Pod up to 15 cm long and 1.5 cm wide, flattened, pale yellow. Seeds ovoid, brownish.

Fl. & Fr.: Dec. - May.

Distr.: Northern S. America, C. America to Mexico and Antilles; widely naturalized in tropical Asia. *CNS 1599* (Aroor).

SAMANEA (A.P. de Candolle) Merrill

J. Wash. Acad. Sci. 6: 46. 1916.

Samanea saman (Jacq.) Merr., J. Wash. Acad. Sci. 6: 47. 1916; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 233. 1976; Kosterm. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 477. 1980; Mani. & Sivar., Fl. Calicut 102. 1982; Britto in Matthew, Fl. Tam. Carnatic 3: 550 1983; Ramach. & Nair, Fl. Cannanore 172. 1988; *Mimosa saman* Jacq., Fragm. 15, t. 9. 1800. *Pithecolobium saman* (Jacq.) Benth. in Hook., Lond. J. Bot. 3: 216. 1844. *Enterolobium saman* (Jacq.) Prain, J. Asiat. Soc. Bengal, Pl. 2, Nat. Hist. 66: 252. 1897; Gamble, Fl. Pres. Madras 435. 1919.

Trees, up to 20 m high; bark rough, deeply fissured, yellowish brown; branchlets yellowish-tomentose. Leaves bipinnate; pinnae 4 or 5 pairs, 6-18 cm long; leaflets 4-15 pairs, sessile, 1-4 x 0.8-2.5 cm, oblong-elliptic to obovate, base truncate to cuneate, apex obtuse-apiculate; glands opposite to all leaflets; rachis tomentose, with glands opposite to all pinnae. Flowers in dense heads on 6-10 cm long, pubescent peduncle, solitary or 2-3 together in the axils of the upper leaves. Flowers c. 25 per head, sessile. Calyx-tube 3-5 mm long, funnel-shaped, pubescent; teeth 5, triangular. Corolla pinkish, 8-12 mm long, funnel-shaped. Stamens many, monadelphous; filaments pink, 2-3 cm long. Ovary stipitate. Pod 8-18 x 1-2 cm, linear-oblong, slightly twisted, fleshy, indehiscent, slightly flattened. Seeds 12-18, to 1 x 0.6 cm, ovate, brown.

Fl. & Fr.: Mar. - Jun.

Distr.: Native of Central and South America; widely planted in the tropics as avenue trees. *CNS 2588* (Puliyoor).

XYLIA Bentham

J. Bot. (Hooker) 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; Mani. & Sivar., Fl. Calicut 101. 1982; Ramach. & Nair, Fl. Cannanore 172. 1988; Vajravelu, Fl. Palghat Dist.

190. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 176. 1994; Sivar. & Mathew, Fl. Nilambur 245. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 171. 1996. *Mimosa xylocarpa* Roxb., Pl. Corom. t. 100. .1798. *Xylia dolabriformis* Benth., J. Bot. (Hooker) 4: 417. 1842; Bedd., Fl. Sylv. t.186. 1872; Baker in Hook. f., Fl. Brit. India 2: 286. 1878. ***Irumul***.

Trees. Leaves 2-pinnate, to 24 cm long; leaflets 4 pairs, 5-16 x 2.5 - 5.5 cm, elliptic-oblong, base cuneate, apex acute or obtuse, thin-coriaceous; rachis with glands opposite to all pinnae. Flower heads 2-2.5 cm across, usually in racemes; peduncle to 10 cm long. Calyx-tube c. 4 mm long, 5-toothed. Corolla yellowish; petals 5, slightly connate at base. Stamens 10; filaments 8-10 mm long; anthers tipped with caducous glands. Ovary sessile, 1.5-2 mm long, oblong; style c. 2 mm long. Pod 15-19 x 4-5.5 cm, falcate, flat, woody. Seeds c. 6.

Fl. & Fr.: Mar. - Dec.

Distr.: Peninsular India, Myanmar, Malesia, Philippines. A valuable timber yielding tree. *CNS 1879* (Nootavanpara at Chengannur).

45. CRASSULACEAE DC.

in Lamarck & Candolle,Fl. Franc., ed. 3, 4(1): 382. 1805.

KALANCHOE Adanson

Fam. 2: 248. 1763.

Kalanchoe pinnata (Lam.) Pers., Syn. Pl. 1: 446. 1805; Raym.-Hamet, Bull. Hebr. Boissier (Ser. 2) 8: 21. 1908; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 209. 1976; Mani. & Sivar., Fl. Calicut 102. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 561. 1983; Ramach. & Nair, Fl. Cannanore 174. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 178. 1994; Sivar. & Mathew, Fl. Nilambur 249. 1996. *Cotyledon pinnata* Lam., Encycl. 2: 141. 1786. *Bryophyllum calycinum* Salisb., Parad. Lond. t. 3. 1805 & in Curits., Bot. Mag. t. 1409. 1811; Clarke in Hook. f., Fl. Brit. India 2: 413. 1878. *Bryophyllum pinnatum* (Lam.) Kurz, J. Asiat. Soc. Bengal, pt. 2, Nat. Hist. 40: 42. 1871; Gamble, Fl. Pres. Madras 451. 1919. ***Ilamulachi***.

Subsucculent herbs. Leaves decussate, simple or 3-5-foliolate, 5-9 x 3-5.5 cm, elliptic-ovate, base rounded, margins deeply crenate, apex obtuse to rounded; petiole to 6 cm long, greenish with violet blotches. Inflorescence a terminal cymose panicle. Flowers pendulous. Calyx tube inflated, 2.5-3 cm long, green with reddish blotches; lobes 4, c. 1 cm long, triangular, acuminate. Corolla greenish, to 4 cm long, subglobose, 8-folded, glandular within; lobes 4, ovate. Stamens 8, inserted above the constriction of corolla. Hypogynous scales 4. Carpels 4; ovules many. Follicle c. 1.2 cm long, enclosed with reddish calyx.

Fl. & Fr.: Dec. - Mar.

Distr.: Pantropical. In waste lands. *CNS 1967* (Thamarakulam), *CNS 2150* (Vandanam).

46. DROSERACEAE Salisb.

Parad. Lond. 2: ad. t. 95. 1808.

DROSERA Linnaeus

Sp. Pl. 218. 1753.

Small insectivorous herbs, usually on marshy areas. Leaves alternate, rosulate or cauline, with sticky marginal glands. Inflorescence terminal or lateral helicoid cymes, sometimes branched. Flowers bisexual, regular. Calyx lobes 5, connate at base, persistent in fruit. Petals 5, marcescent, free, spathulate. Stamens 5, alternating with petals. Ovary superior, 1-celled; ovules many on 2-5 parietal placentae; styles 3-5, free or connate below. Fruit a 3-5-valved loculicidal capsule. Seeds many, minute.

1a. Acaulescent herbs; leaves in basal rosette, spathulate to obovate; styles 5 ..... **D. burmannii**

1b. Caulescent herbs; leaves cauline, linear; styles 3 ..... **D. indica**

Drosera burmannii Vahl, Symb. Bot. 3: 50. 1794; Clarke in Hook. f., Fl. Brit. India 2: 424. 1878; Gamble, Fl. Pres. Madras 452. 1919; Ramamoorthy in Sald. & Nicols., Fl.

Hassan Dist. 159. 1976; Mani. & Sivar., Fl. Calicut 103. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 563. 1983; Amarat. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 113. 1987; Ramach. & Nair, Fl. Cannanore 174. 1988; Mani., Fl. Silent Valley 100. 1988; Vajravelu, Fl. Palghat Dist. 193. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 179. 1994; Sivar. & Mathew, Fl. Nilambur 250. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 173. 1996.

Acaulescent herbs. Leaves radical, 5-8 x 3-5 mm, spathulate to obovate, base tapering into a flat petiole, apex rounded, margins and upper surface carrying viscid, reddish, stipitate glands; stipules adnate to petiole, scarious. Racemes erect, 1-sided, 5-10 cm high. Flowers 8-12, 6-7 mm across; bracts 1-2 mm long, linear; pedicel 2-3 mm long. Calyx minute; lobes 2-3 mm long. Petals pink, 4-5 mm long, spathulate. Ovary 1-2 mm long, ovoid, 3-celled; ovules 2 in each cell; styles 5; stigma penicellate. Capsule 3-4 mm long, ovoid, membranous. Seeds small, reticulate.

Fl.& Fr.: Sept. - Nov.

Distr.: West Africa, India to Malesia, China and Australia. Rare, on exposed moist marshy areas. *CNS 1228* (Thuravoor).

Drosera indica L., Sp. Pl. 282. 1753; Clarke in Hook. f., Fl. Brit. India 2: 424. 1874; Gamble, Fl. Pres. Madras 452. 1919; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 159. 1976; Mani. & Sivar., Fl. Calicut 103. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 564. 1983; Amarat. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 114. 1987; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 102. 1988; Vajravelu, Fl. Palghat Dist. 193. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 179. 1994; Sivar. & Mathew, Fl. Nilambur 251. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 173. 1996. ***Akara-puda*** Rheede, Hort. Malab. 10: 39, t. 20. 1690 (Plate IX: A, B & C).

Caulescent herbs; stem glandular-pubescent, up to 7 cm tall. Leaves 1.5-4 x 0.2 - 0.4 cm, linear, glandular hairy above, glabrous below, circinate in vernation; lower leaves deflexed. Racemes axillary, 1-3 cm long, 2-10-flowered. Flowers 0.8-1.2 cm across; pedicels 4-5 mm long; bracts 1-2 mm long, linear. Calyx lobes 1-2 mm, glandular hairy.







Plate IX. A - C. *Drosera indica* L.; A. Habit; B. Flowering Twig; C. Flower.

Petals rose-coloured, 4-6 mm long, spathulate, obtuse. Ovary 1-2 x 1 mm, ovoid, 3-celled; ovules 2 in each cell; styles 3, each 2-fid. Capsules 3-4 mm long, oblong. Seeds many, minute, ovoid, reticulate.

Fl. & Fr.: Sept. - Nov.

Distr.: Tropical Africa, India to Japan, New Guinea, Australia and Sri Lanka. On exposed moist areas among grasses. *CNS 1041* (Vandanam).

47. RHIZOPHORACEAE R. Br.

in Flinders, Voy. Terra Austr. 2: 549. 1814.

1a. Plants of mangrove; seeds germinating in fruit while attached to trees.
  2a. Trees with arching prop roots; leaves mucronate; calyx lobes 4 .... **Rhizophora**
  2b. Shrubs or trees without arching prop roots; leaves not mucronate; calyx lobes 5 or more.
    3a. Leaves acute at apex; calyx lobes 8-16; bracteoles absent; ovary 4-celled ..... **Bruguiera**
    3b. Leaves obtuse or rounded at apex; calyx lobes 5-6; bracteoles present; ovary 1-celled ..... **Kandelia**
1b. Plants of inland habitats; seeds not germinating in fruit attached to trees; calyx lobes 4 ..... **Carallia**

BRUGUIERA Lamarck

Tabl. Encycl. Meth., Bot. 1793.

Small trees or shrubs, with knee-like pneumatophores. Leaves ovate-acute, black-dotted beneath, petioled; stipules lanceolate, deciduous leaving a distinct scar. Flowers bisexual, solitary or in 2-5-flowered pedunculate cymes, articulated with the pedicel. Calyx connate with ovary below and free above, segments 8-16. Petals bilobed, deciduous, each embracing 2 stamens. Stamens twice the number of petals; filaments

unequal; anthers linear. Ovary inferior, 2-4 celled, each with 2 ovules; style elongate, filiform. Fruit included in calyx tube, 1-or 2-seeded.

1a. Calyx segments and petals 8 ..... **B. cylindrica**

1b. Calyx segments and petals 12-16 ..... **B. gymnorhiza**

Bruguiera cylindrica (L.) Blume, Enum. Pl. Java 1: 93. 1827; Wight & Arn., Prodr. Fl. Ind. Orient 311. 1834; Gamble, Fl. Pres. Madras 459. 1919; Macnae & Fosb. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 491. 1981; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3:570. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 215. 1988. *Rhizophora cylindrica* L., Sp. Pl. 443. 1753. *R. caryophylloides* Bl. Enum. Pl. Java 1: 93. 1827. ***Karii-kandel, Kanil-kandel*** Rheede, Hort. Malab. 6: 59, t. 33. 1686. ***Kandel*** (Plate XI: A).

Large shrubs. Leaves 6-9.5 x 3-4.5 cm, ovate-lanceolate, base cuneate, apex acute, coriaceous; petiole1-3 cm long; stipules 2-4 cm long. Cymes axillary, 2-3-flowered; peduncle to 1.8 cm long. Flowers greenish, subsessile, 1-1.3 cm across. Calyx segments 8, 5-7 x 1.5-2 mm, linear, reflexed in fruit. Petals 8, greenish, to 4 mm long, erect, hairy without, deeply bifid, margins ciliate throughout; lobes obtuse, bristles 2 or 3 per lobe, c. 1 mm long; sinus bristles to 1.5 mm long. Stamens 16; filaments c. 2 mm long. Fruit 0.8-1.2 x 0.5-0.7 cm, oblong-ovoid, smooth. Radicle reaching 3-7 cm long, cylindrical, slender, dark green.

Fl. & Fr.: Dec. - Oct.

Distr.: India, Maldives and Ceylon, through Indonesia and Thailand toVietnam and New Guinea. Very common in mangrove swamps. *CNS 1452* (Thrikunnapuzha).

Bruguiera gymnorhiza (L.) Savigny in Lam., Encycl. 4: 696. 1798; Wight & Arn., Prodr. Fl. Ind. Orient. 311. 1834; Thw., Enum. Pl. Zeyl. 120. 1859; Hook. f., Fl. Brit. India 2: 437. 1878; Macnae & Fosb. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 493. 1981; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 570. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 215. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 180.

1994. *Rhizophora gymnorhiza* L., Sp. Pl. 443. 1753. *Bruguiera conjugata* Merr., Philipp. J. Sci. 9: 118. 1914; Gamble, Fl. Pres. Madras 458. 1919. ***Kandel*** Rheede, Hort. Malab. 6: 57-58, t. 31-32. 1686 (Plate X: D).

Small trees; bark greyish to black, roughly fissured; young branches with prominent scars of leaves and stipules. Leaves 4-11.5 x 2-5 cm, ovate-lanceolate, base cuneate, apex acute, coriaceous; petioles to 2.8 cm long; stipules 3-5.5 cm long. Flowers axillary, solitary, drooping, 2.5-3 cm long; pedicels 0.4-2 cm long, curved. Calyx segments 12-16, reddish, 1.2-1.5 x 0.2-0.5 cm, acicular, tip pungent, coriaceous. Petals 12-16, brown, 1.1-1.3 cm long, deeply bifid, outer margin fringed towards the base with white silky hairs; lobes acute, bristles 3 or 4, c. 2 mm long, sinus bristle to 4 mm long. Stamens c. 18; filaments to 1 cm long; anthers c. 3 mm long. Style to 1 cm long. Fruit 2-2.5 cm long, conical.

Fl. & Fr.: Jan. - Aug .

Distr.: India, Sri Lanka, from southern Africa and the shoers of the Red Sea to the Ryukyu Islands and to northern New South Wales and east to the Marshall Islands. Rare, in mangrove swamps. *CNS 1595* (Aroor).

CARALLIA Roxburgh

Pl. Coromandel 3: 8, t. 211. 1811 (1819) (*nom. cons.*).

Carallia brachiata (Lour.) Merr., Philipp. J. Sci. Bot. 15: 249. 1919; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 297. 1976; Macnae & Fosb. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 496. 1981; Mani. & Sivar., Fl. Calicut 104. 1982; Ramach. & Nair, Fl. Cannanore175. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 216. 1988; Vajravelu, Fl. Palghat Dist. 194. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 180. 1994; Sivar. & Mathew, Fl. Nilambur 252. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 174. 1996. *Diatoma brachiata* Lour., Fl. Cochinch. 296. 1790. *Carallia integerrima* DC., Prodr. 3: 33. 1828; Bedd., Fl. Sylv. t. 193. 1872; Henslow in Hook. f., Fl. Brit. India 2: 439. 1878; Gamble, Fl. Pres. Madras 459. 1919. ***Kare-kandel*** Rheede, Hort. Malab. 5: 25-26, t. 13. 1685.

Trees; bark greyish to dark brown, fissured in older trees. Leaves 5-9 x 2-6 cm, obovate to elliptic, base cuneate, apex obtuse, coriaceous, dark green above, paler with scattered black dots beneath; petiole to 1.5 cm long; stipules 1.5-2 cm long, enclosing terminal bud, caducous. Flowers in axillary, trichotomously branched cymes; buds coated with an yellow resin. Calyx 2-5 mm long, companulate; lobes 5-8. Petals 5-8, greenish white, 2-4 mm long, orbicular, clawed, margin lacerate, apex 2-fid. Stamens twice as many as petals, inserted on disc. Ovary globose, half-inferior, 3-5-celled; ovules 2 in each cell; style subulate; stigma 3-5-lobed. Fruit 3-5 mm across, globose, red. Seed 1, subreniform, with orange testa.

Fl. & Fr.: Dec. - May. Common in sacred groves and wastelands.

Distr.: Asia to North Australia. *CNS 2031* (Vandanam).

KANDELIA (A.P.de Candolle) R. Wright *et* Arnott
Prodr. 310. 1834.

Kandelia candel (L.) Druce, Bot. Exch. Club. Soc. Brit. Isles 1913, 3: 420. 1914; Ding Hou in Steenis, Fl. Males. I, 5: 473. 1958; Mani. & Sivar., Fl. Calicut 103. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 572. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 216. 1988. *Rhizophora candel* L., Sp. Pl. 443.1753. *Kandelia rheedii* Wight & Arn., Prodr. Fl. Ind. Orient. 311. 1834; Beddome, Fl. Sylv. 100. 1871; Hook. f., Fl. Brit. India 2: 437. 1878; Gamble, Fl. Pres. Madras 457. 1919. ***Tsjerou-kandel*** Rheede, Hort. Malab. 6: 63, t. 35. 1686. ***Kandel.***

Large shrubs. Leaves 5-14 x 2.5-6 cm, elliptic-oblong, base obtuse, margins reflexed, apex obtuse or rounded, coriaceous; petiole, 1-2 cm long. Cymes axillary, dichotomously branched, 4-10-flowered; peduncle 2-4 cm long. Flowers 2.6-3 cm across; pedicel 2-3 mm long; buds 1.8-2 cm long. Calyx lobes 5-6, 1.5-1.8 x 0.2-0.3 cm, linear, apex obtuse or acute, coriaceous, reflexed in fruit. Petals 5-6, c. 1.3 x 0.2 cm, oblong, 2-lobed; lobes multifid; sinus with a long bristle. Stamens many, free. Ovary 1-celled; ovules 6; stigma 3-lobed. Fruit 2-3 cm long, ovoid. Radicle 30-40 cm long, cylindrical, pendulous.

Fl. & Fr.: Most of the seasons.

Distr.: India, Myanmar, Siam, Indo-China and Malesia. Rare, in mangrove swamps. *CNS 1462* (Thanneer mukkom).

RHIZOPHORA Linnaeus

Sp. Pl. 443. 1753.

Trees or shrubs, with prop roots emerging from the lower stem, occasionally from the branches. Leaves opposite, entire, thick, with large interpetiolar deciduous stipules enclosing the buds. Flowers in pairs on short thick peduncle or in a shortly peduncled cyme; bracts 2, hard, thick and fused. Calyx deeply divided in to 4 segments, persistent, enlarging in fruits. Petals 4. Stamens 8-12. Ovary half-inferior, 2-celled with 2 ovules in each cell. Fruit conical to ovoid, idehiscent. Seeds 1; cotyledons connate into a fleshy body continuous with, but set off from the hypocotyl, protruding when seedling is ready to fall.

1a. Peduncles very short, thick, up to 1.5 cm long, 2-flowered; flowers sessile .... **R. apiculata**

1b. Peduncles 3-7 cm long curved, 4 or more flowered; flowers pedicelled .... **R. mucronata**

Rhizophora apiculata Blume, Enum. Pl. Java 1: 91. 1827; Macnae & Fosb. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 490. 1981; Mathew & Britto in Matthew, Fl. Tam. Carnatic 3: 573. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 216. 1988. *Rhizophora candellaria* DC., Prodr. 3: 32. 1828; Wight & Arn., Prodr. Fl. Ind. Orient. 310. 1834; Gamble, Fl. Pres. Madras 456. 1919. *Rhizophora conjugata* sensu Arn., non L, 1753: Thw., Enum. Pl. Zeyl. 120. 1859; Hook. f., Fl. Brit. India. 2: 436. 1878. *Pee-kandel* Rheede, Hort. Malab. 6: 61, t. 34. 1686. ***Kandel*** (Plate X: A & B).

Small trees or large shrubs. Leaves 10-18 x 4-7.5 cm, ovate-lanceolate to broadly ovate, base acute, apex acute-mucronate, coriaceous, dark green above, paler and dotted with brownish-black beneath; petiole to 2.5 cm long; stipules 4-5.5 cm long. Flowers

sessile in pairs, on short, stout peducle, from axils of fallen leaves. Sepals 4, to 1.5 x 0.6 cm, oblong-ovate, acute. Petals to 1 x 0.2 cm, linear, flat, creamy white, soon falling, covering the stamen at the back. Stamens 10-12, sessile; anthers c. 5 mm long. Fruit c. 2.5 cm long, obconical. Seedlings up to 70 cm long.

Fl. & Fr.: Most of the seasons.

Distr.: India, eastwards to Guam and the Solomon Islands, from Hainan and the Philippines to North Queensland. In mangrove swamps. *CNS 1748* (Kumbolichira at Kayamkulam).

Rhizophora mucronata Poir. in Lam., Encycl. Meth. 6: 189. 1804, Thw., Enum. Pl. Zeyl. 120. 1859; Hook. f., Fl. Brit. India 2: 435. 1878; Gamble, Fl. Pres. Madras 456. 1919; Macnae & Fosb. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 491. 1981; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 574. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 180. 1994. *Rhizophora mangle* auct. non L., 1753: Roxb., Fl. Ind. 2: 459. 1832. *Rhizophora candelaria* auct. non DC., 1828: Wight & Arn., Prodr. Fl. Ind. Orient. 310. 1834. ***Kandel*** (Plate X: C).

Small trees or large shrubs; prop-roots descending from all levels. Leaves 9-16 x 6-10 cm, broadly elliptic to oval, base acute, apex acute with a long mucro up to 7 mm long, coriaceous, green above, paler beneath, dotted with tiny brown spots; petiole 1.5-2.5 cm long; stipules to 5 cm long, soon falling. Inflorescence axillary, cymose; peduncles 3-7 cm long. Sepals 4, 0.9-1.3 x 0.4-0.6 cm, oblong-lanceolate, coriaceous. Petals 4, 1-1.2 x 0.2-0.3 cm, narrow, curved, thick, induplicate, hairy within and along margins. Stamens 8. Style short, c. 1 mm long. Fruits 4-5 cm long, ovate-conical, pendulous, dark brown. Seedlings up to 60 cm long.

Fl. & Fr.: Jun. - Dec.

Distr.: Common on Indo-West-Pacific shores, from South Africa to Queensland and to the Ryukya Islands. Common in mangrove swamps. *CNS 1749* (Mangadichira at Kayamkulam), *CNS 1872* (Aroor).

312 P



Plate X. A & B. *Rhizophora apiculata* Bl.; A. Flowering twig; B. Flowers enlarged; C. *Rhizophora mucronata* Poir.; D. *Bruguiera gymnorhiza* (L.) Sav.

48. COMBRETACEAE R. Br.

Prodr. 351.1810.

1a. Trees or shrubs.

2a. Petals 5, receptacles with 2 adnate brateoles, shrubs; plants of mangrove swamps ..... **Lumnitzera**

2b. Petals absent; receptacle without adnate bracteoles; trees; not plants of mangrove swamps ..... **Terminalia**

1b. Climbing shrubs.

3a. Calyx accrescent; petals absent ..... **Calycopteris**

3b. Calyx not accrescent; petals 4 or 5.

4a. Flowers 4-meous; petals greenish-yellow; receptacle shortly produced beyond the ovary, below 8 mm long; style not adnate to the upper receptacular wall ..... **Combretum**

4b. Flowers 5-merous; petals pinkish or light pinkish; receptacle produced more than 2 cm beyond the ovary; style partly adnate to the inner wall of the upper receptacle ..... **Quisqualis**

CALYCOPTERIS Lamarck

Tabl. Encycl. t. 357; 2(2): 485. 1793.

Calycopteris floribunda (Roxb.) Poiret in Lam., Encycl. Suppl. 2: 91. 1811 & Tabl. Encycl. 2: t. 357. 1793; Clarke in Hook. f., Fl. Brit. India 2: 499. 1878; Gamble, Fl. Pres. Madras 467. 1919; Gandhi Sald. & Nicols., Fl. Hassan Dist. 292. 1976; Mani. & Sivar., Fl. Calicut 105. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 576. 1983; Ramach. & Nair, Fl. Cannanore 176. 1988; Vajravelu, Fl. Palghat Dist. 195. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 181.1994; Sivar. & Mathew, Fl. Nilambur 255. 1996; Sasi & Sivar., Fl. Pl. Thrissur For. 176. 1996. *Getonin floribunda* Roxb., Pl. Corom. t. 87. 1798 & Fl. Ind. 2: 428. 1832; Wight & Arn., Prodr. Fl. Ind. Orient. 315. 1834. ***Pullanji***.

Scandent shrubs; young stem densely brown pubescent. Leaves 4-9 x 2-3 cm, ovate to elliptic, base rounded, apex acute or acuminate-caudate, densely pubescent on both sides, more below, puncatate; petiole to 1 cm long. Flowers in dense axillary racemes, crowded in dense panicles at top of branches. Bracts leafy, 0.6-1.2 x 0.3-0.4 cm. Calyx tube 4-5 mm long; lobes 5, to 5 mm long elliptic cream coloured, velvety, accrescent. Petals absent. Stamens 10, 5+5 in two rows. Ovary inferior, 3-4 mm long, 1-celled; ovules 3, pendulous; stigma simple. Drupe 6-8 mm long, with 5 spreading accrescent calyx lobes. Seed single.

Fl. & Fr.: Dec. - Apr.

Distr.: Indo-Malaysia. Very common in sacred groves. *CNS 1548* (Angadikkal).

COMBRETUM Loefling

Iter Hispan. 308. 1758 (*nom. cons.*).

Combretum latifolium Bl., Bijdr. 641. 1825, non Don, 1827; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 293. 1976; Mani. & Sivar., Fl. Calicut 105. 1982; Ramach. & Nair, Fl. Cannanore 177. 1988; Vajravelu, Fl. Palghat Dist. 195. 1990; Philcox in Dassan., Fosb. ^ Clayton, Rev. Handb. Fl. Ceylon 9: 35. 1995; Sivar. & Mathew, Fl. Nilambur 255. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 177. 1996. *Combretum extensum* Roxb. ex G. Don, Trans. Linn. Soc. Lond. 15: 414, 422. 1827; Clarke in Hook. f., Fl. Brit. India 2: 458. 1878; Gamble, Fl. Pres. Madras 469.1919; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 85. 1988. ***Pee-ula*** Rheede, Hort. Malab. 7: 43, t. 23. 1688.

Climbing shrubs; young branchlets pale-brown scaly mixed with minute rufous, globular glands, becoming glabrous. Leaves opposite or sub opposite, 7-12 x 3.5-6 cm, elliptic-obovate to oblong-elliptic, base cuneate, apex obtusely acuminate, subcoriaceous; petiole to 1.5 cm long. Inflorescence of long-peduncled axillaryspikes,forming terminal pendulous panicles. Flowers 4-merous, subsessile, greenish-white, polygamo-dioecious. Receptacle 4-5 mm long, funnel-shaped from above the ovary. Sepals 4, c. 2 x 1.5 mm, triangular. Petals 4, c. 2 x 2 mm, rounded, greenish-yellow. Stamens 8; filaments c. 3 mm

316 A





Plate XI. *A. Bruguiera cylindrica* (L.) Bl.; B. *Lumnitzera racemosa* Willd.

long. Ovary linear, 1-locular; ovules 2-3, pendulous. Drupe 3-3.5 cm long, with 4 membranous wings, c. 1 cm wide, transversely striate.

Fl. & Fr.: Feb. - May.

Distr.: India, Myanmar, Thailand and Malaysia. Rare. In sacred groves. *CNS 2459* (Vallikavu at Chengannur).

LUMNITZERA Willdenow

Ges. Naturf. Freunde Berlin Neue Schiriften 4: 86. 1803.

Lumnitzera racemosa Willd., Ges. Naturf. Freunde Berlin Neue Schriften 4: 187. 1803; Wight & Arn., Prodr. Fl. Ind. Orient.316. 1834; Clarke in Hook. f., Fl. Brit. India 2: 452. 1878; Gamble, Fl. Pres.Madras 468.1919; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 578. 1983; Philcox in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 29. 1995. ***Kandal*** (Plate XI: B; Fig. 22).

Evergreen shrubs to 3 m tall. Leaves 3.5-7 x 2.3-5 cm, obovate or oblong, base attenuate, margin obscurely crenate to entire, apex rounded, occasionally emarginate, fleshy-coriaceous; petiole to 1 cm long. Spikes axillary, to 5 cm long; peduncle to 4 cm long. Flowers hermaphrodite, 5-merous; c. 1 cm across, sessile. Receptacle 0.8-1.2 cm long, tubular, striate, laterally compressed, usually contracted above the middle. Bracteoles 2, inserted opposite about midway on receptacle, adnate, c. 1.5 x 1 mm, broadly ovate, ciliolate, persistent. Calyx lobes 5, c. 1 mm long, triangular, ciliolate, persistent. Petals white, 3-4 x 1-1.5 mm, oblong-lanceolate. Stamens 10, borne on the inner wall of the receptacular tube; filaments c. 3 mm long. Ovary c. 7 mm long oblong, 1-celled; 2-5, pendulous; style 3-4 mm long. Fruit 10-12 x 3-5 mm, ellipsoid, woody.

Fl. & Fr.: Apr. - Aug.

Distr.: Tropical East Africa and Madagascar, tropical asia, Northern Australia and Polynesia. In mangrove swamps. *CNS 2460* (Mnjadichira at Kayamkulam).

QUISQUALIS Linnaeus

Sp. Pl. ed. 2, 1: 556. 1762.

Quisqualis indica L., Sp. Pl. ed. 2, 1: 556. 1762; Roxb., Fl. Ind. 2: 427. 1832; Wight & Arn., Prodr. Fl. Ind. Orient. 318. 1834; Clarke in Hook. f., Fl. Brit. India 2: 459. 1878; Gamble, Fl. Pres. Madras 469. 1919; Mani. & Sivar., Fl. Calicut 105. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 579. 1983; Ramach. & Nair, Fl. Cannanore 179. 1988; Vajravelu, Fl. Palghat Dist. 197. 1990; Philcox in Dassan., Fosb. & Clayton. Rev. Handb. Fl. Ceylon 9: 31. 1995; Sivar. .& Mathew, Fl. Nilambur 256. 1996. *Quiqualis glabra* Brum. f., Fl. Ind. 104, tab. 28, fig. 2. 1768. *Quisqualis pubescns* Brum. f., Fl. Ind. 104, tab.35, fig. 2. 1768. ***Thookuchethi***.

Woody climbers; young branchlets tomentose. Leaves opposite to subopposite, 6-12 x 3-5 cm, elliptic to oblong-elliptic, base rounded to subcordate, often unequal sided, apex acuminate, minutely verrucose above, finely pubescent beneath, chartaceous; petiole to 1 cm long. Spikes terminal, to 8 cm long. Flowers fragrant; bracts 2-5 x 1-2 mm, linear. Receptacles 4.5-8 cm long, narrowly tubular, expanding towards the apex, pubescent without. Sepals 2-3 x 1.5-2.5 mm, triangular reflexed. Petals 1-1.5 x 0.4-1 cm, obovate-oblong, obtuse, white, turning deep red at maturity, finely pubescent. Filaments 5-7 mm long. Style adnate to the wall of the upper receptacle for most of its length. Fruit 3-3.5 x 1-1.2 cm, ovate-elliptic, black.

Fl. & Fr.: Mar. - Jun.

Distr.: Throughout the Old World tropics; probably indigenous to Africa and Indo-Malaysia. Cultivated pantropically. *CNS 2461* (Cherthala).

TERMINALIA Linnaeus

Syst. Nat. ed. 12, 2: 674 (err. 638). 1767; Mant. 21, 128. 1767 (*nom. cons.*)

Large deciduous trees. Leaves simple, alternate to subopposite or rarely clustered at the end of branchlets, lateral nerves prominent, often with 2 glands on the petiole or on midrib towards the base on the lower side. Inflorescence simple or branched spikes,

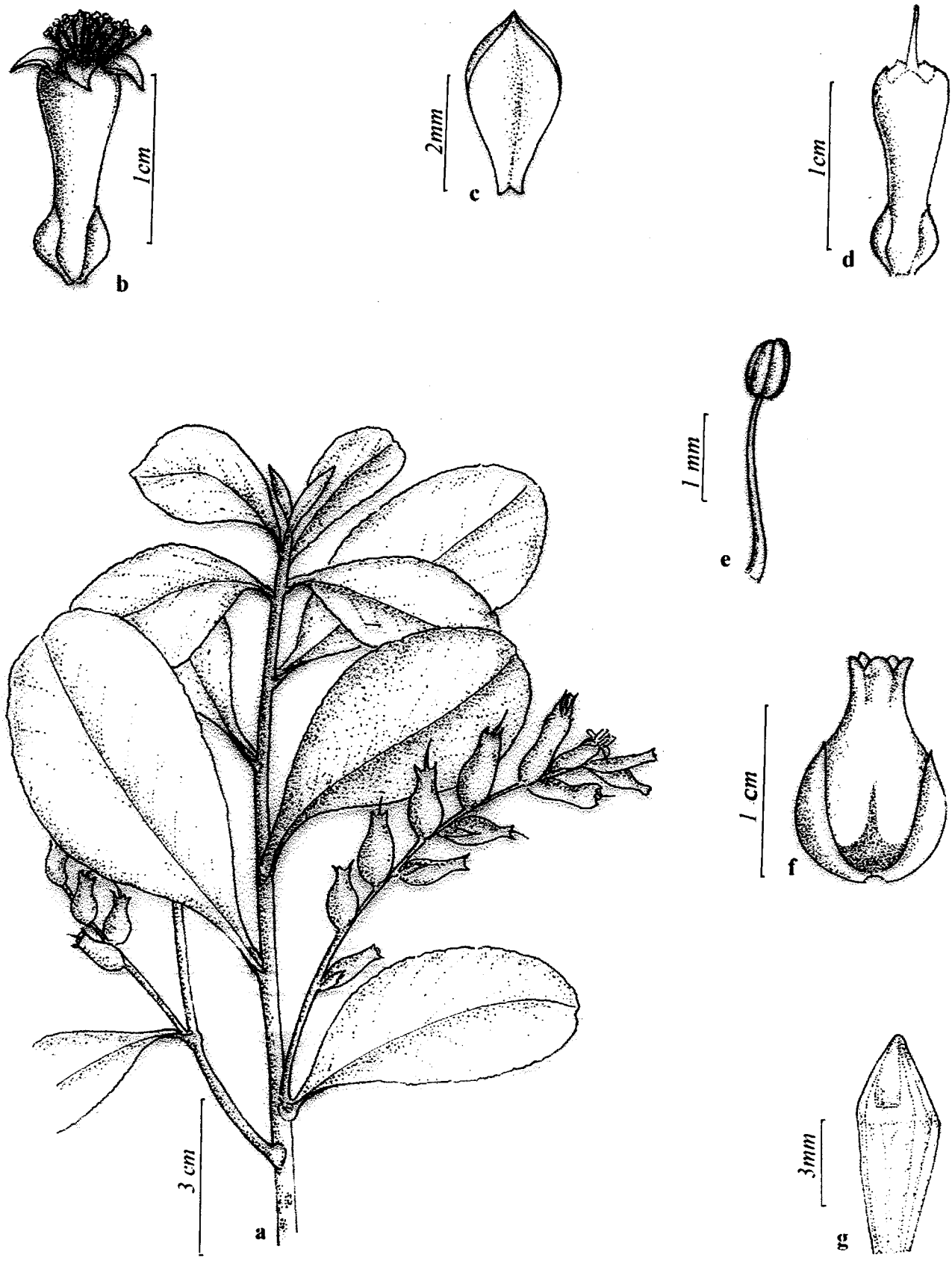


Fig. 22. *Lumnitzera racemosa* Willd.: a. Twig; b. Flower with bracteoles; c. Petal; d. Flower-petals and calyx removed; e. Stamen; f. Fruit; g. Seed.

axillaryor terminal, usually with bisexual flowers towards base and male flowers towards the apex. Bracteoles small, caducous. Calyx tube campanulate, adnate to ovary at base; lobes 5, triangular-ovate. Petals 0. Stamens 10 in two rows, upper alternating with calyx lobes, lower opposite. Disc inside the stamens, 5-lobed, villous. Ovary 1-celled, ovules 1-3, pendulous; style subulate; stigma simple. Fruit a dryindehiscent drupe, smooth, ribbed or winged, wings equal or unequal. Seed 1.

1a. Glands prescent one on either side of midrib within lamina; dupes ellipsoid, 2-ridged; new foliage green ..... **T. catappa**

1b. Glands absent on lamina; drupes subglobose, 5-ridged, new foliage red .... **T. bellirica**

Terminalia bellirica (Gaertn.) Roxb., Pl. Corom. t. 198. 1805, *'bellerica*, & Fl. Ind. 2: 431. 1832; Clarke in Hook. f., Fl. Brit. India 2: 445. 1878; Gamble, Fl. pres. Madras 463.1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 294. 1976; Mani. & Sivar., Fl. Calicut 105. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 581. 1983; Ramach. & Nair, Fl. Cannanore 178. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 85. 1988; Vajravelu Fl. Palghat Dist. 196. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 183. 1994; Philcox in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 42.1995;Sivar. & Mathew, Fl. Nilambur 258. 1996; sasi. & Sivar., Fl. Pl. Thrissur For. 177. 1996. *Myrobalamus bellirica* Gaertn., Fruct. Sem. Pl. 2: 90, t. 97. 1791. ***Tani*** Rheede, Hort. Malab. 4: 23-24, t. 10. 1683. ***Thani.***

Large trees. Leaves 10-18 x 5-8 cm, ovate to obovate or broadly elliptic, base cuneate, apex obtusely short-acuminate or emarginate, lower surface glaucescent, lateral nerves c. 6 pairs, thin-coriaceous. Spikes simple, clustered or solitary, axillary, 4-8 cm long. Calyx-tube 1-1.5 mm long, pubescent without; lobes 1-1.5 mm long, triangular, greenish-yellow. Ovary 1-2 m long; style 3-4 mm long. Drupe globose to ovoid,2-3 cm diam., tomentose without. Seeds globose, 1.5-2 cm diam.

Fl. & Fr.: Feb. - Apr.

Distr.: Indo-Malaysia. In waste lands. Wood suitable for match boxes and splints and also for paper pulp. *CNS 2462* (Kappakada).

Terminalia catappa L., Syst. Nat. ed. 12, 2: 674. 1767; Roxb., Fl. Ind. 2: 430. 1832; Wight & Arn., Prodr. Fl. Ind. Orient.313. 1834; Wight,Ic. t. 172. 1839; Bedd., Fl. Sylv. t. 18. 1868; Clarke in Hook. f., Fl. Brit. India 2: 444. 1878; Gamble, Fl. Pres. Madras 463. 1919; Mani. & Sivar., Fl. Calicut 104. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 582. 1983; Philcox in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 39. 1995. ***Thallithenga***.

Deciduous trees to 22 m tall; young branchlets densely sericeous-pubescent. Leaves clustered at the ends of branchlets, spirally arranged 13-21 x 7-12 cm, obovate or oelliptic-ovate, narrowing below the middle into a narrow subcordate base bearing dark-coloured, sessile glands, one each on either side of the midrib, apex obtuse or retuse, finely sericeous-tomentose when young but soon becoming somewhat glossy when mature, thin-coriaceous; petiole to 1 cm long. Flowers sessile, white, in axillary spikes 6-11 cm long, with a dominance of male flowers and a few female usually only at the base. Calyx tube c. 2 mm long,tomentose; lobes 5, c. 1 mm long, triangular. Stamens 10; filaments 2-3 mm long. Ovary c. 5 mm long. Drupe 3.5-5.5 x 2.5-3.5 cm, ellipsoid or ovoid,laterally more or less compressed, 2-ridged.

Fl. & Fr.: Feb. - May.

Distr.: Tropical Asia, northern Australia and Polynesia; but widely planted throughout the tropics. *CNS 2463* (Muttar).

49. MYRTACEAE Juss.

Gen. Pl. 322. 1789.

1a. Fruit a capsule; adult leaves alternate, young leaves opposite ..... **Eucalyptus**

1b. Fruit a berry; all leaves opposite.

2a. Ovary many-celled; seeds many; cymes axillary, 1-3-flowered ..... **Psidium**

2b. Ovary 2-celled; seeds 1 or 2; cymes terminal or axillary, many-flowered .... **Syzygium**

EUCALYPTUS L'Heritier de Brutelle

Sertum Angl. 18. 1789, t. 20. 1792.

Eucalyptus globulus Labill., Rel. Voy.Rech. Perouse 1: 153.1799; Gamble, Fl. Pres.Madras 486. 1919; Mathew, Rec. Bot. Surv. India 20: 108. 1969; Ashton in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 462. 1981; Matthew & Britton in Matthew, Fl. Tam. Carnatic 3: 588. 1983; Mani., Fl. Silent Valley 102. 1988. *Eucalyptus pulverulenta* Link., Enum. Pl. Hort. Berol. 31. 1821. *Eucalyptus glauca* DC., Prodr. 3: 221. 1828.

Medium sized to large trees; bark smooth and exfoliating in large leathery strips. Mature leaves 7-15 x 2.5-4 cm, lanceolate and more or less falcate, base obtuse, apex acuminate, glaucous; petiole to 1.5 cm long. Floers in axillary, edunculate umbels. Calyx tube c. 1 mm long, turbinate; operculum umbonate. Stamens many; anthers versatile. Fruit c. 1 x 2 cm, broadly turbinate, 4-ribbed.

Fl. & Fr.: Mar. - May.

Distr.: Native of Tasmania. Widely cultivated in Sri Lanka and India. Commonly grown on roadsides as an avenue tree. *CNS 1925* (Veeyapuram).

PSIDIUM Linnaeus

Sp. Pl. 470. 1753.

Psidium guajava L., Sp. Pl. 470. 1753; Duthie in Hook. f., Fl. Brit. India 2: 468. 1878, '*guagava*'; Gamble, Fl. Pres. Madras 472. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 280. 1976; Ashton in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 406. 1981; Mani. & Sivar., Fl. Calicut 108. 1982; Ramach. & Nair, Fl. Cannanore 184. 1988; Mani., Fl. Silent Valley 103. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 194. 1988; Vajravelu, Fl. Palghat Dist. 201. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 185. 1994; Sivar. & Mathew, Fl. Nilambur 260. 1996. ***Pela, Malacka-pela*** Rheede, Hort. Malab. 3: 33, t. 34, 35. 1682. ***Pera***.

Small trees. Stem smooth with pealing bark. Young stem 4-angled. Leaves 16-11 x 2.5-5 cm, elliptic-oblong, base rounded to obtuse-cuneate, apex acute-apiculate, hirsute on both sides when young, glabrous on ageing except the nerves, thin-coriaceous, lateral nerves prominent; petioles 0.6-1 cm long. Cymes axillary, 1-3-flowered; peduncles 0.5-1.2 cm long; pedicel short or 0. Calyx tube 4-9 mm long, ovoid, densely hirsute; lobes 4, unitedland closed in bud. Petals 4, white, 1-1.5 cm long, broadly ovate, caducous. Stamens many. Ovary globose, many-celled; ovules numerous; style subulate. Berry 2.5-3.5 cm diam., globose crowned by persistent calyx lobes. Seeds many, embedded in fleshy pulp.

Fl. & Fr.: Mar. - Jun.

Distr.: Native of Tropical America; naturalized throughout tropics. Usually cultivated for its edible fruits. *CNS 2119* (Mannar).

SYZYGIUM R. Br. ex J.Gaertner

Fruct. 1: 166. 1788 (*nom. cons.*).

Trees or shrubs. Leaves simple, opposite, pellucid dotted; lateral nerves many, close, forming prominent intramarginal nrve. Flowers few to many in axillary, terminal or lateral corymbose cymes or panicles, rarely solitary. Bracteoles present or 0.1 calyx tube turbinate, lobes 4-5, usually persistent in fruits. Petals 4-5, free or calyptrate and falling as one piece. Stamens many, exserted, incurved in buds; filaments unequal. Ovary 2-celled, ovules many; style simple; stigma subulate. Berry globoselto subglobose. Seeds 1-few.

1a. Leaves 4-8.5 cm broad, intramarginal vein not developed; cymes axillary, peduncle up to 11 cm long ..... **S. travancoricum**

1b. Leaves up to 4 cm broad, intramarginal vein developed; cymes terminal or axillary or lateral from the scars of fallen leaves.

2a. Ripe fruit white ..... **S. zeylanicum**

2b. Ripe fruit scarlet to dark purple.

3a. Calyx tube long, funnel-shaped; cymes axillary, peduncle upto 2 cm long ..... **S. lanceolatum**

3b. Calyx tube short, turbinate; cymes terminal or lateral from the scars of fallen leaves.

4a. Leaves obovate, obtuse to emarginate at apex; cymes terminal ..... **S. caryophyllatum**

4b. Leaves elliptic-ovate to lanceolate, acuminate at apex; cymes lateral from the scars of fallen leaves ..... **S. cumini**

Syzygium caryophyllatum (L.) Alston in Trimen, Handb. Fl. Ceylon 6. (Suppl.): 116. 1931; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 280. 1976; Ashton in Dassan & Fosb., Rev. Handb. Fl. Ceylon 2: 450. 1981; Mani. & Sivar., Fl. Calicut 107. 1982; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 194. 1988; Ramach. & Nair, Fl. Cannanore 181. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 188. 1994; Sivar. & Mathew, Fl. Nilambur 262. 1996. *Myrtus caryophyllata* L., Sp. Pl. 472. 1753. *Eugenia caryophyllacea* Wight, Ic. t. 540. 1842; Duthie in Hook. f., Fl. Brit. India 2: 490. 1878. *Syzygium caryophyllaeum* auct., non Gaertn., 1788: Gamble, Fl. Pres. Madras 480. 1919. *Njara* Rheede, Hort. Malab. 5: 53, t. 27. 1685. ***Nara***.

Small trees. Leaves 4-7 x 2-4 cm, obovate, narrowly attenuate at base, obtuse to emarginate at apex, pellucid dotted below, thin-coriaceous, dark brown on drying; petiole 4-7 mm long. Cymes corymbose; terminal, rarely from upper leaf-axils, up to 6 cm long, dense. Bracts and bracteoles minute. Calyx tube 2-2.5 mm, truncate. Petals 4, 1-1.5 mm, white, calyptrate. Stamens 2-3 mm, white. Berry 8-10 mm across, subglobose, ripening dark purple.

Fl. & Fr.: Apr.-Jun.

Distr.: Perninsular India and Sri Lanka. Banks of ponds and canals, sometimes in sacred groves. *CNS 1005* (Vandanam).

Syzygium cumini (L.) Skeels, U.S. Dept. Agri. Bur. Pl. Industr. Bull. 248: 2. 1912; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 281. 1976; Ashton in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 443. 1981; Mani. & Sivar., Fl. Calicut 107. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 594. 1983; Ramach. & Nair, Fl. Cannanore 181. 1988;

Nicols., Suresh & Mani., An Interpr. Hort. Malab. 194. 1988; Mani., Fl. Silent Valley 104. 1988; Vajravelu,Fl. Palghat Dist. 199. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 188. 1994; Sivar. & Mathew, Fl. Nilambur 262. 1996; Sasi. & Sivar., Fl. Thrissur For. 181. 1996. *Myrtus cumini* L., Sp. Pl. 471. 1753. *Eugenia jambolana* Lam., Encycl. 3: 198. 1789; Duthie in Hook. f., Fl. Brit. India 2: 499. 1879. *Syzygium jambolanum* (Lam.) DC., Prodr. 3: 259. 1828; Gamble, Fl. Pres. Madras 481. 1919. ***Perin-njara*** Rheede, Hort. Malab. 5: 57-58, t. 29. 1685.

Large trees; bark pale yellow-brown. Leaves 6-12 x 3-5 cm, elliptic-ovate to lanceolate, base broadly cuneate, apex shortly acuminate, thin-coriaceous; nerves many, close parallel; petiole 1.2-1.5 cm long. Cymes lateral; peduncles 3-5 cm long; umbellules articulated. Calyx tube 2-2.5 mm long, truncate. Petals 4, 1.5-2 mm long, calyptrate, white. Filaments 2-3 mm long. Style 3-4 mm long. Berry 1-1.8 cm across, globose, ripening purple. Seeds 1-2, 5-7 x 3-4 mm, ovoid.

Fl. & Fr.: Dec. - Feb.

Distr.: Sri Lanka, India, Malesia to Australia. Common in wastelands and roadsides. *CNS 2391* (Pallippad).

Syzygium lanceolatum (Lam.) Wight & Arn., Prodr. 2: 230. 1834; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 282. 1976; Ashton in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 433. 1981 Mani., Fl. Silent Valley 106. 1988; Vajravelu, Fl. Palghat Dist. 200. 1990; Sasi. & Sivar., Fl. Pl. Thrissur For.183. 1996. *Eugenia lanceolata* Lam., Encycl. 3: 200. 1789; Trimen, Handb. Fl. Ceylon 2: 172. 1894. *Eugenia wightiana* Wight Ic. t. 529, 530. 1840, p.p.; Hook. f., Fl. Brit. India 2: 285. 1879, p.p. *Syzygium wightianum* Wall. ex Wight & Arn., Prodr. 330. 1834; Gamble, Fl. Pres. Madras 478. 1919 (Plate XII: B & C; Fig. 23).

Small trees with smooth bark; twigs terete. Leaves 6-13 x 2-4 cm, ovate-lanceolate to elliptic, base attenuate, margins sub-revolute, apex acuminate, chartaceous; nerves many, parallel; petiole to 1 cm long. Flowers in short axillary cymes; peduncle to 2 cm long. Calyx to 12 mm long, c. 3 mm across, funnel-shaped, purplish. Petals

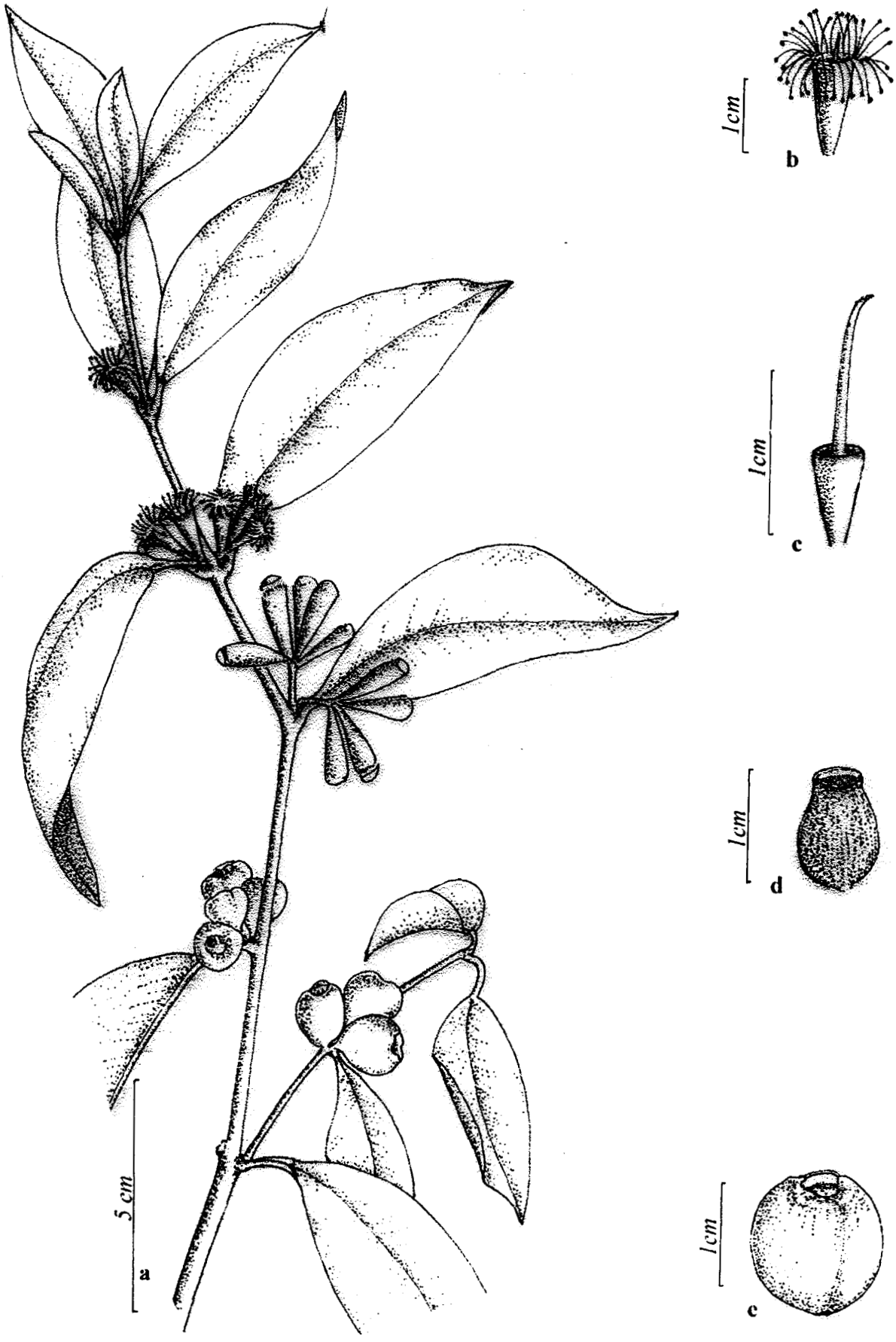


Fig. 23. *Syzygium lanceolatum* (Lam.) Wight & Arn.: a. Flowering twig; b. Flower; c. Pistil; d.Young fruit; e. Mature fruit.

3299



Plate XII. *A. Syzygium travancoricum* Gamble; B & C. *Syzygium lanceolatum* (Lam.) Wight &Arn.; B. Twig; C. Fruits; D. *Syzygium zeylanicum* (L.) DC.

c. 3 x 3 mm, suborbicular, white. Stamens many, to 6 mm long. Berry 1-1.5 cm across, subglobose, red-purple when mature.

Fl. & Fr.: Jan. - Apr.

Distr.: Southern India and Sri Lanka. In sacred groves. *CNS 1788* (Vandanam).

Syzygium travancoricum Gamble, Kew Bull. 1918: 240. 1918 & Fl. Pres. Madras 480. 1919; Nair & Mohanan, J. Econ. Tax. Bot. 2: 233. 1981; Mohanan & Henry, Fl. Thiruvananthapuram 192.1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 185. 1996 (Plate XII: A).

Medium sized trees with smooth pale grey bark; branchlets quadrangular. Leaves 11-18 x 4-8.5 cm, ovate-oblong, shortly decurrent on the petiole, base broadly cuneate, apex acute, subcoriaceous; petiole to 1.5 cm long. Cymes axillary; peduncle up to 11 cm long. Flowers white, c. 3 mm across, in 5-8 cm long peduncled corymbose cymes, axillary. Calyx 2-3 mm long. Petals c. 2 mm long.

Fl. & Fr.: Apr. - Jun.

Distr.: Western Ghats. Rare; an endangered species. In some scared groves only. *CNS 1978* (Thamarakulam).

Syzygium zeylanicum (L.) DC., Prodr. 3: 260. 1828; Gamble, Fl. Pres. Madras 479. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 283. 1976; Ashton in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 431. 1981; Mani. & Sivar., Fl. Calicut 108. 1982; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 196. 1988; Ramach. & Nair, Fl. Cannanore 183. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 192. 1994. *Myrtus zeylanica* L., Sp. Pl. 472. 1753. *Eugenia spicata* Lam., Encyl. 3: 201. 1789; Bedd. Fl. Sylv. t. 202. 1872. ***Belluta-kanneli*** Rheede, Hort. Malab. 5: 39-40, t. 20. 1685. ***Poocha pazham*** (Plate XII: D).

Large shrubs to small tress with pale greyish-brown bark. Leaves 2-5 x 0.6-3 cm, ovate-lanceolate, base acute to obtuse, apex acuminate, reticulations prominent below, thick-coriaceous; petioles 3-5 mm long. Flowers in terminal many-flowered panicles of

umbellules, each 3-5-flowered; peduncles 3-5 mm long. Calyx tube 3-4 mm long, companulate; lobes 4, c. 1 mm long, ovate. Petals 4, white, 1-2 mm long, deciduous. Filaments 4-6 mm long. Style 3-5 mm long. Berry 8-10 mm across, globose, white. Seed solitary.

Fl. & Fr.: Jan. - Apr.

Distr.: Indo-Malesia. Common in sacred groves. *CNS 1020* (Vandanam).

50. LECYTHIDACEAE Poit.

in Mem. Mus. Hist. Nat. 13: 143. 1825.

1a. Flowers in thick, short, erect spikes; all filaments not antheriferous; fruit globose, fleshy ..... **Careya**

1b. Flowers in long, pendant racemes; all filaments antheriferous; fruit angular, fibrous ..... **Barringtonia**

BARRINGTONIA J.R. Forster *et* J.G.A. Forster

Charact. Gen. 75, t. 38. 1776 (*nom. cons.*).

Shrubs or trees with fissured bark. Leaves spirally arranged; stipules minute and soon falling. Racemes terminal or lateral on the twigs, pendulous. Calyx of 2 or 4 segments adnate to ovary. Petals 4 or 5, adnate to staminal tube. Stamens very numerous, connate at the base in to a thick tube; filaments very long; anthers basifixed, 2-celled. Ovary 2-4 celled with many pendulous ovules in each cell; style long, simple. Fruit fibrous, indehiscent, 1-celled. Seed 1.

1a. Flowers 4-5 cm across; stamens in 5-6 whorls; fruit 5-7 cm long ..... **B. racemosa**

1b. Flowers 1-1.5 cm across; stamens in 3 whorls; fruit 2-4 cm long ..... **B. acutangula**

Barringtonia acutangula (L.) Gaertn., Fruct. Sem. Pl. 2: 97, t. 101. 1790; Roxb., Fl. Ind. 2: 635. 1832; Clarke in Hook. f., Fl. Brit. India 2: 508. 1879; Gamble, Fl. Pre. Madras 487.

1919; Macnae & Fosb. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 199. 1981; Mani. & Sivar., Fl. Calicut 109. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 596. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 159. 1988; Sivar. & Mathew, Fl. Nilambur 266. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 185. 1996.

Trees. Leaves simple, alternate, apically clustered, 7-14 x 3-5 cm, obovate, base attenuate, margin serrulate, apex subacute, thin-coriaceous, subsessile. Racemes axillary, pendulous, c. 30 cm long. Flowers c. 1.5 cm across, 4-5 merous. Calyx-tube cupular; lobes 4, c.2 mm long, ovate. Petals 4, scarlet coloured, to 8 x 3 mm, ovate-oblong, basally connate. Stamens many; filaments pink, connate at base. Ovary 2-locular; ovules 2-6 per locule; style long, filiform. Berry 2-4 cm long, ellipsoid, angular. Seeds solitary, ovoid.

Fl. & Fr.: Mar.-May.

Distr.: Sri Lanka, India, Myanmar, Malesia and N. Australia. Less common. Along stream sides.Root bark used to poison fish. *CNS 1583* (Choolatheruvu).

Barringtonia racemosa (L.) Spreng., Syst. Veg. 3: 127. 1826; Thw., Enum. Pl. Zeyl. 119. 1859; Kurz, J. Asiat. Soc. Bengal 46 (2): 70. 1877; Hook. f., Fl. Brit. India 2: 507. 1879; Gamble, Fl. Pres. Madras 487. 1919; Payens, Blumea 15: 192. 1967; Macnae & Fosb. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 197. 1981; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 159. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 193. 1994. *Eugenia racemosa* L., Sp. Pl. 471. 1753. *Butonica racemosa* (L.) Juss. ex Miers, Trans . Linn. Soc. London Bot. 1: 66, Pl. 13. 1875. *Butonica ceylanica* Miers, Trans. Linn. Soc. London Bot. 1: 77. 1875. *Barringotonia ceylanica* (Miers) Gardner ex Clarke in Hook. f., Fl. Brit. India 2: 508. 1879; Trimen, Handb. Fl. Ceylon 2: 190. 1894. ***Samstravadi, Caipa-tsjambu*** Rheede, Hort. Malab. 4: 11-13, t. 6. 1683. ***Samudrakaya*** (Plate XIII: A).

Small trees upto 15 m tall. Leaves tufted at the ends of stout twigs, subsessile, 11-32 x 4-10 cm, obovate, base attenuate, apex acute, shiny. Racemes pendulous, terminal, 25-40 cm long. Flowers 4-5 cm across; pedicels 1-1.5 cm long; bracts triangular. Calyx tube rupturing into 2-5 unequal lobes. Petals 4, cream coloured, oblong or oblong-oval.

Stamens in 5 or 6 whorls; filaments pink. Ovary 2-4-celled. Fruit 5-7 x 2-3.5 cm, ovoid, brownish-red.

Fl. & Fr.: Through out the year.

Distr.: From Natal in Southern Africa, north to Kenya, eastwards to Fiji, Samoa and Caroline Islands, and from Ryukya Islands and Guam to Queensland. On the shores of back waters. *CNS 2575* (Punnamada), *CNS 1470* (Muhamma).

CAREYA Roxburgh

Pl. Corom. 3: 13. 1811 (*nom. cons.*).

Careya arborea Roxb., Pl. Corom. t. 218. 1811; Bedd., Fl. Sylv. t. 205. 1872; Clarke in Hook f., Fl. Brit. India 2: 511. 1879; Gamble, Fl. Pres. Madras 488. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 157. 1976; Macnae & Fosb. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 200. 1981; Mani. & Sivar., Fl. Calicut 108. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 597. 1983 Mani., Fl. Silent Valley 108. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 160. 1988; Ramach. & Nair, Fl. Cannanore 184. 1988; Vajravelu, Fl. Palaghat Dist. 201. 1990; Mohanan & Henry, Fl. Thiruvanathapuram 193. 1994; Sivar. & Mathew, Fl. Nilambur 267. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 186. 1996. ***Pelou*** Rheede, Hort. Malab. 3: 35-36, t. 36. 1682. ***Perzhu.***

Trees. Leaves 10-28 x 5-13 cm, broadly ovate to oblong-obovate, base cuneate, margin denticulate to entire, apex obtuse, thin coriaceous crowded at end of branches. Flowers large, white, showy, 6-8 cm across, in short terminal spikes. Calyx tube campanulate, 1.4-2 cm long; lobes 4, 0.7-1 x 1.2-1.4 cm, broadly ovate, persistent. Petals 4, white, 3-4 x 3-3.6 cm, elliptic-oblong. Stamens many in several rows; filaments 2-5 cm long, slightly united at extreme base, falling as a single unit, cream coloured, outer and inner rows antherless. Ovary inferior, 1.6-2 cm long, 1-1.5 cm across, 4-celled; ovules many; style filiform, 3-4 cm long; stigma capitate. Berry large, globose to subglobose, 4.5 cm diam., crowned by persistent calyx. Seeds many, embodied in fleshy pulp.

Fl. & Fr.: Feb.-Apr.

Distr.: India, Sri Lanka to Malaya. Rare. In waste places. *CNS 1850* (Chettikulangara).

Uses: Juice of fresh bark given with honey as demulcent in cough and cold. Infusion of flowers given after child birth to heal ruptures.

51. MELASTOMATACEAE Juss.

Gen. Pl. 328. 1789.

1a. Leaves penninerved, with faint intramarginal vein; calyx tube glabrous; anthers longitudinally dehiscent ..... **Memecylon**

1b. Leaves 3-5-ribbed; calyx tube with hairs, bristles or scales; anthers dehiscent by apical pores.

2a. Stem and bracts scaly; stamens unequal ..... **Melastoma**

2b. Stem and bracts bristly; stamens equal ..... **Osbeckia**

MELASTOMA Linnaeus

Sp. Pl. 389. 1753.

Melastoma malabathricum L., Sp. Pl. 390. 1753, *'malabathrica'*; Clarke in Hook. f., Fl. Brit. India 2: 523. 1879; Gamble, Fl. Pres. Madras 495. 1919; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 286. 1976; Mani. & Sivar., Fl. Calicut 110. 1982; Bremer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 159. 1987; Ramach. & Nair, Fl. Cannanore 185. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 175. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 194. 1994; Sivar. & Mathew, Fl. Nilambur, 269. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 187. 1996. ***Kadali*** Rheede Hort. Malab. 4: 87-88, t. 42. 1683.

Shrubs to 1.3 m tall; stem densely covered with paleaceous pectinate hairs. Leaves 4-11 x 1.5-4 cm, elliptic-oblong, base attenuate, apex acute, upper surface prominently lineolate; lower surface tomentose, 5-ribbed, drying dull-greenish; petiole to 1.5 cm long. Flowers solitary or few in rather dense clusters, c. 5 cm across; bracts 1.2-2 x 1-1.4 cm, boat-shaped, densely paleaceous hairy. Calyx tube 0.7-1 cm long, campanulate; lobes 5,

5-7 x 4-5 mm, ovate-lanceolate, densely paleaceous hairy. Petals 5, reddish purple, 1.5-2 x 0.7 - 1 cm, obovate. Stamens 10, alternating ones large and small; anthers dimorphic, dehiscence by apical pores. Ovary ovoid, 5-locular; ovules many; style simple. Capsules 1-1.5 x 0.8-1 cm, ovoid, irregularly dehiscent. Seeds many, minute.

Fl. & Fr.: Almost throughout the year.

Distr.: India and Sri Lanka. Common along wet places. *CNS 1587* (Aroor).

MEMECYLON Linnaeus

Sp. Pl. 349. 1753.

Shrubs or small trees. Leaves opposite, coriaceous; lateral nerves and intramarginal veins obscure. Flowers usually in axillary or lateral fascicles, cymes or umbellules. Bracteoles 2-3 at base of the pedicel. Calyx tube companulate, adnate to ovary, minutely 4-lobed. Petals 4, usually blue, early caducous. Disc rayed. Stamens 8. Ovary 1-celled; ovules 6-12 on central placenta; style slender; stigma simple. Berry globose, 1-seeded.

1a. Leaves sessile to subsessile, cordate to round at base ..... **M. malabaricum**

1b. Leaves petioled, narrowly to broadly attenuate at base.

2a. Leaves drying yellowish, apex obtuse to retuse; peduncle and pedicels very short or absent ..... **M. umbellatum**

2b. Leaves drying blackish, apex acute; peduncle and pedicel elongated .... **M. edule**

Memecylon malabaricum (Clarke) Cogn. in DC., Monogr. Phan. 7:1148. 1881; Gamble, Fl. Pres. Madras 505. 1919; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 288. 1976; Mani. & Sivar., Fl. Calicut 111. 1982; Mohanan & Henry, Fl. Thiruvananthapuram 197. 1994. *M. amplexicaule* Roxb. var. *malabarica* Clarke in Hook. f., Fl. Brit. India 2: 559. 1979, p.p., incl. typus.

Bushy shrubs. Leaves 5-12 x 1.5-4 cm, ovate, apex gradually acute, cordate at base, sessile; nerves obscure. Flowers fascicled in very dense many-flowered cymes;



Plate XIII. A. *Barringtonia racemosa* (L.) Spreng.; B. *Memecylon edule* Roxb.; C. *Rotala macrandra* Koehne.

peduncles 1-2 mm long; pedicels short, 1-2 mm long. Calyx tube 1-2 mm long, campanulate, truncate at apex. Petals 1-2 mm long, obovate, blue. Style subulate, c. 3 mm long. Berry 4-5 mm across, globose.

Fl. & Fr.: Feb. - May.

Distr.: Endemic to Southern Western Ghats. Common in sacred groves. *CNS 1072* (Ambalapuzha).

Memecylon edule Roxb., Pl. Corom. t. 82. 1798 & Fl. Ind. 2: 260.1832; Clarke in Hook. f., Fl. Brit.India 2: 563. 1879, p.p.; Gamble, Fl. Pres. Madras 508. 1919; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 600. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 175. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 196. 1994. ***Karjavo-maram*** Rheede, Hort. Malab. 5: 37, t. 19. 1685 (Plate XIII: B).

Shrubs. Leaves 3.5 - 7 x 2-3 cm, elliptic, base rounded, apex acute or retuse, coriaceous; petiole to 1 cm long. Umbels to 3 cm long; peduncle c. 5 mm long, stout. Flowers c. 5 mm across; pedicel 5-6 mm long, slender. Calyx-tube c. 1.5 mm long, campanulate; lobes 4, c. 1 mm long, suborbicular. Petals 4, blue, c. 3 mm long, broadly ovate. Stamens 8; filaments c. 4 mm long. Ovary c. 1. 5 mm long, 1-celled; style to 5 mm long. Berry 5-6 mm across, globose, blue. Seed to 4 mm long.

Fl. & Fr.: Mar. - Jul.

Distr.: Sri Lanka, India, Myanmar, Thailand and Malesia.

In sacred groves. *CNS 1424* (Kanichukulangara), CNS 1868 (Elangimelvallikavu).

Memecylon umbellatum Brum. f., Fl. Ind. 87. 1768; Gamble, Fl. Pres. Madras 504. 1919; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 288. 1976; Mani. & Sivar., Fl. Calicut 110. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 600. 1983; Ramach. & Nair, Fl. Cannanore 187. 1988; Mani., Fl. Silent Valley 110. 1988; Vajravelu, Fl. Palghat Dist. 202. 1990; Sivar. & Mathew, Fl. Nilambur 271. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 189. 1996. *Memecylon tinctorium* Koenig ex Willd., Sp. Pl. 2: 347. 1799.

Memecylon rubro-caeruleum Thw., Enum. Pl. Zeyl. 415. 1864. *Memecylon edule* Roxb. var. *rubro-caerulea* (Thw.) Clarke in Hook. f., Fl. Brit. India 2: 564. 1879.

Large shrubs. Leaves 2.5-5 x 1.5-3 cm, ovate-oblong or elliptic, base cuneate, apex obtuse to rounded, coriaceous, drying yellowish green; petiole c. 5 mm long. Umbels compact, 1.5-3 cm across, sessile or very short peduncled, many-flowered; flowers subsessile. Calyx 2-3 mm wide, pale bluish, truncate or shallowly 4-lobed. Petals blue, elliptic-ovate to orbicular. Filaments blue; anthers c. 1.5 mm long. Style blue. Berry c. 7 mm across, globose, initially yellowish green; mature fruit bluish black.

Fl. & Fr.: Apr. - Jun.

Distr.: Sri Lanka and Peninsular India. In sacred groves. *CNS 1867* (Elangimelvallikavu).

OSBECKIA Linnaeus

Sp. Pl. 345. 1753.

Herbs, subshrubs or shrubs, branchlets usually 4-angled. Leaves simple, opposite, 3-5-ribbed, rarely more. Flowers in terminal capitate cymes, panicles, or rarely solitary, very showy, purplish or pink, 4-5-merous. Calyx tube urceolate to subglobose, produced beyond ovary, bristly without, lobes 4-5,usually alternate with tufted appendages on rim of tube. Petals 4-5, usually ciliate on margins. Stamens 8-10, equal to subequal; anthers dehiscent by apical pores; connectives 2-auricled at base. Ovary adnate to calyx tube, semi-inferior, 4-5-celled, bristly at apex; ovules many on placentae radiating from axils; style incurved at tip. Capsules enclosed within the calyx tube, dehiscing by apical slits. Seeds many, minute, tubercled.

1a. Annual herbs; flowers 4-merous; anthers truncate at apex ..... **O. muralis**

1b. Shrubs or undershrubs; flowers 5-merous; anthers beaked at apex.

2a. Calyx-lobes obtuse at apex; vegetative parts densely bristly; leaves 3.5-9 cm long, 5-ribbed ..... **O. aspera**

2b. Calyx lobes acute; vegetative parts sparsely bristly; leaves 1.5-3.2 cm long, 3-ribbed ..... **O. virgata**

Osbeckia aspera (L.) Bl., Bijdr. Natuurk. Wetensch. 6: 220. 1831; Clarke in Hook. f., Fl. Brit. India 2: 519. 1879; Gamble, Fl. Pres. Madras 492. 1919; Hansen, Ginkgoana 4: 82. 1977; Bremer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 166. 1987; Mani., Fl. Silent Valley 110. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 176. 1988; Vajravelu, Fl. Palghat Dist. 203. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 198. 1994; Sivar. & Mathew, Fl. Nilambur 272. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 189. 1996. *Melastoma asperum* L., Sp. Pl. 389. 1753. *Osbeckia kleinii* Wight & Arn., Prodr. 323. 1834. *Osbeckia courtallensis* Gamble, Kew Bull. 1918: 242. 1918 & Fl. Pres. Madras 493. 1919. ***Katou-kadali*** Rheede, Hort. Malab. 4: 91, t. 43. 1683.

Erect shrubs; branchlets more or less pubescent with appressed to spreading hairs. Leaves 3.5-9 x 1.5-3.2 cm, elliptic-lanceolate, base attenuate, acute to shortly acuminate at apex, basally 5-ribbed, more or less pubescent with appressed short hairs on both sides, drying yellowish-green; petiole to 1 cm long. Flowers c. 2 cm across, in terminal cymes, sometimes elongated clusters, pentamerous. Calyx tube 6-8 mm long, c. 5 mm wide, cupular, with dense short bristle-like hairs; lobes 5, oblong, obtuse. Petals 5, pink, 1-1.5 x 0.8-1 cm, ovate, apex rounded. Stamens 10; anthers 5-6 mm long. Ovary hairy at apex; style exserted, 1.25-1.5 cm long; stigma curved, papillate. Capsules 0.8-1 x 0.6-0.7 cm, ovoid, ribbed. Seeds many.

Fl. & Fr.: Almost throughout the year.

Distr.: Peninsular India and Sri Lanka. Along road sides. *CNS 1741* (Aroor).

Osbeckia muralis Naud., Ann. Sci. Nat. Bot. Ser. 3, 14: 56. 1850; Hansen, Ginkgoana 4: 41, ff. 2(5) & 9(10), tt. 6. (C & D). 1977; Sivar. & Mathew, Fl. Nilambur 273. 1996. *Osbeckia truncata* D. Don ex Wight & Arn., Prodr. 332. 1834, p.p., *nom. illeg.*; Clarke in Hook. f., Fl. Brit. India 2: 514. 1879; Gamble, Fl. Pres. Madras 494. 1919; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 289. 1976; Mani. & Sivar., Fl. Calicut 110. 1982.

Erect herbs; stem 4-angled, laxly villous. Leaves 1-3.5x 0.8-2 cm, elliptic to oblong, base rounded to obtuse, apex acute, chartaceous, densely pubescent with long hairs on both sides, 3-ribbed; petiole to 6 mm long. Flowers few in terminal cymose

clusters, 4-merous, c. 1.5 cm across. Calyx tube 2-4 mm wide, cupular, ribbed, long-simple hairy; lobes 4, 2-4 mm long, triangular, stellately bristly at apex. Petals pink, 4-6 x 3-4 mm, ovate. Stamens 8; anthers 2-4 mm long, ovate-oblong, apex truncate. Ovary 4-locular, apically with many erect bristles. Capsule 4-6 mm long, globose. Seeds many, minute.

Fl. & Fr.: Sept. - Dec.

Distr.: Western Ghats. In lateritic slope. *CNS 1289* (Pandavanpara), *CNS 1321* (Chathiyara).

Osbeckia virgata D. Don ex Wight & Arn., Prodr. 323. 1834; Hansen, Ginkgoana 4: 107. 1977; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 602. 1983; Mani., Fl. Silent Valley Ill. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 199. 1994; Sivar. & Mathew, Fl. Nilambur 274. 1996. *Osbeckia octandra* sensu Hook. f., Fl. Brit. India 2: 521. 1879, non (L.) DC., 1828; Gamble, Fl. Pres. Madras 493. 1919; Bremer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 165. 1987.

Much-branched subshrubs, up to 1 m tall; young stem bluish, stiff appressed hairy. Leaves 1.5-3.3 x 0.5 - 1.8 cm, elliptic to linear-lanceolate,base attenuate, apex acute, hairy below on nerves, prominently 3-ribbed; petiole up to 5 mm long. Flowers in terminal few-flowered clusters, pentamerous, c. 2 cm across. Calyx tube 3-4 mm long, subglobose with stalked stellate and simple bristles; lobes 5, lanceolate, acute. Petals pink, 6-7 x 3-4 mm, obovate. Stamens 10; anthers 4-5 mm long. Ovary 5-locular, with tufted stiff hairs. Capsules 6-7 x 4-5 mm, subglobose. Seeds minute, curved and minutely tubercled.

Fl. & Fr.: Oct. - Apr.

Distr.: Peninsular India and Sri Lanka. Common in lateritic slope. *CNS 1772* (Chathiyara).

52. LYTHRACEAE J. St.-Hil.

Expos. Fam. Nat. 2: 175. 1805.

1a. Shrubs or trees.

2a. Leaves orangish or black-dotted beneath; flowers somewhat irregular, in axillary cymes; calyx tubular, longer than broad ..... **Woodfordia**

2b. Leaves not orangish or black-dotted beneath; flowers regular, in terminal panicles; calyx-tube broader than long.

3a. Petals 4; stamens 8; capsule irregularly dehiscing; seeds not winged .... **Lawsonia**

3b. Petals 6; stamens numerous; capsule 3-6 valved; seeds winged .... **Lagerstroemia**

1b. Herbs.

4a. Flowers in axillary cymes; capsule opening irregularly or operculately.

5a. Stamens inserted at base of the calyx tube; ovary with locules complete, the placenta continuous with the style; seeds hollowed on one side .... **Nesaea**

5b. Stamens inserted on the rim or the middle of calyx tube; ovary with locules incomplete, the placenta not continuous with the style; seeds flat ..... **Ammannia**

4b. Flowers solitary in leaf-axils or in spikes; capsule opening by well-defined minutely transversely striate valves ..... **Rotala**

AMMANNIA Linnaeus

Sp. Pl. 119. 1753.

Ammannia baccifera L., Sp. Pl. 120. 1753; Clarke in Hook. f., Fl. Brit. India 2: 569. 1879; Gamle, Fl. Pres. Madras 510. 1919; Mani. & Sivar., Fl. Calicut 111. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 605. 1983; Ramach. & Nair, Fl. Cannanore 191. 1988; Verdcourt in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 3: 220. 1995; Sivar. & Matthew, Fl. Nilambur 277. 1996. *A. indica* Lam., Tab. Encycl. 1: 311. 1791. *A.*

aegyptiaca Willd., Hort. Berol. 1: 6, t. 6. 1803. *A.vesicatoria* Roxb., Fl. Ind. 1: 426. 1832; Wight & Arn., Prodr. Fl. Ind. Orient. 1834.

Erect annual herbs to 40 cm tall; stem 4-angled or more or less winged. Leaves decussate, sessile, 2-6 x 0.5-0.8 cm, linear to elliptic, base attenuate, apex acute, chartaceous. Cymes dischasial, axillary. Flowers 4 or 5-merous, perigynous; pedicels c. 2 mm long. Calyx tube 1-2 mm long, campanulate; lobes 4, 1-1.5 mm long, triangular. Petals absent. Stamens 4; filaments c. 0.5 mm long. Ovary c. 1 mm in diam., globose, 4-5-locular; ovules many; stigma capitate. Capsule 1.5-2 mm across, globose, exceeding calyx tube. Seeds brownish, concavo-convex.

Fl. & Fr.: Sept. - Dec.

Distr.: Tropical Africa, S. Europe, C. Asia, Himalayala, India to China and Japan, Malesia and Australia. In low-lying marshyor fellow fields, roadside diethces, etc. *CNS 1093* (Pallithode).

LAGERSTROEMIA Linnaeus

Syst. Nat. ed.10, 2: 1068, 1076, 1372. 1759.

Trees. Leaves opposite to subopposite, or upper ones alternate. Panicles terminal, dense. Bracts 2, on the peduncle; bracteoles 2. Flowers 6-merous. Calyx campanulate, smooth or ribbed; lobes 6. Petals 6, showy, wrinkled and clawed, inserted on the rim of calyx tube. Stamens many, exserted. Ovary 3-6-celled; ovules many per cell on axile placenta; style curved; stigma capitate. Fruit a woody loculicidal capsule, 3-6-valved. Seeds many, laterally compressed, winged.

1a. Flowers 5-6 cm across; calyx tube ribbed ..... **L. speciosa**

1b. Flowers below 2 cm across; calyx tube smooth ..... **L. microcarpa**

Lagerstroemia microcarpa Wight, Ic. t. 109. 1839; Furtado & Srisuko, Gard. Bull. Settlem. 24: 192. 1969; Bedd., Fl. Sylv. t. 30. 1869; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 273. 1976; Mani., Fl. Silent Valley 113. 1988; Ramach. & Nair, Fl. Cannanore 192. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 202. 1994; Sivar. & Mathew, Fl.

Nilambur 277. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 195. 1996. *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***.

Large deciduous trees; bark smooth, greyish-white, outer layer peeling off. Leaves bifarious, 8-11 x 3-4.5 cm, elliptic-lanceolate, attenuate at base, acute to acuminate at apex, glabrous, glaucous below. Flowers in terminal panicles. Calyx tube 3-4 mm long, campanulate; lobes 6, ovate-acute, reflexed, tomentose. Petals 6, c. 5 mm long, obovate, clawed at base, wrinkled on margins, pinkish-white. Stamens many. Ovary 5-6-celled; style curved. Capsule c. 1 cm across, ellipsoid. Seeds minute.

Fl. & Fr.: Mar. - Jun.

Distr.: South West India. Rare, once collected. *CNS 2435* (Mavelikara).

Lagerstroemia speciosa (L.) Pers., Syn. Pl. 2: 2. 1806; Alston in Trimen, Handb. Fl. Ceylon 6: 129. 1931; Mani. & Sivar., Fl. Calicut 114. 1982; Ramach. & Nair, Fl. Cannanore 192. 1988; Verdcourt in Dassan., Fosb. & Clayton, Rev. Handb.Fl. Ceylon 9: 211. 1995. *Munchausia speciosa* L. in Münchhausen's Der Hausvater 5(1): 357, t. 2. 1770. *Adambea hirsuta* Lam., Encycl. 1: 39. 1783. *Lagerstroemia reginae* Roxb., Pl. Corom. 1: 46, t, 65. 1795; Wight & Arn., Prodr. 1: 308. 1838; Wight, Ic. t. 413. 1840; Bedd., Fl. Sylv. t. 29. 1869; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 273. 1976; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 608. 1983. *L. flos-reginae* Retz., Obs. Bot. 5: 25. 1788, p.p.; Clarke in Hook. f., Fl. Brit. India 2: 577. 1879; Gamble, Fl. Pres. Madras 513. 1919. *L. hirsuta* (Lam.) Willd., Sp. Pl. 2: 1178. 1799; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 166. 1988; Sivar. & Mathew, Fl. Nilambur 278. 1966; Sasi. & Sivar., Fl. Pl. Thrissur For. 195. 1996. ***Cadali-poea,Adamboe*** Rheede, Hort. Malab. 4: 45-46, t. 20-21, 1683. ***Poo-maruthu***.

Medium-sized trees; bark smooth, yellowish-grey, peels off in thin small, linear flakes. Leaves 9-18 x 3-6 cm, elliptic to oblong-lanceolate, base broadly attenuate, apex acuminate; lateral veins 14-16 pairs; petioles to 1 cm long. Flowers c. 7 cm across, in

terminal panicles, showy. Calyx tube 0.6-1 cm long, companulate, many-ribbed; lobes triangular-ovate, acuminate. Petals 2.5-3 x 1-2 cm, broadly ovate, clawed at base, wrinkled on margins, pink. Stamens many. Capsules woody, 1.5-2 cm across, ovoid to subglobose, 6-valved. Seeds many, winged.

Fl. & Fr.: Apr.-Jun.

Distr.: India, Pakistan, Myanmar, Sri Lanka, China, New Guinea and Indonesia. Often planted as avenue trees. *CNS 2436* (Kanjikuzhi).

LAWSONIA Linnaeus

Sp. Pl. 349. 1753.

Lawsonia inermis L., Sp. Pl. 349. 1753; Gamble, Fl. Pres. Madras 514. 1919; Mani. & Sivar., Fl. Calicut 115. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 609. 1983; Ramach. & Nair, Fl. Cannanore 1195. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 167. 1988; Verdcourt in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 213. 1995; Sivar. & Mathew, Fl. Nilambur 279. 1996; *Lawsonia alba* Lam., Encycl. 3: 106. 1789 & Tabl. Encycl. t. 196, f. 2. 1792; Hook. f., Fl. Brit. India 2: 573. 1879; Brandis, Ind. Trees 340. 1906, *nom. illeg.* ***Mail-anschi*** Rheede, Hort. Malab. 1: t. 40. 1678.

Woody shrubs; bark ashy grey or brown, smooth, branchlets ending in spines. Leaves 2.5-4.5 x 1-2 cm, elliptic or oblong to oblanceolate, base attenuate, apex acute or rounded, subsessile. Flowers in terminal cymose panicles; pedicels 2-4 mm long. Flowers sweet-scented, creamy white, 4-merous. Calyx tube c. 2 mm long, cupular; lobes 4, 2-3 mm long. Petals 4, 3-4 mm long, orbicular or obovate. Stamens 8; filaments 4-5 mm long, inflexed in bud. Ovary globose, 4-celled. Fruit purplish green, 4-6 x 5-7 mm, globose, dehiscing irregularly. Seeds c. 2.5 mm long.

Fl. & Fr.: Mar. - Jun.

Distr.: Central Asia, India. Often cultivated as hedge plant. Also used as a medicine. *CNS 2437* (Muhamma).

Local people use the leaves for preparing a paste which is used for coloring palms and feet.

NESAEA Commerson ex Humboldt, Bonpland *et* Kunth
Nov. Gen.Sp. ed. folio, 6: 151. 1823.

Annular or perennial herbs; stem often 4-angled. Leaves decussate, sessile. Cymes dichasial, axillary, some times flower solitary; bracteoles 2, prominent, linear, more or less equal to calyx tube. Calyx tube campanulate or urceolate, ribbed; lobes 4, keeled, inflexed; appendages erect, ciliate. Petals 4 or 0, obovate, suborbicular, deciduous. Stamens 4, inserted at the base of calyx tube. Ovary sessile, 2-4-locular; ovules numerous; style continuous with placenta; stigma capitate. Capsule globose, opening by an apical lid with lower part septicidal or breaking irregularly. Seeds numerous, compressed, hollowed within.

1a. All leaves cuneate at the base; calyx tube usually pubescent ..... **N. lanceolata**

1b. All or at least upper leaves cordate and subamplexicaule at the base; calyx tube glabrous ..... **N. brevipes**

Nesaea brevipes Koehne, Bot. Jahrd. Syst. 3: 326. 1882; Gamble, Fl. Pres. Madras 510. 1919; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 610. 1983; Ramach. & Nair, Fl. Cannanore 193. 1988; Verdcourt in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 216. 1995. *Ammannia cordata* Wight & Arn., Prodr. 1: 304. 1834; Clarke in Hook. f., Fl. Brit. India 2: 570. 1879 (Fig. 24).

Erect annual herbs to 30 cm tall; stem 4-angled. Leaves 1.8-3.4 x 0.7-1.2 cm, oblong or elliptic-oblanceolate, base cordate or subamplexicaule, margins slightly serrulate by minute rough hairs, apex acute or obtuse, sessile. Cymes 1-3-flowered, axillary subsessile; bracetoles as long as the calyx. Calyx-tube c. 2 mm long, broadly campanulate; lobes 4, c. 1 mm long, triangular; appendages 4, ciliate. Petals absent. Stamens 4; filaments c. 2 mm long. Ovary 4-celled; ovules many. Capsule 1.5-2 mm across, globose. Seeds ovoid.

Fl. & Fr.: Dec. - Feb.

Distr.: India and Sri Lanka. Rare; in bunds of paddy fields. *CNS 1331* (Angadikkal).

Nesaea lanceolata (Heyne ex Clarke) Koehne, Bot. Jahrb. Syst. 3: 325. 1882; Gamble, Fl. Pres. Madras 510. 1919; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 610. 1983; Verdcourt in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 215. 1995. *Ammannia lanceolata* Heyne ex Clarke in Hook. f., Fl. Brit. India 2: 570. 1879. *A. salicifolia* sensu Thuw., Enum. Pl. Zeyl. 121. 1859, non Monti., 1859 (Fig. 25).

Decumbent annual herbs to 30 cm long; stem 4-angled, often reddish. Leaves 1.2-3 x 0.5-1.2 cm, elliptic-oblong or oblanceolate, base attenuate, margins slightly serrulate by minute rough hairs, apex obtuse, sessile or subsessile cymes, 4-merous. Bracteoles 2-3 mm long, lanceolate, equalling, shorter or longer than the calyx. Calyx-tube 4-angular, 2-3 mm long, cup-shaped, narrowly ribbed, puberulous or glabrous; lobes 4, c. 1 mm long, broadly triangular; appendages 4, more or less equalling the lobes, ciliate. Petals 4, pale pink, some times absent, 1-5 mm long, obovate-suborbicular. Stamens 4; anthers ovoid. Ovary 2-locular; stigma capitate. Capsule c. 2 mm long, globose. Seeds many, compressed, brown.

Fl. & Fr.: Aug. - Dec.

Distr.: India and Sri Lanka. Common in low-lying areas, fallow fields,pond banks, etc. *CNS 1331* (Thycattussery), *CNS 1343* (Alappuzha beach).

ROTALA Linnaeus

Mant. Pl. 143, 175. 1771.

Annual herbs, terrestrial or emergent aquatics. Leaves decussate or whorled, subsessile. Flowers axillary, solitary or whorled, forming spikes or racemes, 3-5-merous; bracteate and bracteolate. Calyx-tube campanulate or cupular, lobes erect, alternating with appendages. Petals small. Stamens 3-5, exserted or not. Ovary 2-4-locular; ovules many per locule. Capsule dehiscent by 2-4 valves, crowned by the style. Seeds minute.

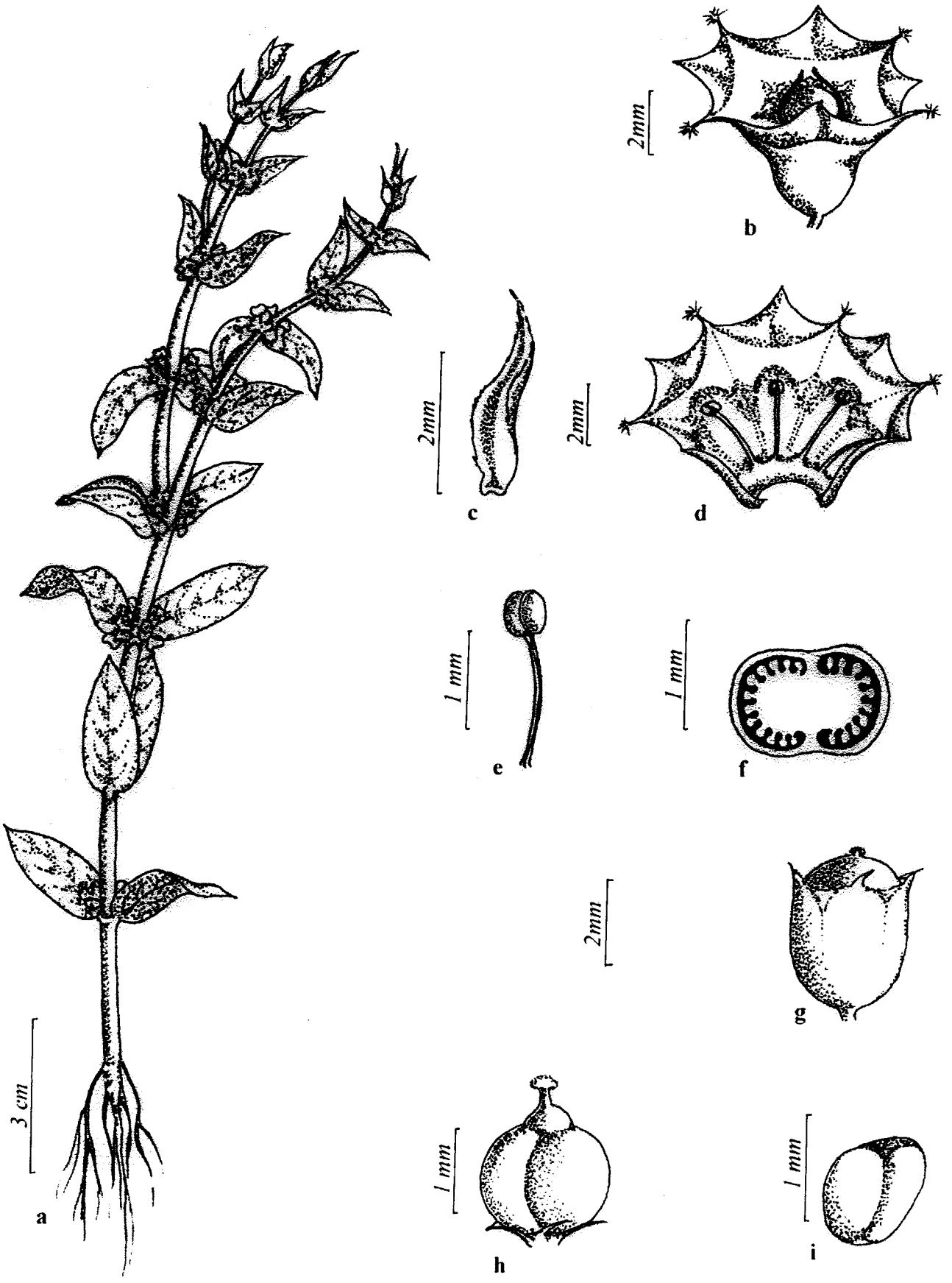


Fig. 24. *Nesaea brevipes* Koehne: a. Habit; b. Flower ; c. Bracteole; d. Calyx tube, split-open; e. Stamen; f. Ovary-T.S; g. Fruit with calyx; h. Mature fruit; i. Seed.

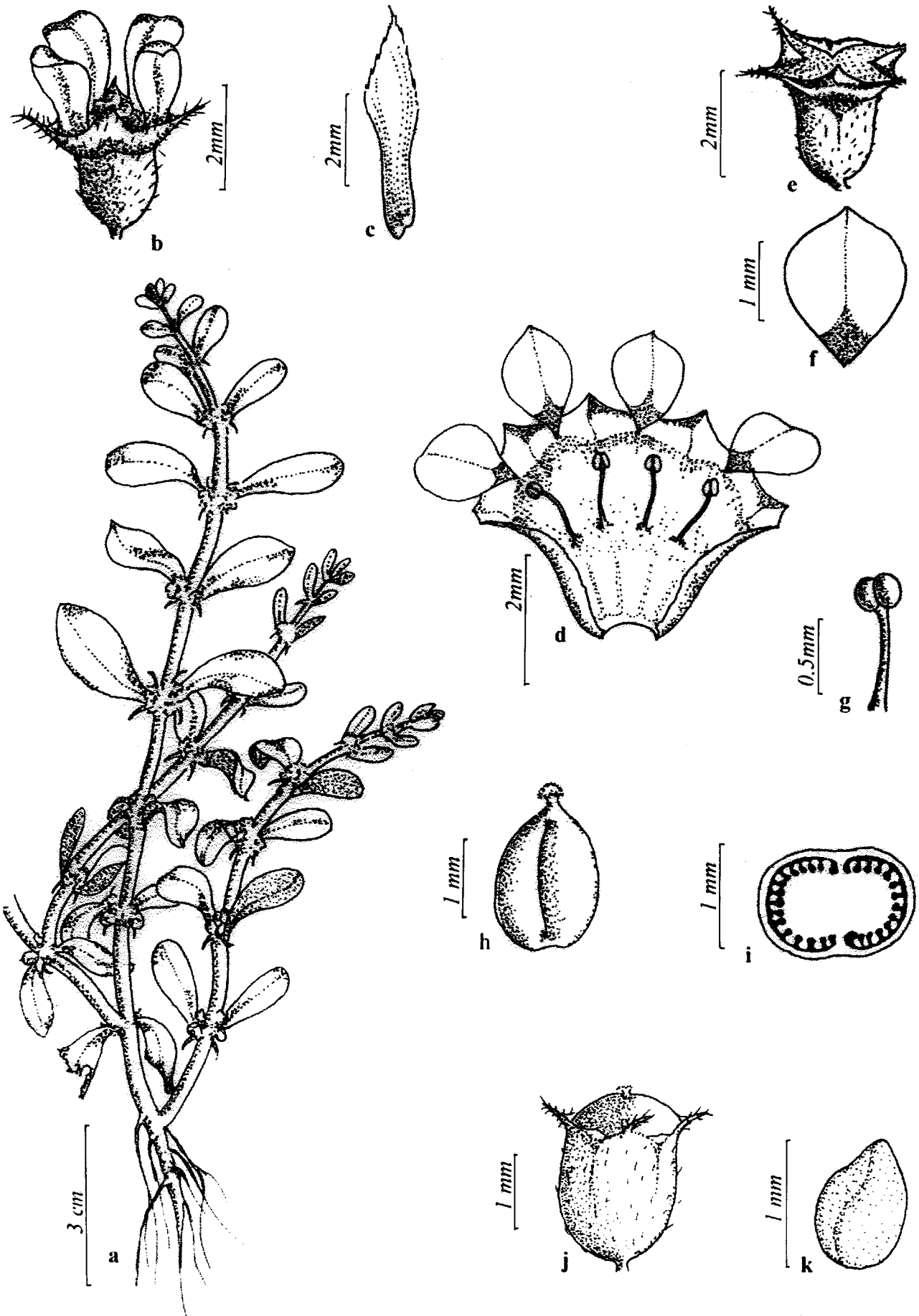


Fig. 25. *Nesaea lanceolata* (Heyne ex Clarke) Koehne: a. Habit; b. Flower ; c. Bracteole; d. Calyx tube, split-open; e. Calyx; f. Petal; g. Stamen; h.Pistil; i. Ovary-T.S; j. Fruit with persistent calyx; k. Seed.

1a. Flowers trimerous ..... **R. malampuzhensis**

1b. Flowers 4-5 merous.

2a. Flowers solitary or in axillary flowering branchlets, bracts not as above; leaves monomorphic.

3a. Plants succulent; calyx appendages present; capsule 3-valved; leaf margins not cartilaginous.

4a. Bracteoles longer than flowers; petals obovate; capsule not exceeding the calyx lobes ..... **R. densiflora**

4b. Bracteoles shorter than flowers; petals narrow, elliptic; capsule exceeding the calyx lobes ..... **R. rosea**

3b. Plants not succulent; calyx appendages absent; capsule 2-valved; leaf margins cartilaginous ..... **R. indica**

Rotala densiflora (Roth ex Roem. & Schult.) Koehne, Bot. Jahrb. Syst. 1: 164. 1880 & 4: 388. 1883; Koehne in Engl., Pflanzenr. IV. 216: 35. 1903; Gamble, Fl. Pres. Madras 508. 1919; van Leeuwen, Blumea 19: 55. 1971; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 274. 1976; Cook, Boissiera 29: 82. 1979; Mani. & Sivar., Fl. Calicut 113. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 612. 1983; Ramach. & Nair, Fl. Cannanore 1193. 1988; Joseph & Sivar., Proc. Ind.Acad. Sci. (Plant Sci.) 99(3): 181. 1989; Verdcourt in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 224. 1995. *Ammannia densiflora* Roth ex Roem. & Schult., Syst. Veg. 5: 407. 1819. *Rotala roxburghiana* Wight, Ic. t. 260B. 1840, *nom. illeg. Ammannia pentandra* sensu Clarke in Hook. f., Fl. Brit. Ind. 2: 568. 1879, non Roxb. 1820; Blatt. & Hallb., J. Bombay Nat. Hist. Soc. 25: 707. 1918.

Amphibious or terrestrial erect annuls upto 25 cm tall; stem 4-gonous, often narrowly winged at the angles, rooting at the base. Leaves decussate below, alterante above, 0.8-2.2 x 0.2-0.5 cm, linear-lanceolate to ovate or oblong, base obtuse, apex acute or obtuse. Bracts dimorphic, those on main stem and lower branches leaf-like, and those on upper branches considerably smaller, ovate or elliptic, scarcely exceeding the flower. Bracteoles pinkish, lanceolate, exceeding the calyx. Flowers solitary, sessile. Calyx tube 1-1.5 mm long, campanulate; lobes usually 5, c. 0.5 mm long, triangular, the alternating

appendages linear, longer than calyx lobes. Petals 5, rarely 4, bright pink, 0.5-1 mm long, obovate, obtuse or retuse at apex, persistent. Stamens 5 or rarely fewer, attached below the middle of the calyx tube. Capsule globose, 3-valved, as long as calyx. Seeds sub-ovoid.

Fl & Fr.: Aug. - Nov.

Distr. : Western Himalaya, North East India, and widely spread in Peninsular India, Sri Lanka, Australia and North Italy. A pretty herb growing in marshy places and paddy fields. *CNS 2438* (Pattanakkad).

Rotala indica (Willd.) Koehne, Bot. Jahrb. 1 : 172. 1880 & in Engl., Pflanzenr. IV. 216 : 40. 1903; Blatt. & Hallb., J. Bombay Nat. Hist. Soc. 25: 711. 1918; Gamble, Fl. Pres. Madras 508. 1919; van Leeuwen, Blumea 19: 54. 1971; Panigrahi, Ind. For. 102: 766. 1976; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 274. 1976; Mani. & Sivar., Fl. Calicut 112. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3 : 613. 1983; Joseph & Sivar., Proc. Ind. Acad. Sci. (Plant Sci.) 99(3): 184. 1989; Verdcourt in Dassan., Fosb. & Clayton, Rev. Handb. Fl, Ceylon 9: 226.1995; Sivar. & Mathew, Fl. Nilambur 279. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 196. 1996. *Peplis indica* Willd., Sp., Pl. 2: 244. 1799. *Ammannia nana* Roxb., Fl. Ind. (ed.1) 1: 448. 1820, non Wall., 1818. *Ammania peploides* Spreng., Syst. 1 : 444, 1825; Clarke in Hook. f., Fl. Brit. India 2 : 566. 1879. *Ameletia indica* (Willd.) DC., Mem. Soc. Phys. Nat. Hist. Geneve 3 : 82, t. 3A, 1826 & Prodr. 3: 76. 1828.

Amphibious annuals; stem erect or decumbent to 35 cm long, 4-angled or terete, rooting at the nodes. Leaves decussate, sessile or subsessile, 0.5-1.6 x 0.4-1 cm, obovate-spathulate or suborbicular, base cuneate or obtuse, margins cartilaginous, apex acute, obtuse or emarginate. Bracts dimorphic, leaf like on major branches, much smaller elliptic-oblong on flowering branches which ultimately look like bracteate spikes. Bracteoles 2, 1.5-2 mm long, linear to lanceolate. Flowers sessile, axillary, solitary. Calyx tube pink or red, turning brown, 1.5-2.5 mm long, campanulate; lobes 4, c.1 mm long, triangular, appendages absent. Petals 4, pink, c. 0.5 mm long, elliptic. Stamens 4 or some times fewer, filaments inserted at about the middle of calyx tube. Ovary c. 1 mm long,

ellipsoidal; style to 1 mm long; stigma capitate. Capsule c. 2 mm long, ellipsoid, 2-valved. Seeds hemispherical.

Fl. & Fr.: Dec. - Apr.

Distr. : Native of South East Asia. Introduced and more or less naturalised in Italy, Portugal, Congo and USA. Common species in wet or moist rice fields and other marshy places. *CNS 2438* (Bharanikkavu).

Rotala macrandra Koehne, Bot. Jahrb. 1 : 176. 1880 & in Engl., Pflanzenr. IV. 216 : 41. 1903; Gamble, Fl. Pres. Madras 509. 1919; Cook, Boissiera 29 : 54. 1979; Mani. & Sivar., Fl. Calicut 113. 1982; Ramach. & Nair, Fl. Cannanore 194. 1988; Joseph & Sivar., Proc. Ind. Acad. Sci. (Plant Sci.) 99 (3): 185. 1989; Sasi & Sivar., Fl. Pl. Thrissur For. 196. 1996. *R. rotundifolia* sensu Blatt. & Hallb., J. Bombay Nat. Hist. Soc. 25 : 718. 1918, p.p., non Koehne 1880. *Ameletia rotundifolia* Wight, Ic.t.258. 1840, non Roxb., 1820. *Ammannia rotundifolia* Wight & Arn., Prodr. 1 : 306. 1834; Clarke in Hook. f., Fl. Brit. India 2 : 566. 1879, p.p. (Plate XIII: C).

Aquatic or amphibious, heterophyllus annuals; stem terete, creeping and rooting below, branches decumbent; aerial stem reddish tinged. Leaves : submerged leaves in whorls of 3 to begin with, lanceolate and decussate, ovate-acute later on; aerial leaves decussate, sessile, 1.2 - 2 cm across, ovate-orbicular, base cordate, apex obtuse or rounded, fleshy, reddish tinged, brownish on drying. Flowers in terminal, simple or branched, bracteate spikes, monomorphic. Bracts closely imbricating, to 3 mm long, broadly ovate-acute. Bracteoles linear. Calyx tube to 1 mm long, campanulate; lobes 4, to 1 mm long, triangular-acute, pink, appendages absent. petal 4, 1.5-2 mm long, obovate - obtuse, rose. Stamens 4, exserted, inserted at the base of the calyx tube. Ovary globose; style to 3 mm long. Capsule 1.5-2 mm across, globose, 4-valved. Seeds semi-ellipsoidal.

Fl. & Fr.: Oct. - Jan.

Distr. : Endemic to Peninsular India. A very common weed in flooded paddy fields and temporary ponds. It usually set flowers and fruits when the surrounding water get dried up. *CNS 1403* (Kanichukulangara), *CNS 2439* (Mararikulam).

Rotala malampuzhensis R. Vasudevan Nair (J. Bombay Nat. Hist. Soc. 72: 57. 1975. *nom. invalid*) ex Cook, Boissiera 29 : 98. 1979; Mani. & Sivar., Fl. Calicut 114.1982; Panigrahi & Nicols., Taxon 32 : 120. 1983; Joseph & Sivar., Proc. Ind. Acad. Sci. (Plant Sci.) 99(3): 186. 1989; Sasi & Sivar., Fl. Thrissur For. 196. 1996.

Marshy gregarious annuals; stems creeping and rooting below, reddish. Leaves decussate, sessile, 0.8-1.5 x 0.3-0.4 cm, linear to lanceolate. Bracts leaf like. Bracteoles c. 1 mm long, capillary, almost equalling calyx tube. Flowers axillary, solitary, sessile. Calyx tube, c. 1 mm long, campanulate, bright red; lobes 3, ovate-acute, appendages 3, minute. Petals 3, small, bright red. Stamens 3, inserted above the base of the calyx tube. Nectar scales 3, prominent, linear and alternating with the stamens. Ovary globose; style very short; stigma capitate. Capsule globose, bright red, exceeding the calyx tube, opening by 3 valves. Seeds sub-ovoid, smooth, bright red.

Fl. & Fr.: Jul. - Sept.

Distr.: The coastal plain of Kerala. Common in flooded paddy fields and temporary pools. Often forming dense, deep green carpets. *CNS 2440* (Kalarkode).

Rotala rosea (Poir.) Cook, Boissiera 29 : 86. 1979; Mani. & Sivar., Fl. Calicut 113. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3 : 614. 1983; Ramach. & Nair, Fl. Cannanore 194. 1989; Joseph & Sivar., Proc. Ind. Acad. Sci. (Plant Sci.) 99(3): 192. 1989; Verdcourt in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon, 9: 225. 1995. *Ammannia rosea* Poir., in Lam., Encyl. Meth. Bot. Suppl. 1 : 329. 1810. *A. pentandra* Roxb., Fl. Ind. (ed. 1) 1 : 448. 1820; Clarke in Hook. Fl. Brit. India 2 : 568. 1879 (excl. var. *fimbriata.) A. leptopetala* Bl., Mus. Bot. 2: 134. 1856. *Rotala leptopetala* (Bl.) Koehne, Bot. Jahrb. 1 : 162. 1880; Gamble, Fl. Pres. Madras 508. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 274. 1976. *Rotala pentandra* (Roxb.) Blatt. & Hallb., J. Bombay Nat. Hist. Soc. 25: 718. 1918., p.p; van Leeuwen, Blumea 19 : 55. 1971 (Fig. 26).

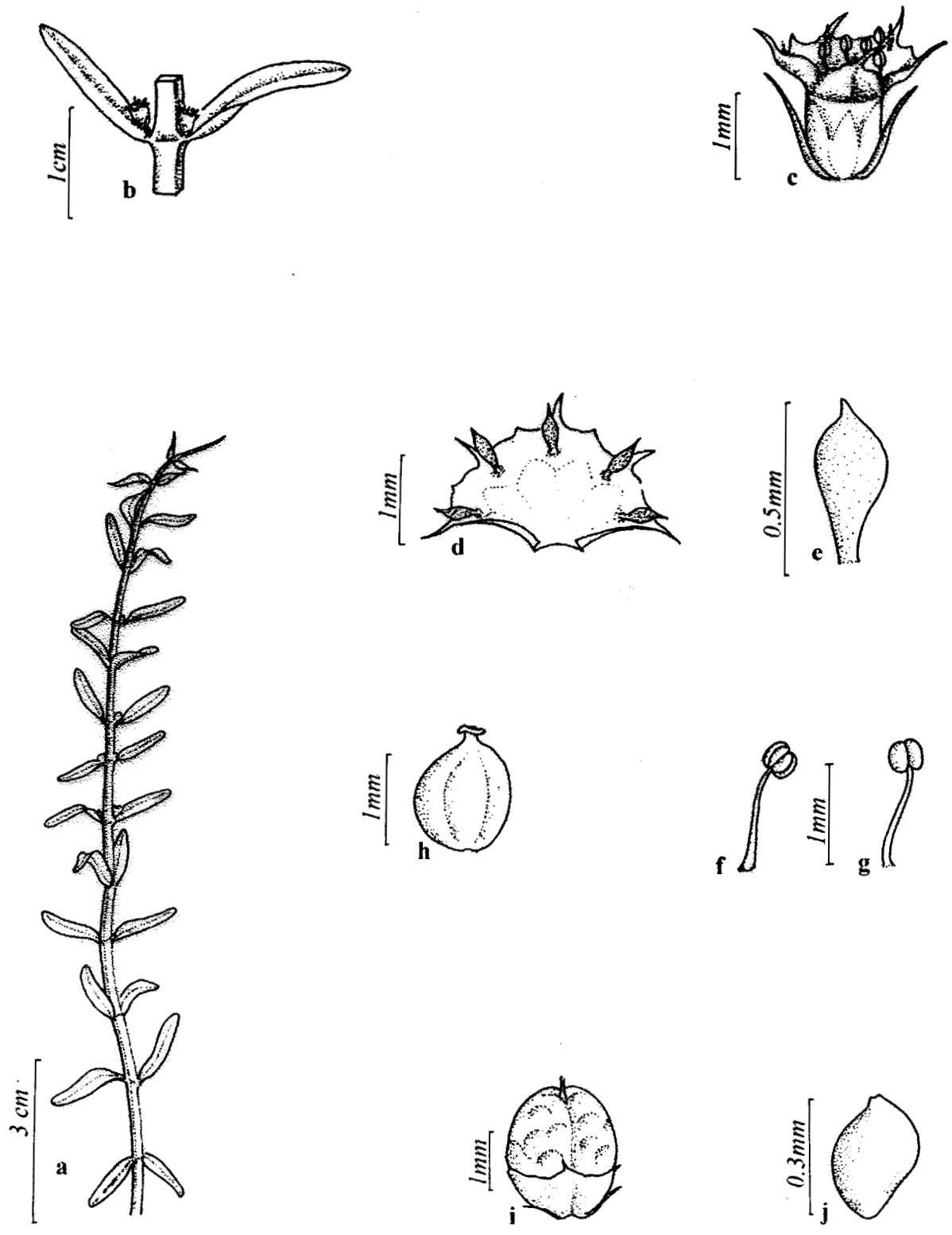


Fig. 26. *Rotala rosea* (Poir.)Cook: a. Habit ; b. Nodal region showing leaves and flowers; c. Single flower; d. Calyx tube, split-open; e. Petal; f & g. Stamen-ventral and dorsal views; h. Pistil; i. Fruit; J. Seed.

Amphibious or marshy annuals; stem erect or creeping, simple or branched, to 20 cm tall. Leaves decussate, 8 - 20 x 3 - 6 mm, linear-lanceolate to ovate, cuneate to obtuse at the base, apex acute or obtuse. Flowers monomorphic, sessile, solitary in the axils of the bractiform leaves. Bracteoles 0.5-1 mm long, linear or filiform, not exceeding the calyx tube. Calyx tube c. 1.5 mm long, campanulate; lobes 5, minute, triangular, the alternating appendages subulate, equalling the lobes. Petals 5, pink, c. 0.5 mm long, obovate. Stamens 5, included, inserted just below the middle of calyx tube. Ovary globose; stigma capitate. Capsule c. 2 mm across, globose, 3-valved, exceeding the calyx. Seeds sub-ovoid, brownish.

Fl. & Fr. : Aug. - Dec.

Distr. : India, South East Asia to New Guinea, Philippines, South China, SriLanka, Korea and Japan. Usually found in marshy or flooded fields. *CNS 1343* (Kayamkulam).

WOODFORDIA Salisbury

Parad. Londin., t. 42. 1806.

Woodfordia fruticosa (L) Kurz, J. Asiat. Soc. Bengal 40 : 56. 1871; Kurz, For. Fl. Burma 1 : 518. 1877; Gamble, Fl. Pres. Madras 1919; Mani. & Sivar., Fl. Calicut 115. 1982; Vedcourt in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9 : 205. 1995. *Lythrum fruticosum* L., Sp. Pl. ed. 2, 641. 1762. *Grislea tomentosa* Roxb., Pl. Corom. 1 : 29, t. 31. 1795; Roxb., Bot. Reg. t. 30. 1815. *Woodfordia floribunda* Salisb., Parad. Londin., t. 42. 1806; Clarke in Hook. f., Fl. Brit. India 2 : 572. 1879, p.p. *Grislea punctata* Sm. in Rees, Cyclop. 17, no. 2. 1819; Wight & Arn., Prod., 308. 1834 (Plate XIV: A).

Deciduous shrubs to 3 m tall with spreading stems. Leaves subsessile, 4-11 x 2-4 cm, ovate-lanceolate or lanceolate, subcoriaceous, whitish velvety tomentose and finely orangish- or black-punctate beneath. Flowers crimson, slightly zygomorphic, in 2-16-flowered axillary cymes; pedicels to 1 cm long. Calyx tube 1-1.5 cm long, tubular; lobes 6, short, more or less triangular, alternating with small callous appendages. Petals 6, red, 3-4 mm long, lanceolate-acuminate. Stamens 12, inserted near the bottom of the calyx tube, 0.5-1.5 cm long. Ovary 4-6 mm long, oblong, 2-celled; ovules many; style

0.7-1.5 cm long. Capsule 0.6-1 x 0.25-0.4 cm, ellipsoid, included in the calyx. Seeds numerous, trigonous-ovoid.

Fl & Fr. : Jan. - Apr.

Distr. : Arabia, Yunnan, Pakistan, India, Myanmar, Sri Lanka, Thailand, Java, Timor, W. Sumbawa, Madagascar, Comoro Is. and Tanzania. Rare; in waste lands. *CNS 2441* (Muhamma).

53. SONNERATIACEAE Engl. & Gilg

in Engler, Syllabus, ed. 9 & 10: 299. 1924.

SONNERATIA Linnaeus f.

Suppl. 38, 252. 1782 (*nom. cons.*).

Sonneratia caseolaris (L.) Engl. in Pflanzenfam. Nachtr. 261. 1897; Gamble, Fl. Pres. Madras 515. 1919; Arulchelvam, Ceylon For. 8: 75. 1968; Macnae & Fosb. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 452. 1981; Mohanan & Henry, Fl. Thiruvananthapuram 203. 1994. *Rhizophora caseolaris* L. in Stickman, Herb. Amboin. 13. 1754. *Sonneratia acida* L. f., Suppl. Pl. 252. 1781; Thw., Enum. Pl. Zeyl. 123. 1859; Hook. f., Fl. Brit. India 2: 579. 1879. ***Kandel*** (Plate XIV: B).

Shrub or small trees reaching 9 m high; twigs quadrangular. Leaves 5 - 8 x 4 - 6 cm, obovate or roundish, base attenuate, apex obtuse, sometimes apiculate at the apex, coriaceous; petiole up to 5 mm long. Flowers large, terminal, solitary, on very short thick pedicel. Calyx thickly coriaceous; tube widely campanulate; lobes 6, lanceolate, acute. Petals 6, c. 2.5 cm long, linear, pink. Stamens numerous, inserted on the circular rim of the calyx tube, inflexed in bud, c. 5 cm long, red. Style c. 6 cm long; stigma capitate. Fruit c. 6 cm across, depressed-globose, supported on enlarged calyx, top with the persistent tapering style-base forming a point c. 2.5 cm long in the centre.

Fl. & Fr.: Sept. - May.



Plate XIV. A. *Woodfordia fruticosa* (L.) Kurz; B. *Sonneratia caseolaris* (L.) Engl.; C. *Ludwigia prostrata* Roxb.

Distr.: India, Sri Lanka, Myanmar, Thailand, Java eastwards to Solomon Is. and New Hebrides and North Australia. Along back water swamps. *CNS 1606* (Perumbalam).

54. ONAGRACEAE Juss.

Gen. Pl. 317. 1789.

LUDWIGIA Linnaeus

Sp. Pl. 118. 1753 ('*Ludvigia*'); Corr. Linnaeus, Gen. ed. 5, 55. 1754.

Herbs or undershrubs, usually in moist places, sometimes aquatic. Leaves simple, alternate or opposite. Flowers axillary, solitary, 4-5-merous, yellow. Bracteoles 2. Calyx tube not produced above the ovary, lobes 4. Petals 4, cauducous; disc raised with nectaries below the stamens. Stamen 4 or 8; anthers basifixed. Ovary inferior,4-5-celled; ovules many in 2 or more vertical rows per cell, on axile placenta; style short; stigma capitate. Fruit a linear or oblong 4-5-celled capsule, terete or ribbed, breaking irregularly along ribs. Seeds many, minute, with narrow raphe.

Note: The genera *Ludwigia* and *Jussiaea* were traditionally segregated mainly based on the number of stamens in relation to the number of sepals. Raven (1963) concluded that this generic delimitation is unnatural and merged *Jussiaea* under *Ludwigia*. This concept is widely accepted now and is followed here.

1a. Aquatic herbs; stems floating with aerophores; flowers 5-merous; capsule thick-walled ..... **L. adscendens**

1b. Terrestrial herbs or subshrubs; stems erect without aerophores; flowers 4-merous; capsule thin-walled.

2a. Stamens 4; seeds monomorphic.

3a. Capsule terete; seeds in several rows in each locule ..... **L. perennis**

3b. Capsule 4-angled; seeds in one row in each locule ..... **L. prostrata**

2b. Stamens 8; seeds dimorphic ..... **L. hyssopifolia**

Ludwigia adscendens (L.) Hara, J. Jap. Bot. 28: 291. 1953; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 283. 1976; Raven in Steenis, Fl. Males. 1. 8: 104. 1977; Mani. & Sivar., Fl. Calicut 117. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 621. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 202. 1988; Wagner in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 341. 1995. *Jussiaea adscendens* L., Mant. Pl. 69. 1767. *J. repens* L., Sp. Pl. 388. 1753, non Forster, 1771: Clarke in Hok. f., Fl. Brit. India 2: 587. 1876; Gamble, Fl. Pres. Madras 516. 1919. ***Nir-carambu*** Rheede, Hort. Malab. 2: 99-100, t. 51. 1679.

Aquatic floating herbs; aerophores spongy, white coloured, fusiform. Leaves 1.5-3.5 x 0.5-1.5 cm, obovate to oblanceolate, base attenuate, apex obtuse, lower surface glossy. Flowers solitary, axillary, to 4 cm across. Calyx tube c. 1 cm long, pubescent; lobes 5, narrow-lanceolate. Petals 5, obovate, emarginate or rounded at apex, cream coloured or white with an yellowish blotch inside. Stamens 10; filaments subequal. Ovary 5-locular; ovules many; style hairy at base; stigma globose. Capsule c. 2.5 cm long, terete, 10-ribbed, dehiscing by 4-5 valves.

Fl. & Fr.: Sep. - Apr.

Distr.: Continental Asia, Malesia, Australia. Locally abundant in abandoned paddy fields, shallow pools, ponds, etc. *CNS 1256* (Thotappally), *CNS 2442* (Kainakary).

Ludwigia hyssopifolia (G. Don) Exell, Garcia de Orta 5: 471. 1957; Raven in Steenis, Fl. Males I, 8: 104. 1977; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 622. 1983; Ramach. & Nair, Fl. Cannanore 195. 1988; Wagner in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 339. 1995; Sivar. & Mathew, Fl. Nilambur 280. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 197. 1996. *Jussiaea hyssopifolia* Don, Gen. Hist. 2: 693. 1832. *J. linifolia* Vahl, Eclog. Amer. 2: 32. 1798, non Poir., 1813; Gamble, Fl. Pres. Madras 1875. 1936. *Fissendocarpa linifolia* (Vahl) Bennet, J. Bombay Nat. Hist. Soc. 67(1): 126. 1970; Mani. & Sivar., Fl. Calicut 116. 1982.

Herbs; branchlets angled or winged. Leaves 2.5-5 x 1-2 cm, elliptic-lanceolate, base cuneate, apex gradually acute to acuminate, glabrous, membranous; petiole to 1 cm

long. Flowers solitary, axillary. Calyx tube narrow; lobes 4, c. 3 mm long, lanceolate, persistent. Petals 4, obovate, yellow. Stamens 8; filaments unequal. Ovary 4-celled; ovules many; stigma 4-lobed. Capsule c. 2 cm long, linear, terete, 8-ribbed. Seeds dimorphic, uniseriate and embedded in endocarp below and pluriseriate and free above.

Fl. & Fr.: Oct. - Nov.

Distr.: Pantropical. Common in wet paddy fields and marshy places. *CNS 2443* (Thuravoor), *CNS 2332* (Aroor).

Ludwigia perennis L., Sp. Pl. 119. 1753; Raven, Reinwardtia 6: 367. 1963; Sreem., Bull. Bot. Surv. India 8: 80. 1966; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 285. 1976; Mani. & Sivar., Fl. Calicut 117. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 623. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 202. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 206. 1994; Wagner in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 338. 1995; Sivar. & Mathew, Fl. Nilambur 282. 1996. *L. parviflora* Roxb., Fl. Ind. 1: 419. 1820; Clarke in Hook. f., Fl. Brit. India 2: 588. 1879; Gamble, Fl. Pres. Madras 517. 1919. ***Carambu*** Rheede, Hort. Malab. 2: 95-96, t. 49. 1679.

Erect herbs. Leaves 2-6 x 0.5-15 cm, elliptic-lanceolate, base attenuate, apex acute to acuminate, glabrous. Flowers sessile, 4-merous. Calyx tube adnate to ovary; lobes 4, c. 2 mm long, ovate acuminate. Petals 4-5 mm long, elliptic, yellow. Stamens 4; filaments short. Ovary 1-1.5 cm long, linear, 4-celled, 4-angled. Ovules many. Capsule 1-2 cm long, linear, subterete, 4-ribbed. Seeds ellipsoid.

Fl. & Fr.: Most of the seasons.

Distr.: East Africa, Iran, Indo-Malaysia and Tropical Australia. Common in marshes, fallow fields, etc. *CNS 1362* (Pallippuram), *CNS 2444* (Kavalam).

Ludwigia prostrata Roxb., Fl. Ind. 1: 411. 1820; Clarke in Hook. f., Fl. Brit. India 2: 558. 1879; Gamble, Fl. Pres. Madras 517. 1919; Wagner in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 339. 1995; Sivar. & Matthew, Fl. Nilambur 283. 1996 (Plate XIV: C).

Annual herbs to 60 cm tall, often red tinged; branchlets angled and slightly winged. Leaves 3-10 x 0.6-3.6 cm, elliptic to lanceolate, base attenuate, slightly decurrent, apex acute or acuminate, brownish on drying; lateral nerves 8-13 pairs, impressed above and raised below; petiole to 1 cm long. Flowers 5-7 mm across, in the upper leaf axils, solitary or clusters of 2-10 together, subsessile. Sepals 4, 2-2.5 x 1-1.5 mm, ovate-lanceolate, margin ciliate, apex acute, persistent. Petals yellow, 2-3 x 1-1.5 mm, oblanceolate or narrowly spathulate, base cuneate, apex acute, 1-nerved. Stamens 4; filaments c. 1 mm long, yellow; anthers closely appressed to the stigma. Ovary 5-8 x 1 mm, linear, 4-sided, hirsute; style c. 1 mm long; stigma globose, yellow. Capsule 1.2-2 x 0.1-0.15 cm, linear, curved, 4-angled, pale brown, thin-walled, sparsely hirsute or glabrous. Seeds in one row in each locule, c. 0.5 mm long, ovoid, pale pink, transversely striped with fine brown lines.

Fl. & Fr.: Jul. - Oct.

Distr.: Asia and Malesia; from northern India, southern Nepal, Assam, southern China to Sri Lanka, Java, Timor, Borneo and Philippines. *CNS 2445* (Aroor).

55. TURNERACEAE Kunth ex DC.

Prodr. 3: 345. 1828.

TURNERA Linnaeus

Sp. Pl. 271. 1753.

Erect perennial hairy herbs or subshrubs. Leaves often with 2 marginal basal glands, dentate-serrate above the base, distinctly gland-dotted beneath. Flowers solitary in the leaf axils; pedicels adnate to the petiole, with 2 apical bracteoles. Calyx tube often with thickenings above the insertion-point of the stamens. Petals on a short hairy claw, obovate, caducous after anthesis. Ovary globose-ovoid; stigma multifid. Capsule broadly ovoid, 3-valved. Seeds globose to oblong, often curved, with unilateral aril.

Note: Opinion is divided on whether T. *subulata* and T. *ulmifolia* should be considered as separate species or not. While Urban (1893), Gamble (1935) and Matthew (1983) considered them as to be polymorphic varieties of a single species, Backer (1951), Vappulluri (1969) and Manilal and Sivarajan (1982) considered them as two distinct species. Considering the distinct morphological differences, it is evident that both are obviously distinct species. Moreover, Backer (1951) found that both species are intersterile.

1a. Leaf apex obtuse or subacute; pedicels adnate to petiole throughout; bracteoles linear-subulate, entire, without glands; corolla cream-yellow with dark purple base; flowers heterostylous ..... **T. subulata**

1b. Leaf-apex acute or acuminate; pedicels adnate to petiole only at abse; bracteoles lanceolate, serrate, with 2 large glands; corolla deep yellow without dark purple base; flowers homostylous ..... **T. ulmifolia**

Turnera subulata J.E. Smith in Rees, Cyclop. 36. 1819; Backer in Steenis, Fl. Males. I, 4: 236. 1951; Vuppulluri, Ind. For. 95(4): 313. 1969; Mani. & Sivar., Fl. Calicut 117. 1982; Madhu. & Rejani, J. Econ. Tax. Bot. 13(1): 129. 1989; Mohanan & Henry, Fl. Thiruvananthapuram 206. 1994. *T. elegans* Otto in Nees Hort. Phys. Berol. 36. 1820. *T. trioniflora* Sims, Bot. Mag. 2106. 1820. *T. ulmifolia* L. var. *elegans* (Otto) Urban, Monogr. Turn. 139. 1895; Gamble, Fl. Pres. Madras 523. 1919; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 627. 1983.

Subshrubs. Leaves 2.5-6 x 1-3 cm, ovate or elliptic, base cuneate-decurrent, margin serrate-dentate, apex obtuse or subacute, sparsely puberulous, gland-dotted; petiole to 8 mm, with a pair of discoid foliar glands. Flowers solitary in upper leaf-axils, heterodistylous; pedicel adnate to the petiole throughout; bracteoles c. 1.5 x 0.3 cm, linear-subulate. Calyx tube small, lobes 5, to 6 mm, linear. Petals 5, obovate, pale yellow with a purple base. Stamens 5, inserted at the base of calyx tube; anthers oblong. Capsule c.5 x 4 mm, globose, pubescent. Seeds many, pitted.

Fl. & Fr. : Most of the year.

Distr. : Native of tropical America, now introduced in other tropical countries. In open waste lands. *CNS 1961* (Valavanadu).

Turnera ulmifolia L., Sp. Pl. 271. 1753; Urban, Monogr. Turn. 138. 1883; Gamble, Fl. Pres. Madras 523. 1919; Gilg. in Engler & Prantl, Pflanzenfam. ed. 2, 21: 465. 1925; Mani. & Sivar., Fl. Calicut 117. 1982; Ramach. & Nair, Fl. Cannanore 196. 1988. *Turnera ulmifolia* L. var. *angustifolia* (Mill.) Willd. ex Urb., Monogr. Turn. 141. 1883; Gamble, Fl. Pres. Madras 523. 1919; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 627. 1983.

Erect perennial herbs upto 1 m tall; branchlets glandular-pubescent. Leaves 4-12 x 1.5-3.2 cm, lanceolate, base cuneate, decurrent and with 2 glands, margins irregularly crenate-serrate, apex acute to acuminate, more or less hairy on both sides; petiole 1-2.5 cm long. Flowers 3.5-4 cm across, axillary, solitary, homostylous; pedicel adnate to the petiole in the lower part, free above; bracteoles lanceolate, serrate, with 2 large marginal glands. Calyx densely appressed pubescent; tube 1-1.3 cm long, funnel-shaped; lobes 7-10 mm long , lanceolate. Petals yellow, c. 2 cm long, obovate, apex turncate. Ovary ovoid, pubescent, 1-celled; ovules many per cell; styles 3. Capsule 6-8 mm long, ovoid, hairy, 3-valved. Seeds many, elliptic, brown with white aril.

Fl. & Fr.: May.- Dec.

Distr. : Native of the West Indies; introduced in other tropical countries. Along road sides and other waste place. *CNS 2110* (Alappuzha town).

56. PASSIFLORACEAE Juss. ex Kunth

in Humboldt *et al.*, Nov. Gen. Sp. 2, ed. 4. 126 [& ed. f. 100]. 1817.

PASSIFLORA Linnaeus

Sp. Pl. 959. 1753.

Climbing shrubs or herbs, tendril bearing. Leaves alternate, palmately lobed or simple, usually glandular-dentate along margins; stipule small or leafy. Flowers bisexual,

solitary or in cymes; bracts and bracteoles often large. Calyx tube fleshy, lobes 5. Petals 5, inserted on the throat of the calyx tube. Corona with 1 to several rows of filiform segments and a shallow cup surrounding the gynandrophore. Stamens 5, arising from the gynandrophore. Ovary 1-celled; ovules many; styles 3. Berry indehiscent. Seeds arillate.

1a. Plants viscid-pubescent; involucral bracts finely divided ..... **P. foetida**

1b. Plants glabrous; involucral bracts entire ..... **P. edulis**

Passiflora foetida L. , Sp. Pl. 959. 1753; Gamble, Fl. Pres. Madras 524. 1919; Green, Kew Bull. 26(3): 355. 1972; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 169. 1976; Mani. & Sivar., Fl. Calicut 118. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 630. 1983; Ramach. & Nair, Fl. Cannanore 197. 1988; Mani., Fl. Silent Valley 114. 1988; Vajravelu, Fl. Palghat Dist. 210. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 207. 1994; Sivar. & Mathew, Fl. Nilambur 286. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 198. 1996.

Herbaceous vines. Stem, petioles and leaves glandular-hispid. Leaves 5-7 x 3-5 cm, roughly to deeply 3-5-lobed, suborbicular to ovate, cordate at base, lobes acuminate, adpressed glandular-pubescent. Petiole to 1.5 cm long. Stipules deeply dissected to glandular appendaged. Bracts and bracteoles deeply pinnatisect, glandular-pubescent. Flowers axillary, often solitary, 3-4 cm across. Calyx lobes 5, 1-1.5 x 0.6- 0.8 cm, broadly ovate, apically spurred. Petals white, shorter than calyx lobes. Coronal segments in 2 whorls; outer coronal hairs many, 0.8-1 cm long; inner ones 2-3 mm long. Gynandrophore 5 mm long. Stamens 5. Ovary 1-celled; ovules many; styles 3; stigma capitate. Berries 1.5- 2 cm diam., subglobose, yellow, subtended by the bracts and brcteoles. Seeds many, 4-5 mm, ovate, laterally compressed, pitted.

Fl. & Fr. : Nov. - Mar.

Distr. : Native of tropical South America; now naturalized through tropical Asia, S.E. Asia to China. Common on wastelands and road sides. The plant has a foetid smell on crushing. *CNS 1176* (Alappuzha beach).

Passiflora edulis Sims in Curtis, Bot. Mag. t. 1989. 1818; Gamble, Fl. Pres. Madras 524. 1919; Matthew, Rec. Bot. Surv. India 20: 124. 1969; Wilde in Steenis, Fl. Males. I, 7: 410. 1972; Green, Kew Bull. 26: 354. 1972; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 629. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 207. 1994; Sivar. & Mathew, Fl. Nilambur 286. 1996.

Climbing shrubs. Leaves to 9.5 x 8.2 cm, palmately 3-lobed, basally 3-nerved, lobes oblong, margin serrulate, apex acute or acuminate, glabrous; petiole to 1.6 cm long; stipules linear. Flowers axillary, solitary, white. Calyx lobes 5. Petals 5, inserted at the throat of calyx tube; corona tinged violet. Stamens 5. Ovary 1-celled; ovules many; styles 3; stigmas capitate. Berry c. 4 cm across.

Fl. & Fr. Jan.- Mar.

Distr. : Tropical America and Brazil; now widely cultivated. Commonly cultivated for its edible fruit. *CNS 1962* (Choolatheruvu).

57. CARICACEAE Dumort.

Anal. Fam. Pl. 37, 42. 1829.

CARICA Linnaeus

Sp. Pl. 1036. 1753.

Carica papaya L. , Sp. Pl. 1036. 1753; Hook. f., Fl. Brit. India 2: 599. 1879; Gamble, Fl. Pres. Madras 525. 1919; Purseglove, Trop. Crops, Dicots 45. 1977; Mani. & Sivar., Fl. Calicut 118. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 632. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 80. 1988; Vajravelu, Fl. Palghat Dist. 211. 1990. ***Ambapaja, Papajamaram*** Rheede, Hort. Malab. 1: 21-23, t. 15. 1678.

Small, usually dioecious trees; trunk with prominent leaf-scars. Leaves large, digitately lobed; petiole very long, hollow inside; stipules 0. Flowers pale yellow, subsessile or in long, drooping panicles. Male flower: Calyx-tube 5- lobed, small; corolla

lobes 5; stames 10, inserted on petals; pistillode rudimentary. Female flower subsessile; ovary superior, sessile, 1- locular; ovules many, stigmas 5. Fruits large, fleshy.

Fl. & Fr. : Throughout year.

Distr.: Native of tropical America, now widely cultivated in the tropics and subtropics. Commonly cultivated for its edible fruits. The fruit is used in several medicines used as abdominal wormiades. *CNS 2111* (Komalapuram)

58. CUCURBITACEAE Juss.

Gen. Pl. 393. 1789.

1a. Ovules pendulous; fruit turncate at apex; seeds surrounded by a large membranous wing; stamens 5 ..... **Zanonia**

1b. Ovules horizontal; fruit not turncate at apex; seeds not prominently winged; stamens 3 (rarely 5 in *Luffa*).

2a. Petals fimbriate ..... **Trichosanthes**

2b. Petals entire.

3a. Fruits echinate ..... **Momordica**

3b. Fruits not echinate.

4a. Anther cells flexuous or conduplicate.

5a. Flowers white ..... **Coccinia**

5b. Flowers yellow.

6a. Corolla rotate, or if campanulate 5-partite to the base, or free.

7a. Fruits dry, endocarp fibrous ..... **Luffa**

7b. Fruits fleshy, endocarp not fibrous.

8a. Stamens inserted at the mouth of the calyx tube; anthers free; fruits densely hispid and white waxy outside ..... **Benincasa**

8b. Stamens inserted below the mouth of the calyx tube; anthers more or less cohering; fruits not as above.

9a. Tendrils simple; connective of stamen produced beyond the anther loculi; fruits oblong-cylindric ..... **Cucumis**

9b. Tendrils 2-3- fid; connective of stamen not produced; fruits globose .. **Citrullus**

6b. Corolla campanulate, not divided more than half-way down ..... **Cucurbita**

4b. Anther-cells straight or curved, not conduplicate.

10a. Seeds with transverse ridge ..... **Diplocyclos**

10b. Seeds without transverse ridge.

11a. Calyx glabours; ovary rostrate at the apex; fruit apically beaked ..... **Solena**

11b. Calyx hairy; ovary not rostrate; fruit not apically breaked .... **Mukia**

BENINCASA G. Savi

Biblioth. Ital. (Milan) 9: 158. 1818.

Benincasa hispida (Thunb.) Cogh. in DC., Monogr. Phan. 3: 513. 1881; Chakr., Rec. Bot. Surv. India 17:84. 1959 & in Fasc. Fl. India 119. 1982; Mani & Sivar., Fl. Calicut 121. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3:635. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 94. 1988. *Cucurbita hispida* Thunb., Fl. Jap. 322. 1784. *Benincasa cerifera* Savi. in Bibliot. Ital. 9:158.1818; Hook. f., Fl. Brit. India 2: 616. 1879; Gamble, Fl. Pres. Madras 543. 1919. ***Cumbulam*** Rheede, Hort. Malab. 8: t. 3. 1688.

Monoecious, hispid climbers; tendrils 2-3-fid. Leaves large, to 25 x 25cm, orbicular-cordate, 5-7-lobed, margin irregularly dentate, scabrous; petiole to 15 cm long. Flowers axillary, solitary. Calyx tube 10-13 mm across, broadly campanulate; lobes 8-12

x 3-5 mm, lanceolate. Corolla yellow; petals 5, 3-5 cm long obovate. Stamens in male flowers 3, inserted at the calyx tube; anthers sigmoid-flexuous; connectives 3-lobed; pistillode short. Ovary in female flowers ovoid, densely pubescent; ovules many; style thick 2-3 mm long. Fruits large, succulent, densely hairy when young, with a thick waxy deposit when mature. Seeds 8-12 x 5-7 mm, avoid, compressed, yellowish white, marginate.

Fl.& Fr. : Aug. - Sept.

Distr. : Tropical Asia. Cultivated for its fruits and also occuring wild. *CNS 1864* (Palmel).

CITRULLUS H.A.Schrader ex Eckl. & Zeyh.

Enum. Pl. Afric. Austral. 279. 1836 (*nom.cons.).*

Citrullus lanatus (Thunb.) Matsumara & Nakai, Cat. Sem. *et* Spor. Hort. Bot. Univ. Tokyo 1916: 30. 1916; Hara, Taxon 18: 346-347. 1969; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 181. 1976; Mani. & Sivar., Fl. Calicut 122. 1982; Chakr., Fasc. Fl. India 11: 22. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 636. 1983; Vajravelu, Fl. Palghat Dist. 217. 1990. *Momordica lanata* Thunb., Prodr., Fl. Cap. 13. 1794. *Citrullus vulgaris* Schrad. in Eckl. et Zeyher, Enum. Pl. Afr. Austr. 279. 1936; Chakr., Rec. Bot. Surv. India 17: 113. 1959.

Annual herbs; stem angular, villous; tendrils bifid. Leaves c. 14 x 10 cm, deeply 3-5-lobed, villous; lobes obovate-oblong or obtuse-rotund, apical ones sometimes lanceolate, acute or acuminate; petiole to 10 cm long. Flowers axillary, solitary; penducle 1-3 cm long in male, 2-6 cm long in female, villous. Calyx-tube to 4 mm, equal to lobes. Corolla lobes 1-1.5 x 0.3-4 cm, ovate, villous, yellow. Stamens 3, inserted at the base of calyx tube; filaments in male free; anthers one 1-celled, others 2-celled. Ovary in female flowers ovoid. Fruits upto 20 cm across, subglobose. Seeds many, smooth, black, ovoid, compressed.

Fl. & Fr. : Feb. - Apr.

Distr. : Africa; widely cultivated in Old and New World tropics. Cultivated for its delicious fruits and also occuring wild. *CNS 1472* (Vandanam).

COCCINIA R. Wight *et* Arnott

Prodr. 1: 347. 1834.

Coccinia grandis (L.) J. Voigt, Hort. Suburb. Calc. 59. 1845; Mani. & Sivar., Fl. Calicut 121. 1982; Chakr., Fasc. Fl. India 11: 24. 1982; Matthew & Brito in Matthew, Fl. Tam. Carnatic 3: 637. 1983; Ramach. & Nair, Fl. Cannanore 198. 1988. Nicols., Suresh & Mani., An Interpr. Hort. Malab. 95.1988; Vajravelu, Fl. Palghat Dist. 212. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 208. 1994. *Bryonia grandis* L. , Mant. Pl. 126. 1767. *Coccinia indica* Wight & Arn., Prodr. 347. 1834, *nom. illegit.;* Gamble, Fl. Pres. Madras 537.1919. *Cephalandra indica* (Wight & Arn.) Naudin, Ann. Sci. Nat. Bot. (Ser.5) 5: 16. 1866, *illegit.;* Clarke in Hook. f., Fl. Brit. India. 2:621. 1879. *Coccinia cordifolia* (L.) Cogn. in DC., Mon. Phan. 3: 529. 1881; Chakr., Rec. Bot. Surv. India. 17: 117. 1959. ***Covel*** Rheede, Hort. Malab. 8:27-28, t. 14.1688.

Extensive vine; tendrils simple. Leaves 3-7 x 3-5 cm, palmately 3-5-lobed or angled, broadly ovate to orbicular in outline, base cordate, margin denticulate, apex acute, upper surface punctate, lower surface glandular; petiole 2.5-5 cm long. Flowers axillary, solitary. Male flower: calyx tube 4-5 mm long, campanulate, lobes 5, subulate; corolla white, 2.5-3.5 cm long, campanulate, villous; stamens 3, inserted below the calyx-tube, filaments connate, anthers flexouse; pistillode absent. Female flowers: calyx-tube campanulate; corolla white; ovary 1-1.3 cm long, oblong, glandular pubescent; ovules many, horizontal; style 6-7 mm long, slender; stigma 3-partite, densely papillose. Fruit 4-5 x 2-2.5 cm, ovoid-oblong; pulp red. Seeds 6-7 mm long, oblong, compressed.

Fl. & Fr. : Dec. - Apr.

Distr. : Sri Lanka, Peninsular India. Common; on wayside, thickets, usually in plains. *CNS 1458* (Alappuzha town).

Juice of tap root used as medicine in diabetes. Fruits edible.

CUCUMIS Linnaeus

Sp. Pl. 1011. 1753 & Gen. Pl. ed. 5, 442. 1754.

Cucumis sativus L., Sp. Pl. 1012. 1753; Hook. f., Fl. Brit. India 2:620. 1879; Gamble, Fl. Pres. Madras 535. 1919; Chakr., Rec. Bot. Surv. India 17:105. 1959 & in Fasc. Fl. India. 11:35. 1982; Mani. & Sivar., Fl. Calicut 123. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3:642. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 95. 1988. ***Mullen- belleri*** Rheede, Hort. Malab. 8: t. 6. 1688.

Hirsute prostrate herbs; tandrils simple. Leaves 10-16 cm long and broad, broadly orbicular or ovate-cordate, entire or palmately 5-lobed, margin bi-denticulate; petiole to 15 cm long. Male flowers 3-4, in axilliary fascicles. Calyx 8-10 mm long, companulate, densely villous, lobes subulate. Corolla yellow, 2-3 cm long; lobes acute. Stamens 3; filaments reduced; anthers 3-4 mm long, flexuous; pistillode globose. Female flowers solitary. Ovary ellipsoid, tubercled, densely pubscent; style to 3 mm long. Fruit oblong, yellowish green. Seeds 8-10 x 3-5 mm, oblong.

Fl. & Fr.: Dec. - May.

Distr.: Tropics and sub-tropics. Cultivated as a vegetable, as a summer crop. *CNS 1237* (Pattanakadu).

CUCURBITA Linnaeus

Sp. Pl. 1010. 1753 & Gen. Pl. ed. 5, 441. 1754.

Cucurbita maxima Duch. ex Lam., Encyl. Meth. Bot. 2: 151. 1786; Hook. f., Fl. Brit. India 2: 622. 1879; Gamble, Fl. Pres. Madras 543.1919; Chakr., Rec. Bot. Surv. India 17:123. 1959 & in Fasc. Fl. India 11: 40. 1982; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 181. 1976; Jeffrey, Kew Bull. 34: 799. 1980; Mani. & Sivar., Fl. Calicut 123. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3:643. 1983; Vajravelu, Fl. Palghat Dist. 217. 1990.

Densely pubscent climbers; tendrils forked. Leaves 7-18 x 7-25 cm, orbicular or more or less reniform, entire or emarginate, 5-angled or lobed; petiole to 15 cm long.

Flowers axillary, solitary, large. Male flower: calyx-tube 5-8 mm long, campanulate, lobes 5, linear. Corolla 5-7 cm long, campanulate, yellow, lobes 5, apically recurved. Stamens 3; filaments 5-7 mm long; anthers linear, one 1-celled, others 2-celled. Female flower: Ovary oblong. Fruits large. Seeds 18-22 x 10-12 mm, ovate, yellowish.

Fl. & Fr.: Aug. - Dec.

Distr.: Cosmopolitan; mostly cultivated. Cultivated for its fruits, used as vegetable. *CNS 2026* (Thiruvanandoor).

DIPLOCYCLOS (Endlicher) Post *et* Kuntze

Lex. 178. 1903.

Diplocyclos palmatus (L.) C. Jeffrey, Kew Bull. 15: 352. 1962; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 177. 1976; Mani. & Sivar., Fl. Calicut 122. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3:644. 1983; Ramach. & Nair, Fl. Cannanore 119.1988; Mani., Fl. Silent Valley 116.1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 96. 1988; Vajravelu, Fl. Palghat Dist. 212. 1990; Sivar. & Mathew, Fl. Nilambur 288. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 202. 1996. *Bryonia palmata* L., Sp. Pl. 1013. 1753, p.p.; Clarke in Hook. f., Fl. Brit. India 2: 622. 1879. *B. laciniosa* auct., non (L.), Naudin 1859: Gamble, Fl. Pres. Madras 534. 1919; Chakr., Rec. Bot. Surv. India 17: 135. 1959 & Fasc. Fl. India 11:16. 1982. ***Nehoemeka*** Rheede, Hort. Malab. 8: 37-38, t. 19. 1688.

Stout climbers; tendrils 2-fid. Leaves 5-7 x 7-9.5 cm, palmately 5-lobed, orbicular-cordate, basally 5-7-ribbed; scabrid above; lobes elliptic-oblong, accuminate. Petiole to 7 cm long. Flowers monoecious; male and female flowers in axilliary clusters; calyx campanulate, lobes 5, to 1 mm long, linear; corolla greenish-yellow, to 5 mm, ovate-acute; stamens 3, free, inserted at the middle of calyx-tube, anther cells slightly flexuous; staminodes 3; ovary globose; ovules few; horizontal; stigma 3-fid, papillose. Fruit 1-1.5 cm across, globose, with vertical greenish and white patches. Seeds ovoid, compressed with crenulate, transverse ridge.

Fl. & Fr. : Sept. - Nov.

Distr. : N. tropical Africa, Arabia, tropical Asia from W. Pakistan to Hainan, Malesia and tropical Australia. In sacred groves. *CNS 1048* (Vandanam sacred grove).

LUFFA Miller

Gard. Dict. Abridg. ed. 4. 1754.

Annual herbs, scandent, glabrous or pubscent; tendrils bi- or multifid. Leaves angled. Plants monoecious. Male flowers in racemes; peduncles long, often bracteate, yellow; calyx-tube campanulate, lobes 5, triangular or lanceolate; petals 5, free, spreading, obcordate or obovate; stamens 3 or 5, inserted at the mouth of the calyx tube; anthers exserted, 1-locular, others 2-locular, sigmoid-flexuous, connective dilated; pistillode glanduliform. Female flowers solitary; calyx-tube shortly produced above the ovary; staminodes 3; ovary elongated , angular or cylindric; style columnar, stigma 3, bilobed. Fruit oblong or cylindric, terete or acutely angled, fibrous inside. Seeds oblong, compresssed.

1a. Stamens 5; fruits terete, smooth ..... **L. aegyptica**

1b. Stamens 3; fruits 10-angled ..... **L. acutangula**

Luffa acutangula (L.) Roxb., Hort. Beng. 70. 1814 & Fl. Ind. 3:713. 1832; Clarke in Hook. f., Fl. Brit. India 2: 615. 1879; Gamble, Fl. Pres. Madras 533. 1919; Chakr., Fasc. Fl. India 11: 67. 1982; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 97.1988; Vajravelu, Fl. Palghat Dist. 217. 1990; Sivar. & Mathew, Fl. Nilambur 292. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 204.1996. *Cucumis acutangula* L., Sp. Pl. 1: 1011. 1753. ***Piccina*** Rheede, Hort. Malab. 8: 13-14, t. 7. 1688.

Annual scandent herbs; tendrils often trifid. Leaves 12-20 cm long and as broad, palmately 5-7-angled or suboblate, scabrous; petioles 8-12 cm long. Flowers yellow, male and female in the same axil. Male flowers: penduncles 8-13 cm long, 14-18-flowered at apex; pedicels 1-3 cm long; calyx-tube campanulate; lobes lanceolate; petals c. 2 x 2.5 cm, obcordate; stamens 3, 1 unilocular, 2 bilocular, filaments 3-4 mm long. Female flowers: peduncles 0.5-1 cm long; ovary elongate, 10-angular. Fruit 14-28 x 6-9 cm, clavate-oblong, acutely 10-angled. Seeds 1-1.2 cm long, ovate, compressed, black.

Fl. & Fr.: Aug.- Oct.

Distr.: Extensively cultivated in the tropics. India, Burma, Sri Lanka, Malaysia, Indonesia, China, and South Africa. Cultivated for its fruits used as vegetable, and also occurring wild. *CNS 1719* (Vallikkunnam).

Luffa aegyptiaca Mill., Gard. Dict. (ed. 8), 4: 500. 1785; Clarke in Hook. f., Fl. Brit. India 2: 614. 1879; Gamble, Fl. Pres. Madras 533. 1919; Excell, J. Bot. 71: 352.1933; Bennet, Fl. Howrah 358. 1979; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 97. 1988. *Luffa cylindrica* M. Roemer, Fam. Nat. Syn. Monogr. 2: 63.1846; Chakr., Rec. Bot. Surv. India 17: 75. 1959 & in Fasc. Fl. India 11: 70. 1982; Jeffrey, Kew Bull. 15: 355. 1962; Mani. & Sivar., Fl. Calicut 122. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 646. 1983; Mani., Fl. Silent Valley 118. 1988; Ramach. & Nair, Fl. Cannanore 203. 1988; Vajravelu, Fl. Palghat Dist. 213. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 208. 1994; Sivar. & Mathew, Fl. Nilambur 292. 1996. ***Cattu-picinna*** Rheede, Hort. Malab. 8: 15, t. 8. 1688.

Climbing herbs, tendrils 3-fid. Leaves 5-(7)-lobed, 6-12 x 6-11 cm, orbicular or broadly ovate in outline, base cordate, margin shallowly dentate, apex acuminate, upper surface glandular-punctate, lower surface scabrid; petiole to 4.5 cm long. Flowers monoecious, male and female on same axil. Male flowers in recemes, clustered; peduncle to 9 cm; pedicel to 8 mm; calyx tube broadly companulate, lobes 5, 2-3 x 1-1.5 cm, lanceolate- acuminate; petals 5, yellow; stamens 5, free, inserted near mouth of calyx tube, anthers one 1-celled, others 2-celled. Female flowers solitary, co-axillary with male flower; ovary oblong, 1-locular; ovules many. Fruits 10-22 x 6-8 cm, cylindric, fibrous within. Seeds many, c. 10 x 8 mm, ovoid, compressed, black.

Fl. & Fr.: Oct. - Dec.

Distr.: Old World tropics.Common in plains, widely cultivated. *CNS 2595* (Meledum).

The tender fruits are used as vegetables. Dried fruits (fibrous endocarp) used as a brush while taking bath.

MOMORDICA Linnaeus

Sp. Pl. 1009. 1753 & Gen. Pl. ed. 5, 440. 1754.

Annual or perennial glabrous to hispid scandent herbs. Leaves undivided, lobed or 3-9-foliolate. Tendrils simple or bifid. Plants monoecious or dioecious. Male flowers solitary or in racemes. Calyx tube short, lobes 5, ovate to lanceolate. Corolla often 5-partite to the base, rarely 5-lobed. Stamens 3, free, one 1-celled, two 2-celled, anthers flexuous; pistillode 0. Female flowers solitary, ovary oblong or fusiform, placenta 3; ovules numerous; style linear, stigma 3-lobed or entire; staminode 0. Berry muricate or echinate. Seeds smooth or rugose.

1a. Flowers monoecious; bract inserted at the base of the peduncle; fruits narrowed at the ends ..... **M. charantia**

1b. Flowers dioecious; bract inserted at the tip of the peduncle; fruits obtuse at the ends ..... **M. dioica**

Momordica charantia L., Sp. Pl. 1009. 1753; Wight, Ic. t. 504. 1841 & Ill. t. 105. 1850, p.p.; Hook. f., Fl. Brit. India 2: 616. 1879; Gamble, Fl. Pres. Madras 532.1919; Chakr., Fasc. Fl. India 11:89. 1982; Mani. & Sivar., Fl. Calicut 121. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 648. 1983; Mani., Fl. Silent Valley 119.1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 98. 1988; Vajravelu, Fl. Palghat Dist. 214. 1990; Sivar. & Mathew, Fl. Nilambur 293. 1996. ***Pandi-pavel*** Rheede, Hort. Malab. 8: t. 9. 1688. ***kaippa, pavel.***

Climbers; tendrils simple. Leaves up to 8 x 8 cm, orbicular-cordate, 5-7-lobed; lobes acute or acuminate, margin dentate-lobulate; petiole to 4 cm. Flowers axillary, solitary. Male flowers: bracts 5-12 x 5-12 mm; foliaceous, reniform; peduncle to 6 cm long; calyx tube campanulate, glabrescent; lobes ovate; Corolla yellow; to 3 cm across, petals 5, obovate, villous. Stamens 3; anthers to 2.5 mm; pistillodes 3. Female flowers: Peduncles 6-10 cm long often bracteate at base; ovary fusiform. Fruit 10-15 cm long, oblong, echinate. Seeds 1-1.5 x 0.7-0.9 cm, ovoid, compressed, base and apex subtridentate, sculptured.

Fl. & Fr.: Throughout the year.

Distr. : Tropical Old World. Commonly cultivated for its fruits which are widely used as a vegetable. *CNS 1865* (Thykkuttam).

Momordica dioica Roxb. ex Willd., Sp. Pl. 4: 605. 1805; Clarke in Hook f., Fl. Brit. India 2: 617. 1879; Gamble, Fl. Pres. Madras 523. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 177. 1976; Jeffrey, Kew Bull. 34: 790. 1980; Chakr., Fasc. Fl. India 11: 94. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 648. 1983; Ramach. & Nair, Fl. Cannanore 200. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 71. 1988; Vajravelu, Fl. Palghat Dist. 214. 1990; Sivar. & Mathew, Fl. Nilambur 294. 1996; Sasi . & Sivar., Fl. Pl. Thrissur For. 204. 1996. ***Erima-pavel*** Rheede, Hort. Malab. 8: 23, t. 12. 1688. ***Ben-Pavel*** Rheede, Hort. Malab. 8: 35-36, t. 18. 1688.

Climbing herbs with tuberous roots; tendrils simple. Leaves 4-8 x 3-6 cm, broadly ovate, deeply 3-5-lobed, base cordate, margin denticulate, apex acute, membranous; petiole to 2.5 cm. Flowers dioecious, solitary, axillary. Male flowers with long peduncles with foliaceous bracts at apex; peduncle 4-6 cm long. Calyx tube c. 1 cm long, lobes linear, villous. Petals c. 2.5 x 1 cm, oblong, obtuse, yellow. Stamens 3, inserted at the mouth of calyx tube; one 1-celled, two 2-celled; staminodes of 2-3 glands. Ovary oblong with many horizontal ovules. Fruit c. 3 x 2.2 cm, ovoid, softly echinate. Seeds 6-7 x 5-6 mm, ovoid, emarginate, pale yellow.

Fl. & Fr.: Most of the seasons.

Distr.: Indo-Malesia and China. Rare; in wayside thickets. *CNS 1750* (Venmony).

Seeds fried and eaten as a remedy for cough and pain in the chest. Application of paste of roots promotes growth of hair and prevents it from falling off. Fruits edible.

MUKIA Arnott

J. Bot. (Hooker) 3: 276. 1841.

Mukia maderaspatana (L.) Roemer, Syn. Monogr. 2: 47. 1846; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 178. 1976; Jeffrey, Kew Bull. 34: 802. 1980; Mani. & Sivar., Fl.

Calicut 123. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 650. 1983; Ramach. & Nair, Fl. Cannanore 200. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 99. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 209. 1994; Sivar. & Mathew, Fl. Nilambur 294. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 204. 1996. *Cucumis maderaspatanus* L., Sp. Pl. 1012. 1753. *Bryonia scabrella* L.f., Suppl. Pl. 424. 1781; Roxb., Fl. Ind. 3:724. 1832. *Mukia scabrella* (L.f.) Arn. in Hook., J. Bot. 3: 276. 1841; Clarke in Hook. f., Fl. Brit. India 2: 623. 1879. *Melothria maderaspatana* (L.) Cogn. in A.& C.DC., Mon. Phan. 3: 623. 1881; Gamble, Fl. Pres. Madras 539. 1919; Chakr. Rec. Bot. Surv. India 17:141. 1959 & Fasc. Fl. India 11: 83. 1982. ***Mucca-piri*** Rheede, Hort. Malab. 8:25-26, t. 13. 1688.

Prostrate or climbing scabrid herbs; tendrils simple. Leaves 4-8 x 3-7 cm, ovate-deltoid, angular or shallowly 3-5-lobed, base cordate, margin denticulate, apex accuminate, mucronate, scabrid on both sides; petiole to 6 cm. Male flowers in axillary, sessile clusters. Calyx tube to 2 mm, villous; lobes subulate, erect. Petals 5 , c. 3 mm long, ovate-oblong, obtuse, yellow. Stamens 3, free, inserted at base of calyx tube; anthers oblong, ciliate. Female flowers solitary or in clusters. Ovary villous. Berry c. 1.2 cm across, globose, red. Seeds lenticular, rugose.

Fl. & Fr. : Nov. - Feb.

Distr.: Indo-Malesia to New Zealand, Africa and China. Coomon. In open disturbed areas, on thickets, fences, etc. *CNS 1590* (Aroor R.S.).

SOLENA Loureiro

Fl. Cochinch. 477, 514.1790.

Solena amplexicaulis (Lam.) Gandhi in Sald. & Nicols., Fl. Hassan Dist. 179. 1976; Jeffrey, Kew Bull. 34:793. 1980; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 651. 1983; Mani., Fl. Silent Valley 119. 1988; Ramach. & Nair, Fl Cannanore 200. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 99. 1988; Vajravelu, Fl. Palghat Dist. 215. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 209. 1994; Sivar. & Mathew, Fl. Nilambur 296. 1996. *Bryonia amplexicaulis* Lam., Encycl. 1: 496. 1785. *Solena*

heterophylla Lour., Fl. Cochinch. 1: 514. 1790; Mani. & Sivar., Fl. Calicut 123. 1982. *Zehneria umbellata* Thw., Enum. Pl. Zeyl. 125. 1859; Clarke in Hook . f., Fl. Brit. India 2: 625. 1879, p.p. *Melothria heterophylla* (Lour.) Cogn. in DC., Mon. Phan. 3: 618. 1881; Gamble, Fl. Pres. Madras 539. 1919; Chakr., Rec. Bot. Surv. India 17: 146. 1959. *M. amplexicaulis* (Lam.) Cogn. in DC., Mon. Phan. 3:61. 1881; Gamble, Fl. Pres. Madras 539. 1919; Chakr., Fasc. Fl. Ind. 11: 77.1982. ***Karivi-valli*** Rheede, Hort. Malab. 8: 51, t. 26. 1688 (Fig. 27).

Vines tendrils simple. Leaves plymorphic, 4-12 x 2.5-7 cm, ovate to oblong, 3-5-angled or lobed, base cordate, amplexicaule, margin denticulate, apex acuminate, scabrid, chartaceous. Flowers dioecious. Male flowers in racemes; calyx tube to 4 mm, lobes 5, triangular. Corolla campanulate, white, lobes 5, ovate; stamens 3, one 1-celled, two 2-celled, inserted at base of calyx tube; pistillodes 3-lobed. Female flower solitary; peduncle to 5 mm long; ovary oblong. Fruit 1.5-2 x 1-1.5 cm, ribbed, apically beaked. Seeds 6-7 x 5-6 mm, turgid, marginate.

Fl. &Fr.: Jul. - Jan.

Distr.: Endemic in South India. In way side thickets and sacred groves. *CNS 2596* (Edathwa).

TRICHOSANTHES Linnaeus

Sp. Pl. 1008. 1753.

Annual or perennial climbing herbs; tendrils 2- or 3-branched. Leaves deeply lobed or angular. Flowers dioecious or monoecious. Male flowers in racemes, often bracteate. Calyx tube oblong, dilated above, 5-lobed. Corolla white, 5-lobed, lobes oblong, fimbriate. Stamens 3, filaments very short, one 1-celled and two 2-celled, anthers connate, cells conduplicate; bracts as long as the calyx lobes. Ovary inferior, 1-locular, placenta 3; ovules many; style slender; stigma entire or lobed. Berry smooth. Sseeds many, usually smooth.

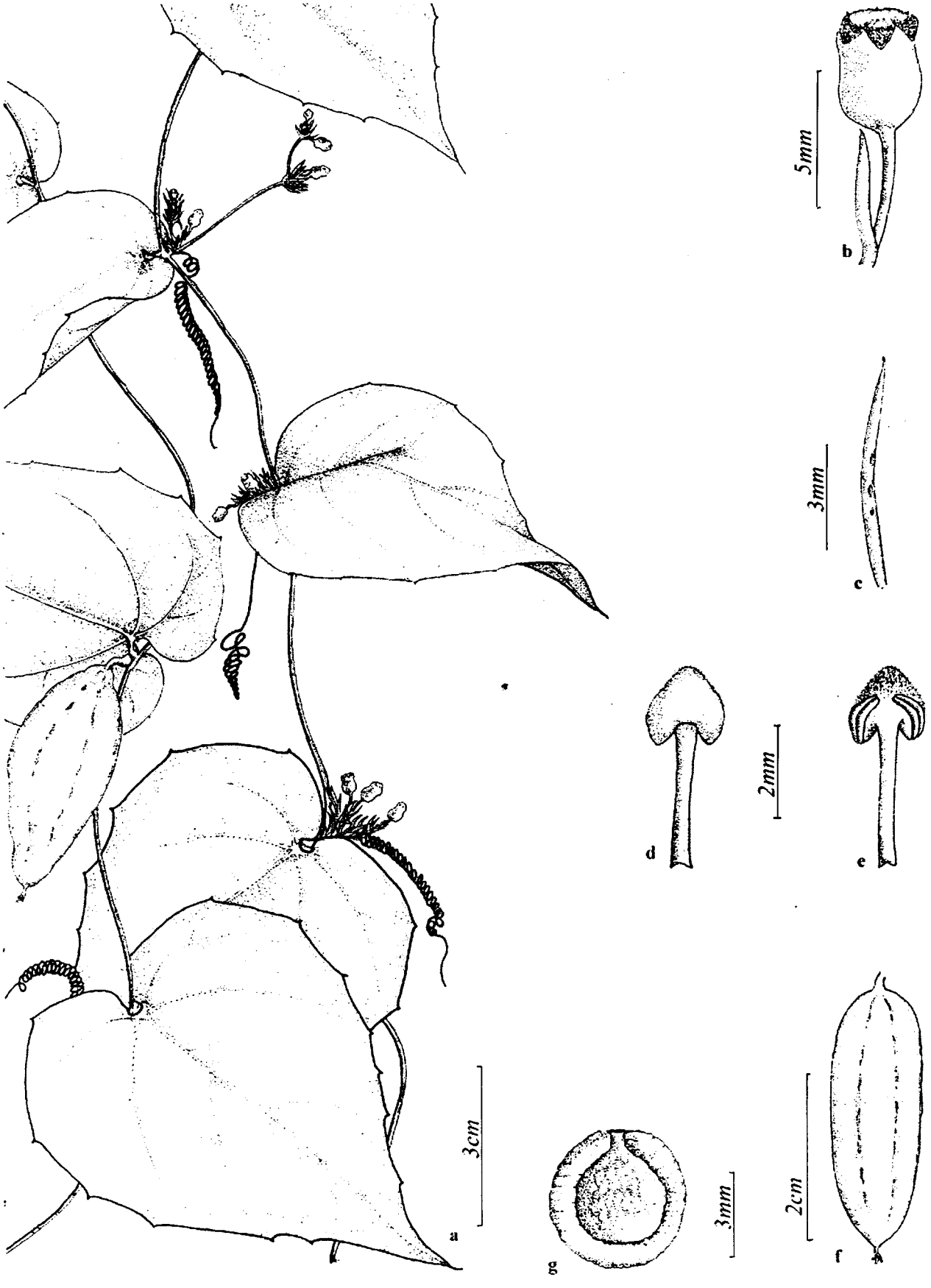


Fig. 27. *Solena amplexicaulis* (Lam.)Gandhi: a. Twig; b. Male flower; c. Bract; d & e. Stamen-dorsal and ventral views; f. Fruit; g. Seed.

1a. Male racemes minutely bracteate or ebracteate

2a. Leaves broadly ovate or sub-orbicular, palmately 3-5-lobed, lower surface glandular-pubescent; calyx tube glandular-pubescent ..... **T. cucumerina**

2b. Leaves ovate-lanceolate, entire, glabrous; calyx tube glabrous .... **T. nervifolia**

1b. Male racemes with large dentate or laciniate bracts.

3a. Calyx segments broader, shortly dentate; corolla yellow ..... **T. tricuspidata**

3b. Calyx segment deeply 3-5-lobed; corolla white ..... **T. lepiniana**

Trichosanthes cucumerina L., Sp. Pl. 1008. 1753; Clarke in Hook. f., Brit. India 2: 609. 1879; Gamble, Fl. Pres. Madras 529. 1919; Chakr., Rec. Bot. Surv. India 17:31. 1959 & Fasc. Fl. India 11: 12. 1982; Jaffrey, Kew Bull. 34: 796. 1980; Mani. & Sivar., Fl. Calicut 120. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 653. 1983; Ramach. & Nair, Fl. Cannanore 201. 1988; Nicols., Suresh & Mani., An Intrepr. Hort. Malab. 100. 1988; Vajravelu, Fl. Palghat Dist. 215. 1990; Sivar. & Mathew, Fl. Nilambur 298. 1996. ***Padavalam*** Rheede, Hort. Malab. 8: 29-30, t. 15. 1688. ***Kattupadavalam.***

Vines. Leaves 8-11 x 8-10 cm, palmately 3-5-lobed, broadly ovate or sub-orbicular, base truncate-cordate, margin distantly denticulate, apex acute, lower surface glandular-pubescent, chartaceous; petiole to 3.2 cm. Male flowers in axilliary racemes, ebracteate; pedicel to 2 cm long. Calyx-tube turbinate, glandular-pubscent, lobes linear. Petals oblong-lanceolate, long-fimbriate, white. Stamens 3; pistillodes 3, slender. Female flowers solitary; pedicel to 1.5 cm. Ovary ribbed, pubescent; style to 1.6 cm. Fruits ovoid-fusiform, beaked, white-striped when young, yellow when ripe.

Fl. & Fr. : Sept. - Oct.

Distr.: Sri Lanka, India and Malesia. Common on fences. *CNS 1537* (Kadakkarappally).

Note: *T. cucumerina* var. *anguina* (L.) Haines, is commonly cultivated as a vegetable.

Trichosanthes lepiniana (Naud.) Cogn. in DC., Mon. Phan. 3: 377. 1881; Gamble, Fl. Pres. Madras 530. 1919. *Involucraria lepiniana* Naud. in Huber, Cat. 11. 1868.

Perennial, robust, dioecious climbers. Leaves 8-17 cm long and almost as broad, suborbicular, shortly palmately 3-5-lobed; petioles 4-6 cm long. Male flowers: peduncles 12-16 cm long, 4-8-flowered; bracts thinly membranous, 2-3 cm long, attenuate; pedicels 3-5 mm long; calyx tube 4-6 cm long, puberulous; lobes spreading, 1.2-1.5 x 0.4-0.5 cm, lobes subulate; petals white, 2-3 cm long, ovate, deeply laciniate, lacinia long, fimbriate; staminal filiments c. 2 mm long; anther head c. 1.2-1.4 x 0.4 cm. Female flowers: peduncles 2-4 cm long; ovary oblong. Fruits c. 7 x 5 cm, ovoid, red. Seeds 1-1.2 x 0.5-0.6 cm, oblong, obscurely marginate, black, shortly rugulose.

Fl. & Fr.: Mar. - Jun.

Distr.: India and Malaysia. In wayside thickets. *CNS 1244* (Alapuzha town).

Trichosanthes nervifolia L., Sp. Pl. 1088. 1753; Clarke in Hook. f., Fl. Brit. India 2: 609. 1879; Gamble, Fl. Pres. Madras 529. 1919; Chakr., Rec. Bot. Surv. India 18: 30. 1959 & Fl. India Fasc. 11: 119. 1982; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 180. 1976; Jeffrey, Kew Bull. 34: 803. 1980; Mani. & Sivar., Fl. Calicut 120. 1982; Mani., Fl. Silent Valley 120. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 100. 1988; Sivar. & Mathew, Fl. Nilambur 300. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 206. 1996. *Trichosanthes cuspidata* Lam., Encycl.1: 190. 1783; Gamble, Fl. Pres. Madras 529. 1919. ***Scheru-padavalam*** Rheede, Hort. Malab. 8: 31, t. 16. 1688.

Scandant herbs; tendrils bifid. Leaves 6-14 x 5-7 cm, ovate-lanceolate, base cordate, margins distantly denticulate, apex gradually acute, basally 5-nerved, prominent on lower side, membranous; petiole to 3 cm long. Male flowers in racemes; pedicels slender. Calyx-tube c. 1.2 cm long, oblong, dilated above, 5-lobed; lobes filiform. Corolla white, 5-lobed; lobes oblong, fimbriate. Pistillodes 3. Female flowers solitary; ovary 1-locular, ovoid; ovules many; style slender; stigma entire or lobed. Fruit 7-10 x 3-5 cm, ellipsoid, red on ripening. Seeds semi-ellipsoid, compressed, rugulose.

Fl. & Fr.: Nov. - Mar.

Distr.: Peninsular India and Sri Lanka. Rare, in wayside thickets and on walls. *CNS 2400* (Alappuzha town).

Trichosanthes tricuspidata Lour., Fl. Cochinch. 589. 1790: Jeffrey, Kew Bull. 34: 797. 1980 & 36: 738. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 653. 1983; Mani., Fl. Silent Valley 121. 1988; Ramach. & Nair, Fl. Cannanore 201. 1988; Sivar. & Mathew, Fl. Nilmabur 300. 1996. *Modecca bracteata* Lam., Encycl. 4: 210. 1797. *Trichosanthes bracteata* (Lam.) J. Voigt, Hort. Suburb. Calc. 58. 1848; Chakr., Rec. Bot. Surv. India 17: 44. 1959 & Fasc. Fl. India 11: 109. 1982; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 179. 1976; Mani. & Sivar., Fl. Calicut 119. 1982; Vajravelu, Fl. Palghat Dist. 215. 1990. *T. palmata* Roxb., Fl. Ind.3 : 704. 1832, non L., 1753; Hook. f., Fl. Brit. India 2: 606. 1879; Gamble, Fl. Pres.Madras 529. 1919.

Scabrid climbing herbs; tendrils 2-fid. Leaves up to 19 x 17.2 cm, orbicular-cordate, deeply or shallowly 3-5-lobed, margin dentate. Male flowers in axillary racemes; bracts ovate, often purple. Calyx tube to 6.2 cm, lobes lanceolate. Corolla lobes ovate, yellow, fimbriate. Stamens 3. Female flowers solitary. Berries c. 7 cm across, globose, red with orange streaks.

Fl. & Fr.: Sept. - Dec.

Distr.: India, Sri Lanka and Malesia. In waste lands. *CNS 2053* (Chengannur).

ZANONIA Linnaeus

Sp. .Pl. ed. 1, 1028. 1753.

Zanonia indica L., Sp. Pl. ed. 2, 1457. 1763; Clarke in Hook. f., Fl. Brit. India 2: 633. 1876; Gamble, Fl. Pres. Madras 543. 1919; Chakr., Fasc. Fl. India 11: 124. 1982; Mani., Fl. Silent Valley 121. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 100. 1988; Vajravelu, Fl. Palghat Dist. 216. 1990. ***Penar-vallimasc*** Rheede, Hort. Malab. 8: 93, t. 49. 1688.

Woody dioecious, perennial climbers; tendrils simple or bifid, elongate. Leaves 8-22 x 4-12 cm, ovate-oblong, base rounded, apex acute, subcoriaceous, trinerved; petiole 4-11 cm long. Flowers small, males arranged in lax pendulous panicles, females racemose. Male flowers: pedicels 4-5 mm long; sepals c. 2 mm long, ovate, acute; petals upto 3.5 x

1.5 mm, oblong, obtuse, buff-coloured. Female flowers: peduncles to 18 cm long; pedicels thick; sepals 3-4 x 3-4 mm, petals 5-7 x 3-4 mm; ovary 8-10 mm long, obconic-cylindric; ovules pendulous, 2-many in each locule; styles 3, apex bifid. Fruit 6-10 x 2.5-3 cm, elongate-cylindric, 3-valved at the truncate apex. Seeds 3-4 x 1-1.3 cm, oblong, compressed, surrounded by a large membranous wing.

Fl. & Fr.: Dec. - May.

Distr.: India, Bangladesh, Myanmar, Sri Lanka and Malaysia. Common in sacred groves. *CNS 1739* (Cherthala), *CNS 1916* (Vandanam).

59. CACTACEAE Juss.

Gen. Pl. 310. 1789.

1a. Stems columnar, strongly ribbed or angled; areoles without barbed bristles; stamens inserted on perianth tube; stylar branches more than 10 ..... **Cereus**

1b. Stems with broad flattened joints; areoles with barbed bristles; stamens inserted on the receptacle; stylar branches less than 5 ..... **Opuntia**

CEREUS P. Miller

Gard. Dict. Abr. ed., 4. 1754.

Cereus pterogonus Lem., Cact. Gen. Sp. Nov. 59. 1839; Curtis, Bot. Mag. t. 5360. 1863; Burkill, Rec. Bot Surv. India 4: 294. 1911; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 659. 1983; Vajravelu, Fl. Palghat Dist. 219. 1990.

Erect leafless shrubs to 5 m tall; stems columnar, 3-6-winged or ridged, covered with echinate areoles without glochids; spines unequal, 0.5-2.5 cm long. Flowers lateral, sessile, large. Perianth tube terete at base, to 8 cm long, funnel-shaped with a few scales below. Tepals many; outer ones greenish-white; inner ones white, 4-6 x 1-1.5 cm, oblong or lanceolate. Stamens many, inserted at various levels on the perianth; anthers oblong. Ovary 2.5-3 cm long, subterete, with parietal placentae; stigmatic lobes 10-15.

Fl.. : May- Jul.

Distr. : Native of Brazil; introduced by Portuguese into Goa where it is naturalised and now runningwild in other parts. In wastelands. *CNS 1206* (Pattanakkad).

OPUNTIA P. Miller

Gard. Dict. Abr. ed., 4. 1754.

Opuntia stricta (Haw.) Haw., Syn. Pl. Succ. 191. 1812, var. **dillenii** (Ker Gawler) Benson, Cact. & Succ. J. America 41: 126. 1969; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist.. 869. 1976; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 661. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 210. 1994. *Cactus dillenii* Ker Gawler, Bot. Reg. 3: t. 255. 1818. *Cactus strictus* Haw., Misc. Nat. 188. 1803. *Opuntia dillenii* (Ker Gawler) Haw., Suppl. Pl. Succ. 79. 1819; Wight & Arn., Prodr. 363. 1834; Hook. f., Fl. Brit. India 2: 657. 1879; Burkill, Rec. Bot. Surv. India 4: 294. 1911; Gamble, Fl. Pres. Madras 548. 1919; Vajravelu, Fl. Palghat Dist. 219. 1990.

Fleshy shrubs with often drooping branches; stem flat, obovate or oblanceolate, glaucous; areoles with 5-7 spines, densely bristly at base; spines yellow. Young leaves c. 5 mm long, subulate, fleshy, seated on a swollen fleshy base. Flowers to 5 cm across. Perianth many, yellow; outer tepals c. 2 cm long; inner ones c. 3 cm long, obovate. Stamens many. Ovary c. 2 cm long, glochidiate; style apically branched. Berry obovoid. Seeds many.

Fl. & Fr. : Jan.- Sept.

Distr. : Native of tropical America. Introduced and naturalized in India. In wastelands and sea shores. *CNS 1964* (Alappuzha beach), *CNS 2112* (Purakkad).

60. MOLLUGINACEAE Hutch.

Fam. Fl. Pl. 1: 128. 1926.

1a. Carpels 5, deeply separated, in fruit forming 5 radiating membranous one-seeded carpels, indehiscent ..... **Gisekia**

1b. Carpels 3, united; ovary in fruit forming a membranous loculicidal capsule, with many seeds in all 3 cells.

2a. Staminodes present; seeds appendaged at the hilum ..... **Glinus**

2b. Staminodes absent; seeds not appendaged ..... **Mollugo**

GISEKIA Linnaeus

Mant. 2:554,562.1771.

Gisekia pharnaceoides L., Mant. 2: 562. 1771; Hook. f., Fl. Brit. India 2:664. 1879; Gamble, Fl. Pres. Madras 553.1919; Jeffrey, Kew Bull. 14: 235.1960; Mani. & Sivar., Fl. Calicut 127.1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 663 1983; Fosb. in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9:321. 1995.

Prostrate and creeping herbs, several branches from above the strong tap root portion, reddish , rooting at nodes. Leaves opposite or apparently whorled, unequal,1.5-3 x 0.5-1 cm, obovate-spathulate, base cuneate, apex obtuse, apiculate, reddish to green, fleshy, pubescent; petiole to 3 mm long. Flowers in axillary fascicles or cymes, greenish-white; pedicels filiform, 5-8 mm long. Sepals 5, green, c. 2 mm long, broadly elliptic to suborbicular, concave, obtuse. Petals absent. Stamens 5; filaments broadening to base. Ovary of 5 free carpels, each with a single ovule, styles 5. Capsule 5-celled, c. 2 mm long, papillose, indehiscent. Seeds reniform, minutely pitted, compressed, dark red or black.

Fl. & Fr. : Mar. - Aug.

Distr. : Widespread from Africa to S. E. Asia in direr coastal areas. Commonly seen on the sandy coasts, where plants are often reddish. *CNS 1007* (Vandanam).

GLINUS Linnaeus

Sp. Pl. 463. 1753.

Glinus oppositifolius (L.) A. DC., Bull. Herb. Boiss. Ser. 2, 1:559. 1901; Backer in Steenis, Fl. Males. I, 4: 270. 1951; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 95. 1976; Mani. & Sivar., Fl. Calicut 126. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 665. 1983; Sivar., J. Taiwan Mus. 41(2) : 82.1988; Ramach. & Nair , Fl.

Cannanore 204. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab.182.1988; Sivar. & Mathew, Fl. Nilambur 306. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 208.1996. *Mollugo oppositifolia* L., Sp. Pl. 89.1753; Gamble, Fl. Pres. Madras 552. 1219; Fosb. in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 325. 1995. *M. spergula* L., Syst. ed. 10, 881. 1759 ; Clarke in Hook.f., Fl. Brit. India 2: 662. 1879. ***Kaipa- tsjira*** Rheede, Hort. Malab. 10:47, t. 24.1690.

Diffuse or prostrate, glabrous herbs. Leaves in whorls of 3-5, unequal, 7-20 x 3-8 mm, obovate-spathulate, base attenuate, apex obtuse or acute, sub-succulent, subsessile. Flowers in axillary, 5-8-flowered fascicles; pedicel to 1.5 cm. Tepals 5, 5-6 x 2-3 mm, oblong, with green central stripe, broad thin hyaline margins, apex obtuse or acute, spreading at anthesis, closing again around fruit. Stamens 5, often alternating with linear, bifid staminodes; anthers oblong. Ovary ellipsoid , 3-celled; ovules many; styles 3, recurved; stigmas capitate. Capsule c. 3 mm long, oblong, loculicidal, enclosed in erect calyx. Seeds ovoid, curved, tubercled, dark reddish brown, with a pair of unequal white hilar appendages.

Fl. & Fr.: Feb. - Jul.

Distr. : Pantropical. Common along river beds, waste lands and in exposed wet sandy areas. *CNS 1285* (Champakulam), *CNS 2446* (Vayalar south).

MOLLUGO Linnaeus

Sp.Pl. 89.1753.

Erect or diffuse annuals; branchlets often angled. Leaves usually in whorls, subsessile; stipules scarious. Flowers in terminal and axillary cymose panicles. Tepals 5, persistent. Stamens 3-5; staminodes absent. Ovary 3-locular; ovules many; style 3. Capsule 3-valvular, subglobose. Seeds numerous, subreniform, compressed, without hilar appendages.

1a. leaves all radical ..... **M. nudicaulis**

1b. Leaves in whorls at the nodes.

2a. Flowers in umbelliform simple cymes; seeds top-shaped, reticulate .... **M. cerviana**

2b. Flowers in dichasial cymes; seeds reniform, areolate or tuberculate.

3a. Stamens 5; seeds grooved on margin .....**M. disticha**

3b. Stamens 3; seeds not grooved on margins.

4a. Leaves at least the basal ones obovate-spathulate; seeds areolate ..... **M. pentaphylla**

4b. Leaves all elliptic-lanceolate, acute; seeds tuberculate .... **M. stricta**

Mollugo cerviana (L.) Ser. in DC., Prodr. 1:392. 1824; Clarke in Hook .f., Fl. Brit. India 2: 663. 1879., Gamble, Fl. Pres. Madras 553. 1919; Ramamoorthy in Sald. . & Nicols., Fl. Hassan Dist. 95. 1976; Mani. & Sivar., Fl. Calicut 126.1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3:666. 1983; Sivar., J. Taiwan Mus. 41(2): 85. 1988; Vajravelu, Fl. Palghat Dist. 220. 1990; Fosb. in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 327. 1995. *Pharnaceum cerviana* L., Sp. Pl. 272.1753.

Small, erect herbs; stems many in whorls of 2-8 from the rootstock, filiform. Leaves both radical and cauline; radical ones 0.5-1 cm long, obovate-spathulate, glaucous; cauline leaves in whorls of 2-6, 5-15 mm long, linear, blunt, glaucous. Flowers in terminal umbellate cymes; pedicel to 1.2 cm, capillary. Tepals 5, subequal, 1.5-2 mm long, obovate, obtuse, greenish with broad hyaline margins, concave. Stamens 5; filaments dilated below and slightly connate. Ovary ovoid, 3-celled; styles 3. Capsule, c.2 mm long, ellipsoid, loculicidal. Seeds ovoid-subreniform, brown.

Fl. & Fr.: May-Jun.

Distr. : Wide spread in tropics and subtropics of the Old World. Common on the sandy sea coast . *CNS 1487* (Nagamkulangara).

Mollugo disticha (L.) Ser. in DC., Prodr. 1:392. 1824; Wight & Arn., Prodr. Fl. Ind. Orient. 44. 1834; Clarke in Hook .f., Fl. Brit. India 2: 663. 1879; Gamble, Fl. Pres. Madras 553.1919; Mani. & Sivar., Fl. Calicut 127. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 667. 1983; Sivar., J. Taiwan Mus. 41(2): 86. 1988; Fosb. in Dassan.,

Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 328. 1995. *Pharnaceum distichum* L., Mant. 2: 221. 1767.

Erect or diffuse glabrous or glandular-pubescent herbs; stem angular. Leaves in whorls or pseudo-whorls of 4-6, 1-3 x 0.4-1 cm, lanceolate or obovate-oblanceolate, base cuneate, margin subentire, apex acute; petiole to 2 mm long . Flowers in panicled cymes, branches conspicuously zig-zag; pedicel to 6 mm long . Tepals 5, 2-3 mm long , subequal, elliptic, greenish-white. Stamens 5; filaments to 1.5 mm. Ovary ovoid, 3-celled; styles calvate. Capsule to 3 mm long, ovoid, loculicidal. Seeds orbicular, compressed brown, papillose.

Fl. & Fr.: Mar. - Aug.

Distr.: Peninsular India and Sri Lanka. Common on the sandy sea coast and river banks. *CNS 1409* (Kanichukulangara).

Mollugo nudicaulis Lam., Encyl. 4:234. 1797; Clarke in Hook. f., Fl. Brit. India 2: 664. 1879; Gamble, Fl. Pres. Madras 553.1919; Mani. & Sivar., Fl. Calicut 126. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 667. 1983; Sivar., J. Taiwan Mus. 41(2): 85.1988; Fosb. in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 329. 1995.

Annual acaulescent herbs. Leaves radical, 2.5-4 x 1.3-2 cm, obovate to spathulate, base attenuate, margin entire, apex rounded , glabrous, subsessile. Cymes terminal, corymbose. Pedicel filiform to 4 mm long. Tepals 5, 2-3 mm long, elliptic, hooded, white. Stamens 3-5; filament c.1.5 mm long. Ovary oblong, 3-lobed, 3-celled; stigmas 3, sessile, flat, spreading, papillose. Capsule c. 2 mm long, ellipsoid. Seeds many, oblique-reniform, reddish-black, thickly tuberculate.

Fl. & Fr. : Aug. - Sept.

Distr.: Panttropical. Along railway line. *CNS 2447* (Kayamkulam).

Mollugo pentaphylla L., Sp. Pl. 89.1753; Gamble, Fl. Pres. Madras 553.1919; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 97.1976; Mani. & Sivar., Fl. Calicut

127.1982; Sivar. & Usha, Taxon 32:125. 1983; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3:668.1983; Ramach. & Nair., Fl. Cannanore 205.1988; Sivar., J. Taiwan Mus. 41(2): 86.1988; Vajravelu, Fl Palghat Dist. 221. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 213.1994; Fosb. in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9:329. 1995; Sivar. & Mathew, Fl. Nilambur 307.1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 209.1996. *M. stricta* auct., non L., 1762: sensu Clarke in Hook. f., Fl. Brit. India 2: 663. 1879. *M. paniculata* Burm.f., Fl. Ind. 32.1768.

Ascending herbs. Leaves in whorls of 2-6, unequal, 1.5-3.5 x 0.6-1.2 cm, obovate to oblong-lanceolate, base attenuate, apex subacute or obtuse, glabrous. Cymes axillary and terminal. Pedicels filiform, 5-8 mm long. Tepals 5, 2-3 mm long, elliptic-oblong, obtuse, green with white scarious margins, some what accrescent in fruit. Stamens 3-5. Ovary ovoid, c. 2 mm long, 3-5-celled; ovules many; styles 3-5. Capsules 2-2.5 mm across, ovoid, membranous. Seeds many, reniform, areolate, reddish brown.

Fl. & Fr.: Jul.-Aug.

Distr.: India, Malesia, Philippines and tropical S. America. A common weed on plains, in sandy sea coasts, river beds and waste places. *CNS 1054* (Vandanam).

Note : For a detailed discussion on the taxonomy of this species, refer Sivarajan & Usha (1983).

Mollugo stricta L., Sp. Pl. 2 L:131. 1762; Burm. f., Fl. Ind. 31, t. 5, f.3.1768; Fenzl, Ann. Wien Mus. 1:380.1836; Clarke in Hook .f., Fl. Brit. India 2:663. 1879, p.p.; Sivar. & Usha, Taxon 32.125.1983; Sivar., J. Taiwan Mus. 41(2): 87.1988; Nicols., Suresh & Mani., An interpr. Hort. Malab. 182.1988; Sivar. & Mathew, Fl. Nilambur 307.1996. *M. pentaphylla* var. *rupestris* Cooke, Fl. Pres. Bombay 1:594. 1903; Mani. & Sivar., Fl. Calicut 127.1982. *M. Pentaphylla* auct., non L., 1753: Gamble, Fl. Pres. Madras 553.1919, p.p. ***Tsjeru-jonganam*** Rheede, Hort. Malab.10:51, t. 26.1690.

Erect or diffuse herbs; stem angular. Leaves 1-4.5 x 0.3 - 0.8 cm, lanceolate to linear-lanceolate, base attenuate, apex acute. Flowers in terminal and subterminal

corymbose panicles. Tepals 5, greenish-white. Stamens 3-5. Capsule subglobose, 3-valved. Seeds many, tuberculate.

Fl. & Fr. : Sept.-Dec.

Distr.: India, Indo-China, Malesia, Japan and Tropical S. America. Commonly seen in waste places. *CNS 1392* (Kayamkulam).

61. AIZOACEAE F. Rudolphi

Syst. Orb. Veg. 53.1830.

1a. Ovary and capsule 3-5-celled, ovules many; stamens 30 or more ..... **Sesuvium**

1b. Ovary and capsule 1-2-celled, ovules 2 or a few; stamens less than 20 .. **Trianthema**

SESUVIUM Linnaeus

Syst. Nat. ed. 10. 1052, 1058,1371. 1759.

Sesuvium portulacastrum (L.) L., Syst. Nat. ed. 10. 1058. 1759; Roxb., Fl. Ind. 2: 509. 1832; Hook. f., Fl. Brit. India 2: 659. 1879; Gamble, Fl. Pres. Madras 550. 1919; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 668. 1983. *Portulaca portulacastrum* L., Sp. Pl. 446. 1753. *Sesuvium repens* Willd., Enum. Hort. Berol. 521. 1809; Wight & Arn., Prodr. 361. 1834 (Fig. 28).

Prostrate or ascending succulent glabrous herbs; stem stout, rooting at the nodes. Leaves 1.5-4.2 x 0.5-1 cm, spathulate-oblong or oblanceolate, base attenuate, apex obtuse, fleshy; petiole 6-10 mm long, dilated at the base into a scarious semi-amplexicaul sheath; stipules triangular. Flowers c. 7 mm across, axillary, solitary; pedicels to 3 mm long. Calyx tube c. 2 mm long, turbinate; lobes 5, rose, c. 3 mm long, oblong-lanceolate. Stamens 30 or more, inserted on the throat of calyx; filaments basally connate. Styles 3. Capsule c. 10 mm long, oblong-ovoid, circumscissile. Seeds black, shining.

Fl. & Fr.: Nov. - Jan.

Distr.: Pantropical. Rare; near mangrove swamp. *CNS 1976* (Kumbolichira).

TRIANTHEMA Linnaeus

Sp. Pl. 223. 1753.

Trianthema portulacastrum L., Sp. Pl. 223. 1753; Gamble, Fl. Pres. Madras 550. 1919; Mani. & Sivar., Fl. Calicut 125. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 670. 1983; Ramach. & Nair, Fl. Cannanore 203. 1988; Vajravelu, Fl. Palghat Dist. 221. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 211. 1994; Sivar., & Mathew, Fl. Nilambur 305.1996. *Trianthema monogyna* L., Mant. Pl. 69. 1767; Hook. f., Fl. Brit. India 2: 660. 1879. *Trianthema obcordata* Roxb., Fl. Ind. 2: 445. 1832; Wight, Ic. t. 288. 1840.

Prostrate or ascending succulent herbs; branchlets pubescent on one side, thickened at the nodes. Leaves opposite or subopposite, unequal, 1.2-3.5 x 0.8-2.2 cm, orbicular-obovate, oblong or elliptic, base obtuse or attenuate, margins entire, often undulate, purplish, apex obtuse, rounded or retuse, sub-succulent; petiole sheathing with two stipule-like appendages. Flowers c. 7 mm across, axillary, solitary, sessile, sheathed by the base of the petiole. Calyx tube c. 1.5 mm long, adnate to base of petiole; lobes 5, white or pink, c. 4 mm long, oblong, obtuse. Stamens 15-20. Capsule to 5 mm long, turbinate, apex truncate, 2-lobed, brown, circumscissile. Seeds black with muricate concentric lines.

Fl. & Fr.: Apr. - July.

Distr.: Pantropical. Waste lands and roadsides. Often used as a vegetable. *CNS 2108* (Poonthala), *CNS 2152* (Kurathikadu).

62. APIACEAE Lindl.

Intr. Nat. Syst. Bot., ed. 2: 21. 1836.

(UMBELLIFERAE, *nom. alt.*).

1a. Prostrate herbs, rooting at nodes; leaves simple, reniform; umbels simple .... **Centella**

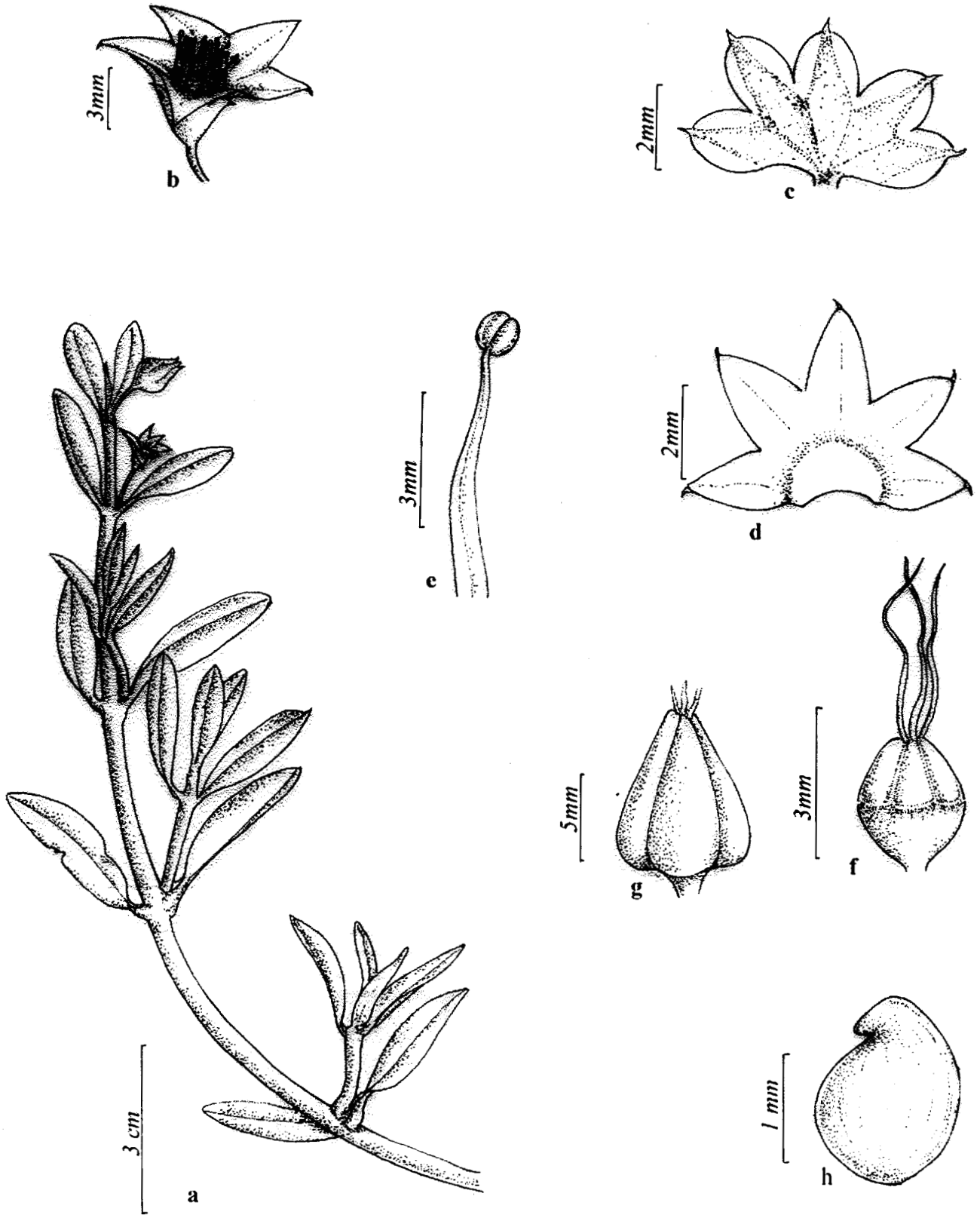


Fig. 28. *Sesuvium portulacastrum* (L.) L.: a. Twig; b. Flower ; c & d. Calyx tube, split-open, outer and inner views; e. Single stamen; f. Pistil; g. Fruit; h. Seed.

1b. Erect herbs; leaves; compound, heteromorphic; umbels compound ..... **Coriandrum**

CENTELLA Linnaeus

Sp. Pl. ed. 2, 1393. 1763.

Centella asiatica (L.) Urban in Mart., Fl. Bras. 11 (1): 287. 1879; Gamble, Fl. Pres. Madras 556. 1919; Gandhi in Sald. & Nicols., Fl. Hassan. Dist. 416. 1976; Krahulik & Theob. in Dassan. & Fosb., Rev. Hndb. Fl. Ceylon 3: 484. 1981; Mani. & Sivar., Fl. Calicut 128; 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 676. 1983; Mani., Fl Silent Valley 124. 1988; Ramach. & Nair, Fl. Cannanore 205. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 52. 1988; Vajravelu, Fl. Palghat Dist. 222. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 213. 1994; Sivar. & Mathew, Fl. Nilambur 308. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 209. 1996. *Hydrocotyle asiatica* L., Sp. Pl. 234. 1753; Clarke in Hook. f., Fl. Brit. India 2: 669. 1879. *Codagen* Rheede, Hort. Malab. 10: 91, t. 46. 1690. ***Kodangal.***

Prostrate herbs with creeping stem, rooting at nodes; Leaves 1-2.5 x 0.8 cm, orbicular-reniform, deeply cordate at base, crenate on margins, chartaceous; stipule scarious; petiole 1-3.5 cm long, sheathing at base. Inflorescence a simple axillary umbel; peduncle 0.4-1 cm long. Calyx-lobes 5, triangular, obscure. Petals 5, 1-1.5 cm long, ovate, purplish. Stamens 5. Ovary c. 1 mm long, compressed, 2-celled; style 2, dilated at base. Cremocarp with 2 laterally compressed 7-9-ribbed mericarps.

Fl. & Fr.: Most of the seasons.

Distr.: Pantropical. Common along streamsides, paddy fields and other wet places. *CNS 1535* (Kadakkarappally).

Widely used in Ayurvedic medicine against diseases of skin, nerves and blood, and also as a brain tonic.

CORIANDRUM Linnaeus

Sp. Pl. 256. 1753.

Coriandrum sativum L., Sp. Pl. 256. 1753; Roxb., Fl. Ind. 2 : 94. 1832; Wight, Ic. t. 516. 1842; Hook. f., Fl. Brit. India 2: 717. 1879; Gamble, Fl. Pres. Madras 566. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 418. 1976; Krahulik & Theob. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 489. 1981; Mani. & Sivar., Fl. Calicut 128. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 677. 1983; Vajravelu, Fl. Palghat Dist. 223. 1990. *Cuminum cyminum* Wall., Cat. 594. 1829. ***Malli.***

Erect herbs to 23 cm tall. Basal leaves trifoliolate; leaflets 1-2.5 x 1-2 cm, broadly ovate, base cuneate, margins variously incised, apex obtuse; cualine leaves ternately decompound, segments linear-filiform; petiole to 1.5 cm long. Umbels terminal, compound; rays 3-5, 1-2.5 cm long. Flowers to 5 mm across; pedicels 2-4 mm long. Sepals 5, c. 1 mm long, ovate - lanceolate. Petals 5, white, radiant and unequal in the outer flowers, equal in inner flowers. Stylopodium conical. Stamens 5. Ovary ovoid. Fruit 2-5 mm long, orbicular, terete.

Fl. & Fr.: Oct. - Dec.

Distr.: A native of the Mediterranean region; now widespread both as a cultivated and as a weedy species in the Old and New Worlds. *CNS 2585* (Kayamkulam).

63. ARALIACEAE Juss.

Gen. Pl. 217. 1789.

SCHEFFLERA J.R. Forster *et* J.G.A. Forster

Charact.Gen. 45. 1776 (*nom. cons.*).

Schefflera venulosa (Wight & Arn.) Harms in Engler & Prantl, Pflanzenfam. 3(8): 39. 1894; Gamble, Fl. Pres. Madras 570. 1919; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 412. 1976; Ramach. & Nair., Fl. Cannanore 208. 1988; Nicols., Suresh & Mani., An

Interpr. Hort. Malab. 60. 1988; Mani., Fl. Silent Valley 128. 1988; Vajravelu, Fl. Palghat Dist. 224.1990; Sivar. & Mathew, Fl. Nilambur 310. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 212.1996. *Paratropica venulosa* Wight & Arn., Prodr. 1: 377. 1834. *Heptapleurum venulosum* (Wight & Arn.) Seem., J. Bot. 3:80. 1865; Clarke in Hook. f., Fl. Brit. India 2: 729. 1879, p.p. ***Unjala*** Rheede, Hort. Malab. 7: 53, t.28.1688.

Large climbing shrubs; branchlets lenticellate. Leaves digitately compound; leaflets unequal, 4.5-17 x 2.8-5.5 cm, elliptic to elliptic-oblong, base rounded or cuneate, apex acuminate, coriaceous; petiole 8-26 cm long; petiolule 2.5-7 cm long; stipules connate within the petiole. Inflorescence a large terminal panicled-umbel. Calyx truncate. Petals 5-6, yellow, 3-nerved. Stamens 5-6, alternate, inserted round the disc. Ovary 5-6-celled; ovule 1 per cell; style reduced. Drupe c. 7 mm across, globose, 5-6-angled.

Fl. & Fr.: May- Aug.

Distr.: India, Myanmar and Indo-China. In sacred groves. *CNS 2105* (Vandanam).

64. ALANGIACEAE DC.

Prodr. 3: 203. 1828.

ALANGIUM Lamarck

Encycl. Meth. Bot. 1: 174. 1783 (*nom. cons.*).

Alangium salvifolium (L. f.) Wangerin in Engl., Pflanzenr. 4, 220 b, 41: 9. 1910; Bloembergen, Bull. Jard. Bot. Buitenzorg III, 16: 149. 1939; Gamble, Fl. Pres. Madras 572. 1919; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3:687. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 42. 1988; Vajravelu, Fl. Palghat Dist. 224. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 217. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 213. 1996. *Grewia salvifolia* L. f., Suppl. 409. 1781. *Alangium lamarckii* Thwaites, Enum. Pl. Zeyl. 133. 1859; Hook. f., Fl. Brit. India 2: 741. 1879.

Deciduous or evergreen stragglers, shrubs or trees up to 18 m tall; branchlets at times spinescent, tomentose to glabrescent. Leaves 5-15 x 2.2-6.5 cm, oblong-lanceolate, base cuneate, apex obtuse, chartaceous to subcoriaceous, glabrescent. Inflorescence axillary, subsessile, densely rusty-tomentose, often in clusters of 4-8 flowers, sometimes solitary. Flowers cream, fragrant, 1.2-3 cm long; pedicels 2-7 mm long. Calyx-tube c. 2.5 mm long; lobes 5-10, c. 3 mm long. Petals 4-10, 12-30 mm long, basally swollen and apically obtuse, tomentose without. Stamens 10-30; filaments 5-10 mm long, bearded. Ovary 1-celled; ovule 1, pendulous; style 10-20 mm long; stigma capitate. Disc lobed. Drupes 9-20 x 6-14 mm, subglobose, red when ripe.

1a. Erect shrubs or trees; leaves oblong-lanceolate, often obovate; flowering twig generally leafless; inflorescence subsessile; petals 5-10 ..... ssp. **salvifolium**

1b. Straggling or climbing shrubs; leaves oblong-obovate; flowering twig leafy; inflorescence pedunculate; petals 4-7 ..... ssp. **sundanum**

-ssp. **salvifolium**, *Alangium hexapetalum* Lam., Encycl. 1: 174. 1783. *Alangium decapetalum* Lam., Encycl. 1: 174. 1783; DC., Prodr. 3: 203. 1828; Wight & Arn., Prodr. 325. 1834; Wight, Ic. t. 194. 1839. *Alangium salvifolium* (L.) Wangerin ssp. *decapetalum* (Lam.) Wangerin in Engl., Pflanzenr. IV, 220 b (41): 11. 1910; Bloembergn, Bull. Jard. Bot. Buitenzorg III,16: 152. 1939. *Alangium salvifolium* (L.f.) ssp. *hexapetalum* (Lam.) Wangerin in Engl., Pflanzenr. IV, 220 b (41): 9. 1910. ***Angolam*** Rheede, Hort. Malab. 4: 39-40, t. 17. 1683.

Deciduous shrubs or trees. Leaves 7-11 x 2.5-4.5 cm, oblong-lanceolate. Inflorescence sessil. Sepals 5-10. Petals 5-10. Stamens 10-30.

Fl. & Fr.: Apr. - Sept.

Distr.: India, Africa, Sri Lanka, China, Vietnam and Thailand. In waste lands. *CNS 2109* (Alappuzha town).

A. salvifolium ssp. **sundanum** (Miq.) Bloembergen, Bull. Jard. Bot. Buitenzorg III, 16: 156.1939; Mani. & Sivar., Fl. Calicut 128. 1982; Ramach. & Nair, Fl. Cannanore 209. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 42. 1988. *Alangium sundanum* Miq., Fl. Ind. Bat.1: 774. 1856. *Alangium hexapetalum* Lam., Encycl. 1: 174. 1783; DC., Prodr. 3: 203. 1828; Roxb., Fl. Ind. 2: 502. 1832; Wight & Arn., Prodr. 326. 1834; Gamble, Fl. Pres. Madras 572. 1919. ***Kara-angolam*** Rheede, Hort. Malab. 4: 55-56, t. 26.

Evergreen stragglers or climbers up to 10 m. Leaves 8-16 x 4-6.5 cm, oblong-obovate to elliptic. Inflorescence subsessile. Sepals 4-7. Petals 4-7. Stamens 10-20.

Fl. & Fr.: Mar. - Jun.

Distr.: India, Sri Lanka, Malay Peninsula, Sumatra, Java, Philippines, Kangean Isl., Lesser Sunda Isl., Celebes, Salajar and New Guinea. In sacred groves. *CNS 1956* (Sharangakavu).

65. RUBIACEAE Juss.

Gen. Pl. 196. 1789.

1a. Herbs.

2a. Ovule 1 in each cell.

3a. Fruit a scarlet berry; leaves orbicular-reniform; petiole to 5 cm long; creeping herbs ..... **Geophila**

3b. Fruit capsular or split into 2-3-mericarps; leaves not as above; petiole up to 1 cm long; plants not creeping.

4a. Flowers 3-merous; ovary 3-locular; stigmas 3 ..... **Richardia**

4b. Flowers 4-merous; ovary 2-locular; stigmas 2.

5a. Flowers in terminal corymbose cymes; petiole up to 1 cm long; corolla pale-violet ..... **Knoxia**

5b. Flowers axillary, clustered or verticillate; leaves sessile or subsessile; corolla pink or white.

6a. Fruit circumscissile ..... **Mitracarpus**

6b. Fruit not circumscissile.

7a. Fruit split open, first septicidal then loculicidal ..... **Spermacoce**

7b. Fruit split into two indehiscent mericarps .... **Diodia**

2b. Ovules many in each cell.

8a. Flowers 5-merous.

9a. Prostrate small herbs; flowers axillary, solitary; fruit globular, indehiscent; leaves 4-5 x 1.5-2 mm ..... **Dentella**

9b. Erect herbs; flowers in terminal branched, scorpioid cymes; fruit obcordate, laterally compressed, dehiscent; leaves 7-15 x 3-6 cm ..... **Ophiorrhiza**

8b. Flowers 4-merous ..... **Hedyotis**

1b. Trees, shrubs or lianes.

9a. Ovules many in each cell.

10a. Armed plants with axillary spines ..... **Benkara**

10b. Unarmed plants.

11a. Leaves whorled, flowers in terminal, helicoid cymes ..... **Hamelia**

11b. Leaves opposite; flowers in cymes or panicles.

12a. Fruit a berry; seeds not winged; stipules not foliaceous; flowers in terminal cymes.

13a. Corolla white, lobes twisted in bud; calyx-lobes short, equal ..... **Tarenna**

13b. Corolla orange-red, lobes valvate in bud; one of the calyx-lobes transformed into a showy, white, leaf-like structure ..... **Mussaenda**

12b. Fruit capsular; seeds winged; stipules foliaceous; flowers in drooping terminal and axillary paniculate spikes .... **Hymenodictyon**

9b. Ovule 1 in each cell.

14a. Fruit a syncarpium; flowers aggregated in globose heads ..... **Morinda**

14b. Fruit a drupe or berry; flowers in fascicles or cymes, rarely solitary.

15a. Corolla-lobes valvate in bud.

16a. Flowersin axillary cymes or fascicles ..... **Canthium**

16b. Flowers in terminal cymes.

17a. Corolla straight; fruiting peduncle and pedicels yellow ..... **Psychotria**

17b. Corolla curved; fruiting peduncle and pedicels not yellow ..... **Chasalia**

15b. Corolla-lobes twisted in bud.

18a. Flowers 5-merous.

19a. Corolla tube almost as long as lobes; anthers distinctly filamented and exserted; style long, stigmatic lobes exserted ..... **Coffea**

19b. Corolla tube longer than lobes; anthers sessile, included; style short, stigmatic lobes included ..... **Psilanthus**

18b. Flowers 4-merous.

20a. Style twice as long as corolla tube; stigma entire ..... **Pavetta**

20b. Style as long as corolla-tube; stigma 2-fid .....**Ixora**

BENKARA R. Adanson

Fam. 2:85. 1763.

Benkara malabarica (Lam.) Tirvengadum, Taxon 32: 440. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 217. 1988. *Randia malabarica* Lam., Encycl. 3: 25. 1789; Hook. f., Fl. Brit. India 3: 111. 1880; Gamble, Fl. Pres. Madras 616. 1921; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 696. 1983. *Gardenia fragrans* Roxb., Pl. Corom. 2: 19, t.137. 1800. *Xeromphis malabarica* (Lam.) Raju, Excurs. Himalchalam. Hills 13. 1966. *Catunaregam malabaricum* (Lam.) Sivar. in Mani. & Sivar., Fl. Calicut 131. 1982. ***Ben-kara*** Rheede, Hort. Malab. 5: 69-70, t. 35. 1685.

Armed shrubs; spines in axillary pairs. Leaves 2-7 x 1.5-3.5 cm, elliptic, oblanceolate or obovate, base cuneate, apex obtuse or rounded, coriaceous; petiole to 7 mm long. Flowers in axillary corymbose cymes; pedicels 5-7 mm long; bracts and bracteoles free or connate. Calyx c. 4 mm long, tubular; teeth 5, triangular-acute. Corolla white, c. 1.8 cm across, salver-shaped; tube 5-7 mm long; lobes 5, oblong, acute, reflexed. Stamens 5, between the lobes, exserted; anthers c. 7 mm long, linear. Berry 0.8 - 1.2 cm across, subglobose, scarlet. Seeds many, not embedded in pulp.

Fl. & Fr.: Feb. - Jul.

Distr.: Peninsular India and Sri Lanka. Common in sacred groves. *CNS 1421* (Vandanam).

CANTHIUM Lamarck

Encycl. Meth. Bot. 1: 602. 1785.

Armed or unarmed shrubs or trees. Leaves opposite, decussate; stipules interpetiolar, caducous. Flowers in axillary cymes, corymbs or fascicles. Calyx obconic to turbinate, truncate or 4-5-toothed. Corolla funnel-shaped, tube usually with a ring of deflexed hairs within; lobes 4-5, valvate, usually deflexed. Stamens 4-5, attached at throat, exserted; filaments short or 0. Disc annular. Ovule 1 in each cell, pendulous; style short, stout, usually hairy; stigma thick. Fruit a didymous to subglobose drupe; pyrenes 2. Seeds oblong.

1a. Plants unarmed.

2a. Flowers in axillary umbellate cymes, pentamerous ..... **C. dicoccum** var. **umbellatum**

2b. Flowers fascicled on axillary stout short branchlets, tetramerous ..... **C. travancoricum**

1b. Plants armed, spines supra-axillary.

3a. Flowers 4-merous; stigma capitate ..... **C. parviflorum**

3b. Flowers 5-merous; stigma acute ..... **C. rheedii**

Canthium dicoccum (Gaertn.) Teijs. & Binn., Cat. Hort. Bog. 113. 1866. var. **umbellatum** (Wight) Sant. & Merch., Bull. Bot. Surv. India 3: 107. 1962; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 575. 1976; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 698. 1983; Ramach. & Nair, Fl. Cannanore 212. 1988; Mani., Fl. Silent Valley 129. 1988; Vajravelu, Fl. Palghat Dist. 229. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 223. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 217. 1996. *C. umbellatum* Wight, Ic. t. 1034. 1845; Hook. f., Fl. Brit. India 3: 132. 1880. *Psydrax dicoccos* Gaertner, Fruct. Sem. Pl. 1:125. t. 26. f. 2. 1788. C. *didymum* sensu Bedd., Fl. Sylv. t. 221. 1872, non Gaertn., 1778. *Plectronia didyma* (Gaetrn.) Kurz. var. *umbellata* (Wight) Gamble, Fl. Pres. Madras 624. 1921 (Plate XV: A).

Small to medium sized evergreen trees; bark yellowish-grey; branchlets tetragonous. Leaves 8-15 x 5-4 cm, elliptic-oblong or obovate,base cuneate, apex shortly acuminate, coriaceous, glabrous and glossy; petiole c. 1 cm long. Flowers in dense umbellate axillary cymes, 5-merous; pedicels 3-8 mm long. Calyx glabrous, shortly 5-lobed. Corolla campanulate, cream coloured, villous within; lobes 5, c. 1.5 mm long, oblong, acute. Stamens 5, on the mouth of corolla; anthers c. 1.5 mm long. Ovary c. 1.5 mm long; stigma capitate with an apical slit. Drupe 6-8 mm across, subglobose, black, with 2 oblong, nearly terete pyrenes.

Fl. & Fr.: Jun. - Dec.

Distr.: Sri Lanka, India, Nepal, Indo - China, Malesia. In sacred groves. *CNS 1022* (Vandanam).

Canthium travancoricum (Bedd.) Hook. f., Fl. Brit. India 3: 134. 1880; Ramach. & Nair, Fl. Cannanore 212. 1988; Vajravelu, Fl. Palghat Dist. 229. 1990; Sasi. & Sivar., Fl. Pl. Thrissur For. 217. 1996. *Plectronia travancorica* Bedd., Ic. 58, t. 239. 1872; Gamble, Fl. Pres. Madras 625. 1921.

Small unarmed trees; branchlets subtetragonous. Leaves 3-6 x 2.2-4 cm, ovate, base cuneate, apex caudate-acuminate; lateral nerves 7 or 8 pairs; petiole to 1.5 cm long. Flowers pale green, c. 4 mm long, fascicled on axillary stout short branchlets; pedicels

slender. Calyx tooth 4, subulate. Corolla tube c. 3 mm long, with a ring of hairs within; lobes 4, c. 1 mm long, ovate. Drupe c. 1 cm across, obovoid, compressed, yellow when ripe.

Fl. & Fr.: Mar. - Aug.

Distr.: Southern W.Ghats. Endemic. In sacred groves. *CNS 1420* (Kanichukulangara), *CNS 2574* (Ambalapuzha).

Canthium parviflorum Lam., Encycl. 1: 602. 1785; Roxb., Pl. Corom. t. 51. 1796; Hook. f., Fl. Brit. India 3: 136. 1880; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 575. 1976; Mani. & Sivar., Fl. Calicut 130. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 699. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 224. 1994. *Plectronia parviflora* (Lam.) Bedd. Fl. Sylv. 124. 1872; Gamble, Fl. Pres. Madras 625. 1921.

Armed shrubs; branchlets obtusely 4-angled; bark grey; spines 1-3.2 cm long, supra-axillary. Leaves 1.8-4.2 x 1.3-3 cm, ovate, elliptic-ovate to obovate, base rounded to attenuate, apex subacute; petiole c. 5 mm long; stipules subulate. Flowers greenish, 4-merous, in axillary, sessile cymes below spines. Calyx cupular, 4-toothed. Corolla 4-5 mm across, campanulate to globose, mouth villous; lobes 4, ovate, acute, spreading or reflexed. Stamens 4, subsessile, exserted. Stigma capitate, slightly 2-lobed. Fruit 1-1.4 cm across, subglobose, yellow.

Fl. & Fr.: Apr. - Aug.

Distr.: India, Indo-China, Western and Southern China and Malesia. In sacred groves. CNS 2375 (Krishnapuram).

Canthium rheedii DC., Prodr. 4: 474. 1830; Wight & Arn., Prodr. 426. 1834; Hook. f., Fl. Brit. India 3: 134. 1880; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 699. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 219. 1988; Vajravelu, Fl. Palghat Dist. 229. 1990; Sivar. & Mathew, Fl. Nilambur 317. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 217. 1996. *Plectronia rheedii* (DC.) Bedd. Fl. Sylv. 134. 1872; Gamble, Fl. Pres. Madras 625. 1921. ***Tsjerou-kara*** Rheede, Hort. Malab. 5: 73-74, t. 37. 1685.

Armed shrubs; spines supra-axillary. Leaves 2-5.5 x 1.5-3.5 cm, ovate, elliptic-ovate or lanceolate, base rounded or cordate, apex acute to acuminate, chartaceous; petiole to 3 mm long; stipules filiform. Flowers in a few-flowered, axillary fascicles. Calyx c. 1.5 mm long, cupular, 5-toothed. Corolla white, 5-6 mm across; tube 3-4 mm long, slightly constricted above, furnished with a curtain of stiff reflexed hairs within; lobes 5, lanceolate, acuminate, reflexed. Stamens 5; filaments c. 2 mm long. Ovary c. 1 x 1 mm, compressed; stigma acute. Drupe 7-10 mm across, obcordate, compressed; pyrenes rugose.

Fl. & Fr.: Jan. - May.

Distr.: Peninsular India and Sri Lanka. Common in sacred groves. *CNS 1021* (Kanichukulangara).

CHASALIA A.P. de Candolle

Prodr. 4: 531. 1830.

Chasalia ophioxyloides (Wall.) Craib., Gard. Bull. Straits Settlem. 6: 474. 1930; Sant. & Merch., Bull. Bot. Surv. India 3: 108: 1961; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 576. 1976; Mani., Fl. Silent Valley 131. 1988; Ramach. & Nair, Fl. Cannanore 213. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 220. 1988; Vajravelu, Fl. Palghat Dist. 230. 1990; Sivar. & Mathew, Fl. Nilambur 319. 1996. *Psychotria ophioxyloides* Wall. in Roxb., Fl. Ind. 2: 168. 1824. *Psychotria curviflora* Wall. in Roxb., Fl. Ind. 2: 167. 1824; Mani. & Sivar., Fl. Calicut 145. 1982; Mohanan & Henry, Fl. Thiruvananthapuram 243. 1994. *Chasalia curviflora* sensu Hook. f., Fl. Brit. India 3: 176. 1880, non (Wall.) Thw., 1859; Gamble, Fl. Pres. Madras 643. 1921. ***Katou-belluta-amelpodi*** Rheede, Hort. Malab. 5: 66, t. 33 (on left). 1685.

Subshrubs, 1-2 m high. Leaves 8-12 x 3-6 cm, elliptic, ovate or lanceolate, broadly to narrowly attenuate at base, acute to acuminate at apex, chartaceous; petiole to 2 cm. Inflorescence a panicled-cyme, terminal. Calyx tube c. 2 mm, 5-toothed. Corolla 0.6-1.2 cm long, campanulate, curved towards the tip, white to pink, lobes 5, acute. Stamens 5,

included. Ovary 2-locular; ovule 1-per locule. Fruit 5-7 mm across, globose, didymous, purple-black on ripening. Seeds 2, c. 3 mm diam., globose.

Fl. & Fr.: Jan. - Sep.

Distr.: India and Sri Lanka. Common in wastelands, sacred groves and fences. *CNS 1494* (Chengnnur).

COFFEA Linnaeus

Sp. Pl. 172. 1753.

Coffea arabica L., Sp. Pl. 172. 1753; Wight, Ic. t. 53. 1838; Hook. f., Fl. Brit. India 3: 153. 1880; Gamble, Fl. Pres. Madras 636. 1921; Matthew, Rec. Bot. Surv. India 20: 133. 1969; Mani. & Sivar., Fl. Calicut 147. 1982; Matthew & Rani in Matthew Fl. Tam. Carnatic 3: 701. 1983; Vajravelu, Fl. Palghat Dist. 245. 1990.

Shrubs. Leaves c. 9.5 x 5.3 cm, elliptic or oblanceolate, margin wavy, acuminate at apex, glabrous, lateral nerves 8-10 pairs; petiole to 8 mm; stipules large, to 6 x 3 mm, ovate, acuminate. Flowers in dense axillary clusters, fragrant, white. Calyx cup-shaped, small. Corolla lobes elliptic-acute, to 6 mm long. Anthers linear-oblong; filaments short. Berries 2-seeded, ellipsoid.

Fl. & Fr.: Nov. - Jan.

Distr.: Native of Africa, now widely cultivate in India. Commonly cultivated for its berries. *CNS 1982* (Kattanum).

DENTELLA J.R. Forster *et* J.G.A. Forster

Charact. Gen. 25.1776.

Dentella repens (L.) Forster & Forster f., Char. Gen. 26, t. 13. 1775; Hook. f., Fl. Brit. India 3: 42. 1880; Gamble, Fl. Pres. Madras 590. 1921; Subram. & Sharma, Bull. Bot. Surv. India 10: 386. 1969; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 576. 1976; Mani. & Sivar., Fl. Calicut 139. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 702. 1983; Ramach. & Nair, Fl. Cannanore 214. 1988; Nicols., Suresh & Mani., An Interpr.

Hort. Malab. 221. 1988; Vajravelu, Fl. Palghat Dist. 230. 1990; Sivar. & Mathew, Fl. Nilambur 320. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 219. 1996. *Oldenlandia repens* L., Mant. 40. 1767. ***Tsjeru-manell*** Rheede, Hort. Malab. 9: 73, t. 39. 1689.

Small prostrate herbs, rooting at nodes. Leaves subsessile, 4-5 x 1.5-2 mm, obovate, oblong to spathulate, base narrowed, apex acute; stipules connate. Flowers axillary, solitary, sessile. Calyx tube c. 1 mm long; lobes 5, subulate, curled hairy. Corolla white; tube 2-3 mm long, funnel-shaped, hairy within; lobes 5, ovate-acute, toothed. Stamens 5, included, attached in the middle of corolla tube; anthers linear. Ovary 2-celled; style filiform; stigma 2-lobed. Fruits c. 3 mm diam., globular, indehiscent, tomentose, many-seeded with persistent calyx crown. Seeds minute, angular, brown, rugose.

Fl. & Fr.: Mar. - Jun.

Distr.: India, Sri Lanka to Malesia, N. Australia and Polynesia. In wet sandy areas and paddy fields. *CNS 1288* (Champakulam).

DIODIA Linnaeus

Sp. Pl. 104. 1753.

Diodia teres Walt., Fl. Carol. 87. 1788; Gleason, Ill. Fl. N.E.US & Adj. Canada 3: 278. 1952; Osada, Colour. Ill. Natur. Pl. Japan 53: Pl. 17. 1976; Dwyer, Ann. Missouri Bot. Gard. 67:152. 1980; Ahmed Kunju *et al.*, Ind. J. For. 13: 351. 1990. *Diodia prostrata* Swartz, Prodr. Veg. Ind. Occ. 30. 1788.

Erect branched herbs; stem terete and woody at base, younger parts 4-angled. Leaves sessile, 2-4 x 0.3-1 cm, narrowly elliptic, oblong to linear-lanceolate, base attenuate, margins revolute, apex acute and setaceous hispid and white punctate on both surfaces, lateral veins 4-5 pairs; stipules connate like a sheath, to 2 mm long, hispid without, apex truncate with 4-7 mm long hairy setae. Flowers sessile, axillary, congested in the stipular sheath. Calyx densely hispid; lobes 4, c. 1.5 mm long. Corolla pink; tube c. 3 mm long, campanulate; lobes 4, oblong-acute, hispid without. Stamens 4, inserted near

the throat. Stigma flat, broad, bilobed. Fruits c. 3 mm long, turbinate, densely hispid, splitting into two indehiscent mericarps. Seeds reticulate, reddish brown.

Fl. & Fr.: Aug. - Dec.

Distr.: Tropical America and Africa. Common in wastelands. *CNS 1088* (Pallithode).

GEOPHILA D. Don

Prodr. Fl. Nepal. 136.1825 (*nom. cons.*).

Geophila repens (L.) Johnston, Sargentina 8: 821. 1949; Ramach. & Nair, Fl. Cannanore 214. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 221. 1988; Vajravelu, Fl. Palghat Dist. 231. 1990; Sivar. & Mathew, Fl. Nilambur 321. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 219. 1996. *Rondeletia repens* L., Syst. Nat. (ed. 10), 928. 1759. *Psychotria herbacea* Jacq., Enum. Pl. Carib. 16. 1760. *Geophila herbacea* (Jacq.) K. Schum. in Engler & Prantl, Pflanzenfam. 4(4): 99: 1891; Sant. & Merch., Bull. Bot. Surv. India 3: 108. 1961. *Geophila reniformis* D. Don, Prodr. 136.1825, nom. illeg.; Hook. f., Fl. Brit. India 3: 178. 1880; Gamble, Fl. Pres. Madras 643. 1921. ***Karinta-kali*** Rheede, Hort.Malab. 10: 41, t. 21. 1690.

Prostrate herbs; stem slender, stolon-like. Leaves 1.5-2.5 x 1-2 cm, orbicular or broadly ovate to reniform, apex rounded or retuse, chartaceous, basally 5-7-nerved; petiole to 5 cm long. Flowers solitary or in few-flowered umbels; peduncles to 4 cm long. Calyx tube short; lobes subulate, 3 mm long, persistent. Corolla 1-1.5 cm across, funnel-shaped, hairy within, white; lobes recurved, ovate-acute. Stamens 5, included. Ovary 2-locular; ovule 1-per locule. Berry c. 7 mm across, globose, scarlet. Seeds plano-convex.

Fl. & Fr.: Nov. - Jan.

Distr.: Sri Lanka, Peninsular India, Malaya, S. China, Polynesia, Tropical Africa and Tropical America. In moist shady places. *CNS 1997* (Elanjimel vallikavu).

HAMELIA N.J. Jacquin

Enum. Pl. Carib. 2, 16. 1760.

Hamelia patens Jacq., Enum. Pl. Car. 16. 1760; Bor & Raiz., Beautif. Ind. Climbers, Shrubs: 96.1954; Mani. & Sivar., Fl. Calicut 145. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 708. 1983.

Much branched shrubs. Leaves whorled, 4-8 x 2-3.2 cm, elliptic, base cuneate, apex acute or shortly acuminate; petiole to 1.8 cm long; stipules subulate. Flowers in terminal, branched helicoid cymes, 5-merous, shortly pedicellate. Calyx turbinate, 5-toothed, puberulous. Corolla c. 2 cm long, tubular, 5-ribbed, orange-yellow or red, teeth 5. Stamens 5, included. Ovary oblong, 5-locular; ovules many; style filiform; stigma fusiform, grooved, twisted.

Fl. & Fr.: Throughout the year.

Distr.: Throughout tropics. Commonly cultivated in gardens and as a hedge. *CNS 2599* (Pareppady).

HEDYOTIS Linnaeus

Sp. Pl. 101. 1753.

Erect, or prostrate herbs, or undershrubs; stem terete to 4-angled. Leaves opposite; stipules interpetiolar, free or connate at base, sheathing, usually with pectinate bristles. Flowers 4-merous, in axillary cymes or terminal panicled cymes, rarely solitary. Calyx cup-shaped, lobes 4, persistent. Corolla funnel-shaped, tube usually hairy at throat; lobes 4, valvate. Stamens included or exserted; stigma 2-fid. Capsule septicidal or loculicidal, sometimes indehiscent. Seeds many, angular or rounded, reticulated or pitted.

1a. Leaves elliptic, elliptic-lanceolate, ovate or orbicular, 4-25 mm wide.

2a. Capsules indehiscent ..... **H. auricularia**

2b. Capsules dehiscent.

3a. Capsules 4-angled ..... **H. biflora**

3b. Capsules not 4-angled.

4a. Flowers aggregated in capitate clusters around nodes; leaves 2-5.5 cm long, elliptic-lanceolate, scabrid on margins, coriaceous ..... **H. nitida**

4b. Flowers solitary or 2-3 together, axillary; leaves 0.5-1.2 cm long, broadly ovate or orbicular, not scabrid on margins, membranous ..... **H. trinervia**

1b. Leaves linear-lanceolate, 2-5 mm wide.

5a. Erect herbs; stem 4-angled and narrowly winged along angles ..... **H. herbacea**

5b. Diffuse or prostrate herbs; stem 4-angled or terete, never winged.

6a. Flowers solitary or in axillary pairs; stem terete ..... **H. brachypoda**

6b. Flowers in lax umbellate or corymbose cymes; stem 4-angled.

7a. Peduncles many-flowered, stout; capsule scabrid ..... **H. puberula**

7b. Peduncles 2-6-flowered, slender; capsule glabrous ... **H. corymbosa**

Hedyotis auricularia L., Sp. Pl. 101. 1753; Hook. f., Fl. Brit. India 3: 58. 1880; Rao & Hemadri, Ind. For. 99: 375. 1973; Mani. & Sivar., Fl. Calicut 140. 1982; Mani., Fl. Silent Valley 131. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 222. 1988; Ramach. & Nair, Fl. Cannanore 216. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 228. 1994; Sivar. & Mathew, Fl. Nilambur 324. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 220. 1996. *Oldenlandia auricularia* (L.) K. Schum. in Engl. & Prantl, Pflanzenfam. 4(4): 25. 1891; Gamble, Fl. Pres. Madras 597. 1921; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 585. 1976; Vajravelu, Fl. Palghat Dist. 239. 1990. *Hedyotis hirsuta* Lam., Encycl. 3: 79. 1789. *Exallage auricularia* (L.) Bremek., Verh. Kon. Nederl. Akad. Wet. 2. 48(2): 142. 1952. ***Muriguti*** Rheede, Hort. Malab. 10: 63, t. 32. 1690.

Diffuse to trailing hers; stem 4-angled, bluish, villous when young. Leaves 2-7 x 1-2.5 cm, elliptic-ovate or elliptic-lanceolate, base rounded or cuneate, apex shortly acuminate, lateral nerves 4 or 5 pairs, glabrous; stipules broadly ovate, pectinate on margins. Flowers fascicled at axils; pedicels c. 1 mm long. Calyx tube c. 1 mm long, 4-lobed. Corolla white, campanulate; tube c. 1 mm long; lobes 4, reflexed, hairy at throat.

Stamens 4, included. Capsule c. 2 mm across, globose, pubescent, indehiscent. Seeds many, black, 3-angled.

Fl. & Fr.: Jan. - May.

Distr.: India, Sri Lanka to Malaya, South China and Australia. Common in wastelands. *CNS 1031* (Mundankavu).

Hedyotis biflora (L.) R. Br. ex Wight & Arn., Prodr. 413. 1834; Mohanan & Henry, Fl. Thiruvananthapuram 228. 1994. *Oldenlandia biflora* L., Sp. Pl. 119. 1753; Hook. f., Fl. Brit. India 3: 70. 1880; Gamble, Fl. Pres. Madras 602. 1921. *Oldenlandia paniculata* L., Sp. Pl. 1667. 1754; Hook. f., Fl. Brit. India 3: 69. 1880. *Thecagonum biflorum* (L.) Babu, Bull. Bot. Surv. India 11: 214. 1969.

Branched procumbent herbs; stem 4-angled. Leaves 1.2-3.5 x 0.4-1.5 cm, elliptic or ovate, base cuneate, apex acute, puberulous. Inflorescence axillary or mostly terminal cymes. Calyz 4-angled; lobes short, triangular, acute. Corolla white, c. 5 mm across, campanulate; tube c. 2 mm long, villous at throat; lobes 4, obovate. Stamens 4; anthers oblong. Capsule 4-angled, 3-4 x 2.5-3.5 mm, hispidulous, loculicidally dehiscent in the upper part.

Fl. & Fr.: Oct. - Jan.

Distr.: Peninsular India and Sri Lanka. Rare; on moist wall. *CNS 2577* (Chengannur).

Hedyotis brachypoda (DC.) Sivar. & Biju, Taxon 39: 672. 1990; Sivar. & Mathew, Fl. Nilambur 324. 1996. *Oldenlandia brachypoda* DC., Prodr. 4: 424. 1830. *Oldenlandia diffusa* sensu auct., non (Willd.) Roxb., 1820: Hook. f., Fl. Brit. India 3: 65.1880 (incl. var. *diffusa* & *extensa*); Trimen, Handb. Fl. Ceylon 2: 315. 1894; Gamble, Fl. Pres. Madras 601. 1921. *Hedyotis diffusa* sensu auct., non Willd., 1798: Mani. & Sivar., Fl. Calicut 141. 1982; Mani., Fl. Silent Valley 132. 1988; Ramach. & Nair, Fl. Cannanore 217. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 229. 1994 (Fig. 29).

Diffuse or prostrate herbs; stem terete. Leaves subsessile, 1.5-3 x 0.3-0.5 cm, linear-lanceolate, base acute, margins revolute, apex acute; stipules sheathing. Flowers solitary or in axillary pairs, sessile or stout pedicelled. Calyx 1-1.5 mm long; lobes 4, triangular. Corolla white; tube c. 2 mm long; lobes 4, 2-2.5 mm long, oblong. Stamens 4. Style shortly exserted, 1.5-2 mm long; stigma papillate. Capsule 3-4 mm across, subglobose. Seeds angular, reticulate.

Fl. & Fr.: Aug. - Jan.

Distr.: India, Sri Lanka to Malaya, Philippines and Japan. A common weed in wet low lands, marshes and bunds of paddy fields with stem floating on water. *CNS 1083* (Aroor), *CNS 2578* (Kanjikuzhi).

Hedyotis corymbosa (L.) Lam., Encycl. 1: 272. 1792; Rao & Hemadri, Ind. For. 99: 375. 1973; Mani. & Sivar., Fl. Calicut 143. 1982; Dutta, Rev. Ind. Hedyotis 281. 1985; Ramach. & Nair, Fl. Cannanore 216. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 222. 1988; Sivar. & Biju, Taxon 39: 671. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 228. 1994; Sivar. & Mathew, Fl. Nilambur 325. 1996. *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. Tam. Carnatic 3: 727. 1983; Vajravelu, Fl. Palghat Dist. 239. 1990. ***Parpadagam*** Rheede, Hort. Malab. 10: 69, t. 35.1690 (Fig. 30).

Diffuse or spreading prostrate herbs; stem 4-angled. Leaves 1-2.5 x 0.2-0.4 cm, linear-lanceolate, base attenuate, scabrid on margins, acute at apex; stipules sheathing. Flowers 2-6 in a corymb; 4-merous; peduncles 4-8 mm long. Calyx tube c. 1 mm long, lobes minute. Corolla white; tube c. 1 mm long with a ring of hairs at throat. Stamens 4 inserted at corolla base. Capsules c. 2 mm across, subglobose, loculicidal, dehiscing at top only. Seeds minute, trigonous.

Fl. & Fr.: Apr. - Sep.

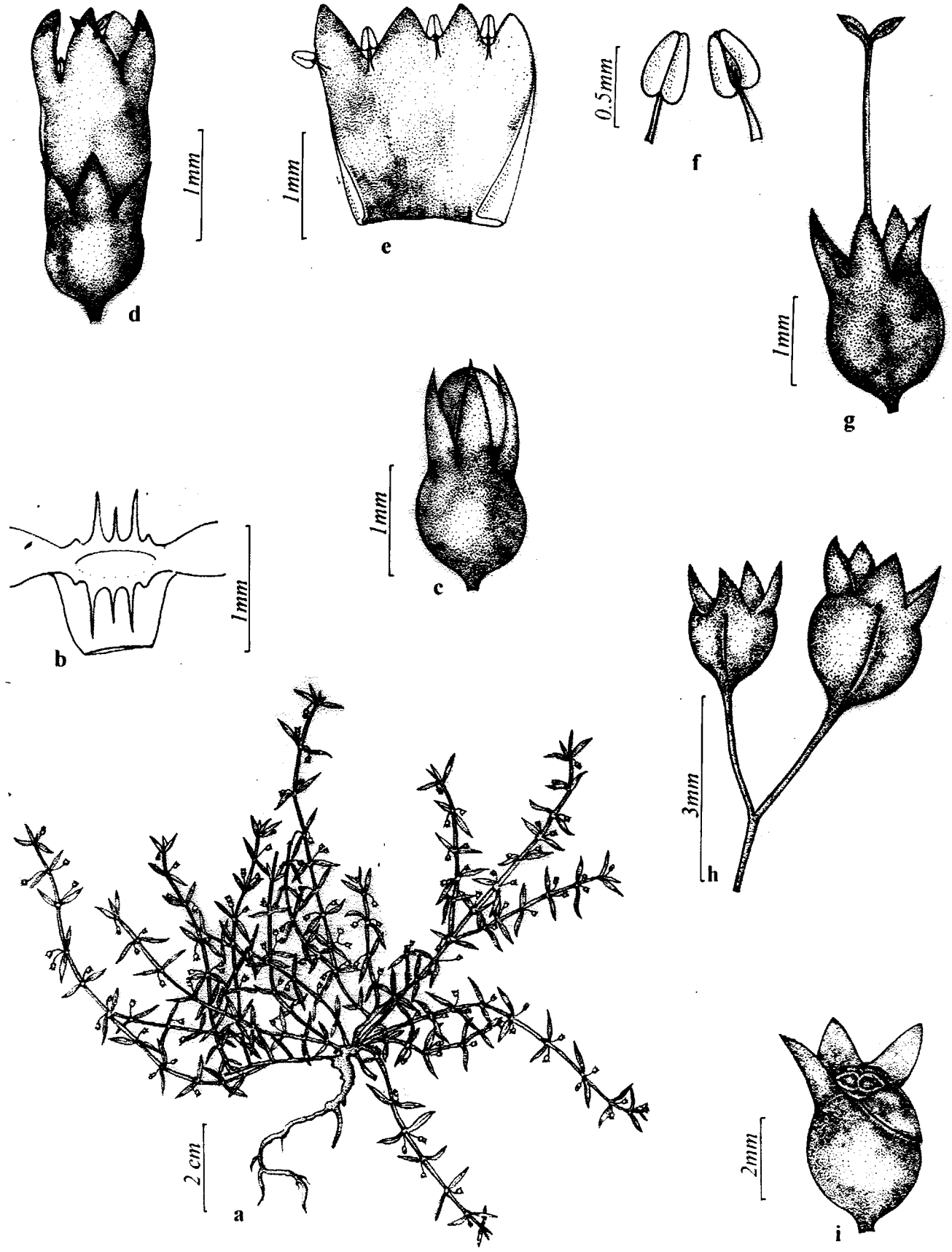


Fig. 29. *Hedyotis brachypoda* (DC.) Sivar. & Biju: a. Habit; b. Nodal region showing stipule; c. Flower bud; d. Flower; e. Corolla, split-open; f. Stamens-ventral and dorsal views; g. Calyx with pistil; h. Capsules; i. Mature capsule.

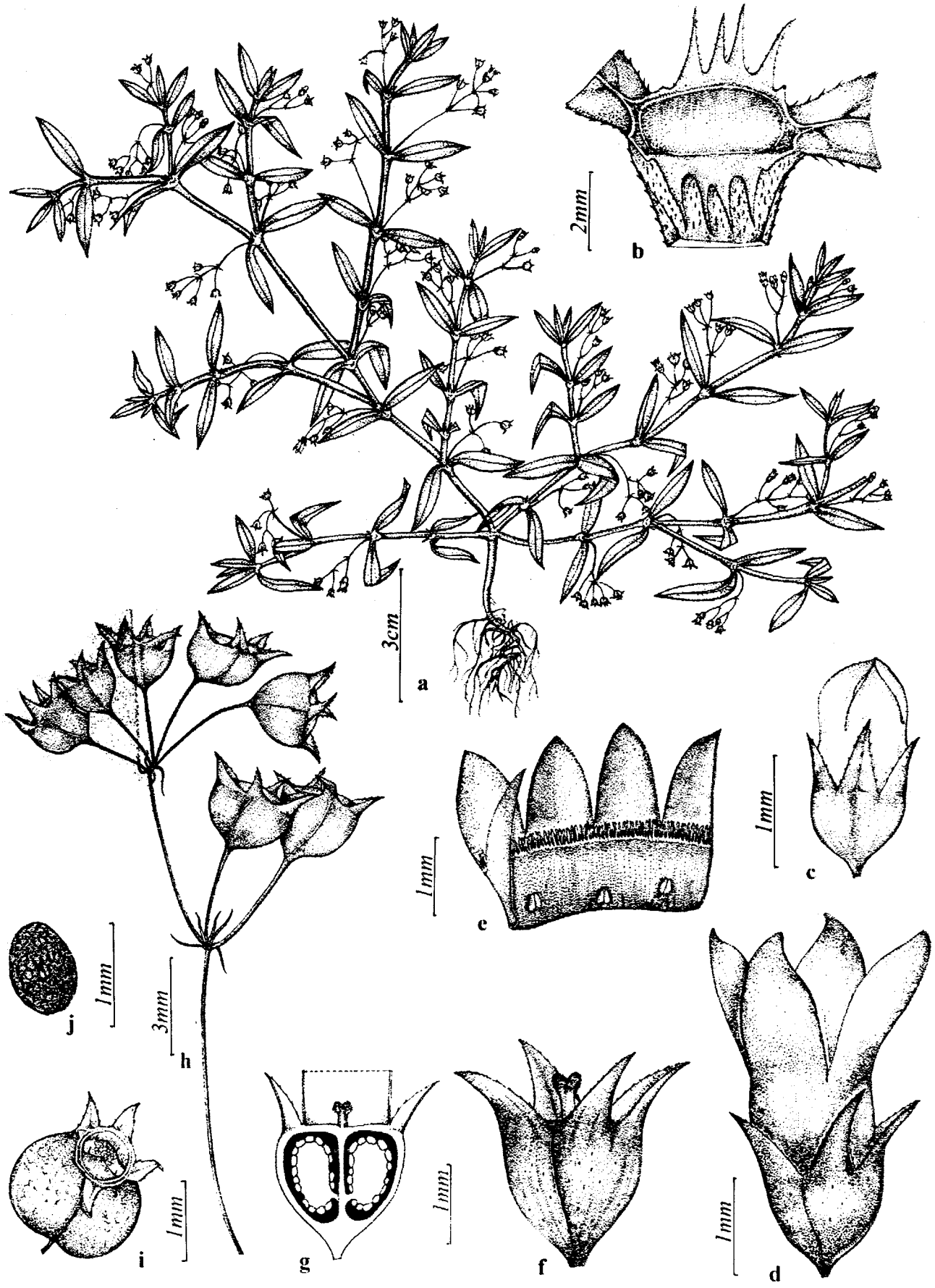


Fig. 30. *Hedyotis corymbosa* (L.)Lam.: a. Habit; b. Nodal region showing stipule; c. Flower bud; d. Flower; e. Corolla, split-open; f. Calyx with pistil; g. Ovary-L.S; h. Fruit; i. Mature fruit; j. Seed.

Distr.: Tropical Asia, Africa and America. A common weed in moist low lands. *CNS 1163* (Cheriyanadu).

Hedyotis herbacea L., Sp. Pl. 102. 1753; Rao & Hemadri, Ind. For. 99: 376. 1973; Mani. & Sivar., Fl. Calicut 141. 1982; Mani., Fl. Silent Valley 132. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 223. 1988; Ramach. & Nair, Fl. Cannanore 217. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 229. 1994; Sivar. & Mathew, Fl. Nilambur 326. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 221. 1996. *Oldenlandia herbacea* (L.) Roxb., Fl. Ind. 1: 424. 1820; Gamble, Fl. Pres. Madras 601. 1921; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 586. 1976; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 728. 1983; Vajravelu, Fl. Palghat Dist. 240. 1990. *Hedyotis heynei* R. Br. ex Wight & Arn., Prodr. 416. 1834. *Oldenlandia heynii* (R. Br.) G. Don, Gen. Syst. 3: 531. 1834; Hook. f., Fl. Brit. India 3: 65. 1880. ***Schanganam-Pullu*** Rheede, Hort. Malab. 10: 45. 1690.

Much branched, erect herbs; stem 4-angled, narrowly winged along angles. Leaves sessile, 1.5-3 x 0.1-0.3 cm, linear-lanceolate, acute at apex, glabrous; stipules short, 3-4-setose on margins. Flowers solitary or 2-nate, axillary; peduncles filiform, 0.5-1 cm long. Calyx tube turbinate, to 2 mm, funnel-shaped; lobes triangular-subulate. Corolla white, 1-1.5 mm long, wider on mouth; lobes 5, minute. Stamens 4, included, subsessile. Stigma 2-fid. Capsule c. 2.5 mm across, subglobose, didymous, loculicidal. Seeds minute, trigonous.

Fl. & Fr.: Jun. - Sept.

Distr.: Indo-Malaysia and Tropical Africa. On exposed lands, usually in large populations. *CNS 1043* (Vandanam).

Hedyotis nitida Wight & Arn., Prodr. 412.1834; Hook. f., Fl. Brit. India 3: 61. 1880; Ramach. & Nair, Fl. Cannanore 217. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 229. 1994; Sivar. & Mathew, Fl. Nilambur 327. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 221. 1996. H. *glabella* R. Br. ex Bedd., Ic. t. 36. 1868-1874. *Oldenlandia nitida* (Wight

& Arn.) Gamble, Fl. Pres. Madras 597. 1921; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 586. 1976; Vajravelu, Fl. Palghat Dist. 240. 1990 (Fig. 31).

Diffuse woody herbs; stem 4-angled, scabrid along angles. Leaves subsessile, 2-5.5 x 1-1.5 cm, elliptic-lanceolate, attenuate at base, scabrid on margins, rigid, acute at apex, coriaceous; stipules sheathing, pectinate, bristles 4-6 mm long, scabrid. Flowers axillary, fascicled or solitary, sessile. Calyx tube c. 1 mm long; lobes lanceolate, scabrid. Corolla white, 6-8 mm long. Stamens exserted. Ovary 1-celled; ovules many. Capsule c. 3 mm across, ovoid, hard. Seeds minute, trigonous.

Fl. & Fr.: Feb. - May.

Distr.: Peninsular India and Sri Lanka. In sacred groves. *CNS 1998* (Sharanga kavu).

Hedyotis puberula (G. Don) Arn., Pug. 342. 1836; Deb & Dutta, J. Bombay Nat. Hist. Soc. 81: 232. 1982; Ramach. & Nair, Fl. Cannanore 218. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 232. 1994. *Oldenlandia puberula* G. Don, Gen. Syst. 3: 530. 1834. *O. umbellata* L., Sp. Pl. 119. 1753; Hook. f., Fl. Brit. India 3: 66. 1880; Gamble, Fl. Pres. Madras 601. 1921; Matthew & Rani in Matthew Fl. Tam. Carnatic 3: 730. 1983. *Hedyotis umbellata* (L.) Lam., Tabl. Encycl. 1: 272. 1792, non Walt., 1788; Mani. & Sivar., Fl. Calicut 143. 1982. *Oldenlandia wightii* Hook. f., Fl. Brit. India 3: 66.1880; Gamble, Fl. Pres. Madras 601. 1921; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 586. 1976. *Hedyotis wightii* (Hook. f.) Nair, J. Bombay Nat. Hist. Soc. 79: 453. 1982.

Diffuse or prostrate herbs; root-stock woody. Leaves sessile, 0.5-1.6 x 0.2-0.4 cm, linear-lanceolate, base decurrent, margin revolute, apex acute, scabrous, 1-nerved; stipules with several bristles, base triangular. Flowers in many-flowered terminal, umbellate cymes and also sometimes axillary. Calyx lobes 4, persistent, c. 1.5 mm long, ovate-acuminate. Corolla pinkish-white, c. 3 mm across, campanulate; lobes 4, lanceolate. Stamens 4, in the throat of the corolla tube, exserted; filaments linear. Ovary c. 1 mm across, globose, hairy; stigma 2-fid, recurved. Capsule 2-2.5 mm across, globose, didymous, scabrid. Seeds angular, reticulate.

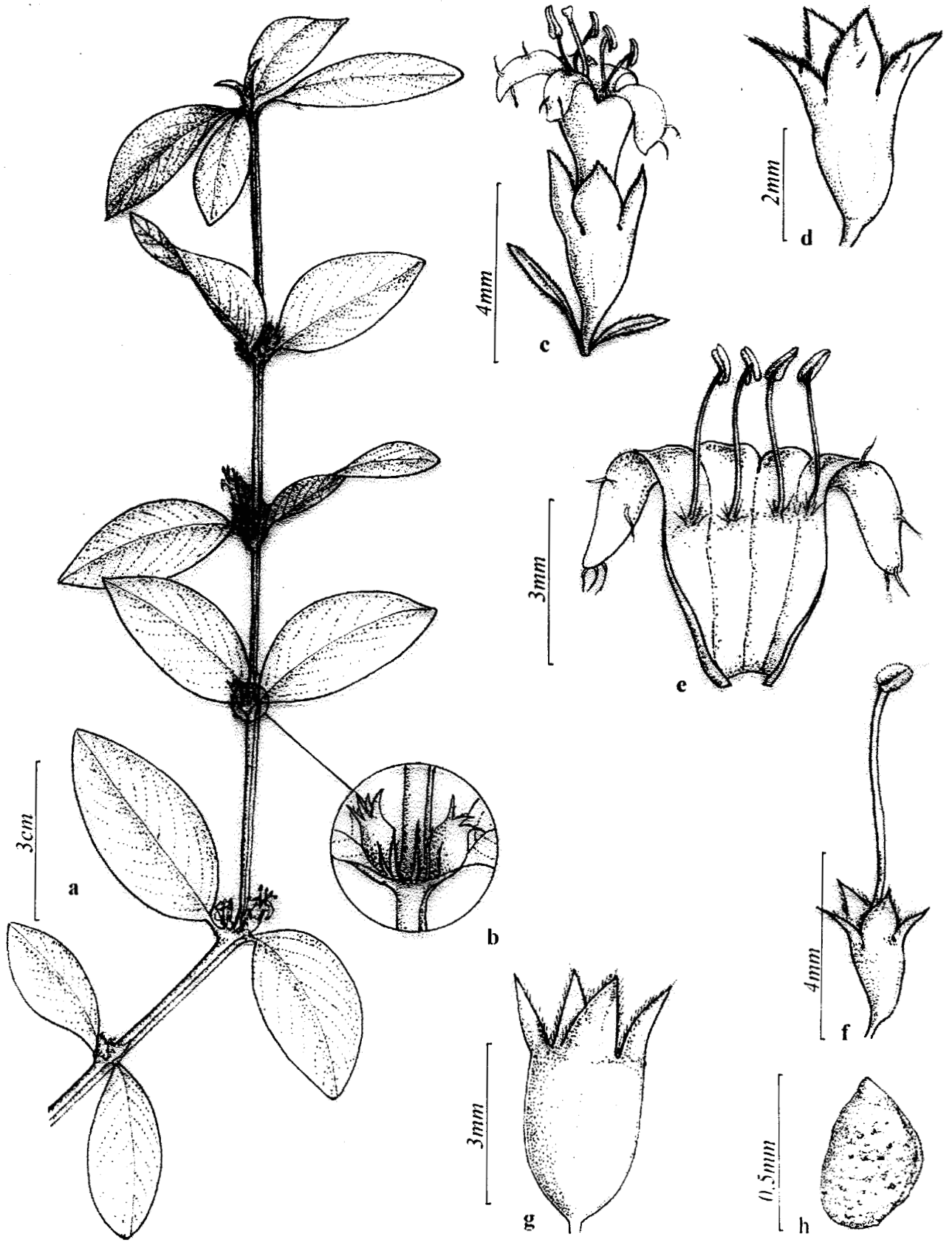


Fig. 31. *Hedyotis nitida* Wight & Arn.: a. Twig; b. Nodal region showing stipule and fruit; c. Flower with bracteoles; d. Calyx with ovary; e. Corolla, split-open; f. Calyx with pistil; g. Fruit with calyx; h. Seed.

Fl. & Fr.: Aug. - Sept.

Distr.: Peninsular India and Sri Lanka. In wastelands and railway tracks. *CNS 1065* (Ambalappuzha).

Note: *Oldenlandia umbellata* and O. *wightii* have been defined on very trivial diagnostic characters. Deb and Dutta (l.c), after studying the relevant types and other specimens, have rightly merged them, and have accepted the name *Hedyotis puberula* (G. Don) Arn., which was based on G. Don's *O. puberula* (1834)., as *H. umbellata* (L.) Lam., (1792) is a later homonym of *H. umbellata* Walt. (1788).

Hedyotis trinervia (Retz.) Roem. & Schult., Syst. 3: 197. 1819; Mani. & Sivar., Fl. Calicut 141. 1982; Ramach. & Nair, Fl. Cannanore 218. 1988. *Oldenlandia trinervia* Retz., Obs. Bot. 4: 23. 1786; Hook. f., Fl. Brit. India 3: 66. 1880; Gamble, Fl. Pres. Madras 597. 1921.

Prostrate herbs, rooting at nodes, up to 23 cm long, usually hairy. Leaves subsessile or shortly petioled, 5-12 x 4-9 mm, broadly ovate or orbiculr, base cuneate or rounded, apex obtuse or mucronate, 3-nerved from the base. Flowers white, minute, axillary, solitary or 2-3 together, sessile or shortly pedicelled. Calyx-tube globose, hairy; lobes 4, lanceolate, minute. Corolla c. 2.5 mm long, rotate. Capsule 2-3 mm across, didymous. Seeds minute, dark brown.

Fl. & Fr.: Aug. - Dec.

Distr.: India, Bangladesh, Sri Lanka, Sumatra, Java and Tropical Africa. Fairly common in coconut groves as a weed. *CNS 2572* (Mangadichira), *CNS 2682* (Thottappally), *CNS 1171* (Alappuzha beach), *CNS 1540* (Kadakkarappally).

HYMENODICTYON Wallich

in Roxburgh, Fl. Ind. 1: 148. 1824.

Hymenodictyon orixense (Roxb.) Mabb., Taxon 31: 66. 1982; Matthew & Rani in Matthew Fl. Tam. Carnatic 3: 709. 1983; Nicols., Suresh & Mani., An Interpr. Hort.

Malab. 224. 1988; Vajravelu, Fl. Palghat Dist. 233. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 233. 1994; Sivar. & Mathew, Fl. Nilambur 329. 1996; Sasi. & 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. 1798. *Hymenodictyon excelsum* (Roxb.) Wall. in Roxb., Fl. Ind. 2: 149. 1824; Hook. f., Fl. Brit. India 3: 35. 1880; Gamble, Fl. Pres. Madras 589. 1921. ***Ben-theka*** Rheede, Hort. Malab. 4: 63-64, t. 30. 1683.

Medium to large deciduous trees; bark greyish-brown, rough, dull yellow inside; branchlets 4-angled, pubescent. Leaves 10-20 x 6-12 cm, broadly elliptic to ovate, base broadly attenuate, apex acuminate, lateral nerves 6-10 pairs; petiole to 4 cm long; foliaceous. Flowers small, greenish-yellow in drooping terminal and axillary paniculate spikes. Peduncles with 2 long petioled leafy bracts at branch nodes; pedicels 1-2 mm long. Calyx minute, puberulous; lobes ovate, acute. Corolla tube slender, c. 2 mm long, puberulous, greenish. Ovary 1 mm long. Capsules 1.5-2.5 x 1-1.5 cm, oblong. Seeds many, 0.8-1 cm long, orbicular, wing 2-fid below.

Fl. & Fr.: Jun. - Aug.

Distr.: Indo-Malesia. In sacred groves. *CNS 1553* (Sharangakavu).

IXORA Linnaeus

Sp. Pl. 110. 1753.

Bushy shrubs or small trees. Leaves coriaceous; stipules interpetiolar, connate at base. Flowers 4-merous in terminal corymbose cymes. Bracts leafy; bracteoles minute. Calyx tube ovoid; lobes 4, persistent. Corolla tube elongated, slender; lobes 4, twisted in buds. Stamens 4, attached at mouth of tube; filaments short or 0; anthers sagittate at base, mucronate at tip. Stigma 2-branched. Berry globose or didymous; pyrenes planoconvex.

1a. Leaves lanceolate, acute to acuminate at apex; calyx lobes 3-3.5 mm long; corolla greenish yellow ..... **I. malabarica**

1b. Leaves elliptic to oblong, subacute at apex; calyx lobes c. 1 mm long; corolla scarlet ..... **I. coccinea**

Ixora malabarica (Dennst.) Mabberley, Taxon 26: 539. 1977; Husain & Paul, J. Econ. Tax. Bot. Add. Ser. 6: 144. 1989; Mohanan & Henry, Fl. Thiruvananthapuram 234. 1994. *Chiococca malabarica* Dennst., Schlsuess. Hort. Ind. Malab. 12, 19 & 37. 1818. *Ixora lanceolaria* Colebr. in Roxb., Fl. Ind. 1: 397. 1820; Wight, Ic. t. 827.1844-1845; Hook. f., Fl. Brit. India 3:138. 1880, p.p.; Gamble, Fl. Pres. Madras 630. 1921.

Slender erect shrubs. Leaves 4-13 x 2-4.5 cm, lanceolate, base broadly acute to rounded, apex acute to shortly acuminate, thin-coriaceous; stipules 5-6 mm long, triangular with subulate tip. Cymes corymbiform, flacid, few-flowered. Bracts and bracteoles 2-2.5 mm long, subulate. Calyx campanulate; lobes 3-3.5 mm long. Corolla greenish yellow; tube 1.6-2 cm long; lobes 4-5 mm long, lanceolate, curled and recurved. Stamens attached between lobes at throat of tube. Berry c. 1 cm across, subglobose.

Fl. & Fr.: Sept. - Feb.

Distr.: Endemic to Western Ghats. In sacred groves. *CNS 2382* (Bhajanamadom at Thazhakkara).

Ixora coccinea L., Sp. Pl. 110. 1753; Hook. f., Fl. Brit. India 3: 145. 1880; Gamble, Fl. Pres. Madras 631. 1921; Mani. & Sivar., Fl. Calicut 147. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 711. 1983; Ramach. & Nair, Fl. Cannanore 220. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 225. 1988; Husain & Paul, J. Econ. Tax. Bot. Add. Ser. 6: 83. 1989; Vajravelu, Fl. Palghat Dist. 233.1990; Mohanan & Henry, Fl. Thiruvananthapuram 234. 1994; Sivar. & Mathew, Fl. Nilambur 330. 1996. ***Shetti*** Rheede, Hort. Malab. 2: 17-18, t. 13. 1679. ***Chetti***.

Woody shrubs, branched from the base, spreading by root sprouts. Leaves sessile, 5-8 x 2.5-3.5 cm, elliptic to oblong, round to slightly cordate at base, apex subacute; stipules sheathing, acuminate. Cymes terminal, corymbiform. Flowers scarlet, sessile, dense. Calyx tube 1-2 mm long, puberulous without; lobes c. 1 mm long, triangular.

Corolla tube 3-3.5 cm long; lobes 0.8-1 x 0.3-0.5 cm, elliptic, subacute. Stamens 4, attached at throat; anthers 3-3.5 mm long. Ovary c. 2 mm across; style 3-3.5 mm long, exserted. Berry 7-10 mm across, globose, purple when mature. Seeds 2, globose.

Fl. & Fr.: Throughout the year.

Distr.: Peninsular India and Sri Lanka. Common in sacred groves. *CNS 1032* (Vandanam).

KNOXIA Linnaeus

Sp. Pl. 104. 1753.

Knoxia sumatrensis (Retz.) DC., Prodr. 4: 569. 1830; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 579. 1976; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 714. 1983; Bhatt & Deb, J. Econ. Tax. Bot. 6: 89. 1985; Mani., Fl. Silent Valley 134. 1988; Ramach.& Nair, Fl. Cannanore 223. 1988; Vajravelu, Fl. Palghat Dist. 235. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 235. 1994; Sivar. & Mathew, Fl. Nilambur 332. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 226. 1996. *Spermacoce sumatrensis* Retz., Obs. Bot. 4: 23.1786. *Knoxia corymbosa* sensu Hook. f., Fl. Brit. India 3: 128. 1880, non Willd., 1797; Gamble, Fl. Pres. Madras 622. 1921.

Erect or diffuse pubescent herbs. Leaves 6-10 x 1.5-3 cm, linear-lanceolate to oblanceolate, base acute, apex acuminate, glabrescent above and pubescent below, lateral veins c. 10 pairs; stipules sheathing with pectinate bristles; petiole to 1 cm long. Inflorescence terminal elongating lax corymbose cymes. Flowers 4-merous. Calyx lobes 4, small, subequal, acute. Corolla c. 3 mm long, funnel-shaped, pale-violet, pubescent within near the throat, lobes small. Stamens 4, exserted or inserted. Ovary c. 1 mm across; style 1.5-2.5 mm, filiform; stigma 2-lobed. Capsules 2-2.5 mm long, narrowly ellipsoid, 2-seeded. Seeds small, reddish-brown.

Fl. & Fr.: Sep. - Jan.

Distr.: Sri Lanka, India, China, Philippines and Australia. *CNS 1974* (Nootavanpara).

MITRACARPUS Zuccarini ex J.A. Schultes et J.H. Schultes

Mant. 3. 210 ("*Mitracarpum*") 399. 1827.

Mitracarpus hirtus (L.) DC., Prodr. 4: 572. 1830; Dyer, Ann. Missouri Bot. Gard. 67: 284. 1980; Ramach. & Nair, Fl. Cannanore 224. 1988; Vajravelu, Fl. Palghat Dist. 236. 1990. *Spermacoce hirta* L., Sp. Pl. ed 2, 148. 1762. *S. villosus* Sw., Prodr. Veg. Ind. Occ. 29. 1788. *Staurospermum verticillatum* Schum. & Thonn., Berskr., Guin. Pl. 73. 1827. *Mitracarpus villosus* (Sw.) DC., Prodr. 4: 572. 1830; Verdc., Kew Bull. 30: 317. 1975; Sivar. & Mathew, Fl. Nilambur 334. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 227. 1996. M. *verticillatus* (Schum.) Valke, Linnaea 40: 196. 1876; Sebastine & Ramamurthy, Bull. Bot. Surv. India 9: 291. 1967; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 581. 1976; Mani. & Sivar., Fl. Calicut 134. 1982; Mani., Fl. Silent Valley 136. 1988.

Erect pubescent herbs. Leaves 2-4 x 1.5-2 cm, ovate or ovate-lanceolate, base obtuse, apex acute, membranous, sessile; stipule pectinate. Flowers white, verticillate in axillary fascicles, 4-merous. Bracteoles filiform. Calyx-tube small, unequally 4-lobed, larger 2 lobes c. 1 mm long. Corolla c. 1.5 mm long, funnel-shaped; lobes 4. Stamens 4, attached at throat. Ovary 2-locular, ovule 1-per locule. Capsule c. 1 mm long, ovoid, dehiscence circumcissile. Seeds 2, minute.

Fl. & Fr.: Almost throughout the year.

Distr.: India and Tropical Africa. A common weed on road sides and waste places. This introduced weed is very competent over the indigenous species and rapidly replaces them. *CNS 1070* (Ambalappuzha).

MORINDA Linnaeus

Sp. Pl. 176. 1753.

Trees, shrubs or climbers; branches terete to 4-angled. Leaves opposite to ternate; stipule interpetiolar, connate, sheathing. Flowers in axillary or terminal, simple or umbellate heads. Peduncle bracteate. Calyx truncate, coherent below with ovaries, embedded within. Corolla funnel-shaped, lobes 4-5, valvate. Stamens 4-5, attached

towards the mouth of corolla tube; anthers included or exserted. Ovary 2-celled, ovules 2 in each cell; stigma 2-lobed, hairy. Fruit a syncarp of 1-seeded pyrenes.

1a. Climbing shrubs; heads umbellate; flowers 4-merous; corolla tube short; ripe fruit orange-red ..... **M. reticulata**

1b. Trees or erect shrubs; heads solitary; flowers 5-merous; corolla tube elongate; ripe fruit whitish-green.

2a. Leaves glabrous, shining; stipules obtuse; pyrenes with an empty ventral cavity; seeds winged below ..... **M. citrifolia**

2b. Leaves glabrescent or tomentose; stipules bifid; pyrenes without an empty ventral cavity; seeds not winged ..... **M. pubescens**

Morinda citrifolia L., Sp. Pl. 176. 1753; Hook. f., Fl. Brit. India 3: 155. 1880; Gamble, Fl. Pres. Madras 651. 1921; Mani. & Sivar., Fl. Calicut 144. 1982; Ramach. & Nair, Fl. Cannanore 225. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 225. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 236. 1994. *Morinda bracteata* Roxb., Fl. Ind. 1: 544. 1832. *Cada-pilava* Rheede, Hort. Malab. 1: t. 52. 1678.

Shrubs or small trees; branches angular. Leaves 12-30 x 7.5-12.5 cm, broadly ovate to obovate, base attenuate, apex acute or acuminate, shining, secondary nerves 8-10; petiole to 2 cm long; stipules broad, obtuse. Flowers in leaf-opposed, peduncled, capitate heads, white. Calyx limb to 5 mm long, truncate with or without a leafy bract-like lobe, green. Corolla-tube to 1 cm long; lobes 5, throat hairy. Stamens 5; filaments small, hairy, attached to the throat. Syncarpium c. 2.5 cm across, ovoid or globose, white or cream in colour, fleshy. Seeds winged below.

Fl. & Fr.: Sept. - May.

Distr.: Sri Lanka, India, Malay Arcipelago, Australia and Pacific Islands. Among margroves. *CNS 1444* (Thrikunnapuzha).

Morinda pubescens J. E. Smith in Rees, Cyclop. 24: n. 3. 1813; Verdc., Kew Bull. 37:543. 1983; Vajravelu, Fl. Palghat Dist. 237. 1990; Mohanan & Henry, Fl.

Thiruvananthapuram 237. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 228. 1996. *M. tomentosa* Heyne ex Roth, Nov. Pl. Sp. 147. 1821; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 581. 1976. *M. coreia* Buch.-Ham., Trans. L. Soc. London 13: 537. 1822; Mani. & Sivar., Fl. Calicut 144. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 718. 1983. *M. tinctoria* Roxb., Fl. Ind. 2: 197. 1824, non Noronha, 1790; Hook. f., Fl. Brit. India 3: 156. 1880; Gamble, Fl. Pres. Madras 651. 1921. *M. tinctoria* Roxb., var. *tomentosa* (Heyne ex Roth) Hook. f., Fl. Brit. India 3: 156. 1880; Gamble, Fl. Pres. Madras 651. 1921.

Trees; bark pale-brown, thick, vertically fissured and irregularly cracked, yellow inside. Leaves 5-18 x 2-8 cm, elliptic-lanceolate or oblanceolate, attenuate at base, wavy on margins, acute at apex, charataceous; petiole c. 1 cm long; stipules bifid at apex. Flowers white, in few-flowered terminal or axillary globose heads. Peduncles 3-4.5 cm long. Calyx-tube hemispheric, truncate. Corolla tube 1-2 cm long, funnel-shaped; lobes 5, 8-10 mm long, oblong. Stamens 5, exserted, attached at throat. Ovary 2-locular; ovule 1-per locule. Syncarpium 1.5-2 cm across, globose, whitish-green. Seeds oblong or obovoid.

Fl. & Fr.: Most of the seasons.

Distr.: India, Sri Lanka and Malesia. In wastelands. *CNS 2560* (Thottappally).

Morinda reticulata Gamble, Kew Bull. 1920: 248. 1920 & Fl. Pres. Madras 652. 1921; Mohanan & Henry, Fl. Thiruvananthapuram 237. 1994 (Plate XV: B).

Large woody climbing shrubs. Leaves 6-12 x 2-4.5 cm, oblanceolate to linear-lanceolate, attenuate at base, caudate acuminate at apex, waxy shining above, lateral nerves 10-12 pairs; petioles to 6 mm long; stipules acute, connate. Flowers white in terminal umbellate heads; peduncle 1-2 cm. Calyx truncate, limb forming a ring. Corolla rotate; tube c. 1.5 mm long, very hairy within; lobes 4, oblong, recurred. Stamens 4, included. Stigma 2-fid. Syncarpium irregularly lobed, 0.5-1 cm diam., with prominent scars of calyx ring, orange; pyrenes many, bony, pyriform, triquetrous in viscous pulp.

Fl. & Fr.: Apr. - Jul.

Distr.: Endemic to Western Ghats. In sacred goves. *CNS 1030* (Vandanam).

MUSSAENDA Linnaeus

Sp. Pl. 177. 1953.

Mussaenda belilla Buch.-Ham., Trans. L. Soc. London 14: 203. 1824; Ridsdale in Manilal, Bot. Hist. Hort. Malab. 131. 1980; Ramach. & Nair, Fl. Cannanore 225. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 226.1988; Vajravelu, Fl. Palghat Dist. 237. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 238. 1994; Sivar. & Mathew, Fl. Nilambur 337. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 228. 1996. *M. frondosa* L., var. *laxa* Hook. f., Fl. Brit. India 3: 89. 1880; Mani. & Sivar., Fl. Calicut 145. 1982. *M. laxa* (Hook. f.) Hutch. ex Gamble, Fl. Pres. Madras 610. 1921; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 582. 1976. ***Belilla*** Rheede, Hort. Malab. 2: 27-28, t. 18, 1679.

Straggling shrubs; branchlets pubescent. Leaves 6-10 x 4-6 cm, broadly ovate, base rounded, caudate acuminate at apex, sparsely hairy on both surfaces; petiole to 1.5 cm long; stipules 3-4 mm long, ovate, bifid at apex. Cymes terminal, lax, tomentose. Flowers 5-merous. Bracts and bracteoles linear, 1-1.5 cm, hairy. Calyx-lobes 5, 0.8-1 cm long, lanceolate, hairy, one of the calyx lobes transformed into a showy, white, pubescent, leaf-like structure, 8-12 x c. 4.5 cm. Corolla 2.5-3 cm long, funnel-shaped dialated above middle, orange-red or yellow, tomentose outside, villous at mouth; lobes 6-7 mm long, ovate-lanceolate. Stamens 5, included or exserted. Berry c. 1 cm across, globose.

Fl. & Fr.: Most of the seasons.

Distr.: South West India. Endemic. On way side thickets and fences. *CNS 1588* (Aroor).

OPHIORRHIZA Linnaeus

Sp. Pl.150. 1753.

Ophiorrhiza mungos L., Sp. Pl. 150. 1753; Hook. f., Fl. Brit. India 3: 77. 1880; Gamble, Fl. Pres. Madras 607. 1921; Mani., Fl. Silent Valley 139. 1988; Vajravelu, Fl. Palghat Dist.

241. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 240. 1994; Sivar. & Mathew, Fl. Nilambur 343. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 232. 1996.

Annual erect herbs, rooting at lower nodes. Leaves 7-15 x 3-6 cm, elliptic or elliptic-lanceolate, base attenuate, apex acuminate, chartaceous, hirsute on veins below; petiole to 1.5 cm; stipules subulate, 3-5 mm long, 2-fid at tip. Flowers in terminal branched, scorpioid cymes, dense. Peduncle to 2.5 cm long, rusty pubescent. Calyx tube c. 1 mm long; lobes obscure. Corolla 0.8-1 cm long, white with pink shades on lobes. Capsule 2.5-3 long, 4-6 mm wide, obcordate, laterally compressed, glabrous, dehiscence loculicidal. Seeds many, angular.

Fl. & Fr.: Dec. - Mar.

Distr.: Sri Lanka, Peninsular India, Java and Sumatra. In sacred groves. *CNS 1999* (Sharangakavu).

PAVETTA Linnaeus

Sp. Pl. 110. 1753.

Shrubs or small trees. Leaves decussate; stipules interpetiolar, ovate, acute, basally connate. Flowers 4-merous in terminal and axillary corymbs. Bracts and bracteoles small, membranous. Calyx campanulate; lobes 4. Corolla salver-shaped, white to cream coloured; tube slender; lobes 4, twisted towards left in buds. Stamens 4, attached to mouth of corolla tube, anthers linear, exserted. Ovary 2-celled; ovules 1 in each cell on axile placenta; style exserted; stigma fusiform. Fruit a fleshy berry, globose or subglobose. Seeds 1-2, globose to hemispherical.

1a. Leaves beneath and inflorescence branches softly tomentose; corolla-lobes oblong ..... **P. tomentosa**

1b. Leaves and inflorescence branches glabrous; corolla-lobes obovate ..... **P. indica**

Pavetta indica L., Sp. Pl. 110. 1753; Wight, Ic. t. 148. 1839; Hook. f., Fl. Brit. India 3: 150. 1880; Gamble, Fl. Pres. Madras 633. 1921; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 587. 1976; Mani. & Sivar., Fl. Calicut 146. 1982; Matthew & Rani in Matthew Fl.

Tam. Carnatic 3: 732. 1983; Ramach. & Nair, Fl. Cannanore 230. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 228. 1988; Vajravelu, Fl. Palghat Dist. 242. 1990; Sivar. & Mathew, Fl. Nilambur 345. 1996. ***Pavetta*** Rheede, Hort. Malab. 5: 19-20, t. 10. 1685.

Shrubs; branchlets glabrescent. Leaves 7-11 x 3-4 cm, ovate-elliptic or oblanceolate, base acute-attenuate, apex acuminate, chartaceous, glabrous; petiole to 1.8 cm long. Corymb terminal. Calyx minutely 4-toothed, to 3 mm long. Corolla white; tube c. 1.5 cm long, slender, sparsely pilose within; lobes obovate. Stamens 4, between the lobes, exserted; anthers linear-oblong. Ovule solitary; style slender, exserted; stigma fusiform. Berry 6-9 mm across, globose, black when ripe.

Fl. & Fr.: Apr. - Jul.

Distr.: South India. Very common in sacred groves. *CNS 2052* (Vandanam).

Root powder is supposed to cure hernia. Fruits powdered and given in honey to cure for dysentery.

Pavetta tomentosa Roxb. ex Smith in Rees, Cyclop. 26: n. 52. 1819; Bremek., Repert. Spec. Nov. Regni Veg. 37: 113. 1934; Fischer in Gamble, Fl. Pres. Madras 1879. 1936; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 588. 1976; Mani. & Sivar., Fl. Calicut 146. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 733. 1983; Ramach. & Nair, Fl. Cannanore 230. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 228. 1988; Vajravelu, Fl. Palghat Dist. 242. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 242. 1994; Sivar. & Mathew, Fl. Nilambur 345. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 233. 1996. *Pavatta indica* L. var. *tomentosa* (Roxb. ex Smith) Hook. f. in Hook. f., Fl. Brit. India 3: 150. 1880. ***Katou-theka*** Rheede, Hort. Malab. 4: 59-60, t. 28. 1683.

Erect shrubs; tender parts softly tomentose. Leaves 8-14 x 3.5 - 5.5 cm, obovate-elliptic to oblanceolate, base acute, apex acuminate, softly tomentose beneath; petiole to 2.5 cm long. Cymes terminal, much branched. Flowers white; pedicels tomentose. Calyx c. 3 mm long, tomentose, teeth minute. Corolla-tube 1-1.3 cm long; lobes 5, 7-8 mm long,

oblong, apiculate. Stamens 5; anthers c. 3 mm long, linear-oblong. Style far exserted; stigma fusiform, puberulous. Berry 6-7 mm across, globose, black when ripe.

Fl. & Fr.: May - Sept.

Distr.: India, Himalaya, Indo-China and Malay Archipelago. In sacred groves. *CNS 2390* (Panyannar Kavu at Thazhakkara).

PSILANTHUS J. D. Hooker

in Bentham & Hooker, Gen. Pl. 2: 23, 115. 1873 (*nom. cons.*).

Psilanthus travancorensis (Wight & Arn.) Leroy, Compt. Rend. Hebd. Seances Acad. Sci. 29, D: 595. 1980; Bridson, Kew Bull. 42: 455. 1987; Sivar. *et al.*, Bot. Bull. Academia Sinica 33: 219. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 225. 1994. *Coffea travancorensis* Wight & Arn., Prodr. 433. 1834; Thw., Enum. Pl. Zeyl. 154. 1864; Hook. f., Fl. Brit. India 3: 154. 1880; Trimen, Handb. Fl. Ceylon 2: 353. 1894; Gamble, Fl. Pres. Madras 637. 1921; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 221. 1988. ***Tsjeru-mulla*** Rheede, Hort. Malab. 6: 85, t. 49. 1686. ***Pushkara-mulla***.

Shrubs to 2 m tall. Leaves 4-9 x 2.8 - 4.5 cm, broadly ovate, elliptic or oblanceolate, base acute or cuneate, apex acute to shortly acuminate, shining green above, paler beneath, coriaceous; petiole to 3 mm long; stipules 1.5-2 mm long, ovate, acuminate. Inflorescence terminal or axillary, 1-5-flowered cymes. Flowers white, fragrant; bracts 1-1.5 mm long, ovate-cuspidate; bracteoles to 2 mm long, lanceolate. Calyx c. 1mm long, cup-shaped, much shorter than the disc; limb subentire. Corolla tube 1-1.6 cm long, cylindric; lobes 5, 8-12 x 3-7 mm, elliptic-obtuse. Stamens 5, inserted below the throat; anthers sessile, c. 5 mm long. Stigma 2-lobed. Fruits c. 1 x 1.4 cm, depressed globose, didymous, blue-black when ripe. Seeds 5-7 x 4-5 mm, ellipsoid, with a prominent ventral groove.

Fl. & Fr.: Jul. - Dec.

Distr.: Southern India and Sri Lanka. In sacred groves. *CNS 1074* (Aroor).

PSYCHOTRIA Linnaeus

Syst. Nat.,ed. 10. 929, 1364. 1759 (*nom. cons.*).

Psychotria flavida Talbot, Syst. List Pl. Bombay 113. 1894; Gamble, Fl. Pres. Madras 641. 1921; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 589. 1976; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 736. 1983; Ramach. & Nair, Fl. Cannanore 232. 1988; Deb & Gang., J. Econ. Tax. Bot. (Addl. Ser.) 7: 89. 1989; Mohanan & Henry, Fl. Thiruvananthapuram 243. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 236.1996.

Small shrubs; branchlets terete, glabrous. Leaves 10-18 x 3.5-8 cm, elliptic-oblong or obovate, attenuate at base, acute at apex, glabrous, yellowish green on drying; lateral nerves 9-12 pairs; petiole to 2.5 cm long; stipules 6-8 mm long, ovate, acute at apex, deciduous. Flowers in terminal corymbose cymes. Bracteoles 5-7 mm long, lanceolate. Calyx tube 2-2.5 mm, campanulate, 5-toothed. Corolla white; tube c. 2 mm long, funnel-shaped, hairy at throat; lobes 5, oblong, acute. Stamens 5; anthers ovate. Stigma 2-lamellate. Fruit c. 5 mm across, globose, bluish-purple; fruiting peduncle and pedicels yellow. Seeds 1-2, planoconvex.

Fl. & Fr.: Mar. - Apr.

Distr.: South West India. Endemic. In sacred groves. *CNS 2000* (Kooritharakavu at Chathiyara).

RICHARDIA Linnaeus

Sp. Pl. 330. 1753.

Richardia scabra L., Sp. Pl. 330. 1753; Balakr., Bull. Bot. Surv. India 6: 85. 1964; Lewis & Oliver, Brittonia 26: 282. 1974; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 740. 1983; Ramach. & Nair, Fl. Cannanore 233. 1988; Sivar. & Mathew, Fl. Nilambur 347. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For 237. 1996.

Procumbent annual or perennial herbs; branches subterete, hispid. Leaves subsessile, 2-3.5 x 0.7-1.8 cm, ovate or elliptic-ovate, base attenuate or obtuse, apex acute, scabrous on both sides, fleshy; stipules c. 2 mm long, connate, cupular with setiferous

appendages, ciliate. Flowers in terminal, sessile, capitate clusters, with setiform bracts at base, entire cluster subtended by 2-4 leaf-like ovate, sessile bracts. Calyx 1-1.5 mm long, truncate, scabrous; lobes 6, c. 1 mm long, obovate, ciliolate. Corolla white, c. 3 mm across, funnel-shaped, sparsely strigose without; lobes triangular, acute. Stamens 6, between the lobes. Ovary subglobose, papillose, 3-locular; ovule 1 per locule on basal placenta; stigma capitate. Capsule 3-celled, densely scabrous; cocci rounded on outer surface; inner surface slightly concave. Seeds 1 in each cell, oblong, slightly winged.

Fl. & Fr.: Apr. - Dec.

Distr.: Native of Tropical America, now spreading and recorded from several African and Asian countries. *CNS 2090* (Ambalappuzha).

SPERMACOCE Linnaeus

Sp. Pl. 102. 1753.

Erect or diffuse herbs; stem terete to 4-angled, sometimes winged on angles. Leaves decussate or whorled, sessile or petiolate; stipules interpetiolar, connate with the base of the petioles, membranous, pectinate on margins. Flowers 4-merous, sessile, in axillary and terminal fascicles, verticillate cymes or heads. Bracts many, filiform. Calyx campanulate; lobes 2-4, often unequal, persistent. Corolla salver-shaped or funnel-shaped, white to pink, throat hairy or not; lobes 4, valvate. Stamens 4, attached to the throat of corolla tube. Ovary 2-locular; ovule 1-per locule; stigma 2-fid. Capsule globose or ovoid, with 2 mericarps, each dehiscing ventrally. Seeds globose to ovoid, grooved ventrally.

Note: For a recent review on the delimitation and circumscription of the genus, see Sivarajan *et al.* (Proc. Ind. Acad. Sci. (Pl. Sci.) 97: 347-358. 1987).

1a. Stem broadly winged.

2a. Calyx lobes 2; leaves to 1.3 cm broad; corolla c. 2 mm long; capsule c. 1 mm long ..... **S. mauritiana**

2b. Calyx lobes 4; leaves 1.5-3.5 cm broad; corolla c. 4 mm long; capsule 2.5-4 mm long ..... **S. latifolia**

1b. Stem not winged.

3a. Seeds transversely rugose ..... **S. assurgens**

3b. Seeds not transversely rugose.

4a. Stem terete, densely pilose hairy; leaves highly flexuous; corolla tube more or less equalling the lobes ..... **S. hispida**

4b. Stem 4-angled, minutely adpressed hairy; leaves rarely flexuous; corolla tube usually 3-4 times longer than lobes ..... **S. articularis**

Spermacoce articularis L. f., Suppl. Pl. 119. 1782; Sivar. & Nair, Taxon 35: 366. 1986; Sivar. *et al.*, Proc. Indian Acad. Sci. (Pl. Sci.) 97: 349. 1987; Sivar. & Mathew, Fl. Nilambur 349. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 238. 1996. *Spermacoce hispida* auct., non L., 1753; Hook. f., Fl. Brit. India 3: 200. 1881; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 742. 1983; Deb & Duatta, J. Econ. Tax. Bot. 5: 1046. 1984. *Borreria articularis* (L. f.) Williams, Bull. Berb. Boiss. Ser. 5, 2: 956. 1905; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 573. 1976; Mani. & Sivar., Fl. Calicut 138. 1982; Vajravelu, Fl. Palghat Dist. 227. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 221. 1994. *Borreria hispida* sensu Gamble, Fl. Pres. Madras 654. 1921, non spruce ex schum 1888.

Diffuse herbs; stem 4-angled, adpressed minutely hairy. Leaves 1-2.5 x 0.8 - 1.4 cm, elliptic or obovate, base attenuate, margin flat, rarely flexuous, apex obtuse, acute, apiculate, more or less scabrid on both sides; stipules with long subulate hispid bristles. Flowers in axillary, few-flowered sessile clusters. Calyx-tube obovoid; lobes 2, c. 1.5 mm long, with 2 intermediate teeth, hairy. Corolla pinkish-white, tube funnel-shaped, usually much longer than lobes, c. 2.5 mm long, with a ring of hairs inside. Stamens 4, exserted. Capsule 4-6 x 3-4 mm, globose, hispid, 2-valved, splitting septicidally into two mericarps then septum ditaches from the valves, releasing the seeds. Seeds 2-3 mm long, oblong, brown, reticulate.

Fl. & Fr.: May - Aug.

Distr.: India, China, Malesia, Indo-China, Philippines and Tropical Africa in exposed lands. *CNS 1023* (Vandanam).

Spermacoce assurgens Ruiz and Pavon, Fl. Peru 1: 60, t. 92. 1798; Verdc., Kew Bull. 37: 547. 1983; Sivar. *et al.*, Proc. Indian Acad. Sci. (Pl. Sci.) 97: 351. 1987. *Borreria laevis* auct. mult.; Bremek. in Pulle, Fl. Suriname 4: 289. 1934; Back. & Bakh. f., Fl. Java 2: 354. 1965, non (Lam.) Griseb., 1861. *Spermacoce laevis* sensu auct. mult., Deb & Dutta, J. Econ. Tax. Bot. 5: 1051. 1984, non Lam., 1792.

Erect or diffuse herbs, often purple suffused; stem 4-angled. Leaves 2.2-5 x 0.4-1.5 cm, elliptic, base cuneate, apex acute, impressly veined. Flowers white in axillary and terminal, capitate cymes. Capsule 3-3.5 x 2-2.5 mm, pubescent. Seeds c. 2 x 1 mm, ellipsoid, transversely rugose.

Fl. & Fr.: Sept. - Dec.

Distr.: A native of Tropical America. This species is now naturalised in tropical Africa, Madagascar, Malesia Java and India. In waste land. *CNS 1899* (Alappuzha town).

Spermacoce hispida L., Sp. Pl. 102. 1753; Roxb., Fl. Ind. 1: 373. 1820; Sivar. *et* Nair, Taxon 35: 366. 1986; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 229. 1988; Sivar. *et al.*, Proc. Indian Acad. Sci. (Pl. Sci.) 97: 354. 1987; non sensu Hook. f. 1881, Verdcourt, Fl. Trop. E. Africa Rubiac. 361. 1976; Matthew & Rani in Matthew, Fl. Tam. Carnatic 742. 1983; Deb & Dutta, J. Econ. Tax. Bot. 1046. 1984; Ramach. & Nair, Fl. Cannanore 235. 1988. *Borreria hispida* (L.) Schum. in Engler & Prantl, Pflanzenfam. 4(4): 144. 1891, non Spruce ex Schum., 1888; Gamble, Fl. Pres. Madras 654. 1921. ***Tardavel*** Rheede, Hort. Malab. 9: 149, t. 76. 1689.

Diffuse or ascending branched subshrubs stem usually terete or subtetragonous, bluish, covered with long, spreading pilose hairs all around. Leaves 1-2 x 0.8 - 1.5 cm, oblong-elliptic or obovate, attenuate at base, margins highly flexuous, acute at apex, hispid on both sides; stipules sheathing. Flowers sessile in axillary verticillate cymes. Calyx tube c. 2 mm long, ovoid; lobes 4, obovate. Corolla pinkish white; tube slender, 5-6 mm long, hairy at throat; lobes 4, as long as tube. Capsule c. 2 mm across, subglobose, hispid. Seeds 2, c. 1 mm long, ellipsoid, grooved, closely pitted, black.

Fl. & Fr.: May - Aug.

Distr.: India, Indo-China and Malesia. Common in exposed sandy soil. Roots resemble sarasaparila in taste. *CNS 1052* (Nangiarkulangara).

Note: Powder of root used as a medium against rheumatism, indigestion and biliousness.

Spermacoce latifolia Aublet, Hist. Pl. Guiane Frtan. 1: 55, t. 19/1. 1775; Deb & Dutta, Bull. Bot. Surv. India 18: 216. 1979 & J. Econ. Tax. Bot. 5: 1051. 1984; Sivar. *et al.*, Proc. Ind. Acad. Sci. (Pl. Sci.) 97: 355. 1987; Mani., Fl. Silent Valley 143. 1988; Ramach. & Nair, Fl. Cannanore 236. 1988; Sivar. & Mathew, Fl. Nilambur 350. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 238. 1996. *Borreria latifolia* (Aubl.) K. Schum. in Mart., Fl. Bras. 6(6): 61. 1888; Mohanan & Henry, Fl. Thiruvananthapuram 221. 1994. *B. eradii* Ravi, J. Bombay Nat. Hist. Soc. 66(3): 539, t. 1, f. 1-10. 1970; Sivar. & Joseph, J. Bombay Nat. Hist. Soc. 77: 368. 1980; Mani. & Sivar., Fl. Calicut 136. 1982.

Diffuse herbs; stem 4-angled and prominently winged, hispid. Leaves 2-5 x 1.5 - 3.5 cm, broadly elliptic or ovate, base rounded or cuneate, apex acute, loosely hispid on both sides, lateral veins prominent; stipules sheathing, with subulate hispid bristles. Flowers in axillary few-flowered cymes. Calyx tube c. 1.5 mm long; lobes ovate-acuminate, unequal. Corolla white, c. 4 mm long, hairy at throat; lobes 4. Stamens attached at throat between the lobes. Capsule 2.5-4 mm long, ellipsoid, densely pubescent. Seeds 2, 1.5-2 mm long, ellipsoid, reticulate-rugose on dorsal side.

Fl. & Fr.: May - Aug.

Distr.: Tropical America, Australia, Tropical Africa and India. Common in exposed lands and waste places. *CNS 1987* (Thiruvambadi).

Spermacoce mauritiana Osca Gideon ex Verdc. Kew Bull. 37: 547. 1983; Sivar. *et al.*, Proc. Ind. Acad. Sci. (Pl. Sci.) 97: 356. 1987; Sivar. & Mathew, Fl. Nilambur 351. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 238. 1996. *Spermacoce ocymoides* auct., non Burm. f., 1768: Hook. f., Fl. Brit. India 3: 200. 1881, p.p. *Borreria ocymoides* acut., non (Burm. f.) DC., 1830: Gamble, Fl. Pres. Madras 654. 1921; Gandhi in Sald. & Nicols., Fl. Hassan

Dist. 574. 1976; Mani. & Sivar., Fl. Calicut 136. 1982; Vajravelu, Fl. Palghat Dist. 228. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 222. 1994. *Spermacoce decandollei* Deb & Duatta, J. Econ. Tax. Bot. 5: 1044. 1984, *nom. superfl.*

Diffuse or erect herbs; stem 4-angled and narrowly winged, ciliate along the margins. Leaves 1-2.7 x 0.4-1.3 cm, ovate to elliptic, base cuneate, apex acute, glabrous, subsessile; stipule bristles subulate. Flowers very small, in axillary and terminal, sessile, capitate clusters. Bracts and bracteoles subulate. Calyx lobes 2, 1-2 mm long, lanceolate. Corolla white, c. 2 mm long. Capsule c. 1 mm long, truncate, compressed, pubescent. Seeds oblong, reticulate.

Fl. & Fr.: Aug. - Oct.

Distr.: India, Tropical America, Africa, West Indies and Malesia.

Common in waste places and roadsides. *CNS 1086* (Pallithode).

Note: This species is sometimes misidentified as *Spermacoce ocymoides* Burm. f., but this can be easily identified by its winged stem and 2-lobed calyx.

TARENNA J. Gaertner

Fruct. 1: 139. 1788.

Tarenna asiatica (L.) Kuntze ex Schumann, Bot. Tidsskr. 24: 332. 1902; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 591. 1976; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 744. 1983; Ramach. & Nair, Fl. Cannanore 237. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 230. 1988; Vajravelu, Fl. Palghat Dist. 244. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 246. 1994. *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.) Kuntze, Rev. Gen. Pl. 1: 278. 1891; Gamble, Fl. Pres. Madras 613. 1921. *Stylocoryne webera* A. Rich., Men. Soc. Hist. Paris 4: 248. 1834. ***Cupi*** Rheede, Hort. Malab. 2: 37-38, t. 23. 1679 (Fig. 32).

Shrubs to small trees. Leaves 6-14 x 3-5 cm, elliptic to elliptic-oblong, attenuate at base, acute to acuminate at apex, waxy above, drying black; lateral veins c. 10 pairs, close; petiole 1.2-1.8 cm long; stipules ovate. Cymes terminal, corymbose. Flowers 5-merous. Bracts c. 1.5 mm long, subulate. Calyx 3-4 mm long, campanulate. Corolla white turning cream in colour, salver-shaped; lobes 5, 5 - 6 mm, twisted. Stamens 5, exserted, connective produced above. Ovary 2-locular; ovules many per locule. Berry 5-10 mm across, globose, black. Seeds 3 - 4 in each cell, muricate.

Fl. & Fr.: Feb. - Sept.

Distr.: Peninsular India, Sri Lanka to Malesia. In sacred groves. *CNS 1934* (Vandanam), *CNS 2096* (Konattusserykavu at Kadakkarappally).

66. ASTERACEAE Dumort.

Comment. bot. 55. 1822.

(COMPOSITAE, *nom. alt.*).

1a. Capitula of two kinds, unisexual; male capitula above, spherical; female capitula below, ovoid, covered with hooked bristles; anthers free; filaments connate; female florets apetalous ..... **Xanthium**

1b. Capitula of one kind only, heterogamous or homogamous; anthers connate; filaments free; female florets petalous.

2a. Capitula exclusively homogamous, either ligulate or disciform, florets bisexual.

3a. Florets all ligulate; sap milky ..... **Launaea**

3b. Florets all tubular; sap watery.

4a. Scandent herbs or shrubs.

5a. Leaves opposite; phyllaries 1-seriate ..... **Mikania**

5b. Leaves alternate; phyllaries many-seriate ..... **Vernonia**

4b. Erect herbs or shrubs.

6a. Capitula consisting of 1-5 flowers and aggregated in to glomerules, subtended by bract like leaves.

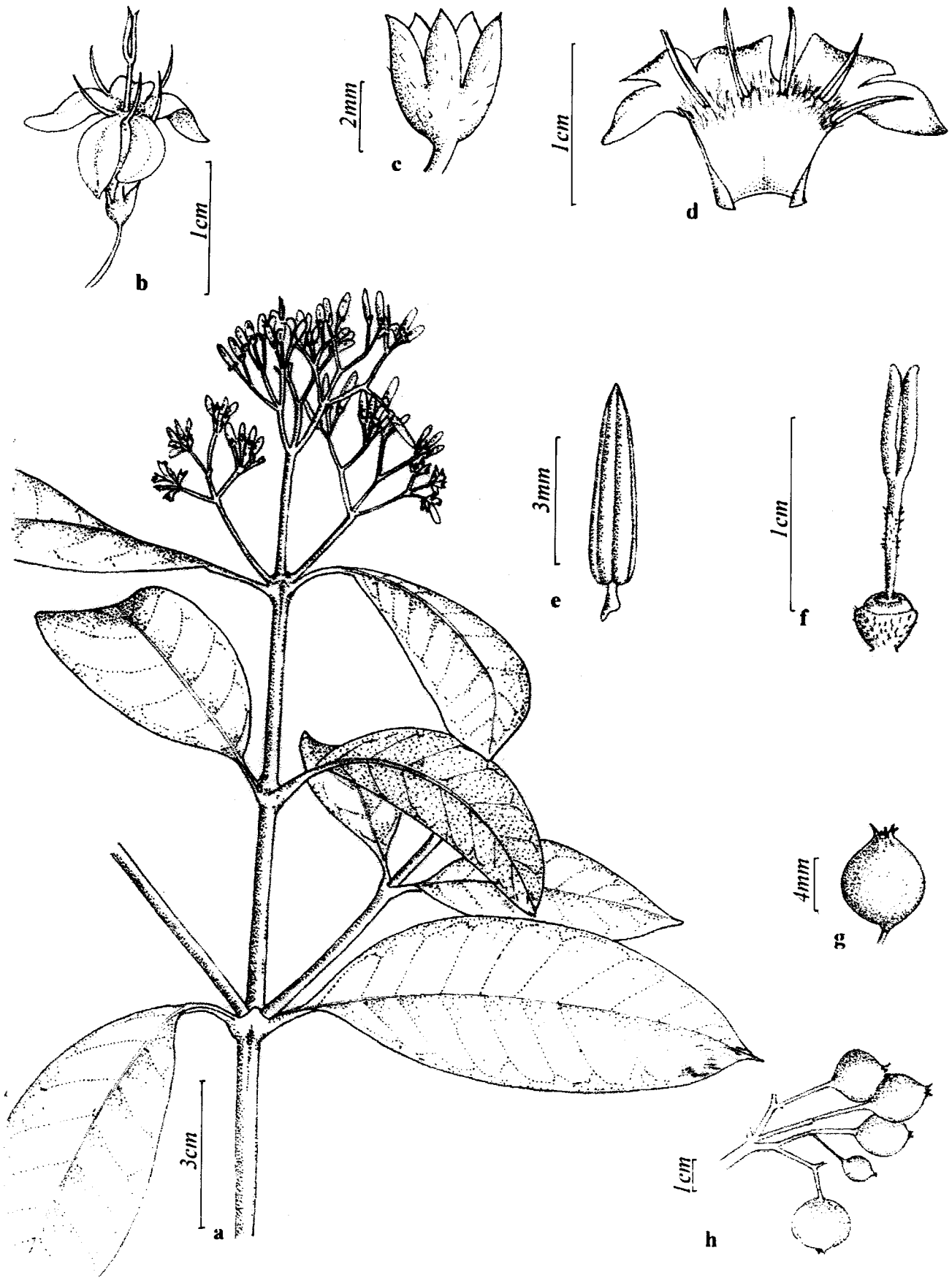


Fig. 32. *Tarenna asiatica* (L.) Kuntze ex Schumann: a. Flowering twig; b. Flower; c. Calyx; d. Corolla.split-open; e. Stamen; f. Pistil; g. Fruits; h. Single fruit.

7a. Plants scapigerous; phyllaries 2-seriate, free; capitula 3-5-flowered ..... **Elephantopus**

7b. Plants non-scapigerous; phyllaries 1-seriate, connate in to a tubular pseudocalyx; capitula 1-flowered .... **Lagascea**

6b. Capitula more than 10-flowered, separate, not subtended by bract-like leaves.

8a. Leaves alternate.

9a. Capitula sessile in close axillary clusters .... **Struchium**

9b. Capitula peduncled, terminal, solitary or numerous.

10a. Phyllaries multi-seriate, imbricate.

11a. Outer phyllaries more or less leafy; stem loosely moniliform hairy .... **Phyllocephalum**

11b. Outer phyllaries not leafy; stem not moniliform hairy ..... **Vernonia**

10b. Phyllaries 1-seriate.

12a. Involucres with small calyculate bracts at the base ..... **Crassocephalum**

12b. Involucres ecalyculate ..... **Emilia**

8b. Leaves opposite.

13a. Phyllaries foliaceous, accrescent; peduncle curved in fruit; flowers yellow ..... **Eleutheranthera**

13b. Phyllaries neither foliaceous nor accrescent; peduncle straight in fruit; flowers white or bluish.

14a. Heads axillary, solitary; achenes with corky and ciliate margins ..... **Spilanthes**

14b. Heads in terminal panicles, achenes without corky and ciliate margins

15a. Achenes curved, glandular-tuberculate ..... **Adenostemma**

15b. Achenes straight, ribbed or angled, not glandular-tuberculate.

16a. Receptacle paleaceous; pappus of 5 aristate scales .. **Ageratum**

16b. Receptacle epaleaceous; pappus hairs more than 10 .... **Chromolaena**

2b. Capitula exclusively heterogamous, either radiate or disciform; outer florets female, inner bisexual.

17a. Female and bisexual flowers both tubular 3-5-lobed; capitula disciform.

18a. Branchlets winged.

19a. Heads collected in dense globose or ovoid clusters .... **Sphaeranthus**

19b. Heads corymbose ..... **Epaltes**

18b. Branchlets not winged.

20a. Heads solitary; achenes glandular; pappus tubular with fimbriate mouth .....**Grangea**

20b. Heads in corymbs or panicles; achenes not glandular; pappus of hairs.

21a. Corolla of female flowers almost as long as those of bisexual flowers; anther-base tailed; pappus 1-seriate ..... **Blumea**

21b. Corolla of female flowers very short; anther-base obtuse; pappus 2-seriate ..... **Conyza**

17b. Female flowers ligulate, ligules sometimes very short; bisexual disc flowers tubular, 4-5-lobed; capitula radiate.

22a. Receptacle naked, without paleae; leaf base amplexicaul and auriculate .. .. **Vicoa**

22b. Receptacle paleaceous; leaf base not amplexicaul and auriculate.

23a. Leaves alternate.

24a. Annual herbs up to 1 m tall; leaves pinnatifid; heads white, 0.4-0.7 cm across in terminal dichotomous panicles .. **Parthenium**

24b. Perennial subshrubs 2-3 m tall; leaves 3 -5-lobed or unlobed; heads yellow, 4-10 cm across, solitary ..... **Tithonia**

23b. Leaves opposite.

25a. Styles of disc flowers undivided; disc achenes sterile; ray achenes covered with hooked spines ..... **Acanthospermum**

25b. Styles of disc flowers branched; disc achenes fertile; achenes not spinous.

26a. Rays pink; leaves bipinnatisect; achenes rostrate ..... **Cosmos**

26b. Rays yellow or white; leaves not bipinnatisect; achenes erostrate.

27a. Leaves 3-5-foliolate; pappus retrorsely barbellate ..... **Bidens**

27b. Leaves simple; pappus not retrorsely barbellate or pappus absent.

28a. Pappus bristles numerous, 4.5-6.5 mm long, plumose ..... **Tridax**

28b. Pappus bristles 1-3, up to 4 mm long, not plumose or pappus minute horns or scales, or absent.

29a. Rays white.

30a. Ray flowers 3-5; erect herbs; leaves 3-nerved from base, petiolate ..... **Blainvillea**

30b. Ray flowers more than 15; ascending herbs; leaves penninerved, subsessile ..... **Eclipta**

29b. Rays yellow.

31a. Capitula more or less sessile in leaf axils; achenes of ray flowers compressed, winged, the wings lacerate ..... **Synedrella**

31b. Capitula pedunculate; achenes of ray flowers not winged and lacerate.

32a. Receptacle conical; achenes ciliate ..... **Spilanthes**

32b. Receptacle flat or convex; achenes not ciliate ..... **Wedelia**

ACANTHOSPERMUM Schrank

Pl. Rar. Horti. Acad. Monac. 53. 1820 ("1819").

Acanthospermum hispidum DC., Prodr. 5 : 522. 1836; Gamble, Fl. Pres. Madras 704. 1921; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 599. 1976; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 206. 1980; Mani. & Sivar., Fl. Calicut 151. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3 : 758. 1983; Ramach. & Nair, Fl. Cannanore 240. 1988; Vajravelu, Fl. Palghat Dist. 247. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 251. 1994; Sivar. & Mathew, Fl. Nilambur 356. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 243. 1996. ***Njeringil***

Densely hispid herbs. Leaves 3-6 x 2-3 cm, obovate to oblanceolate, base cuneate, margin entire to coarsely dentate-serrate, apex acute, chartaceous, pilose on both sides, subsessile. Capitulum solitary, axillary, subsessile, heterogamous, 4-5 mm across, yellow involucral bracts 2-seriate, inner prickly with 2 awns. Ray flowers female, 5-8, ligule c. 1.5 mm long, elliptic. Disc flowers bisexual, 5-7, 1.5-2 mm long, yellow. Pappus 0. Stamens 5; anther-base sagittate. Achenes of ray florets hooked hairy with 2 apical divergent spinescent bristles, 5-6 mm long, obovate-cuneate, compressed; achenes of disc flowers sterile, glandular.

Fl. & Fr. : Oct.-Dec.

Distr.: Indigenous to S. America. Now introduced into other tropical countries. A common weed in waste places, roadsides and sea-coast. *CNS 1156* (Alappuzha).

ADENOSTEMMA J. R. Forster & J. G. A. Forster

Charact. Gen. 89, t. 45. 1776.

Adenostemma lavenia (L.) Kuntze, Rev. Gen. Pl. 1 : 304. 1891; Gamble, Fl. Pres. Madras 677. 1921; Koster., Blumea 1: 471. 1935; Panigr., Kew Bull. 30 : 648. 1975; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 600. 1976; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 139. 1980; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 759. 1983; Mani., Fl. Silent Valley 146. 1988; Ramach. & Nair, Fl. Cannanore 241. 1988; Vajravelu, Fl. Palghat Dist. 247. 1990; Mohanan & Henry, Fl.

Thiruvananthapuram 251. 1994; Sivar. & Mathew, Fl. Nilambur 357. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 243. 1996. *Verbesina lavenia* L., Sp. Pl. 902. 1753. *Adenostemma viscosum* Forest. f., Char. Gen. Pl. 90. 1776; Hook. f., Fl. Brit. India 3 : 242. 1881.

Erect herbs. Stem, leaf veins and petals glandular pubescent. Leaves 5-15 x 3-8 cm, broadly ovate to elliptic-lanceolate, base subtruncate, decurrent on a long petiole, margin coarsely serrate, apex acute, chartaceous; petiole to 5 cm long. Heads in terminal lax panicles, homogamous. Involucre bracts 2-seriate, c. 5 mm long, ovate, ciliate on margins. Florets white, bisexual. Pappus of 3-5 subulate hairs. Corolla tube slender, 3-4 mm long, lobes 5. Stamens 5; anthers glandular at tips. Style arms exserted, 2-lobed, obtuse. Achenes 3-4 mm long, curved, angled, brown, glandular-tuberculate.

Fl. & Fr. : Sept.-Dec.

Distr. : India, China, Malaya, Trop. Africa and Australia. In moist shady grounds. *CNS 1342* (Noottavanpara).

AGERATUM Linnaeus

Sp. Pl. 839. 1753.

Ageratum conyzoides. L., Sp. Pl. 839. 1753; Hook. f., Fl. Brit. India 3 : 243. 1881; Gamble, Fl. Pres. Madras 677. 1921; Koster., Blumea 1 : 484. 1935; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 601. 1976; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1 : 141. 1980; Mani. & Sivar., Fl. Calicut 151. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3 : 761. 1983; Mani., Fl. Silent Valley 147. 1988; Ramach. & Nair, Fl. Cannanore 241. 1988; Vajravelu, Fl. Palghat Dist. 248. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 252. 1994; Sivar. & Mathew, Fl. Nilambur 359. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 244. 1996.

Erect annual herbs; stem terete, pilose. Leaves 3-7 x 3-4.5 cm, broadly ovate, base truncate to cuneate, margin crenate-serrate, apex acute, hirsute on both sides; petiole to 4 cm long. Heads panicled, each 4-6 mm across. Involucral bracts 3-4 mm long, oblong-lanceolate. Corolla white; tube c. 1 mm long, 5-toothed. Stamens 5. Ovary c. 1.5 mm long.

Achenes 4-angled, c. 2 mm long, narrowly oblong, black, sparsely hirsute along the angles. Pappus scales 5, c. 2 mm long, lanceolate.

Fl. & Fr. : Most of the seasons.

Distr. : Pantropical. A common weed everywhere, with a characteristic smell. *CNS 1150* (Ezhupunna).

It is often used by local people to heal cuts and wounds.

BIDENS Linnaeus

Sp. Pl. 831. 1753.

Bidens biternata (Lour.) Merr. & Sherff ex Sherff, Bot. Gaz. 88 : 293. 1929; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 602. 1976; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1 : 229. 1980; Mani., Fl. Silent valley 149. 1988; Ramach. & Nair, Fl. Cannanore 242. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 253. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 245. 1996. *Coreopsis biternata* Lour., Fl. Cochinch. 508. 1790. *Bidens pilosa* sensu Hook. f., Fl. Brit. India 3 : 309. 1881, non L., 1753. Gamble, Fl. Pres. Madras 709. 1921.

Erect herbs to 1 m tall; stem 4-gonous. Leaves pinnatly 3-5-foliolate; leaf lets 3-7 x 1.5-3 cm, ovate-lanceolate, base cuneate, margin sharply serrate, apex acuminate, chartaceous; petiole to 2 cm long. Heads heterogamous in long peduncled corymbose panicles. Ray florets 1-seriate, female; corolla ligulate; tube 2-3 mm long; ligule 3-4 mm long, white. Disc florets bisexual, yellow; tube 3-4 mm long, lobes 5. Stamens 5. Ovary 4-angled, 1-1.5 mm long; style-arms oblong, hairy at tips. Achenes 0.5-1 cm long, cuneiform, 4-angled, black; papus bristles 3.5 mm long.

Fl. & Fr. : Most of the Seasons.

Distr. : Pantropical. Along roadsides and other waste places. *CNS 2565* (Kayamkulam).

BLAINVILLEA Cassini

Dict. Sci. Nat. 29 : 493. 1823.

Blainvillea acmella (L.) Philip., Blumea 6 : 350. 1950; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 603. 1976; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1 : 213. 1980; Mani. & Sivar., Fl. Calicut 153. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 767. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 254. 1994; Sivar. & Mathew, Fl. Nilambur 361. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 246. 1996. *Verbesina acmella* L., Sp. Pl. 901. 1753. *Eclipta latifolia* L. f.., Suppl. Pl. 378. 1781. *Blainvillea rhomboidea* Cass., Dict. Sci. Nat. 29 : 494. 1823; Gamble, Fl. Pres. Madras 706. 1921. *Blainvillea latifolia* (L. f.) DC. in Wt., Contrib. Bot. India 17. 1834; Hook. f., Fl. Brit. India 3: 305. 1880.

Erect, branched annual herbs; stem pilose. Leaves 6-10 x 3-5 cm, ovate or ovate-lanceolate, base rounded or cuneate, margins serrate, apex acuminate, hirsute on both surface; petiole to 1.5 cm. Heads axillary, solitary, heterogamous 4-5 mm across, white, rayed; peduncle to 2 cm long. Involucral bracts 1-2-seriate. Ray florets female, few; ligule 1-1.5 mm long, 2-3-lobed. Disc florets bisexual, 5-lobed. Anthers obtuse at base, appendaged at apex. Achenes dark brown, puberulous; of ray florets trigonous; of disc florets laterally compressed. Pappus of 2-5 bristles.

Fl. & Fr.: Sept.-Jan.

Distr.: Pantropical. In waste places and cultivated grounds. *CNS 1313* (Chengannur).

BLUMEA A. P. de Candolle

Arch. Bot. (Paris) 2 : 514. 1833 (*nom. cons.*).

Herbs or undershrubs, usually aromatic. Stem variously pubescent. Leaves alternate, simple, margins toothed or rarely lobed. Heads heterogamous in axillary and terminal corymbose panicles. Involucral phyllaries several seriate, outer smaller. Receptacles flat to subconvex. Female flowers outer, many-seriate; corolla tube filiform, 2-4-toothed. Bisexual flowers inner, few; corolla tube stouter, 5-lobed. Anthers 4 or 5,

base sagittate, appendaged at apex. Style-arms subulate or flat. Achenes ribbed or angled; papus uniseriate, filiform.

1a. Florets purplish ..... **B. mollis**

1b. Florets yellow.

2a. Prostrate herbs with branches radiating from the rootstock ..... **B. oxyodonta**

2b. Erect herbs.

3a. Leaves white-silky beneath ..... **B. barbata**

3b. Leaves not white-silky beneath.

4a. Panicles dense; strongly glandular plants with few eglandular hairs ..... **B. lacera**

4b. Panicles lax, diffusely branched; plants eglandular ..... **B. virens**

Blumea barbata DC. in Wight, Contrib. Bot. Ind. 14. 1834; Hook. f., Fl. Brit. India 3 : 262. 1881; Gamble, Fl. Pres. Madras 687. 1921; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 604. 1976; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1 : 171. 1980; Ramach. & Nair, Fl. Cannanore 243. 1988; Vajravelu, Fl. Palghat Dist. 249. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 255. 1994.

Erect herbs; branchlets brownish, softly villous. Leaves 2-4 x 0.6-1.5 cm, lanceolate to oblanceolate, base cuneate, margin dentate, apex acute, upper surface tomentose, lower surface densely white sericeous, sessile. Heads 3-4 mm across, 5-15 borne on axillary or terminal racemes or panicles. Involucral bracts 3-4-seriate, 2.5-5 mm long, pubescent. Flowers yellow; female flower corolla of c. 3 mm long; corolla of bisexual c. 3.5 mm long, pubescent. Achenes c. 1 mm long, sparsely puberulous, 10-ribbed, brown. Pappus white.

Fl. & Fr.: Dec.-Mar.

Distr.: Peninsular India and Sri Lanka. Common in waste lands. *CNS 1844* (Chathiyara).

Blumea lacera (Burm. f.) DC. in Wight, Contrib. Bot. India 14. 1834; Clarke, Compos. Ind. 76. 1876; Hook. f., Fl. Brit. India 2 : 263. 1881; Gamble, Fl. Pres. Madras 687. 1921; Randeria, Blumea 10 : 264. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 604.

1976. Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1 : 170. 1980; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3 : 770. 1983. *Conyza lacera* Burm. f., Fl. Ind. 180, t. 59, f. 1. 1768. *Blumea glandulosa* DC. in Wight, Contrib. Bot. India 14. 1834 *et* Prodr. 5 : 438. 1836; Thw., Enum. Pl. Zeyl. 163. 1860.

Annual herbs, 40-70 mm tall, glandular-viscid; stem simple or branched, glandular-pubescent, interspersed with a few eglandular hairs. Leaves 2.5-6 x 1.5-3.5 cm, broadly elliptic or oblanceolate, the lower ones often pinnately or lyrately lobed, base attenuate, margin irregularly crenate-dentate, apex acute or obtuse, glandular-puberulent on both surfaces; petiole 0.5-2 cm long. Capitula 3-4 mm across, yellow, numerous, in terminal panicles. Involucral bracts c. 4-seriate; outer ones c. 2 mm long, lanceolate, glandular-hairy without; inner ones c. 5 mm long, linear-oblong, apex ciliate, acuminate. Flowers heterogamous, not rayed. Female flowers outer; corolla c. 3 mm long; ovary oblong; style 2-4 mm; stigma subulate. Bisexual flowers inner; corolla c. 4 mm long, lobes glandular puberulous; stamens subexserted. Achenes c. 0.5 mm long, linear, 5-ribbed, brown. Pappus white.

Fl. & Fr. : Jan.-May.

Distr. : Africa, Sri Lanka, India, Malaysia, Australia. In wastelands, roadsides and fallow fields. *CNS 1578* (Kidangara).

Blumea mollis (D. Don) Merr., Philipp. J. Sci. (Bot.) 5 : 395. 1910; Randeria, Blumea 10 : 261. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 605. 1976; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1 : 169. 1980; Mani. & Sivar., Fl. Calicut 150. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3 : 771. 1983; Mani., Fl. Silent Valley 152. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 66. 1988; Ramach. & Nair, Fl. Cannanore 244. 1988; Vajravelu, Fl. Palghat Dist. 249. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 256. 1994; Sivar. & Mathew, Fl. Nilambur 364. 1996. *Erigeron molle* D. Don, Prodr. Fl. Nepal. 172. 1825. *Blumea wightiana* DC. in Wight, Contrib. Bot. India 14. 1834; Hook. f., Fl. Brit. India 3 : 261. 1881; Gamble, Fl. Pres. Madras 686. 1921. *Blumea neilgherrensis* Hook. f., Fl. Brit. India 3 : 261. 1881; Gamble, Fl. Pres. Madras 2: 688. 1921. ***Nari-patsja*** Rheede, Hort. Malab. 10 : 123, t. 62. 1690.

Herbs. Whole plant densely pubescent mixed with few glandular hairs. Leaves 3-8 x 2-4 cm, base cuneate, decurrent, margin coarsely serrate, apex acute, pubescent above, cottony below. Heads pinkish-purple, c. 5 mm across in terminal and axillary corymbose panicles. Involucre bracts many-seriate, 2-4 mm long, linear-lanceolate, silky pubescent; inner ones scarious, ciliate on margins. Flowers heterogamous, not rayed. Female flowers outer, many-seriate; corolla tube, 2-3 mm long, minutely 2-4-lobed. Bisexual flowers inner, few; corolla tube 2-3 mm long, lobes 5, glandular without. Achenes 7-8 mm long, 7-8-ribbed, hairy on ribs. Pappus white silky hairs, caducous.

Fl. & Fr.: Feb.-May.

Distr. : Tropical Asia and Africa. Common along waysides. *CNS 2566* (Palamel).

Blumea oxyodonta DC. in Wight., Contrib. Bot. India 15. 1834; Hook. f., Fl. Brit. India 3: 266. 1881; Gamble, Fl. Pres. Madras 686. 1921; Randiera, Blumea 10: 280. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 606. 1976; Mani. & Sivar., Fl. Calicut 150. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 773. 1983; Ramach. & Nair, Fl. Cannanore 245. 1988; Sivar. & Matthew, Fl. Nilambur 365. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 247. 1996.

Prostrate herbs with thick root stock; stem several from the root stock, pubescent. Leaves radical and cauline; radical larger oblanceolate, dentate, obtuse; cauline ones smaller oblong, dentate, sessile, young leaves densely silky. Heads c. 5 mm across, few in axillary and terminal panicles, heterogamous, non-rayed, yellow. Involucral bracts many-seriate; outer c. 3 mm long, lanceolate, scabrid-pubescent; intermediate ones oblong-lanceolate; inner linear-lanceolate. Female flowers outer; corolla c. 3 mm long; ovary oblong. Bisexual flowers inner; corolla c. 3.5 mm long; stamens 5. Achenes 4-angled, pubescent.

Fl. & Fr. : Jan.-April.

Distr. : Indo-Malesia and South China. Common in waste lands. *CNS 1845* (Mannarsala).

Blumea virens Wall. ex DC. in Wight, Contrib. Bot. India 14. 1834; Hook. f., Fl. Brit. India 3: 264. 1881; Gamble, Fl. Pres. Madras 687. 1921; Randeria, Blumea 10: 272. 1960;

Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 606. 1976; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 173. 1980; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 773. 1983. *Conyza virens* Wall., Cat. 3037. 1831, nom. nud. *Blumea membranacea* var. *gardneri* Hook. f., Fl. Brit. India 3: 265. 1881.

Erect annual herbs, 35-80 cm tall; stem generally simple, striate. Leaves 4-10 x 1-3 cm, lower ones usually lyrately lobed with 1-2 pairs of triangular-oblong lateral lobes; upper leaves obovate to lanceolate, base attenuate, margins irregularly serrate-dentate, apex acute or shortly acuminate, thin, sparsely pilose on both surfaces. Capitula 3-4 mm across, numerous in lax terminal panicles. Involucral bracts 4-5-seriate; outer ones c. 2 mm long, lanceolate; inner ones c. 4 mm long, linear. Flowers heterogamous, not rayed, yellow. Female flowers outer; corolla c. 4 mm long; ovary oblong. Bisexual flowers inner; corolla 4- 4.5 mm long, lobes minutely papillate. Achenes c. 1 mm long, linear-elliptic, c. 8-ribbed. Pappus white.

Fl. & Fr. : Nov.-Jan.

Distr. : Sri Lanka, India, Burma, Malesia and China. In waste lands and on moist walls. *CNS 1435* (Chathurthyakari).

CHROMOLAENA A. P. de Candolle
Prodr. 5: 133. 1836.

Chromolaena odorata (L.) King & Robinson, Phytologia 20: 204. 1970; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 608. 1976; Mani. & Sivar., Fl. Calicut 151. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 776. 1983; Mani., Fl. Silent Valley 152. 1988; Ramach. & Nair, Fl. Cannanore 247. 1988; Vajravelu, Fl. Palghat Dist. 250. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 257. 1994; Sivar. & Mathew, Fl. Nilambur 366. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 248. 1996. *Eupatorium odoratum* L., Syst. Nat. ed. 10, 2: 1205. 1759; Hook. f., Fl. Brit. India 3: 244. 1881; Koster., Blumea 25. 249. 1979; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 143. 1980. ***Communistu-pacha.***

Aromatic subshrubs. Leaves 6-8 x 2.5-4.5 cm, deltoid-ovate, base cuneate, margin coarsely serrate, apex acute or acuminate, bassally 3-nerved, densely pubescent, glandular on upper side; petiole to 3 cm long. Heads homogamous in terminal and axillary corymbose panicles, non-rayed, white. Involucral bracts many seriate, scarious, unequal; outer ovate, concave; inner oblong to linear. Florets bisexual. Corolla tube 4-5 mm long, 5-lobed. Stamens 5, subexserted. Style-arm deeply 2-3 mm long, linear, black, 3-4-ribbed, hairy along ribs. Pappus white-silky barbellate.

Fl. & Fr. : Nov.-Feb.

Distr. : Native of Tropical America, widely distributed in Tropical parts of the world.

An aggressive, well established weed. *CNS 1549* (Angadikkal).

Leaf juice quickly heals minor wounds.

CONYZA Lessing

Syn. Gen. Comp. 203. 1832 (*nom. cons.*).

Conyza bonariensis (L.) Cronq., Bull. Torrey Bot. Club 70: 632. 1943; Grierson, Ceylon J. Sci., Biol. Sci. 10: 53. 1972 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 158. 1980; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 777. 1983; Vajravelu, Fl. Palghat Dist. 251. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 258. 1994. *Erigeron bonariensis* L., Sp. Pl. 863. 1753; Matthew, Rec. Bot. Surv. India 20: 147. 1969. *Erigeron linifolius* Willd., Sp. Pl. 3: 1995. 1803; Clarke, Comp. Ind. 50. 1876; Hook. f., Fl. Brit. India 3: 254. 1881. *Conyza ambigua* DC., Fl. Franc. Suppl. 6: 468. 1815; Gamble, Fl. Pres. Madras 683. 1921.

Erect annual herbs 40-120 cm tall. Lower leaves 6-14 x 1-2.5 cm, narrowly oblanceolate, base attenuate, margins coarsely serrate-dentate, apex acute, pubescent on both surfaces, subsessile; upper leaves smaller, linear-lanceolate, entire-margined. Capitula c. 5 mm across, cream in colour, in terminal, lax, racemose panicles. Phyllaries purple-tinged, linear-lanceolate. Female corollas 3-4 mm long, minutely ligulate at the

apex. Bisexual flowers 6-18 per capitulum; corollas c. 3 mm long. Achenes c. 1 mm long, subglabrous.

Fl. & Fr.: Dec.-Apr.

Distr.: Pantropic weed of American origin. In waste grounds. *CNS 1579* (Cheriyanad).

COSMOS Cavanilles

Icon. 1: 9, t. 14. 1791.

Cosmos caudatus Kunth, Nov. Gen. Pl. 4: 188. 1820; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 225. 1980; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3 : 779. 1983. *Cosmos bipinnatus* auct., non Cav., 1791: Trimen, Handb. Fl. Ceylon 3: 40. 1895; Mani. & Sivar., Fl. Calicut 155. 1982. ***Akasha-Vendi.***

Erect annual herbs, 0.5-1.5 m tall. Leaves bipinnatisect or somewhat tripinnatisect, pinnules opposite, 1.5-3 x 0.3-0.5 cm, oblong-lanceolate, apex acute to apiculate; petiole up to 6 cm long. Capitula solitary, axillary or terminal, heterogamous, c. 4 cm across, radiate; peduncle 10-15 cm long. Involucre broadly campanulate; outer phyllaries 8, c. 1 cm long, linear-lanceolate; inner phyllaries 1-1.3 cm long, oblong-lanceolate. Ray flowers 8; corolla tube c. 1 mm long, ligules 1-1.3 x 0.4-0.7 cm, obovate, 3-lobed at apex, pink. Disc flower corollas 5-7 mm long, yellow. Achenes 2-2.5 cm long, curved, black, rostrate, ending in awns.

Fl. & Fr. : Jan.-Aug.

Distr. : Native of West Indies and Central America, now introduced in Mauritius, India, Sri Lanka and Philippines. Road sides and waste grounds. Garden escape. *CNS 2567* (Thalavady).

CRASSOCEPHALUM Moench

Meth. 516. 1794.

Crassocephalum crepidioides (Benth.) Moore, J. Bot. London 50: 211. 1912; Belcher, Kew Bull. 462. 1955; Steenis, J. Ind. Bot. Soc. 46: 463. 1967; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 610. 1976; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon

1: 248. 1980; Mani. & Sivar., Fl. Calicut 150. 1982; Nair & Srinivasan, J. Econ. Tax. Bot. 3: 289. 1982; Ramach. & Nair, Fl. Cannanore 248. 1988; Vajravelu, Fl. Palghat Dist. 251. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 258. 1994; Sivar. & Mathew, Fl. Nilambur 368. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 248. 1996. *Gynura crepidioides* Benth. in Hook., Niger Fl. 438. 1849.

Erect herbs; young shoots puberulous. Leaves 5-10 x 2-4.5 cm, obovate to oblanceolate, margins serrate; lower leaves variously lobed, auricled at base; petiole to 2 cm long. Heads 3-7 on long-peduncled terminal corymbs, cylindric, to 1 cm long, non-rayed; peduncles 8-20 cm long. Involucre campanulate. Corolla orange to brick-red, 0.8-1 cm long, lobes 5. Style-arms slender, hispid. Achenes 2-3 mm long, ribbed, hairy on ribs. Pappus hairs soft white 1-1.2 cm long.

Fl. & Fr. : Jul. - Dec.

Distr. : Native of tropical Africa, now naturalized throughout world Tropics. In waste lands. *CNS 1846* (Chennithala).

ECLIPTA Linnaeus

Mant. 2: 157, 286. 1771 (*nom. cons.*).

Eclipta prostrata (L.) L., Mant. Pl. 2: 286. 1771; Santapau, J. Bombay Nat. Hist. Soc. 54: 475. 1957; Koster., Blumea 25: 273. 1979; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 212. 1980; Koyama, Taxon 30: 505. 1981; Mani. & Sivar., Fl. Calicut 152. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 783. 1983; Ramach. & Nair, Fl. Cannanore 249. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 67. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 259. 1994; Sivar. & Mathew, Fl. Nilambur 369. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 249. 1996. *Verbesina prostrata* L., Sp. Pl. 902. 1753. V. *alba* 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 795. 1921; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 612. 1976; Vajravelu, Fl. Palghat Dist. 252. 1990. ***Cajennaem*** Rheede, Hort. Malab. 10: 81-82, t. 41. 1690. ***Kayyonni.***

Diffuse or ascending herbs; stem and leaves sparsely strigose with bulbous based hairs. Leaves 2-5 x 0.5-1 cm, elliptic or oblong-lanceolate, base obtuse, margin faintly serrate-dentate, apex acute, both surface strigose, sessile or subsessile. Heads axillary, solitary, heterogamous, rayed, white; peduncle to 3 cm long. Phyllaries of outer series 5, broader; inner series 3, narrower. Ray florets female; corolla tube c. 0.5 mm long; ligules 1.5-2.5 mm long. Disc florets bisexual; Corolla tubular, lobes 4. Anthers sagittate at base. Achenes trigonous or compressed, black. Pappus of 2 small scales.

Fl. & Fr. : Jul. - Oct.

Distr. : Pantropical. Common on wet marshy places, along paddy-field margins. *CNS 1274* (Nedumudi).

ELEPHANTOPUS Linnaeus

Sp. Pl. 814. 1753.

Elphantopus scaber L., Sp. Pl. 814. 1753; Hook. f., Fl. Brit. India 3: 242. 1881; Gamble, Fl. Pres. Madras 676. 1921; Koster., Blumea 1: 456. 1935; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 612. 1976; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 135. 1980; Mani. & Sivar., Fl. Calicut 149. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 784. 1983; Ramach. & Nair, Fl. Cannanore 249. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 67. 1988; Vajravelu, Fl. Palghat Dist. 252. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 260. 1994; Sivar. & Mathew, Fl. Nilambur 370. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 250. 1996. ***Ana-schovadi*** Rheede, Hort, Malab. 10: 13-14, t. 7. 1690. ***Ana-schovadi.***

Scapigerous herbs; whole plant scabrous. Leaves radical, rossetted at base, 6-18 x 2-5 cm, obovate to oblong or oblanceolate, base attenuate, margin crenate, apex obtuse or broadly acute, strigose above; cauline leaves small, narrow, sessile, base amplexicaule. Heads, homogamous, non-rayed, sessile, aggregated in dense, stalked glomerules, substened by 3 ovate, reduced leaves. Involucral bracts 2-seriate, scarious. Flowers 2-5, bisexual. Corolla purple; tube 5-6 mm long, lobes 5. Stamens 5, auricled at base. Ovary 3 - 4 mm, oblong; style arms subulate. Achenes 4-5 mm long, 10-ribbed. Pappus of 4-6 spiny bristles, c. 5 mm long.

Fl. & Fr. : Dec.-Apr.

Distr. : Widely distributed throughout tropical Asia, Africa and Australia. CNS 1417 (Kanichukulangara).

Decoction of root and leaves with cumin and starch water given in diarrhoea and dysentery.

ELEUTHERANTHERA Poir. ex Bosc
Nouv. Dict. Hist. Nat. ed. 1, 7: 498. 1803.

Eleutheranthera ruderalis (Swartz) Sch.-Bip., Bot. Zeit. 24: 165. 1866; Baker & Bakh., Fl. Java 2: 407. 1965; Bennet, Curr. Sci. 34: 411. 1965 & Fl. Howrah Dist. 372. 1979; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 217. 1980; Sasi. & Nambiar, Ind. J. For. 4: 240. 1981; Sasi. & Sivar., Fl. Pl. Thrissur For. 250. 1996. *Melampodium ruderale* Swartz, Fl. Ind. Occ. 3: 1372. 1806.

Annual herbs; stem glabrescent. Leaves 2.5-5.5 x 2-3.5 cm, ovate or ovate-oblong, base cuneate, sometimes oblique, apex acute or subobtuse, pubescent on both surfaces, 3-nerved from base; petiole to 1 cm long. Heads 6-12-flowered, axillary, homogamous, non-rayed; peduncle 0.2-1 cm long, erect at first, becomes curved in fruit. Involucral bracts in 2 series, outer leafy, 5-8 x 2-3 mm. Flowers bisexual. Corolla yellow, tubular, 3-4 mm long, 5-lobed. Anthers sagittate at base. Achenes 3-3.5 mm long, obovoid, slightly angled, tubercled, finely pubescent.

Fl. & Fr. : Nov.-May.

Distr. : Native of Tropical America; now established in several Asian countries.

A weed in cultivated lands and in waste places. *CNS 1149* (Alappuzha).

EMILIA Cassini
Bull. Sci. Soc. Philom. Paris 1817: 68. 1817.

Emilia sonchifolia (L.) DC. ex Wight, Contrib. Bot. India 24. 1834; Hook. f., Fl. Brit. India 3: 336. 1881; Gamble, Fl. Pres. Madras 716. 1921; Ramamoorthy in Sald. & Nicols.,

Fl. Hassan Dist. 614. 1976; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 251. 1980; Mani. & Sivar., Fl. Calicut 149. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 787. 1983; Ramach. & Nair, Fl. Cannanore 250. 1988; Mani., Fl. Silent Valley 154. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 67. 1988; Vajravelu, Fl. Palghat Dist. 252. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 261. 1994; Sivar. & Mathew, Fl. Nilambur 371. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 251. 1996. *Cacalia sonchifolia* L., Sp. Pl. 835. 1753. ***Muel-schevi*** Rheede, Hort. Malab. 10: 135, t. 68. 1690. ***Muyalcheviyan.***

Erect or diffuse herbs. Leaves radical and cauline; radical leaves 4-10 x 1-3 cm, lyrate-pinnatifid with large terminal lobes, semi-orbicular; cauline leaves small, obovate to spathulate. Heads homogamous, not rayed, 1-3 on long slender peduncles. Involucral bracts cylindric, uniseriate, 6-8 mm long, oblong-lanceolate. Florets bisexual. Corolla pink, 3-3.5 mm long, wider to the mouth, lobes 5. Stamens 5; anthers 1-1.5 mm long. Ovary c. 1.5 mm long; style-arms acute. Achenes 1-2 mm long, 5-ribbed, hispid. Pappus white silky, 5-6 mm long.

Fl. & Fr. : Oct.- Apr.

Distr. : Tropical and subtropical regions of Asia and Africa. Common along roadsides, fallow fields, etc. *CNS 1053* (Vandanam).

Juice of leaves dropped into eyes to cure night blindness and inflammation.

EPALTES Cassini

Bull. Sci. Soc. Philom. Paris 1818: 139. 1818.

Epaltes divaricata (L.) Cass., Bull. Bot. Sci. Soc. Philom. Paris 1818: 139. 1818; DC. in Wight, Contrib. Bot. India 6. 1834; Hook. f., Fl. Brit. India 3: 274. 1881; Gamble, Fl. Pres. Madras 691. 1921; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 614. 1976; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 178. 1980; Mani. & Sivar., Fl. Calicut 151. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 788. 1983; Ramach. & Nair, Fl. Cannanore 250. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 261. 1994; Sivar. & Mathew, Fl. Nilambur 372. 1996. *Ethulia divaricata* L., Mant. Pl. 10. 1767.

Erect annual herbs; branchlets winged. Leaves simple, alternate, 2-6 x 0.7-1 cm, lanceolate or oblanceolate, base cuneate, decurrent, margin faintly dentate, apex acute, coriaceous, subsessile. Heads heterogamus, 4-6 mm across, disciform, 1-3 in terminal clusters, non-rayed. Phyllaries multi-seriate, scarious, acuminate. Florets pink to purple; outer florets female, inner bisexual. Female corollas 1-1.5 mm long; bisexual flower corollas 2-3 mm long. Stamens 5, included. Ovary linearly oblong. Achenes c. 1 mm long, oblong, with 10 paler ribs, brown.

Fl. & Fr. : Dec.-Feb.

Distr. : India, Myanmar, China and Java. In wet or marshy lowlands and as a weed in cultivated fields. *CNS 1230* (Thuravoor).

GRANGEA Adanson

Fam. 2: 121, 563. 1763.

Grangea maderaspatana (L.) Poir. in Lamk., Encyl. (suppl.) 2: 825. 1812; Wight, Ic. t. 1097. 1846; Hook. f., Fl. Brit. India 3: 247. 1881; Gamble Fl. Pres. Madras 680. 1921; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 617. 1976; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 150. 1980; Mani. & Sivar., Fl. Calicut 150. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 796. 1983; Ramach. & Nair, Fl. Cannanore 251.1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 67. 1988; Vajravelu, Fl. Palghat Dist. 253. 1990; Sasi. & Sivar., Fl. Pl. Thrissur For. 251. 1996. *Artemisia maderaspatana* L., Sp. Pl. (ed. 2) 1190. 1763. ***Nelam-pata*** Rheede, Hort. Malab. 10: t. 49. 1690.

Prostrate or decumbent herbs; stem pubescent and glandular. Leaves alternate, 3-5-lobed or pinnatifid, 2-6 x 1-3 cm, subsessile. Heads 1-1.5 cm across, subglobose, heterogamous, terminal or leaf-opposed, solitary, non-rayed. Involucral phyllaries few-seriate, pubescent. Ray florets female. Disc florets bisexual. Corolla c. 2 mm long yellow, glandular. Stamens 5; anthers obtuse at base. Stigma bifid. Achenes 1-1.5 mm long, flattened, puberulent and glandular. Pappus cupular, fibriate at margins, white.

Fl. & Fr. : Jan.-May.

Distr. : Tropical Africa, India, China and Malaya. In sandy soils and river beds. *CNS 1272* (Nedumudi).

LAGASCEA Cavanilles

Anales Cieno. Nat. 6: 331. 1803.

Lagascea mollis Cav., Anales Cieno. Nat. 6: 333, t. 44. 1803; Clarke, Compos. Ind. 131. 1876; Hook. f., Fl. Brit. India 3: 302. 1881; Gamble, Fl. Pres. Madras 703. 1921; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 618. 1976; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 204. 1980; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 804. 1983; Ramach. & Nair, Fl. Cannanore 252. 1988; Vajravelu, Fl. Palghat Dist. 254. 1990.

Erect, annual, white-pubescent herbs. Leaves opposite or alternate, 1.5-4.5 x 1-2 cm, ovate or elliptic-lanceolate, base attenuate, margins distantly serrate, apex acuminate, densely whitish pubescent on both surfaces; petiole to 2 cm long. Capitula 1-flowered, aggregated in solitary, terminal, long-peduncled, disciform glomerule, 1-1.5 cm across. Involucre c. 4 mm long, tubular-campanulate, lobes purplish. Flowers white, bisexual, c. 4 mm long, tubular-campanulate; lobes 5, ovate, acute. Stamens 5, included. Ovary oblong. Achenes c. 3 mm long, compressed or 3-angled, black, weakly ribbed.

Fl. & Fr.: Sept.-Dec.

Distr.: Native of tropical America, now adventive in India and Malaya. In waste places. *CNS 2568* (Mavelikkara).

LAUNAEA Cassini

Dict. Sci. Nat. 25: 61, 321. 1822.

Launaea sarmentosa (Willd.) Kuntze, Rev. Gen. Pl. 1: 350. 1891; Grierson, Ceylon J. Sci., Biol. Sci. 60. 1972 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 276. 1980; Mani. & Sivar., Fl. Calicut 148. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 807. 1983; Ramach. & Nair, Fl. Cannanore 253. 1988. *Prenanthes sarmentosa* Willd., Phytographia 10, t. 6, f. 2. 1794 & Sp. Pl. 3: 1540. 1803. *Launaea pinnatifida* Cass., Ann.

Sc. Natur. (ser. 1) 23: 85. 1831; Hook. f., Fl. Brit. India 3: 416. 1881; Gamble, Fl. Pres. Madras 733. 1921.

Glabrescent, creeping herbs with milky sap, rooting at nodes. Leaves in rosettes, 2-9 x 0.6-1.7 cm, oblanceolate-sinuate, base attenuate, margins denticulate, apex obtuse or acute, fleshy. Heads cylindric, peduncles, yellow, solitary or fascicled, homogamous, ligulate; peduncle 0.5-2.5 cm long. Involucre 1-1.5 cm long, urceolate-campanulate; phyllaries 3 -4-seriate. Florets all ligulate; ligules c. 7 x 2 mm; basal tube 4-5 mm long. Achenes 4-6 mm long, 4-5-ribbed, black, truncate. Pappus of many-seriate silky white hairs.

Fl. & Fr. : Sept.-Nov.

Distr. : India, Malesia, East Africa and Mauritius. Common along the sea-coast. *CNS 1064* (Ambalapuzha).

MIKANIA Willdenow

Sp. Pl. 3 (3): 1742. 1803 (*nom. cons.*).

Mikania cordata (Burm. f.) Robins., Contr. Gray Herb. 104: 65. 1934; Koster., Blumea 1: 504. 1935; Nair, Rubb. Board Bull. 9: 28. 1968; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 146. 1980; Ramach. & Nair, Fl. Cannanore 253. 1988; Sasi. & Sivar., Fl. Pl. Thrissur For. 251. 1996. *Eupatorium cordatum* Burm. f., Fl. Ind. 176, t. 58, fig. 2. 1768. *Mikania scandens* auct., non L., 1753: Clarke, Comp. Ind. 34. 1876 & Fl. Brit. India 3: 244. 1881.

Climbers. Leaves opposite, 4-10 x 2-7 cm, triangular ovate, base cordate, margin irregularly dentate or subentire, apex acuminate, basally 5-7-nerved, membranous, glabrescent; petiole c. 4 cm long. Heads homogamous, 3-4 mm across, non-rayed, numerous in axillary corymbs. Involucral phyllaries 4-5, uniseriate. Florets 4, white or pale yellow. Corolla tubular, 5-lobed at apex. Anthers obtuse at base. Achenes to 1 mm long, 4-angled, brown, glandular. Pappus white, uniseriate, connate at base.

Fl. & Fr. : Most of the seasons.

Distr. : China, Malesia, Philippines, India and Tropical Africa. Very extensive climbers. A fast spreading weed. *CNS 1181* (Alappuzha).

PARTHENIUM Linnaeus

Sp. Pl. 988. 1753.

Parthenium hysterophorus L., Sp. Pl. 988. 1753; Rao, J. Bombay Nat. His. Soc. 54: 218. 1956; Mahesh., Curr. Sci. 35: 181. 1966; Ellis & Swaminath., J. Bombay Nat. His. Soc. 66: 233. 1969; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 620. 1976; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 809. 1983; Vajravelu, Fl. Palghat Dist. 259. 1990; Sivar. & Mathew, Fl. Nilambur 373. 1996.

Erect, branched, pubescent herbs. Leaves pinnatifid; pinnules 5-12 x 0.4-0.7 cm, lanceolate-oblong, base ducurrent. Heads heterogamous, rayed in lax, terminal, dichotomous panicles. Ray florets female with pappus of 2 reflexed awns. Disc florets bisexual without pappus. Achenes compressed, puberulous along the sides, 3-quetrous.

Fl. & Fr.: Mar.-Apr.

Distr. : A native of America, now Pantropical. A widespread weed in arid parts of India causing allergy and skin ailments; this has recently invaded Kerala. *CNS 1580* (Mavelikkara).

PHYLLOCEPHALUM Blume

Bijdr. 888. 1826.

Phyllocephalum rangacharii (Gamble) Narayana, Curr. Sci. 51: 438. 1982; Sivar. & Mathew, Fl. Nilambur 374. 1996. *Centratherum rangacharii* Gamble, Kew Bull. 1920: 338. 1920 & Fl. Pres. Madras 667. 1921.

Annual herbs; stem loosely moniliform hairy. Leaves alternate, 4-9 x 1.5-3 cm, ovate or elliptic-lanceolate, base attenuate, margin distantly denticulate, apex shortly acuminate, lower surface white silky-tomentose, loosely moniliform hairy above. Heads solitary or 2-3 at tip of long slender peduncles, 1-1.2 cm across, disciform, homogamous. Involucre bracts many-seriate; outer leafy, 5-8 x 3-3.5 mm, elliptic-ovate, silky-tomentose

outside; inner ones scarious, lanceolate. Florets purple. Corolla 5-6 mm long; tube slender, wider at mouth. Stamens 5; anther-base obtuse. Style-arms puberulous. Achenes 1.5-2 mm long, ovoid, 8-10-ribbed. Pappus white barbellate hairs, 2-2.5 mm long.

Fl. & Fr. : Oct.-Dec.

Distr. : Endemic to Western Ghats. A weed in waste places and roadsides. *CNS 1059* (Ambalapuzha).

SPHAERANTHUS Linnaeus

Sp. Pl. 927. 1753.

Annual herbs; stem narrowly winged. Leaves alternate, base decurrent on the stem, serrate or dentate. Heads heterogamous, non-rayed, in terminal glomerules, clustered into compound heads; peduncles winged. Phyllaries many. Outer layer florets female, corolla 2-3-fid; inner florets bisexual, corolla 5-dentate at apex. Anthers obtuse at base. Receptacle glabrous. Achenes oblong, angular, pappus absent, usually tipped by persistent corolla.

1a. Heads 1-1.5 cm across, purple; wings of stem toothed; leaves villous ..... **A. indicus**

1b. Heads 0.6-1 cm across, white; wings of stem entire; leaves glabrous ..... **S. africanus**

Sphaeranthus africanus L., Sp. Pl. ed. 2, 1314. 1762; Hook. f., Fl. Brit. India 3: 275. 1881; Gamble, Fl. Pres. Madras 692. 1921; Robyns, Kew Bull. 1924: 196. 1924; Grierson, Ceylon J. Sci. Biol. Sci. 11: 16. 1974 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 182. 1980; Ramach. & Nair, Fl. Cannanore 254. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 266. 1994. *Sphaeranthus microcephalus* Willd., Sp. Pl. 3: 2395. 1884; Thw., Enum. Pl. Zeyl. 162. 1860. ***Vella-Adakkamaniyan.***

Erect annual herbs, 15-40 cm tall, with an aromatic smell; stems much branched, 3-4-winged, wings entire or distantly denticulate. Leaves 2-6 x 0.5-2.5 cm, oblanceolate or obovate, base attenuate, semi-amplexicaul and decurrent, margins serrulate, apex acute, pubescent on both surfaces, sessile. Heads 0.6-1 cm across, globose, terminal on the branches; peduncle stout, up to 2 cm long. Phyllaries c. 8 per head, 2-2.5 x 0.5-1 mm,

spathulate. Flowers white; corollas 1.5-2 mm long, lower half swollen, upper part spreading. Achenes c. 1 mm long, glandular.

Fl. & Fr.: Nov. - May.

Distr.: Africa, India, Myanmar, China, Australia, Indochina, Malaysia, Philippines and Sri Lanka. Common in marshy brackish situations. *CNS 1172* (Alappuzha beach), *CNS 2569* (Thrikunnapuzha).

Sphaeranthus indicus L., Sp. Pl. 927. 1753; Hook. f., Fl. Brit. India 3: 275. 1881, p p.; Gamble, Fl. Pres. Madras 692. 1921; Rmamoorthy in Sald. & Nicols., Fl. Hassan Dist. 623. 1976; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 181. 1980; Mani. & Sivar., Fl. Calicut 151. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 816. 1983; Ramach. & Nair, Fl. Cannanore 254. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 68. 1988; Vajravelu, Fl. Palghat Dist. 255. 1990; Sivar. & Mathew, Fl. Nilambur 377. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 253. 1996. *S. hirtus* Willd., Sp. Pl. 3: 1395. 1802; Wight, Ic. t. 1904. 1846. ***Adaca-manien*** Rheede, Hort. Malab. 10: t. 43. 1960. ***Adakkanniyan***.

Branched diffuse herbs with aromatic smell; branchlets winged, wings irregularly toothed. Leaves 2-5 x 1-2 cm, oblanceolate or spathulate, base decurrent, margin coarsely serrate-dentate, apex obtuse, white pilose on both sides, sessile. Heads c. 1.5 cm across, ovoid or globose; peduncle stout. Phyllaries few, 2-seriate, linear-lanceolate. Corolla purplish, 1.5-2 mm long, lower part becoming swollen. Stamen 5, included. Ovary angled or oblong, hirsute. Achenes of female flowers c. 1 mm long, 4-5-angled, brown; achenes of bisexual flowers c. 1.5 mm long, narrowly obconical.

Fl. & Fr.: Jan. - Apr.

Distr.: Sri Lanka, India, Nepal, Myanmar and Malesia to Australia. Common in harvested paddy fields and fallow land. *CNS 1847* (Edathuva).

Widely used in Ayurvedic medicine as an anthelmentic and tonic. The whole plant powdered and given with ghee as a remedy in hernia, poision, and stone in the urinary bladder.

SPILANTHES N. J. Jacquin

Enum. Pl. Carib. 8, 28. 1760.

Erect or decumbent herbs. Leaves opposite, serrate on margins, basally 3-nerved, chartaceous. Heads heterogamous, rayed or not, solitary or in panicles, axillary and terminal. Peduncles very long. Involucre campanulate; bracts sub-biseriate, outer smaller. Receptacles elongate. Bracteoles paleaceous, enclosing and connate with ovary as a stalk. Flowers very pungent when chewed; outer female, inner bisexual. Corolla yellow or white; limb 4-5-lobed. Anther base truncate. Style-arms recurved. Achenes of female flowers triquetrous; of bisexual flowers laterally compressed, usually ciliate or with a line of corky tissue along angles. Pappus 0 or of few short bristles.

1a. Heads rayed, yellow.

2a. Heads c. 1 cm across, usually solitary, ray florets 8-12; achenes monomorphic ... . **S. ciliata**

2b. Heads c. 0.5 cm across, usually in lax panicles; ray florets 4-6; achenes dimorphic .....**S. uliginosa**

1b. Heads discoid; white ..... **S. radicans**

Spilanthes ciliata H.B. & K., Nov. Gen. et. Sp. Pl. 4: 621. 1836; Moore, Proc. Amer. Acad. Arts and Sci. 42(20): 538. 1907; Sivar. & Mathew, Anc. Sci. Life 3(3): 171. 1984; Sivar. & Remesan, J. Econ. Tax. Bot. 10 (1): 145. 1987; Sivar. & Mathew, Fl. Nilambur 378. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 254. ***Pallu-Vedana-Cheadi.***

Diffuse herbs rooting at lower nodes; stem terete. Leaves to 7 x 4 cm, ovate, base rounded or subcordate, margins serrate, apex acute; petiole 1-2.5 cm long. Heads rayed, axillary, usually solitary, rarely 2-3 in each axil, c. 1 cm across, subglobose, turning conical, yellow; peduncle 3-8 cm long. Involucral bracts 2-seriate, shorter than ray florets, inner series narrower and smaller, up to 6 x 2 mm, elliptic, subacute. Palea c. 3 mm long, boat-shaped, concave, obtuse, keeled. Ray florets 8-12, female, ligulate; corolla tube c. 1 mm long, limb 3-lobed; pappus of 3 awns, deciduous; achenes trigonous, black, strongly margined and ciliate along the margins. Disc florets many, biusexual; pappus of 2 unequal bristles; corolla tube c. 2 mm long, lobes much shorter than the tube; achenes c. 2 x 0.5

mm, oblong, truncate at apex, laterally compressed, black, stronglyt margined, ciliate along the margins.

Fl. & Fr.: Aug. - Feb.

Distr.: Native of Neotropics, now fairly common in Kerala. A common weed in wet and moist places along road sides and waste lands. *CNS 1198* (Punnamada).

Spilanthes radicans Jacq., Collect. Bot. Chem. Hist. Nat. 11(3): 1714. 1804; Schrad. in DC., Prodr. 5: 1836; Sivar. & Mathew, Anc. Sci. Life 3: 169. 1984; Sivar. & Remesan, J. Econ. Tax. Bot. 10(1): 144. 1987; Mani., Fl. Silent Valley 159. 1988; Sivar. & Mathew, Fl. Nilambur 379. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 254. 1996. *Spilanthes ocymifolia* (Lam.) A.H. Moore, Proc. Amer. Acad. Sci. 42(20): 531. 1907.

Erect herbs; stem minutely pubescent. Leaves to 7 x 4 cm, ovate, base obtuse, margins faintly serrate or entire, apex acute; petiole 1-2 cm long. Heads axillary, solitary, 5-8 mm across, discoid, white; peduncle 4-7 cm long; receptacle glabrous. Involucral bracts oblong, obtuse, minutely hairy without. Palea c. 4 mm long, oblong, concave, boat-shaped, keeled along the back. Pappus of 2 subequal bristles, persistent. Corolla tube c. 2 mm long, base bulbous, expanded above, 4-5-lobed; lobes triangular-ovate, papilllose. Stigmatic lobes linear, recurved. Achenes dimorphic, marginal ones trigonous, others laterally compressed, ellipsoid, obcordate, brownish, the corky margins densely ciliate.

Fl. & Fr.: Aug. - Dec.

Distr.: A native of Central America and Mexico. Common in wastelands. *CNS 1848* (Mannar).

Spilanthes uliginosa Sw., Nov. Gen. Pl. Seu. Prodr. Descr. Veg. Ind. Occ. 110. 1788; DC., Prodr. 5: 264. 1836; Moore, Proc. Amer. Acad. Art. Sci. 42(20): 537. 1907; Sivar. & Mathew, Anc. Sci. Life 3(3): 171. 1984; Sivar. & Ramesan, J. Econ. Tax. Bot. 10(1): 146. 1987. *Spilanthes iabadicensis* A. H. Moore, Proc. Amer. Acad. Art. Sci. 42(20): 524. 1907; Koster. & Philipson, Blumea 6: 354. 1950; Grierson in Dassan. Fosb., Rev. Handb. Fl. Ceylon 1: 221. 1980.

Erect or diffuse herbs; stem glabrous, rooting at lower nodes. Leaves 4-7 x 1-3 cm, ovate or ovate-lanceolate, base unequal, margins irregularly serrate, apex acute; petiole 1-1.5 cm long. Heads rayed, usually in lax panicles, c. 5 mm across, ovoid, yellow; peduncle 1.5-4 cm long. Involucral bracts ovate or oblong, apex obtuse or subacute. Palea c. 2 mm long, boat-shaped, apex rounded, fimbriate, keeled. Ray florets 4-6, female; corolla tube c. 2.5 mm long, hairy, limb c. 1.5 x 1 mm, 3-lobed; style exerted, bilobed; stigma linear, recurved. Disc florets many; corolla tube c. 2 mm long, 4-lobed, lobes ovate, obtuse, papillose. Achenes c. 1.5 x 0.5 mm, dimorphic, marginal ones trigonous, central ones laterally compressed, margins sparsely ciliate; pappus of 2 unequal bristles, ray florets without pappus.

Fl. & Fr.: Nov. - Feb.

Distr.: Probably a native of Tropical America; this has been reported from Africa, Sri Lanka, Java and India. In wet or marshy places. *CNS 2570* (Aroor).

STRUCHIUM P. Browne

Civ. Nat. Hist. Jamai. 312, t. 34. 1756.

Struchium sparganophorum (L.) O. Kuntze, Rev. Gen. Pl. 366. 1891; Koster., Blumea 1: 370. 1955; Senaratna, Ceylon J. Sci., Sect. A. Bot. 12: 163. 1945; Vasudevan, Bull. Bot. Surv. India 8: 202-203. 1966; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 120. 1980; Rao *et al.*, Fl. Ind. Enum. Aster. 73. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 267. 1994. *Ethulia sparganophora* L., Sp. Pl. 2: 1171. 1763.

Erect, branched, semi-aquatic herbs; stem green, sparsely puberulous. Leaves alternate, elliptic-lanceolate, base attenuate and decurrent on the petiole at base, margins serrulate-denticulate, apex acute or acuminate; petiole to 2.5 cm long. Heads axillary, sessile, cluster of 4-5, c. 5 mm across, globose, white, homogamous. Involucre in 4-5 series, outer smaller and inner larger, triangular to oblanceolate, acuminate, greenish, margins scarious and hairy. Receptacle convex, pitted. Florets all tubular, without palea, 4-5 mm long, bisexual. Calyx of three white, 0.5 mm long, acute scales united variously, persistent. Corolla 2-3 mm long, white, tube narrow, lobes 5, spreading glandular.

Stamens 3; filaments filiform, white. Ovary c. 1.5 mm long; stigma bifid, purple. Achenes c. 1.5 mm long, triangular, blackish.

Fl. & Fr.: Aug. - Feb.

Distr.: Tropical America, Africa and Malesia; recently introduced in India. Along the banks of freshwater ponds, flooded paddy fields and other wet or marshy places. *CNS 1278* (Nedumudi), *CNS 1479* (Kanjippadam).

SYNEDRELLIA J. Gaertner

Fruct. 2: 456. 1791 (*nom. cons.*).

Synedrella nodiflora (L.) Gaertyn., Fruct. 2: 456, t. 171. 1791; Hook. f., Fl. Brit. India 3: 308. 1881; Gamble, Fl. Pres. Madras 708. 1921; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 624. 1976; Koster., Bumea 25: 271. 1979; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 222. 1980; Mani. & Sivar., Fl. Calicut 152. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 818. 1983; Mani., Fl. Silent Valley 159. 1988; Ramach. & Nair, Fl. Cannanore 255. 1988; Vajravelu, Fl. Palghat Dist. 256. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 267. 1994; Sivar. & Mathew, Fl. Nilambur 379. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 254. 1996. *Verbesina nodiflora* L. in Juslenius, Cent. Pl. 1: 28. 1755.

Erect branches herbs; stem adpressed hairy. Leaves opposite, 4-8 x 2-4 cm, elliptic-ovate, base cuneate to truncate, narrowly winged on the petiole, margin serrate, apex acute, scabrous on both sides, basally 3-nerved; petiole to 3 cm. Heads solitary, axillary and terminal, few-flowered, 0.5-1 cm across, radiate. Phyllaries 2-seriate; outer foliaceous, inner paleaceous. Flowers heterogamous, yellow. Ray flowers: female; corolla tube 2-2.5 mm long; ligule 1-2 mm long, 2-3-lobed; ovary 3 mm long, oblong, winged; style-arms acute. Disc flowers; bisexual; corolla tube 2-3 mm long, lobes 5; stamens 5, included, ovary 2-3 mm long. achenes 3-4 mm long, dimorphic: of ray florets dorsally compressed, with lacerate wings; of disc florets trigonous, not winged, with 2 or 3 rigid awns.

Fl. & Fr.: Most of the seasons.

Distr.: Native of W. Indies; naturalised in Tropical Asia. Common weed in open areas. *CNS 1135* (Vandanam).

TITHONIA Desfontaines ex A.L. Jussieu

Gen. 189. 1789.

Tithonia diversifolia (Hemsl.) A. Gray, Proc. Amer. Acad. Arts. 19: 5. 1883; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 625. 1976; Koster., Blumea 25: 265. 1979; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 218. 1980; Mani. & Sivar., Fl. Calivut 154. 1982; La Duke, Rhodora 84: 498. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 820. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 268. 1994; Sivar. & Mathew, Fl. Nilambur 380. 1996. *Mirasola diversifolia* Hemsl., Biol. Gent. Amer., Bot. 2: 168, t. 47. 1881.

Perennial shrubs, 2-3 m tall. Leaves alternate, 5-12 x 3-7 cm, digitately 3-5-lobed or the upper ones oblanceolate or ovate-deltoid, unlobed, trinerved; lobes ovate-acuminate, margin crenate, pubescent; petiole 2-6 cm long. Heads yellow, solitary, large, heterogamous, rayed; peduncle to 6 cm long, apex swollen and hollow. Phyllaries multiseriate, oblong-lanceolate, finely pubescent, acute or obtuse at apex. Ray flowers c. 12, basal tube 1-2 mm long, ligule 4-6 x 0.7-1.5 cm, elliptic. Achenes 4-angled, hairy, dark-brown. Pappus of 4-5 scales and 2 awns.

Fl. & Fr.: Sept. - Nov.

Distr.: Native of Tropical South America, introduced in India, China, Malesia, Myanmar and South Africa. Cultivated as an ornamental and also found running wild along banks of stream. *CNS 2571* (Thazhakkara).

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; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 626. 1976; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 232. 1980; Mani. & Sivar., Fl. Calicut 154. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 821. 1983; Mani, Fl.

Silent Valley 160. 1988; Ramach. & Nair, Fl. Cannanore 255. 1988; Vajravelu, Fl. Palghat Dist. 256. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 268. 1994; Sivar. & Mathew, Fl. Nilambur 381. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 255. 1996.

Procumbent herbs, rooting at lower nodes, stem pilose. Leaves 2-4 x 1-3.5 cm, ovate, base cuneate, margin coarsely dentate or trilobed, apex acute, hirsute on both sides. Heads 1.5-2 cm across, heterogamous, radiate, yellowish-white, solitary, terminal, peduncle 10-20 cm long, hirsute and glandular. Phyllaries 2-3-seriate, outer herbaceous; inner scarious. Ray florets female, few. Disc florets bisexual, many. Stamens 5, subexerted. Achenes 2-2.5 mm long, obconical, blackish, faintly ribbed. Pappus of slender setose hairs.

Fl. & Fr.: Most of the seasons.

Distr.: Native of Tropical America, now widespread throughout tropics and subtropics. Common weed along road sides; wastelands and paddy fields. *CNS 1131* (Mannar).

VERNONIA Schreber

Gen. 1: 541. 1791. (*nom. cons.*).

Herbs or climbing shrubs. Leaves alternate, simple. Inflorescence a lax or dense, terminal and/or axillary, corymbose panicle. Capitula homogamous, disciform; receptacle convex. Involucre tubular or campanulate; phyllaries multi-seriate. Flowers pink or purple, bisexual. Pappus 2 or 1-seriate. Corolla tubular, campanulate; lobes 5, equal. Stamens 5; anthers linear. Ovary oblong; stigma 2-fid, recurved. Achenes smooth, angled or ribbed.

1a. Climbing shrubs; capitula 1-5-flowered; achenes angled ..... **V. elaeagnifolia**

1b. Erect herbs; capitula more than 10-flowered; achenes smooth ..... **V. cinerea**

Vernonia cinerea (L.) Less., Linnaea 4: 291. 1829; Hook. f., Fl. Brit. India 3: 233. 1881; Gamble, Fl. Pres. Madras 676. 1921; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 627. 1976; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 133. 1980; Mani. & Sivar., Fl. Calicut 149. 1982; Rani. & Matthew in Matthew, Fl. Tam. Carnatic 3: 827. 1983; Nicols, Suresh & Mani., An Interpr. Hort. Malab. 69. 1988; Ramach. & Nair, Fl.

Cannanore 256. 1988; Vajravelu, Fl. Palghat Dist. 257. 1990; Mohanan & Henry, fl. Thiruvananthapuram 269. 1994; Sivar. & Mathew, Fl. Nilambur 382. 1996; Sasi. Sivar., Fl. Pl. Thrissur For. 256. 1996. *Conyza cinerea* L., Sp. Pl. 862. 1753. ***Puam curundata*** Rheede, Hort. Malab. 10: 127, t. 64. 1690. ***Puvankurunal.***

Erect herbs. Leaves very variable, larger towards base, 2-3.5 x 1-2 cm, elliptic-lanceolate, attenuate at base, acute at apex, pubescent on both sides; upper ones very small. Heads in terminal panicles, 4-6 mm long, homogamous, non-rayed. Involucral phyllaries many-seriate, 3-5 mm long, oblong to linear lanceolate. Flowers all bisexual, tubular. Corolla pink, tube 3-4 mm long; lobes 5. Stamens 5, included. Style-arms linear acute. Achenes 4 or 5-angled, 1-1.5 mm long, villous. Pappus 2-seriate, outer hairs minute, to 1 mm long, inner hairs 4-5 mm long, white.

Fl. & Fr.: Most of the seasons.

Distr.: Throughout the tropics. A weed on wastelads and road sides. *CNS 1177* (Choolatheruvu), *CNS 1177* (Choolatheruvu).

Used in Ayurvedic medicines.

Vernonia elaeagnifolia DC., Prodr. 5: 22. 1836; Clarke, Compos. Ind. 24. 1876; Hook. f., Fl. Brit. India 3: 237. 1881; Mani. & Sivar., Fl. Calicut 149. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 380. 1983. ***Kartan-chedi.***

Climbing shrubs. Leaves 2.5-4 x 1-2 cm, elliptic-oblong, base rounded, apex obtuse; coriaceous, petiole up to 5 mm long. Capitula subsessile, c. 7 mm long, agregated in axillary or terminal, stalked corymbs. Involucre c. 3 mm across, tubular; phyllaries scarious. Corolla tube c. 4 mm long; lobes 5, lanceolate. Stamens 5, anthers linear, sagittate. Ovary c. 1 mm long, oblong; stigma acute. Achenes angled, minutely glandular.

Fl. & Fr.: Jan. - Mar.

Distr.: Myanmar and Siam. Garden escape and also found running wild along roadsides and fences. *CNS 2572* (Vallikkunnam).

VICOA Cassini

Ann. Sci. Nat. (Paris) 17: 418. 1829.

Vicoa indica (L.) DC. in Wight, Contrib. Bot. India 10. 1834; Gamble, Fl. Pres. Madras 701. 1921; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 628. 1976; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 200. 1980; Mani. & Sivar., Fl. Calicut 152. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 830. 1983; Mani., Fl. Silent Valley 162. 1988; Ramach. & Nair, Fl. Cannanore 258. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 271. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 256. 1996. *Inula indica* L. Sp. Pl. ed. 2, 1237. 1763; *Vicoa auriculata* Cass., Ann. Sci. Nat. (Paris) Ser. 1, 17: 418. 1829; Hook. f., Fl. Brit. India 3: 297. 1881.

Erect herbs, branches slender, sparsely pubescent. Leaves 3-5 x 0.5-1.2 cm, oblong-lanceolate, amplexicaul and auricled at base, margin rarely serrate, apex gradually acute, pubescent on both sides, sessile. Heads solitary, axillary and terminal, long peduncled, heterogamous, rayed, c. 1.2 cm across, yellow. Involucral phyllaries many-seriate, 2-3 mm long, linear-lanceolate. Ray flowers female, 1-seriate; corolla tube c. 1.5 mm long, ligulate; ligule yellow, 5-6 x 1-1.5 mm, ovate, 3-toothed at apex. Disc flowers bisexual, many; corolla tubular, c. 2 mm long, 5-toothed, glandular without. Anthers tailed at base. Stylar-arms short. Achenes terete, sparsely hairy. Pappus hairs absent in ray flowers; white silky in disc flowers.

Fl. & Fr.: Nov. - Mar.

Distr.: India, Sri Lanka, China, Thailand and West Tropical Africa. In gravelly soil and on moist walls. *CNS 1312* (Pandanad).

WEDELIA N. Jacquin

Enum. Pl. Carib. 8, 28. 1760 (*nom. cons.*).

Procumbent perennial herbs or scandent sub-shrubs. Leaves simple, opposite, dentate or entire. Capitula solitary or 1-3 together, terminal or axillary, heterogamous, radiate. Involucre campanulate, 1-2-seriate, outer phyllaries herbaceous, inner ones membranous. Ray florets female, 1-seriate; ligule entire or 2-3-dentate, yellow. Disc

flowers bisexual, tubular-campanulate, 5-lobed, yellow. Anther bases sagittate, apical appendage ovate. Style branches flattened. Receptacle convex, paleaceous. Achenes cuneate-obovate, triquetrous or laterally compressed, truncate or rounded at the apex. Pappus none or cup-like.

1a. Procumbent or ascending perennial herbs; leaves elliptic to obovate or oblanceolate, subpetiolate; capitula solitary.
   2a. Leaves 3-lobed ..... **W. trilobata**
   2b. Leaves entire ..... **W. chinensis**
1b. Scandent, straggling subshrubs; leaves ovate, petiolate; capitula 1-3 ..... **W. biflora**

Wedelia biflora (L.) DC. in Wight, Contrib. Bot. India. 18. 1834; Clarke, Comp. Ind. 137. 1876; Hook. f., Fl. Brit. India 3: 306. 1881; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 216.1980; Ramach. & Nair, Fl. Cannanore 258. 1988. *Verbesina biflora* L., Sp., Pl. ed. 2, 1272. 1763. *Wollastonia biflora* (L.) DC., Prodr. 5: 546. 1836; Wight, Ic. t. 1108. 1846; Fosb. & Sachet, Smiths. Contr. Bot. 45: 32. 1980; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 70. 1988. ***Vallia-manga-nari*** Rheede, Hort. Malab. 10: 79-80, t. 40. 1690.

Straggling subshrubs, 1.5-2.5 m high; stem ribbed, sparsely hairy. Leaves 2.5-7 x 1-4 cm, ovate, base rounded or cuneate, margins finely serrate, apex acute or acuminate, shortly appressed hispid on both surfaces, trinerved; petiole up to 2.5 cm long. Heads 1-3 together, heterogamous, rayed, yellow; peduncle up to 5 cm long, hairy. Phyllaries 8-10, 5-6 x 2-2.5 mm, ovate-elliptic. Ray flowers 8-12, female; corolla tube veryshort, ligule 1-1.3 x 0.4-0.5 cm, 2-3-lobed at apex. Disc of flowers bisexual; corolla c. 4 mm long. Achenes c. 3 mm long, truncate at the apex, 3-4-angled, dark brown. Pappus minute.

Fl. & Fr.: Aug. - Apr.

Distr: India, Malaya, China, Polynesia, Australia and East Tropical Africa. Along the sea coast on sandy beaches. *CNS 1582* (Andhakaranazhi).

Wedelia chinensis (Osbeck) Merr., Philipp. J. Sci. 12: 111. 1917 & Trans. Amer. Philos. Soc. (N.S.) 24: 390. 1935; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 215.

1980; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 832. 1983; Nicols, Suresh & Mani., An Interpr. Hort. Malab. 69. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 271. 1994. *Solidago chinensis* Osbeck, Dagbok Ostind. Resa. 241. 1757. *Verbesina calendulacea* L., Sp. Pl. ed. 2, 1272. 1763. *Wedelia calendulacea* (L.) Less., Syn. 222. 1832; DC. in Wight, Contrib. Bot. India 17. 1834; Wight, Ic. t. 1107. 1846; Clarke, Compos. Ind. 136. 1876; Hook. f., Fl. Brit. India 3: 306. 1881; Gamble, Fl. Pres. Madras 707. 1921. ***Pee-cajenneam*** Rheede, Hort. Malab. 10: 83, t. 42. 1960. ***Kadal-Kayyonni.***

Procumbent or ascending herbs, rooting at the nodes; stems often reddish. Leaves 3-6 x 0.5-1.5 cm, spathulate or oblanceolate, base cuneate, margins entire or sparingly serrate, narrowly inrolled, apex acute or apiculate, shortly appressed hispid on both surfaces, trinerved; petiole to 1 cm long. Head c. 2 cm across, axillary, solitary, yellow; peduncle 3-8 cm long. Outer phyllaries 5, 6-7 x 2-3 mm, oblong, inner phyllaries 5-6 x 1.5-2 mm, lanceolate. Ray flowers 8-12; corolla tube c. 1 mm long, ligules 6-8 x 3-4 mm, 2-3-lobed at the apex. Disc flower corollas c. 4 mm long, lobes 5. Stamens 5. Ovary oblong. Achenes 4-4.5 x 2-2.5 mm, those of ray flowers triquetrous, those of disc flowers compressed, dark brown, rugulose. Pappus minute.

Fl. & Fr.: Aug. - Mar.

Distr.: India, Malaya and China. In marshy situations usually near the coast. *CNS 1092* (Pallithode).

Wedelia trilobata (L.) A. S. Hitchc., Rep. Mo. Bot. Gard. 4: 99. 1898; Nash & Williams, Fieldiana (Bot.) 24: 353. 1976; Cronquist, Vasc. Fl. S.E.U.S. 1: 34. 1980; Koyama, Acta Phytotax. Geobot. 34: 171. 1985; Sivar. & Pradeep, Ind. J. For. 2. (2): 161. 1988. *Silphium trilobatum* L., Syst. ed. 10, 1232. 1759.

Prostrate or diffuse perennial herbs, rooting at nodes. Leaves opposite, 3-8 x 3-6 cm, elliptic to obovate, mostly 3-lobed, upper ones unlobed, base cuneate, margins coarsely dentate, apex acute, scabrid above and glabrous beneath, trinerved, sessile. Heads axillary, solitary, c. 2.5 cm across, heterogamous, yellow, peduncle 5-12 cm long. Involucral bracts 8-12 x 3-5 mm, oblong-obtuse. Ray florets 8-9, female; ligules 8-12 x 5-6 mm, 3-lobed at apex, yellow. Disc florets bisexual; corolla tube 5-6 mm long, lobes 5.

Achenes 3-4 x 5-6 mm, dimorphic, those of ray florets obovoid, trigonous, those of disc florets obovoid - lenticular, strongly warty.

Fl. & Fr.: Throughout the year.

Distr.: Native of tropical America. Introducedin India. In marshy places *CNS 2573* (Pallana).

XANTHIUM Linnaeus

Sp. Pl. 987. 1753.

Xanthium indicum Keon. in Roxb., Fl. Ind. 3: 601. 1832; Wight, Ic. t. 1104. 1832; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 209. 1980; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 833. 1983; Sivar. & Mathew, Fl. Nilambur 385. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 256. 1996. *X. strumarium* L., Sp. Pl. 987. 1753; p.p.; Hook. f., Fl. Brit. India 3: 303. 1881, p.p.; Gamble, Fl. Pres. Madras 703. 1921; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 629. 1976; Mani. & Sivar., Fl. Calicut 154. 1982; Vajravelu, Fl. Palghat Dist. 259. 1990.

Erect undershrubs; tender parts muricate, hispid-pubescent. Leaves 3-5-lobed, 9-13 x 6-10 cm, broadly ovate, rounded or cordate at base, margin irregularly serrate, scabrid above, glandular beneath, prominently 3-nerved from base, chartaceous; petiole to 5 cm long. Heads unisexual, male above, female below, on an axillary or terminal racemose axis. Involucral phyllaries several, free. Male 1-flowered, clustered; stamens 5, exerted. Female head solitary, 2-flowered. Corolla and papus 0. Achens 2, c. 1 cm long, enclosed by a prickly glandular-hispid enveloped with 2 horns.

Fl. & Fr.: Jan. - Sept.

Distr.: India, Malaya, Sumatra and Java. In waste places and swamps. *CNS 1849* (Olakettiyambalam), *CNS 2574* (Alappuzha).

67. LOBELIACEAE R. Br.

in Trans. Linn. Soc. London 12: 133. 1817.

LOBELIA Linnaeus

Sp. Pl. 929. 1753.

Lobelia alsinoides Lam., Encycl. 3 : 588. 1792; Moel. & Tuyn in Steenis, Fl. Males. I, 6 : 126. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 568. 1976; Mani. & Sivar., Fl. Calicut 155. 1982; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 168. 1983; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3 : 837. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 76. 1988; Ramach. & Nair, Fl. Cannanore 259. 1988; Vajravelu, Fl. Palghat Dist. 260. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 272. 1994; Sivar. & Mathew, Fl. Nilambur 385. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 257. 1996. *Lobelia trigona* Roxb., Fl. Ind. 2 : 111. 1824; Wight, Ic. t. 1170. 1848; Clarke in Hook. f., Fl. Brit. India 3 : 423. 1881; Gamble, Fl. Pres. Madras 736. 1921. ***Tsjeria-manga-nari*** Rheede, Hort. Malab. 10 : 177, t. 89. 1690. ***Kakkapoo.***

Annual prostrate glabrous laticiferous herbs; stem 3-angled. Leaves 1-2 x 1-1.5 cm, ovate or elliptic, base rounded or truncate, margin serrate, apex acute, chartaceous, lower petiolate and upper sessile. Flowers solitary, axillary towards the upper nodes; pedicels slender, 1-2 cm long. Calyx-tube 1-2 mm long; lobes 5, 2-3 mm long, subulate. Corolla bluish, 4-6 mm long, split 2-lipped, upper lip 2-lobed, lower 3-lobed. Staminal tube 3-4 mm long; anthers connivent around stigma, all hairy at tip. Ovary 2-celled; ovules many; stigma shortly 2-fid, ciliate. Capsules turbinate, 3-4 x 2 -3 mm, 5-ribbed. Seeds trigonous, smooth, brown.

Fl. & Fr. : Aug.-Dec.

Distr. : Ind-malaysia. Common in moist areas of plains and along the coast during monsoon. *CNS 1332.* (Angadikkal).

68. SPHENOCLEACEAE Mart. ex DC.

Prodr. 7(2): 548. 1839.

SPHENOCLEA J. Gaertner

Fruct. 1 : 113. 1788 *(nom. cons.)*.

Sphenoclea zeylanica Gaertn., Fruct. 1 : 113, t. 24, f. 5. 1788; Clarke in Hook. f., Fl. Brit. India 3 : 438. 1881; Gamble Fl. Pres. Madras 739. 1921; Mani. & Sivar., Fl. Calicut 155. 1982; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4 : 186. 1983; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3 : 841. 1983; Ramach. & Nair, Fl. Cannanore 260. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 253. 1988; Vajravelu, Fl. Palghat Dist. 261. 1990; Sasi. & Sivar., Fl. Pl. Thrissur For. 258. 1996. *S. Pongatium* DC., Prodr. 7 : 548. 1838; Wight, Ill. t. 138. 1850, nom. illeg. ***Pongati*** Rheede, Hort. Malab. 11: t. 24. 1692.

Erect glabrous marshy herbs; stem hollow, to 1 m high. Leaves 3-7 x 1. 5-3 cm, oblong-lanceolate, base cuneate, apex acute, glabrous and glaucous; petiole to 2.5 cm long. Flowers white, in terminal, leaf-opposed pedunculate spikes; spikes to 2.5-5 cm long. Bracts to 3 x 2 mm, spathulate, inflexed over calyx. Bracteoles obovate, 2-3 mm long, apiculate. Calyx tube cupular lobes 5, ovate, concave, shortly connate below. Corolla white, tube urceolate; lobes 5, ovate, subacute, reflexed in flowers. Stamens 5; filaments dialted at base; anthers free, reniform. Ovary, c. 2 mm long, obconic, 2 -celled; ovules many; style short; stigma discoid or 2-lobed. Capsule, 3-4 mm across, depressed-globose. Seeds many, oblong, minute, yellowish-brown.

Fl. & Fr.: Dec.-Mar.

Distr.: Pantropics. In flooded lowlands, shallow pools and also in banks of back waters. *CNS 1095* (Pallithode).

69. PLUMBAGINACEAE Juss.

Gen. Pl. 92. 1789.

PLUMBAGO Linnaeus

Sp. Pl. 151. 1753.

Plumbago zeylanica L., Sp. Pl. 151. 1753; Roxb., Fl. Ind. 1:462. 1832; Hook. f., Fl. Brit. India 3: 480. 1882; Gamble, Fl. Pres. Madras 744. 1921; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 112. 1976; Mani. & Sivar., Fl. Calicut 156. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 844. 1983; Ramach. & Nair, Fl. Cannanore 260. 1988; Vajravelu, Fl. Palghat Dist. 262. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 273. 1994; Sivar. & Mathew, Fl. Nilambur 389. 1996.

Erect subshrubs, sometimes subscandent; stem striate. Leaves 3-7 x 1.7-3.2 cm, ovate or elliptic-ovate, base shortly and abruptly attenuated into a short petiole, apex acute or subacute, somewhat glaucous beneath; petiole c. 1 cm long, amplexicaul at base and often auriculate. Flowers white, in elongate, terminal, often panicled racemes; rachis with sessile glands; bracteoles ovate, acuminate. Calyx 8-12 mm long, narrowly tubular, densely covered with stalked glands; lobes small. Corolla 1-1.6 cm across; tube c. 1.5 cm long; lobes obovate-oblong. Stamens 5; filaments c. 1.5 cm long. Ovary ellipsoid, 1-locular; stigma 5-fid. Capsule oblong, acute with 5 furrows.

Fl. & Fr.: Sept.-Apr.

Distr.: Throughout the tropics and subtropics. Rare. In open places and among bushes. *CNS 1039* (Vandanam).

70. MYRSINACEAE R. Br.

Prodr. 532. 1810.

1a. Fruit a cylindric, falcate follicle; leaf apex obtuse to emarginate ..... **Aegiceras**

1b. Fruit a subglobose drupe; leaf apex acute to acuminate.

2a. Corolla above 1.5 cm across, rose in colour; lobes contorted in bud; stamens connivent; inflorescence axillary or lateral umbels ..... **Ardisia**

2b. Corolla below 7 mm across, yellow or orange in colour; lobes imbricate in bud; stamens spreading; inflorescence an axillary raceme ..... **Embelia**

AEGICERAS J. Gaertner

Fruct. 1: 216. 1788.

Aegiceras corniculatus (L.) Blanco, Fl. Philipp. 1:79. 1837; Gamble, Fl. Pres. Madras 757. 1921; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 849. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 191. 1988. *Rhizophora corniculata* L., Amoen. Acad. 4: 123. 1759. *Aegiceras majus* Gaertn., Fruct. Sem. Pl. 1:216, t. 46, f. 1. 1788; Bedd., Fl. Sylv. t. 19, f. 3. 1869; Hook. f., Fl. Brit. India 3: 533. 1882; Mani. & Sivar., Fl. Calicut 156. 1982. ***Pou-kandel*** Rheede, Hort. Malab. 6: 65, t. 36. 1686 (Plate XV: C; Fig. 33).

Evergreen shrubs; bark brownish-grey. Leaves alternate, 3-9 x 1.8-4.5 cm, elliptic to obovate, narrowed at base, entire, apex obtuse, sometimes retuse or emarginate, coriaceous; petiole to 1 cm long. Flowers white in terminal or axillary umbellate cymes; pedicel to 8 mm long; bracts 0; bracteoles c. 3 mm long, with red glands. Calyx-lobes 5; c. 4 mm long, obovate, obtuse, coriaceous. Corolla white, c. 1 cm across; lobes 5, 5-7 mm long, oblong, acuminate, reflexed, twisted to right. Stamens 5, exserted; filaments basally villous; anthers c. 3 mm long, cordate-oblong. Ovary c. 1 mm long, fusiform; ovules many; stigma acute. Follicle 4-6 cm long, cylindric, falcate, splitting lengthwise. Seeds elongate.

Fl. & Fr.: Feb.-Sept.

Distr.: Tropical shores from Pakistan through India to Australia. Rare. In tidal forests. *CNS 1635* (Kumbolichira).

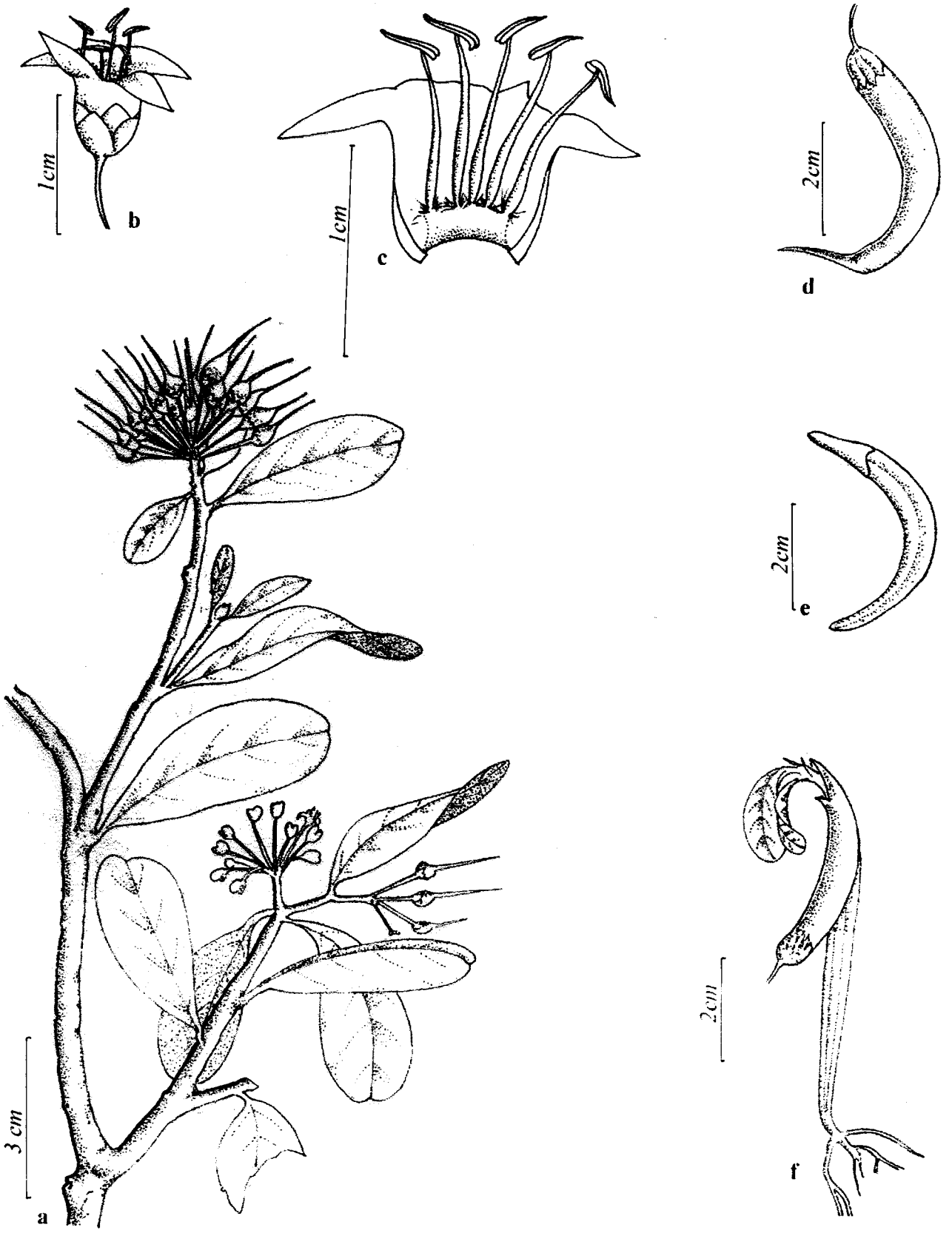


Fig. 33. *Aegiceras corniculatus* (L.) Blanco: a. Flowering branch; b. Flower; c. Corolla, split-open; d. Fruit; e. Seed; f. Seedling.

ARDISIA O. Swartz

Prodr. 3, 48. 1788 (*nom. cons.*).

Ardisia littoralis Andr., Bot. Rep. x. t. 630. 1811; Gamble, Fl. Pres. Madras 756. 1921. *A. humilis* Clarke in Hook. f., Fl. Brit. India 3: 529. 1882, p.p. (Fig. 34).

Erect branched shrub to 1.5 m tall. Leaves clustered towards the ends of the branches, 5-11 x 2.4-5 cm, obovate-oblong or elliptic, base cuneate, apex acute or subobtuse, coriaceous; petiole to 1 cm long. Inflorescence axillary or lateral umbels, rarely lengthened into racemes; peduncle 2-3 cm long. Flowers pink; pedicels 0.8-1.4 cm long, stout. Calyx 3-5 mm long; lobes elliptic, obtuse, with membranous margins, in fruit enlarged, orbicular, closely pressed to the berry. Corolla-lobes 5-7 mm long, obliquely ovate-acuminate, gland-dotted. Berry 5-7 mm across, dipressed globose, apiculate, red at first turning purplish black.

Fl. & Fr.: Apr.-Sept.

Distr.: India, Sri Lanka, Myanmar & Malaya. Among mangrove swamps and backwaters. CNS 1446 (Thirikunnapuzha).

EMBELIA N.L. Burman

Fl. Ind. 62. 1768 (*nom. cons.*).

Climbing or erect shrubs. Leaves alternate, entire or toothed, often punctate, glabrous. Flowers 4 or 5-merous, bisexual or unisexual, in axillary and terminal, simple or compound racemes or panicles. Bracts minute. Bracteoles absent. Calyx lobes 4-5, usually gland-dotted. Corolla tube very short; lobes 4-5; imbricate in bud, the margins pubescent or papillose. Stamens or staminodes inserted above the base of petals. Stamens 4-5; anthers dehiscing longitudinally. Ovary ovoid to globose, 1-celled; ovules few; stigma capitate. Fruit a small globose berry, usually 1-seeded; albumen pitted.

1a. Erect shrubs; leaves caudate-acuminate at apex; corolla yellow ..... **E. tsjeriam-cottam**

1b. Climbing shrubs; leaves acute at apex; corolla orange ..... **E. basaal**

Embelia basaal (Roem. & Schult.) A. DC., Trans. Linn. Soc. London 17: 131. 1834; Gamble, Fl. Pres. Madras 753. 1921; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 851. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 192. 1988. *Ardisia basaal* Roem. & Schult., Syst. 4: 517. 1819. *Choripetalum aurantiacum* A.DC. in DC., Prodr. 8:88. 1844. *C. viridiflorum* A. DC. in DC., Prodr. 8: 88. 1844; Wight, Ic. t. 1210. 1848. *Embelia viridiflora* (A.DC.) Scheff., Comm. Myrsin. 45. 1867; Clarke in Hook. f., Fl. Brit. India 3: 516. 1882. ***Basaal*** Rheede, Hort. Malab. 5: 23-24, t. 12. 1685.

Large woody climbers; stem warted with lenticels. Leaves 5-10 x 3-4.5 cm, elliptic-lanceolate to elliptic-obovate, broadly attenuate at base, acute at apex, glabrous on both sides; petioles 1-1.2 cm long. Flowers in axillary and lateral racemes, 2.5-3 cm long. Bracts c. 0.1 cm long, triangular. Pedicels c. 1 mm long. Calyx tube small, 4-toothed, glandular without. Petals 1.5-2 mm long, ovate, punctate without. Stamens attached to petals; anthers yellowish white; filaments c. 2 mm long. Drupe c. 6 mm across.

Fl. & Fr.: Dec.-Mar.

Distr.: Peninsular India, Sri Lanka to Malaya. In sacred groves. *CNS 1699* (Malayakavu at Chattiyara).

Embelia tsjeriam-cottam (Roem. & Schult.) DC., Trans. Linn. Soc. London 17: 131. 1834; Wight, Ic. t. 1209. 1848; Gamble, Fl. Pres. Madras 753. 1921; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 203. 1976; Nicols., Suresh & Mani., An Interpr. Hort. Malab.192. 1988; Sivar. & Mathew, Fl. Nilambur 393. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 263. 1996. *Ardisia tsjeriam-cottam* Roem. & Schult., Syst. 4: 518. 1819. *Embelia robusta* sensu Clarke in Hook. f., Fl. Brit. India 3: 515. 1882, non Roxb., 1832. ***Tsjeriam-cottam*** Rheede, Hort. Malab. 5. 21-22, t. 11. 1685.

Deciduous shrubs; young stem densely brown pubescent. Leaves 3-7 x 2-4 cm, elliptic-obovate, attenuate at base, margin serrulate, caudate acumiante at apex, glabrous, venation prominent below; petiole to 1 cm long. Racemes axillary, 2.5-4 cm long, appear along with leaves. Peduncle brown pubescent. Pedicel c. 2 mm long. Calyx lobes triangular, c. 1 mm long. Corolla yellow with a thick callous at base inside; lobes 1.5-2

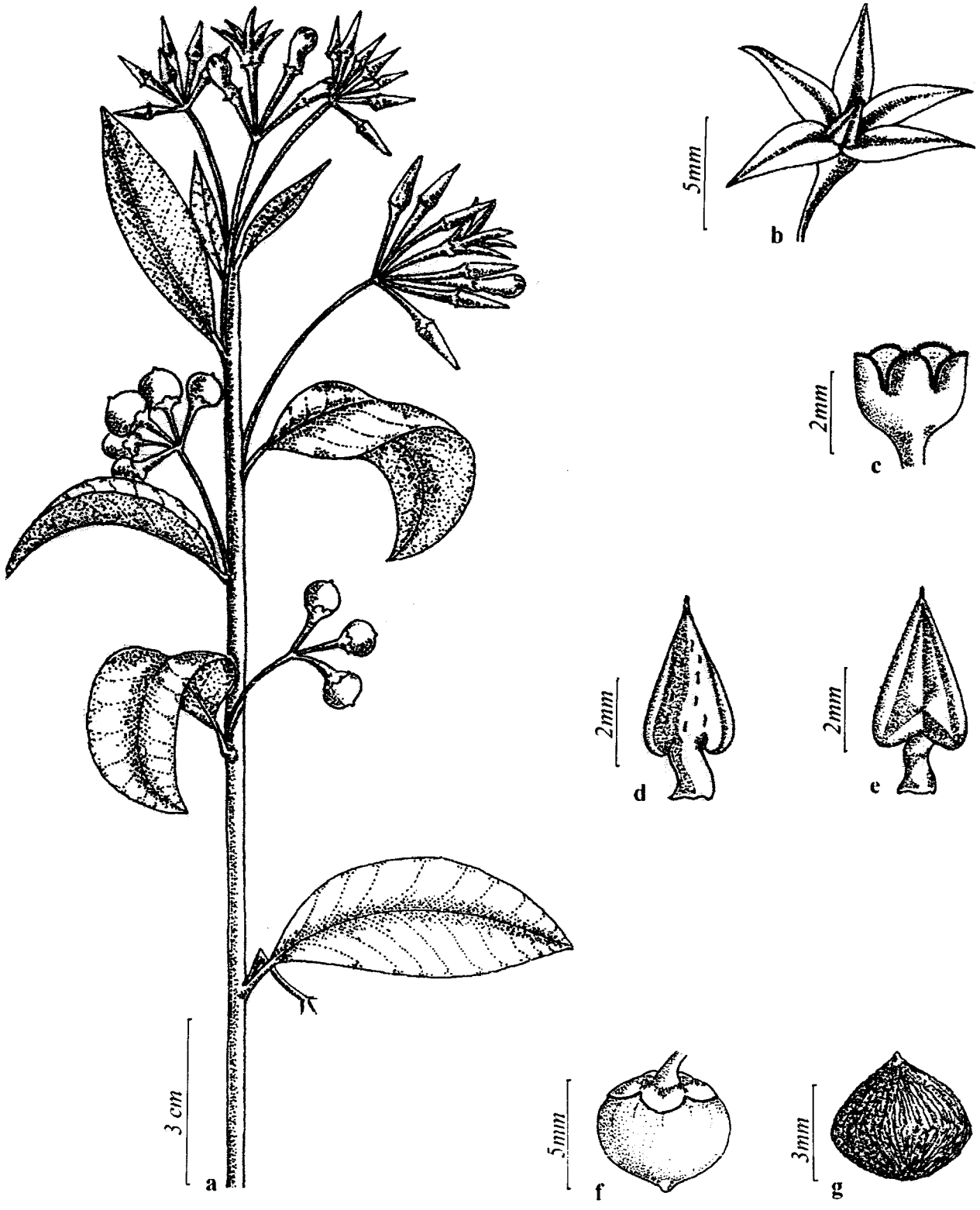


Fig. 34. *Ardisia littoralis* Andr.: a. Twig with flowers and fruits; b. Single flower; c. Calyx; d & e. Stamens-dorsal and ventral views; f. Mature fruit; g. Seed.

4-99 A



Plate XV. A. *Canthium dicoccum* (Gaertn.) Tejis. & Binn.; B. *Morinda reticulata* Gamble; C. *Aegiceras corniculatus* (L.) Blanco; D. *Maba buxifolia* (Rottb.) Juss.

mm long, punctate. Anthers with red gland at the back. Ovary globose; stigma truncate. Fruits 3-4 mm across, subglobose, red tipped by the style.

Fl. & Fr.: Apr.-Jan.

Distr.: India, Myanmar and Sri Lanka. In sacred groves. *CNS 2158* (Ambalappuzha).

71. SAPOTACEAE Juss.

Gen. Pl. 151. 1789.

1a. Stamens as many as the number of calyx lobes.

2a. Corolla lobes 5, uniseriate ..... **Chrysophyllum**

2b. Corolla lobes 16 or more; 2 or more seriate.

3a. Corolla lobes 18 or 24; berry ovoid, up to 1 cm across ..... **Mimusops**

3b. Corolla lobes 16; berry globose above 2 cm across ..... **Manilkara**

1b. Stamens twice or more the number of calyx lobes.

4a. Corolla lobes 4; stamens 8 ..... **Isonandra**

4b. Corolla lobes 8 or 12; stamens more than 16 ..... **Madhuca**

CHRYSOPHYLLUM Linnaeus

Sp. Pl.192.1753.

Chrysophyllum cainito L., Sp. Pl. 192. 1753; Vink, Blumea 9: 26. 1958; Gamble, Fl. Pres. Madras 758. 1921; Mani. & Sivar., Fl. Calicut 156. 1982; Verdcourt & Meijer in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 403. 1995.

Small trees; bark greyish to dark brownish black; young parts golden-ferruginous silky but later glabrous. Leaves 4-9 x 3-6 cm, elliptic or oblong-elliptic, base cuneate or rounded, abruptly acuminate at apex, glabrous above and golden-ferruginaous silky beneath, thick; lateral veins close and parallel; petiole to 1 cm long. Flowers in axillary fascicles, campanulate, greenish-yellow. Sepals 1.5-2 mm long, broadly ovate, coppery

silky without. Corolla white, 3-4 mm long; lobes 5-6, ovate or triangular, silky outside. Fruit purplish black, ellipsiod to globose. Seeds laterally compressed.

Fl. & Fr.: Aug.-Dec.

Distr.: Probably native of the Greater Antilles; now widely cultivated and naturalized throughout Central and South America, West Indies, Sri Lanka and India. *CNS 2481* (Eramallur).

ISONANDRA R. Wight

Ic. 2(1): 4. 1840.

Isonandra lanceolata Wight, Ic. t. 359. 1840; DC., Prodr. 8: 187. 1844; Clarke in Hook. f., Fl. Brit. India 3: 539. 1882; Gamble, Fl. Pres. Madras 761. 1921; Jeuken, Blumea 6: 568. 1952; Mani., Fl. Silent. Valley 167. 1988; Ramach. & Nair, Fl. Cannanore 263. 1988; Vajravelu, Fl. Palaghat Dist. 266. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 276. 1994; Verdcourt & Meijer in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 383. 1995; Sivar. & Mathew, Fl. Nilambur 395. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 264. 1996 (Fig. 35).

Shrubs to small trees; bark dark brown, thin, cracked; young stem and petioles hispid. Leaves 6-12 x 2-4 cm, lanceolate to oblanceolate, attenuate at base, apex caudate, lateral nerves prominent, glabrous and glossy; petiole to 1.5 cm long. Flowers in axillary and lateral short pedicelled fascicles. Calyx lobes 4, 2-3 mm long, ovate-acute, brown tomentose. Corolla cream coloured, c. 3 mm long, campanulate, lobes 4. Stamens 8, attached at the base of corolla tube; anthers apiculate. Ovary c. 1 mm long; style subulate. Berry 0.5-1.3 x 0.6-0.9 cm, ellipsoid, scarlet. Seeds 1-2, 4-7 mm long, ellipsoid, laterally compressed, bright brown.

Fr. & Fr.: Dec.-Mar.

Distr.: Peninsular India and Sri Lanka. Common in sacred groves. *CNS 2620* (Nangiarkulangara).

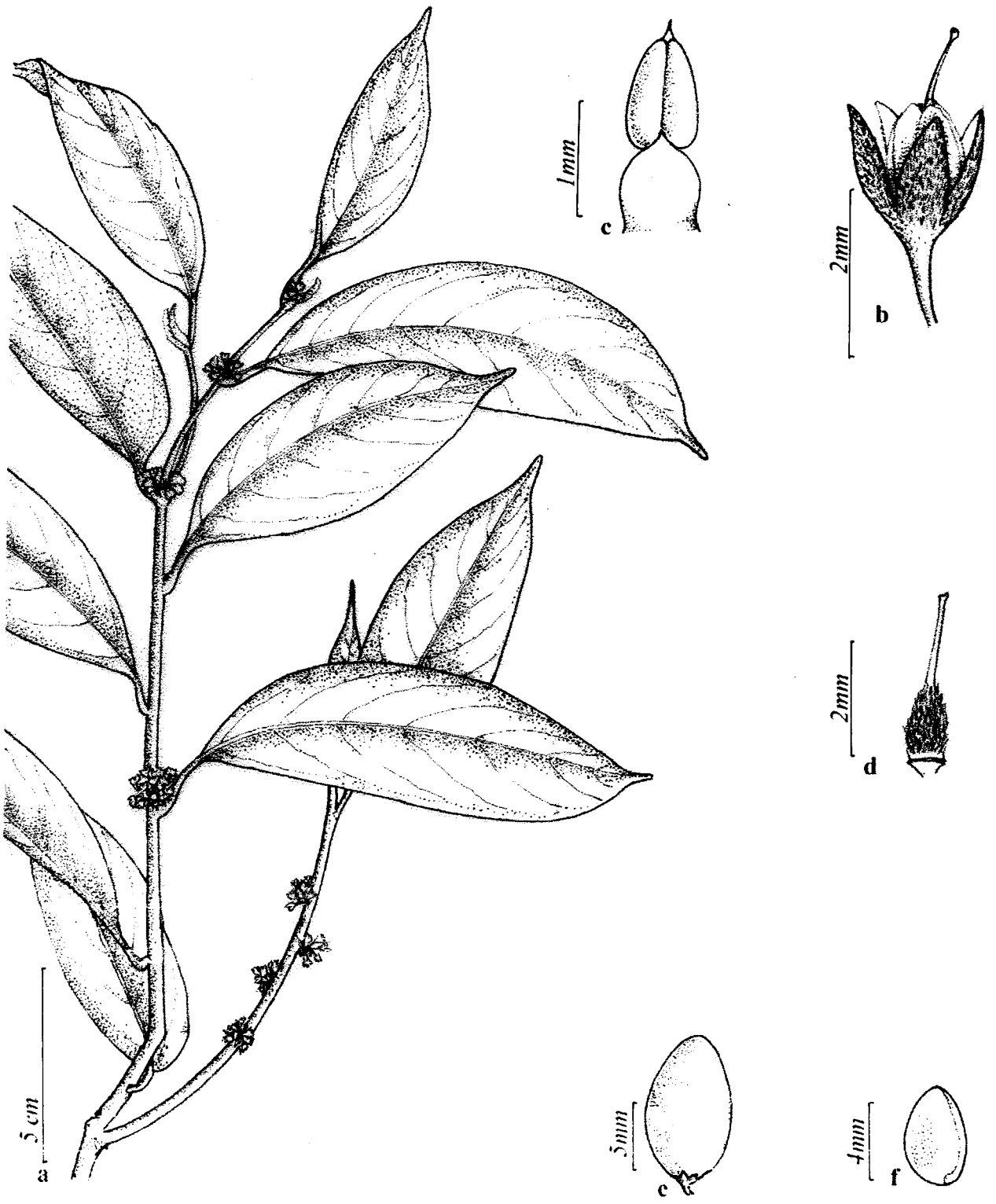


Fig. 35 *Isonandra lanceolata* Wight: a.Twig with flowers ; b. Single flower; c. Stamen; d. Pistil; e. Fruit; f. Seed.

MADHUCA Hamilton ex J.F. Gmelin

Syst. Nat. 2: 773, 779. 1791.

Madhuca neriifolia (Moon) H. J. Lam, Bull. Bot. Buitenzorg Ser. 3, 7: 182 & 265. 1925; Royen, Blumea 10: 98. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 194. 1976; Ramach. & Nair, Fl. Cannanore 264. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 277. 1994; Verdcourt & Meijer in Dassan., Fosb & Clayton, Rev. Handb. Fl. Ceylon 9: 395. 1995; Sivar. & Mathew, Fl. Nilambur 396. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 265. 1996. *Bassia neriifolia* Moon, Cat, Pl. Ceylon 36. 1824. *Bassia malabarica* Bedd., For. Man. Bot. 140. 1872; Clarke in Hook. f., Fl. Brit. India 3: 544. 1882; Gamble, Fl. Pres. Madras 764. 1921.

Small to medium sized evergreen trees; bark pale-brown, reddish inside; latex milky. Leaves 7-14 x 2-4 cm, linear-oblong or elliptic-oblong, base acute, obtuse to slightly acute at apex, waxy above; lateral nerves 15-20 pairs. Flowers in dense axillary and lateral lusters; pedicels glabrous, 2-2.5 mm at anthesis, enlarges in fruit. Calyx lobes 4, (2+2), 6-7 x 4-5 mm, ovate-lanceolate, minutely tomentose. Corolla 1.5-2 cm long, campanulate, creamy-yellow; lobes 8-10, fleshy, hairy without. Stamens 16; filaments villous; anthers linear, aristate at apex. Ovary c. 5 mm long, oblong, 6-celled; ovules 1 in each cell; style slender, subulate. Berry 2-3 cm long, ellipsoid, beaked. Seeds single, 0.8-1 cm long, ellipsoid, laterally compressed, black with a white hylum.

Fl. & Fr.: Jan.-Apr.

Distr.: Peninsular India and Sri Lanka. In sacred groves. *CNS 2482* (Vandanam).

MANILKARA Adanson

Fam. 2: 166. 1763 (*nom cons.*).

Manilkara zapota (L.) P. Royen, Blumea 7: 410. 1953; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 859. 1983; Vajravelu, Fl. Palghat Dist. 268. 1990; Verdcourt & Meijer in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 360. 1995. *Achras zapota* L., Sp. Pl. 1190. 1753. *Achras sapota* L., Sp. Pl. (ed. 2) 470. 1762; Hook.f., Fl., Brit. India 3: 534.

1882; Gamble, Fl. Pres. Madras 759. 1921. *Sapota achras* Mill., Gard. Dict. (ed.8) n. 1. 1768. *Manilkara achras* (Mill.) Fosb., Taxon 13: 255. 1964; Mani. & Sivar., Fl. Calicut 157. 1982. ***Zapota.***

Trees. Leaves 6-14 x 2-4.5 cm, lanceolate to oblong, acute at both ends; petiole to 3 cm. Flowers solitary or paired; pedicels to 1.5 cm. Calyx lobes 6 or 8 in 2 series of 3 or 4, 6-9 x 3-6 mm; outer concave, thick, appressed puberulous, inner ones oblong, concave. Corolla white or cream, 7-10 mm long; lobes usually 16 in 2 series of 8 each. Stamens 8, subsessile; anthers cordate. Ovary 3 mm, villous without; stigma 8-lobed. Berry globose, 4-6 cm across. Seeds strongly compressed, 1.5-2 cm long, black.

Fl. & Fr.: Sep.-Nov.

Distr.: India and Sri Lanka. Planted as a fruit tree. *CNS 2112* (Kanjikuzhi).

Its latex-'chickle'-is used for the manufacture of chewing gum.

MIMUSOPS Linnaeus

Sp. Pl. 349. 1753.

Mimusops elengi L., Sp. Pl. 349. 1753; Wight, Ic. t. 1850; Bedd., Fl. Sylv. t. 40. 1870; Hook. f., Fl. Brit. India 3: 548. 1882; Gamble, Fl. Pres. Madras 765. 1921; Royen, Blumea 6: 594. 1952; Ramamoorhty in Sald. & Nicols., Fl. Hassan Dist. 194. 1976; Mani. & Sivar., Fl. Calicut 157. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 860. 1983; Nicols., Suresh & Mani., An. Interpr. Hort. Malab. 238. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 277. 1994; Verdcourt & Meijer in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 357. 1995; Sivar. & Mathew, Fl. Nilambur 397. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 267. 1996. ***Elengi*** Rheede, Hort. Malab. 1: 33-34, t. 20. 1678. ***Elengi.***

Medium sized evergreen trees; bark dark brown, pink inside; young shoots adpressed tomentose. Leaves 5-9 x 3-5 cm, elliptic or ovate-lanceolate, base acute or obtuse, apex shortly acuminate, glabrous and glossy; lateral nerves numerous; petiole to 2 cm long. Flowers solitary or very few in axillary clusters, fragrant; pedicels stout 1-1.3 cm long, densely brown pubescent. Calyx lobes 8, in 2 series; outer 4 brown, desnsely

pubescent without; inner 4 white, 6-7 mm long, lanceolate. Corolla white, rotate; lobes 18 in 2 rows, 4-5 mm long, lanceolate. Stamens 8, alternating with staminoides. Ovary c. 1.5 mm long, ovoid, 6-8-locular ; ovules 1 in each cell. Berry 1. 5-2.3 cm long, ovoid. Seed solitary, 0. 7-1 x 0.5-0.7 cm, ellipsoid, laterally compressed, brownish black.

Fl. & Fr.: Apr.-Aug.

Distr.: India to Malay peninsula. In sacred groves. *CNS 1448* (Thrikunnapuzha).

Fruit edible. Pulp of ripe fruit relieves head-ache.

72. EBENACEAE Gurke

in Engler & Prantl, Nat. Pflanzenfam. 4(1): 153. 1891.

1a. Flowers 3-merous; ovary 3-locular; berry less than 0.8 cm across ..... **Maba**

1b. Flowers 4-or 5 -merous; ovary 6-8-locular; berry more than 3 cm across .... **Diospyros**

DIOSPYROS Linnaeus

Sp. Pl. 1057. 1753.

Diospyros malabarica (Desr.) Kostel., Allg. Med. Pharm. Fl. 3: 1099. 1834; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 102. 1988; Koster. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 27. 1982. *Garcinia malabarica* Desr. in Lam., Encycl. 3: 701. 1792. *Diospyros peregrina* auct., non Guerke, 1891: Gamble, Fl. Pres. Madras 777. 1921; Mani. & Sivar., Fl. Calicut 157. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 870. 1983. D. *embryopteris* Pers., Syn. 2: 624. 1807; Clarke in Hook. f., Fl. Brit. India 3: 556. 1882. ***Panitsjika-maram*** Rheede, Hort. Malab. 3: 45-47, t. 41. 1682. ***Panichika.***

Dioecious trees, upto 12 m high ; bark black, rough, scaly. Leaves 10-20 x 2-6 cm, oblong, base and apex obtuse, reticulations close, prominent, thick-coriaceous, drying yellowish; petiole to 1.5 cm. Flowers 4-merous. Male flowers in axillary fascicles, 6-8 per cymes, c. 2 cm across; pedicel c. 4 mm long; Calyx cup-shaped, silky; lobes 4, 3 -5 x

3 -4 mm, ovate, acute, appressed-hairy without; corolla 8-12 mm long, widely tubular; lobes 4, yellow, c. 3 mm long, ovate, rounded, reflexed; stamens 24-40, biseriate, free, connivent in the middle, connectives hairy. Female flowers 1-5 in axillary fascicles, 2.5-3 cm across, up to 2 cm long; calyx cup -shaped; lobes 4, c. 1.5 x 1.5 cm, ovate, acute, thick-fleshy, appressed-pubescent; corolla lobes 4, c.1.5 cm long, ovate, tip recurved; staminodes 4; ovary globose, 4- lobed, glandular-hairy, 8-locular; stigma lobed, fimbriate. Berry up to 6 cm across, globose; fruiting calyx woody, reflexed. Seeds 4-8, 2-2.5 cm long, elliptical, brown.

Fl. & Fr.: Mar.-May.

Distr.: Sri Lanka, India and Malaya. Common is sacred groves. *CNS 1491* (Nagamkulangara).

MABA J.R. Forster *et* J.G.A. Forster
Charact. Gen. 121. 1776.

Maba buxifolia (Rottb.) Juss., Ann. Mus. Natl. Hist. Nat. 5: 418. 1804; Wight, Ic. t. 763. 1844; Hook. f., Fl. Brit. India 3:551. 1882; Gamble, Fl. Pres. Madras 768. 1921; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 871. 1983. *Pisonia? buxifolia* Rottb., Nye Saml. Kongel. Danske Vidensk. Selsk. Skr. 2: 536, t. 4, f. 2. 1783. *Ferreola buxifolia* Roxb., Pl. Corom. 1: 35, t. 45. 1795 & Fl. Ind. 3: 790. 1832. *Ehretia ferrea* Willd., Phytographia 1:4. t. 2, f . 2. 1794. *Diospyros ferrea* (Willd.) Bakh., Gard. Bull. Straits. Settlem. 7: 162. 1933 & Bull. Jard. Bot. Buitenzorg (Ser.3) 15: 50. 1936; Green, Kew Bull. 23: 341. 1969; A.C. Smith, J. Arnold Arbor. 52: 382. 1971; Kosterm., Blumea 23: 449. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 9. 1982 (Plate XV: D).

Small trees to 4 m tall; bark dark grey, fissured, rough. Leaves alternate, 1-2.5 x 1-1.8 cm, obovate-oblong or spathulate, base cuneate to attenuate, apex obtuse to emarginate, coriaceous; petiole to 2 mm long. Flowers 1-3, in axillary fascicles, white. Male flower: calyx pale yellowish, c. 2 mm long, cup-shaped, lobes 3, 1-1.5 mm long, triangular-ovate, acute; corolla tube 5 -6 mm long, tubular, lobes 3, 1 -1.5 mm long, oblong-ovate, acute ; stamens 6, c. 2 mm long. Female flower: similar to male one; ovary

c. 2 mm long, globose, silky-pubescent, stigmas 3. Berry 5-7 mm long, subglobose, yellow to brownish red. Seeds 1-3, c. 4 mm long, wedge-shaped.

Fl. & Fr. : Feb.-May.

Distr.: Peninsular India and Sri Lanka. In sacred groves. *CNS 1573* (Vandanam).

73. SYMPLOCACEAE Desf.

in Mem. Mus. Hist. Nat. 6: 9. 1820.

SYMPLOCOS N. J. Jacquin

Enum. Pl. Carib. 5: 24. 1760.

Symplocos cochinchinenesis (Lour.) Moore, J. Bot. 52: 148. 1914, ssp. **laurina** (Retz.) Nooteb., Leiden Bot. Ser. 1: 156. 1975; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 198. 1976; Nooteb. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 458. 1981; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 874. 1983; Ramach. & Nair, Fl. Cannanore 266. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 255. 1988; Mani., Fl. Silent Valley 169. 1988; Vajravelu, Fl. Palghat Dist. 271. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 281. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 272. 1996. *Myrtus laurinus* Retz., Obs. Bot. 4: 26. 1786. *Drupatris cochinchinensis* Lour., Fl. Cochinch. 1: 314. 1790. *Symplocos spicata* Roxb., Fl. Ind. 2: 541. 1832; Bedd, Fl. Sylv. 149. 1872; Hook. f., Fl. Brit. India 3: 573. 1882; Gamble, Fl. Pres. Madras 782. 1923. ***Patsjotti*** Rheede, Hort. Malab. 5: 9-10, t. 5. 1685. ***Pachotti*** (Fig. 36).

Small trees; young shoots glabrous. Leaves 6-13 x 2.5-5 cm, elliptic, base cuneate, margin crenate to crenate-serrate, apex acuminate, thin coriaceous, glossy; petiole to 2 cm long. Flowers in axillary simple or branched spikes, to 9 cm long, tomentose when young. Calyx-lobes 5, c. 1 mm long, orbicular, ciliolate along margins. Corolla white, to 1 cm across, rotate; lobes 3-4 mm long, ovate. Stamens many, in 5 groups. Ovary 1-1.5 mm long, subglobose, 2-3- celled; ovules 2 in each cell; stigma capitate. Drupe 5-7 mm across, ampulliform. Seeds 2-3, oblong.

Fl. & Fr.: Jan.-Jun.

Distr.: Throughout Tropical Asia. In sacred groves. *CNS 1607* (Kayamkulam).

74. OLEACEAE Hoffmanns & Link

Fl. Portug. 1: 385. 1813-1820.

1a. Woody Climbers.
  2a. Stem 4-angled; leaves prominently ribbed from base; corolla lobes valvate ..... **Myxopyrum**
  2b. Stem terete; leaves not ribbed from base; corolla lobes imbricate .. **Jasminum**
1b. Shrubs or trees ..... **Olea**

JASMINUM Linnaeus

Sp. Pl. 7. 1753.

Woody climbing shrubs. Leaves usually opposite, simple, 3-foliolate or imparipinnate. Flowers usually white, showy, sweet-scented, solitary or in axillary to terminal cymes, bracteate. Calyx truncate or campanulate, lobes 5-9, usually linear. Corolla salver-form; tube cylindric, usually with a dialated portion below the throat, where the stamens are included; lobes 5 or more, imbricate. Stamens 2, included; anthers oblong. Ovary superior, 2-locular; ovules 1 in each locule; style filiform; stigma 2-fid. Fruit a didymous or globose berry. Seeds 1 in each carpel or rarely 2.

1a. Leaves 3-foliolate ..... **J. azoricum**
1b. Leaves simple.
  2a. Young shoots brown tomentose; leaves tawny-pubescent; flowers in dense-flowered, terminal, capitate cymes ..... **J. multiflorum**
  2b. Young shoots and leaves glabours; flowers in 3-5-flowered, terminal cymes.
    3a. Calyx lobes curled; leaf nerve-axils glandular below ..... **J. sambac**
    3b. Calyx lobes not curled; leaf nerve-axils eglandular ..... **J. angustifolium**



Fig.36 *Symplocos cochinchinensis* (Lour.) Moore: a. Twig with flowers and fruits; b. Single flower; c. Corolla lobe; d. Fruit; e. Seed.

Jasminum angustifolium (L) Willd., Sp. Pl. 1: 36. 1797; Clarke in Hook. f., Brit. India 3: 598. 1882; Gamble, Fl. Pres. Madras 790. 1923; Mani. & Sivar., Fl. Calicut 159. 1982; Matthew & Rani in Matthew, Fl Tam. Carnatic 3: 879. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 199. 1988. *Nyctanthes angustifolia* L., Sp. Pl .6. 1753. ***Katu-pitsjegam-Mulla*** Rheede, Hort. Malab. 6: 93, t. 53.1886. ***Pitsjegam.***

Twining shrubs. Leaves 1.5-3 x 1-2 cm, ovate to lanceolate, base rounded or truncate, apex acute-apiculate or subacute, subcoriaceous, glabrous; petiole to 3 mm long. Flowers in terminal 1-3-flowered cymes; bracts linear; pedicel to 2 cm long. Calyx tube 1.5-2 mm long; lobes 5-6, 2-4 mm long, linear, unequal. Corolla white, salver-form; tube 1.5 cm long, pinkish; lobes 5-9, 1-1.5 cm long, oblanceolate, acute. Stamens 2, included. Fruit a paired berry, 7-8 mm across, globose, dark purple on ripening.

Fl.&Fr : Mar. - May.

Distr.: Sri Lanka, Peninsular India. Among bushes along lateritic hill slopes. *CNS 2029* (Bharanikkavu).

Jasminum azoricum L., Sp. Pl. 7. 1753; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 512. 1976; Mani. & Sivar., Fl. Calicut 159.1982; Mathew & Rani in Mathew, Fl. Tam. Carnatic 3: 880. 1983; Ramach. & Nair, Fl. Cannanore 270.1988; Mani., Fl. Silent Valley 170. 1988; Vajravelu, Fl. Palghat Dist. 274.1990; Mohanan & Henry, Fl. Thiruvananthapuram 284.1994; Sivar. & Mathew, Fl. Nilambur 402.1996. *Jasminum flexile* Vahl, Symb. Bot. 3:1. 1794; 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; Sasi. & Sivar., Pl. Thrissur For. 273.1996.

Climbing shrubs; young shoots glabours. Leaves 3-foliolate; leaflets 4-7 x 2-3.5 cm, middle lobe larger, ovate-lanceolate, base rounded or obtuse, apex acuminate, subcoriaceous, glabrous; petioles 2-3 cm long. Flowers in terminal or axillary dichasial cymes; pedicels to 1 cm long. Calyx-lobes 5, c. 1 mm long, triangular. Corolla white with pink shade; tube 2-2.5 cm long, wider towards tip; lobes 5, 1-1.5 cm long, elliptic. Anthers apiculate. Style filiform, 2-fid. Berry 1-1.2 x 0.6-0.8 cm, ellipsoid, purple.

Fl.& Fr: Feb. - Apr.

Distr.: India, Sri Lanka to Malaya. In sacred groves. *CNS 1745* (Sharngakavu).

Jasminum multiflorum (Burm. f.) Andr., Bot. Repos. 8: t. 496. 1807; Kobuski, J. Arnold Arbor. 13: 172. 1932; Green, Baileya 13: 151-152. 1965; Mani. & Sivar., Fl. Calicut 160. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3:884. 1983; Ramach. & Nair, Fl. Cannanore 271.1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 200. 1988; Vajravelu, Fl. Palghat Dist. 275. 1990; Sasi. & Sivar., Fl. Pl. Thrissur For. 274. 1996. *Nyctanthes multiflora* Brum. 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. ***Katu-tsjiregam-mulla*** Rheede, Hort. Malab. 6 :95, t. 54. 1686. ***Kuda-mulla.***

Climbing shrubs; young shoots brown tomentose. Leaves 4-6 x 2-3 cm, ovate to elliptic, base rounded or cordate, apex acute, softly pubescent on both sides; petiole to 1 cm, villous. Flowers in dense-flowered terminal, capitate cymes. Bracts leafy, 1-1.5cm long, linear. Calyx lobes 5, to 1cm long, linear, villous. Corolla white; tube c.1.5cm long; lobes 6-8, 0.6-1cm long, ovate-lanceolate, fragrant. Stamens included; anthers oblong. Style filiform; stigma 2-fid. Berry 1-1.3cm long, avoid, dark purple on ripening.

Fl. & Fr. : Feb.- Apr.

Distr: India and China. In sacred groves and also cultivated. *CNS 1869* (Elangimelvallikavu).

Jasminum sambac (L.) Aiton, Hort. Kew. 1:8. 1789; Hook. f., Fl. Brit. India 3: 591. 1882; Gamble, Fl. Pres. Madras 788. 1921; Mani. & Sivar., Fl. Calicut 160. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 885. 1983; Ramach. & Nair, Fl. Cannanore 272. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 200.1988; Mohanan & Henry, Fl. Thiruvananthapuram 285. 1994. *Nyctanthes sambac* L. , Sp. Pl. 6. 1753. ***Nalla-mulla*** Rheede, Hort. Malab. 6: t. 50. 1686. ***Mulla.***

Scandent shrubs. Leaves to 9 x 4 cm, elliptic-ovate or obovate, base sub-cordate or rounded, apex acute or acuminate, gland-dotted. Flowers in terminal 3-5-flowered cymes; bracts linear-subulate. Calyx lobes 5, curled, narrow-lanceolate. Carolla white, lobes 5,

to 1.4 cm long, oblong, mucronate; tube cylindric, to 2.5 cm long. Stamens 2, attached to the corolla-tube below; anthers ablong; style long, exserted; stigma bifid. Fruit not seen.

Fr. : Throughout the year.

Distr.: Sri Lanka, India and Myanmar. A common plant grown for its fragrant flowers. *CNS 2597* (Muthukulam).

MYXOPYRUM Blume

Bijdr. 683. 1825, '1826'.

Myxopyrum smilacifolium Bl., Mus. Bot. 1:320. 1850; Clarke in Hook. f., Fl. Brit. India 618. 1882, p.p.; Kiew, Blumea 29: 509. 1984; Mani., Fl. Silent Valley 172. 1988; Sivar. & Mathew, Fl. Nilambur 404. 1996; Sasi & Sivar., Fl. Pl. Thrissur For. 275. 1996. *Myxopyrum serratulum* Hill, Kew Bull. 1910: 41. 1910; Gamble, Fl. Pres. Madras 798. 1923; Ramach. & Nair, Fl. Cannanore 272. 1988; Vajravelu, Fl. Palghat Dist. 276. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 286. 1994. ***Chathuramulla.***

Twining shrubs; branches 4-angular. Leaves 7-13 x 3-5 cm, elliptic-ovate or oblong, base rounded to subcordate, margins serrulate from the middle towards apex, apex acuminate, basally 5-nerved, subcoriaceous; petiole to 1.2 cm long. Flowers in axillary trichotomous panicles, small, 4-merous, bisexual. Calyx 1-1.5 cm long, lobes 4. Corolla yellowish, tube 1-2 mm long; lobes 4. Stamens 2, included. Ovary 2-locular; ovules 1-2-per locule; stigma 2-lobed. Berry 1-1.5 cm across, globose, black. Seeds 2.

Fl. & Fr. : Mar. - May.

Distr.: Indo - Malaya and China. In sacred groves. *CNS 1886* (Sharngakavu).

OLEA Linnaeus

Sp. Pl. 8. 1753.

Olea dioica Roxb., Fl. Ind. 1:105. 1820; Clarke in Hook. f., Fl. Brit. India 3: 612. 1882; Gamble, Fl. Pres. Madras 796. 1923. Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 514. 1976; Mani & Sivar., Fl. Calicut 158. 1982; Matthew & Rani in Matthew, Fl. Tam.

Carnatic 3: 891. 1983; Ramach. & Nair, Fl. Cannanore 273. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 201. 1988., Mani., Fl. Silent Valley 173. 1988; Vajravelu, Fl. Palghat Dist. 276. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 286. 1994; Sivar. & Mathew, Fl. Nilambur 405. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 275.1996. ***Kari-vetti*** Rheede, Hort. Malab. 4: 111-112, t. 54. 1683.

Small trees; bark greyish- brown. Leaves very variable in size and shape, 6-18 x 2-6 cm, elliptic-oblong, base cuneate, margin dentate or rarely entire, apex acuminate, chartaceous. Flowers polygamous in axillary or terminal cymose panicles, 4-merous. Calyx tube minute, triangular-ovate, 4-toothed. Corolla white, 2-3 mm long, campanulate, 4-lobed, acute. Stamens 2, included; anthers subsessile. Ovary 2-locular; stigma capitate. Drupe 0.5-1 cm long, ellipsoid, purple. Seed 1.

Fl. & Fr. : Apr. - June.

Distr: South West and North East India. In sacred groves and waste places. *CNS 1776* (Kayamkulam) , *CNS 1757* (Kuriyankavu at Thazhakkara).

75. APOCYNACEAE Juss.

Gen. Pl. 143. 1789.

1a. Leaves in whorls of 3 or more at nodes.

2a. Erect undershrubs, shrubs or trees.

3a. Trees; fruit linear follicles; seeds comose ..... **Alstonia**

3b. Undershrubs or shrubs; fruit globular drupes; seeds without coma .... **Rauvolfia**

2b. Climbing shrubs.

4a. Corolla yellow, more than 5 cm across, funnel-shaped, throat densely villous; ovary of 2 wholly combined carpels ..... **Allamanda**

4b. Corolla white, less than 3 cm across, salver-shaped, throat naked; ovary of 2 distinct carpels ..... **Kamettia**

1b. Leaves alternate or opposite.

5a. Plants with axillary recurved spines; fruit a berry ..... **Carissa**

5b. Plants without axillary spines; fruit a follicle, drupe or capsule.

6a. Climbing shrubs.

7a. Leaves ovate-orbicular; corolla more than 5.5 cm across .... **Chonemorpha**

7b. Leaves elliptic or elliptic-oblong; corolla less than 3.5 cm across.

8a. Anthers exserted.

9a. Calyx eglandular; corolla greenish; filaments of the stamens long, spirally twisted; mericarps connate .... **Parsonsia**

9b. Calyx glandular; corolla white; filaments short, not spirally twisted; mericarps distinct with age .... **Vallaris**

8b. Anthers included.

10a. Corolla-lobes overlapping to the left; seeds winged; coma absent ..... **Kamettia**

10b. Corolla-lobes overlapping to the right; seeds without wings, comose apically.

11a. Corolla more than 2 cm across; mouth of corolla with a ring of scales ..... **Strophanthus**

11b. Corolla less than 1 cm across; mouth of corolla naked.

12a. Latex watery; branchlets glabrous; leaves more than 8 cm long, glabrous; disc of concave glands; follicles stout, widest near the base; coma above 2 cm long .... **Anodendron**

12b. Latex milky; branchlets pubescent; leaves less than 6 cm long, pubescent; disc of linear

glands; follicles slender, narrow, uniformly thickened; coma below 1 cm long .... **Ichnocarpus**

6b. Erect herbs, shrubs or trees.

13a. Leaves alternate.

14a. Deciduous trees; corolla salver-shaped, throat glabrous ... . **Plumeria**

14b. Evergreen shrubs or trees; corolla funnel-shaped; throat villous.

15a. Leaves linear; calyx glandular within; flowers yellow; fruit less than 4 cm across, pericarp not fibrous .... **Cascabela**

15b. Leaves oblanceolate; flowers white; fruit more than 6 cm across, pericarp fibrous ..... **Cerbera**

13b. Leaves opposite.

16a. Erect herbs or subshrubs; flowers solitary or paired, axillary; seeds not arillate or comose ..... **Catharanthus**

16b. Erect trees or shrubs; flowers in terminal or axillary dichasial cymes; seeds arillate or comose.

17a. Seeds with a tuft of coma, not arillate.

18a. Corolla-throat with corona-scales; stamens exserted; anthers connivent around stigma, cells basally produced into spurs ..... **Wrightia**

18b. Corolla-throat without corona-scales; stamens included, anthers free from stigma, cells not spured ..... **Holarrhena**

17b. Seeds without coma, arillate.

19a. Mericarps green with grey warts; anthers coherent with stigma; calyx and style shed along with corolla ..... **Voacanga**

19b. Mericarps smooth; anthers free from the stigma; calyx and style not shed along with corolla .... **Tabernaemontana**

ALLAMANDA Linnaeus

Mant. 146, 214 ("Allemanda"), [576]. 1771.

Allamanda cathartica L., Mant. Pl. 214. 1771; Gamble, Fl. Pres. Madras 2: 821. 1923; Mani. & Sivar., Fl. Calicut 161. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 902. 1983; Ramach. & Nair, Fl. Cannanore 281. 1988; Sivar. & Mathew, Fl. Nilambur 406. 1996. ***Manjakolambi***.

Straggling shrubs. Leaves whorled, 6-11 x 3-6 cm, elliptic or broadly oblong, base acute or attenuate, apex acuminate, subcoriaceous, lateral veins 12-14 pairs; petiole to 5 mm long. Flowers in terminal or axillary short-peduncled cymes. Calyx 5-partite; lobes c. 1.5 x 0.5 cm, obovate-acute. Corolla yellow, 5-7 cm across, funnel-shaped; tube 4-6 cm long, inflated above the middle, throat densely villous; lobes 5, orbicular. Stamens 5, included in the basal constricted part of corolla tube; anthers subsessile, c. 5 mm long, sagittate, mucronate. Ovary bilocular; stigma ovoid with a basal ring like appendage. Fruit not seen.

Fl.: Throughout the year.

Distr.: Native of Tropical America; now naturalised in the tropics of the world. Often grown as an ornamental; it is also naturalised in some areas. *CNS 2490* (Punnapra).

ALSTONIA R. Brown

On Asclepiad. 64. 1810; Mem. Wern. Nat. Hist. Soc. 1: 75. 1811, (*nom. cons.*).

Alstonia scholaris (L.) R. Br., Mem. Wern. Nat. Hist. Soc. 1: 76. 1811; Hook. f., Fl. Brit. India 3: 642. 1882; Gamble, Fl. Pres. Madras 810. 1923; Markgraf, Blumea 22: 23. 1974; Stevens in Sald. & Nicols., Fl. Hassan Dist. 429. 1976; Mani. & Sivar., Fl. Calicut 164. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 903. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 42. 1983; Ramach. & Nair, Fl. Cannanore 274. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 52.1988; Vajravelu, Fl. Palghat Dist. 278. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 288. 1994; Sivar. & Mathew, Fl. Nilambur 407. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 277. 1996; *Echites scholaris* L., Mant. Pl. 53. 1767. ***Pala*** Rheede, Hort. Malab. 1: 81-82, t. 45. 1678. ***Pala***.

Trees; bark greyish, rough, irregularly cracked, latex milky, branches often in whorls. Leaves whorled, 4-7 per node,4-12 x 2-5 cm, obovate to oblanceolate, base cuneate, apex obtuse, green above, glaucous below, subcoriaceous, glabrous; secondary veins numerous, closely parallel; petiole to 1.5 cm long. Inflorescence in dense terminal, panicled umbellate cymes. Flowers 5-merous, bisexual, fragrant. Calyx 1.5-2 mm long, cupular, lobes 5, unequal, triangular-ovate. Corolla greenish-white, salver-form, tube 4-5 mm long, hairy at throat; lobes 5, 7-8 mm long, ovate, twisted, recurved, fragrant. Stamens 5, attached at throat. Ovaries 2, free; ovules many on marginal placenta. Fruit a pair of slender follicles, drooping, 25-40 cm long. Seeds 3-4 mm long, compressed, comose.

Fl. & Fr.: Oct. - Jan.

Distr.: S.E. Asia to Australia. In sacred groves. *CNS 2124* (Aravukadu).

ANODENDRON Alph. de Candolle

Prodr. 8: 443. 1844.

Anodendron manubriatum Merr., Philipp. J. Sci. 7: 333. 1912; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 69. 1983; Rani & Matthew in Matthew, Fl. Tam.

Carnatic 2: 904. 1983; Sasi. & Sivar., Fl. Pl. Thrissur For. 277. 1996. *Echites manubriata* Wallich, Cat. 1663. 1829. *nom. nud. E. paniculata* Roxb., Fl. Ind. 2: 17. 1832, non Poiret, 1812; Wight, Ic. t. 396. 1840. *Anodendron paniculatum* (Roxb.) A. DC. in DC., Prodr. 8: 444. 1844; Hook. f., Fl. Brit. India 3: 668. 1882; Gamble, Fl. Pres. Madras 820. 1923; Vajravelu, Fl. Palghat Dist. 279. 1990.

Large woody climbers, latex watery; bark brown. Leaves decussate, 8-22 x 4-8 cm, elliptic-oblong or elliptic-obovate, base rounded, apex obtusely acute, subcoriaceous; lateral nerves 10-13 pairs, parallel; petiole to 2 cm long. Flowers small, in axillary and terminal lax paniculate cymes; pedicel to 4 mm long. Calyx-lobes 5, c. 1 mm long, ovate, acute, alternating with 5 small glandular scales. Corolla yellowish-white, c. 8 mm across, slaver-form; tube c. 1.5 mm long, inflated over stamens; lobes 5, c. 4 mm long, slightly falcate, overlapping to right. Stamens 5, included; anthers sagittate, basally spurred, apex mucronate,connivent around stigma. Ovaries 2, free; ovules many, marginal; style c. 1 mm long; stigma obconic. Follicles divaricate, 9-14 x 2-3 cm, terete, tapering to the apex. Seeds 2-2.5 cm long, obovate, compressed, beaked, comose at apex.

Fl.: Feb. - Apr., *Fr.*: Apr. - Nov.

Distr.: Indo-Malesia. Common in sacred groves. *CNS 2629* (Nangiarkulangara), *CNS 2125* (Kanjukavu).

CARISSA Linnaeus

Syst. Nat. ed. 12, 2: 189. 1767; Mant. 7, 52. 1767 (*nom. cons.*).

Armed shrubs, erect or straggling; branchlets zigzag. Leaves decussate, coriaceous. Flowers pedicellate, in terminal or axillary cymes. Calyx cupular; lobes unequal, pubescent without. Corolla white, salver-form, puberulous; tube inflated over stamens; lobes overlapping to right. Stamens 5, included; anthers lanceolate, base rounded, acute, free from stigma. Ovary 1, oblong-globose, 2-locular; ovules 2 per locule, axile; stigma entire or forked. Fruit a globose or ellipsoid berry. Seeds 4, ellipsoid.

1a. Leaves obovate or oblanceolate, apex obtuse-emarginate; corolla more than 2 cm across; berry ellipsoid, above 1.5 cm across ..... **C. carandas**

1b. Leaves elliptic-ovate, apex acute; corolla below 1.5 cm across; berry globose, upto 1 cm across ..... **C. spinarum**

Carissa carandas L., Mant. Pl. 52. 1767; Roxb., Pl. Corom.. 77. 1798 & Fl. Ind. 1: 687. 1832; Wight, Ic. t. 426. 1841; Hook. f., Fl. Brit. India 3: 630. 1882; Gamble, Fl. Pres. Madras 804. 1922; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 37. 1983; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 905. 1983.

Much-branched spinous shrubs; spines to 3 cm long, simple. Leaves 2.5-5.5 x 1.5-3.5 cm,obovate, elliptic or oblong, base cuneate, apex obtuse or emarginate; petiole to 4 mm long. Flowers in terminal or axillary cymes; peduncle to 2 cm long, puberulous; pedicel to 5 mm long. Calyx-lobes 5, 2-3 mm long, linear-lanceolate, acute, puberulous without. Corolla white, c. 2 cm across; tube c. 1.5 cm long; lobes c. 1 cm long, elliptic-oblong. Stamens 5, attached from above the middle of tube. Ovary c. 2 mm across; style c. 8 mm long; stigma pointed. Berry 1.5-2 cm across, ellipsoid, often tinged red, ripening dark blue, edible.

Fl. & Fr.: Mar. - Jun.

Distr.: Sri Lanka, India, Myanmar, Nepal and Malesia. Widespread by cultivation. *CNS 2495* (Choolatheruvu).

Carissa spinarum L., Mant. Pl. 559. 1771; Hook. f., Fl. Brit. India 3: 631. 1882; Gamble, Fl. Pres. Madras 805. 1922; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 35. 1983; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 906. 1983. *Carissa diffusa* Roxb., Fl. Ind. ed. Carey 2: 524. 1824; Wight., Ic.t. 427. 1841. Bedd., Fl. Sylv. S. India 157. 1871 (Plate XVI: C).

Shrubs to 3 m tall; spines simple or forked, 1-3 cm long. Leaves 1.5-4 x 1.2-3 cm, broadly ovate or suborbicular, base acute or rounded, apex acute and apiculate, coriaceous; petiole to 3 mm long. Inflorescence terminal, rarely axillary, 5-7-flowered;

peduncle c. 3 mm long; pedicel to 3 mm long. Calyx-lobes 5, 2-2.5 mm long, lanceolate, acuminate, puberulous without. Corolla white, to 1.5 cm across; tube 1.2-2 cm long; lobes c. 7 mm long, oblong, acute. Stamens 5, attached near the middle of tube. Ovary c. 1 mm long; style 4-5 mm long; stigma forked. Berry 0.7-1 cm across, globose, shining black.

Fl. & Fr.: Dec. - May.

Distr.: Sri Lanka, India and Myanmar, Lateritic slopes and in sacred groves. *CNS 1923* (Cheriyanadu).

CASCABELA Rafinesque

Sylva Tell. 162. 1838.

Cascabela thevetia (L.) Lippold, Feddes Repert. 91: 52. 1980; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 907. 1983; Sivar. & Mathew, Fl. Nilambur 410. 1996. *Cerbera thevetia* L., Sp. Pl. 209. 1753. *C. peruviana* Pers., Syn. Pl. 1: 267. 1809. *Cascabela peruviana* (Pers.) Rafin., Sylv. Tellur.162. 1838. *Thevetia peruviana* (Pers.) Schum., in Engl. & Prantl, Pflanzenfam. 4: 159. 1895; Merr., Philipp. J. Sci. 9: 130. 1914; Mani. & Sivar., Fl. Calicut 163. 1982; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 29. 1983; Vajravelu, Fl. Palghat Dist. 284. 1990. *T. neriifolia* Juss. ex Steud., Nom. Bot. 2: 680. 1841; Gamble, Fl. Pres. Madras 2: 821. 1923. ***Manja-arali***.

Small trees. Leaves alternate, clustered near tips of branches, 8-12.6 x 0.7-1 cm, linear-lanceolate, base cuneate, margin recurved, apex acute, glabrous; petiole to 1 cm long. Flowers in sub-terminal cymes, pedicel to 2 cm long. Calyx lobes 5, c. 8 mm long, lanceolate, unequal, tube short. Corolla large, golden-yellow, 4-5 cm across, funnel-shaped; tube 4-5 cm long, throat villous; lobes 5, obovate, overlapping to the left. Stamens 5, included; anthers c. 2 mm long, oblong-cordate. Ovary c. 2 mm, depressed-conic; stigma conic with a basal ring. Drupe 2.5-3.5 cm across, broadly turbinate, compressed laterally. Seeds few strongly flattened.

Fl. & Fr.: Throughout the year.

Distr.: A native of South America, now pantropical. Cultivated as an ornamental in gardens and temple grounds. The fruits are highly poisonous. *CNS 2491* (Neerkunnam).

CATHARANTHUS G. Don

Gen. Hist. 4: 71, 95. 1837.

Annual or perennial herbs or undershrubs. Leaves simple, decussate, often glandular, lateral veins regular, ascending. Flowers solitary, paired or few in axillary clusters, bisexual, hypogynous, 5-merous. Calyx-lobes 5, linear-lanceolate. Corolla salver-form, lobes 5, twisting to left. Stamens 5, in the corolla-tube. Ovaries 2, free; ovules many, on marginal placenta. Follicles paired, slender. Seeds many.

1a. Annual herbs; leaves elliptic-lanceolate, acute or acuminate; flowers c. 1 cm across ..... **C. pusillus**

1b. Perennial herbs or undershrubs; leaves obovate-rounded; flowers c. 3 cm across ... . **C. roseus**

Catharanthus pusillus (Murray) G. Don, Gen. Hist. 4: 95. 1837; Stevens in Sald. & Nicols., Fl. Hassan Dist. 432. 1976; Mani. & Sivar., Fl. Calicut 164. 1982; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 45. 1983; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 908. 1983; Ramach. & Nair, Fl. Cannanore 276. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 53. 1988; Vajravelu, Fl. Palghat Dist. 279. 1990; Sivar. & Mathew, Fl. Nilambur 411. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 278. 1996. *Vinca pusilla* Murray, Novi. Comment. Soc. Regiae Sci. Gott. 3: 66, t. 1. 1773; Hook. f., Fl. Brit. India 3: 640. 1882. *Lochnera pusilla* (Murray) Schumann in Engl., Nat. Pflanzenfam. 4. (2): 145. 1895; Gamble, Fl. Pres. Madras 809. 1923. ***Cupta-vela*** Rheede, Hort. Malab. 9: 61, t. 33. 1689.

Annual erect herbs; branchlets quadrangular. Leaves 2-5.5 x 0.8-2 cm, elliptic-lanceolate, base and apex acute, entire, glabrous, chartaceous; petiole 2-5 mm long. Flowers axillary, solitary or in pairs or 3-5. Calyx lobes 5, 3-4 mm long, linear-lanceolate. Corolla white, tube 4-6 mm long, linear-lanceolate. Corolla white, tube 4-6 mm long,

cylindric, lobes 5, elliptic-acute. Stamens 5, included. Ovary c. 1 mm long. Follicles 2.5-4 cm long, c. 2 mm wide, linear. Seeds many, black.

Fl. & Fr.: Apr. - Aug.

Distr.: India and Sri Lanka. Common in exposed areas. Seasonal. *CNS 1363* (Thankikavala).

Catharanthus roseus (L.) G. Don, Gen. Hist. 4: 95. 1837; Stearn, Lloydia 29: 196. 1966; Stevens in Sald. & Nicols., Fl. Hassan Dist. 432. 1976; Mani. & Sivar., Fl. Calicut 165. 1982; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 44. 1983; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 909. 1983; Ramach. & Nair, Fl. Cannanore 276. 1988; Vajravelu, Fl. Palghat Dist. 280. 1990; Sivar. & Mathew, Fl. Nilambur 411. 1996. *Vinca rosea* L., Syst. Nat. ed. 10, 944. 1759; Hook. f., Fl. Brit. India 3: 640. 1882. *Lochnera rosea* (L.) Reichenb., Consp. Regni. Veg. 134. 1828; Gamble, Fl. Pres. Madras 809. 1923. ***Kainari***.

Perennial woody herbs; young stems, leaves and calyx puberulous. Leavs 3-6 x 1.5-2.5 cm, elliptic-obovate, base cuneate, apex obtuse or rounded, glabrous, lateral veins c. 10 pairs, chartaceous; petiole to 1.3 cm long. Flowers axillary, solitary or paired, shortly pedicellate. Calyx-lobes 5, subequal, 3-5 mm long, subulate. Corolla pink or white, tube 2-3 cm long, pubescent without; lobes 5, 1.5-2 x c. 1.5 cm, triangular-obovate, obtuse. Stamens 5, included. Ovary c. 4 mm long; style to 3 cm long. Follicles 2-3 x 0.2-0.3 cm, linear, puberulous. Seeds many, black.

Fl. & Fr.: Aug. - Jan.

Distr.: Native of Madagascar, now naturalised in the tropics. Abundant in wastelands and along waysides. *CNS 2126* (Ambalapuzha).

The whole plant is medicinal and contains alkaloids very useful for treatment against cancer.

CERBERA Linnaeus

Sp. Pl. 208. 1753.

Cerbera odollam Gaertn., Fruct. 2: 193. 1791; Corner, Gard. Bull. Singapore 10: 274. 1934; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 53. 1983; Ramach. & Nair, Fl. Cannanore 276. 1988; Nicols., Suresh & Mani., An Inter. Hort. Malab. 53. 1988. *Cerbera manghas* L., Sp. Pl. 208. 1753, p.p.; Gamble, Fl. Pres. Madras. 806. 1923; Mani. & Sivar., Fl. Calicut 163. 1982. ***Odallam*** Rheede, Hort. Malab. 1: t. 39. 1678. ***Othalam***

Trees. Leaves alternate, crowded at the apices of branches, 11-20 x 3-5.5 cm, oblanceolate, base narrowed, apex acute, glabrous, slightly coriaceous; dried leaf black; petiole to 2 cm. Flowers in sub-terminal, umbellate cymes. Calyx-lobes 5, 1-1.5 cm long. Corolla white,tube 1.5-2 cm long, cylindric below, swollen just above the middle; lobes 5, 2-3 cm long, ovelapping to the left. Stamens 5, included. Ovary of 2 distinct carpels. Drupes 6-8.5 cm across, globose or ellipsoid, glabrous, green, often tinged with pink when ripe; pericarp fibrous.

Fl. & Fr.: Oct. - Dec.

Distr.: Peninsular India and Malesia.This species is characteristic to salt-marshes and backwaters, but occasionally found in other areas also. *CNS 1530* (Kuthiyathodu).

Note: *Cerbera manghas* L., and *C. odollam* Gaertn., have usually been treated as conspecific by Indian taxonomists. However, they refer to two distinct taxa have been made amply clear by Corner (1939). For a more detailed note on the identity and nomenclature of the Indian material, refer Nicolson *et al.* (1988).

CHONEMORPHA G. Don

Gen. Hist. 4: 69, 76. 1837 (*nom. cons.*).

Chonemorpha fragrans (Moon) Alston, Ann. Roy. Bot. Gard. Peradeniya 11:203. 1929; Chatterjee, Kew Bull. 1947 : 52. 1947; Stevens in Sald. & Nicols., Fl. Hassan Dist. 433. 1976; Mani. & Sivar., Fl. Calicut 162. 1982; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 56. 1983; Nicols., Suresh & Mani, An Interpr. Hort. Malab. 54. 1988; Mohanan

& Henry, Fl. Thiruvananthapuram 289. 1994; Sivar. & Mathew, Fl. Nilambur 413. 1996. *Echites fragrans* Moon, Cat. 20. 1824. *Chonemorpha macrophylla* G. Don, Gen. Syst. 4: 76. 1837; Hook. f., Fl. Brit. India 3: 661. 1882; Gamble, Fl. Pres. Madras 818. 1923. ***Belutta-kaka-kodi*** Rheede, Hort. Malab. 9: 7-8, t. 5-6. 1689. ***Perumkurumba***.

Large climbing shrubs; stem 4-angled; young parts brown pubescent. Leaves 10-20 x 8-15 cm, broadly elliptic to suborbicular, base subcordate, apex acuminate, softly pubescent below; veins 6-8 pairs, reticulations prominent below; petioles 1-2cm long, pubescent. Flowers large, 5-merous, in terminal, paniculate cymes, white turning dull yellow. Calyx tubular; tube 5-6 mm long with a ring of glands at base; lobes 5, 5-6cm long, ovate. Corolla 6 cm across, salver-form; tube 2.5-3.5cm long; lobes 5, 2-2.5 x 1.5-2cm, orbicular. Stamens 5, included; anthers sagittate. Carpels 2; ovules many; stigma subclavate. Follicles 2, woody, 8-12 cm long, 2-3cm wide, cylindric. Seeds ovoid, flat, crowned with silky coma.

Fl. & Fr.: Feb. - Apr.

Distr.: Indo-Malesia. In sacred goves. *CNS 1920* (Vallikavu at Chengannur).

HOLARRHENA R. Brown

On Asclepiad. 51.1810; Mem. Wern. Nat. Hist. Soc. 1:62.1811.

Holarrhena pubescens (Buch.-Ham.) Wall. ex Don, Gen. Hist. 4: 78. 1837; Rani & Matthew, in Matthew, Fl. Tam. Carnatic 3: 910. 1983; Panigr., Taxon 36: 466. 1987; Ramach. & Nair, Fl. Cannanore 277. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 55. 1988; Vajravelu., Fl. Palghat Dist. 280. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 291. 1994 Sivar. & Mathew, Fl. Nilambur 413. 1996; Sasi. & Sivar. Fl. Pl. Thrissur For. 280.1996. *Echites pubescens* Buch.-Ham., Trans. Linn. Soc. London 13: 521. 1821. *Holarrhena antidysenterica* (L.) Wall. ex DC., Prodr. 8: 413. 1844; Hook.f., Fl. Brit. India 3:644. 1882; Gamble, Fl. Pres. Madras 811. 1923; Stevens in Sald. & Nicols., Fl. Hassan Dist. 434. 1976; Mani & Sivar., Fl. Calicut 165. 1982. *H.codaga* G. Don, Gen. Hist. 4: 78. 1837. ***Codaga-pala*** Rheede, Hort. Malab. 1:85-86, t.47. 1678. ***Kodagapala***.

Small deciduous trees or large shrubs; young stem, petioles, leaves and peduncles densely pubescent. Leaves 5-15 x 4-7cm, elliptic or broadly ovate, base rounded, apex acuminate, nerves 10-12 pairs, petiole to 1 cm long. Cymes paniculate or corymbose, terminal or axillary. Flowers 5-merous; pedicel to 1.2 cm long. Bracts and bracteoles minute. Calyx cupular, lobes 5, 2-3 mm long, unequal, glandular within. Corolla white, salver-form; tube 1-1.5 cm long mouth with a ring of hairs; lobes 5, 1-1.5cm long, oblong, rounded at tip, puberulous without. Stamens 5, included. Ovaries 2, free; ovules many, marginal; stigma fusiforum. Follicles in pairs, slender, 18-25 cm long linear, drooping. Seeds 0.8-1 cm long, linear oblong, comose.

Fl. & Fr.: Apr. - Jul.

Distr.: Indo-Malaysia. In waste gravelly soil. *CNS 2630* (Chettikulangara).

ICHNOCARPUS R. Brown.

On Asclepad. 50. 1810; Mem. Wern. Nat. Hist. Soc. 1:61.1811.

Ichnocarpus frutescens (L.) R. Br. in Ait., Hort. Kew. Ed. 2, 2:69.1811; Hook. f., Fl. Brit. India 3: 669. 1882; Gamble, Fl. Pres. Madras 820. 1923; Stevens in Sald. & Nicols., Fl. Hassan Dist. 435. 1976; Mani & Sivar., Fl. Calicut 162. 1982; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 71. 1983; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 912. 1983; Ramach. & Nair, Fl. Cannanore 278. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 55. 1988; Vajravelu, Fl. Palghat Dist. 281. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 292. 1994; Sivar. & Mathew, Fl. Nilambur 414. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 280. 1996. *Apocynum frutescens* L., Sp. Pl. 213. 1753. ***Pal-valli*** Rheede, Hort. Malab. 9:19: t.12. 1689. ***Pal-valli.***

Large woody climbers; latex creamy-yellow; tender parts rusty - pubescent. Leaves 2.5 -6 x 1.5-3.5 cm, elliptic-oblong, base rounded, apex acute-apiculate, rusty villous below, thin-coriacerous; petioles 4-6 mm long. Cymes paniculate, terminal and axillary, rusty pubescent. Flowers 5-merous, small, 3-4 mm long, c.3 mm across. Bracts minute, ovate. Calyx c.1 mm long, campanulate, lobes 5, subequal, ovate, with 5 glandular scales. Corolla creamy-white, salver-form; tube c.2mm long, dialated at

portion where stamens are included; lobes 5, ovate-lanceolate, silky hairy at top; throat villous. Stamens 5, included, apiculate. Ovaries 2, partly connate; ovules many on marginal placenta. Follicles slender, 7-11 x 0.3 - 0.5 cm, cylindric, rusty pubescent when young, more or less glabrescent when ripe. Seeds c. 1.5 mm long, linear, comose.

Fl. & Fr.: Sep. - Mar.

Distr.: Indo-Malesia and Australia. Common in plains and slopes; among bushes and thickets. (NS 1522) *(Panavally).*

Root powdered and given in milk as a remedy in formation sugar in urine and stone in urinary bladder.

KAMETTIA Kosteletzky

Allg. Med. Pharm. Fl. 3:1062.1834.

Kamettia caryophyllata (Roxb.) Nicols. & Suresh, Taxon 35 : 354. 1986; Ramach. & Nair, Fl. Cannanore 278. 1988; Nicols., Seresh & Mani., An Interpr. Hort. Malab. 55. 1988. *Echites caryophyllata* Roxb., Hort. Beng. 20. 1814 ("coryophyllata"). *Kamettia malabarica* Kostel., Allg. Med.-Pharm. Fl. 3: 1062. 1834, nom. illeg. *Aganosma roxburghii* G. Don., Gen. Syst. 4: 77. 1837. *Ellertonia rheedii* Wight, Ic. t. 1295. 1848; Hook.f., Fl., Brit. India 3: 641. 1882; Gamble, Fl. Pres. Madras 811. 1923; Mani. & Sivar., Fl. Calicut 162. 1982. ***Kametti-valli*** Rheede, Hort. Malab. 9: 23-24, t.14. 1689.

Climbing shrubs; stem dark, prominently lenticellate. Leaves decussate or whorled, 6-10 x 2-5 cm, elliptic, base cuneate, apex long-acuminate, lateral nerves 14-16 pairs, parallel, chartaceous. Cymes terminal to subterminal. Bracts minute, c.1 mm long, subulate. Flowers pedicelled and sessile in same inflorescence, 5-merous. Calyx 2-3 mm long, campanulate; lobes 5, broadly ovate, acute, reddish. Corolla white, salver-form, c. 2 cm across; tube 1.5-2 cm long, dialated at middle where stamens are included; lobes 5, 1-1.4 cm long, linear-lanceolate, twisted to left in buds. Stamens 5; anthers apiculate. Ovaries 2, free; ovules many on marginal placenta. Follicles 6-8 cm long; cylindric, attenuate at tip. Seeds many, winged, peltately attached to the placenta.

Fl. & Fr.: Sep. - Jan.

Distr.: Endemic to Western Ghats. Common in sacred groves. *CNS 2631. (Kayamkulam).*

PARSONSIA R. Brown

On Asclepiad. 53. 1810; Mem. Wern. Nat. Hist. Soc. 1:64.1811 (*nom.cons.).*

Parsonsia alboflavescens (Dennst.) Mabb., Taxon 26 : 532. 1977; Mani & Sivar., Fl. Calicut 163. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 914. 1983; Mani., Fl. Silent Valley 175. 1988; Ramach. & Nair, Fl. Cannanore 279.1988. Nicols., Suresh & Mani., An Interpr. Hort. Malab. 56. 1988; Vajravelu, Fl. Palghat Dist. 282.1990; Mohanan & Henry, Fl. Thiruvananthapuram 292. 1994; Sivar. & Mathew, Fl. Nilambur 416. 1996. *Periploca alboflavescens* Dennst., Schlüss. Hort. Malab. 12, 23 & 35. 1818. *Echites laevigata* Moon, Cat. Pl. Ceylon 20. 1824. *Parsonsia spiralis* Wall. ex G. Don, Gen. Syst. 4: 80. 1837; Hook.f., Fl. Brit. India 3: 650. 1882; Gamble, Fl. Pres. Madras 814. *1923. P. laevigata* (Moon) Alston, Ann. Roy. Bot. Gard. Peradeniya 11: 304. 1929; Stevens in Sald. & Nicols., Fl. Hassan Dist. 436. 1976; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 58. 1983. ***Kudici-Kodi*** Rheede, Hort. Malab. 9:13, t. 9.1689; ***Wallia-Pal-Valli*** Rheede, Hort. Malab. 9: 15, t. 10. 1689.

Twining shrubs. Leaves 5-12 x 4-8 cm, elliptic-ovate, base rounded, apex acute or slightly acuminate, glabrous, subcoriaceous; petiole to 2 cm long. Inflorescence axillary umbellate cymes; peduncles 3-5 cm long. Flowers yellowish-white; pedicels slender, 1-2 mm long. Calyx lobes 5, c.3 mm long, triangular. Corolla salver-shaped; tube 3-4 mm long, cylindrical; lobes 5, 4-6 mm long, lanceolate, twisted. Stamens 5, filaments spirally twisted around style; anthers c.3 mm long, narrowly sagittate, connivent around stigma. Disc of 5 conical lobes. Ovary 2, connate; ovules many; stigma conical. Follicles of 2 connate, cylindric mericarps, 8-12 cm long, longitudinally grooved. Seeds oblong, with silky white coma.

Fl. & Fr.: Jan. - Jun.

Distr: China, India to Malaysia. Common near back water channels. *CNS 2127 (Thrikunnapuzha).*

PLUMERIA Linnaeus

Sp. Pl. 209.1753.

Plumeria rubra L., Sp. Pl. 209. 1753; Blatter *et al.*, Beautif. Ind. Trees (ed.2) 112. 1954; Matthew, Rec. Bot. Surv. India. 20: 154. 1969; Mani. & Sivar., Fl. Calicut 164. 1982; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 29. 1983; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 915. 1983. Vajravelu, Fl. Palghat Dist. 284. 1990. *P. acuminata* Ait., Hort. Kew. 2:70. 1789; Hook. in Curtis, Bot. Mag. t. 3952. 1842. *P. acutifolia* Poir. in Lam., Encyl. Suppl. 2: 667. 1812; Hook. f., Fl. Brit. India 3:641. 1882; Gamble, Fl. Pres. Madras 2: 821. 1923. ***Kallipala.***

Deciduous trees. Leaves alternate, clustered towards branch tips, 14-32 x 6.5 - 9 cm, elliptic to oblanceolate, base cuneate to attenuate, apex acute; lateral veins many, parallel, distally united forming a submarginal vein; petiole to 3 cm long. Flowers in panicles, clustered at leafless branch-tips, white with a yellow centre. Calyx cupular, c.3 mm long; lobes 5. Corolla 3.5 - 4.5 cm across, funnel - shaped; tube c.1.5 cm long; lobes 5, c. 2.5 x 1.5 cm, obovate-obtuse. Stamens 5, included in the tube; anthers c. 2 mm long, ovate-lanceloate. Ovary c. 2 mm long, globose; ovules many; stigma 2- lobed. Fruit not seen.

Fr.: Apr. - May.

Distr.: Native of tropical America; widely naturalised in the tropics. Common in plains and temple grounds. This is often grown at ornamental and on hedges. *CNS 2492 (Vayalar).*

RAUVOLFIA Linnaeus

Sp. Pl. 208. 1753.

Shrubs. Leaves simple, whorled, usually unequal. Inflorescence corymbose or umbellate cymes, axillary or terminal. Flowers 5-merous. Calyx lobes 5, free to base,

eglandular. Corolla salver-shaped, tube cylindric, dialated over stamens, lobes 5, twisting to left. Stamens 5, sagittate. Disc annular. Ovaries 2, connate; ovules 2 per locule; style filiform; stigma calyptriform, tip 2-fid. Drupe distinct or connate, with 2 one-seeded pyrenes. Seeds ovoid to subglobose.

1a. Plants glabrous; calyx divided to the base; corolla more than 1 cm long; leaves usually 3 per node ..... **R. serpentina**

1b. Plants dense tomentose; calyx cupular; corolla less than 0.5 cm long; leaves 4 per node ..... **R. tetraphylla**

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; Mani. & Sivar., Fl. Calicut 164. 1982; Rani. & Matthew in Matthew, Fl. Tam. Carnatic 3: 917. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 49. 1983; Ramach. & Nair, Fl. Cannanore 279. 1988. Nicols., Suresh & Mani., An Interpr. Hort. Malab. 57. 1988; Vajravelu, Fl. Palghat Dist. 282. 1990. Mohanan & Henry, Fl. Thiruvananthapuram 293. 1994. Sivar. & Mathew, Fl. Nilambur 417. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 282. 1996. *Ophioxylon serpentinum* L., Sp. Pl. 1043. 1753; Wight, Ic. t. 849. 1844-1845. ***Tsjovanna ampelodi*** Rheede, Hort. Malab. 9:15, t. 10. 1689. ***Sarpagandhi.***

Erect undershrubs with thick rootstock; latex watery. Leaves 6-12 x 2.5-4 cm, elliptic or oblanceolate, base attenuate, acute to acuminate at apex, glabrous; petiole to 1.5 cm long. Flowers in terminal or axillary umbellate cymes; peduncle, pedicles, calyx reddish. Peduncle 3-5 cm long. Bracts and bracteoles minute. Calyx-lobes 5, 1.5-2 mm long, ovate-lanceolate, each with 2 glands. Corolla white with pale purple shade on the tube; tube 1-1.5 cm long, dilated at the middle, slightly curved; lobes 5, 3-5 mm long, oblong. Stamens 5, included. Ovary c.1 mm long; style filiform; stigma 2-fid at tip. Drupe 5-7 mm across, obovoid, connate with their lower half or a little beyond, shining blackish-purple when ripe.

Fl. & Fr.: Aug. - Sept.

Distr.: Indo-Malaysia. In waste lands. *CNS 1921.* (*Vallikunnam*).

Roots used against dysentery and bowel complaints; decoration given as an antidote in snake-bite.

Rauvolfia tetraphylla L., Sp. Pl. 208. 1753; Rao, Ann. Missouri Bot. Gard. 43 : 285. 1956; Fuchs, Taxon 9: 40. 1960; Mani. & Sivar., Fl. Calicut 165. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 917. 1983; Ramach. & Nair, Fl. Cannanore 279. 1988; Sivar. & Mathew, Fl. Nilambur 417. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 282. 1996. *Rauvolfia canescens* L., Sp. Pl. (ed. 2) 303. 1762; Gamble, Fl. Pres. Madras 808. 1923 (Fig. 37).

Shrubs, pubescent all over. Leaves in whorls of 4, unequal, 4-8 x 3-5 cm, elliptic or obovate, base acute, apex acuminate, shortly pubescent; petiole to 5 mm long. Flowers in axillary or terminal, 5-7-flowered, corymbose cymes. Calyx lobes c. 1 mm long, orbicular, ciliate. Corolla white, c. 4 mm long, campanulate, tube pubescent at the throat, lobes ovate, obtuse. Stamens 5; filaments short. Drupes 6-8 mm across, globose, purple-red when ripe.

Fl. & Fr.: Jun. - Aug.

Distr.: Native of West Indies; now naturalized in many places in Peninsular India. In waste places. *CNS 1559 (Kalarcodu).*

STROPHANTHUS A.P.de Candolle
Bull. Sci. Soc. Philom. 3:122.1802.

Strophanthus wightianus Wall. ex Wight, Ic. t. 1301. 1848; Hook.f., Fl. Brit. India 3: 666. 1882; Gamble, Fl. Pres. Madras 817. 1923 (Plate XVI: A & B; Fig. 38).

Climbing shrubs; branchlets prominently warted. Stem, petioles and peduncles violetish. Leaves 6-11 x 3-6 cm, elliptic to elliptic-obovate, attenuate at base, acute at apex, thin coriaceous; veins 8-12 pairs, looped to form inter marginal vein; petiole to 2 cm long. Flowers in terminal branched corymbose cymes. Bracts 3-4 mm long, triangular acute, reddish-brown. Peduncles stout. Pedicels 5-6 mm long. Calyx lobes 5, 3-4 mm long, base c.3 mm wide, triangular, margin ciliate, acute. Corolla borwn; tube 7-10 mm

long, widened at throat, cream coloured; lobes 5, overlapping to the right, 1-1.5 x 0.3 - 0.4 cm, linear, concave, twisted, apex obtuse, reddish-brown; corona scales 10, yellow, 2-3 mm long, subulate. Stamens 5, included; filaments c. 2 mm long, densely pubescent; anthers to 2 mm long, sagittate, base spurred, apex apiculate. Carpels 2, apocarpous, c.2 mm long, globose; ovules many; style c.4 mm long, slender, filiform; stigma conical. Follicles stout, 8-13 cm long, 2-3 cm wide,cylindric, woody, green, apex obtuse. Seeds many, ovoid, compressed, 6-8 mm long, tipped with silky coma.

Fl. & Fr.: Mar. - Jan.

Distr.: Endemic to Southern Western Ghats. Rare. In Sacred groves. *CNS 1018 (Vandanam).*

TABERNAEMONTANA Linnaeus

Sp. Pl. 210. 1753.

Tabernaemontana alternifolia L., Sp. Pl. 211. 1753; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 57. 1988; Sivar. & Mathew, Fl. Nilambur 418. 1996. *Tabernaemontana heyneana* Wall., Edward's Bot. Reg. 15: t. 1273. 1829; Hook.f., Fl. Brit. India 3: 646. 1882; Vajravelu, Fl. Palghat Dist. 283. 1990. *Ervatamia heyneana* (Wall.) Cooke, Fl. Pres. Bombay 2: 134. 1904; Gamble, Fl. Pres. Madras 813. 1923; Mani. & Sivar., Fl. Calicut 166. 1982; Ramach. & Nair, Fl. Cannanore 277. 1988. ***Kuruttupala***.

Shrubs to small trees; bark greyish, rough with shallow irregular fissures. Leaves to 15 x 6 cm, elliptic-oblong or oblong-lanceolate, base acute, apex shortly acuminate, coriaceous; lateral nerves 12-15 pairs, nearly at right angles to the midrib; petiole to 1.5 cm long. Flowers in terminal corymbose cymes; peduncle to 4 cm long. Calyx c.4 mm long, shortly lobed; lobes broadly oblong, obtuse, glandular inside; glands fimbriate. Corolla white; tube c. 2.5 cm long, cylindric, inflated near the apex; lobes c. 1.5 cm long, margins crisped, twisted to the right. Stamens included; anthers linear. Style linear; stigma clavate. Follicles divaricate, orange-yellowish, to 3 x 1 cm, usually curved and beaked. Seeds covered with red aril.

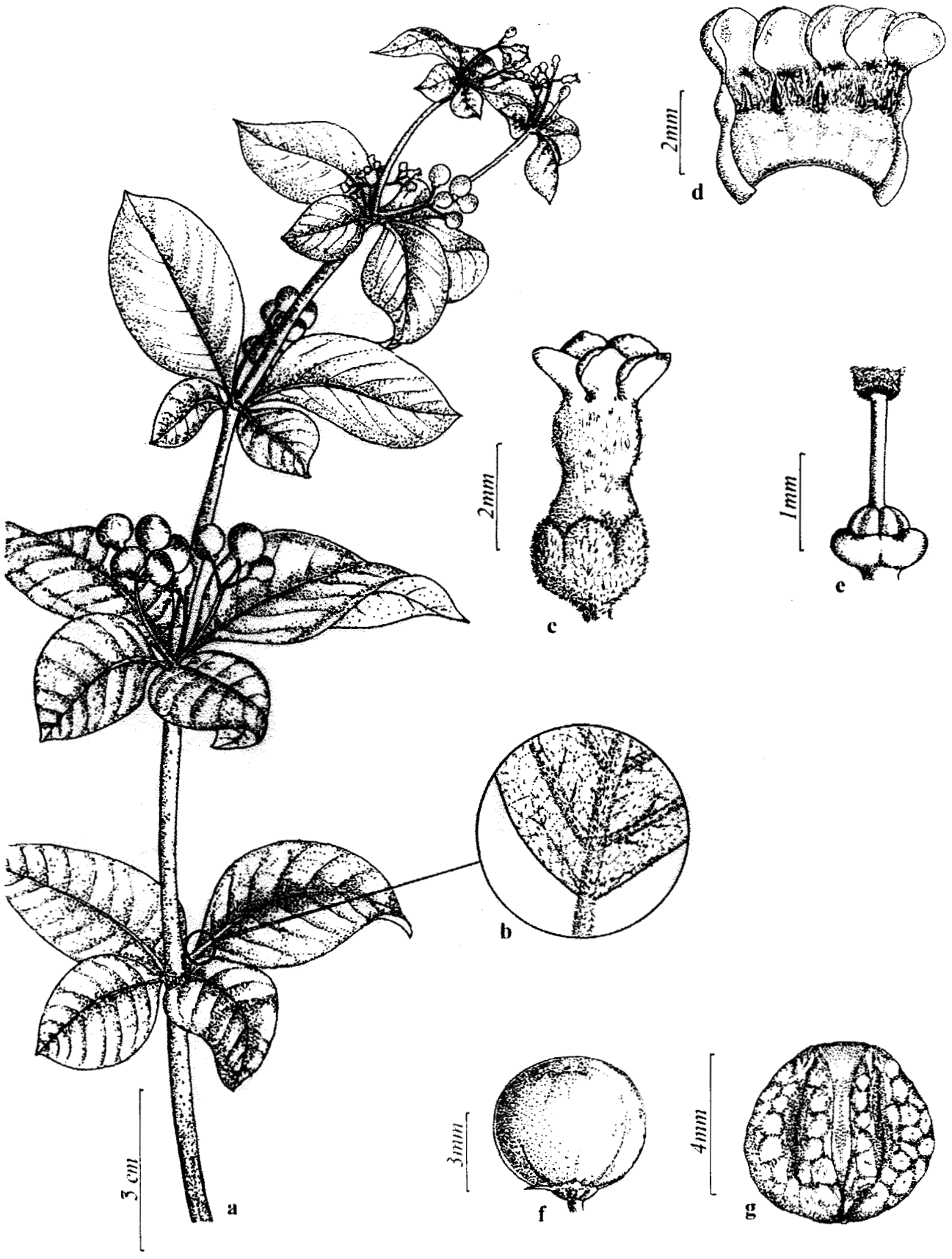


Fig. 37. *Rauvolfia tetraphylla* L.: a. Flowering twig; b. A portion of the leaf; c. Flower; d. Corolla, split-open; e. Pistil; f. Fruit; g. Seed.

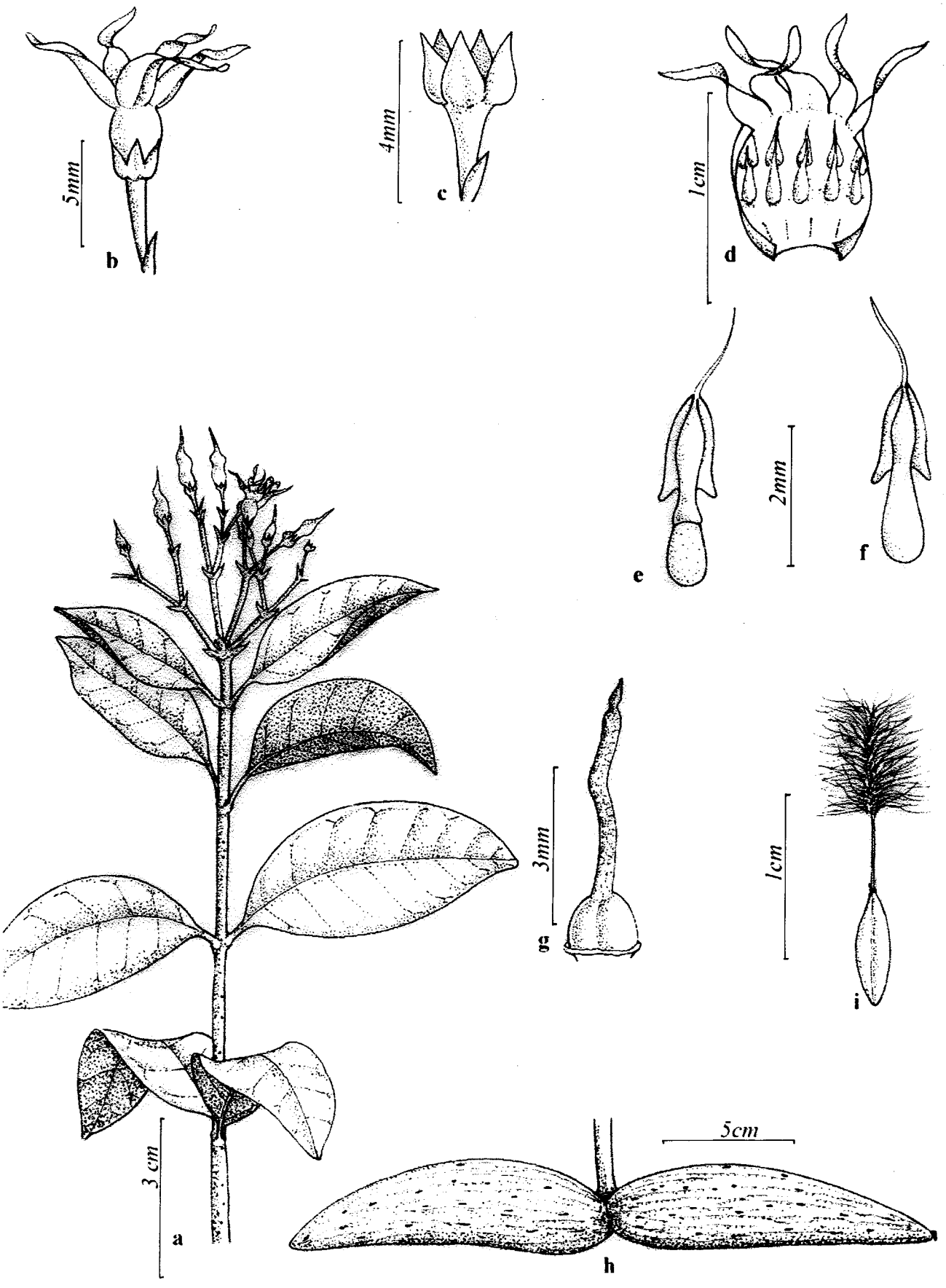


Fig. 38. *Strophanthus wighitianus* Wall.: a. Flowering twig; b. Flower; c. Calyx with pedicel and bract; d. Corolla, spilt-open; e & f. Stamens-dorsal and ventral views; g. Pistil; h. Follicles; i. Seed.

Fl. & Fr.: Throughout the year.

Distr.: Throughout W. Ghats; endemic. Common in wastelands and roadsides. *CNS 2633* (*Thekkekara*).

VALLARIS N.L.Burman

Fl. Indica 51. 1768.

Vallaris solanacea (Roth) Kuntze, Rev. Gen. Pl. 2 : 147. 1891; Gamble, Fl. Pres. Madras 815. 1923; Mani. & Sivar., Fl. Calicut 162. 1982; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 59. 1983; Rani & Matthew in Matthew, Fl. Tam Carnatic 2: 918. 1983. *Peltanthera solanacea* Roth, Nov. Pl. Sp. 132. 1821. *Vallaris heynei* Sprengel in L., Syst. Veg. (ed.16) 1:635. 1824; Hook. f., Fl. Brit. India 3: 650. 1882; Bor & Raiz., Beautif. Ind. Climbers & shrubs 208. 1954. *Echites dichotoma* Roxb., Fl. Ind. 2: 19. 1832. *V. dichotoma* (Roxb.) Wallich ex Don, Gen. Hist. 4: 79. 1837; Wight, Ic. t. 438. 1841.

Climbing shrubs; tender parts puberulous. Leaves decussate, 5-11 x 2.5-4cm, elliptic or oblong, base attenuate, apex acuminate; petiole to 1.5 cm long. Cymes extra-axillary; peduncle c. 4 cm long; pedicel to 1 cm long, hispid. Calyx-lobes 5, unequal, c. 4 mm long, lanceolate, alternating with minute glands, hispid. Corolla white, 2-2.5 cm acorss, salver-form or sub-rotate; tube to 5 mm long, cylindric, villous within; lobes 5, orbicular, twisted to right. Stamens 5, exserted; anthers c. 2 mm long, sagittate, basally bearded, adnate to stigma. Ovaries 2, free, to 1.5 mm; ovules many, marginal; style c. 5 mm long; stigma obconic. Mericarps 10-15 x 1- 1.5 cm, cylindric. Seeds to 1 cm long, oblong, beaked at one end, with a tuft of silky white coma.

Fl. & Fr.: Mar. - May.

Disstr.: Sri Lanka through India to Himalayas, Bengladesh, Burma, S. China and Indo-China. Generally as garden escape and also found in wastelands. *CNS 2432* (Alappuzha town).

VOACANGA Du Petit - Thouars

Gen. Nova Madag. 10. 1806.

Voacanga grandifolia (Miq.) Rolfe, J. Bot. London 21 : 202. 1883; Sahni & Bahadur, Ind. J. For. 2: 33-35. 1979; Leeuwenberg, Agr. Univ. Wageningen Pap. 85 (3) : 55. 1985; Sunil & Sivar., Rheedea 4(2) : 109. 1994. *Pootia grandifolia* Miq., Versel. en, Meded. Kon. Akad. Wet. 6: 193. 1857. & Fl. Ind. Bat. 2: 417. 1857. *Orchipeda grandifolia* Miq., Ann. Mus. Lugd. Bat. 1:316. 1864. *Tabernaemontana celebica* Miq., Ann. Mus. Lugd. Bat. 4: 139. 1869. *Voacanga grandifolia* var. *glaberifolia* Bakh.f., in Back., & Bakh. f., Fl. Java 3: 229. 1965 (Fig. 39).

Dichotomously branched, laticiferous trees or shrubs, 2-6 m tall; bark greyish or yellowish, smooth. Leaves opposite, often in unequal pairs, sessile or subsessile, amplexicaule, 24-47 x 8-16 cm, broadly elliptic to oblanceolate, base rounded or auriculate, apex acute or acuminate, green above, pale below; secondary veins 15-25 pairs, raised below, glabrous except on nerves below. Inflorescence axillary, long-peduncled, erect or drooping, first branching dichotomous, further branching cymose, laxly-flowered; peduncle stout, 9-20 cm long. Flowers 5-merous; pedicels to 2.5 cm long; bracteoles to 8 mm long, ovate, deciduous. Calyx somewhat companulate, divided to middle, with many basal glands within and shedding with the corolla, 0.7-1.5 cm long; lobes 5, 4-7 mm across, suborbicular. Corolla white,5-7 cm across, rotate or salver-shaped; tube to 1.7 cm long, twisted; lobes 5, overlapping to the left in bud, 1.5-2 cm across, obovate-rounded. Stamens 5, inserted at the mouth of the corolla tube; filaments short; anthers to 5 mm long, sagittate, cohering with the stigma. Disc annular, 5-lobed, yellow. Ovary 2-carpellary, apocarpous, many-ovuled; style to 1.6 cm long; stigma acute with a ring at base. Fruits of two, recurved or divaricate mericarps, 7-8 x 4-6 cm, somewhat elongate-reniform or obovoid-oblong, yellow or green with many pale grey or brownish warts. Seeds many, to 8 mm long, ovoid, dark brown, rugose; aril orange red.

Fl. & Fr.: Throughout the year.

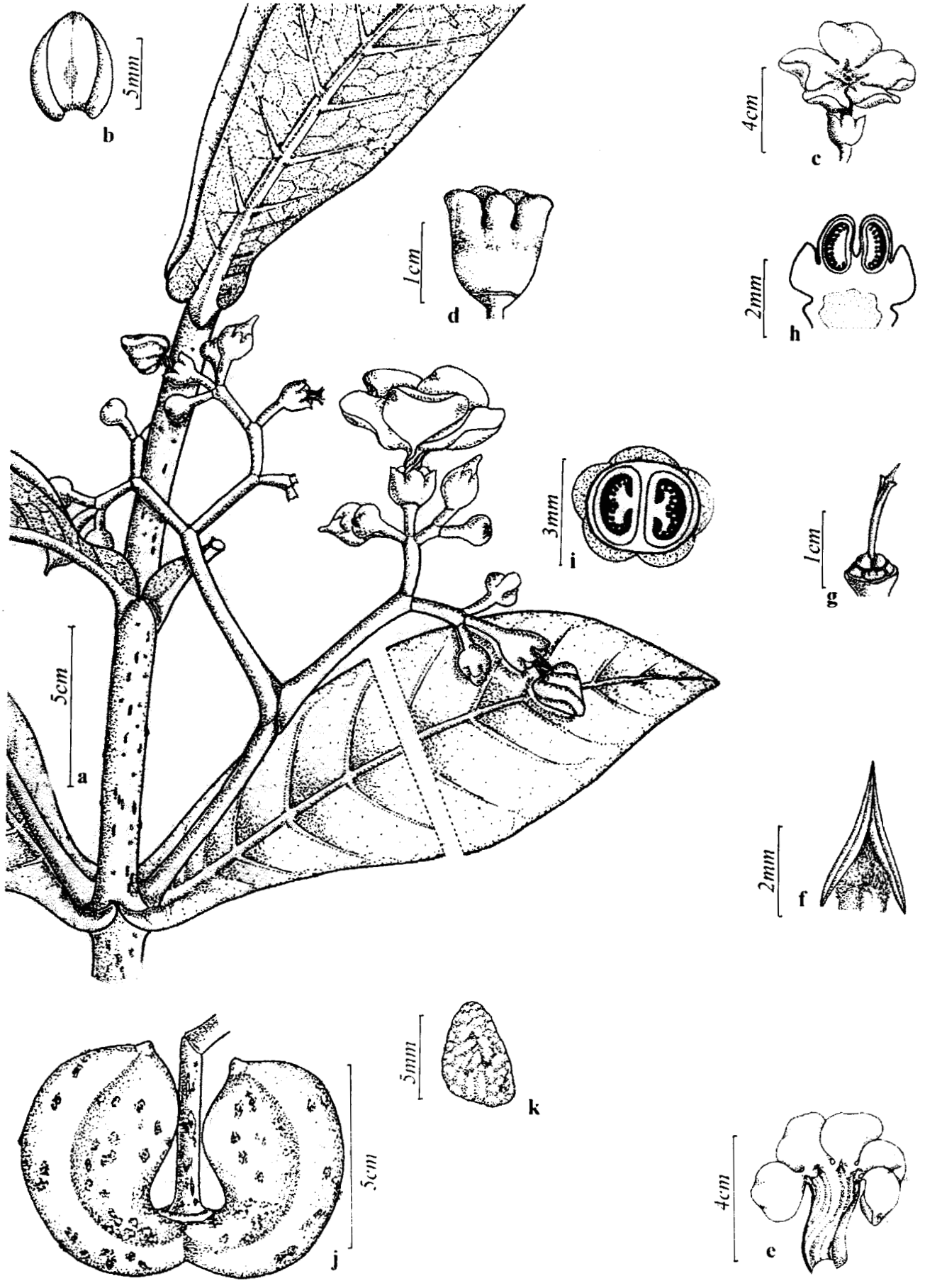


Fig. 39. *Voacanga grandifolia* (Miq.) Rolfe: a. Flowering twig ; b. Bracteole; c. Flower; d. Calyx; e. Corolla tube opened showing insertion of stamens; f. Single stamen; g. Pistil; h. Ovary-L.S; i. Ovary-C.S; j. Fruite; k. Seed.

Distr.: Malesia (Indonesia and Papua New Guinea) and India (Goa and Kerala). In waste places and roadsides. *CNS 1645* (Alappuzha town), *CNS 1922* (Alappuzha town).

WRIGHTIA R. Brown

On Asclepiad. 762. 1810.

Small deciduous trees. Leaves simple, decussate, chartaceous. Flowers in axillary and terminal cymes. Flowers 5-merous, bisexual, hypogynous. Calyx cupular, lobes 5, glandular within. Corolla white or reddish, salver-form, tube shorter than the lobes, lobes overlapping to the left, mouth with coronal scales,often fimbriate. Stamens 5, attached to the mouth of corolla tube; anthers exserted, conniving and adhering to the stigma. Carpels free or connate. Follicles cylindric, fully or apically connate. Seeds comose.

1a. Leaves tomentose on both sides; corolla reddish; anthers glabrous at apex; follicles connate throughout ..... **W. arborea**

1b. Leaves glabrous beneath; corolla white; anthers ciliate at apex; follicles connate at apex only ..... **W. tinctoria**

Wrightia arborea (Dennst.) Mabb., Taxon 26: 533. 1977; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 64. 1983; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 920. 1983; Ramach. & Nair, Fl. Cannanore 280. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 59. 1988; Sasi. & Sivar., Fl. Pl. Thrissur For.283. 1996. *Periploca arborea* Dennst., Schluess. Hort. Malab.13, 23 & 25. 1818. *Wrightia tomentosa* Roemer & Schultes in L., Syst. Veg. 4: 414. 1819; Hook. f., Fl. Brit. India 3: 653. 1882; Gamble, Fl. Pres. Madras 816. 1923; ***Nelem-pala*** Rheede, Hort. Malab. 9: 5, t. 3-4. 1689 (Fig. 40).

Small to medium sized trees; branchlets tomentose; latex yellow. Leaves 8-15 x 3-5.5 cm, elliptic-oblong, base rounded, apex acuminate, lower surface tomentose, chartaceous; petiole c. 5 mm long. Flowers in dense, short peduncled tomentose terminal cymes, white at first, turning reddish; pedicel to 1 cm long. Calyx-lobes 5, 2-3 mm long, broadly ovate, obtuse, ciliate along margin, pubescent without. Corolla c. 2 cm across; tube 4-5 mm long; lobes 5, 1-1.5 cm long, oblong; corona scales oblong, orange. Follicles

connate throughout, 10-18 x 1.5-2 cm, subcylindric, brown, speckled with white small tubercles. Seeds c. 12 x 3 mm, comose.

Fl. & Fr.: Apr. - Dec.

Distr.: Indo-Malaysia. Rare. In sacred groves. *CNS 1550* (Thamarakulam).

Root used as an antidote against snake bite.

Wrightia tinctoria (Roxb.) R. Br., Mem. Wern. Nat. Hist. Soc. 1: 74. 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; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 921. 1983; Mani., Fl. Silent Valley 175. 1988; Ramach. & Nair, Fl. Cannanore 281. 1988; Vajravelu, Fl. Palghat Dist. 283. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 295. 1994; Sivar. & Mathew, Fl. Nilambur 420. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 283. 1996. *Nerium tinctorium* Roxb., Orient. Repret. 1: 39. 1791. ***Thattan-chavana.***

Small trees; latex milky. Leaves 6-12 x 2-4.5 cm, oblong-lanceolate, base acute or rounded, apex acuminate, chartaceous, glabrous, glaucous below; a bluish colour forms when the fresh leaves are crushed; petiole c. 3 mm long. Inflorescence terminal panicled cymes. Pedicels slender, 1-1.5 cm long, with 2 minute bracts. Calyx lobes 5, c. 2 mm long, triangular ovate, hairy on margins. Corolla white; tube 2-3 mm long; lobes 5, 0.8-1 cm long, oblong, obtuse; corona scales 2-3 series, filiform, fimbriate. Stamens 5, 6-7 mm long; anthers sagittate, joined around the stigma. Carpels free; ovules many. Follicles slender, free, apically jointed, c. 35 cm long, terete, curved, black when ripe, glabrous, drooping. Seeds many.

Fl. & Fr.: Feb. - May.

Distr.: India, Myanmar and Timor. Rare. Along roadsides. *CNS 2493* (Charummoodu).

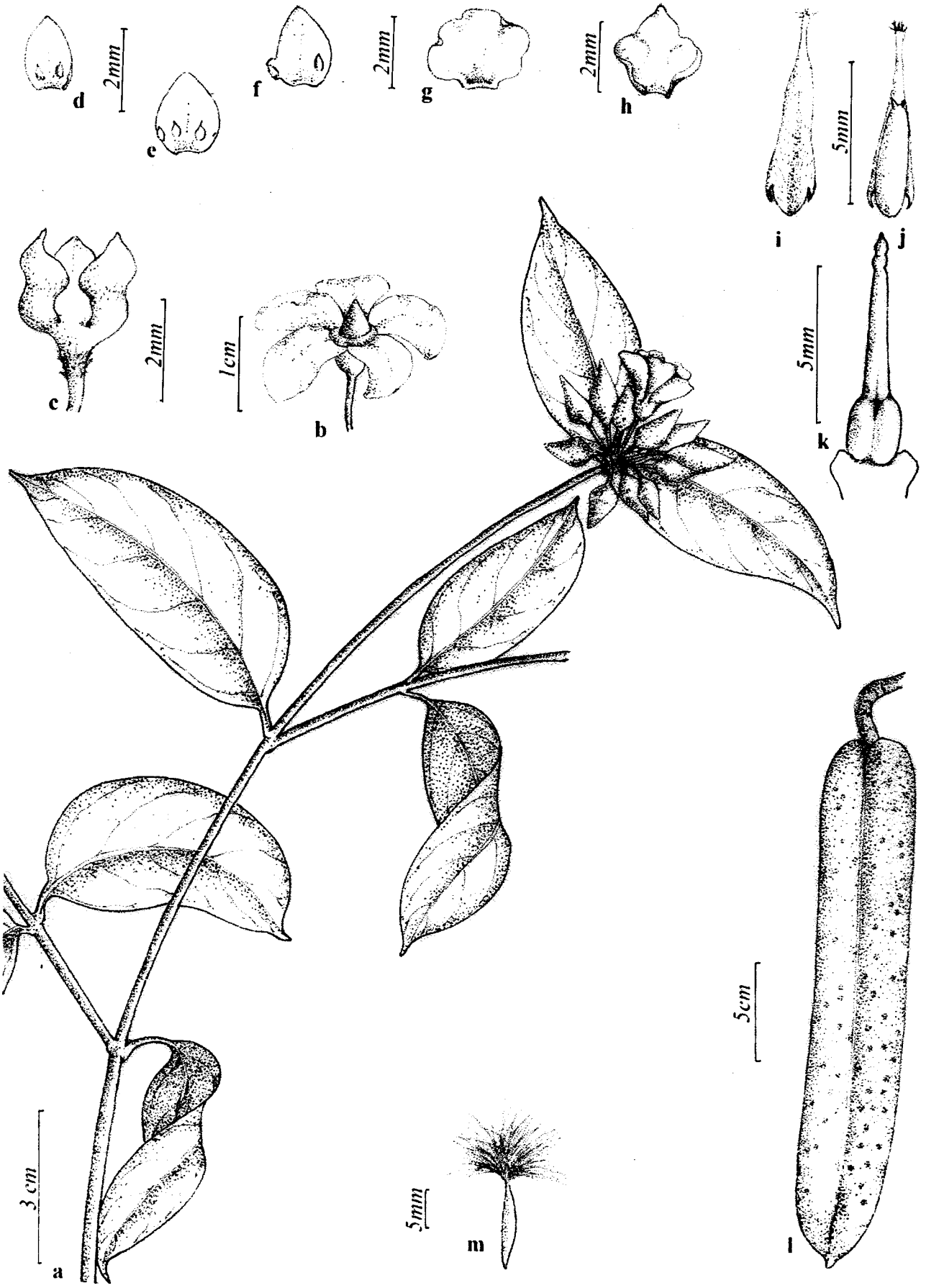


Fig. 40. *Wrightia arborea* (Dennst.) Mabb.: a. Twig with flower; b. Single flower; c. Calyx; d-h. Sepals; i & j. Stamen, dorsal and ventral views; k. Pistil; l. Follicles; m. Seed.

76. ASCLEPIADACEAE R. Br.

Asclepiadeae 12, 19. 1810.

1a. Erect herbs or shrubs.

2a. Leaves oblong to obovate, base auriculate or cordate, glaucous; corolla 3-4.5cm wide, pale voilet; corona laterally compressed; follicle oblong, above 2.5 cm across; inflated ..... **Calotropis**

2b. Leaves lanceolate, tapering at both ends, not glaucous; corolla 1-2 cm across, red; corona cucullate; follicle fusiform, less than 1.5 cm across, not inflated ..... **Asclepias**

1b. Climbers or straggling herbs or shrubs.

3a. Inflorescence terminal; corolla purple, above 3.5 cm across; tube above 3 cm long ..... **Cryptostegia**

3b. Inflorescence axillary; corolla white, yellow or green, below 2 cm across; tube less than 1 cm long.

4a. Filaments connate into a staminal column, indistinct, anthers adnate to style-apex.

5a. Cymes raceme-like; corolla purple-spotted; corona double .... **Cosmostigma**

5b. Cymes umbel-like; corolla not purple spotted; corona single.

6a. Corolla white; pollinia pendulous; follicles compressed, slightly winged ..... **Cynanchum**

6b. Corolla other than white; pollinia erect or horizontal; follicles terete.

7a. Latex watery; calyx eglandular; pollinia horizontal ... . **Tylophora**

7b. Latex milky; calyx glandular; pollinia erect.

8a. Branchlets pubescent, petiole without glands; corolla yellow, corona corolline ..... **Gymnema**

8b. Branchlets glabrous, petiole 2-glandular; corolla green, corona staminal ..... **Wattakaka**

4b. Filaments free, distinct; anthers connivant around stigma.

9a. Pollen-masses granular, loosely contained in spathulate pollen-carrier; calyx glandular; style included.

10a. Corolla lobes valvate; leaves with 10-20 pairs of lateral nerves ..... **Hemidesmus**

10b. Corolla lobes imbricate; leaves with numerous close and parallel lateral nerves ..... **Cryptolepis**

9b. Pollen-masses waxy, 2 or 4, sessile on a soft, pollen carrier; calyx eglandular; style exserted ..... **Toxocarpus**

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; Stevens in Sald. & Nicols., Fl. Hassan Dist. 439. 1976; Mani. & Sivar., Fl. Calicut 170. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 929. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 74. 1983; Ramach. & Nair, Fl. Cannanore 282. 1988; Vajravelu, Fl. Palghat Dist. 293. 1990; Sivar. & Mathew, Fl. Nilambur 422. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 284. 1996. ***Kammalchedi.***

Herbs, to 1 m tall; young stems and inflorescence minutely puberulous. Leaves 6.5-9 x 1.5-2.5 cm, lanceolate, acute at both ends, glabrous. Flowers in lateral umbellate cymes. Peduncle to 5 cm long. Calyx lobes c. 4 mm long, lanceolate, acute, ciliate. Corolla red, c. 1.2 cm across, rotate, lobes reflexed, 6-8 x 4-5 mm, ovate. Corona of five erect lobes attached to the staminal column, yellow, c. 7 mm long. Anthers with connective shortly apiculate; pollen masses solitary in each anther locus, pedulous; caudicles folded and curved. Ovary c. 1 mm; stigma columnar. Follicles 6-8 x 0.8-1.2 cm, fusiform, tapering at both ends. Seeds flattened, winged, brown; coma silky.

Fl. & Fr.: Throughout the year.

Distr.: Tropical America, naturalized in tropics. Occational along stream banks. *CNS 2483* (Venmony).

CALOTROPIS R. Brown

On Asclepaid. 28. 1810.

Calotropis gigantea (L.) R. Br. in Aiton f., Hort. Kew. (ed.2) 2: 78. 1811; Hook. f., Fl. Brit. India 4: 17. 1883; Gamble, Fl. Pres. Madras 832. 1923; Stevens in Sald. & Nicols., Fl. Hassan Dist. 440. 1976; Mani. & Sivar., Fl. Calicut 170. 1982; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 78. 1983; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 929. 1983; Mani., Fl. Silent Valley 176. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 61. 1988; Vajravelu, Fl. Palghat Dist. 285. 1990; Sivar. & Mathew, Fl. Nilambur 423. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 285. 1996. *Asclepias gigantea* L., Sp. Pl. 214. 1753. ***Ericu, Bel-ericu*** Rheede, Hort. Malab. 2: 53-56, t. 31. 1679. ***Ericu***

Erect shrubs to 1.5 m tall. Leaves 10-18 x 5-8.5 cm, elliptic-ovate to obovate, base cordate or auriculed, apex acute or obtuse, adpressed pubescent when young, becoming glabrous on maturity, glaucous green, thin-coriaceous, subsessile. Inflorescence an umbellate cyme, subterminal. Peduncle 5-7 cm long. Flowers pale purple or greenish-white, c. 3 mm across. Calyx deeply 5-lobed, lobes, 3- 4 mm long, ovate, glandular. Corolla purple, 3-4 cm across, rotate; lobes 5, ovate c. 1.5 cm long, spreading. Coronal lobes c. 1 cm long, laterally compressed, horny. Stamens 5, filaments connate into a staminal column; pollinia 2 per anther, pendulous. Ovaries 2, free; ovules many, on marginal placenta. Follicles in pairs, inflated, 6.5-8 x 2.5-4 cm oblong. Seeds ovate, to 8 x 5 mm; coma long, silky.

Fl. & Fr.: Most of the seasons.

Distr.: Trop. Asia. Common along waysides and exposed waste lands. *CNS 2113* (Mannancherry).

Leaf juice boiled with coconut oil and applied as a remedy in itches. The stem is a source of bast fiber and the highly toxic sap is used for a variety of medicinal purposes.

COSMOSTIGMA R.Wight

Contr. Bot. India 41. 1834.

Cosmostigma racemosum (Roxb.) Wight, Contrib. Bot. India 42. 1834 & Ic. t. 591. 1842; Hook. f., Fl. Brit. India 4: 46. 1883; Gamble, Fl. Pres. Madras 846. 1923; Stevens in Sald. & Nicols., Fl. Hassan Dist. 445. 1976; Mani. & Sivar., Fl. Calicut 168. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 938. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 106. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 61. 1988; Sasi. & Sivar., Fl. Pl. Thrissur For. 288. 1996; *Asclepias racemosa* Roxb., Fl. Ind. 2: 32. 1832. *Cosmostigma acuminatum* Wight, Ic. t. 1270. 1848. ***Wattou-Valli*** Rheede, Hort. Malab. 7: 61, t. 32. 1688.

Stout woody climbers. Leaves 6-8.5 x 4-6 cm, ovate, cordate at base, acuminate at apex, glabrous, with a few small black glandular papillae at base; petiole 2-4.5 cm long. Flowers in axillary corymbs; pedicels slender, to 1 cm long. Calyx lobes 5, c. 2 mm long, ovate, ciliate on margins. Corolla 0.8-1 cm across, rotate, greenish-yellow with brown dots; lobes 5, 3-4 mm long, ovate-lanceolate. Corona lobes erect, c. 1 mm long, double, bifid at apex. Pollinia erect, oblong. Carpels 2, apocarpous; ovules many; style apex 5-angled. Follicles stout, c. 10 cm long, apex blunt. Seeds ovoid, flattened; coma brownish, silky.

Fl. & Fr.: Jun.-Sept.

Distr.: Indo-Malaysia. In sacred groves. *CNS 1519* (Sharngakavu at Venmony).

CRYPTOLEPIS R. Brown

On Asclepiad. 58. 1810; Mem. Wern. Nat. Hist. Soc. 1: 69. 1811.

Cryptolepis buchananii Roem. & Schult., Syst. Veg. 4: 409. 1819; Wight, Ic. t. 494. 1849; Hook. f., Fl. Brit. India 4: 5. 1883; Gamble, Fl. Pres. Madras 826. 1923; Stevens in Sald. & Nicols., Fl. Hassan Dist. 446. 1976; Mani. & Sivar., Fl. Calicut 170. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 939. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 183. 1983; Mani., Fl. Silent Valley 178. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 62. 1988; Ramach. & Nair, Fl. Cannanore 282. 1988;

Vajravelu, Fl. Palghat Dist. 288. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 301. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 288. 1996. ***Katu-pal-valli*** Rheede, Hort. Malab. 9: 17-18, t. 32. 1688.

Climbing shrubs with milky latex. Leaves 5-10 x 2-4.5 cm, elliptic or oblong-lanceolate, base acute or cuneate, apex obtuse or apiculate. Glabrous and glossy, lower surface glaucous; lateral nerves 10-15 pairs, horizontally parallel; petiole to 1 cm long. Inflorescence axillary dichotomous cymes, shorter than leaves. Peduncles to 2 cm long. Flowers 5-merous, lax. Calyx lobes 5, 2-2.5 cm long, ovate-acute, with 5 scales at base on inner side. Corolla greenish-yellow; tube 1-2 mm long, cylindric; lobes 5, 3-5 mm long, linear- lanceolate, twisted to right, Corolla greenish-yellow; tube 1-2 mm long, cylindric; lobes 5, 3-5 mm long, linear-lanceolate, twisted to right in buds, ovate-acute, with 5 scales at base on inner side. Coronal lobes 5, clavate. Pollen granular, united in tetrads. Carpels 2, apocarpous; ovules many. Follicles 2, woody, c. 7 cm long. Seeds flat, with silky coma.

Fl. & Fr.: Mar.-Nov.

Distr.: Peninsular India and Sri Lanka. Less common; on thickets. *CNS 1499* (Chengannoor).

CRYPTOSTEGIA R. Brown

Bot. Reg. t. 435. 1820.

Cryptostegia grandiflora R. Br., Bot. Reg. t. 435. 1820; Wight & Arn. in Wight, Contrib. Bot. India 36. 1833; Hook. f., Fl. Brit. India 4: 6. 1883; Gamble, Fl. Pres. Madras 862. 1923; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 941. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 183. 1983.

Tall glabrous twiners. Leaves to 8 x 3.6 cm, elliptic-oblong, base acute to truncate, apex acute, lateral nerves 8-14 pairs, closely parallel, glabrous or slightly pubescent; petiole to 1 cm. Inflorescence a terminal, 3-5- flowered cymes; peduncle to 4 cm long. Bracts deciduous. Calyx lobes 5, 1-1.5 x c. 0.4 cm, ovate-lanceolate, margin recurved. Corolla purple, c. 4 cm across, funnel-shaped; tube 3-3.5 cm long; lobes 5, broadly

obovate, twisted to right in bud. Stamens 5, connivent around stigma. Corona of 5, fleshy scales alternating with corolla lobes. Ovary oblong; style to 4 mm; stigma conic.

Fl. & Fr.: Most of the seasons.

Dist.: Native of Madagascar, widely distributed in the tropics. Cultivated as an ornamental and also found running wild. *CNS 2484* (Kalarcodu).

CYNANCHUM Linnaeus

Sp. Pl. 212. 1753.

Cyananchum callialatum Buch.-Ham. ex Wight & Arn. in Wight, Contr. Ind. Bot. 56. 1834; Wight, Ic. t. 1279. 1848; Hook f., Fl. Brit. India 4: 24. 1883; Gamble, Fl. Pres. Madras 836. 1923; Stevens in Sald. & Nicols., Fl. Hassan Dist. 446. 1976; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 942. 1983; Mani., Fl. Silent Valley 178. 1988 ('*callialata*'); Ramach. & Nair, Fl. Cannanore 283. 1998; Vajravelu, Fl. Palghat Dist. 288. 1990; Sivar. & Mathew, Fl. Nilambur 425. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 288. 1996.

Glabrous twining herbs. Leaves 3-8 x 2-4.5 cm, elliptic-oblong or linear-oblong, base cordate or subauricled, apex acute, glabrous, glaucous below; petiole to 2.5 cm long. Inflorescence an axillary umbellate cyme. Peduncles 3-4 cm long. Calyx lobes 5, c. 2 mm, equal. Corolla white, c. 1 cm across; lobes 5, divided nearly to the base, 4-5 mm long, oblong, acute. Corona of 5 erect obtuse, bifid lobes, with shorter lobes between them. Pollinia pendulous, oblong. Ovules many. Follicle ovoid, 6-8 cm long, winged. Seeds comose.

Fl. & Fr.: Sep.-Mar.

Distr.: Myanmar to South India. Along bushes and thickets. *CNS 2621* (Pandavanpara).

GYMNEMA R. Brown

On Asclepaid. 22. 1810; Mem. Wern. Nat. Hist. Soc. 1: 37. 1811.

Gymnema sylvestre (Retz.) R. Br. ex Schult. in Roem. & Schult., Syst. Veg. 6: 57. 1820; Hook. f., Fl. Brit. India 4: 29. 1883; Gamble, Fl. Pres. Madras 839. 1923; Stevens in Sald.

& Nicols., Fl. Hassan Dist. 448. 1976; Mani. & Sivar., Fl. Calicut 169. 1982; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 100. 1983; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 946. 1983; Ramach. & Nair, Fl. Cannanore 283. 1988; Vajravelu, Fl. Palghat Dist. 289. 1990; Sivar. & Mathew, Fl. Nilambur 426. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 289. 1996. *Periploca sylvestris* Retz., Obs. 2: 15. 1781. ***Sarkarakolli.***

Climbing shrubs; tender parts pubescent. Leaves 3.5-6 x 3-4 cm, elliptic to ovate or obovate, base truncate or obtuse, apex shortly acuminate, densely tomentose; petiole to 1 cm long. Flowers small, in axillary umbellate cymes, greenish-yellow. Calyx deeply 5-partite, lobes c. 1 mm long, obovate, obtuse. Corolla c. 3 mm across, campanulate, dull yellow. Corona of 5 fleshy lobes, corolline. Pollen masses erect, attached to the horny pollen carriers by short caudicles. Style free near the top, apex conical. Follicles slender.

Fl. & Fr.: Aug.-Dec.

Distr.: Peninsular India, Sri Lanka and Tropical Africa. Along bushes and thickets. *CNS 1292* (Nootavanpara).

Chewing the leaves makes one unable to taste sugar for sometime.

HEMIDESMUS R. Brown

On Asclepiad. 45. 1810; Mem. Wern. Nat. Hist. Soc. 1: 56. 1811.

Hemidesmus indicus (L.) R. Br. in Aiton, Hort. Kew. (ed. 2), 2: 75. 1811; Wight, Ic. t. 594. 1842; Hook. f., Fl. Brit. India 4: 4. 1883; Gamble, Fl. Pres. Madras 825. 1923; Stevens in Sald. & Nicols., Fl. Hassan Dist. 448. 1976; Mani. & Sivar., Fl. Calicut 171. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 947. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 185. 1983; Mani., Fl. Silent Valley 178. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 62. 1988; Ramach. & Nair, Fl. Cannanore 284. 1988; Vajravelu, Fl. Palghat Dist. 290. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 301. 1994; Sivar. & Mathew, Fl. Nilambur 427. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 291. 1996. *Periploca indica* L., Sp. Pl. 211. 1753. ***Naru-nindi*** Rheede, Hort. Malab. 10: 67-68, t. 34. 1690. ***Naru-nindi.***

Slender twining undershrubs with woody rootstock; stem brownish. Leaves very variable, opposite or in whorls, often variegated, 3-7 x 0.7-3 cm, elliptic-oblong to linear-lanceolate, base rounded, apex gradually acute-apiculate, thin coriaceous, glabrous on both sides; petiole to 4 mm long. Flowers few, subsessile, in short, axillary cymes. Calyx 1-2 mm long, lobes 5, ovate, ciliolate along the margins. Corolla yellow, c. 8 mm across, 3-4 mm long, rotate, lobes 5, fleshy, triangular. Corona of 5 scales. Stamens 5, anthers jointed at apex, appendaged. Carpels 2, apocarpous; ovules many; styles 2; stylar apex flat, 5-angled. Follicles c. 10 cm long, cylindric; coma white.

Fl. & Fr.: Jan.-Oct.

Distr.: India and Sri Lanka. Along wayside thickets. *CNS 2114* (Vandanam).

The aromatic root tuber is used as substitute for sarasprilla and are used in the preparation of several medicines and beverages.

TOXOCARPUS Wight *et* Arnott
in Wight, Contrib. Bot. India 61. 1834.

Toxocarpus kleinii Wight & Arn. in Wight, Contrib. Bot. India 61. 1834; Wight, Ic. t. 886. 1844-45; Hook. f., Fl. Brit. India 4: 14. 1883; Gamble, Fl. Pres. Madras 830. 1923; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 89. 1983; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 960. 1983; Vajravelu, Fl. Palghat Dist. 292. 1990.

Slender slightly woody twiners with stem and inflorescence puberulous. Leaves 4-7 x 2-4 cm, elliptic to obovate, base acute or obtuse, apex abruptly acute or obtuse, subcoriaceous, puberulous along nerves below; petiole to 1.5 cm long. Inflorescence a lax, axillary, dichotomous cyme. Flowers subsessile; bracts c. 3 mm long, lanceolate. Calyx-lobes 5, 3-4 mm long, lanceolate, rusty puberulous without. Corolla yellowish- green, 1-1.5 cm across; tube 2-3 mm long; lobes 5, c. 1 x 0.3 cm, oblong to lanceolate, recurved, overlapping to the left. Corona single, c. 2 mm long, flap-like, adnate to stamens. Stamens 5, connivent around stigma; anthers sagittate, c. 1.5 mm long, subsessile; pollen-masses in pairs, pendulous, minute. Ovaries c. 2 mm long, conic; style apex elongate, to 3 mm long,

fusiform, exserted. Follicles paired, 12-15 x c. 1 cm, cylindric. Seeds c. 1.5 x 0.5 cm, oblong; coma silky, brownish.

Fl. & Fr.: Jun. - Jan.

Distr.: Peninsular India and Sri Lanka. In sacred groves. *CNS 2494* (Vallikunnam).

TYLOPHORA R. Brown

On Asclepiad. 17. 1810; Mem. Wern. Nat. Hist. Soc. 1: 28. 1811.

Twining herbs or shrubs. Leaves simple, decussate, chartaceous. Flowers in axillary or lateral, simple or branched subumbellate cymes or racemes, 5-merous, bisexual. Calyx 5-partite. Corolla rotate or rotate-campanulate; lobes overlapping; corona of 5 fleshy scales, adnate to the base of staminal column. Anthers small with a membranous appendage; pollen masses small, erect or horizontal. Carpels free; style-apex pentagonal or 5-lobed. Follicles paired. Seeds comose.

1a. Coronal scales gibbous below, the apex with a free acuminate point; leaves over 3 cm broad ..... **T. indicia**

1b. Coronal scales subglobose without a free pointed tip; leaves upto 2.5 cm broad ..... **T. tetrapetala**

Tylophora indica (Burm.f.) Merr., Philipp. J. Sci. Bot. 19: 373. 1921; Stevens in Sald. & Nicols., Fl. Hassan Dist. 454. 1976; Mani. & Sivar., Fl. Calicut 169. 1982; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 91. 1983; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 962. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 64. 1988; Vajravelu, Fl. Palghat Dist. 292. 1990; Sasi. & Sivar., Fl. Pl. Thrissur For. 293. 1996. *Cynanchum indicum* Burm.f., Fl. Ind. 70. 1768. *Tylophora asthmatica* (L.f.) Wight & Arn. in Wight, Contrib. Bot. India 51. 1834; Hook. f., Fl. Brit. India 4: 44. 1883; Gamble, Fl. Pres. Madras 843. 1923. ***Nansjera-patsja*** Rheede, Hort. Malab. 9: 21-22, t. 13. 1689.

Slender climbers. Leaves 4-9 x 2.5-4 cm, broadly ovate to ovate-oblong, base rounded to subcordate, apex acute, subcoriaceous, glabrescent or puberulous above, tomentose below; petiole to 1.5 cm. Flowers c. 1 cm across, in umbellate cymes sessile or with short peduncle; pedicel to 1.3 cm long. Calyx lobes 2-3 mm long, linear-lanceolate.

Corolla greenish-yellow with purple center, 1-1.5 cm across; lobes to 4 mm long. Corona single, free at apex, arching over gynostegium. Ovary obconical; style to 1 mm. Follicle to 7 cm long, c. 1 cm wide, cylindric, produced into an acute, slender beak. Seeds ovate, flat.

Fl. & Fr.: Jun.-Nov.

Distr.: Indo-Malesia. Along bushes and thickets. *CNS 2485* (S.L. Puram).

Tylophora tetrapetala (Dennst.) Suresh in Nicols., Suresh & Mani., An Interpr. Hort. Malab. 64. 1988; *Asclepias tetrapetala* Dennst., Schluess., 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; Ramach. & Nair, Fl. Cannanore 286. 1988; Vajravelu, Fl. Palghat Dist. 293. 1990; *T. tenuissima* (Roxb. ex Schult.) Wight & Arn. in Wight., Contrib. Bot. India 49. 1834; Wight, Ic. t. 588. 1842; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 96. 1983.

Stem very slender, long-twining, glabrous. Leaves 1.3-5 x 0.8-2.4 cm, obovate-oblong to oblong-lanceolate, base rounded or acute, apex acute and apiculate, fleshy; petiole to 9 mm long. Flowers in few-flowered, laxy and dichasially branched, axillary cymes; pedicels capillary. Calyx-lobes 5-6 mm long, ovate-acute. Corolla purplish-brown, c. 4 mm across. Follicles 4-5 x 0.7-1 cm, linear-lanceolate, produced in to a slender, acute beak.

Fl. & Fr.: Nov.-Jan.

Distr.: Indo-Malesia. Rather common in halophilous scrub near coastal areas. *CNS 2115* (Thrikunnapuzha), *CNS 1447* (Thrikunnapuzha).

WATTAKAKA Hasskarl

Flora 40: 99. 1857.

Wattakaka volubilis (L.f.) Stapf. in Curits, Bot. Mag. Sub. 148: t. 8976. 1923; Stevens in Sald. & Nicols., Fl. Hassan Dist. 455. 1976; Mani. & Sivar., Fl. Calicut 170. 1982; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 108. 1983; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 963. 1983; Mani., Fl. Silent Valley 180. 1988; Nicols., Suresh &

Mani., An Interpr. Hort. Malab. 65. 1988; Ramach. & Nair, Fl. Cannanore 286. 1988; Vajravelu, Fl. Palghat Dist. 293. 1990; Sasi. & Sivar., Fl. Pl. Thrissur For. 294. 1996. *Asclepias volubilis* L.f. , Suppl. Pl. 170. 1781. *Dregea volubilis* (L.f.) Benth. ex Hook. f. in Hook. f., Fl. Brit. India 4: 46. 1883. *Marsednia volubilis* (L.f.) T. Cooke, Fl. Pres. Bombay 2: 166. 1904; Gamble, Fl. Pres. Madras 846. 1923. ***Watta-kaka-kodi*** Rheede, Hort. Malab. 9: 25-26, t. 15. 1689.

Stout twiners; bark brown. Leaves 5-9 x 3.5-7 cm, obovate, base cordate or rounded, apex acuminate, chartaceous, glabrous; petiole to 3.5 cm long. Flowers in axillary many-flowered umbellate cymes. Peduncles longer than the petioles. Pedicels slender, c. 2 cm long. Calyx-lobes 5, 2-3 mm long, oblong, ciliate, glandular. Corolla greenish, c. 1.5 cm across, rotate, lobes 5, ovate. Corona 5, membranous, adnate at the base of staminal column, fleshy. Carpels globose; stylar apex convex. Follicles stout, woody, 5-8 cm long, 2-2.5 cm wide, oblong, tomentellous when young, glabrous when ripe. Seeds comose, obovoid.

Fl. & Fr.: Jan.-Aug.

Distr.: Indo-Malesia, and south and west China. Along roadsides and other waste places. *CNS 1182* (Alappuzha town).

Root applied as an antidote in snake bite and also used in native medicine for fever in children.

77. LOGANIACEAE R. Br. ex Mart.

Nov. Gen. Sp. Pl.2: 133. 1827.

1a. Small slender herbs; flowers 4-merous; capsule c. 0.2 cm across ..... **Mitrasacme**

1b. Trees or climbers; flowers 5-merous; berry more than 1.5 cm across.

2a. Leaves 3-5-ribbed from base, chartaceous; corolla lobes vlavate; pericarp hard ..... **Strychnos**

2b. Leaves penni-nerved, subsucculent; corolla lobes imbricate; pericarp fleshy ..... **Fagraea**

FAGRAEA Thunberg

Kongl. Vetensk. Acad. Nya. Handl. 3: 132. 1782.

Fagraea ceilanica Thunb. , Kongl. Vetensk. Acad. Nya. Handl. 3: 132. 1782; Clarke in Hook. f., Fl. Brit. India 4: 83. 1883, "*zeylanica*"; Gamble, Fl. Pres. Madras 865. 1923; Stevens in Sald. & Nicols., Fl. Hassan Dist. 418. 1976; Mani. & Sivar., Fl. Calicut 172. 1982; Ramach. & Nair, Fl. Cannanore 287. 1988; Mani., Fl. Silent Valley 180. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 162. 1988; Vajravelu, Fl. Palghat Dist. 294. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 302. 1994; Sivar. & Mathew, Fl. Nilambur 429. 1996; Sasi. & Sivar., Fl. Pl. Thrissur. For. 295. 1996. ***F. obovata*** Wall. in Roxb., Fl. Ind. 2: 33. 1824; Clarke in Hook. f., Fl. Brit. India 4: 83. 1883; Gamble, Fl. Pres. Madras 865. 1923. *F. coromandelica* Wight, Ic. t. 1317. 1848 *(nom. illeg.)*. ***Modagam*** Rheede, Hort. Malab. 4: 119, t. 58. 1683 (Plate XVI: D).

Small trees, usually epiphytic on tree trunks; branchlets stout with prominent leaf-scars. Leaves 10-18 x 5-8 cm, obovate or oblanceolate, base cuneate, margin entire, apex obtuse, fleshy, shiny, glabrous; petiole to 2.5 cm long. Inflorescence terminal or axillary, few-flowered corymbose cymes. Flowers large, 6-8 cm across, creamy white. Calyx deeply 5-lobed; lobes c.8 mm long, obovate, acute or obtuse. Corolla funnel-form; tube 4-5 cm long; lobes 5, broad, twisted to right. Stamens 5, adnate at base of corolla-tube. Ovary 2-celled; ovules many in each cell; stigma capitate. Berry 2-4 x 1.5-3 cm, ellipsoid, shiny. Seeds many.

Fl. & Fr. : Almost throughout the year.

Distr.: Indo-Malaysia. In sacred groves. *CNS 1035* (Vandanam).

MITRASACME Labillardiere

Novae Holl. Pl. Spec. 1: 35. 1805.

Annual erect slender herbs; stem 4-angled. Leaves simple, cauline or sub-radical. Flowers axillary or in terminal, solitary, fascicles or umbles, 4-merous, bisexual. Calyx small, lobes valvate. Corolla campanulate, lobes valvate. Stamnes 4, included. Ovary 2-celled, superior; ovules many; style 2, connate at apex; stigma capitate or 2-lobed, pilose.



Plate XVI. *A & B. Strophanthus wightianus* Wall. ex Wight; A. Flowering twig; B. Follicle; C. *Carissa spinarum* L.; D. *Fagraea ceilanica* Thunb.; E. *Hoppea fastigiata* (Griseb.) Clarke

Capsule globose, laterally compressed, carpels separating and then dehiscing. Seeds many, angular or ellipsoid.

1a. Vegetative parts glabrous; leaves linear; flowers axillary, solitary or rarely in pairs ..... **M. indica**

1b. Vegetative parts hispid; leaves ovate; flowers in terminal lax umbles .... **M. pygmaea** var. **malaccensis**

Mitrasacme indica Wight, Ic. t. 1601. 1850; Leenh. in Steenis, Fl. Males. I, 6: 384. 1962; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 965. 1983; Sivar. & Mathew, Fl. Nilambur 430. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 295. 1996. *M. alsinoides* auct., non R. Br., 1810: Clarke in Hook. f., Fl. Brit. India 4: 80. 1883; Gamble, Fl. Pres. Madras 864. 1923; Mani. & Sivar., Fl. Calicut 173. 1982.

Glabrous herbs to 7 cm tall. Leaves 5-10 x 1-2 mm, linear-lanceolate, base and apex acute, subsessile; petiole faintly sheathing at base. Flowers white, solitary or 2-3 clustered in the axils; pedicels filiform to 1 cm long. Calyx tube 1 mm long; lobes 4, as long as the tube. Corolla to 2 mm long, campanulate, villous within the throat. Stamens 4, included; anthers oblong. Ovary subglobose; style 2, connate above. Capsule c. 2 mm across, subglobose. Seeds reticulate.

Fl. & Fr. : Aug. - Oct.

Distr. : Sri Lanka, India, Myanmar, Japan, Australia and Malesia. On exposed grassy places. *CNS 1257* (Thottappally).

Mitrasacme pygmaea R. Br., Prodr. 453. 1810; Ohwi, Fl. Japan 734. 1965, var. **malaccensis** (Wight) Hara, J. Jap. Bot. 30: 24. 1955; Stevens in Sald. & Nicols., Fl. Hassan Dist. 420. 1976; Mani. & Sivar., Fl. Calicut 172. 1982; Mohanan & Henry, Fl. Thiruvananthapuram 302. 1994. *M. malaccensis* Wight, Ic. t. 1601. 1850. *M. polymorpha* auct., non R. Br. 1810: Clarke in Hook. f., Fl. Brit. India 4: 80. 1883; Gamble, Fl. Pres. Madras 864. 1923.

Small, hirsute herbs to 5 cm tall. Leaves subradical, 5-10 x 3-5 mm, ovate or elliptic, base rounded, apex acute, chartaceous, subsessile. Flowers few in terminal or

subterminal umbles. Calyx lobes small, to 2 mm long. Corolla white, to 3 mm long, companulate, lobes suborbicular. Ovary globose or obovoid; style 2, connate above the middle; stigma capitate. Capsule depressed globose. Seeds many, ellipsoid, punctate.

Fl. & Fr. : Sep. - Jan.

Distr. : India to Japan. On exposed grassy places. Rare. *CNS 1465* (Chathiyara).

STRYCHNOS Linnaeus

Sp. Pl. 189. 1753.

Trees or woody climbers, often with circinate tendrils. Leaves simple, decussate, ovate to orbicular, basally 3-5-ribbed. Flowers in terminal or axillary cymes, 5-merous. Calyx cupular, lobes 5, acute. Corolla salver-form, greenish, lobes 5, reflexed. Stamens 5, included; anthers often bearded at base. Ovary superior, 2-celled; ovules many; stigma capitate or 2-lobed. Fruit a thick or thin walled berry, indehiscent. Seeds few or 1 or 2, lenticular or ovate, embedded in fleshy pulp.

1a. Trees; flowers greenish; leaves suborbicular or broadly ovate ..... **S. nux-vomica**

1b. Climbing shrubs with forked hooks; flowers yellow; leaves elliptic or elliptic-ovate ..... **S. minor**

Strychnos minor Dennst., Schluess. Hort. Malab. 33. 1818; Bisset & Philcox, Taxon 20: 542. 1971; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 164. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 303. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 297. 1996. *Strychnos colubrina* Stocks, Bot. Mat. Med. 1: 414. 1812, p.p., non L., 1753; Hook. f. , Fl. Brit. India 4: 87. 1883; Gamble, Fl. Pres. Madras 868. 1923; Stevens in Sald. & Nicols. , Fl. Hassan Dist. 421. 1976. ***Scheru-katu-valli-kaniram*** Rheede, Hort. Malab. 7: 9, t. 5. 1688.

Climbing shrubs; bark pale brown; tendrils 2-branched. Leaves 5.5-14 x 2.8-5.4 cm, ovate or elliptic-ovate, base obtuse or rounded, apex acute or acuminate, coriaceous, 3-ribbed from a little above the base; petiole to 1.2 cm long. Flowers white in cymes up to 3 cm long. Calyx lobes c. 1 mm long. Corolla tube c. 2 mm long, throat wooly; lobes ovate-acute, as long as the tube. Berry woody 2-2.5 cm across. Seeds 1-3, orbicular.

Fl.& Fr. : Nov. - Feb.

Distr. : Indo-Malesia. Common in sacred groves. *CNS 2573* (Vandanam).

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; Mani. & Sivar., Fl. Calicut 171. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 966. 1983; Ramach. & Nair, Fl. Cannanore 289. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 164. 1988; Vajravelu, Fl. Palghat Dist. 296. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 303. 1994; Sivar. & Mathew, Fl. Nilambur 430. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 297. 1996. ***Caniram*** Rheede, Hort. Malab. 1: 67-68, t. 37. 1678.

Medium sized to large deciduous trees; bark yellowish-grey, yellow inside. Leaves 5-8 x 4-7 cm, broadly ovate to suborbicular, base cuneate, apex obtuse, basally 3-5-nerved, glabrous, coriaceous; petiole to 1.2 cm long. Cymes terminal, tomentose. Calyx lobes c. 1 mm long, ovate, tomentose. Corolla tube c. 1 cm long, lobes c. 3 mm long. Stamens subexserted. Ovary depressed globose. Berry 3-4 cm across, globose orange-red when ripe. Seeds 3 or 4, lenticular, c. 2 cm across, enclosed in a bitter pulp.

Fl. & Fr. : Feb. - Nov.

Distr. : Sri Lanka, India, Indo-China and Malesia. Common in sacred groves. *CNS 1465* (Cherthala).

Juice of fresh bark given to cure Cholera and desentery. Seeds powdered and given in leprosy, paralysis and snake bites.

78. GENTIANACEAE Juss.

Gen. Pl. 141. 1789.

1a. Corolla lobes very unequal, tube 7-10 mm long, slightly bent; stamens inserted at different levels on corolla tube; capsule oblong ..... **Canscora**

1b. Corolla lobes equal, tube 3-4 mm long, straight; stamens inserted at same level oncorolla tube; capsule ellipsoid ..... **Hoppea**

CANSCORA Lamarck

Encycl. Meth. Bot. 1 : 601. 1785.

Canscora decussata Schult. & Schult. f., Mant. Syst. Veg. 3 : 229. 1827; Hook. f., Fl. Brit. India 4 : 104. 1883; Gamble, Fl. Pres. Madras 879. 1923; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 423. 1976; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 74. 1981; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3 : 971. 1983; Mohan & Henry, Fl. Thiruvananthapuram 304. 1994.

Erect herbs to 35 cm high; stem narrowly 4-winged. Leaves 1.5-2.5 x 0.8-1.5 cm, elliptic-lanceolate, base rounded, apex acute, 3-nerved at base, subsessile. Cymes dichasial, axillary or terminal; pedicel 1-1.5 cm long, winged. Calyx 8-11 cm long; lobes 3-4 mm long, lanceolate, acute, winged. Corolla white; tube 7-8 mm long ; lobes 4, 5-6 x 4 -5 mm, obovate to orbicular. Stamens 4, each with a circular membranous ring below the anther. Ovary c. 4 mm long; stigma 2-fid, recurved. Capsule 8-10 x 2-4 mm, linear-oblong, tipped by persistent style. Seeds angular.

Fl. & Fr. : Oct.-Jan.

Distr. : Sri Lanka, tropical Africa through Mascarene Isls, to Southern and S. E. Asia. In moist exposed slopes. *CNS 1310* (Noottavan para).

HOPPEA Willdenow

Ges. Naturf. Freunde Berlin Neue Schriften 3 : 434. 1801.

Hoppea fastigiata (Griseb.) Clarke in Hook. f., Fl. Brit. India 4 : 100. 1883; Gamble, Fl. Pres. Madras 877. 1923; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 426. 1976; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3 : 76. 1981; Mani. & Sivar., Fl. Calicut 174. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3 : 977. 1983; Ramach. & Nair, Fl. Cannanore 292. 1988; Mani., Fl. Silent Valley 184. 1988; Vajravelu, Fl. Palghat Dist. 300. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 308. 1994; Sivar. & Mathew, Fl. Nilambur 435. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 299. 1996. *Cicendia fastigiata* Griseb., Gen. Sp. Gent. 158. 1839 (Plate XVI: E).

Erect branched small herbs, 5-10 cm high; stem yellowish-green, 4-winged. Leaves 4-8 x 3-7 mm, broadly ovate, base rounded or truncate, apex acute, obscurely 3-nerved, sessile. Flowers in 2-3-chotomous terminal and axillary cymes, 4-merous; pedicels short or 0. Calyx tubular, c. 3 mm long; lobes 4, lanceolate. Corolla light yellow, tubular; tube 3-4 mm long; lobes 4, oblong. Stamens 4, attached at throat of corolla tube, included, only one fertile. Ovary c. 3 mm long, ellipsoid, 1-celled; ovules many; stigma 2-lobed. Capsule 3-4 x 1.5-2 mm, ellipsoid. Seeds many.

Fl. &Fr. : Sept.-Nov.

Distr. : Myanmar, India to Sri Lanka. Fairly common in swampy areas. *CNS 1114* (Punnapra), *CNS 2561.* (Kumbolichira).

79. MENYANTHACEAE (Dumort.) Dumort.

Anal. Fam. Pl. 20, 25. 1829.

NYMPHOIDES J. Hill

Brit. Herbal 77. 1756.

Aquatic, monoecious or dioecious, rhizomatous or stoloniferous perennials or annuals with monomorphic or dimorphic shoots and leaves. Flowers in umbellate clusters of 2-many, arising from the junctions of the petiole-like branch and the petiole of the fertile leaf, tetra-or pentamerous, bisexual or unisexual, homostylous or heterostylous. Calyx deeply 5 (4-8) partite. Corolla white or yellow, rotate, 5 (4-8) lobed, lobes often ornamented with fringes or crests. Stamens as many as corolla lobes, reduced to staminodes or absent in the female flowers. Pistil in male flowers reduced to pistillode, in bisexual and female flowers bottle-shaped with or without hypogynous disc glands, unilocular with few to many ovules; style short, stout; stigma variously lobed or lacerate. Capsules rupturing irregularly, few-many seeded. Seeds variable in size, shape and ornamentation.

1a. Leaves monomorphic, all floating and fertile.

2a. Corolla yellow; flowers in 1-few-flowered lateral clusters ..... **N. aurantiacum**

2b. Corolla white; flowers in many-flowered clusters arising from the junction of petiole-like branches and actual petiole.

3a. Corolla lobes not winged, but covered with long dense hairs within; flowers bisexual, distylous ..... **N. indica**

3b. Corolla lobes winged, not hairy within; flowers unisexual or bisexual and homostylous.

4a. Plants dioecious; corolla lobes with fimbriate wings; stigma bilobed with a whorl of radiating glandular hairs; seeds 3-6 mm across ..... **N. macrospermum**

4b. Plants monoecious; corolla lobes with flexuous wings and crests; stigma bilobed, not glandular hairy; seeds to 2 mm across .... **N. hydrophylla**

1b. Leaves dimorphic, basal leaves submerged, rosulate and sterile, upper fertile leaves floating.

5a. Wings on corolla lobes shortly, fimbriately toothed; stamens exserted from the corolla tube ..... **N. parvifolium**

5b. Wings of the corolla lobes fimbriate with long hairs; stamens included in the corolla tube ..... **N. sivarajanii**

Nymphoides aurantiacum (Dalz.) O. Kuntze, Rev. Gen. Pl. 1:429. 1891; Subram., Aquat. Ang. 24.1962; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3:207. 1981; Sivar. & Joseph, Aquatic Botany 45:151.1993. *Limnanthemum aurantiacum* Dalz. in Hooker's J. Bot. Kew Gard. Misc. 2:136.1850; Clarke in Hook. f., Fl. Brit. India 4:132. 1883; Gamble, Fl. Pres. Madras 883. 1923. *L. biflorum* Thw., Enum. Pl. Zeyl. 205. 1860. L. *forbesianum* sensu Griseb., Gen. Sp. Gent. 345. 1839 & in DC., Prodr. 9:139. 1845, in part; Clarke, J. Linn. Soc. Bot. 14:450. 1875 & Hook. f., Fl. Brit. India 4:132. 1883.

Annuals or perennials; rhizome short. Primary fertile branches from the node of the primary shoot, sympodial, trailing on the water surface with many floating leaves

similar to primary leaves; internodes 8-25 cm long; nodes occasionally rooting. Leaves all fertile, floating, c. 8 cm across, orbicular-rounded, base deeply cordate, margins subentire, green above, purplish and gland-dotted below. Inflorescence 1-3- flowered arising from the junction of the branch and the petiole on the primary shoot and lateral on secondary shoots. Flowers bisexual, homostylous; bract to 5 x 2 mm, ovate or oblong; pedicel to 4 cm in fruits. Calyx deeply 5- lobed; lobes oblong-spathulate, glandular without. Corolla orange-yellow; tube to 6 mm long; lobes 5, to 6 x 3 mm, obovate -oblong, margin with fimbriately toothed wings, apex distinctly 2-lobed. Stamens 5, inserted at the sinuses of the corolla, alternating with tufts of yellow, glandular hairs. Ovary bottle-shaped; style short; stigma 5-lobed. Capsule ovoid. Seeds 10-13 in each capsule, c. 2 mm across, discoid, light brown.

Fl. & Fr.; Aug.-Nov.

Distr.: South India and Sri Lanka. In shallow pools and flooded paddy fields. *CNS 2117* (Thalavady).

Nymphoides hydrophylla (Lour.) O. Kuntze, Rev. Gen. Pl. 2:429. 1891; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3:208. 1981; Mathew & Rani in Mathew, Fl. Tam. Carnatic 3: 979. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 181. 1988; Ramach. & Nair, Fl. Cannanore 293. 1988; Vajravelu, Fl. Palghat Dist. 297. 1990; Sivar. & Joseph, Aquatic Botany 45: 153. 1993; Mohanan & Henry, Fl. Thiruvananthapuram 308. 1994. *Menyanthes hydrophylla* Lour., Fl. Cochinch. 105. 1790. *Menyanthes cristata* Roxb., Pl. Corom. 2: 3, t. 105. 1798. *Villarsia hydrophyllum* (Lour.) Roem. & Schult., Syst. 4: 181. 1819. *Limnanthemum hydrophyllum* (Lour.) Griseb., Gen. Sp. Gent. 348. 1838. *Limnanthemum cristatum (* Roxb.) Griseb., Gen. Sp. Gent. 342. 1838; Clarke in Hook. f., Fl. Brit. India 4:131. 1883; Gamble, Fl. Pres. Madras 883. 1923. ***Tsjeroea-citamble*** Rheede, Hort. Malab. 11: 57, t. 29. 1692 (Fig. 41).

Rhizomatous annuals or perennials; rhizome 0.5-1.5 cm thick. Primary fertile shoots many, uniphyllous, arising from the axils of scales on the rhizome. Secondary shoots zig-zag, sympodial, many-jointed, each joint bearing a single floating leaf. Leaves

all fertile, floating, 6-10 cm across, ovate to orbicular, base deeply cordate, gland-dotted below, membranous; petiole to 2.5 cm long. Flowers bisexual and female, in umbellate clusters of 10 -20 at the junction of the branch and petiole; pedicels 3-4.5 cm long. Calyx deeply 5-partite; lobes 3-5 mm long, narrowly lanceolate. Corolla white with a yellow throat; tube c. 2 mm long with a ring of glandular hairs at the throat; lobes 5, 7-8 x 3-4 mm, with flexuous, membranous wings on the margins and a similar median longitudinal crest within. Stamens 5, highly reduced in female flowers. Ovary bottle-shaped with 5, minute, orbicular, disc glands at the base; stigmas 2-lobed. Capsule to 14 mm long, oblong. Seeds 4-6 in each capsule, to 2 mm across, discoid, brown.

Fl & Fr.: Sep.-Jan.

Distr.: India, Sri Lanka, Malaysia and Southern China. A common species in temporary ponds, pools and in flooded lowlands. *CNS 2623* (Pallipuram), *CNS 2486* (Mararikulam South).

Nymphoides indica (L.) O. Kuntze, Rev. Gen. Pl. 2: 429. 1891; Subram., Aquat. Ang. 24. 1962; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 207. 1981; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 475. 1976; Mani. & Sivar., Fl. Calicut 175. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 980. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 181. 1988; Vajravelu, Fl. Palghat Dist. 297. 1990; Sivar. & Joseph, Aquatic Botany 45: 156. 1993; Mohanan & Henry, Fl. Thiruvananthapuram 308. 1994; Sivar. & Mathew, Fl. Nilambur 436. 1996. *Menyanthes Indica* L., Sp. Pl. 145. 1753; Roxb., Fl. Ind. 2: 31. 1824. *Limnanthemum indicum* (L.) Griseb., Gen. Sp. Gent. 343. 1838 & in DC., Prodr. 9: 139. 1845; Clarke in Hook. f., Fl. Brit. India 4: 131. 1883; Gamble, Fl. Pres. Madras 833. 1923. *Limnanthemum wightianum* Ggriseb., Gen. Sp. Gent. 344. 1838 & in DC., Prodr. 9: 139. 1845. ***Nedel-ambel*** Rheede, Hort. Malab. 11: 55-56, t. 28. 1692. ***Ambel*** (Fig. 42).

Rhizomatous herbs; rhizome 2-3 cm thick with prominent branch scars. Primary fertile branches many, petiole-like and uniphyllous, highly variable in length depending on the depth of water; secondary branches sympodial, zig-zag, many-jointed, trailing on water

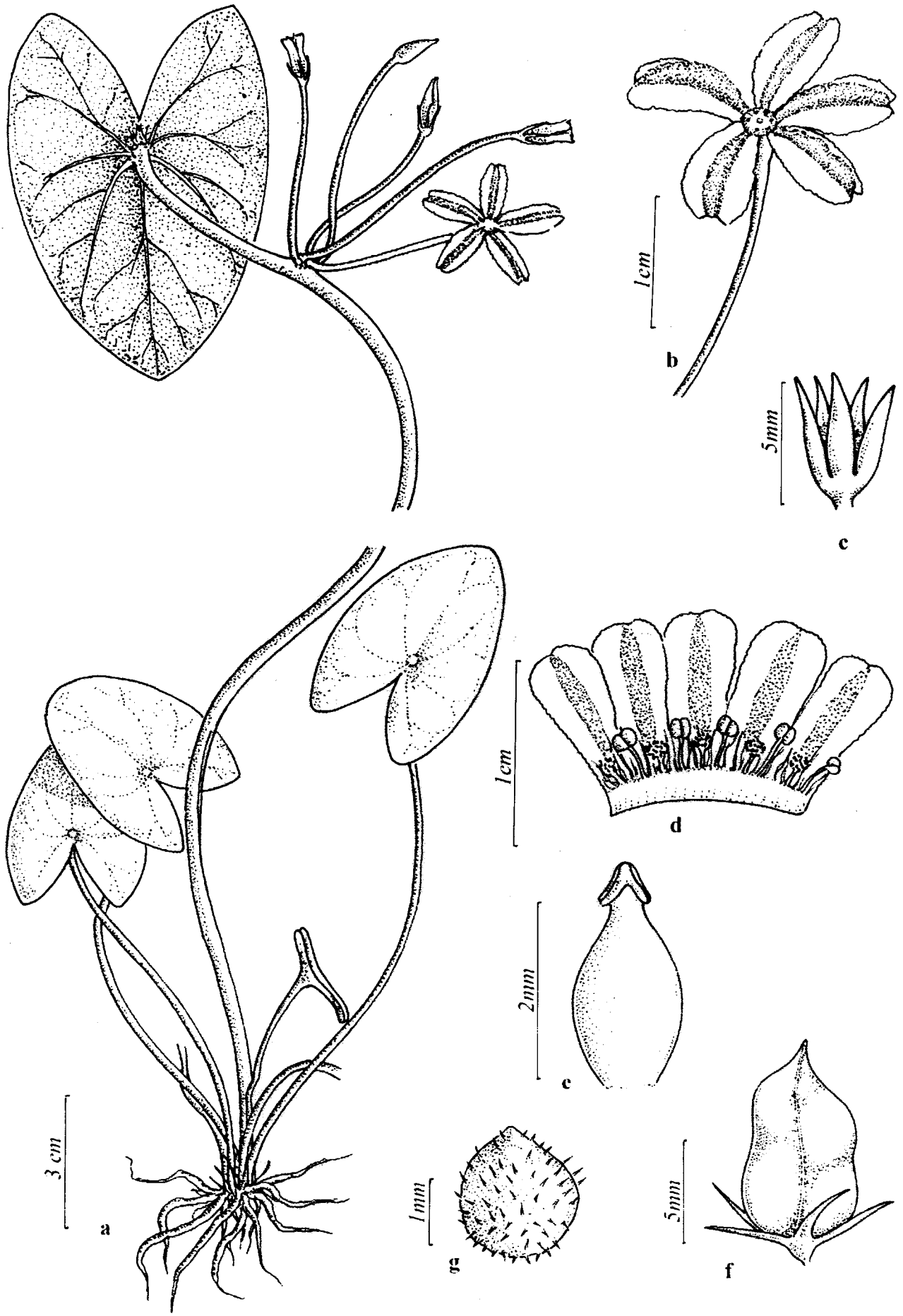


Fig. 41. *Nympoides hydrophylla* (Lour.) O.Kuntze: a. Habit; b. Flower; c. Calyx; d. Corolla, split-open; e. Pistil; f. Fruit; g. Seed.

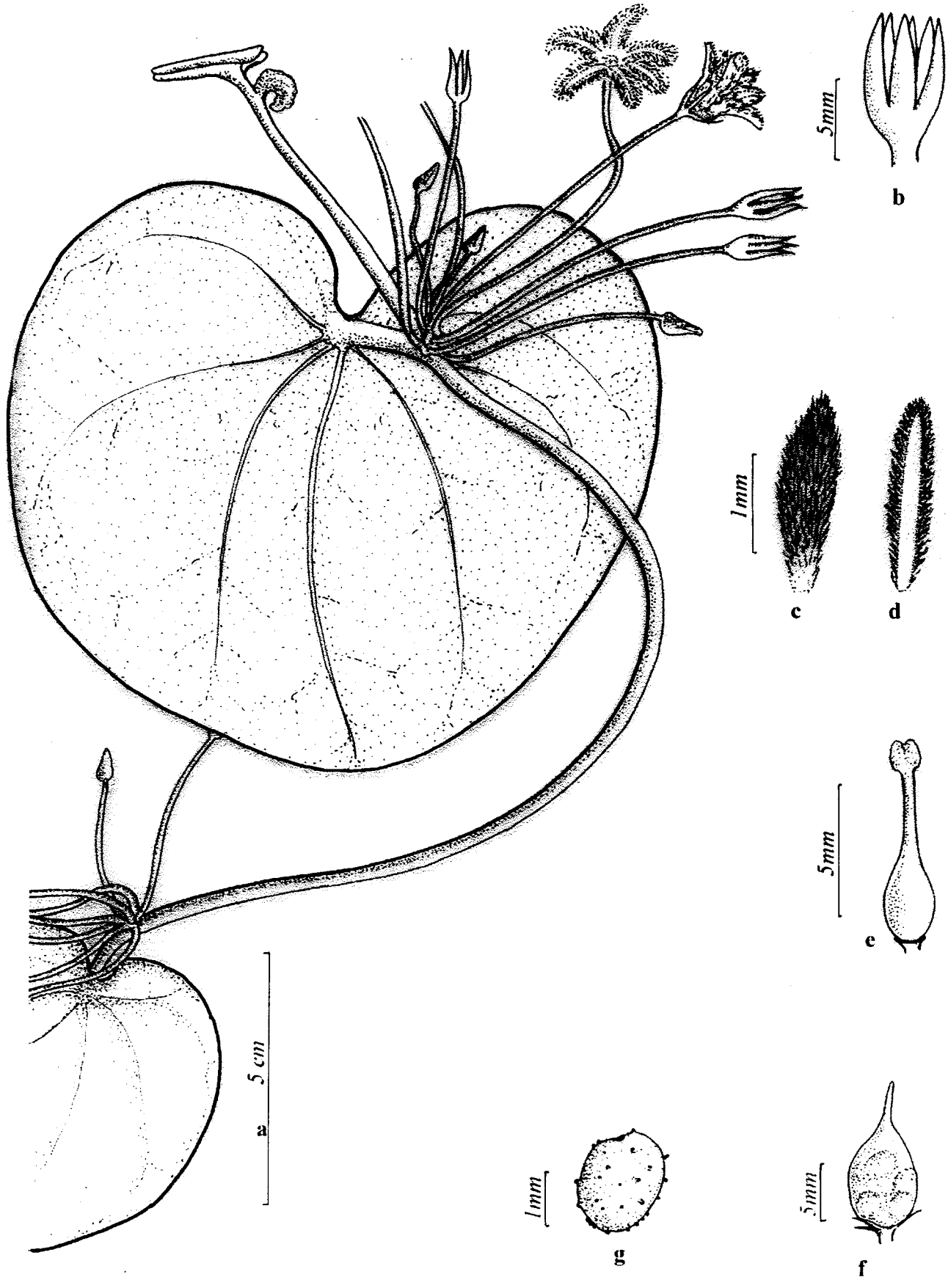


Fig. 42. *Nymphoides indica* (L.) O.Kuntze: a. Habit; b.Calyx; c & d. Corolla lobe-dorsal and ventral views; e. Pistil; f. Fruit; g. Seed.

surface; each joint uniphyllous; nodes often rooting. Leaves all cauline, fertile and floating, to about 25 cm across, ovate-orbicular, base deeply cordate with narrow sinuses, entire or subentire, fleshy, glossy green above, pale and gland-dotted beneath ; petiole to 3 cm long. Flowers bisexual, distylous in umbellate clusters from the junction of the petiole and the branch; bract to 7 x 4 mm, ovate or oblong; pedicel 5-10 cm long. Calyx deeply 5-partite; lobes to 6 x 2 mm, oblong-acute, green with hyaline margins. Corolla white with yellow throat; tube c. 2 mm long; lobes 5, to 13x4 mm, elliptic or oblong, acute, densely covered with long, white hairs within. Stamens as many as corolla lobes, dimorphic; filaments yellow. Ovary bottle- shaped; stigma sinuately 4-8 lobed; disc glands as many as stamens, orbicular. Capsules ellipsoid. Seeds c. 1.5 mm across, discoid, brownish, tubercled.

Fl. & Fr.: Sep.-Mar.

Distr.: Pantropical. Very common in shallow ponds, pools and flooded paddy fields, during the monsoon. *CNS 2210* (Kanichukulangara Jn.), *CNS 2624* (Angadikal).

Nymphoides macrospermum Vasudevan, Kew Bull. 22: 101. 1968; Sivar. & Joseph, Aquatic Botany 45: 162. 1993.

Annual or perennial, dioecious, rhizomatous herbs. Branches dimorphic, all fertile; primary branches petiole-like, the length of which vary according to water depth, uniphyllous; secondary branches arising from the nodes of primary branches, sympodial, many-jointed, each with a single, floating leaf at the apex, producing clusters of flowers and fleshy, tuberous roots at the nodes. Leaves c. 15 cm across, ovate-orbicular, base deeply cordate, apex rounded, membranous, gland-dotted below; leaves on secondary branches smaller; petiole to 3 cm long. Flowers unisexual, in umbellate clusters at the nodes; pedicels to 5 cm long. Male flowers: calyx deeply 5-partite; lobes to 2.5 mm long, oblong-obtuse, pinkish. Corolla white, 1-1.5 cm across; tube short; lobes 5, c. 5 x 2 mm, oblong or elliptic, hairy at base and with fimbriately toothed wings on the margins and with a similar median longitudinal crest within. Stamens 5; filaments c. 2 mm long; anthers yellow. Pistillode bottle-shaped. Female flowers: calyx and corolla as in male.

Staminodes 5, similar to fertile stamens. Ovary bottle-shaped; stigma yellowish, bifid, each lobe fimbriate. Capsule to 8 mm long, ovoid. Seeds 2-6 in each capsule, c. 4 x 3 mm, ovoid or ellipsoid.

Fl. & Fr.: Sep. - Dec.

Distr.: Endemic to Kerala. Coastal regions. Found in the flooded paddy fields. *CNS 2625* (Angadikal).

Nymphoides parvifolium (Griseb.) O. Kuntze, Rev. Gen. Pl. 2: 429. 1891; Subram., Aquat. Ang. 24. 1962; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 210. 1981, 'parviflora'; Mani. & Sivar., Fl. Calicut 175. 1982; Sivar. & Joseph, Aquatic Botany 45: 164. 1993. *Limnanthemum parvifolium* Griseb. in DC., Prodr. 9:141. 1845; Clarke in Hook. f., Fl. Brit. India 4: 132. 1883; Gamble, Fl. Pres. Madras 883. 1923. *Limnanthemum moonii* Thw., Enum. Pl. Zeyl. 205. 1860. *Limnanthemum parvifolium* var. *moonii* (Thw.) Clarke in Hook. f., Fl. Brit. India 4: 132. 1883 (Fig. 43).

Annual or perennial, rhizomatous herbs; rhizome short, obconical. Branches all fertile, petiole-like, very slender, uniphyllous, to 2 cm long. Leaves dimorphic; sterile leaves many, in a basal rosette, submerged, to 3 x 1.5 cm, spathulate; petiole to 3.5 cm long; fertile leaves solitary at the apices of capilliform branches, floating, to 4 x 3 cm, ovate-orbicular, base deeply cordate, apex rounded, membranous; petiole to 5 mm long. Flowers bisexual, in umbellate clusters at the junction of the petiole and the branches. Calyx deeply 4-lobed; lobes c. 2 x 1 mm, oblong-acute, pinkish at apex. Corolla white with a yellow throat; tube c. 2 mm long, with a ring of hairs at the throat; lobes 4, 3-4 mm long, oblong or elliptic, margins fimbriately toothed towards the apex. Stamens 4; filaments 1-1.5 mm long, alternating with tufts of white glandular hairs. Ovary bottle-shaped with 4 disc glands below; stigma bilobed. Capsules ellipsoid. Seeds 8-15 in each capsule, c. 1 mm across, discoid, light brown.

Fl. & Fr.: Oct.-Jan.

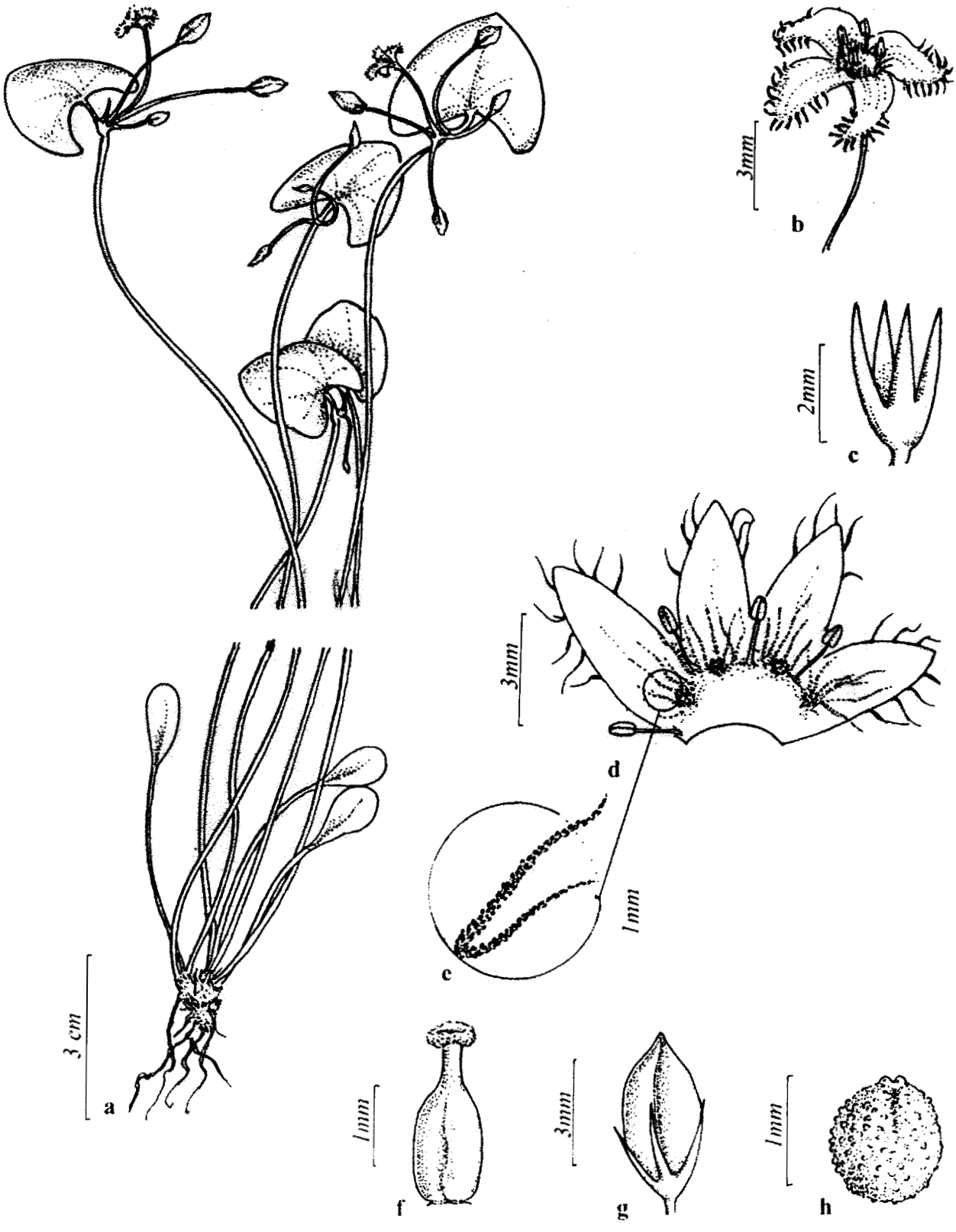


Fig. 43. *Nymphoides parvifolium* (Griseb.) O. Kuntze: a. Habit; b. Flower; c. Calyx; d. Corolla, cut-open; e. Glandular hairs; f. Pistil; g. Fruit; h. Seed.

Distr.: Southern India, Sri Lanka, Malaysia and tropical Australia. In flooded paddy fields. *CNS 2118* (Choolatheruvu).

Nymphoides sivarajanii Joseph, Willdenowia 20: 135. 1991; Sivar. & Joseph, Aquatic Botany 45: 167. 1993.

Annual or perennial, rhizomatous herbs. Branches all fertile, many from the axils of basal leaves, uniphyllous, petiole-like. Leaves dimorphic; vegetative leaves basal, submerged, rosulate, ovate, obovate or rhomboid; petiole to 1.5 cm long; fertile leaves floating, 2-4x1.5 -3 cm, ovate to orbicular, base deeply cordate, apex rounded; petiole to 5 mm long. Flowers bisexual, in umbellate clusters at the junction of the petiole and branch; pedicels to 3 cm long. Calyx 5-partite; lobes to 3x1 mm, linear or oblong. Corolla white with a yellow throat; tube short with ring of long, white hairs at the throat; lobes 5, to 7 mm long, oblong with densely fimbriate marginal wings. Stamens 5, alternating with minute, stalked tufts of glandular hairs. Ovary bottle-shaped; hypogynous disc of 5 minute glands. Capsules oblong or obovoid. Seeds 15-20 in each fruit, to 1 mm across, discoid, brownish, surface tuberculate.

Fl. & Fr.: Aug.-Dec.

Distr.: Endemic to Kerala. Coastal lowlands in the state. In flooded lowlands. *K.C. Joseph 51096* (CALI) (Kurupanthara).

80. HYDROPHYLLACEAE R. Br.

Bot. Reg. 3: adt. 242. 1817.

HYDROLEA Linnaeus

Sp. Pl. 328. 1762 (*nom. cons.*).

Hydrolea zeylanica (L.) Vahl, Symb. Bot. 46. 1791; Clarke in Hook. f., Fl. Brit. India 4: 133. 1883; Gamble, Fl. Pres. Madras 884. 1921; Subram., Aquat. Ang. 27. 1962; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 981. 1983; Davenport, Rhodora 90: 198. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 151. 1988; Sasi. & Sivar., Fl. Pl.

Thrissur For. 300. 1996. *Nama zeylanica* L., Sp. Pl. 226. 1753. *Steris javana* L., Mant. 54. 1767. *Hydrolea inermis* Lour., Fl. Cochinch. 1: 72. 1790. ***Tsjeru-vattel*** Rheede, Hort. Malab. 10: 55, t. 28. 1690 (Fig. 44).

Gregarious annual amphibious herbs; stem erect or ascending, glabrous or pubescent with simple or glandular hairs. Leaves simple, alternate, 2-5 x 0.8 - 2 cm, elliptic-oblong to lanceolate, base cuneate, apex acute or acuminate, glabrous to densely pubescent; petiole to 1 cm long. Flowers solitary or in terminal or axillary cymes. Sepals 5, 5-6 x 1-2 mm, elliptic-lanceolate, acute, hirsute. Corolla deep blue; tube short; lobes 5, 5-6 x 1.5-2.5 mm, elliptic-lanceolate. Stamens 5; filaments c. 2 mm long, filiform; anthers c. 2 mm long, sagittate. Ovary globose, hispid; styles c. 3 mm long; stigma capitate. Capsule 4-5 mm long, ellipsoid. Seeds c. 0.5 mm long, ovoid, with longitudinal and transverse ridges.

Fl. & Fr.: Nov. - Jan.

Distr.: Widely distributed in tropical Asia, Africa and Australia. In paddy fields and other wet or marshy places. *CNS 1401* (Kanichukulangara).

81. BORAGINACEAE Juss.

Gen. Pl. 128. 1789.

1a. Shrubs or trees.

2a. Style 4-branched ..... **Cordia**

2b. Style 2-branched ..... **Ehretia**

1b. Herbs.

3a. Leaves markedly asymmetric, margins coarsely dentate; inflorescence axillary, few-flowered sessile cymes or solitary; flowers 4-merous ..... **Coldenia**

3b. Leaves more or less symmetrical, margins entire or if dentate, then plants erect; inflorescence terminal spike-like, scorpioid cymes; flowers 5-merous ..... **Heliotropium**

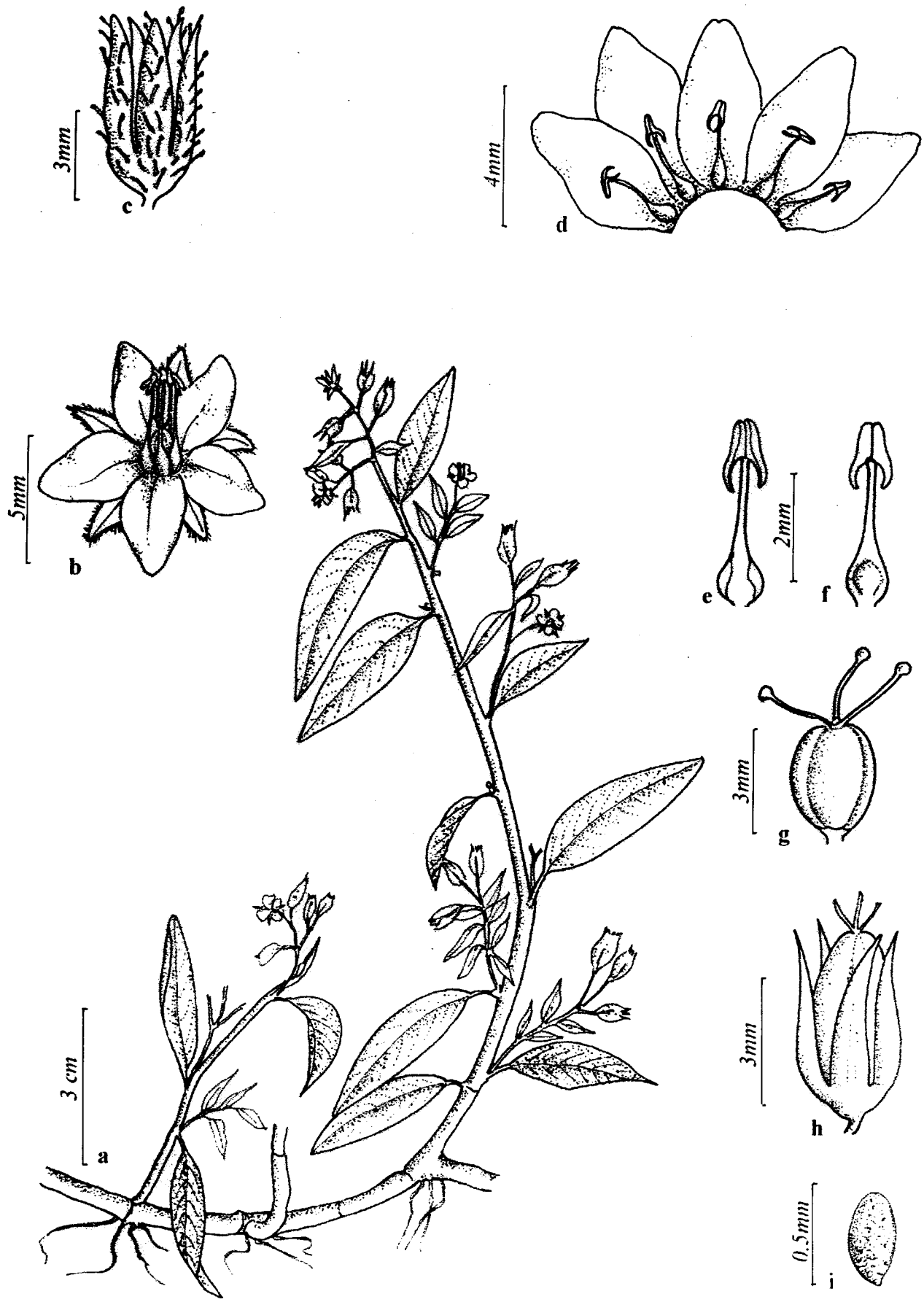


Fig. 44. *Hydrolea zeylanica* (L.) Vahl: a. Habit; b. Flower; c. Calyx; d. Corolla, split-open; e & f. Stamens-ventral and dorsal views; g. Pistil; h. Capsule with calyx; i. Seed.

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; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 479.1976; Mani. & Sivar., Fl. Calicut 178.1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 983.1983; Ramach. & Nair, Fl. Cannanore 294.1988; Vajravelu, Fl. Palghat Dist. 302.1990; Nowicke & Miller in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 23 1991; Mohanan & Henry, Fl. Thiruvananthapuram 309. 1994; Sivar. & Mathew, Fl. Nilambur 438.1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 301.1996.

Trailing herbs, stem and leaves softly white villous. Leaves 1.5-3 x 0.5-1.5 cm, obliquely obovate or subpinnatifid, base cuneate, margin irregularly dentate, apex emarginate, lateral veins impressed above. Inflorescence axillary few-flowered sessile cymes or some times solitary. Calyx 4-lobed; lobes ovate-acute, ciliate. Corolla white, c. 2 mm long, tube c. 1 mm long; lobes 4, imbricate in buds. Stamens 4, included. Ovary 4-lobed, 4-locular; ovule 1-per locule. Drupe of 4 subconnate pyrenes, 1.5-2 mm across, subglobose.

Fl. & Fr. : Jan.-Jul.

Distr.: Pantropical. Common in paddy fields during summer. *CNS 1391* (Kayamkulam).

CORDIA Linneaus

Sp.Pl. 190.1753.

Shrubs or trees. Leaves simple, alternate or subopposite. Flowers 4 or 5-merous, in terminal or lateral cymes. Calyx shortly lobed or dentate, persistent, accrescent. Corolla funnel-form, 4 or 5-lobed, lobes equal or unequal, imbricate, throat often scaly. Stamens as many as the corolla lobes, exserted, filaments often hairy at base. Ovary entire, 4-locular; ovule 1-per locule; style 4-branched. Berry with 1-4-seeded, ovoid or ellipsoid.

1a. Shrubs; leaves penninerved; inflorescence a scorpiod cyme ..... **C. cylindristachya**

1b. Trees; leaves basally 3-nerved; inflorescence a lax corymbose cyme ..... **C. obliqua**

Cordia cylindristachya Roem. & Schult., Syst. 4: 459. 1819; Ravi & Murali., Bot. Surv. India 30(1) : 171. 1990.

Profusely branched densely foliaceous shrubs. Leaves 4-11.5 x 1.8-5.5 cm, elliptic-ovate to broadly elliptic, base cuneate, margin serrate, apex acuminate, scabrid, thin-coriaceous; nerves 7-9 pairs; petiole to 1 cm long. Flowers dense in trminal 4-12 cm long, scorpoid cymes. Calyx campanulate. Corolla white, c. 5 mm across. Berry 3 - 5 mm across, globose, red.

Fl. & Fr. : Most of the seasons.

Distr. : Originally of Trop. America, now in all warmer countrries. Often planted for fencing . *CNS 2081* (Mavelikara).

Cordia obliqua Willd., Phytographia 1(4): t. 4, f. 1. 1794; Hook. f., Fl. Brit. India 4: 137. 1883; Gamble, Fl. Pres. Madras 887. 1923; Mani. & Sivar., Fl. Calicut 178. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1000. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 74. 1988. *Cordia latifolia* Roxb., Fl. Ind. 2: 330. 1824, p.p. *Cordia myax* auct., non L., 1753. Wight, Ill. Ind. Bot. t. 169. 1850. ***Vidimaram*** Rheede, Hort. Malab. 4: 77-78, t. 37. 1683.

Small trees, usually with drooping branches, hairy when young. Leaves 5-9 x 4.5-7 cm, orbicular, elliptic-oblong or broadly ovate, base rounded, margins entire, remotely dentate or sinuate, apex subacute or obtuse, glabrescent on both sides, subcoriaceous; petiole to 3.5 cm long. Flowers white, fragrant, in terminal corymbose cymes. Calyx 4-5 mm long, funnel-shaped, globose, accrescent; lobes 5, c. 1.5 mm long. Corolla c. 7 mm across; tube 4-5 mm long; lobes c. 4 mm long, linear-oblong, recurved. Stamens 5; filaments c. 4 mm long, hairy at base. Drupe 1-1.5 cm long, ovoid, yellowish, with viscous 1-seeded pulp.

Fl. & Fr. : Mar. - Aug.

Distr. : Pakistan, India, Sri Lanka and N.Africa. In waste places. *CNS 1900* (Alappuzha town).

EHRETIA P. Browne

Civ. Nat. Hist. Jamaica 168. 1756.

Ehretia canarensis (Clarke) Gamble, Fl. Pres. Madras 891. 1923; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 481. 1976; Mohanan & Henry, Fl. Thiruvananthapuram 311. 1994; Sivar. & Mathew, Fl. Nilambur 440. 1996. *Ehretia laevis* Roxb. var. *canarensis* Clarke in Hook. f., Fl. Brit. India 4: 142. 1883; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 75. 1988. *Sondari, Kaka-ponna* Rheede, Hort. Malab. 5: 79-80, t. 40. 1685.

Small trees. Leaves alternate, 6-10 x 3-4 cm, elliptic, base cuneate, apex acuminate, thin coriaceous, glabrous, lateral nerves 5-7 pairs; petiole c. 2 cm long. Flowers 2.5-3 mm across, in axillary and terminal unilateral corymbose cymes. Calyx minute, 5-toothed. Corolla white, c. 2.5 mm long, lobes 5, oblong, obtuse. Stamens 5, exserted. Ovary minute, 2-celled; ovules 2 in each cell; style 2-fid above middle. Drupe 4-5 mm across, subglobose, red. Seeds 4.

Fl. & Fr. : May - Aug.

Distr. : Peninsular India. In sacred groves. *CNS 2376* (Panayannarkavu at Thazhakkara).

HELIOTROPIUM Linnaeus

Sp.Pl. 130. 1753.

Erect or prostrate herbs; often hairy. Leaves alternate or sub-opposite. Flowers 5-merous, usually in terminal elongated scorpioid cymes, some times axillary. Calyx deeply lobed. Corolla salver-form, lobes imbricate, throat glabrous. Stamens 5, included. Ovary 4-celled; ovule 1-per locule; style terminal with a depressed conical stigmatic ring below the apex. Fruit of 4 nutlets, free or paired.

1a. Erect herbs; flowers in long scorpioid cymes; anthers free at their apex.

2a. Flowers pale violet or pink; nutlets united in pairs ..... **H. indicum**

2b. Flowers white; nuts not united ..... **H. keralense**

1b. Prostrate herbs; flowers in few-flowered cymes; anthers connivent by their apices ..... **H. marifolium**

Heliotropium indicum L., Sp. Pl. 130. 1753; Hook. f., Fl. Brit. India 4: 152. 1883; Gamble, Fl. Pres. Madras 896. 1923; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 481. 1976; Mani. & Sivar. , Fl. Calicut 176. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 988. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 75. 1988; Ramach. & Nair, Fl. Cannanore 295. 1988; Vajravelu, Fl. Palghat Dist. 303. 1990; Nowicke & Miller in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 30. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 309. 1994. ***Ben-patsja*** Rheede, Hort. Malab. 10 : 95-96, t. 48. 1690.

Erect, branched, pubescent herbs. Leaves to 11 x 6 cm, sub-deltoid or broadly ovate, base turncate, margin undulate, apex acute, chartaceous; petiole 3-6 cm long. Spikes terminal or leaf-opposed, curved, to 20 cm long. Flowers sessile. Calyx- lobes 5, 1.5-2 mm long, linear, acute. Corolla pale violet or pink, salver-form; tube 3-4 mm long, slightly constricted distally, 5 -lobed; lobes c. 1 mm long, ovate. Stamens 5, subsessile, free. Ovary weakly 4 -lobed; stigma conical. Nutlets connate in pairs, separating later, ribbed, each nutlet 2-3 mm long.

Fl. & Fr. : Sep. - Mar.

Distr. : Pantropical. A common weed in moist sandy fields and waste places. *CNS 1200* (Thykkuttam).

Heliotropium keralense Sivar. & Mani., J. Ind. Bot. Soc. 51: 348-350. 1972; Mani. & Sivar., Fl. Calicut 176. 1982; Sivar. & Mathew, Fl. Nilambur 440. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 303. 1996.

Erect pubescent herbs upto 25 cm tall. Leaves upto 8 x 4 cm, ovate, abruptly narrowed and decurrent on petiole at base, margins flexuous, obtuse or acute at apex, sparsely strigose beneath on veins, glabrous above; petiole to 8 cm long. Flowers white in long, terminal, one-sided scorpioid, spiciform cymes upto 15 cm long. Calyx c. 2.5 mm long, lobes 5, subequal, persistant, bulbous-based hairy without. Corolla 3-4 mm long, villous; lobes 5, triangular, plicate. Stamens 5, included. Ovary 4-lobed, 4-loculed; ovules one per locule; stigma lobed, hemispheric. Fruit separating into 4 pyrenes. Seeds brownish-black.

Fl. & Fr. : Dec. - Jun.

Distr. : Endemic to Kerala. A common weed in waste places and road sides. *CNS 1259* (Thottappally), *CNS 1200* (Karuvatta).

Heliotropium marifolium Retz., Obs. Bot. 2: 8. 1781; Clarke in Hook. f., Fl. Brit. India 4: 152. 1883, p.p.; Kazmi, J. Arnold Arbor. 51: 155. 1970; Sasi. & Sivar., Fl. Pl. Thrissur For. 304. 1996. *H. scabrum* Retz., Obs. Bot. 2: 8.1781; Wight, Ic. t. 1389. 1848; Clarke in Hook. f. , Fl. Brit. India 4: 152. 1883; Gamble, Fl. Pres. Madras 897. 1923; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 481. 1976; Mani. & Sivar., Fl. Calicut 176. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 989. 1983; Nowicke & Miller in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 30. 1991; Vajravelu, Fl. Palghat Dist. 304. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 310. 1994.

Scabrous herbs, branches procumbent, radiating from the rootstock. Leaves 6-12 x 3-14 mm, lanceolate to elliptic, base and apex acute, strigosely hirsute, subsessile. Flowers in axillary and terminal few-flowered short cymes up to 2.5 cm long. Calyx-lobes 5, c. 2 mm long, deltoid. Corolla white, c. 3 mm long, salver-shaped, hairy at throat. Stamens 5, included, subsessile. Ovary 4-lobed; style short, c. 0.5 mm long. Stigma conical. Fruit 4-lobed, shorter than the persistent calyx, globose, eventually separating into 4 nutlets.

Fl. & Fr. : Mar. - Jul.

Distr.: Sri Lanka and Peninsular India. On wet places, harvested fields, and among grassess. *CNS 1629* (Vandanam).

82. CONVOLVULACEAE Juss.

Gen. Pl. 132. 1789.

1a. Leafless, parasitic twiners; stems yellow; corolla with 5 epipetalous fimbriate scales inside ..... **Cuscuta**

1b. Leafy, non parasitic plants; stems green or brown; corolla without 5 epipetalous fimbriate scales inside .

2a. Style 1 or absent.

3a. Pollen grains spinulose.

4a. Fruit indehiscent, epicarp fleshy or woody; seeds embedded in mealy pulp ..... **Argyreia**

4b. Fruit dehiscent, epicarp thin, fragile; seeds not embedded in mealy pulp ..... **Ipomoea**

3b. Pollen grains smooth.

5a. Style 1; corolla funnel-form or salver-form, lobes entire; fruit dehiscent.

6a. Ovary imperfectly 2-locular; stigma-lobes oblong .... **Hewittia**

6b. Ovary perfectly 2-or 4-locular; stigma-lobes capitate or globose.

7a. Calyx-lobes unequal, outer sepals decurrent on pedicel ..... **Aniseia**

7b. Calyx-lobes subequal; outer sepals not decurrent on pedicel ..... **Merremia**

5b. Style absent; corolla subrotate, lobes bifid; fruit fleshy or woody, indehiscent ..... **Erycibe**

2b. Style 2 or more.

8a. Prostrate or ascending herbs; styles free, each 2-branched; leaves small, elliptic ..... **Evolvulus**

8b. Woody twiners; styles basally connate, unbranched; leaves large, cordiform ..... **Bonamia**

ANISEIA J.D. Choisy

Mem. Soc. Phys. Geneve 6: 481. 1834.

Aniseia martinicensis (Jacq.) Choisy, Mem. Soc. Phys. Geneve 8: 66. 1838; Oost., Blumea 3: 279. 1939; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 291. 1980; Mani. & Sivar., Fl. Calicut 185. 1982; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 86. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 311. 1994. *Convolvulus martinicensis* Jacq., Sel. Strip. Amer. 26, t. 17. 1763. *Convolvulus uniflorus* Brum. f., Fl. Ind. 47, t. 21, f. 2. 1768. *Ipomoea uniflora* (Burm. f.) Roem. & Schult., Syst. Veg. 4: 247. 1819; Clarke in Hook. f., Fl. Brit. India 4: 201. 1883. *Aniseia uniflora* (Burm. f.) Choisy, Mem. Soc. Phys. Geneve 6: 483. 1834; Gamble, Fl. Pres. Madras 924. 1923. ***Ben-tiru-tali*** Rheede, Hort. Malab. 11: 111, t. 54.1692.

Twiners. Leaves 2.5-5 x 1-2 cm, oblong to elliptic-oblong, base attenuate, apex emarginate with mucronte tip; petiole 5-10 mm long. Flowers solitary, axillary, rarely in 2-3-flowered cymes; pedicels 5-10 mm long, 2-3 subulate bracts present at base of pedicel; fruiting pedicels much longer, upto 5 cm. Calyx-lobes 5, unequal, 1-1.5 x 0.6-0.8 cm, outer 3 foliaceous, ovate, inner 2 lanceolate. Corolla white, campanulate; tube 2-2.5 cm long; limb spreading, subentire, both tube and limb pubescent without . Stamens 5, included. Ovary 3-4 mm long, ovoid, 2-locular; ovules 2-per locule; style filiform; stigma 2, capitate. Capsule 1.5-2 x 1-1.5 cm, ovoid. Seeds 4, 1-1.5 cm long, ovoid.

Fl. & Fr.: Aug. - Jan.

Distr.: Pantropical. Usually among thickets near rivers and cannals. *CNS 1078* (Aroor).

ARGYREIA Loureiro

Fl. Cochinch. 95, 134. 1790.

Argyreia hirsuta Wight & Arn., Nova Acta Phys.-Med. Acad. Caes. Leop.-Carol. Nat. Cur. 18: 365. 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; Ramach. & Nair, Fl. Cannanore 297. 1988; Vajravelu, Fl. Palghat Dist. 306. 1990; Mohanan & Henry, Fl.Thiruvananthapuram 312. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 305. 1996. *Rivea hirsuta* (Wight & Arn.) Wight, Ic. t. 891. 1845.

Climbing undershrubs; stem hirsute. Leaves 13-20 x 7-14 cm, broadly ovate, base cordate, apex abruptly acuminate, densely strigose above, tomentose beneath; nerves 7-13 pairs, prominent below; petiole 5-11 cm long, densely pubescent. Flowers in axillary few to many flowered cymes; bracts leafy, to 3 cm long, lanceolate, shortly petioled, persistent. Sepals 6-8 x 2-3 mm, oblong, obtuse, sparsely hairy, equal. Corolla 5-7 cm long, funnel-shaped, pale purple, hispid without. Style filiform; stigma 2-globose. Berry 8-12 mm across, depressed-globose, yellow. Seeds embedded in mealy pulp.

Fl. & Fr.: Aug.-Dec.

Distr.: South India and Sri Lanka. In waste place among bushes. *CNS 1296* (Angadikkal).

BONAMIA Thouars

Hist. Veg. Iles. France 1: 33, t. 8. 1804 (*nom. cons*).

Bonamia semidigyna (Roxb.) Hallier f., Bot.Jahrb. 16: 528. 1893; Oost., Blumea 3: 76. 1939 & in Steenis, Fl. Males. I, 4: 398. 1953; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 303. 1980; Mani. & Sivar., Fl. Calicut 187. 1982. *Convolvulus semidigynus* Roxb., Hort. Beng. 13. 1814, nom. nud. & Fl. Ind. 2: 47. 1824. *Breweria cordata* Bl., Bijdr. 722. 1825; Clarke in Hook. f., Fl. Brit. India 4: 223. 1883; Gamble, Fl. Pres. Madras 923. 1923. *B. roxburghii* Choisy, Mem. Soc. Phys. Geneve 6. 493 1833.

Densely rusty-tomentose climbers. Leaves 4-8 x 3-6 cm, ovate-cordate, base cordate, apex acuminate-apiculate, softly tomentose; lateral nerves 5-6 pairs; petiole 2-4 cm long. Cymes axillary, 2-5-flowered; peduncle c. 9 cm long. Flowers white; pedicel to 1 cm long; bracts oblanceolate. Sepals subequal, c. 1 x 0.5 cm, elliptic-ovate to ovate-oblong, dense-tomentose. Corolla c. 3 cm across, funnel-form, rusty villous on the plaits outside. Stamens included. Ovary 2-locular; ovules 2-per locule; style 2-fid; stigma capitate. Capsule 10-12 mm long, subglobose. Seeds 4, 5-6 mm long, black, glabrous.

Fl. & Fr.: Nov. - Mar.

Distr.: India, Indo-China and Malesia. Rare. In sacred groves. *CNS 1575* (Sharangakavu).

CUSCUTA Linnaeus

Sp. Pl. 124. 1753.

Parasitic twiners; branchlets yellowish, slender or stout. Leaves absent. Flowers in fascicles or in racemes, 4-5-merous. Calyx-lobes nearly free, subequal. Corolla globose or funnel-form, often scaly-fimbriate structures present inside corolla-tube. Stamens exserted. Ovary 2-locular; ovules 2-per locule; style 1 or 2. Capsule subglobose. Seeds glabrous.

1a. Stem slender; flowers in fascicles; capsule dry ..... **C. chinensis**

1b. Stem stout; flowers in racemes; capsule succulent ..... **C. reflexa**

Cuscuta chinensis Lam., Encycl. 2: 229. 1786; Wight, Ic. t. 1373. 1848; Clarke in Hook. f., Fl. Brit. India 4: 226. 1883; Gamble, Fl. Pres. Madras 931. 1923; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 305. 1980; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1013. 1983 (Plate XVII: A).

Slender yellow twiners. Flowers sessile, 5-7, in lateral fascicles. Calyx-lobes 5, c. 2 x 1.5 mm, broadly ovate, scarious. Corolla pale yellow, c. 5 mm across, 3-3.5 mm long, widely funnel-form; lobes triangular-ovate, acute or obtuse, spreading. Stamens 5; filaments longer than the ovoid anthers; corolla scales oblong, fimbriate above. Ovary c.

1.5 mm long, globose; styles 2, filiform; stigma rounded. Capsule c. 3 mm across, depressed-globose, irregularly dehiscent. Seeds c. 1 mm long.

Fl. & Fr.: Nov. - Mar.

Distr.: Sri Lanka, India, Australia and China. Usually parasitic upon undershrubs. *CNS 1598* (Aroor).

Cuscuta reflexa Rexb., Pl. Corom. t. 104. 1799 & Fl. Ind. 1: 446. 1832; Clarke in Hook. f., Fl. Brit. India 4: 225. 1883; Gamble, Fl. Pres. Madras 931. 1923; Oost., Blumea 73: 70. 1938 & in Steenis, Fl. Males. I, 4: 393. 1953; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 306. 1980; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1014. 1983. ***Manja-valli***.

Stout succulent twiners; stem up to 2.5 mm in diam., yellowish. Flowers sessile in lateral racemes. Calyx cupular, lobes herbaceous, c. 1.5 mm long, suborbicular. Corolla cream coloured, c. 7 mm across, 6-8 mm long, funnel-form; lobes ovate-triangular, erect. Stamens 5; filaments very short; corolla scale ovate to oblong, fimbriate. Ovary c. 2 mm long, conical, stigma acute. Capsule succulent, c. 5 mm across, globose-conical. Seeds 3-3.5 mm long, black.

Fl. & Fr.: Nov. - Mar.

Distr.: Sri Lanka, India, China and Malesia. Along bushes and thickets. *CNS 1119* (Alappuzha), *CNS 2562* (Kayamkulam).

ERYCIBE Roxburgh

Pl. Corom. 2: 31. 1802.

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. 1980; Mani. & Sivar., Fl. Calicut 179. 1982; Ramach. & Nair, Fl. Cannanore 298. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 87. 1988;

Vajravelu, Fl. Palghat Dist. 307. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 313. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 306.1996. *E. wightiana* Grah., Cat. Pl. Bomb. 137. 1839. *E. paniculata* var. *wightiana* (Grah.) Clarke in Hook. f., Fl. Brit. India 4: 181. 1883. ***Erima-tali*** Rheede, Hort. Malab. 7: 73, t. 39. 1688. ***Vadayara***.

Large woody climbers; young branches, leaves and inflorescence densely rusty tomentose. Leaves 4-8 x 2-5 cm, broadly elliptic or elliptic-obovate, base rounded, apex obtusely acuminate, coriaceous; lateral veins 5-6 pairs; petioles to 1 cm long. Inflorescence axillary and terminal panicled cymes. Flowers 6-8 mm across, fragrant. Calyx tube 1.5-2 mm long; lobes 5, ovate, obtuse, densely-brown tomentose. Corolla creamy-white, campanulate-rotate; tube1-1.5 mm long, villous without; lobes 5, 2.5-3 mm long, each deeply 2-fid and seemingly 10. Stamens 10, exerted. Ovary 1-celled, ovules 4; style absent; stigma subglobose. Berry 6-8 x 3-3.5 mm, ovoid or ellipsoid. Seed 1.

Fl. & Fr.: Jun. - Dec.

Distr.: India and Sri Lanka. Not common. In sacred groves. *CNS 1378* (Kadakarappally), *CNS 1840* (Vandanam).

EVOLVULUS Linnaeus

Sp. Pl. ed. 2, 391. 1762.

Prostrate or ascending herbs. Leaves usually small, alternate, entire. Flowers axillary, solitary or in few-flowered cymes, 5-merous. Calyx lobes subequal, shortly decurrent. Corolla rotate or funnel-form, blue or white. Stamens included or exserted; pollen smooth. Ovary globose, 2-celled and 2-ovulate or 1-celled and 3 or 4-ovuled; style 2, each deeply bifid; stigma filiform. Capsule globose or ovoid, 2-4-valved. Seeds smooth or faintly verrucose, glabrous.

1a. Leaves elliptic, apex apiculate; corolla blue; capsule 2-locular ..... **E. alsinoides**

1b. Leaves oblong-orbicular, apex obtuse or retuse; corolla white; capsule 1-locular .... **E. nummularius**

Evolvulus alsinoides (L.) L., Sp. Pl. ed. 2, 392. 1762; Hook. f., Fl. Brit. India 4: 220. 1883; Gamble, Fl. Pres. Madras 923. 1923; Stearn, Taxon 21: 649. 1972; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 468. 1976; Austin in Dassan. & Fosb., Rev. Handb.Fl. Ceylon 1: 309. 1980; Mani. & Sivar., Fl. Calicut 188. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1015. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 88. 1988; Ramach. & Nair, Fl. Cannanore 299. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 313. 1994; Sivar. & Mathew, Fl. Nilambur 444. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 306.1996. *Convolvulus alsinoides* L., Sp. Pl. 157. 1753. ***Vistnu-clandi*** Rheede, Hort. Malab. 11: 131-132, t. 64. 1692. ***Vishnucranthy***.

Small prostrate much brnached villous herbs; branches radiating from rootstock. Leaves more or less distinctly in 2 rows, 6-12 x 4-7 mm, broadly elliptic to elliptic-lanceolate, base rounded or acute, apex subacute, adpressed pilose on both sides; petiole to 2 mm long. Flowers solitary or paired, at axils; pedicels to 5 mm long, silky hairy; bracts linear, c. 1 mm long. Calyx lobes 2-3 mm long, lanceolate, silky hairy. Corolla c. 1 cm across, rotate, subentire, blue. Ovules 2 in each cell; styles 2, each longitudinally 2-fid. Capsule 1.5-2 mm across, globose, 2-valved. Seeds usually 4, minute.

Fl. & Fr.: Sep. - Dec.

Distr.: Native of Tropical America, now Pantropical. Common in open wet areas. *CNS 1008* (Vandanam), *CNS 2204* (Kanjikuzhi).

Evolvulus nummularius (L.) L., Sp. Pl. ed. 2, 391. 1762; Balakr., Bull. Bot. Surv. India 6: 86. 1964; Stearn, Taxon 21: 649. 1972; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 311. 1980; Mani. & Sivar., Fl. Calicut 188. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1016. 1983; Ramach. & Nair, Fl. Cannanore 299. 1988; Vajravelu, Fl. Palghat Dist. 307. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 313. 1994; Sivar. & Mathew, Fl. Nilambur 444. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 306. 1996. *Convolvulus nummularius* L., Sp. Pl. 157. 1753. *Volvulopsis nummularium* (L.) Roberty, Candollea 14: 28. 1952.

Slender prostrate perennial herbs. Leaves 5-15 x 4-10 mm, broadly ovate to orbicular, base subcordate, apex obtuse to emarginate, glabrous or sparsely hairy below; petiole to 5 mm long. Flowers 1-2, in leaf-axils; pedicels slender 2-5 mm long. Calyx lobes 5, free, 2-3.5 mm long, ovate-lanceolate, acute, ciliate on margins. Corolla white, 6-8 mm across, rotate. Stamens sub-exserted. Capsule 3-4 mm across, globose. Seeds brown to black.

Fl.& Fr.: May - Dec.

Distr.: Native of Tropical America, now Pantropical. A common weed of roadsides and wastelands. *CNS 1284* (Mancombu).

HEWITTIA R.Wight *et* Arnott

Madras J. Lit. Sci. 5: 17, 22. 1837.

Hewittia malabarica (L.) Suresh in Nicols., Suresh & Mani., An Interpr.Hort. Malab. 88. 1988. Sivar. & Mathew, Fl. Nilambur 445. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 307. 1996. *Convolvulus malabaricus* L., Sp. Pl. 155. 1753. *C. sublobatus* L. f., Suppl. Pl. 135. 1782. *C. bicolor* Vahl, Symb. 3: 25.1794, non Desr., 1792. *Hewittia bicolor* (Vahl) Wight & Arn., Madras J. Sci.1(5): 22. 1837; Gamble, Fl. Pres. Madras 924.1923. H. *sublobata* (L.f.) Kuntze, Rev. Gen. Pl. 2: 441 1891; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 468.1976; Austin in Dassan.& Fosb., Rev. Handb. Fl. Ceylon 1: 312. 1980; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1016. 1983; *Hewittia scandens* (Milne) Mabberly in Mani., Bot. Hist. Hort. Malab. 84.1980; Mani. & Sivar., Fl. Calicut. 179. 1982; Mani., Fl. Silent Valley 187. 1988; Ramach. & Nair, Fl. Cannanore 300. 1988; Vajravelu, Fl. Palghat Dist. 307. 1990; Mohanan & Henry Fl. Thiruvananthapuram 314. 1994. ***Kattu-kelengu*** Rheede, Hort. Malab. 11: 105, t. 51. 1692.

Stem twining or prostrate, pubescent. Leaves 4-7 x 3-4 cm, ovate, base cordate, margin entire or angled, apex acute, puberulent, basally 3-nerved; petiole to 6 cm long. Flowers in axillary 1 to few-flowered peduncled cymes; bract linear-lanceolate, attached to little below the calyx. Sepals 5, outer 3 larger, accrescent, inner 2 smaller. Corolla yellowish or cream coloured with a purple centre, c. 3 cm across, campanulate, limb

shallowly 5-lobed. Stamens included; filaments dilated at base. Ovary imperfectly 2-locular; ovules 2-per locule; stigma 2. Capsule 4-valved, 8-10 mm across, subglobose. Seeds 4 or less, 5-6 mm long, subtrigonous, black.

Fl. & Fr.: Dec. - Mar.

Distr.: Trop. Africa and Asia, Malesia and Polynesia. A common weed of waste lands. *CNS 1183* (Alappuzha).

IPOMOEA Linnaeus

Sp. Pl. 159. 1753.

Twining herbs or subshrubs. Leaves alternate, entire, lobed or divided. Flowers axillary, solitary or in cymes, rarely paniculate. Sepals 5, equal or unequal. Corolla campanulate or funnel-shaped; limb spreading, plicate, subentire or slightly 5-lobed. Stamens 5, included or exserted; filaments often unequal. Ovary usually 2-celled, rarely 4-celled; ovules 4-6 in each cell; style filiform. Fruit an ovoid or globose capsule, 4-6-valved; sepals accrescent in fruits. Seeds 4-6, glabrous or puberulous without.

1a. Erect shrubs ..... **I. carnea**

1b. Creepers or twiners.

2a. Aquatic plants, rooting in mud at the nodes or floating ..... **I. aquatica**

2b. Terrestrial plants.

3a. Corolla salver-form, lobes triangular; stamens and style exserted.

4a. Leaves pinnatifid ..... **I. quamoclit**

4b. Leaves entire or angled.

5a. Corolla 8-13 cm long, more than 8 cm across, white; ovary 2-locular ..... **I. alba**

5b. Corolla 2-3.5 cm long, less than 3 cm across, red; ovary 4-locular ..... **I. hederifolia**

3b. Corolla funnel-form (salver-form in *I. sepiaria*); lobes indistinct; stamens and style included.

6a. Creepers, not normally twining.

7a. Leaves emarginately more or less 2-lobed, parallel nerved; roots not tuberous ..... **I. pes-caprae**

7b. Leaves palmately 3-7-lobed; not parallel nerved; roots tuberous ..... **I. batatus**

6b. Twiners, not usually rooting at the nodes.

8a. Leaves lobed.

9a. Leaves shallowly 3-lobed.

10a. Sepals 1.5-2.2 cm long, acuminate, long-hirsute; corolla blue with white throat, 3-5 cm long .... **I. nil**

10b. Sepals 7-8 mm long, obtuse or acute, sparsely pubescent; corolla pink with dark throat, up to 1.8 cm long ..... **I. triloba**

9b. Leaves deeply palmately 5-9-lobed.

11a. Flowers subsessile in pedunculate capitate heads, white; leaves softly hirsute ..... **I. pes-tigridis**

11b. Flowers pedicellate, solitary or in short racemes or cymes, pink; leaves glabrous.

12a. Stipular leaves present; sepals membranaceous; flowers usually solitary .... **I. cairica**

12b. Stipular leaves absent; sepals coriaceous; flowers in cymes ..... **I. mauritiana**

8b. Leaves entire.

13a. Corolla salver-form, 3-3.5 cm long, pink with dark purple throat ..... **I. sepiaria**

13b. Corolla funnel-form, up to 2.5 cm long, white to cream with red-purple throat ..... **I. obscura**

Ipomoea alba L., Sp. Pl. 161. 1753; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 469. 1976; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 317. 1980; Rani & Matthew

in Matthew, Fl. Tam. Carnatic 3: 1020. 1983; Mani., Fl. Silent Valley 188. 1988; Ramach. & Nair, Fl. Cannanore 301. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 89. 1988; Vajravelu, Fl. Palghat Dist. 309. 1990; Sivar. & Mathew, Fl. Nilambur 446.1996; Sasi. & 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-nux* (L.) Boger, Hort. Maurit. 227. 1837; Gamble, Fl. Pres. Madras 920. 1923. ***Munda-Valli*** Rheede, Hort. Malab. 11: 103, t. 50. 1692.

Glabrescent twiners, stem often prickly. Leaves 6-15 x 4-10 cm, ovate, base cordate, apex acuminate; petiole to 9 cm long. Flowers solitary or few in cymes; peduncle to 3 cm long. Sepals apically caudate, outer 2 or 3 smaller, the inner ones c. 1 cm long, fleshy. Corolla white, greenish at base, salver-form, 8-10 cm across; tube 8-13 cm long. Stamens subexserted. Capsule 2-3 x 1-2 cm, subglobose, dark brown. Seeds 8-10 mm long, dark brown.

Fl. & Fr.: Dec. - Mar.

Distr.: Native of Tropical America. Introduced and naturalized in many Tropical Asian countries. Flowers opening at night. Along sea-coast. *CNS 1066* (Ambalapuzha beach).

Ipomoea aquatica Forssk., Fl. Aegypt.-Arab., 44. 1775; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 469. 1976; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 318. 1980; Mani. & Sivar., Fl. Calicut 182. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1021. 1983; Nicols., Suresh & Mani., An Interpr., Hort. Malab. 89. 1988; Vajravelu, Fl. Palghat Dist. 309. 1990. *I. reptans* Poiret in Lam., Encycl. (Suppl. 3): 460. 1814, non L., 1753; Gamble, Fl. Pres. Madras 916. 1923. ***Ballel*** Rheede, Hort. Malab. 11: 107-108, t. 52. 1692.

Creeping or floating aquatic herbs; branches succulent. Leaves 5-10 x 2-6 cm, varies in form, usually oblong-lanceolate or narrowly triangular, base hastate, apex acute; petiole 4-8 cm long. Flowers purplish-white, solitary or few in cymes. Sepals subequal, persistent. Corolla c. 5 cm across, funnel-form, tube to 2 cm lorg. Stamens included; filaments villous at base. Capsule 8-10 mm across, globose. Seeds glabrous.

Fl. & Fr.: Sep. - Jan.

Distr.: Tropics. Common in stagnant fresh water ponds and fallow fields. *CNS 1402* (Kanichukulangara).

Ipomoea batatas (L.) Lam., Tabl. Encycl. 1: 465. 1793; Hook. f., Fl. Brit. India 4: 202. 1883; Gamble, Fl. Pres. Madras 919. 1923; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 320. 1980; Mani. & Sivar., Fl. Calicut 183. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1022. 1983; Nicols., Suresh & Mani., An Interpr. Hort Malab. 90. 1988; Sivar. & Mathew, Fl. Nilambur 447. 1996. *Convolvulus batatas* L., Sp. Pl. 154. 1753. ***Kapa-kelegu*** Rheede, Hort. Malab. 7: t. 50. 1688. ***Madhura-kelengu***.

Creeping herbs with tuberous roots. Leaves pedately 3 to many lobed, chartaceous, glabrous, green above, glaucous below, base truncate to subcordate; petiole to 11 cm long. Flowers in axillary, 5-9-flowered cymes; peduncle to 10 cm. Calyx lobes 5, unequal, ovate, mucronate, puberulous without. Corolla long, pink, funnel-form. Stamens 5, hairy below. Ovary conic; style to 1 cm. Fruit not seen.

Fl. : Nov. - Mar.

Distr.: Native of tropical South America, now widely cultivated throughout the tropics. Commonly cultivated for its sweet tubers generally known as 'sweet potato'. *CNS 1841* (Vallikkunnam).

Ipomoea cairica (L.) Sweet, Hort. Brit. 287. 1827; Gamble, Fl. Pres. Madras 918. 1923; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 470. 1976; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 322. 1980; Mani. & Sivar., Fl. Calicut 183. 1982; Rani. & Matthew in Matthew, Fl. Tam. Carnatic 3: 1024. 1983; Ramach. & Nair, Fl. Cannanore 301. 1988. *Convolvulus cairicus* L., Syst. Nat. (ed. 10), 922. 1759. *Ipomoea pulchella* Wight, Ic. t. 156. 1839, non Roth, 1821. *I. palmata* Forssk., Fl. Aeg.-Arab. 43. 1775; Hook. f., Fl. Brit. India 4: 214. 1883; Bor & Raiz., Beaut. Ind. Climbers & Shrubs 6. 1954. ***Kolambipoovu***.

Extensive climbers. Leaves pedately 5-7-foliolate, 3-7 x 4-8 cm, orbicular in outline; lobes elliptic-ovate, apex obtuse to emarginate; petiole to 4.5 cm long. Flowers

solitary or in short racemes; pedicels 1-2.5 cm long. Calyx-lobes subequal, 4-6 mm long, outer obovate, apiculate. Corolla pink, 4.5-6 cm long, funnel-shaped. Stamens 5; filaments pilose below. Style long; stigma globose. Capsule 1-1.2 cm long, subglobose. Seeds 4-6 mm long, subglobose to ovoid, blackish.

Fl. & Fr.: Sep. - Mar.

Distr.: Paleotropics. Common on wayside thickets. *CNS 1262* (Thottappally).

Ipomoea carnea Jacq., Enum. Syst. Pl. 13. 1760; Gamble, Fl. Pres. Madras 919. 1923; Bor & Raiz., Beaut. Ind. Climbers & Shrubs 6. 1954, ssp. *fistulosa* (Mart. ex Choisy) Austin, Taxon 26: 237. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 322. 1980; Rani. & Matthew in Matthew, Fl. Tam. Carnatic 3: 1024. 1983; Ramach. & Nair, Fl. Cannanore 302. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 315.1994; Sivar. & Mathew, Fl. Nilambur 449. 1996. *I. fistulosa* Mart. ex Choisy in DC., Prodr. 9: 349. 1845; Bhatt., J. Bombay Nat. Hist. Soc. 73: 318. 1976; Mani. & Sivar., Fl. Calicut 181. 1982.

Erect to subscandent shrubs; stem fistulose at maturity. Leaves 6-20 x 3-7 cm, ovate-lanceolate, base cordate, apex gradually acuminate, glabrous, lateral veins 8-10 pairs; petiole to 8 cm long. Cymes many-flowered, axillary or subterminal; peduncle c. 8 cm long; pedicel to 1.2 cm long. Calyx-lobes 5, subequal, 4-6 mm long, suborbicular, glabrous. Corolla pale pink, showy, 5-8 cm long, funnel-shaped. Capsule c. 1.5 cm across, ovoid with a mucronate tip. Seeds densely pubescent, black or brown.

Fl. & Fr.: Sept. - May.

Distr.: Native of America, now pantropical. Introduced and naturalised as a weed in wet lowlands. *CNS 1555* (Muhamma), *CNS 1410* (Kalarcodu).

Ipomoea hederifolia L., Syst. Nat., ed. 10, 925. 1759; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 471. 1976; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 325. 1980; Mani. & Sivar., Fl. Calicut 184. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1027. 1983; Ramach. & Nair, Fl. Cannanore 303. 1988; Mani., Fl. Silent Valley 189. 1988; Vajravelu, Fl. Palghat Dist. 311. 1990; Mohanan & Henry, Fl. Thiruvananthapuram

315. 1994; Sivar. & Mathew, Fl. Nilambur 451. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 309. 1996. *Quamoclit pheonicea* (Roxb.) Choisy, Mem. Soc. Phys. Geneva 6: 433. 1834; Gamble, Fl. Pres. Madras 919. 1923. *Ipomoea coccinea* sensu Clarke in Hook. f., Fl. Brit. India 4: 199. 1883.

Slender twining herbs. Leaves 4-8 x 3.5-7 cm, ovate to suborbicular, entire or 3-5-angled, cordate at base, acute to shortly acuminate at apex, glabrous; petiole to 6 cm long. Cymes few-flowered, axillary; peduncles 5-8 cm long; pedicels 0.7 - 1 cm long. Calyx lobes 5, 2-4 mm long, oblong or elliptic. Corolla deep red, salver-form, tube to 3.5 cm long, limb 1.5-2.5 cm across, subentire. Ovary 2-3 mm long, conical, 4-celled; ovule 1 in each cell. Capsule 5-6 mm across, subglobose. Seeds 4, c. 3 mm long, pyriform, black.

Fl. & Fr.: Sep. - Mar.

Distr.: Native of Tropical America, now run wild throughout the tropics. A garden escape, occasionally found on way-side thickets. *CNS 1576* (Chengannur).

Ipomoea mauritiana Jacq., Collect. 4: 216. 1791; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 331. 1980; Mani. & Sivar., Fl. Calicut 183. 1982; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 92. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 315. 1994; Sivar. & Mathew, Fl. Nilambur 452. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 309. 1996. *Convolvulus paniculatus* L., Sp. Pl. 156. 1753. *Ipomoea paniculata* (L.) 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., 1753. ***Pal-modecca*** Rheede,Hort. Malab. 11: 101-102, t. 49. 1692. ***Kolambipoovu***.

Glabrous twining shrubs with tuberous roots. Leaves palmately 5-7-lobed, 6-12 x 5-9 cm, base cordae, acuminate at apex of lobations; petiole 4-8 cm long. Inflorescence axillary, few to many-flowered cymes; peduncles 6-12 cm. Calyx-lobes subequal, c. 8 mm long, broadly ovate, glabrous. Corolla large, pink, widely campanulate; tube 2.5-3 cm long, limb spreading, 4-5 cm across, glabrous. Stamens included. Ovary 4-locular. Capsule c. 1 x 0.8 cm, ovoid. Seeds 4, ovoid, black, wooly.

Fl. & Fr.: Aug. - Dec.

Distr.: Pantropical. Commonly found on way-side thickets. *CNS 1179* (Alappuzha), *CNS 1432* (Kanichukulangara).

Ipomoea nil (L.) Roth, Cat. 1: 36. 1797; Shinn., Taxon 14: 231. 1965; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 472. 1976; Austin in Dassan. &Fosb., Rev. Handb. Fl. Ceylon 1: 332. 1980; Mani. & Sivar., Fl. Calicut 182. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1028. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 316. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 309. 1996. *Convolvulus nil* L., Sp. Pl., ed. 2, 219. 1762; *Ipomoea hederacea* auct. non (L.) Jacq., 1786: Hook. f., Fl. Brit. India 4: 199. 1883; Gamble, Fl. Pres. Madras 917. 1923.

Hirsute annual twiners. Leaves 3-lobed, rarely entire, 5-12 x 4.5-11 cm, ovate to suborbicular, base cordate, apex acute to acuminate, pubescent; petiole up to 7 cm long. Flowers solitary or in cymes; peduncle up to 5 cm long; pedicel to 1 cm long. Sepals 5, subequal, 1.5-2.2 x 0.2-0.4 cm, linear-lanceolate, acuminate, densely long-hirsute without. Corolla blue, throat white, 3-5 cm long, 4-5 cm across, funnel-form. Filaments to 2.5 cm long. Capsule 8-12 mm long, subglobose, surrounded by the sepals.

Fl. & Fr.: Sept. - Dec.

Distr.: N. American in origin; widely introduced in the tropics. On roadside margins and other waste places. *CNS 2563* (Alappuzha).

Ipomoea obscura (L.) Ker-Gawler, Bot. Reg. 3: t. 239. 1817; Clarke in Hook. f., Fl. Brit. India 4: 207. 1883; Gamble, Fl. Pres. of Madras 916. 1923; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 472. 1976; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 333. 1980; Mani. & Sivar., Fl. Calicut 183. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1030. 1983; Ramach. & Nair, Fl. Cannanore 303. 1988; Sasi. & Sivar., Fl. Pl. Thrissur For. 310. 1996. *Convolvulus obscurus* L., Sp. Pl., ed. 2, 220. 1762; Roxb., Fl. Ind. 2: 52. 1824. ***Thiruthali***.

Slender twining herbs. Leaves 2.5-6 x 2-4 cm, ovate to cordate, base cordate, apex acuminate, pubescent or glabrescent on both surfaces; petiole to 3 cm long. Flowers solitary or in subumbellate cymes; pedicel to 1-1.5 cm long. Sepals 4-8 mm long, ovate-lanceolate, apex acute-apiculate. Corolla yellowish, throat purplish, 1.5-2.5 cm long, c. 2.5 cm across, campanulate. Stamens 5, villous at base. Ovary c. 1.5 mm long, conical; stigma capitate. Capsule 6-8 mm across, subglobose, apically beaked. Seeds c. 5 mm long, ovoid, black, thinly pubescent.

Fl. & Fr.: Throughout the year.

Distr.: Tropical Africa, Madagascar, tropical Asia, Queensland, Fiji, also China, Formosa. Common on hedges and sandy soil. *CNS 1393* (Kayamkulam).

Ipomoea pes-caprae (L.) R. Br. in Tuckey, Narr. Exped. R. Zaire 477. Mar. 1818; Sweet, Hort. Suburb. Lond. 35. 1818; Gamble, Fl. Pres. Madras 917. 1923; Austin in Dassan. & Fosb. Rev. Handb. Fl. Ceylon 1: 334. 1980; Mani. & Sivar., Fl. Calicut 182. 1982; Rani. & Matthew in Matthew, Fl. Tam. Carnatic 3: 1030. 1983; Ramach. & Nair, Fl. Cannanore 303. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 92. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 316. 1994; Sivar. & Mathew, Fl. Nilambur 452. 1996. *Convolvulus pes-caprae* L., Sp. Pl. 159. 1753. *Ipomoea biloba* Forssk., Fl. Aeg.-Arab. 44. 1775; Hook. f., Fl. Brit. India 4: 212. 1883. ***Schovanna-adamboe*** Rheede, Hort. Malab. 11: t. 57. 1692. ***Adambu***.

Stout creepers. Leaves shallowly 2-lobed, 2-5 x 3-6 cm, broadly orbicular, base truncate, lateral nerves c. 6 pairs, coriaceous; petiole 2-4 cm long. Flowers solitary or few in axillary cymes. Calyx lobes 5, unequl, ovate, acuminate, outer surface wrinkled. Corolla pink, c. 5 cm across, funnel-shaped. Stamens 5. Style long, pilose. Capsule subglobose, glabrous. Seeds brownish-tomentose.

Fl. & Fr.: Nov. - Feb.

Distr.: Pantropical. Common along sandy sea-coast. Commonly known as the railway creeper. *CNS 1168* (Alappuzha beach).

The leaves are used to cure boils, swellingss, wound, etc. The seeds are said to be a good remedy for stomach-ache.

Ipomoea pes-tigridis L., Sp. Pl. 162. 1753; Wight, Ic. t. 836. 1844-45; Clarke in Hook. f., Fl. Brit. India 4: 204. 1883; Gamble, Fl. Pres. Madras 918. 1923; Sant., J. Bombay Nat. His. Soc. 47: 348. 1947; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 336. 1980; Mani. & Sivar., Fl. Calicut 184. 1982; Rani. & Matthew in Matthew, Fl. Tam. Carnatic 3: 1031. 1983; Ramach. & Nair, Fl. Cannanore 304. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 92. 1988; Vajravelu, Fl. Palghat Dist. 311. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 316. 1994; Sivar. & Mathew, Fl. Nilambur 453. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 310. 1996. ***Pulli-schovadi*** Rheede, Hort. Malab. 11: 121, t. 59. 1692.

Densely hispid twiners. Leaves broadly orbicular, deeply 5-9-lobed; lobes obovate, apex acute to acuminate; petiole 3-7 cm long. Flowers subsessile in axillary, capitate clusters; peduncle c. 7 cm long. Bracts oblong, acute, villous. Calyx-lobes unequal, 8-12 mm long, ovate-acuminate, pubescent. Corolla white, 3-4 cm long, c. 4 cm across, funnel-form. Ovary c. 1 mm long, conical. Capsule 8-10 mm long, ovoid, brown. Seeds c. 4 mm long, pubescent, black.

F. & Fr.: Sept. - Dec.

Distr.: Tropical Asia and Africa. In waste places. *CNS 1197* (Alappuzha).

Ipomoea quamoclit L., Sp. Pl. 159. 1753; Clarke in Hook. f., Fl. Brit. India 4: 199. 1883; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 338. 1980; Mani. & Sivar., Fl. Calicut 184. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1031. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 93. 1988; Vajravelu, Fl. Palghat Dist. 312. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 317. 1994; Sivar. & Mathew, Fl. Nilambur 454. 1996; Sasi & Sivar., Fl. Pl. Thrissur For. 310. 1996. *Quamoclit pinnata* Bojer, Hort. Maurit. 224. 1837; Gamble, Fl. Pres. Madras 919. 1923. ***Tsjuria-cranti*** Rheede, Hort. Malab. 11: 123, t. 60. 1962. ***Akasha-mulla***.

Slender glabrous twiners. Leaves 3-6 cm long, deeply pinnatisect with 10-15 pairs of linear lobes. Flowers solitary, axillary or in few-flowered axillary cymes; peduncle 3-4 cm long; pedicels 1-1.5 cm long. Sepals 4-5 mm long, elliptic or oblong, mucronate at apex. Corolla red, salver-form, 2-3 cm long, mouth 1.5-2 cm across. Filaments unequal, exserted. Ovary 2-3 mm long, 4-celled; ovules 1 in each cell; stigmas capitate. Capsule 6-7 x 4-5 mm, ovoid. Seeds 4, 3-4 mm long, compressed, conical, brownish-black.

Fl. & Fr.: Aug. - Nov.

Distr.: Native of Tropical America; now run wild and pantropical. *CNS 1842* (Alappuzha).

Ipomoea sepiaria Roxb., Fl. Ind. 2: 90. 1824; Wight, Ic. t. 838. 1844-45; Hook. f., Fl. Brit. India 4: 209. 1883; Gamble, Fl. Pres. Madras 916. 1923; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 338. 1980; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1032. 1983; Ramach. & Nair, Fl. Cannanore 304. 1988; Vajravelu, Fl. Palghat Dist. 312. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 317. 1994. ***Ipomoea maxima*** auct., non (L.) Sweet, 1830. Oost. Steenis, Fl. Males. I, 4: 472. 1953. ***Kolambi.***

Slender twining herbs. Leaves 2-5 x 2-3.5 cm, ovate-cordate, oblong-triangular, base rounded or hastate, apex acute to acuminate; petiole to 2 cm long. Flowers in few-to many-flowered subumbellate cymes; peduncle to 10 cm long; pedicel to 1 cm long. Sepals 4-8 x 3-4 mm, elliptic-oblong, apex obtuse or acute. Corolla pink, throat dark purple, 3-3.5 cm long, salver-form. Filaments to 2 cm long. Ovary c. 1.5 mm long, conical; stigma capitate. Capsule 4-8 mm across, globose. Seeds 3-4 mm long, tomentose.

Fl. & Fr.: Nov. - Apr.

Distr.: Tropical Africa, Tropical Asia, Malesia to Formosa, Queensland and Australia. In waste places. *CNS 2564* (Kayamkulam).

Ipomoea triloba L., Sp. Pl. 161. 1753; Oost. in Steenis, Fl. Mal., Ser. I, 4: 468. 1953; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 341. 1980. *Convolvulus dentatus*

Blanco, Fl. Filip. ed. 1, 89. 1837, non Vahl, 1794. *Ipomoea blancoi* Choisy in DC., Prodr. 9: 389. 1845.

Stem twining or rarely prostrate. Leaves 2.5-6 x 2.7-5 cm, broadly ovate to orbicular, base cordate, margins deeply 3-lobed, less commonly 5-7-lobed. Flowers in axillary sub-umbellate cyme or rarely solitary; peduncle 1-8 cm long, somewhat verruculose. Sepals unequal, 7-8mm long, oblong to elliptic-oblong, apex obtuse to acute, mucronate, sparsely pubescent without, margins ciliate. Corolla pink, throat darker, 1.4-1.8 cm long, funnel-form. Capsule 5-6 mm long, subglobose, brown. Seeds 3-3.5 mm long, subrotund.

Fl. & Fr.: Nov. - Feb .

Distr.: An American species; now a pantropical vine found throughout Malaysia, the Pacific Islands and tropical Asia. Along bushes and thickets. *CNS 1766* (Kumarapuram).

MERREMIA Dennstedt ex Endlicher

Gen. Pl. 1403. 1841 (*nom. cons.*).

Climbing herbs or shrubs, sometimes prostrate; branchlets terete or winged. Leaves entire to palmately lobed. Flowers axillary, solitary or in few-flowered cymes; bracts often linear. Sepals 5, subequal. Corolla campanulate, usually white or yellow; limbs spreading, twisted. Filaments subequal, hairy or glabrous, anthers twisted; pollen smooth. Ovary 2-4-celled; ovules 4; style filiform; stigma 2, globose. Capsule thin walled, 4-valved or irregularly dehiscing. Seeds 4, glabrous or puberulous.

1a. Leaves simple.

2a. Leaf-base truncate or cordate. Seeds hairy.

3a. Leaves cordiform; flowers yellow ..... **M. hederacea**

3b. Leaves elliptic-oblong; flowers white ..... **M. umbellatum**

2b. Leaf-base auriculate or hastate; seeds glabrous ..... **M. tridentata**

1b. Leaves palmately 5-7-lobed to palmately compound.

4a. Leaves palmately compound; flowers white.

5a. Leaflets entire, hirsute; sepals strigose; corolla white without purple throat ..... **M. aegyptica**

5b. Leaflets deeply and prominently toothed, glabrous; sepals glabrous; corolla white with purple throat ..... **M. dissecta**

4b. Leaves palmately lobed; flowers yellow ..... **M. vitifolia**

Merremia aegyptica (L.) Urban, Symb. Antill. 4: 505. 1910; Gamble, Fl. Pres. Madras 928. 1923; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1036. 1983. *Ipomoea aegyptica* L., Sp. Pl. 162. 1753. *Ipomoea pentaphylla* Jacq., Collectanea 2: 297. 1789; Hook. f., Fl. Brit. India 4: 202. 1883. *Batatas pentaphylla* Wight, Ic. t. 834. 1844-45.

Stout climbers. Leaves palmately compound; leaflets 5, 7-12 x 2.5-5 cm, obovate, base acute, apex acuminate, subsessile; petiole to 10 cm long. Flowers in dichasial cyme; pedicel to 4 cm long. Calyx-lobes 5, unequal; outer c. 1.5 x 0.5 cm, oblong, strigose without; inner 1-1.5 x 0.6-0.7 cm, broadly ovate, obtuse. Corolla white, 2-3 cm across, c. 2.5 cm long. Stamens 5; filaments 5-7 mm long, hairy below. Ovary c. 1 mm long, conical; stigma biglobose. Capsule c. 1 cm across.

Fl. & Fr.: Dec. - Mar.

Distr.: Pantropical. In waste places. *CNS 1577* (Aroor).

Merremia dissecta (Jacq.) Hallier f., Bot. Jahrb. Syst. 16: 552. 1893; Gamble, Fl. Pres. Madras 928. 1923; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1:349. 1980; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1036. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 317. 1994. *Convolvulus dissectus* Jacq., Observ. Bot. 2: 4, t. 28. 1767. *Ipomoea sinuata* Ortega, Hort. Matr. Dec. 7: 84. 1798;Clarke in Hook. f., Fl. Brit. India 4: 214. 1883.

Hirsute or glabrous twiners. Leaves dessected, lobes 5-7, lanceolate, 4-7 x 1-3 cm, margin irregularly lobed, apex acuminate; petiole c. 8 cm long. Flowers in axillary cymes. Calyx-lobes unequal. Corolla white with purplish throat, c. 4 cm across, campanulate. Capsule globose. Seeds glabrous.

Fl. & Fr.: Sep. - Jan.

Distr.: Native of Trop. America; now in Sri Lanka, India and Malesia. Common on hedges. *CNS 1843* (Alappuzha).

Merremia hederacea (Brum. f.) Hallier f., Bot. Jahrb. 18: 118. 1893; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 350. 1980; Mani. & Sivar., Fl. Calicut 186. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1037. 1983; Ramach. & Nair, Fl. Cannanore 305. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 93. 1988; Sivar. & Mathew, Fl. Nilambur 457. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 311. 1996. *Evolvulus hederaceus* Burm. f., Fl. Ind. 77, t. 30, f. 2. 1768. *Ipomoea chryseides* Ker-Gawl., Bot. Reg. 4: t. 270. 1818; Clarke in Hook. f., Fl. Brit. India 4: 206. 1883. *Merremia chryseides* (Ker-Gawl.) Hall. f., Bot. Jahrb. 16: 552. 1893; Gamble, Fl. Pres. Madras 929. 1923. *Merremia convolvulacea* Dennst. ex Hall. f., Bot. Jahrb. 16: 552. 1893. ***Kudici-valli*** Rheede, Hort. Malab. 8: 52 (51), t. 27. 1688.

Prostrate or twining herbs; stem often warty. Leaves 2-4 x 1.5-3 cm, ovate, rarely 3-lobed, base cordate, apex acuminate-apiculate, glabrous or sparsely pubescent; petiole 1-2 cm long. Cymes many-flowered, axillary; peduncle 2-4 cm long. Sepals unequal, obovate, notched and mucronulate, outer c. 3 mm long, inner c. 4 mm long. Corolla yellow, campanulate, c. 1.3 cm across. Capsule c. 5 mm long, obconical, slightly 4-lobed. Seeds black, glabrous or puberulent.

Fl. & Fr.: Dec. - Mar.

Distr.: Sri Lanka, India, Malesia, S. China, Australia and Trop. Africa. Along bushes and thickets. *CNS 1438* (Kavalam).

Merremia tridentata (L.) Hall. f., Bot. Jahrb. Syst. 16: 552. 1893; Gamble, Fl. Pres. Madras 928. 1923; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 473. 1976; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 351. 1980; Mani. & Sivar., Fl. Calicut 186. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1038. 1983; Ramach. & Nair, Fl. Cannanore 306. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 93. 1988;

5985



Plate XVII. *A. Cuscuta chinensis* Lam.; B & C. *Merremia tridentata* (L.) Hall. f. B. Flowering twig; C. Flower.

Vajravelu, Fl. Palghat Dist. 313. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 318. 1994; Sivar. & Mathew, Fl. Nilambur 458. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 312. 1996. *Convolvulus tridentatusi* L., Sp. Pl. 157. 1753. *C.hastatus* Desr. in Lam., Encycl. 3: 542. 1792, non Forssk. 1775. *Ipomoea tridentata* (L.) Roth in Roem., Arch. Bot. (Leipzig) 1, 2: 38. 1798; Clarke in Hook. f., Fl. Brit. India 4: 203. 1883. *Merremia hastata* (Desr.) Hall. f., Bot. Jahrb. Syst. 16: 522. 1893; Gamble, Fl. Pres. Madras 929. 1923. ***Tala-neli*** Rheede, Hort. Malab. 11: 113, t. 55. 1692 (Plate XVII: B & C).

Trailing herbs with long slender branches and thick root-stock. Leaves 2-4 x 0.5-1.2 cm, linear-lanceolate, base auricled and toothed, apex acute, mucronate, sessile to subsessile. Flowers axillary few-flowered cymes, sometimes solitary; peduncle 1-2 cm long. Sepals 5-6 x 2-3 mm, lanceolate, acuminate. Corolla campanulate, cream coloured or yellow with a purplish eye at centre; tube 1-1.5 cm long; limb spreading 1-1.5 cm across, subentire. Stamens 5. Ovary 2-celled; stigma 2-lobed. Capsules 5-8 mm across, subglobose. Seeds 4, glabrous, brown.

Fl. & Fr.: Aug. - Jan.

Distr.: Throughout Old World Tropics. Common on hedges and sandy soil. *CNS 1085* (Aroor), *CNS 1201* (Chandiroor), *CNS 1311* (Chengannur).

Merremia umbellata (L.) Hall. f., Bot. Jahrb. Syst. 16: 552. 1893; Gamble, Fl. Prcs. Madras 928. 1923; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 473. 1976; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 354. 1980; Mani. & Sivar., Fl. Calicut 186. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1040. 1983; Ramach. & Nair, Fl. Cannanore 306. 1988; Mani., Fl. Silent Valley 190. 1988; Vajravelu, Fl. Palghat Dist. 313. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 318. 1994; Sivar. & Mathew, Fl. Nilambur 460. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 312. 1996. *Convolvulus umbellatus* L., Sp. Pl. 155. 1753. *Ipomoea cymosa* (Desr.) Roem. & Schult., Syst. Nat. 4: 241. 1819; Clarke in Hook. f., Fl. Brit. India 4: 211. 1883.

Twiners; young shoots puberulous. Leaves 4-7 x 1.5-3.5 cm, ovate-lanceolate, base cordate or rounded, apex acuminate, pubescent below; petiole 1.5-2.5 cm long.

Inflorescence axillary umbelliform cymes; peduncle 1-3 cm long; pedicels 7-10 mm long. Sepals 6-8 mm long, ovate-lanceolate, apiculate, scarious on margins. Corolla white, campanulate; tube 2-3 cm long, pubescent without; limb 2.5-3 cm across. Stamens 5, unequal; anthers twisted. Ovary 2-celled, ovules 2 in each cell; stigma capitate. Capsule 8-10 x 5-6 mm, ovoid. Seeds long hairy, black.

Fl. & Fr.: Dec. - Marc.

Distr.: Pantropical. Commonly found on wayside thickets. *CNS 1440* (Kavalam).

Merremia vitifolia (Burm. f.) Hall. f., Bot. Jahrb. Syst. 16: 552. 1893; Gamble, Fl. Pres. Madras 928. 1923; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 474. 1976; Austin in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 355. 1980; Mani. & Sivar., Fl. Calicut 185. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1040. 1983; Ramach. & Nair, Fl. Cannanore 307. 1988; Mani., Fl. Silent Valley 190. 1988; Vajravelu, Fl. Palghat Dist. 314. 1990; Sivar. & Mathew, Fl. Nilambur 460.1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 312. 1996. *Convolvulus vitifolius* Burm. f., Fl. Ind. 45, t. 18, f. 1. 1768. *Ipomoea vitifolia* (Burm. f.) Bl., Bijdr. 709. 1825; Clarke in Hook. f., Fl. Brit. India 4: 213. 1883. ***Manja-kolambi***.

Twining shrubs; stem brownish-black, young shoots patently hairy. Leaves lobed, 6-12 cm long, equally wide, base cordate, margin dentate-serrate, acute to acuminate at apex of lobation, sparsely fulvous hairy on both sides, basally 7-ribbed; petiole 3-8 cm long. Inflorescence axillary, 1-3-flowered cymes; peduncles 4-5 cm long. Sepals 10-15 x 6-8 mm, ovate-lanceolate, mucronate, outer hirsute, inner glabrescent. Corolla yellow, campanulate, 3.5-5 cm long, 4-6 cm across. Ovary 2-celled, ovules 2 in each cell. Capsule 1-1.2 cm across, globose, fruiting sepals much larger. Seeds 4, 6-8 mm long ovoid.

Fl. & Fr.: Dec. - Apr.

Distr.: Indo - Malaysia. In waste places and along roadsides. *CNS 1498* (Chengannur).

83. SOLANACEAE Juss.

Gen. Pl. 124. 1789.

1a. Corolla trumpet-shaped; fruit echinate capsule ..... **Datura**

1b. Corolla rotate or campanulate; fruit a smooth berry.

2a. Flowers in paniculate cymes; corolla campanulate ..... **Cestrum**

2b. Flowers solitary or in simple cymes; corolla rotate .

3a. Calyx in fruit enlarged, inflated and completely enclosing the berry ... . **Physalis**

3b. Calyx in fruit not inflated and enclosing the fruit.

4a. Leaves pinnatisect; berries depressed-globose ..... **Lycopersicon**

4b. Leaves simple; berries globose or elongate.

5a. Anthers longer than filaments, opening by apical pores; berries globose ..... **Solanum**

5b. Anthers as long as or shorter than filaments, opening by longitudinal slits; berries elongate ..... **Capsicum**

CAPSICUM Linnaeus

Sp. Pl. 188. 1753.

Capsicum frutescens L., Sp. Pl. 189. 1753; Gamble, Fl. Pres. Madras 941. 1923; Heiser. & Picker., Taxon 18: 280. 1969; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 456. 1976; Deb, J. Econ. Tax. Bot. 1: 35. 1980; Mani. & Sivar., Fl. Calicut 191. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1047. 1983; Hepper in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 395. 1987; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 246. 1988; Sivar. & Mathew, Fl. Nilambur 466. 1996. C. *minimum* Clarke in Hook. f., Fl. Brit. India 4: 239. 1883. C. *annum* var. *frutescens* (L.) O. Kuntze, Rev. Gen. Pl. 449. 1891. ***Vallia-Capo-molago*** Rheede, Hort. Malab. 9: t. 35. 1689. ***Molagu***.

Shrubby perennials. Leaves c. 10 x 5.2 cm, ovate-lanceolate, base obliquely rounded to acute, apex gradually acuminate; petiole to 2.6 cm long. Flowers usually 2-3

per node. Calyx cupular, lobes 5, triangular, acute. Corolla white, lobes 5, triangular-ovate, puberulous without. Stamens 5, exserted; filaments to 1.5 mm long; anthers oblong. Stigma capitate. Fruit green or white, gradually tapering towards apex, erect. Seeds many, compressed, circular.

Fl. & Fr.: Throughout the year.

Distr.: Tropical America. Introduced and cultivated in India. In waste lands. *CNS 1720* (Nooranad).

CESTRUM Linnaeus

Sp.Pl. 191. 1753.

Cestrum nocturnum L., Sp. Pl. 191. 1753; Bor & Raiz., Beautif. Ind. Climbers & Shrubs 119. 1954; Matthew, Rec. Bot. Surv. India 20: 166. 1969; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 458. 1976; Deb, J. Econ. Tax. Bot. 1:35. 1980; Mani. & Sivar., Fl. Calicut 189. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1050. 1983; Hepper in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 408. 1987.

Shrubs 1-3 m tall with numerous arching branches. Leaves 7-15 x 2.5-5 cm, ovate-lanceolate, base rounded or sub-attenuate, apex acute or acuminate; petiole 1-1.5 cm long. Flowers greenish-yellow in lax, terminal paniculate cymes; peduncle glabresent. Calyx tubular, to 3 mm long. Corolla c. 2. cm long; lobes erect, hairy within, plicate. Stamens 5, inserted above the middle of corolla, included; filaments with a linear short appendage at base. Berry 6-8 mm long, ovoid, white.

Fl. & Fr.: Throughout the year.

Distr.: Native of West Indies, cultivated in Tropics. The flowers open at night, giving out a pleasant scent, and close during the day. *CNS 1866* (Karthigappally).

DATURA Linnaeus

Sp. Pl. 179. 1753.

Datura metel L., Sp. Pl. 179. 1753; Safford, J. Wash. Acad. Sci. 11: 178. 1921; Gamble, Fl. Pres. Madras 941. 1923; Sant., J. Bombay Nat. Hist. Soc. 47: 657. 1948 & Rec. Bot. Surv. India (ed. 3) 16: 174. 1967; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 458. 1976; Deb, J. Econ. Tax. Bot. 1: 37. 1980; Mani. & Sivar., Fl. Calicut 188. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1052. 1983; Hepper in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 404. 1987; Ramach. & Nair, Fl. Cannanore 309. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 246. 1988; Vajravelu, Fl. Palghat Dist. 315. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 319. 1994; Sivar. & Mathew, Fl. Nilambur 461. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 315. 1996. *D. alba* Nees, Trans. Linn. Soc. London 17: 73. 1834; Wight, Ic. t. 852. 1844. D. *fastuosa* Wight, Ic. t. 1396. 1848, non L., 1759; Clarke in Hook. f., Fl. Brit. India 4: 242. 1883; Gamble, Fl. Pres. Madras 941. 1923. ***Nila-hummatu*** Rheede, Hort. Malab. 2: t. 29. 1679. ***Ummam***.

Subshrubs; branches somewhat zigzag. Leaves entire or angled with acute lobes, c. 12 x 8 cm, ovate, base oblique, apex acute or acuminate; petiole to 6 cm long. Flowers solitary in axil, erect; pedicels 1-1.5 cm long. Calyx 6-8 cm long, tubular, 5-lobed, minutely pubescent. Corolla creamy-white, c. 15 cm long, funnel-shaped; teeth 5, cuspidate. Stamens 5, attached towards the base of corolla tube, included, subequal; filaments hairy at base. Capsule c. 3 cm across, spherical, covered with short spines, dehiscence irregular. Seeds compressed, c. 5 mm long, smooth, brown.

Fl. & Fr.: Jun. - Aug.

Distr.: Paleotropics. Common on waste lands and roadsides. *CNS 1261* (Thottappally).

The leaves and roots are used in Ayurvedic preparations.

LYCOPERSICON P. Miller

Gard. Dict., Abr. ed. 4. 1754.

Lycopersicon esculentum Mill., Gard. Dict. (ed.8) n. 2, 1768; Clarke in Hook. f., Fl. Brit. India 4: 237. 1883; Gamble, Fl. Pres. Madras 941. 1923; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1053. 1983; Mani., Fl. Silent Valley 192. 1988. Ramach. & Nair, Fl. Cannanore 313. 1988. *Solanum lycopersicum* L., Sp. Pl. 185. 1753. *Lycopersicon lycopersicum* (L.) Karsten, Deutsch. Fl. 966. 1885; Wight, Contr. U.S. Natl. Herb. 9: 312. 1905; Raiz., Ind. For. 94: 445. 1968; Mani. & Sivar., Fl. Calicut 191. 1982; Deb., J. Econ. Tax. Bot. 1: 41. 1980; Sivar. & Mathew, Fl. Nilambur 466. 1996. ***Thakkali***.

Erect, pubescent herbs. Leaves pinnatisect, chartaceous, lobes obliquely triangular-ovate, acute, shortly petiolulate; petiole to 2 cm long. Flowers axillary, solitary, yellow. Calyx lobes 5, triangular, acute. Corolla lobes ciliate, acute. Stamens 5, exserted; filaments to 2 mm long. Ovary 2-locular; stigma obtuse. Berry irregularly 4-lobed, depressed-globose, large. Seeds discoid.

Fl. & Fr.: Throughout the year.

Distr.: Native of South America, Mexico. Commonly cultivated and also found wild. CNS 2027 (Mancombu).

The fruit is used as a vegetable.

PHYSALIS Linnaeus

Sp. Pl. 182. 1753.

Physalis angulata L., Sp. Pl. 183. 1753; Schult. in Urban, Symbol. Antill. 4: 141. 1909; Waterfall, Rhodora 69: 216. 1967; Hepper in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 394. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 248. 1988; Sivar. & Mathew, Fl. Nilambur 462. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 316. 1996. P. *minima* L., Sp. Pl. 183. 1753; Clarke in Hook. f., Fl. Brit. India 4: 238. 1883; Gamble, Fl. Pres. Madras 939. 1923; Sant., Rec. Bot. Surv. India (ed.3) 16: 174. 1967; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 460. 1976; Deb, J. Econ. Tax. Bot. 1: 43. 1980; Mani. & Sivar.,

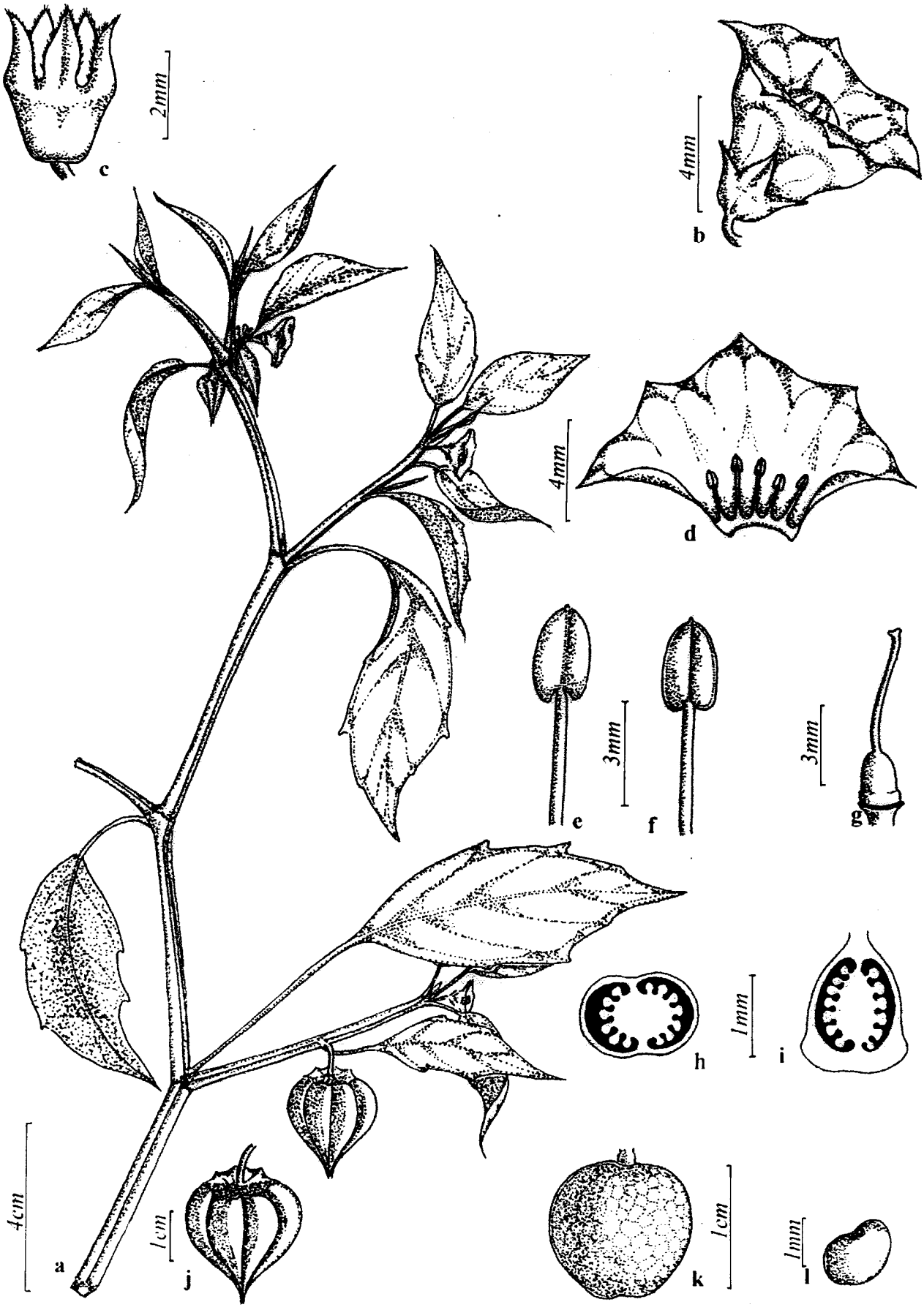


Fig. 45. *Physalis angulata* L.: a.Twig with flower and fruit; b. Flower; c. Calyx; d. Corolla, split-open; e. Stamen-dorsal view; f. Stamen-ventral view; g. Pistil; h.Ovary-T.S; i. Ovary-L.S; j. Fruit with calyx; k. Mature fruit; l. Seed.

Fl. Calicut 189. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1056. 1983; Ramach. & Nair, Fl. Cannanore 309. 1988; Mani., Fl. Silent Valley 192. 1988; Vajravelu, Fl. Palghat Dist. 316. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 320. 1994. ***Inota-inodien*** Rheede, Hort. Malab. 10: 139, t. 70. 1960. ***Pee-jnota-jnodien*** Rheede, Hort. Malab. 10: 141, t. 71. 1690. ***Jnota-jnodien*** (Fig. 45).

Annual herbs; branches angular. Leaves 3-7 x 1.5-3 cm, ovate or elliptic-lanceolate, base cuneate, unequal sided, margins dentate or sinuate, sometimes entire, apex acute, glabrous or sparsely pubescent; petiole to 4 cm long. Flowers axillary, solitary; pedicels c. 8 mm long. Calyx campanulate, 5-toothed, c. 2.5 cm across in fruit. Corolla pale-yellow with a purple base, campanulate, c. 8 mm across; limb plicate, shortly lobed. Stamens 5, unequal; anthers oblong. Style linear; stigma obscurely 2-lobed. Berry c. 7 mm across, globose, enclosed by the inflated calyx. Seeds many, discoid, minutely rugose.

Fl. & Fr.: Jul. - Dec.

Distr.: Tropical Asia, Africa and Australia. Common on plains as a weed on moist shady places. *CNS 1164* (Alappuzha town), *CNS 2107* (Pallana).

Widely used in Ayurvedic medicine.

SOLANUM Linnaeus

Sp. Pl. 184. 1753.

Armed or unarmed herbs or shrubs. Leaves alternate to sub-opposite, entire or variously lobed. Flowers in extra-axillary cymes, corymbs or terminal panicles. Calyx campanulate or rotate, enlarged or not in fruit; lobes 5. Corolla usually rotate; limb plicate, 5-lobed or subentire. Stamens 5, attached to throat of corolla tube; filaments short; anthers conniving around the stigma in a cone, dehiscence by apical pores or slits. Ovary 2-celled; ovules many; style single; stigma capitate. Fruit a pulpy berry, globose or elongated. Seeds many, compressed, sometimes reniform, smooth or pitted.

1a. Plants not prickly.

2a. Annual herbs; corolla white; berry 4-5 mm across, black, globose ..... **S. americanum**

2b. Shrubs; corolla purple; berry above 2 cm across, yellow, elongate ..... **S. melongena**

1b. Plants prickly.

3a. Flowers bluish-violet ..... **S. anguivi**

3b. Flowers white.

4a. Prickles straight, numerous; calyx prickly; berry 2-2.5 cm across, crimson-red ..... **S. capsicoides**

4b. Prickles curved, few; calyx not prickly; berry 1-1.5 cm across, yellow to orange coloured ..... **S. torvum**

Solanum americanum Mill., Gard. Dict. ed. 8, no. 5. 1768; Edmonds, Kew Bull. 27: 103. 1792; Symon, J. Adelaide Bot. Gard. 4:46. 1981; Hepper in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 368. 1987; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 249. 1988; Sivar. & Mathew, Fl. Nilambur 463. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 316. 1996. *Solanum nigrum* sensu ampl.: Clarke in Hook. f., Fl. Brit. India 4: 229. 1883, non. L., 1753; Gamble, Fl. Pres. Madras 936. 1923; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 461. 1976; Mani. & Sivar., Fl. Calicut 190. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1062. 1983; Mani., Fl. Silent Valley 194. 1988; Ramach. & Nair, Fl. Cannanore 312. 1988; Vajravelu, Fl. Palghat Dist. 319. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 322. 1994. *Solanum rubrum* Mill., Gard. Dict. ed. 8, no.4. 1768, non L., 1767; Wight, Ic. t. 344. 1843. ***Nelen-tsjunda*** Rheede, Hort. Malab. 10: 145, t. 73.1690 ***Mani-thakkali***.

Erect annual herbs; stem glabrous or sparsely hispid. Leaves 2-5 x 1-3 cm, ovate or elliptic, base rounded, shortly decurrent on the petiole, subentire, acute to acuminate at apex, membraneous; petiole to 5 cm long. Inflorescence axillary to extra-axillary umbellate cymes; peduncle 1-2 cm long; pedicels 4-6 mm long. Calyx cupular, 5-lobed,

minute. Corolla white, 3-4 mm across, subentire. Berry, 4-5 mm across, globose, purplish-black. Seeds c. 1 mm long, discoid, minutely pitted.

Fl. & Fr.: Apr. - Jul.

Distr.: Pantropical. Common in roadsides and other waste places. *CNS 1161* (Alappuzha town).

Solanum anguivi Lam., Tabl. Encycl. 2: 23. 1794; Hepper, Bot. J. Linn. Soc. 76: 290. 1978; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1058. 1983; Ramach. & Nair, Fl. Cannanore 310. 1988; Vajravelu, Fl. Palghat Dist. 318. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 321. 1994; Sivar. & Mathew, Fl. Nilambur 464. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 317. 1996. *Solanum indicum* auct. non L., 1753: Roxb., Fl. Ind. 1: 570. 1832; Wight, Ic. t. 346. 1840; Clarke in Hook. f., Fl. Brit. India 4: 234. 1883; Gamble, Fl. Pres. Madras 938. 1923; Sant., J. Bombay Nat. Hist. Soc. 47: 653. 1948.

Armed undershrubs, up to 1.5 m tall; branches minutely stellate-hairy on young parts, glabrate when mature. Leaves 5-12 x 4-7 cm, ovate or ovate-oblong, sinuately to deeply lobed, base rounded or unequal, apex subacute, sparsely stellate-hairy above, stellate-woolly beneath, prickly on the nerves; petiole to 2.5 cm long. Flowers bluish-violet in extra-axillary racemes; peduncle c. 4 cm long; pedicel to 8 mm long. Calyx cupular; lobes 5, c. 5 mm long, triangular, prickly. Corolla c. 2 cm across, campanulate. Stamens 5; anthers c. 5 mm long. Ovary c. 2 x 2 mm, globose; stigma acute. Berry 0.8-1.3 cm across, globose; orange yellow when ripe.

Fl. & Fr.: Aug. - Feb.

Distr.: India, Malaya, Indo-China, Philippines and Taiwan. A common weed along road sides and other waste places. *CNS 1071* (Ambalapuzha).

Solanum capsicoides All., Melanges Philos. Mat. Soc. Roy. Turin 12: 64. 1773; Symon, J. Adelaide Bot. Gard. 4: 101. 1981; Hepper in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 374. 1987. *Solanum aculeatissimum* sensu Clarke in Hook. f., Fl. Brit. India 4: 237. 1883, non Jacq., 1781: Gamble, Fl. Pres. Madras 939. 1923.

Densely prickly subshrubs, 30-40 cm tall. Leaves sinuately lobed, 6-9 x 4-7 cm, base obliquely cordate, lobes acuminate, sparsely villous hairy, chartaceous, scattered prickles especially on the nerves beneath. Inflorescence extra-axillary, few-flowered, flowers pendent. Calyx prickly, teeth broadly triangular. Corolla white, c. 6 mm long. Berry 2-2.5 cm across, globose, at first pale green with dark green markings, crimson-red at maturity. Seeds c. 5 mm across, flat, punctate, winged.

Fl. & Fr.: Sep. - Jan.

Distr.: Indigenous to Malaya, now naturalised in other parts of tropics. Rare. In waste places. *CNS 1901* (Thottappally).

Solanum melongena L., Sp. Pl. 186. 1753; Clarke in Hook. f., Fl. Brit. India 4: 234. 1883; Gamble, Fl. Pres. Madras 937. 1923; Mani. & Sivar., Fl. Calicut 190. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1061. 1983; Hepper in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 373. 1987; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 251. 1988; Sivar., & Mathew, Fl. Nilambur 466. 1996. ***Schunda*** Rheede, Hort. Malab. 2: 69-70, t. 37. 1679. ***Vazhuthana***.

Armed shrubs; prickles very small. Leaves 4-16 x 3-9 cm, ovate, sinuately toothed, unequal-sided at base. Flowers blue, solitary or in few-flowered racemes. Calyx-lobes lanceolate, enlarging in fruit, limb 5-lobed. Corolla purple, 1.5-3 cm across, campanulate, often plicate, lobes 5, sparsely pubescent. Stamens 5; anthers oblong. Ovules many; style stellately villous, linear; stigma capitate. Berry smooth, variable in size, purple or greenish. Seeds minutely pitted.

Fl. & Fr.: Aug. - Nov.

Distr.: Cosmopolitan. Commonly cultivated for its fruits. *CNS 1740* (Chunakara).

Solanum torvum Sw., Nov. Gen. Sp. 47. 1788; Wight, Ic. t. 345. 1840; Clarke in Hook. f., Fl. Brit. India 4: 234. 1885; Gamble, Fl. Pres. Madras 937. 1923; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 462. 1976; Mani. & Sivar., Fl. Calicut 189. 1982; Matthew &

Rani in Matthew, Fl. Tam. Carnatic 3: 1064. 1983; Hepper in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 376. 1987; Ramach. & Nair, Fl. Cannanore 312. 1988; Vajravelu, Fl. Palghat Dist. 320. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 323. 1994; Sivar. & Mathew, Fl. Nilambur 466. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 317. 1996. *Solanum ficifolium* sensu Abeywick., Ceylon J. Sci. Biol. Sci. 2: 220. 1959. ***Chunda***.

Shrubs to 2 m tall. Stem densely stellate-hairy when young; prickles few, scattered. Leaves 7-14 x 5-10 cm, ovate, usually coarsely 2-3-sinulate, base obliquely subcordate, apex acute, stellately pubescent on both sides, dense on lower sides, chartaceous, scattered with a few prickles on midrib and on petiole; lateral nerves 4 or 5 pairs; petioles 1.5 - 3.5 cm long. Inflorescence supra-axillary, many-flowered corymbose cymes; peduncle to 5 cm long. Calyx tube 2-2.5 mm long, campanulate, lobes oblong. Corolla white, c. 2.5 cm across; lobes 5-6 mm long, ovate, pubescent outside. Berry 1-1.5 cm across, globose, pale green turning dull orange. Seeds discoid, smooth.

Fl. & Fr.: Almost throughout the year.

Distr.: Tropical America, Indo - Malaysia. In Waste lands, fallow fields and river banks. *CNS 1286* (Champakulam).

84. SCROPHULARIACEAE Juss.

Gen. Pl. 117. 1789.

1a. Flowers aggregated in dense terminal cylindric heads ..... **Adenosma**

1b. Flowers not aggregated in terminal heads.

2a. Stamens 2.

3a. Staminodes 2; anthers 2-celled.

4a. Stem terete or subterete; anthers parallel; capsule loculicidal ..... **Dopatrium**

4b. Stem quadrangular; anthers disjunct; capsule septicidal ..... **Lindernia**

3b. Staminodes absent; anthers 1-celled.

5a. Flowers subsessile; leaves opposite; calyx tubular, lobes 5 .... **Microcarpaea**

5b. Flowers pedicellate; leaves fasciculate; calyx campanulate, lobes 3 ..... **Glossostigma**

2b. Stamens 4.

6a. Corolla-tube pouched; stamens attached at the base of the mouth ..... **Angelonia**

6b. Corolla-tube cylindric; stamens attached on the base of the throat.

7a. Calyx spathaceous, asymmetrical, split on one side; roots orange-yellow ..... **Centranthera**

7b. Calyx not spathaceous, symmetrical, not split on one side; root not orange-yellow.

8a. Calyx lobes 4; corolla rotate, lobes 4 ..... **Scoparia**

8b. Calyx lobes 5; corolla tubular, lobes 5, or corolla 2-lipped.

9a. Stem terete.

10a. Leaves serrate or pinnatifid to laciniate; calyx-lobes connate, not foliaceous; anther-cells stipitate ..... **Limnophila**

10b. Leaves entire; calyx-lobes free, foliaceous; anther-cells not stipitate ..... **Bacopa**

9b. Stem quadrangular or angular (terete in **Stemodia**).

11a. Corolla 3-4 cm long; leaves pinnatisect with linear, terete segments ..... **Rhamphicarpa**

11b. Corolla upto 2.5 cm long; leaves not pinnatisect.

12a. Calyx-tube 15-ribbed; anthers with 1 fertile cell; lower lip of corolla enveloping the upper lip in bud ..... **Striga**

12b. Calyx-tube not ribbed; anthers with 2 fertile cells; upper lip of corolla enveloping the lower lip in bud.

13a. Lower leaves opposite, upper ones in verticils of 3; stem terete ..... **Stemodia**

13b. All leaves opposite; stem quadrangular.

14a. Calyx-lobes free, foliaceous ..... **Mecardonia**

14b. Calyx-lobes connate, not foliaceous.

15a. Calyx strongly keeled; corolla 2-2.5 cm long, deep purple ..... **Torenia**

15b. Calyx not keeled, smooth; corolla up to 1 cm long, white, cream or pink ..... **Lindernia**

ADENOSMA R. Brown

Prodr. 442.1810.

Adenosma indiana (Lour.) Merr., Trans. Amer. Philos. Soc. n.s. 24: 351. 1935 ("*indianum*"); Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 448. 1981; Nicols., Surcsh & Mani., An Interpr. Hort. Malab. 238. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 324. 1994. *Manulea indiana* Lour., Fl. Cochinch. 2: 386. 1790. *Stemodia capitata* Benth., Bot.Reg. 17: no.4. sub t. 1470. 1832. *Adenosma capitatum* (Benth.) Hance, J. Linn. Soc. Bot. 13: 114. 1873; Hook. f., Fl. Brit. India 4: 264. 1884; Gamble, Fl. Pres. Madras 949. 1923. ***Carim-tumba*** Rheede, Hort. Malab. 10: 185, t. 93. 1690.

Erect herbs; stem up to 45 cm tall, densely villous. Leaves opposite or whorled, 2-3.5 x 1-2 cm, ovate to elliptic-ovate, base rounded, margin serrate, apex acute, hairy on both sides, lateral nerves 6-8 pairs, sessile. Flowers in dense, terminal bracteate cylindric heads, 1.5-3 cm long; bracts linear. Calyx-lobes 5, 3-4 mm long, lanceolate, ciliate, upper largest. Corolla bluish or violet; tube c. 5 mm long, cylindric, upper lip erect, 2-fid, lower spreading, 3-lobed. Stamens 4, didynamous; anther cells stipitate. Ovules many; style filiform below, dilated above; stigma 2-fid. Capsules 3-4 x 2-2.5 mm, ellipsoid. Seeds c. 0.5 mm long, ovoid-oblong, reticulate.

Fl. & Fr.: Aug.-Sept.

Distr.: Sri Lanka, Peninsular and Eastern India and Malaya. On exposed areas, near paddy fields, on way sides, etc. *CNS 1241* (Pattanakdu).

ANGELONIA Humboldt *et* Bonpland

Pl. Aequin. 2: 92, t. 108. 1812 ("1809").

Angelonia salicariaefolia Humb. & Bonpl., Pl. Aequin. 2: 92, t. 108. 1812; Bailey, Man. Cult. Pl. 900. 1924; Mani. & Sivar., Fl. Calicut 196. 1982; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3:392. 1981. *Angelonia biflora* Benth. in DC., Prodr. 10: 254. 1846; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1070.1983.

Erect viscid herbs. Leaves sub-opposite below, alternate above, 2.5-9 x 0.5-1 cm, lanceolate or oblong-lanceolate, base gradually attenuate, margin serrulate, apex acute, penninerved, minutely glandular-hirsute on both surface, chartaceous, sessile. Flowers axillary, 1-3-per node; pedicels slender, c. 1 cm long, often curved. Calyx-lobes 5, 4-5 x 1.5-2 mm, ovate-lanceolate, glandular-pubescent without. Corolla bluish-violet, up to 2 cm across; tube obliquely pouched, with an apical, small, hooded lobe, glandular-hairy within; lobes 5, obscurely 2-lipped. Stamens 4, exserted. Ovary globose, glandular hairy, 2-locular. Capsule 4-7 mm across, globose. Seeds c. 1 mm long, oblong-cuneiform, 4-5-angular, reticulate.

Fl. & Fr.: Mar.-Aug.

Distr.: S. America; now naturalized in tropics. Boaders of ditches, ponds and paddy fields. *CNS 2207* (Kerikkad).

BACOPA Aublet

Hist. Pl. Guiane 128, t. 48. 1775 (*nom. cons.*).

Bacopa monnieri (L.) Pennell, Proc. Acad. Nat. Sci. Philadelphia 98: 94. 1946; Sald. in Sald. & Nicols., Fl. Hassan Dist. 517. 1976; Philcox, Kew Bull. 33: 679. 1976; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 421. 1981; Mani. & Sivar., Fl. Calicut 193.

1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 1071. 1983; Nicols., Suresh. & Mani., An Interpr. Hort. Malab. 239. 1988; Vajravelu, Fl. Palghat Dist. 322. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 325. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 319. 1996. *Lysimachia monnieri* L., Cent. Pl. 2: 9. 1756. *Moniera cuneifolia* Michaux, Fl. Bor. Amer. 2: 22. 1803; Gamble, Fl. Pres. Madras 953. 1923. *Herpestis monnieria* (L.) Kunth, Nov. Gen. Sp. 2: 366. 1818, *nom. illeg.*; Hook. f., Fl. Brit. India 4: 272. 1884. ***Brami*** Rheede, Hort. Malab. 10: 27, t. 14. 1690. ***Brami.***

Aquatic or amphibious, prostrate, semi-succulent herbs; stem creeping, branches ascending. Leaves 1-1.5 x 0.4-0.6 cm, ovate-oblong or spathulate, base narrowed rounded at apex, punctate above, thick, sessile. Flowers solitary, axillary; pedicels to 2.5 cm long; bracteoles 2, up to 3 mm long. Calyx-lobes 5, unequal; outer calyx lobe c. 5 x 4 mm, ovate, others slightly smaller. Corolla bluish-white, c. 8 mm long, broadly campanulate, faintly 2-lipped; lobes 5, subequal. Stamens 4, didynamous. Ovary oblong-globose; style slightly deflexed. Capsule 3-4 x 1.5-2 mm, ovoid or oblong, enclosed in calyx. Seeds c. 0.5 mm long, oblong, reticulate.

Fl. & Fr.: May-Aug.

Distr.: Paleotropical. A weed in moist or wet fields and sandy river banks. *CNS 1258* (Thottappally).

CENTRANTHERA R. Brown

Prodr. 438. 1810.

Centranthera indica (L.) Gamble, Fl. Pres. Madras 971. 1924; Sald. in Sald. & Nicols., Fl. Hassan Dist. 518. 1976; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 396. 1981; Mani. & Sivar., Fl. Calicut 206. 1982; Mani., Fl. Silent Valley 195. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 240. 1988; Sivar. & Mathew, Fl. Nilambur 467. 1996; Sasi. & 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. 1884; Gamble, Fl. Pres. Madras 971. 1923. *C. procumbens* Benth. in DC., Prodr. 10: 525. 1846;

Hook. f., Fl. Brit. India 4: 301. 1884. ***Corosinam*** Rheede, Hort. Malab. 9: 133, t. 68.1689 (Plate XVIII: D; Fig. 46).

Diffuse, densely hispid herbs; roots orange-yellow. Leaves basally opposite, upper ones alternate, 1-2 x 0.5-0.8 cm, elliptic, oblong or linear-oblong, base rounded, apex obtuse or acute, hairy on both sides, sessile. Flowers subsessile, axillary, solitary; bracteoles 2. Calyx 5-10 mm long, spathaceous, oblique, split on one side, faintly 3-5-lobed at apex. Corolla rose coloured or white, tube long, incurved, dilated above, lobes 5, subequal, spreading. Stamens 4, didynamous, included; filaments villous; anthers transverse, base mucronate. Ovary globose; style simple. Capsule 4-7 x 3 -5 mm, ovoid, loculicidal, covered by persistent calyx lobes, dark brown. Seeds c. 1 mm long, oblong-cuneate, striate.

Fl. & Fr.: Aug.-Nov.

Distr.: South India through Ceylon and Burma to Malaysia, China and Australia. In wet sandy fields. *CNS 1603* (Kalarcodu), *CNS 2579* (Punnapra).

DOPATRIUM F. Hamilton ex Bentham
in Lindley, Edward's Bot. Reg. ad t. 1770 (4). 1935.

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; Sald. in Sald. & Nicols., Fl. Hassan Dist. 518. 1976; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 424. 1981; Mani. & Sivar., Fl. Calicut 203. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1074. 1983; Vajravelu, Fl. Palghat Dist. 322. 1990. *Gratiola juncea* Roxb., Pl. Corom. t. 129. 1800 & Fl. Ind. 1: 142. 1832.

Aquatic or amphibious, semisucculent erect herbs; roots spongy white. Basal leaves decussate, 1.5-2 x 0.5-0.8 cm, oblong, base and apex acute, fleshy, basally 3-nerved, sessile, decurrent on stem; upper ones reduced. Flowers axillary, in decussate pairs, lower ones subsessile, upper ones pedicellate; bracts linear; pedicels 6-12 mm long, filiform. Calyx-lobes 5, 1-1.5 mm long, obtuse. Corolla bluish-pink, c. 5 mm across, tube

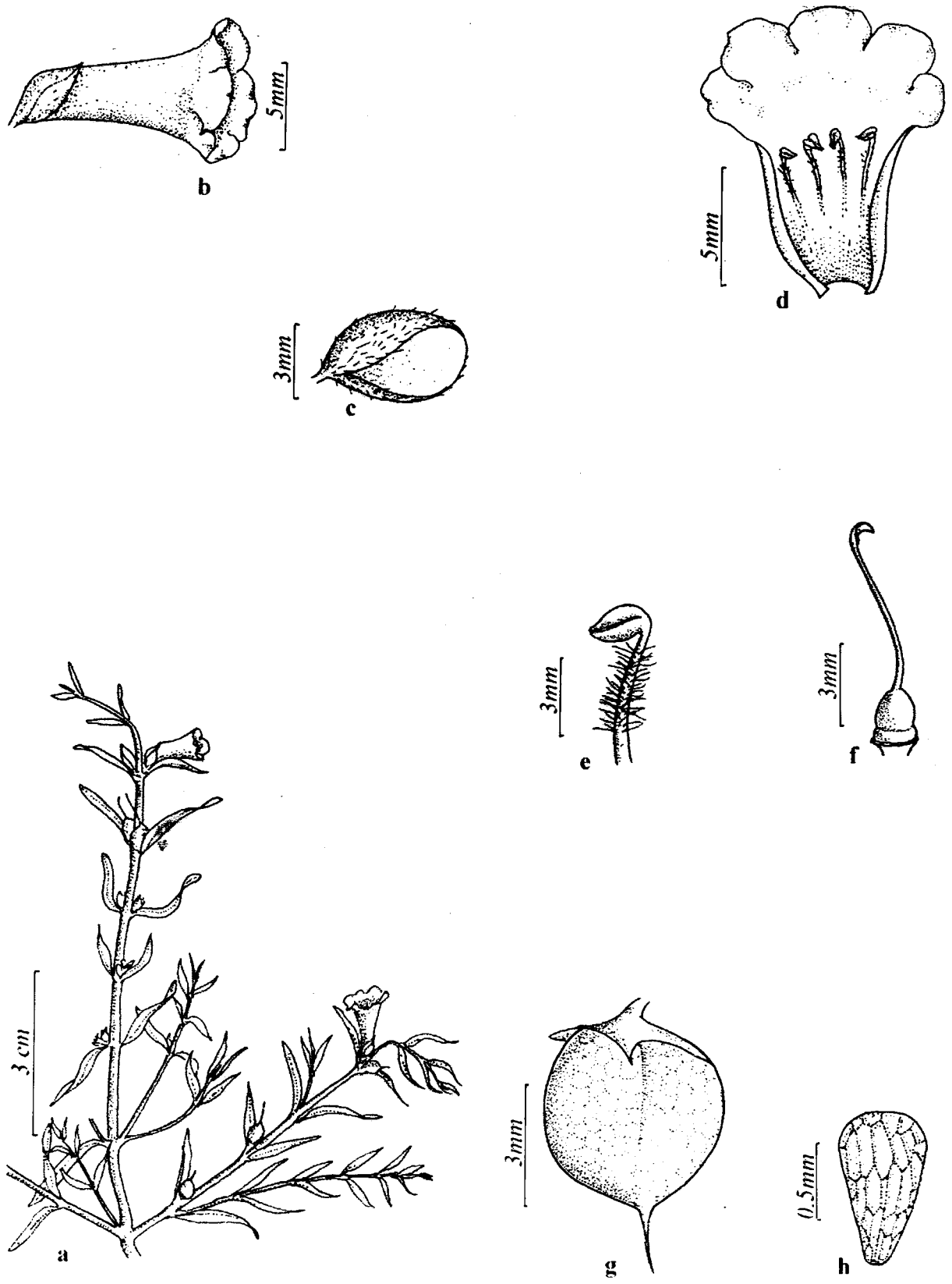


Fig. 46. *Centranthera indica* (L.) Gamble: a. Habit; b. Flower; c. Calyx ; d. Corolla, split-open; e. Stamen; f. Pistil; g. Fruit; h. Seed.

c. 5 mm long; lobes 5, upper lip covering the lower lip in bud. Stamens 2, included; anthers 2-celled, lobes unequal, bearded. Ovary c. 1 mm, globose; stigma 2-lamellate. Capsule 2-3 mm across, globose, on erect pedicel. Seeds numerous, minute, pitted, blackish brown.

Fl. & Fr.: Sept.-Dec.

Distr.: Eastern tropics. This plant grows in shallow water as well as in wet or marshy habitats. *CNS 1115* (Punnapara), *CNS 1248* (S. L. Puram).

GLOSSOSTIGMA R. Wight *et* Arnott ex Arnott

Nova Acta Phys.-Med. Acad. Caes. Leop.-Carol. Nat. Cur. 18: 355. 1836 (*nom. cons.*).

Glossostigma diandra (L.) Kuntze, Revis. Gen. Pl. 2: 461. 1891; A. Chev., Bull. Mus. Hist. Nat. (Paris) (ser. 2) 4: 587. 1932; Sald. in Sald. & Nicols., Fl. Hassan Dist. 518. 1976; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1076. 1983. *Limosella diandra* L., Mant. Pl. 252. 1767. *Glossostigma spathulatum* (Hook.) Arn., Nov. Actorum Acad. Caes. Leop.-Carol. German. Nat. Cur. 18: 355. 1836; Hook. f., Fl. Brit. India 4: 288. 1884; Gamble, Fl. Pres. Madras 964. 1924.

Prostrate, marsh herb; stolons interwoven, rooting at the nodes. Leaves radical, fascicled, 0.5-1.5 cm long, c. 2 mm broad at apices, spathulate, base narrowed, apex obtuse. Flowers solitary; pedicel to 1 cm long. Calyx campanulate; lobes 3, c. 2 mm long, obtuse. Corolla pinkish-white, 2-2.5 mm across; tube c. 1 mm long; lobes 5, unequal, upper shorter. Stamens 2; filaments filiform; anthers 1-celled, reniform. Ovary c. 0.5 mm across, globose; style c. 1 mm long; stigma spathulate, obtuse. Capsule globose, loculicidal, enclosed by calyx. Seeds ellipsoid.

Fl. & Fr.: Aug.-Nov.

Distr.: India (Upper Gangetic plain, Bihar, the Deccan peninsula), Sri Lanka, tropical Africa and Australia. Margins of ponds and other wet marshy areas. *CNS 1106* (Punnapra).

LIMNOPHILA R. Brown

Prodr. 442. 1810 (*nom. cons.*).

Herbs, aquatic or marshy, often with aromatic smell when bruised; stems erect, ascending or creeping. Leaves opposite or whorled, submerged leaves multifid with capillary lobes. Flowers sessile or pedicellate, solitary-axillary or in lax or compact, terminal or axillary spikes or racemes; bracts often foliaceous; bracteoles absent. Calyx-lobes 5, subequal. Corolla tubular, 2-lipped; upper lip entire or 2-fid, outside in bud, lower lip 3-lobed. Stamens 4, included, didynamous; anther cells stipitate. Style deflexed at tip; stigma bilamellate. Capsule ellipsoid to globose, septicidally 4-valved; valves bifid. Seeds angular or ribbed.

1a. Leaves 3-5-ribbed from the base; lower leaves usually pinnatifid or multifid; calyx not striate.

2a. Flowers sessile ..... **L. heterophylla**

2b. Flowers pedicellate.

3a. Flowers solitary, axillary, pale yellow ..... **L. indica**

3b. Flowers in terminal or axillary racemes, white with purple blotches ..... **L. aquatica**

1b. Leaves pinnately nerved, not ribbed; leaves neither pinnatifid nor nultifid, all alike; calyx usually striate.

4a. Leaves opposite throughout, base cuneate or attenuate; flowers sessile or subsessile ..... **L. repens**

4b. Leaves verticillate, base subamplexicaul; flowers long pedicelled .... **L. aromatica**

Limnophila aquatica (Roxb.) Alston, Ann. Roy. Bot. Gard. Peradeniya 11: 205. 1919; Philcox, Kew Bull. 24: 129. 1970; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 431. 1982; Mani. & Sivar., Fl. Calicut 204. 1982. *Cyrilla aquatica* Roxb., Pl. Corom. 2: 47, t. 189. 1798 & Fl. Ind. 3: 115. 1832. *Limnophila racemosa* Benth., Scroph. Ind. 26. 1835; Hook. f., Fl. Brit. India 4: 271. 1884; Gamble, Fl. Pres. Madras 952. 1923 (Plate XVIII: C).

Emergent aquatic annuals; stem rooting at lower nodes with basal parts usually submerged. Leaves on aerial stems opposite or ternately whorled, 2-5 x 0.8-1.5 cm, ovate-lanceolate to oblong-lanceolate, base rounded or semi-amplexicaul, margin serrulate, apex acute, 3-5-nerved at base, glabrous, obscurely punctate, sessile; submerged leaves capillaceo-multifid. Flowers in apparent terminal racemes; pedicels 3-10 mm long, slender, glandular-pubescent. Calyx c. 4 mm long, lobes equal, ovate-lanceolate, acuminate. Corolla tube 7-10 mm long, white, puberulous without, villous within at throat, limb subequally 5-lobed, white or pale blue, lobes of upper lip orbicular with a pale purplish blotch at centre of each. Stamens 4. Capsule globose or ellipsoid. Seeds oblong to globular, black.

Fl. & Fr.: Jul.-Dec.

Distr.: Sri Lanka, India, Nepal, Myanmar, East and South China, Taiwan and Malesia. A common weed in the flooded paddy fields, shallow ponds and slow running streams. *CNS 1404* (Kanichakulangara), *CNS 1246* (S. L. Puram).

Limnophila aromatica (Lam.) Merr., Interpr. Rumph. Herb. Amboin. 466. 1917; Philcox, Kew Bull. 24: 145. 1970; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 430. 1981; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 240. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 326. 1994. *Ambulia aromatica* Lam., Encycl. 1: 128. 1783. *Limnophila gratissima* Bl., Bijdr. 749. 1826; Hook. f., Fl. Brit. India 4: 268. 1884; Gamble, Fl. Pres. Madras 591. 1923. ***Manga-nari*** Rheede, Hort. Malab. 10: 11-12 , t. 6. 1690 (Fig. 47).

Erect fleshy glabrous herbs, to 60 cm tall. Leaves opposite or in whorls of 3, 2-6 x 1-1.5 cm, oblong-lanceolate, rounded and semi-amplexicaul at base, margin serrulate, apex subacute, penninerved, punctate, sessile. Flowers in many-flowered, terminal or axillary racemes; pedicels 5-12 mm, finely glandular. Calyx campanulate, glandular; tube c. 3 mm; lobes 5, sub-equal, 3- 5 mm long, lanceolate, acuminate. Corolla purple, c. 1 cm across; tube 8-10 mm long, sparsely glandular without, densely villous within. Stamens 4;

posterior filaments villous. Ovary c. 2 mm long, ellipsoid; stigma white. Capsule 4-5 mm across, subglobose. Seeds many, minute, angular, blackish-brown.

Fl. & Fr.: Sep.-Dec.

Distr.: China, India to Malaysia and Philippines to Australia. Common in water logged areas. *CNS 1079* (Aroor).

Limnophila heterophylla (Roxb.) Benth., Scroph. Ind. 25. 1835; Hook. f., Fl. Brit. India 4: 270. 1884; Gamble, Fl. Pres. Madras 952. 1923; Philcox, Kew Bull. 24: 124. 1970; Sald. in Sald. & Nicols., Fl. Hassan Dist. 519. 1976; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 434. 1981; Mani. & Sivar., Fl. Calicut 205. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1080. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 326. 1994. *Columnea heterophylla* Roxb., Fl. Ind. 3: 97. 1832.

Emergent annual herbs. Aerial leaves opposite or verticillate, up to 20 x 3.5 mm, elliptic to oblong, base sub-amplexicaul, margin serrulate, apex subacute, glabrous, 3-nerved from base, sessile; submerged leaves multifid with capillary segments up to 4 cm long. Flowers solitary, sessile or sub-sessile in the upper axils. Calyx c. 3 mm long; lobes 1-2 mm long, ovate-lanceolate, glabrous. Corolla c. 5 mm long, pale pink, throat sparsely pilose; upper lip 2-lobed, lobes orbicular, lower lip 3-lobed. Stamens 4, included, didynamous. Capsule c. 3 mm long, ellipsoid. Seeds angular, brown.

Fl. & Fr.: Aug.-Dec.

Distr.: Sri Lanka and south east Asia, eastwards through Malesia to China. In water-logged fields and shallow ponds. *CNS 1855* (Eramallur.)

Limnophila indica (L.) Druce, Bot. Exch. Club Soc. Brit. Isles 3: 420. 1914; Philcox, Kew Bull. 24: 115. 1970; Sald. in Sald. & Nicols., Fl. Hassan Dist. 520. 1976; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 432. 1981; Mani. & Sivar., Fl. Calicut 203. 1982; Rani. & Matthew in Matthew, Fl. Tam. Carnatic 3: 1080. 1983; Ramach. & Nair, Fl. Cannanore 315. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 240. 1988; Vajravelu, Fl. Palghat Dist. 323. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 327.



Fig. 47. *Limnophila aromatica* (Lam.) Merr.: a. Flowering twig; b. Flower; c. Calyx with bracteoles; d. Corolla, split- open; e. Pistil; f. Capsule; g. Seed.

1994; Sivar. & Mathew, Fl. Nilambur 468. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 320. 1996. *Hottonia indica* L., Syst. Nat. (ed. 10) 919. 1759. *Limnophila gratioloides* R. Br., Prodr. 442. 1810; Hook. f., Fl. Brit. India 4: 271. 1884; Gamble, Fl. Pres. Madras 952. 1923. ***Tsjeria-manga-nari*** Rheede, Hort. Malab. 9: 165, t. 85. 1689. ***Tsjudan-tsjera*** Rheede, Hort. Malab. 12: 71, t. 36. 1693.

Amphibious annual herbs. Leaves dimorphic; submerged leaves deeply dissected with flattened or capillary lobes; upper leaves decussate to whorled, variously dissected, 5-15 x 4-6 mm, linear-lanceolate, base cuneate, margin serrulate, apex acute, basally 3-nerved, chartaceous, subsessile. Flowers solitary, axillary; pedicels to 1 cm long. Calyx membraneous, c. 5 mm long, lobes as long as the tube, linear-lanceolate. Corolla 8-10 mm long, tube white, mouth yellow with purple shades, lobes orbicular. Stamens 4. Ovary c. 1.5 mm long, ellipsoid. Capsule c. 3 mm long, ellipsoid or sub-globose. Seeds angular, small, numerous, black.

Fl. & Fr.: Sept.-Dec.

Distr.: Paleotropics. Common in marshes, wet fields and river banks. *CNS 1406* (Kanichukulangara).

Limnophila repens (Benth.) Benth. in DC., Prodr. 10: 387. 1846; Philcox, Kew Bull. 23: 154. 1970; Sald. in Sald. & Nicols., Fl. Hassan Dist. 520. 1976; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 427. 1981; Mani. & Sivar., Fl. Calicut 205. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1081. 1983; Ramach. & Nair, Fl. Cannanore 315. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 327. 1994; Sivar. & Mathew, Fl. Nilambur 469. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 320. 1996. *Stemodia repens* Benth. in Edward., Bot. Reg. 17: sub. t. 1470. 1832 & Scroph. Ind. 24. 1835. *Limnophila conferta* Benth. in DC., Prodr. 10: 387. 1846; Hook. f., Fl. Brit. India 4: 266. 1884; Gamble, Fl. Pres. Madras 951. 1923. ***Manga-nari***

Erect or procumbent herbs with strong aromatic smell. Leaves 1-2 x 0.4-0.9 cm, oblong to elliptic-oblong, base acute, margin crenate-serrate, apex acute, punctate on both surfaces, glabrous, penninerved, chartaceous, subsessile. Flowers axillary, solitary or in

short racemes. Calyx c. 4 mm long, lobes lanceolate, hirsute, striate at maturity. Corolla violet-pink, rarely yellow, c. 5 mm across; tube 6-8 mm long, pubescent without and at throat within, longitudinally purple striped. Stamens 4. Stigma spathulate. Capsule 3-4 mm long, ellipsoid. Seeds angular, brown.

Fl. & Fr.: Aug.-Dec.

Distr.: Tropical Asia. Common in wet paddy fields, stream sides and marshy places. *CNS 2208* (Pallipuram), *CNS 2580* (Kainakary).

LINDERNIA Allioni

Melanges Philos. Math. Soc. Roy. Turin. (Misc. Taur.) 3(1): 178. 1766.

Small annual herbs, erect or prostrate, usually on moist places; stem 4-angled. Leaves opposite, sessile or petioled, serrate or entire. Flowers axillary, solitary or passing into terminal racemes; pedicles sometimes deflexed in fruit; bracts present or not. Calyx 5-lobed or partite. Corolla 2-lipped, upper lip outside in bud, much smaller than the wider 3-lobed lower lip; tube cylindric, widening to top. Stamens 2 or 4, included or not; anthers divaricate, all prefect or lower pair reduced to staminodes; filaments often with small appendages. Ovary 2-celled; ovules many; style slender; stigma 2-lamellate. Capsule globose, ovoid or oblong, septicidally 2-valved. Seeds numerous, minute, rugose.

1a. Perfect stamens 4; staminodes absent.
  2a. Capsule about equalling the calyx or less.
    3a. Flowers in racemes ..... **L. viscosa**
    3b. Flowers solitary in axils of leaves.
      4a. Leaves penninerved, petiolate or subsessile, ovate or ovate-orbicular.
        5a. Stem scabrescent; flowering calyx cleft to middle, ribbed ..... **L. crustacea**
        5b. Stem hispidulous; flowering calyx cleft to base, smooth ..... **L. caespitosa**



Plate XVIII. A & B. *Lindernia hyssopioides* (L.) Haines; A. Habit; B. Flowering twig; C. *Limnophila aquatica* (Roxb.) Alston; D. *Centranthera indica* (L.) Gamble

4b. Leaves with 3-5 ribs from the base, sessile, elliptic .... **L. procumbens**

2b. Capsule twice as long as calyx or longer.

6a. Flowers sessile ..... **L. sessiliflora**

6b. Flowers pedicelled ..... **L. anagallis**

1b. Perfect stamens 2; staminodes 2.

7a. Capsule about equalling the calyx or shorter, globose ..... **L. rotundifolia**

7b. Capsule twice as long as calyx or longer, linear to ovoid-ellipsoid.

8a. Leaves with 3 ribs from the base; staminodes 2-fid; capsule ovoid-ellipsoid ..... **L. hyssopioides**

8b. Leaves penninerved; staminodes simple; capsule narrow, linear.

9a. Leaves entire or very nearly so; flowers solitary in axils of leaves ..... **L. tenuifolia**

9b. Leaves distinctly serrate; flowers in racemes.

10a. Leaves sharply aristate-dentate; flowering calyx cleft to middle ..... **L. ciliata**

10b. Leaves usually serrate; flowering calyx cleft to base ..... **L. antipoda**

Lindernia anagallis (Brum. f.) Pennell, J. Arnold Arb. 24: 252. 1943; Mukherjee, J. Ind. Bot. Soc. 24: 133. 1945; Philcox, Kew Bull. 22: 45. 1968; Sald. in Sald. & Nicols., Fl. Hassan Dist. 521. 1976; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 410. 1981; Mani. & Sivar., Fl. Calicut 198. 1982; Sivar. & Mathew, J. Bombay Nat. Hist. Soc. 80: 139. 1983; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1084. 1983; Mani., Fl. Silent Valley 195. 1988; Ramach. & Nair, Fl. Cannanore 316. 1988; Vajravelu, Fl. Palghat Dist. 324. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 328. 1994; Sivar. & Mathew, Fl. Nilambur 470. 1996; Sasi. & 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. 1884; Gamble, Fl. Pres. Madras 959. 1923. *Vandellia angustifolia* Benth., Scroph. Ind. 37. 1935. *Lindernia angustifolia* (Benth.) Wettst. in Engler & Prantl, Natur. Pflanzenfam. 4. 3b: 79. 1891; Mukherjee, J. Ind. Bot. Soc. 24: 132. 1945.

Diffuse herbs, rooting at lower nodes, then ascending. Leaves 0.8-2 x 0.5-1 cm, ovate to elliptic, base truncate, margin crenate-serrate, apex subacute, penninerved, glabrous, sessile. Flowers white or pink, axillary, solitary or rarely 2-per node; pedicel 1-1.5 cm long. Calyx deeply 5-lobed almost to the base, 3-6 mm long, lobes linear-lanceolate. Corolla tube 6-8 mm long; limb 2-lipped, upper lip entire, lower lip 3-lobed. Stamens 4, fertile; anterior filaments with a linear appendage from near base; anthers of basal pair spurred. Capsule to 1.3 mm long, linear, glabrous, much exceeding the calyx. Seeds c. 0.5 mm long, ellipsoid.

Fl. & Fr.: Sep.-Nov.

Distr.: Sri Lanka, India and Malesia. Much variable herbs; in marshy lowlands and paddy fields. *CNS 1273* (Nedumudi).

Lindernia antipoda (L.) Alston in Trim., Fl. Ceylon 6 (Suppl.): 214. 1931; Philcox, Kew Bull. 22: 57. 1968; Sald. in Sald. & Nicols., Fl. Hassan Dist. 521. 1976; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 413. 1981; Mani. & Sivar., Fl. Calicut 200. 1982; Sivar. & Mathew, J. Bombay Nat. Hist. Soc. 80: 133. 1983; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1085. 1983; Ramach. & Nair, Fl. Cannanore 316. 1988; Vajravelu, Fl. Palghat Dist. 324. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 328. 1994; Sivar. & Mathew, Fl. Nilambur 471. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 322. 1996. *Ruellia antipoda* L., Sp. Pl. 635. 1753. *Gratiola veronicifolia* Retz., Obs. Bot. 4: 8. 1786. *Ilysanthes veronicifolia* (Retz.) Urban, Ber. Deustsch. Bot. Ges. 2: 436. 1884; Gamble, Fl. Pres. Madras 962. 1923. *Bonnaya veronicifolia* (Retz.) Spreng. in L., Syst. Veg. (ed. 16) 1: 41. 1824; Hook. f., Fl. Brit. India 4: 285. 1884.

Prostrate or diffuse herbs, rooting at the nodes. Leaves variable 1.5-2.5 x 0.5-1 cm, elliptic-obovate, base cuneate, margin subentire to serrate, apex obtuse, penninerved, subsessile. Flowers solitary, axillary or in terminal racemes; bracts leafy; pedicle to 1 cm long. Calyx divided to the base; lobes c. 4 mm long, lanceolate, margin scarious. Corolla bluish with an yellow mouth, 6-8 mm long, internally short pilose between the

staminodes. Stamens 2, fertile; staminodes 2, hooked. Capsule 1-1.4 cm long, linear-lanceolate. Seeds yellow, ridged.

Fl. & Fr.: Aug.-Oct.

Distr.: Tropical and subtropical Asia and N. Australia. A common herb in paddy fields and marshes during monsoon. *CNS 1477* (Kanjippadam).

Lindernia caespitosa (Bl.) Panigrahi, Taxon 33: 320. 1984; Nicols., Suresh & Mani, An Interpr. Hort. Malab. 241. 1988; Ramach. & Nair, Fl. Cannanore 317. 1988; Sivar. & Mathew, Fl. Nilambur 472. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 322. 1996. *Diceros caespitosa* Bl., Bijdr. 753. 1826. *Torenia hirta* Cham. & Schlech., Linnaea 2: 571. 1827. *Vandelia scabra* Benth., Scroph. Ind. 36. 1835; Hook. f., Fl. Brit. India 4: 281. 1884; Gamble, Fl. Pres. Madras 959. 1923. *Vandelia caespitosa* (Bl.) Benth. in DC., Prodr. 10: 415. 1846. *Lindernia pusilla* sensu Philcox, Kew Bull. 22: 41. 1968, non Boldingh, Oct. 1916; Sald. in Sald. & Nicols., Fl. Hassan Dist. 523. 1976; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 408. 1981; Mani. & Sivar., Fl. Calicut 199. 1982; Sivar. & Mathew, J. Bombay Nat. Hist. Soc. 80: 139. 1983; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1092. 1983; Vajravelu, Fl. Palghat Dist. 325. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 330. 1994. ***Nanschera-canschabu*** Rheede, Hort. Malab. 10: 99, t. 50. 1690.

Prostrate or diffuse herbs, rooting at nodes, hirsute. Leaves 1-1.5 x 0.7-1 cm, ovate-orbicular, base rounded, margin crenate-serrate, apex acute, sub-glabrous to pubescent above, hirsute beneath, pinnately nerved, subsessile. Flowers axillary 2 per node; pedicel 1-1.5 cm, long, glabrous to sparsely glandular-pubescent. Calyx-lobes 5, divided to the base, c. 3 mm long, oblong-lanceolate, margin scarious. Corolla 5-8 mm long, tube white, yellow at mouth, upper lip pale brown or completely violet. Stamens 4, lower pair appendaged. Capsule c. 3 mm, subglobose, equalling or shorter than fruiting calyx. Seeds yellow, short cylindric.

Fl. & Fr.: Jul.-Sept.

Distr.: Africa, Sri Lanka, India, Himalaya, Myanmar, S. China, Malesia and Polynesia. In marshy low lands and cultivated fields. *CNS 1116* (Punnapra), *CNS 2581* (Thuravoor).

Lindernia ciliata (Colsm.) Pennell, Brittonia 2: 182. 1936; Mukherjee, J. Ind. Bot. Soc. 24: 133. 1945; Philcox, Kew Bull. 22: 51. 1968; Sald. in Sald. & Nicols., Fl. Hassan Dist. 521. 1976; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 412. 1981; Mani. & Sivar., Fl. Calicut 199. 1982; Sivar. & Mathew, J. Bombay Nat. Hist. Soc. 80: 133. 1983; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1086. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 242. 1988; Ramach. & Nair, Fl. Cannanore 317. 1988; Vajravelu, Fl. Palghat Dist. 324. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 329. 1994; Sivar. & Mathew, Fl. Nilambur 472. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 322. 1996. *Gratiola ciliata* Colsm., Prodr. Desc. Gratiol. 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, Ber. Deutsh. Bot. Ges. 2: 436. 1884; Gamble, Fl. Pres. Madras 962. 1923. ***Pee-tsjanga-puspam*** Rheede, Hort. Malab. 9: 115, t. 59. 1689. ***Kaka-pu.***

Small erect annual herbs. Leaves 0.8-1.5 x 0.4-0.6 cm, elliptic-oblong, base rounded, margin aristate-dentate, apex obtuse or acute, penninerved, sessile. Flowers in lax terminal racemes; pedicels 1-2 mm long. Bracts leafy, 2-3 mm long. Calyx-lobes 5, c. 5 mm long, linear. Corolla pink or bluish-pink, c. 8 mm long, tube curved, 2-lipped. Stamens 2; anthers unequal; staminodes with divergent hooks. Ovary 2 -3 mm long, elongate. Capsule 1-1.5 cm long, linear, septum winged, exceeding the fruiting calyx. Seeds black.

Fl. & Fr.: Oct.-Dec.

Distr.: Indo-Malaysia. Very common. Usually after monsoon. *CNS 1319* (Chengannur), *CNS 1604* (Thycattussery).

Lindernia crustacea (L.) F. V. Muell., Syst. Cens. Austral. Pl. 97. 1887; Mukherjee, J. Ind. Bot. Soc. 24: 130. 1945; Philocx, Kew Bull. 22: 17. 1968; Sald. in Sald. & Nicols., Fl. Hassan Dist. 522. 1976; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 407. 1981;

Mani. & Sivar., Fl. Calicut 199. 1982; Sivar. & Mathew, J. Bombay Nat. Hist. Soc. 80: 136. 1983; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1088. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 243. 1988; Ramach. & Nair, Fl. Cannanore 317. 1988; Vajravelu, Fl. Palghat Dist. 324. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 329. 1994; Sivar. & Mathew, Fl. Nilambur 473. 1996; Sasi. & 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. 1845; Hook. f., Fl. Brit. India 4: 279. 1884; Gamble, Fl. Pres. Madras 759. 1923. ***Katu-pee-tsjanga-puspam*** Rheede, Hort. Malab. 9: 113, t. 58. 1689. ***Ona-pu.***

Prostrate, diffusely branched herbs, rooting at nodes; stem 4-angled, slightly winged on angles. Leaves 0.8-1.5 x 0.7-1.2 cm, ovate, base truncate, margin serrate, apex subacute, penninerved; petiole c. 5 mm long. Flowers axillary, solitary or 2-per node on terminal racemes; pedicel 1-1.2 cm long. Calyx c. 4 mm long, divided to 1/3, 5-ribbed, lobes elliptic-lanceolate, ciliate on margins. Corolla rose to purple, tube c. 5 mm long. Stamens 4, didynamous; lower pair of stamens with a subulate appendage at the middle of filament. Ovary globose. Capsule c. 5 mm long, 2-3 mm across, ovoid. Seeds minute, many.

Fl. & Fr.: Most of the seasons.

Distr.: Old World Tropics. Common in moist waste lands. *CNS 1036* (Vandanam).

Lindernia hyssopioides (L.) Haines, Bot. Bihar & Orissa 635. 1922; Mukherjee, J. Ind. Bot. Soc. 24: 132. 1945; Philcox, Kew Bull. 22: 50. 1968; Sald. in Sald. & Nicols., Fl. Hassan Dist. 522. 1976; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 414. 1981; Mani. & Sivar., Fl. Calicut 200. 1982; Sivar. & Mathew, J. Bombay Nat. Hist. Soc. 80: 136. 1983; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1090. 1983; Mani., Fl. Silent Valley 195. 1988; Ramach. & Nair, Fl. Cannanore 318. 1988; Vajravelu, Fl. Palghat Dist. 325. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 329. 1994. *Gratiola hyssopioides* L., Mant. Pl. 174. 1771. *Ilysanthes hyssopioides* (L.) Benth. in DC., Prodr.

10: 419. 1846; Hook. f., Fl. Brit. India 4: 283. 1884; Gamble, Fl. Pres. Madras 916. 1923 (Plate XVIII: A & B; Fig. 48).

Slender erect herbs; up to 40 cm tall; stem 4-angled, simple or diffusely branched. Leaves 1-2 x 0.2-0.4 cm, linear-lanceolate, basal ones elliptic-ovate, base cuneate or truncate, apex acute, faintly 3-nerved from base, sessile. Flowers axillary, solitary; bracts linear; pedicels 1-3 cm long, filiform, deflexed in fruit. Calyx deeply 5-lobed almost to the base, 1.5-3.5 mm long, lobes linear-lanceolate, glabrous, tip purplish. Corolla pale lilac or bluish, 6-10 mm long, upper lip 2-lobed at apex, lower lip 6-10 mm across with dark blue blotches at base of lobes. Stamens 2, inserted at about the middle of corolla tube; anthers oblong; staminodes usually 2-fid, obtuse with a linear hairy, basal appendage. Capsule 4-5 mm long, ovoid-ellipsoid, twice as long as the fruiting calyx. Seeds yellow, oblong, longitudinally ridged.

Fl. & Fr.: Oct.-Nov.

Distr.: S. E. Aisa, Malesia and China. Common in wet low lands and paddy fields. *CNS 1212* (Cherthala); *CNS 1247* (S. L. Puram).

Lindernia procumbens (Krock) Philcox, Taxon 14: 30 . 1965 & in Kew Bull. 22: 29. 1968. *Anagalloides procumbens* Krock, Fl. Siles. 2: 398. t. 26. 1790. *L. pyxidaria* L., Mant. 2: 252. 1771, nom. illegit., p.p., quoad spec., excl.

Annual erect herbs to 15 cm tall. Leaves 1-2.5 x 0.5-1 cm, elliptic to ovate - elliptic, margins entire or sub-crentae, scabrid, 3-5-nerved from base, sessile. Flowers solitary, axillary; pedicles to 1.5 cm long, slender. Calyx deeply 5-lobed almost to the base, 2-3 mm long; lobes linear-lanceolate. Corolla 3-6 mm long, white, upper lip almost circular. Stamens 4, fertile; anterior filaments with a small globular or slender spur at the base. Capsule ellipsoid, equal to or slightly longer than calyx. Seeds yellow, compressed-cylindric.

Fl. & Fr.: Jan.-Mar.



Fig. 48. *Lindernia hyssopioides* (L.) Haines: a.Habit; b. Leaf; c. Flower; d. Calyx; e. Corolla, split-open; f. Staminoide; g. Staminoide-hair; h.Pistil; i. Capsule; j. Seed.

Distr.: Malesia, India, Thailand, China and Japan. Rare. Along river banks. *CNS 1856* (Cheriyanad).

Lindernia rotundifolia (L.) Alston in Trim., Handb. Fl. Ceylon 6 (Suppl.): 214. 1931; Mukherjee, J. Ind. Bot. Soc. 24: 132. 1945; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 416. 1981; Mani. & Sivar., Fl. Calicut 201. 1982; Sivar. & Mathew, J. Bombay Nat. Hist. Soc. 80: 135. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 243. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 330. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 323. 1996. *Gratiola rotundifolia* L., Mant. Pl. 274. 1767. *Ilysanthes rotundifolia* (L.) Benth. in DC., Prodr. 10: 420. 1846; Hook. f., Fl. Brit. India 4: 254. 1884; Gamble, Fl. Pres. Madras 962. 1923. ***Tsjanja-puspam*** Rheede, Hort. Malab. 9: 111, t. 57. 1689.

Erect or diffuse herbs, rooting at lower nodes. Leaves 0.8-1.3 x 0.5-1 cm, ovate to orbicular, base and apex rounded, margin crenate to subentire, basally 3-nerved, sessile. Flowers solitary in leaf axils; pedicle 0.5-1 cm long, slender. Calyx deeply divided, lobes 5, 2-2.5 x 1 mm, lanceolate. Corolla c. 1 cm long, white with blue blotches at mouth and lobes; lobes orbicular. Stamens 2; staminodes 2, glandular-scabrid at base. Stigma 2-lamellate. Capsule c. 3 mm long, subglobose, equal to or slightly shorter than calyx. Seeds c. 0.5 mm long, oblong, pale brown.

Fl. & Fr.: Aug.-Nov.

Distr.: South West India, Sir Lanka, Mauritius and Malagasy Islands. Common in wet or marshy lowlands during monsoon. *CNS 1044* (Vandanam)

Lindernia sessiliflora (Benth.) Wettst. in Engl. & Prantl, Nat. Pflanzenfam. IV. 3B: 79. 1891; Backer, Onkruidfl. Java Suiker. 620. 1931; Mukherjee, J. Ind. Bot. Soc. 24: 132. 1945. *Torenia sessiliflora* Benth. in Wall., Cat. No. 3959. 1831, *nom. nud. Vandellia sessiliflora* Benth., Scrop. Ind. 37. 1835; Benth. in DC., Prodr. 10: 416. 1846; Hook. f., Fl. Brit. India 4: 282. 1884; Gamble, Fl. Pres. Madras 959. 1923 (Fig. 49).

Annual herbs; stem creeping and rooting at the nodes; branches to 15 cm long, 4-angled, pubescent mainly on the angles. Leaves 1.5-3.5 x 1.3-2.8 cm, broadly ovate to suborbicular, base rounded, decurrent on petiole, margins crenate-serrate, apex rounded, nerves 2-4 pairs, subcoriaceous, glabrous above, pubescent on nerves beneath; petiole up to 8 mm long. Flowers axillary, usually solitary or 2-3, c. 8 mm long, usually sessile, sometimes with pedicels up to 5 mm long. Calyx-tube 4-5 mm long, ribbed, ciliate, 5-lobed; lobes unequal, upper lobe up to 4 mm long, others shorter, 2- 3 mm long, narrowly lanceolate to linear-sabulate, pubescent without. Corolla 7-9 mm long, white; tube 5 -6 mm long; upper lip entire, 2-3 mm long, brown, lower lip distinctly 3-lobed. Stamens 4, all fertile; anterior filaments with a thick, rounded papillose spur at the base. Capsule 0.8-1.2 x 0.2-0.3 cm, ellipsoid, cylindric. Seeds many, 0.5-0.75 x 0.5 mm, ellipsoid, pale yellow, tuberculate.

Fl. & Fr.: Aug.-Dec.

Distr.: Malesia, Pakistan, India and Myanmar. In most sandy soil. *CNS 1787* (Elangimelvallikavu).

Lindernia tenuifolia (Colsm.) Alston in Trim., Handb. Fl. Ceylon 6 (Suppl.): 214. 1931; Mukherjee, J. Ind. Bot. Soc. 24: 134. 1945; Philcox, Kew Bull. 22: 62. 1968; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 411. 1981; Mani. & Sivar., Fl. Calicut 200. 1982; Sivar. & Mathew, J. Bombay Nat. Hist. Soc. 80: 134. 1983; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1094. 1983; Ramach. & Nair, Fl. Cannanore 319. 1988; Sivar. & Mathew, Fl. Nilambur 475. 1996. *Gratiola tenuifolia* Colsm., Prod. Desc. Grat. 8. 1793. *Bonnaya tennifolia* (Colsm.) Spreng., Syst. Veg. (ed. 16) 1: 42. 1824; Hook. f., Fl. Brit. India 4: 286. 1884. *Ilysanthes tenuifolia* (Colsm.) Urb. in Berol., Deutsch. Bot. Ges. 2: 435. 1884; Gamble, Fl. Pres. Madras 962. 1923.

Erect annual herbs to 15 cm tall. Leaves 1-2.5 x 0.2-0.3 cm, linear, narrowed at base, subacute at apex, glabrous. Flowers axillary, solitary or leaf-opposed; pedicels 4-8 mm long, deflexed in fruit. Calyx 5-lobed, c. 2.5 mm long, lobes lanceolate. Corolla light-blue, tube c. 4 mm long, upper lip entire, lower 3-lobed. Stamens 2; staminodes subulate;

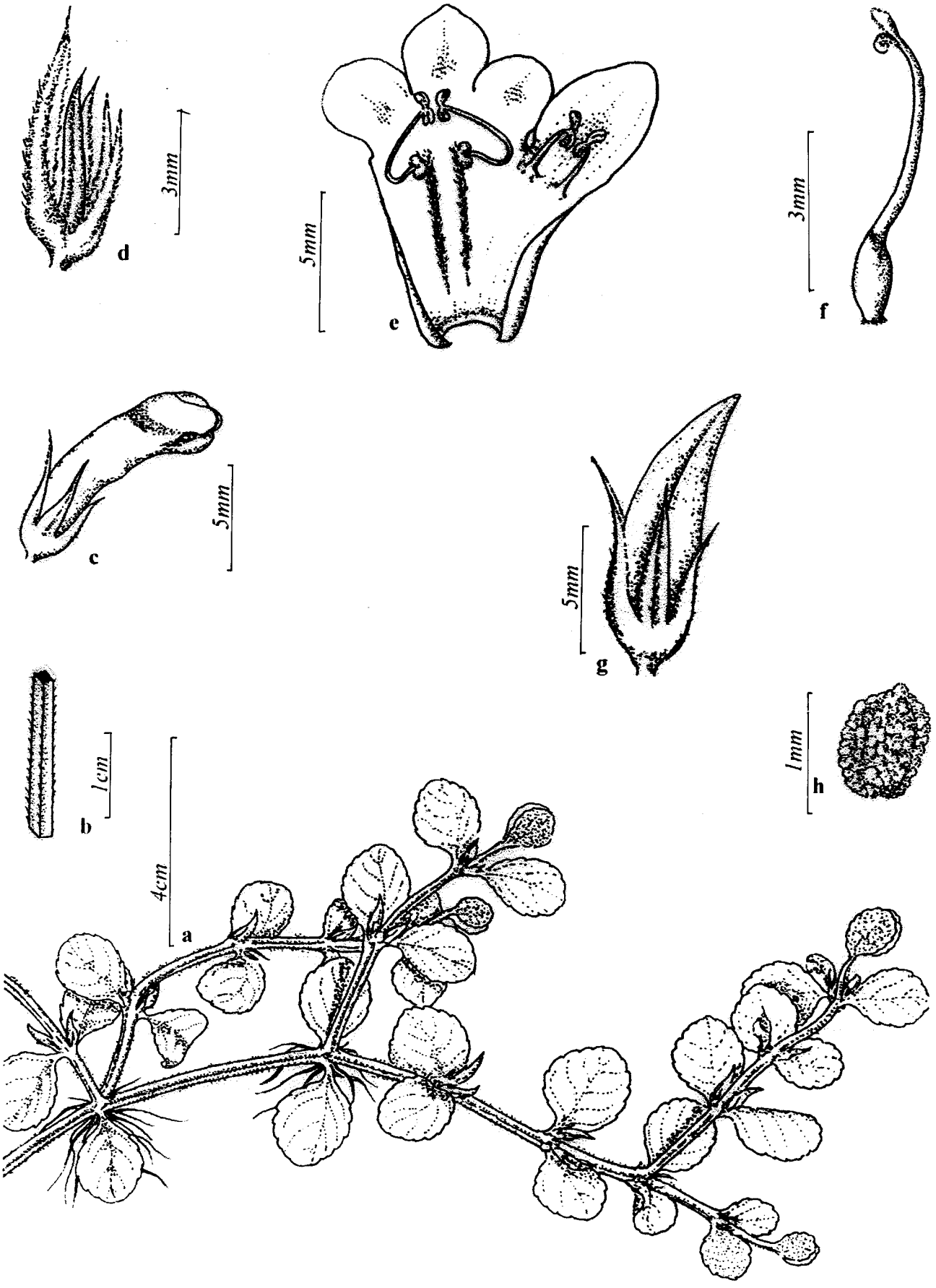


Fig. 49. *Lindernia sessiliflora* (Benth.) Wettst.: a. Habit; b. A portion of stem; c. Flower; d. Calyx; e. Corolla, split-open; f. Pistil; g. Capsule; h. Seed.

anthers unequal. Capsule 6-10 mm, linear-cylindric, much exceeding the calyx. Seeds pale yellow, ovoid.

Fl. & Fr.: Aug.-Oct.

Distr.: India, Sri Lanka, Myanmar and China. In wet low lands paddy fields. *CNS 1263* (Thottappally).

Lindernia viscosa (Hornem.) Bold., Zakfl. Java 165. 1916; Philcox, Kew Bull. 22: 38. 1968; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 406. 1981; Mani. & Sivar., Fl. Calicut 198. 1982; Sivar. & Mathew, J. Bombay Nat. Hist. Soc. 80: 137. 1983; Ramach. & Nair, Fl. Cannanore 319. 1988; Sivar. & Mathew, Fl. Nilambur 476. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 323. 1996. *Gratiola viscosa* Hornem., Enum. Pl. Hort. Haffn. 19. 1807. *Vandellia hirsuta* Buch.-Ham. ex Benth., Scroph. Ind. 36. 1835; Hook. f., Fl. Brit. India 4: 280. 1884; Gamble, Fl. Pres. Madras 959. 1923. *Lindernia hirsuta* (Benth.) Wettst. in Engl. & Prantl., Pflanzenfam 4. 3b: 79. 1891; Mukherjee, J. Ind. Bot. Soc. 24: 131. 1945.

Erect or diffuse hirsute annual herbs, rooting at lower nodes. Leaves 1.5-5 x 1-3 cm, broadly ovate, oblong or obovate, base rounded or truncate, margin crenate-serrate, apex obtuse, hirsute on both surfaces, penninerved; petiole to 1.5 long; upper leaves much smaller and subsessile. Inflorescence a terminal lax, many-flowered raceme; peduncle sparsely glandular-pubescent; pedicels 5-8 mm long, glandular-pubescent; bracts minute, lanceolate. Calyx deeply 5-lobed almost to the base, glandular hispid; lobes 3-4 mm long, linear-lanceolate. Corolla c. 5 mm long, upper lip pale brown, lower lip white with yellow spots at mouth. Stamens 4; longer pair of filaments with a knee-like appendage. Capsule c. 2.5 mm long, ovoid, glabrous, slightly shorter than the calyx lobes. Seeds straw-coloured, shortly cylindric.

Fl. & Fr.: Sep.-Dec.

Distr.: Sri Lanka, India, Malesia, Philippines and China. Less common. On exposed moist shady places. *CNS 2209* (Andhakaranazhi), *CNS 2582* (Thazhakkara).

MECARDONIA Ruiz & Pavon

Prodr. 95. 1794.

Mecardonia procumbens (Mill.) Small, Fl. South East U. S. 1065, 1338. 1903; Sald. in Sald. & Nicols., Fl. Hassan Dist. 523. 1976; D' Arcy, Ann. Missouri Bot. Gard. 66: 240. 1979; Joseph & Suresh, Indian J. Bot. 5: 127. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1097. 1983; Ramach. & Nair, Fl. Cannanore 320. 1988; Sivar. & Mathew, Fl. Nilambur 476. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 324. 1996. *Erinus procumbens* Mill., Gard. Dict. (ed. 8) 6. 1768. *Lindernia dianthera* Sw., Nov. gen. sp. 92. 1788. *Bacopa procumbens* (Mill.) Green, Publ. Field Columb. Mus. Bot. Ser. 2: 261. 1907; Raiz., Ind. For. 94: 436. 1968. *Mecardonia dianthera* (SW.) Pennell, Proc. Acad. Nat. Sci. Philadelphia 98: 87. 1940.

Diffuse herbs; stem 4-angled. Leaves 1-1.5 x 0.4-0.9 cm, ovate-lanceolate, base acute, margin crenate-serrate, apex acute, penninerved, subsessile. Flowers axillary, solitary; pedicles to 1 cm long, bractioles 2, c. 4 mm long, oblong. Calyx deeply 5-partite, lobes unequal; outer 3 c. 6 x 3 mm, ovate-lanceolate; inner 2 c. 4 x 1 mm, narrower. Corolla yellow, c. 7 mm long, obscurely 2-lipped, lobes unequal. Stamens 4, didynamous; anther cells stipitate. Stigma lamellate. Capsule to 6 x 2 mm, oblong-cylindric, 2-valved, included in the calyx. Seeds with testa reticulate.

Fl. & Fr.: Dec.-Apr.

Distr.: Native of Tropical America; introduced and naturalized in India. *CNS 1605* (Palamel).

MICROCARPAEA R. Brown

Prodr. 435. 1810.

Microcarpaea minima (J. Koenig) Merr., Philipp. J. Sci. 7: 100. 1912; Pramanik, Bull. Bot. Surv. India 14: 173. 1972; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 402. 1981; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1098. 1983. *Paederota minima* J. Koening in Retz., Obs. Bot. 5: 10. 1789. *Microcarpaea muscosa* R. Br., Prodr. 436. 1810;

Hook. f., Fl. Brit. India 4: 287. 1884; Gamble, Fl. Pres. Madras 963. 1923. Mani. & Sivar., Fl. Calicut 194. 1982.

Small prostrate herbs rooting at nodes. Leaves minute, 2-4 x 0.5-1 mm, elliptic-oblong, base decurrent, apex obtuse, 1-nerved, punctate above, sessile. Flowers sessile, axillary, solitary. Calyx tubular, c. 1.5 mm long, lobes 5, lanceolate, ciliate at margin. Corolla purplish, 2-3 mm long, caducous; upper lip shorter, 2-lobed, lower lip 3-lobed, all ciliate along margins. Stamens 2; filaments filiform; anthers 1-celled, confluent. Ovary c. 1 mm long, cylindric. Capsule 1.5-2 mm long, ellipsoid, included in the persistent calyx. Seeds ellipsoid.

Fl. & Fr.: Nov.-Feb.

Distr.: Sri Lanka, India, Nepal, east to S. China, Malesia and Australia. Commonly seen in wet or moist fields and swamps where it spread like a mat. *CNS 1113* (Punnapra), *CNS 2583* (Kavalam).

RHAMPHICARPA Bentham

in W.J. Hooker, Comp. Bot. Mag. 1: 368. 1836.

Rhamphicarpa longiflora (Arn.) Benth., Comp. Bot. Mag. 1: 368. 1836; Hook. f., Fl. Brit. India 4: 300. 1884; Gamble, Fl. Pres. Madras 969. 1923; Mani. & Sivar. Fl. Calicut 192. 1982; Vajravelu, Fl. Palghat Dist. 325. 1990. *Buchnera longiflora* Arn., Nov. Act. Nat. Cur. 18: 356. 1836 (Fig. 50).

Erect, slender herbs to 25 cm tall; stem quadrangular, branched. Leaves 1-6 cm long, pinnatisect; segments linear, terete, channeled, fleshy, green to brown, black on drying. Flowers white, axillary, solitary, 3-4 cm long, subsessile; bracteoles 2, c. 2 mm long, subulate. Calyx-lobes 5, 5-7 x 1-2 mm, linear, subacute. Corolla salver-from, white; tube 3-3.5 cm long, cylindric, slender, glandular-hairy without; lobes 5, 5-6 x 5-6 mm, obovate, obtuse or emarginate at apex, margin with long hairs. Stamens 4, didynamous; filaments c. 1 mm long; anthers to 2 mm long. Ovary c. 3 mm long; stigma bifid, oblong-

lanceolate. Capsule 8-10 x 4-5 mm, compressed, curved, oblique, beaked. Seeds c. 1 mm long, oblong, reticulate.

Fl. & Fr.: Aug.-Nov.

Distr.: India. A rainy season annual in wet areas. Plants bloom at night and shed the flowers early morning. *CNS 2210* (A.I.R. Campus, Kalavoor).

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; Sald. in Sald. & Nicols., Fl. Hassan Dist. 525. 1976; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 439. 1981; Mani. & Sivar., Fl. Calicut 193. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1100. 1983; Ramach. & Nair, Fl. Cannanore 320. 1988; Mani., Fl. Silent Valley 196. 1988; Vajravelu, Fl. Palghat Dist. 326. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 331. 1994; Sivar. & Mathew, Fl. Nilambur 477. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 324. 1996. ***Kallurukki.***

Erect annual or perennial herbs. Leaves decussate to whorled, 1-3 x 0.5-1.5 cm, obovate-oblong, base attenuate, margin crenate-serrate, apex acute, penninerved, punctate, chartaceous; petiole to 0.7 cm long. Flowers axillary, solitary or 2; pedicels slender 4-7 mm long. Calyx lobes 2-3 mm, ovate-oblong, ciliate along margin. Corolla white 4-6 mm long, rotate, throat densely hairy, lobes spathulate. Stamens 4, subequal, 3-4 mm long. Ovary globose, 2-celled; ovules many; stigma truncate. Capsules 1-2 mm across, globose. Seeds 4-angled, reticulate.

Fl. & Fr.: Most of the seasons.

Distr.: Native of Tropical America, now pantropical. A very common weed. *CNS* (Pallanthuruthi).

Roots and leaves are used in Ayurvedic medicines used to cure stone in urinary bladder.

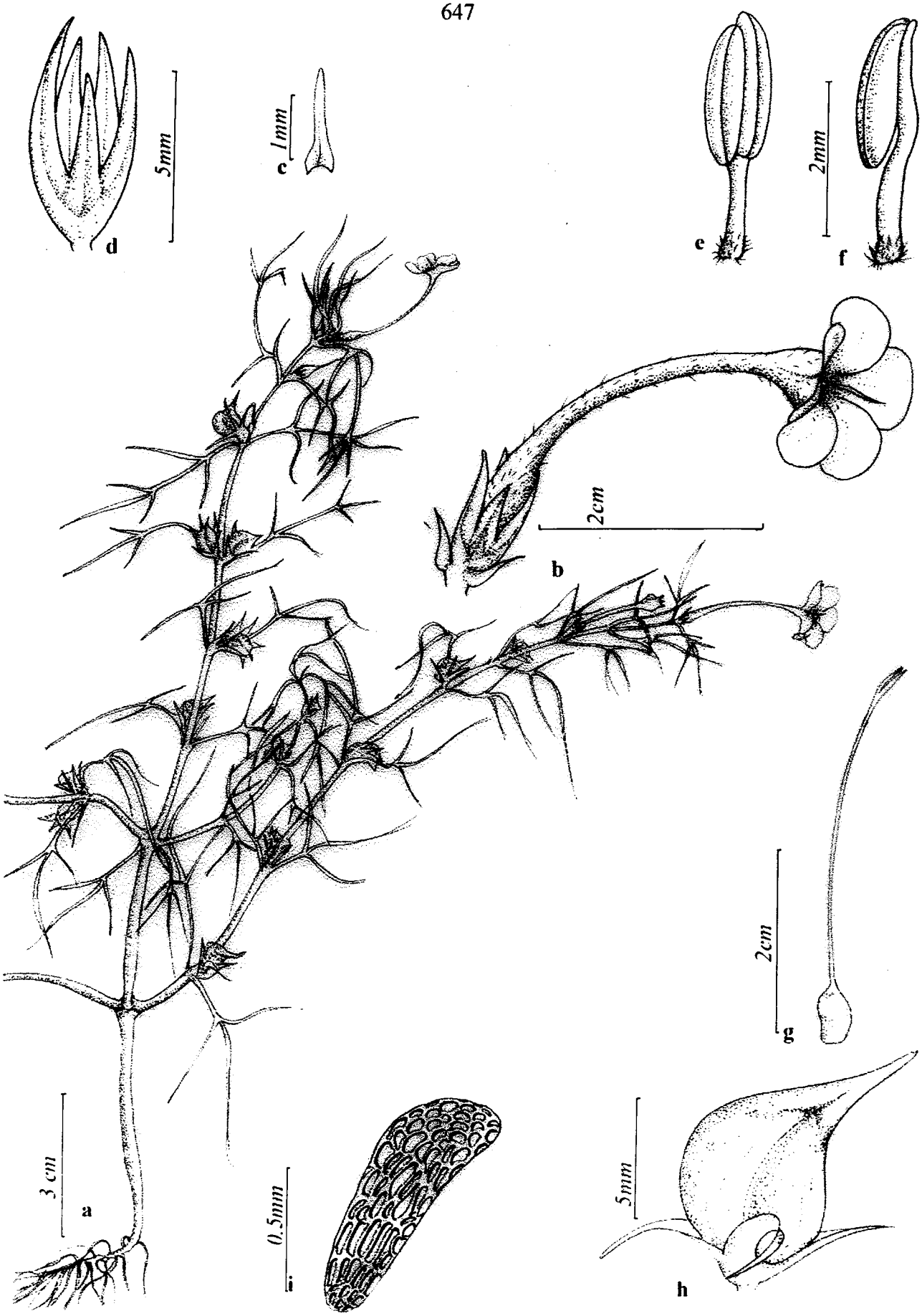


Fig. 50. *Rhamphicarpa longiflora* (Arn.)Benth.: a. Habit ; b. Single flower; c. Bracteole; d. Calyx; e & f. Stamen-side and ventral views; g. Pistil; h. Fruit.

STEMODIA Linnaeus

Syst. Nat. (ed. 10). 1091, 1118, 1374. 1759 (*nom. cons.*).

Stemodia verticillata (Mill.) Sprague, Kew Bull. 1921: 211. 1921; Alston in Trimen, Handb. Fl. Ceylon 6: 211. 1931; Abeywick., Ceylon J. Sci. Bio. Sci. 2(2): 221. 1951; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 420. 1981; Sivar. & Babu, J. Econ. Tax. Bot. 5: 939. 1984. *Erinus verticillatus* Mill., Gard. Dict. (ed. 8) no. 5. 1768. *Stemodia parviflora* Ait., Hort. Kew. ed. 2, 52. 1810.

Small annual herbs up to 10 cm high, much branched, hairy throughout. Leaves: lower opposite, upper ones in verticils of 3, 0.7-1.5 x 0.5-1.4 cm, ovate-acute, truncate at base, margin coarsely crenate-serrate, apex subacute, penninerved; petiole 4-8 mm long, minutely glandular-hispid. Flowers axillary, solitary, sessile or subsessile. Calyx 5-partite, 2-3 mm long, linear-lanceolate, glandular-hairy. Corolla bluish, c. 5 mm long, tube 3-4 mm long, cylindric, villous inside, limb shortly bi-lipped. Stamens 4; anther cells shortly stipitate. Capsule 3 mm across, orbicular, biconvex, shorter than calyx, 4-valved. Seeds c. 0.5 mm long, cuneiform, truncate at both ends and longitudinally ribbed, dark brown.

Fl. & Fr.: Mar-Aug.

Distr.: Native of tropical America, now pantropical. Often as a weed in gardens. *CNS 2584* (S. L. Puram).

STRIGA Loureiro

Fl. Cochinch. 17. 1790.

Striga angustifolia (D. Don) Sald., Bull. Bot. Surv. India 5: 70. 1963 & in Sald. & Nicols., Fl. Hassan Dist. 526. 1976; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 401. 1981; Mani. & Sivar., Fl. Calicut 195. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1103. 1983; Ramach. & Nair, Fl. Cannanore 321. 1988; Mani., Fl. Silent Valley 197. 1988; Vajravelu, Fl. Palghat Dist. 327. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 331. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 325. 1996. *Buchnera angustifolia* D. Don, Prodr. 91. 1825. *Striga euphrasioides* auct., non Benth., 1835. excl.

basionym; Hook. f., Fl. Brit. India 4: 299. 1884; Gamble, Fl. Pres. Madras 968. 1924. Sant., J. Bombay Nat. Hist. Soc. 49: 44. 1951.

Annual erect scabrid herbs, often semiparasites; stem obtusely 4-angled. Leaves 1-2 x 0.2-0.4 cm, linear, setulose on both sides, ciliolate along margins, upper leaves smaller. Flowers subsessile, white in terminal lax bracteate spikes; bracteoles 2. Calyx tubular 10-15-ribbed, lobes c. 3 x 1 mm, linear, setulose. Corolla c. 1 cm long, tube strigose on upper half, incurved above the middle, lobes spreading, emarginate and orbicular. Stamens 4, didynamous, included; anthers 1-celled. Capsule c. 6 mm long, oblong, prominently ribbed, setose.

Fl. & Fr.: Aug.-Oct.

Distr.: Indo-Malesia. Among short grasses in dry sandy soil. *CNS 1701* (Pathirappally).

TORENIA Linnaeus

Sp. Pl. 619. 1753.

Torenia bicolor Dalz. in Hooker's J. Bot. Kew Gard. Misc. 3: 38. 1851; Hook. f., Fl. Brit. India 4: 278. 1884; Gamble, Fl. Pres. Madras 957. 1924; Sald., Bull. Bot. Surv. India 8: 129. 1966 & in Sald. & Nicols., Fl. Hassan Dist. 527. 1976; Mani. & Sivar., Fl. Calicut 196. 1982; Ramach. & Nair, Fl. Cannanore 322. 1988; Mani., Fl. Silent Valley 198. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 244. 1988; Vajravelu, Fl. Palghat Dist. 327. 1990; Sivar. & Mathew, Fl. Nilambur 478. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 326. 1996. ***Kaka-pu*** Rheede, Hort. Malab. 9: 103, t. 53. 1689. ***Kaka-poo.***

Decumbent annual; stem 4-angled, ciliate along the ridges near the nodes. Leaves 1.5-3.5 x 1-2.2 cm, triangular-ovate, base truncate or subcordate, margin serrate, apex acute, sparsely pubescent, membranous; petiole 1-1.5 cm long, sparsely hirsute. Flowers axillary, solitary or in pairs; pedicels 1.5-3 cm long. Calyx 1.2-1.5 cm long, keeled; keel decurrent on pedicels, glabrous. Corolla 2-2.5 cm long, deep purple or tube yellowish and lobes deep purple. Stamens 4, didynamous; anthers connate in pairs; appendage of

staminal filament short, stout. Ovary oblong. Capsule 1-1.5 cm long, oblong, included; fruiting pedicles to 3.5 cm long. Seeds subglobose, rugose.

Fl. & Fr.: Sep.-Jan.

Distr.: Endemic to Peninsular India. In moist places and shades. Common. Peak of flowering usually after monsoon. *CNS 1930* (Chathiyara).

85. OROBANCHACEAE Ventenat

Tabl. Regne Veg. 2: 292. 1799.

CHRISTISONIA G. Gardner

Calcutta J. Nat. Hist. 8: 153. 1847.

Christisonia tubulosa (Wight) Benth. ex Hook. f., Fl. Brit. India 4: 421. 1884; Gamble, Fl. Pres. Madras 975. 1924; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 534. 1976; Mohanan & Henry, Fl. Thiruvananthapuram 334. 1994. *Oligopholis tubulosa* Wight, Ic. t. 1422. 1849.

Fleshy leafless parasitic herbs, 15-26 cm high. Stem scaly, simple or branched from the rootstock. Scales 2-3 mm long, ovate-lanceolate. Inflorescence terminal, lax racemes; pedicels 1-2.5 cm long. Calyx tubular; tube 0.8-1.2 cm long; lobes obtuse. Corolla funnel-shaped, purplish white; tube 2.5-4 cm long, 2-lipped, 5-lobbed; lobes orbicular, subequal, lower lip yellowish at throat. Stamens 4, didynamous, connivent in pairs; anthers 2-celled, 1 cell perfect, other sterile, spurred. Ovary 1-celled, ovules many; style slender; stigma peltate. Capsule 0.8-1.2 cm long, ovoid. Seeds many, minute, calyx tube persistent in fruits.

Fl. & Fr.: Oct. - Dec.

Distr.: Peninsular India. Rare. Once collected from Edathala roadside. *CNS 1483* (Edathala).

86. LENTIBULARIACEAE Rich.

in Poiteau & Turpin, Fl. Paris 1, ed. 4: 261.

UTRICULARIA Linnaeus

Sp. Pl. 18. 1753.

Terrestrial or aquatic, annual or perennial herbs. Stem modified into stolons, root-like rhizoids and leaf-like foliar organs. Traps intermingled with rhizoids and foliar organs, usually minute, with a lateral, basal or sometimes terminal mouth, provided with very diverse external appendages. Scapes erect or twining, with or without scales. Bracts basifixed or medifixed; bracteoles usually present. Calyx 2-lobed, the lobes similar or dissimilar. Corolla bilabiate; tube very 2 short; upper lip usually entire or 2-lobed, usually smaller than the lower; lower lip usually with a well defined palate and often swollen at the base, apex entire or 2-5-lobed, spurred. Stamens 2, inserted at the base of the corolla; filaments straight or curved; anthers dorsifixed. Ovary ovoid or globose; style usually short; stigma 2-labiate, the lower lip usually the larger and receptive. Capsule globose or ovoid, dehiscing by longitudinal slits or by pores or circumscissile. Seeds small, usually numerous, lenticular, ellipsoid or prismatic; testa winged, reticulate or smooth.

1a. Aquatic, submerged floating herbs ; foliar organs dissected into narrow segments.
  2a. Primary foliar segments one or two ; upper corolla lip larger than the lower; seeds lenticular, broadly winged, testa smooth ..... **U. exoleta**
  2b. Primary foliar segments three or more; upper corolla lip smaller than the lower; seeds prismatic with sharp angles and slightly winged margins, testa reticulate ..... **U. aurea**

1b. Terrestrial herbs; foliar organs entire.
  3a. Corolla yellow ..... **U. bifida**
  3b. Corolla other than yellow.
    4a. Bracts medifixed ..... **U. caerulea**
    4b. Bracts basifixed.
      5a. Racemes twining; flowers 1.5-2.5 cm long ..... **U. reticulata**
      5b. Racemes erect; flowers less than 8 mm long.

6a. Spur horizontal; foliar organs 1-nerved; mouth of trap..... lateral ..... **U. minutissima**

6b. Spur descending; foliar organs 3-nerved; mouth of trap basal ..... **U. uliginosa**

Utricularia aurea Lour., Fl. Cochinch. 1: 26. 1790; A. DC. in DC., Prodr. 8: 8. 1844; Basak, Bull. Bot. Surv. India 17: 99. 1975 (1978); Mani. & Sivar., Fl. Calicut 208. 1982; Srivastava, J. Econ. Tax. Bot. 4: 188. 1983; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1111. 1983; Taylor, Kew Bull. Add. Ser. 14: 623. f. 190. 1989 & in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 198. 1995; Vajravelu, Fl. Palghat Dist. 329. 1990; Janarth. & Henry, Bladderworts of India 30. 1992. *Utricularia flexuosa* Vahl, Enum. 1: 198. 1804; A. DC. in DC., Prodr. 8: 24. 1844; Oliver, J. Linn. Soc. Bot. 3: 175. 1859; Clarke in Hook. f., Fl. Brit. Ind. 4: 328. 1884; Gamble, Fl. Pres. Madras 980. 1924; Santapau, J. Bombay Nat. Hist. Soc. 49: 218. 1950. *Utricularia fasciculata* Roxb., Fl. Ind. 1: 143. 1820; Wight in Hooker's J. Bot. Kew Gard. Misc. 1: 372. 1849 & Ic. t. 1568. 1850.

Suspended aquatic herbs; rhizoids usually absent; stolon up to 1 m long, c. 2.5 mm thick, floating below the surface of water, branched. Foliar organs semi-verticillate, repeatedly dichotomously branched, upto 6 cm long, ultimate segments capillary, terete, setulose. Traps numerous, 2-5 mm across, ovoid or obovoid, lateral on the secondary and tertiary segments, green, turning black with age, stalked; mouth lateral, oblique; appendages usually 2 or more in number. Racemes arising at intervals on the stolons, to 20 cm long; scales absent; bracts basifixed, 1-2 mm long, ovate. Flowers up to 12 mm long; pedicels to 1.5 cm long, recurved and distally thickened in fruit. Calyx-lobes subequal, 2-3 mm long, ovate, becoming much larger and reflexing in fruit. Corolla yellow; upper lip erect, c. 5 x 4 mm, suborbicular, obtuse at apex; lower lip c. 6 x 9 mm, morel or less obovate, hairy in throat, bigibbous at base; spur more or less equal to lower lip, in length. Stamens 2; filaments curved, 1- 1.5 mm long. Ovary ovoid; stigma 2-lipped. Capsule up to 5 mm across, globose with a long beak, circumscissile. Seeds disk-shaped, angular, margin winged.

Fl. & Fr.: Aug.-Apr.

Distr.: Tropical Asia, from India to China, Japan and New Guinea and in tropical Australia. Common in stagnant or slow running waters. *CNS 1249* (Thalavady).

Utricularia bifida L., Sp. Pl. 18. 1753; Oliver, J. Proc. Linn. Soc. Bot. 3: 182. 1859; Clarke in Hook f., Fl. Brit. Ind. 4: 332. 1884; Prain, Rec. Bot. Surv. India 3: 155. 1905; Gamble, Fl. Pres. Madras 982. 1924; Basak, Bull. Bot. Surv. India 17: 104. 1975 (1978); Gandhi in Sald. & Nicols., Fl. Hassan Dist. 563. 1976; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1112. 1983; Srivastava, J. Econ. Tax. Bot. 4: 189. 1983; Taylor, Kew Bull. Add. Ser. 14: 307, t. 82. 1989 & in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 182. 1995; Janarth. & Henry, Bladderworts of India 37. 1992. *Utricularia humilis* Vahl, Enum. 1: 203. 1804. *Utricularia wallichiana* Benj., Bot. Zeitung (Berlin) 3: 213. 1845. *Utricularia alata* Benj., Bot. Zeitung (Berlin) 3: 212. 1845 (Plate XIX: B; Fig. 51).

Terrestrial herbs; rhizoids filiform; stolons up to 2.5 cm long, branched, filiform. Foliar organs up to 8 mm long, narrowly linear, obtuse at apex, 1-nerved. Traps numerous, c. 1 mm across, reniform, stalked; appendages 2, subulate. Racemes 2-7 cm long, erect, solitary, 1-5-flowered; scales c. 1 mm long, ovate, basifixed, acute at apex; bracts 1-2 mm long, ovate to linear-lanceolate, basifixed, acute at apex; bracteoles subulate, shorter than the bract. Flowers 4-8 mm long; pedicels 2-4 mm long, broadly winged, erect in anthesis, recurved in fruit. Calyx-lobes 2, subequal, 2-4 x 2-3 mm, broadly ovate, apex obtuse. Corolla yellow; upper lip 2-4 x 1-2 mm, linear-oblong, rounded at apex; lower lip 2-4 mm across, orbicular to obovate, rounded at apex; spur subulate, about as long as the limb. Filaments straight. Ovary ovoid; stigma 2-lipped. Capsules c. 2.5 x 2 mm, ovoid, slightly compressed. Seeds ovoid, testa reticulate.

Fl. & Fr.: Aug.-Nov.

Distr.: Tropical Asia, from India to China, Japan and New Guinea and tropical Australia. In wet soil and as a weed in rice fields. *CNS 1105* (Punnapra), *CNS 2464* (Vandanam).

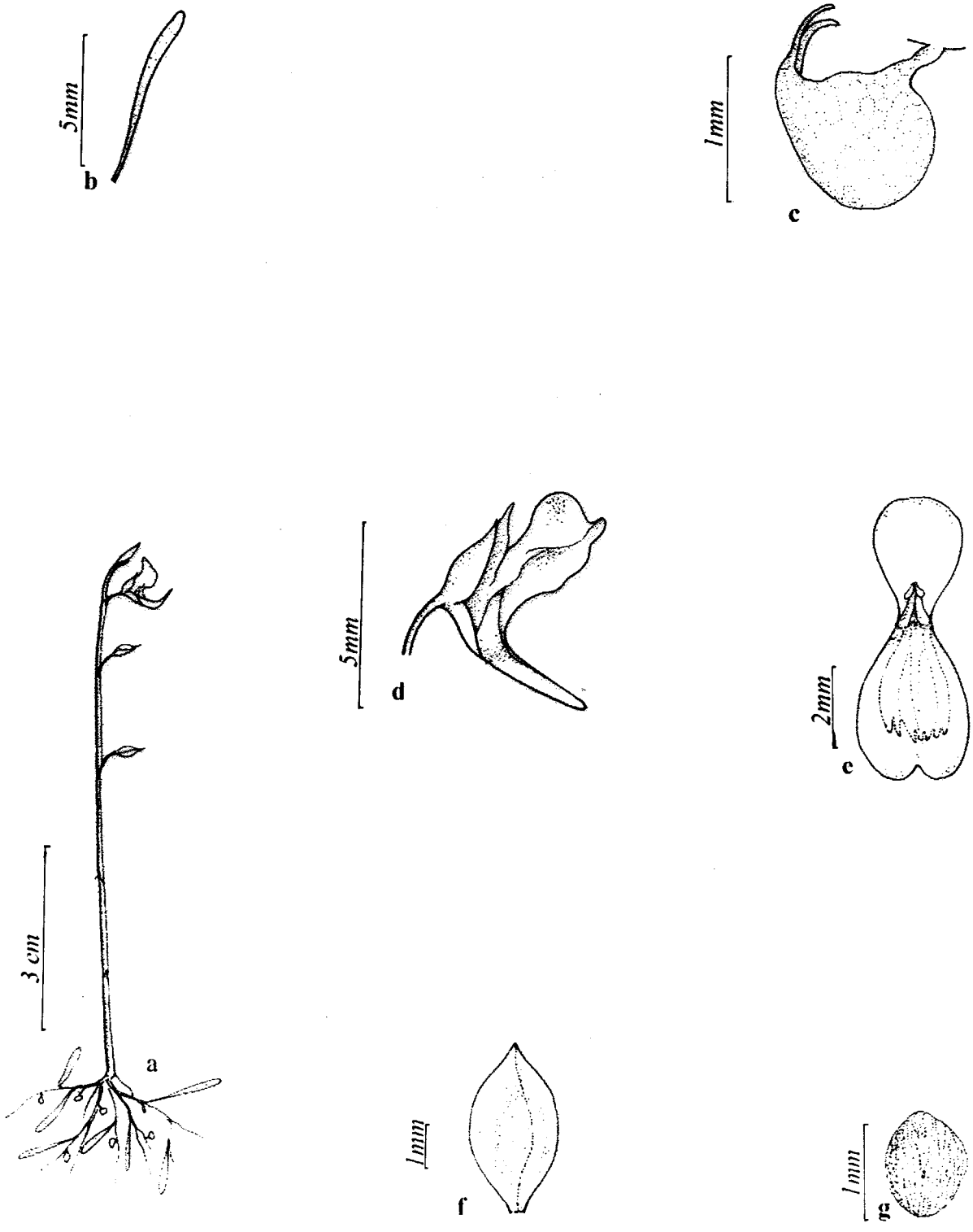


Fig. 51. *Utricularia bifida* L.: a. Habit; b. Foliar organ; c. Trap; d. Flower; e. Corolla with lips spread out; f. Capsule with fruiting calyx; g. Seed.

Utricularia caerulea L., Sp. Pl. 1: 18. 1753; Wight in Hooker's J. Bot. Kew. Gard. Misc. 1: 374. 1849 & Ic. t. 1583. 1850; Gamble, Fl. Pres. Madras 983. 1924; Sant., J. Bombay Nat. Hist. Soc. 49. 217. 1950; Basak, Bull. Bot. Sur. India 17: 101. 1975 (1978) & 21: 216. 1979 (1981); Gandhi in Sald. & Nicols., Fl. Hassan Dist. 564. 1976; Raghavan *et al.*, Rec. Bot. Surv. India 21: 63. 1981; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1112. 1983; Srivastava, J. Econ. Tax. Bot. 4: 189. 1983; Mani., Fl. Silent Valley 199. 1988; Taylor, Kew Bull. Add. Ser. 14: 187, f. 43a & b. 1989 & in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 180. 1995; Vajravelu, Fl. Palghat Dist. 330. 1990; Janarth. & Henry, Bladderworts of India 42. 1992; Sasi. & Sivar., Fl. Pl. Thrissur For. 328. 1996. *Utricularia nivea* Vahl, Enum. Pl. 1: 203. 1804; Wight in Hooker's J. Bot. Kew Gard. Misc. 1: 372. 1849 & Ic. t. 1582. 1850; Oliver in J. Proc. Linn. Soc. Bot. 3: 186. 1859; Basak, Bull. Bot. Surv. India 17: 101. 1975 (1978). *Utricularia rcemosa* Wall. ex Walp. in Meyen, Obs. Nova Acta 19: 401. 1843; Clarke in Hook. f., Fl., Brit. India 4: 333. 1884. *Utricularia filicaulis* Wall. ex A. DC. in DC., Prodr. 8: 21. 1844; Oliver, J. Proc. Linn. Soc. Bot. 3: 186. 1859.

Terrestrial herbs; rhizoids upto 2.5 cm long; stolons capillary, upto 2 cm long. Foliar organs upto 1 cm long, narrowly obovate, rosulate, apex rounded. Traps numerous 1-1.5 mm long, ovoid, stalked. Racemes 2.5-6 cm long, terete; scales similar to the bracts; bracts 1.5-3 mm long, narrowly elliptic, acute at both ends; bracteoles 1-2 mm long. Flowers up to 4 mm long; pedicels c. 1.5 mm long, often recurved in fruit. Calyx lobes subequal, c. 1.5 mm long, ovate, hooded. Corolla purple or cream; upper lip 2-lobed, c. 2 mm long, obovate to oblong, notched or emarginate at apex; lower lip 2-3 mm long, suborbicular to broadly ovate; spur 3-4 mm long, slightly curved forwards. Stamens 2; filaments c. mm long. Ovary ovoid; stigma 2-lipped. Capsules 1.5-2 mm across, subglobose. Seeds ovoid or ellipsoid, reticulate.

Fl. & Fr.: Aug.-Nov.

Distr.: Madagascar, Sri Lanka, India to Japan, Malesia and Australia. On wet or marshy open sandy soil. *CNS 1109* (Punnapra), *CNS 2465* (Vandanam).

Utricularia exoleta R. Br., Prodr. 430. 1810; Clarke in Hook. f., Fl. Brit. India 4: 329. 1884; Woodrow, J. Bombay Nat. Hist. Soc. 12: 175. 1898; Wood, Rec. Bot. Surv. India 2: 124. 1902; Gamble, Fl. Pres. Madras 980. 1924; Sant., J. Bombay Nat. Hist. Soc. 49: 218. 1950; Deb., Bull. Bot. Surv. India 3: 342. 1961; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 564. 1976; Srivastava, J. Econ Tax. Bot. 4: 190. 1983; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1114. 1983; Janarth. & Henry, Bladderworts of India 49. 1992. *Utricularia diantha* Roxb. ex Roem. & Schult., Mant. 1: 169. 1822; Wight in Hooker's J. Bot. Kew Gard. Misc. 1: 372. 1849 & Ic. t. 1569. 1850; Oliver, J. Proc. Linn. Soc. Bot. 3: 176. 1859. *Utricularia gibba* L. subsp. *exoleta* (R. Br.) Taylor in Mitt. Bot. Staatssamml. Muenchen 4: 101. 1961 & in Kew Bull. 18: 204. 1964; Rau, Bull. Bot. Surv. India 10: 57. 1968; Basak., Bull. Bot. Surv. India 17: 100. 1975 (1978); Raghavan *et al.*, Rec. Bot. Surv. India 21: 63. 1981; Mani. & Sivar., Fl. Calicut 208. 1982.

Suspended aquatic herbs; stolons upto 10 cm long, filiform, profusely branched. Foliar organs upto 1 cm long, simple or 1-3 times dichotomously divided from base. Traps rather few, c. 1.5 mm across, ovate to reniform, lateral; on the primary to penultimate segments; mouth lateral, appendages 2 or rarely more. Racemes 4-10 cm long, erect, 1-3 flowered; scales 1 or 2 or sometimes absent, similar to the bracts; bracts basifixed, c. 1 mm long, oblong, truncate or denticulate at apex. Flowers up to 6 mm long; pedicels 3-6 mm long, suberect. Calyx lobes subequal, 1-2 mm long, broadly ovate. Corolla yellow; upper lip c. 3 mm long, suborbicular; rounded at apex; lower lip c. 2.5 mm long, suborbicular; spur as along as lower lip, conical, obtuse at apex. Stamens c. 1 mm long. Ovary globose. Capsules c. 3 mm across, globose. Seeds lenticular, smooth, with a relatively broad thick wing.

Fl. & Fr.: Nov.-Feb.

Distr.: Tropical Africa, Portugal, India to China and Japan, N. and E. Australia and Malesia.. In shallow waters. *CNS 2466* (Thamarakulam).

Utricularia minutissima Vahl, Enum. 1: 204. 1804; Oliver, J. Proc. Linn. Soc. Bot. 3: 190. 1859; Clarke in Hook. f., Fl. Brit. India 4: 334. 1884; Nair, J. Bombay Nat. Hist. Soc. 62: 180. 1965; Abraham, J. Bombay Nat. Hist. Soc. 63: 459. 1967; Rao & Banerjee, J.

Bombay Nat. Hist. Soc. 64: 583. 1968; Basak, Bull. Bot. Surv. India 17: 102. 1975 (1978); Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1117. 1983; Taylor, Kew Bull. Add. Ser. 14: 170, f. 37. 1989 & in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 177. 1995; Janarth. & Henry, Bladderworts of India 72. 1992. *Utricularia capillacea* Wight ex Oliver, J. Proc. Linn. Soc. Bot. 3: 184. 1859, non Willd., 1797. *Utricularia lilliput* Pellegr., Bull. Mus. Hist. Nat. (Paris) 26: 181. 1920; Subram. & Balakr., Bull. Bot. Surv. India 2: 347. 1960.

Terrestrial herbs; rhizoids upto 1 cm long, filiform; stolons capillary, up to 1.5 cm long, sparsely branched. Foliar organs 0.6-1 cm long, linear, glandular at base, apex rounded. Traps numerous, upto 0.4 mm long, reniform to ovoid, stalked, attached on the foliar organs and on the rhizoids; mouth lateral with 2 bristles and gland-tipped process. Racemes 1.5-4 cm long, erect, purple, 1-3- flowered; scales similar to bracts; bracts c. 0.5 mm long, linear-ovate, basifixed; bracteoles similar but often narrower. Flowers c. 3 mm long; pedicels c. 0.5 mm long. Calyx lobes subequal, 1-1.5 mm long, ovate, hooded. Corolla pink; upper lip c. 2. 5 mm long, oblong, obtuse or shallowly emarginate; lower lip, c. 3 mm long, ovate-orbicular, obscurely 3-lobed; spur up to 2.5 mm long, straight. Stamens 2; filaments c. 0.5 mm long. Ovary obliquely ovoid. Capsules upto 2 mm long, obliquely ovoid. Seeds globose to obovoid, testa reticulate.

Fl. & Fr.: Aug.-Oct.

Distr.: India to Japan and South to Australia. In wet sandy soil near water stagnant places. *CNS 1111* (Punnapra).

Utricularia reticulata Smith, Exotic Bot. 2: 119. 1805; Oliver, J. Proc. Linn. Soc. Bot. 3: 180. 1859; Clarke in Hook. f., Fl. Brit. India 4: 331. 1884 p.p.; Woodrow, J. Bombay Nat. Hist. Soc. 12: 176. 1898; Gamble, Fl. Pres. Madras 982. 1924; Sant., J. Bombay Nat. Hist. Soc. 49: 219. 1950 & Rec. Bot. Surv. India 16: 188. 1967; Raghavan *et al.*, Rec. Bot. Surv. India 21: 63. 1981; Mani. & Sivar., Fl. Calicut 208. 1982; Ramach. & Nair, Fl. Cannanore 324. 1988; Taylor, Kew Bull. Add. Ser. 14: 362, f. 103. 1989 & in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 187. 1995; Janarth. & Henry, Bladderworts of India 91. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 335. 1994; Sivar. &

Mathew, Fl. Nilambur 481. 1996. *Utricularia reticulata* Smith var. *parviflora* Sant., Kew Bull. 1948: 491. 1949; Sant., J. Bombay Nat. Hist. Soc. 49: 220. 1950. *Utricularia caerulea* auct., non L., 1753: Burm. f., Fl. Ind. 11. 1768; Bhattacharyya, Bull. Bot. Soc. Bengal 30: 76. 1976 (1978). *Utricularia graminifolia* sensu Graham, Cat. Pl. Bombay 165. 1839, non Vahl, 1804 (Plate XIX: A; Fig. 52).

Terrestrial herbs; rhizoids upto 2 cm long, capillary; stolons upto 5 cm long, capillary, profusely branched. Foliar organs upto 1 cm long, narrowly linear, 1-nerved, attenuate at base, obtuse at apex. Traps numerous, 0.5-1 mm long, subglobose; appendages 2, subulate. Racemes up to 45 cm long, twining, rarely erect; scales similar to the bracts; bracts 2-3 x 1-1.5 mm, ovate to lanceolate, basifixed, apex acute; bracteoles subulate, about as long as bract. Flowers 1.5-2.5 cm long; pedicles 5-15 mm long, erect at anthesis, deflexed in fruit, narrowly winged. Calyx lobes subequal, 4-8 x 3-7 mm, lanceolate to ovate, acute to acuminate at apex. Corolla violet, blue or white; upper lip 7-12 mm long, obovate or suborbicular; lower lip 10-15 x 8-11 mm, orbicular to obovate, apex rounded; spur subulate about as long as the limb, conical, slightly curved. Stamens 2-3 mm long. Ovary ovoid; stigma 2-lipped, truncate at apex. Capsules 4-6 x 3-4 mm, ovoid or discoid, compressed. Seeds obovoid, testa reticulate.

Fl. & Fr.: Aug.-Dec.

Distr.: Tropical Asia, India and Sri Lanka. In marshy grasslands, water-logged soil and as a weed of rice fields. *CNS 1107* (Punnapra).

Utricularia uliginosa Vahl, Enum. 1: 203. 1804; Wight in Hooker's J. Bot. Kew Gard. Misc. 1: 372. 1849 & Ic. t. 1574. 1850; Gamble, Fl. Pres. Madras 981. 1924; Sant., J. Bombay Nat. Hist. Soc. 49: 218. 1950 & Rec. Bot. Surv. India 16: 188. 1967; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 566. 1976; Mani. & Sivar., Fl. Calicut 209. 1982; Taylor, Kew Bull. Add. Ser. 14: 333, f. 92. 1989, p.p. & in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 183. 1995; Vajravelu, Fl. Palghat Dist. 331. 1990; Janarth. & Henry, Bladderworts of India 133. 1992; Sasi. & Sivar., Fl. Pl. Thrissur For. 328. 1996. *Utricularia affinis* Wight, Hooker's J. Bot. Kew Gard. Misc. 1: 373. 1849 & Ic. t. 1580, f.

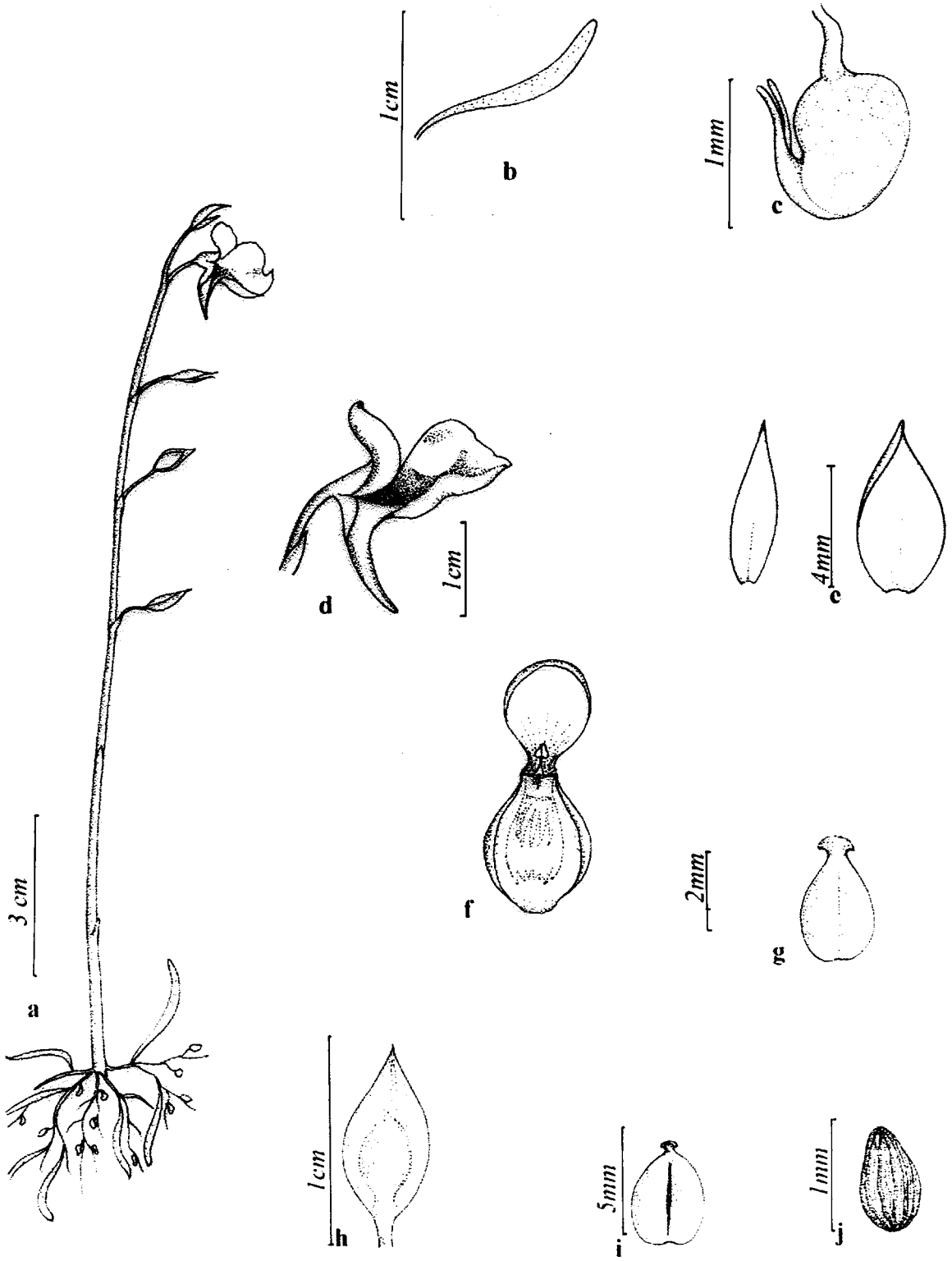


Fig. 52. *Utricularia recticulata* Smith: a.Habit; b. Foliar organ; c. Trap; d. Flower; e. Calyx lobe; f. Corolla with lips spread out; g. Pistil; h. Capsule with fruiting calyx; i. Capsule; j. Seed.

1. 1850; Oliver, J. Proc. Linn. Soc. Bot. 3: 178. 1859; Clarke in Hook. f., Fl. Brit. India 4: 330. 1885. *Utricularia caerulea* L. var. *affinis* (Wight) Thw., Enum. Pl. Zeyl. 171. 1860.

Terrestrial herbs; rhizoids upto 1.5 cm long; stolons upto 4 cm long, profusely branched. Foliar organs upto 5 x 0.6 cm, linear, rounded at apex, 3-nerved. Traps c. 1 mm across, subglobose; mouth basal; appendages 2. Racemes upto 15 cm long, erect, 1- 5-flowered; scales few, similar to the bracts; bracts c. 2 mm long, ovate-deltoid, basifixed, acute at apex; bracteoles subulate, shorter than the bract. Flowers up to 6 mm long; pedicels to c. 3 mm long, winged, erect or spreading in fruit. Calyx lobes subequal, 3-4 mm long in fruit, broadly ovate. Corolla blue; upper lip 2-3 mm long, oblong; lower lip 3-4 mm long, obovate to oblong; spur 3-5 mm long. Filaments straight. Ovary ovoid; stigma bilipped. Capsules 3-4 x 2-3 mm, ovoid. Seeds subglobose, reticulate.

Fl. & Fr.: Aug.-Nov.

Distr.: Tropical Asia from India to China, Japan and New Guinea and Tropical Australia. In wet sandy or muddy soil and along the margins of ponds. *CNS 1108* (Vandanam).

87. BIGNONIACEAE Juss.

Gen. Pl. 137. 1789.

1a. Leaves bipinnate to decompound.

2a. Stamens 5; corolla campanulate; capsule flat; leaflets 6-13 cm long ..... **Oroxylum**

2b. Stamens 4; corolla tubular, slender, curved; capsule terete; leaflets 2.5-6 cm long ..... **Millingtonia**

1b. Leaves simple-pinnate.

3a. Calyx spathaceous, split on one side.

4a. Corolla crimson-red, bell-shaped; capsule terete ..... **Spathodea**

4b. Corolla white, funnel-shaped; capsule subterete ..... **Dolichandrone**

3b. Calyx not spathaceous.

5a. Leaflets more than 20, 3-9 cm wide, margin entire; corolla pale purple, white inside; capsule winged ..... **Pajanelia**

5b. Leaflets 5-9, 1.8-3 cm wide, margin serrate, corolla yellow; capsule not winged ..... **Tecoma**

DOLICHANDRONE (Fenzl) B. Seemann

Ann. Mag. Nat. Hist. Ser. 3, 10: 31.1862 (*nom. cons.*).

Dolichandrone spathacea (L.f.) K. Schum., Fl. Kais. Wilh. Land. 123. 1889; Gamble, Fl. Pres. Madras 996. 1924; Theob. in Dassan. & Fosb., Rev. Handb.Fl. Ceylon 2: 392. 1981; Mani. & Sivar., Fl. Calicut 210. 1982; Nicols.,Suresh & Mani., An Interpr. Hort. Malab. 72. 1988. *Bignonia spathacea* L. f., Suppl. Pl. 283. 1781. *Spathodea rheedei* Spreng., Syst. Veg. 2: 835. 1825 ("*rheedii*"). *Dolichandrone rheedei* (Spreng.) Seem., J. Bot. 8: 380. 1870; Hook. f., Fl. Brit. India 4: 379. 1884 ("*rheedii*"). ***Niir-pongelion*** Rheede, Hort. Malab. 6: t. 29. 1686 (Plate XIX: C).

Trees Leaves 5-7-foliolate; leaflets 6-14 x 3.5-7 cm, ovate-lanceolate, base truncate; margin entire, apex acuminate, glabrous, shortly petiolate. Flowers large, white, in terminal corymbs; pedicel to 2 cm long, stout. Calyx spathaceous, 4.5-6 x 2.5-3.5 cm, obovate. Corolla fragrant, 10-13 cm long, c. 7 cm across, funnel-shaped; lobes orbicular, margin crispid. Stamens 4, didynamous; filaments to 3 cm long, curved, glabrous; anthers c. 4 mm long. Ovary c. 1 cm long, linear-oblong; style slender to 10.5 cm long; stigma 2-lipped. Capsule to 40 x 2.5 cm, subterete. Seeds compressed with membranous wing.

Fl. & Fr.: Jun.-Aug.

Distr.: India, S.E. Asia, Indonesia and Solomon Islands. Commonly found along the banks of rivers and streams or scattered near mangroove swamps. *CNS 1463* (Thanneermukkom).

MILLINGTONIA Linnaeus f.

Suppl. Pl. 45. 1782.

Millingbtonia hortensis L. f., Suppl. Pl. 291. 1781; Wight, Ill. t. 161, f. 6. 1850; Hook. f., Fl. Brit. India 4: 377. 1884; Gamble, Fl. Pres. Madras 994. 1924; Matthew & Rani in

Matthew, Fl. Tam. Carnatic 3: 1131. 1983; Vajravelu, Fl. Palghat Dist. 336. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 339. 1994. *Bignonia suberosa* Roxb., Pl. Corom. t. 214. 1811 & Fl. Ind. 3: 111. 1832.

Trees; bark thick corky. Leaves bipinnate; leaflets 2.5-6 x 2-4.2 cm, elliptic-ovate, base rounded, often oblique, margin crenate or coarsely toothed, apex acuminate, chartaceous; petiolule to 1 cm long. Flowers in terminal corymbose panicles. Calyx 3-4 mm long, cupular, puberulous; lobes 5, obtuse. Corolla white; tube to 10 cm long, cylindric, lobes 5. Stamens 4; anthers oblong, with 1 fertile cell, barren cell reduced to an appendage. Stigma ovate, acute. Capsule terete.

Fl. & Fr.: Nov. - Dec.

Distr.: South East Asia and Malesia Common in plains, often planted. *CNS 1957* (Chengannur).

OROXYLUM Ventenat

Decas Gen. Nov. 8. 1808.

Oroxylum indicum (L.) Vent., Dec. Gen. Nov. 9. 1808; Clarke in Hook. f., Fl. Brit. India 4: 378. 1884; Gamble, Fl. Pres. Madras 994. 1924; Theob. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 389. 1981; Mani. & Sivar., Fl. Calicut 210. 1982; Ramach. & Nair, Fl. Cannanore 327. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 73. 1988; Vajravelu, Fl. Palghat Dist. 335. 1990; Sivar. & Mathew, Fl. Nilambur 483. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 331. 1996. *Bignonia indica* L., Sp. Pl. 625.1753. *Spathodea indica* Pers., Syn. Pl. 2: 173. 1806. *Calosanthes indica* (L.) Bl., Bijdr. 761. 1826; Wight, Ic. t. 1387. 1848. ***Palega-pajaneli*** Rheede, Hort. Malab. 1: 78a, t.43. 1678. ***Palakappayyani***.

Deciduous trees; bark grey, lenticelled. Leaves bipinnate to decompound; rachis to 1 m long; leaflets 2-4 pairs per pinna, 6-13 x 4-8 cm, ovate or elliptic, base rounded or cordate, apex acuminate. Flowers in terminal racemes, on stout, woody peduncles, to 50 cm long; pedicels 1-2 cm long. Calyx purplish, to 2.5 cm long, campanulate, coriaceous, glabrous, mouth truncate. Corolla pink outside and maroon within, c. 10 cm long,

campanulate; lobes 5, subequal, c. 3 cm long. Stamens 4, exserted; filaments hairy at base. Capsule 40-60 x 5-8 cm, compressed, linear, flat, tapering at both ends. Seeds 5-6 cm long, discoid, thin, winged all around except at the base.

Fl. & Fr.: Aug. - Nov.

Distr.: Indo - Malesia. In sacred groves. *1486* (Nagarmkulangara).

PAJANELIA A. P. de Candolle

Biblioth. Universelle Geneve Ser.2, 17:130. 1838.

Pajanelia longifolia (Willd.) Schum. in Engl. & Prantl, Pflanzenfam. 4. 3b: 244.1895; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 536. 1976; Mani. & Sivar., Fl. Calicut 210. 1982; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 73. 1988; Ramach. & Nair, Fl. Cannanore 327. 1988; Vajravelu, Fl. Palghat Dist. 335. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 339. 1994; Sivar. & Mathew, Fl. Nilambur 484. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 332. 1996. *Bignonia longifolia* Willd., Sp. Pl. 3: 306. 1800. *Pajanelia rheedii* Wight, Ic. tt. 1343,1344. 1848; Hook. f., Fl. Brit. India 4: 384. 1884; Gamble, Fl. Pres. Madras 1000. 1924. ***Pajaneli*** Rheede, Hort. Malab. 1: 79-80, t. 44. 1678.

Medium sized deciduous trees; bark pale grey with lenticels linearly arranged. Leaves imparipinnate, crowded towards the tip of branchlets; rachis trigonous, 50-90 cm long; leaflets 12-14 pairs, 8-20 x 3-9 cm, ovate-elliptic, oblique, base attenuate to rounded, apex acute. Flowers large in terminal 30-50 cm long racemes; pedicels c. 1 cm long. Calyx2.5-3.5 cm long, ovoid, lobes unequal. Corolla tubular, pale purple, white inside, fleshy; tube 6-8 cm long, base narrow, cylindric, broadly dialated above, 2.5-3.5 cm across, lobes 5, 1.2-2 cm long, ovate to suborbicular, woolly without. Stamens 4, didynamous. Ovary 0.5-1 cm long, 2-celled; ovules many; style 2-4 cm long; stigma 2-lobed. Capsule large, 25-40 cm long, 4-7 cm wide, winged. Seeds many, compressed, papery, broadly winged, c. 3.5 cm long (including wing).

Fl. & Fr.: Aug. - Jan.

Distr.: India and Myanmar. In open dry wastelands. *CNS 1955* (Pandanad).

SPATHODEA Palisot de Beauvois

Fl. Oware 1: 46. 1805.

Spathodea campanulata P. Beauv., Fl. Owere. 1: 47, t. 27. 1805; Gamble, Fl. Pres. Madras 1000. 1924; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 537. 1976. Theob. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 393. 1981; Mani & Sivar., Fl. Calicut 210. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1133. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 339. 1994.

Trees; bark pale, smooth. Leaves imparipinnate, 10-12-foliolate, tomentose; leaflets 6-14 x 3-6 cm, ovate to lanceolate, apex acuminate, pubescent. Flowers large, showy in terminal many-flowered, dense racemes, scarlet red; bracts lanceolate, acuminate. Calyx 4-5 cm long, spathaceous, densely pubescent, brownish, curved. Corolla 7-10 cm long, 6-7 cm across, broadly campanulate. Capsules 15-20 x 2.5-4 cm, oblong-lanceolate, flattened. Seeds c. 2.5 cm long, hyaline winged.

Fl. & Fr.: Sept. - Mar.

Distr.: New World tropics; now naturalised in India. Often planted as avenue trees. *CNS 1920* (Karthigappally).

TECOMA A.L. Jussieu

Gen. 139. 1789.

Tecoma stans (L.) Kunth in Humb., Kunth & Bonpl., Nov. Gen. Spec. 3: 144. 1819; Matthew, Rec. Bot. Surv. India. 20: 175. 1969; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 537. 1976; Mani. & Sivar., Fl. Calicut 211. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1135. 1983; Vajravelu, Fl. Palghat Dist. 336. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 339. 1994. *Bignonia stans* L., Sp. Pl. (ed. 2) 871. 1763. *Stenolobium stans* (L.) Seemann, Ann. Mag. Nat. Hist. (Ser. 3) 10: 30. 1862; Gamble, Fl. Pres. Madras 1000. 1924.

Shrubs or small trees. Leaves simple pinnate, 5-9-foliolate; leaflets 3.5-8 x 1.8-3 cm, lanceolate, base cuneate, margin serrate, apex acuminate. Flowers large and showy in terminal racemes. Calyx campanulate, obscurely lobed; lobes 5. Corolla bright-yellow, to 8 cm long. Stamens 4, didynamous; filaments hairy at base; anther cells pubescent; staminoides short. Ovules many; style included; stigma 2-fid. Capsule linear, somewhat compressed. Seeds compressed.

Fl. & Fr.: Oct. - Feb.

Distr.: Native of South America; now widely cultivated. Often grown in gardens and hedges. *CNS 2385* (Chettikulangara).

88. PEDALIACEAE R. Br.

Prodr. 519. 1810.

1a. Flowers in racemes; stamens 2; ovary 1-locular; leaves palminerved ..... **Martynia**

1b. Flowers solitary; stamens 4; ovary 2-or falsely 4- locular; leaves penninerved.

2a. Fruit drupaceous, indehiscent, spiny; corolla yellow; ovules 2 per locule ..... **Pedalium**

2b. Fruit capsular, not spiny; corolla white or pinkish-violet; ovules many per locule ..... **Sesamum**

MARTYNIA Linnaeus

Sp. Pl. 618. 1753.

Martynia annua L., Sp. Pl. 618. 1753; Gamble, Fl. Pres. Madras 1003. 1924; Hevly, Taxon 18: 527. 1969; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 561.1976; Theob. & Grupe in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 203.1981; Mani. & Sivar., Fl. Calicut 213.1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3:1137.1983; Ramach. & Nair, Fl. Cannanore 328.1988; Vajravelu, Fl. Palaghat Dist. 336.1990; Mohanan & Henry, Fl. Thiruvananthapuram 340. 1994; Sivar. & Mathew, Fl. Nilambur 486. 1996.

Martynia diandra Gloxin, Obs. Bot. 14, t. 1. 1785; Hook. f., Fl. Brit. India 4: 386. 1884. *Martynia angulosa* Lam., Encycl. 2: 112. 1786. ***Kakka-chundu***.

Erect subshrubs to 1 m tall, glandular-hairy all over. Leaves 8-20 x 6-19 cm, broadly ovate to suborbicular, base cordate, margin sinuate-dentate, apex acute, chartaceous, palmately 5-nerved from base; petiole 8-14 cm long. Racemes 7-14-flowered, at the bifurcations of the branches; peduncle 4-8 cm long; pedicel 1-2 cm long; bracts 1-2 x 0.7-1 cm, broadly ovate, pale pink. Calyx lobes 5, greenish-white, 9-12 mm long; ovate-oblong. Corolla reddish-purple with yellow throat; tube 3-4 cm long; lobes rounded. Stamens 2; filaments white, c. 1 cm long; anther cells disjunct, superposed, longitudinally coherent with the opposite pair; staminodes 3. Fruits drupaceous, ovoid, flattened somewhat dorso-ventrally, ribbed, viscid-pubescent; endocarp 2-3 cm long, hard, black, with a hooked spine at tip.

Fl. & Fr.: Sep.-Dec.

Distr.: Tropical and subtropical America, Mexico, W. Pakistan, India, Nepal and Myanmar. Along sandy sea-coast. *CNS 1347* (Alappuzha beach).

PEDALIUM Royen ex Linnaeus

Syst. Nat. (ed. 10).1123, 1375. 1759.

Pedaliun murex L., Syst. Nat. (ed.10). 1123. 1753; Roxb., Fl. Ind. 3: 114. 1832; Wight, Ic. t. 1615. 1850; Hook. f., Fl. Brit. India 4: 386. 1884; Gamble, Fl. Pres. Madras 1001. 1924; Theob. & Grupe in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 322. 1981; Mani. & Sivar., Fl. Calicut 212. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1138. 1983; Ramach. & Nair, Fl. Cannanore 328. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 206. 1988; Vajravelu, Fl. Palaghat Dist. 337. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 339. 1994. ***Caca-mullu*** Rheede, Hort. Malab. 10: t. 72. 1690.

Erect of diffuse, highly mucilagenous, semi-succulent annual herbs. Leaves alternate or opposite, 2-5.2 x 1.8-3.8 cm, ovate or orbicular, base truncate, margin dentate, apex rounded; petiole 1-3 cm long. Flowers solitary, axillary, pedicel c. 2 mm long with a

pair of yellow glands. Calyx-lobes 5, Free, 2-3 mm long, linear. Corolla pale yellow, 2-lipped, 2-2.5 cm long, glandular-pubescent, hispid within. Stamens 4, didynamous. Ovary 2-locular with 2 ovules in each. Fruit indehiscent 1-1.5 x 0.5-0.8 cm, top-shaped, obtuse at apex with 4 spines at the angles near the base. Seeds oblong.

Fl. & Fr.: Jun.-Dec.

Distr.: Tropical Africa, Sri Lanka, India and Pakistan. Common along sandy sea shore and waste lands. *CNS 1166* (Ambalappuzha).

SESAMUM Linnaeus

Sp. Pl. 634. 1753.

Erect or prostrate herbs. Leaves alternate or opposite, simple or lobed. Flowers solitary, axillary, terminating into leafy racemes at apices of branches. Calyx 5-lobed, lobes unequal. Corolla tubular, ventricose, 2-lipped, lobes 5, throat villous. Stamens 4, didynamous, included. Ovary 2-celled or 4-celled due to formation of false septum; ovules numerous; stigma 2-lobed. Capsule 2-valved, oblong or ovoid. Seeds 2-seriate, oblong, compressed.

1a. Corolla white; capsule with a conspicuous, subulate beak; mature seed smooth ..... **S. orientale**

1b. Corolla pinkish-violet; capsule rounded or obtuse, not beaked; seeds with transverse ridges ..... **S. radiatum**

Sesamum orientale L., Sp. Pl. 634. 1753; Roxb., Fl. Ind. 3: 100. 1832; Grah., Cat. Pl. Bombay 126. 1839; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 562. 1976; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3:1140.1983; Ramach. & Nair, Fl. Cannanore 329.1988; Seggeler, Taxon 38: 656. 1989; Vajravelu, Fl. Palaghat Dist. 337.1990; Sivar. & Mathew, Fl. Nilambur 487. 1996; Sasi. & 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; Theob. & Grupe in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3:

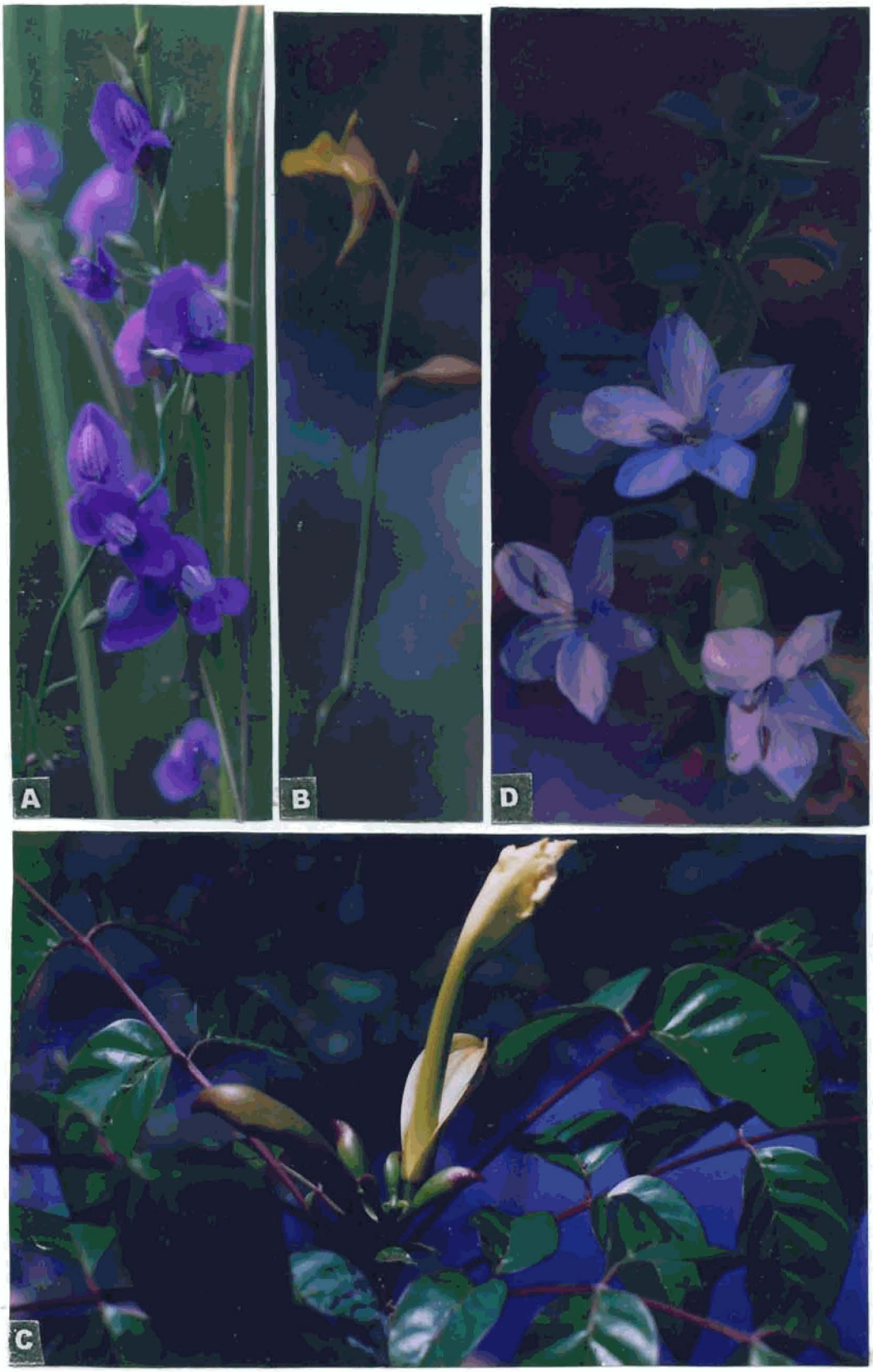


Plate XIX. A. *Utricularia reticulata* Smith; B. *Utricularia bifida* L.; C. *Dolichandrone spathacea* (L. f.) K. Schum.; D. *Barleria mysorensis* Heyne

325. 1981; Mani. & Sivar., Fl. Calicut 212.1982; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 207. 1988; ***Schit-elu*** Rheede, Hort. Malab. 9: t. 54. 1689. ***Ellu.***

Erect pubescent herbs to 1.2 m tall; young shoots 4-angled. Leaves opposite below and alternate above, basal leaves often 3-foliolate, 6-12 x 3-6 cm, elliptic to lanceolate, base rounded, margin entire or irregularly crenate-serrate, apex acute, pubescent on both sides; petiole to 4.5 cm long. Flowers axillary, solitary; pedicel to 3 mm long. Calyx lobes 5, c. 7 mm long, lanceolate, pubescent. Corolla white, c. 3 cm long, tubular ventricose, 2-lipped, lobes 5. Stamens, didynamous; anthers oblong. Ovary c. 3 mm long, pubescent. Capsule 1.5-2 x 0.4-0.6 cm, oblong, compressed, beaked, medianly grooved, pubescent. Seeds c. 2 mm long, obovate, compressed, black, smooth.

Fl. & Fr.: Aug.-Feb.

Distr.: Tropical Africa, India, Sri Lanka, W. Pakistan, Nepal and E. Asia. Widely cultivated and naturalized along roadsides and in abandoned fields. *CNS 1490* (Nagamkulangara), *CNS 1003* (Vandanam).

Sesamum radiatum Schum. in Schum. & Thonn., Beskr. Guin. Pl. 282. 1827; Theob. & Grupe in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 326. 1981. *Sesamum occidentale* Regel & Heer, Ind. Sem. Hort. Turic. 1842. ***Kat-ellu***..

Erect mucilaginous herbs, 1-1.5 cm high; stem 4-angled, moniliform-hairy. Lower leaves variously lobed; upper becoming smaller, 3-11 x 1.5-6.5 cm, elliptic to oblong, all bullate hairy on both surfaces. Flowers axillary, solitary; pedicels 5-6 mm long. Calyx 5 - lobed; lobes 4-5 mm long, ovate, glandular hairy. Corolla pinkish; tube funnel-shaped, 1.5-2 x 1-1.3 cm, scattered glandular hairy without, 2-lipped, 5-lobed, hairy within. Stamens 4, didynamous, included. Ovary 2-celled, tomentose; ovules many; style filiform; stigma 2-lobed. Capsule 2-2.5 x 0.7-1 cm, 4-lobed, oblong, obtuse at apex, densely hairy without. Seeds c. 2 mm long, obovate, compressed, arranged in 4 rows, ridged without, brown on drying.

Fl. & Fr.: Aug.-Dec.

Distr.: Native of Tropical West Africa; now widely spread throughout Old World. A common weed along road sides and other waste areas. *CNS 1851* (Thiruvizha), *CNS 2576* (Kaithavana).

89. ACANTHACEAE Juss.

Gen. Pl. 102. 1789.

1a. Fertile stames 4.

2a. Climbers (except *Thunbergia erecta)*; calyx with 12-16 subulate teeth or reduced to a rim ..... **Thunbergia**

2b. Erect or prostrate herbs or shrubs.

3a. Corolla without an upper lip, the lower lip large, expanded, 3-lobed; anther 1-celled, sterile cell bearded throughout ..... **Acanthus**

3b. Corolla 2-lipped or with 5 subequal lobes; anthers 2-celled, glabrous or bearded at one end.

4a. Seeds not supported on retinacula ..... **Staurogyne**

4b. Seeds supported on retinacula.

5a. Corolla-lobes twisted to left in bud.

6a. Corolla strongly 2-lipped, tube uniformly cylindric.

7a. Flowers in dense terminal and axillary one-sided spikes; bracts foliaceous, orbicular, closely imbricate; capsule 2- or 4-seeded; filaments pairs free ..... **Phaulopsis**

7b. Flowrs in axillary whorls or cymes; bracts other than orbicular-foliaceous and not closely imbricate; capsule 8 or more-seeded; filament pairs connate ..... **Hygrophila**

6b. Corolla not 2-lipped, lobes subequal, spreading; tube ventricose.

8a. Flowers in lax, axillary cymes, rarely solitary; bracteoles narrow, shorter than calyx; capsule linear, glabrous, seed bearing throughout .. **Ruellia**

8b. Flowers axillary, solitary; bracteoles large, foliaceous; capsule, oblong-cylindric, clavate with solid base, sparsely pubescent ..... **Dipteracanthus**

5b. Corolla-lobes imbricate in bud.

19a. Flowers in congested heads; corolla strongly 2-lipped, c. 8 mm long, tube uniformly cylindric; capsule without a contracted solid base ..... **Lepidagathis**

19b. Flowers in lax, 1-sided spikes or racemes; corolla not 2-lipped, lobes subequally spreading, 2.5-3.2 cm long, tube ventricose; capsule with a contracted solid base ..... **Asystasia**

1b. Fertile stamens 2.

20a. Corolla-lobes twisted to the left in bud ..... **Eranthemum**

20b. Corolla-lobes imbricate in bud.

21a. Corolla distinctly 2-lipped; calyx 5-partite (4-partite in *Justicia japonica, J. procumbens, J. prostrata).*

22a. Flowers in terminal or axillary lax panicles, or unilateral racemes.

23a. Ovules 4-10 in each cell; anther cells parallel.

24a. Capsule 4-seeded, ellipsoid; inflorescence exclusively axillary, as long as or shorter than the leaves .... **Indoneesiella**

24b. Capsule 8-10-seeded, linear-oblong; inflorescence both axillary and terminal, much exceeding the leaves .... **Andrographis**

23b. Ovules 2, or rarely 1 per cell; anther cells superposed.

25a. Corolla white, upper lip much narrower than the lower; bracts and bracteoles small, subequal, shorter than calyx ..... **Rhinacanthus**

25b. Corolla pink or rose, upper lip nearly as broad as the lower; bracts larger, exceeding the calyx and bracteoles ..... **Peristrophe**

22b. Flowers in dense spikes.

26a. Bracts dimorphous on 1-sided spikes; placentas separating elastically from the valves ..... **Rungia**

26b. Bracts homomorphous on cylindric or 4-sided spikes; placentas not separating elastically from the valves.

27a. Anther-cells parallel, subequal; corolla bluish-green, tube more than twice as long as the lobes ..... **Ecbolium**

27b. Anther-cells not parallel, one higher than the other; corolla white, sometimes with purple or pink spots or streaks, tube more or less or as long as the lobes .... **Justicia**

21b. Corolla not 2-lipped, lobes subequal; calyx 4-partite ..... **Barleria**

ACANTHUS Linnaeus

Sp. Pl. 639. 1753.

Acanthus ilicifolius L., Sp. Pl. 639. 1753; Roxb., Fl. Ind. 3: 32. 1832; Hook. f., Fl. Brit. India 4: 481. 1883; Gamble, Fl. Pres. Madras 1014. 1924; Sant., Bot. Mem. Univ. Bombay 2: 16. 1952; Mani. & Sivar., Fl. Calicut 221. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1146. 1983; Ramach. & Nair, Fl. Cannanore 331. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 35. 1988; Mohanan & Henry, Fl. Thiruvananthapruam 342. 1994. *Dilivaria ilicifolia* (L.) Juss., Gen. Pl. 103. 1789; Nees in Wall., Pl. Asiat. Rar. 3: 98. 1832; Wight, Ic. t. 459. 1841. ***Paina-schulli*** Rheede, Hort. Malab. 2: t. 48. 1679.

Armed, gregarious shrubs. Leaves 4-10 x 3-6 cm, sinuately lobed, lobes spine-tipped; petiole to 1 cm long, with a pair of short basal spines. Flowers blue, 3.5-4.5 cm

long, in terminal 7-15 cm long spikes; bracts 6-10 x 2-2.5 mm, ovate-lanceolate, apex acute; bracteoles 2, connate to 5 x 2 mm, ciliate. Calyx lobes 4, to 1.6 x 1 cm, ovate, mucronate, coriaceous. Corolla bluish-purple, to 4 cm long; tube c. 6 mm long, throat villous; lower lip 3-lobed. Stamens 4, attached at the throat of the corolla tube, exserted; filaments thick, to 1.8 cm long; anther 1-1.2 cm long, bearded, one cell sterile. Ovary 3-4 mm long, oblong, 4-ovuled; stigma 2-fid. Capsule 2.5-3.7 x 1.5-2 cm, ellipsoid-oblong. Seeds c. 1.4 cm across, orbicular.

Fl. & Fr. : Mar. - Apr.

Distr. : Sri Lanka, India, Malesia, Australia. A gregarious halophytic species forming impenetrable thickets in backwaters and salt marshes. CNS 2120 (Pallithode).

ANDROGRAPHIS Wallich ex C.G. D. Nees
in Wall., Pl. Asiat. Rar. 3: 77, 116. 1832.

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; Mani. & Sivar., Fl. Calicut 214. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1152. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 36. 1981; Ramach. & Nair, Fl. Cannanore 331. 1988; Mani., Fl. Silent Valley 202. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 342. 1994. *Justicia paniculata* Burm. f., Fl. Ind. 9. 1768. *Cara-Kaniram* Rheede, Hort. Malab. 9: 109-110. t. 56. 1689. ***Kiriathu.***

Erect, branched herbs; stem 4-angled. Leaves 2-4.5 x 0.8-2 cm, elliptic to lanceolate, base attenuate, margins entire, apex acute to shortly acuminate; petioles 0.5-1 cm long. Flowers lax in axillary and terminal racemose panicles; panicles branches zig-zag. Flowers 0.8-1 cm apart, white-purple; bracts and bracteoles minute; pedicel 7-10 mm long. Calyx 1.5-2 mm long, subulate, sparsely glandular-hairy. Corolla 8-12 mm long; tube 4-6 mm long, slender, cylindric; upper lip 4-5 mm long, lower 3-4 mm long. Stamens 2; filaments exserted, densely hairy; anthers bearded at base on one cell. Capsule 1-1.5 cm long, linear-oblong, compressed, minutely hairy. Seeds 8-10, rugose, retinacula hooked, acute.

Fl. & Fr. : Sept.- Jan.

Distr. : Peninsular India, Sri Lanka. Common on wastelands and roadsides. CNS 1423 (Puliyoor).

ASYSTASIA Blume

Bijdr. 796. 1826.

Erect or subscandent subshrubs. Leaves opposite, entire or crenate. Flowers often in terminal lax-flowered secund racemes or spikes, branched or not. Bracts and bracteoles minute, subulate. Calyx deeply 5-lobed, lobes linear-lanceolate. Corolla ventricose or funnel-shaped; lobes 5, spreading, subequal. Stamens 4, didynamous; filaments connate at base in pairs; anther cells parallel, unequal, with a short spur at base. Ovary 2-celled; ovules 2 in each cell; style pubescent below; stigma shortly 2-fid. Capsules elliptic-oblong, tapering to a basal contracted stipe; stipe recurved at dehiscence. Seeds 4, orbicular or angular, rugose or tuberculate.

1a. Leaf-base cuneate; flowers lilac; calyx hairy ..... **A. dalzelliana**

1b. Leaf-base rounded or subcordate; flowers yellow or white with purple bloches; calyx not hairy ..... **A. gangetica**

Asystasia dalzelliana Sant., Kew Bull. 3: 276. 1948 & Bot. Mem. Univ. Bombay 2: 68. 1951; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 542. 1976; Mani. & Sivar., Fl. Calicut 222. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1156. 1983; Ramach. & Nair, Fl. Cannanore 332. 1988; Vajravelu, Fl. Palghat Dist. 343. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 343. 1994; Sivar. & Mathew, Fl. Nilambur 490. 1996. *A. violacea* sensu Dalz. ex Clarke in Hook. f., Fl. Brit. India 4: 494. 1884, non Hook., 1850; Gamble, Fl. Pres. Madras 1063. 1924.

Erect or diffuse herbs; branches 4-angled, tomentose. Leaves 2-3.5 x 1.5-2.2 cm, broadly ovate to elliptic, base cuneate, apex acuminate, lateral nerves close, pubescent; petiole to 1 cm long. Flowers in terminal or subterminal secund racemes. Calyx lobes 5, 5-6 mm long, lanceolate. Corolla lilac; tube to 2.5 cm long, puberulous without; lobes 5,

subequal, spreading, orbicular. Stamens 4; anthers c. 3 mm long. Style to 1.5 cm long, puberulous below. Capsule to 1.5 cm long, calvate, stalked, pubescent, beaked. Seeds 2-4, c. 0.5 mm cross, orbicular or angular.

Fl. Fr. : Aug.- Nov.

Distr. : Peninsular India. Rare. In sacred groves. *CNS 2392* (Kariyankavu at Thazhakkara).

Asystasia gangetica (L.) T. And. in Thw., Enum. Pl. Zeyl. 235. 1860; Gamble, Fl. Pres. Madras 1063. 1924; Sant., Bot. Mem. Univ. Bombay 2: 68. 1951; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 543. 1976; Mani. & Sivar., Fl. Calicut 221. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1157. 1983; Ramach. & Nair, Fl. Cannanore 332. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 36. 1988; Vajravelu, Fl. Palghat Dist. 343. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 344. 1994. *Justicia gangetica* L., Cent. Pl. 2: 3. 1756. *Asystasia coromandeliana* Wight ex Nees in Wall., Pl. Asiat. Rar. 3: 89. 1832; Wight., Ic. t. 1506. 1850; Clarke in Hook. f., Fl. Brit. India 4: 493. 1884. ***Valli-upu-dali*** Rheede, Hort. Malab. 9: 85, t. 1689.

Straggling or diffuse perennial herbs; stem 4-angled. Leaves 3-5.5 x 1.5-3.5 cm, ovate-lanceolate, base rounded, apex acute or acuminate, sparsely hairy, thin-chartaceous; petiole 1.5-3.2 cm long. Racemes terminal and in upper leaf axils, 6-14 cm long, 10-16-flowered; bracts 2-3 mm long, lanceolate. Calyx lobes 5, c. 5 x 1 mm, oblong-lanceolate. Corolla yellow or white, 2.5-3.2 cmlong; tube cylindric below, inflated above; lobes 5, subequal, orbicular. Stamens 4. Stigma bifid. Capsule 2.5-3 cm long, calvate, beaked, pubescent. Seeds c. 4, angular, tubercled on the faces.

Fl. & Fr. : Nov. - Feb.

Distr. : Arabia, Africa, Sri Lanka, Peninsular India and Malaysia. Common in plains, coasts and waste lands; also cultivated as an ornamental. *CNS 1175* (Alapuzha beach), *CNS 1536* (Kadakkarappally).

BARLERIA Linnaeus

Sp. Pl. 636. 1753.

Armed or unarmed shrubs or subshrubs. Leaves opposite, usually lineolate with raphides. Flowers solitary or in cymes, racemes or dense spikes, often axillary. Bracts leafy or sometimes reduced to spines; bracteoles 0. Calyx-lobes 4, free, unequal, outer pair larger, enclosing the inner. Corolla fairly large, funnel-shaped or salver form, tube longer than the lobes, lobes 5, subequal. Fertile stamens 2; staminodes 2 or absent; anther cells parallel, equal. Ovary 2-celled, ovule 2 in each cell; stigma subentire or minutely 2-fid; disc cupular, half embracing the ovary. Capsule ovoid-oblong, beaked at tip. Seeds 2-4, orbicular, discoid, pubescent or glabrous.

1a. Plants armed with axillary spines.

2a. Leaves suborbicular; flowers yellow; capsules oblong, 4-seeded ..... **B. mysorensis**

2b. Leaves elliptic-acuminate; flowers bluish or white; capsules ovoid, 2-seeded ..... **B. prionitis**

1b. Plants unarmed ..... **B. cristata**

Barleria cristata L., Sp. Pl. 636. 1753; Roxb., Fl. Ind. 3: 37. 1832; Wight, Ic. t. 453. 1841; Clarke in Hook. f., Fl. Brit. India 4: 488. 1884; Gamble, Fl. Pres. Madras 1060. 1924; Mani. & Sivar., Fl. Calicut 220. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1162. 1983, Vajravelu, Fl. Palghat Dist. 345. 1990.

Subshrubs. Leaves 4-9 x 2-4 cm, elliptic-lanceolate, base cuneate-decurrent, margin ciliate, apex acuminate, chartaceous; petiole to 1.5 cm long. Flowers upto 4 cm long, 1-4, in axillary lax cymes, subsessile; bracts lanceolate, acute, 1-ribbed, scabrous; bracteoles 1.2-1.5 cm long, linear-lanceolate. Calyx-lobes 4, scarious when dry; outer 2 1.8-2 cm long, obovate, prominently nerved, margin spinous; inner ones lanceolate, acuminate. Corolla violet or white, c. 4 cm across, funnel-form; tube c. 3.5 cm long, softly pubescent without. Stamens 5; staminodes with sterile anther cells. Ovary oblong-

conic, 4-ovuled; stigma minutely 2-lamellate. Capsule 1.2-1.5 cm long, oblong, compressed, appressed hairy. Seeds 2 per cell, c. 3.5 mm across, suborbicular.

Fl. & Fr. : Dec. - Feb.

Distr. : India, Myanmar, Indo-China, S. China and Philippines. Grown in gardens. Occassionally run wild. *CNS 2344* (Olathala).

Barleria mysorensis Heyne in Roth, Nov. Sp. Pl. 313. 1821; Hook. f. , Fl. Brit. India 4: 484. 1884; Gamble, Fl. Pres. Madras 1059. 1924; Mani. & Sivar., Fl. Calicut 220. 1982; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 36. 1988. *Cara-schulli* Rheede, Hort. Malab. 2: t. 47. 1679 (Plate XIX: D).

Armed pubescent subshrubs; spines usually long, hard. Leaves to 1.8 x 1.5 cm, ovate or orbicular, mucronate, silky-hairy beneath, white pubescent above. Flowers axillary, solitary or in few-flowered subsessile cymes. Calyx 4-partite. Corolla violet, funnel-shaped, subequally 5-lobed. Stamens 2; filamnets long; anthers 2-celled. Capsules oblong or ellipsoid, beak not solid. Seeds 4.

Fl. & Fr. : Sept.- Jan.

Distr. : Peninsular India. A weed along roadsides and wastelands in the plains. *CNS 1203* (Chandiroor).

Barleria prionitis L., Sp. Pl. 636. 1753; Roxb., Fl. Ind. 3: 36. 1832; Wight, Ic. t. 452. 1841; Clarke in Hook. f., Fl. Brit. India 4: 482. 1884; Gamble, Fl. Pres. Madras 1058. 1924; Sant., Bot. Mem. Univ. Bombay 2: 57. 1951; Mani. & Sivar., Fl. Calicut 220. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1166. 1983; Ramach. & Nair, Fl. Cannanore 334. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 37. 1988; Vajravelu, Fl. Palghat Dist. 346. 1990; Sivar. & Mathew, Fl. Nilambur 494. 1996. ***Coletta-veeta*** Rheede, Hort. Malab. 9: 77-78, t. 41. 1689.

Armed subshrubs. Leaves 4-8 x 1.5-3.5 cm, ovate-lanceolate, base attenuate, margin subentire, apex acuminate, spine-tipped, chartaceous; petiole up to 2.3 cm long.

Flowers axillary, solitary or in condensed cymes; bracts 1-1.4 cm long, linear-oblong, spine-tipped; bracteoles converted into spines. Calyx-lobes 4; outer 2 larger, c. 1 cm long, ovate, spine-tipped; inner 2 smaller, ovate-lanceolate. Corolla golden yellow or ornage coloured, 2.5-3.4 cm long, subequally 4-lobed. Stamnes 2, exserted; staminodes 2, included, villous. Ovary ovoid; ovules 2. Capsule 1.2-1.8 cm long, ovoid, beaked. Seeds 2, suborbicular, compressed, hygroscopically hairy.

Fl. & Fr. : Nov. - Jan.

Distr.: Pantropical. Common in gardens, occasionally run wild. *CNS 2236* (Pathirappally).

DIPTERACANTHUS C.G.D. Nees

in Wallich, Pl. Asiat. Rar. 3: 75, 81. 1832.

Dipteracanthus prostratus (Poiret) Nees in Wall., Pl. Asiat. Rar. 3: 81. 1832; Sant., J. Bombay Nat. Hist. Soc. 51: 352. 1953; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 547. 1976; Mani. & Sivar., Fl. Calicut 225. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1171. 1983; Ramach. & Nair, Fl. Cannanore 334. 1988; Vajravelu, Fl. Palghat Dist. 347. 1990; Mohann & Henry, Fl. Thiruvananthapuram 346. 1994; Sivar. & Mathew, Fl. Nilambur 496. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 337. 1996. *Ruellia prostrata* Poiret in Lam., Encycl. 6:349. 1804; Clarke in Hook. f. , Fl. Brit. India 4: 411. 1884; Gamble, Fl. Pres. Madras 1017. 1924.

Diffuse woody herbs, sometimes rooting at lower nodes. Leaves 2-6 x 1.5-3 cm, ovate-elliptic, base truncate or acute, apex acute or obtuse, sparsely strigose; petiole to 1.5 cm long. Flowers axillary, solitary; bracteoles to 1 cm long, elliptic. Calyx-lobes 5, c. 6 mm long, lanceolate, ciliate. Corolla pale violet, 1.5-2 cm long, c. 1.5 cm across, funnel-form, lobes 5, subequal, spreading. Stamens 4, didynamous, included. Ovary pubescent; ovules 12-16. Capsule 1.5-2 cm long, oblong-cylindric, clavate, sparsely pubescent. Seeds 4, c. 3 mm across, orbicular, compressed, hygroscopically hairy.

Fl. & Fr. : Sep. - Dec.

Distr. : India. Common in sandy waste areas. *CNS 1137* (Vandanam).

ECBOLIUM S. Kurz

J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 40: 75. 1875.

Ecbolium viride (Forssk.) Alston in Trim., Handb. Fl. Ceylon 6. 229. 1931; Mani. & Sivar., Fl. Calicut 218. 1982; Rani. & Matthew in Matthew, Fl. Tam. Carnatic 3: 1174. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 38. 1988; Ramach. & Nair, Fl. Cannanore 335. 1988; Mani., Fl. Silent Valley 203. 1988; Vajravelu, Fl. Palghat Dist. 348. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 346. 1994. *Justicia viridis* Forssk., Fl. Aegypt.-Arab. 5. 1775. *Ecbolium linneanum* Kurz, J. As. Soc. Bengal 2: 75. 1871; Wight, Ic. t. 463. 1841; Clarke in Hook f., Fl. Brit. India 4: 544. 1885; Gamble, Fl. Pres. Madras 1074. 1924. ***Carim-curini*** Rheede, Hort. Malab. 2: 31-32, t. 20. 1679.

Erect subshrubs . Leaves 4-9 x 2-4 cm, ovate-elliptic, base attenuate, apex acute or obtuse, glabrous, thick-chartaceous; petiole to 2 cm long. Flowers in dense terminal and axillary 5-11 cm long spikes. Bracts decussate, closely imbricate, c. 2 x 0.8 cm, lanceolate, margin ciliolate. Calyx-lobes 5, subequal. Corolla bluish-green; tube c. 3 cm long, narrow cylindric; limb 2-lipped, upper lip linear, lower lip spreading with 2 wing-like lateral lobes. Stamens 2, exserted. Ovary subglobose; ovules 2. Capsule c. 2 x 0.7 cm, stalked, ovoid, compressed, pubescent. Seeds 2, orbicular-ovate, compressed, tuberculate.

Fl. &Fr. : Nov. - Mar.

Distr. : Africa, Sri Lanka, India, Malaysia and Nepal. In waste places and on roadsides. *CNS 1346* (Alappuzha beach).

ERANTHEMUM Linnaeus

Sp. Pl. 9. 1753.

Eranthemum capense L., Sp. Pl. 9. 1753; Sant., J. Bombay Nat. Hist. Soc. 51: 355. 1953; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 548. 1976; Mani. & Sivar., Fl. Calicut 216. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1176, 1983; Ramach. & Nair, Fl. Cannanore 335. 1988; Vajravelu, Fl. Palghat Dist. 348. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 346. 1994; Sivar. & Mathew, Fl. Nilambur 498. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 338. 1996. *Justicia montana* Roxb., Pl. Corom. 176. 1805. *Eranthemum montanum* Roxb., Fl. Ind. 1: 110. 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. Leaves 6-10 x 2-4.5 cm, elliptic-lanceolate, base attenuate, margin entire or crenulate, apex acuminate, densely lineolate, chartaceous; petiole to 2.5 cm long. Flowers in terminal, glandular-hairy, paniculate spikes; bracts to 2 cm long, lanceolate, glandular hairy; bracteoles c. 5 mm long, linear-lanceolate. Calyx-lobes 5, equal, c. 4 mm long, lanceolate. shortly connate at base, glandular-hispid. Corolla salver-form, blue; tube 2-2.5 cm long, slender, cylindric; lobes 5, subequal, c.1 cm long, ovate, spreading. Stamens 2 perfect, exserted, attached at the throat; staminodes 2, basally connate to the filament. Ovary cylindric; ovules 4; style sparsely hairy; stigma shortly 2-lobed. Capsule c. 1.5 cm long, oblong. Seeds 4, discoid.

Fl. & Fr. :Dec. - Jan.

Distr. : Peninsular India and Sri Lanka. In sacred groves. *CNS 1520* (Sharangakavu).

HYGROPHILA R. Brown

Prodr. 479. 1810.

Herbs to subshrubs, sometimes armed at nodes; branchlets 4-angled. Leaves decussate, petiolate or subsessile, sometimes dimorphic. Flowers in axillary sessile cymes or whorls around the nodes. Bracts and bracteoles linear, sometimes leafy. Calyx-lobes 5,

subequal, basally united. Corolla shortly tubular, 2-lipped; upper lip 2-lobed, erect, lower 3-lobed, deflexed, palate crested. Stamens 4, exserted; filament pairs united at base and forming a hirsute sheath; anther cells oblong, subequal. Ovary cylindric-oblong; ovules 4 or more per locule; style hairy; stigma simple. Capsule cylindric, oblong. Seeeds 4-8, orbicular, flattened, hairy when wet.

1a. Plants armed; calyx-lobes 4 ..... **H. schulli**

1b. Plants unarmed; calyx-lobes 5.

2a. Leaves dimorphic, submerged leaves dissected, aerial leaves obovate to suborbicular; flowers in axillary 3-flowered cymes; plants viscid, aromatic ..... **H. triflora**

2b. Leaves not dimorphic, all alike; flowers in dense axillary whorls; plants not viscid and aromatic ..... **H. ringens**

Hygrophila ringens (L.) R. Br. ex Steud., Nom. 1: 418. 1821; Nicols., Suresh & Mani. , An Interpr. Hort. Malab. 39. 1988; Sivar. & Mathew, Fl. Nilambur 503. 1996. *Ruellia ringens* L., Sp. Pl. 635. 1753. *Ruellia salicifolia* Vahl, Sym. Bot. 3: 84. 1794. *Hygrophila salicifolia* (Vahl) Nees in Wall., Pl. Asiat. Rar. 3: 81. 1832; Roxb., Fl. Ind. 3: 50. 1832. Wight, Ic. t. 1490. 1849; Clarke in Hook. f., Fl. Brit. India 4: 407. 1884; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 550. 1976; Mani. & Sivar., Fl. Calicut 224. 1982; Rani & Matthew in Matthew, Fl. Tam.Carnatic 3: 1180. 1983; Vajravelu, Fl. Palghat Dist. 350. 1990. *Hygrophila angustifolia* auct. non R. Br., 1810: Gamble, Fl. Pres. Madras 1016. 1924. ***Nir-Schulli*** Rheede, Hort. Malab. 2: 89-90, t. 46. 1679.

Erect or ascending herbs, 30-75 cm tall. Leaves 3.2-9.5 x 1-3 cm, linear-oblong or linear-lanceolate, base attenuate, margins crenulate, apex acute; petiole 0.8-1.5 cm long. Flowers pale purple, c. 1.8 cm long, in dense axillary whorls, subsessile; bracts 4-6 mm long, lanceolate; bracteoles c. 4 mm long, linear. Calyx-lobes 5, c. 8 mm long, unequal, connate half-way down in flower, divided nearly to the base in fruit. Corolla tube 5-6 mm long; upper lip c. 1 cm long; lower lip c. 1.2 cm long, glandular-hairy without. Stamens 4; anthers 1.5-2 mm long. Style c. 1 cm long, hairy. Capsule 1- 1.3 cm long. Seeds c. 1.5 mm across; retinacula long and curved.

Fl. & Fr. : Nov.- May.

Distr. : Throughout India, Sri Lanka, Indo-China, S. China, Japan and Malesia. In wet places like bunds of paddy fields, river banks, etc. *CNS 2232* (Punnamada).

Hygrophila schulli (Ham.) M.R. & S. M. Almeida, J. Bombay Nat. Hist. Soc. (Suppl.) 83: 221. 1986; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 40. 1988; Sivar. & Mathew, Fl. Nilambur 502. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 340. 1996. *Bhael schulli* Ham., Trans. Linn. Soc. London 14: 289. 1825. *Barleria longifolia* L. in Torner, Cent. Pl. 22. 1756, non *Hygrophila longifolia* Nees, 1847. *Barleria auriculata* Schum. in Schum. & Thonn., Besk. Guin. Pl. 285. 1827. *Asteracantha longifolia* (L.) Nees in Wall., Pl. Asiat. Rar. 3: 90. 1832; Wight, Ic. t. 449. 1841; Gamble, Fl. Pres. Madras 1015. 1924; Subram., Aquat. Ang. 39. 1962. *Hygrophila auriculata* (K. Schum.) Heine, Kew Bull. 16: 172. 1962; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 549. 1976; Mani. & Sivar., Fl. Calicut 224. 1982; Rani & Matthew in Matthew Fl. Tam. Carnatic 3: 1178. 1983; Ramach. & Nair, Fl. Cannanore 338. 1988; Vajravelu, Fl. Palghat Dist. 350. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 347. 1994. ***Bhael-Schulli*** Rheede, Hort. Malab. 2: 87-88, t. 45. 1679.

Erect armed subshrubs; stem purplish, generally with 8 leaves and 6 spins at each node, strigose-hispid; spins 1.8-3.3 cm long, curved or straight. Leaves apparently whorled, 4-15 x 1.5-3.5 cm, lanceolate, base cuneate, margins undulate and minutely dentate, apex acute to acuminate, scabrous; petiole to 5 mm long. Flowers in axillary whorls, sessile; bracts and bracteoles foliaceous, c. 1.5 cm long. Calyx-lobes 4, unequal, 0.7-1 cm long, lanceolate. Corolla bluish-purple, c. 1.5 cm long; tube to 1 cm long; lobes 5. Stamens 4; anther cells unequal. Ovary c. 2 mm long, oblong, apically ciliate. Capsule c. 1. cm long. Seeds orbicular.

Fl. & Fr. : Oct. - Mar.

Distr. : Tropical Himalayas, India, Myanmar, Indi-China and Malaya. Common in marshy grounds along water courses. *CNS 1415* (Kanichukulangara).

Hygrophila triflora (Roxb.) Fosb. & Sachet, Baileya 21(3): 145. 1981. *Ruellia triflora* Roxb. (Hort. Beng. 46. 1814) Fl. Ind. (ed. Carey) 3: 52. 1832. *Adenosma triflora* (Roxb.) Nees in Wallich, Pl. Asiat. Rar. 3: 79. 1832 & in DC., Prodr. 11: 68. 1847. *Cardanthera triflora* (Roxb.) Ham. ex Benth. in Benth. & Hook. f., Gen. Pl. 2: 1074. 1876; Clarke in Hook. f. , Fl. Brit. India 4: 405. 1884.

Viscid, aromatic herbs; stem erect or ascending, rooting at nodes. Leaves subsessile, dimorphic; submerged leaves 5-6 x 3-4 cm, pinnately or bipinnately dissected; aerial leaves 3.5-4.5 x 2-3 cm, obovate to suborbicular, base cuneate or rounded, margins serrate-dentate, apex obtuse, densely glandular hairy above, sparsely hairy on nerves beneath. Cymes axillary, usually 3-flowered. Calyx c. 8 mm long; lobes 5, linear-lanceolate, glandular hairy. Corolla pale blue, 1-1.3 cm long, bilabiate; lower lip shortly 3-lobed; upper lip shortly 2-lobed. Stamens 4, didynamous; filaments hairy at base; anthers c. 2 mm long, purplish. Style filiform, c. 3 mm long; stigma 2-fid. Capsule 6-8 mm long. Seeds brownish.

Fl. & Fr. : Dec. - Apr.

Distr. : South Asia. Rare. In marshy banks of ponds and canals. *CNS 2086* (Kanichukulangara).

During monsoon the plants mostly produce only the pinnatifid leaves. The emergent reproductive part arise only after the rains have subsided.

INDONEESIELLA Sreemadhavan

Phytologia 16: 466. 1968.

Indoneesiella echioides (L.) Sreemadh., Phytologia 16: 466. 1968; Mani. & Sivar., Fl. Calicut 215. 1982; Rani. & Matthew in Matthew, Fl. Tam. Carnattic 3: 1181. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 40. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 348. 1994; Sivar. & Mathew, Fl. Nilambur 504. 1996. *Justicia echioides* L. , Sp. Pl. 16. 1753. *Andrographis echioides* (L.) Nees in Wall., Pl. Asiat. Rar. 3: 117. 1832, p.p.; Wight, Ic. t. 467. 1841; Clarke in Hook. f., Fl. Brit. India 4: 505.

1884; Gamble, Fl. Pres. Madras 1051. 1924; Vajravelu, Fl. Palghat Dist. 341. 1990. *Neesiella echioides* (L.) Sreemadh., Phytologia 15: 271. 1967, nom. illeg. ***Pee-tumba*** Rheede, Hort. Malab. 9: 87, t. 46. 1689.

Erect herbs, 10-40 cm high. Whole plant villous; stem 4-angled. Leaves 2-4 x 0.6-1.2 cm, elliptic-oblong, base narrowed or rounded, apex subacute or obtuse, pubescent, subsessile, chartaceous. Inflorescence axillary, short unilateral racemes, simple or 1-2-branched, as long as or shorter than leaves. Flowers subsessile. Calyx-lobes 5, 0.8-1 cm long, linear, shortly connate. Corolla white with brown tinge; tube 0.7-1 cm long, 2-lipped; upper lip 2-lobed, 6-8 mm long, lower c. 8 mm long, 3-lobed. Stamens 2; filaments hairy at base, broad, exerted; anthers 2-celled, 1-cell bearded below. Ovary ellipsoid; ovules 4; stigma 2-fid. Capsules 8-12 x 2-3 mm, ellipsoid, compressed, attenuate at base, sparsely hairy towards tip. Seeds 4, c. 2 mm across, globose, brown, pitted without; retinacula spiny.

Fl. & Fr. : Sep. - Feb.

Distr. : India and Sri Lanka. Common on exposed sunny areas. *CNS 1037* (Vandanam).

JUSTICIA Linnaeus

Sp. Pl. 15. 1753.

Diffuse or erect herbs or shrubs. Leaves opposite, usually lineolate with raphides. Flowers subsessile, aggregated in dense linear, cylindric terminal spikes or in panicles. Bracts various, bracteoles 2, linear or rarely 0. Calyx 4 or 5-lobed, lobes equal or unequal, often prominently nerved. Corolla tubular, 2-lipped, upper lip subentire or 2-lobed, lower 3-lobed, crested. Stamens 2, subexerted; filaments curved or twisted; anthers 2-celled; cells divergent, unequal, appendaged. Ovary 2-celled; ovules 2 in each cell; stigma unequally 2-fid. Capsule with a solid base, ovoid to oblong. Seeds 4, suborbicular, discoid, minutely papillose or spinulose; retinacula curved.

1a. Perennial undershrubs or shrubs; calyx-lobes 5.

2a. Anther-cells unequal, superposed with a white basal spur-like appendage; connectives broad.

3a. Bracts white with green nerves, larger than calyx; bracteoles 2 ..... **J. betonica**

3b. Bracts otherwise, smaller than calyx; bracteoles absent ..... **J. gendarussa**

2b. Anther-cells equal, parallel, not appendaged at base; connective narrow .... **J. adhatoda**

1b. Annual herbs; calyx -lobes 4.

4a. Spikes short, cylindric, hairy; bracts and bracteoles as long as or longer than the calyx-lobes.

5a. Bracts obovate, hairs simple; hairs on the spikes short and dense .... **J. procumbens**

5b. Bracts ovate, hairs jointed; hairs on the spikes long and lax ..... **J. japonica**

4b. Spikes slender, linear; bracts and bracteoles shorter than the calyx-lobes .... **J. prostrata**

Justicia adhatoda L., Sp. Pl. 15. 1753; Roxb., Fl. Ind. 1: 127. 1820; Stearn in J. Arnold Arbor. 52: 640. 1971; Ramach. & Nair, Fl. Cannanore 340. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 348. 1994; Sivar. & Mathew, Fl. Nilambur 505. 1996. *Adhatoda zeylanica* Medic., Hist. & Commentat. Acad. Elect. Sci. Theod. Palat. 6: 393. 1790; Ramamoorthy in Sald. & Nicols., Fl Hassan Dist. 540. 1976; Mani. & Sivar., Fl. Calicut 217. 1982; Rani. & Matthew in Matthew, Fl. Tam. Carnatic 3: 1147. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 35. 1988; Vajravelu, Fl. Palghat Dist. 340. 1990. *Adhatoda vasica* Nees in Wall., Pl. Asiat. Rar. 3: 103. 1832; Hook. f., Fl. Brit. India 4: 540. 1885; Gamble, Fl. Pres. Madras 1082. 1924. ***Adel-odagam*** Rheede, Hort. Malab. 9: t. 43. 1689.

Shrubs 1-2.5 m tall. Leaves 12-25 x 3-7 cm, elliptic-lanceolate, base acute to attenuate, margin entire to minutely crenate, apex acuminate; petiole to 5 cm long. Flowers white, subsessile, 2.5-3 cm long in axillary and terminal peduncled, bracteate

spikes. Bracts large, leafy, upto 2.5 x 1.5 cm, ovate-acute in closely imbricating pairs; bracteoles subsimilar. Calyx lobes 5, equal, 1-1.2 cm long, lanceolate, shortly connate at base. Corolla 2-lipped, throat villous, upper lip erect, shortly 2-fid, lower 3-fid. Stamens 2, attached to the throat of the tube, exserted; filaments thick, villous below. Ovary oblong, pubescent, 4-ovuled; stigma minutely 2-fid. Capsules c.1.8 cm long, ovate, clavate, compressed, pubescent. Seeds 1-2, discoid, rugose.

Fl. & Fr. : Nov. - Mar.

Distr.: Subtropical Himalayas, India, Indo-China and Malaya. Common in the plains, often planted along fences. *CNS 1591* (Aroor).

The leaves and roots are used in the treatment of cough, bronchites, asthma, etc.

Justicia betonica L., Sp. Pl. 15. 1753; Clarke in Hook. f., Fl. Brit. India 4: 525. 1885; Gamble, Fl. Pres. Madras 1078. 1924; Sant., Bot. Mem. Univ. Bombay 2: 85. 1952; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 551. 1976; Mani. & Sivar. , Fl. Calicut 218. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1184. 1983; Mani., Fl. Silent Valley 205. 1988; Grah., Kew Bull. 43: 586. 1988; Ramach. & Nair, Fl. Cannanore 340. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 41. 1988; Vajravelu, Fl. Palghat Dist. 351. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 349. 1994; Sivar. & Mathew, Fl. Nilambur 506. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 341. 1996. ***Bem-curini*** Rheede, Hort. Malab. 2: 33-34, t. 21. 1679.

Shrubs to 1.5 m tall, branchlets terete. Leaves 7-12 x 3-5.5 cm, elliptic or ovate-lanceolate, base acute to attenuate, margin subentire, apex acuminate; lateral nerves c. 8 pairs; petiole 1-2.5 cm long. Spikes 4-15 cm long, terminal or subterminal. Bracts and bracteoles 1-1.5 x 0.5-0.7 cm, elliptic or ovate, acuminate, white with green nerves. Calyx lobes 5, c. 4 mm long, oblanceolate, 3-ribbed, puberulous. Corolla white, rose-spotted, c. 1 cm long. Stamens 2, curved; anthers long-spurred. Ovary oblong, pubescent; style to 1 cm long, hairy. Capsule 0.7-1.2 x 0.3-0.5 cm, clavate, pubescent. Seeds 2-4.

Fl. & Fr. : Nov. - Feb.

Distr. : Paleotropics. Among thickets. *CNS 1398* (Kayamkulam R.S. surroundings).

Justcia gendarussa Burm. f., Fl. Ind. 10. 1768; Clarke in Hook. f., Fl. Brit. India 4: 532. 1885; Gamble, Fl. Pres. Madras 1079. 1924; Sant., Bot. Mem. Univ. Bombay 2: 91. 1951; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1186. 1983; Grah., Kew Bull. 43: 589. 1988; Mani., Fl. Silent Valley 205. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 41. 1988; Sivar. & Mathew, Fl. Nilambur 508. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 341. 1996. *Gendarussa vulgaris* Nees in Wall. , Pl. Asiat. Rar. 3: 104. 1832; Wight, Ic. 468. 1841; Mani. & Sivar., Fl. Calicut 216. 1982; Mohanan & Henry, Fl. Thiruvananthapuram 347. 1994. ***Vada-kodi*** Rheede, Hort. Malab. 9: t. 42. 1689.

Much branched shrubs or undershrubs; branchlets dark purple, terete, smooth. Leaves 6-10 x 1.2-2 cm, oblong-lanceolate, base acute, apex acute or obtuse, glabrous; lateral nerves 5-7 pairs; petiole 3-4 mm long. Flowers in terminal 4-8 cm long, paniculate spikes. Bracts 3-4 mm long, linear; bracteoles absent. Calyx lobes 3-4 mm long, linear-lanceolate. Corolla white with purple streaks; tube to 1 cm long. Stamens 2; filaments filiform, to 6 mm long; lower anther cell spurred. Ovary obovoid or conic, puberulous.

Fl. : Nov. - Feb. Fruits not seen.

Distr.: Trop. Africa land Asia. Common in waste lands, and often grown on hedges and road sides. *CNS 1431* (Kayamkulam R.S. surroundings).

Justicia japonica Thunb. , Fl. Jap. 20. 1784; Ramach. & Nair, Fl. Cannanore 340. 1988; Sivar. & Mathew, Fl. Nilambur 508. 1996. *J.simplex* D. Don, Prodr. Fl. Nepal. 118. 1825; Clarke in Hook. f. , Fl. Brit. India 4: 539. 1885; Gamble, Fl. Pres. Madras 1080. 1924; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 552. 1976; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1189. 1883; Mani., Fl. Silent Valley 206. 1988; Grah., Kew Bull. 43: 597. 1988; Vajravelu, Fl. Palghat Dist. 353. 1990. *Rostellularia japonica* (Thunb.) Ellis, Bull. Bot. Surv. India 22: 196. 1980 (1982); Mohanan & Henry, Fl. Thiruvananthapuram 352. 1994.

Erect or decumbent herbs; branchlets 4-angled, grooved, strigose-hispid. Leaves 1.5-2.5 x 0.5-1.2 cm, elliptic to linear-lanceolate, base rounded, obtuse to slightly acute at apex, loosely strigose hairy on both sides, lineolate with transverse and curved raphides; petiole to 3 mm long. Bracts and bracteoles 4-5 mm long, ovate, scarious-margined, ciliate. Calyx 4-partite; lobes c. 4 mm long, linear, margins scarious, ciliate. Corolla pink, tube c. 4 mm long. Stamens 2; anther cells superposed, lower cell spurred. Capsule 3-4 mm long, oblong, hairy at apex. Seeds 4, ovoid, compressed.

Fl. & Fr. : Sep. - Nov.

Distr. : Indo-Malesia, East Asia and Tropical Africa. A common weed in waste places and roadsides. *CNS 1291* (Pandavanpara).

Justicia procumbens L., Sp. Pl. 15. 1753; Clarke in Hook. f. , Fl. Brit. India 4: 539. 1885; Gamble, Fl. Pres. Madras 1080. 1924; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1188. 1983; Grah., Kew Bull. 43: 597. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malb. 41. 1988; Sivar. & Mathew, Fl. Nilambur 509. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 342. 1996. *Rostellularia procumbens* (L.) Nees in Wall., Pl. Asiat. Rar. 3: 101. 1832. ***Tsjeru-tradavel*** Rheede, Hort. Malab. 10: 187, t. 94. 1690.

Diffuse or erect herbs; branchlets subtetragonous, strigose-hispid. Leaves 3-4 x 0.5-1.2 cm, elliptic or ovate, base and apex acute, scabrous above; nerves 4-5 pairs, prominent below; petiole to 1 cm long. Spikes terminal, 1-2.5 cm long, cylindric, dense-flowered; peduncle slender. Bracts 4-6 mm long, obovate, margin ciliate; bracteoles c. 4 mm long, lanceolate, margin scarious, ciliate. Calyx lobes 4, 6-8 mm long, lanceolate, scarious on margins, hairy without. Corolla pink; tube 5-6 mm long, ventricose; lower lips with thick lines on inner face. Anthers spurred. Capsule 4-5 mm long, oblong, sparsely pubescent. Seeds orbicular, compressed, tuberculate without.

Fl. & Fr. : Sep. - Mar.

Distr. : Sri Lanka, India, Malaya and Australia. Not common. On exposed grassy slopes. *CNS 1290* (Pandavanpara), *CNS 1971* (Thazhakkara).

Justicia prostrata (Clarke) Gamble, Fl. Pres. Madras 1081. 1924; Sant., Bot. Mem. Univ. Bombay 2: 88. 1951; Rani. & Matthew in Matthew, Fl. Tam. Carnatic 3: 1188. 1983; Ramach. & Nair, Fl. Cannanore 341. 1988; Sivar. & Mathew, Fl. Nilambur 510. 1996. *J. diffusa* Willd. var. *prostrata* Clarke in Hook. f. , Fl. Brit. India 4: 538. 1885. *Rostellularia prostrata* (Clarke) Majumd., Bull. Bot. Soc. Bengal 25: 75. 1971; Mani. & Sivar., Fl. Calicut 219. 1982; Mohanan & Henry, Fl. Thiruvananthapuram 353. 1994.

Prostrate or diffuse herbs, rooting at lower nodes. Leaves 1-2 x 0.5-1 cm, ovate to suborbicular, base rounded, apex acute or obtuse; petiole 4-10 mm long. Spikes terminal or subterminal, 2-4 cm long, linear. Bracts and bracteoles 1.5-4 mm long, lanceolate. Calyx lobes 4, to 3 mm long, lanceolate, greem-nerved on the centre and with scarious margins. Corolla pink or white, to 6 mm long. Stamens 2, lower cell spurred. Capsule 3-4 mm long, oblong, 4-seeded, hairy at apex. Seeds slightly compressed, papillose, light-brown.

Fl. & Fr. : Sep.-Jan.

Distr. : Sri Lanka and India. Common in waste lands. *CNS 1977* (Alappuzha town).

LEPIDAGATHIS Willdenow

Sp. Pl. 3(1) : 400. 1800.

Lepidagathis incurva Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 119. 1825; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 556. 1976; Mani. & Sivar., Fl. Calicut 223. 1982; Mani., Fl. Silent Valley 206. 1988; Sivar. & Mathew, Fl. Nilambur 512. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 343. 1996. *L. hyalina* Nees in Wall., Pl. Asiat. Rar. 3: 95. 1832; Calrke in Hook. f. , Fl. Brit. India 4: 521. 1885; Gamble, Fl. Pres. Madras 1068. 1924.

Prostrate herbs with elongated branches; stem obtusely 4-angled. Leaves 2-4 x 1.5-3 cm, ovate, oblong or elliptic-lanceolate, base rounded and decurrent or attenuate, margin faintly crenate, apex acute, hispid or glabrescent; petiole 1-2 cm long. Flowers sessile, aggregated in condensed terminal and axillary villous spikes. Bracts c. 1 x 0.5 cm,

elliptic-lanceolate, long mucronate, 1-nerved, scarious; bracteoles lanceolate. Calyx-lobes 5, unequal, elliptic-lanceolate, aristate, 3-nerved. Corolla c. 8 mm long, white with dark pink dots on the lobes, 2-lipped. Stamens 4, included; anther-cells unequal, minutely ciliate. Ovary globose; ovules 2-per locule; style pubescent. Capsule c. 6 mm long, ellipsoid, apically ciliate. Seeds flattened, hairy.

Fl. & Fr. : Jan. - Apr.

Distr. : South West India and Sri Lanka. A common weed in wet places like river banks, low-lying areas, etc. *CNS 1455* (Kavalam).

PERISTROPHE C.G. D. Nees

in Wallich, Pl. Asiat. Rar. 3: 77, 112. 1832.

Peristrophe paniculata (Forssk.) Brummitt, Kew Bull. 38: 451. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 42. 1988; Sivar. & Mathew, Fl. Nilambur 514. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 344. 1996. *Dianthera paniculata* Forssk., Fl. Aeg.-Arab. 7. 1775. *Dianthera bicalyculata* Retz., Kongl. Vetensk. Acad. Handl. 297. t. 9. 1775. *Peristrophe bicalyculata* (Retz.) Nees in Wall., Pl. As. Rar. 3: 113. 1832; Clarke in Hook. f., Fl. Brit. India 4: 554. 1885; Gamble, Fl. Pres. Madras 1084. 1924; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 556. 1976; Mani. & Sivar., Fl. Calicut 215. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1193. 1983. ***Katou-pulcolli*** Rheede, Hort. Malab. 6: t. 23. 1686.

Erect hispid, laxly branched herbs to 1 m tall. Leaves 3-6 x 1.6-3 cm, ovate, base rounded or truncate, apex acuminate, glabrescent above and tomentose below; lateral nerves 8-10 pairs; petiole to 1.5 cm long; leaves of flowering branches much smaller. Flowers in lax terminal or axillary panicles. Bracts 7-12 mm long, linear. Calyx lobes c. 3 mm long, linear, ciliate. Corolla pink, c. 1 cm long, tube white, cylindric, often twisted, 2-lipped. Stamens 2, exserted; anther cells 2, superposed. Ovary oblong, 2-celled; style filiform; stigma bifid. Capsule 0.8-1.2 cm long, ellipsoid, tomentose. Seeds 4, c. 2 mm across, orbicular, papillose.

Fl. & Fr.: Dec.- Feb.

Distr. : Tropical Africa,Tropical India and Myanmar. Common in plains, wastelands and road sides. *CNS 1926* (Thottappally).

PHAULOPSIS Willdenow

Sp. Pl. 3: 4, 342. 1799-1800 ("Phaylopsis")

Corr. K.P. J. Sprengel, Anleit. ed. 2, 2: 422. 1817 (*nom. cons.).*

Phaulopsis imbricata (Forssk.) Sweet, Hort. Brit. 327. 1827; Bennet, Ind. J. For. 1: 24. 1978; Mani. & Sivar., Fl. Calicut 222. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1194. 1983; Mani., Fl. Silent Valley 210. 1988; Ramach. & Nair, Fl. Cannanore 347. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 350. 1994; Sivar. & Mathew, Fl. Nilambur 514. 1996; Sasi. & 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. t. 39. 1798; Gamble, Fl. Pres. Madras 1022. 1924. *Aetheilema reniforme* Nees in Wall. , Pl. Asiat. Rar. 3: 94. 1832. *Phaulopsis parviflora* Willd., Sp. Pl. 3: 417.1 1884; Wight, Ic. t. 1533. 1850; Clarke in Hook. f. , Fl. Brit. India 4: 417. 1884. *P. dorsiflora* (Retz.) Sant., Kew Bull. 3: 276. 1948 & Bot. Mem. Univ. Bombay 2: 30. 1951; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 557. 1976; Vajravelu, Fl. Palghat Dist. 358. 1990.

Prostrate herbs; young shoots softly glandular-hairy. Leaves opposite, pairs unequal, 1.5-4 x 1-2.5 cm, ovate or elliptic, base obliquely acute, margin subentire, apex acute, pubescent; petiole to 2.5 cm long. Flowers small, in dense terminal and axillary, 2-3 cm long one-sided spikes. Bracts foliaceous, 0.5-1 cm diam., orbicular, silky hairy, closely imbricate. Calyx lobes 5, one larger than others, 5-8 mm long, ovate, others very small and linear. Corolla white, 4-5 mm long; tube slender; lobes subequal, 2-lipped. Stamens 4, didynamous; anther-cells divergent. Ovary oblong, 2-celled; ovules 2 in each cell; style slender, villous; stigma 2-lobed. Capsules 4-6 mm long, clavate, compressed, ciliate. Seeds 4, compressed, orbicular, white hairy without.

Fl. & Fr. : Oct. - Feb.

Distr. : Africa, and India to China. Occasional; in waste places and on roadsides. *CNS 2564* (Kommadi).

RHINACANTHUS C.G.D. Nees
in Wall., Pl. Asiat. Rar. 3: 76, 108. 1832.

Rhinacanthus nasutus (L.) Kurz, J. Asiat. Soc. Bengal 39: 79. 1870; Sant., J. Bombay Nat. Hist. Soc. 51: 367. 1953; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 558. 1976; Mani. & Sivar., Fl. Calicut 215. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1196. 1983; Ramach. & Nair, Fl. Cannanore 348. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 42. 1998; Vajravelu, Fl. Palghat Dist. 359. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 351. 1994; Sivar. & Mathew, Fl. Nilambur 515. 1996; Sasi. & 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. 1885; Gamble, Fl. Pres. Madras 1083. 1924. ***Pul-colli*** Rheede, Hort. Malab. 9: 135, t. 69. 1689.

Subshrubs; stem subterete, glabrescent. Leaves 6-10 x 2-5 cm, elliptic-lanceolate, base attenuate, apex acute or acuminate; lateral nerves 8-10 pairs; petiole c. 1 cm long. Flowers subsessile, in terminal or axillary divaricate branches of lax-panicles. Bracts and bracteoles c. 2 mm long, lanceolate, glandular-pubescent. Calyx lobes subequal, 3-4 mm long, linear-lanceolate, glandular-pubescent. Corolla white, sparsely pubescent; tube 1-1.5 cm long, narrowly cylindric, 2-lipped; lower lip c. 1 cm long, 3-lobed, upper lip c. 7 mm long, linear. Stamens 2, exserted; anther-cells 2, superposed. Ovary 2-locular; ovules 2-per locule; style pubescent; stigma obliquely 2-fid. Capsule c. 2 cm long, linear-ellipsoid, pubescent. Seeds 4, orbicular, rugose.

Fl. & Fr. ; Dec. - Mar.

Distr.: Peninsular India and Sri lanka. Not common; on roadsides. *CNS 1787* (Venmony).

RUELLIA Linnaeus

Sp. Pl. 634. 1753.

Ruellia tuberosa L., Sp. Pl. 635. 1753.; Gamble, Fl. Pres. Madras 1017. 1924; Mani. & Sivar., Fl. Calicut 225. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1197. 1983; Ramach. & Nair, Fl. Cannanore 349. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 353. 1994 (Fig. 53).

Glabrescent herbs, 25-45 cm tall; rootstock with numerous fleshy tubers. Leaves 3.2-8.5 x 1.8-4 cm, elliptic-obovate or obovate-oblong, base cuneate to attenuate, apex obtuse; petiole 1-2.5 cm long. Flowers blue, c. 3 cm long, solitary or in 3-flowered cymes, axillary or terminal; pedicel to 5 mm long; bracts and bracteoles c. 5 mm long, linear. Calyx lobes subequal, 1.2-2 cm long, linear, acute, ciliate. Corolla c. 3.5 cm across; tube c. 3 cm long; lobes subequal, rounded. Stamens 4, included; filaments hairy below; anthers 3-4 mm long, sagittate, puberulous; staminode linear. Style c. 2 mm long; stigma 2-lamellate, flattened, ciliate. Capsule 2-2.7 x 0.3-0.4 cm, linear-oblong, black. Seeds c. 2 mm across, orbicular, flattened, hairy.

Fl. & Fr. : Jun.-Dec.

Distr. : Tropical America; naturalized in India and Malesia. Often found in wastelands and waysides. *CNS 1399* (Kayamkulam).

RUNGIA C.G.D. Nees

in Wall. , Pl. Asiat. Rar. 3: 77, 109. 1832.

Rungia pectinata (L.) Nees in DC., Prodr. 11: 469. 1847; Wight, Ic. t. 1547. 1850; Sant., J. Bombay Nat. Hist. Soc. 51: 365. 1953; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 559. 1976; Mani. & Sivar., Fl. Calicut 216. 1982; Ramach. & Nair, Fl. Cannanore 350. 1988; Mani., Fl. Silent Valley 211. 1988; Vajravelu, Fl. Palghat Dist. 360. 1990; Sivar. & Mathew, Fl. Nilambur 517. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 346. 1996. *Justicia pectinata* L. in Torner, Cent. Pl. 3. 1756. *Rungia parviflora* (Retz.) Nees var.

pectinata (L.) Clarke in Hook. f. , Fl. Brit. India 4: 550. 1885; Gamble, Fl. Pres. Madras 1071. 1924.

Diffuse or erect herbs. Leaves 1.5-3 x 0.5-1.2 cm, ovate-lanceolate, base attenuate, apex acute, glabrous, lineolate on upper surface. Spikes axillary and terminal, 1-2.5 cm long. Barren bracts in 2 rows, c 5 mm long with scarious margins, lanceolate. Fertile bracts 3-4 x 1-2 mm, orbicular with scarious margins; bracteoles c. 2 mm long, elliptic, margin ciliate. Calyx lobes 5, 4-5 mm long, subulate. Corolla bluish white, tube 2-3 mm long, pubescent outside. Anther cells superposed, the lower cell with a basal appendage. Capsule 2-3 x 1-1.5 mm, oblong, pubescent at apex.

Fl. & Fr. : Nov. - Feb.

Distr. : Peninsular India and Sri Lanka. A common weed in waste places. *CNS 1297* (Angadikkal), *CNS 1534* (Kadakkarappally).

STAUROGYNE Wallich

Pl. Asiat. Rar. 2: 80, t. 186. 1831.

Erect or diffuse villous herbs. Leaves opposite or alternate, often with smaller leaves in axils. Flowers in simple or compound dense or lax spikes, terminal as well as axillary. Bracts sometimes leafy; bracteoles small. Calyx deeply 5-partite, lobes subequal, linear. Corolla tube funnel-shaped or cylindric, 2-lipped, lobes 5 , spreading. Stamens 4, didynamous, included; filaments hairy; anther cells divergent. Ovary 2-locular; ovules many in each cell; stigma 2-lobed, one often again 2-lobed. Capsule oblong. Seeds globose, smooth or pitted.

1a. Erect viscous pubescent herbs; all or the upper leaves alternate; seeds smooth, not pitted ..... **S. glauca**

1b. Diffuse or trailing herbs, pubescent or glaberscent, not viscous, rooting at nodes; leaves opposite; seeds pitted.

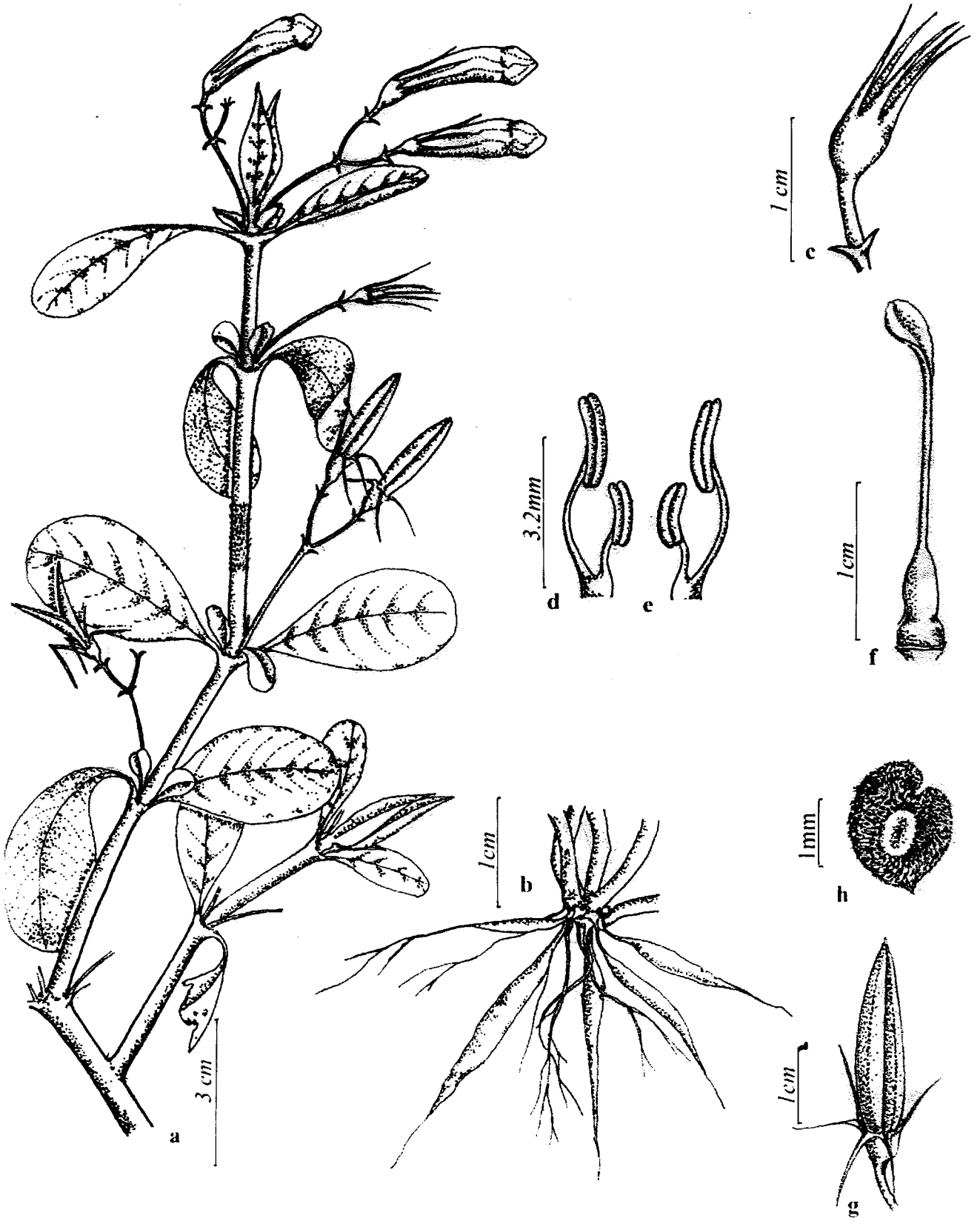


Fig. 53. *Ruellia tuberosa* L.: a. Twig; b. Tuberous roots; c. Calyx; d & e. stamens; f. Pistil; g. Fruit with persistent calyx; h. Seed.

2a. Flowers few in psuedo-axillary, short, subcapitate spikes, rarely solitary; corolla bluish-purple; leaves 1.2-4 cm long ..... **S. glutinosa**

2b. Flowers in dense-flowered, to 6 cm long, terminal spikes; corolla pink; leaves 3-8 cm long ..... **S. zeylanica**

Staurogyne glauca (Nees) Kuntze, Rev. Gen. Pl. 1: 497. 1891; Gamble, Fl. Pres. Madras 1011. 1924; Sant., Bot. Mem. Univ. Bombay 2: 13. 1952; Mani. & Sivar., Fl.Calicut 223. 1982; Ramach. & Nair, Fl. Cannanore 350. 1988; Sivar. & Mathew, Fl. Nilambur 518. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 347. 1996. *Ebermaiera glauca* Nees in DC., Prodr. 11: 73. 1847; Wight. Ic. t. 1488. 1849; Clarke in Hook. f. , Fl. Brit. India 4: 395. 1885.

Erect viscous pubescent herbs. Leaves all or the upper alternate, 2-6 x 1-1.8 cm, spathulate-oblong, base attenuate, margin subentire, apex obtuse; petiole to 1 cm long. Spikes to 7 cm long, cylindric. Lower bract leaf-like, linear-spathulate, upper smaller; bracteoles 2, c. 4 mm long, linear, tomentose. The larger calyx lobe c. 7 mm long, others c. 4 mm long, pubescent. Corolla bluish-purple, 5-8 mm long, pubescent, tube cylindric. Stamens 4; cells divergent, ovoid. Capsule 4-6 mm long, oblong, glabrous. Seeds smooth, globose.

Fl. & Fr.: Jan. - Mar.

Distr. : Indo-Malesia. In sacred groves. *CNS 2116* (Sharangakavu).

Staurogyne glutinosa (Wall. ex Clarke) O. Kuntze, Rev. Gen. Pl. 1: 499. 1891; Dhruvan & Mathew, Rheedea 5(1): 60. 1995. *Ebermaiera glutinosa* Wall. ex Calrke in Hook. f., Fl. Brit. India 4: 396. 1884; Prian, Beng. Pl. 798 & Veg. 256. 1963. *Ebermaiera glauca* T. Anders., J. Linn. Soc. 9: 450. 1867, non Nees, 1847 (Fig. 54).

Diffuse or trailing pubescent or glabrescent herbs with slender branches and rooting at nodes. Leaves opposite, 1.2- 4 x 0.8-2 cm, ovate or elliptic, base attenuate, apex obtuse, membranous, veins 4-7 pairs; petiole to 1.6 cm long. Inflorescence pseudoaxillary, short peduncled, bracteate, subcapitate spikes, rarely axillary, solitary.

Flowers c. 1.5 cm long; pedicel to 2 mm long; bracts foliaceous, 6-8 x 2.5-3.5 mm, viscid-hairy with a few eglandular hairs at base; bracteoles to 5 x 2 mm, oblong, viscid-hairy. Calyx deeply 5-partite; lobes unequal, 6-8 x 0.5-2 mm, viscid-hairy. Corolla to 1.3 cm long, slightly 2-lipped, bluish-purple; tube slightly curved, viscid without; lobes 5, ovate, obtuse. Stamens 4, included; filaments flat, hairy; anthers divergent, with a median transverse band of hairs, muticous. Ovary c. 2 mm long, oblong, viscid-pubescent; style to 6 mm long; stigma bifid, glandular; the lower lobe again 2-lobed. Capsule c. 4 mm long, oblong. Seeds many, cuboid, pitted.

Fl. & Fr. : Jan. - May.

Distr.: India and Bengladesh. In moist damp soil. *CNS 1950* (Panavally).

Staurogyne zeylanica (Nees) Kuntze, Rev. Gen. Pl. 497. 1891; Gamble, Fl. Pres. Madras 1011. 1924; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 560. 1976; Mani. & Sivar., Fl. Calicut 223. 1982; Ramach. & Nair, Fl. Cannanore 351. 1988; Vajravelu, Fl. Palghat Dist. 361. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 355. 1994; Sivar. & Mathew, Fl. Nilambur 519. 1996; Sasi. & 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.

Pubescent trailing herbs; stem 4-angled. Leaves opposite, 3-8 x 1.5-4 cm; elliptic-oblong, obovate or oblanceolate, base attenuate, obtuse at apex, pubescent below and glabrescent above; petiole to 3 cm long; leaves of flowering branches usually smaller. Spikes terminal, dense-flowered, to 6 cm long. Bracts 4-8 x 2-3 mm, obovate, obtuse, pubescent; bracteoles c. 5 mm long, linear-spathulate. Calyx lobes 5; the larger calyx lobe 6-8 mm long, other lobes much narrower, hirsute. Corolla pink; tube 4-5 mm long, 2-lipped; lobes 5, spreading. Stamens 4; filaments hairy; staminode rudimentary. Ovary oblong; stigma 2-lobed, one lobe again 2-fid. Capsules 5-7 mm long, oblong, medianly grooved, pubescent. Seeds many, globose, pitted; retinacula 0.

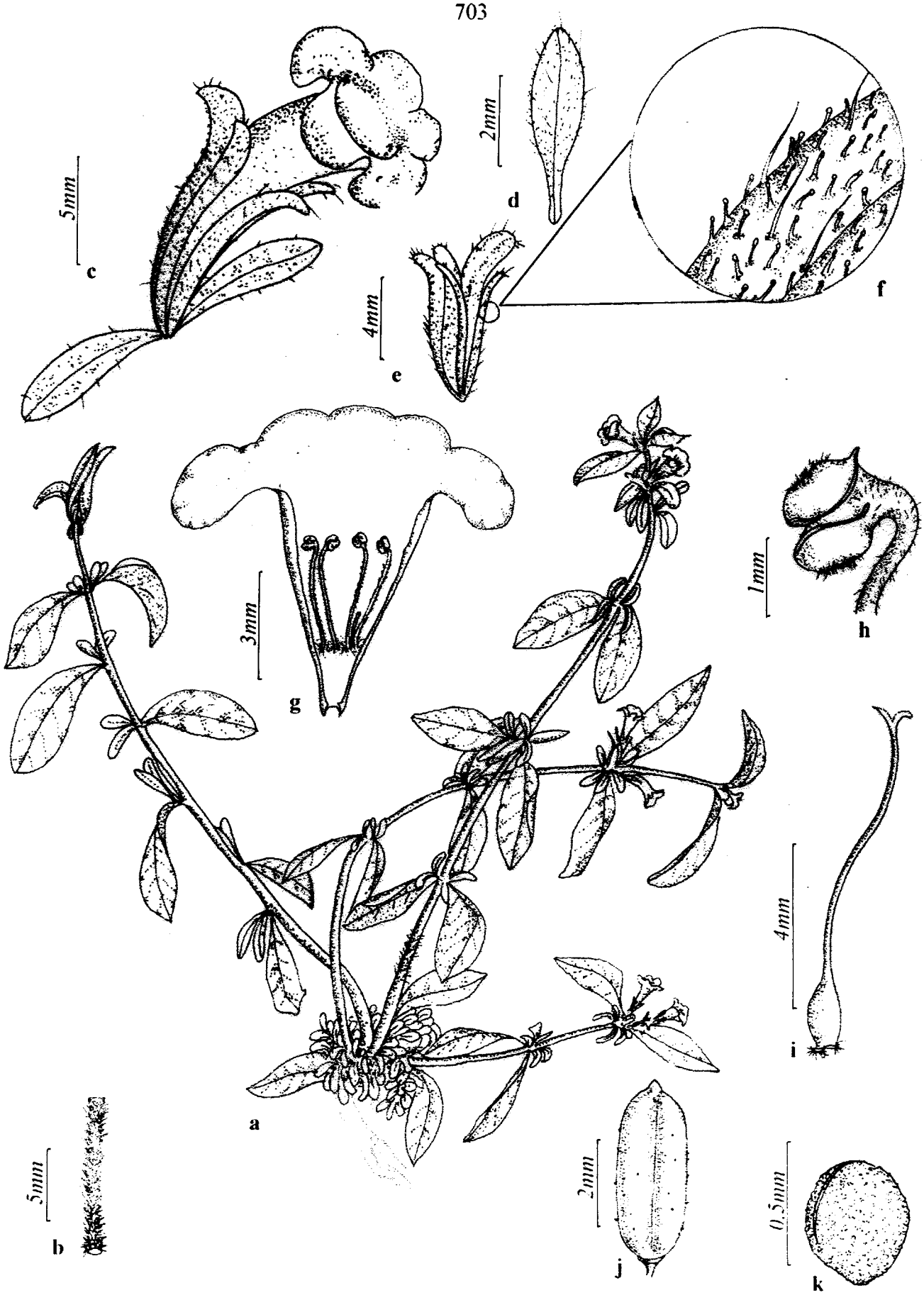


Fig. 54 *Staurogyne glutinosa* (Wall.ex Clarke) O. Kuntze: a.Habit; b. A portion of stem; c. Flower; d. Bracteole; e. Calyx; f. A portion of calyx showing pubescence; g. Corolla, split-open; h. Stamen; i. Pistil; j. Capsule; k. Seed

Fl. & Fr. : Dec. - Mar.

Distr. : Peninsular India and Sri Lanka. In sacred groves. *CNS 1521* (Sharangakavu).

THUNBERGIA Retzius

Physiogr. Salsk. Handl. 1(3): 163. 1780 ("1776") (*nom. cons.*).

Climbers or erect shrubs. Leaves decussate, basally 3-5-nerved or penninerved, entire or serrate. Flowers axillary, solitary or paired or in racemes. Bracts foliaceous; bracteoles spathaceous enclosing the flower buds. Calyx with 12-16 subulate teeth or reduced to a rim. Corolla fairly large, funnel-form, lobes 5, subequal, twisted in bud. Stamens 4, didynamous; anthers unequal, obtuse or shortly tailed. Ovules 2 in each cell; style elongated; stigma 2-fid, lamellate, entire or fringed. Capsule globose below containing the seeds and beaked and sterile at apex. Seeds globose.

1a. Erect shrubs ..... **T. erecta**

1b. Climbing herbs or shrubs.

2a. Flowers in racemes; calyx-lobes reduced to a rim ..... **T. grandiflora**

2b. Flowers solitary or paired; calyx-lobes 12-16.

3a. Petiole winged; corolla yellow with purple-black throat ..... **T. alata**

3b. Petiole not winged; corolla white ..... **T. fragrans**

Thunbergia alata Bojir. ex Sims in Curtis, Bot. Mag. t. 2591. 1825; Hook. f., Fl. Brit. India 4: 391. 1884; Gamble, Fl. Pres. Madras 1008. 1924; Sant., Bot. Mem. Univ. Bombay 2: 10. 1951; Bremek., Verh. Kon. Neder. Akad. Wetensch., Afd. Naturk., Tweede Sect. 50(4): 41. 1955; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 560. 1976; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1210. 1983; Vajravelu, Fl. Palghat Dist. 362. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 355. 1994; Sivar. & Mathew, Fl. Nilambur 527. 1996.

Climbing herbs; stem slender, pubescent. Leaves to 9 x 3.5 cm, hastate or sagittate, base cordate, apex mucronate; petiole winged. Flowers axillary, solitary or paired. Bracts glabrous, acute; bracteoles ovate-cordate. Calyx lobes 14-15, subulate.

ciliate. Corolla yellow with a purple eye; tube to 1.2 cm, lobes spreading. Stamens 4, attached at the throat of the tube; anthers bearded. Stigma 2-fid. Capsule beaked; beak to 1.4 cm long. Seeds strongly reticulate.

Fl. & Fr. ; Dec. - Feb.

Distr. : Africa and India. Cultivated and escape. *CNS 2147* (Thalavady).

Thunbergia erecta (Benth.) T. Anders., J. Proc. Linn. Soc. Bot. 7: 18. 1863; Gamble, Fl. Pres. Madras 1008. 1924; Bor & Raiz., Beautif. Ind. Climbers, shrubs 107. 1954; Bremek., Verh. Kon. Ned. Akad. Wetensch. Afd. Naturk., Tweede. Sect. 50(4):37. 1955; Mani. & Sivar., Fl. Calicut 226. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1210. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 355. 1994. *Meyenia erecta* Benth. in Hook., Niger. Fl. 476. 1849.

Erect or straggling shrubs. Leaves 3-8 x 2-4 cm, elliptic to ovate, base rounded, margins entire or distantly serrate, apex acuminate, penninerved, thin-coriaceous; petiole to 4 mm long. Flowers axillary, solitary; bracteoles 1.4-1.8 x 0.7-0.9 cm, ovate, white; pedicel to 1.3 cm long. Calyx teeth 12-16, subulate. Corolla to 3.8 cm across, deep bluish-purple, tube cream, inflated above, lobes 5, spreading, subequal. Stamens 4; anthers oblong. Stigma 2-fid.

Fl. & Fr:. Throughout the year.

Distr.: West tropical Africa, now widely cultivated. *CNS 1889* (Thuravoor).

Thunbergia fragrans Roxb., Pl. Corom. t. 67. 1796 & Fl. Ind. 3: 33.1832; Clarke in Hook. f. , Fl. Brit. India 4: 390. 1885; Gamble, Fl. Pres. Madras 1007. 1924; Bor & Raiz., Beautif. Ind. Climbers, shrubs 105. 1954; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 560. 1976; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1211. 1983; Mani. , Fl. Silent Valley 212. 1988; Vajravelu, Fl. Palghat Dist. 362. 1990; Sivar. & Mathew, Fl. Nilambur 527. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 350. 1996.

Slender twiners; branchlets sparsely sericeous. Leaves 5-7 x 2.5-3.5 cm, triangular-ovate or ovate-elliptic, base sub-cordate or truncate, margin coarsely dentate towards base, apex acute, mucronate, thinly pubescent, basally 5-nerved; petiole to 3 cm long. Flowers axillary, solitary; bracteoles c. 1.5 x 0.8 cm, ovate-oblong, apiculate; pedicels 2-3.5 cm long, thickened upwards. Calyx 12-16 toothed, 1.5-2 mm long, subulate, glandular-pubescent. Corolla white, c. 4 cm across, puberulous without. Stamens 4; filaments glandular-hispid towards base; anther cells obtuse. Ovary globose; stigma 2-lipped. Capsule scabrid. Seeds reticulate.

Fl. & Fr. : Dec. - Feb.

Distr. : Sri Lanka, India, Nepal, Myanmar, Indo-China and W. China. A twining herb with beautiful non-fragrant white flowers. *CNS 2393* (Sharangakavu).

Thunbergia grandiflora (Rottl.) Roxb., Fl. Ind. 3: 34. 1832; Wight, Ic. t. 872. 1844-45; Clarke in Hook. f., Fl. Brit. India 4: 392. 1884; Gamble, Fl. Pres. Madras 1008. 1924; Sant., Bot. Mem. Univ. Bombay 2: 9. 1951; Bremek., Verh. Kon. Ned. Akad. Wetensch. Afd. Naturk. Tweede Sect. 50(4): 45-46. 1955; Mani. & Sivar., Fl. Calicut 226. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1212. 1983; Ramach. & Nair, Fl. Cannanore 351. 1988. *Flemingia grandiflora* Roxb. ex Rottler, Ges. Naturf. Freunde Berlin Neue Schriften 4: 202. 1803.

Large climbers with pendant branches. Leaves 5-14 x 4-7 cm, ovate, base cordate, hastate or sagittate, margin dentate, apex acuminate, glabrous or slightly puberulous; petiole to 2.2 cm long. Flowers large in axillary racemes; bracts to 3 cm long. spathaceous, tomentose; bracteoles falcate. Calyx to 2 mm long, ring-like. Corolla blue or white, c. 3.5 cm across, tube widened, lobes subequal, spreading. Stamens 4, attached at the throat of the tube; anthers oblong. Capsule globose, beaked. Seeds 4, globose, retinacula absent.

Fl. & Fr. : Sep. - Dec.

Distr. : India, South China and Myanmar. Often planted along fences. *CNS 2318* (Mayithara).

90. VERBENACEAE J. St.-Hil.

Expos. Fam. Nat. 1: 245. 1805.

1a. Leaves digitately 3-5-foliolate ..... **Vitex**

1b. Leaves simple.

2a. Inflorescence a globose or elongated spike.

3a. Spikes condensed, globose or ovoid, axillary; calyx not ribbed; stamens 4.

4a. Erect shrubs, stem prickly; calyx truncate or obscurely lobed; fruit drupaceous, succulent ..... **Lantana**

4b. Prostrate herbs, stem not prickly; calyx cupular, lobes 2; fruit dry .. .. **Phyla**

3b. Spikes elongate throughout, terminal; calyx ribbed; stamens 2 .... **Stachytarpheta**

2b. Inflorescence a raceme or cyme.

5a. Corolla regular, lobes 4 or 6-8; stamens as many as corolla - lobes.

6a. Flowers 4-merous; corolla purple; calyx not inflated in fruit; pyrenes 4 ..... **Callicarpa**

6b. Flowers 6-8-merous; corolla white; calyx inflated in fruit; pyrene 1 ..... **Tectona**

5b. Corolla zygomorphic, lobes 5; stamens 4.

7a. Stamens inserted well below in the tube; involute in bud, clearly exserted later ..... **Clerodendrum**

7b. Stamens inserted near the middle in the tube, not involute in bud, included or subexserted.

8a. Inflorescence terminal corymbose panicles ..... **Premna**

8b. Inflorescence racemose.

9a. Leaves with a pair of sessile glands at the base of lamina; corolla yellow, more than 2 cm across, tube inflated ..... **Gmelina**

9b. Leaves without glands; corolla white or blue, less than 1.2 cm across, tube cylindric.

10a. Shrubs; leaves 2.5 - 5.5 x 2-4 cm, corolla blue, salver-form ..... **Duranta**

10b. Trees; leaves 8-19 x 5-8 cm. corolla white, tubular-campanulate ..... **Citharexylum**

CALLICARPA Linnaeus

Sp. Pl. 111. 1753.

Callicarpa tomentosa (L.) Murr., Syst. Veg. ed. 13, 130. 1774; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 486. 1976; Mani. & Sivar., Fl. Calicut 227. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1217. 1983; H.N. & A.L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 299. 1983; Mani., Fl. Silent Valley 213. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 259. 1988; Ramach. & Nair, Fl. Cannanore 353. 1988; Vajravelu, Fl. Palghat Dist. 364. 1990; Mohanan & Henry, Fl. thiruvananthapuram 357. 1994; Sivar. & Mathew, Fl. Nilambur 529. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 351. 1996. *Tomex tomentosa* L., Sp. Pl. 118. 1753. *Callicarpa lanata* L., Mant. Pl. 2: 331. 1771; Clarke in Hook. f., Fl. Brit. India 4: 567. 1885; Gamble, Fl. Pres. Madras 1092. 1924. **Tondi-teregam** Rheede, Hort. Malab. 4: 123-124, t. 60. 1683.

Small trees; branchlets, petiole, leaves beneath and peduncle fulvous-tomentose. Leaves 10-26 x 5-14 cm, broadly elliptic-ovate to triangular ovate, base rounded to slightly cuneate, margin entire or denticulate, apex acuminate, densely tomentose below and glabrous above except the nerves; lateral nerves c. 8 pairs; petiole to 5 cm long. Flowers subsessile in axillary and terminal umbellate cymes; peduncle 2-3 mm long. Bracts c. 3 mm long, linear. Calyx cupular, 2-3 mm long, 4-toothed, densely stellate hairy without.

Corolla pink, c. 5 mm across; tube very short; lobes 4, 2-3 mm long. Stamens 4, exserted; filaments glandular. Ovary c. 2 mm long, 2-celled, pubescent; ovules 1 in each cell; stigma thick, obscurely 2-lobed. Drupes 3-4 mm across, globose.

Fl. & Fr.: Jan. - Apr.

Distr.: Peninsular India and Sri Lanka. In sacred groves. *CNS 2467* (Thamarakulam).

Leaves, root and bark used to skindiseases.

CITHAREXYLUM Linnaeus

Sp. Pl. 625. 1753.

Citharexylum spinosum L., Sp. Pl. 2: 625. 1753; Mani. & Sivar., Fl. Calicut 229. 1982. *C. subserratum* Sw., Nov. Gen. Pl. 91. 1788; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1218. 1983. *C. fruticosum* L. var. *subserratum* (Sw.) Mold., Phytologia 1: 17. 1933 & 6: 383. 1958; Ramach. & Nair, Fl. Cannanore 360. 1988; Vajravelu, Fl. Palghat Dist. 370. 1990. ***Parijatham***.

Shrubs or small trees; bark whitish-grey, fissured; branchlets usually tetragonous. Leaves 8-19 x 5-8 cm, elliptic-lanceolate, base acute, margin entire or irregularly and coarsely dentate, apex obtuse or acute, veins finely reticulate, chartaceous; petiole to 3.5 cm long. Flowers fragrant in axillary and terminal, simple or compound, 6-28 cm long, pendulous racemes. Bracts c. 1.5 mm long, subulate, deciduous. Calyx 4-5 mm long, cupular, 5-toothed, rim ciliate. Corolla white, tubular-campanulate, 0.8-1.2 across, faintly 2-lipped; tube 6-8 mm long; lobes 5, unequal, 3-5 x 2-3 mm, oblong, obtuse, mouth white-villous within. Stamens 4, included; filaments 2-3 mm long; anthers c. 1 mm long, oblong. Ovary c. 1 mm, globose; style c. 3 mm long; stigma globose. Fruits not seen.

Fl.: Apr. - Sep.

Distr.: Argentina, northwards to southern U.S.A., planted. Occasionally run wild. Commonly cultivated on hedges and in gardens. *CNS 2468* (Panavally).

CLERODENDRUM Linnaeus

Sp. Pl. 637. 1753.

Shrubs, erect or scandent, or small trees. Leaves opposite or ternate. Flowers zygomorphic, 5-merous, in axillary or terminal cymose panicles. Bracts foliaceous or small. Calyx campanulate, 5-lobed to 5-partite, persistent and often accrescent. Corolla salver-form, tube elongated, limb obscurely 2-lipped, lobes 5, spreading. stamens 4, didynamous, much exserted on opening. Ovary imperfectly 4-celled, cells 1-ovuled; style filiform, longer than corolla; stigma 2-fid. Drupe globose or 4-lobed; pyrenes 4, each 1-seeded, usually only one pyrene is developed. Seeds oblong to pyriform, stony.

1a. Plants normally scandent ..... **C. thomsonae**

1b. Plants usually erect shrubs or trees.

2a. Corolla-tube more than 8 cm long ..... **C. indicum**

2b. Corolla-tube less than 3 cm long.

3a. Panicles terminal.

4a. Leaves in whorls of 3-4, sessile or short petioled, leaf base attenuate; corolla pale blue ..... **C. serratum**

4b. Leaves always opposite, long-petioled, leaf base cordate; corolla white or reddish.

5a. Leaf-blades densely covered beneath with glistening scales; corolla reddish ..... **C. paniculatum**

5b. Leaf-blades without glistening scales; corolla white.

6a. Corolla regularly "doubled" ..... **C. philippinum**

6b. Corolla not "doubled" ..... **C. viscosum**

3b. Panicles axillary ..... **C. inerme**

Clerodendrum indicum (L.) Kuntze, Rev. Gen. 586. 1891; Mani. & Sivar., Fl. Calicut 232. 1982; H.N. & A.L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 426. 1983; Ramach. & Nair, Fl. Cannanore 355. 1988; Sivar. & Mathew, Fl. Nilambur 530. 1996. *Siphonanthus indica* L., Sp. Pl. 1: 109. 1753. *Clerodendrum siphonanthus* R. Br. in

air., Hort. Kew. ed. 2, 4: 65. 1812; Hook. f., Fl. Brit. India 4: 595. 1885; Gamble, Fl. Pres. Madras. 1100. 1924.

Erect subshrubs to 2 m tall, stoloniferous; stem mostly unbranched, obtusely tetragonous, hollow. Leaves in whorls of 3-4, 7-22 x 2-4 cm, linear-lanceolate or elliptic-lanceolate, base attenuate to acute, margin entire or more or less toothed, apex acute or acuminate, sessile or subsessile. Flowers in terminal panicles. Bracts foliaceous resembling the leaves in all respects but smaller; bracteoles 5-12 x 2-3 mm, linear. Calyx 5-partite, red, broadly campanulate; tube 4-6 mm long; lobes 5, 6-10 mm long, ovate, apex acute. Corolla white, hypocrateriform; tube slender, 8-13 cm long, curved; lobes 8-15 mm long, oblong or ovate-oblong, obtuse, reflexed. Stamens 4, exserted; filaments purple, slender; anthers oblong, c. 2.5 mm long, purple. Sytle filiform, purple; stigma shortly bifid. Frit 4-lobed, blue-black, 1-1.3 cm across; pyrenes 1-4, 1-seeded; fruiting-calyx accrescent, fleshy, bright red.

Fl. & Fr.: Sep. - Dec.

Distr.: India, China, Indo-China, Malesia and Sri Lanka. Common in plains and coasts. *CNS 2469* (Cherthala).

The root (taken with ginger) is said to be useful in treating Asthma, coughs and other pulmonary complaints.

Clerodendrum inerme (L.) Gaertn., Fruct. 1: 271. 1788; Roxb., Fl. Ind. 3: 58. 1832; Hook. f., Fl. Brit. India 4: 589. 1885; Gamble, Fl. Pres. Madras 1099. 1924; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 486. 1976; Mani. & Sivar., Fl. Calicut 233. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1219. 1983; H.N. & A.L Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 447. 1983; Ramch. & Nair, Fl. Cannanore 353. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 260. 1988; Vajravelu, Fl. Palghat Dist. 364. 1990. *Volkameria inermis* L., Sp. Pl. 637. 1753. ***Nir-notsjiil*** Rheede, Hort. Malab. 5: t. 49. 1685.

Much branched, straggling shrubs; bark dark brown or whitish-grey. Leaves 2.5 - 6 x 2-3.5 cm, base acute, apex obtuse or acute, slightly fleshy, densely punctate beneath; petiole to 1 cm long. Flowers in axillary or supra-axillary, few-flowered cymes; pedicel to 1.2 cm long. Bracts linear. Calyx cupular, c. 4 mm long, 5-toothed. Corolla white, hypocrateriform; tube cylindric, 2-2.5 cm long; lobes 5, obovate. Stamens 4, exserted; filaments c. 3 cm long, maroon, white basally; anthers yellow. Ovary oblong, 4-lobed; style purple. Drupes 0.8-1.2 x 0.6-0.8 cm, pyriform, black when mature; pyrenes 4.

Fl. & Fr.: Jan. - Apr.

Distr.: Coastal India, Sri Lanka, Myanmar and Australia. Common along sandy sea - shore and backwaters. *CNS 1089* (Pallithode).

Clerodendrum paniculatum L., Mant. Pl. 90. 1767 ('paniculata'); Clarke in Hook. f., Fl. Brit. India 4: 593. 1885; Vivek., Bull. Bot. Surv. India 10: 240. 1968; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 487. 1976; Mani. & Sivar., Fl. Calicut 234. 1982; H.N. & A.L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 412. 1983; Ramach. & Nair, Fl. Cannanore 354. 1988; Sivar. & Mathew, Fl. Nilambur 530. 1996. ***Arumasapoovu***.

Erect subshrubs, to 2.5 m tall, stoloniferous; stem scarcely branched. Leaves 7-18 x 8-19 cm, orbicular, base cordate, margin faintly lobed, denticulate, apex acute, membranous, basally 7-nerved; petiole to 10 cm long. Flowers in terminal panicles of dichotomous cymes; pedicels reddish, 6-14 mm long. Calyx deeply 5-lobed, red, campanulate, 3-5 mm long; lobes oblong, obtuse. Corolla red, hypocrateriform; tube slender, 1.4-2 cm long; lobes 7-8 mm long, posterior pair shorter and narrower than the others. Stamens exserted; filaments 2-3 cm long. Ovary loblong. Fruit not seen.

Fl. : Jul. - Oct.

Distr.: India, S.W. China and Java.

A garden species, now running wild. Propagated mainly by root suckers; the plant never sets fruit and seeds here. *CNS 2470* (Pandanad.).

Clerodendrum philippinum Schauer in DC., Prodr. 11: 667. 1847 ('Clerodendron'); Howard & Powell, Taxon 17: 54. 1968; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 487. 1976; Mani & Sivar., Fl. Calicut 232. 1982; H.N. & A.L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 469. 1983; Mathew & Rani in Mathew, Fl. Tam. Carnatic 3: 1219. 1983; Vajravelu, Fl. Palghat Dist. 365. 1990. *Volkameria fragrans* Vent., Jard. Malm. t. 70 1804. *Clerodendrum fragrans* Willd., Enum. Hort. Berol. 2: 659. 1809. ***Motormohini.***

Erect subshrubs, to 2.5 m tall, mostly unbranched, younger portion densely short-pubescent. Leaves 8-20 x 6.5 - 18 cm, broadly ovate, base cordate or truncate, margin coarsely and irregularly dentate, apex acuminate, basally 3-veined, pubescent, chartaceous; petiole to 18 cm long. Flowers in terminal condensed cymes, short-pedunculate, often subtended by a pair of foliaceous long-stipitate bracts. Calyx 1-1.5 cm long, campanulate, red-purple, with scattered circular glandular disks; lobes 4-8 mm long, lanceolate, acuminate. Corolla white, hypocrateriform, double, very fragrant. Stamens and pistil all modified into supernumerary petals. Fruit not seen.

Fl.: Aug. - Dec.

Distr.: Native of China. Occasional. A garden species, now running wild, mostly reproducing vegetatively. *CNS 2471* (Puliyoor).

Clerodendrum serratum (L.) Moon, Cat. Pl. Ceylon 46, no. 382. 1824; Wight, Ic. t. 1472. 1849; Clarke in Hook. f., Fl. Brit. India 4: 592. 1885; Gamble, Fl. Pres. Madras 1100. 1924, "*Clerodendron*"; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 487. 1976; Mani. & Sivar., Fl. Calicut 233. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1220. 1983; H.N. & A.L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 417. 1983; Mani., Fl. Silent Valley 214. 1988; Ramach. & Nair, Fl. Cannanore 354. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 260. 1988; Vajravelu, Fl. Palghat Dist. 365. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 358. 1994; Sivar. & Mathew, Fl. Nilambur 531. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 351. 1996. *Volkameria serrata* L., Mant. Pl. 90. 1767. *Tsjerou-theka* Rheede, Hort. Malab. 4: 61-62, t. 29, 1683.

Shrubs to 2 m tall; stems and branches purplish, obtusely tetragonous. Leaves 8-22 x 5-14 cm, broadly elliptic-ovate or obovate, base attenuate to acute, margin coarsely serrate, apex acuminate, glabrous above and pubescent along the nerves below, thin-coriaceous; petiole to 1 cm long. Inflorescence elongate, terminal cymose panicles, 16-28 cm long, pubescent. Bracts ternate, 0.8-1.5 x 0.3-1 cm, ovate-lanceolate. Calyx 5-6 mm long, c. 5 mm across, cup-shaped, teeth ciliate. Corolla bluish; tube 0.8-1.2 cm long; lobes spreading, 2-lipped, 0.8-1 x 0.5 - 0.7 cm, unequal, oblong. Stamens 4; filaments 2-2.5 mm long, exerted. Ovary c. 2.5 mm across, globose. Drupe 4-lobed, 0.8-1.2 cm across, subglobose, dark-purple. Seeds 2-4, 4-5 mm across, globose.

Fl. & Fr.: Dec. - Mar.

Distr.: Myanmar, India to Sri Lanka. Rare; on the lateritic slopes. *CNS 2472* (Chengannur).

Clerodendrum thomsonae Balf., Edinb. Ne Phil. (N.S.) 15: 233, t. 2. 1862; Hook. in Curtis, Bot. Mag. 88. 1862; Gamble, Fl. Pres. Madras 1100. 1924; Bor & Raiz., Beautif. Ind. Climbers & Shrubs 160. 1954; Mani. & Sivar., Fl. Calicut 233. 1982; H.N. & A. L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 433.1983. ***Kadalapoovu***.

Twining shrubs; branchlets purplish, obtusely tetragonous, puberulent. Leaves opposite, 5-12 x 3-6 cm, ovate or elliptic-ovate, base truncate or rounded, margin entire, apex acuminate, glabrous above, slightly pubescent below. Flowers in axillary cymes, abundant near the apex of the twigs; pedicel to 1.5 cm long. Calyx white; 5-angled, c. 1.6 x 0.7 cm, lobes ovate, acuminate. Corolla scarlet-red; tube c. 2.5 cm long, slender; lobes spreading or reflexed, 6-10 x 3-14 mm. Stamens exserted, didynamous. Fruit drupaceous, 6-9 mm across, glossy-black; fruiting-calyx pink.

Fl. & Fr.: Aug. - Nov.

Distr.: Originally from tropical Africa, now widely cultivated as an ornamental almost throughout the world. It is widely escaped and naturalized. *CNS 2610* (Cherthala).

Clerodendrum viscosum Vent., Jard. Malm. 1: t. 25. 1803; Sant., Bull. Bot. Surv. India 3: 14. 1961; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 488. 1976; Mani. & Sivar., Fl. Calicut 232. 1982; H.N. & A.L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 473. 1983; Mani., Fl. Silent Valley 214. 1988; Ramach. & Nair, Fl. Cannanore 354. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 260. 1988; Vajravelu, Fl. Palghat Dist. 365. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 358. 1994; Sivar. & Mathew, Fl. Nilambur 531. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For 351. 1996. *Clerodendrum infortunatum* sensu Wight, Ic. t. 1471. 1849, non L., 1753; Clarke in Hook. f., Fl. Brit. India 4: 594. 1885; Gamble, Fl. Pres. Madras 1100. 1924. ***Peragu*** Rheede, Hort. Malab. 2: 41-42, t. 25. 1676.

Shrubs; bark grey and corky; young shoots tawny villous. Leaves 8-17 x 6-12 cm, ovate or orbicular, base cordate, margin entire or denticulate, apex acuminate, villous beneath and tomentose above; basally 5-7 nerved; petiole to 8 cm long. Panicle terminal, 14-20 cm long, villous. Bracts foliaceous. Calyx cupular, 0.8-1 cm long; lobes lanceolate, 3-5-ribbed, acuminate at apex, tomentose. Corolla white, tubular; tube 1-1.5 cm long, villous without; lobes 6-10 mm long, oblong, hairy without. Stamens 4; filaments slender, purplish, 2-2.5 cm long; anthers oblong. Ovary globose; style slender; exserted, 2-2.5 cm long. Drupe 6-8 mm across, globose, bluish-black on ripening; fruiting calyx enlarged, pink. Seeds 2-4, globose, 2-3 mm across.

Fl. & Fr.: Almost throughout the year.

Distr.: Indo-Malaysia. Common on plains, along roadsides, wastelands and hedges. CNS 1308 (angadikal).

The roots, bark and flowers are used in local medicine as a remedy for skin diseases.

DURANTA Linnaeus

Sp. Pl. 637. 1753.

Duranta erecta L., Sp. Pl. 637. 1753; Bromely; Kew Bull. 39: 803. 1984. *D. repens* L., Sp. Pl. 637. 1753; Matthew, Rec. Bot. Surv. India 20: 185. 1969; Gandhi in Sald. &

Nicols., Fl. Hassan Dist. 488. 1976; Mani. & Sivar., Fl. Calicut 228. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1221. 1983; H.N. & A.L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 278. 1983; Ramach. & Nair, Fl. Cannanore 360. 1988; Sivar. & Mathew, Fl. Nilambur 533. 1996. *D. plumieri* jacq., Select. Strip. Amer. Hist. 186, t. 176. 1763; Hook. f., Fl. Brit. India 4: 560. 1885; Gamble, Fl. Pres. Madras 1106. 1924.

Shrubs; branches often spiny, terete. Leaves 2.5 - 5.5 x 2-4 cm, elliptic-ovate or obovate, base cuneate, margins entire or coarsely serrate above the middle, apex acute, glabrous; petiole to 1 cm long. Flowers in simple or panicled racemes, terminal and axillary; pedicel 2-5 mm long. Calyx tubular, fleshy, 3-4 mm long, angled, persistent. Corolla blue or violet, with or without two purplish stripes on the tube; tube 4-6 mm long, densely puberulent outside above the calyx, limb 7-9 mm across, densely puberulent on both surface, especially towards the throat within. Stamens 4, didynamous. Ovary globular, 8-locular, 8-ovuled. Drupes yellow or orangeish - yellow, 6-10 mm across, globose, completely enclosed by the fruiting-calyx.

Fl. & Fr.: Feb. - Apr.

Distr.: A native of Central America; now naturalized in India, Himalayas and China. Common on plains, often grown on hedges *CNS 2611* (Chengannur).

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; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 489. 1976; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1222. 1983; H.N. & A.L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 390. 1983; Ramach. & Nair, Fl. Cannanore 355. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 261. 1988; Vajravelu, Fl. Palghat Dist. 365. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 358. 1994. Sivar. & Mathew, Fl. Nilambur 535. 1996;

Sasi. & Sivar., Fl. Pl. Thrissur For. 352. 1996. ***Cumbulu*** Rheede, Hort. Malab. 1: 75-76. 1678. ***Kumbil***.

Medium sized trees; bark grey or yellowish-grey, lenticellate; young shoots fulvous tomentose. Leaves 6-15 x 5-10 cm, broadly ovate or deltoid-ovate, base truncate or subcordate, apex acuminate, glabrous above and fulvous tomentose below, coriaceous; basally 3-nerved; petiole to 8 cm long. Racemes terminal, panicled, to 10 cm long, tomentose. Bracts 5-6 mm long, lanceolate. Calyx cupular, 5-6 mm long, unequally 4-5-lobed. Corolla brownish-yellow; tube 1.8-2.2 cm long, very narrow at base, dialated above, 1-1.5 cm diam; lobes 5, obovate, acute, tomentose. Stamens 4, didynamous, included; filaments 1-1.2 cm long. Ovary 4-6 mm across, globose, 4-celled; ovule 1 in each cell; stigma 2-lobed. Drupe 2-3 x 1-1.5 cm, ovoid or obovoid-pyriform, greenish-yellow, 1-2 seeded. Seeds oblong.

Fl. & Fr.: Feb. - May.

Distr.: Indo-Malaysia. In waste places, sacred groves and often planted along fences. CNS 2612 (Vallikavu at Chengannur), *CNS 2473* (Vandanam).

Roots are commonly used in Ayurvedic medicine.

LANTANA Linnaeus

Sp. Pl. 626. 1753.

Lantana camara L., Sp. Pl. 627. 1753, var. **aculeata** (L.) Moldenke, Torreya 34: 9. 1934; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 489. 1976; Mani. & Sivar., Fl. Calicut 230. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1224. 1983; H.N. & A.L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 220. 1983; Ramach. & Nair, Fl. Cannanore 355. 1988; Mani., Fl. Silent Valley 214. 1988; Vajravelu, Fl. PalghatDist. 366. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 359. 1994. Sivar. & Mathew, Fl. Nilambur 536. 1996; Sasi. & Sivar., Fl. Pl. Thrissur. For 352. 1996. *Lantana aculeata* L., Sp. Pl. 627. 1753; Clarke in Hook. f., Fl. Brit. India 4L 562. 1885; Gamble, Fl. Pres. Madras 1087. 1924. ***Konkinipoo***.

Much branched straggling shrubs; stem 4-angled, armed with short thorns. Leaves 3-6 x 2-4 cm, ovate or elliptic-ovate, base subcordate or truncate, margin creneate-serrate, apex acute to shortly acuminate, scabrous above, puberulous below, veins impressed above; petiole to 1.5 cm long. Inflorescence terminal and axillary condensed spikes; peduncle 3-4 cm long, shortly prickly. Flowers sessile, orangish-red, changing to deep red on ageing. Bracts closely imbricating. Calyx truncate. Corolla salver-shaped; tube 0.8-1 cm long, slender, cylindric, bent and inflated over stamens; lobes 5, obscurely 2-lipped. Stamens 4, included. Ovary 2-celled; ovules 1 in each cell; style slender; stigma subcapitate. Drupe 2-3 mm across, globose, purple on ripening. Seeds reticulate.

Fl. & Fr.: Most of the seasons.

Distr.: A native of Tropical America; now naturalised in the tropics and subtropics. *CNS 2611* (Aroor).

PHYLA Loureiro

Fl. Cochinch. 63, 66. 1790.

Phyla nodiflora (L.) Ed. Greene, Brittonia 4: 46. 1899; Meeuse, Blumea 5: 69. 1942; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 490. 1976; Mani. & Sivar., Fl. Calicut 231. 1982; H.N. & A.L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 236. 1983; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1226. 1983; Ramach. & Nair, Fl. Cannanore 356. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 262. 1988; Vajravelu, Fl. Palghat Dist. 367. 1990. *Verbena nodiflora* L., Sp. Pl. 20. 1753. *Lippia nodifora* (L.) A. Rich. in Michx., Fl. Bor. - Amer. 2: 15. 1803; Wight, Ic. t. 1463. 1849; Hook. f., Fl. Brit. India 4: 563. 1885; Gamble, Fl. Pres. Madras 1088. 1924. ***Ana-coluppa*** Rheede, Hort. Malab. 10: t. 47. 1690.

Prostrate herbs, rooting at nodes. Leaves 1-3 x 0.8-1.5 cm, obovate-spathulate or oblanceolate, sometimes elliptic or cuneiform, base cuneate, margin sharply serrate above the middle, apex rounded or obtuse, fleshy, glabrescent to appressed pubescent; petiole to 8 mm long, decurrent. Flowers 5-merous, sessile, aggregated in axillary, globose-capitate or elongate, cylindric, stalked spikes, 1-2.5 cm long when mature and 6-9 mm across;

peduncle solitary in eachaxil, 1.5-6 cm long. Bracts small, closely imbricate, obovate. Calyx cupular, aboutequalling the corolla tube, deeply 2-cleft; lobes lanceolate. Corolla pink to white, 2-2.5 mm long, salver-form, 2-lipped, upper lip 2-lobed, emarginate, lower 3-lobed. Stamens 4, included. Drupe c. 2 mm long, enclosing two, 1-celled pyrenes.

Fl. & Fr.: Aug. - Dec.

Distr.: Tropics and subtropics. Common along wet or moist lands, sandy sea-coasts and river banks. *CNS 1068* (Alappuzha beach).

PREMNA Linnaeus

Mant. 154, 252, 1771 (*nom. cons.*)

Premna latifolia Roxb., Fl. Ind. 3: 76. 1832, var. **viburnoides** Clarke in Hook. f., Fl. Brit. India 4: 756. 1885; Gamble, Fl. Pres. Madras 1096. 1924; Mani. & Sivar., Fl. Calicut 230. 1982; H.N. & A.L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 323. 1983. ***Kozhavappa***.

Branched shrubs. Leaves to 8.5 x 5.6 cm, ovate or obovate, base rounded or cuneate, margin entire, apex shortly acuminate; petiole to 2 cm long. Flowers in terminal corymbose panicles. Calyx 2-lipped. Corolla dull white, 2-lipped, upper lip 2-lobed, lower 3-lobed, hairy inside. Stamens 4, didynamous. Drupe globose, black when ripe.

Fl. & Fr.: May - Jul.

Distr.: Peninsula (Coromandel) through to Bangladesh. Common along the sea-shore and backwaters. *CNS 2474* (Kayamkulam).

STACHYTARPHETA Vahl

Enum. Pl. 1: 205. 1804 (nom. cons.).

Herbs to subshrubs, annual or perennial. Leaves usually dentate, petiolate. Flowers in terminal subterete spikes, the flowers usually attached in the furrows or excavations in the peduncle. Bracts lanceolate. Calyx tubular, membranous, 5-lobed, lobes. unequal. Corolla salver-form, tube narrow, curved, lobes 5, orbicular, obtuse.

Stamens 2, included; filaments short. Ovary 2-celled; cells 1-ovuled; style elongated; stigma capitate. Fruit of 2, 1-seeded pyrenes. Seeds oblong.

1a. Calyx-teeth 5,4 (sub) equal, 5th one very short, flowers white ..... **S. cayennensis**

1b. Calyx-teeth 4, all equal or nearly so; flowers bluish-pink.

2a. Leaves pale green, margin coarsely crenate-serrate ..... **S. jamaicensis**

2b. Leaves bright green, margin finely serrate ..... **S. urticaefolia**

Stachytarpheta cayennensis (L.C. Rich.) Schou. in D.C., Prodr. 11: 562. 1847; Danser, Ann. Jard. Bot. Buitenz. 40: 2. 1929; Brenan, Kew Bull. 5: 223. 1950; nair *et al.*, J. Bombay Nat. Hist. Soc. 79(1): 230. 1982.

Subshrubs; branches slender, pubescent. Leaves 2-5 x 1-3 cm, elliptic-lanceolate or ovate-elliptic, base cuneate, margin crenate-serrate, apex acute or obtuse, hairy on nerves, drying blackish. Spike terminal, drooping, 12-26 cm long. Bracts linear-lanceolate, ciliate on margins. Calyx-tube 4-5 mm long, narrowly cylindric, 5-toothed, unequal, anterior one very small. Corolla white, hirsute on throat, lobes 5. Stamens 2, included; satminodes 2, hairy. Ovary 2-celled; ovules solitary; stigma capitate or slightly bilobed. Fruit c. 3 mm long, glabrous.

Fl. & Fr.: Dec. - Mar.

Distr.: Native of Tropical America, now introduced into tropics and subtropics. Not common, weed on roadsides and waste places. *CNS 2614* (Edathuva).

Satachytarpheta jamaicensis (L.) Vahl, Enum. Pl. 1: 206. 1804; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1232. 1983; H.N. & A.L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 253. 1983; Ramach. & Nair, Fl. Cannanore 357. 1988; Vajravelu, Fl. Palghat Dist. 369. 1990; Sivar. & Mathew, Fl. Nilambur 537. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 354. 1996. *Verbena jamaicensis* L., Sp. Pl. 19. 1753.

Subshrubs; branches subtertragonous. Leaves 3.5-7 x 2-4 cm, obovate, base cuneate and decurrent on petiole, margin coarsely crenate-serrate, apex obtuse or rounded; petiole to 2 cm long. Spikes terminal, 10-25 cm long, c. 4 mm across. Bracts c. 7 mm long.

Calyx c. 6 mm long, 4-toothed, puberulous. Corolla hypocrateriform, bluish-pink; tube 8-10 mm long, slightly curved; limb c. 8 mm across. Style included. Fruit c. 5 mm long, oblong.

Fl. & Fr.: Jan. - Aug.

Distr.: Tropical Asia, America. Common along disturbed grounds. *CNS 2475* (Cheriyanad.).

Stachytarpheta urticaefolia (Salisb.) Sims, Bot. Mag. 43: t. 1848. 1816 (as "urticifolia"); H.N. & A.L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 257. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 361. 1994. *Cymburus urticaefolius* Salisb., Parad. Lond. Pl. t. 53. 1806. *Stachytarpheta indica* auct., non (L.) Vahl, 1804; Clarke in Hook. f., Fl. Brit. India 4: 564. 1885, p.p.; Gamble, Fl. Pres. Madras 1090. 1924; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 492. 1976; Mani. & Sivar., Fl. Calicut 227. 1982.

Erect subshrubs; young shoot sparsely pubescent. Leaves 4-7 x 3-4 cm, elliptic-ovate, base rounded, margin finely serrate, apex acute, glabrous on both sides; petiole to 2 cm long, cuneatly winged. Spikes terminal, 15-28 cm long, c. 3 mm across, cylindric. Bracts 4-6 mm long, linear-lanceolate, ciliate on margins. Calyx tubular, c. 5 mm long; lobes 4, minute. Corolla blue, tube c. 5 mm long, slightly curved, 5-lobed. Stamens 2, included; staminodes 2. Ovary 2-celled, 2-3 mm long; style slender; stigma capitate. Capsule 4-5 mm long, cylindric, splitting in to two 1-seeded pyrenes. Calyx tube persistent.

Fl. & Fr.: Sep. - Dec.

Distr.: Pantropical, probably native of Tropical Asia. Common weed on road-sides and waste places *CNS 2615* (Pathiyoor).

TECTONA Linnaeus f.

Suppl. Pl. 20 ("Tecktona"), 151. 1782 (*nom. cons.*).

Tectona grandis L. f., Suppl. Pl. 151. 1781. Roxb., Pl. Corom. t. 6. 1795 & Fl. Ind. 1: 600. 1832; Clarke in Hook. f., Fl. Brit. India 4: 570. 1885; Gamble, Fl. Pres. Madras 1029. 1924; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 493. 1976; Mani. & Sivar., Fl. Calicut 231. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1236. 1983; Ramach. & Nair, Fl. Cannanore 358. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 265. Vajravelu, Fl. Palghat Dist. 369. 1990; Sivar. & Mathew, Fl. Nilambur 537. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 354. 1996. ***Theka*** Rheede, Hort. Malab. 4: 57-58, t. 27. 1683. ***Theku***.

Deciduous trees; bark pale brown, shallowly vertically grooved, dull yellow inside; twigs 4-angled, young stellately adpressed tomentose. Leaves 20-40 x 15-30 cm, broadly elliptic, base attenuate and decurent on petiole, apex acute or acuminate, glabrescent above, stellate-pubescent below, with minute red glands beneath, thin-coriaceous; lateral nerves 8-10 pairs; petiole to 1 cm long. Flowers in terminal cymose panicles to 30 cm long and broad. Bracts to 1 cm long, lanceolate. Calyx 5-7-lobed. Corolla cream coloured, c. 8 mm across, lobes 7. Stamens c. 7, exserted. Ovary 4-locular; ovules 1-per locule. Fruit 1.5-2.5 cm (with calyx), globose; drupe 2-4-lobed, stellate-tomentose.

Fl. & Fr.: Jan. - Sep.

Distr.: Indo-Malaya. Extensively planted for timber. Bark powdered and applied to cure ulcers. *CNS 2476* (Vandanam).

VITEX Linnaeus

Sp. Pl. 638, ("938). 1753.

Trees or shrubs; branchlets 4-angled. Leaves 3-7-foliolate; leaflets entire or toothed. Flowers 5-merous, in cymes forming terminal or axillary panicles or corymbs. Calyx cupular, truncate or shortly 5-toothed, persistent. Corolla personate, tube 2-lipped, cylindric, short, often villous within; upper lip 2-lobed, lower 3. Stamens 4, didynamous,

usually exserted; filaments hairy below. Ovary 2 or imperfectly 4-celled; cells 1 or 2 ovuled; style filiform; stigma bifid. Drupe ovoid to subglobose, 2-4-pyrened. Seeds 2-4, ovate-oblong, tests stony.

1a. Leaves glabrescent; petiole winged, auriculate at base ..... **V. attissima**

1b. Leaves grey-or fulvous-pubescent beneath; petiole not winged and auriculate at base.

2a. Leaflets lanceolate, petiolulate, grey-pubescent beneath; bracts not foliaceous and conspicuous ..... **V. negundo**

2b. Leaflets ovate or elliptic, sessile, fulvous-pubescent and conspicuous .... **V. pinnata**

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. 1924; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 494. 1976; Mani. & Sivar., Fl. Calicut 228. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1239. 1983; H. N. & A.L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 353. 1983; Ramach. & Nair, Fl. Cannanore 359. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 265. 1988; Vajravelu, Fl. Palghat Dist. 370. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 361. 1994. Sivar. & Mathew, Fl. Nilambur 539. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 355. 1996. *Vitex alata* Heyne ex Roth, Nov. Pl. Sp. 316. 1821; Clarke in Hook. f., Fl. Brit. India 4: 1885. ***Mail-elou*** Rheede, Hort. Malab. 5: 1-2, t. 1. 1685.

Trees, bark yellowish or pale brown, turmeric-yellow inside; young shoots adpressed pubescent. Leaves 3-5-foliolate; leaflets 5-14 x 2-3.5 cm, middle one larger, oblanceolate or elliptic-lanceolate, apex gradually acuminate, glabrous above, slightly pubescent below, more on nerves; petiole to 10 cm long, narrowly winged, wings auricled at base. Panicle terminal or from upper leaf-axils, to 16 cm long. Peduncles, pedicels and calyx densely grey-pubescent. Flowers fascicled on rachis. Bracts c. 3 mm long, lanceolate. Calyx campanulate, 1-2 mm long; lobes 5, triangular. Corolla bluish-white, c. 7 mm long, hairy without. Stamens 4, filaments villous. Drupes 5-6 mm across, globose, 2-4-seeded, purple when ripe enclosed in the persistent calyx.

Fl. & Fr.: Mar. - Jul.

Distr.: Peninsular India and Sri Lanka. In sacred groves. *CNS 2616* (Mannarsala).

The juice of the bark is applied externally in the treatment of chest-pain. A yellow dye is extracted from the wood.

Vitex negundo L., Sp. Pl. 638. 1753; Roxb., Fl. Ind. 3: 70. 1832; Wight, Ic. t. 519. 1842; Hook. f., Fl. Brit. India 4: 583. 1885; Gamble, Fl. Pres. Madras 1102. 1924; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 494. 1976; Mani. & Sivar., Fl. Calicut 228. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1240. 1983; H.N. & A.L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 373. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 266. 1988; Ramach. & Nair, Fl. Cannanore 359. 1988; Vajravelu, Fl. Palghat Dist. 370. 1990; Sivar. & Mathew, Fl. Nilambur 540. 1996. *V. trifolia* Grah., Cat. 155. 1839. non L., 1753. ***Bem-nosi*** Rheede, Hort. Malab. 2: t. 12. 1679. ***Karinochi.***

Shrubs or small trees; purple pubescent all over, aromatic, bark pale. Leaves 3-5-foliolate; leaflets 6-13 x 2-5 cm, narrowly oblong or elliptic to lanceolate, base acute, apex acuminate. Panicles terminal, 10-25 cm long. Calyx 5-toothed obconic, c. 3 mm long, teeth triangular. Corolla deep purple to violet in colour, c. 7 mm across, hypocrateriform; tube 3-5 mm long, puberulent without, upper lipd 2-lobed, lower 3-lobed with the middle lobe larger, obovate, undulate-margined, other lobes shorter, subequal, obtuse. Stamens 4, filaments purple. Ovary c. 1 mm long; style purple; stigma 2-fid. Drupe 3-5 mm across, globose, purple or black.

Fl. & Fr.: Mar. - Apr.

Distr.: South India. Common in coastal areas, and is often planted as a hedge and for medicinal use. *CNS 2477* (Haripad).

Vitex pinnata L., Sp. Pl. 638. 1753; H. N. & A. L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 361. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 266. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 362. 1994. *V. pubescens* Vahl, Symb.

Bot. 3: 85. 1794; Clarke in Hook. f., Fl. Brit. India 4: 585. 1885; Gamble, Fl. Pres. Madras 1103. 1924. *Vitex arborea* Roxb., Fl. Ind. 3: 73. 1832; Wight, Ic. t. 1465. 1849.

Trees; young stem 4-angled, densely pubescent; bark greyish or yellowish-grey, yellow inside. Leaves digitately 3-5-foliolate; leaflets 6-12 x 3-5.5 cm, ovate or elliptic, base rounded to broadly attenuate, apex acuminate, pubescent, lateral veins prominent beneath; petioles 5-7 cm long. Flowers in dense terminal cymose panicles. Peduncle and pedicels pubescent. Bracts foliaceous. 0.5-1 cm long, 2-5 mm wide, lanceolate. Calyx tube 3-4 mm long, campanulate, pubescent without, lobes 5. Corolla bluish white, tube 3-4 mm long; lobes 5, 2-lipped. Stamens 4, didynamous. Ovary 2-4-celled. Drupe 5-6 mm across, globose, purple on ripening.

Fl. & Fr.: Jan. - Apr.

Distr.: Indo-Malaysia. Common in sacred groves. *CNS 2617* (Thiruvizha).

91. AVICENNIACEAE Endlicher

Ench. Bot. 314. 1841.

AVICENNIA Linnaeus

Sp. Pl. 110. 1753.

Shrubs or small trees, mostly inhabiting the saline or brakhish coastal mangrove lagoons, with abundant pencil-like erect pneumatophores. Leaves opposite, corriaceous, glaberescent above, minutely tawny-pubescent below, obtuse or acute. Cymes sessile, clustered in pedunculate heads, usually paired in the axis of the upper leaves or arranged in a short terminal trichotomous panicles; bracts small. Calyx-lobes coriaceous, ovate, concave, imbricate. Corrolla-tube short, cylindric; lobes 4, subequal, or the posterior one langer, thick. Stamens 4, adnate to corolla tube, included or exserted; filaments thick; anthers oblong-ellipsoid. Ovary oblong-globose; ovules 4 ; style tapering; stigma bifid. Fruit a compressed capsule, dehiscing by 2 leathery valves. Seed solitary.

1a. Leaves ovate or lanceolate or elliptic, apex acute; corolla 5-8 mm wide; stamens included; style less than 1 mm long, conical ..... **A. marina**

1b. Leaves obovate or broadly oblong, rounded at the apex; corolla 12-15 mm wide; stamens exserted; style more than 2 mm long ..... **A. officinalis**

Avicennia marina (Forssk.) Vierh. in Denkschr., Akad. Wien 71 : 435. 1907; Gamble, Fl. Pres. Madras 1106. 1924; Mani. & Sivar., Fl. Calicut 234. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1242. 1983; H.N. & A.L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 127. 1983. *Sceura marina* Forssk., Fl. Aeg.-Arab. 1: 137. 1775. ***Chakkapoo*** (Plate XX: B).

Large shrubs or small tree; bark greyish-white, smooth. Leaves 3-7 x 2-3.8 cm, ovate or elliptic, base acute to cuneate, apex acute, coriaceous, grey pubescent beneath; petiole to 1.4 cm long. Flowers yellow, in axillary and terminal, peduncled, capitate clusters; peduncle to 7 cm long. Bract and bracteoles c. 2.5 mm long, ovate. Calyx short, urceolate; lobes 5, 2-4 mm long, rounded-ovate to elliptic, obtuse at apex. Corolla yellow to orange-yellow, c. 6 mm across; tube campanulate, 1-2 mm long; lobes 4, 3-4 mm long, ovate to oblong, acute, minutely tomentose without. Stamens 4, adnate to the corolla throat, included; anthers black. Ovary c. 2 mm long; style filiform, yellow; stigma 2-fid. Capsules 1.4-2.5 x 0.8-1.5 cm, ovate or conic, yellowish-green.

Fl.& Fr. : Apr.-Jun.

Distr.: South India. Rare. It inhabits tidal mud-flats, low grounds flooded by salt water and shallow salt water lake-margins. *CNS 2116* (Kumbolichira at Kayamkulam).

Avicennia officinalis L., Sp. Pl. 110. 1753; Hook. f., Fl. Brit. India 4 : 604. 1885; Gamble, Fl. Pres. Madras 1105. 1924; Moldenke, Phytologia 15 : 477. 1968; Mani. & Sivar., Fl. Calicut 234. 1982; H. N. & A. L. Moldenke in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4 : 132. 1983; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1243. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 259. 1988; Ramach. & Nair, Fl. Cannanore 360. 1988. *Oepata* Rheede, Hort. Malab. 4 : t. 45. 1683. ***Kandel*** (Plate XX: A).

Shrubs or small trees; bark brownish-grey, thin. Leaves 4-8.5 x 2-4 cm, elliptic or obovate, base subcuneate or rounded, apex obtuse, coriaceous, glabrous above, pubescent beneath; petiole to 1.4 cm long. Flowers yellow, in axillary long-peduncled, capitate cymes; peduncle to 2.5 cm long; pedicel to 8 mm. Bracts small, sessile, rounded-ovate, densely tomentose at base, caducous; bracteoles 3-5 mm long, ovate or subreniform, apex obtuse. Calyx lobes 4, 5-6 x 3-5 mm, rounded-ovate, ciliate-margined. Corolla yellowish-brown; tube campanulate; lobes 4, unequal, thick, 3-5 x 3-4 mm, oblong-obtuse. Stamens 4, exserted. Ovary conic, c. 2 mm long; style filiform. Capsules 1.5-2 cm long, ovoid, compressed.

Fl. & Fr.: Mar.-May.

Distr.: South India. Common along the banks of rivers and streams. *CNS 1596* (Perumbalam), *CNS 2622* (Aroor).

92. LAMIACEAE Lind.

Intr. Nat. Syst. Bot. ed. 2, 275. 1836. (LABIATAE *nom. alt.*).

1a. Stamens ascending to the upper lip or spreading and projecting straight forward.
  2a. Leaves whorled ..... **Eusteralis**
  2b. Leaves opposite.
    3a. Calyx 8-10-toothed; upper lip of corolla hooded; filaments glabrous ..... **Leucas**
    3b. Calyx 5-lobed; upper lip of corolla straight or spreading; filaments bearded .
      4a. Corolla-lobes 4; stamens subequal or unequal; leaves in equal pairs ..... **Pogostemon**
      4b. Corolla-lobes 5; stamens didynamous; leaves in equal pairs .... **Anisomeles**

1b. Stamens descending, lying upon or enclosed in the lower lip.
  5a. Calyx very oblique, 2-lipped; upper lip of fruiting calyx entire, triangular-ovate, deflexed, concealing the mouth, lower lip truncate ..... **Anisochilus**

125A

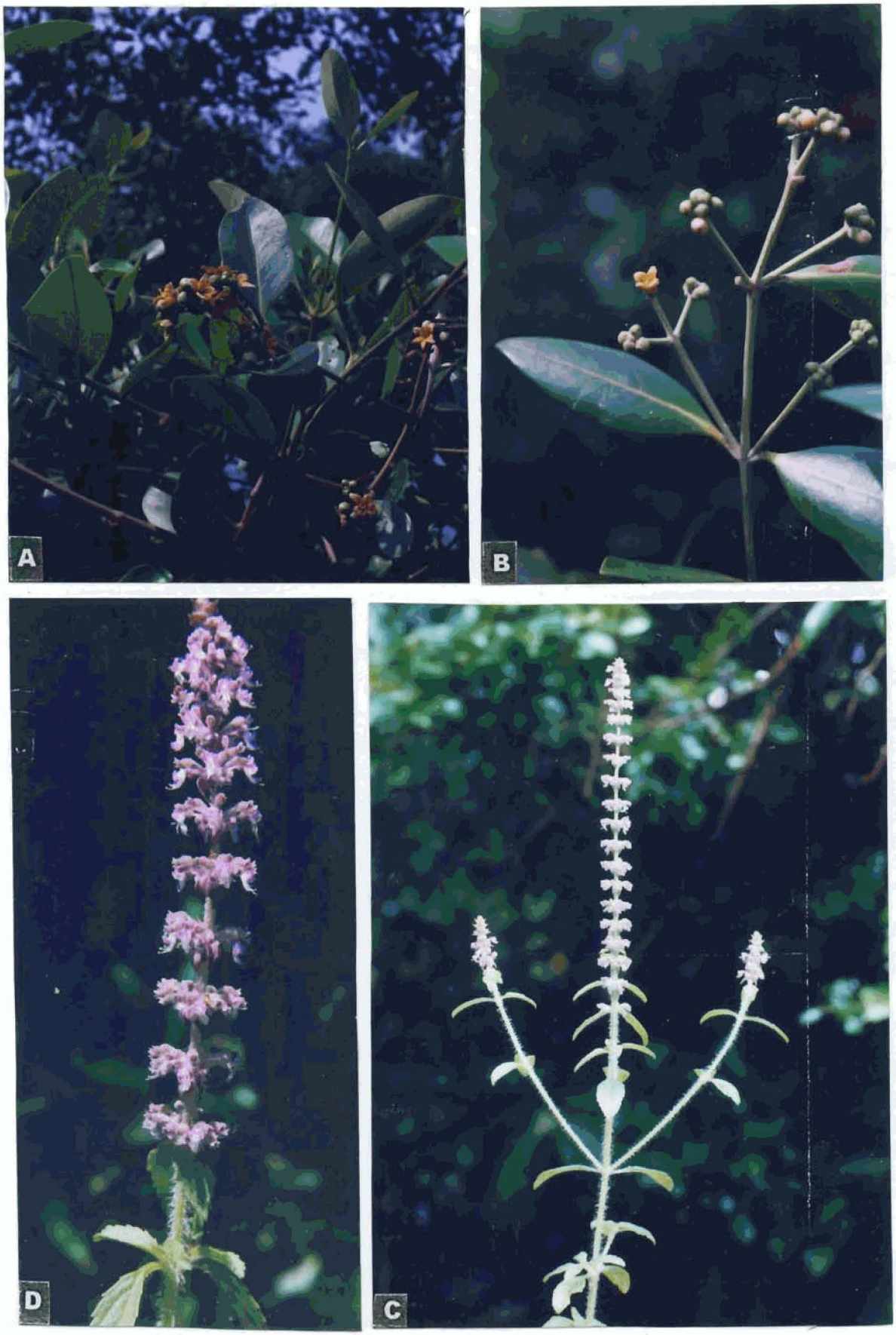


Plate XX. *A. Avicennia officinalis* L.; B. *Avicennia marina* (Forssk.) Vierh.; C & D. *Geniosporum menthoides* (L.) Druce, var. *prostratum* (L.) Press & Sivar.; C. Twig; D. Inflorescence.

5b. Calyx equally 5 -toothed or 2-lipped, not oblique, upper lip of fruiting calyx rounded, reflexed, not concealing the mouth, lower lip 4-lobed.

6a. Calyx campanulate, equally 5-toothed; corolla 2+3 ..... **Hyptis**

6b. Calyx tubular, distinctly 2-lipped, corolla 4+1.

7a. Lower lip of corolla declinate, flat or slightly concave, hardly longer than the upper lip.

8a. Floral whorls crowded in terminal globose or ovoid heads .... **Acrocephalus**

8b. Floral whorls racemose or spicate.

9a. Anthers 1-celled.

10a. Verticils upto 6-flowered; upper lobe of calyx large, ovate, recurved, the margins decurrent on the tube .....**Ocimum**

10b. Verticils more than 6-flowered; upper lobe of calyx widest, the margins not decurrent on the tube ..... **Geniosporum**

9b. Anthers 2-celled ..... **Orthosiphon**

7b. Lower lip of corolla deflexed, boat-shaped, much longer than the upper lip.

11a. Stamens entirely free ..... **Plectranthus**

11b. Stamens fused into a sheath around the style .....**Coleus**

ACROCEPHALUS Bentham

Edwards's Bot. Reg. 15:t. 1282. 1829.

Acrocephalus hispidus (L.) Nicols. & Sivad., Taxon 29: 24. 1980; Mani. & Sivar., Fl. Calicut 235. 1982; Mani., Fl. Silent Valley 215. 1988; Ramach. & Nair, Fl. Cannanore 361. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 151. 1988; Vajravelu, Fl. Palghat Dist. 372. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 364. 1994; Sivar. & Mathew, Fl. Nilambur 543. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 358. 1996. *Gomphrena hispida* L., Sp. Pl. ed. 2, 326. 1762. *Prunella indica* Brem. f., Fl. Ind. 130.

1768. *Ocimum capitatum* Roth, Nov. Sp. Pl. Ind. Orient. 276. 1821. *Acrocephalus capitatus* (Roth) Benth., Bot. Reg. 15: t. 1300. 1830; Hook. f., Fl. Brit. India 4: 611. 1885. *Acrocephalus indicus* (Burm. f.) Kuntze, Rev. Gen. Pl. 511. 1891; Gamble, Fl. Pres. Madras 1115. 1924; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 497. 1976. ***Minangani*** Rheede, Hort. Malab. 9:141, t. 72. 1689.

Erect annual herbs; stem 4-angled and ridged, villous along ridges. Leaves opposite, 1-2.5 x 0.5-1 cm, ovate-lanceolate or elliptic-lanceolate, base narrowly attenuate, margins coarsely serrate, apex acute, thinly pubescent on nerves beneath; petiole to 1 cm long. Flowers grouped in terminal globose, ovoid or short cylindric heads, 0.5-1.5 cm long, subtended by a pair of floral leaves and many bracts. Calyx c. 2 mm long, tubular, 2-lipped, upper lip entire, lower usually 4-toothed. Corolla white turning brownish, c. 4 mm long, 2-lipped, upper lip subequally 4-lobed. Stamen 4, didynamous; anthers 1-celled. Ovary 4-partite; style slender; stigma shortly 2-fid. Nutlets 4, minute, smooth.

Fl. &Fr. : Aug.- Nov.

Distr. : Indo-Malaysia. Common on exposed waste places. *CNS 2560* (Piulinkunnu).

ANISOCHILUS Wallich ex Bentham
in Lindley, Edwards's Bot. Reg. 15: t. 1300. 1830.

Anisochilus carnosus (L.f.) Wall., Pl. Asiat. Rar. 2: 18. 1831; Hook. f., Fl. Brit. India 4:627. 1885; Gamble, Fl. Pres. Madras 1126. 1924; Mukherjee, Rec. Bot. Surv. India 14: 58. 1940; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 497. 1976; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3:152. 1981; Mani. & Sivar., Fl. Calicut 235. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1248. 1983; Ramach. & Nair, Fl. Cannanore 361. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 151. 1988; Vajravelu, Fl. Palghat Dist. 372. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 364. 1994; Sivar. & Mathew. Fl. Nilambur 543. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 358. 1996. *Lavandula carnosa* L.f., Supl. Pl. 273. 1781. ***Katu-kurka*** Rheede, Hort. Malab. 10:179, t. 90. 1690.

Semisucculent annual herbs, branchlets pubescent. Leaves 2-5 x 2-3.5 cm, broadly ovate, base turncate or cordate, margin crenate-serrate, apex obtuse, verrucose above, pubescent below, subsucculent; petiole to 4 cm long. Flowers in terminal simple or panicled, 1.5-3 cm long, oblong spikes. Calyx c. 4 mm long, tubular, mouth oblique, 2-lipped, acute; upper lip pubescent without, deflexed in fruits. Corolla purple, c. 1 cm long, lobes 5, 2-lipped, upper lip entire, lower 4-lobed . Stamens 4, exserted; filaments connate at base forming a sheath. Fruits of 4, ovoid nutlets. Seeds orbicular, smooth.

Fl. & Fr. : Sep. - Dec.

Distr.: Sri Lanka, India and Myanmar. Rare; on the rocky hill slopes during monsoon. *CNS 1836* (Noottavanpara).

ANISOMELES R. Brown

Prodr. 503. 1810.

Anisomeles indica (L.) Kuntze, Rev. Gen. 512. 1891; Gamble, Fl. Pres. Madras 1140. 1924; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 498. 1976; Carmer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 176. 1981; Mani. & Sivar., Fl. Calicut 240. 1982; Rani. & Matthew in Matthew, Fl. Tam. Carnatic 3: 1250. 1983; Mani., Fl. Silent Valley 216. 1998; Ramach. & Nair, Fl. Cannanore 362. 1988; Nicols., Suresh. & Mani., An Interpr. Hort. Malab. 152. 1988; Vajravelu., Fl. Palghat Dist. 373. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 364. 1994; Sivar. & Mathew, Fl. Nilambur 544. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 359. 1996. *Nepeta indica* L., Sp. Pl. 571. 1753. *Anisomeles ovata* Aiton, Hort. Kew. ed. 2, 2:364. 1811; Wight, Ic. t. 865. 1844- 1845; Hook. f., Fl. Brit. India 4: 672. 1885. ***Tsjaden*** Rheede, Hort. Malab. 10:175, t. 88. 1690.

Erect, aromatic woody herbs, 1-1.5 m high, stem 4-angled, grooved on opposite sides, densely pubescent. Leaves 3-7 x 2.5-4.5 cm, broadly ovate to obovate, base turncate, margin coarsely serrate-crenate, apex acute, tomentose on both sides; petiole to 3 cm long. Flowers in axillary sessile clusters or in terminal interrupted spikes. Calyx campanulate; tube 4-5 mm long; lobes 5. c. 2 mm long, ovate, ciliate on margin. Corolla pale pink, 1-1.4 cm long, 2-lipped. Stamens 4, didynamous, exserted; filaments hairy;

anthers of upper pair 2-celled, of lower 1-celled. Ovary 4-partite; style slender; stigma 2-fid; disc subentire. Nutlets 4, lenticular, reddish-brown.

Fl. & Fr. : Aug. - Dec.

Distr.: Indo-Malaysia and China. Common in wastelands, waysides etc. *CNS 1028* (Vandanam).

COLEUS Loureiro

Fl. Cochinch. 358. 1790.

Coleus amboinicus Lour., Fl. Cochinch. 372. 1790; Gamble, Fl. Pres. Madras 1124. 1924; Mukerjee, Rec. Bot. Surv. India 14: 54. 1940; Mani. & Sivar., Fl. Calicut 237. 1982; Cramer, Kew Bull. 32:555. 1978 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3:138. 1981; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 152. 1988. *Coleus aromaticus* Benth. in Wall., Pl. Asiat. Rar. 2: 16. 1830; Hook.f., Fl. Brit. India 4:625. 1885. *Plectranthus amboinicus* (Lour.) Spreng., Syst. 2: 690. 1825; Willemse, Blumea 25: 509. 1979. ***Iribeli*** Rheede, Hort. Malab. 9: t. 74.1689. **Panikoorka.**

Branched, pubescent herbs. Leaves to 5.6 x 3.1 cm, ovate or suborbicular, base cordate, margins finely serrate, apex obtuse or acute, fleshy; petiole to 2 cm long. Flowers shortly pedicelled, in dense thyrsoid panicle. Calyx hispid, small, the upper lip ovate, acute, lower of 4 acuminate lobes, throat glabrous within. Corolla purple, 2-lipped, tube decurved. Stamens 4, didynamous; anther cells confluent. Ovary 4-partite; stigma 2-fid. Nutlets smooth.

Fl. & Fr. : Aug. - Nov.

Distr. : South India and Srilanka. An aromatic herb, commonly cultivated in home gardens. *CNS 1568* (Kalliseri).

The juice of the leaves is used as a remedy for infantile cold and fever.

EUSTERALIS Rafinesque

Fl. Tell. 2: 95. 1836.

Eusteralis deccanensis Panigrahi, Phytologia 32(6): 475. 1976; Mani. & Sivar., Fl. Calicut 238. 1982; Ramach. & Nair, Fl. Cannanore 363. 1988. *Dysophylla stellata* auct., Benth., 1830: Hook. f., Fl. Brit. India 4: 640. 1885; Gamble, Fl. Pres. Madras 1137. 1924, p.p. *Mentha stellata* Buch.-Ham. ex. Roxb., Fl. Ind. 3:5. 1832. *Dysophylla tomentosa* sensu Keng in Gard. Bull. Straits Settlem. 24: 71. 1969, non Dalz., 1850.

Branched herbs upto 22 cm tall; stem creeping at base, then with many stiff erect branches and very short internodes. Leaves in whorls, 4-8 per node, c. 8 x 2 mm, narrowly linear, apex acute, puberulous. Flowers pinkish, minute in dense, terminal spikes up to 5 cm long; bracts c. 2 mm long, persistent. Calyx c. 2 mm long, campanulate, pubescent; lobes triangular, erect or slightly inflexed. Corolla 1.5-2 mm long; tube c.1mm long; lobes ovate-oblong, obtuse, hairy without. Stamens 4, much exserted, bearded with purple hairs. Style flattened. Nutlets ellipsoid, smooth, yellowish brown.

Fl. & Fr. : Dec. - Jan.

Distr. : South India. Rare. In paddy fields. *CNS 1767* (Kanichukulangara Jn.).

GENIOSPORUM Wallich et Bentham

Edward's Bot. Reg. 15: t. 1300. 1830.

Geniosporum menthoides (L.) Druce, var. **prostratum** (L.) Press & Sivar., Bull. Brit. Mus. Nat. Hist. (Bot.) 19: 116. 1989. *Ocimum prostratum* L., Mant. 2: 566. 1771. *Ocimum menthoides* L., Sp. .Pl. 2: 598. 1753. *Geniosporum prostratum* (L.) Benth., Edwards Bot. Reg. 15: sub. t. 1300. 1830; Hook. f., Fl. Brit. India 4:610. 1885; Gamble, Fl. Pres. Madras 1116. 1924; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 153. 1988. *Ocimum tenuiflorum* L., Sp. .Pl. 597. 1753. *Geniosporum tenuiflorum* (L.) Merr., Philipp. J. Sci. 19: 379. 1921; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 119. 1981, p.p.; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1255. 1983. ***Katu-tumba*** Rheede, Hort. Malab. 10: t. 92. 1690 (Plate XX: C & D; Fig. 55).

Erect herbs to 40 cm tall; stem diffusely branched from base, obtusely 4-angular, scabrid or villous-pilose. Leaves 1-2.5 x 0.5-1.2 cm, oblong to lanceolate, base cuneate, margin serrate, apex acute, scabrid above and pilose beneath, punctate with sessile globules on both surfaces; petiole to 8 mm long. Flowers in terminal, interrupted thyrsoid spikes, 3-12 cm long; verticils 8-16-flowered; pedicels to 2 mm long. Floral leaves 3-5x 3-4 mm, broadly ovate, base turncate, apex acute, hirsute, punctate. Calyx erect, deflexed in fruit; tube c. 1 mm long, cupular-campanulate, hirsute without, obscurely 2-lipped, posterior and lateral lobes broad, acute; anterior lobes lanceolate. Corolla bluish to purplish, 2-lipped; tube c.1 mm long; lobes 5, unequal, 4+1, lobes of upper lip ovate-oblong, lower lip c. 2 mm long, obovate-oblong. Stamens 4, didynamous; filaments 1.5-2 mm long, hirsute, spreading; anthers reniform. Style 2-2.5 mm long; stigma bifid. Nutlets 4, c. 0.5 mm long, ellipsoid, black.

Fl. & Fr. : Aug. - Dec.

Distr. : Central and South India, Sri Lanka. Common in open sandy grounds. *CNS 1006* (Vandanam), *CNS 1837* (Punnapra).

HYPTIS N.J. Jacquin

Collectanea 1:101, 103. 1787 (*nom. cons.*).

Herbs or subshrubs. Leaves decussate, serrrate. Flowers in cymes or capitate clusters, terminal and axillary. Bracts subulate. Calyx campanulate or tubular, 10-nerved, 5-lobed, lobes subequal. Corolla lobes 5, 2-lipped, upper lip saccate, 3-lobed, lower 2-lobed, erect and spreading. Stamens 4, didynamous, declinate, filaments free, pubescent; anther cells confluent. Ovary 4-partite; style subentire or shortly 2-fid; disc anteriorly developed. Nutlets oblong, smooth or rugose.

1a. Flowers in pedunculate heads; corolla white ..... **H. rhomboidea**

1b. Flowers in axillary cymes; corolla blue ..... **H.suaveolens**

Hyptis rhomboidea Mart. & Gal., Bull. Acad. Bru. 11(2):188. 1844; Keng, Gard. Bull. Singapore 24: 92. 1969. *H. capitata* auct., non Jacq., 1781-1786: Mukherjee, Rec. Bot.

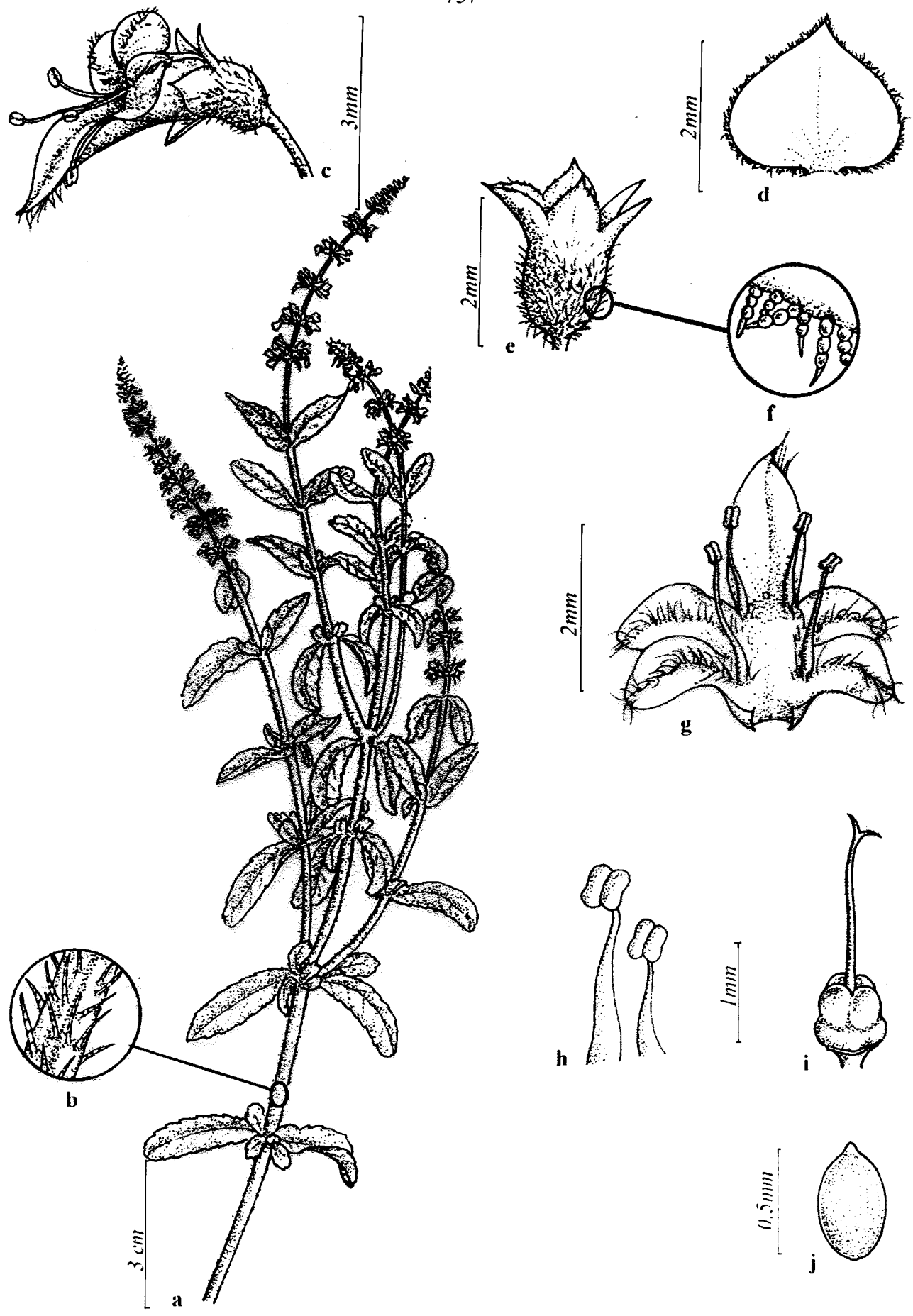


Fig. 55. *Geniosporum menthoides* (L.) Druce: a. Twig; b. Stem pubescence; c. Flower; d. Bract; e. Calyx; f. Pubescence on calyx; g. Corolla, split-open; h. Stamens; i. Pistil; j. Seed.

Surv. India 14: 63. 1940; Vargheese, J. Bombay Nat. Hist. Soc. 76: 200. 1980; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 156. 1981; Sivar. *et al.* , J. Econ. Tax. Bot. 7: 224, f. 1-6. 1985; Sivar. & Mathew, Fl. Nilambur 546. 1996.

Perennial undershrubs; stem 4-angled, shallowly furrowed on the sides, puberulous. Leaves 4-15 x 2-7 cm , ovate or elliptic, base cuneate-decurrent, margin coarsely serrate, apex acute, hairy on both sides, upper ones smaller; petiole to 5 cm long. Flowers in long-peduncled, globose heads; peduncle to 4 cm long; involucral bracts 4-6, foliaceous, ciliate on margins. Calyx tubular, 10-nerved, teeth small. Corolla white; tube infundibular, sparsely villous without; limb 2-lipped. Stamens 4, didynamous. Style glabrous, stigma shortly bifid. Nutlets 4, c.1.5 x 1 mm, ovoid-oblong, subtrigonous, reddish-brown.

Fl. & Fr. : Dec. - Mar.

Distr. : Native of Trpical America; introduced in Indo-Malesian region. A weed in waste places and road sides. *CNS 1439* (Kavalam).

Hyptis suaveolens (L.) Poit., Ann. Mus. Natl. Hist. Nat. 7: 472, t. 29, f. 2. 1806; Hook. f., Fl. Brit. India 4: 630. 1885; Gamble, Fl. Pres. Madras 1129. 1924; Mukherjee, Rec. Bot. Surv. India 14:63. 1940; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 502. 1976; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3:155. 1981; Mani. & Sivar., Fl. Calicut 240. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3:1256. 1983; Ramach. & Nair, Fl. Cannanore 364. 1988; Vajravelu, Fl. Palghat Dist. 376. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 365. 1994; Sivar. & Mathew, Fl. Nilambur 547. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 360. 1996. *Ballota suaveolens* L., Syst. Nat. ed. 10, 1100. 1759.

Erect subshrubs, very aromatic, stem obtusely 4-angled, glandular-hispid. Leaves 2-6 x 1-4 cm, ovate to suborbicular, base cordate or rounded, margin irregularly dentate, apex acute or obtuse, strigose-hairy; petiole to 3 cm long. Flowers in short axillary cymes. Calyx campanulate; tube 3-4 mm long, ribbed; lobes 5, aristate, c. 2 mm long. Corolla pale blue; tube 4-5 mm long, 2-lipped. Stamens 4; filaments bearded. Ovary 4-partite;

stigma shortly 2-fid. Nutlets 2-3 x 1.5-2 mm, compressed, black, white mucilagenous on wetting. Fruiting-calyx enlarged.

Fl. &Fr. : Nov.- Mar.

Distr. : Native of Tropical America; now pantropical. A common weed on wastelands, waysides, etc. *CNS. 1127* (Vandanam).

LEUCAS P. Brown

Prodr. 504. 1810.

Herbs; branches 4-angled, pubescent or villous. Leaves opposite or whorled. Flowers white, in axillary and terminal few or many-flowered verticillate cymes. Bracts linear or lanceolate. Calyx tubular or funnel-shaped, 10-ribbed, lobes 6-10, teeth equal or unequal, mouth oblique or staight. Corolla tube cylindric; limb 2-liped, upper lip shorter, hooded, enclosing the stamens, usually densely bearded without, lower 3-lobed, middle lobe larger, side ones very small. Stamens 4, didynamous, included in the upper lip, lower pair longer. Ovary 4-partite; ovules 4; style gynobasic; Stigma obliquely 2-fid; disc 4-lobed. Nutlets 4, ovoid or triquetrous; fruiting-calyx enlarged.

1a. Mouth of the calyx-tube strongly oblique.
   2a. Bracts as long as the calyx-tube, villous and long-ciliate; calyx-tube glabrous and membranous in the lower half, ribbed and strigose in the upper, mouth 10-toothed ..... **L. aspera**
   2b. Bracts shorter than calyx, finely pubescent; calyx-tube with upper and lower halves similar, glabrous or short-pubescent, mouth 8-toothed ..... **L. indica**
1b. Mouth of the calyx-tube slightly oblique or straight ..... **L. stricta**

Leucas aspera (Willd.) Link, Enum. Hort. Berol. Alt. 2: 113. 1822; Sprengel in L., Syst. Veg. (ed. 16) 2: 743. 1825; Hook. f., Fl Brit. India 4: 690. 1885; Gamble, Fl. Pres. Madras 1150. 1924; Mani. & Sivar., Fl. Calicut 239. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1259. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 154. 1988; Vajravelu. Fl Palghat Dist. 378. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 366.

1994; Sivar. & Mathew, Fl. Nilambur 548. 1996. *Phlomis aspera* Willd., Enum. Hort. Berol. Alt. 621. 1809. *Leucas plukenetii* (Roth) Sprengel in L., Syst. Veg. (ed. 16) 2: 743. 1825. *Phlomis pulkenetii* Roth, Nov. Pl. Spec. 261. 1821. ***Tumba*** Rheede, Hort. Malb. 10: 181, t. 91. 1690. **Thumba.**

Erect hirsute herbs to 40 cm tall. Leaves 3-8 x 1-2 cm, linear-lanceolate, base cuneate, margin distantly serrate, apex acute, puberulous, petiole c. 3 mm long. Verticils terminal and axillary; bract linear, equalling calyx, hirsute. Calyx c. 6 mm long, tubular, 10-ribbed, upper half strigose without, glabrous below; mouth oblique, 10-toothed; teeth unequal, posterior the longer, linear, c.1 mm long. Corolla white; tube c. 6 mm long; Upper lip c. 3 mm long, villous without; lower lip 7-8 mm long. Stamens 4; style c. 8 mm long.

Fl. & Fr. : Aug. - Nov.

Distr. : India, Himalaya, Bangladesh, Indo-China, Malesia and Mauritius. Common in wastelands, fallow fields, etc. *CNS 1570* (Neelamperoor).

Leucas indica (L.) R. Br. ex Vatke, Oesterr. Bot. Z. 25:95. 1875; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1262. 1983; Ramach. & Nair, Fl. Cannanore 366. 1988; Vajravelu, Fl. Palghat Dist. 378. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 367. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 361. 1996. *Leonurus indicus* L., Syst. Nat. ed. 10, 1101. 1760. *Leucas lavandulifolia* J.E.Smith in Rees, Cyclop. 20: no. 2. 1812, "*lavandulaefolia*"; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 504. 1976. *Phlomis linifolia* Roth, Nov. Pl. Sp. 260. 1821. *Leucas linifolia* (Roth) Spreng., Syst. 2: 743. 1825; Hook. f., Fl. Brit India 4: 690. 1885; Gamble, Fl. Pres. Madras 1149. 1924. **Tumba.**

Auunal herbs, to 40 cm tall; branches puberulous. Leaves 4-7 x 0.6-1.3 cm, linear-lanceolate, base attenuate, margin subentire, apex acute, hairy on veins and on margins; petiole 4-5 mm long. Flowers in dense axillary verticils. Bract 5-6 mm long, linear, hairy. Calyx tube 4-5 mm long, tubular, slightly curved, pubescent, shortly 8-toothed, one slightly longer, mouth oblique. Corolla white; tube 2-3 mm long, 2-lipped; upper lip 1-2

mm long, lower 5-6 mm long, 3-lobed. Stamens 4, didynamous; filaments sparsely hairy. Ovary 4-celled; ovules 4; stigma 2-fid. Nutlets 4, minute.

Fl. & Fr. : Aug. - Nov.

Distr. : Sri Lanka, India, China, Malesia to Japan. A weed of waste places. *CNS 1838* (Chengannur).

Leucas stricta Benth. in Wall., Pl. Asiat. Rar. 1: 61. 1830 & in DC., Prodr. 12: 531. 1848; Hook. f., Fl. Brit. India 4: 688. 1885; Mukherjee, Rec. Bot. Surv. India 14: 170. 1940; Gamble, Fl. Pres. Madras 1150. 1924; Mani. & Sivar., Fl. Calicut 239. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1266. 1983. **Tumba.**

Erect, densely hispid herbs to 45 cm tall. Leaves 3-8 x 0.7-2.2 cm, narrowly elliptic to lanceolate, base cuneate, margin entire to serrate, apex acute, densely hairy on both sides; petiole to 4 mm long. Verticils terminal and axillary. Bracts to 6 mm long, linear-lanceolate. Calyx 5-6 mm long, tubular; tube slightly curved; teeth unequal, posterior the longer, c. 1 mm long, subulate. Corolla white; tube 7-8 mm long; upper lip 5-6 mm long, villous without; lower 10-11 mm long. Stamens 4; filaments 5-7 mm long. Nutlet c. 2 mm long, brown.

Fl.& Fr. : May.- Nov.

Distr.: India, Bangledesh and Indo-China. Common in plains, in wasteplaces and roadsides. *CNS 2557* (Kainakkari).

OCIMUM Linnaeus

Sp. Pl. 597. 1753.

Herbs or shrubs; leaves entire or serrate. Racemes simple or branched, terminal; flowers in distant verticils. Bracts foliaceous, deciduous. Calyx ovoid or campanulate, deflexed in fruits, ribbed, 2-lipped, upper lip orbicular or obovate, decurrent on the tube, lower lip unequal, 4-lobed,often aristate. Corolla 2-lipped, glabrous inside, upper lip erect, unequally 4-lobed, lower concave, entire. Stamens 4, didynamous, exserted; anthers

1-celled, confluent. Ovary 4-partite; style 2-fid at apex. Nutlets ovoid or globose, mucilaginous when wet.

1a. Mouth of calyx closed after anthesis by upcurved lower lip; lower lip of fruiting calyx shorter than the upper lip; leaves 3-5.2 cm wide; shrubs or undershrubs .... **O. gratissimum**

1b. Mouth of calyx not closed after anthesis by upcurved lower lip; lower lip of fruiting calyx as long as or longer than the upper lip; leaves 0.5-2.5 cm wide; herbs.

2a. Leaves acute at apex; calyx-tube hirsute within; posterior filaments at base with a transverse hairy process; nutlets mucilaginous when wet.

3a Fruiting calyx 6-8 mm long; corolla 7-10 mm long ..... **O. basilicum**

3b. Fruiting calyx 4-5mm long; corolla 5-7 mm long ..... **O. americanum**

2b. Leaves obtuse at apex; calyx-tube glabrous within; posterior filaments at base with a hairy tuft; nutlets not mucilaginous when wetted .....**O. sanctum**

Ocimum americanum L., Cent. Pl. 1: 15. 1755; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 505. 1976; Mani. & Sivar., Fl. Calicut 236. 1982; Vajravelu, Fl. Palghat Dist. 380. 1990; Paton, Kew. Bull. 47: 425. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 368. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 362. 1996. *O.canum* Sims, Bot. Mag. t. 2452. 1823; Hook. f., Fl. Brit. India 4: 607. 1885; Gamble, Fl. Pres. Madras 1111. 1924; Mukherjee, Rec. Bot. Surv. India14:17. 1940; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 114. 1981; Matthew & Rani in Matthew, Fl.Tam. Carnatic 3: 1269. 1983; Ramach. & Nair, Fl. Cannanore 368. 1988. **Katu-thulasi.**

Herbs; branchlets terete to sub 4-angular, puberulous. Leaves 1-3 x 0.5-1.5 cm, elliptic-oblong, base truncate or obtuse, margin sparingly serrate, apex acute, glabrescent or sparsely pilose along nerves below; petiole to 2 cm long. Racemes to 8 cm long, densely pubescent. Bracts ovate, acute. Calyx c. 4 mm long, sericeous; lobes 5, 2-lipped. Corolla white, 5-7 mm long, 2-lipped. Stamens 4, didynamous; filaments glabrous; anthers 1-celled. Stigma equally 2-fid at apex; disc 4-lobed. Nutlets c. 1 mm long, ovoid-subtrigonous.

Fl. & Fr. : Jul.- Dec.

Distr. : Paleotropics. Common weed in open, waste, sandy ground along roadsides. *CNS 1571* (Alappuzha).

Ocimum basilicum L., Sp. Pl. 597. 1753; Roxb., Fl. Ind. 3:17. 1832; Hook. f., Fl Brit. India 4:608. 1885; Gamble, Fl. Pres. Madras 1111. 1924;. Morton, J. Linn. Soc. Bot. 58:234. 1962; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 115. 1981; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1268. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 154. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 368. 1994; Sivar. & Mathew, Fl. Nilambur 550. 1996. *Ocimum americanum* L., Cent. Pl. I: 15. 1755. ***Soladi-tirtava*** Rheede, Hort. Malab. 10:173, t. 87. 1690. **Thulasi.**

Erect annual herbs to 60 cm tall; stem obtusely 4-angular. Leaves 3.5-6 x 1.5-2.5 cm, ovate-elliptic, base cuneate, margin entire to distantly crenulate, apex acute, puberulous above, pubescent with sessile oil galnds beneath; petiole to 2 cm long. Racemes to 14 cm long; bracts oblanceolate, ciliate; pedicel to 2 mm long. Calyx to 6 mm long; tube c. 3 mm long, sparsely strigose; upper lip c. 3 mm long, broadly ovate; lower lip to 4 mm long, hairy within. Corolla cream, 7-10 mm long; tube c. 4 mm long, inflated below; lobes 5. Stamens 4; filaments of posterior pair with a transverse process of tufted hairs. Nutlets 2-3 x 1-1.5 mm, ellipsoid, black, mucilaginous when wet. Fruiting calyx 6-8 mm long.

Fl. & Fr. : Throughout the year.

Distr. : Throughout the warmer parts of Asia, Africa and America; widely cultivated. *CNS 2558* (Thanki kavala)

Ocimum gratissimum L., Sp. Pl. 1197. 1753; Hook. f., Fl. Brit. India 4: 608. 1885; Gamble, Fl. Pres. Madras 1111. 1924; Mukherjee, Rec. Bot. Surv. India 14:20. 1940; Morton, J. Linn. Soc. Bot. 58: 232. 1962; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3:112. 1981; Mani. & Sivar., Fl. Calicut 236. 1982; Rani & Matthew in Matthew., Fl. Tam. Carnatic 3: 1270. 1983; Ramach. & Nair, Fl. Cannanore 368. 1988; Nicols.,

Suresh & Mani., An Interpr. Hort. Malab. 155. 1988; Vajravelu. Fl. Palghat Dist. 380. 1990; Sasi. & Sivar., Fl . Pl. Thrissur For. 362. 1996. ***Kattu-tirtava*** Rheede, Hort. Malab. 10:171, t. 86. 1690. **Kattu-tirtavu.**

Undershrubs; branchlets 4-gonous, glabrescent. Leaves 4-9 x 3- 5.2 cm, ovate, base attenuate or decurrent, margin deeply serrate, apex acute or acuminate, glabrous except on the nerves; petiole to 5 cm long. Racemes to 10 cm long. Bracts oblanceolate. Calyx c. 5 mm long, sparsely hispidulous; lobes 5, upper lip c. 3 mm long, lower lip c. 2 mm long, 3-4 ribbed, ciliate. Corolla white, c. 5 mm long, lobes 5, acute. Stamens 4; filaments villous at base. Ovary obovoid. Nutlets 4, c. 2 mm across, subglobose, reticulate or pitted.

Fl. & Fr. : Dec. - Jan.

Distr. : Pantropical. In waste places and on roadsides. *CNS 1527* (Chambakkulam).

Ocimum tenuiiflorum L., Sp. Pl. 597. 1753; DC., Prodr. 12: 39. 1848; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1271. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 155. 1988; Vajravelu, Fl. Palghat Dist. 380. 1990; Sivar. & Mathew, Fl. Nilambur 551. 1996. *O.sanctum* L., Mant. Pl. 85. 1767; Hook. f., Fl. Brit. India 4: 609. 1885; Gamble, Fl. Pres. Madras 1111. 1924; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 116. 1981; Mani. & Sivar., Fl. Calicut 236. 1982. ***Mala-tirtava*** Rheede, Hort. Malab. 10:t. 85. 1690. ***Krishna thulasi.***

Subshrubs; branchlets hirsute with reddish-purple hairs. Leaves 1.3- 3 x 0.6-2 cm, elliptic-oblanceolate, obtuse at both ends, margin coarsely serrate, puberulous; petiole to 2 cm long, covered with reddish-purple hairs. Racemes to 11 cm long, generally simple, occasionally branched at base; pedicel c. 2 mm long. Bracts to 2 x 3 mm, suborbicular. Calyx purplish, c. 3 mm long, campanulate; lobes 5, upper lip ovate, acute, lower lip hispid without. Corolla reddish-pink, to 4 mm long, tubular-campanulate; tube c. 2 mm long, dotted with sessile oil glands; lobes of upper lip oblong-orbicular; lower lip ovate-oblong. Stamens 4; filaments villous at the base of upper pair. Nutlets c.1.5 mm long, ellipsoid, dark brown.

Fl. & Fr. : Throughout the year.

Distr. : S.W. Asia, Himalaya, India, Sri Lanka and Malesia. Usually cultivated in Indian homes. Also seen as escape. *CNS 1839* (Nooranad).

ORTHOSIPHON Bentham

Edwards's Bot. Reg. 15: t. 1300. 1830.

Perennial herbs or undershrubs. Leaves serrate or crenulate, dotted with sessile oil globules beneath. Racemes terminal; verticils 6-flowerd, distant. Calyx tubular-campanulate, deflexed and accrescent in fruit; limb 2-labiate; upper lip broadly ovate or rounded, the margins decurrent on tube; lower lip 4-lobed. Corolla distinctly exceeding calyx, 2-labiate; upper lip 3-4 -lobed; lower concave, as long as upper. Stamens didynamous, included in lower lip or much exserted; anthers 2-celled, reinform. Nutlets ovoid, smooth or tuberculate.

1a. Stamens included in lower lip of corolla ..... **O. thymiflorus**

1b. Stamens much exserted beyond lower lip of corolla ..... **O. aristatus**

Orthosiphon aristatus (Bl.) Miq., Fl. Ind. Bat. 2: 943. 1858; Mukherjee, Rec. Bot. Surv. India 14: 26. 1940; Sleesen, Reinwardtia 5: 38. 1959; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 125. 1981; Sasi. & Sivar., Fl. Pl. Thrissur For. 363. 1996. *Ocimum aristatum* Bl., Bijdr. 833. 1825. *Orthosiphon stamineus* Benth. in Wall. Pl. Asiat. Rar. 2: 15. 1831& in DC., Prodr. 12: 52. 1848; Hook. f., Fl. Brit. India 4:615. 1885; Gamble, Fl. Pres. Madras 1115. 1924.

Diffusely branched perennial herbs. Leaves 3-6.5 x 1.2- 3.5 cm, rhomboid to ovate-deltoid, base cuneate, margins serrate from about the middle upwards, apex acute, glandular-punctate beneath. Recemes 8-16 cm long; verticils lax; peduncle strigulose with purplish hairs. Bracts c.1 x 2 mm, broadly ovate. Calyx tube to 3 mm long, 10-nerved; upper lip to 3 mm long, broadly ovate, purplish; lower lip longer. Corolla white, tomentose without; tube 1-1.5 cm long; upper lip orbicular; lower lip as long as upper,

boat-shaped. Stamens exserted; filaments to 3 cm long. Nutlets c. 2 mm long, ovoid-oblong.

Fl. & Fr. : Almost throughout the year.

Distr. : Throughout South-eastern Asia to tropical Australia. A garden escape. *CNS 2559* (Bharanikkavu).

Orthosiphon thymiflorus (Roth) Sleesen, Reinwardtia 5: 42. 1959; Cramer in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 124. 1981; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1272. 1983; Ramach. & Nair, Fl. Cannanore 369. 1988; Vajravelu, Fl. Palghat Dist. 380. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 369. 1994; Sivar. & Mathew, Fl. Nilambur 552. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 363. 1996. *Ocimum thymiflorum* Roth, Nov. Pl. Sp. 269. 1821. *Ocimum viscosum* Roth, Nov. Pl. Sp. 274. 1821 ("*ocymum*"). *Orthosiphon tomentosus* 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; Mukherjee, Rec. Bot. Surv. India 14: 23. 1940. *Endostemon viscosus* (Roth) Ashby, J. Bot. 74: 126. 1936; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 501. 1976.

Perennial subshrubs. Leaves 4-7.5 x 2.5-4 cm, ovate to elliptic, base truncate or obtuse, margin crenate-serrate, apex acute, puberulous along the nerves, membranous; petiole to 2.5 cm long. Racemes to 15 cm long; verticils rather lax. Bracteoles ovate, acute. Calyx c. 5 mm long, tubular-campanulate, pubescent, oblique-mouthed; tube 3-4 mm long; upper lip broadly ovate, purplish, lower lip c. 4 mm long, 4-toothed. Corolla c. 1 cm long, white, 2-lipped; tube c. 7 mm long, pubescent without; limb pale lilac. Stamens 4, included in the concave lower lip. Style glabrous. Nutlets c. 1.5 x 1 mm, oblong-orbicular, brown, minutely tuberculate.

Fl. & Fr. : Sep. - Nov.

Distr. : Indo- Malesia. In wastelands. *CNS 1572* (Venmony).

PLECTRANTHUS L'Heritier

Stirp. Novae 84. 1788

Plectranthus mollis (Aiton) Spreng., Syst. Veg. 2: 690. 1825; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 506. 1976; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1276. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 156. 1988. *Ocimum molle* Aiton, Hort. Kew. 2: 322. 1789. *Plectranthus incanus* Link, Enum. Hort. Berol. Alt. 2: 120. 1822; Hook. f., Fl. Brit. India 4: 621. 1885; Gamble, Fl. Pres. Madras 1121. 1924. *P. cordifolius* D. Don, Prodr. Fl. Nepal 116. 1825. ***Perim-tolass*** Rheede, Hort. Malab. 10: 167, t. 84. 1690.

Annual erect herbs; stem 4-angular, flaccid, sparsely pubescent. Leaves 3-11 x 3-9 cm, broadly ovate,base cordate, margins broadly dentate, apex acute, sparsely pubescent; petioles 3-8 cm long. Inflorescence terminal cymose panicles, 7-23 cm long. Calyx 2-3 mm long, 2-lipped, campanulate. Corolla purplish; tube c. 2 mm long, slender, inflated above; lower lip small, obtuse, upper lip elongate. Fruiting calyx accrescent, upper lobe foliaceous, obtuse. Nutlets 4, oblong, smooth.

Fl. & Fr.: Aug. - Nov.

Distr.: India. Very common in waste places land along roadsides. *CNS 1612* (Pallippuram).

POGOSTEMON Desfontaines

Mem. Mus. Hist. Nat. 2: 154. 1815.

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; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 507. 1976; Mani. & Sivar., Fl. Calicut 240. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1280. 1983 ; Mani., Fl. Silent Valley 222. 1988; Ramach. & Nair, Fl. Cannanore 372. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 156. 1988; Vajravelu, Fl. Palghat Dist. 382. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 371. 1994; Sivar. & Mathew, Fl. Nilambur 553. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For.

364. 1996. *Elsholtzia paniculata* Willd., Sp. Pl. 3: 59. 1800. ***Manam-podam*** Rheede, Hort. Malab. 10: 129, t. 65. 1690.

Herbs to 80 cm tall; branchlets slender, obtusely 4-angled, glabrescent. Leaves in unequal pairs, 4-8 x 2-3 cm, ovate or elliptic, base attenuate, margin irregularly serrate-dentate, apex acute or acuminate, villous on both sides, membranaceous; petiole to 2.5 cm long. Panicle unilateral, to 12 cm long. Bracts 4-5 x 3-4 mm, oblique-ovate, imbricate around flowers, ciliate on margins. Calyx c. 5 mm long, campanulate, lobes subequal, hirsute. Corolla violet, tube 3-4 mm long, obscurely 2-lipped, lobes ciliate on margins. Stamens 4; filaments sparsely hairy. Seeds smooth, ovoid, with one face often angled.

Fl.& Fr. : Sep. - Dec.

Distr. : India and Mynamar. In waste places. *CNS 1318* (Chengannur).

93. NYCTAGINACEAE Juss.

Gen. Pl. 90. 1789.

1a. Flowers large, funnel-like in terminal capitate clusters; fruit rugose ..... **Mirabilis**

1b. Flowers small in paniculate cymes; fruit not rugose ..... **Boerhavia**

BOERHAVIA Linnaeus

Sp. Pl. 3. 1753.

Erect or diffuse herbs. Leaves opposite in unequal pairs. Inflorescence a panicle of umbellate or capitate clusters. Flowers actinomorphic, 5-merous, bisexual; pedicels jointed; bracteoles small. Perianth limb funnel-shaped, 5-lobed, lobes plicate. Stamens 1-3, included, filaments unequal. Ovary superior, stipitate, 1-locular; ovules 1, erect; stigma peltate. Fruit 5-ribbed or 5-angled, viscid glandular; enclosed by the perianth tube.

1a. Erect herbs; fruit eglandular, obconic, apex truncate ..... **B. erecta**

1b. Diffuse herbs, fruit glandular, club-shaped, apex obtuse ..... **B. diffusa**

Boerhavia erecta L., Sp. Pl. 3. 1753; Mani. & Sivar., Fl. Calicut 242. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1288. 1983; Ramach. & Nair, Fl. Cannanore 374. 1988; Vajravelu, Fl. Palghat Dist. 384. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 374. 1994. B. *punarnava* Shah & Krishnamoorthy, J. Sci. Industr. Res. C. Biol. Sci. 21: 254. 1961; Nair, Bull. Bot. Surv. India 9: 288. 1967.

Erect herbs. Leaves in unequal pairs, 2-4 x 1.2-3 cm, elliptic-ovate to ovate-lanceolate, base cuneate or subacute, margin repand, apex acute to apiculate, subsucculent; petiole to 1.2 cm long. Panicle zig-zag, axillary and terminal; umbellules 2-4-flowered. Pedicels upto 6 mm long. Perianth white with pink stripes, c. 3 mm across; tube 2-2.5 mm long. Stamens 1 or 3. Fruit c. 2.5 mm long, obconic, apex truncate, the grooves between the ribs somewhat undulate.

Fl. & Fr.: Aug. - Dec.

Distr.: Pantropical. Most commonly found along railway lines and waste lands. *CNS 1888* (Mavelikara), *CNS 1397* (Kayamkulam).

Boerhavia diffusa L., Sp. Pl. 3. 1753; Gamble, Fl. Pres. Madras 1162. 1925; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 92. 1976; Mani. & Sivar., Fl. Calicut 242. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1287. 1983; Ramach. & Nair, Fl. Cannanore 373. 1988; Vajravelu, Fl. Palghat Dist. 383. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 373. 1994; Sivar. & Mathew, Fl. Nilambur 556. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 366. 1996. *Boerhavia repens* L., Sp. Pl. 3. 1753; Fosb., Smiths. Contrib. Bot. 39: 8. 1978; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 196. 1988. ***Talu-dama*** Rheede, Hort. Malab. 7: 105, t. 56. 1688. ***Thazhu-dama***.

Diffuse herbs with long tap roots and elongated trailing branches, thickened at nodes, purplish. Leaves 1.5-3.3 x 1.5-3 cm, broadly ovate or suborbicular, base truncate, margin often unulate, apex obtuse or acute, subsucculent; petiole to 1.5 cm long. Umbellate cymes mostly axillary, 5-6 cm long. Perianth pink, c. 3 mm across. Stamens 2 or 3; filaments unequal. Fruit clavate, c. 3 mm long, 5-ribbed, glandular, apex rounded.

Fl. & Fr.: Most of the seasons.

Distr.: Pantropical. Very common along waysides, wastelands, etc. *CNS 1049* (Punnapra).

Decoction of root is used as a remedy for rheumatism, cough, asthma, chest-pain, piles and swellings.

MIRABILIS Linnaeus

Sp. Pl. 177. 1753.

Mirabilis jalapa L., Sp. Pl. 177. 1753; Gamble, Fl. Pres. Madras 1164. 1925; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 92. 1976; Mani. & Sivar., Fl. Calicut 241. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1291. 1983; Ramach. & Nair, Fl. Cannanore 374. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 197. 1988; Vajravelu, Fl. Palghat Dist. 384. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 374. 1994. ***Andi-malleri*** Rheede, Hort. Malab. 10: 149-150, t. 75. 1690. ***Nalu-mani-chedi***

Herbs with large tuberous roots; stem semisucculent. Leaves opposite, 3-9 x 2.5-5 cm, triangular-ovate, base obliquely truncate to shortly decurrent, apex acute to acuminate; lateral nerves 5-7 pairs; petiole to 3.5 cm long. Inflorescence of 3-7-flowered, terminal, capitate cluster. Perianth pink, white or yellow, funnel-shaped; tube to 4 cm long, slender, limb 5-lobed. Stamens 3-6, exserted. Ovary globose, subsessile; stigma shortly lobed or fimbriate. Anthocarp 4-6 mm across, globose, rugose, black when ripe.

Fl. & Fr.: Throughout year.

Distr.: Native of Peru; now cultivated all over the world. *CNS 2043* (Alappuzha town).

94. AMARANTHACEAE Juss.

Gen.. Pl. 87. 1789.

1a. Leaves opposite.

2a. Anthers 1-celled ..... **Alternanthera**

2b. Anthers 2-celled.

3a. Flowers dimorphic; modified sterile flowers with hooked spines .... **Cyathula**

3b. Flowers monomorphic; all fertile.

4a. Spikes elongate; bracts and bracteoles spine-tipped, staminodes 5 .... **Achyranthes**

4b. Spikes globose; bracts and bracteoles not spine-tipped;staminodes 0 ..... **Gomphrena**

1b. Leaves alternate.

5a. Flowers bisexual.

6a. Utricle many-seeded ..... **Celosia**

6b. Utricle single-seeded.

7a. Flowers in spikes; plants white pubescent; staminodes present ..... **Aerva**

7b. Flowers in globose heads; plants not white pubescent; staminodes absent ..... **Allmania**

5b. Flowers unisexual ..... **Amaranthus**

ACHYRANTHES Linnaeus

Sp. Pl. 204. 1753.

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; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 102. 1976; Towns. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 38. 1980; Mani. & Sivar., Fl. Calicut. 245. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1296. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 44. 1988; Ramach. & Nair, Fl. Cannanore 375. 1988; Vajravelu, Fl. Palghat Dist. 385. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 375. 1994; Sivar. & Mathew, Fl. Nilambur 555. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 367. 1996. A. *prophyristachya* Wall. ex Moq. in DC., Prodr. 13(2): 316. 1849. ***Cadelari*** Rheede, Hort. Malab. 10: t. 78. 1690. ***Cadaladi.***

Erect pubescent herbs. Leaves 3-6 x 2-3 cm, obovate or ovate, base cuneate, apex abruptly acuminate, finely pubescent on both sides; petiole to 1.5 cm long. Spikes terminal, to 20 cm long. Bracts and bracteoles ovate, spine-tipped, scarious. Tepals 5, unequal, greenish-white, 4-5 mm long, the outer longest, lanceolate, aristate, 1-3-nerved. Stamens 5; filaments 2-4 mm long, connate, alternate with fimbriate staminodes. Ovary 1-locular, ovule 1, basal; style 2-3 mm long, filiform; stigma capitellate. Utricle 2-3 mm long, oblong or ovoid. Seed 1, filling the capsule, cylindrical, smooth.

Fl. & Fr.: Sep. - Jan.

Distr.: Pantropics. A very common weed in wastelands, roadsides and elsewhere. *CNS 1589* (Aroor). The spiny persistent bracteoles help the mature fruit to stick to animal bodies and clothings and facilitate seed dispersal.

The plant as a whole is used in Ayurveda in the treatment of piles, boils, etc.

AERVA Forsskal

Fl. Aegypt. - Arab. 170, cxxii. 1775 (*nom. cons.*).

Aerva lanata (L.) Juss., Ann. Mus. Natt. Hist. Natl. 2: 131. 1803; Schult. in L., Syst. Veg. 5: 564. 1819; Wight, Ic. t. 723. 1840; Hook. f., Fl. Brit. India 4: 728. 1885; Gamble, Fl. Pres. Madras 1178. 1925; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 104. 1976; Towns. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1:32. 1980; Mani. & Sivar., Fl. Calicut 244. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1299. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 44. 1988; Ramach. & Nair, Fl. Cannanore 376. 1988; Vajravelu, Fl. Palghat Dist. 385. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 375. 1994; Sivar. & Mathew, Fl. Nilambur 558. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 368. 1996. *Achyranthes lanata* L., Sp. Pl. 204. 1753. ***Scheru-bula*** Rheede, Hort. Malab. 10: 57, t. 29. 1690. ***Cherula***/

Erect or decumbent, white-pubescent herbs. Leaves 1.5-3 x 1-2.5 cm, obovate or orbicular, base cuneate, apex obtuse, apiculate or acute, pubescent on both sides; petiole to 5 mm long. Flowers minute, bisexual, in dense terminal and axillary sessile spikes.

Bracts and bracteoles c. 1 mm long, membranous, oblong ovate. Tepals 5, greenish-white, to 1.5 mm long, oblong, obtuse, densely lanate dorsally. Stamens 5, shortly connate below, alternate with subulate staminodes. Ovary 1-ovuled; stigma 2-fid. Utricle c. 1 mm, rotund, compressed. Seed reniform, black, shining.

Fl. & Fr.: Sep. - Jan.

Distr.: Widespread in tropics and subtropics. A common plant on waysides and wasteland. *CNS 2530* (Mannarsala).

Used in several Ayurvedic preparations.

ALLMANIA R. Brown ex R. Wight
J. Bot. (Hooker) 1: 226. 1834.

Allmania nodiflora (L.) R. Br. ex Wight in Hook., J. Bot. Kew Gard. Misc. 1: 226, t. 128. 1834; Hook. f., Fl. Brit. India 4: 716. 1885; Gamble, Fl. Pres. Madras 1167. 1925; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 105. 1976; Towns. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 7. 1980; Mani. & Sivar., Fl. Calicut 246. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1301. 1983; Mani., Fl. Silent Valley 225. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 44. 1988; Vajravelu, Fl. Palghat Dist. 386. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 376. 1994; Sivar. & Mathew, Fl. Nilambur 558. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 368. 1996. *Celosia nodiflora* L., Sp. Pl. 205.1753. ***Pee-tardavel*** Rheede, Hort. Malab. 9: 153, t. 79. 1689.

Diffuse annual herbs, with long tap root; branchlets angular, reddish. Leaves 1.5-4 x 0.8-2 cm, orbicular or obovate, base attenuate, apex obtuse or acute, black on drying; petiole to 1 cm long. Spikes capitate, subsessile to pedunculate, 0.8-1.2 across, reddish, terminal and leaf-opposed. Bracts and bracteoles c. 2 mm long, membranous, subulate with filiform tips. Perianth lobes 5, 3-5 mm long, oblong-lanceolate, acuminate, scarious, pilose dorsally, persistent. Stamens 5, unequal; filaments joined into a cup, c. 3 mm long. Ovary c. 1.5 mm across, ovoid; ovule 1, erect; stigma 2-lobed. Utricle circumcissile, 3-4 mm across, subglobose. Seeds 2-3 mm across, lenticular, black.

Fl. & Fr.: Jun.-Oct.

Distr.: Tropical Asia, from S. China to Philippines. Frequent in dry, grassy places, roadsides, along railway track and areas of loose sand. *CNS 1011* (Vandanam).

ALTERNANTHERA Forsskal

Fl. Aegypt. - Arab. 28, lix. 1775.

Erect or prostrate or ascending herbs, sometimes aquatic and floating. Leaves decussate or clustered, sessile or shortly petioled. Flowers bisexual, in terminal and axillary sessile or peduncled heads or spikes. Tepals 5, free, equal or unequal. Stamens 2-5, filaments basally connate and cupular, alternating with usually forked staminodes; anthers 1-celled. Ovary 1-ovuled, compressed or not; style short; stigma capitate. Utricle indehiscent, falling with perianth.

1a. Flowers in long-peduncled axillary heads; stem fistular ..... **A. philoxeroides**

1b. Flowers in axillary, sessile heads; stem not fistular.

2a. Bracts and bracteoles barbellate hairy ..... **A. tenella**

2b. Bracts and bracteoles glabrous.

3a. Tepals subequal, 1-veined without glochidiate bristles; pseudo-staminodes almost as long as and resemble filaments ..... **A. sessilis**

3b. Tepals very unequal, outer basally 3-veined with a tuft of glochidiate bristles on the keel; pseudo-staminodes lacerate, shorter than filaments ..... **A. pungens**

Alternanthera philoxeroides (Mart.) Griseb., Abh. Ges. Wiss. Goett. 24: 36. 1879; Kuntze, Rev. Gen. Pl. 2: 540. 1891; Maheshwari, Bull. Bot. Surv. India 6: 313-314. 1964; Sankaran & Narayanan, Curr. Sci. 40: 641. 1971; Naithani & Raiz., Ind. For. 102: 681. 1976; Sivar. & Mathew, Indian J. For. 7(1): 52. 1984; Sald. & Rao in Sald., Fl. Karnataka 1: 165. 1984. *Bucholzia philoxeroides* Mart., Nov. Acta. Leop. Carl. 13: 315. 1826.

Perennial aquatic or marshy herbs usually with many erect branches from a prostrate stem, often much branched and forming dense masses; stem fistular,

longitudinally striate, with a longitudinal groove each on two opposite sides. Leaves opposite, 4-10 x 0.5 - 2.5 cm, elliptic-lanceolate to obovate-lanceolate, base narrow, acute, midrib prominent; petiole 1-6 mm long. Inflorescence usually axillary, pedunculate, ovoid to globular-ellipsoid, white heads, sometimes terminal and sessile, 1-2 cm across; peduncles usually1-5 cm long. Bracts and bracteoles subequal, ovate, 1-nerved, apiculate, glabrous, persistent. Tepals 5, subequal, 5-7 x 1.5-2.5 mm, oblong-acute, mucronulate, white, dorsally compressed. Stamens 5, filaments united below into a tube, 3-4 mm long, linear; anthers unilocular. Pseudo-staminodes lacerate and exceeding the stamens. Ovary shortly stalked, ovoid; style slender; stigma capitate, densely papillose.

Fl. & Fr.: Sep. - Mar.

Distr.: South America, Asia, Australia and U.S.A. A gregarious weed in stagnant and slow-moving shallow water pools, ditches and marshes. *CNS 2531* (Cherthala).

The tender leafy shoots are used as vegetable.

Alternanthera pungens Kunth, Nov. Gen. Sp. 2: 206. 1817; Melville, Kew Bull. 12: 178. 1958; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 106. 1976; Towns. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1:47. 1980; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1303. 1983; Sivar. & Mathew, Ind. J. For. 7(1): 48. 1984; Ramach. & Nair, Fl. Cannanore 376. 1988. *Achyranthes repens* L., Sp. Pl. ed. 1, 205. 1753. *Alternanthera echinata* Smith in Rees, Cycl. Suppl. 39: 10. 1819; Tadulingam & Venkat., Handb. S. Ind. Weeds 274, t. 114. 1932.

Prostrate, mat-forming perennial herbs with stout rootstock, much-branched from the base outwards, rooting at the lower nodes; young branches villous but glabrescent with age. Leaves 1.5-3.5 x 1-2.8 cm, elliptic, obovate or more or less rounded, base narrowed, apex rounded to subacute, glabrous or thinly appressed-pilose on both surfaces; petiole to 1 cm long. Inflorescence axillary, sessile, globose to shortly cylindrical spikes, 0.5-1.5 x 0.5-1 cm; bracts 4-5 mm long, oblanceolate, white or stramineous, aristate; bracteoles similar but smaller. Tepals 5; outer 2 c. 5 mm long, oblanceolate, pungently mucronate; inner tepal c. 3 mm long, oblong, apical mucro short; lateral tepals c. 2 mm long. Stamens

5, the alternating pseudo-staminodes broad, subquadrate. Ovary depressed-globose. Utricle c. 2 mm across, lenticular. Seed discoid, brown.

Fl. & Fr.: Throughout the year.

Distr.: A native of the American continent; now widespread as a weed in the tropics and subtropics of the Old World. In dry sandy places. *CNS 2528* (Arattupuzha).

Alternanthera sessilis (L.) R. Br. ex DC., Cat. Pl. Hort. Monsp. 4: 77. 1813; Wight, Ic. t. 727. 1843; Hook. f., Fl. Brit. India 4: 731. 1885; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 106. 1976; Towns. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 49. 1980; Mani. & Sivar., Fl. Calicut 245. 1982; Matthew & Rani in Matthew, Fl.Tam. Carnatic 3: 1304. 1983; Sivar. & Mathew, Ind. J. For. 7(1): 47. 1984; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 45. 1988; Ramach. & Nair, Fl. Cannanore 377. 1988; Vajravelu, Fl. Palghat Dist. 386. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 377. 1994; Sivar. & Mathew, Fl. Nilambur 559. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 369. 1996. *Gomphrena sessilis* L., Sp. Pl. 225. 1753. *Alternanthera triandra* Lamk., Encyl. 1: 95. 1785; Gamble, Fl. Pres. Madras 1179. 1925. ***Coluppa*** Rheede, Hort. Malab. 10: 21-22, t. 11. 1960. ***Coluppa***.

Annual or perennial prostrate herbs; branches often purplish, young shoots with 2 lines of hairs, rooting at the nodes. Leaves 1.5-3x 0.5-1.2 cm, linear-oblong to spathulate, base cuneate, apex acute or obtuse, chartaceous; petiole c. 3 mm long. Spikes white, axillary, sessile, c. 5 mm across, globose to oblong. Bracts and bracteoles ovate or obovate. Tepals 5, equal, c. 2 mm long, ovate, acute, scarious, 1-nerved. Fertile stamens 3. Ovary compressed, roundish. Utricle c. 3 mm across, obcordate or cordiform, strongly compressed with a narrow, pale, somewhat thickened margin. Seed c. 1 mm across, discoid, brown, shining, faintly reticulate.

Fl.& Fr.: Most of the seasons.

Distr.: Tropics and Subtropics.

Common on moist, clayey soil, paddy fields and wastelands. This species is eaten as a vegetable. *CNS 1067* (Mambuzhakari).

Alternanthera tenella Colla, Mem. Acad. Sci. Terine Turin 33: 131, t. 9. 1820; Mears, Proc. Acad. Nat. Sci. Philadelphia 129: 19. 1977; Sivar. & Mathew, Ind. J. For. 7(1): 49. 1984.

Prostrate or diffuse herbs; stem white-villous especially on the younger parts. Leaves 2-4.5 x 1-2.5 cm, elliptic to oblanceolate, base cuneate, decurrent, apex subacute or obtuse, hairy. Heads axillary, sessile, 1-5, ovoid, white. Bracts and bracteoles elliptic-lanceolate, spinescent, 1-nerved, keeled. Tepals 5, lanceolate, spinous tipped, unequal. Fertile stamens 5; staminodes 3-4-toothed. Ovary obovoid, 1-ovuled; stigma capitate, papillose. Utricle cordiform. Seeds discoid, brown, faintly reticulate.

Fl. & Fr.: Throughout year.

Distr.: Tropics and Subtropics. In waste places. *CNS 1496* (Chengannur).

AMARANTHUS Linnaeus

Sp. Pl. 989. 1753.

Erect or decumbent, unarmed or spinous annual herbs; stem subsucculent. Leaves alternate, apparently clustered with small axillary leaves. Flowers unisexual; male and female flowers mixed, in axillary or terminal spiciform racemes or panicles; bracteoles 2, persistent. Tepals 3-5, hyaline, free in male, shortly connate in female, membranous. Stamens 3-5; filaments free; anthers 2-celled. Ovary 1-ovuled; style 1; stigmas 2 or 3. Utricle membranous, circumcissile, or indehiscent. Seeds usually black and shining.

1a. Plants with axillary spines ..... **A. spinosa**

1b. Plants unarmed.

2a. Tepals and stamens 5 each ..... **A. caudatus**

2b. Tepals and stamens 3 each.

3a. Prostrate herbs; flowers in axillary clusters, not forming terminal leafless spikes or panicles ..... **A. graecizans** var. **thellugianus**

3b. Ereact or ascending herbs; flowers in terminal and axillary panicles .....
..... **A. viridis**

Amaranthus caudatus L., Sp. Pl. 990. 1753; Hook. f., Fl. Brit. India 4: 719. 1885; Gamble, Fl. Pres. Madras 1170. 1925; Towns. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1:14. 1980; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1305. 1983; Sivar. & Mathew, Fl. Nilambur 560. 1996. ***Cheera***.

Large, erect annual herbs; the whole plants red or purple suffused. Leaves 3-15 x 2-7 cm, ovate-oblong or rhomboid-ovate, base cuneate to attenuate, apex obtuse to subacute, mucronate; petiole to 7 cm long. Flowers in axillary and terminal red or green panicled spikes, to 20 cm long; male and female flowers intermixed throughout the spikes. Bract ovate, caudate-acuminate, aristate. Flowers unisexual. Perianth 5, 2-3.5 mm long, oblong-elliptic, aristate. Stamens 5 in male. Stigma 3-lobed, erect or flexuose. Utricle c. 2 mm long, ovoid-globose, circumscissile. Seeds 1-1.5 mm across, lenticular, compressed, black, shining.

Fl. & Fr.: Mar.-May.

Distr.: World wide. Commonly cultivated in home gardens as a vegetable, but also found frequently wild. *CNS 2533* (Mannancherry).

Amaranthus graecizans L., Sp. Pl. ed. 1, 990. 1953. subsp. **thellungianus** (Nevski) Gusev, Bot. Zurn. 57: 462. 1972; Towns. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1:22. 1980; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1306. 1983. *Amaranthus thellungianus* Nevski in Act. Inst. Bot. Acad. Sc. U.R.S.S. 1(4): 311. 1937. *Amaranthus polygamus* auct., non L., 1755: Hook. f., Fl. Brit. India 4: 721. 1885, in part; Gamble, Fl. Pres. Madras 1171. 1925. *Amaranthus polygonoides* auct. non L., 1753: Roxb., Fl. Ind. 3: 602. 1832;Wight, Ic. t. 512. 1841 & t. 719. 1840.

Prostrate annual herbs, branched from the base. Leaves 0.8 - 1.5 x 0.5-1 cm, ovate or rhomboid-ovate, base attenuate, apex acute to obtuse or obscurely retuse at the mucronulate tip; petiole to 1 cm long. Flowers in axillary cymose clusters; bracts c. 1 mm

long, ovate-lanceolate, acute; bracteoles 1-1.5 mm long, lanceolate. Tepals 3, 1.5-2 mm long; those of the male flowers lanceolate-oblong, cuspidate; those of female flowers linear-oblong, gradually to abruptly narrowed to the variable mucro. Stamens 3. Ovary oblong-globose; stigmas 3, slender. Utricle c. 2 mm across, subglobose. Seed c. 1 mm across, orbicular.

Fl. & Fr.: Aug. - Dec.

Distr.: India, Sri Lanka and Middle Asia. In waste places. *CNS 2534* (Alappuzha).

Amaranthus spinosus L., Sp. Pl. 991. 1753; Wight, Ic. t. 513. 1841; Hook. f., Fl. Brit. India 4: 718. 1885; Gamble, Fl. Pres. Madras 1170. 1925; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 106. 1976; Towns. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1:9. 1980; Mani. & Sivar., Fl. Calicut 243. 1983; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1307. 1983; Mani., Fl. Silent Valley 226. 1988; Ramach. & Nair, Fl. Cannanore 378. 1988; Vajravelu, Fl. Palghat Dist. 387. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 377. 1994; Sivar. & Mathew, Fl. Nilambur 561. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 369. 1996. ***Mullencheera.***

Erect glabrous herbs, profusely branched; branches grooved; spines divaricate, sharp, to 1.2 cm long. Leaves 3-8 x 2-4 cm, ovate or elliptic-lanceolate, base attenuate, apex obtuse or subacute; petiole to 4 cm long. Flowers in terminal panicled spikes or in axillary, sessile clusters. Bracts and bracteoles minute, ovate-lanceolate. Male flowers: 1-2 mm across; tepals 5, calycine, unequal, ovate-lanceolate; stamens 5; anthers sagittate. Female flowers: 1-2 mm across; tepals 5, oblong, acute at apex; ovary 1-celled; ovules solitary; stigmas 2-3. Utricle circumcissile. Seeds minute, discoid.

Fl. & Fr.: Jan. - May.

Distr.: Throughout the tropics. Common in wastelands and road sides. *CNS 2535* (Mayithara).

It is used as a laxative and also in the treatment of snake-bites and also a good vegetable.

Amaranthus viridis L., Sp. Pl. (ed.2) 1405. 1763; Roxb., Fl. Ind. 3: 605. 1832; Hook. f., Fl. Brit. India 4: 720. 1885; Gamble, Fl. Pres. Madras 1171. 1925; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 107. 1976; Towns. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1:19. 1980; Mani. & Sivar., Fl. Calicut 243. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1308. 1983; Ramach. & Nair, Fl. Cannanore 378. 1988; Vajravelu, Fl. Palghat Dist. 387. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 377. 1994; Sivar. & Mathew, Fl. Nilambur 561. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 369. 1996. *A. gracilis* Desf., Tabl. Encycl. Bot. 43. 1804. *Euxolus caudatus* Moq. in DC., Prodr. 13: 274. 1849; Wight, Ic. t. 1773. 1852. Kuppacheera.

Erect or diffuse glabrous herbs. Leaves 2-5 x 1.6 - 3.5 cm, deltoid-ovate or rhomboid, base truncate or cuneate, apex obtuse or acute; petiole to 3.5 cm long. Panicles terminal and axillary. Flowers c. 2 mm across. Bracts and bracteoles c. 1.5 mm long, ovate-lanceolate. Male flowers: tepals 3, c. 1.5 mm long, oblong-lanceolate; stamens 3, free. Female flowers: tepals 3; ovary globose; style 2. Utricle indehiscent, compressed, rugose and brownish. Seeds c. 1 mm across, rounded, slightly compressed, dark brown to black.

Fl. & Fr.: Apr. - Jul.

Distr. Tropics and subtropics. Common along way sides and as a weed of cultivated plants. *CNS 1287* (Cherumkari).

Used as a vegetable.

CELOSIA Linnaeus

Sp. Pl. 205. 1753.

Celosia argentea L., Sp. Pl. 205. 1753; Wight, Ic. t. 1767. 1852; Hook. f., Fl. Brit. India 3: 714. 1885; Gamble, Fl. Pres. Madras 1166. 1925; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 107. 1976; Towns. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1:3. 1980; Mani. & Sivar., Fl. Calicut 246. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1309. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 45. 1988; Ramach. & Nair,

Fl. Cannanore 378. 1988; Vajravelu, Fl. Palghat Dist. 387. 1990; Sivar. & Mathew, Fl. Nilambur 562. 1996; ***Beluta-adeca-manien*** Rheede, Hort. Malab. 10: t. 38. 1690.

Erect, annual herbs; stem striate. Leaves 3-9 x 0.5-2.5 cm, elliptic or lanceolate, base cuneate to attenuate, apex acute or acuminate, glabrous; petiole to 2 cm long. Flowers in axillary or terminal, dense spikes, pink turning white. Bract 4-5 mm long, oblong, acute; bracteoles c. 4 mm long, oblanceolate, bidentate, midrib awned between the teeth. Tepals 5, c. 6 x 2.5 mm, elliptic-oblong, hyaline, outer longer, 3-nerved, mucronate, inner smaller. Stamens 5; filaments slender. Stigmas 2-3, very short. Ovules 4-8. Capsule 3-4 mm across, globose, included in perianth. Seeds many, 1-1.5 mm across, lenticular, black, shining.

Fl. & Fr.: Sep.-Oct.

Distr.: Cosmopolitan. Along roadsides and in waste grounds. *CNS 2529* (Eramallur).

CYATHULA Blume

Bijdr. 548. 1826 (*nom. cons.*).

Cyathula prostrata (L.) Bl., Bijdr. 549. 1826; Hook. f., Fl. Brit. India 4: 723. 1885; Gamble, Fl. Pres. Madras 1172. 1925; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 107. 1976; Towns. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 26. 1980; Mani. & Sivar., Fl. Calicut 243. 1982; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 46. 1988; Ramach. & Nair, Fl. Cannanore 379. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 378. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 370. 1996. *Achyranthes prostrata* L., Sp. Pl. ed. 2, 1:296. 1762. *Desmochata prostrata* (L.) DC., Cat. Hort. Monosp. 102. 1813; Wight, Ic. t. 733. 1843. ***Sheru-cadelari*** Rheede, Hort. Malab. 10: 157, t. 79. 1690.

Slender prostrate herbs, rooting at lower nodes; branches ascending. Leaves 1.5 - 3.5 x 1-2.5 cm, ovate or rhomboid, base cuneate, apex acute-apiculate, pubescent on both sides, often pale purplish; petioles 3-8 mm long. Flowers in fasciles, of which 1 or 2 perfect, deflexed in fruit, in terminal spikes. Perianth of perfect flowers calycine, c. 2 mm long, oblong, apiculate, pubescent; of sterile flowers formed of hooked awns. Stamens 5;

filaments fused with alternating lacerate staminodes to form a cup at the base. Ovary minute, 1-celled; ovule 1, pendulous. Utricle c. 1.5 mm across, ovoid. Seed c. 1 mm across, ovoid, brown, shining.

Fl. & Fr.: Oct. - Dec.

Distr.: Paleotropics. Very common in waste ground. *CNS 2536* (Kanjurkavu).

GOMPHRENA Linnaeus

Sp. Pl. 224. 1753.

Diffuse or erect herbs with swollen nodes. Leaves decussate. Spikes terminal and axillary, globose to elongate, subtended by basal leaves. Flowers bisexual, each solitary in the axil of a bract, 2-bracteolate; bracteoles laterally compressed, carinate. Tepals 5, uneuqal, densely lanate; outer 2 larger; inner 3 shorter, basally indurate. Stamens 5, connate below. Ovary 1-ovuled. Utricle irregularly rupturing, thin-walled. Seed ovoid, compressed.

1a. Ascending or diffuse herbs; spikes cylindric, silvery-white; anthers included .... **G. celosioides**

1b. Erect herbs; spikes globose, pink; anthers exserted ..... **G. globosa**

Gomphrena celosioides Martius, Beitr. Amarant. 93. 1825 & Nova Acta Phys. Med. Acad. Caes. Lep.-Carol. Nat. Cur. 13: 30. 1826; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 108. 1976; Towns. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1:53. 1980; Mani. & Sivar., Fl. Calicut 246. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3; 1312. 1983; Vajravelu, Fl. Palghat Dist. 388. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 378. 1994; Sivar. & Mathew, Fl. Nilambur 562. 1996. *G. decumbens* auct., non Jacq., 1805: Gamble, Fl. Pres. Madras 1179. 1925.

Diffuse or ascending herbs; branches spreading, lanate. Leaves 2-5 x 0.8-1.5 cm, oblanceolate or spathulate, base cuneate, apex subacute or obtuse, hairy; petiole to 1.5 cm long. Spikes terminal and axillary, at first subglobose, c. 1.25 cm across, finally elongate and cylindrical, silvery-white; bracts 3-4 mm long, deltoid-ovate, shortly mucronate with

excurrent midrib, scarious; bracteoles similar, acuminate. Tepals 5, 4-5 mm long, narrowly lanceolate, faintly 1-nerved, apex acuminate. Stamens 5; anthers oblong, included. Ovary compressed-globose; style slender. Utricle c. 1 mm across, compressed-pyriform. Seeds compressed-ovoid, brown, faintly reticulate.

Fl. & Fr.: Most of the seasons.

Distr.: Tropics. Along roadsides and waste places. *CNS 2537* (Thumboli).

Gomphrena globosa L., Sp. Pl. 224. 1753; Roxb., Fl. Ind. 2: 63. 1832; Wight, Ic. t. 1784. 1862; Hook. f., Fl. Brit. India 4: 732. 1885; Gamble, Fl. Pres. Madras 1179. 1925; Towns. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1:55. 1980; Mani. & Sivar., Fl. Calicut 246. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1313. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 46. 1988. ***Wadapu*** Rheede, Hort. Malab. 10: 73-74, t. 37. 1690.

Erect annual herbs; branchlets appressed hairy. Leaves 4-8 x 1.5-3.5 cm, obovate-lanceolate, base cuneate, apex subacute or obtuse; petiole to 1 cm long. Spikes terminal, 1.5-2.5 cm across, subglobose, elongate with age, pink; bracts 3-5 mm long, deltoid-ovate, mucronate; bracteoles strongly laterally compressed, scarious, acuminate, 1-nerved. Tepals 5, 5-6 mm long, narrowly lanceolate, 1-nerved, the outer more lanate. Stamens 5; anthers linear, exserted. Ovary subglobose; ovule compressed, reniform; style suberect. Utricle c. 2.5 mm across, oblong-ovoid, compressed. Seeds c. 2 mm across, compressed-ovoid, brown, shining.

Fl. & Fr.: Most of the seasons.

Distr.: A native of Tropical America, now cosmopolitan. A garden escape, now naturalised. *CNS 2538* (Vallikunnam).

95. BASELLACEAE Moquin-Tandon

Chenop. Monogr. Enum. x. 1840.

BASELLA Linnaeus

Sp. Pl. 272. 1753.

Basella alba L., Sp. Pl. 272. 1753;Wight, Ic. t. 896. 1844-45; Mani. & Sivar., Fl. Calicut 247. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1327. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 71. 1988; Harriman in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 1. 1991. B. *rubra* L., Sp. Pl. 272. 1753; Hook. f., Fl. Brit. India 5: 20. 1886; Gamble, Fl. Pres. Madras 1185. 1925. ***Basella*** Rheede, Hort. Malab. 7: t. 24. 1688.

Succulent, climbing perennial herbs, often reddish or purplish. Leaves 2.5-5 x 1.5-3 cm, ovate to orbicular, base rounded to decurrent, apex acute, purplish; petioles 1-2.5 cm long. Flowers small, pinkish, in short axillary spikes; peduncle 5-8 cm long; bracts ovate; bracteoles 2, partly connate with perianth. Perianth 3-4 mm long, urceolate; lobes 5, equal. Stamens 5; filaments c. 1.5 mm long, dilated at the base. Ovary c. 1 mm across, globose. Psudoberry 4-7 x 5-9 mm, dipressed-globose, black, with deep purple juice. Seed 1, globose.

Fl. & Fr.: Dec. - Jan.

Distr.: Native of Tropical Asia and Africa; now widely cultivated. *CNS 2044* (Kappakada).

96. PHYTOLACCACEAE R. Brown

in Tuckey, Narr. Exped. Cango 454. 1818.

RIVINA Linnaeus

Sp. Pl. 121. 1753.

Rivina humilis L., Sp. Pl. 121. 1753; Backer in Steenis, Fl. Males. I, 4: 229. 1951; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1329. 1983; Mohanan & Henry, Fl.

Thiruvananthapuram 378. 994. *Rivina laevis* L., Mant. Pl. 41. 1767; Hook. f., Fl. Brit. India 5: 21. 1886.

Erect herbs or subshrubs; branchlets thinly pubescent. Leaves 3-8 x 1.5-3.8 cm, ovate-lanceolate, base rounded, margins entire to minutely crenulate, apex gradually acute to acuminate; petiole to 3.8 cm long. Racemes terminal and axillary, lax, 5-7.5 cm long. Flowers white, c. 4 mm across; pedicel to 2 mm long; bracts lanceolate. Tepals 4, to 2 mm long, oblong. Stamens 4; filaments c. 1.5 mm long; anthers oblong. Ovary c. 1 mm across, globose; style bent, recurved in fruit. Fruit c. 5 mm across, globose, blood red when ripe. Seed c. 2 mm across, lenticular.

Fl. & Fr.: Most of the seasons.

Distr.: Native in tropical America; naturalized in Sri Lanka, India and Malesia. Common in roadside and other waste places. *CNS 1481* (Edathuva).

97. POLYGONACEAE Juss.

Gen. Pl. 82. 1789.

1a. Tendril climbers; stipules not ocreate ..... **Antigonon**

1b. Plants not climbing; stipules ocreate ..... **Polygonum**

ANTIGONON Endlicher

Gen. 310. 1837.

Antigonon leptopus Hook. & Arn., Bot. Beech. Voy. 308, t. 69. 1841; Gamble, Fl. Pres. Madras 1192. 1925; Bor. & Raiz., Beautif. Ind. Climbers & Shrubs. 265. 1954; Mani. & Sivar., Fl. Calicut 247. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1331. 1983; Ramach. & Nair, Fl. Cannanore 380. 1988; Vajravelu, Fl. Palghat Dist. 391. 1990.

Climbers with the branchlets and rachis of the inflorescence often passing into tendrils. Leaves 5.5-10 x 3.5-5.5 cm, ovate-lanceolate or deltoid, base cordate, apex acuminate, somewhat rugose; petiole to 3 cm long. Flowers axillary racemes, pink or

white; pedicels articulated. Perianth 1-seriate, campanulate, lobes equal or unequal, imbricate. Stamens free, opposite to tepals; anthers 2-celled, parallel, dehiscence longitudinal. Ovary sessile, 1-locular. Nutlet hard. Seed one, erect, albuminous.

Fl. & Fr.: Throughout the year.

Distr.: Indigenous to South America; now widely cultivated in India. *CNS 1195* (Alappuzha town).

POLYGONUM Linnaeus

Sp. Pl. 359. 1753.

Erect or straggling herbs to subshrubs. Leaves alternate; stipules membranous, connate into a tubular ocrea, margins glabrous or ciliate. Flowers bisexual, regular, grouped in capitate clusters or elongate racemes, simple or branched. Bracts and bracteoles membraneous, ocreate. Perianth pink or white, campanulate, lobes 4-5, outer 2 lobes usually smaller. Stamens 4-8, perigynous, alternating with glandular disc-lobes; filaments dilated towards base. Ovary compressed or trigonous, 1-celled; ovules solitary; style 2 or 3 branched; stigma capitate. Fruit a compressed or trigonous nutlet, covered by the persistent perianth.

1a. Inflorescence oblong or subglobose heads; peduncles glandular-hispid; stems angular with recurved prickles ..... **P. strigosum**

1b. Inflorescence of simple or branched spikes or racemes; peduncles not glandular-hispid; stems terete without recurved prickles.

2a. Flowers rose coloured ..... **P. glabrum**

2b. Flowers white coloured.

3a. Bracts and perianth gland-dotted; racemes slender, drooping; bracts more or less distant ..... **P. hydropiper**

3b. Bracts and perianth not gland-dotted; racemes stout and erect; bracts closely imbricate.

4a. Styles 2; nut biconvex; leaves densely strigose tomentose on both sides; bracts hispid ..... **P. pulchrum**

4b. Styles 3; nut trigonous; leaves glabrous except the margins and midrib; bracts glabrous ..... **P. barbatum**

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; Gandhi in Sald. & Nicols., Fl. Hassan Dist.109. 1976; Mani. & Sivar., Fl. Calicut 247. 1982; Ramach. & Nair, Fl. Cannanore 381. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 211. 1988; Vajravelu, Fl. Palghat Dist. 390. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 379. 1994; Sivar. & Mathew, Fl. Nilambur 564. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 371. 1996. *Persicaria barbata* (L.) Hara in Hara, Fl. E. Himalayas 1:70. 1966; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1334. 1983. ***Belutta-modela-muccu*** Rheede, Hort. Malab. 10: 159, t. 80. 1690. ***Velutta-modela-muccu*** Rheede, Hort. Malab. 12: 145, t. 76. 1693.

Stout herbs, to 1.2 m tall, procumbent below. Leaves subsessile, 7-15 x 1.5-2.5 cm, lanceolate, base acute to cuneate, apex acute or acuminate, glabrous except the margins and midribs; ocrea tubular, 1.5-3 cm long, strigose without, mouth truncate, long barbellate. Spikes terminal, paniculate, 3.5-11cm long. Bracts oblong-truncate, ciliate along margins. Perianth white; lobes 5, 2-3 mm long, oblong. Stamens 5. Style-arms 3. Nutlets 3-gonous, included within perianth tube, black on ripening.

Fl. & Fr.: Nov. - Feb.

Distr.: Paleotropics. A common weed in marshy lowlands and along banks of stream and rivers. *CNS 1388* (Kandamangalam).

Polygonum glabrum Willd., Sp. Pl. 2: 447. 1799; Wight, Ic. t. 1799. 1852; Hook. f., Fl. Brit. India 5:34. 1886; Gamble, Fl. Pres. Madras 1189. 1925; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 109. 1976; Mani. & Sivar., Fl. Calicut 247. 1982; Ramach. & Nair, Fl. Cannanore 381. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 212. 1988; Vajravelu, Fl. Palghat Dist. 391. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 379. 1994; Sivar. & Mathew, Fl. Nilambur 565. 1996. *Persicaria glabra* (Willd.) M. Gomez, Ann. Inst. Segunda Enself. Habana 2: 278. 1896; Matthew & Rani in Matthew, Fl. Tam.

Carnatic 3: 1336. 1983; Mani., Fl. Silent Valley 227. 1988. ***Schorann-modela-muccu*** Rheede, Hort. Malab. 12: 147, t. 77.1693 (Plate XXI: A).

Stout herbs. Leaves 5-14 x 1.5-2.5 cm, narrowly lanceolate, base acute or cuneate, apex gradually acuminate; ocrea tubular, 1.5-3 cm long, mouth truncate, long barbellate, smooth; petiole to 1.5 cm long. Spikes terminal or from the upper axils, paniculate, 3.7-11 cm long; pedicels to 3 mm long. Bracts oblong or broadly triangular, margin scarious. Perianth tubular-campanulate, rose coloured; lobes 5, c. 2.5 mm long, oblong, obtuse. Stamens 5. Style-arms 2. Nut biconvex, included within the perianth tube, black on ripening, polished.

Fl. & Fr.: Dec. - Feb.

Distr.: Africa and Indo-Malesia. Common weed in marshy areas, banks of rivers and streams. *CNS 1556* (Muhamma).

Polygonum hydropiper L., Sp. Pl. 361. 1753; Hook. f., Fl. Brit. India 5: 39. 1886; Gamble, Fl. Pres. Madras 1190. 1925; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 111. 1976; Ramach. & Nair, Fl. Cannanore 382. 1988; Vajravelu, Fl. Palghat Dist. 391. 1990; Sivar. & Mathew, Fl. Nilambur 566. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 371. 1996. *Persicaria hydropiper* (L.) Opiz, Sezam 72. 1852.

Stout herbs, procumbent below. Leaves subsessile, 3-7 x 1-2.2 cm, linear-lanceolate, base attenuate, apex acuminate, gland-dotted; ocrea to 1.5 cm long, tubular, glabrous, mouth with a few slender bristles. Racemes to 7 cm long, slender, lax, drooping. Bracts ovate, acute, gland-dotted. Perianth white with pink shades, gland-dotted; lobes 5, c. 2 mm long, ovate-obtuse. Stamens 5. Nuts biconvex.

Fl. & Fr.: Nov. - May.

Distr.: Tropics and W. Europe. Common in marshy grounds along water courses. *CNS 1981* (Angadikkal).

Polygonum pulchrum Bl., Bijdr. 530. 1826; Sant. & Wagh, Bull. Bot. Surv. India 5: 108. 1964; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 112. 1976. *Polygonum tomentosum* Willd., Sp. Pl. 2: 447. 1799, 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 & Rani in Matthew, Fl. Tam. Carnatic 3: 1339. 1983 (Fig. 56).

Stout herbs; stems thick and very hairy. Leaves 6-17 x 2.4-4 cm, elliptic-oblong or lanceolate, base attenuate, apex acuminate, densely strigose tomentose on both sides; petiole 1-2 cm long; ocrea 1.2-2.5 cm long, long-tubular, truncate, strigose, bristle ciliate. Flowers white in panicled racemes, 3.5-7.5 cm long. Bracts hispid and ciliate. Stamens 7-8. Styles 2. Nut c. 3 mm long, biconvex, shining, black.

Fl. & Fr.: Oct. - May.

Distr.: India, Sri Lanka, Tropical and S. Africa and Malesia. *CNS 1283* (Mancombu).

Polygonum strigosum R. Br., Prodr. 420. 1810; Hook. f., Fl. Brit. India 5: 47. 1886; Gamble, Fl. Pres. Madras 1191. 1925 (Fig. 57).

Creeping or suberect herbs; stems angular, the angles beset with small reflexed or recurved barbs or prickles, more so below the nodes. Leaves 3.5-12 x 2-3.5 cm, oblong or linear-oblong, base truncate to hastate, apex acuminate; petiole to 1.4 cm long; ocrea 2-2.5 cm long, long-tubular, truncate, with many excurrent nerves, terminating in erect setae. Flowers 3-4.5 mm across, white, in 6-12 mm long, oblong or subglobose peduncled heads; peduncles 5-15 cm long, panicled, slender, glandular-hispid below the head. Bracts ovate or oblong, strigose and ciliate. Perianth 3-5 mm long, campanulate; tube c. 2 mm long; lobes 5, 2-3 mm long, obovate, obtuse. Stamens 5, alternating with 5, yellow, subulate staminoids; filaments c. 2 mm long; anthers white. Ovary c. 1 mm long, ovoid; style c. 2 mm long, 2-fid; stigma capitate. Nut 1.5-2 mm across, biconvex, reddish-brown to black.

Fl. & Fr.: Nov. - May.

Distr.: India. Bangladesh, Sri Lanka, Malay Archipelago and China. In marshy areas, sometimes floating on aquatic weeds. *CNS 1791* (Edathuva).

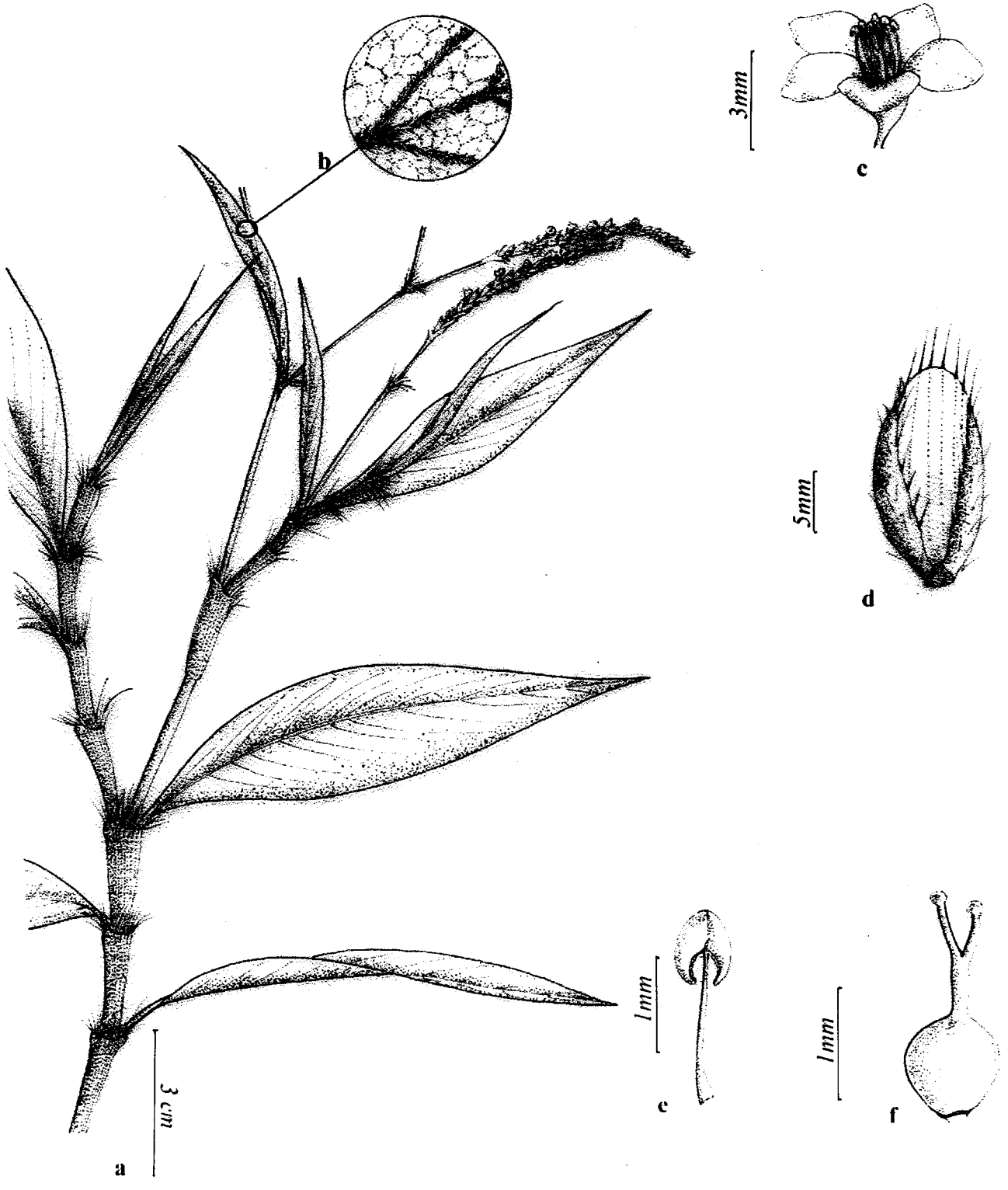


Fig. 56. *Polygonum pulchrum* Bl.: a. Twig ; b. A portion of leaf showing strigose tomentum; c. Single flower; d. Bract; e. Stamen; f. Pistil.

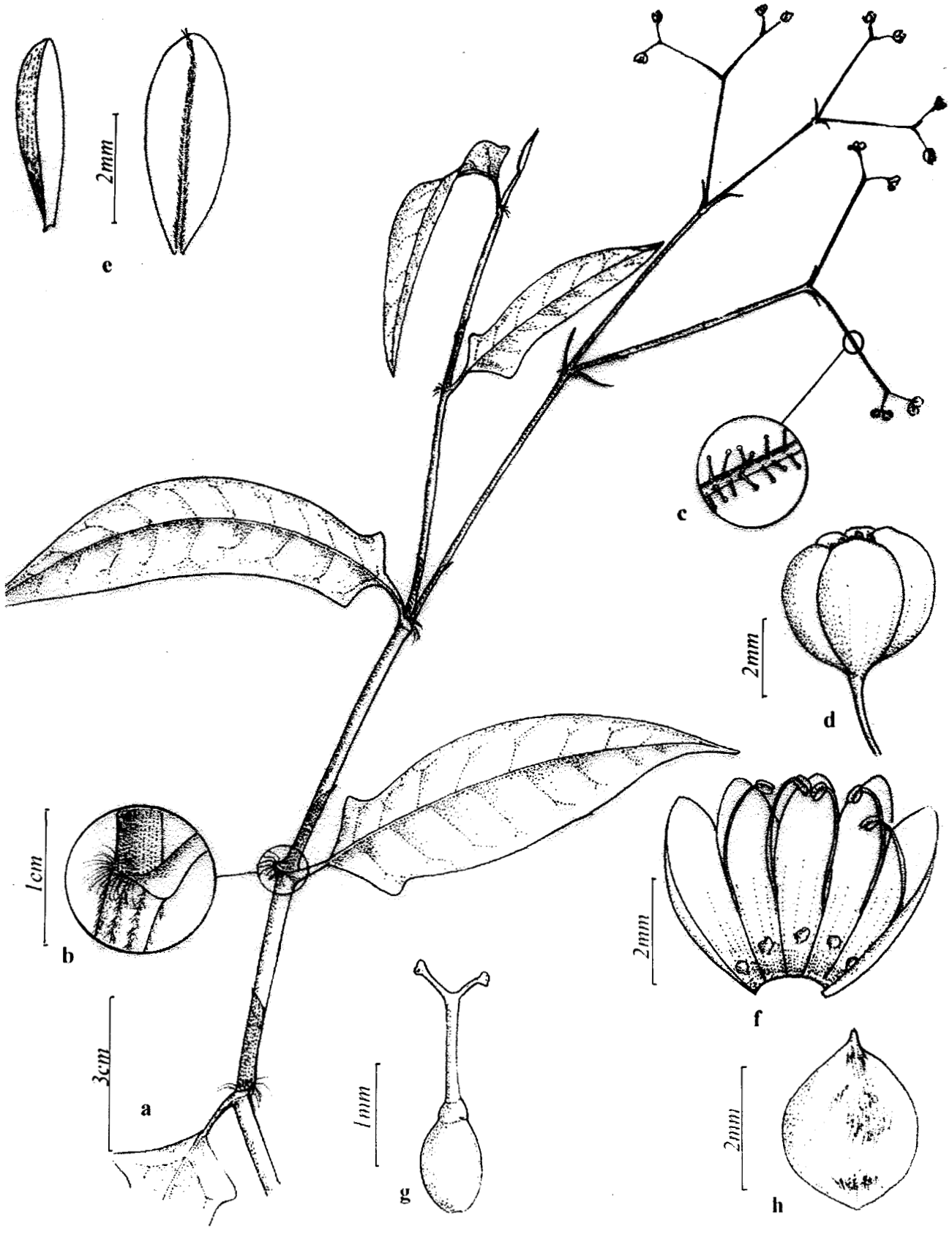


Fig. 57. *Polygonum strigosum* R.Br.: a. Flowering twig; b. Nodal region showing recurved barbs; c. Glandular hairs on peduncle; d. Flower; e. Tepals; f. Corolla, split-open showing stamen & staminodes; g. Pistil; h. Nut.

98. ARISTOLOCHIACEAE Juss.

Gen. Pl. 72. 1789.

ARISTOLOCHIA Linnaeus

Sp. Pl. 960. 1753.

Twining herbs or subshrubs. Leaves alternate, simple; petiole-base dilated. Flowers 3-merous, zygomorphic, in axillary or leaf-opposed racemes, rarely solitary. bracts often large. Perianth tubular; tube inflated below, narrowed above into a cylindric neck and expanded into a dialated oblique limb, 2-3-dentate. Stamens 6, sessile, adnate around the stylar column. Ovary inferior, 6-celled and ridged; ovules many; stigmatic lobes 6, fleshy. Capsule ovoid, drooping, 6-ridged, splitting septicidally to 6 valves at the upper part and hanging like a basket. Seeds many, laterally compressed, winged or not.

1a. Leaves cordiform-reniform, base cordate; flowers solitary ..... **A. grandiflora**

1b. Leaves ovate-lanceolate or ovate-oblong, base truncate; flowers in racemes .... **A. indica**

Aristolochia grandiflora Sw., Nov. Gen. Pl. 126. 1788; Bor & Raiz., Beautif. Ind. Climbers & Shrubs 15. 1954; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1344.1983.

Climbing shrubs. Leaves 8-15 x 10-16 cm, cordiform-reniform, base cordate, sinus broad, apex obtusely acute, glaucous below, 5-nerved from base; petiole to 12 cm long; stipule-like prophyll auriculate, to 3 x3.5 cm. Flowers solitary, 18-26 cm long; pedicels to 16 cm long; bracts auricualte. Perianth-tube to 10 cm long, bent above, with 2 patches of white glandular hairs at the inflated base within; limb 2-lipped, upper lip straight, folded, to 16 x 3 cm, densely scabrous within; lower lip to 4 x 7 cm, broadly cordate, apex, emarginate, separated from mouth by an elongate stalk. Stamens 6; anthers linear. Disc annular, fleshy. Ovary c. 3 cm long; stigmatic lobes 6, lanceolate, spreading, margin rolled back.

Fl. : Jan. - Mar.

Distr.: Native of Central America, Porto Rico and Columbia. Introduced in India. Cultivated in gardens. *CNS 1972* (Cheriyanad), *CNS 2156* (Purakkad).

Aristolochia indica L., Sp. Pl. 760. 1753; Roxb., Fl. Ind. 3: 489. 1832; Hook. f., Fl. Brit. India 5: 75. 1886; Gamble, Fl. Pres. Madras 1202. 1925; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 56. 1976; Mani. & Sivar., Fl. Calicut 248. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1345. 1983; Ramach. & Nair, Fl. Cannanore 383. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 60. 1988; Vajravelu, Fl. Palghat Dist. 394. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 381. 1994; Sasi. & Siavr., Fl. Pl. Thrissur For. 373. 1996. *A. lanceolata* Wight, Ic. t. 1858. 1952. ***Careloe-vegon*** Rheede, Hort. Malab. 8: 49. t. 25. 1688.

Twining perennial herbs; branchlets slender. Leaves 3.5-8 x 2-3.5 cm, ovate-lanceolate or ovate-oblong, base truncate, apex acute to acuminate, glabrous; 3-5-nerved at base; petiole to 2.5 cm long. Flowers in few-flowered axillary racemes; pedicels c. 7 mm long, elongate in fruits. Bracts c. 1.5 mm long, lanceolate. Perianth tube dull brown, 1-1.5 cm long, bulbous base 3-5 mm across, green; limb 2-2.5 cm long, linear-oblong, rounded at apex, greyish-green. Stamens 6. Ovary c. 2 mm long; stigmas 6, fleshy. Capsule 1.5-3 x 1.5-2 cm, globose-pyriform, 6-ridged, dehiscing from the base, after dehiscence parachute-like. Seeds 4-6 mm across, broadly deltoid, flat, winged.

Fl.& Fr.: Jul.-Nov.

Distr.: Sri Lanka and Indo-Malesia. Common in wastelands and roadsides thickets. *CNS 238* (Thankikavala).

The root used as an antidote against snake-bite, bites of poisonous insects, etc.

99. PIPERACEAE C. Agardh

Aphor. Bot. 201. 1824.

1a. Climbing shrubs; spikes leaf-opposed; flowers unisexual; berry globose, smooth ..... **Piper**

1b. Erect herbs; spikes terminal or axillary; flowers bisexual; berry ovoid, ribbed ..... **Peperomia**

PEPEROMIA Ruiz *et* Pavon

Prodr. 8. 1794.

Peperomia pellucida (L.) H.B.K., Nov. Gen. Sp. 1: 64. 1816; Gamble, Fl. Pres. Madras 1210. 1925; Mani. & Sivar., Fl. Calicut 248. 1982; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 299. 1987; Ramach. & Nair, Fl. Cannanore 386. 1988; Vajravelu, Fl. Palghat Dist. 396. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 383. 1994; Sivar. & Mathew, Fl. Nilambur 575. 1996. *Piper pellucidum* L., Sp. Pl. 30. 1753. *Piper exiguum* Bl., Verh. Batav. Genootsch Kunsten 11: 232. 1826. *Peperomia exigua* (Bl.) Miq., Syst. Pip. 77. 1843; Hook. f. , Fl. Brit. India 5: 97.1886. ***Maka-pacha.***

Erect succulent herbs, 5-25 cm tall. Leaves decussate and alternate, 1.5 - 2.5 x 1.5-2 cm, ovate to suborbicular, base cordate, apex shortly acuminate, glabrous, 5-7-ribbed; petiole 0.6-1.8 cm long. Spikes slender, filiform, axillary and terminal, 2-3.5 cm long. 4-5 mm in diameter. Flowers bisexual; bracts c. 0.5 mm wide. Stamens 2. Ovary ovoid. Berry c. 1 mm long, ovoid, sessile, ribbed, reticulate, blackish brown at maturity.

Fl. & Fr. : Throughout the year.

Distr. : Native of tropical America; now Pantropical. Common on moist walls and other wet or moist, shaded localities. *CNS 1743* (Kalliseri).

PIPER Linnaeus

Sp. Pl. 28. 1753.

Climbing shrubs, rooting at nodes; stem thickened and articulated at nodes. Leaves alternate, usually oblique, basally 4-7-ribbed, coriaceous or chartaceous. Spikes

leaf-opposed, solitary, pendulous or erect. Flowers unisexual, or bisexual, sessile, partly embedded in fleshy peduncles, enclosed within bracts. Bracteoles present or 0. Perianth 0. Stamens 2-3; anthers 2-celled. Ovary globose to ellipsoid, 1-celled; ovule solitary; style short or 0; stigmas 2-4. Fruit an ovoid or globose berry, sessile. Seed 1, globose.

1a. Trailors; leaves dimorphic; flowers unisexual, male and female flowers in separate spikes; spikes erect ..... **P. longum**

1b. Climbers with adventitious roots; leaves monomorphic; flowers bisexual; spikes pendulous ..... **P. nigrum**

Piper longum L., Sp. Pl. 29. 1753; Hook. f., Fl. Brit. India 5 : 83. 1886; Gamble, Fl. Pres. Madras 1205. 1925; Mani. & Sivar., Fl. Calicut 248. 1982; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 288. 1987; Ramach. & Nair, Fl. Cannanore 387. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 208. 1988; Vajravelu, Fl. Palghat Dist. 398. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 384. 1994; Sivar. & Mathew, Fl. Nilambur 577. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 376. 1996. *Chavica roxburghii* Miq., Syst. Piper. 239. 1843; Wight, Ic. t. 1928. 1853. ***Cattu-tirpali*** Rheede, Hort. Malab. 7: 27-28, t. 14. 1688. ***Thippali.***

Subshrubs with slender prostrate or ascending shoots, sometimes climbing. Leaves heteromorphic, leaves of sterile shoots 4-10 x 3-6 cm, ovate, base cordate, apex acute or acuminate, membranous, glabrous, basally 5-7-nerved, petiole to 3 cm long; leaves of flowering shoots smaller with oblique base. Male spikes 2-4 cm long, erect, yellow; bracts orbicular-peltate; stamens 2-4. Female spikes 2-3 cm long, erect, yellow; ovary sessile, stigmas 3-5, spreading. Berries c. 2 mm across, globose, partly sunken in the rachis.

Fl. & Fr. : Sep.-Dec.

Distr. : Sri Lanka, India and Malesia. In sacred groves. *CNS 2028* (Mannarasala).

Decocation of fruits mixed in honey is used for cough and throat pain, and fruit used as a spice.

Piper nigrum L., Sp. Pl. 28. 1753; Hook. f., Brit. India 5: 90. 1886; Gamble, Fl. Pres. Madras 1206. 1925; Ramamoorthy in Sald. & Nicols., Fl. Hasssan Dist. 54. 1976; Mani. & Sivar., Fl. Calicut 248. 1982; Matthew & Rani. in Matthew, Fl. Tam. Carnatic 3: 1352. 1983; Huber in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 282. 1987; Mani., Fl. Silent Valley 231. 1988; Ramach. & Nair, Fl. Cannanore 388. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 209. 1988; Vajravelu, Fl. Palghat Dist. 398. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 384. 1994; Sivar. & Mathew, Fl. Nilambur 578. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 376. 1996. ***Molago-codi*** Rheede, Hort. Malab. 7: 23-24, t. 12. 1688. ***Cattu-molago*** Rheede, Hort. Malab. 7:25, t. 13.1688. ***Kurumulaku.***

Climbing shrubs, rooted at swollen nodes. Leaves 9-15 x 6-8 cm, ovate to elliptic-ovate, base truncate or roundedd, apex acuminate, glabrous, coriaceous, black on drying, basally 3-(5)- nerved; petiole to 2.5 cm long. Spikes pendulous, to 6 cm long. Bracts forming a cup below the flowers. Flowers rather close, bisexual. Stamens 2. Ovary globose; style 3-4, recurved. Berry 4-6 mm across, globose, crimson-red when ripe.

Fl. & Fr.: May - Sep.

Distr. : Peninsular India and Sri Lanka. Cultivated. Fruit is the well known spice, black pepper. *CNS 2054* (Puliyoor).

Root powder or its decoction is taken with honey to cure cough, asthma and rheumatism.

100. MYRISTICACEAE R. Br.

Prodr. 399. 1810.

MYRISTICA Gronovius

Fl. Orient. 141. 1755 (*nom. cons.*).

Myristica malabarica Lam., Mem. Acad. Sci. Paris 162. 1788; Hook. f., Fl. Brit. India 5: 103. 1886; Gamble, Fl. Pres. Madras 1213. 1925; Sinclair, Gard. Bull. Singapore 23: 168, t. 9. 1968; Mani. & Sivar., Fl. Calicut 249. 1982; Mani. & Suresh, J. Econ. Tax. Bot. 7: 205. 1985; Mani., Fl. Silent Valley 233. 1988; Nicols., Suresh & Mani., An Interpr. Hort.

Malab. 190. 1988; Vajravelu, Fl. Palghat Dist. 401. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 387. 1994; Sivar. & Mathew, Fl. Nilambur 581. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 378. 1996. ***Panam-palca*** Rheede, Hort. Malab. 4: 9-10, t. 5. 1683.

Trees; bark greenish-black, tuberculate-lenticellate, red inside, exudation red. Leaves 7-14 x 3-4.5 cm, elliptic-oblong, base rounded to broadly attenuate, green above, glaucous beneath, coriaceous; lateral veins slender, 6-8 pairs; petiole to 1.5 cm long. Flowers unisexual in axillary pedunculate cymes; male flowers many; female 2-4 per cyme. Perianth creamy-white, 4-5 mm long, ovoid, glabrous, 3-lobed. Anthers 10-20. Drupe 5-7 x 1-2.5 cm, oblong, tomentose, aril orange-red, completely covering the seed.

Fl. & Fr.: Dec.-Apr.

Distr.: Konkan Southwards; endemic, very rare. In certain sacred groves. *CNS 2320* (Cherthala), *CNS 2411* (Elanmelvallikavu).

101. LAURACEAE Juss.

Gen.. Pl. 80. 1789.

1a. Leafless, hemi-parasitic, green climbers ..... **Cassytha**

1b. Leafy shrubs or trees.

2a. Leaves opposite or sub-opposite, 3-nerved from base ..... **Cinnamomum**

2b. Leaves alternate, penninerved.

3a. Flowers unisexual, aggregated in umbels ..... **Litsea**

3b. Flowers bisexual, aggregated in panicles ..... **Persea**

CASSYTHA Linnaeus

Sp. Pl. 35. 1753.

Cassytha filiformis L., Sp. Pl. 35. 1753; Roxb., Fl. Ind. 2: 314. 1832; Wight, Ic. t. 1847. 1852; Hook f., Fl. Brit. India 5: 188. 1886; Gamble, Fl. Pres. Madras 1241. 1925; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 46. 1976; Mani. & Sivar., Fl. Calicut 250. 1982; Mathew & Rani in Matthew, Fl. Tam. Carnatic 3: 1358. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 157. 1988; Ramach. & Nair, Fl. Cannanore 392. 1988; Mohanan

& Henry, Fl. Thiruvananthapuram 397. 1994. ***Acatsja-valli*** Rheede, Hort. Malab. 7: t. 44. 1688 (Plate XXI: B).

Leafless, parasitic twiners; stem filiform, cord-like, twined, branched, dark green or yellow. Flowers in terminal or axillary spikes, white, bisexual, sessile; peduncles 3-5 cm long; bracteoles 3. Perianth lobes 6, free, unequal; outer 3 smaller, c.1 mm long, ovate-orbicular; inner lobes 2-3 mm long, obovate. Fertile stamens 6-9, operculate; the third row with a pair of glands on the filaments; staminodes 3. Stigma capitate. Drupe 6-10 mm across, globose, white, enclosed within inflated perianth, crowned by lobes, black. Seed 1, globose.

Fl. & Fr. : Sep.- Dec.

Distr. Sri Lanka, India, Bangladesh, Tropical Africa and America. Parasite on various bushes. *CNS 2478* (Thiruvizha), *CNS 1218* (Kanichukulangara).

CINNAMOMUM Schaeffer

Bot. Exped. 74. 1760 (*nom. cons.*).

Small to medium sized trees, usually aromatic. Leaves alternate to sub-opposite, prominently 3-5-ribbed from base. Inflorescence axillary or subterminal cymose panicles. Flowers bisexual. Tepals 6, in two rows of 3 each, basally connate to a short perianth tube, often persistent. Stamens 9 perfect, in 3 rows, inner most row with stalked glands on filaments; anthers of 2 outer rows 4-celled, introrse; of inner row 2-celled, extrorse; a whorl of 3 staminodes persent inner to inner most row of stamens. Ovary superior, 1-celled; ovule 1; style short; stigma peltate or triangular. Berry fleshy, subtended by persistent cup-like perianth tube. Seed 1, globose to ellipsoid.

1a. Leaves 12-25 cm long; young leaves and panicles pubescent ..... **C.malabatrum**

1b. Leaves 7-15 cm long; young leaves and panicles glabrous ..... **C. verum**

Cinnamomum malabatrum (Burm. f.) Bl., Rumphia 1: 38, t. 13. f. 3-4. 1836; Kosterm., Bull. Bot. Surv. India 25: 102. 1983(1985); Mani., Fl. Silent Valley 235. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 157. 1988; Vajravelu, Fl. Palghat Dist. 403.

1990; Mohanan & Henry, Fl. Thiruvananthapuram 392. 1994; Sivar. & Mathew, Fl. Nilambur 583. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 380. 1996. *Laurus malabatrum* Brum. f., Fl. Ind. 92. 1768. *Cinnamomum iners* auct., non Blume, 1826: Hook. f., Fl. Brit. India 5: 130. 1886; Gamble, Fl. Pres. Madras 1224. 1925. ***Katou-karua*** Rheede, Hort. Malab. 5: 105-106, t. 53. 1685. ***Vayana.***

Small to medium sized trees; bark smooth, reddish-brown, dull red inside, aromatic. Leaves 12-25 x 5-8 cm, oblong or elliptic-oblong, base rounded, apex acute or obtuse, glabrous and glossy, coriaceous, tender leaves often pinkish-red and pubescent, 3-ribbed from base; pedicels to 1.2 cm long. Panicles terminal and axillary, to 25 cm long, minutely pilose. Flowers yellowish. Perianth lobes tomentose, fleshy, ovate. Staminal filaments glandular. Ovary ellipsoid; stigma obliquely peltate. Berry upto 10 x 8 mm, ellipsoid, on a deep perianth-cup, bluish-black.

Fl. & Fr. : Jan.-May.

Distr. : Western Ghats; endemic. Common in sacred groves and waste places. *CNS 1394* (Kayamkulam).

Cinnamomum verum Presl., Rostl. 2: 36. 1825; Kosterm., Bibl. Laur. 360. 1864; Reinwardtia 7: 141. 1965 & Bull. Bot. Surv. India 25: 126. 1983 (1985); Mani. & Sivar., Fl. Calicut 250. 1982; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 158. 1988; Ramach. & Nair, Fl. Cannanore 393. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 392. 1994; Sivar. & Mathew, Fl. Nilambur 585. 1996. *C. zeylanicum* Garc. ex Bl., Bridjr., 568. 1826; Wight, Ic. t. 123. 1839; Hook. f., Fl. Brit. India 5: 131. 1886; Gamble, Fl. Pres. Madras 1224. 1925. ***Carua*** Rheede, Hort. Malab. 1: t. 57. 1678. ***Karukapatta***

Trees; bark light brown with a strong, pleasant cinnamon smell and burning taste; young shoots bright light-red. Leaves 7-15 x 3.5-6 cm, elliptic-oblong, base cuneate, apex acute or shortly acuminate, 3-5-nerved from base, shining above and glaucous beneath, coriaceous; petiole to 1 cm long. Flowers small, yellowish-green, in terminal panicles; peduncle glaberscent, to 4.5 cm long. Perianth lobes 6, c. 8 mm long, campanulate; lobes

upto 3 mm long, oblong-lanceolate, subacute, persistent. Perfect stamens 9. Berry upto 1.2 cm long, ellipsoid or oblong-ovoid, dark purple.

Fl. & Fr.: Mar.-Apr.

Distr. : South West India, Sri Lanka and Myanmar. Widely cultivated. *CNS 2618* (Choolatheruvu).

Bark and leaves which are used as spices and medicines.

LITSEA Lamarck

Encycl. Meth. Bot. 3: 574. 1792 (*nom. cons.*).

Litsea coriacea (Heyne ex Meisn.) Hook. f., Fl. Brit. India 5: 166. 1886; Gamble, Fl. Pres. Madras 1236. 1925; Mani. & Sivar., Fl. Calicut 251. 1982; Ramach. & Nair, Fl. Cannanore 397. 1988; Mani., Fl. Silent Valley 236. 1988; Vajravelu, Fl. Palghat Dist. 404. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 394. 1994; Sivar. & Mathew, Fl. Nilambur 586. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 382. 1996. *Tetranthera coriacea* Heyne ex Meisn. in DC., Prodr. 15: 186. 1864. ***Maravattithali***

Small tress; bark pale brown, thinly scaly. Leaves 10-15 x 4-6 cm, oblong to narrowly elliptic, base acute, apex acute or acuminate, glabrous and glossy above, dull below, coriaceous; petiole c. 1 cm long. Flowers in axillary to leaves or leaf scars, subsessile umbellules. Involucral bracts 4-6, c. 1 mm, ovate-rounded. Perianth tube silky, lobes 6. Male flowers: stamens 9-12, in 3-4 rows, glands yellow. Female flowers: ovary globose, minute. Berry 4-5 mm across, ovoid, seated on cupular, entire perianth tube. Seeds 3-4 mm across.

Fl. & Fr.: Dec.-Mar.

Distr.: Endemic to Western Ghats. Common in waste lands, along fences and in sacred groves. *CNS 2479* (Vallikavu at Chengannur), *CNS 1510* (Chengannur).

PERSEA P. Miller

Gard. Dict. Abr. ed. 4. 1754 (*nom. cons.*).

Persea macrantha (Nees) Kosterm., Reinwardtia 6: 193. 1962 & 7: 537. 1969; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 49. 1976; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1363. 1983; Ramach. & Nair, Fl. Cannanore 397. 1988; Vajravelu, Fl. Palghat Dist. 407. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 397. 1994; Sivar. & Mathew, Fl. Nilambur 588. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 383. 1996. *Machilus macrantha* Nees in Wall., Pl. Asiat. Rar. 2: 70. 1831 & 3: 31. 1831; Wight, Ic. t. 1824. 1852; Bedd., Fl. Sylv. t. 264. 1872; Hook. f., Fl. Brit. India 5: 140. 1886. *Machilus glaucescens* Wight, Ic. t. 1825. 1852.

Trees; bark rough, pale brown, pinkish inside. Leaves clustered towards apex of branchlets, 4-15 x 2-5 cm, elliptic to oblong-lanceolate, base obliquely attenuate, apex obtuse, glaucous below, coriaceous; petiole to 2.5 cm long. Inflorescence axillary or terminal panicles. Perianth pale yellow, glabrous; lobes 6 in 2 rows, 4-5 mm long. Stamens 9, in 3 rows, firtst and second rows opposite to perianth, introrse, 3rd row opposite to first row, extrorse; staminodes present as 4th row; filaments pubescent; anthers 4-celled. Ovary 1-1.5 mm across, obovoid; stigma discoid. Berry 1-1.5 cm across, globose, seated on persistent perianth, purple when ripe. Seeds globose 6-8 mm across.

Fl. & Fr. : Dec. - Apr.

Distr. : Peninsular India and Sri Lanka. Rare. In waste lands and in sacred groves. *CNS 2619* (Aroor), *CNS 1594* (Vandanam).

102. LORANTHACEAE A.L. Jussieu

Ann. Mus. Natl. Hist. Nat. 12: 293. 1808.

1a. Leaves opposite decussate; corolla white, tube split lengthwise towards one side, lobes spirally twisted ..... **Helicanthes**

1b. Leaves alternate to sub-opposite; corolla pink, tube not split lengthwise, lobes not spirally twisted ..... **Dendrophthoe**

DENDROPHTHOE C.F.P. Martius

Flora 13: 109. 1930.

Dendrophthoe falcata (L.f.) Ettingsh., Denkschr. Kaiserl. Akad. Wiss. Math.-Naturwiss. Kl. 32: 52, 53, 58, t. 13, f. 14. 1872; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 305. 1976; Mani. & Sivar., Fl. Calicut 252. 1982; Mattehw & Rani in Matthew, Fl. Tam. Carnatic 3: 1372. 1983; Wiens in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6 : 134. 1987; Ramach. & Nair, Fl. Cannanore 399. 1988; Mani., Fl. Silent Valley 239. 1988; Vajravelu, Fl. Palghat Dist. 409. 1990; Mohannan & Henry, Fl. Thiruvananthapuram 399. 1994; Sivar. & Mathew, Fl. Nilambur 591. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 385. 1996. *Loranthus falcatus* L. f., Suppl. Pl. 211. 1781. *L. longiflorus* Desr. in Lam., Encycl. 3: 598. 1792; Hook. f., Fl. Brit. India 5: 214. 1886; Gamble, Fl. Pres. Madras 1253. 1925. *L. amplexifolius* DC., Prodr. 4: 305. 1830. *L. longiflorus* Desr., var. *falcata* (L.f.) Kurz, For. Fl. Burma 2 : 321. 1877; Hook. f., Fl. Brit. India 5: 215. 1886; Gamble, Fl. Pres. Madras 1253. 1925. ***Valli- Itticanni*** Rheede, Hort. Malab. 10: 5, t. 4. 1690. **Itti-Kanni.**

Stem woody, terete, lenticellate. Leaves subopposite, 5-10 x 3-4.5 cm, ovate-oblong to lanceolate, base turncate, obtuse or cordate, apex acute or obtuse, thickly coriaceous; petiole 2-3 mm long or absent. Inflorescene axilliary and lateral, curved racemes, 3-5 cm long, many-flowered; pedicels c. 3 mm long. Calyx 2-3 mm long, turncate. Corolla tube pink, 2.5-3.5 cm long, curved, slender at base, widening to top; lobes green, 0.7-1 cm long, c. 2 mm wide, linear, recurved. Filaments bright red, c. 4 mm long; anthers yellow, linear-oblong. Ovary 2-3 mm long. Berry 1-1.5 x 0.3-0.4 cm, oblong, crimson.

Fl. & Fr. Most of the seasons.

Distr.: Indo-Malaysia. *CNS 1046* (Vandanam), *CNS 1746* (Thakazhy). This is common parasite, living usually on a variety of hosts.

HELICANTHES Danser

Verh. Kon. Ned. Akad. Wetensch. Afd. Natuurk., Tweede Sect. 29(6): 55. 1933.

Helicanthes elastica (Desr.) Danser, Verh. Kon. Ned. Akad. Westensch. Afd. Natuurk., Tweede Sect. 29(6): 55. 1933; Mani. & Sivar., Fl. Calicut 253. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1373. 1983; Mani., Fl. Silent Valley 239. 1998; Vajravelu, Fl. Palghat Dist. 410.1990; Sasi. & Sivar., Fl Pl. Thrissur For. 385. 1996. *Loranthus elasticus* Desr. in Lam., Encycl. 3: 599. 1792; Wight, Ic. t. 343. 1840; Hook. f., Fl. Brit. India 5: 216. 1886; Gamble, Fl. Pres. Madras 1254. 1925. *Dendrophthoe elasticus* (Desr.) Danser, Bull. Bot. Buitenzorg Ser. 3, 10: 308. 1929; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 165. 1988. ***Velutta-itti-canni*** Rheede, Hort. Malab. 10: 7. t. 3. 1690. **Itti-Kanni.**

Semi-parasitic dichotomously branched subshrubs; branchlets woody, swollen at nodes. Leaves 4-8 x 1.5-4 cm, ovate or elliptic-oblong, base obtuse or truncate, apex acute or obtuse, thickly coriaceous, basally 3-nerved. Flowers aggregated in short axillary fascicles. Calyx minute, flask-shaped, margin truncate. Corolla white with green stripes, 3-3.5 cm long, split lengthwise into 5 linear, twisted lobes. Stamens 5, exserted, filaments crimson. Ovary c. 1.5 mm long; style 3-3.5 cm long; stigma ovoid. Berry 6-8 x 3-3.5 mm, obovoid, red.

Fl. & Fr. : Dec. - Apr.

Distr. : Peninsular India. Parasitic commonly on *Mangifera indica* L. *CNS 1870* (Ezhupunna).

103. SANTALACEAE R. Br.

Prodr. 350. 1810.

SANTALUM Linnaeus

Sp. Pl. 349. 1753.

Santalum album L., Sp. Pl. 349. 1753; Roxb., Fl. Ind. 1: 462. 1820; Hook. f., Fl. Brit. India 5: 231. 1886; Gamble, Fl. Pres. Madras 1261. 1925; Gandhi in Sald. & Nicols., Fl.

Hassan Dist. 304. 1976; Mani.& Sivar., Fl. Calicut 254. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1381. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 235. 1988; Ramach. & Nair., Fl. Cannanore 402. 1988; Vajravelu, Fl. Palghat Dist. 414. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 401. 1994; Sivar. & Mathew, Fl. Nilambur 598. 1996. ***Malla-katou-tsjambou***, Rheede, Hort. Malab. 4: 17-18, t. 8. 1683. ***Chandanam***.

Trees, hemiparasitic on the roots of a variety of plants; bark dark-grey, rough, heart wood strongly scented. Leaves opposite below, alternate above, 2.5-6.5 x 1.6-3 cm, elliptic or elliptic-ovate or ovate-lanceolate, base obtuse, apex obtuse, acute or subacute, glaucous beneath, subcoriaceous; petiole 1-1.5 cm long. Flowers in terminal and axillary,trichotomous paniculate cymes, 5-merous, c. 4.5 mm across, initially pale then brownish-purple. Perianth lobes 5, c. 3 mm long, ovate, thin-fleshy, basally connate into a campanulate tube, minutely ciliate. Stamens 5; filaments c. 1 mm long. Disc-lobes very thick. Ovary c. 1 mm across, globose; ovules 2-3, pendulous; stigma 3-lobed. Drupe c. 1 cm across, globose or ovoid, black.

Fl. & Fr.: Dec. - Mar.

Distr.: Peninsular India. In waste lands. *CNS 2087* (Neerkunnam).

The fragrant timber is used in several medicines and for religious purposes.

104. EUPHORBIACEAE Juss.

Gen. Pl. 384. 1789.

1a. Inflorescence a cyathium; tepals absent or minute; stamen 1; filaments jointed to a pedicel; pistils stalked.

2a. Cyathia actinomorphic, green or reddish ..... **Euphorbia**

2b. Cyathia obliquely zygomorphic, scarlet red ..... **Pedilanthus**

1b. Inflorescence other than a cyathium; tepals usually conspicuous; stamens 2 to many; filaments not jointed; pistils subsessile.

3a. Cells of ovary 2-ovuled.

4a. Petals present; calyx-lobes valvate ..... **Bridelia**

4b. Petals absent; calyx-lobes imbricate in bud.

5a. Flowers in spikes or racemes.

6a. Disc present; ovary 1-celled; fruit compressed drupe; male raceme erect ..... **Antidesma**

6b. Disc absent; ovary 2-3-celled; fruit a capsule, split-opening irregularly, not compressed; male flowers in catkin-like spikes ..... **Aporosa**

5b. Flowers in axillary clusters.

7a. Tepals gland-dotted; leaves subsucculent ..... **Sauropus**

7b. Tepals not gland-dotted; leaves otherwise.

8a. Stigma semi-orbicular, peltate or dilated fleshy; fruit 1-seeded; leaf margins crenate or serrulate ..... **Drypetes**

8b. Stigma otherwise; fruit more than 1-seeded; leaf margins entire.

9a. Disc absent; leaves above 6 cm long and 3.5 cm broad ..... **Glochidion**

9b. Disc present; leaves below 6 cm long and 3 cm broad.

10a. Disc combined with the calyx-lobes; anthers adnate to the column; calyx of male turbinate, of female spreading ..... **Breynia**

10b. Disc not combined with the calyx-lobes; anther not adnate to the column; calyx of both the male and female flowers spreading.

11a. Plants dioecious; pistillodes 3 ..... **Securinega**

11b. Plants monoecious; pistillodes absent ..... **Phyllanthus**

3b. Cells of ovary 1-ovuled.

12a. Climbers with stinging hairs ..... **Tragia**

12b. Erect or diffuse herbs to trees.

13a. Perianth 2-seriate; inner tepals longer than outer, usually petaloid in male flowers.

14a. Erect herbs; filaments inflexed in bud; inflorescence a raceme; leaves ovate or ovate-lanceolate ..... **Croton**

14b. Erect shrubs to trees; filaments, short, straight; inflorescence a panicle; leaves orbicular or 3-5-lobed.

15a. Dioecious trees; branchlets, inflorescence and under surface of leaves covered with soft, white-stellate tomentum; petals connate; fruit a 1-seeded drupe; stamens 13-20; filaments villous at base ..... **Givotia**

15b. Monoecious shrubs; branchlets, inflorescence and leaves not white-stellate tomentose; petals free; fruit a 3-valved capsule, 3-seeded; stamens 8-10; filaments glabrous at base ..... **Jatropha**

13b. Perianth 1-seriate; tepals sepaloid (except in *Manihot* and *Hevea*).

16a. Leaves trifolioate ..... **Havea**

16b. Leaves simple or palmatifid of lobed.

17a. Anthers vermiculiform or linear; style laciniate .... **Acalypha**

17b. Anthers not vermiculiform or linear; style not laciniate.

18a. Herbs, erect or diffuse.

19a. Capsule with 2 rows of spines on the cocci; flowers in erect axillary spikes; leaves oblong-lanceolate; petiole to 3 mm long ..... **Sebastiania**

19b. Capsule smooth; flowers in interrupted, axillary, drooping racemes; leaves ovate or ovate-lanceolate; petiole to 2.5 cm long ..... **Micrococca**

18b. Erect or scandent shrubs or trees.

20a. Stamens indefinite, more than 20.

21a. Leaves palmately 6-8-lobed, margins coarsely serrate; filaments connate and repeatedly branched; capsule prickly ..... **Ricinus**

21b. Leaves not lobed, margins entire; filaments free and not branched; capsule not prickly, if echinate then leaves and capsule tawny tomentose.

22a. Fruit a capsule, 3-lobed, dehiscent; inflorescence erect; styles plumose .... **Mallotus**

22b. Fruit a drupe, subglobose, indehiscent; inflorescence pendulous; styles linear .... **Trevia**

20b. Stamens definite, 2-10.

23a. Latex milky; anthers 2-celled; ovary 3-celled; capsule 3-celled and 3-seeded, glabrous and smooth.

24a. Leaves palmatifid or palmatipartite, lobes 3-7; stamens 10; tepals 5, petaloid; disc flat, 10-lobed; petiole 10 cm or more long .... **Manihot**

24b. Leaves not lobed; stamens 3; tepals 3, much reduced; disc absent; petiole upto 3 cm long ..... **Excoecaria**

23b. Latex watery; anthers 4-celled; ovary 1-celled; capsule 1-celled and 1-seeded, glandular-pubescent and echinate when young ..... **Macaranga**

ACALYPHA Linnaeus

Sp. Pl. 1003. 1753.

Monoecious or dioecious herbs or shrubs. Leaves crenate to serrate. Flowers in terminal or axillary spikes, racemes or panicles; female flowers usually at the base of inflorescence, sometimes separate. In male flowers perianth lobes 4. Stamens usually 8. Female flowers with large bracts, lanceolate or 3-5-fid. Perianth lobes 3-6, imbricate. Ovary 3-lobed, 3-celled; cells 1-ovuled; styles 3, stigma 2-many fid. Capsule of 3 bivalved cocci; seeds smooth, globose.

1a. Shrubs.
  2a. Dioecious; female spikes pendulous, red, upto 24 cm long; leaves not glandular and aromatic ..... **A. hispida**
  2b. Monoecious; spikes erect, yellowish, upto 2 cm long; leaves glandular and aromatic ..... **A. fruticosa**

1b. Annual herbs.
  3a. Male and female flowers on separate spikes; female spikes branched, terminal; male spikes unbranched, axillary; female flowers pedicelled ..... **A. racemosa**
  3b. Male and female flowers on same spike, female flowers below, male ones above, all axillary.
    4a. Bracts longer than the capsules.
      5a. Bracts with gland-tipped hairs; leaf-lamina hispid, longer than the petiole; rachis of spike not ending in a triradiate hood .... **A. malabarica**
      5b. Bracts not glandular hairy; leaf-lamina glabrous, as long as or shorter than the petiole; rachis of spike ending in a triradiate hood .. .. **A. indica**
    4b. Bracts shorter than the capsules ..... **A. lanceolata**

Acalypha fruticosa Forssk., Fl. Aeg.-Arab. 161. 1775; Hook. f., Fl. Brit. India 5: 415. 1887; Gamble, Fl. Pres. Madras 1331. 1925; Mani. & Sivar., Fl. Calicut 269. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 146. 1983; Ramach. & Nair, Fl. Cannanore 406. 1988;

Nicols., Suresh & Mani., An Interpr. Hort. Malab. 104. 1988; Vajravelu, Fl. Palghat Dist. 418. 1990; Sivar. & Mathew, Fl. Nilambur 601. 1996. *Perim-munja* Rheede, Hort. Malab. 9: t. 75. 1689.

Erect profusely branched shrubs. Leaves 2-5 x 1-3 cm, ovate, base truncate or subcordate, margin crenate-serrate, apex acuminate, hairy on both sides, aromatic, glandular below, glands orange; petiole to 3 cm long. Spikes short, axillary, solitary, androgynous, to 2 cm long. Tepals tomentose, with sessile glands outside. Stamens many; anthers sub-globose to oblong. Female flowers below, sessile; bracts reniform, margin dentate; ovary to 0.5 mm across; styles many. Capsules trilobed.

Fl. & Fr.; Dec.-Mar.

Distr.: Tropical Africa, Peninsular India and Myanmar. Often grown in hedges. *CNS 2394* (Kurathikadu).

Acalypha hispida Burm. f., Fl. Ind. 303, t. 61, f. 1. 1768; Hook. f., Fl. Brit. India 5: 417. 1887; Bailey, Man. Cult. Pl. 621. 1949; Airy Shaw, Kew Bull. 26: 206. 1972; Mani. & Sivar., Fl. Calicut 268. 1982; Rani in Matthew, Fl. Tam. Carnatic 3:1408. 1983.

Much branched dioecious shrubs. Leaves to 18 x 9 cm, broadly ovate, base rounded or subcordate, margin serrate, apex acuminate, pubescent on both sides; petiole to 6 cm long. Female spikes to 24 cm long, cylindric, pendulous, bright crimson-red; styles branched; ovary villous. Male plants not seen.

Fl..: Throughout the year.

Distr.: India, Myanmar and Sri Lanka. Commonly grown as ornamental in gardens. *CNS 2148* (Thumbapuram).

Acalypha indica L., Sp. Pl. 1003. 1753; Hook. f., Fl. Brit. India 5: 416. 1887; Gamble, Fl. Pres. Madras 1330. 1925; Airy Shaw, Kew Bull. 26: 206. 1972; Mani. & Sivar., Fl. Calicut 269. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1408. 1983; Nicols., Suresh &



Plate XXI. *A. Polygonum glabrum* Willd.; B. *Cassytha filiformis* L.;
C. *Sauropus bacciformis* (L.) Airy Shaw; D. *Euphorbia rosea* Retz.

Mani., An Interpr. Hort. Malab. 104. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 405. 1994; Sivar. & Mathew, Fl. Nilambur 602. 1996.

Annual herbs, to 60 cm tall; stem striate, pubescent. Leaves 1.2-6.5 x 1-3.8 cm, broadly ovate, base rounded to shortly attenuate, margin crenate-serrate, apex acute or obtuse, basally 5-nerved; petiole 1.5-5.5 cm long. Spikes axillary, 2.5-6.2 cm long, monoecious, rachis ending in a triradiate hood at the tip. Male flowers above, ebracteate, minute, clustered; anthers vermiculiform. Female flowers below subtended by foliaceous, 3-7 mm long, suborbicular-cuneiform, many-nerved, toothed bracts; ovary hispid, 3-lobed; styles 3, each 2-fid. Capsules 3-valved, concealed by bract, hispid.

Fl. & Fr.: Jul.-Dec.

Distr.: Tropical Africa, Sri Lanka, India, Myanmar and Philippines. A common weed in moist or wet places. *CNS 1132* (Vandanam), *CNS 1459* (Alappuzha town).

Acalypha lanceolata Willd., Sp. Pl. 4: 524. 1805; Gamble, Fl. Pres. Madras 1331. 1925; Mani. & Sivar., Fl. Calicut 269. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1408. 1983; Brahmam & Saxena, J. Bombay Nat. Hist. Soc. 81: 509. 1984; Ramach. & Nair, Fl. Cannanore 406. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 405. 1994. *Acalypha fallax* Muell.-Arg., Linnaea 34: 43. 1865; Hook. f., Fl. Brit. India 5: 416. 1887.

Annual erect herbs, 15-45 cm tall; stems often clothed with long silky deciduous hairs. Leaves 2.5-6 x 1.2-3 cm, ovate, ovate-oblong or lanceolate, base rounded or subacute, margins serrate-dentate, apex acute or subactue, membranous, pubescent; petiole 2.5-4.5 cm long. Spikes axillary, solitary, 2-3 cm long; peduncle 2-3.5 cm long. Male flowers upper most and few. Female flowers below, 6 or more, lax; bracts 1.5-2 mm long, glandular-pubescent or hispid, shorter than capsule. Capsule hispid with glandular-based hairs.

Fl. & Fr.: Jun.-Sep.

Distr.: Peninsular India, Sri Lanka, Myanmar, Java and Sumatra. A common weed in waste places and roadsides. *CNS 1350* (Alappuzha beach).

Acalypha malabarica Mueller, Linnaea 34: 42. 1865; Hook. f., Fl. Brit. India 5: 416. 1887; Gamble, Fl. Pres. Madras 1330. 1925; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 330. 1976; Mani. & Sivar., Fl. Calicut 269. 1982.

Annual erect tomentose herbs upto 50 cm tall. Leaves 3-7 x 1.4-4 cm, ovate or ovate-deltoid, base rounded to truncate, margins crenate-serrate, apex acute, pubescent on both surfaces, basally 3-5-ribbed, membranous; petiole 1.5-4.5 cm long; stipules c. 3 mm long, linear, ciliate. Spikes axillary, 1-3 cm long, shorter than petiole. Male flowers terminal, few; pedicels c. 1 mm long, jointed at the middle; bractsc. 0.5 mm long, ovate, ciliate; perianth 4, free, c. 0.5 mm long, ovate, concave, dorsally muricate. Female flowers basal; bracts 1.5-3 mm long, folded, toothed, glandular hispid; ovary c. 1 mm long, pubescent; style 3, each 3-fid with unequal lobes. Capsule 2-2.5 mm across; trigonous; hispid, bracts longer than the capsules. Seeds c. 1.5 x 1 mm, obovoid, reddish-brown.

Fl. & Fr.: Jul.-Dec.

Distr.: Central and Peninsular India. Fairly common in waste lands and roadsides. *CNS 2571* (Alappuzha town).

Acalypha racemosa Heyne ex Baill., Etud. Gen. Euphorb. 443. 1858; Mani. & Sivar., Fl. Calicut 270. 1982; Ramach. & Nair, Fl. Cannanore 407. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 104. 1988; Vajravelu, Fl. Palghat Dist. 418. 1990; Sivar. & Mathew, Fl. Nilambur 602. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 391. 1996. *Acalypha paniculata* Miq., Fl. Med. Ind. 1(2): 406. 1859; Hook. f., Fl. Brit. India 5: 415. 1887; Gamble, Fl. Pres. Madras 1330. 1925; Airy Shaw, Kew Bull. 32(2): 247. 1981; Rani in Matthew, Fl. Tam. Carnatic 3: 1409. 1983; Mani., Fl. Silent Valley 243. 1988. ***Pee-cupameni*** Rheede, Hort. Malab. 10: 163, t. 82. 1690. ***Welia-cupameni*** Rheede, Hort. Malab. 10: 165, t. 83. 1690.

Erect herbs to 1 m tall; branchlets minutely pubescent. Leaves 4-8 x 2-5 cm, broadly ovate, base rounded or subcordate, margin crenate-serrate, apex acuminate, sparsely hispid, membranous, basally 3-(5) nerved; petiole to 7 cm long. Flowers

monoecious. Male flowers in slender axillary spikes, 6-10 cm long, flowers very minute; tepals 4; stamens 8 on a convex receptacle, anthers linear. Female flowers in terminal panicles; bracts minute,ovate; tepals 3-6; ovary 3-lobed, 3-locular; ovule 1-per locule; styles filiform in 3 groups of 3 each. Capsules 1.5-2 mm across, with 3 cocci. Seeds globose.

Fl. & Fr.: Jul.-Dec.

Distr.: Tropical Africa to Indo-Malaysia. In moist shady areas. *CNS 1890* (Venmony).

ANTIDESMA Linnaeus

Sp. Pl. 1027. 1753.

Dioecious shrubs to small trees. Leaves alternate, entire; stipules narrow. Flowers sessile or pedicellate in slender axillary and terminal spikes or racemes. Perianth uniseriate, lobes 3-5, free or connate. Stamens 2-5, inserted on or within depressions of the disc; connective broad. Ovary 1-celled, 2-ovuled; styles 2-4, recurved, persistent in fruits. Drupes ovoid to globose, usually compressed. Seeds 1-2.

1a. Stamens 3-5; pistillode present; spikes above 6 cm long ..... **A. menasu**

1b. Stamens 2; pistillode absent; spikes up to 3 cm long ..... **A. acidum**

Antidesma acidum Retz., Obs. Bot. 5: 30. 1788; Rani in Matthew, Fl. Tam. Carnatic 3: 1412. 1983; Vajravelu, Fl. Palghat Dist. 420. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 427. 1994; Sivar. & Mathew, Fl. Nilambur 603. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 392. 1996. *Stilago diandra* Roxb., Pl. Corom. t. 66. 1802. *Antidesma diandrum* (Roxb.) Roth, Nov. Pl. Spec. 369. 1821; Hook. f., Fl. Brit. India 5: 561. 1887, p.p.; Gamble, Fl. Pres. Madras 1298. 1925. A. *lanceolarium* Wall. ex Wight, Ic. t. 766. 1844.

Large shrubs; young stem, petioles and leaf below villous with curled hairs. Leaves 3-9 x 2-4 cm, elliptic or obovate, base attenuate, apex shortly acuminate; petiole to 3 mm long. Spikes terminal, single or 2-branched, 2.5-3 cm long. Perianth greenish-yellow; lobes 4, c. 1.5 mm long, brown hairy within. In male flowers stamens 2, attached

in depressions on the disc. In female flowers ovary obovoid, 1-loculed; ovules 2. Drupe 4-6 mm across, globose.

Fl. & Fr.: Feb.-May.

Distr.: Indo-Malaysia. In sacred groves. *CNS 2172* (Vandanam), *CNS 2397* (Aravukadu).

Antidesma menasu Miq. ex Tul., Ann. Sci. Nat. Bot. Ser. 3, 15: 215. 1851; Hook. f., Fl. Brit. India 5: 364. 1887; Gamble, Fl. Pres. Madras 1297. 1925; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 331. 1976; Mani. & Sivar., Fl. Calicut 272. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1413. 1983; Mani., Fl. Silent Valley 245. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 105. 1988; Vajravelu, Fl. Palghat Dist. 420. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 428. 1994; Sivar. & Mathew, Fl. Nilambur 605. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 392. 1996. ***Noeli-tali, Nuli-tali*** Rheede, Hort. Malab. 4: 115-116, t. 56. 1683.

Dioecious small trees; young shoots puberulous. Leaves 7-16 x 3-5 cm, oblong-lanceolate, base broadly acute to obtuse, apex acuminate, chartaceous, sparsely pubescent on main nerves on both sides; petiole c. 1 cm long. Flowers in axillary racemes or terminal panicles, to 10 cm long. Male flowers subsessile, 1-1.5 mm across; tepals 1-seriate, 4-lobed, c. 1mm long, pubescent without; stamens 3-5; pistillode acute. Female flowers pedicellate; tepals 4, c. 1 mm long; ovary c. 1 mm long; stigma 3-fid. Drupe 4-5 mm across, globose, red when ripe.

Fl. & Fr.: Dec.-May.

Distr.: Peninsular India. In sacred groves. *CNS 1927* (Elangimelvallikavu).

APOROSA Blume

Bijdr. 514. 1825-1826.

Aporosa lindleyana (Wight) Baill., Etud. Gen. Euphorb. 645.1858; Hook. f., Fl. Brit. India 5: 349. 1887; Gamble, Fl. Pres. Madras 1809. 1925; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 331. 1976; Mani. & Sivar., Fl. Calicut 260. 1982; Ramach. &

Nair, Fl. Cannanore 409. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 106. 1988; Vajravelu, Fl. Palghat Dist. 421. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 407. 1994; Sivar. & Mathew, Fl. Nilambur 605. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 393. 1996. *Scepa lindleyana* Wight, Ic. t. 361. 1840. ***Amvetti, vetti-tali*** Rheede, Hort. Malab. 5: 107-108, t. 54. 1685.

Small to medium sized trees; bark pale brown, pink inside. Leaves 7-13 x 3-6 cm, oblong or elliptic, base rounded to broadly attenuate, apex obtusely acuminate, glabrous and glossy, coriaceous; petiole to 1.5 cm long. Male flowers small, yellow, in axillary and terminal solitary or clustered catkins, 2-4 x 0.2-0.3 cm; perianth 3-4-lobed, yellow, tomentose; stamens 3-4. Female flowers pedicelled, in racemes; racemes to 1.5 cm long, tomentose. Ovary fusiform, stipitate, 2-3-locular; ovules 2 in each cell; style short or 0; stigma 2-3-lobed, plumose. Capsule 6-8 mm across, globose, split-opening irregularly, yellow. Seeds 2-3, compressed, 3-4 mm across, covered with yellow pulp.

Fl. & Fr.: Dec.-Apr.

Distr.: Peninsular India and Sri Lanka. Common in sacred groves. *CNS 1122* (Vandanam), *CNS 1460* (Cherthala).

BREYNIA J.R. Forster & J.G.A. Forster

Charact. Gen. 145. 1776 (*nom. cons.*).

Monoecious shrubs or small trees. Leaves alternate, distichous, ovate-elliptic to orbicular, black above and glaucous below on drying. Flowers axillary, solitary, pendulous. Male flowers towards the tip of branchlets; female towards the base. Perianth uniseriate; lobes 6, united into a turbinate tube in male, shortly connate and campanulate in female. Stamens 3; anthers connate by their connectives. Ovary globose, 3-locular; ovules 2 in each cell; styles 3, sessile or basally connate into a short column. Capsule globose or depressed, indehiscent, subtended by accrescent perianth. Seeds subtrigonous.

1a. Leaves glaucous beneath, obtuse at apex; fruit depressed globose, c. 1.5 cm across; fruiting perianth much enlarged ..... **B. retusa**

1b. Leaves greenish beneath, acute at apex; fruit subglobose, c. 0.4 cm across; fruiting perianth hardly enlarged ..... **B. vitis-idaea**

Breynia retusa (Dennst.) Alston, Ann. Roy. Bot. Gard. (Peradeniya) 11: 204. 1929; Airy Shaw, Kew Bull. 26(2): 227. 1972; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 333. 1976; Rani in Matthew, Fl. Tam. Carnatic 3: 1415. 1983; Mani., Fl. Silent Valley 246. 1988; Ramach. & Nair, Fl. Cannanore 411. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 106. 1988; Vajravelu, Fl. Palghat Dist. 422. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 408. 1994; Sivar. & Mathew, Fl. Nilambur 608. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 396. 1996. *Phyllanthus retusus* Dennst., Schluess. Hort. Malab. 24. 1818. *Phyllanthus paten* Roxb., Fl. Ind. 3: 667. 1832. *Melanthesa turbinata* Wight, Ic. t. 1897. 1852; Trimen, Handb. Fl. Ceylon 4: 33. 1898. *M. obliqua* Wight, Ic. t. 1898. 1852. *Breynia patens* (Roxb.) Rolfe, J. Bot. 11: 359. 1882; Hook. f., Fl. Brit. India 5: 329. 1887; Gamble, Fl. Pres. Madras 1304. 1925. ***Perin-nirouri, Ma-nirouri*** Rheede, Hort. Malab. 5: 85-86, t. 43. 1685.

Shrubs, 1-1.5 m high. Leaves 1.3-2.5 x 0.7-1.3 cm, broadly elliptic or ovate, base rounded or acute, apex obtuse, glaucous below, black on drying; petiole to 2 mm long. Flowers unisexual, solitary, axillary. Male flowers c. 3 mm across; pedicels c. 1 mm long; perianth turbinate, 3-4 mm long, truncate; lobes 5-6; stamens 3. Female flowers 5-6 mm across; pedicels 3-4 mm; perianth campanulate, 3-4 mm long, 5-6-lobed. Ovary globose; stigma bifid. Capsule 1.2-1.5 cm across, depressed globose, orange-red on ripening. Fruiting perianth enlarged.

Fl. & Fr.: Jan.-Apr.

Distr.; Sri Lanka, India, Nepal and Myanmar. Common on the lateritic slopes. *CNS 2374* (Cheriyanad).

Breynia vitis-idaea (Burm. f.) Fischer, Kew Bull. 1932: 65. 1932; Airy Shaw, Kew Bull. 26: 227. 1972; Mani. & Sivar., Fl. Calicut 271. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1416. 1983; Ramach. & Nair, Fl. Cannanore 411. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 107. 1988; Vajravelu, Fl. Palghat Dist. 423. 1990; Mohanan &

Henry, Fl. Thiruvananthapuram 408. 1994; Sivar. & Mathew, Fl. Nilambur 609. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 396. 1996. *Rhamnus vitis-idaea* Burm. f., Fl. Ind. 61. 1768. *Phyllanthus rhamnoides* Retz., Obs. Bot. 5: 30. 1788. *Melanthesa rhamnoides* (Retz.) Bl., Bijdr. 591. 1826; Wight, Ic. t. 1898, f. 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. ***Niruri*** Rheede, Hort. Malab. 2: 45-46, t. 27. 1679.

Large shrubs, 3-4 m high. Leaves 2-3 x 1.5-2.5 cm, ovate or elliptic, base acute or obtuse, apex acute, glabrous, dark brown above and lighter below on drying; petiole to 2 mm long. Male flowers in axillary fascicles of 2-5; pedicels 3-5 mm long; perianth turbinate, yellow, lobes 5; stamens 3. Female flowers axillary, solitary, reddish, c. 1.5 mm across; perianth campanulate, 5-6-lobed; ovary 3-celled; style short; stigmas 3, sunk at top of ovary. Fruit 3-4 mm across; globose, red on ripening, changes to purple.

Fl. & Fr.: Dec.-Apr.

Distr.: Indo-Malaysia and China. In waste lands. *CNS 1949* (Mannarsala).

BRIDELIA Willdenow

Sp. Pl. 4(2): 978. 1806 ("1805").

Trees or scandent shrubs. Leaves alternate, lateral nerves and intercostae parallel. Flowers dioecious or monoecious, fascicled in the axils of leaves or panicled spikes. Bracts scaly. Perianth 2-seriate, 5 + 5. Disc flat, with an annular rim in male, or an inner corona in female flowers, enclosing the ovary. Stamens 5, filaments radiating from a pistillode. Ovary 2-celled; ovules 2 in each cell; styles 2, free or united at base; stigma subentire. Fruit a 1-2-seeded drupe. Seeds globose, with fleshy albumen.

1a. Trees, trunk often armed; flowers fascicled on spikes; drupe globose ..... **B. retusa**

1b. Scandent shrubs; flowers in axillary fascicles; drupe ovoid ..... **B. scandens**

Bridelia retusa (L.) Spreng., Syst. Veg. ed. 16, 3: 48. 1826; Hook. f., Fl. Brit. India 5: 268. 1887, p.p.; Gamble, Fl. Pres. Madras 1280. 1925; Sant., J. Bombay Nat. Hist. Soc. 50: 308. 1951; Airy Shaw, Kew Bull. 26: 230. 1972; Mani. & Sivar., Fl. Calicut 273. 1982; Rani in

Matthew, Fl. Tam. Carnatic 3: 1417. 1983; Vajravelu, Fl. Palghat Dist. 423. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 409. 1994. *Clutia retusa* L., Sp. Pl. 1042. 1753, "*Cluytia*"; *C. spinosa* Roxb., Pl. Corom. t. 172. 1802. *Bridelia spinosa* (Roxb.) Willd., Sp. Pl. 4(1): 979. 1805.

Trees; stem often armed with sharp thorns; bark greyish-brown, reddish inside. Leaves 8-15 x 4-7 cm, elliptic-oblong or obovate, base obtuse or rounded, margin slightly dentate, apex acute to retuse, glabrous, thin-coriaceous; lateral nerves 15-25 pairs; petiole c. 1 cm long. Spikes axillary and terminal, often panicled. Flowers sessile. Bracts scaly, pubescent without. Male flowers: c. 2 mm across; tepals 10, biseriate, inner smaller than outer; disc annular; stamens spreading from an erect gynophore; pistillode present. Female flowers: 5-6 mm across; outer tepals 2-2.5 mm long, inner smaller; ovary globose, c. 2 mm across; styles 2, stigmatic on inner surface. Drupe 6-8 mm across, globose, black, calyx persistent.

Fl. & Fr.: Aug.-Nov.

Distr.: Sri Lanka, India, Myanmar and Malaya. In waste lands. *CNS 1952* (Palamel).

Bridelia scandens (Roxb.) Willd. Sp. Pl. 4: 979. 1806; Gamble, Fl. Pres. Madras 1281. 1925; Sant., J. Bombay Nat. Hist. Soc. 50: 307. 1952; Airy Shaw, Kew Bull. 26: 230. 1972; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 334. 1976; Mani. & Sivar., Fl. Calicut 273. 1982; Mani., Fl. Silent Valley 247. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 107. 1988; Vajravelu, Fl. Palghat Dist 424. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 409. 1994; Sivar. & Mathew, Fl. Nilambur 611. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 397: 1996. *Clutia scandens* Roxb., Pl. Corom. t. 173. 1802, ("*Cluytia*"). *Bridelia stipularis* Muell.-Arg. in DC., Prodr. 15: 499. 1866; Hook. f., Fl. Brit. India 5: 270. 1887, p.p. ***Scherunam-cottam*** Rheede, Hort. Malab. 2: 23-24, t. 16. 1679.

Scandent shrubs with spines on older stem; branchlets brown tomentose. Leaves 4-8 x 2-6 cm, elliptic-oblong, base subcordate or rounded, apex obtuse, minutely tomentose below, those of flowering branches much smaller; petiole c. 5 mm long.

Flowers greenish-yellow, sessile, in axillary fascicles. Male flowers 2-3 mm across. Female flowers 4-5 mm across. Tepals 10, biseriate, ovate-acute, densely tomentose without. Stamens 5, monadelphous. Drupe 5-6 mm across, globose, black, calyx persistent.

Fl. & Fr.: Nov.-March.

Distr.: Sri Lanka, Eastern and Peninsular India, Malaya Islands, Philippines and Trop. Africa. Common in sacred groves and along bushes and thickets. *CNS 1897* (Pallippuram).

CROTON Linnaeus

Sp. Pl. 1004. 1753.

Herbs; monoecious. Leaves alternate, sometimes opposite, often with glands at base. Flowers fascicled in terminal racemes; male flowers many, towards the tip; female flowers very few at base of racemes. Perianth 2-seriate in male flowers; usually 1-seriate in female. Disc of 5 glands opposite to outer tepals. Stamens many from a villous receptacle; filaments free, inflexed in bud. Ovary globose, 3-celled; ovule 1 in each cell; style 3, each usually 2-forked. Capsule subglobose, 3-valved or separating into three 2-valved cocci. Seeds caruncled.

1a. Mature plants white strigose-stellate hairy; 2 stalked glands present at the base of lamina; male perianth white; capsule stellate hairy; plants aromatic ..... **C. hirtus**

1b. Mature plants more or less glabrous; lamina without stalked glands; male perianth greenish-white; capsule warty; plants non aromatic ..... **C. bonplandianus**

Croton bonplandianus Baill., Adansonia 4: 339. 1864; Croizat, J. Bombay Nat. Hist. Soc. 41: 573.1940, ("bonplandianum"); Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 335. 1976; Mani. & Sivar., Fl. Calicut 266. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1420. 1983; Ramach. & Nair, Fl. Cannanore 412. 1988; Vajravelu, Fl. Palghat Dist. 426. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 411. 1994; Sivar. & Mathew, Fl. Nilambur 613. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 399. 1996. *Croton sparsiflorus* Morong, Ann. New York Acad. Sci. 7: 221. 1893; Gamble, Fl. Pres. Madras 1316. 1925.

Herbs, young parts stellate-pubescent and viscous glandular. Leaves 2-5 x 1-2 cm, ovate-lanceolate, base attenuate, margin faintly serrulate, apex gradually acute, densely stellate scaly on both sides when young, sparsely so below and glabrous above on ageing; petiole to 1.5 cm long. Racemes to 10 cm long; pedicels glandular on either side. Male flowers 3-4 mm across; perianth 2-seriate, greenish-white, outer c. 1 mm long, inner c. 2 mm long; stamens many. Female flowers few, towards base, 2.5-3 mm across; perianth 1-seriate, lobes 5; ovary subglobose, tomentose; style short; stigma 3, each forked to form 6 lobes. Capsule 5-6 mm across, ovoid, warty. Seeds 3, globose, caranculate.

Fl. & Fr.: Most of the seasons.

Distr.: Native of S. America; naturalized in subtropics. This introduced noxious weedy species has occupied almost all arable and exposed lands. *CNS 1139* (Vandanam).

Croton hirtus L' Herit., Strip. Nov. 1: 17, t. 9. 1785; Amaratunga in Ceylon J. Sci. 12: 189. 1977; Veldkamp in Fl. Males. Bull. 40: 415. 1987; Ramach. *et al.*, Ind. J. For. 15(2): 183. 1992. *Croton glandulosus* L., Syst. ed. 10, 2: 1275. 1795, var. *hirtus* (L'Herit.) Muell.-Arg. in DC., Prodr. 15(2): 684. 1866 (Fig. 58).

Erect dichotomously branched aromatic herbs upto 60 cm high; branchlets with white to pale yellow strigose-stellate hairs. Leaves 2.4-9 x 1.5-7.8 cm, ovate to ovate-oblong, base truncate, broadly cuneate or oblique, margins irregularly serrate, apex acute, stellate white hairy on both sides, 3-5-nerved from base, 2-stalked gland present at the base of lamina; petiole 0.3-6.5 cm long, stellate hairy; stipules 2-5 mm long, linear, stellate hairy. Inflorescence terminal, upto 4 cm long with multibranched numerous glandular hairs, female flowers below, male flowers above; bracts 2-4 mm long, linear, glandular hairy. Male flowers white; pedicels c. 1 mm long, stellate hairy; tepals 10, 2-seriate, white, 1.5-2 x 0.5-1 mm, obovate or oblanceolate, obtuse or acute at apex, stellate hairy without. Stamens many. Female flowers green; tepals 5; longer ones 3, c. 3 mm long, obovate; shorter ones 2, 1-1.5 mm long. Ovary c. 1.5 mm long, ovoid, stellate hairy. Capsules 3-5 x 3-4 mm, ovoid, stellate hairy. Seeds 2-3 mm long, trigonous, brown with black patches, caruncle cream.

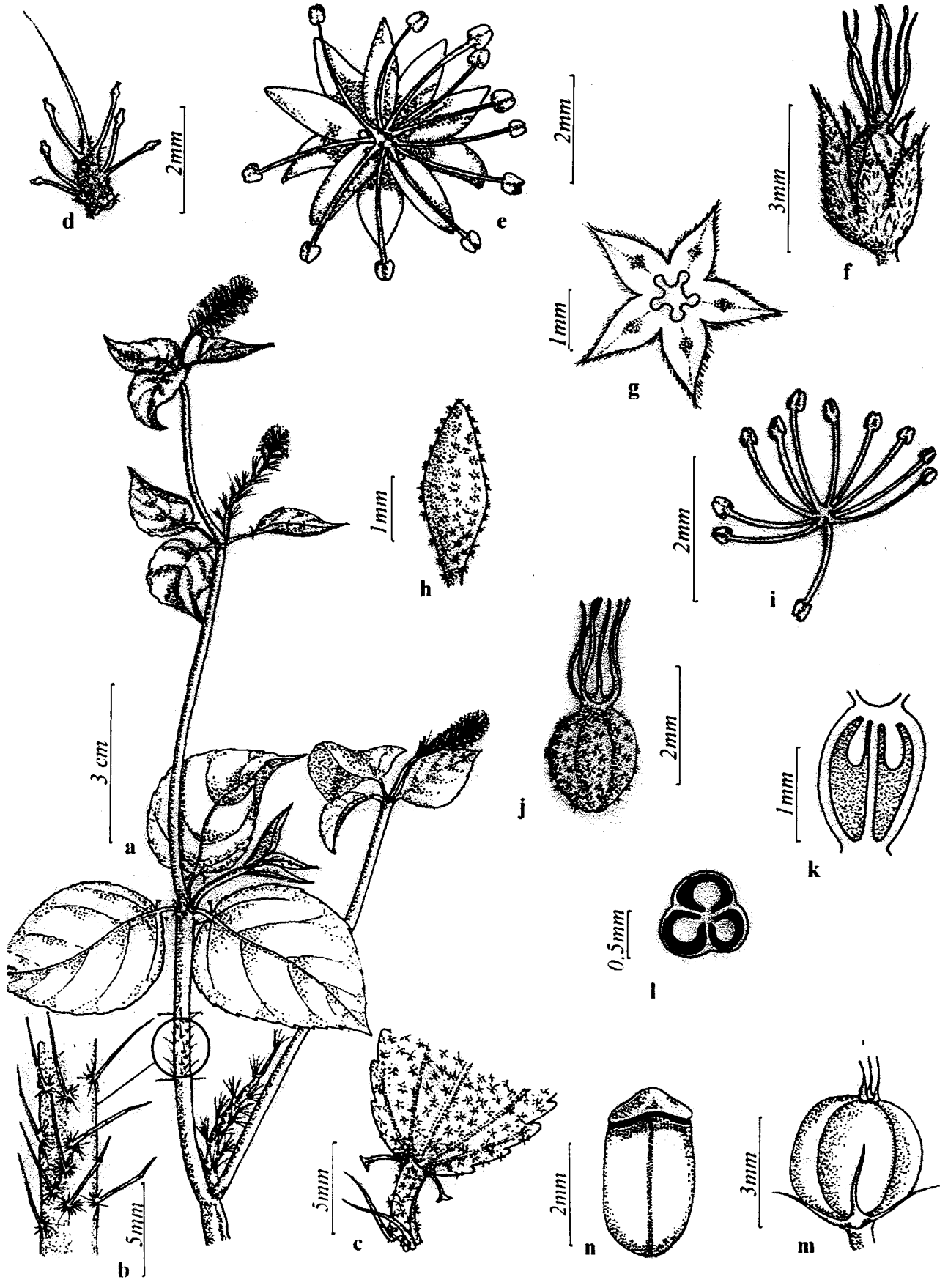


Fig. 58. *Croton hirtus* L' Herit.: a. Twig; b. A portion of stem showing stellate hairs; c. A portion of leaf showing stalked glands & stipules; d. Bract; e. Male flower; f. Female flower; g. Male flower: outer perianth & disc; h. Female tepal; i. Staminal cluster; j. Pistil; k. Ovary-L.S; l. Ovary-C.S; m. Capsule; n. Seed.

Fl. & Fr.: Most of the seasons.

Distr.: West Indies, Central and South America, Tropical Asia, Thailand, and Sri Lanka. In waste lands. *CNS 1100* (Pallithode), *CNS 2377* (Vayalar South).

DRYPETES M. Vahl

Ecolg. 3: 49. 1807.

Dioecious evergreen trees. Leaves alternate, margin entire to serrulate. Flowers in axillary fascicles. Tepals 4 or 5, unequal. Stamens 3-12, free, opposite to tepals, exserted. Ovary 1- or 3-locular; ovules 2 per cell, pendulous; style 1 or 3; stigma semi-orbicular, peltate or dilated. Disc annular or absent. Drupe ellipsoid or globose. Seed usually 1, ovoid.

1a. Branchlets pendulous; leaves subcoriaceous, apex acuminate; stamens 3; ovary 3-locular; styles 3; stigma dilated; drupe ellipsoid ..... **D. roxburghii**

1b. Branchlets spreading; leaves thick-coriaceous, apex obtuse or rounded; stamens 6-12; ovary 1-locular; style 1; stigma semi-orbicular, peltate, margin crenulate; drupe globose ..... **D. sepiaria**

Drypetes roxburghii (Wall.) Hurusawa, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 6(6): 335. 1954; Airy Shaw, Kew Bull. 26: 257. 1972 & Euphorb. Borneo 107. 1975; Rani in Matthew, Fl. Tam. Carnatic 3: 1423. 1983; Mani., Fl. Silent Valley 248. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 109. 1988; Sivar. & Mathew, Fl. Nilambur 618. 1996. *Putranjiva roxburghii* Wall., Tent. Fl. Nap. 61. 1826; Wight, Ic. t. 1876. 1852; Hook. f., Fl. Brit. India 5: 336. 1887; Gamble, Fl. Pres. Madras 1311. 1925. ***Pongolam*** Rheede, Hort. Malab. 7: 111, t. 59. 1688.

Trees. Leaves 4-12 x 2-3.8 cm, lanceolate, base obliquely acute or truncate, margins serrulate, apex shortly acuminate, subcoriaceous, nerves 2-4 pairs; petiole to 1 cm long. Male flowers greenish-yellow, many, c. 2.5 mm across, sessile, dense, around branchlets. Tepals 5, c. 1.5 mm long, oblong, obtuse, ciliate. Stamens 3. Female flowers

few, axillary, c. 4 mm across; pedicel c. 1 mm long. Tepals 5, unequal, to 2 mm long, oblong. Ovary 3-locular; styles 3, bifurcate, dilated. Drupe to 2 cm long, ellipsoid.

Fl. & Fr.: Mar.-Jul.

Distr.: Sri Lanka to W. Himalaya and Burma, Indo-China, Java, Moluccas, Lesser Sunda Isls. and E. New Guinea. *CNS 1983* (Kadakarappally).

Drypetes sepiaria (Wight & Arn.) Pax & Hoffm. in Engl. Pflanzenr. IV. 147 (15): 271. 1927; Rani in Matthew, Fl. Tam. Carnatic 3: 1423. 1983. *Hemicyclia sepiaria* Wight & Arn., Edinburgh New Philos. J. 14: 297. 1833; Wight, Ic. t. 1872. 1852; Hook. f., Fl. Brit. India 5: 337. 1887; Gamble, Fl. Pres. Madras 1299. 1925.

Small evergreen trees; bark greyish, thin, smooth. Leaves 2.5-6.5 x 1.7-3.8 cm, elliptic or oblong, base obtuse or rounded, margins entire to coarsely crenate, apex obtuse or rounded, coriaceous; petiole 4-7 mm long. Flowers dioecious; males in clusters in the axils of leaves or on the branches below them, female usually solitary with longer pedicels. Tepals 4, imbricate, small, ciliate, inner usually larger. Stamens 6-12, attached to the disc. Ovary obliquely ovoid, 1-celled; stigma 1, sessile or on a short style, semi-orbicular, peltate, margin crenulate. Drupe 5-7 mm across, globose, red, with hard endocarp. Seed solitary, arillate.

Fl. & Fr.: Feb.-May.

Distr.: Peninsular India and Sri Lanka. In waste lands and in sacred groves. *CNS 1221* (Kalavoor).

EUPHORBIA Linnaeus

Sp. Pl. 450. 1753.

Erect or diffuse herbs, shrubs or trees, armed or not; latex milky. Leaves alternate, opposite or whorled, leafless or with scaly leaves when succulent; stipules minute, sometimes modified into spines. Cyathia solitary or in terminal and axillary cymes. Involucre cupular, turbinate or campanulate; bracts usually 5, glands 1-5. Perianth 0 or

sometimes reduced to scales. Male florets 1 to many; filaments jointed below to the pedicel; anthers globose. Female floret single for a cyathia, usually raised above on a stalk, erect or sometimes pendulous. Ovary 3-celled; ovule 1 in each cell; styles 3, arms bifid or bilobed. Capsule of 3, bivalved cocci. Seeds globose or angualr.

1a. Erect shrubs or trees.

2a. Plants armed ..... **E. nivulia**

2b. Plants unarmed.

3a. Branchlets articulate, subsucculent; leaves upto 1 cm long, deciduous; glands of the involucre 5 ..... **E. tirucalli**

3b. Branchlets not articulate; leaves above 10 cm long, persistent, floral leaves scarlet red; glands of the involucre 1 ..... **E. pulcherrima**

1b. Erect or prostrate annual herbs.

4a. Leaves alternate below, opposite or whorled above, more than 3 cm long; gland of involucre 1, opposite the pistil; stem erect and usually unbranched.

5a. Upper leaves sinuate, scarlet red at base; gland bilabiate .... **E. cyathophora**

5b. Upper leaves entire, uniformly green; gland cupular ..... **E. heterophylla**

4b. Leaves opposite or distichous, less than 2.5 cm long; gland of involucre 4 or 5, alternating with bracts; stem prostrate or ascending, branched.

6a. Appendage of glands unequal, conspicuous, rose-coloured ..... **E. rosea**

6b. Appendage of glands equal, inconspicuous.

7a. Cyathia numerous, aggregated in single or paired, axillary clusters; leaves above 1 cm long, acute at apex; ascending herbs ..... **E. hirta**

7b. Cyathia axillary, solitary or few in clusters; leaves below 7 mm long, obtuse or rounded at apex; prostrate herbs ..... **E. thymifolia**

Euphorbia cyathophora Murray, Commentat. Soc. Regiae Sci. Gott. 7: 81. 1786; R. Sm., Kew Bull. 32: 78. 1978; Rani in Matthew, Fl. Tam. Carnatic 3: 1430. 1983. *Euphorbia heterophylla* auct., non L., 1753: Gamble, Fl. Pres. Madras 1278. 1925.

Erect herbs, 25-60 cm tall. Leaves alternate or the upper opposite, 3.5-6.5 x 2.2-3.4 cm, oblong or obovate-oblong, usually lobed, base obtuse or cuneate, apex obtusely acute, glabrescent above, pubescent beneath; petiole 1-1.5 cm long; floral leaves scarlet in the basal half. Cyathia in terminal clusters. Involucre campanulate; gland 1, opposite the pistil; appendages 0. Male florets bracteolate. Female florets laterally pendulous; styles 3, erect, bifid at apex. Capsule c. 4 mm across. Seeds oblong-globose, tuberculate.

Fl. & Fr.: Dec.-Apr.

Distr.: Possibly native in Greater Antilles, Eastern USA and Mexico. Widely cultivated and naturalized in India. *CNS 1188* (Alappuzha R.S).

Euphorbia heterophylla L., Sp. Pl. 453. 1753; R. Sm., Kew Bull. 26: 264. 1972; Mani. & Sivar., Fl. Calicut 257. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1432. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 414. 1994. *Euphorbia geniculata* Orteg., Nov. Pl. Descr. Dec. 18. 1797; Hook. f., Fl. Brit. India 5: 239. 1886 & 266. 1887; Gamble, Fl. Pres. Madras1884. 1936.

Erect herbs, 25-70 cm tall. Leaves alternate or the upper opposite with stipular glands, 3-8 x 1.8-4 cm, oblong-obovate or elliptic-oblong, base subacute, margins subentire, apex obtuse to acute, pubescent on the nerves beneath; petiole 0.5-3 cm long. Cyathia in terminal clusters or corymbose cymes, with the subtending leaves often pale near the base. Involucre c. 2.5 mm long, campanulate; lobes oblong, lacerate, with often gland-tipped fimbriae; gland 1, opposite the pistil, stalked, with expanded disciform hollow top. Male florets numerous; anthers broadly oblong. Styles 3, 2-fid. Capsule c. 6 mm across. Seeds angled, bluntly tuberculate.

Fl. & Fr.: Jul.-Nov.

Distr.: Native of C. America; now a pantropical weed. *CNS 1148* (Alappuzha town), *CNS 2378* (Vayalar).

Euphorbia hirta L., Sp. Pl. 454. 1753; Gamble, Fl. Pres. Madras 1275. 1925; Airy Shaw, Kew Bull. 26(2): 264. 1972; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 338. 1976;

Mani. & Sivar., Fl. Calicut 257. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1434. 1983; Ramach. & Nair, Fl. Cannanore 415. 1988; Mani., Fl. Silent Valley 249. 1988; Vajravelu, Fl. Palghat Dist. 428. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 415. 1994; Sivar. & Mathew, Fl. Nilambur 619. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 403. 1996. *Euphorbia pilulifera* L., Sp. Pl. 454. 1753; Hook. f., Fl. Brit. India 5: 250. 1887.

Slender, erect, pubescent herbs about 20-35 cm tall. Leaves decussate, 1-2.5 x 0.7-1.5 cm, broadly oblong to elliptic-lanceolate, base obliquely truncate, margin serrulate, apex acute, hispid on both sides, basally 3-nerved; petiole to 3 mm long. Cyathia aggregated in single or paired axillary clusters. Involucre minute, c. 1 mm long; glands 5, red. Male flowers 4-6, ebracteolate. Female florets laterally pendulous; styles 2-fid from base. Capsule 1.5-2 mm across, pubescent. Seeds minute, red, 4-angled, minutely furrowed.

Fl. & Fr.: Most of the seasons.

Distr.: Pantropical. Common on waysides and waste lands. *CNS 1152* (Alappuzha town).

The whole plant crushed and cooked with rice and made into 'canji' and taken against worm inferstation in children, bowel-complaints, cough and gonorrhoea.

Euphorbia nivulia Buch.-Ham., Trans. Linn. Soc. London 14: 286. 1824; Wight, Ic. t. 1862. 1852; Hook. f., Fl. Brit. India 5: 255. 1887; Gamble, Fl. Pres. Madras 1277. 1925; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 338. 1976; Rani in Matthew, Fl. Tam. Carnatic 3: 1435. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 110. 1988; Sasi. & Sivar., Fl. Pl. Thrissur For. 403. 1996. *Euphorbia neriifolia* Roxb., Fl. Ind. 2: 467. 1832; Mani. & Sivar., Fl. Calicut 256. 1982. ***Ela-calli*** Rheede, Hort. Malab. 2: 83-84, t. 43. 1679.

Large erect, fleshy deciduous, shrubs; branches terete; spines straight, 3-6 mm long, paired on flat corky base. Leaves alternate, sessile, 7-18 x 3-6.5 cm, oblanceolate-oblong or obovate, base cuneate, apex obtuse, fleshy. Cyathia usually paired, in subterminal cymes. Involucre broadly cupular, yellow; lobes fimbriate; glands 5,

transversely oblong, fleshy, appendage absent. Male flowers with sterile florets, bracteolate. Female florets laterally pendulous. Style stout, branched above; stigmatic lobes flattened and slightly expanded. Capsule c. 5 mm across, 3-lobed. Seeds 4-angular, smooth.

Fl. & Fr.: Mar.-May.

Distr.: India and Myanmar. Not common; inwastelands and along fences. *CNS 2160* (Chengannur).

Euphorbia pulcherrima Willd. ex Klotz., Allg. Deutsche Gartn.-Zeitung 2: 27. 1834; Gamble, Fl. Pres. Madras 1278. 1925; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 339. 1976; Mani. & Sivar., Fl. Calicut 256. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1436.1983; Ramach. & Nair, Fl. Cannanore 417. 1988. *Poinsettia pulcherrima* Graham, Edinburgh New Philos. J. 20: 412. 1836; Hook. f., Fl. Brit. India 5: 239. 1887.

Branched shrubs to 4 m tall; branchlets fistular. Leaves alternate, 10-15 cm long, elliptic or oblong, margins repand-dentate. Cyathia in corymbose cymes, surrounded by brilliant scarlet foliar leaves. Involucral gland large, unilateral, ellipsoid, compressed, yellow. Fruit not seen.

Fl.: Nov.-Feb.

Distr.: Native of Mexico and C. America; frequently cultivated in tropical gardens. *CNS 2161* (Chengannur).

Euphorbia rosea Retz., Obs. Bot. 4: 26. 1786/87; Hook. f., Fl. Brit. India 5: 251. 1887; Gamble, Fl. Pres. Madras 1275. 1925; Rani in Matthew, Fl. Tam. Carnatic 3: 1438. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 415. 1994 (Plate XXI: D; Fig. 59).

Prostrate or ascending herbs with woody rootstock; branches upto 30 cm long, reddish, flexuous. Leaves opposite, subsessile, 3-10 x 2-4.5 mm, obliquely obovate, oblanceolate-oblong or linear-spathulate, base truncate or cuneate, margins crenulate, apex obtuse or rounded, coriaceous. Cyathia few in subterminal, lax clusters, rarely

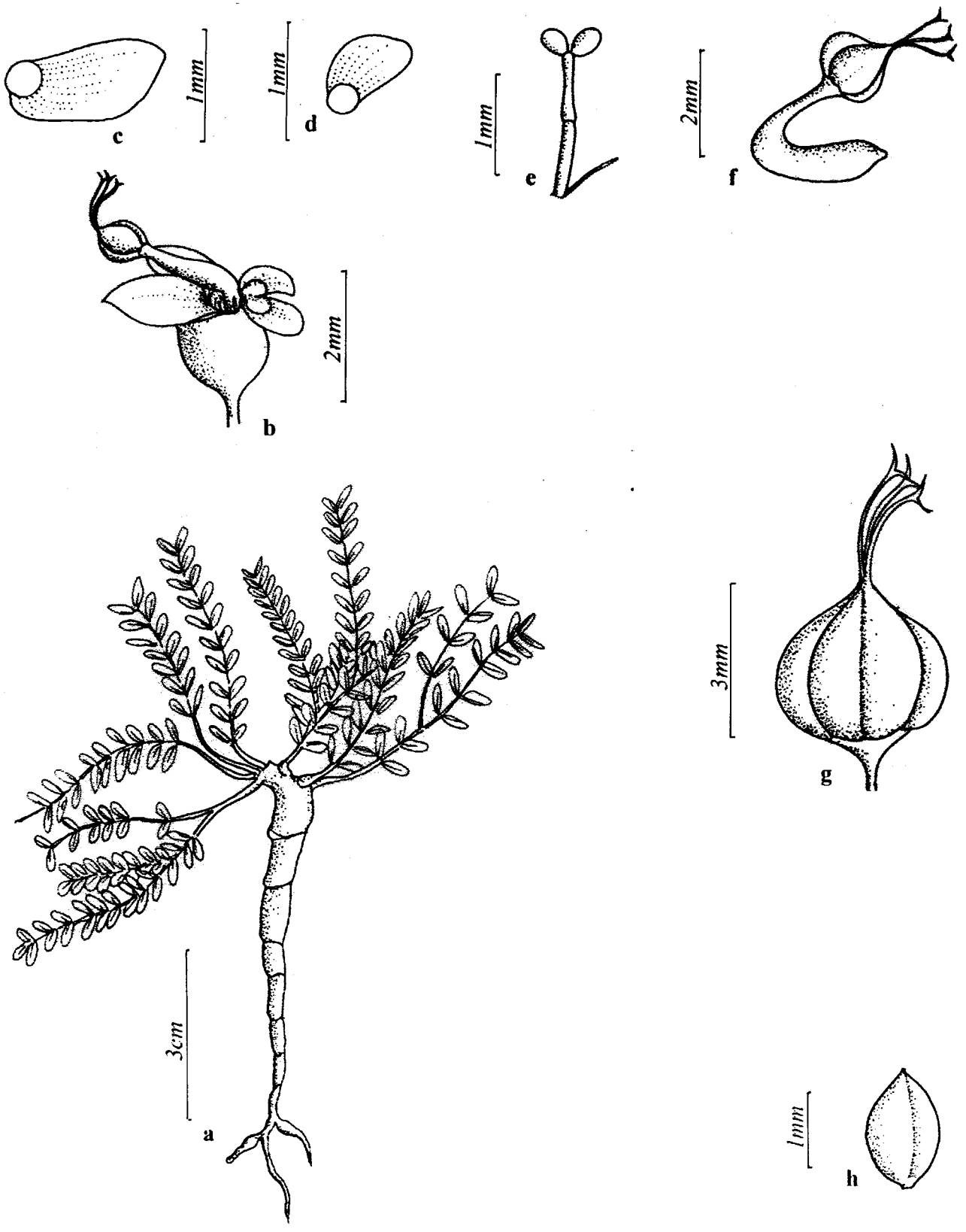


Fig. 59. *Euphorbia rosea* Retz.: a. Habit; b. Cyathium; c & d. Petaloid appendages with gland; e. Male flower with bracteole; f. Female flower; g. Capsule; h. Seed.

solitary in upper axils. Involucre c. 3 mm long, subcampanulate; lobes triangular-ovate, 3-5-fid; glands 4, appendage unequal, rose coloured. Male florets 4-6, bracteolate. Female florets laterally pendulous. Styles deeply 2-fid; stigma spathulate. Capsule c. 2.5 mm across. Seeds keeled.

Fl. & Fr.: May-Jul.

Distr.: Peninsular India, Sri Lanka and Afghanistan. Not common; in waste sandy soil. *CNS 1001* (Vandanam), *CNS 2202* (Neerkunnam).

Euphorbia thymifolia L., Sp. Pl. 454. 1753; Roxb., Fl. Ind. 2: 473. 1832; Hook. f., Fl. Brit. India 5: 252. 1887; Gamble, Fl. Pres. Madras 1276. 1925; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 339. 1976; Mani. & Sivar., Fl. Calicut 257. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1439. 1983; Ramach. & Nair, Fl. Cannanore 416. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 110. 1988; Vajravelu, Fl. Palghat Dist. 429. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 416. 1994; Sivar. & Mathew, Fl. Nilambur 620. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 404. 1996. *Chamaesyce thymifolia* (L.) Millsp., Publ. Field Mus. Nat. Hist. Bot. Ser. 2: 412. 1916. ***Caicotten-pala*** Rheede, Hort. Malab. 10: 65, t. 33. 1690. ***Nila-pala***.

Softly hispid prostrate herbs. Leaves opposite, distichous, 2-7 x 2-4 mm, oblong or suborbicular, base obliquely cordate, margin serrulate, apex obtuse, 1-nerved, subsessile. Cyathia in axillary clusters. Involucre campanulate, c. 8 mm long; glands 4. Male flowers 1-4, ebracteolate. Female laterally pendulous; ovary tomentose; style 3-forked from base. Capsule c. 2 mm across, obtusely angled, glabrescent. Seeds 4-angular, minutely tuberculate, red.

Fl. & Fr.: Feb.-May.

Distr.: Tropical Asia. Common in plains, fallow fields and waste lands. *CNS 1989* (Poochakkal), *CNS 2064* (Veliyanad).

This is used as a remedy for ring-worm and other skin diseases.

Euphorbia tirucalli L., Sp. Pl. 452. 1753; Hook. f., Fl. Brit. India 5: 254. 1887; Gamble, Fl. Pres. Madras1276. 1925; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 339. 1976; Mani. & Sivar., Fl. Calicut 257. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1440. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 111. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 416. 1994. ***Tiru-calli*** Rheede, Hort. Malab. 2: 85-86, t. 44. 1679.

Shrubs; branchlets terete, succulent, articulated. Leaves deciduous, 5-10 mm long, linear-oblong, base cuneate, apex obtuse to subacute. Cyathia clustered in the forks of the branchlets, shortly pedicelled, mostly female. Involucre campanulate; glands 3-5, transversely oval, peltate, lobes short, hairy; appendage 0. Male florets bracteolate, bracteoles laciniate at tip. Styles short, recurved, 2-lobed. Capsule 5 mm, globose, cocci compressed, velvety. Seeds ovoid, smooth.

Fl. & Fr.: Jul.-Oct.

Distr.: Old World tropics. Cultivted throughout India; naturalized in Deccan Peninsula and Sri Lanka. *CNS 2089* (Neerkunnam).

EXCOECARIA Linnaeus

Syst. Nat. (ed. 10). 2: 1288. 1759.

Dioecious or monoecious shrubs or trees with milky latex. Leaves simple, alternate, oblong or elliptic-lanceolate, margins entire to crenulate-serrulate; stipules minute. Inflorescence axillary or terminal, male and female flowers in separate spike or inflorescence androgynous with 1-few female flowers at the base of the males; bracts small and broad, of various shapes. Male flowers: Tepals 2-3, free or shortly connate, imbricate. Disc 0. Stamens 2-3, free; anthers 2-celled, basifixed, longitudinally dehiscent. Pistillode 0. Female flowers: Tepals 3, free or connate. Disc 0. Ovary 3-celled; ovule 1 per cell; styles 3, simple, shortly connate below, recurved above. Capsule 3-celled, depressed, unlobed or deeply lobed, dehiscent. Seeds globose or ovoid.

1a. Capsule depressed globose, unlobed, 2.5-3 cm across; male flowers pedicellate .... **E. indica**

1b. Capsule deeply 3-lobed, c. 1 cm across; male flowers sessile ..... **E. agallocha**

Excoecaria agallocha L., Syst. Nat. (ed. 10) 2: 1288. 1759; Wight, Ic. t. 1865. 1852; Hook. f., Fl. Brit. India 5: 472. 1888; Gamble, Fl. Pres. Madras 1344. 1925; Mani. & Sivar., Fl. Calicut 270. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1442. 1983; Ramach. & Nair, Fl. Cannanore 417. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 111. 1988; Chakrab. & Gangop., J. Econ. Tax. Bot. 18: 198. 1994; Mohanan & Henry, Fl. Thiruvananthapuram 416. 1994. ***Cammetti*** Rheede, Hort. Malab. 5: 89-90, t. 45. 1685.

Large shrubs or small trees with poisonous milky juice; bark greyish, smooth, with prominent lenticels. Leaves 3-8 x 2-4.5 cm, ovate or ovate-elliptic, base rounded or obtuse, margins entire to coarsely crenate, apex acute or shortly acuminate, coriaceous, old leaves deep red; petiole 1.2-3 cm long, 2-glandular just below the blade. Male spikes 3-5.8 cm long, catkin-like, from the upper axils or from the axils of fallen leaves; bracts c. 1.5 mm broad, rounded; tepals minute, lanceolate,toothed, incurved; stamens exserted, cells ellipsoid. Female spikes fewer, 1.2-2.5 cm long on separate trees; bracts cuspidate; tepals c. 1 mm long, ovate, cuspidate; styles 3, revolute. Capsule 1-1.5 cm across, 3-lobed, crustaceous, smooth.

Fl. & Fr.: May-Jul.

Distr.: India, Sri Lanka to Formosa and Ryukyu Isls., Malesia to N. Australia and Pacific. Common in tidal forests. Plant sap is said to be poisonous to eyes and skin. *CNS 1451* (Kodamthuruthu).

Excoecaria indica (Willd.) Muell.-Arg., Linnaea 32: 123. 1863; Airy Shaw, Kew Bull. 36: 297. 1981; Chakrab. & Gangop., J. Econ. Tax. Bot. 18: 206. 1994. *Sapium indicum* Willd., Sp. Pl. 4: 572. 1805; Wight, Ic. t. 1950. 1853; Hook. f., Fl. Brit. India 5: 471. 1888; Gamble, Fl. Pres. Madras 1346. 1925; Subudhi, Choudhury & Acharya, J. Econ. Tax. Bot. 14: 583. 1994.

Evergreen small trees or large shrubs with acrid milky juice; bark greyish, smooth. Leaves 6-14 x 2-3.5 cm, elliptic-lanceolate or oblong-lanceolate, base attenuate, margins

crenate-serrate, apex acute or acuminate, main nerves many and parallel; petiole 5-12 mm long, reddish. Raceme terminal and lateral, 4-10 cm long, female flowers below, 1-few; male flowers above, numerous; bracts 1-1.2 x 1.2-1.5 mm, triangular, obtuse, denticulate. Male flowers puberulous; pedicels 1-3 mm long; tepals 3-lobed, lobes 1.5-2 x 1-1.5 mm, ovate to suborbicular, fimbriate and ciliate along margins; stamens 2-3, free or often united below into a column, anthers orbicular. Female flowers: Pedicels 5-15 mm long, slender; tepals 3, 1-1.5 x 1.4-2 mm, suborbicular, puberulous, fimbriate. Capsule 2.5-3 cm across, globose, 3-celled, black when dry. Seeds 12-14 x 5-7 mm, oblong-ovoid, dark brown.

Fl. & Fr.: Dec.-Mar.

Distr.: S & E. India, S.E. Asia, and throughout Malesia to Solomon Is. Rare. Once collected from backwater canal in Thrikkunnapuzha. *CNS 1780* (Thrikkunnapuzha).

GIVOTIA W. Griffith

Calcutta J. Nat. Hist. 4: 388.1843.

Givotia rottleriformis Griffith, Calcutta J. Nat. Hist. 4: 388. 1844; Wight, Ic. t.1889. 1852; Hook. f., Fl. Brit. India 5: 395. 1887; Gamble, Fl. Pres. Madras 1342. 1925; R. Sm., Kew Bull. 22: 504. 1968; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 341. 1976; Rani in Matthew, Fl. Tam. Carnatic 3: 1443. 1983; Vajravelu, Fl. Palghat Dist. 430. 1990. ***Kappakadalavanakku*** (Fig. 60).

Dioecious trees, conspicuously softly white-stellate-tomentose on branchlets, inflorescence and undersurface of leaves; bark whitish; latex blood red. Leaves alternate, 6-17 x 7-19 cm, broadly ovate or orbicular, base subcordate, margins coarsely dentate, apex shortly acuminate, glabrous above, except along nerves, densely white-tomentose beneath; palmately 5-nerved from base, subcoriaceous; petiole 6-13 cm long. Flowers in axillary or subterminal racemose or paniculate cymes, 12-22 cm long; pedicels jointed; bracts linear. Tepals 10, biseriate, ovate, imbricate; outer tepals to 5 x 3 mm; inner petaloid, to 7 x 4 mm, connate, campanulate, obtuse. Stamens 13-20; filaments villous at

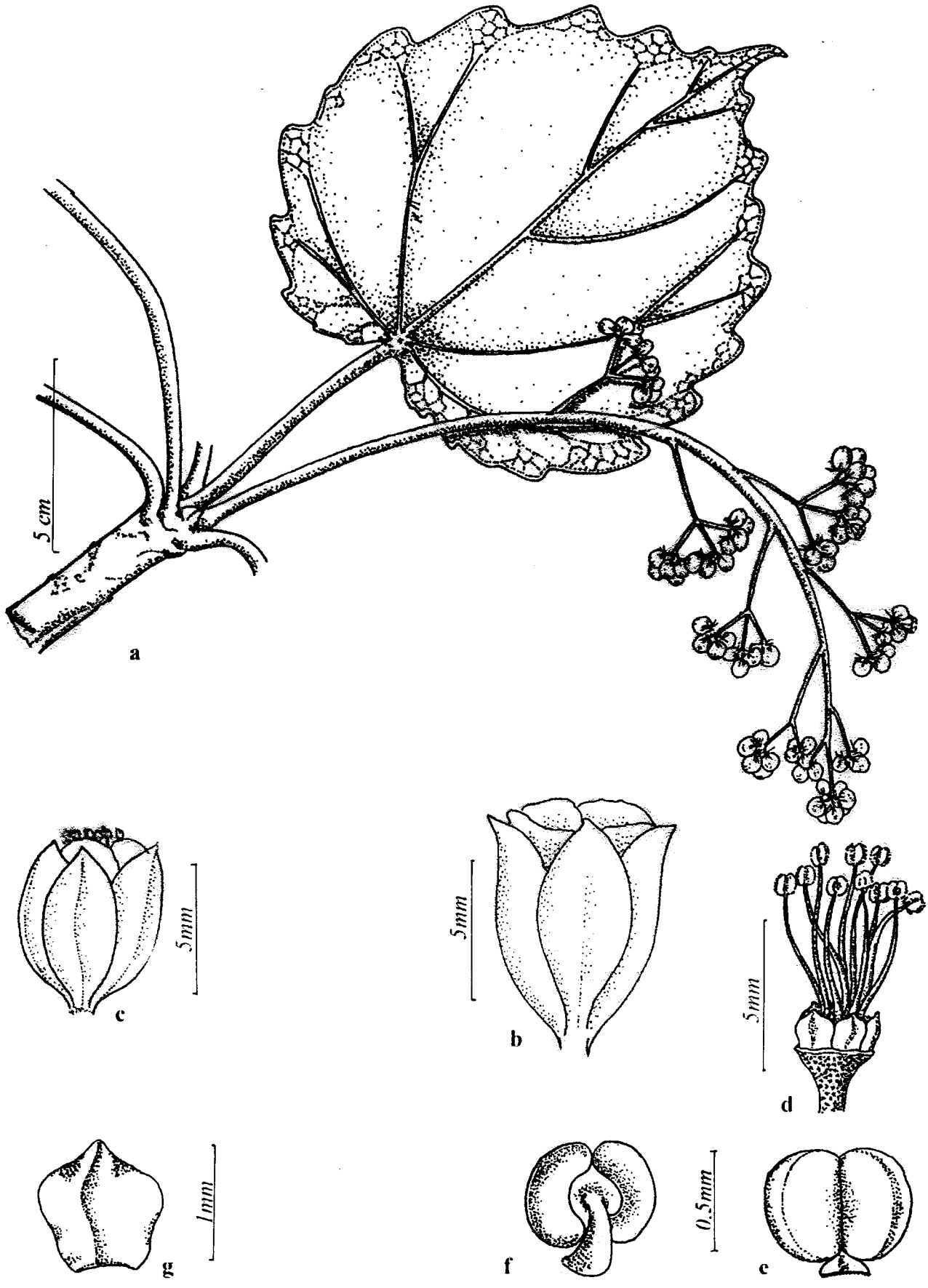


Fig. 60. *Givotia rottleriformis* Griffith: Male plant: a. Twig; b. Flower; c. Tepals(outer); d. Stamens & Disc; e. Anther-ventral view; f. Anther dorsal view; g. Disc gland.

base, free. Disc of male of orbicular glands, that of female cupular. Ovary globose, 2-3-celled; styles 2-fid. Drupe 2.2-2.5 cm long, subglobose or ellipsoid.

Fl. & Fr.: Mar.-Sep.

Dist.: Peninsular India and Sri Lanka. Very common, planted as hedge. *CNS 1223* (Eramallor), *CNS 2091* (Chandiroor).

GLOCHIDION J.R. Forster & J.G.A. Forster

Charact. Gen. 113, t. 57. 1776 (*nom. cons.*).

Glochidion zeylanicum (Gaertn.) A. Juss., Tent. Euphorb. 107. 1824; Hook. f., Fl. Brit. India 5: 310. 1887; Gamble, Fl. Pres. Madras 1306. 1925; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 342. 1976; Mani. & Sivar., Fl. Calicut 260. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1446. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 112. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 417. 1994; Sivar. & Mathew, Fl. Nilambur 623. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 405. 1996. *Bridelia zeylanica* Gaertn., Fruct. 2: 128, t. 109. 1790. ***Pevetti, Pee-vetti***, Rheede, Hort. Malab. 4: 113, t. 55. 1683.

Deciduous trees, branches radiating from main stem and clustered towards the tips. Leaves 6-12 x 3.5-6 cm, broadly oblong-elliptic, base obliquely cuneate or truncate, apex acute, glabrous, coriaceous; lateral nerves c. 6 pairs; petiole c. 5 mm long. Flowers in axillary, short-peduncled umbels. Male flowers 5-7 mm across, pale yellow; tepals 6; stamens 4 or more; pedicels c. 8 mm long. Female flowers 3-4 mm across; tepals 6, c. 2 mm long, unequal, ovate, subacute. Ovary 1.5-2 mm long, 4-5-locular; style conical, cleft at tip. Capsule 0.8-1 cm across, subglobose, in clusters, beaked with persistent style.

Fl. & Fr.: Jan.-Aug.

Distr.: Indo-Malaysia.

Commonly seen along the banks of rivers and near marshy areas. *CNS 2103* (Ambalappuzha).

HEVEA Aublet

Hist. Pl. Guiane 871, t. 335. 1775.

Hevea brasiliensis (Willd. ex Juss.) Muell.-Arg., Linnaea 34: 204. 1865; Gamble, Fl. Pres. Madras 1346. 1925; Mani. & Sivar., Fl. Calicut 259. 1982; Ramach. & Nair, Fl. Cannanore 428. 1988; Vajravelu, Fl. Palghat Dist. 440. 1990; Sivar. & Mathew, Fl. Nilambur 623. 1996. *Siphonia brasiliensis* Willd. ex Juss., Euphorb. Gen. Tent. 113, t. 12, f. 388. 1824. ***Rubber***.

Trees, monoecious; bark greyish. Leaves trifoliolate; leaflets 10-18 x 3.7-6.5 cm, elliptic-lanceolate or obovate-elliptic, base rounded, apex acuminate; petiole 7.5-14 cm long; petiolule c. 1 cm long. Flowers small, yellowish in large pubescent, terminal panicles.

Fl. & Fr.: Dec.-May.

Distr.: Considered indigenous to the Amazon valley of Brazil, Venezuela, Peru, Ecuador and Colombia. Widely cultivated in S.E. Asia. *CNS 2396* (Pandavanpara).

JATROPHA Linnaeus

Sp. Pl. 1006. 1753.

Shrubs. Leaves alternate, lobed; stipules glandular, usually persistent. Flowers unisexual or plygamous in terminal or axillary panicled cymes. Perianth 2-seriate, 5 + 5, outer sepaloid, inner ones petaloid, free or connate. Stamens 8-10, monadelphous or diadelphous, exserted. Ovary globose, 3-locular; ovule 1-per locule; styles 3. Disc-glands 5, free. Capsule smooth or ribbed, 3-valved. Seeds ovoid to 3-gonous.

1a. Petiole and leaf margin glabrous; inner tepals connate near half way; stamens 10 ..... **J. curcas**

1b. Petiole and leaf margin with gland-tipped hairs; inner tepals free; stamens 8 ..... **J. gossypifolia**

Jatropha curcas L., Sp. Pl. 1006. 1753; Roxb., Fl. Ind. 3: 686. 1832; Hook. f., Fl. Brit. India 5: 383. 1887; Gamble, Fl. Pres. Madras 1340. 1925; Airy Shaw, Euphorb. Borneo 137. 1975; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 343. 1976; Dehgam & Webster, Univ. California Publ. 74: 52. 1979; Mani. & Sivar., Fl. Calicut 258. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1449. 1983; Vajravelu, Fl. Palghat Dist. 431. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 418. 1994; Sivar. & Mathew, Fl. Nilambur 625. 1996. ***Kadalavanakku***.

Glabrous shrubs with an acrid latex; bark smooth, greenish-white, peeling off in thin flakes. Leaves shallowly 5-lobed or entire, 8-15 x 6-12 cm, orbicular or subcordate, base truncate to cordate, margin serrate, apex acute, basally 5-nerved; petiole 5-15 cm long. Flowers yellowish-green in terminal or axillary, monoecious panicled cymes; peduncle 6-12 cm long. Tepals 10, biseriate; outer tepals 3-4 x 1-2 mm, equal in male and unequal in female; inner 5-7 x 2.5-3 mm, oblong or obovate. Stamens 10; filaments unequal, united into a central column. Ovule solitary in each cell; styles 3, 2-fid. Disc-glands 5. Capsule c. 2.5 cm long, ellipsoid, rugose on drying.

Fl. & Fr.: May.-Aug.

Distr.: New World tropics. Common. Planted as hedge plants, occasionally run wild. *CNS 1069* (Ambalapuzha beach).

Jatropha gossypifolia L., Sp. Pl. 1006. 1753; Hook. f., Fl. Brit. India 5: 383. 1887; Gamble, Fl. Pres. Madras 1340. 1925; Airy Shaw, Kew Bull. 26: 283. 1972; Rani in Matthew, Fl. Tam. Carnatic 3: 1450. 1983; Ramach. & Nair, Fl. Cannanore 420. 1988; Vajravelu, Fl. Palghat Dist. 431. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 418. 1994; Sivar. & Mathew, Fl. Nilambur 625. 1996.

Shrubs, purplish green and glandular hairy on younger parts. Leaves in close spiral, deeply 3-5-lobed, 7-11 x 8-12 cm, orbicular-cordate, margin with gland-tipped hairs, lobes obtusely acuminate, 5-nerved; stipules glandular-hairy; petiole 3-10 cm long, glandular-hairy. Flowers red with yellow centre, unisexual in axillary and terminal monoecious corymbose cymes. Bracts linear-lanceolate, glandular-hairy. Male perianth

lobes free, biseriate, reddish-brown, outer c. 5 mm long, lanceolate, inner ones c. 4 mm long, obovate, villous at base within. Stamens 8-10. Female tepals 5. Stamens 8, biseriate. Ovary 3-celled; ovules solitary in each; styles 3, connate below. Capsule 1.3-17 x 1-1.4 cm, 3-lobed. Seeds oblong, 3-gonous.

Fl. & Fr.: Jul.-Sep.

Distr.: New World Tropics. Common on wastelands, roadsides, etc. *CNS 1073* (Ambalapuzha).

MACARANGA Du Petit-Thouars

Gen. Nova Madag. 26. 1806.

Macaranga peltata (Roxb.) Muell.-Arg. in DC., Prodr. 15(2): 1010. 1866; Gamble, Fl. Pres. Madras 1326. 1925; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 343. 1976; Whitmore, Gard. Bull. s.s. 31: 55. 1978; Mani. & Sivar., Fl. Calicut 259. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1453. 1983; Ramach. & Nair, Fl. Cannanore 421. 1988; Vajravelu, Fl. Palghat Dist. 432. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 418. 1994; Sivar. & Mathew, Fl. Nilambur 626. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 405. 1996. *Osyris peltata* Roxb., Fl. Ind. 3: 755. 1832. *Mappa peltata* (Roxb.) Wight, Ic. t. 817. 1844. *Macaranga roxburghii* Wight, Ic. t. 1852 & 1949, f. 4. 1853; Hook. f., Fl. Brit. India 5: 448. 1887. ***Vatta***.

Medium sized trees; bark brown, reddish inside, exudation red, sticky; branchlets thick, glaucous. Leaves 10-20 x 10-15 cm, ovate-orbicular, peltate, margin entire or faintly crenate, apex acuminate, densely pubescent on both sides when young, glabresent on ageing, ciliate on margins, dotted with numerous reddish-yellow glands below; petiole to 16 cm long; stipules 1-1.5 x 0.8-1 cm, broadly ovate, ciliate on margins. Panicles axillary and lateral, lax; peduncles 4-7 cm long, branched, tomentose. Bracts 2-3 mm long, concave. Male flowers many; tepals 3, 1-2 mm long; stamens 3, free. Female flowers 1-2 mm across; tepals 3; ovary globose, 1-locular; ovules 3; style lateral, hairy. Capsule 5-6 mm across, globose, glandular pubescent, echinate when young.

Fl. & Fr.: Dec.-Apr.

Distr.: India and Sri Lanka. In waste lands. *CNS 1523* (Sharangakavu at Venmony).

MALLOTUS Loureiro

Fl. Cochinch. 601, 635. 1790.

Trees or shrubs. Leaves alternate or opposite, entire or lobed, 3-7-ribbed or penninerved, sometimes peltate, often gland-dotted beneath; stipules deciduous. Flowers dioecious or monoecious, in terminal or axillary, simple or panicled spikes or racemes, bracteate. Male flowers clustered at axils of bracts; perianth 1-seriate, united and split open in 2-3 valves; stamens many, free. Female flowers lax, solitary per bract; perianth 1-seriate, 3-6-lobed; ovary 2-4-celled; ovule 1 per cell; styles free or connate below, above spreading and plumose or papillose. Capsule with 2-4 cocci, smooth or echinate without, usually glandular. Seeds ovoid or globose.

1a. Leaves broadly ovate to deltoid, nearly as wide as long.

2a. Trees; leaves subpeltate, densely fulvous stellate-tomentose beneath; capsules echinate with soft woolly spines, 3-4-valved ..... **M. tetracoccus**

2b. Climbing or straggling shrubs with long thorns on the trunk; leaves not peltate, softly stellate-pubescent and glandular beneath; capsules smooth, not echinate, 2-valved ..... **M. repandus**

1b. Leaves ovate-lanceolate, clearly longer than broad.

3a. Leaves opposite and alternate, long acuminate at apex, yellow-glandular beneath; capsules brown pubescent without or yellow glandular.

4a. Leaves finely pubescent below; styles 3; capsule 3-lobed .... **M. rhamnifolius**

4b. Leaves glabrous; styles 2; capsule 2-lobed ..... **M. atrovirens**

3b. Leaves alternate, acute to shortly acuminate at apex, red-glandular beneath; capsules red-glandular without ..... **M. philippensis**

Mallotus atrovirens Muell.-Arg., Linnaea 34: 195. 1865-66; Hook. f., Fl. Brit. India 5: 440. 1887; Gamble, Fl. Pres. Madras 1322. 1925; Mani. & Sivar., Fl. Calicut 260. 1982; Sivar. & Mathew, Fl. Nilambur 627. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 406. 1996.

Dioecious shrubs or small trees; bark ash-grey, dull yellow inside; branchlets pubescent. Leaves opposite, 6.5-12 x 3-5.5 cm, elliptic to obovate, base acute, margins entire or subentire, apex acute to acuminate, glabrous, yellow glandular below, penninerved, cross veins very prominent; petiole to 4 cm long. Racemes axillary, to 10 cm long; pedicels c. 0.5 cm long, yellow glandular. Perianth lobes c. 2 mm long, ovate-lanceolate, glandular. Ovary densely glandular; styles 2, reflexed, plumose. Capsule c. 5 x 7 mm, 2-lobed, yellow glandular. Seeds 2, hemispherical.

Fl. & Fr.: Jan.-Jul.

Distr.: Southern W.Ghats. Endemic. Usually found growing near streams or rivers. *CNS 2630* (Mavelikkara).

Mallotus philippensis (Lam.) Muell.-Arg., Linnaea 34; 196. 1865; Bedd., Fl. Sylv. t. 289. 1873 ("Philippinensis"); Hook. f., Fl. Brit. India 5: 442. 1887; Gamble, Fl. Pres. Madras 1322. 1925; Airy Shaw, Euphorb. Borneo 168. 1975; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 344. 1976;Mani & Sivar., Fl. Calicut 260. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1456. 1983; Ramach. & Nair, Fl. Cannanore 422. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 112. 1988; Vajravelu, Fl. Palghat Dist. 433. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 420. 1994; Sivar. & Mathew, Fl. Nilambur 629. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 408. 1996. *Croton philippensis* Lam., Encycl. 2: 206. 1786. ***Ponnagam*** Rheede, Hort. Malab. 5: 41-42, t. 21. 1685. ***Tsjerou-ponnagam*** Rheede, Hort. Malab. 5: 43, t. 22. 1685. ***Pee-ponnagam*** Rheede, Hort. Malab. 5: 37, t. 24. 1685.

Trees; bark nearly smooth, greyish; branchlets and young leaves covered with densely brown stellate pubescence. Leaves alternate, 6-18 x 3-9 cm, ovate, ovate-lanceolate or ovate-oblong, base rounded to broadly attenuate, margins subentire, apex gradually acuminate, glabrescent above, greyish pubescent and red-glandular beneath,

basally 3-ribbed; petiole 3-7 cm long. Panicles terminal, racemose, 8-15 cm long. Male flowers clustered in racemes, 3-4 mm across; tepals 4, 1-seriate, free, c. 2.5 mm long, tomentose without; stamens many. Female flowers 4-5 mm across; tepals 3, 3-4 mm long; ovary c. 2 mm long, 3-celled, pubescent and red-glandular without; stigmas 3, spreading, yellow. Capsule 8-12 mm across, globose, 3-valved, smooth, densely covered with red glands. Seeds globose, black.

Fl. & Fr.: Nov.-Apr.

Distr.: China, Indo-Malaysia to Australia. In waste lands. *CNS 2197* (Mavelikara).

Mallotus repandus (Willd.) Muell.-Arg., Linnaea 34: 197. 1865; Hook. f., Fl. Brit. India 5: 442. 1887; Gamble, Fl. Pres. Madras 1321. 1925; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 113. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 420. 1994; Sivar. & Mathew, Fl. Nilambur 629. 1996. *Croton repandus* Willd., Ges. Naturf. Freunde Berlin Neue Schriften 4: 206.1803. ***Watta-tali*** Rheede, Hort. Malab. 5: 63-64, t. 32. 1685.

Large scandent or subscandent shrubs with thorns on the trunk; branchlets stellate-pubescent. Leaves 4.5-10 x 4-8.7 cm, ovate or ovate-deltoid, base subcordate or truncate, margins entire or somewhat sinuate-toothed, apex obtuse, acute or acuminate, glabrescent above, densely stellate-pubescent and closely covered with small glands beneath, basally 3-ribbed; petiole 2.5-6 cm long. Male flowers in terminal panicled racemes; tepals 3-5, c. 3 mm long, suborbicular or lanceolate, concave, tomentose, glandular within; stamens many. Female flowers green, in simple racemes; tepals linear, caducous; ovary 2-lobed, tomentose, 2-celled; stigma plumose. Capsule 1-1.2 cm across, 2-valved, densely fulvous-tomentose and glandular without. Seeds subglobose, black.

Fl. & Fr.: Nov.-Apr.

Distr.: India, Sri Lanka, Myanmar, China, Malay Isls. and New Caledonia. In sacred groves. *CNS 2602* (Nulayakad Kavu).

Mallotus rhamnifolius (Willd.) Muell.-Arg., Linnaea 34: 196. 1865; Hook. f., Fl. Brit. India 5: 440. 1887; Gamble, Fl. Pres. Madras 1322. 1925; Nicols., Suresh & Mani., An

Interpr. Hort. Malab. 114. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 421. 1994. *Croton rhamnifolius* Willd., Neue Schrift. Naturf. Freunde Berlin 4: 190. 1803. ***Pee-tsjerou-ponnagam*** Rheede, Hort. Malab. 5: 45, t. 23. 1685.

Large shrubs; young parts densely brown tomentose. Leaves opposite or alternate, 7-16 x 3.5-6.5 cm, ovate-lanceolate or elliptic-lanceolate, base cuneate or subrounded, apex acuminate, glabrous above, finely pubescent and yellow-glandular below, basally 3-ribbed; petiole to 10 cm long. Spikes terminal, unbranched, 8-15 cm long. Male flowers distantly fascicled, 1-2 mm across; tepals 1-seriate, splitting to 3-5 valves; stamens many. Female flowers 1.5-2 mm across; tepals 5, lanceolate; ovary 3-celled; styles 3, spreading. Capsule 3-4 mm across, 3-valvular, brown stellate-tomentose. Seeds c. 2 mm across, globose.

Fl. & Fr.: Jan.-Apr.

Distr.: Peninsular India and Sri Lanka. In wastelands. *CNS 1790* (Angadikkal).

Mallotus tetracoccus (Roxb.) Kurz, J. Asiat. Soc. Bengal 16: 245.1873; Airy Shaw, Kew Bull. 26(2): 298. 1972; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 345. 1976; Rani in Matthew, Fl. Tam. Carnatic 3: 1457. 1983; Ramach. & Nair, Fl. Cannanore 423. 1988; Mani., Fl. Silent Valley 253. 1988; Vajravelu, Fl. Palghat Dist. 434. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 421. 1994; Sivar. & Mathew, Fl. Nilambur 630. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 408. 1996. *Rottlera tetracocca* Roxb., Fl. Ind. 3: 826. 1832. *Rottlera peltata* Wight, Ic. t. 1873. 1852. *Mallotus albus* auct. non Muell.-Arg. 1865; Hook. f., Fl. Brit. India 5: 429. 1887. *Mallotus albus* var. *occidentalis* Hook. f., Fl. Brit. India 5: 429. 1887; Gamble, Fl. Pres. Madras 1321. 1925.

Deciduous trees. Young stem densely twany tomentose. Leaves 6-17 x 4-12 cm, broadly ovate to deltoid, subpeltate, base broadly cuneate or subtruncate, apex acute to acuminate, twany tomentose when young on both sides, glabrous on upper side on ageing, 3-5-ribbed from base; petiole 8-15 cm long. Racemes densely clustered, axillary and terminal, paniculate, 10-25 cm long. Male flowers 5-7 mm across; tepals 4, 2-4 mm long, ovate; stamens many, on a fleshy receptacle. Female flowers: tepals 4, connate at base;

ovary 7-8 mm across, 3-4 locular, 3-4-lobed, tubercled and densely tomentose without; styles 3, spreading above, plumose. Capsules 1.5-2 x 1-1.5 cm, 3-4-valved, echinate-tomentose without. Seeds angular.

Fl. & Fr.: Oct.- Apr.

Distr.: Sri Lanka, India to South West China. In sacred groves. *CNS 1988* (Elangimelvallikavu).

MANIHOT P. Miller

Gard. Dict. Abr. ed. 4, 2. 1754.

Shrubs or small trees, often with tuberous roots and milky sap. Leaves alternate, petioled, palmatifid or palmatipartite. Flowers monoecious, in simple or paniculate racemes, males usually above and females below. Perianth often petaloid, campanulate or urceolate, 5-lobed or 5-fid. Stamens 10 in 2 whorls; filaments free, inserted between the lobes or glands of the disc. Pistillode 0 or 3-lobed. Disc in female hypogynous. Ovary 3-celled, cells 1-ovuled; styles shortly connate at the base, spreading, dilated or lobed at the tips. Capsule of three 2-valved cocci.

1a. Mainly shrubs; leaves not or slightly peltate, lobes oblanceolate; ovary with 6 longitudinal ridges; capsules with 6 longitudinal wings when young .... **M. esculenta**

1b. Mainly small trees; leaves distinctly peltate, lobes broadly elliptic to obovate; ovary smooth; capsules without wings ..... **M. glaziovii**

Manihot esculenta Crantz, Inst. Rei Herb. 1: 167. 1766; Airy Shaw, Kew Bull. 26: 308. 1972 & in Euphorb. Borneo 175. 1975; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 350. 1976; Mani. & Sivar., Fl. Calicut 259. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1458. 1983; Vajravelu, Fl. Palghat Dist. 440. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 421. 1994; Veldkamp & G.H. de Bruijn in Flach & Rumawas, Plant Res. S.E. Asia 9:107. 1996; Sivar. & Mathew, Fl. Nilambur 630. 1996; van Welzen *et al.*, Rheedea 7(2): 80. 1997. *Jatropha manihot* L., Sp. Pl. 1007. 1753. *Manihot utilissima* Pohl, Pl. Bras. Ic. Decr. 1: 32, t. 24. 1827; Hook. f., Fl. Brit. India 5: 239. 1886; Pax in

Engl., Pflanzenr. IV. 147. (2): 67, fig. 94. 1910; Gamble, Fl. Pres. Madras 1346. 1925. ***Kappa***.

Shrubs; bark smooth, yellowish grey. Leaf-lobes 7-18 x 2.6-5.5 cm, oblanceolate, base cuneate, apex shortly acuminate, dark green above, pale greenish below; petiole 12-23 cm long, light greenish to red. Inflorescence lax, with 3-5 together in fascicles. Male flowers: perianth divided to halfway or more, greenish-white with reddish-white bands inside; anthers yellow; disc yellow to light orange. Female flowers: perianth green with red margin and midrib; disc pink; ovary with 6 longitudinal ridges. Capsule c. 2.5 cm across, subglobose, 3-winged when young, smooth later. Seeds up to 12 mm long.

Fl. & Fr.: Feb.-Aug.

Distr.: Probably originally cultivated in NE. Brazil, nowadays only known from cultivation, and found throughout SE. Asia and Malesia. *CNS 2565* (Danapady).

Manihot glaziovii Mull.-Arg. in Mart., Fl. Bras. 11, 2: 446. 1874; Pax in Engl., Pflanzenr. IV. 147(2): 89, fig. 31. 1910; Gamble, Fl. Pres. Madras 1346. 1925; Airy Shaw, Kew Bull. Add. Ser. 4: 174. 1975 & in Euphorb. Borneo 174. 1975; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 345.1976; Mani. & Sivar., Fl. Calicut 259. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1459. 1983; Vajravelu, Fl. Palghat Dist. 440. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 422. 1994; Sivar. & Mathew, Fl. Nilambur 631. 1996. van Welzen *et al.*, Rheedea 7(2): 82. 1997. ***Kattu-rubber***.

Trees; bark pinkish grey to dark brown; scaly. Leaves peltate; lobes 3 or 5, 10-30 x 6-15 cm, broadly elliptic to obovate, apex acute, dark green above, pale bluish green below; petiole to 32 cm long. Inflorescence lax, usually single or few together. Male flowers: perianth divided to more or less halfway, greenish white to dark purplish inside at base; filaments white; anthers yellow. Female flowers: Perianth green tinged with reddish; ovary smooth. Capsule c. 3 cm across, globose, warty, without wings. Seeds c. 12 mm long; caruncle yellow.

Fl. & Fr.: June-March.

Distr.: Native of N. Brazil. Sparsely cultivated throughout SE Asia. Commonly planted as hedge. *CNS 2121* (Pandanad).

MICROCOCCA Bentham

in W.J. Hooker, Niger Fl. 503. 1849.

Micrococca mercurialis (L.) Benth. in Hook., Niger. Fl. 503. 1849; Gamble, Fl. Pres. Madras 1328. 1925; Mani. & Sivar., Fl. Calicut 268. 1982; R. Sm., Kew Bull. 37: 425. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1460. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 422. 1994; Sivar. & Mathew, Fl. Nilambur 632. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 410. 1996. *Tragia mercurialis* L., Sp. Pl. 980. 1753. *Caloxylon mercuriale* (L.) Thw., Enum. Pl. Zeyl. 271. 1861; Hook. f., Fl. Brit. India 5: 412. 1887. ***Kunukittatti***.

Annual herbs. Leaves alternate, 2-4x 1-2.5 cm, ovate or ovate-lanceolate, base rounded, serrate on margins, apex acute or shortly acuminate, puberulous, membranous; petiole to 2.5 cm long. Flowers in interrupted clusters, on axillary racemes, often drooping. Bracts minute. Male flowers minute, c. 1.5 mm across; perianth 1-seriate, 3-lobed, lobes ovate; stamens 3-5, free, with 6-8-ciliate glandular scales between filaments. Female flowers c. 2 mm across; tepals 3, lanceolate, shortly connate; ovary 3-lobed, sparsely pubescent, 3-locular; ovules 3; styles 3; stigma linear, plumose. Capsule 4-5 mm across, 3-lobed, glabrescent. Seeds c. 1mm across, globose, minutely arillate.

Fl. & Fr.: Mar.-Jul.

Distr.: India, Sri Lanka, Arabia and Tropical Africa. A weed along roadsides and in fallow lands. *CNS 1140* (Vandanam).

PEDILANTHUS Poiteau

Ann. Mus. Natl. Hist. Nat. 19: 388. 1812.

Pedilanthus tithymaloides (L.) Poit., Ann. Mus. Natl. Hist. Nat. 19: 390, t. 19. 1812; Hook. f., Fl. Brit. India 5: 239. 1886; Gamble, Fl. Pres. Madras 1346. 1925; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 350. 1976; Mani. & Sivar., Fl. Calicut 258. 1982; Rani

in Matthew, Fl. Tam. Carnatic 3: 1461. 1983; Sivar. & Mathew, Fl. Nilambur 634. 1996. *Euphorbia tithymaloides* L., Sp. Pl. 453. 1753.

Erect fleshy shrubs or undershrubs to 1.5 m tall; branchlets zigzag, latex milky. Leaves alternate, 3-7 x 2-4 cm, elliptic-ovate or elliptic, base attenuate, apex acute or subacute, variegated, deciduous, fleshy; petiole to 8 mm long. Cyathia stalked, terminal, cymose, subtended by petaloid, lanceolate, caducous bracts. Involucre obliquely bilateral, zygomorphic, c. 1.5 cm long; bracts 4, unequal, thin-fleshy, scarlet; glands 4, unequal, basal, enclosed by bracts; appendages and perianth absent. Male florets c. 25, all fertile; filaments jointed below to the pedicels; anthers reniform. Female florets single, raised above by a stalk, erect; ovary 3-celled; ovules 3; style stout; stigmas 3, each bifid. Fruit not seen.

Fl.: Mar.-May.

Distr.: Widely cultivated in India. Native of S. America. Planted as hedge plants. Occasionally run wild and getting naturalized. *CNS 2178* (Vallikkunnam).

PHYLLANTHUS Linnaeus

Sp. Pl. 981. 1753.

Monoecious herbs, shrubs or trees. Leaves alternate, distichous, subsessile, penninerved, entire. Stipules various. Flowers axillary, solitary to clustered. Perianth lobes 4-6, usually in 1 series, valvate or imbricate, free or basally connate, persistent in fruits. Stamens 3-6; filaments free or connate; dehiscence vertical or transverse. Ovary 3-12-celled, ovules 2 in each cell, sometimes more; styles 3, spreading, erect or reflexed. Disc in male of 4, 5or 6 glands, in female annular. Capsule smooth or verrucose of three, 2-valved cocci or sometime fleshy drupes or berry, indehiscent. Seeds 6-10, usually trigonous, variously striate or smooth.

1a. Erect or scandent shrubs or trees; fruit baccate.

2a. Tepals 4; stamens 4, filaments free; flowers clustered in slender racemes; leaves 2-3 cm wide ..... **P. acidus**

2b. Tepals 5-6; stamens 3 or 5, filaments connate; flowers in axillary fascicles or solitary; leaves up to 1.5 cm wide.

3a. Trees; stamens 3; leaves 2-4 mm wide; fruit 2-3 cm across, greenish-yellow ..... **P. emblica**

3b. Scandent shrubs; stamens 5; leaves 1-1.5 cm wide; fruit 5-7 mm across, black ..... **P. reticulatus**

1b. Herbs annual or perennial; fruit capsular.

4a. Stipules subsagittate-peltate; stems many branched from woody rootstock; branchlets do not resemble pinnate leaves; perennials ..... **P. virgatus**

4b. Stipules not subsagittate-peltate; stem single; branchlets resemble pinnate leaves; annuals.

5a. Capsules verrucose; leaves reddish ..... **P. urinaria**

5b. Capsules smooth; leaves green.

6a. Stem angled; tepals 6; disc glands 6 in male flowers; fruiting perianth as long as capsule ..... **P. debilis**

6b. Stem terete; tepals 5; disc glands 5 in male flowers; fruiting perianth smaller than capsule.

7a. Stamens 5; filaments free; female pedicels upto 6 mm long ... . **P. tenellus**

7b. Stamens 3; filaments connate; female pedicels up to 2 mm long ..... **P. amarus**

Phyllanthus acidus (L.) Skeels, U.S.D.A. Bur. Pl. Industr. Bull. 148: 17. 1909; Webster, J. Arnold Arbor. 38: 66. 1957; Mani. & Sivar., Fl. Calicut 263. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1463. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 114. 1988. *Averrhoa acida* L., Sp. Pl. 428. 1753. *Cicca acida* (L.) Merr., Interpr. Herb. Amboin.314. 1917. *Cicca disticha* L., Mant. Pl. 124. 1767; Gamble, Fl. Pres. Madras 1346.1925. *Phyllanthus distichus* (L.) Muell.-Arg. in DC., Prodr. 15: 413. 1866; Hook. f., Fl. Brit. India 5: 304. 1887. ***Neli-pouli*** Rheede, Hort. Malab. 3: 57-58, t. 47-48. 1682. ***Nellika-pouli***.

Small trees; branches closely marked with the scars of deciduous branchlets; branchlets 15-37 cm long. Leaves 2.2-6 x 2-3 cm, ovate, ovate-oblong or ovate-lanceolate, base rounded, apex acute or obtuse, somewhat pale glaucous beneath; petiole 3-5 mm long; stipules minute, subulate. Flowers 4-merous, clustered usually in slender racemes from the tubercles; clusters with several males and 1-2 females; rarely bisexual. Male flowers red, minute; tepals 4; stamens 4; filaments free. Female flowers green; tepals 4, unequal; ovary 3-4-celled, shortly stipitate, 3-4-lobed; styles 3-4, spreading, 2-fid. Drupe 1.3-1.8 cm across, depressed globose, 6-8-groved, yellowish.

Fl. & Fr.: Dec.-Apr.

Distr.: Probably native of the coastal region of N.E. Brazil. Planted throughout India. *CNS 1990* (Purakkad).

Phyllanthus amarus Schum. & Thonn., Kongl. 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; Mani. & Sivar., Fl. Calicut 264. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1464. 1983; Ramach. & Nair, Fl. Cannanore 424. 1988; Vajravelu, Fl. Palghat Dist. 435. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 423. 1994; Sivar. & Mathew, Fl. Nilambur 635. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 412. 1996. *Phyllanthus niruri* auct., non L., 1753: Wight, Ic. t. 1894. 1852; Hook. f., Fl. Brit. India 5: 298. 1887; Gamble, Fl. Pres. Madras 1290. 1925. ***Keezhar-nelli.***

Erect herbs to 30 cm tall. Leaves 6-8 x 3-4 mm, oblong, base unequal sided, apex obtuse to acute, lower surface glaucous; stipules lanceolate, scarious. Male flowers towards tip of branchlets, solitary, axillary; tepals 5, ovate; stamens 3, exserted; filaments connate; disc of 5 glands. Female flowers c. 1.5 mm across; tepals 5, oblong; ovary globose; style erect, recurved; pedicel to 2 mm long. Capsule c. 2 mm across, globose. Seeds 6, trigonous, vertically muriculate.

Fl. & Fr.: Most of the seasons.

Distr.: Native of Tropical America; now Pantropical. In wastelands, paddy fields and road sides. *CNS 2566* (Thiruvanvandoor), *CNS 1993* (Andhakaranazhi).

This species is used in Indian medicines especilly against Jaundice.

Phyllanthus debilis Klein ex Willd., Sp. Pl. 4: 582. 1805; Hook. f., Fl. Brit. India 5: 297. 1887; Gamble, Fl. Pres. Madras 1290. 1925; Airy Shaw, Kew Bull. 26: 92. 1971; Mani. & Sivar., Fl. Calicut 264. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1466. 1983; Mitra & Jain, Bull. Bot. Surv. India 27: 168. 1985; Ramach. & Nair, Fl. Cannanore 424. 1988; Sivar. & Mathew, Fl. Nilambur 635. 1996. *Phyllanthus niruri* var. *javanicus* Muell.-Arg., Linnaea 32: 43. 1863 & in DC., Prodr. 15(2): 407. 1866. *Phyllanthus niruri* var. *debilis* (Klein. ex Willd.) Muell.-Arg., Linnaea 32: 43. 1863 & in DC., Prodr. 15(2): 407. 1866. This also is known as ***Keezhar-nelli***.

Erect herbs to 50 cm tall; stem angled; branches 6-14 cm long. Leaves 1-2 x 0.3 -0.5 cm, elliptic or elliptic-oblong, base attenuate or broadly cuneate, apex obtuse or acute, lower surface subglaucous, subsessile; stipules c. 2 mm long, lanceolate, acuminate. Male flowers towards tip of branchlets, clustered at axils; tepals 6, in 1 series, 1-1.5 mm long, obovate, hyaline; disc-glands 6, roundish; stamens 3, on a staminal column formed of connate filaments. Female flowers solitary; pedicels c. 2 mm long; tepals 6, c. 2 mm long, elliptic-oblong, margin hyaline; disc saucer-form, faintly 6-lobed; ovary c. 1 mm long; style-arms recurved. Capsule 2-3 mm across, globose, smooth. Seeds 6, trigonous, longitudinally striate.

Fl. & Fr.: Almost throughout the year.

Distr.: Tropical Africa, India and New Guinea. Common in wastelands. *CNS 2128* (Mannarsala), *CNS 2567* (Thumboli).

Phyllanthus emblica L., Sp. Pl. 982. 1753; Bedd., Fl. Sylv. t. 258. 1872; Hook. f., Fl. Brit. India 5: 289. 1887; Webster, J. Arnold Arbor. 38: 76. 1957; Airy Shaw, Kew Bull. 26(2): 319. 1972; Mani. & Sivar., Fl. Calicut 262. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1466. 1983; Mani., Fl. Silent Valley 253. 1988; Nicols., Suresh & Mani., An Interpr. Hort.

Malab. 114. 1988; Vajravelu, Fl. Palghat Dist. 436. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 424. 1994; Sivar. & Mathew, Fl. Nilambur 636. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 412.1996. *Emblica officinalis* Gaertn., Fruct. 2: 122. 1791; Wight, Ic. t. 1896. 1852; Gamble, Fl. Pres. Madras 1295. 1925; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 336. 1976; Ramach. & Nair, Fl. Cannanore 414. 1988. ***Nilicamaram*** Rheede, Hort. Malab. 1: 69-70, t. 38. 1678. ***Nelli***.

Medium-sized deciduous trees; branchlets reddish brown, pubescent. Leaves 10-12 x 2-4 mm, elliptic-oblong, base truncate, apex acute to shortly apiculate, pinnately arranged on short branches; stipule minute, linear. Flowers small, male and female mixed in fascicles or more usually the upper male and lower ones female. Male flowers: c. 2 mm across; tepals 6, oblanceolate; stamens 3, filaments connate; anthers coherent; disc-glands 6. Female flowers: 3-4 mm across; tepals 6, oblanceolate; ovary c. 1.5 mm long, style 3, bifid at apex, fimbriate. Drupe fleshy, 2-3 cm across, globose, greenish-yellow. Seeds 6, 3-gonous, enclosed in a stony testa.

Fl. & Fr.: Jan.-Apr.

Distr.: Paleotropics. In waste lands and also cultivated for its edible fruits. *CNS 1547* (Angadikkal).

Phyllanthus reticulatus Poir. in Lamk., Encyl. 5: 298. 1804; Hook. f., Fl. Brit. India 288. 1887; Webster, J. Arnold Arbor. 38: 57. 1957; Airy Shaw, Kew Bull. 26: 322. 1972; Mani. & Sivar., Fl. Calicut 262. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1468. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 115. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 424. 1994; Sivar. & Mathew, Fl. Nilambur 639. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 413. 1996. *Kirganelia reticulata*((Poir.) Baill., Etued. Gen. Euphorb. 613. 1858; Gamble, Fl. Pres. Madras 1294. 1925; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 343. 1976; Ramach. & Nair, Fl. Cannanore 421. 1988; Vajravelu, Fl. Palghat Dist. 432. 1990. ***Katou-nirouri*** Rheede, Hort. Malab. 5: t. 44. 1685.

Scandent shrubs; branches pubescent. Leaves 1.5-2 x 1-1.5 cm, elliptic, base acute, apex acute or obtuse, glabrous; stipules lanceolate, often spinescent; petiole to 2 mm long.

Male flowers in axillary fascicles; tepals 5, unequal, obovate, imbricate; stamens 5, outer 2-3 free, inner connate. Female flowers solitary; tepals 5, shortly connate, obovate, valvate, margin scarious; ovary globose, 5-12-locular; styles 3, bifid. Fruits 5-7 mm across, globose, black, 8-10-seeded. Seeds trigonous.

Fl. & Fr.: Dec.-Mar.

Distr.: Indo-Malesia and Tropical Africa. Common in plains, wastelands, often grown in hedges. *CNS 1238* (Pattanakkad).

Phyllanthus tenellus Roxb. (Hort. Beng. 69. 1814, *nom. nud.*) Fl. Ind. 3: 668. 1832; Muell.-Arg. in DC., Prodr. 15(2): 338. 1866; Hook. f. in Hook., Ic. Pl. t. 1569. 1887; Webster, J. Arnold Arbr. 38: 52, f. 6. 1957 & 37. 257. Pl. I. f. 3. 1956; Dhruvan & Ramla, J. Econ. Tax. Bot. 21(3): 731. 1997. *Chorisandra pinnata* Wight, Ic. t. 6: 1994. 1853. *Diasperus tenellus* (Roxb.) Kuntze, Rev. Gen. 2: 601. 1891. *Phyllanthus minor* Fawcett & Rendle, J. Bot. 57: 65-66. 1919 & in Fl. Jamaica 4(2): 257. 1920.

Erect annual herbs to 60 cm tall. Branchlets 5-14 cm long, with 14-25 leaves. Leaves 0.8-2.3 x 0.4-1.2 cm, broadly elliptic to obovate, base acute to rounded, apex subactute, dark green above, paler beneath; petiole to 1 mm long. Flowers 1-5 in axillary clusters. Male flowerss: c. 1.5 mm across,white; tepals 5, imbricate, c. 0.5 mm long, obovate, whitish with a narrow midrib; disc 5-lobed; stamens 5, free, alternate with the disc lobes; pedicels to 2 mm long; filiform. Female flowers: c. 1.5 mm across; tepals to 1 mm long, triangular-ovate, whitish with a thick greenish midrib; disc annular to 5-gonal; ovary smooth; pedicels to 6 mm long. Capsule 1-1.5 mm across, depressed-globose, smooth. Seeds trigonous, densely papillose.

Fl. & Fr.: Oct.-Apr.

Distr.: Native of Mascarene Islands. Introduced and naturalized in South-eastern United states, West Indies, Brazil and India. *CNS 2046* (S.N. Puram).

Phyllanthus urinaria L., Sp. Pl. 892. 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. 1971; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 347. 1976; Mani. & Sivar., Fl. Calicut 266. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1469. 1983; Ramach. & Nair, Fl. Cannanore 425. 1988; Vajravelu, Fl. Palghat Dist. 437. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 425. 1994; Sivar. & Mathew, Fl. Nilambur 640. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 413. 1996. *Phyllanthus leprocarpus* Wight, Ic. t. 1895, f. 4. 1852.

Erect herbs to 40 cm tall; young stem and leaves reddish. Leaves 0.6-1.2 x 0.4-0.6 cm, oblong, base oblique, margin ciliate, apex acute to apiculate, glabrous; stipules c. 1mm long, linear to subulate. Male flowers in axillary clusters; tepals 6, 1-seriate, orbicular; stamens 5, filaments united; disc 6-lobed. Female flowers in lower axils, solitary; tepals 6, obovate-oblong; ovary warted without; stigma 3, each 2-fid; disc annular. Capsule 2-3 mm across, globose, 3-lobed, sessile, verrucose. Seeds 6, trigonous, transversely ridged.

Fl. & Fr.: Jul.-Dec.

Distr.: Pantropical. A common weed on roadsides and waste places. *CNS 1026* (Vandanam).

Phyllanthus virgatus Forst. f., Ins. Austr. Prod. 65: 1786; Airy Shaw, Kew Bull. 26: 325. 1972 & 37: 34. 1982; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 347. 1976; Mani. & Sivar., Fl. Calicut 264. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1469. 1983; Ramach. & Nair, Fl. Cannanore 425. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 115. 1988; Vajravelu, Fl. Palghat Dist. 437. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 425. 1994; Sivar. & Mathew, Fl. Nilambur 641. 1996; Sasi. & 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. ***Niruri, Nirpulla*** Rheede, Hort. Malab. 10: t. 27. 1690.

Erect or diffuse herbs with woody root stock. Leaves 1.5-2.2 x 0.4-0.6 cm, narrowly oblong, base acute, apex apiculate; stipules peltate-subsagittate, acuminate. Flowers solitary, axillary. Male flowers minute, subsessile; tepals 5, orbicular; stamens 3;

filaments nearly free. Female flowers on long, filiform pedicels; tepals 6, oblong, acute; styles 3, spreading; disc saucer-shaped, wavy. Capsule 3-4 mm across, depressed-globose, verrucose. Seeds minutely tubercled.

Fl. & Fr.: Jul.-Feb.

Distr.: Indo-Malesia to Polynesia and China. In waste lands. *CNS 1309* (Chengannur).

RICINUS Linnaeus

Sp. Pl. 1007. 1753.

Ricinus communis L., Sp. Pl. 1007. 1753; Roxb., Fl. Ind. 3: 689. 1832; Hook. f., Fl. Brit. India 5: 457. 1887; Gamble, Fl. Pres. Madras 1335. 1925; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 347. 1976; Mani. & Sivar., Fl. Calicut 258. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1471. 1983; Mani., Fl. Silent Valley 245. 1988; Ramach. & Nair, Fl. Cannanore 426. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 118. 1988; Vajravelu, Fl. Palghat Dist. 440. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 425. 1994; Sivar. & Mathew, Fl. Nilambur 641. 1996. ***Avanacu, Citavanacu, Pandi-avanacu*** Rheede, Hort. Malab. 2: 57-60, t. 32. 1679. ***Avanacu***.

Monoecious, branched glaucous shrubs. Leaves alternate, palmately 6-8-lobed, peltate, to 20 x 24 cm; lobes 9-15 x 3-6 cm, lanceolate, margin coarsely serrate, apex acuminate; petiole to 18 cm long. Flowers in terminal paniculate racemes, pale yellow; male flowers below, female ones above. Male flowers: perianth cupular, 3-5-lobed, c. 4 mm long, lanceolate; stamens many, filaments connate, repeatedly branched. Female flowers: tepals 5, subequal, c. 5 mm long, lanceolate; ovary globose, 3-locular, echinate; ovule 1-per locule; styles 3, papillose. Capsule 1.6-2 cm across, 3-lobed, prickly. Seeds oblong, smooth, marbled, carunculate.

Fl. & Fr.: Most of the seasons.

Distr.: Probably native of N.E. Trop. Africa. Widely cultivated in tropics, occasionally run wild. *CNS 2100* (Chennithala).

The seeds yield 'caster oil'. The roots, leaves and seeds of this plant are important in Ayurvedic medicines.

SAUROPUS Blume

Bijdr. 595. 1825-1826.

Sauropus bacciformis (L.) Airy Shaw, Kew Bull. 35: 685. 1980; Rani in Matthew, Fl. Tam. Carnatic 3: 1472. 1983. *Phyllanthus bacciformis* L., Mant. Pl. 294. 1771. *Agneia bacciformis* (L.) Juss., Euphorb. Gen. 24. 1824; Wight, Ic. t. 1893. 1852; Hook. f., Fl.Brit. India 5: 285. 1887; Gamble, Fl. Pres. Madras 1284. 1925. *Synostemon bacciformis* (L.) Webster, Taxon 9: 26. 1960; Airy Shaw, Kew Bull. 26: 343. 1972; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 349. 1976; Mohanan & Henry, Fl. Thiruvananthapuram 426. 1994. ***Nilam-tenga*** (Plate XXI: C).

Erect or diffuse glabrous herbs, 12-45 cm tall; stems angular or compressed. Leaves subsessile, 0.5-1.8 x 0.2-1 cm, elliptic, oblong or oblong-obovate, base rounded or cuneate, apex acute, obtuse or rounded, apiculate, rather thick; stipules lanceolate or deltoid and auricled, acuminate. Flowers monoecious, minute, axillary, clustered or solitary; bracts subulate. Male flowers 2-4 from the lower axils, c. 1 mm across; pedicels slender; perianth lobes 6, gland-dotted, white-margined, hooded; disc 6-lobed; filaments connate with subsessile anthers. Female flowers solitary, axillary, near the top of the branches, c. 3 mm across; perianth-lobes 6, ovate, acuminate, gland-dotted; disc absent; style very short, bifid, sunk in the top of the ovary. Capsule drooping, 3-5 mm long, ellipsoid or oblong-ovoid, with truncate tip, splitting into three, 2-valved cocci. Seeds 6, slender, curved.

Fl. & Fr.: Most of the seasons.

Distr.: India, Mauritius, Sri Lanka, S.E. Asia, S. China, Malaya, Java and Celebes. Frequent in open, grassy places near the sea. *CNS 1091* (Pallithode), *CNS 1965* (Muhamma).

SEBASTIANIA K.P.J. Sprengel

Neue Entdeck. Pflanzenk. 2: 118. 1820 ("1821").

Sebastiania chamaelea (L.) Muell.-Arg. in 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; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 348. 1976; Mani. & Sivar., Fl. Calicut 267. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1474. 1983; Ramach. & Nair, Fl. Cannanore 426. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 118. 1988; Vajravelu, Fl. Palghat Dist. 438. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 426. 1994; Sivar. & Mathew, Fl. Nilambur 643. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 414. 1996. *Tragia chamaelea* L., Sp. Pl. 981. 1753. ***Codi-avanacu*** Rheede, Hort. Malab. 2: 63, t. 34. 1679.

Erect or diffuse herbs. Leaves alternate, 2-4.5 x 0.7-1 cm, oblong-lanceolate, base obtuse, margin minutely dentate, apex obtuse or acute; petiole to 3 mm long. Flowers in monoecious slender axillary spikes, 1.5-2.5 cm long. Male flowers minute, c. 1.5 mm across in clusters of 3; tepals 5, connate; stamens 2-4, anthers globose. Female flowers solitary at base of spike, c. 1 mm across; tepals 3, ovate; ovary 3-lobed, echinate without; ovule 1 in each cell; style 3, connate at base. Capsule 3-lobed each with two rows of soft prickles on the back, 4-6 mm across. Seeds 1-1.5 mm long, oblong, carunculate.

Fl. & Fr.: Most of the seasons.

Distr.: India, Sri Lanka, Australia to Pacific. Common in exposed areas. *CNS 1038* (Vandanam).

SECURINEGA Commerson ex A.L. Jussieu

Gen. 388. 1789 (*nom. cons.*).

Securinega virosa (Roxb. ex Willd.) Baill., Adansonia 6: 334. 1866; Airy Shaw, Kew Bull. 26(2): 340. 1972; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 348. 1976; Mani. & Sivar., Fl. Calicut 271. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1476. 1983; Ramach. & Nair, Fl. Cannanore 427. 1988; Mani., Fl. Silent Valley 255. 1988; Vajravelu,

Fl. Palghat Dist. 439. 1990; Sivar. & Mathew, Fl. Nilambur 644. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 415. 1996. *Phyllanthus virosus* Roxb. ex Willd., Sp. Pl. 4: 578. 1805. *Fluggea microcarpa* Bl., Bijdr. 580. 1826; Hook. f., Fl. Brit. India 5: 328. 1887. *Fluggea virosa* (Willd.) Baill., Etud. Gen. Euphorb. 593. 1858; Gamble, Fl. Pres. Madras 1296. 1925.

Profusely branched dioecious shrubs. Leaves alternate, 1.5-3.5 x 1-2 cm, obovate, base cuneate, apex obtuse, glaucous below, chartaceous; petiole c. 3 mm long. Flowers minute in axillary clusturs, short-pedicelled. Male flowers numerous; pedicels to 2 mm long; tepals 5, c. 1 mm long, ovate-concave, crenulate; stamens 5, free; pistillodes 3. Female flowers c. 2 mm across; tepals 5, ovate. Fruit white, c. 4 mm across, globose.

Fl. & Fr.: Apr.-Jun.

Distr.: Indo-Malesia to Polynesia, E. Asia and Tropical Africa. In wastelands. *CNS 1485* (Edathuva).

TRAGIA Linnaeus

Sp. Pl. 980. 1753.

Tragia involucrata L., Sp. Pl. 980. 1953; Hook. f., Fl. Brit. India 5: 465. 1888, p.p.; Gamble, Fl. Pres. Madras 1332. 1925; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 349. 1976; Mani. & Sivar., Fl. Calicut 267. 1982; Rani in Matthew, Fl. Tam. Carnatic 3: 1479. 1983; Ramach. & Nair, Fl. Cannanore 427. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 118. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 427. 1994; Sivar. & Mathew, Fl. Nilambur 645. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 415. 1996. ***Schorigenam*** Rheede, Hort. Malab. 2: t. 39. 1679. ***Kodi-thuva***.

Slender, twining herbs with stinging hairs. Leaves 6-10 x 3-5.5 cm, ovate or elliptic, base acute or rounded, margin serrate, apex acuminate, hispidulous on both sides; petiole to 2.5 cm long. Spikes axillary, monoecious, to 2 cm long; male flowers above, female flowers 1-2, at the base. Male flowers c. 1.5 mm across; bracts spathulate; tepals 3, spreading; stamens 3, anthers subsessile. Female flowers c. 3 mm across, ebracteate;

tepals 6, c. 1 mm long, ovate-lanceolate, enlarged and spreading in fruits; style 3, spreading. Capsule c. 0.6 x 1 cm, 3-lobed, hispid. Seeds globose.

Fl. & Fr.: Nov.-Dec.

Distr.: India and Sri Lanka. A weed in open places, waste lands; climbing on bushes and thickets. *CNS 1239* (Pattanakkad).

TREVIA Linnaeus

Sp. Pl. 1193. 1753 ('Trewia').

Trevia polycarpa Benth. in Benth. & Hook. f., Gen. Pl. 3: 318. 1880; Hook. f., Fl. Brit. India 5: 424. 1887; Gamble, Fl. Pres. Madras 1319. 1925; Rani in Matthew, Fl. Tam. Carnatic 3: 1483. 1983; Vajravelu, Fl. Palghat Dist. 440. 1990; Sasi. & Sivar., Fl. Pl. Thrissur For. 416. 1996. *Trevia nudiflora* Wight, Ic. t. 1871. 1852, non L., 1753. ***Ammanaka***.

Trees; bark smooth, greyish. Leaves 6-20 x 4.5-12 cm, broadly ovate to deltoid, base truncate or rounded, apex gradually acuminate; petiole to 12 cm long. Flowers in axillary pendulous racemes. Male: raceme to 12 cm long; flowers c. 6 mm across; tepals c. 3 mm long, oblanceolate, acute;stamens many; filaments c. 4 mm long. Female: raceme to 8 cm long; flowers c. 3 mm across; tepals c. 3 mm long, lanceolate; ovary 3-or-4-locular; styles 3 or 4. Drupe c. 1.5 cm across, globose.

Fl. & Fr.: Feb.-Aug.

Distr.: Peninsular India. Along stream sides. *CNS 1436* (Chakkumkari).

Note: The acceptance of spelling change from *Trewia* to *Trevia* was discussed in detailed by Nicolson *et al.*, (1988).

105. URTICACEAE Juss.

Gen. Pl. 400. 1789.

1a. Plants with stinging hairs; leaf margin not entire.

2a. Leaves 3-7-lobed; stipules foliaceous, ovate-cordate; achenes oblique tipped by style, not winged ..... **Girardinia**

2b. Leaves not lobed; stipules small, lanceolate; achenes compressed with narrow winged margin ..... **Laportea**

1b. Plants without stinging hairs; leaf margin entire.

3a. Leaves opposite, 1-nerved, to 6 mm long; achenes not winged ..... **Pilea**

3b. Leaves alternate, nerves 3 or 4 pairs, above 1.5 cm long; achenes winged ..... **Pouzolzia**

GIRARDINIA Gaudichaud-Beaupre

in Freycinet, Voyage Monde, Uranie Physicienne Bot. 498.1830 ('1826').

Girardinia diversifolia (Link) Friis, Kew Bull. 36: 145. 1981; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1490. 1983; Mani., Fl. Silent Valley 262. 1988; Ramach. & Nair, Fl. Cannanore 438. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 258. 1988; Vajravelu, Fl. Palghat Dist. 453. 1990; Sivar. & Mathew, Fl. Nilambur 651. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 419. 1996. *Urtica diversifolia* Link, Enum. Pl. Hort. Bot. Berol. Alt. 2: 385. 1822, non Bl., 1825. *Girardinia heterophylla* Decne. in Jacq., Bot. Voy. Bon. 151, t. 153. 1844; Hook. f., Fl. Brit. India 5: 550. 1888. G. *zeylanica* Decne in Jacq., Bot. Voy. Bon. 152. 1844; Fischer in Gamble, Fl. Pres. Madras 1373. 1928; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 89. 1976; Mani. & Sivar., Fl. Calicut 279. 1982. ***Ana-schorigenum*** Rheede, Hort. Malab. 2: 77-78, t. 41. 1679.

Subshrubs with white stinging hairs. Leaves alternate, 3-7-lobed, 8-15 x 10-17 cm, base cordate, lobes margin inciso-serrate, densely strigose, 3-ribbed from base; stipules to 1.5 x 1 cm, broadly oblong, auricled, acute; petiole to 10 cm long, reddish. Male flowers in axillary, cylindrical branched or unbranched spikes, white; tepals 4, c. 2 mm long, ovate, cucullate; stamens 4; pistillode globose. Female flowers in subterminal heads;

tepals connate into a ventricose tube, 2-4-lobed; ovary flattened, ovate, style filiform. Achenes c. 3 mm across, compressed.

Fl. & Fr.: Nov. - Jan.

Distr.: Sri Lanka, India, Himalaya, Myanmar, east to China and Malesia. In waste places. *CNS 2114* (Thamarakulam).

LAPORTEA Gaudichaud-Beaupre

in Freycinet, Voyage Monde,Uranie Physicienne Bot. 498. 1830 ("1826") (*nom. cons.*).

Laportea interrupta (L.) Chew, Gard. Bull. Straits Settlem. 21: 200. 1965 & 25: 145. 1969; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 89. 1976; Mani. & Sivar., Fl. Calicut 279. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1491. 1983; Ramach. & Nair, Fl. Cannanore 439. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 258. 1988; Vajravelu, Fl. Palghat Dist. 453. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 436.1994; Sivar. & Mathew, Fl. Nilambur 652. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 420. 1996. *Urtica interrupta* L., Sp. Pl. 985. 1753; Roxb., Fl. Ind. 3: 585. 1832; Wight, Ic. t. 692. 1840. *Fleurya interrupta* (L.) Gaudich., Voy. Bonite, Bot. 497, t. 8. 1826; Wight, Ic. t. 1975. 1853; Wedd., Monogr. Urtic. 115. 1856; Hook. f., Fl. Brit. India 5: 548. 1888; Fischer in Gamble, Fl. Pres. Madras 1372. 1928. ***Battischorigenam*** Rheede, Hort. Malab. 2: 75, t. 40. 1979. ***Choriyan***.

Erect monoecious annual herbs with stinging hairs. Leaves alternate, 4-10 x 3-5 cm, broadly ovate, base rounded or subcordate, margin coarsely serrate, apex acuminate, sparsely hairy, membranous, 3-nerved from base; petiole to 8 cm long. Flowers in short, cymose clusters aggregated in slender lax, axillary spikes to 13 cm long. Male flowers: tepals 4, c. 1 mm long, ovate, concave; stamens 4, filaments unequal; pistillode linear, clavate. Female flowers: tepals 4, unequal, basally connate into a cup; ovary obliquely attached, ovoid, style lateral, filiform. Achenes c. 2 mm across, ovoid, compressed.

Fl. & Fr.: Sep. - Dec.

Distr.: Paleotropics. Common weedy species in moist wastelands and in gardens. *CNS 2383* (Thumboli), *CNS 1923* (Kanjoor).

PILEA Lindley

Collect. Bot. ad t. 4. 1821 (*nom. cons.*).

Pilea microphylla (L.) Liebm., Vidensk. Salsk. Skr. 5(2): 296. 1851; Hook. f., Fl. Brit. India 5: 551. 1888; Fischer in Gamble, Fl. Pres. Madras 1379. 1928; Mani. & Sivar., Fl. Calicut 279. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1493. 1983; Ramach. & Nair, Fl. Cannanore 440. 1988. *Parietaria microphylla* L., Syst. Nat. ed. 10, 1308. 1759. *Urtica microphylla* (L.) Sw., Fl. Ind. Occid. 1: 305. 1797. *Pilea muscosa* Lind., Coll. Bot. t. 4. 1821; var. *microphylla* (Sw.) Wedd., Monogr., Urtic. 174. 1856.

Slender succulent herbs; branches and leaves bifarious; stem transparent. Leaves to 4 x 3 mm, ovate-orbicular, base attenuate, apex obtuse, subsucculent, 1-nerved; raphides transverse; petiole to 1 mm long. Flowers monoecious in small umbellate clusters, 1-1.5 mm across. Male flowers: tepals 4, free, concave, obtuse; stamens 4. Female flowers: tepals connate, 2-4-toothed; ovary c. 0.5 mm long, ovoid, 1-celled; ovule 1. Achene c. 1 mm long, ellipsoid.

Fl. & Fr.: Oct. - Dec.

Distr.: Native of Tropical S. America; now cosmopolitan. A weed in moist places in gardens and on stone walls. *CNS 1349* (Alappuzha town).

POUZOLZIA Gaudichaud-Beaupre

in Freycinet, Voyage Monde, Uranie Physicienne Bot. 503. 1830 ("1826").

Pouzolzia zeylanica (L.) Bennett in Bennett *et al.*, Pl. Jav. Rar. 67. 1838; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 91. 1976; Mani. & Sivar., Fl. Calicut 280. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1497. 1983; Mani., Fl. Silent Valley 265. 1988; Ramach. & Nair, Fl. Cannanore 441. 1988; Nicols., Suresh &Mani., An Interpr. Hort. Malab. 259. 1988; Vajravelu, Fl. Palghat Dist. 457. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 439. 1994; Sivar., & Mathew, Fl. Nilambur 654.1996;

Sasi. & Sivar., Fl. Pl. Thrissur For. 422. 1996. *Parietaria zeylanica* L., Sp. Pl. 1052. 1753. *P. indica* L., Mant. Pl. 128. 1767. *Pouzolzia indica* (L.) Gaudich. in Freycinet, Voy. Bonite Bot. 503. 1826; Wight, Ic. t. 1980, f. 1 & t. 2100, f. 40. 1853; Hook. f., Fl. Brit. India 5: 581. 1888; Fischer in Gamble, Fl. Pres. Madras1382. 1928. ***Bula*** Rheede, Hort. Malab. 10: 59, t. 30.1690.

Slender procumbent herbs. Leaves alternate, 1.5-3 x 1-2 cm, ovate-elliptic, base rounded, apex acute, sparsely strigose, membranous, lateral nerves 3 or 4 pairs, basal pair opposite; petiole to 2 cm long. Flowers in axillary, subsessile clusters. Male flowers: 3-4 mm across; tepals 4, 1.5-2 mm long, ovate-lanceolate, sparsely villous; stamens 4, filaments c. 2 mm long. Female flowers: tepals connate; style linear c. 2 mm long, thinly pubescent. Achenes 2-winged.

Fl. & Fr.: Mar. - Dec.

Distr.: Indo-Malesia, E. Asia. Common on plains, in wet places, riverbanks, waste lands and as an epiphyte on walls and tree trunks. *CNS 2563* (Palamel).

106. ULMACEAE Mirb.

Elem. Physiol. Veg. Bot. 2: 905. 1815.

TREMA Loureiro

Fl. Cochinch. 539, 562. 1970.

Trema orientalis (L.) Bl., Mus. Bot. 2: 61. 1856; King in Hook. f., Fl. Brit. India 5: 484. 1888; Fischer in Gamble, Fl. Pres. Madras 1350. 1928; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 75. 1976; Mani. & Sivar., Fl. Calicut 274. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1504. 1983; Mani., Fl. Silent Valley 258. 1988; Ramach. & Nair, Fl. Cannanore 429. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 258. 1988; Vajravelu, Fl. Palghat Dist. 442. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 429. 1994; Sivar. & Mathew, Fl. Nilambur 656. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 424. 1996. *Celtis orientalis* L., Sp. Pl. 1044. 1753; Wight, Ic. t. 602 & 603. 1842. *Sponia*

wightii Planch., Ann. Sci. Nat. Bot. Ser. 3, 10: 322. 1848; Wight, Ic. t. 1971. 1853; Bedd., Fl. Sylv. t. 311. 1873. ***Mallam-toddali*** Rheede, Hort. Malab. 4: 83-84, t. 40. 1683.

Dioecious trees; bark greyish-white, smooth; branchlets adpressed pubescent. Leaves 6-10 x 2.5-4 cm, ovate or oblong-lanceolate, base obliquely cordate, margin serrate, apex acuminate, strigose above and adpressed hirsute below, 3-ribbed at base; petiole to 1 cm long. Cymes axillary, in clusters. Flowers 5-merous, 3-4 mm across, subsessile. Tepals 5, free, c. 1.5 mm long, concave, finely ciliate. Stamens 5. Pistillode oblong. Ovary c. 1.5 mm long, ovoid, 1-celled; ovules 1; style arms erect, pointed. Drupe 3-4 mm across, globose, blackish. Seed c. 2 mm across, globose.

Fl. & Fr.: Dec. - Mar.

Distr.: Tropical Africa, Indo-Malaysia, China, Australia and Polynesia. Fast growing tree. Common in the disturbed areas. *CNS 1457* (Kalarcodu).

107. MORACEAE Link

Handbuch 2: 444. 1831.

1a. Flowers enclosed in syconia (Figs.) ..... **Ficus**

1b. Flowers not enclosed in syconia.

2a. Leaf margin toothed; female flowers free.

3a. Male inflorescence elongate; female flowers in spikes ..... **Morus**

3b. Male flowers in capitate clusters; female flowers solitary ..... **Streblus**

2b. Leaf margin entire; female flowers connate ..... **Artocarpus**

ARTOCARPUS J. R. Forster & J.G. A. Forster

Charact. Gen. Pl. 51. 1775 (*nom. cons.*).

Trees, latex milky. Leaves alternate, entire or pinnatifid, chartaceous or coriaceous; stipules amplexicaule, deciduous. Flowers minute, densely crowded on globose, cylindric or oblong receptacles, axillary or cauliflorous. Perianth 2-4-lobed in male flowers, tubular in female, ending in a conical hard tip. Stamen 1. Ovary 1-celled;

style obscure; stigma spathulate, exserted. Fruit an enlarged syncarp, globose or ovoid-oblong, smooth or echinate. Perianth accrescent, fleshy. Seed with a membranous testa; cotyledons unequal.

1a. Leaf-blade entire, coriaceous; fruiting perianth fleshy.
  2a. Young branches and leaves almost glabrous, scabrid; inflorescence cauliforous; syncarp 20-40 cm wide ..... **A. heterophyllus**
  2b. Young branches and leaves densely pubescent to hirsute; inflorescence on the main branches; syncarp less than 10 cm wide ..... **A. hirsutus**
1b. Leaf-blade pinnatifid, chartaceous; fruiting perianth not fleshy ..... **A. incisus**

Artocarpus heterophyllus Lam., Encycl. 3: 209. 1789; Jarette, J. Arnold Arbor. 40: 334. 1959; Ramamoorthy & Gandhi in Sald. & Nicols., Fl. Hassan Dist. 77. 1976; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 217. 1981; Mani. & Sivar., Fl. Calicut 278. 1982; Rani & Matthew in Matthew, Fl. Tam Carnatic 3: 1509. 1983; Mani., Fl. Silent Valley 258. 1988; Ramach. & Nair, Fl. Cannanore 430. 1998; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 182. 1988; Vajravelu, Fl. Palghat Dist. 443. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 430. 1994; Sivar. & Mathew, Fl. Nilambur 659. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 426. 1996. *Artocarpus integrifolia* auct., non L. f., 1781: Wight, Ic. t. 678. 1840; King in Hook. f., Fl. Brit. India 5: 541. 1888; Fischer in Gamble, Fl. Pres. Madras 1369. 1928. ***Tsjaka-maram*** Rhede, Hort. Malab. 3: 17-20, t. 28. 1682. **Pilavu**.

Trees with sticky milky sap; bark dark greyish-brown. Leaves 8-14 x 4-7 cm, obovate or elliptic-ovate, base cuneate or acute, entire (lobed in juvenile plants), apex obtuse or shortly acute, coriaceous; stipules to 5 cm long, ovate-lanceolate, deciduous; petiole to 2 cm long. Spikes cauliflorous, also from main branches, enclosed by leafy deciduous spathe-like bracts. Male spikes 2.5-5 x 0.8-2 cm, oblong; perianth 2-lobed, puberulous; stamen 1, filament flattened. Female spikes 3-6 x 1.5-3 cm, warty; perianth tubular; ovary globose, stigma subulate, papillose. Syncarp 40-60 x 25-45 cm, oblong; perianth tube acrescent, fleshy, edible. Seed 2.5-4 x 2-2.5 cm, oblong; testa membraneous.

Fl. & Fr. : Mar.- Jun.

Distr.: Possibly native of peninsular India; widely cultivated throughout the tropics. *CNS 1584* (Chingoli).

Artocarpus hirsutus Lam., Encycl. 3: 210. 1789; Wight, Ic. t. 1957. 1853; King in Hook. f., Fl. Brit. India. 5: 541. 1888; Fischer in Gamble, Fl. Pres. Madras 1369. 1928, *"hirsuta"*; Ramamoorthy & Gandhi in Sald. & Nicols., Fl. Hassan Dist. 78. 1976; Mani. & Sivar., Fl. Calicut 278. 1982; Ramach. & Nair Fl. Cannanore 430. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 183. 1988; Vajravelu, Fl. Palghat Dist. 433. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 431. 1994; Sivar. & Mathew, Fl. Nilambur 660. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 426. 1996. ***Ansjeli*** Rheede, Hort. Malab. 3: 25-27, t. 32. 1682. **Ayani.**

Large trees; bark brownish-black; latex milky. Leaves 10-18 x 8-13 cm, broadly ovate or elliptic-ovate, base rounded to broadly attenuate, apex acute to shortly acuminate, lower surface hirsute, coriaceous; stipules to 3 cm long, foliaceous, densely tawny strigose, deciduous; petiole to 2.5 cm long. Male spikes 6-12 x 0.5-0.8 cm, linear-oblong. Female spikes 1.5-2 cm across, ovoid-globose. Tepals 2-3, free in male flowers, tubular in female. Stamen 1. Syncarp 6-10 cm across, globose to ovoid, echinate, tomentose, yellow when ripe. Seeds 0.6-1 cm across, globose.

Fl. & Fr.: Feb. - May.

Distr. : Endemic to Peninsular India. In waste lands and also in sacred groves. *CNS 1852* (Kumarapuram).

Artocarps incisus L. f., Suppl. Pl. 411. 1781; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 219. 1981; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1509. 1983. *Rademachia incisa* Thunb., Kongl. Vetensk. Acad. Handl. 37: 253. 1776. *Artocarpus communis* Forster & Forster f., Char. Gen. Pl. 102. 1776; Jarrett, J. Arnold Arbor. 40: 387. 1959; Mani. & Sivar., Fl. Calicut 277. 1982; Ramach. & Nair, Fl. Cannanore 430. 1988.

A. altilis (Parkinson) Fosb., J. Washington Acad. Sci. 31: 95.1941 & Brittonia 12: 104. 1960. ***Kada-pilavu.***

Trees. Leaves pinnatifid, 20-50 x 15-35 cm, base decurrent, apex shortly acuminate, pubescent along the nerves above, densely so below; petiole to 3 cm long. Male spikes 8-18 x 1-2 cm, oblong-cylindric, pendent. Female spikes upright, 4-8 x 3-6 cm. Perianth 2 mm, glabrous. Stamen 1; filament to 2 mm long. Ovary obovoid; stigma simple. Syncarps 15-20 x 10-15 cm, oblong or rounded; perianth not fleshy.

Fl. : Apr.-Jun.

Distr. : Probably native of New Guinea. Widely cultivated in the tropics. *CNS 2205* (Vayalar).

FICUS Linnaeus

Sp. Pl. 1059. 1753.

Trees or shrubs, sometimes scandent, often epiphytic at first and becomes independent later; aerial roots are sometimes formed; latex milky. Leaves alternate or rarely opposite; entire or lobed; stipules sheathing, often coloured, deciduous. Flowers arranged on the inner surface of syconium. Syconium sessile or peduncled, axillary to leaves or leaf-scars or cauliflorus. Perianth of male 2-6-fid or partite, imbricte; of female 2-6, or fewer. Stamens 1 or 2, sometimes to 6. Ovary straight or oblique; Style excentric. Gall flowers similar to female flowers; perianth of neuter 3-fid. Figs globose or obovoid.

1a. Climbing or straggling shrubs ..... **F. heterophylla**

1b. Erect shrubs or trees.

2a. Leaves opposite ..... **F. hispida**

2b. Leaves alternate.

3a. Cauliflorous ..... **F. racemosa**

3b. Not cauliflorous.

4a. Figs distinctly peduncled; leaves scabrous.

5a. Leaf-base unequal,oblique; figs paired or clustered, 0.4-0.7 cm across ..... **F. tinctoria** ssp. **parasitica**

5b. Leaf-base equal, rounded; figs solitary, 1-1.5 cm across .... **F. exasperata**

4b. Figs sessile to subsessile; leaves glabrous or densely pubescent to tomentose, not scabrous.

6a. Leaves usually 5-ribbed from base, densely pubescent to tomentose below; figs 1.5-2 cm across.

7a. Leaf-apex obtuse, primary nerves 4-6 pairs; figs globose, red when ripe; buds and young shoots glabrous or puberulous ..... **F. benghalensis**

7b. Leaf-apex shortly or abruptly acuminate, primary nerves 9-13 pairs; figs oblong to subovate, ornage-yellow when ripe; buds and young shoots brown hairy .... **F. drupacea**

6b. Leaves 3-ribbed from base, glabrous below; figs 0.5-1.2 cm across.

8a. Leaf-base truncate, apex caudate-acuminate with the tip 2-5 m long; petiole 3.5-10cm long ..... **F. religiosa**

8b. Leaf-base cuneate or rounded, apex obtuse, acute or acuminate with the tip upto 2 cm long; petiole upto 6 cm long.

9a. Leaf-apex obtuse or acute; petiole upto 1.2 cm long; figs reddish yellow when ripe .... **F. microcarpa**

9b. Leaf-apex acuminate; petiole 2-6 cm long; figs purple when ripe.

10a. Figs 5-7 mm across; male flowers ostiolar; ovary dark-red ..... **F. tsjakela**

10b. Figs 1-1.2 cm across, male flowers disperse; ovary white ..... **F. amplissima**

Ficus amplissima Smith in Rees, Cyclop. 14, n. 68. 1810; Miq., London J. Bot. 6: 580. 1847; Corner, Gard. Bull. Singapore 18: 84. 1961; Ramamoorthy & Gandhi in Sald. & Nicols., Fl. Hassan Dist. 79. 1976; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 242. 1981; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1515. 1983; Mani., Fl. Silent Valley 259. 1988; Nicols., Suresh & Mani., An Interpr. Hort Malab. 183. 1988; Vajravelu, Fl. Palghat Dist. 445. 1990; Sasi. & Siavar., Fl. Pl. Thrissur For. 427. 1996. *Ficus tsiela* Roxb. ex Buch.-Ham., Trans. Linn. Soc. London 15: 149. 1827; Roxb., Fl. Ind. 3: 549. 1832; Wight, Ic. t. 668. 1840; King, Ann. Roy. Bot. Gard. (Calcutta) 1: tt. 73 & 74. 1887 & in Hook . f., Fl. Brit. India 5: 515. 1888; Fischer in Gamble, Fl. Pres. Madras 1362. 1928. ***Tsiela*** Rheede, Hort. Malab. 3: 25-27, t. 32. 1682. **Al.**

Deciduous trees, often epiphytic when young, usually without aerial roots; bark smooth, greenish grey. Leaves spirally arranged, 5-12 x 2-6 cm, elliptic-oblong, base rounded or broadly cuneate, margins cartilaginous, apex obtusely acuminate, coriaceous; lateral veins 6-10 pairs; petiole 2-3.5 cm long. Figs sessile, axillary and on the twigs below the leaves, paired, 1-1.2 cm across, depressed globose, ripening pink or purple. Bracts 3, 2-2.5 x 3-3.5 mm, ovate, obtuse. Tepals 2-3, ovate-acute, free, reddish. Male flowers disperse; stamen 1; anthers oblong. Female flowers sessile; ovary white. Gall flowers with pedicels 1-2.5 mm long; ovary sessile, white.

Fl. & Fr. : Oct. - Jan.

Distr. : Sri Lanka, Maldives and Peninsular India. In sacred groves. *CNS 2036* (Karthikappally).

Ficus benghalensis L., Sp. Pl. 1059. 1753; King, Ann. Roy. Bot. Gard. Calcutta 1: 18, t. 13. 1887; King in Hook. f., Fl. Brit. India 5: 499. 1888; Fischer in Gamble, Fl. Pres. Madras 1361. 1928; Ramamoorthy & Gandhi in Sald. & Nicols., Fl. Hassan Dist. 80. 1976; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 251. 1981; Mani. & Sivar., Fl. Calicut 277. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1518. 1983; Ramach. & Nair, Fl. Cannanore 431. 1988; Nicols., Suresh & Mani., An Interpr. Hort Malab. 184. 1988; Vajravelu, Fl. Palghat Dist. 450. 1990; Sivar. & Mathew, Fl. Nilambur

663. 1996. *Urostigma benghalensis* (L.) Gasp., Nov. Gen. Fic. 7. 1844; Wight, Ic. t. 1989. 1853. ***Peralu*** Rheede, Hort. Malab. 1: 49-50, t. 28. 1678. **Per-al**.

Trees with numerous prop roots. Leaves alternate, 10-20 x 7-12 cm, elliptic-ovate, base rounded or subcordate, apex obtuse or subacute, lower surface pubescent, basally 3-5-nerved, coriaceous; petiole to 4 cm long. Figs 1 or 2 axillary, monoecious, sessile, 1.5-2 cm across, depressed globose, reddish on ripening. Basal bracts 4-5, cupular, shortly connate. Tepals 3-5, shortly connate, 1.5-2 mm long. Stamen 1. Ovary c. 1.5 mm across, subglobose; style c. 2 mm long. Gall flowers similar to female flowers, pedicellate. Achenes 2-2.5 mm across, globose-ellipsoid.

Fl. & Fr. : Sep.- Dec.

Distr.: India, Pakistan, Sri Lanka. Planted as avenue trees. *CNS 1525* (Chambakulam).

Ficus drupacea Thunb., Diss. Fic. 11. 1786, var. **pubescens** (Roth) Corner, Gard. Bull. Straits Settlem. 17: 381. 1960; Ramamoorthy & Gandhi in Sald. & Nicols., Fl. Hassan Dist. 80. 1976; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 247. 1981; Mani. & Sivar., Fl. Calicut 276. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1519. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 184. 1988; Vajravelu, Fl. Palghat Dist. 446. 1990; Sivar. & Mathew, Fl. Nilambur 665. 1996; Sasi. & Sivar., Fl Pl. Thrissur For. 428. 1996. *Ficus mysorensis* Heyne ex Roth in Roem. & Schult., Syst. Veg. 1: 508. 1817; King, Ann. Roy. Bot. Gard. Calcutta 1: 19, t. 14. 1887; King in Hook. f., Fl. Brit. India 5: 500 1888; Fischer in Gamble, Fl. Pres. Madras 1361. 1928, var. *pubescens* Roth in Roem . & Schult., Syst. Veg. 1: 508. 1817. ***Katou-alou*** Rheede, Hort. Malab. 3: 73.-74, t. 57. 1682.

Trees; bark-brown; young shoots fulvous tomentose. Leaves alternate, 8-17 x 4-9 cm, broadly elliptic-ovate to oblong, base rounded or subcordate, apex obtusely acuminate, brown pubescent below when young, becomes glabrescent when mature, coriaceous, lateral nerves 10-14 pairs, prominent and parallel; petiole to 2 cm long. Figs monoecious, axillary, solitary to paired, sessile, 1.5-2 cm across, oblong to subovate, orange-yellow when ripe. Basal bracts 2-3, 4-5 mm long, suborbicular, tomentose. Tepals

3-4, free. Stamen 1, exserted. Ovary obovoid; style filiform, c. 2 mm long. Gall flowers similar to female. Achenes 1-1.5 mm long, smooth.

Fl. & Fr. : Dec. - Mar.

Distr. : Sri Lanka, India, Bangladesh and Laos. In sacred groves. *CNS 1468* (Cherthala), *CNS 2577* (Vandanam).

Ficus exasperata Vahl, Enum. Pl. 2: 197 & 402. 1806; Ramamoorthy & Gandhi in Sald. & Nicols., Fl. Hassan Dist. 81. 1976; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 274. 1981; Mani. & Sivar., Fl. Calicut 275. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1520. 1983; Ramach. & Nair, Fl. Cannanore 432. 1988; Mani., Fl. Silent Valley 259. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 185. 1988; Vajravelu, Fl. Palghat Dist. 447. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 432. 1994; Sivar. & Mathew, Fl. Nilambur 665. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 429. 1996. *Ficus asperrima* Roxb., Fl. Ind. 3: 554. 1882; Wight, Ic. t. 633. 1840; King in Hook. f., Fl. Brit. India 5: 522. 1888; Fischer in Gamble, Fl. Pres. Madras 1366. 1928. ***Teregam*** Rheede, Hort. Malab. 3: 79, t. 60. 1682. **Teregam.**

Small trees; bark greyish-brown, smooth, young stem scabrid. Leaves alternate, 4-10 x 3-5 cm, elliptic or obovate, base rounded, margin entire to sparingly toothed, apex acuminate, scabrous with stiff tubercled hairs on both sides; lateral nerves 4-6 pairs, basal pair opposite and ribbed; petiole to 3 cm long; leaves of saplings and coppice often lobed. Figs dioecious, solitary, axillary or on leafless branches, c. 1.2 cm across, globose, yellow on ripening, pubescent; peduncle to 1 cm long. Bracts 2-3, lateral. Tepals 3-6, free . Male flowers near ostiole, in 1-2 rings; stamen 1. Female sessile, ovary obovoid; style filiform. Gall flowers similar to female flowers, pedicelled or sessile. Achenes 1-1.5 mm long, ovoid.

Fl. & Fr.: Feb.- Apr.

Distr. : East Africa, Arabia, India and Sri Lanka. In waste lands and in sacred groves. *CNS 1585* (Panavally).

Bark is used in the treatment of liver and spleen enlargements.

Ficus heterophylla L. f., Suppl. Pl. 442. 1781; Roxb., Fl. Ind. 3: 532. 1832; Wight, Ic. t. 659. 1840; King, Ann. Roy. Bot. Gard. Calcutta 1: t. 94. 1888 & in Hook. f., Fl. Brit. India 5: 518. 1888; Fischer in Gamble, Fl. Pres. Madras 1366. 1928; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 272. 1981; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1521. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 185. 1988; Sivar. & Mathew, Fl. Nilambur 666. 1996. *F. scabrella* Roxb., Fl. Ind. 3: 532. 1832; Wight, Ic. t. 661. 1840. ***Valli-teregam*** Rheede, Hort. Malab. 3: 83, t. 62. 1682.

Shrubs with weak branches. Leaves alternate, 5-7 x 2-3 cm, elliptic, young ones pinnately 5-7-lobed, base rounded, margin serrate, apex acuminate, 3-nerved from base, lateral nerves 5-7 pairs, scabrid, thin-coriaceous; petiole 1 cm long; stipules 0.7-1 cm long, lanceolate. Figs axillary, solitary, dioecious, 1-1.5 cm across, ellipsoid-globose, orange to red when ripe; peduncle to 1 cm long; basal bracts ovate. Tepals 3, c. 1.5 mm long., linear-lanceolate. Male 2-3-seriate, pedicellate; stamen 1. Female sessile; ovary ovoid; style dilated above. Achenes compressed, slightly keeled.

Fl. & Fr. : Nov. - Jan.

Distr. : Sri Lanka, India, Myanmar, S. China to Java and Borneo. Along stream sides. *CNS 2206* (Edathuva).

Ficus hispida L. f., Suppl. Pl. 442.1781; King, Ann. Roy. Bot. Gard. Calcutta 1: 16, tt. 154,155. 1888; King in Hook. f., Fl. Brit. India. 5: 522. 1888; Fischer in Gamble, Fl. Pres. Madras 1367. 1928; Ramamoorthy & Gandhi in Sald. & Nicols., Fl. Hassan Dist. 81. 1976; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 277. 1981; Mani. & Sivar., Fl. Calicut 275. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3:1522. 1983; Ramach. & Nair, Fl. Cannanore 432. 1988; Mani., Fl. Silent Valley 259. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 155. 1988; Vajravelu, Fl. Palghat Dist. 447. 1990; Mohanan & Henry, Fl. Thiuruvananthapuram 433. 1994; Sivar. & Mathew, Fl. Nilambur 667. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 429. 1996. *Ficus oppositifolia* Roxb., Fl. Corom. t. 124. 1799; Wight, Ic. t. 638. 1840. *Ficus daemona* Koenig ex Vahl,

Enum. Pl. 2: 198. 1806; Wight, Ic. t. 641. 1840. ***Perin-teregam*** Rheede, Hort. Malab. 3: 81, t. 1682. **Erumanakku**.

Large shrubs or small trees, young shoots hispid; internodes of branchlets hollow. Leaves opposite, 12-18 x 5-10 cm, broadly oblong to elliptic, base rounded to truncate, margin entire to minutely toothed, apex acute or acuminate, scabrid above and densely brown hispid below, 3-ribbed from base; stipules 0.8-1 cm long, lanceolate; petiole to 2.5 cm long. Figs dioecious, fascicled on trunk or on elongated pendulous or trailing leafless branches, rarely axillary on leafy branches, 2-2.5 cm across, depressed globose, greenish yellow on ripening. Peduncle to 1 cm long. Basal bracts 2-3, triangular. Perianth cupular, truncate. Stamen 1. Ovary depressed globose; style c. 1 mm long, hairy. Gall flowers similar to female flowers, pedicelled. Achene c. 1.5 mm long, lenticular, keeled.

Fl. & Fr. : Almost throughout the year.
Distr. : Indo-Malaysia, S. China and Australia. In waste places. *CNS 1853* (Mayithara).

Ficus microcarpa L. f., Suppl. Pl. 442. 1781; Ramamoorthy & Gandhi in Sald. & Nicols., Fl. Hassan Dist. 81. 1976; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 258. 1981; Mani. & Sivar., Fl. Calicut 276. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1522. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 186. 1988; Vajravelu, Fl. Palghat Dist. 448. 1990; Sasi. & Sivar., Fl. Pl. Thrissur For. 429. 1996. *Ficus retusa* auct. non L., 1767: King, Ann. Roy. Bot. Gard. Calcutta 1: 50, t. 61. 1887; King in Hook. f., Fl. Brit. India 5: 511. 1888; Fischer in Gamble, Fl. Pres. Madras 1362. 1928. *Ficus microcarpa* L. f., var. *nitida* auct., non Thunb., 1781-1801: King, Ann. Roy. Bot. Gard. Calcutta 1: t. 61. 1887. ***Itty-alu*** Rheede, Hort. Malab. 1: 45-46, t. 26. 1678. ***Itty-arealou*** Rheede, Hort. Malab. 3: 69-70, t. 55. 1682.

Trees; bark greyish-brown, smooth. Leaves alternate, 4-7 x 3- 4.5 cm, elliptic-ovate to obovate, base cuneate, apex acute to obtuse, glabrous, coriaceous, lateral nerves 9-13 pairs, looping to form an intramarginal vein; stipules 4-7 mm long; ovate-lanceolate; petiole to 1.2 cm long. Figs monoecious, solitary to paired, sessile, axillary or at scars of fallen leaves, 6-8 mm across, globose, reddish-yellow on ripening. Basal bracts 3, 1-1.5

mm long. Tepals 3-4, free, 1-1.5 mm long. Male flowers dispersed; stamen 1. Female flowers sessile; ovary ovoid-globose; style linear, tapering. Gall flowers similar to female flowers, pedicelled. Achene 1-1.5 mm long, smooth.

Fl. & Fr. : Mar. - May.

Distr. : Indo-Malaysia. In sacred groves. *CNS 1372* (Nulayakad kavu at Kadakarappally).

Ficus racemosa L., Sp. Pl. 1060. 1753; Ramamoorhty & Gandhi in Sald. & Nicols., Fl. Hassan Dist. 82. 1976; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 266. 1981; Mani. & Sivar., Fl. Calicut 275. 1982; Rani. & Matthew in Matthew, Fl. Tam. Carnatic 3: 1526. 1983; Ramach. & Nair, Fl. Cannanore 433. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 187. 1988; Vajravelu, Fl. Palghat Dist. 448. 1990; Sivar. & Mathew, Fl. Nilambur 668. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 430. 1996. *Ficus glomerata* Roxb., Pl. Corom. t. 123. 1799; Wight. Ic. t. 667. 1840; King, Ann. Roy. Bot. Gard. Calcutta 2: 173, t. 218A. 1888; King in Hook. f., Fl. Brit. India. 5: 535. 1888; Fischer in Gamble, Fl. Pres. Madras 1364. 1928. ***Atty-alu*** Rheede, Hort. Malab. 1: 43-44, t. 25. 1678. **Athi.**

Small to medium sized trees; bark reddish-brown, smooth. Aerial roots absent. Leaves 9-14 x 3-6 cm, elliptic-lanceolate or oblong-lanceolate, base rounded to attenuate, apex acute, lateral nerves 8-10 pairs, basal pair opposite and ribbed; stipules c. 1 cm long, lanceolate; petiole to 2.5 cm long. Figs monoecious, on short leafless branches arising from warty tubercles of trunk or larger branches, 1.5-2.2 cm across, globose, white pilose without, orange-red when ripe; peduncle to 8 mm long. Basal bracts 2-3, c. 2 mm long, triangular-ovate. Perianth shortly connate, 3-5-lobed, c. 1.5 mm long, red,. Male flowers near ostiole, in 3 rows, pedicelled; stamens 2, exserted, filaments connate below. Female flowers sessile, mixed with gall flowers; ovary shortly stalked, c.1 mm long, style 2-3 mm long. Achenes c. 1 mm long, lenticular.

Fl. & Fr. : Feb.- Apr.

Distr. : Indo-Malayasia, Pakistan, S. China and Australlia. In sacred groves and in waste places. *CNS 1433* (Kanichukulangara).

Ficus religiosa L., Sp. Pl. 1059. 1753; Roxb., Fl. Ind. 3: 547. 1832; Bedd., Fl. Sylv. t. 314. 1873; King, Ann. Roy. Bot. Gard. Calcutta 1: 55, t. 67A. 1887 & Hook. f., Fl. Brit. India 5: 513. 1888; Fischer in Gamble, Fl. Pres. Madras 1363. 1928; Corner, Gard. Bull. Straits Settlem. 21: 6. 1965; Ramamoorthy & Gandhi in Sald. & Nicols., Fl. Hassan Dist. 82. 1976; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 236. 1981; Mani. & Sivar., Fl. Calicut 277. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1527. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 187. 1988; Ramach. & Nair, Fl. Cannanore 434. 1988; Vajravelu, Fl. Palghat Dist. 450. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 433. 1994. *Urostigma religiosum* (L.) Gasp., Caprif. 82, t. 7, t. 1-5. 1845; Wight, Ic. t. 1967. 1853. ***Arealu*** Rheede, Hort. Malab. 1: 47-48, t. 27. 1678. **Arealu.**

Large trees. Leaves alternate, 6-15 x 5-11 cm, deltoid or broadly ovate, base truncate, apex caudate, thin-coriaceous, basally 3-nerved, lateral nerves 8-10 pairs; petiole to 10 cm long; stipules to 1.5 cm long, ovate-lanceolate. Figs monoecious, axillary, in pairs, c. 8 mm across, globose, sessile, ripening pink, purple or black; basal bracts cupular. Male flowers ostiolar, sessile; tepals 2, free, ovate-lanceolate; stamen 1. Female flowers sessile; tepals 3-4, free, linear-lanceolate, brownish; ovary ovoid-oblong. Gall flowers similar. Achenes smooth.

Fl. & Fr. : Nov. - Feb.

Distr. : India and Indo-China. Considered as a sacred tree, planted near temples. *CNS 2578* (Kuthiyathode).

Powder of bark taken with honey improves complexion, cures ulcers and purifies blood.

Ficus tinctoria Forst. f., Ins. Austr. 76. 1786., ssp. **parasitica** (Willd.) Corner, Gard. Bull. Straits Settlem. 17: 476. 1960; Ramamoorthy & Gandhi in Sald. & Nicols., Fl. Hassan Dist. 83. 1976; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3:276. 1981;

Mani. & Sivar., Fl. Calicut 276. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1528. 1983; Ramach. & Nair, Fl. Cannnanore 433. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 187. 1988; Vajravelu, Fl. Palghat Dist. 449. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 443. 1994; Sivar. & Mathew, Fl. Nilambur 669. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 430. 1996. *Ficus parasitica* J. Koenig ex Willd., Mem. Acad. Roy. Sci. Hist. (Berlin) 102. 1798. *Ficus gibbosa* Bl. var. *parasitica* (J. Koenig ex Willd.) King, Ann. Roy. Bot. Gard. Calcutta 1: t. 2, 16. 1887 & in Hook. f., Fl. Brit. India 5: 497. 1888; Fischer in Gamble, Fl. Pres. Madras 1365. 1928. ***Tsjerou-meer-alou*** Rheede, Hort. Malab. 3: 71, 56. 1682.

Small trees, often epiphytic. Leaves alternate, 5-10 x 3-5.5 cm, obliquely elliptic-ovate, base unequal, one side gibbous and other cuneate, apex acute, scabrid, thin-coriaceous, lateral nerves c. 5 pairs; stipules c. 1 cm long, lanceolate; petiole 4-6 mm long. Figs dioecious, axillary, usually paired or clustered, 5-7 mm across, subglobose, scabrid, yellow when ripe; peduncle to 1.5cm long. Basal bracts ovate. Tepals 3-5, free, scarious. Stamen 1. Ovary c. 1 mm across, obovoid; style c. 2 mm long. Achenes c. 1.5 mm long, ovoid.

Fl. Fr. : Sep. - Feb.

Distr. : India, Sri Lanka and Indo-China. In waste places. *CNS 1854* (Eramallur).

Ficus tsjakela Rheede ex Burm. f., Fl. Ind. 277. 1768; King, Ann. Roy. Bot. Gard. Culcutta 1: 58, t. 70. 1887; King in Hook. f., Fl. Brit. India. 5: 514. 1888; Fischer in Gamble, Fl. Pres. Madras 1362. 1928; Ramamoorthy & Gandhi in Sald. & Nicols., Fl. Hassan Dist. 83. 1976; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 237. 1981; Mani. & Sivar., Fl Calicut 277. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1530. 1983; Ramach. & Nair, Fl. Cannanore 434. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 188. 1988; Mani., Fl. Silent Valley 260. 1988; Vajravelu, Fl. Palghat Dist. 450. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 434. 1994; Sivar. & Mathew, Fl. Nilambur 671. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 430. 1996. ***Tsjakela*** Rheede, Hort. Malab. 3: 87, t. 64. 1682. **Kal-al.**

A deciduous tree. Leaves 9-20 x 4.5-7.5 cm, oblong-elliptic, base rounded, apex acuminate, thinly coriaceous, lateral veins 8-14 pairs; petiole upto 6 cm long. Figs sesssile, axillary, paired, and in clusters of 3-6 on leafless portions, 5-7 mm across, depressed-globose, greyish-purple on ripening. Bracts 3, 2-2.5 x 3-3.5 mm, ovate-rounded. Tepals 2-3, red, free or shortly jointed. Male flowers ostiolar in one ring. Female flowers sessile; ovary dark red, more or less stalked. Gall flowers similar to female flowers.

Fl. Fr. : Jan.-Apr.

Distr. : Peninsular India and Sri Lanka. In sacred groves and in waste places. *CNS 1878* (Olathala).

MORUS Linnaeus

Sp. Pl. 986. 1753.

Morus australis Poir., Encycl. 4: 38. 1797; Nakai, J. Arnold Arbor. 8:236. 1927; Rehder, J. Arnold. Arbor. 10:123. 1929; Matthew, Rec. Bot. Surv. India 20: 198. 1969; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1532. 1983. *Morus indica* auct., non L., 1753: Roxb., Fl. Ind. 3: 396. 1832; Hook. f., Fl. Brit. India 5: 492. 1888; Fischer in Gamble, Fl. Pres. Madras 1370. 1928.

Shrubs or small trees; bark light grey. Leaves 4-10 x 2.8-5.5 cm, ovate or ovate-oblong, base rounded, margins serrate, often deeply lobed, apex acuminate or caudate, basal nerves 3; petiole 2-4.5 cm long. Flowers in axillary spikes, greenish. Male spike rather lax-flowered, 1.2-2 cm long, cylindric or ovoid, hairy all over; peduncle short. Tepals 2-2.5 mm long, elliptic. Stamens twice as long. Female spike short, ovoid, on slender peduncles. Tepals obovate with white margin. Styles connate below hairy. Fruit ovoid or subglobose, red, turning black.

Fl. & Fr. : Nov. - May.

Distr. : Himalaya, Sikkim; widely cultivated throughout India, Myanmar and W. China. *CNS 1758* (Alappuzha)

STREBLUS Loureiro

Fl. Cochinch. 599, 614. 1790.

Streblus asper Lour., Fl. Cochinch. 615. 1790; Hook. f., Fl. Brit. India. 5: 489. 1888; Fischer in Gamble, Fl. Pres. Madras 1353. 1928; Ramamoorthy & Gandhi in Sald. & Nicols., Fl. Hassan Dist. 84. 1976; Corner in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 281. 1981; Mani. & Sivar., Fl. Calicut 274. 1982; Rani & Matthew in Matthew, Fl. Tam. Carnatic 3: 1534. 1983; Ramach. & Nair, Fl. Cannanore 434. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 189. 1988; Vajravelu, Fl. Palghat Dist. 450. 1990; Sivar. & Mathew, Fl. Nilambur 672. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 430. 1996. *Epicarpurus orientalis* Bl., Bijdr. 488. 1825; Wight, Ic. t. 1961. 1853. ***Tinda-parua*** Rheede, Hort. Malab. 1: t. 48. 1678. **Paru-maram.**

Small trees; bark greyish; branchlets on trunk often arrested and thorny. Laves 3.5-7 x 2-3.5 cm, elliptic-obovate to rhomboid, base cuneate, margin serrate to subentire, apex acute, scabrid, lateral nerves 5 or 6 pairs; petiole to 5mm long; stipules caducous. Male flowers in dense, capitate clusters, white; bracts many, ovate-acuminate; tepals 4, free, c. 2 mm long, lanceolate, concave; stamens 4. Female flowers solitary or 1-2 in the axils, pedicellate; bracts and bracteoles ovate; tepals 4, c. 4 mm long, ovate, concave, puberulous; ovary c. 3 mm, ovoid, style branched. Drupe globose, yellow, enclosed in persistent tepals.

Fl. & Fr. : Jan. - Mar.

Distr. : Sri Lanka, India, Myanmar, S. China, Hainan, Indo-China, Thailand and Malesia. In sacred groves. *CNS 1602* (Vandanam).

108. CASUARINACEAE R. Br.

in Flinders, Voy. Terra Austr. 2: 571. 1814.

CASUARINA Adanson

Fam. 2: 481. 1763.

Casuarina equisetifolia Forster & Forster f., Char. Gen. Pl. 104, f. 53. 1776; Hook. f., Fl. Brit. India 5: 598. 1888; Fischer in Gamble, Fl. Pres. Madras 1389. 1928; Mani. & Sivar., Fl. Calicut 280. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1536. 1983; Ramach. & Nair, Fl. Cannanore 442. 1988; Vajravelu, Fl. Palghat Dist. 458. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 440. 1994.

Trees; branchlets arising from the axils of small, recurved scales. Leaves reduced to scales, c. 7 in a node, alternating with ribs of the upper node, 0.5-1 mm long, acute. Male spikes 3-5 x 0.2-0.3 cm; tepals 2, c. 1 mm long, lanceolate, scarious, acute; stamen 1, inflexed in bud; anther oblong. Female spikes 4-8 x 3-4 mm, shortly stalked; bracts and bracteoles 1.5-2 mm, persistent, woody; tepals o; ovary c. 1 mm long, ovoid; style 5-8 mm long, filiform. Carpophores 1.5 - 3 x 1-2 cm, ovoid or oblong-cylindric. Nutlets compressed, winged, tipped with persistent style.

Fl. & Fr.: Throughout the year.

Distr.: Malesia, Australia, Pacific. Along sea-coast. *CNS 1887* (Thottappally).

109. CERATOPHYLLACEAE Gray

Nat. Arr. Brit. Pl. 2: 395, 554. 1821.

CERATOPHYLLUM Linnaeus

Sp. Pl. 992. 1753.

Ceratophyllum demersum L., Sp. Pl. 992. 1753; Hook. f., Fl. Brit. India 5: 639. 1888; Fischer in Gamble, Fl. Pres. Madras 1391. 1928; Subram., Aquat. Ang. 52. 1962; Gandhi

in Sald. & Nicols., Fl. Hassan Dist. 60. 1976; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1540.1983; Wilmot-Dear, Kew Bull. 40(2): 257. 1985.

Submerged rootless aquatic monoecious herbs, 15-90 cm long, densely leafy. Leaves 7-12 in close verticiles, 1.2-3 cm long, 2-7 mm broad, branched dichotomously once or twice, swollen near middle, margin denticulate, apex acute. Flowers solitary, mostly in upper axils, sessile. Male flowers: perianth segments 10-15, subequal, slightly connate at base, tipped with a small purplish hair; stamens 10-20, anthers c. 1.5 mm long, oblong, white. Female flowers: Perianth segments 10-15; ovary globular, sessile; style c. 2 mm long. Fruit 3-4 x 2-3 mm, ovoid or ellipsoid, black, furnished with one terminal and 2 sub-basal spines, much longer than the fruit. Seed c. 2 mm across, globose.

Fl. & Fr.: Oct. - Mar.

Distr.: Cosmopolitan. Common in still waters. *CNS 2088* (Ezhupunna).

110. HYDROCHARITACEAE Juss.

Gen. Pl. 67. 1789.

1a. Acaulescent herbs; stem absent; leaves radical.
  2a. Spathe prominently winged; leaves broadly ovate ..... **Ottelia**
  2b. Spathe not winged; leaves linear.
    3a. Leaf margins minutely toothed, apex obtuse; female peduncle spirally coiled after fertilisation ..... **Vallisneria**
    3b. Leaf margins entire, apex acuminate; female peduncle straight ..... **Blyxa**
1b. Caulescent herbs; stem present; leaves whorled ..... **Hydrilla**

BLYXA Noronha ex Petit-Thouars

Gen. Nova Madag. 4: 17. 1806.

Acaulescent, annual, submerged, aquatic herbs. Leaves many in basal rosette, sessile, linear to lanceolate. Flowers 1-many, unisexual or bisexual, trimerous, epigynous, emergent, enclosed in a spathe of two conduplicate bracts. Male flowers long-pedicelled;

female and bisexual ones borne on elongate hypanthea. Sepals 3, free. Petals 3, free. Stamens 3 in bisexual flowers, 6-9 in male flowers. Stigmas 3, free, linear. Capsules elongate, disintegrating at maturity. Seeds many, surface variously ornamented.

1a. Flowers unisexual; stamens in male flowers 9; seeds obtuse or apiculate at ends ..... **B. octandra**

1b. Flowers bisexual; stamens 3; seeeds with tails at each end ..... **B. aubertii**

Blyxa aubertii Rich., Mem. Cl. Sci. Math. Inst. Natl. France 12(2): 77, t. 4. 1812; Subram., Aquat. Ang. 59. 1962; Gandhi & Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 633. 1976; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1542. 1983; Mani., Fl. Silent Valley 266. 1988; Vajravelu, Fl. Palghat Dist. 460. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 441. 1994; Sivar. & Mathew, Fl. Nilambur 673. 1996. *Hydrotrophus echinospermus* Clarke, J. Linn. Soc. Bot. London 14: 4, t. 1. 1875. *Blyxa echinosperma* (Clarke) Hook. f., Brit. India 5: 661. 1888; Subram., Aquat. Ang. 59. 1962; Fischer in Gamble, Fl. Pres. Madras 1397. 1928; Mani. & Sivar., Fl. Calicut 281. 1982. *Blyxa talbotii* Hook. f., Fl. Brit. India 5: 661. 1888; Fischer in Gamble, Fl. Pres. Madras 1397. 1928.

Submerged, acaulescent aquatic herbs. Leaves 6-15 x 0.4-0.6 cm, linear, broader at base, tapering to a long acuminate tip, flaccid. Flowers solitary, bisexual, emergent; pedicel to 18 cm long. Spathe 5-6 cm long, tubular. Sepals 3, 0.8-1 cm long, linear. Petals 3, antisepalous; filaments to 4 mm long; anthers linear. Ovary 4-5 cm long, linear-cylindric, 3-loculed, many-ovuled; stigmas 3, white, 1-1.5 cm long, linear, papillose at the distal end. Capsules to 5 cm long, linear-cylindric. Seeds 1-2 mm long, ellipsoid. tubercled or echinate, with tails at each ends.

Fl. & Fr. : Sep.-Dec.

Distr. : Sri Lanka, India, S.E. and E. Asia reaching Papua New Guinea and Japan, and in North and Eastern Australia. In stagnant pools or ponds, flooded paddy fields and slow running canals. *CNS 1363* (Pallipuram).

Blyxa octandra (Roxb.) Planch. ex Thw., Enum. Pl. Zeyl. 332. 1864; Fischer in Gamble, Fl. Pres. Madras 1397. 1928; Subram., Aquat. Ang. 60. 1962; Mani. & Sivar., Fl. Calicut 281. 1982; Ramach. & Nair, Fl. Cannanore 443. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 442. 1994. *Vallisneria octandra* Roxb., Pl. Corom. 2: 34, t. 165. 1802. *Blyxa roxburghii* Rich., Mem. Cl. Sci. Math. Phys. France 12(2): 77, t. 5. 1814; Hook. f., Fl. Brit. India 5: 660. 1888, *nom. illegit.*

Submerged acaulescent dioecious herbs. Leaves 6-20 x 0.3-0.6 cm, linear, narrowed towards both ends, apex acute. Flowers unisexual, emergent. Male flowers 20 or more in each spathe, 1 or rarely 2 opening every day; peduncle 3-6.5 cm long, the length varying with the depth of water; pedicel to 7 cm long. Speals 3, 5-7 mm long, linear, apically connate at first. Stamens 9 in 3 whorls; filaments 3-5 mm long. Pistillode 3-lobed. Female flowers: spathe 1 or rarely 2-flowered, with 1-2.5 cm long stalk. Speals 8-10 x 1-1.5 mm, boat-shaped, green, margins hyaline. Petals white, filiform. Stigma 3, c. 2 cm long, linear, white. Capsule 2-4 cm long. cylindrical. Seeds c. 2 mm long, ellipsoidal.

Fl. & Fr. : Aug. - Nov.

Distr. : Peninsularr and Eastern India. In still water. *CNS 1753* (Thamarakulam).

HYDRILLA L.C. Richard

Mem. Cl. Sci. Math. Inst. Natl. France 12(2): 9, 61, 76. 1814.

Hydrilla verticillata (L.f.) Royle, Ill. Bot. Himal. t. 376. 1839; Hook. f., Fl. Brit. Iindia 5: 659. 1888; Fischer in Gamble, Fl. Pres. Madras 1396. 1928; Subram., Aquat. Ang. 59. 1962; Gandhi & Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 634. 1976; Mani. & Sivar., Fl. Calicut 280. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1545. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 293. 1988; Vajravelu, Fl. Palghat Dist. 460. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 442. 1994; Sivar. & Mathew, Fl. Nilambur 674. 1996. *Serpicula verticillata* L.f., Suppl. 416. 1781; Roxb., Fl. Corom. t. 164. 1802 & Fl. Ind. 3: 578. 1832. ***Ene-pael*** Rheede, Hort. Malab. 9: 159, t. 81. 1689.

Monoecious submerged perennial herbs; stem highly branched, slender, basal nodes distant, upper ones closer. Leaves in whorls of 3-7, 0.5-1.8 x 0.1-0.3 cm, linear or lanceolate, margins serrulate, membraneous, 1-nerved. Flowers unisexual, enclosed in spathes, axillary, solitary. Male flowers: spathe sessile. Sepals 3, 1.5-3 x 1 mm, ovate to elliptic, reflexed, white. Petals 3, white, 2-3 x 0.5-1 mm, spathulate. Stamens 3. Female flowers: spathe sessile, 4-5 x 1-1.5 mm, tubular. Sepals 3, 2-3 x 1 mm, oblong or ovate, white. Ovary 3-4 mm long, oblong; style 2-3. Fruit softly echinate, with persistent style. Seeds c. 2 mm long, ellipsoid, dark brown.

Fl. & Fr. : Oct. - May.

Distr. : Widely distributed in the Old World from Africa to Australia through South and East Asia and Malesia. Common in ponds, tanks, pools, lakes and canals, growing in dense clumps. *CNS 2033* (Nedumudi).

OTTELIA Persoon

Syn. Pl. 1: 400. 1805.

Ottelia alismoides (L.) Pers., Syn. Pl. 1: 400. 1805; Hook. f., Fl. Brit. India 5: 662. 1888; Fischer in Gamble, Fl. Pres. Madras 1398. 1928; Subram., Aquat. Ang. 61. 1962; Gandhi & Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 634. 1976; Mani. & Sivar., Fl. Calicut 281. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1546. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 293. 1988; Karthik. *et al.*, Fl. Ind. Enum. Monocot. 81. 1989; Vajravelu, Fl. Palghat Dist. 461. 1990; Sivar. & Mathew, Fl. Nilambur 675. 1996. *Stratiotes alismoides* L., Sp. Pl. 535. 1753. *Damasonium indicum* Willd., Sp. Pl. 2(1): 276. 1799. ***Ottelambel*** Rheede, Hort. Malab. 11: 95, t. 46. 1692.

Submerged acaulescent annual herbs. Leaves submerged as well as floating, submerged leaves narrowly oblong or spathulate; floating leaves larger, upto 25 x 23 cm, broadly ovate or suborbicular, base cordate, margins entire or denticulate, apex acute, obtuse or notched; petiole to 40 cm long. Flowers bisexual, sessile inside a stalked spathe 2-3 cm long, elliptic, 3-10-ribbed, of which 2-3 develop into wings; wings crisped and flexuous when mature. Sepals 3, 1-2 cm long, linear or narrowly oblong, obtuse, green,

persistent. Petals 3. 1.5-3 long, obvate, apex rounded, white, base yellow. Stamens 6-12; filaments glandular hairy; anthers yellow. Ovary oblong; style papillose hairy. Fruit 1.5-2 cm long, ellipsoid, fleshy. Seeds numerous, fusiform, black, striated.

Fl. & Fr. : Sep.-Feb.

Distr.: Throughout the warmer parts of South and S.E Asia, Malesia and Northern Austallia. A gregarious weed in ponds, pools, lakes, flooded paddy fields and even in running streams. *CNS 1243* (S.L. Puram).

VALLISNERIA Linnaeus

Sp. Pl. 1015. 1753.

Vallisneria natans (Lour.) Hara, J. Jap. Bot. 49: 136. 1974; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1547. 1913; Gandhi & Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 635. 1976. *Physkium natans* Lour., Fl. Cochinch. 66. 1790; S. Moore, J. Bot. 63: 290. 1925. *Vallisneria spiraloides* Roxb., Fl. Ind. 3: 750. 1832. *Vallisneria asiatica* Miki, Bot. Mag. (Tokyo) 48: 329. 1934. *Vallisneria spiralis* auct., non. L., 1753: Wight, Ill. Ind. Bot. tt. 23 & 24. 1840; Hook. f., Fl. Brit. India 5: 660. 1888, p.p.; Fischer in Gamble, Fl. Pres. Madras 1369. 1928; Subram., Aquat. Ang. 57. 1962.

Acaulescent, submerged herbs. Stolons to 4 cm long. Leaves radical, 8-25 x 0.5-1 cm, linear, flat, base narrow, margins minutely toothed, apex obtuse. Flowers dioecious. Male flowers smaller than female flowers, with many stalked flowers, which break off and rise to the water surface at anthesis; spathe to 5 x 3 mm, oblong; speals 3, ovate or oblong; petals absent; stamens 1-3. Female flowers long-peduncled, the peduncle spirally coiling after fertilization; sapthe to 1 cm long, oblong, enveloping ovary. Sepals 3, to 2 x 1.5 mm, ovate-oblong; petals 3, minute; staminoides 3; ovary c. 2 mm long, linear; styles 3, to 3 mm long, 2-lobed, hairy on their inner surface. Fruit 5-10 cm long, linear. Seeds numerous, oblong.

Fl. & Fr. : Oct. - Feb.

Distr. : Iraq, India, Nepal, Indo-China, Japan, Malesia and Australia. In still water. Rare. *CNS 1874* (Mararikulam).

111. ORCHIDACEAE Juss.

Gen. Pl. 64. 1789.

1a. Plants epiphytic.

2a. Leaves equitant, laterally compressed ..... **Oberonia**

2b. Leaves not eqitant or laterally compressed.

3a. Plants with pseudobulbs.

4a. Racemes erect on a separate scape arising at the base of the pseudobulb; flowers not hidden by bifarious foliaceous bracts; column prolonged into a foot ..... **Bulbophyllum**

4b. Racemes pendulous, terminal on pseudobulb; flowers hidden by imbricating bifarious foliaceous persistent bracts; column not prolonged into a foot ..... **Pholidota**

3b. Plants non-pseudobulbous.

5a. Leaves terete ..... **Luisia**

5b. Leaves flat.

6a. Leaves linear, apex bilobed; inflorescence leaf-opposed corymbs; lip spurred; plants leafy at flowering ..... **Acampe**

6b. Leaves elliptic-lanceolate, apex acute, not bilobed; inflorescence a terminal or axillary raceme; plants leafless during flowering ..... **Dendrobium**

1b. Plants terrestrial.

7a. Flowers with a mentum.

8a. Herbs with epigeal pseudobulbs; scapes lateral on pseudobulb .... **Eulophia**

8b. Herbs with tuberous root stocks and without pseudobulbs; scape terminal ..... **Habenaria**

7b. Flowers without a mentum or spur ..... **Zeuxine**

ACAMPE Lindley

Folia Orchid. Fasc. 4. 1853.

Acampe praemorsa (Roxb.) Blatt. & McCann, J. Bombay Nat. Hist. Soc. 35: 495. 1932; Jayaweera in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 231. 1981; Abraham & Vatsala, Intr. Orch. 450. 1981; Mani. & Sivar., Fl. Calicut 284. 1982; Joseph, Orch. Nilgiris 133. 1982; Seidenf. in Matthew, Fl. Tam. Carnatic 3: 1602. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 297. 1988; Vajravelu, Fl. Palghat Dist. 465. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 446. 1994; Sivar. & Mathew, Fl. Nilambur 677. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 433. 1996. *Epidendrum praemorsum* Roxb., Pl. Corom. 34. 1795. *Acampe wightiana* Lindl., Folia Orch. Acampe 2. 1853; Fischer in Gamble, Fl. Pres. Madras 1447. 1928. *Saccolabium praemorsum* (Roxb.) Hook. f., Fl. Brit. India 6: 62. 1890. *Saccolabium wightianum* Hook. f., Fl. Brit. India 6: 62. 1890. ***Thalia-maravara*** Rheede, Hort. Malab. 12: 9, t. 4. 1693.

Robust epiphytic shrubs. Stem stout, 20-50 cm high, with vermiform roots from basal nodes. Leaves distichous, 12-20 x 2-3 cm, linear, sheathing at base, apex unequally 2-lobed, thick, coriaceous. Corymbs leaf-opposed; peduncle 3.5-5 cm long. Floral bracts scaly, broadly orbicular, broader than long. Flowers 0.8-1 cm across; sepals and petals 0.8-1 x 0.3-0.5 cm,ovate-lanceolate, creamy yellow with reddish-brown transverse bands, thick, fleshy. Lip c. 8 x 4 mm, fleshy, creamy white with narrow red streaks, saccate at base, 3-lobed; lateral lobes small; mid-lobe ovate-obtuse, margin crispate; spur short. Anther terminal, 2-loculed; pollinia 2, globose. Capsule to 4 cm long, cylindrical, ribbed.

Fl. & Fr.: Jul.-Sep.

Distr.: India and Sri Lanka. In sacred groves. *CNS 1768* (Veeyapuram).

BULBOPHYLLUM Du Petit-Thouars

Hist. Pl. Orch., Tabl. Esp. 3. 1822 (*nom. cons.*).

Creeping epiphytes with uninodal pseudo-bulbs on the rhizome. Leaves 1 or 2 on pseudobulb. Flowers solitary, umbellate or racemose, on a separate scape from rhizome.

Sepals 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. Column short, often 2 horned at apex. Pollinia 4, in 2 groups. Capsule fusiform or ellipsoid.

1a. Pseudobulbs 2-3 cm long; leaves 4-12 cm long; flowers many, racemose .... **B. neilgherrense**

1b. Pseudobulbs 4-7 mm long; leaves 7-16 mm long; flowers solitary, rarly 2 .... **B. rheedi**

Bulbophyllum neilgherrense Wight, Ic. t. 1650. 1851; Hook. f., Fl. Brit. India 5: 761.1890; Fischer in Gamble, Fl. Pres. Madras 1418. 1928; Sant. & Kapad., Orch. Bombay 195. 1966; Sald. in Sald. & Nicols., Fl. Hassan Dist. 815. 1976; Abraham & Vatsala, Intr. Orch. 334. 1981; Mani. & Sivar., Fl. Calicut 284. 1982; Joseph, Orch. Nilgiris 92. 1982; Seidenf. in Matthew, Fl. Tam. Carnatic 3: 1591. 1983; Mani., Fl. Silent Valley 271. 1988; Ramach. & Nair, Fl. Cannanore 447. 1988; Vajravelu, Fl. Palghat Dist. 468. 1990; Sasi. & Sivar., Fl. Pl. Thrissur For. 435. 1996.

Epiphytes with uninodal pseudobulbs on rhizome; rhizome creeping, stolon-like. Pseudo-bulbs fleshy, yellowish-green, 2-3 cm long, conical-ovoid, faintly 4-angled. Leaves single, apical, sessile, 4-12 x 1.5-3 cm, elliptic-oblong, apex obtuse, coriaceous. Racemes lateral, 6-10 cm long, sheathing at base. Flowers brownish, c. 1 cm long, dense, bracts small, oblong-lanceolate. Lateral sepals c. 1 cm long, ovate-acuminate; dorsal sepal c. 5 mm long. Petals small; lateral petals ovate-triangular, awned. Lip dark red, 3-lobed, spurred at base, mid-lobe thick, grooved dorsally, fleshy, laterals membranous. Column short, produced above into 2 teeth.

Fl. & Fr.: Feb.-Apr.

Distr.: S.W. India: Endemic. In sacred groves. *CNS 1428* (Kanichukulangara); CNS 1429 (Vandanam).

Bulbophyllum rheedei Mani. & Sathish., Rheedea 1 (1 & 2): 52. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 450. 1994.

Small pseudobulbous herbs; rhizome thick wiry; pseudobulbs 4-7 x 3-5 mm, ovoid-globular, dark green. Leaves 7-16 x 4-7 mm, oblong-ovate or elliptic, base cuneate, apex retuse or emarginate; petiole very short. Inflorescence from the basal part of the rhizome, just near the pseudobulb; scape to 1.2 cm long, bracteate with a single flower, rarely 2. Flowers creamy white with violet spots or almost violet. Dorsal sepal 5-6 x 3-4 mm, oblong, gland-dotted. Petals c. 2.5 x 1.5 mm, oblong, gland-dotted. Lip thick, creamy yellow with darker purple margins. Column c. 1 mm long, narrowly winged. Fruits 1-1.2 x 0.5-0.6 cm, globose to ellipsoid, stalked.

Fl. & Fr.: Jun.-Nov.

Distr.: Kerala and Karnataka. In sacred groves. *CNS 2042* (Muhamma), *CNS 1885* (Vandanam).

DENDROBIUM O. Swartz

Nova Acta Regiae Soc. Sci. Upsal. Ser. 2, 6: 82. 1799 (*nom. cons.*).

Dendrobium ovatum (L.) Kraenzl. in Engl., Pflanzenr. IV. 50(45): 71. 1910; Fischer in Gamble, Fl. Pres. Madras 1416. 1928; Sald. in Sald. & Nicols., Fl. Hassan Dist. 822. 1976; Abraham & Vatsala, Intr. Orch. 353. 1981; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 299. 1988; Vajravelu, Fl. Palghat Dist. 474. 1990; Sivar. & Mathew, Fl. Nilambur 685. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 439.1996. *Epidendrum ovatum* L., Sp. Pl. 952. 1753. *Cymbidium ovatum* (L.) Willd., Sp. Pl. 4: 101. 1805. *Dendrobium chloropus* Lindl., Bot. Reg. (Misc.) 30: 44. 1844; Hook. f., Fl. Brit. India 5: 719. 1890. *Dendrobium barbatulum* auct., non Lindl., 1830: Wight, Ic. t. 910. 1844. ***Anantali-maravara*** Rheede, Hort. Malab. 12: 15-16, t. 7. 1693.

Epiphytic herbs; stem tufted, 10-25 cm long; internodes2-3 cm long. Leaves appears before flowering, 5-7 x 2-2.5 cm, elliptic-lanceolate, base sheathing, apex acute. Racemes many-flowered, 3-8 cm long, terminal or from axils of fallen leaves. Flowers

1.5-2 cm across, creamy white; bracts ovate-lanceolate. Sepals 1.2-1.5 x 0.4-0.6 cm, elliptic-oblong. Petals 1.2-1.5 x 0.5-0.7 cm, lateral petals spathulate. Lip c. 1.5 cm long, 3-lobed, yellow-hairy on dorsal side, mid-lobe large, obovate, side-lobes small, falcate; mentum 4-5 mm long. Pedicel and ovary 1.5-2 cm long. Capsule fusiform.

Fl. & Fr.: Jan. - Apr.

Distr.: Endemic to India. In sacred groves. *CNS 1427* (Kanichukulangara).

EULOPHIA R. Brown
in Bot. Reg. t. 573. 1821.

Eulophia epidendraea (Retz.) Fischer in Gamble, Fl. Pres. Madras 1434. 1928; Jayaweera in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 168. 1981; Seidenf. in Matthew, Fl. Tam. Carnatic 3: 1605. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 458. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 441. 1996. *Serapias epidendraea* Koenig in Retz., Obs. Bot. 6:65. 1791. *Limodorum virens* Roxb., Pl. Corom. 1:31, Pl. 38. 1795. *Limodorum epidendroides* Willd., Sp. Pl. 4: 124. 1805. *Eulophia viridiflora* Steud., Nom. Bot. ed. 2, 1:605. 1841. ***Katou-theka-maravara*** Rheede, Hort. Malab. 12: 49, t. 25. 1693 (Plate XXII: A & B).

Large, terrestrial herbs with pseudobulbous stems and vermiform roots, pseudobulbs 4.5-10.5 cm long, 3-6.5 cm diam., conico-ovoid, covered with broad, membranous, basal sheaths. Leaves many, 17-51 x 0.9-1.7 cm, linear, acuminate, bases sheathing the pseudobulb. Flowers greenish-yellow with a white purple-streaked lip, 2 cm long; peduncle terete, about 47 cm long, erect, bearing 9 membranous sterile bracts. Floral bracts 7.8-9.9 x 3.9-5.4 mm, ovate, acuminate; dorsal sepals 1.8-2.2 x 0.5-0.6 cm, lanceolate-oblong, acuminate, apiculate; lateral sepals 1.8-2.1 x 0.5-0.8 cm, obovate-lanceolate, apiculate; petals 1.4-1.8 x 0.5-0.7 cm, broadly lanceolate; lip c. 1.9 x 1.35 cm, obovate-oblong; lateral lobes of lip small, erect, embracing the column; mid-lobe broadly oblong, rounded, crenulate, recurved; spur short, cylindrical; column 8 mm high, 3.6 mm broad. Ovary with pedicel 1.7-1.8 cm long.

Fl. & Fr.: Oct. - Mar.

Distr.: Sri Lanka, Bengal and the Deccan Peninsula in India. Rather rare, in the shade, on accumulations of decaying leaves and soil. Occasional in certain sacred groves. *CNS 2106* (Vandanam), *CNS 1937* (Areeparambukavu at Cherthala).

HABENARIA Willdenow

Sp. Pl. 4(1): 5, 44. 1805.

Habenaria viridiflora (Sw.) R. Br., Prodr. 312. 1810; Wight, Ic. t. 1705. 1851; Hook. f., Fl. Brit. India 6: 150. 1890; Fischer in Gamble, Fl. Pres. Madras 1471. 1928; Sant. & Kapad., Orch. Bombay 35. 1966; Sald. in Sald. & Nicols., Fl. Hassan Dist. 834. 1976; Jayaweera in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 361. 1981; Mani. & Sivar., Fl. Calicut 283. 1982; Seidenf. in Matthew, Fl. Tam. Carnatic 3: 1566.1983; Sasi. & Sivar., Fl. Pl. Thrissur For. 443. 1996. *Orchis viridiflora* Sw., Kongl., Vetensk. Acad. Nya Handl. 21: 206. 1800. *Habenaria viridiflora* var. *dalzellii* Hook. f., Fl. Brit. India 6: 150. 1800 (Fig. 61).

Terrestrial, tuberous, scapigerous herbs, 15-30 cm tall; tubers 1.5-3.2 cm long, ovoid or oblong. Leaves subradical, 5-10 x 0.8-1.4 cm, linear-lanceolate, apex acuminate, coriaceous, glabrous, midrib prominent on the under surface, base sheathing. Flowers many, green, confined to the upper half of the 15-30 cm long scape; sterile bracts 3-4, minute; floral bracts c. 5 mm long, lanceolate, acuminate, 1-nerved. Sepals unequal; dorsal c. 2 mm long, ovate; laterals c. 2.5 mm long, obliquely ovate, obtuse. Petals similar to lateral sepals, petals with the dorsal sepals form a hood over the column. Lip c. 4 mm long, 3-partite to 2/3 of its length; lobes narrowly linear, curved, lateral lobes longer than the mid-lobe; spur bulbous, c. 2 x 1.5 mm, shorter than the ovary. Column short. Anthers 2-locular; pollinia 2, pyriform.

Fl. & Fr.: Sep.-Oct.

Distr.: India and Sri Lanka. In open sandy ground. *CNS 1789* (Kalavoor A.I.R. Campus).



Plate XXII. *A & B. Eulophia epidendraea* (Retz.) Fischer; A. Habit; B. Inflorescence; C. *Limnocharis flava* (L.) Buch.



Fig. 61. *Habenaria viridiflora* (Sw.) R. Br.: a. Habit; b. Flower; c. Floral bract; d. Dorsal sepal; e. Lateral sepal; f. Lip with petals; g. Lip with petals and spur; h. Pollinia.

LUISIA Gaudichaud-Beaupre

in Freycinet, Voyage Monde, Uranie Physicienne Bot. 426. 1829 ("1826").

Luisia zeylanica Lindl., Folia Orch. Luisia 3. 1853; Seidenf., Dansk Bot. Ark. 27(4): 62. 1971; Sald. in Sald. & Nicols., Fl. Hassan Dist. 836. 1976; Abraham & Vatsala, Intr. Orch. 486, f. 152. 1981; Joseph, Orch. Nilgiris 108. 1982; Seidenf. in Matthew, Fl. Tam. Carnatic 3: 1595. 1983; Mani., Fl. Silent Valley 292. 1988; Sivar. & Mathew, Fl. Nilambur 690. 1996; Sasi. & 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; Sant. & Kapad., Orch. Bombay 213. 1966; Jayaweera in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 210. 1981.

Erect, tufted, epiphytic herbs; stem to 20 cm long. Leaves 4-10 cm long, terete, acute at apex, fleshy, sheathing at base. Inflorescence condensed racemes, extra-axillary. Flowers 2-4, 5-6 mm long, greenish-yellow with purple tinge; bracts 1.5-2 x 1-2 mm, oblong, obtuse. Sepals c. 5 x 1.5 mm, oblong, obtuse, apex incurved. Petals similar to sepals. Lip 4-6 mm long, oblong, concave towards the base, trilobed with dark maroon horizontal bands; mid-lobe rhomboid, larger than side lobes. Ovary c. 2 mm long. Fruits 1.5-3.5 cm long, oblong.

Fl. & Fr.: Aug. - Dec.

Distr.: Indo-Malesia. In sacred groves. *CNS 1799* (Ambalappuzha).

OBERONIA Lindley

Gen. Sp. Orchid Pl. 15. 1830 *(nom. cons.)*.

Oberonia bicornis Lindl., Gen. Sp. Orch. 16. 1830 & Fol. Orch. *Oberonia* 4. 1859; Sant. & Kapad., Orch. Bombay 72. 1966; Seidenf, Dansk Bot. Ark. 25(3): 85. 1966; Mani. & Satish., J. Econ. Tax. Bot. 4(3): 987. 1983; Mani., Fl. Silent Valley 294. 1988. *Malaxis bicornis* (Lindl.) Reichb. f., Walp. Ann. 6: 211. 1861; Hook. f., Fl. Brit. India 5: 682. 1888. *Iridorkis bicornis* (Lindl.) Ktze., Rev. Gen. Pl. 2: 669. 1891.

Small epiphytes. Leaves distichous, 1.5-4.5 x 0.4-1.2 cm, ensiform, equitant, apex acute, fleshy, yellowish-green. Raceme terminal, up to 6 cm long, slender, spiciform. Flowers minute, ochraceous-red; lip deep red, 3-lobed, side-lobes erect, surrounding the column; mid-lobe curving upwards with the lateral lobes.

Fl. & Fr.: Oct. - Nov.

Distr.: South and North East India. Endemic. Very rare. In sacred groves. CNS 1376 (Nulayakadkavu at Kadakkarappally).

PHOLIDOTA Lindley ex W.J. Hooker

Exot. Fl. 2: 138. 1825.

Pholidota pallida Lindl., Edward's Bot. Reg. 21. sub. t. 1777. 1836; Sald. in Sald. & Nicols., Fl. Hassan Dist. 843. 1976; Abraham & Vatsala, Intr. Orch. 289. 1981; Jayaweera in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 120. 1981; Joseph, Orch. Nilgiris 90. 1982; Seidenf. in Matthew, Fl. Tam. Carnatic 3: 1574. 1983; Mani., Fl. Silent Valley 301. 1988; Ramach. & Nair, Fl. Cannanore 460. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 302. 1988; Vajravelu, Fl. Palghat Dist. 490. 1990; Sasi. & Sivar., Fl. Pl. Thrissur For. 452.1996. *P. imbricata* sensu Lindl., Bot. Reg. 14: t. 1213. 1828, non Lind., 1825; Wight, Ic. t. 907. 1845; Hook. f., Fl. Brit. India 5: 845. 1890; King & Pantl., Ann. Roy. Bot. Gard. Calcutta 8: t. 201. 1898; Fischer in Gamble, Fl. Pres. Madras 1431. 1928; Sant. & Kapad., Orch. Bombay 178. 1966; Sivar. & Mathew, Fl.Nilambur 696. 1996. ***Welia-theka-maravara*** Rheede, Hort. Malab. 12:47-48, t. 24.1693.

Epiphytes with crowded pseudobulbs and tufted roots. Pseudobulbs 4-6 cm long, oblong-conical, tetragonous, with large deciduous sheathing scales. Leaves 1-2 from the apex of pseudobulb, 14-25 x 3.2-5.5 cm, elliptic-oblanceolate, base attenuate, apex acute or obtuse, coriaceous, strongly 3-nerved. Racemes drooping, axillary, 20-27 cm long. Flowers pinkish-white, hidden by imbricating, bifarious foliaceous persistent bracts; bracts to 6 x 5 mm, ovate-obtuse. Sepals subequal, to 7 x 5 mm, ovate, apex obtuse or acute, 3-nerved. Petals to 6 x 2.5 mm, linear-oblong. Lip to 8 x 8 mm, deeply saccate, sac

longitudinally 3-ridged within, 3-lobed, mid-lobe bifid. Column orbicular-ovate, winged. Anthers 2-loculed, pollinia 4. Capsule ellipsoid, pendulous.

Fl. & Fr.: Sep. - Jan.

Distr.: Sri Lanka, India to Thailand, Malaya and Indo-China. In sacred groves. *CNS 1912* (Thiruvizha).

ZEUXINE Lindley

Collect. Bot. Append. n. 18. 1826 (1825) ("*Zeuxina*").

Zeuxine longilabris (Lindl.) Benth. ex Hook. f., Fl. Brit. India 6: 107. 1890; Fischer in Gamble, Fl. Pres. Madras 1456. 1928; Sant. & Kapad., Orch. Bombay 169, t. 39. 1966; Sald. in Sald. & Nicols., Fl. Hassan Dist. 855. 1976; Jayaweera in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 319. 1981; Mani. & Sivar., Fl. Calicut 283. 1982; Seidenf. in Matthew, Fl. Tam. Carnatic 3: 1558. 1983; Mani., Fl. Silent Valley 308. 1988; Ramach. & Nair., Fl. Cannanore 464. 1988; Vajravelu, Fl. Palghat Dist. 495.1990; Mohanan & Henry, Fl. Thiruvananthapuram 472. 1994; Sivar. & Mathew, Fl. Nilambur 702. 1996. *Monochilus longilabre* Lindl., Gen. Sp. Orch. Pl. 487. 1840. M. *affine* Wight, Ic. t. 1728. 1851, non Lindl., 1840.

Slender herbs, 13-25 cm tall, in dark shady places; rhizome swollen at nodes with thick roots. Leaves 3, rarely 4, 3-5 x 1.2-2 cm, ovate, base sheathing, apex acute, membranous with whitish midrib, pinkish on drying, crowded at the base of the inflorescence. Raceme terminal, 12-20 cm long, villous; scape with 1-3 sterile bracts. Flowers white, 1-1.5 cm long; bracts c. 8 x 4 mm, broadly lanceolate, acuminate. Dorsal sepal c. 7 x 3 mm, ovate-oblong, obtuse, connate with lateral petals to form a hood; lateral sepals 6-7 x c. 3 mm, ovate-subfalcate, obtuse, free, villous without. Lateral petals 7-8 x 2-2.5 mm, falcate, obtuse, connate at base, deeply cleft, 2-horned within the sac. Fruit dark green.

Fl. & Fr.: Jan.-Mar..

Distr.: Sri Lanka, India and Cambodia. In sacred groves. *CNS 2083* (Sharangakavu at Venmony).

112. ZINGIBERACEAE Lindl.

Key Bot. 69: 15-39. 1835.

1a. Leaves spiral; anther median on a petaloid process ..... **Costus**

1b. Leaves distichous; anther terminal on filament.

2a. Flowers in racemes or panicles, terminal on leafy stem ..... **Alpinia**

2b. Flowers in spikes, on a leafless scape, from the rhizomes.

3a. Bracts pouched, basally connate, sterile terminal bracts brightly coloured ..... **Curcuma**

3b. Bracts not as above ..... **Zingiber**

ALPINIA Roxburgh

Asiat. Res. 11: 350. 1810 (*nom. cons.*).

Rhizome creeping, thick and fleshy; root tubers absent. Leafy shoots many, robust, 1-2 m tall. Leaves many, oblong or lanceolate, plane of distichy transverse to rhizome. Inflorescence raceme or panicle, congested or lax, usually terminal on leafy shoot, erect. Bracts open to the base. Bracteoles tubular, enveloping the young bud, easily deciduous. Calyx usually tubular, shortly 3-toothed. Corolla tube cylindric; lobes oblong or linear-oblong; the dorsal lobe more or less hooded. Labellum petaloid, coloured. Lateral staminodes small. Epigynous glands 2. Ovary trilocular; placentation axile. Capsule spherical, yellow-orange. Seeds many, angular, arillate.

1a. Inflorescence branched; labellum with a long claw ..... **A. galanga**

1b. Inflorescence unbranched, paniculate; labellum without a claw ..... **A. calcarata**

Alpinia calcarata Roscoe, Trans. Linn. Soc. London 8: 347. 1807; Wight, Ic. t. 2008. 1853; Baker in Hook. f., Fl. Brit. India 6: 254. 1892; Trimen, Handb. Fl. Ceylon 4: 249. 1898; Fischer in Gamble, Fl. Pres. Madras 1493. 1928; Rao & Verma, Bull. Bot. Surv. India 14: 139. 1972; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1613. 1983;

Sivar. & Mathew, Fl. Nilambur 703. 1996. *Alpinia cernua* Sims, Bot. Mag. 44: t. 1900. 1817. *Alpinia spicata* Roxb., Asiat.Res. 11: 356. 1810, non Jacq., 1973. *Languas calcarata* (Roscoe) Alston in Trimen, Handb. Fl. Ceylon 6: 282. 1931.

Rhizome creeping, subterranean. Leafy stem 1-2 m tall. Leaves 27-53 x 6-9 cm, linear-lanceolate, narrowing towards base, apex acuminate; ligule c. 1 cm long, shortly bifid, membranous, ciliate along the margin. Inflorescence terminal, paniculate, 10-22 cm long, dense-flowered. Flowers usually shortly pedicelled; pedicel densely pubescent; bracts c. 1 mm long, triangular, pubescent; bracteoles 1-1.5 x 0.7-0.8 cm, ovate, membranous. Calyx 0.8 - 1 cm long, tubular, shortly 3-lobed. Corolla tube almost equal to the calyx; lobes oblong; dorsal lobe slightly longer, 1.5-1.8 x 0.6-0.8 cm; lateral lobes c. 1.5 x 0.5 cm. Labellum to 2.7 cm long, 1.5-1.8 cm wide, obovate, apex emarginate, highly variegated with dark purple and yellow. Stamen c. 2 cm long; anther c. 8 mm long. Ovary c. 4 x 3 mm, trilocular, densely pubescent. Fruit 1.8 - 2.3 x 1-1.5 cm, subglobose, orange-red, pubescent. Seeds many.

Fl. & Fr.: May-Dec.

Distr.: Native of India; also occurs in Myanmar, Thailand, Indonesia, New Guinea, and the Bismark Archipelago. In waste lands. *CNS 1542* (Venmony).

The rhizome is used in the form of an infusion in fever, rheumatism and catarrhal affections. The rhizome form a major ingredient in ayurvedic preparations.

Alpinia galanga (L.) Sw., Obs. 2. 1791; Roxb., Fl. Ind. 1: 58. 1820; Baker in Hook. f., Fl. Brit. India 6: 253. 1892; Fischer in Gamble, Fl. Pres. Madras 1492. 1928; Rao & Verma, Bull Bot. Surv. India 14: 139. 1972; Burtt & Smith in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 516. 1983; Smith, Edinburgh J. Bot. 47: 45. 1990. *Maranta galanga* L., Sp. Pl. ed. 3. 1762. *Languas galanga* (L.) Stuntz, U.S. Dept. Agrl. Bull. 261: 21. 1912; Holttum, Gard. Bull. Singapore 13: 157. 1950.

Aromatic perennial; root stock cylindric. Leafy stem to 2 m high, many. Leaves 40-65 x 8-13 cm, oblong-lanceolate, base cuneate, apex acute; petiole c. 5 mm long; ligule 6-

7 mm long. Inflorescence terminal on the leaf shoot, dense-flowered; peduncle densely pubescent. Flowers c. 4 cm long, shortly pedicellate; bracts 2-2.5 x 0.5-0.8 cm, membranous; bracteoles c. 1.5 cm long. Calyx c. 1 cm long, cylindrical, split on one side, greenish-white. Corolla tube c. 1.2 cm long, greenish-white; lobes unequal, spreading, pubescent. Labellum c. 2 cm long, white, with a few oblique, lilac lines on either side of the midrib on the upper surface, base clawed, margins wavy, apex emarginate. Lateral staminodes 4-5 mm long, subulate. Anther 6-8 mm long; filament 1.2-1.5 cm long. Epigynous glands 2. Ovary c. 3 mm long, ellipsoid. Fruit c. 1 cm across, globose,orange-red.

Fl. & Fr.: Apr.-Nov.

Distr.: Wild in India, Indo-China, Philippines and Borneo. Cultivated throughout S.E. Asia, Malesia, Sri Lanka and in some parts of India. *CNS 2680* (Thiruvambadi).

The rhizome of this species is aromatic, pungent, improves apetite, taste and voice. It is also used in head ache, rheumatic pains and diabetes.

CURCUMA Linnaeus

Sp. Pl. 2. 1753.

Curcuma caesia Roxb., Asiat. Res. 11: 334. 1810. & Fl. Ind. 1: 26. 1820; Baker in Hook. f., Fl. Brit. India 6: 212. 1890; Prain, Bengal Pl. 2: 1042. 1908; Sabu & Mangaly, Ind. J. For. Addl. Ser. 1:15. 1990; Mangaly & Sabu, Rheedea 3(2): 147. 1993. *Curcuma malabarica* Velay., Amal. & Murali., J. Econ. Tax. Bot. 14: 189. 1990. ***Kuva***.

Rhizome large, blue in the centre, strongly aromatic; root tubers many, ovate-oblong, pale, watery-pearl colour; pseudostem 25-32 cm tall. Leaves distichous, 22-40 x 7-12 cm, oblong-lanceolate, base acuminate, apex acute, reddish-brown patch along the sides on the distal half of the mid rib on upper side only, groove on the middle green; petiole about as long as lamina. Inflorescence lateral, 20-30 cm long; peduncle 9-15 cm long; coma bracts large, pink to violet, lower ones streaked green. Fertile bracts 4-5 cm long, lower half fused, apex rounded. Bracteoles c. 3 x 2 cm, white with a median light green patch.

Flowers 4.5-5 cm long. Calyx c. 1 cm long, 3-lobed at apex, split on one side. Corolla tube 3-3.3 cm long, pink, lobes unequal; dorsal lobes c. 1.5 x 1 cm, concave, hooded; lateral lobes c. 1.5 cm long, tip rounded, pink. Labellum 1.5-1.7 cm long, apex emarginate, yellow. Lateral staminodes c. 1.5 x 1 cm, yellow. Anther c. 7 mm long. Epigynous glands two, c. 4 mm long, linear, yellowish. Ovary c. 5 mm long, trilocular; stigma bilipped. Fruiting not common.

Fl.: Apr.-May.

Distr.: Native of South India and Myanmar. It is also reported from Java and widely cultivated in Malesia. It is a common undergrowth in coconut plantations and also as weed in waste lands. *CNS 1793* (Parayamkulam).

COSTUS Linnaeus

Sp. Pl. 1:2. 1753.

Costus speciosus (Koenig) Smith, Trans. Linn. Soc. London 1: 249. 1791; Wight, Ic. t. 2014. 1853; Baker in Hook. f., Fl. Brit. India 6: 249. 1892; Trimen, Handb. Fl. Ceylon 4: 246. 1898; Fischer, Rec. Bot. Surv. India 9: 179. 1921 & in Gamble, Fl. Pres. Madras 1490. 1928; Rao & Verma, Bull. Bot. Surv. India 14: 138. 1972; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 770 1976; Burtt in Mani., Bot. Hist. Hort. Malab. 144. 1980; Mani. & Sivar., Fl. Calicut 288. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1613. 1983; Burtt & Smith in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 491. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 316. 1988; Mani., Fl. Silent Valley 311. 1988; Ramach. & Nair, Fl. Cannanore 467. 1988; Vajravelu, Fl. Palghat Dist. 498. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 475. 1994; Sivar. & Mathew, Fl. Nilambur 707. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For 459. 1996. *Banksea speciosa* Koenig in Retz., Obs. Bot. 3: 75. 1783. ***Tsjana-kua*** Rheede, Hort. Malab. 11: 15-16, t. 8. 1692. ***Anakuva***.

Rhizome tuberous, 1-2 cm thick, highly branched, yellowish-green inside. Leafy shoots 1.5-2.5 m tall. Leaves spirally arranged on the stem, 8-24 x 3-7 cm, oblong or oblanceolate-oblong, base tapering, apex abruptly acuminate, upper surface glabrous,

lower surface sparsely hairy; ligule truncate, densely hairy; petiole 3-5 mm long. Spikes terminal, 4-9 x 2-5 cm, more or less globose. Bracts 1.5-3 x 0.7-1.5 cm, ovate-acute, with a narrow subapical protruberance, reddish. Bracteoles 1-1.5 cm long, oblong, reddish. Calyx 2-2.5 cm long, 3-lobed; lobes 3-5 mm long. Corolla white; lobes to 4 x 0.8 cm, elliptic-oblong, acuminate. Labellum 5-8 cm wide, suborbicular, white with a creamy-yellow median band. Stamen median, on an oblong petaloid process. Ovary 5-8 mm long, globose, 3-lobed, 3-celled; ovules many; stigma crescent-shaped, ciliate. Capsule bright red, 2.5-3 x 2-2.5 cm, dehiscing loculicidally. Seeds 6-8 x 3-4 mm, black with fleshy white aril.

Fl. & Fr.: May-Dec.

Distr.: Sri Lanka, India, Himalaya, Indo-China, Malesia to New Guinea and Taiwan. Common in waste places. *CNS 1731* (Elippakulam).

ZINGIBER Mill.

Gard.Dict. Abr., ed. 4: 1545. 1754 (*nom. cons.*).

Rhizome thick, fleshy, subterranean, highly aromatic. Leafy shoots with many leaves. Leaves subsessile; ligule short to long. Inflorescence borne on a separate leafless shoot; peduncle short or long, usually clothed with sheaths; spike short or long, ovoid or cylindric. Bracts large, fleshy, imbricating, with a membranous hyaline margin. Bracteoles one to each flower, split to the base. Calyx tubular, shortly 3-lobed. Corolla tube cylindric, dorsal lobe broader than the laterals, lateral lobes linear-lanceolate. Labellum deeply 3-lobed, apex emarginate. Filament short; anther long, connective prolonged in to a slender, curved appendage. Stigma projecting just below the appex of the crest, with ciliate margins. Epigynous glands two. Ovary trilocular; ovules many. Capsule fleshy when fresh, leathery when dry, dehiscing loculicidally. Seeds many, black or dark brown, arillate.

1a. Peduncle 20-35 cm long; bracts 1.5-2 cm broad, ovate, apex rounded, green, turning blood-red; corolla white; labellum white ..... **Z. zerumbet**

1b. Peduncle very short or absent; bracts 0.8-1.2 cm broad, apex acumiante, reddish-green; corolla yellowish-orange; labellum light yellow with pink spot ..... **Z. cernum**

Zingiber cernum Dalz. in Hook., Kew J. Bot. 4: 342. 1852; Baker in Hook. f., Fl. Brit. India 6: 245. 1892; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 768. 1976; Mani. & Sivar., Fl. Calicut 288. 1982; Sasi. & Sivar., Fl. Pl. Thrissur For. 463. 1996. *Zingiber nimmonii* (Grah.) Dalz. in Hook., Kew J. Bot. 4: 341. 1852; Baker in Hook. f., Fl. Brit. India 6: 244. 1892; Fischer in Gamble, Fl. Pres. Madras 1489. 1928. *Alpinia nimmonii* Grah., Cat. Pl. Bombay 206. 1839 (Fig. 62).

Rhizome small, purplish-lilac inside, strongly aromatic; roots fleshy, bearing fleshy root tubers. Leafy shoot 50-90 cm tall, erect. Leaves subsessile, 15-23 x 5-9 cm, oblong-lanceolate, base oblique, apex acuminate, upper surface sparsely pubescent, lower densely pubescent; ligule c. 5 mm long, bifid, coriaceous. Inflorescence produced directly from the rhizome; peduncle short or absent; spike ovate or subglobose, enclosed within obovate reddish sheaths. Flowers 4.5-5 cm long, one in each bract; bracts 3-4 x 0.8-1.2 cm, lanceolate, apex acuminate, reddish-green; bracteoles c. 2.5 x 1 cm, lanceolate. Calyx tubular, 1-1.2 cm long, unilaterally split, membranous, white. Corolla tube 2.5-3 cm long, slender, white; lobes 3, subequal, yellowish-orange. Labellum c. 2.5 x 1.2 cm, 3-lobed, light yellow with pink spot; mid-lobe ovate, bifid at apex. Anther sessile, yellow. Stigma slightly projecting from the anther-crest. Epigynous glands c. 5 mm long, yellow. Capsules c. 4 x 2 cm, trigonous, whitish when young, turning to deep red at maturity. Seeds 6-7 x 3-4 mm, dark brown; aril white.

Fl. & Fr.: Jun.-Nov..

Distr.: Endemic to Peninsular India. In moist shady areas. *CNS 1600* (Nootavanpara).

Zingiber zerumbet (L.) J.E. Smith, Exot. Bot. 2: 105, t. 112. 1804; Baker in Hook. f., Fl. Brit. India 6: 247. 1892; Fischer in Gamble, Fl. Pres. Madras1490. 1928; Mani. & Sivar., Fl. Calicut 287. 1982; Burtt & Smith in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4: 495. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 319. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 474. 1994; Sivar. & Mathew, Fl. Nilambur 716. 1996; Sasi. & Sivar.,

Fl. Pl. Thrissur For. 464. 1996. *Amomum zerumbet* L., Sp. Pl. 1. 1753. ***Katou-inchi-kua*** Rheede, Hort. Malab. 11: 27, t. 13. 1692. ***Malainchi***.

Rhizomatous herbs; stem upto 1.2 m tall. Leaves 15-35 x 4-7.5 cm, oblong or oblong-lanceolate, base obtuse, apex acuminate, pubescent below; ligule to 2.5 cm long. Peduncle 20-35 cm long; sheath to 6 cm long, oblong, apex rounded. Spikes 5-8 x 3.5 - 6 cm, ovoid or oblong; bracts 2-3.5 x 1.5-2 cm, broadly ovate, rounded, margin membranous, green, turning blood-red on maturity. Flowers white. Calyx tube 1-1.5 cm long, 3-lobed. Corolla to 2.5 cm long, dorsal lobe ovate-acuminate. Labellum c. 2 x 2 cm, 3-lobed, mid-lobe suborbicular, lateral lobes ovate, c. 1.2 cm long. Capsule 2-2.5 x c. 1 cm, oblong. Seeds 2-3 mm across, globose.

Fl. & Fr.: Jul.-Nov.

Distr.: India, Sri Lanka to Malay Peninsula. In waste places. *CNS 1932* (Mannarsala), *CNS 2382* (Kottaram).

113. CANNACEAE Juss.

Gen. Pl. 62. 1789.

CANNA Linnaeus

Sp. Pl. 1. 1753.

Canna indica L., Sp. Pl. 1. 1753; Roxb., Fl. Ind. 1: 1. 1820; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 770. 1976; Mani. & Sivar., Fl. Calicut 288. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1621. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 282. 1988. *C. orientalis* Roscoe, Monandr. Pl. t. 12. 1828; Fischer in Gamble, Fl. Pres. Madras 1496. 1928. *C. indica* L., var. *orientalis* (Roscoe) Baker in Hook. f., Fl. Brit. India 6: 260. 1892. ***Katu-bala*** Rheede, Hort. Malab. 11: 85-87, t. 43. 1692.

Rhizome creeping; aerial stem erect, glabrous. Leaves 23-45 x 10-15 cm, ovate-elliptic or oblong, base tapering, apex acuminate, nerves close. Raceme many-flowered, to 20 cm long. Flowers paired, to 10 cm long; bracts 4-7 x 0.8-1.2 cm, ovate or narrowly linear; bracteoles to 1 cm, orbicular. Sepals 3, to 1.5 cm long, lanceolate. Petals 3, united

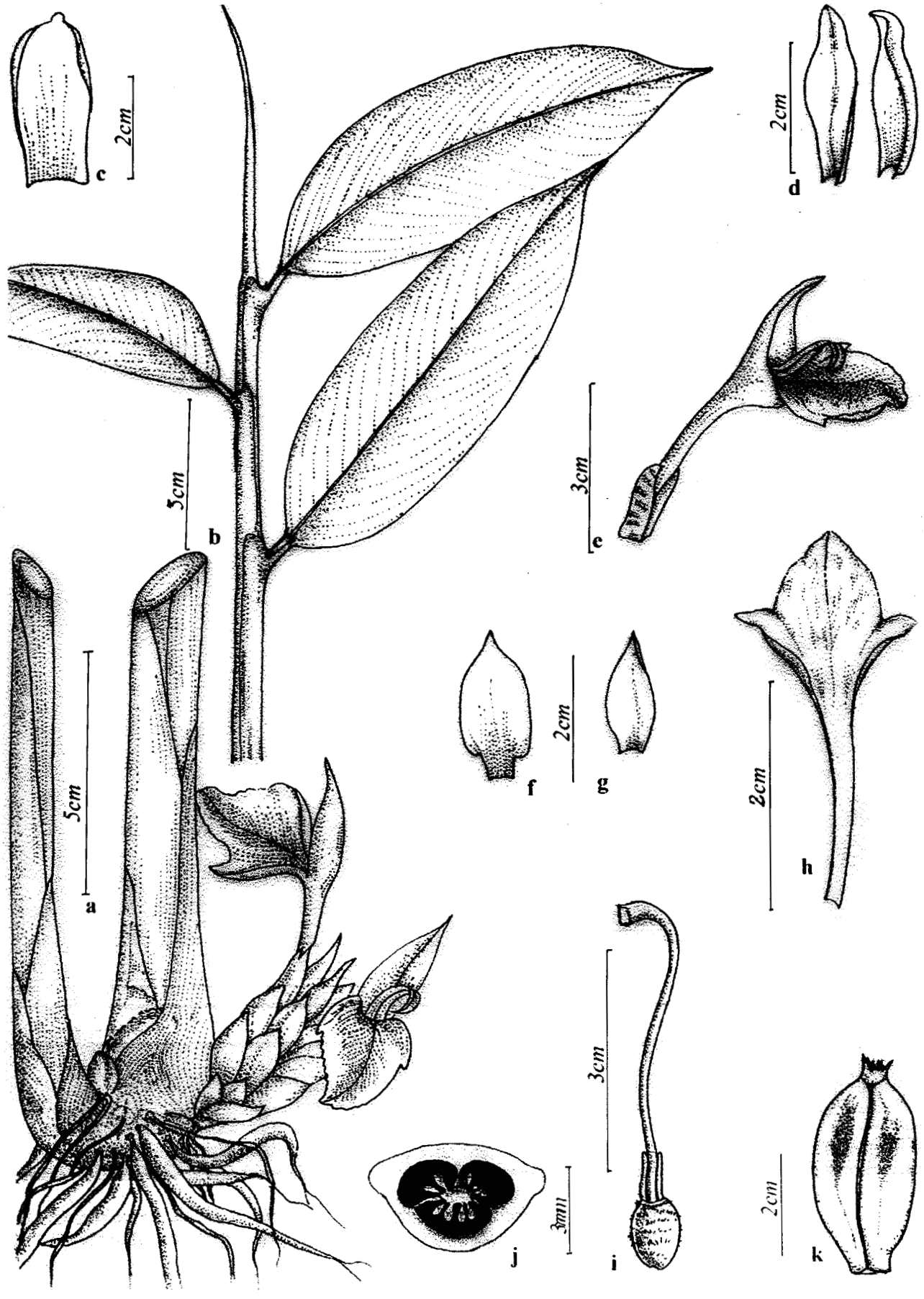


Fig. 62. *Zingiber cernum* Dalz.: a. Stem base with lateral spike; b. Twig; c. Bract; d. Bracteole; e. Flower; f & g. Petals; h. Labellum; i. Pistil with basal glands; j. Ovary-C.S; k. Fruit.

at base, 4-7 cm, linear-lanceolate, orange or red. Staminodes petaloid, bright-red, to 6 cm long, oblanceolate-spathulate, one staminode shorter. Ovary 3-celled; ovules many on axile placentae; style flattened, as long as the staminode. Capsule 1.5-3 x 1-1.6 cm, warty.

Fl. & Fr.: Throughout year.

Distr.: Sri Lanka, india and Malaya. Commonly cultivted and also found wild. *CNS 1939* (Kollakadava).

114. MUSACEAE Juss.

Gen. Pl. 61. 1789.

MUSA Linnaeus

Sp. Pl. 1043. 1753.

Musa paradisiaca L., Sp. Pl. 1043. 1753; Fischer in Gamble, Fl. Pres. Madras 1497. 1928; Cheesman, Kew Bull. 3: 145. 1948; Mani. & Sivar., Fl. Calicut 289. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1620. 1983.

Stout herbs; root stock large; stem formed by the imbricate base of petioles. Leaves simple, large, with a thick midnerve and pinnately parallel nerves. Inflorescence terminal, spicate; bracts spathaceous, large. Flowers bisexual. Sepals and petals connate. Lip free, transparent. Stamens 5, fertile, with a sterile staminode. Ovary inferior, 3-celled; ovules many, axile; style filiform, with a lobulate stigma. Fruit fleshy, oblong.

Fl. & Fr.: Throughout the year.

Distr.: India, Malesia and Brazil. Cultivated throughout the tropics. Several varieties of bananas and plantains are cultivated. *CNS 1917* (Kochalumoodu).

115. BROMELIACEAE Juss.

Gen. Pl. 49. 1789.

ANANAS P. Miller

Gard. Dict. Abr. ed. 4. 1754.

Ananas comosus (L.) Merr., Interpr. Herb. Amboin. 133. 1917; Purseglove, Trop. Crops, Monocots 76. 1975; Rauh, Bromel. 327. 1981; Mani. & Sivar., Fl. Calicut 289. 1982; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 281. 1988. *Bromelia comosa* L., Herb. Amboim. 21. 1754. *Ananas sativus* Schultes f., in L. Syst. Veg. 7: 1283. 1830; Fischer in Gamble, Fl. Pres. Madras 1498. 1928; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1622. 1983. ***Kapa-tsjakka*** Rheede, Hort. Malab. 11: 1-6, t. 1-2. 1692. ***Kaitha-chakka***.

Short-stemmed shrubs. Leaves radical, clustered, spirally arranged rosettes, 45-110 x 3.2-5.8 cm, linear, canaliculate, base amplexicaul and sheathing, margins spiny-serrate, apex acute, spiny, glaucous, coriaceous. Inflorescence terminal on the leafy stem, capitate, crowned with tuft of leaves. Flowers sessile, bisexual; bracts 1.5-3.3 x 0.8-1.5 cm, ovate, margins spiny-serrate, apex acute, spiny, coriaceous. Calyx short. Corolla lobes free or variously connate. Stamens 6, adnate to corolla. Ovary inferior, 3-celled; ovules many per cell on axile placentae; stigmas 3. Fruit a syncarpium formed by the coalescence of thickened rachis, bracts and ovaries, 12-18 x 8-12 cm.

Fl. & Fr.: Aug.-Feb.

Distr.: Native of Tropical America; widely cultivated for its edible fruits in the tropics. *CNS 1892* (Nooranad).

116. AMARYLLIDACEAE J. St.-Hil.

Expos.Fam. Nat. 1: 134. 1805.

1a. Filaments basally united by a coronal membrane; capsules trigonous .... **Pancratium**

1b. Filaments not united by a coronal membrane; capsules subglobose ..... **Crinum**

CRINUM Linnaeus

Sp. Pl. 291. 1753.

Crinum defixum Ker-Gawl., J. Sci. Arts (London) 3: 105.1817; Hook. f., Fl. Brit. India 6:281. 1892; Fischer in Gamble, Fl. Pres. Madras 1504. 1928; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1625. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 273. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 478. 1994. ***Belutta-pola-taly*** Rheede, Hort. Malab. 11: 75-76, t. 38. 1692.

Bulbous herbs; bulbs to 8 x 6 cm, ovoid, narrowing into columnar neck to 12 cm long. Leaves 35-80 x 2.5-4 cm, oblong, apex gradually tapering, deeply canaliculate, scaberulous, coriaceous. Scape to 60 cm long, 1.5-2.5 cm across; umbel 14-20 cm long, c. 8-flowered. Flowers 18-26 cm long, to 10 cm across; pedicel to 1 cm long, to 4 cm in fruit; bracts 7-13 x 1-2 cm, lanceolate. Perianth white, salver-shaped; tube to 10 cm long; lobes to 5 x 0.6 cm, oblong, apex obtuse, 10-nerved. Filaments to 5.5 cm long; anthers to 2 cm long. Ovary to 1 x 0.8 cm, oblong, 3-celled; style to 16 cm long. Capsule 2-4 x 1-2 cm, subglobose.

Fl. & Fr.: Oct. - May.

Distr.: India and Sri Lanka. Very common along ditches, stream margins and fallow fields, especially in coastal areas. *CNS 1979* (Thrikunnapuzha).

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; Mani. & Sivar., Fl. Calicut 289. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1626. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 273. 1988; Vajravelu, Fl. Palghat Dist. 505. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 478. 1994; Sasi. & 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. ***Cattulli-pola*** Rheede, Hort. Malab. 11: 77, t. 40. 1692.

Bulbous herbs; bulbs to 5 cm across, globose. Leaves 12-22 x 1-2 cm, linear-lanceolate, flat, narrow at base, apex subacute, thin-coriaceous, glabrous. Flowers 2-8, in scapose umbels, white, c. 3 cm across; scape to 40 cm tall; spathes 2, membranous, ovate; pedicel short. Perianth funnel-shaped; tube to 2 cm long; lobes 6, c. 2 cm long, linear, reflexed. Stamens 6; filaments to 2 cm long, connate at base into a petaloid, 2-dentate, membranous cup. Ovary 5-6 mm long, oblong, 3-locular; ovules many; style filiform, to 1.5 cm long; stigma capitate. Capsule subglobose.

Fl. & Fr.: Jul. - Aug.

Distr.: Sri Lanka and India. Ephemerals on exposed areas. *CNS 1488* (Nagamkulangara).

117. HYPOXIDACEAE R. Br.

in Flinders, Voy. Terra Austr. 2: 576. 1814.

CURCULIGO J. Gaertner

Fruct. 1: 63, t. 16, f. 11. 1788.

Curculigo orchioides Gaertn., Fruct. 1: 63, t. 16, f. 11. 1788; Roxb., Pl. Corom. t. 13. 1795; Hook. f., Fl. Brit. India 6: 279. 1892; Fischer in Gamble, Fl. Pres. Madras 1502. 1928; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 797. 1976; Mani. & Sivar., Fl. Calicut 290. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1627. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 294. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 476. 1994. *C. malabarica* Wight, Ic. t. 2043. 1853, p.p. ***Nella-pana-kelangu*** Rheede, Hort. Malab. 12: 111, t. 59. 1693. ***Nila-pana*** (Fig. 63).

Herbs with tuberous root-stock; root-stock to 7 cm long, oblong. Leaves subsessile, 8-20 x 1-1.8 cm, oblong-lanceolate, base attenuate, apex acuminate, plicate, prominently nerved from base, often bulbil-bearing at tips; leaf sheath persistent. Flowers 1 to many on short axillary scape, usually hidden between leaf base; bracts lanceolate, spathaceous. Perianth 6-lobed to the base; lobes yellow, 6-8 x 2-3 mm, oblong-elliptic; outer ones pilose without. Stamens 6. Ovary inferior, 3-celled, to 4 mm long, oblong;

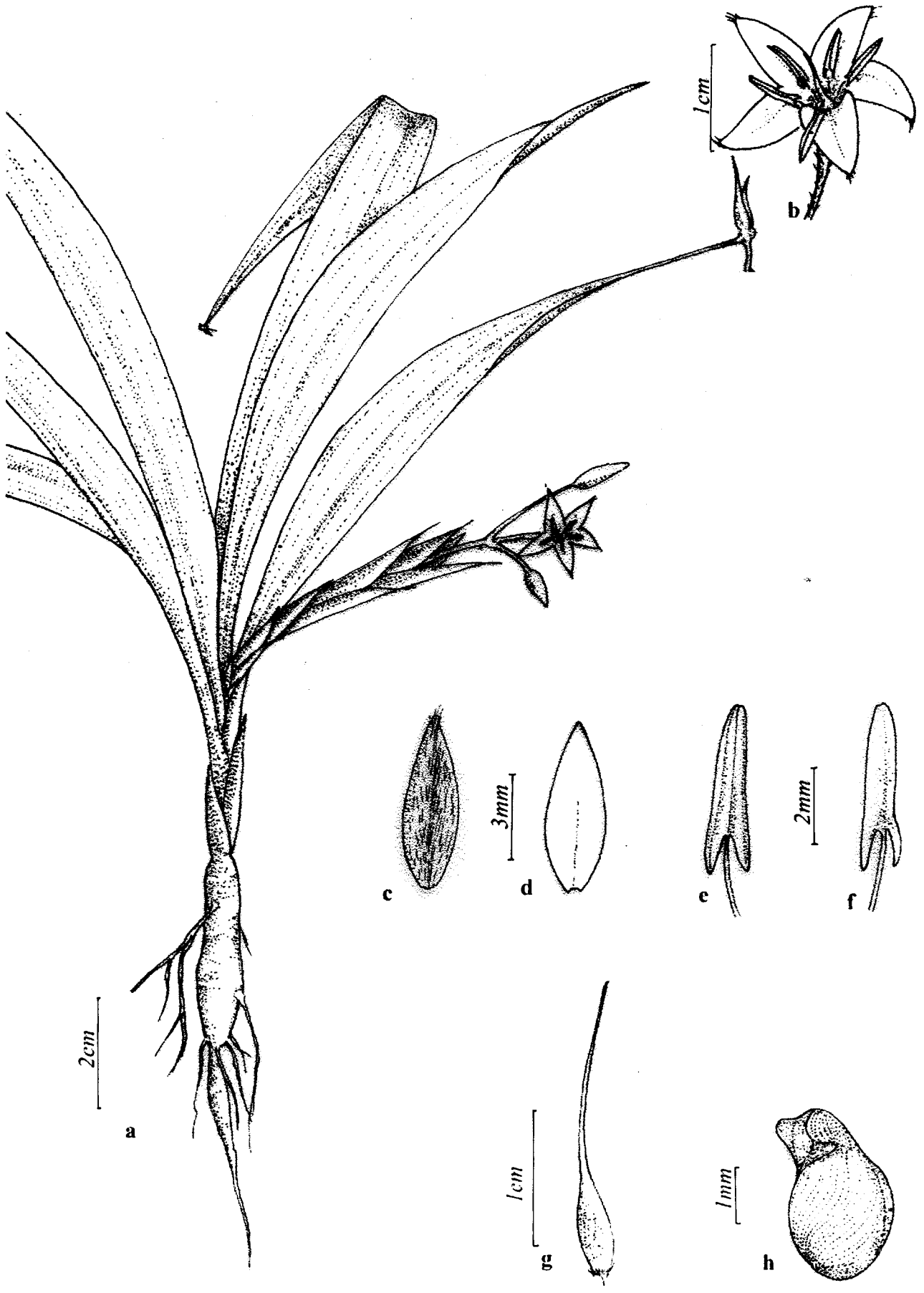


Fig. 63. *Curculigo orchioides* Gaertn.: a. Habit; b. Flower; c & d. Perianth lobes-outer and inner; e & f. Stamens-dorsal and ventral views; g. Capsule with rostrum; h. Seed.

ovules many, apex rostrate, 2-3 cm long; style c. 2 mm long; stigma 3-lobed. Capsule 1.5-2 x 0.5-0.7 cm, oblong. Seeds c. 2 mm across, globose, striate, glossy, black, beaked.

Fl. & Fr.: May -Sep.

Distr.: Indo-Malaysia, Australia and Japan. Common in wet waste places. *CNS 1328* (Chettikulangara).

118. DIOSCOREACEAE R. Br.

Prodr. 294. 1810.

DIOSCOREA Linnaeus

Sp. Pl. 1032. 1753.

Dioecious climbers, perennating from tuberous root stock or rhizome; stem twining clockwise or anticlockwise. Leaves alternate or opposite, simple or 3-7 foliolate, bulbils sometimes present in leaf axils. Flowers in spikes or panicled spikes. Perianth 6-partite, equal or subequal. Stamens 6 perfect, or 3 perfect and 3 staminodes. Ovary triquetrous, 3-celled; cells 2-ovuled; styles 3, short, stigma entire or 2-fid. Capsule loculicidally 3-valved, winged or not. Seeds orbicular, flat or globose.

1a. Leaves simple; branchlets unarmed.

2a. Stem prominently winged ..... **D. alata**

2b. Stem not prominently winged ..... **D.bulbifera**

1b. Leaves 3-5-foliolate; branchlets sparsely prickled ..... **D. pentaphylla**

Dioscorea alata L., Sp. Pl. 1033. 1753; Hook. f., Fl. Brit. India 6 : 296. 1892; Wight, Ic. t. 810. 1840; Fischer in Gamble, Fl. Pres. Madras 1512. 1928; Prain & Burkill, Ann. Roy. Bot. Gard. Calcutta 14: 302, Pl. 123-125. 1939; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 290. 1988; Jayasuriya in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9 : 62. 1995. *D. globosa* Roxb., Fl. Ind. 3 : 797. 1832; Hook. f., Fl. Brit. India 6 : 296. 1892; Wight, Ic. t. 812. 1840. ***Katsjil-Kelengu*** Rheede, Hort. Malab. 7 : 72 ("71"), t. 38. 1688. ***Cachinga.***

Tubers one to several, polymorphic, variously branched or lobed. Stem twining to right, 4-5-winged; wings sometimes reduced to ribs. Bulbils globose, ovoid or obpyriform, occasionally with rootlets. Leaves opposite or rarely subopposite, 7-18 x 4-10 cm, broadly ovate or deltoid-ovate, base cordate or subsagittate, apex acuminate, primary veins 7; petiole to 8 cm long, winged. Male Spike on axillary branchlets, paniculate; rachis winged. Flowers c. 1.5 mm long; bracts to 1 mm long, deltoid-ovate; tepals 1-1.5 mm long, widely ovate, obtuse; stamens 6, free; pistillode conical. Female spike solitary in axils, axis 10-20 cm long. Flowers laxly arranged, sessile; bracts 1-1.5 mm long, ovate; tepals fleshy, c. 1 mm long, broadly ovate; staminodes 6, very small; ovary c. 3 mm long. Capsule 2-2.5 mm long, broadly obcordate.

Fl. & Fr.: Throughout year.

Distr. : Tropical India. Common in plains. Widely cultivated for its tubers, which is used as a vegetable. *CNS 2480* (Noorananad).

Dioscorea bulbifera L., Sp. Pl. 1033. 1753; Wight, Ic. t. 878. 1844; Fischer in Gamble, Fl. Pres. Madras 1511. 1828; Pain & Burkill, Ann. Roy. Bot. Gard. Culcutta 14 (1): 188, t. 77. 1936; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 808. 1976; Mani. & Sivar., Fl. Calicut 291. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1634. 1983; Ramach. & Nair, Fl. Cannanore 473. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 290. 1988; Vajravelu, Fl. Palghat Dist. 507. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 479. 1994; Jayasuriya in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 52. 1995; Sivar. & Mathew, Fl. Nilambur 723. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 468. 1996. *D. sativa* auct., non L. 1753: Hook. f., Fl. Brit., India 6: 295. 1982. ***Katu-Katsjil*** Rheede, Hort. Malab. 7 : 69, t. 36. 1688. ***Kattu-kelengu*** Rheede, Hort. Malab. 7 : 71, t. 37. 1688. ***Patti-cachinga.***

Vines with tuberous root stocks; Stem terete, twining to left. Leaves 9-25 x 8-23 cm, ovate-suborbicular, base deeply cordate, apex acuminate to shortly caudate, membranous, glabrous, basally 9-11-ribbed; petiole to 20 cm long. Bulbils frequent in leaf axils and in inflorescence. Male flowers in slender, axillary panicled spikes, pendulous, to

18 cm long; bracteoles ovate, acute. Perianth light green; lobes 6, biseriate, c. 2.5 mm long, linear-oblong. Stamens 6 free. Female spikes 1-3 together; staminodes 3; ovary triquetrous, 3-locular, ovules 2-per locule; styles 3; stigma 2-fid, reflexed. Capsules 1.5-2.3 x 1-1.5 cm, oblong, 3-winged.

Fl. & Fr. : Nov. - Dec.

Distr. : Old World tropics. Along fences and thickets. *CNS 1047* (Vandanam).

Dioscorea pentaphylla L., Sp. Pl. 1032. 1753; Roxb., Fl. Ind. 3 : 806. 1832; Wight, Ic. t. 814. 1844; Hook. f., Fl. Brit. India 6 : 289. 1832; Fischer in Gamble, Fl. Pres. Madras 1511. 1928; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 808. 1976; Mani. & Sivar., Fl. Calicut 291. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3 : 1635. 1983; Ramach. & Nair, Fl. Cannanore 474. 1988; Mani., Fl. Silent Valley 317. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 292. 1988; Vajravelu, Fl. Palghat Dist. 508. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 479. 1994; Jayasuriya in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 9: 55. 1995; Sivar. & Mathew, Fl. Nilambur 724.1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 469. 1996. ***Tjsageri-nuren*** Rheede, Hort. Malab. 7: 63, t. 33. 1688. ***Katu-nuren*** Rheede, Hort. Malab. 7 : 65 ("63"), t. 34. 1688. ***Nurven-Kelengu*** Rheede, Hort Malab. 7: 67, t. 35; 1688.

Tuberous climbers; stem terete, twining to left, usually armed with prickles. Leaves 3-5-foliolate, with bulbils in the axils; leaflets 3.5-8 x 2.5-5 cm, elliptic-ovate, base acute or attenuate, apex acute, glabrous or pubescent below; upper leaves much smaller; petiole to 8 cm long. Male flowers on slender spikes on axillary or terminal panicles, tomentose. Perianth lobes 6, greyish; outer c. 1.5 mm long, ovate, tomentose, inner c. 1 mm long, lanceolate, glabrous. Stamens 3, staminodes 3. Female spike solitary, tomentose. Perianth lobes 6, biseriate, c. 1 mm long, ovate. Ovary c. 3 mm long, oblong, ribbed; stigma capitate. Capsule c. 2 cm long, oblong, 3-winged, glabrescent.

Fl. & Fr. : Oct. - Dec.

Distr.: India, Myanmar, Indo-China and China. Along fences and other waste places. *CNS 2620* (Charummoodu).

119. LILIACEAE Juss.

Gen. Pl. 48. 1789.

1a Plants armed; leaves scaly, indistinct; cladodes present ..... **Asparagus**

1b. Plants unarmed; leaves prominent; cladodes absent.

2a. Plants herbaceous climbers with tuberous roots; leaf apex ending in a tendril ..... **Gloriosa**

2b. Plants bulbous, scapigerous; leaf apex acute or obtuse .....**Urginea**

ASPARAGUS Linnaeus

Sp. Pl. 313. 1753.

Asparagus racemosus Willd., Sp. Pl. 2: 152. 1799; Roxb., Fl. Ind. 2: 151. 1832; Wight, Ic. t. 2056. 1853; Hook. f., Fl. Brit. India 6:316. 1892; Fischer in Gamble, Fl. Pres. Madras 1517. 1928; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 793. 1976; Mani. & Sivar., Fl. Calicut 293. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1639. 1983; Mani., Fl. Silent Valley 318. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 295. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 480. 1994; Sivar. & Mathew, Fl. Nilambur 727. 1996; Sasi. & Sivar., Fl. Pl. Thrissur. For. 470. 1996. ***Schada-veli-kelangu*** Rheede, Hort. Malab. 10: 19-20, t. 10. 1690. **Schadavari**.

Woody perennial climbers; stem often spinescent, terete, green; rootstock with fascicled tuberous roots. Cladodes from the axils of scale leaves in clusters of 2-6, 0.8-1.5 x 0.1-0.3 cm, linear-falcate, slightly triquetrous, base narrow, apex acute. Racemes 2.5-5 cm long, slender, axillary, solitary or clustered. Flowers bisexual, 5-6 mm across; bracts triangular; pedicel c. 1 mm long. Perianth-lobes 6, white, c. 3 x 0.5 mm, oblong, acute. Stamens 6, adnate to the perianth lobes; filaments subulate. Ovary 2-3 mm long, globose to slightly 3-gonous, 3-celled; ovules 2 per cell; stigma 3, recurved. Berry 4-6 mm diam., globose, purple on ripening. Seeds 2-5, c. 2 mm across, globose.

Fl. & Fr.: Jan.-Apr.

Distr.: Paleotropics. In waste sandy soil, along fences etc. *CNS 1426* (Kanichuklangara).

The tuberous roots are widely used in Ayurvedic medicines against a variety of diseases.

GLORIOSA Linnaeus

Sp. Pl. 305. 1753.

Gloriosa superba L., Sp. Pl. 305. 1753; Roxb., Fl. Ind. 2: 143. 1832; Wight, Ic. t. 2047. 1853; Hook. f., Fl. Brit. India 6: 358. 1842; Fischer in Gamble, Fl. Pres. Madras 1519. 1928; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 797. 1976; Mani & Sivar., Fl. Calicut 292. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1643. 1983; Mani., Fl. Silent Valley 320. 1988; Ramach. & Nair, Fl. Cannanore 477. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 295. 1988; Vajravelu, Fl. Palghat Dist. 510. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 482. 1994; Sivar. & Mathew, Fl. Nilambur 729. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 471. 1996. ***Mendoni*** Rheede, Hort. Malab. 7: 107-108, t. 1688. ***Menthonni.***

Herbaceous climbers with tuberous roots. Leaves subsessile, alternate, opposite or whorled, 5-13 x 1.5-4 cm, ovate-lanceolate, base cordate or amplexicaul, apex acuminate, ending in a tendril. Flowers bisexual, showy, axilliary, solitary or in few-flowered, terminal racemes; pedicel to 7 cm long. Perianth-lobes 6, free, 5-7 x 0.8-1.2 cm, linear-oblong, reflexed or spreading, base narrow, margin undulate, apex acuminate, yellowish below and reddish above. Stamens 6; filaments 3-4 cm long; anthers oblong-linear, versatile. Ovary c. 1 x 0.5 cm, oblong, 3-locular; ovules numerous; style to 4 cm long, deflexed; stigmas 3. Capsule 3-5 x 1-2 cm, ellipsoid-oblong. Seeds many, c. 3 mm, globose, warty.

Fl. & Fr. : Oct. - Mar.

Distr. : Old World Tropics. Common in plains, on thickets and in sacred groves. *CNS 1017* (Vandanam).

The tubers are highly poisonous; also used in medicines.

URGINEA Steinheil

Ann. Sc. Nat. Bot. Ser. 2, 1: 321. 1834.

Urginea indica (Roxb.) Kunth, Enum. Pl. 4: 333. 1843; Wight, Ic. t. 2063. 1853; Hook. f., Fl. Brit. India 6: 347. 1892; Prain, Bengal Pl. 2: 1074. 1903; Fischer in Gamble, Fl. Pres. Madras 1526. 1928; Deb & Dasgupta, Bull. Bot. Surv. India 16: 118. 1974; Deb & Dasgupta in Jain *et al.*, Fasc. Fl. India. 7: 17. 1981. *Scina indica* Roxb., Fl. Ind. 2: 147. 1832. *Urginea coromandeliana* (Roxb.) Hook. f., Fl. Brit. India 6: 347. 1892; Fischer in Gamble, Fl. Pres. Madras 1526.1928. ***Kanthanga.***

Bulbous, scapigerous herbs; bulbs tunicated, 3.5-6 x 2.5-6.5 cm, globose-conical. Leaves radical with sheathing base, 13-25 x 0.6-2.5 cm, linear, lanceolate or lorate. Scapes 17-45 cm tall, erect, purpish brown, 4-15-flowered. Flowers 0.8-1.2 cm long, c. 1 cm across, reddish green or dull green, campanulate; pedicels 2-3.5 cm long, curved, drooping; bracts 1-2 mm, deltoid. Perianth 3+3, subequal, 0.8-1 x 0.3-0.4 cm, linear-oblong, subacute, reflexed, free to the base. Stamens 6; filaments c. 3 mm long, adnate to the base of the perianth segments; anthers 1.5-2 mm long, linear, yellow, base auricled. Ovary 3.5-5 x 2-3 mm, oblong or ovoid; style obconic to narrowly elongate; stigma trilobed. Capsules 10-20 x 5-10 mm, brownish yellow. Seeds 4-10 in each cell, 4-7 x 3-4 mm, winged.

Fl. & Fr. : Feb. - May.

Distr. : India, Nepal, Myanmar and Africa. In sandy soil. The flowers last only for a night, opening in the night and closing in the next morning. *CNS 1875* (Kanichukulangara Jn.).

120. SMILACACEAE Vent.

Tabl. Regne Veg. 2: 146. 1799.

SMILAX Linnaeus

Sp. Pl. 1028. 1753.

Smilax zeylanica L., Sp. Pl. 1029. 1753; Hook. f., Fl. Brit. India 6: 309. 1892; Fischer in Gamble, Fl. Pres. Madras 1518. 1928; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 804. 1976; Mani. & Sivar., Fl. Calicut 292. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1648. 1983; Mani., Fl. Silent Valley 323. 1988; Ramach. & Nair, Fl. Cannanore 478. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 296. 1988; Vajravelu, Fl. Palghat Dist. 511. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 482. 1994; Sivar. & Mathew, Fl. Nilambur 730. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 471. 1996. S. *indica* Burm. f., Fl. Ind. 213. 1768. S. *macrophylla* Roxb., Fl. Ind. 3: 793. 1832; Hook. f., Fl. Brit. India 6: 310. 1892. S. *ovalifolia* Roxb., Fl. Ind. 3: 794. 1832; Wight, Ic. t. 809. 1844. ***Cari-villandi*** Rheede, Hort. Malab. 7: 59-60, t. 31. 1688.

Climbing shrubs; stem prickly. Leaves 6-12 x 3-6.5 cm, ovate-oblong or ovate-lanceolate, base rounded, acute to shortly cuspidate at apex, coriaceous, glabrous and glossy, 3-5-ribbed from base; petiole to 2 cm long, tendril from either sides of petiole. Umbels axillary, 1-3; peduncles 2-3 cm long. Flowers unisexual; pedicels 5-6 mm long; bracts oblong. Perianth 6-partite, free, greenish, c. 7 mm long, oblong. Stamens in male flowers 6, free; filaments flat, apex callose; pistillode 0. Ovary in female flowers 3-lobed, 3-celled; ovules 1 or 2 per cell; style 3-fid; staminodes 3-6. Berry 0.8-1 x 0.6-0.8 cm, subglobose. Seeds 1-3, 3-4 mm across, globose.

Fl. & Fr.: Dec.-Mar.

Distr. : Indo-Malaysia. In sacred groves. *CNS 1235* (Pattanakadu).

121. PONTEDERIACEAE Kunth

in Humboldt *et al.*, Nov. Gen. Sp. 1, ed. 4: 265. 1816.

1a. Petiole swollen to form floats; perianth- lobes connate below ..... **Eichhornia**

1b. Petiole not swollen to form floats; perianth- lobes free ..... **Monochoria**

EICHHORNIA Kunth

Eichhornia, Genus Novum (Diss.) 3. 1842; Enum. 4: 129. 1843 (*non. cons.*).

Eichhornia crassipes (C. Martius) Solms-Laub. in A. DC., Monogr. Phan. 4: 527. 1833; Fischer in Gamble, Fl. Pres. Madras 1530. 1928; Gopal & Sharma, Water Hyacinth 6. 1981; Mani. & Sivar., Fl. Calicut 293. 1982; Matthew & Rani in Matthew, Fl. Tam. Carnatic 3: 1649. 1983; Ramach. & Nair, Fl. Cannanore 479. 1988; Vajravelu., Fl. Palghat Dist. 512. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 482. 1994. *Pontederia crassipes* C. Martius, Nov. Gen. Sp. Pl. t. 4. 1823.

Aquatic free-floating or rooted herbs. Leaves radical, rosulate, 5-10 x 4-9 cm, broadly ovate-rhomboid or orbicular, base cuneate to rounded, apex obtuse, thin-coriaceous, nerves curved, faint; petiole 6-30 cm long, spongy, swollen about the middle. Inflorescence of terminal spikes; peduncle to 10 cm long. Flowers dense, irregular, lilac or blue with yellow median blotch. Perianth tube 1-2 cm long; lobes 3+3, 2-3 x 1-1.5 cm, obovate-oblaceolate, unequal. Stamens 3+3, glandular-pubescent; anthers dorsifixed. Ovary to 6 mm long, oblong, 3-celled, ovules many, stigma globose, glandular-pubescent. Capsule ovoid, enveloped, by perianth. Seeds many, ribbed.

Fl. & Fr.: Jan.-May.

Distr. : S. America; now naturalized in tropics. An aggressive weed which is steadily replacing the native flora. *CNS 1876* (Laxmithop).

MONOCHORIA K.B. Presl

Rel. Haenk. 1: 127. 1827.

Monochoria vaginalis (Burm. f.) Presl, Rel. Haenk. 1: 128. 1827; Hook. f., Fl. Brit. India 6: 363. 1892; Fischer in Gamble, Fl. Pres. Madras 1529 1928; Ramamoorthy in Sald. &

Nicols., Fl. Hassan Dist. 791. 1976; Mani., & Sivar., Fl. Calicut 293. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1650. 1983; Ramach. & Nair, Fl. Cannanore 479. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 314. 1988; Vajravelu, Fl. Palghat Dist. 512. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 483. 1994; Sivar. & Mathew, Fl. Nilambur 731. 1996. *Pontederia vaginalis* Burm. f., Fl. Ind. 8. 1768; Roxb., Pl. Corom. t. 110. 1799 & Fl. Ind. 2: 121. 1832. ***Carim-gola*** Rheede, Hort. Malab. 11: 91-92, t. 44. 1692.

Erect, semi-aquatic herbs, 15-45 cm tall. Leaves 3-8 x 1.5-4.5 cm obvate, base cordate, apex abruptly accuminate, thinly coriaceous; petiole 8-26 cm long, sheathing at base. Inflorescence of solitary terminal raceme, to 9 cm long, from upper nodes of emergent stems. Flowers c. 2 cm across, regular; pedicel 1-1.8cm long; bracts membraneous. Perianth campanulate, deeply lobed; lobes 3+3, deep blue, 0.8-1.2 x 0.5-0.6 cm, oblong-obovate. Stamens 6; filaments subequal. Ovary, c. 5 mm long, globose, 3-locular; ovules many per locule; style to 5 mm long; stigma 3-lobbed. Capsule to 1 x 0.8 cm, oblong. Seeds many, c. 6 mm, oblong, ribbed, transversely striate between ribs.

Fl.& Fr. : Oct. - Jan.

Distr. : India, China, Japan and Malesia. Common in marshy fields. *CNS 1407* (Kanichukulangara).

122. XYRIDACEAE C. Agardh

Aphor. Bot. 158. 1823.

XYRIS Linnaeus

Sp. Pl. 42. 1753.

Erect, scapigerous herbs. Leaves radical, ensiform, linear, base sheathing. Scape simple, terete or subcompressed, obscurely winged or ribbed; head bracteate. Flowers bisexual, sessile. Sepals 3; laterals cymbiform, inner obovate. Petals 3, yellow, connate at base forming an elongated tube. Stamens 3, shorter than petals and attached to the base of petals; filaments short; anthers oblong, basifixed, apex notched; staminodes 3, alternating with petals, filiform, 2-fid. Ovary superior, 1-3-celled; ovules many on 3 parietal

placentae; style terminal, 3-fid; stigma capitate,penicillate. Capsule oblong, loculicidal, 3-valved. Seeds ellipsoid, ribbed.

1a. Scapes 80-100 cm tall, edges scabrid; bracts obtuse or emarginate at apex .... **X. complanata**

1b. Scapes upto 15 cm tall, edges not scabrid; bracts mucronate at apex .... **X. pauciflora**

Xyris complanata R. Br., Prodr. 256. 1810; Mohanan & Henry, Fl. Thiruvananthapuram 483. 1994. *Xyris anceps* sensu Hook. f., Fl. Brit. India 6: 364. 1892, non Lam., 1792; Fischer in Gamble, Fl. Pres. Madras 1532. 1928.

Erect tufted, scapigerous herbs upto 90 cm tall. Leaves distichous, twisted, 6-28 x 0.3-0.5 cm, linear, margins minutely scabrid, apex pungently acute, flat, rigid. Scape upto 100 cm long, flat, 2-edged; edges minutely scabrid, papillose. Heads 1-2.5 cm long, ovoid or ellipsoid, cylindric; bracts c. 6 mm long, orbicular, obtuse or emarginate at apex, chestnut-brown, closely imbricating. Flowers c. 1.5 cm across. Sepals unequal, c. 5 mm long, folded and keeled. Petals 3, yellow; limbs 5-7 mm long, obovate, apex irregularly dentate; claw c. 4 mm long. Stamens 3, attached to claw; filaments c. 4 mm long, yellow. Staminodes 3, alternating with the petals, ovate, pectinate. Ovary c. 2.5 mm long, oblong;style c. 3 mm long; stigmas 3-fid, dilated. Capsule c. 4 mm long, ovoid. Seeds many, c. 0.5 mm long, ellipsoid, ribbed.

Fl. & Fr.: Sep.-Dec.

Distr.: SE Asia and Australia. In marshy areas. *CNS 2384* (A.I.R. Campus Kalavoor).

Xyris pauciflora Willd., Phytographia 1:2, t. 1, f. 1. 1794; Hook. f., Fl. Brit. India 6: 365. 1892; Fischer in Gamble, Fl. Pres. Madras 1532. 1928; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 640. 1976; Mani. & Sivar., Fl. Calicut 294. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1653. 1983; Mani., Fl. Silent Valley 324. 1988; Ramach. & Nair, Fl. Cannanore 480. 1988; Sivar. & Matthew, Fl. Nilambur 731. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 472. 1996.

Erect tufted herbs. Leaves to 11 x 0.3 cm, linear, apex acuminate, papillose. Scape to 15 cm long. Flower-head globose, 5-7 x 4-5 mm; bracts chestnut-brown, c. 3 mm across, broadly ovate to orbicular, mucronate, closely imbricating. Sepals 3, 3-4 mm long, median one broad, laterals curved. Petals 3, yellow; limbs 2.5-4 mm long, obovate, apex emarginate; claw to 3 mm long. Stamens 3; staminodes 3. Ovary to 2.5 mm long, oblong, 1-locular; style to 2 mm long. Capsule oblong. Seeds ellipsoid, ribbed.

Fl. & Fr.: Sep.-Nov.

Distr.: Sri Lanka, India, Myanmar, China, Malesia and Australia. Common in marshy fields and in grasslands during monsoon period. *CNS 1353* (Pallippuram), *CNS 1225* (Thuravoor).

123. COMMELINACEAE R. Br.

Prodr. 268. 1810.

1a. Flowers enclosed in spathe or bracteoles.

2a. Fertile stamens 2-3, staminodes 2 or 3, filaments naked; bracteoles not 2-seriate and secund; petals free ..... **Commelina**

2b. Fertile stamens 6, staminode 0; filaments bearded; bracteoles 2-seriate and secund; petals connate into a tube ..... **Cyanotis**

1b. Flowers not enclosed in spathe or bracteoles.

3a. Inflorescence enclosed within inflated leaf sheath; stamens 6, staminodes 0; petals connate into a tube at base ..... **Tonningia**

3b. Inflorescence not enclosed in leaf sheath; stamens 2-3, staminodes 1-3; petals free.

4a. Flowers regular; bracts subulate, deciduous ..... **Murdannia**

4b. Flowers irregular; bracts funnel-shaped or leafy, persistent ..... **Aneilema**

ANEILEMA R. Brown

Prodr. 270. 1810.

Aneilema montanum (Wight) Clarke in A. & C.DC. , Monogr. Phan. 3: 217. 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; Vajravelu, Fl. Palghat Dist. 513. 1990; Sasi. & Sivar., Fl. Pl. Thrissur For. 472. 1996. *Dictyospermum montanum* Wight, Ic. t. 2069. 1853; Morton, J. Linn. Soc. 59: 4. 1966; Karthik. *et al.*, Fl. Ind. Enum. 21. 1989; Ramach. & Nair, Fl. Cannanore 484. 1988 (Fig. 64).

Leaves clustered towards apex of stem, 5-13 x 2.5- 5 cm, elliptic-lanceolate, base narrowed, apex acuminate; petiole to 1.5 cm long; sheath to 3 cm long. Panicles terminal, 8-17 cm long, covered with hooked hairs; bracts leafy. Flowers white, 8-10 mm across; pedicels 4-7 mm long. Sepals 3, 3-4 x 2-3 mm, obovate, obtuse, concave. Petals 3, white, 5-6 x 3-4 mm, ovate, obtuse. Stames 3; filaments 2-3 mm long; staminodes 0. Ovary 3-celled; c. 1.5 mm long; ovule 1 in each cell; style c. 2 mm long. Capsule 2-3 mm across, globose, glabrous. Seeds hemispheric, rugose.

Fl. & Fr. : Jun-Dec.

Distr. : South and North East India. In sacred groves. *CNS 2159* (Sharangakavu).

COMMELINA Linnaeus

Sp. Pl. 40. 1753.

Erect or diffuse herbs. Leaves subsessile, sheathing at base. Flowers in cymes, terminal and or axillary, from a spathiform or culcullate bract, 2- branched, upper branch deciduous, lower fertile. Sepals 3, membranous, connate at base. Petals free, unequal, 2 larger and clawed. Stamens 3, filaments slender, naked, often spirally coiled; anther cells unequal; staminodes 2 or 3. Ovary 2 or 3-celled; ovules 1 or 2 in each cell; style erect. Pedicels and capsule retracted within the bract; anterior cells 1 or 2-seeded; posterior cell when present 1-seeded or empty. Seeds rugose, pitted or reticulate.

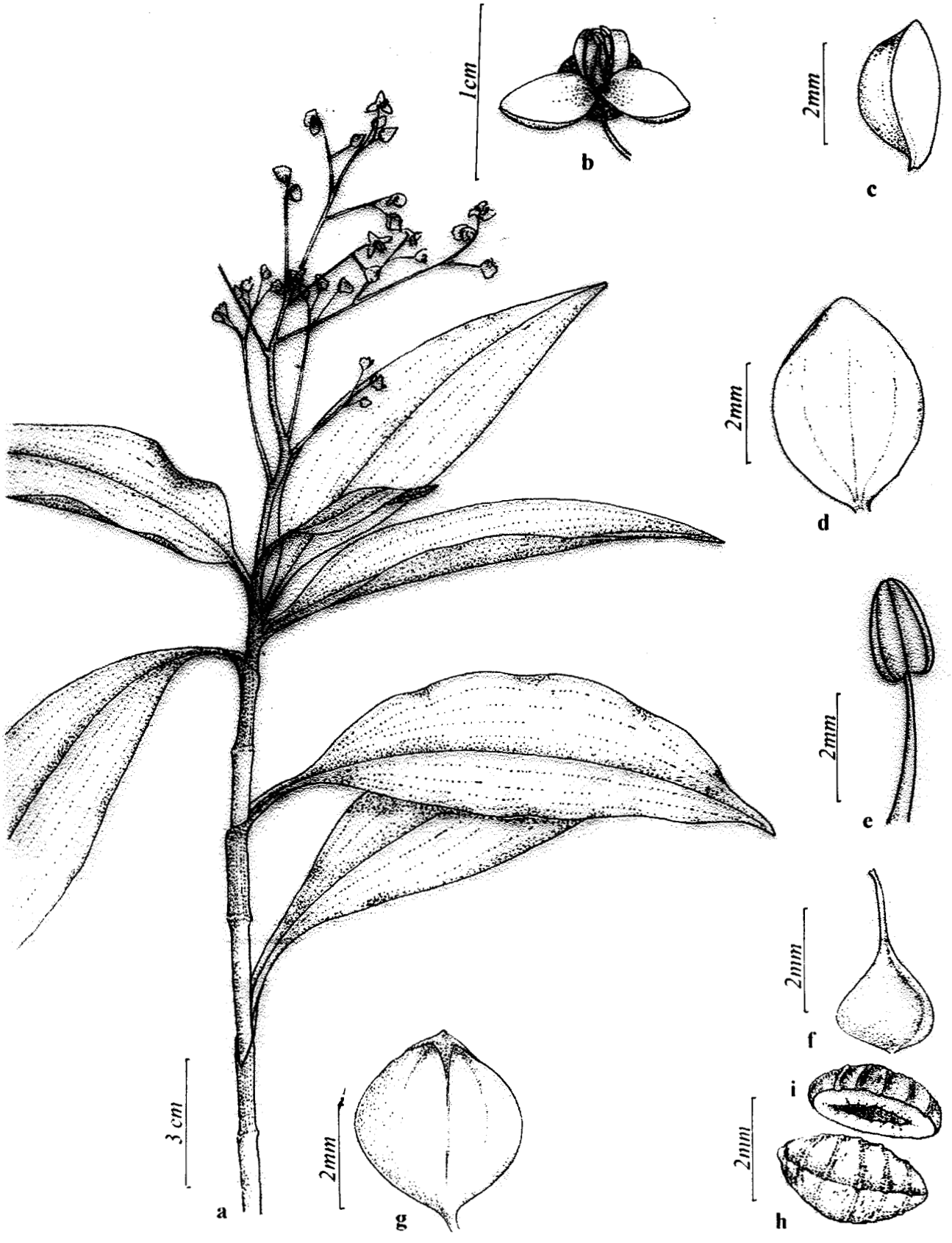


Fig. 64. *Aneilema montanum* (Wight) Clarke: a. Twig; b. Flower; c. Sepal; d. Petal; e. Stamen; f. Pistil; g. Capsule with calyx; h & i. Seed-dorsal and lateral views.

1a. Spathe ovate-lanceolate, base cordate-sagittate.

2a. Capsules 2-celled, posticous cell of capsule obtuse on margins; seeds appendaged, smooth ..... **C. attenuata**

2b. Capsules 3-celled, posticous cell of capsule keeled on margins; seeds not appendaged, reticulate .....**C. diffusa**

1b. Spathe funnel- form or cucullate.

3a. Leaves ovate-oblong; cleistogamous flowers present; capsule 3-locular .... **C. benghalensis**

3b. Leaves linear-lanceolate; cleistogamous flowers 0; capsule 2-locular .... **C. ensifolia**

Commelina attenuata Koenig ex Vahl, Enum. Pl. 2: 168. 1806; Hook. f., Fl. Brit. India 6: 372. 1892; Fischer in Gamble, Fl. Pres. Madras 1539. 1931; Mani. & Sivar., Fl. Calicut 298. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1656. 1983; Mani., Fl. Silent Valley 324. 1988; Sasi. & Sivar. , Fl. Pl. Thrissur For. 473. 1996.

Slender procumbent herbs. Leaves 3-6 x 0.5-1 cm, linear- lanceolate, base obtuse, apex acute to acuminate; sheath to 1 cm long, margin ciliate. Spathe 1.5-3 cm long, ovate-lanceolate, base sagittate-auriculate, apex acuminate; peduncle to 2.5 cm long. Sepals c. 5 mm long, ovate-obtuse, concave. Petals blue. Stamens 3; staminodes 3, all naked. Ovary tomentose, 2-celled; ovules 2 in each cell. Capsule c. 6 x 3 mm, oblong, 2-locular. Seeds c. 4 mm, whitish-appendaged at the ends.

Fl.&Fr.: Nov.- Jan.

Distr. : India and Sri Lanka. In marshy fields. *CNS 2388* (Pallarimangalam).

Commelina benghalensis L., Sp. Pl. 41. 1753; Hook. f., Fl. Brit. India 6: 370. 1892; Fischer in Gamble, Fl. Pres. Madras 1539. 1931; Panigrahi & Kammathy, J. Ind. Bot. Soc. 43: 302. 1964; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 644. 1976; Mani. & Sivar., Fl. Calicut 297. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1657. 1983; Ramach. & Nair, Fl. Cannanore 481. 1988; Vajravelu, Fl. Palghat Dist. 516. 1990; Sivar. & Mathew, Fl. Nilambur 734. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 473. 1996.

Diffuse herbs, rooting at lower nodes; rootstock with cleistogamous flowers. Leaves 3-5 x 2-3.5 cm, ovate or elliptic-ovate, base rounded or subtruncate, apex obtuse or acute, pubescent, margin ciliate; petiole to 8 mm long; sheath to 1.5 cm long, apex with rufous hairs. Spathe c. 1.5 cm across, funnel-shaped, truncate at apex, pubescent. Sepals subequal, c. 2.5 mm long; outer ones linear; inner ones orbicular. Petals blue, larger ones c. 4 x 4.5 mm, broadly ovate. Stamens 3; staminodes 2. Ovary to 1mm long. Capsule to 5 mm long, ellipsoid, 3-celled. Seeds 5, pitted.

Fl. & Fr.: Sep. - Nov.

Distr. : Africa, Himalayas, India to China, Japan and Malesia. Common in exposed arable lands, thickets, wayside, etc. *CNS 1159* (Alappuzha town).

Commelina diffusa Burm. f., Fl. Ind. 18, t. 7, f. 2. 1768; Rao, Notes Roy. Bot. Gard. Edinburgh 25: 179.1964; Panigrahi & Kammathy, J. Ind. Bot. Soc. 43: 299. 1964; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 644. 1976; Mani. & Sivar., Fl. Calicut 298. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1658. 1983; Ramach. & Nair, Fl. Cannanore 481. 1988; Vajravelu, Fl. Palghat Dist. 516. 1990; Sasi. & Sivar., Fl. Pl. Thrissur For. 474. 1996. *C. nudiflora* sensu Hook. f., Fl. Brit. India 6: 369. 1892, non L., 1753; Fischer in Gamble, Fl. Pres. Madras 1538. 1931.

Trailing or diffuse herbs. Leaves 2-6 x 0.8-2 cm, lanceolate or oblong-lanceolate, base obtuse, apex acute or acuminate; sheath 1-2 cm long, ciliate. Peduncle 0.8-1.5 cm long, ovate-lanceolate, base subcordate, complicate. Sepals c. 3 mm long. Petals blue, c. 4 mm long. Stamens and staminodes naked.. Capsule to 8 mm long, oblong, 3-celled, apex beaked. Seeds c. 2 mm, tuberculate and reticulate.

Fl. & Fr. : Sep. - Dec.

Distr. : Pantropics. Very common in waste places. *CNS 1317* (Chengannur).

Commelina ensifolia R. Br. , Prodr. 269. 1810; Hook. f. , Fl. Brit. India 6: 374. 1892; Fischer in Gamble, Fl. Pres. Madras 1540. 1931; Rao, Blumea 14: 352. 1966; Gandhi in Slad. & Nicols., Fl. Hassan Dist. 645. 1976; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1658. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 485. 1994. *C.*

undulata var. *setosa* Clarke in A. & C. DC., Monogr. Phan. 179. 1881; Hook. f., Fl. Brit. India 6: 373. 1892; Fischer in Gamble, Fl. Pres. Madras 1539. 1931; Rao, Notes Roy. Bot. Gard. Edinburgh 26: 352. 1965.

Trailing herbs. Leaves 3-7.5 x 0.8-1.3 cm, linear or linear-lanceolate, base narrow-obtuse, apex acute, glabrescent; sheath to 2.5 cm long, puberulous. Spathe solitary, to 1.5 cm long, cucullate, ovate, apex acute, pubescent; peduncle to 1 cm long. Capsule 2-celled, c. 5 mm. Seeds c. 3 mm, ovoid, smooth.

Fl. & Fr. : Oct. - Dec.

Distr. : Sri Lanka, Australia and India. Rare. In sacred groves. *CNS 1975* (Vandanam).

CYANOTIS D. Don

Prodr. Fl. Nepal. 45. 1825 (*nom. cons.*).

Prostrate or creeping herbs with ascending branches. Leaves fleshy, sheathing at base. Flowers in axillary and or terminal scorpioid cymes; bracts spathiform, equal to or longer than cymes; bracteoles 2-seriate, falcate, imbricate, foliaceous. Sepals 3, subequal, free or basally shortly connate. Petals 3, united at base into a short tube. Stamens 6, all fertile; filaments usually hairy, often with an inflated apex. Ovary 3-celled; cells 2-ovuled; one erect and the other pendulous. Style glabrous or pilose; stigma terminal. Capsule loculicidal, subtended by the bracteoles. Seeds 1 or 2 per locule, terete, rugose or pitted.

1a. Plants purplish; leaves hairy; cymes often in pairs; bracts shorter or equal to the cymes; capsule with a free, central, columnar, 3-toothed axis after dehiscence ..... **C. arcotensis**

1b. Plants green; leaves glabrous; cyme solitary; bracts usually twice as long as the cymes; capsule without a free, central column after dehiscence ..... **C. cristata**

Cyanotis arcotensis Rao, Blumea 14: 345. 1966; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1661. 1983; Mani., Fl. Silent Valley 325. 1988; Vajravelu, Fl. Palghat Dist. 519. 1990. *Cyanotis papilionacea* auct., non (L.) Schult. f., 1830: Wight, Ic. t. 2089.

1853, p.p. ; Hook f. , Fl. Brit. India 6: 384. 1892; Fischer in Gamble, Fl. Pres. Madras 1549. 1931; Rao, Notes Roy. Bot. Gard. Edinburgh 25: 185. 1965; Sasi. & Sivar., Fl. Pl. Thrissur For. 475. 2996.

Branches prostrate, pubescent. Leaves often purplish, 1.5-3.5 x 0.6-1.2 cm, linear-lanceolate to ovate, base rounded, apex acute, sparsely pubescent; sheath to 4 mm long, hispid. Cymes terminal and axillary, solitary or 2-4 in cluster, to 2 cm long; peduncles 2.5-4 cm long. Bracts 0.6-1.2 cm long, ovate, base cordate, apex acuminate, decurved, pubescent; bracteoles to 7 mm long, ovate-falcate, sparsely hispid. Flowers 4-6 mm across. Calyx 4-5 mm long, lobes ovate. Corolla c. 5 mm long, bluish-purple, lobes ovate. Filaments bearded. Ovary c. 1 mm long, oblong, hirsute at apex. Seeds 6, pitted.

Fl. & Fr.: Sep. - Nov.

Distr. : Endemic to Peninsular India. Very common in sandy waste places. *CNS 1220* (Kanichukulangara Jn.).

Cyanotis cristata (L.) D. Don, Prodr. Fl. Nepal. 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; Mani. & Sivar., Fl. Calicut 298. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1662. 1983; Ramach. & Nair, Fl. Cannanore 483. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 285. 1988; Vajravelu, Fl. Palghat Dist. 519. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 486. 1994; Sivar. & Mathew, Fl. Nilambur 736. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 475. 1996. *Commelina cristata* L., Sp. Pl. 42. 1753. ***Veetala-caitu*** Rheede, Hort. Malab. 7: 109, t. 58. 1688.

Fleshy, robust herbs. Leaves 2-8 x 0.8-2.5 cm, ovate-oblong, base rounded or cordate, apex obtuse or acute, sparsely ciliate on margins; sheath loose, to 8 mm long, hispid. cymes mostly terminal, recurved, 2-2.5 x 1-1.5 cm, solitary, peduncle 2-6 cm long. Bracts 2.5-5 x 1-2.2 cm, leaf-like; bracteoles 0.7-1 cm long, falcately ovate, sparsely ciliate on margins. Flowers 6-7 mm across. Calyx tube c. 2 mm long; lobes 2-2.5 mm long, hirsute. Corolla pale blue to purple, c. 6 mm long. Staminal filaments bearded,

violet. Ovary globose, hairy at apex. Capsule 2-3 mm long, subglobose. Seeds c. 1 mm , trigonous, with 2 large pits on either side.

Fl. & Fr. : Aug. - Nov.

Distr. : Paleotropics. Common on exposed lands. *CNS 2561* (Poonthala).

MURDANNIA Royle

Ill. Bot. Himalayan Mts. t. 95. 1839 (*nom. cons.*).

Erect or diffuse herbs; roots fibrous or tuberous. Leaves alternate, sometimes fascicled towards base of stem. Flowers in dense or lax terminal or axillary panicles. Calyx lobes 3, free, membranous. Petals subequal, free, obovate. Fertile stamens 3; filaments naked or bearded; staminodes 1-3. Ovary 3-celled; ovules 1 or more in each cell. Capsule usually 3-angled, 3-valved. Seeds usually 3-angled, 3-valved. Seeds 1 or 2-seriate, rugose or pitted.

1a. Seeds 2-seriate in each locule.

2a. Flowers panicled on a subradical, leafless reddish scape; pedicels not jointed; petals blue, apex somewhat 3-lobed; leaves linear-semiterete, upto 3 mm broad ..... **A. semiteres**

2b. Flowers axillary or terminal, solitary, or few clustered on leafy stem; pedicels jointed; petals brownish-yellow, apex rounded; leaves oblong or ovate-oblong, 0.7-1.8 cm broad ..... **M. crocea** ssp. **ochracea**

1b. Seeds 1- seriate in each locule.

3a. Cells of the capsule 1-seeded; cells of the ovary 1- ovuled; pedicels 2-jointed; bracts 0.8 - 1.5 cm long, convolute, persistent ..... **M. vaginata**

3b. Cells of the capsule 2-6-seeded; cells of the ovary 3-many-ovuled; pedicels not jointed or 1- jointed; bracts upto 6 mm long, ovate, deciduous.

4a. Flowers in 1-4-flowered axillary or rarely terminal cymes; pedicels 1-jointed and decurved in fruit ; petals brownish-yellow; cells of the capsule 4-6-seeded ..... **M. pauciflora**

4b. Flowers in terminal corymbose or branched panicles; pedicels not jointed and erect in fruit; petals blue or purplish; cells of the capsule 2-4-seeded.

5a. Panicles branched, lax; leaves ovate-lanceolate, 1-4 cm long; cells of the capsule 3-seeded; cells of the ovary 3-many-ovuled ..... **M. spirata**

5b. Panicles subglobose or subcorymbose; leaves linear or linear-lanceolate, more than 6 cm long; cells of the capsule 2-seeded; cells of the ovary 2-ovuled.

6a. Leaves 12-30 cm long and 1-2.2 cm broad ..... **M. terminale**

6b. Leaves 6-11 cm long and 0.5-1.2 cm broad ..... **M. nudiflora**

Murdannia crocea (Griff.) Faden, Kew Bull. 32: 188: 1977, ssp. **ochracea** (Dalz.) Faden, Kew Bull. 32: 188. 1977; Mani. & Sivar., Fl. Calicut 295. 1982. *Aneilema ochraceum* Dalz. in Hook., J. Bot. 3: 135. 1851; Hook. f., Fl. Brit. India 6: 380. 1892; Fischer in Gamble, Fl. Pres. Madras 1545. 1931. *Aneilema crocea* Griff., Notul. t. 235. 1851.

Erect or diffuse herbs to 30 cm long, rooting at lower nodes. Leaves 1.2-5 x 0.7-1.8 cm, ovate-oblong or lanceolate, base subamplexicaule, apex acute or subacute; sheath to 1 cm long. Flowers axillary, 1-4 together; pedicels to 8 mm long, jointed below the middle. Sepals 3, c. 3 mm long, oblong. Petals 3, brownish-yellow, ovate, obtuse. Capsule 3.5-5 x 2-2.5 mm, oblong, obtuse. Seeds angular, dark brown, rugose.

Fl. & Fr. : Jul. - Oct.

Distr. : Peninsular India. In damp sandy soil. *CNS 1922* (Valavanadu).

Murdannia nudiflora (L.) Brenan, Kew Bull. 7: 189. 1952; Panigrahi & Kammathy, Proc. Nat. Acad. Sci. Ind. 33: 495. 1963; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 648. 1976; Mani. & Sivar., Fl. Calicut 296. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1666. 1983; Ramach. & Nair, Fl. Cannanore 486. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 283. 1988; Vajravelu, Fl. Palghat Dist. 522. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 488. 1994; Sivar. & Mathew, Fl. Nilambur 739. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 477. 1996. *Commelina nudiflora* L., Sp. Pl.

41. 1753. *Aneilema nudiflora* (L.) R. Br. , Prodr. 271. 1810; Hook. f. , Fl. Brit. India 6: 378. 1892; Fischer in Gamble, Fl. Pres. Madras 1545. 1931. ***Tali-pullu*** Rheede, Hort. Malab. 9: 123, t. 58. 1688.

Procumbent herbs; rooting at lower nodes. Leaves sessile, 6-11 x 0.5-1.2 cm, linear or linear-lanceolate, base rounded, apex acute or acuminate; sheath to 1.2 cm long, margin ciliate. Flowers in terminal and axillary few-flowered, subglobose or subcorymbose panicles. Sepals c. 2 mm long, oblong, obtuse. Petals 2-2.5 mm long, oblong, acute, bluish-purple. Staminal filaments bearded; staminodes 3 with filaments bearded or not. Ovules 2 in each cell. Capsule 2.5-3.7 mm across, globose. Seeds 2- per locule, c.1 mm, cuboid, deeply pitted.

Fl. & Fr.: Jul. - Oct.

Distr. : Africa, Myanmar, India, China, Japan and Malesia. Common in wet fields and open grounds during monsoon. *CNS 2562* (Valiyakulangara).

Murdannia pauciflora (Wight) Brueck. in Engl. & Prantl, Pflanzenfam (ed. 2), 15a: 173. 1930; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 649. 1976; Ramach. & Nair, Fl. Cannanore 487. 1988; Vajravelu, Fl. Palghat Dist. 523. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 488. 1994; Sivar. & Mathew, Fl. Nilambur 739. 1996. *Aneilema pauciflorum* Wight, Ic. t. 2077. 1853, non Dalz., 1851; 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, *nom. supperfl.*; Mani. & Sivar. , Fl. Calicut 295. 1982; Sasi. & Sivar. , Fl. Pl. Thrissur For. 477. 1996.

Decumbent, spreading herbs; rooting at lower nodes. Leaves 2-3 x 1-1.5 cm, ovate-lanceolate, base rounded or cordate, apex acute; sheath c. 5 mm long, hairy. Flowers 1-4 in axillary and terminal cymes, 4-5 mm across; pedicels to 1 cm long, usually deflexed in fruits. Sepals 3, c. 3 mm long, oblong, acute. Petals brownish-yellow, oblong, acute. Fertile stamens 3, filaments glabrous; staminodes 3. Capsule 4-5 mm long, oblong-fusiform, subtrigonous, acute. Seeds 4-6 in each cell, 1-seriate, black, sparsely pitted.

Fl. & Fr. : Aug. - Nov.

Distr. : Peninsular India and Malaya. On exposed moist- shady areas. *CNS 1324* (Angadikkal).

Murdannia semiteres (Dalz.) Sant., Poona Agri. Coll. Mag. 41: 284. 1951; Brenan, Kew Bull. 7: 184. 1952; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 469. 1976; Mani. & Sivar., Fl. Calicut 296. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1666. 1983; Mani., Fl. Silent Valley 327. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 283. 1988; Vajravelu, Fl. Palghat Dist. 523. 1990. *Aneilema semiteres* Dalz. in Hooker's J. Bot. Kew Gard. Misc. 3: 138. 1851. *Dichaespermum juncoides* Wight, Ic. t. 2078, f. 2. 1853. *Aneilema paniculatum* Wall. ex Clarke in A.DC., Monogr. Phan. 3: 215. 1881, non Wight, 1853; Hook. f., Fl. Brit. India 6: 31. 1892; Fischer in Gamble, Fl. Pres. Madras 1546. 1931. *Murdannia juncoides* (Wight) Rao & Kammathy, Bull. Bot. Surv. India 6: 3. 1964(1965); Sasi & Sivar., Fl. Pl. Thrissur For. 477. 1996. ***Nelam-pullu*** Rheede, Hort. Malab. 10: 37, t. 19. 1690 (Fig. 65).

Erect tufted slender herbs. Leaves 4-13 x 0.1-0.3 cm, linear, filiform, semiterete, apex acuminate. Panicles terminal, lax, longer than leaves, branches capillary; peduncles reddish, 8-20 cm long. Flowers blue; pedicels filiform; bracts minute, ocreate. Sepals obovate, acute. Petals blue, 2-4 mm long, obovate, apex somewhat 3-loobed. Staminal filaments naked. Ovary glabrous; ovules 2-seriate in each cell. Capsule 2-3 mm long, subglobose or ovoid, angular. Seeds 2-seriate, 6-8 in each cell, smooth, compressed.

Fl. & Fr. : Oct. - Dec.

Distr. : Peninsular India. Common in waste places. *CNS 1112* (punnapra), *CNS 1231* (Thuravoor).

Murdannia spirata (L.) Brueck. in Engl. & Prantl, Pflanzenfam (ed. 2) 15a: 173. 1930; Panigrahi & Kammathy, Proc. Nat. Acad. Sci. India 33: 495. 1963; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 649. 1976; Mani. & Sivar., Fl. Calicut 296. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1667. 1983; Ramach. & Nair, Fl. Cannanore 487.

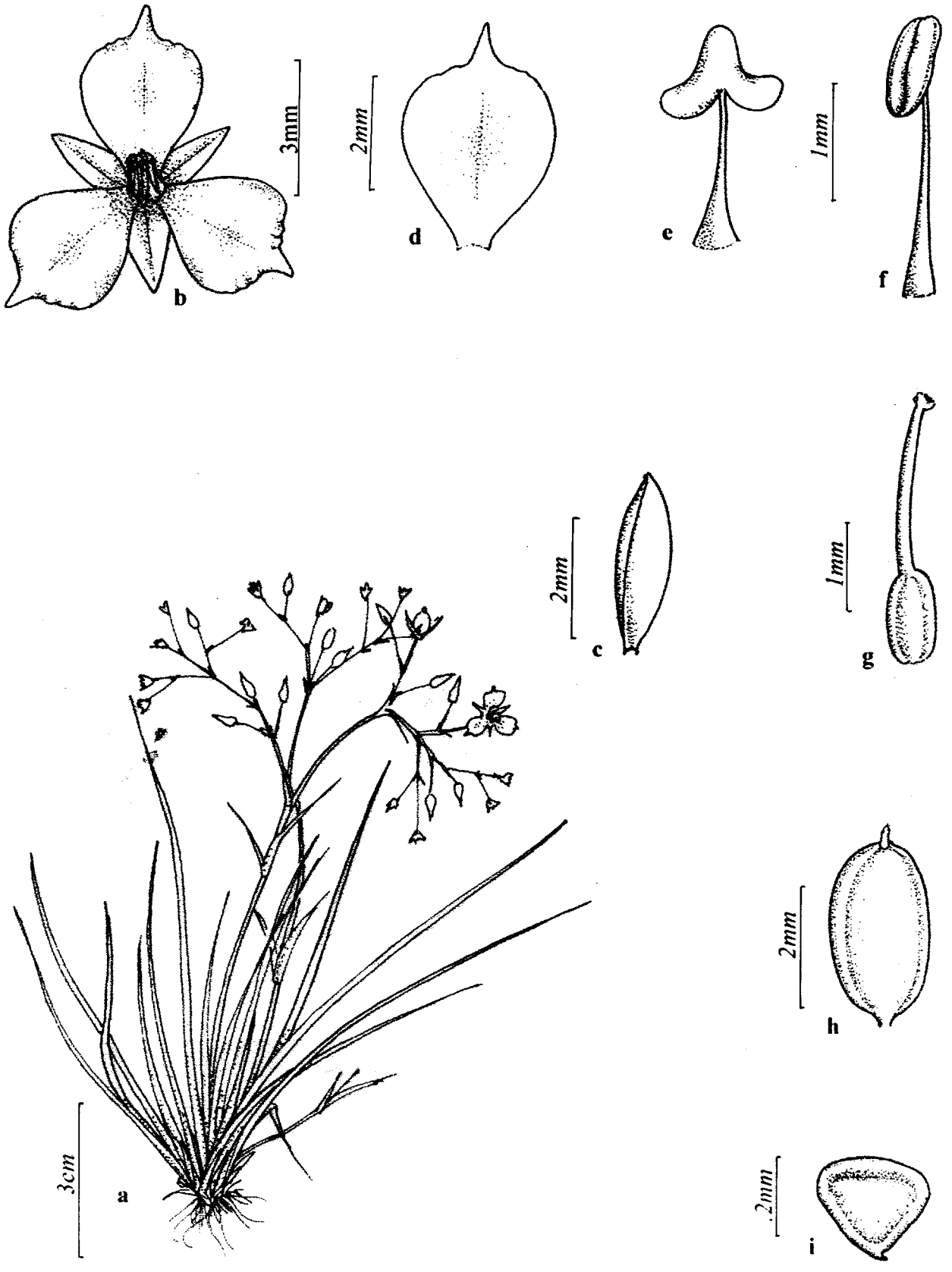


Fig. 65. *Murdannia semiteres* (Dalz.) Sant.: a. Habit; b. Flower; c. Sepal; d. Petal; e. Staminoide; f. Stamen; g. Pistil; h. Capsule ; i. Seed

1988; Vajravelu, Fl. Palghat Dist. 524. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 489. 1994; Sivar. & Mathew, Fl. Nilambur 740. 1996; Sasi. & 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.

Erect or diffuse herbs with fibrous roots. Leaves 1-4 x 0.5-1.2 cm, ovate-lanceolate, base cordate and semi-amplexicaul, apex acute; sheath c.1 cm long, ciliate at mouth. Flowers c.6 mm across, in few-flowered terminal and axillary panicles; bracts to 2 mm long, ovate; pedicel 3-5 mm long, filiform. Sepals 3-3.5 mm long, ovate-oblong. Petals bluish or violet, 3-4 mm long, oblong. Fertile stamens 3, filaments bearded; staminodes 2. Ovules 3 in each cell. Capsule 4-5 mm long, oblong, trigonous. Seeds 3 in each cell, c. 1 mm, angular, cuboid, rugose, light brown.

Fl. & Fr. : Aug. - Nov.

Distr. : Indo-Malesia. Common in plains, sandy coasts and in moist places. *CNS 1205* (Chandiroor).

Murdannia terminale (Bl.) Raizada, Ind. For. 84: 499. 1958; Mohanan & Henry, Fl. Thiruvananthapuram 489. 1994. *Tradescantia terminale* Bl., Enum. 1: 6. 1827. *Aneilema terminale* (Bl.) Boldingh, Zakfl. Landbouwstr. Java 47. 1916. *Aneilema nodiflorum* (L.) R. Br. var. *terminale* (Bl.) Clarke in Hook. f., Fl.. Brit. India 6: 379. 1892; Fischer in Gamble, Fl. Pres. Madras 1545. 1931.

Diffuse herbs, branched from near the base; branches radiating, upto 45 cm long, rooting at the nodes. Leaves of the main stem larger, 12-30 x 1-2.2 cm, of the branches smaller, 4-10 x 0.7-1.8 cm, all linear or linear-lanceolate, margins sparsely ciliate towards base, apex acute, nerves 6-11. Panicles terminal, subglobose or subcorymbose, 4-10 flowered; pedicels 3-4 mm long; bracts 4-6 x 4-5 mm, ovate, obtuse. Sepals 3, 3-4.5 x 2-2.5 mm, elliptic, obtuse. Petals 3, blue or purple, 3-4 x 2-2.5 mm, elliptic or obovate, obtuse. Stamens 3; filaments c. 3 mm long, flat, violet with monoliform hairs; staminoides 3. Ovary c. 1.5 mm long, trigonous; style c. 2 mm long; stigma capitate.

Capsule 4-5 x 2.5-3.5 mm, 3-gonous, elliptic. Seeds 2-per locule, 2-2.5 x 2-2.5 mm, trigonous, pitted.

Fl. & Fr. : Jul. - Oct.

Distr. : Peninsular India, N.E. India and Bhutan. Less common. In waste places. *CNS 2113* (Pokkadukavu at Kayamkulam).

Murdannia vaginata (L.) Brueck. in Engl. & Prantl, Pflanzenfam (ed. 2) 15a: 173. 1930; Mani. & Sivar., Fl. Calicut 295. 1982; Ramach. & Nair, Fl. Cannanore 488. 1988; Sivar. & Mathew, Fl. Nilambur 740. 1996. *Commelina vaginata* L., Mant. Pl. 177. 1771. *Aneilema vaginatum* (L.) R. Br., Prodr. 271. 1810; Wight, Ic.t. 2076. 1853; Hook. f. in Hook. f., Fl. Brit. India 6: 381.1892; Fischer in Gamble, Fl. Pres. Madras 1546. 1931 (Fig. 66).

Diffuse herbs, 15-60 cm tall, branched from near the base; branches radiating, rooting at the nodes. Leaves sessile, 3-20 x 0.4-1.5 cm, linear or linear-lanceolate, apex acute or subacute; sheaths to 2 cm long, margins ciliate. Panicle lax, terminal. Flowers 8-12 mm across, solitary or 2-4-fascicled in the axils of persistent, 0.8-1.5 cm long, convolute, purplish bracts; pedicels 5-7 mm long, jointed, hirsute. Sepals 3, 4-6 x 2.5-3.5 mm ovate-lanceolate. Petals 3, violet, 4-6 x 3-4 mm, obovate, base cuneate, apex obtuse. Stamens 2 perfect, filaments 3-3.5 mm long, violet, flattened towards base, bearded with long, purple hairs; staminodes 3-4; filaments bearded. Ovary c. 1.5 mm long, globose, 3-gonous; style 2-2.5 mm long, violet; stigma capitate. Capsule 3-4 x 3.5-4 mm, subglobose, trigonous, 3-celled, enclosed in persistent sepals. Seeds 3, 1 in each cell, 2-3 x 2-2.5 mm, hemispheric, rugose, brownish.

Fl. & Fr. : Sep. - Dec.

Distr. : Throughout tropical India, Sri Lanka and China. Margins of ponds and other wet areas. Flowers opens early in the morning and close at noon. *CNS 1558* (Kanichukulangara Jn.).

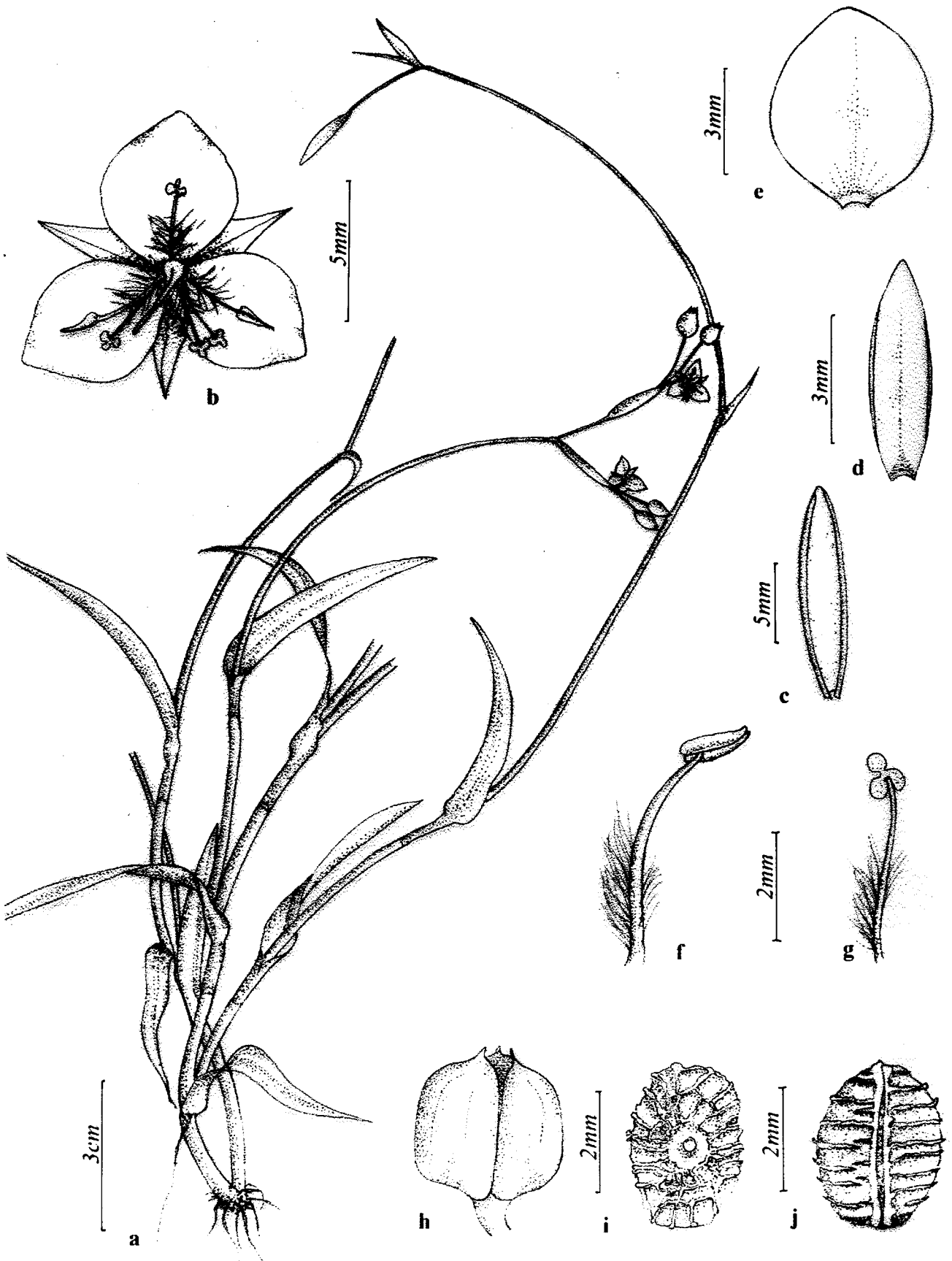


Fig. 66. *Murdannia vaginata* (L.) Brueck.: a. Habit; b. Flower; c. Bract; d. Sepal; e. Petal; f. Stamen; g. Staminode; h. Capsule with persistent calyx; i. Seed-dorsal view; j. Seed-ventral view

TONNINGIA Necker ex A.H.L. Jussieu

Dict. Sci. Nat. 54: 505. 1829.

Tonningia axillaris (L.) O. Kuntze, Rev. Gen. Pl. 2: 721. 1891; Ramach. & Nair, Fl. Cannanore 488. 1988; Karthik. *et al.*, Ind. Enum. (Adenda & Corrig.) 1. 1989; Vajravelu, Fl. Palghat Dist. 524. 1990; Sivar.& Mathew, Fl. Nilambur 741. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 478. 1996. *Commelina axillaris* L. , Sp. Pl. 42. 1753. *Cyanotis axillaris* (L.) D. Don, Prodr. Fl. Nepal. 46. 1825; Hook. f., Fl. Brit. India 6: 388. 1892; Fischer in Gamble, Fl. Pres. Madras 1550. 1931; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 282. 1988. *Amischophacelus axillaris* (L.) Rao & Kammathy, J. Linn. Soc. Bot. 59: 306. 1966; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 642. 1976; Mani. & Sivar., Fl. Calicut 299. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1655. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 484. 1994. ***Nir-pulli*** Rheede, Hort. Malab. 10: 25, t. 13. 1690.

Fleshy decumbent, glabrous herbs, rooting at lower nodes, often purple-suffused. Leaves 3-7 x 0.5-0.8 cm, linear, apex acute or acuminate; sheath to 7 mm long, mouth ciliate. Inflorescence in axillary cymose clusters, enclosed within the leaf sheath. Bracteoles 1-2 mm long, linear. Flowers 6-7 mm across. Calyx connate, tube 2-4 mm long, pilose; lobes lanceolate. Corolla blue; tube to 3 mm, lobes to 4 mm, ovate. Stamens 6; filaments pink with purple pilose hairs. Ovary c. 1.5 mm, woolly, 3-celled; ovules 2 per cell on axile placentae; style c.1.5 mm long, pilose; stigma 3-fid. Capsule 5-6 mm long, oblong, apex beaked. Seeds 6, c. 2 mm, oblong, pitted.

Fl. & Fr.: Almost throughout the year.

Distr.: China, India, Sri Lnaka, Malesia and Australia. Common in open wet or marshy places. *CNS 1557* (Muhamma).

124. FLAGELLARIACEAE Dumort.

Anal. Fam. Pl. 59, 60. 1829.

FLAGELLARIA Linnaeus

Sp. Pl. 333. 1753.

Flagellaria indica L., Sp. Pl. 333. 1753; Hook. f., Fl. Brit. India 6: 391. 1892; Henry & Swamin., Ind. J. For. 3: 140. 1980; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 293. 1988. Banerjee & Rao, Mangroves Orissa Coast 101. 1990; Harriman in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 7: 382. 1991; Mohanan & Henry,Fl. Thiruvananthapuram 489. 1994. ***Panambu-valli*** Rheede, Hort. Malab. 7: 99, t. 53. 1688.

Climbing perennial shrubs. Leaves sessile, 10-25 x 3-5 cm, lanceolate, base sheathing, 2-auricled, apex finely acuminate, cirrhose, many-nerved, coriaceous; sheaths longer than the internodes. Flowers bisexual, sessile, small in terminal 6-15 cm long panicles. Perianth-lobes 6, cream-coloured, 2-2.5 mm long, 1 or 2 outer suborbicular or ovate and inner whorl usually narrower, persistent. Stamens 6, exserted; filaments c. 2.5 mm long, persistent; anthers linear. Ovary c. 1.5 mm long, trigonous; style very short or none; stigmas 3, long and spreading. Drupe 5-7 mm across, globose, 1-3-seeded, red or finally black; the perianth and filaments becoming chaffy and persisting beneath the drupe.

Fl. & Fr.: May - Jul.

Distr.: Tropical Asia, Africa and N. Australia. Rare. Occasional in certain sacred groves. *CNS 1759* (Pathirappilly), *CNS 2037* (Nulayakadukavu at Kadakkarappally).

125. ARECACEAE Schultz

Sch., Nat. Syst. Pflanzenr. 317. 1832. (PALMAE *nom. alt.*).

1a. Scandent shrubs; leaf sheath and rachis armed with spines; fruit scaly ..... **Calamus**

1b. Erect trees; leaf sheath and rachis without spines; fruit not scaly.

2a. Leaves simple, fan-like ..... **Borassus**

2b. Leaves compound, feather-like.

3a. Leaves bipinnate ..... **Caryota**

3b. Leaves simple pinnate.

4a. Stem less than 20 cm across; leaf-sheath tubular; apex of leaflets premorse; drupes less than 4 cm long ..... **Areca**

4b. Stem more than 30 cm across; leaf-sheath 0; apex of leaflets acuminate; drupes 20-40 cm long ..... **Cocos**

ARECA Linnaeus

Sp. Pl. 1189. 1753.

Areca catechu L., Sp. Pl. 1189. 1753; Roxb., Pl. Corom. t. 75. 1796 & Fl. Ind. 3: 615. 1832; Hook. f., Fl. Brit. India 6: 405. 1892; Blatter, Palms Brit. India 471. 1926; Fischer in Gamble, Fl. Pres. Madras 1555. 1931; Mani. & Sivar., Fl. Calicut 300. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1670. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 278. 1988; Ramach. & Nair, Fl. Cannanore 491. 1988; Vajravelu, Fl. Palghat Dist. 525. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 490. 1994. ***Caunga*** Rheede, Hort. Malab. 1: 9-10, t. 5-8. 1678. ***Kamugu***.

Stem erect, hooped, unarmed. Leaves in a terminal crown, to 2 m long; leaflets many, linear or linear-lanceolate, base narrow, apex praemorse; lower ones plicate; upper ones coherent, nerves 2-5 or more, prominent. Spadices several on the axils of fallen leaves, to 50 cm long, branched, shortly peduncled; spikes flexuous or straight, to 30 cm long. Spathes boat-like, coriaceous. Flowers monoecious; lower ones female, 1-3 at spike-base; upper ones male, many. Male flowers: c. 3 mm long; sepals 3, c. 1 mm long, triangular; petals 3, c. 2.5 mm, ovate, white; stamens 6; pistillode 2-fid. Female flowers: c. 1.3 cm long; sepals c. 7 mm, obovate; petals to 1 cm; ovary to 8 mm, oblong, 1-celled, ovule solitary. Fruit to 4 x 2.5 cm, with fibrous mesocarps, orange-red in colour.

Fl. & Fr.: Jun. - Jan.

Distr.: Cultivated from India to the Solomon Islands and less commonly in Africa and tropical America. *CNS 1958* (Kulanada).

BORASSUS Linnaeus

Sp. Pl. 1187. 1753.

Borassus flabellifer L., Sp. Pl. 1187. 1753; Hook. f., Fl. Brit. India 6: 482. 1893; Brandis, Ind. Trees 657. 1906; Fischer in Gamble, Fl. Pres. Madras 1562. 1931; Mani. & Sivar., Fl. Calicut 299. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1670. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 278. 1988; Vajravelu, Fl. Palghat Dist. 526. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 491. 1994. B. *flabelliformis* Murray in L., Syst. Veg. (ed. 13) 827. 1774; Roxb., Pl. Corom. t. 71 & 72. 1796 & Fl. Ind. 3: 790. 1832. ***Carim-pana*** Rheede, Hort. Malab. 1: 11-12, t. 9. 1678.

Tall palms; trunk annulate. Leaves simple, fan-shaped, plicately multifid; leaflets 60-80, induplicate, apex acuminate; petioles subterete, stout, base broad, spinous on the margins. Spadices interfoliar, large, dioecious, branched; peduncle sheathed with open spathes. Male flowers small, clustered; bracts scaly, secund, overlapping. Sepals 3, c. 2 mm long, oblong. Petals 3, c. 2 mm long, obovate. Stamens 6; pistillodes small, bristly. Female flowers large, globose. Sepals reniform, imbricate, accrescent. Petals smaller, convolute, accrescent. Ovary globose, 3 or 4-celled; ovules basal; stigmas 3, sessile, recurved; staminodes 6-9. Drupes yellowish-brown when ripe, with 2-3 compressed pyrenes.

Fl. & Fr.: Throughout the year.

Distr.: Africa, Madagascar, Sri Lanka, India to Indo-China, Siam and E.Java. In waste places and in temple premises. *CNS 1894* (Pattanakad), *CNS 2381* (Cherthala).

CALAMUS Linnaeus

Sp. Pl. 325. 1753.

Calamus travancoricus Bedd. ex Becc. & Hook. f., Fl. Brit. India 6: 452. 1893; Becc., Ann. Roy. Bot. Gard. Calcutta 11: 95, 310. 1908; Fischer in Gamble, Fl. Pres. Madras

1567. 1928; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 279. 1988; Renuka, Rattans of Western Ghats (Monogr.) 53. 1992; Mohanan & Henry, Fl. Thiruvananthapuram 492. 1994; Sivar. & Mathew, Fl. Nilambur 745. 1996. ***Tsjeru-tsjurel*** Rheede, Hort. Malab. 12: 121, t. 1693. ***Vallichooral*** (Fig. 67).

Very slender climbing canes; stem with sheath, c. 2.5 cm across; spines c. 5 mm long, recurved; ocrea papery; flagellum 1-1.3 cm long. Rachis to 45 cm long with claw like spines; leaflets clustered, 10-25 x 1-1.5 cm, lanceolate, acuminate at apex, 3-ribbed. Male inflorescence to 1 m long; partial inflorescence 8-10, to 10 cm long. Female inflorescence 30-40 cm long; partial inflorescence 3-4, c. 12 cm long; involucre shallow, concave. Fruit 0.8-1 cm across, globose, covered with about 24 rows of scales.

Fl. & Fr.: Nov. - Feb.

Distr.: Endemic to Western Ghats. Common in sacred groves. *CNS 2269* (Vandanum), *CNS 1910* (Panayannar kavu).

CARYOTA Linnaeus

Sp. Pl. 1189. 1753.

Caryota urens L., Sp. Pl. 1189. 1753; Roxb., Fl. Ind. 3: 625. 1832; Hook. f., Fl. Brit. India 6: 422. 1892; Blatter, Palms Brit. India 339. 1926; Fischer in Gamble, Fl. Pres. Madras 1560. 1931; Ramamoorthy & Gandhi in Sald. & Nicols., Fl. Hassan Dist. 776. 1976; Moore & Dransfield, Taxon 28: 70. 1979; Mani. & Sivar., Fl. Calicut 300. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1672. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 280. 1988; Vajravelu, Fl. Palghat Dist. 529. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 492. 1994; Sivar. & Mathew, Fl. Nilambur 745. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 480. 1996. ***Schunda-pana*** Rheede, Hort. Malab. 1: 15-16,t. 11. 1678. ***Chunda-pana***.

Monoecious stout tall palms, 16-20 m tall, 30-50 cm diam., trunk smooth with prominent annular leaf-scars. Leaves bipinnate, 4-6 m long; pinnae 5-7 pairs, to 1.5 m long; leaflets broadly cuneate, fan-shaped, 12-20 cm long, 7-10 cm wide at wider portion,

raemorse at apex, many ribbed. Spadix interfoliar, shortly peduncled, much branched, pendulous, to 4 m long; spathes few, 40-50 cm long. Flowers many, in triads with female flower in the middle. Sepals 3, rounded, imbricate. Petals linear-oblong, valvate. Stamens many. Ovary 3-celled, 3-gonous; ovule 1-per locule. Fruit c. 2 cm across, globose, reddish purple. Seeds plano-convex, subreniform.

Fl. & Fr.: Nov. - Apr.

Distr.: India, Sri Lanka, Myanmar and Malaya. Common in sacred groves. *CNS 1992* (Ala).

COCOS Linnaeus

Sp. Pl. 1188. 1753.

Cocos nucifera L., Sp. Pl. 1188. 1753; Roxb., Pl. Corom. t. 73. 1796 & Fl. Ind. 3: 614. 1832; Hook. f., Fl. Brit. India 6: 482. 1893; Blatter, Palms Brit. India 499. 1926; Fischer in Gamble, Fl. Pres. Madras 1557. 1931; Mani. & Sivar., Fl. Calicut 300. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1672. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 280. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 493. 1994. ***Tenga*** Rheede, Hort. Malab. 1:1-8, t. 1-4.1678.

Erect trees with annular petiolar scars. Leaves pinnatisect, 4-6 m long; leaflets reduplicate, 60-100 x 2.5-5 cm, base narrow, apex tapering, acute. Spadices interfoliar, 50-100 cm long, panicled; branches to 60 cm long. Spathe 60-130 cm long, oblong, woody. Flowers monoecious, subsessile. Male flowers: often paired, to 8 mm long. Sepals c. 3 mm long, ovate. Petals 6-8 mm long, ovate, woody, yellowish-brown. Stamens 6; pistillode short, 3-fid. Female flowers 1-3 per branch, basal, globose. Perianth-lobes 6; woody; outer lobes broadly obovate, c. 2 cm across; inner lobes reniform, to 2 cm across. Ovary 3-celled; ovule 1 per cell; style short. Drupe to 30 cm long, ovoid or globose, trigonous; pericarp fibrous; endocarp stony. Seed coherent with the endocarp, with a hollow centre filled with 'coconut milk'.

Fl. & Fr.: Throughout the year.

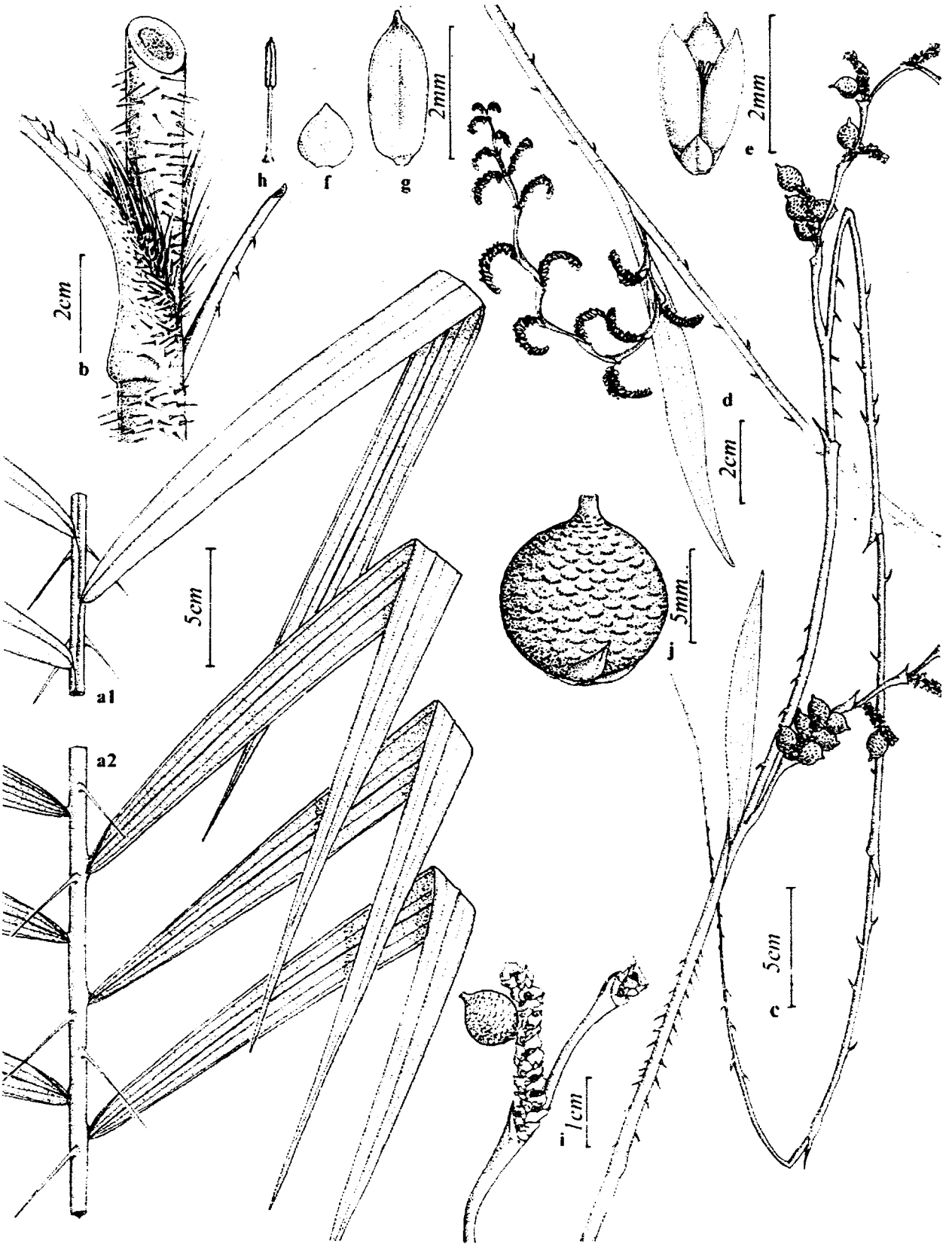


Fig. 67. *Calamus travancoricus* Bedd. ex Becc. &Hook. f.: a1 & a2. Portions of a leaf; b.A portion of stem with leaf sheath; c. Female inflorescence; d. Male inflorescence; e. Male flower; f . Sepal; g.Petal; h. Stamen; i. A partial infructescence; j. fruit.

Distr.: Throughout the Indo-Pacific World and cultivated successfully throughout the tropics. *CNS 1946* (Payippad).

126. PANDANACEAE R. Br.

Prodr. 340. 1810.

PANDANUS S.Parkinson

J. Voyage South Seas 46. 1773.

Dioecious erect shrubs or small trees, sometimes with stilt roots. Leaves linear-ensiform, spirally and closely arranged, sessile, base sheathing, spiny along margins and midrib. Male inflorescence terminal. Spadix branched, each branch with a spathe. Tepals absent. Stamens many; pistillode absent. Female inflorescence, solitary or a spike of several heads, pendulous on ageing; spathe fugaceous. Carpels naked, 1-celled; ovules solitary; stigma simple or branched. Fruit an aggregate of drupes or of phalanges, 1-seeded or several seeded.

1a. Prickles of leaf margins white; fruit-head composed of usually 5-15-celled phalanges ..... **P. fascicularis**

1b. Prickles of leaf margins green or greenish; fruit-head composed of simple drupes ..... **P. unipapillatus**

Pandanus fascicularis Lam., Encycl. 1:372.1783; Stone in Sald. & Nicols., Fl. Hassan Dist. 780.1976; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 304.1988; Mohanan & Henry, Fl. Thiruvananthapuram 494.1994. *Pandanus odoratissimus* L. f., Suppl. Pl. 424. 1781, *nom. illeg.*; St. John, Taxon 12(5): 201-204. 1963; Stone in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 3: 311. 1981; Mani. & Sivar., Fl. Calicut 301.1982; Stone in Matthew, Fl. Tam. Carnatic 3: 1680. 1983. *Pandanus leucanthus* Hassk., Fl. Bot. Ztg. 25 (2), Beibl. 14.1842. ***Kaida-taddi*** Rheede, Hort. Malab. 2:3, t.6.1679. ***Kaida***.

Branched shrubs or small trees; trunk greyish-brown, ringed by leaf-scars and with basal prop roots. Leaves spiralled in 3 rows, upto 200 cm long and 6 cm broad, linear-ensiform, apex gradually narrowed into an elongated triquete flagella, the margins and

dorsal midrib armed with white prickles, glaucous beneath. Female inflorescence a solitary terminal cephalium, pendulous in fruit. Phalanges mostly 5-15-celled, the carpels concentrically arranged, their apices with U-or V-shaped stigmas. Male inflorscence of several spikes, with white or cream axillant bracts, 5-10 cm long, composed of numerous phalanges; anthers apiculate. Fruit c. 20 x 10 cm oblong, red-orange.

Fl.: Jul.-Sep. *Fr.:* Sep. onwards.

Distr.: W. India, eastwards through western Malesia to approximately the central Moluccas. Along streams and canals. *CNS 1608* (Thrikunnapuzha).

Pandanus unipapillatus Dennst., Schleuss., 15, 23, 27. 1818; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 306. 1988. *Pandanus canaranus* Warb. in Engl., Pflanzenr. IV. 9: 75. 1900; Fischer in Gamble, Fl. Pres. Madras 1570. 1931; Stone in Sald. & Nicols., Fl. Hassan Dist. 778. 1976; Mani. & Sivar., Fl. Calicut 301.1982; Stone in Matthew, Fl. Tam. Carnatic 3:1681.1983; Mani. & Suresh, New Botanist 11: 123. 1984; Ramach. & Nair, Fl. Cannanore 491. 1988; Vajravelu, Fl. Palghat Dist. 529. 1990. ***Perin-Kaida-taddi*** Rheede, Hort. Malab. 2: 5, t. 7. 1679. ***Thazha kaida.***

Shrubs or small trees; stem branched above, greyish-brown, ringed by leaf-scars; prop root stout. Leaves 120-210 x 4-5 cm, linear-oblong, apex acuminate, prickly along margins and dorsal mid-rib; prickles greenish to brownish. Infructescence solitary, 20-24 cm long, oblong-ovoid, slightly trigonous, composed of many simple drupes; peduncle pendulous. Drupes 3.5-4 cm long, narrowly clavate, 5-7- angled, orange-yellow when ripe. Male inflorescence spicate; spike c. 7 cm long; stamens 17-27 together; filaments c. 1 mm long; anthers 2-3 mm long.

Fl.: Jul-Aug., *Fr.:* Sep. onwards.

Distr.: Peninsular India. Common along the banks of streams, canals, rice fields and bunds. *CNS 2211* (Mararikulam).

127. TYPHACEAE Juss.

Gen. Pl. 25. 1789.

TYPHA Linnaeus

Sp. Pl. 971. 7153.

Typha angustata Bory & Chaub., Exped. Sci. Moree, Bot. 1: 338. 1883; Hook. f., Fl. Brit. India 6:489. 1893; Gamble, Fl. Pres. Madras 1571. 1931; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 760. 1976; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1684. 1983; Vajravelu, Fl. Palghat Dist. 530. 1990. *Typha angustifolia* auct., non L., 1753: Roxb., Fl. Ind. 3: 567. 1832.

Robust perennial herbs to 2.5 m tall. Rhizome creeping, stem terrete, basally submerged. Leaves distichous, to 2 m long and 1-2.5 cm wide, linear, subterete above the sheath, flattened towards apex, thick, spongy; sheaths 40-50 cm long, auricled, scarious along the margins. Flowers unisexual in cylindrical spikes; the male spikes above the female ones. The distance between male and female spikes ranging from 5-15 cm. Male spike 8-18 cm long; male flowers slender and paler than the female ones, densely packed in the spike and mixed with simple, linear spathulate hairs; stamens 2 or 3; anthers c. 2 mm long, linear. Female spikes to 20 cm long, 1-1.5 cm across, terete; female flowers on compound stalks interspersed with bracts and sterile flowers; gynophore white, to 1.5 mm long; ovary c. 1 mm long, linear; style to 3 mm long; stigma flattened. Fruit c. 2 mm long, fusiform.

Fl. & Fr.: Dec. - Apr.

Distr.: Temperate and subtropical regions in Europe, Asia and N. America. Common in lakes, slow running rivers, paddy fields, stagnent water and marshy regions. *CNS 1554* (Muhamma).

128. ARACEAE Juss.

Gen. Pl. 23. 1789.

1a. Flowers bisexual.

2a. Marshy, rhizomatous creepers; leaves grass-like ..... **Acorus**

2b. Terrestrial, root climbers; leaves not grass-like ..... **Pothos**

1b. Flowers unisexual.

3a. Plants aquatic, free-floating; leaves pubescent ..... **Pistia**

3b. Plants terrestrial; leaves glabrous.

4a. Leaves trichotomously decompound; inflorescence developing before leaf ..... **Amorphophallus**

4b. Leaves simple; inflorescence appearing with leaves.

5a. Leaves peltate.

6a. Spadix appendix absent; leaves mottled ..... **Caladium**

6b. Spadix with a sterile terminal appendix; leaves not mottled .... **Colocasia**

5b. Leaves not peltate.

7a. Plants cormous herbs.

8a. Spathe completely withering; spadix included in the spathe; ovules basal and apical ..... **Theriophonum**

8b. Spathe-limb alone withering; spadix exserted from the spathe; ovules basal ..... **Typhonium**

7b. Plants rhizomatous marshy herbs.

9a. Leaves linear-lanceolate; female flowers few,united in a single whorl forming a syncarpium ..... **Cryptocoryne**

9b. Leaves oblong or elliptic-oblong; female flowers many, free, spirally arranged ..... **Lagenandra**

ACORUS Linnaeus

Sp. Pl. 324.1753.

Acorus calamus L., Sp. Pl. 324. 1753; Roxb., Fl. Ind. 2: 169. 1832; Hook. f., Fl. Brit. India 6: 555. 1893; Wood., J. Bombay Nat. Hist. Soc. 13: 428. 1901; Fischer in Gamble, Fl. Pres. Madras 1577 1931; Chatterjee, Bull. Bot. Soc. Bengal 8: 121. 1959; Sivadasan & Nicols. in Matthew, Fl. Tam. Carnatic 3: 1686. 1983; Suresh *et al.*, Taxon 32: 130. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 274. 1988; Nicols. in Dassan & Fosb., Rev. Handb. Fl. Ceylon 6: 28. 1987; Mohanan & Henry, Fl. Thiruvananthapuram 495. 1994. *Acorus griffithii* Schott, Oesterr. Bot. Zeitschr. 8: 351. 1858. *Acorus nilghirensis* Schott, Oesterr. Bot. Zeitschr. 9: 101. 1859. *Acorus belangeri* Schott, Ann. Mus. Lugd. Bat. 1: 294. 1864. ***Vaembu*** Rheede, Hort. Malab. 11: 99, t. 48. 1692. ***Vayamb.***

Rhizomatous erect marshy herbs; rhizome c. 1-1.5 cm diam., white, terete or slightly flattened, aromatic. Leaves distichous, 35-72 x 0.8-2 cm, ensiform, base equitant, apex acute, coriaceous; petiole indistinct. Inflorescence with peduncle 20-25 cm long, green, trigonous at the base and flattened towards upper portion; spathe 15-48 cm long, resembling leaf. Sapdix 5-9 cm long, cylindric. Flowers bisexual, densely arranged; tepals 6, in two whorls of 3 each; stamens 6. Ovary ovoid, 3-locular; ovules 7-10, pendulous; stigma sessile, obtuse. Fruiting rare.

Fl. & Fr.: Oct. -Jan.

Distr.: North temperate hemisphere and tropical Asia. Cultivated in ponds and canals for its medicinal rhizome. *CNS 2579* (Manaladi).

Used for chronic diarrhoea, cough, asthma and fever.

AMORPHOPHALLUS Blume ex Decaisne

Nouv. Ann. Mus. Nat. Hist. 3: 366. 1834 (*nom. cons.*).

Amorphophallus paeoniifolius (Dennst.) Nicols. var. **campanulatus** (Decne.) Sivadasan in Suresh *et al.*, Taxon 32: 130. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 274. 1988; Nicols. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 40. 1987; Mohanan &

Henry, Fl. Thiruvananthapuram 495. 1994. *Amorphophallus campanulatus* Decne., Nouv. Ann. Mus. Nat. Hist. Paris 3: 366.1834; Hook. f., Fl. Brit. India 6: 513. 1893; Woodr., J. Bombay Nat. Hist. Soc. 13: 428. 1901; Fischer in Gamble, Fl. Pres. Madras 1587. 1931; Nicols. in Sald. & Nicols., Fl. Hassan Dist. 783. 1976. ***Schena*** Rheede, Hort. Malab. 11: 35-36, t. 18. 1692. ***Chena***.

Cormous herbs; corms 8-14 x 10-20 cm, subglobose. Leaves solitary, decompound; petiole 40-90 cm long, tapering to the top, light green with white patches; leaflets sessile, 4-20 x 2-6 cm, ovate to oblong, base decurrent, apex acuminate, shiny green above, pale below, primary veins united below the margin forming an intramarginal vein. Inflorescence solitary; peduncle 4-8 cm long, light green, mottled with light greenish white irregular patches; spathe 16-24 cm long, companulate, basal convolute portion 6-8 cm long, upper portion broad, 10-16 x 18-31 cm, ovate, spreading, margin wavy, purplish green with light pinkish and white mottles. Spadix sessile, 10-18 cm long, shorter than spathe; pistillate portion 3-5.5 cm long, staminate portion 3-5 cm long; appendix 5-8 cm long, hemispherical, dark purplish. Ovary 2-3 mm long, ovate, 2-3-locular; stigma usually 3-lobed, cream coloured. Male flowers densely packed, sessile, yellowish. Fruit-setting very rare. Fruits not observed.

Fl.: Apr. - Jun.

Distr.: India, Sri Lanka, Java and Burma. Culivated widely as a vegetable. *CNS 2118* (Puliyoor).

CALADIUM Ventenat

Descript. Pl. Nouv. Jard. Cels. 30. 1801; Arch. Bot. (Leipzig.) 2(3): 347. 1801.

Caladium bicolor (Dryand.) Vent., Mag. Encycl. 4: 464. 1801; Mani. & Sivar., Fl. Calicut 303. 1982; Sivadasan & Nicols. in Matthew, Fl. Tam. Carnatic 3: 1690. 1983; Nicols. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 51. 1987; Sivar. & Mathew, Fl. Nilambur 754. 1996. *Arum bicolor* Dryand., Hort. Kew. 3: 316. 1789; Curtis, Bot. Mag. t. 820. 1805.

Perennial cormous herbs; corms 1.5-3.5 cm across, subglobose, yellowish inside. Leaves peltate, 14-25 x 8-20 cm, ovate to elliptic, apex acute, green with white, pink or purplish spots or mottles; petiole to 32 cm long, basally sheathing. Inflorescence solitary, axillary, long-peduncled; spathe c. 10 cm long, differentiated into basal 3-4 cm long, globose, convolute, persistent tube and an upper 5-7 cm long, cymbiform, deciduous, expanded,white limb. Spadix c. 10 cm long, differentiated into lower pistillate, middle neuter and upper staminate zones. Female flowers c. 2 mm long; ovary incompletely 2-3-locular, ovules numerous; stigma discoid, white. Neuter flowers elongate-rhomboidal, cream coloured. Staminate region c. 5 cm long, club-shaped with 80-90 compactly packed synandria. Berry many-seeded.

Fl. & Fr.: Apr. - Aug.

Distr.: Endemic to S. America; now naturalized in the tropics. Very common along the roadsides and waste places. *CNS 2164* (Devikulangara).

COLOCASIA Schott

in Schott & Endlicher, Melet. Bot. 18. 1832 (*nom. cons.*).

Colocasia esculenta (L.) Schott in Schott & Endl., Melet. Bot. 18. 1832; Purseglove, Trop. Crops Monocots 61. 1975; Mani. & Sivar., Fl. Calicut 304. 1982; Sivadasan & Nicols. in Matthew, Fl. Tam. Carnatic 3: 1691. 1983; Nicols. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 54. 1987; Ramach. & Nair, Fl. Cannanore 493. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 275. 1988; Vajravelu, Fl. Palghat Dist. 533. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 496. 1994; Sivar. & Mathew, Fl. Nilambur 754. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 485. 1996. *Arum esculentum* L., Sp. Pl. 2: 965. 1753; Roxb., Fl. Ind. 3: 494. 1832. *Arum colocasia* L., Sp. Pl. 2: 965. 1753; Wight, Ic. t. 786. 1844. *Colocasia nymphaefolia* (Vent.) Kunth, Enum. Pl. 3: 371. 1841. *Colocasia antiquorum* Schott in Schott & Endl., Melet. Bot. 18. 1832; Wight, Ic. t. 786. 1844; Hook. f., Fl. Brit. India 6: 523. 1893; Woodr., J. Bombay Nat. Hist. Soc. 13: 428. 1901; Fischer in Gamble, Fl. Pres. Madras 1580. 1931; Nicols. in Sald. & Nicols., Fl. Hassan Dist. 785. 1976. ***Weli-ila*** Rheede, Hort. Malab. 11: 43, t. 22. 1692. ***Chembu***.

Perennial herbs with tuberous stems and stolons; tubers 6-10 x 3-4 cm, runners produced from tubers. Leaves 25-35 x 10-20 cm, ovate, peltate, base cordate, apex acute; petiole 35-90 cm long. Inflorescence 1 or more, axillary; peduncle 30-65 cm long; spathe 15-22 x 2-3.5 cm, differentiated into basal green convolute tube and upper expanded, lanceolate, yellow, caducous limb; spadix 15-22 cm long with female flowers at the base, nuters in the middle, followed by male flowers and terminating in a sterile appendix; female flowers many, c. 3 x 2 mm, ovoid, green, arranged in close spirals, unilocular; ovules 2-4; stigma sessile, discoid with a central pit; neuter flowers occur at the constriction of the spathe, 1-1.5 x 3-4 mm, white; male flowers compactly arranged, cream-coloured, each with 2-6 linear anther lobes forming 3-6-angled, truncate synandria; appendix 3-5 cm long, subcylindric tapering towards the tip, yellow. Berry ovoid. Seeds oblong.

Fl. & Fr.: May - Dec.

Distr.: Endemic to Asia but pantropically cultivated for its edible tubers. Forming gregarious populations along marshy areas and streamsides. *CNS 2183* (Kattanum).

CRYPTOCORYNE Fischer ex Wydler

Linnaea 5: 428. 1830.

Cryptocoryne spiralis (Retz.) Fischer ex Wydler, Linnaea 5: 428. 1830; Wight, Ic. t. 773. 1844; Hook. f., Fl. Brit. India 6: 494. 1893; Fischer in Gamble, Fl. Pres. Madras 1575. 1931; Jacobsen, Cryptocoryner 52. 1979; Mani. & Sivar., Fl. Calicut 302. 1982; Sivadasan & Nicols. in Matthew, Fl. Tam. Carnatic 3: 1694. 1983; Sivar. & Mathew, Fl. Nilambur 756. 1996. *Arum spiralis* Retz., Obs. Bot. 1:30. 1979. *Cryptocoryne huegelli* Schott, Gen. Aroid. 8, t.12. 1853; Hook. f., Fl. Brit. India 6: 494. 1893.

Marshy creeping rhizomatous herbs; roots cream-coloured. leaves 8-15 x 0.7-2 cm, linear-lanceolate, base and apex acuminate; petiole to 10 cm long, sheathing at base. Inflorescence appear along with leaves; peduncle 1-2 cm long; spathe 6-12 x 1-2 cm, linear-lanceolate; basal tube 1.5-2.5 cm long; limb spirally twisted, 5-7 cm long, purple towards apex and green at base, horizontally lamellate within. Spadix 1.5-2 cm long,

pistillate zone c. 5 mm long, neuter flowers clavate seen above the female flowers. Female flowers basal, forming an ovoid syncarp.

Fl. & Fr.: Dec. - Jun.

Distr.: India, extending to Bangladesh. Usually along the river or stream banks and beds. *CNS 2097* (Thazhakkara), *CNS 1944* (Ambalappuzha).

LAGENANDRA Dalzell

in Hooker's J. Bot. Kew Gard. Misc. 4: 289. 1852.

Lagenandra toxicaria Dalz., Hooker's J. Bot. Kew Gard. Misc. 4: 289. 1852; Hook. f., Fl. Brit. India 6: 495. 1893; Woodr., J. Bombay Nat. Hist. Soc. 13: 427. 1901; Fischer in Gamble, Fl. Pres. Madras 1889. 1931; Mani. & Sivar., Fl. Calicut 303. 1982; Ramach. & Nair, Fl. Cannanore 494. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 497. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 486. 1996; Sivar. & Mathew, Fl. Nilambur 757. 1996.

Marshy herbs; rhizome 2-4.5 cm diam., horizontal, stout. Leaves 14-26 x 8-13 cm, oblong or elliptic-oblong, base cuneate, margins undulate, apex acute, veins closely parallel; petiole 10-38 cm long, sheathing at base, greenish at top, brownish at base. Inflorescence with short peduncle; spathe 9-16 cm long, 2-3 cm across; pinkish brown; basal tube 1-2 cm long, purplish outside, dark brown with ridges within; limb 4-6 x 2-3 cm, ovate, light purplish outside and dark purplish within with irregular fimbriate lamellae, caudate tip 8-12 cm long. Spadix 2-2.5 cm long, pistillate portion 5-8 mm long, followed by a slender interstice, staminate globose portion c. 5 mm long and terminal short appendix. Female flowers c. 50, in close spirals; ovary unilocular; ovule 3-7; stigma sessile with a central pit. Staminate portion yellow.

Fl. & Fr.: Throughout the year.

Distr.: South India. Common in marshy areas. *CNS 1363* (Vandanam), *CNS 1904* (Ambalappuzha).

PISTIA Linnaeus

Sp. Pl. 963. 1753.

Pistia stratiotes L., Sp. Pl. 963. 1753; Roxb., Pl. Corom. 3: 64, t. 268. 1819 & in Fl. Ind. 3: 131. 1832; Hook. f., Fl. Brit. India 6: 497. 1893; Woodr., J. Bombay Nat. Hist. Soc. 13: 427. 1901; Fischer in Gamble, Fl. Pres. Madras 1573. 1931; Wilson, J. Arnold Arbor. 41: 62, f. 5. 1960; Subram., Aquat.Angio. 75, f. 49.1962; Nicols. in Sald. & Nicols., Fl. Hassan Dist. 788. 1976; Mani. & Sivar., Fl. Calicut 302. 1982; Sivadasan & Nicols. in Matthew, Fl. Tam. Carnatic 3: 1696. 1983; Nicols. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 100. 1987; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 276. 1988; Vajravelu, Fl. Palghat Dist. 535. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 497. 1994. *Zala asiatica* Lour., Fl. Cochinch. 405. 1790. *Pistia minor* Bl., Rumph. 1: 78. 1836. ***Koda-pail*** Rheede, Hort. Malab. 11: 63, t. 32. 1692. ***Kola-pail.***

Aquatic stoloniferous, floating herbs; roots 6-10 cm long, cream with dark pockets; stem with very short internodes. Leaves sessile, tufted in rosettes, smaller towards centre, 3-8 x 2-6 cm, obovate, base subcuneate, apex rounded or retuse, white pubescent, veins 5-9. Inflorescence with a very short tomentose peduncle. Spathe to 10 mm long, oblong-ovate with a constriction in the middle, lower half sub-convolute, upper half spreading, ovate-acute, light yellowish green; spadix with basal single pistillate flower adnate with spathe, free above. Male flowers in a whorl with 4-6 anthers forming a synandrium subtended by a lobed cupulate structure at the base of spadix. Female flowers naked; ovary 1-celled, ovules many. Berry ovoid. Seeds few to many, oblong, testa rugose.

Fl. & Fr.: Oct. - Mar.

Distr.: Tropics and subtropics. Abundant in shallow pools, tanks, etc. *CNS 1943* (Keerikadu), *CNS 2061* (Thumbapuram).

POTHOS Linnaeus

SP. Pl. 968. 1753.

Pothos scandens L., Sp. Pl. 968. 1753; Roxb., Fl. Ind. 1: 451. 1820; Wight, Ic. t. 776. 1844; Hook. f., Fl. Brit. India 6: 551. 1893; Woodr., J. Bombay Nat. Hist.Soc. 13: 428. 1901; Fischer in Gamble, Fl. Pres. Madras 1592. 1931; Nicols. in Sald. & Nicols., Fl. Hassan Dist. 788. 1976; Mani. & Sivar., Fl. Calicut 302. 1982; Suresh *et al.*, Taxon 32: 127. 1983; Nicols. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 25. 1987; Mani., Fl. Silent Valley 334. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 276. 1988; Ramach. & Nair, Fl. Cannanore 494. 1988; Vajravelu, Fl. Palghat Dist. 535. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 498. 1994; Sivar. & Mathew, Fl. Nilambur 758. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 487. 1996. *Pothos exiguiflorus* Schott, Aroideae 21, t. 41. 1853. *Pothos cognatus* Schott, Aroideae 22, t. 42. 1853. *Pothos decipiens* Schott, Bonplandia 7: 165. 1859. ***Anaparua*** Rheede, Hort. Malab. 7: 75, t. 40. 1688.

Climbers; stem 3-5 mm diam., dark green. Leaves simple, distichous, 7-11 x 2-3.5 cm, ovate or ovate-lanceolate, base rounded, apex acuminate, coriaceous; petioles broadly winged, 3.5-5 x 1-2 cm, apex of petiole-wing rounded to emarginate. Inflorescence axillary, solitary; peduncle 4-8 mm long. Spathe 5-8 mm long, subobicular, apiculate, cream-coloured, reflexed. Spadix 3-9 x 2-4 mm, globose to obovoid, yellowish, dense-flowered. Flowers bisexual; perianth of 6 segments, cream-coloured; stamens 6, filaments flat, white. Ovary oblong, 2-3-loculed, ovule single in each locule, stigma sessile. Berry obovoid, red. Seeds ellipsoidal.

Fl. & Fr.: Dec.- Apr.

Distr.: Madagascar to Indo-Malaysia. In sacred groves and waste places. *CNS 1138* (Thamburankavu at Pallippuram), *CNS 1526* (Champakulam).

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; Sivadasan & Nicols., Kew Bull. 37: 282. 1982; Mani. & Sivar., Fl. Calicut 305. 1982; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 277. 1988; Vajravelu, Fl. Palghat Dist. 538. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 499. 1994; Sivar. & Mathew, Fl. Nilambur 788. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 488. 1996. ***Nir-tsjembu*** Rheede, Hort. Malab. 11: 33-34, t. 16. 1692.

Small cormous herbs; corms 1-2 cm across, subglobose. Leaves 6-9 x 3.5 - 5.5 cm, hastate-sagittate or ovate, basal lobes divergent, rounded; apex acute to mucronate;petiole 5.5-8 cm long, base sheathing. Inflorescence solitary; peduncle to 4 cm long, greenish to purplish; basal convolute portion c. 1 cm long, upper open limb portion 3-4 x 1-1.5 cm, oblong, acute; spadix almost equalling the spathe, to 4 cm long; basal pistillate portion c. 2 mm long, contiguous with neuteriflorous zone, c. 3 mm long, followed by a nacked interstice c. 5 mm long, staminate portion c. 4 mm long, followed by a creamy purplish sterile appendix, c. 2 cm long. Female flowers in a single basal row; ovary ovoid, 1-locular, ovules 4-5; stigma sessile; discoid. Neuter flowers subulate, creamy-purplish. Male flowers many, dense, each with 2 ovoid anther lobes. Berries c. 1 cm long, ovoid, 2-3-seeded.

Fl. & Fr.: Jun. - Sept.

Distr.: Peninsular India. Rare. In waste places. *CNS 1995* (Perumbalam).

TYPHONIUM Schott

Wiener Z. Kunst. 1829(3): 732. 1829.

Small cormous herbs. Leaves entire or sagittate-hastate, 3-lobed, appearing with inflorescence. Peduncle short. Spathe with a short convolute persistent tube and a narrowly linear or broad, deciduous limb; spadix usually exserted; appendix narrow,

tapering towards apex. Flowers naked, female and male flowers separated by neuters. Stamens 1-3; anthers subsessile. Ovary unilocular, 1 or 2-ovuled. Berry ovoid, 1-2-seeded. Seeds globose.

1a. Neuter flowers homomorphic, subulate with recurved tip; leaves 3-lobed; upper portion of the spathe dark purple ..... **T. roxburghii**

1b. Neuter flowers heteromorphic, basal spathulate, upper subulate; leaves hastate-sagittate; upper portion of the spathe creamy-yellow ..... **T. flagelliforme**

Typhonium flagelliforme (Roxb. ex Lodd.) Bl., Rumphia 1: 134.1837; Fischer in Gamble, Fl. Pres. Madras 1578. 1931; Nicols. & Sivadasan, Blumea 27: 489. 1981; Mani. & Sivar., Fl. Clicut 305. 1982; Nicols. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 65. 1987; Ramach. & Nair, Fl. Cannanore 495. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 278. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 499. 1994. *Arum flagelliforme* Roxb. ex Lodd., Bot. Cab. 4: t. 396. 1819; Roxb., Fl. Ind. 3: 502. 1832, *'flagelliforma';* Wight, Ic. t. 791. 1844. ***Neelen schenamajor*** Rheede, Hort. Malab. 11: 39, t. 20. 1692.

Corms 1.5-2.5 cm across, depressed globose. Leaves 5-14 x 2.5-5 cm, narrowly to broadly hastate-sagittate or broadly ovate-cordate, apex acute to acuminate, posterior lobes divergent; petiole 6-18 cm long. Inflorescence solitary; peduncle 7-11 cm long; spathe with basal portion c. 3 cm long, convolute, bulb-like, conspicuously ribbed, covering the fertile portion of the spadix; limb to 15 cm long, narrowly linear-lanceolate, erect, becomes recurved and coiled on maturity, cream, soon withering. Spadix equalling the spathe, basal pistillate portion c. 6 mm long, neuteriflorous zone c. 2 cm long, lower half flat with 6-9 spathulate, dark purple-tipped neuters, upper half composed of subulate neuters; staminate portion c. 7 mm long, yellowish; spadix-appendix 10-13 cm long, slender, yellow. Female flowers compactly arranged; ovary ovoid, green; stigma sessile, discoid. Male flowers with sessile, 2-celled anthers, connective prolonged in to a small hood. Berry ovoid to subglobose, 2-3-seeded.

Fl. & Fr.: May - Nov.

Distr.: Indochina and S. Malesia but reaching S. India, Sri Lanka and Luzon. In wastelands. *CNS 2071* (Bhajanamadom).

Typhonium roxburghii Schott, Aroid. 12, t. 17. 1855; Hook. f., Fl. Brit. India 6: 510. 1893; Prain, J. Asiat. Soc. Bengal 67: 303. 1898; Nicols. & Sivadasan, Blumea 27: 2. 1981; Mani. & Sivar., Fl. Calicut 304. 1982; Nicols. in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 66. 1987; Mohanan & Henry, Fl. Thiruvananthapuram 499. 1994. *Arum roxburghii* (Schott.) Thw., Enum. Pl. Zeyl. 432. 1864. *Typhonium divaricatum* var. *roxburghii* (Schott.) Engler in DC., Monogr. Phan. 2: 612. 1879.

Corm 2-3.5 cm diam., subglobose. Leaves 4-10 x 6-12 cm, usually shallowly 3-lobed, broader than long; petiole 12-24 cm long, sheathing at base. Inflorescence solitary; peduncle 5-8 cm long; spathe 18-25 cm long, lower portion 2-3 cm long, persistent, upper portion 3-4 times longer than broad, abruptly tapering from below the middle, twisted at tip, dark purple. Spadix subequalling the spathe; pistillate portion c. 5 mm long; sterile portion 8-12 mm long, covered with acicular, yellowish to reddish neuter flowers; staminate portion pinkish, c. 1 cm long; appendix stipitate, dark red. Berry 1-2-seeded.

Fl. & Fr.: Apr. - Aug.

Distr.: South and Central Malesia, India and Sri Lanka. In shady waste lands. *CNS 2188* (Vallikunnam).

129. LEMNACEAE Gray

Nat. Arr. Brit. Pl. 2: 729. 1821.

1a. Roots absent; inflorescence not enclosed in a spathe ..... **Wolffia**

1b. Roots present; inflorescence enclosed in a spathe.

2a. Roots 1-2, fronds with a dorsal and a ventral scale ..... **Spirodela**

2b. Root single, fronds without scale ..... **Lemna**

LEMNA Linnaeus

Sp. Pl. 970. 1753.

Lemna perpusilla Torrey, Fl. New York 2: 245. 1843; Hegelmaier, Lemnac. Monogr. 139, t. 6/19, 20, t. 7/18, 19, 1868; Daubs, Monogr. Lemnac. 25, t. 9. 1965; Hartog & Van der Plas, Blumea 18: 355-368. 1970; Hepper in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 398. 1981; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1705. 1983; Vajravelu, Fl. Palghat Dist. 537. 1990; Sasi. & Sivar., Fl. Pl. Thrissur For. 489. 1996. *Lemna paucicostata* Engelm. in Gray, Man. Bot. ed. 5, 681. 1867; Hegelmaier, Lemnac. Monogr. 139, t. 8. 1868; Hook. f., Fl. Brit. India 6: 556. 1893; Fischer in Gamble, Fl. Pres. Madras 1593. 1931; McCann, J. Bombay Nat. Hist. Soc. 43: 153. 1942; Subram., Aquat. Ang. 78. 1962.

Small floating aquatic herbs. Fronds pale green, solitary or cohering in groups of 2-5, asymmetric, 1.5-3 x 1-2.5 mm, ovate to obovate or oblong, base obtuse or emarginate, apex obtuse or rounded; upper side flat or convex with or without an apical papilla, lower side flat; root solitary. Flowering cavity lateral; spathe open. Staminate flowers 2; anthers 2-thecous. Pistillate flower 1; pistil c. 0.5 mm long; style concave. Fruit c. 0.5 mm long, lenticular, 1-seeded. Seeds minute, yellowish.

Fl. & Fr.: Sep. - Jan.

Distr.: Widespread in the tropics and subtropics. Common in still waters, paddy fields, ponds and slow running streams, forming extensive green floating mats on the surface of water. *CNS 1563* (Alappuzha).

SPIRODELA Schleiden

Linnaea 13: 391. 1839.

Spirodela polyrhiza (L.) Schleid., Linnaea 13: 392. 1839; Hegelmaier, Lemnac. Monogr. 73, 151, t. 13/10-16, t. 14, 15. 1868; Maheshwari, Nature 181: 1745. 1958; Mc Cann, J. Bombay Nat. Hist. Soc. 43: 156. 1942; Subram., Aquat. Ang. 77. 1962; Daubs, Monogr. Lemnac. 10, t. 3. 1965; Hartog & Van der Plas, Blumea 18: 360. 1970; Gandhi in Sald. &

Nicols., Fl. Hassan Dist. 790. 1976; Hepper in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 2: 401. 1981; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1706. 1983; Vajravelu, Fl. Palghat Dist. 538. 1990. *Lemna polyrhiza* L., Sp. Pl. 970. 1753; Hook. f., Fl. Brit. India 6: 557. 1893; Fischer in Gamble, Fl. Pres. Madras 1593. 1931.

Floating aquatic herbs. Fronds solitary or cohering in groups of 2-5, symmetric or asymmetric, 4-10 x 3-8 mm, orbicular-ovate, base obtuse, apex obtuse or rounded; nerves 5-11, conspicuous; upper side flat, smooth, green, lower side flat, red-purple. Daughter fronds budding from near the point of root-insertion in a slit in the parent frond. Roots 5-10, arising from the greatly thickened part of the frond; root cap acute. Flowers surrounded by a small open spathe in a lateral slit-pouch with 1-pistillate flower and 2-3 staminate flowers each consisting of a single stamen. Ovary with 1 or 2 ovules. Fruit 1-2 seeded, slightly winged. Seeds smooth.

Fl. & Fr.: Oct. - Dec.

Distr.: Cosmopolitan. Floating on still-water ponds, lakes and waste water ditches. *CNS 1564* (Alappuzha).

WOLFFIA Horkel ex Schleiden

Beitr. Bot. 1: 233. 1844 (*nom. cons.*)

Wolffia globosa (Roxb.) Hartog & van der Plas, Blumea 18: 367. 1970; van der Plas, Fl. Males. I, 7: 236. 1971; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1706. 1983; *Lemna globosa* Roxb., Hort. Beng. 66. 1832; Graham, Cat. Bombay Pl. 252. 1839; Dalz. & Gibs., Bombay Fl. 281. 1861. *Wolffia arrhiza* (L.) Horkel ex Wimmer, Fl. Schles., ed. 3, 140. 1857; Hegelmaier, Lemnac. Monogr. 124, t. 2, Figs. 6-17, t. 3/1-12. 1868; Hook. f., Fl. Brit. India 6: 557. 1893; Fischer in Gamble, Fl. Pres. Madras 1593. 1931; Mc Cann, J. Bombay Nat. Hist. Soc. 43: 159. 1942; Subram., Aquat. Ang. 79. 1962; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 791. 1976.

Fronds solitary, 0.5-1 mm long, elliptic to oblong, base and apex obtuse, margin with a few papillose cells, upper side flat near the apex and convex near the base, with a

few papillose cells, lower side strongly inflated, globular with larger cells, green. Budding pouch often with a distinct collar of elongate cells. Fruits not seen.

Fl. & Fr.: Not known.

Distr.: East Asia, South Asia, Africa and Australia. In stagnant waters of ponds and pools. Small green patches of this taxon floating on the water looks like some green algae. *CNS 2545* (Vandanam).

130. ALISMATACEAE Vent.

Tabl. Regne Veg. 2: 157. 1799.

SAGITTARIA Linnaeus

Sp. Pl. 993. 1753.

Sagittaria guayanensis H.B.K., Nov. Gen. Sp. 1: 250. 1816, ssp. **lappula** (D. Don) Bogin, Mem. New York Bot. Gard. 9: 192, f. 5. 1955; Hartog in Steenis, Fl. Males. I, 5: 328. 1957. *Sagittaria lappula* D. Don, Prodr. Fl. Nepal 22. 1825. *Sagittaria guayanensis* sensu Hook. f., Fl. Brit. India 6: 561. 1893, p.p.: Fischer in Gamble, Fl. Pres. Madras 1596. 1931 (Fig. 68).

Laticiferous aquatic annual herbs. Leaves floating, 2-8 x 1.5-6 cm, broadly ovate, base deeply cordate, basal lobes obtuse, apex obtuse; nerves 10-14, prominent on the undersurface; petiole to 32 cm long, spongy, base sheathing. Inflorescence a raceme, lower flowers bisexual, the upper ones male; peduncle upto 28 cm long; pedicels upto 1 cm long. Sepals 3, 9-12 x 7-10 mm, broadly triangular-ovate, persistent. Petals white, c. 10 x 12 mm, obovate to orbicular. Stamens 9-12; filaments c. 5 mm long, dilated and flattened at base; anthers c. 1.5 mm long, oblong. Carpels many, elliptic to suborbicular, laterally flattened, with dorsal and ventral, undulate, membranous crest; style terminal, c. 1 mm long; stigma punctiform. Fruit a globose cluster of achenes; achenes 3-4 mm long, elliptic, with a broad, blunt-spiny crest.

Fl. & Fr.: Oct. - Jan.

Distr.: Tropics of Africa and southeast to East Malay Peninsula, Java and Celebes. In shallow pools and abandoned paddy fields. *CNS 1056* (Kaumadi).

131. BUTOMACEAE L.C. Richard

Mem. Mus. Hist. Nat. 1: 366. 1815.

LIMNOCHARIS Humb. & Bonpl.

Pl. Aequin. 1: 116. 1807

Limnocharis flava (L.) Buch., Abn. Naturw. Ver. Bremen 2: 2. 1868; Backer, Ann. Jard. Bot. Btzg Suppl. 3: 406. 1909; Biswas & Calder, Handb. Water & Marsh. Pl. Ind. 108. 1932; Kammathy & Subram., J. Bombay Nat. Hist. Soc. 64: 389. 1967; Rao & Das, J. Bombay Nat. Hist. Soc. 70: 577. 1967. *Alisma flava* L., Sp. Pl. 1: 343. 1753. *Limnocharis emarginata* H. B & K., Pl. Aequin. 1: 116. 1807 (Plate XXII: C).

Perennial herbs with stout rhizome. Leaves 8-30 x 5-20 cm, ovate to broadly elliptic or suborbicular, base rounded or subcordate, apex rounded or emarignate; nerves numerous, parallel; petiole 18-60 cm long, triangular, spongy. Inflorescence umbel-like, 2-15-flowered, axillary; peduncles 20-70 cm long, triangular, flattended at the base. Bracts 1.5-2.5 x 1-2 cm, broadly elliptic to rounded. Sepals 3, 1.5-2.5 x 1-1.5 cm, broadly ovate, obtuse, green, persistent. Petals pale yellow, 2-3 x 1-2 cm, broadly ovate to orbicular, apex rounded. Stamens numerous, surrounded by a whorl of staminodes; filaments filiform; anthers linear, basifixed. Ovary with 16 - 20 laterally compressed carpels; stigma sessile, capitate. Fruits c. 1.5 cm across, subglobose. Seeds numerous, c. 1 mm long, ovate, dark brown.

Fl. & Fr.: Throughout the year.

Distr.: Native of Tropical America; introduced into S.E. Asia. Common in slow running streams, backwaters, shallow swamps, paddy fields and other waste marshy places. *CNS 1077* (Aroor R.S), *CNS 2542* (Alappuzha).

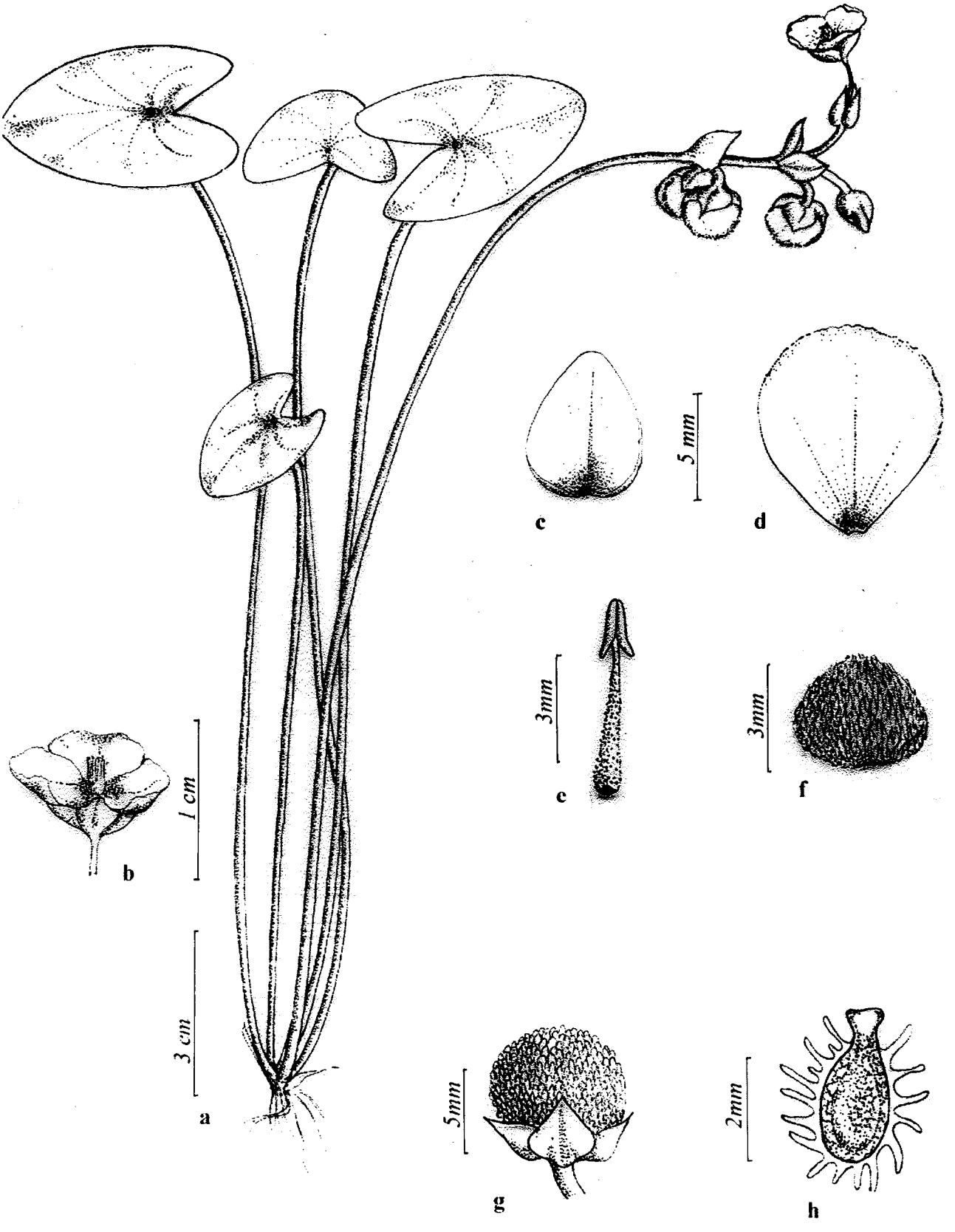


Fig. 68. *Sagittaria guayanensis* H.B.K. ssp. *lappula* (D.Don) Bogin: a. Habit; b. Flower; c. Sepal; d. Petal; e. Stamen; f. Pistil(Cluster); g. Infrutescence; h. Achene.

132. APONOGETONACEAE J. Agardh

Theoria Syst. Pl. 44. 1858.

APONOGETON Linnaeus f.

Suppl. Pl. 32. 1781.

Perennial water-plants with elongate or cylindrical tubers. Leaves submerged and/or floating, in a basal-rosette, with a distinct midrib and one or more pairs of parallel main nerves connected by numerous cross-veins. Inflorescence a long-peduncled emergent spike enveloped by a persistent spathe when young. Flowers bisexual. Tepals persistent, 2, 1-nerved, often as long as broad. Stamens 6, in two whorls. Carpels 3, 4 or rarely 5, free, each with 2-10 ovules. Fruits with a lateral or terminal beak. Seeds without endosperms.

1a. Leaves all submerged, margins undulate; embryo tuberous, crowned with a whorl of linear tortuous appendages ..... **A. appendiculatus**

1b. Leaves mostly floating, margins not undulate; embryo not as above ..... **A. natans**

Aponogeton appendiculatus V. Bruggen, Blumea 16: 265. 1968 (Plate XXIII: A, B & C; Fig. 69).

Perennial water-plants, 40-150 cm high. Tubers up to 2 cm across, oblong or globose. Leaves all submerged, 30-80 x 2.5 - 4.5 cm, oblong-lanceolate, base narrowly cuneate, margins undulate, apex acute or acuminate, mature leaves purplish; petiole 10-25 cm long. Spikes 3-12 cm long (fruiting spike upto 35 cm long), cylindrical, densely flowered; spathe 2-5 cm long, conical, acuminate, calyptrate, 6-7-sided, angles winged, caducous; peduncle 40-135 cm long, narrowed at base and gradually thickening towards apex, dark brown. Flowers 4-5 mm across, in groups about 4. Tepals 2, white with pink tinge, 2-2.5 x 2-2.5 mm, obovate or suborbicular, base cuneate, apex obtuse, fleshy, persistent. Stamens 5-6; filaments 1-1.5 mm long, widened towards the base, white, persistent; anthers c. 0.5 mm long, ovoid, yellow. Ovaries 2-3, 1-1.5 x 1-1.5 mm, conical;

ovules 1 or 2. Fruit 0.8-1.5 x 0.5-1 cm, conical, with scattered blunt spines, base violet, apex beaked. Embryo very unusual, 0.7-1.2 x 0.3-0.6 cm, obovate, tuberous, crowned with a whorl of linear tortuous appendages of 3-5 mm long.

Fls. & Fr.: Aug. - Dec.

Distr.: Endemic to Kerala. Submerged in shallow and back waters. *CNS 1871* (R. Block), *CNS 1747* (Kanjippadam).

Aponogeton natans (L.) Engl. & Krause in Engl., Pflanzern. IV. 13(24): 11: 1906; Fischer in Gamble, Fl. Pres. Madras 1598. 1931; Subram., Aquat. Ang. 91. 1962; Bruggen, Blumea 18: 177. 1970; Mani. & Sivar., Fl. Calicut 306. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3: 1714. 1983; Bruggen in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 4. 1987; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 274. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 500. 1994. *Saururus natans* L., Mant. Pl. 227. 1771. *Aponogeton monostachyon* L. f., Suppl. Pl. 214. 1782; Roxb., Pl. Corom. 1:58, t. 81. 1795; Hook. f., Fl. Brit. India 6: 564. 1893. ***Parua-kelanga*** Rheede, Hort. Malab. 11: 34, t. 15. 1692.

Tubers upto 2 cm across, oblong, sometimes globose. Leaves usually floating and rarely submerged. Submerged leaves upto 6 x 1.5 cm, lanceolate, base cuneate, apex obtuse; petiole to 5 cm long. Floating leaves 3-10 x 1-3 cm, oblong, base cordate, apex obtuse or rounded; parallel main nerves 5 or 7; petiole 7-35 cm long. Spikes upto 7 cm long, cylindrical, densely flowered; peduncle upto 40 cm long. Tepals 2, 1.5-2 x 0.5-1 mm, spathulate, pink, 1-nerved. Stamens 6; filaments 2-3 mm long. Ovaries 3, c. 1 mm long, oblong; ovules c. 8; styles to 1.5 mm long. Fruit c. 3 x 2 mm, smooth, beaked. Seeds c. 8, 1.5 -2 mm long, terete; testa double; outer one winged, transparent and reticulately nerved; inner one appressed to embryo.

Fl. & Fr.: Aug. - Dec.

Distr.: Sri Lanka, India and tropical Asia. Common in stagnant, shallow waters, paddy fields, ponds and marshes. *CNS 1213* (Cherthala).



Fig. 69. *Aponogeton appendiculatus* V. Bruggen: a. Habit; b. Single flower; c.Tepal; d. Stamen; e. Pistil; f. Fruit.

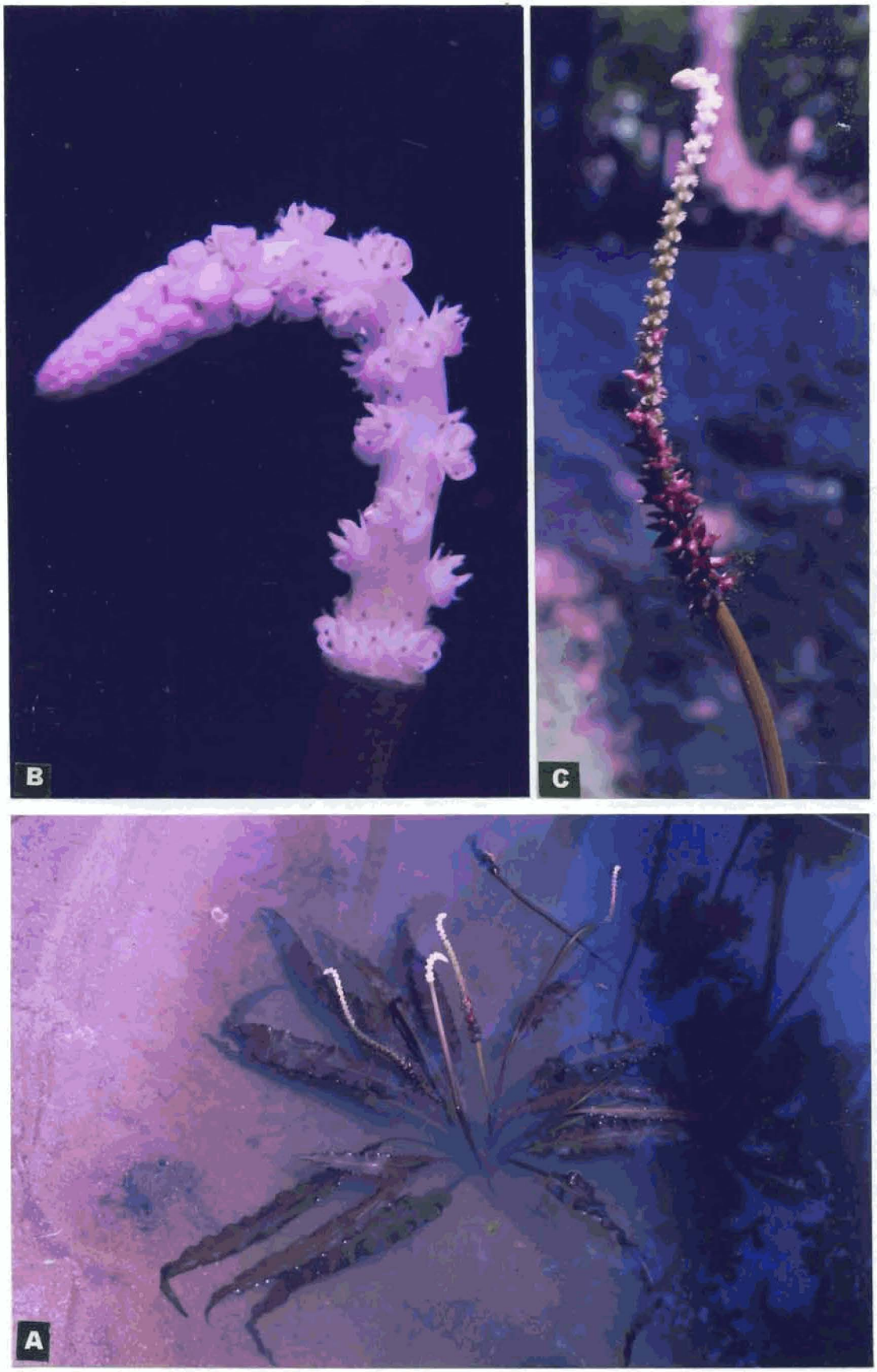


Plate XXIII. *A - C. Aponogeton appendiculatus* V.Bruggen; A. Habit; B. Inflorescence; C. Inflorescence with fruit.

133. POTAMOGETONACEAE Dumort.

Anal. Fam. Pl. 59, 61. 1829.

POTAMOGETON Linnaeus

Sp. Pl. 126. 1753.

Potamogeton octandrus Poir. in Lamk., Encycl. Meth. Suppl. 4: 534. 1816; Subram., Aquat. Ang. 95. 1962; Dandy, J. Linn. Soc. 50: 517. 1937. *Potamogeton javanicus* Hassk. in Verh. Natuurk Ver. Nederl. Ind. 1:26.1856; Hook. f., Fl. Brit. India 6: 566. 1893; Fischer in Gamble, Fl. Pres. Madras 1600. 1931 (Fig. 70).

Aquatic perennial herbs. Stems variable in length according to water depth, slender, branched, terete, brownish. Leaves alternate or subopposite, dimorphic; submerged ones sessile, 4-11 x 0.1 - 0.2 cm, narrowly linear without distinct petiole, brownish; floating leaves petiolate, 1-3 x 0.2 - 0.6 cm, oblong-lanceolate, base acute or rounded, apex acute, 3-5-nerved, light brown, coriaceous; petiole to 2 cm long; stipules 1.5 - 3 cm long, tubular, sheathing the stem and young inflorescence. Inflorescence a cylindric spike, 0.5-1.2 cm long, axillary or leaf-opposed; peduncle 1-3.2 cm long. Flowers sessile, bisexual, to 2 mm across. Perianth lobes 4, orbicular-ovate, short-clawed, greenish. Stamens 4, opposite to perianth lobes. Pistil 4 with pendulous ovules; style short; stigma subsessile. Drupelets 2-3 mm long, more or less compressed, beaked, 3-ribbed. Seed subreniform.

Fl. & Fr.: Oct. - May.

Distr.: Temperate and tropical regions of Asia, Australia and Africa. A rare taxon found in brackish water in coastal area. *CNS 1650* (Kayamkulam).

134. NAJADACEAE Juss.

Gen. Pl. 18. 1789.

NAJAS Linnaeus

Sp. Pl. 1015. 1753.

Submerged herbs, monoecious or dioecious. Stem slender, much branched; internodes elongate. Leaves small, sessile, appearing opposite, pseudo-whorled or in bunches, simple, linear, margin usually toothed, base sheathing, occasionally auriculate. Flowers axillary, unisexual, small. Male flowers enclosed in a perianth - like, membranous sheath (spathe). Stamen 1; anthers subsessile. Female flowers naked or surrounded by a membranous sheath (spathe). Ovary of 1 carpel; style short; stigma 2-4, linear; ovules solitary. Fruit a nutlet, enclosed in a loose, membranous coat.

1a. Leaf-sheaths apically produced into a linear, oblong auricle; leaf margins with more than 50 spiny teeth ..... **N. graminea**

1b. Leaf - sheaths apically obtuse, rarely with obscure auricle; leaf margins with less than 20 spiny teeth ..... **N. indica**

Najas graminea Raffeneau-Delile, Fl. Egypte Hist. Nat. 282. 1813; Hook. f., Fl. Brit. India 6 : 569. 1893; Fischer in Gamble, Fl. Pres. Madras 1604. 1931; Subram., Aquat. Ang. 100. 1962; Haynes, Sida 8(1): 45. 1979; Mani. & Sivar., Fl. Calicut 307. 1982; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3 : 1710. 1983.

Plants monoecious. Stems to 25 cm long, sparingly branched; internodes to 1.5 cm long. Leaves whorled, 1 2 x 0.2 cm, acicular, translucent, margins with 50-70 spiny teeth; sheaths 3-4.5 mm long, with 5-10 spines on the margins; auricles to 2 mm long, narrowly lanceolate, apex acute. Flowers 1-2 per axil, male flowers in the upper axils, female flowers through out. Male flowers: spathe absent, pedicelled; perianth-lobes 1.5-2 mm long, globose-oblong, hyaline; anthers 4-celled, c. 1.5 mm long, elliptic. Female flowers: spathe absent, subsessile, to 3 mm long; perianth - lobe closely appressed to ovary; ovary c. 2 mm long, elliptic; stigma c. 1 mm long. Fruit to 2 x 1 mm, subterete or ellipsoid. Seeds small.

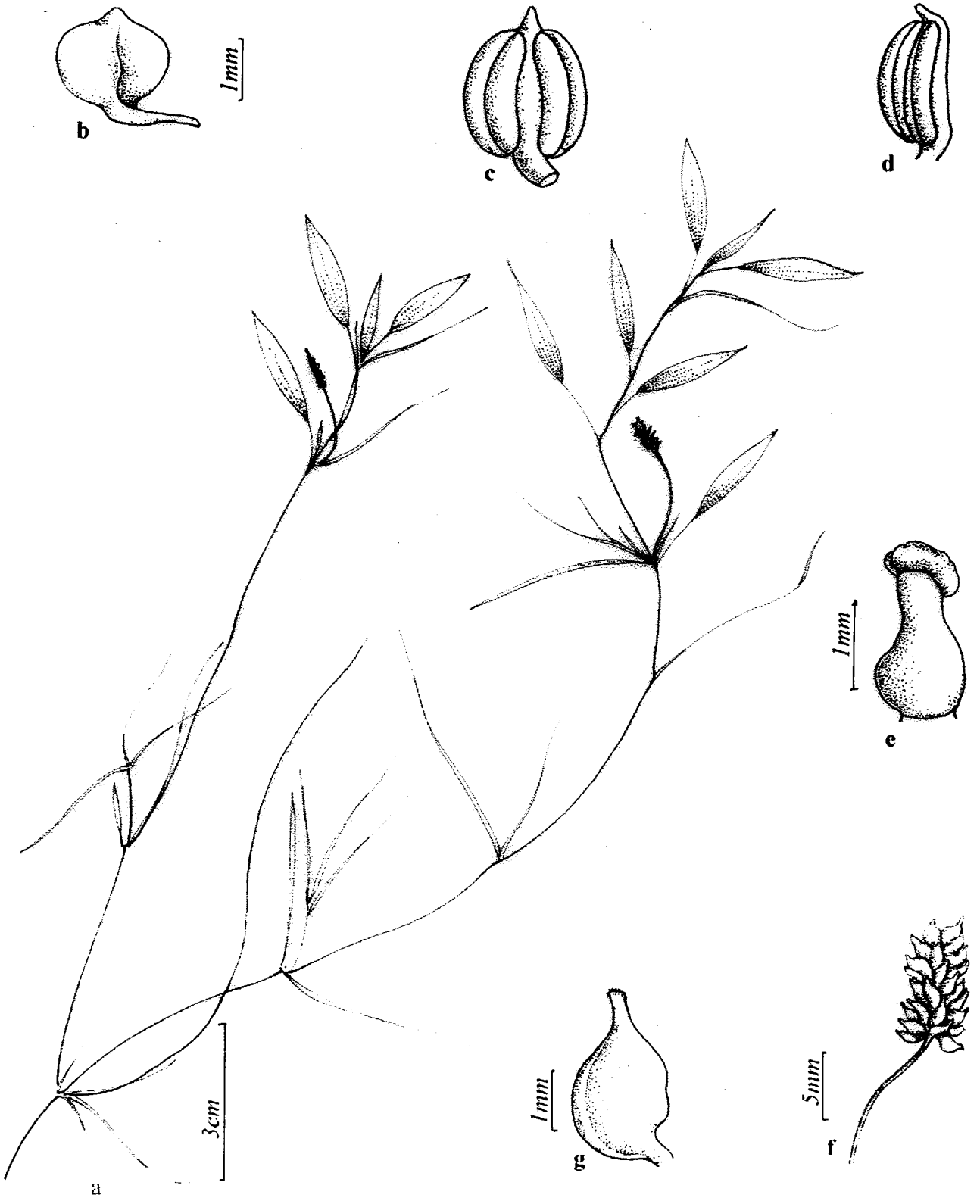


Fig. 70. *Potamogeton octandrus* Poir.: a. Habit; b. Perianth lobe; c & d. Stamen-ventral and side views; e. Pistil; f. Infrutescence; g. Druplet.

Fl. & Fr. : Aug. - Oct.

Distr. : Throughout the world. Common in flooded paddy fields, ponds and lakes. *CNS 1569* (Pallithode).

Najas indica (Willd.) Cham., Linnaea 4 : 501. 1829; Fischer in Gamble, Fl. Pres. Madras 1604. 1931; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 638. 1976; Matthew & Britto in Matthew, Fl. Tam. Carnatic 3 : 1711. 1983; Mani., Fl. Silent Valley 335. 1988; Sasi. & Sivar., Fl. Pl. Thrissur For. 489. 1996. *Caulinia indica* Willd., Mem. Acad. Roy. Sci. Hist. (Berlin) 89, t. 1, f. 3. 1801. *Najas talciculata* A. Braun., J. Bot. 2 : 278. 1864; Hook. f., Fl. Brit. India 6 : 569. 1893; Ficher in Gamble, Fl. Pres. Madras 1604. 1931. *Najas lacerata* Rendle, Trans. Linn. Soc. London 5: 416, t. 41, ff. 132 - 138. 1899; Fischer in Gamble, Fl. Pres. Madras 1604. 1931.

Plants monoecious. Stem to 35 cm long; internodes 2-6 cm long. Leaves 1-2.5 x 0.2-0.4 cm, acicular, margins with 6-18 triangular spines; sheath to 4 mm long, margin entire, apex obtuse, obscurely auricled or with 3-5 spines at the tip. Male flowers: spathe to 2 mm long, apex spiny; pedicel to 1 mm long; perianth-lobes distinct. Ovary to 2 mm long, ellipsoid; style 3 mm long. Fruit to 2 mm long, subterete or trigonous.

Fl. & Fr. : Aug. - Nov.

Distr.: Africa, Tropical continental Asia, north to Japan, throughout Malesia. In ponds and waste water ditches. *CNS 2030* (Kalavoor).

135. ERIOCAULACEAE P. Beauv. ex Desv.

in Ann. Sci. Nat. (Paris) 13: 47. 1828.

ERIOCAULON Linnaeus

Sp. Pl. 87. 1753.

Annual or perennial scapigerous monoecious herbs. Stem usually very short or absent, rarely elongated and branched. Leaves rosulate or cauline, narrow. Peduncles solitary or few to many, enclosed at the base in a sheath. Flowers unisexual, in involucral

heads, bracteate, trimerous or rarely dimerous. Male flowers: sepals 2 or 3, free or laterally connate to form a spathe. Petals 2 or 3, equal or unequal, connate at the base into a clavate stipe, with or without a black gland in each. Stamens 6, white, yellow or black in colour. Female flowers: Sepals 1-3, free or rarely connate, sometimes reduced to hair-like structures. Petals 0-3, free, equal or unequal, hyaline or coriaceous, with or without a black gland in each. Ovary sessile or stalked, 3 or rarely 2-loculed; style 3-fid. Seeds minute; cells of seed-coat isodiametric or elongated transversely or vertically; the radial walls appendaged or not.

1a. Water plants; stem more than 10 cm long; leaves cauline, filiform ..... **E. setaceum**

1b. Terrestrial or marsh plants; stem absent or less than 1 cm long; leaves radical, not filiform.

2a. Leaves acicular; anthers white or pale yellow; cells of seed-coat without appendages ..... **E. redactum**

2b. Leaves linear, linear-lanceolate or oblong; anthers black or dark brown; seed-coat with appendages.

3a. Seed-coat cells vertically elongated, appendages of seeds ribbon-like ..... **E. truncatum**

3b. Seed-coat cells transversely elongated, appendages of seeds setiform.

4a. Male sepals free; leaves oblong, apex cuspidate .... **E. cuspidatum**

4b. Male sepals connate laterally atleast at the base to form a closed or open spathe; leaves linear or linear-lanceolate, apex not cuspidate.

5a. Spathe of male flowers split on the abaxial side; involucral bracts much longer than the floral bracts.

6a. Involucral bracts acuminate or cuspidate; floral bracts straw-coloured, truncate at apex ..... **E. xeranthemum**

6b. Involucral bracts obtuse or subacute; floral bracts blackish, acute or acuminate at apex ..... **E. heterolepis**

5b. Spathe of male flowers closed and tubular; involucral bracts not longer than the floral bracts ..... **E. sexangulare**

Eriocaulon cuspidatum Dalz. in Hook., Kew. J. Bot. 3: 281. 1851; Hook. f., Fl. Brit. India 6: 681. 1893; Fyson, J. Ind. Bot. 1:150. 1919; Fischer in Gamble, Fl. Pres. Madras 1618. 1931; Mold., Fifth Summ. 1:274, 280. 1971 & 2:934. 1971; Mani.& Sivar., Fl. Calicut 309. 1982; Ansari & Balakr., Eriocaul. in India 91. 1994.

Acaulescent herbs. Leaves rosulate, 4-12 x 0.4-0.7 cm, oblong, cuspidate. Peduncles few, upto 28 cm long, erect; sheaths upto 8 cm long. Heads 4-7 mm across, hemispherical, white. Receptacles convex, glabrous. Involucral bracts erect or spreading, c. 2 x 1.5 mm, oblong-ovate, obtuse, straw-coloured. Floral bracts c. 2 x 0.5 mm, oblanceolate, obtuse, hyaline, hoary dorsally towards apex. Male flowers: sepals 2, free, c. 1.5 mm long, spathulate, obtuse or acute, hoary towards apex, scarious. Corolla tube c. 0.5 mm long; lobes 3, subequal, oblong, with a black gland in each. Anthers 6, oblong, black. Female flowers: sepals 2, free, c. 1 mm long, oblanceolate, conduplicate, kecled, scarious. Petals 3, subequal, c. 1 mm long, spathulate, hoary at apex, with a black gland in each, hyaline. Ovary sessile, obovoid; style 3-fid. Seeds c. 0.5 mm long, oblong-obovoid; cells of seed coat transversely elongated; appendages setiform, 1-2 from the transverse walls.

Fl. & Fr.: Sep. - Dec.

Distr.: Endemic to Western Peninsular India. Common in wet or marshy places, sometimes submerged. *CNS 1226* (Thuravoor).

Eriocaulon heterolepis Steud., Syn. Pl. Glum. 271. 1855; Hook. f., Fl. Brit. India 6: 585. 1893; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 652. 1976; Ansari & Balakr., Eriocaul. in India 48. 1994.

Acaulescent herbs. Leaves rosulate, upto 13 x 0.7 cm, linear-lanceolate, apex obtuse or acute. Peduncles many, upto 18 cm long, virgate; sheaths upto 5 cm long. Heads 5-10 mm across, hemispherical, white. Receptacles ovoid, pilose. Involucral bracts 4-6 x 1 mm, oblong-lanceolate, obtuse or subacute, spreading, straw-coloured. Floral bracts c. 1.5 x 0.5 mm, oblanceolate-cuneate, acute or acuminate, hoary towards apex, black. Male flowers: sepals connate in to a spathe, c. 1 x 0.5 mm, obovate, 3-lobed, black. Petals 3,

connate; lobes ovate, sparsely hoary, with a black gland in each. Anthers 6, globose, black. Female flowers: sepals 3, free, unequal; the two lateral ones c. 1.5 mm long, oblong-oblanceolate, conduplicate, keeled, black; the middle one c. 1 mm long, linear, flat. Petals 3, c.1 mm long, spathulate, hyaline, hoary towards apex. Ovary sessile, ovoid; style 3-fid. Seeds to 0.5 mm long, oblong; cells of seed-coat transversely elongated; appendages setiform, 5-6 from the transverse radial walls.

Fr. & Fr.: Oct. - Mar.

Distr.: Endemic to Western Peninsular India. Frequent in moist or marshy fields. *CNS 1365* (Pallipuram).

Eriocaulon redactum Ruhland in Engl., Pflanzenr. IV. 30(13): 1903; Fyson, J. Ind. Bot. 3:16. 1922; Ansari & Balakr., Eriocaul. in India 181. 1994.

Acaulescent herbs. Leaves rosulate, upto 2.5 cm long, acicular. Peduncles few, upto 12 cm long, virgate; sheaths upto 2 cm long. Heads 4-5 mm across, hemispherical, grey. Receptacles ovoid, sparsely pilose. Involucral bracts erect or spreading, c. 1.5 x 0.5 mm, oblong-obovate, obtuse, black. Floral bracts c. 1.5 x 0.5 mm, oblanceolate, acute, black. Male flowers: Sepals connate into a spathe, c. 1 x 0.5 mm, ovate, acute, not lobed, hyaline. Corolla tube c. 0.5 mm long; lobes 3, with a black gland in each. Anthers 6, globose, white. Female flowers: sepals 2, free, c. 1 mm long, reduced to branched hairs. Petals absent. Ovary stipitate, oblong-ovoid; style 3-fid. Seeds c. 0.5 mm long, oblong-ellipsoid, obtuse, purple; cells of seed-coat transversely elongated; appendages absent.

Fl. & Fr.: Sep. - Jan.

Distr.: Endemic to western parts of Peninsular India. Along wet paddy fields and along the sides of ponds. *CNS 1234* (Pattanakadu), *CNS 1361* (Pallipuram).

Eriocaulon setaceum L., Sp. Pl. 87. 1753; Hook. f., Fl. Brit. India 6: 572. 1893; Fischer in Gamble, Fl. Pres. Madras 1618. 1931; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 654. 1976; Mani & Sivar., Fl. Calicut 307. 1982; Nicols., Suresh & Mani., An Interpr. Hort.

Malab. 293. 1988; Ansari & Balakr., Eriocaul. India 72. 1994; Sivar. & Mathew, Fl. Nilambur 765. 1996. ***Tsjeru kotsjiletti-pullu*** Rheede, Hort. Malab. 12: 129, t. 68. 1693.

Caulescent herbs; stems upto 35 cm long. Leaves cauline, upto 5 cm long, filiform. Peduncles many, from the apex of the stem, upto 14 cm long, virgate; sheaths upto 3 cm long. Heads c. 4 mm across, ovoid or hemispherical, pale black. Receptacles ovoid, pilose. Involucral bracts c. 1.5 x 1 mm, ovate, obtuse, straw-coloured. Floral bracts c. 1 x 0.5 mm, obovate-cuneate, obtuse, black. Male flowers: sepals connate into a spathe, c. 1 x 0.5 mm, obovate, 3-lobed, black. Corolla tube c. 0.5 mm long; lobes 3, subequal. Anthers 6, globose, black. Female flowers: sepals 3, free, subequal, c. 1 mm long, oblong-lanceolate, obtuse, black. Petals 3, subequal, c. 1 mm long, spathulate, hyaline, pilose. Ovary sessile, globose; style 3-fid. Seeds c. 0.5 mm long, oblong-ellipsoid; cells of seed-coat transversely elongated; appendages setiform, 3-6 from the transverse radial walls.

Fl. & Fr.: Aug. - Oct.

Distr.: Endemic to Western Peninsular India and Sri Lanka. Frequent in waterlogged paddy fields and ponds. *CNS 1368* (Pallipuram), *CNS 1873* (Kalavoor).

Eriocaulon sexangulare L., Sp. Pl. 87. 1753; Hook. f., Fl. Brit. India 6: 582. 1893; Fyson, J. Ind. Bot. 2: 313. t. 39, 40. 1921; Fischer in Gamble, Fl. Pres. Madras 1618. 1931; Mani. & Sivar., Fl. Calicut 309. 1982; Ramach. & Nair, Fl. Cannanore 497. 1988; Mani., Fl. Silent Valley 336. 1988; Ansari & Balakr., Eriocaul. India 79. 1994; Mohanan & Henry, Fl. Thiruvananthapuram 501. 1994 (Plate XXIV: A).

Acaulescent herbs. Leaves rosulate, 5-16 x 0.3-1 cm, linear-lanceolate, apex acute or acuminate. Peduncles many 10-32 cm long, erect, rigid, virgate; sheaths upto 14 cm long; limb lanceolate, acuminate. Heads 4-7 mm across, hemispherical, white or grey. Receptacles ovoid, sparsely pilose. Involucral bracts spreading, 2-3 x 2-2.5 mm, obovate-orbicular, obtuse, coriaceous, straw-coloured. Floral bracts closely imbricate, c. 2.5 x 2 mm, obovate, cuneate, apex acute, coriaceous, hoary dorsally towards apex, borwn. Male flowers: sepals c. 2 x 1.5 mm, obovate, connate into a closed spathe, keeled, straw-

coloured. Corolla tube c. 1 mm long; lobes 3, equal, oblong, pubescent, with a black gland in each. Anthers 6, oblong, black. Female flowers: sepals 3, free, dissimilar, c. 2 mm long; the two lateral ones obovate-cuneate, keeled; the middle one oblong, flat, not keeled. Petals 3, c. 1 mm long, linear, hyaline, barbate towards apex, with a black gland in each. Ovary sessile, ovoid; style 3-fid. Seeds c. 0.5 mm long, ovoid; cells of seed coat transversely elongated; appendages setiform, solitary from the transverse radial walls.

Fl. & Fr.: Oct. - Jan.

Distr.: Western Peninsular India, Malaya, Myanmar and Sri Lanka. Common in moist paddy fields and other marshy areas. *CNS 1245* (S.L. Puram), *CNS 1360* (Pallipuram), CNS 1752 (Thiruvizha).

Eriocaulon truncatum Buch.-Ham. in Wall., Pl. Asiat. Rar. 3: 29. 1832; Hook. f., Fl. Brit. India 6: 578. 1893; Fyson, J. Ind. Bot. 2: 199. 1921; Fischer in Gamble, Fl. Pres. Madras 1619. 1931; Mold., Phytologia 19: 473. 1970; Gandhi in Sald. & Nicols., Fl. Hassan Dist. 654. 1976; Mani. & Sivar., Fl. Calicut 310. 1982; Matthew & Britto in Mathew, Fl. Tam. Carnatic 3: 1722. 1983; Ramch. & Nair, Fl. Cannanore 498. 1988; Mani., Fl. Silent Valley 336. 1988; Vajravelu, Fl. Palghat Dist. 539. 1990; Ansari & Balakr., Eriocaul. India 118. 1994; Mohanan & Henry, Fl. Thiruvananthapuram 501. 1994; Sivar & Mathew, Fl. Nilambur 765. 1996.

Acaulescent herbs. Leaves rosulate, upto 5 x 0.6 cm, oblong-lanceolate, apex acuminate. Peduncles many, upto 12 cm long, virgate; sheaths upto 3 cm long. Heads c. 4 mm across, hemispherical, white or straw-coloured. Receptacles convex, glabrous or pilose. Involucral bracts spreading or erect, c. 2 mm long, oblong-obovate, obtuse, hyaline. Floral bracts c. 1.5 mm long, obovate-cuneate, obtuse or acute, hyaline. Male flowers: sepals connate into a spathe to 1.5 mm long, obovate, 2-lobed, hoary towards apex, black. Petals 3, subequal, ovate, hairy, with a black gland in each. Anthers 6, oblong, black. Female flowers: sepals 2 or 3, free, to 1.5 mm long, oblong or linear; the middle one smaller or altogether lacking, black. Petals 3, free, subequal, c. 1 mm long, spathulate, hyaline, sparsely hoary, with a black gland in each. Ovary sessile, ovoid; style

3-fid. Seeds c. 0.5 mm long, oblong or ovoid, obtuse, pale yellow; cells of seed coat rectangular, vertically elongated; appendages ribbon-like bands.

Fl. & Fr.: Aug.-Dec.

Distr.: Widely distributed in India and other Asiatic countries. Common in marshy places. *CNS 2032* (Thycattussery).

Eriocaulon xeranthemum Mart. in Wall., Pl. Asiat. Rar. 3: 29. 1832; Hook. f., Fl. Brit. India 584. 1893; Fyson, J. Ind. Bot. Soc. 2: 200. 1921; Fischer in Gamble, Fl. Pres. Madras 1619. 1931; Mani. & Sivar., Fl. Calicut 308. 1982; Ansari & Balakr., Eriocaul. India 58. 1994; Sivar. & Mathew, Fl. Nilambur 766. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 490. 1996.

Acaulescent herbs. Leaves rosulate, upto 3 x 0.3 cm, linear, apex acute or subacuminate. Peduncles few, upto 4 cm long, virgate; sheaths upto 2 cm long. Heads hemispherical or cuneate, c. 4 mm across, straw-coloured. Receptacles convex, glabrous. Involucral bracts erect or spreading, 1.5-2.5 x c. 0.5 mm, linear-oblong, or oblanceolate, acuminate, chartaceous, glabrous, straw-coloured. Floral bracts. c. 1 x 0.5 mm, cuneate, truncate, hyaline, hoary at apex. Male flowers: pedicels minute. Sepals cuneate, connate into a spathe of c. 1 x 0.5 mm, 3-lobed with truncate lobes, black, hoary at apex. Petals 3, subequal, minute, with a black gland in each. Anthers 6, globose, black. Female flowers sessile. Sepals 3, free, unequal, c. 1 mm long; the two lateral ones oblanceolate, obtuse, hoary at apex; the middle one linear, much narrower than the lateral ones. Petals 3, subequal, 0.5 - 1 mm long, spathulate, obtuse, hyaline, barbate, with a black gland in each. Ovary ovoid; style 3-fid. Seeds to 0.5 mm long, oblong or ellipsoid; cells of seed-coat transversely elongated; appendages setiform, 2-4 from the transverse radial walls.

Fl. & Fr.: Jul. - Nov.

Distr.: India, Myanmar and Nepal. Common in open moist or marshy lands. *CNS 1042* (Vandanam).

136. CYPERACEAE Juss.

Gen. Pl. 26. 1789.

1a. Flowers unisexual.

2a. Nut tightly enveloped by two glumes and falling together with them ..... **Diplacrum**

2b. Nut not enveloped by two glumes ..... **Scleria**

1b. Flowers bisexual.

3a. Glumes on spikelets spiral.

4a. Hypogynous scales or bristles present (except in *Schoenoplectus articulatus* and *S. supinus*).

5a. Style-base dilated which is persistent at apex of nut.

6a. Leaves reduced to sheaths; spikelet solitary ..... **Eleocharis**

6b. Leaves with well developed blades; spikelets many.

7a. Spikelets uniformly compound; hypogynous scales 2; hypogynous bristles absent ..... **Hypolytrum**

7b. Spikelets simple; hypogynous scales absent; hypogynous bristles 5-6 ..... **Rhynchospora**

5b. Style-base not dilated, continuous with the ovary, hence nut neither crowned by nor jointed with the style base.

8a. Culms nodose and leafy throughout; glumes aristate ..... **Fuirena**

8b. Culms not nodose and leaved only at base or leaves reduced to sheaths; glumes not aristate.

9a. Hypogynous bristles 0-6; hypogynous scales none; inflorescence pseudolateral, if terminal then erect, perennial, rhizomatous herbs upto 150 cm height ..... **Schoenoplectus**

9b. Hypogynous bristles none; hypogynous scales 2; inflorescence terminal; annual non-rhizomatous herbs upto 23 cm height ..... **Lipocarpha**

4b. Hypogynous scales or bristles absent.

10a. Style jointed with the ovary, style base dilated or spongy-thickened.

11a. Style-base caducous, falling apart from nut ..... **Fimbristylis**

11b. Style-base persistent on the mature nut, hence nut crowned by a bulbous style base ..... **Bulbostylis**

10b. Style continuing down to ovary, not jointed, style-base not dilated.

12a. Rhizomatous perennials; culms leafy throughout; leaves rigid, spine-tipped, nut enclosed in a corky thickened rachilla .... **Remirea**

12b. Non-rhizomatous annuals; culms leafy only at base; leaves filiform, not spine-tipped; nut not enclosed in a corky thickened rachilla ..... **Rikliella**

3b. Glumes on spikelets distichous.

13a. Style-base dilated and constricted or articulated above the nut .... **Fimbristylis**

13b. Style-base not dilated, continuous with the nut.

14a. Rhachilla not articulated, persistent, hence glumes falling apart from rhachilla.

15a. Nut triangular or dorsiventrally flattened with one side facing rhachilla ..... **Cyperus**

15b. Nut bilaterally flattened with one angle facing rhachilla .... **Pycreus**

14b. Rhachilla articulated, hence spikelets falling entirely.

16a. Stigmas 3; nut trigonous with one side facing rhachilla .... **Mariscus**

16b. Stigmas 2; nut bilaterally flattened with one angle facing rhachilla ..... **Kyllinga**

BULBOSTYLIS Kunth

Enum. Pl. 2: 205. 1837 (*nom. cons.*).

Tufted perennials or annuals. Leaves basal, filiform to narrowly linear, usually scabrid, often pubescent; sheaths with ligule; ligule fimbriate or long-ciliate apically. Inflorescence terminal, capitate, anthelate or reduced to a single spikelet; bracts 1-4. Spikelets lanceolate, angular, many-flowered; rachilla persistent, narrowly winged. Glumes spiral, glabrous or pubescent, lower 1-3 empty. Hypogynous bristles or scales absent. Stamens 1-3. Style 3-branched, style-base bulbiform, persistent on the apex of the nut as a minute button. Nut trigonous or triquetrous, smooth, cancellate or transversely rugose.

1a. Inflorescence capitate; nut smooth ..... **B. barbata**

1b. Inflorescence not capitate; nut transversely wrinkled.

2a. Glumes glabrous, muticous ..... **B. densa**

2b. Glumes pubescent, mucronulate ..... **B. puberula**

Bulbostylis barbata (Rottb.) Kunth ex Clarke in Hook. f.,Fl. Brit. India 6: 651. 1893; Fischer in Gamble, Fl. Pres. Madras 1662. 1931; Kukenth., Bot. Jahrb. 70: 463. 1940; Kral, Sida 4: 84. 1971; Hooper in Sald. & Nicols., Fl. Hassan Dist. 659. 1976; Rao & Verma,Cyperac. N.E. India 40. 1982; Mani. & Sivar., Fl. Calicut 327. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1725. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 327. 1985; Ramach. & Nair, Fl. Cannanore 499. 1988; Vajravelu,Fl. Palghat Dist. 540. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 503. 1994; Sivar. & Mathew, Fl. Nilambur 767. 1996. *Scirpus barbatus* Rottb., Progr. 27. 1772. *Isolepis barbata* (Rottb.) R. Br., Prod. Fl. Nov. Holl. 222. 1810. *Isolepis barbata* (Rottb.) R. Br. var. *capillaris* Nees in Wight, Contr. Bot. India 109. 1834. *Stenophyllus barbatus* (Rottb.) Cooke, Fl. Pres. Bombay 2: 887. 1908 (Fig. 71).

Densely tufted annuals without rhizome; culms erect, slender, 6-20 cm tall. Leaves 4-7 cm long, upto 0.5 mm wide, capillary to filiform, acuminate, scabrid towards apex; sheaths 0.5-1.5 cm long, brownish, with white long hairs at mouth. Inflorescence a

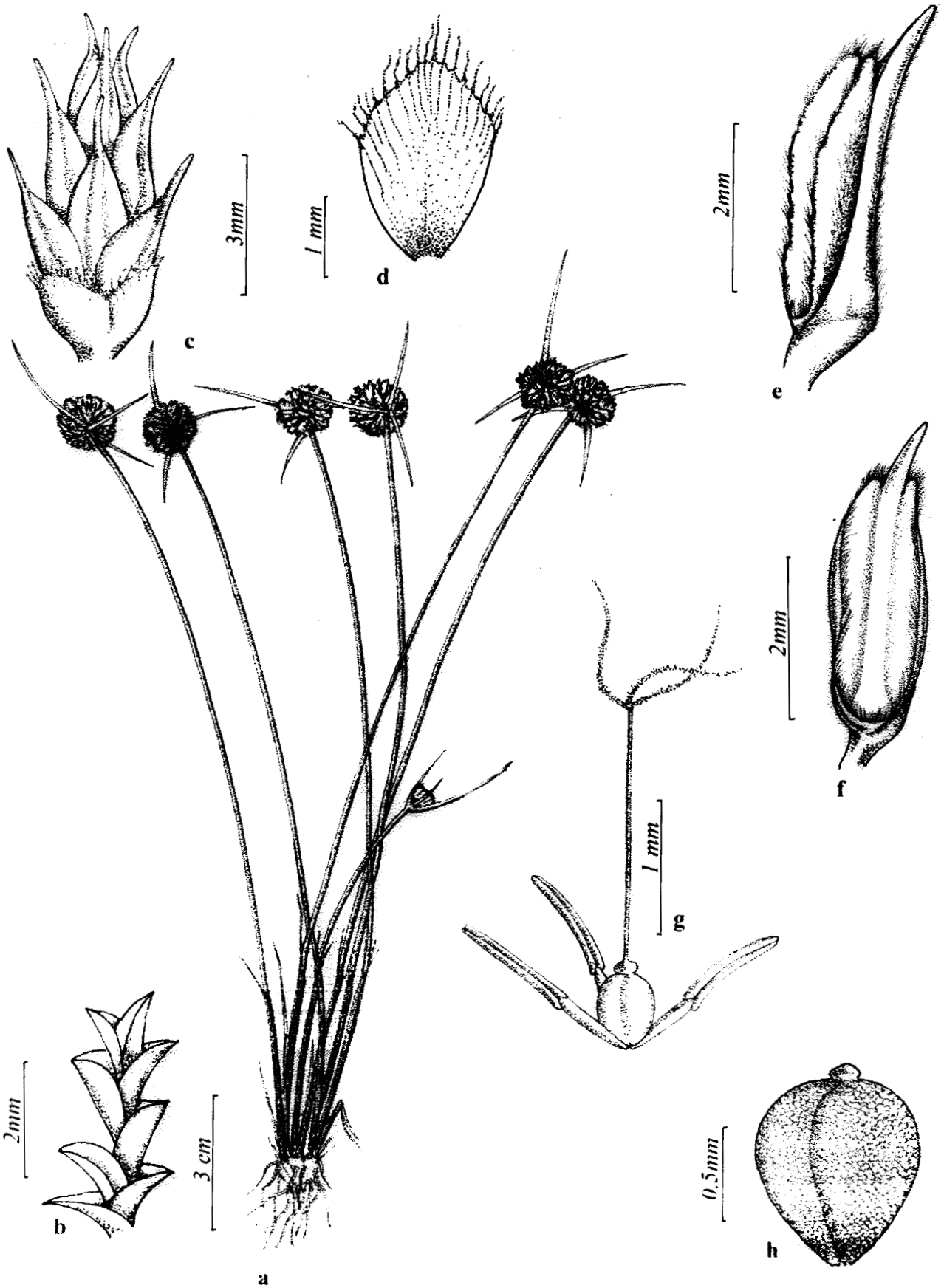


Fig. 71. *Bulbostylis barbata* (Rottb.) Kunth ex Clarke: a. Habit; b. Rachilla ; c. Spikelet; d. Basal sterile glume; e. Fertile glume-folded; f. Fertile glume-spread out; g. Pistil and stamens; h. Nut.

terminal head, 6-12 mm across, brownish; bracts 1-3, 0.5-1.5 cm long, setaceous. Spikelets sessile, 3-7 x 1.5-2.5 mm, ovate-lanceolate, apex subacute. Glumes spiral, 2-4 x 1-2 mm, ovate-acute, strongly keeled, mucronate, keel scabrid, margins ciliolate, 1-2 basal ones empty. Stamen 1-3. Style linear, broader at base; stigmas 3. Nut upto 1 x 0.5 mm, obovate, triquetrous, stamineous.

Fl. & Fr.: Aug. - Dec.

Distr.: Widely distributed in the warmer parts of the Old World. Common in sandy sea beach, open dry, sandy areas. *CNS 1050* (Vandanam).

Bulbostylis densa (Wall. ex Roxb.) Hand.-Mazzetti in Karsten. & Schenk, Veg. 20, 7: 16. 1930; Hooper in Sald. & Nicols., Fl. Hassan Dist. 659. 1976; Mani. & Sivar., Fl. Calicut 327. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1726.1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl.Ceylon 5: 324. 1985; Mani., Fl. Silent Valley 337. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 503.1994; Sivar. & Mathew, Fl. Nilambur 768. 1996. *Scirpus densus* Wall. ex Roxb., Fl. Ind. ed. 1, 1: 231. 1820. *Isolepis densa* (Wall. ex Roxb.) Roem. & Schult., Mant. 2: 71. 1824; Nees in Wight, Contr. Bot. India 109. 1834. *Isolepis trifida* Nees in Wight, Contr. Bot. India 108. 1834; Thw., Enum. Pl. Zeyl. 350.1864. *Bulbostylis capillaris* (L.) Kunth ex Clarke var. *trifida* (Nees) Clarke in Hook. f., Fl. Brit. India 6: 652. 1893; Fischer in Gamble, Fl. Pres. Madras 1662. 1931.

Erect, tufted, non-rhizomatous annuals; culms 5-20 cm tall, capillary, smooth. Leaves shorter than the stems, capillary,c. 0.5 mm wide, apex acute; sheaths 3-4 mm long, loose, mouth oblique, acuminate with white 1-1.5 mm long hairs, pale coloured. Inflorescence simple,cymose, 5-8 x 4-5 mm, with usually 3 spikelets, the central one subsessile, lateral pedicelled; bracts 2-3, setaceous. Spikelets 2.5-3 x 1 mm,, oblong-acute, brown. Glumes spiral, 1-1.5 x 1 mm, ovate-acute, glabrous, muticous, strongly keeled, sides with reddish brown streaks, 1-2 basal ones empty and smaller. Stamen 1. Style linear, broader at base; stigmas 3. Nut c. 1 x 0.5 mm, obovate, triquetrous, white to stramineous, transversely wrinkled.

Fl. & Fr.: Sep. - Nov.

Distr.: Widely distributed in the Old World. *CNS 2517* (Nootavanpara).

Bulbostylis puberula (Poir.) Kunth ex Clarke in Hook. f., Fl. Brit. India 6: 652. 1893; Fischer in Gamble, Fl. Pres. Madras 1662.1931; Mani. & Sivar., Fl. Calicut 327. 1982; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 326. 1985. *Scirpus puberulus* Poir. in Lam., Encycl. 6: 767. 1804. *Isolepis gracilis* Nees in Wight, Contr. Bot. India 109. 1834; Thw., Enum. Pl. Zeyl. 350. 1864.

Erect, tufted, non-rhizomatous annuals; culms slender, 6-32 cm tall, setaceous, pubescent. Leaves basal, 3-10 cm long, c. 0.5 mm wide, filiform, capillary, pubescent; sheaths 5-8 mm long, 4-5 ribbed, with stramineous spots, margins hyaline, mouth acute. Inflorescence subumbellate, 6-10 x 5-8 mm; bracts 2-4, one longer than the inflorescence, others shorter. Spikelets 4-8 x 1-1.5 mm, ovate-acute. Glumes spiral, 1.5-2 x 1-1.5 mm, ovate-acute, densely pubescent, mucronulate, strongly keeled, reddish-brown, 1-2 basal ones empty. Stamen 1; anther oblong. Style linear, broader at base; stigmas 3. Nut c. 1 x 0.5 mm, obovoid, triquetrous, transversely wrinkled, white-stramineous.

Fl. & Fr.: Oct. - May.

Distr.: Widely spread in tropical Africa, Medagascar, India and Malesia. Common in sandy areas. *CNS 1062* (Ambalapuzha).

CYPERUS Linnaeus

Sp. Pl. 44. 1753.

Annuals or perennials,often rhizomatous and stoloniferous; culms triquetrous or subterete. Leaves basal, flat or canaliculate, lower ones often scale-like, sometimes reduced to sheaths; ligule present or absent. Inflorescence terminal, rarely pseudolateral, simple to decompound, often once, twice or more anthelate, rarely capitate; involucral bracts foliar. Spikelets compressed, many-flowered; rachilla persistent, winged or wingless. Glumes distichous, occasionally basal 2 empty, often imbricating. Flowers bisexual, but the uppermost flower becoming staminate or barren; hypogynous bristles absent. Stamens 3, 2 or 1; connective often produced into an apical appendage. Style

continuous with the ovary; stigmas 3-fid or 2-fid, capillary. Nut trigonous or planoconvex, sessile or shortly stipitate, smooth or puncticulate.

1a. Spikelets digitately arranged or inflorescence capitate.
  2a. Inflorescences congested in a head, without rays.
    3a. Annuals without rhizome ..... **C. pygmaeus**
    3b. Perennials with stoloniferous rhizome.
      4a. Plants floating on water; inflorescence terminal; styles scarcely divided at apex; angles of the nut corky ..... **C. cephalotes**
      4b. Plants terrestrial; inflorescence often pseudolateral; style 3-cleft; angles of the nut not corky ..... **C. arenarius**
  2b. Inflorescences open, with 1 or more rays.
    5a. Large-sized perennials with very short rhizome, stolons absent; culms 30-90 cm tall; atleast some leaves and bracts more than 1 cm wide.
      6a. Plants floating on water; angles of nuts spongy-thickened; style flattened ..... **C. platystylis**
      6b. Plants not floating; angles of nuts not spongy-thickened, acute; style not flattened ..... **C. diffusus**
    5b. Small to medium-sized tufted annuals or short-lived perennials with stoloniferous rhizome; culms upto 40 cm tall; leaves and bracts upto 5 mm wide.
      7a. Glumes with conspicuous, spreading or recurved mucro; nuts oblong ..... **C. castaneus**
      7b. Glumes muticous or inconspicuously mucronulate; nuts obovate.
        8a. Spikelets many, congested in globose heads; nut as long as the subtending glume; glumes muticous ..... **C. difformis**
        8b. Spikelets digitate in clusters of 3-15; nut much shorter than the subtending glume; glumes acutish.
          9a. Glumes closely imbricate; connective of the anthers produced into a setulose appendage; rhizome conspicuous, elongated ..... **C. haspan**

9b. Glumes spaced; connective of the anthers without appendage; rhizome absent ..... **C. tenuispica**

1b. Spikelets spicately arranged on an elongated rhachis, thus forming spikes.

10a. Rhachilla of spikelets winged with base of glumes.

11a. Rhizome horizontally creeping or stoloniferous.

12a. Spikelets subterete, hardly compressed; glumes 2-2.5 mm long .... **C. stoloniferus**

12b. Spikelets strongly compressed; glumes 3-4 mm long.

13a. Lowest bract erect, looking like a continuation of the culm; inflorescence apparently quasi-lateral ..... **C. mitis**

13b. All bracts spreading; inflorescence terminal.

14a. Spikelets 2-3 cm long; glumes acute; bracts 2 to 3 times as long as the inflorescence ..... **C. bifax**

14b. Spikelets 1-1.5 cm long; glumes sub-acute; bracts as long as or shorter than the inflorescence ..... **C. rotundus**

11b. Rhizome very short or absent.

15a. Spike parallel-sided, much longer than wide with very numerous spikelets.

16a. Spikelets linear, terete or subterete, 0.5-1 mm wide; glumes muticous or apiculate ..... **C. digitatus**

16b. Spikelets lanceolate to oblong-lanceolate, c. 1.5 mm wide; glumes distinctly mucronate ..... **C. exaltatus**

15b. Spike ovoid or obovoid, usually less than thrice as long as wide, with much less numerous spikelets.

17a. Spikelets linear to lanceolate, distinctly compressed, 1.5-2 mm wide; glumes close together, acute at apex.

18a. Glumes 2-2.5 mm long, straw-coloured with purple-brown stain on both sides ..... **C. sphacelatus**

18b. Glumes 3-4 mm long, pale yellow without purple-brown stain ..... **C. tenuiculmis**

17b. Spikelets filiform, subterete, upto 1 mm wide; glumes spaced, obtuse at apex.

19a. Spikelets spreading; glumes remote, 3-5-nerved, rounded-obtuse at apex ..... **C. distans**

19b. Spikelets erect-patent; glumes slightly imbricate, 7-nerved, shallowly emarginate at apex ..... **C. nutans**

10b. Rhachilla of spikelets not or hardly winged.

20a. Rhizomatous perennials; glumes hardly keeled.

21a. Spikelets 2.5-3.5 mm wide; margins of glumes distinctly hyaline ..... **C. procerus**

21b. Spikelets 1-1.5 mm wide; margins of glumes not hyaline .... **C. malaccensis**

20b. Non-rhizomatous annuals; glumes distinctly keeled.

22a. Spikelets 1-2.5 mm long; glumes 2-3.5 mm long, acute at apex; nut half as long as the subtending glume; style and stigmas long .... **C. compressus**

22b. Spikelets 0.5-1 cm long; glumes c. 1 mm long, obtuse at apex; nut as long as the subtending glume; style hardly any, stigmas short ..... **C. iria**

Cyperus arenarius Retz., Obs. Bot. 4: 9. 1786; Nees in Wight, Contr. Bot. India 77. 1834; Clarke in Hook. f., Fl. Brit. India 6: 602. 1893; Fischer in Gamble, Fl. Pres. Madras 1640. 1931; Mani. & Sivar., Fl. Calicut 318. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1733. 1983; Koyama, Gard. Bull. Singapore 30: 144. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 208. 1985; Ramach. & Nair, Fl. Cannanore 503. 1988. *Cyperus conglomeratus* Rottb., var. *arenarius* (Retz.) Cass., Explor. Algir. Bot. 2: 245. 1855.

Rhizomatous perennials, 10-20 cm tall; rhizome long, creeping, covered with brown scales; culms spaced, single, obtusely trigonous. Leaves basal, 5-10 x 0.1-0.3 cm, linear, spreading on the soil, glaucous-green, glabrous; sheaths 2-7 cm, brown, basal ones

bladeless. Inflorescence of single ovoid heads, 1.5-2 x 1 cm; bracts 2-3, one exceeding the inflorescence and erect, appearing to be the prolongation of the culm, others shorter. Spikelets 8-13 x 3-5 mm, ovoid, acute; rachilla straight, wingless. Glumes closely imbricating, 4-5 x 2-3 mm, ovate, acute, mucronate, 9-11-nerved, 1-2 basal ones empty. Stamens 3; anthers c. 2 mm long, linear. Stigma 3. Nut 1.5-2 x 0.5-1 mm, obovate, trigonous, black-brown.

Fl. & Fr.: Oct. - Dec.

Distr.: Southern and Central Asia, India, Pakistan, Iran and Sri Lanka. Commonly growing on sandy beaches, growing among other littoral species like *Spinifex littoreus*, *Ipomoea pes-caprae* etc., it can survive long periods of drought. Usually this species forms large communities along sandy sea-shores. *CNS 1118* (Ambalapuzha).

Cyperus bifax Clarke, Kew Bull. 8: 13. 1908; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 183. 1985. *Cyperus retzii* Nees in Wight, Contr. Bot. India 82. 1834; Blake, Univ. Queensl. Pap. 2, 2: 8, t. 5. 1942; Koyama, Gard. Bull. Singapore 30: 133. 1977, non Poir., 1806. *Cyperus rotundus* L., subsp. *retzii* (Nees) Kukenth. in Engl., Pflanzenr. IV.20(101): 114. 1936. *Cyperus rotundus* L. var. *pseudesculentus* Kukenth., in Bot. Jahrb. 59: 44. 1924. *Cyperus tuberosus* sensu Clarke in Hook. f., Fl. Brit. India 6: 616. 1893 ex parte.

Erect, non-tufted, rhizomatous perennials; rhizome long, producing ovoid tubers; culms 40-60 cm tall, triquetrous, base tuberous. Leaves several, basal, shorter than the culm, 3-6 mm wide, linear, gradually acuminate; sheaths 1-5 cm long, brown. Inflorescence compound, 4-10 cm across; bracts 3-4, lowest exceeding the inflorescence. Spikelets 2-3 x 0.2 cm, linear-acute, compressed; rachilla broadly winged. Glumes 3.5-4 x 2 mm, ovate, acute, reddish, keel green, margins hyaline, 1-2 basal glumes empty, smaller. Stamens 3; anthers c. 2 mm long, connective red. Style c. 2 mm long; stigmas 3. Nut c. 1 x 0.5 mm, oblong, trigonous, apiculate, minutely puncticulate, brown.

Fl. & Fr.: Oct. - Dec.

Distr.: Southern India,Sri Lanka, Thailand, Malesia and Australia. In wet places and margins of rice fields. *Dinesh 10787* (CALI) (Kayamkulam).

Cyperus castaneus Willd., Sp. Pl.1: 278. 1797; Thw., Enum. Pl. Zeyl. 343. 1864; Clarke in Hook. f., Fl. Brit. India 6: 598. 1893; Fischer in Gamble, Fl. Pres. Madras 1639. 1931; Kukenth. in Engl., Pflanzenr. IV. 20(101): 264. 1936; Mani. & Sivar., Fl. Calicut 317. 1982; Koyama, Gard. Bull. Singapore 30: 143. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 207. 1985; Mohanan & Henry, Fl. Thiruvananthapuram 506. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 491. 1996.

Erect, tufted, non-rhizomatous annuals; culms 4-9 cm tall, triquetrous, slender. Leaves few, basal, 1.5-6 x 0.05-0.15 cm, linear, acute, canaliculate; sheaths upto 1 cm long, dark purple. Inflorescence simple or congested into a single head, upto 4.5 cm long and 5 cm wide; bracts 2-4, the longest upto 5.5 cm long, setaceous; rays when present 1-3. Spikelets 6-20 x 1-2 mm, linear, subacute, strongly compressed, stellately clustered in groups of 4-20, chestnut brown. Glumes 1-1.5 x 0.5-1 mm, oblong, sub-obtuse, mucronate, strongly keeled, mucro recurved, chestnut brown. Stamen 1. Stigmas 3. Nut c. 0.5 x 0.3 mm, oblong, trigonous, apiculate, red-brown.

Fl. & Fr.: Aug. - Nov.

Distr.: From India through Indo-China, Malesia to Northern Australia. In lateritic areas. *CNS 1298* (Angadikkal).

Cyperus cephalotes Vahl, Enum. Pl. 2: 311. 1806; Clarke, J. Linn. Soc. Bot. 21: 25. 1884 & in Hook. f., Fl. Brit.India 6: 597. 1893; Fischer in Gamble, Fl. Pres. Madras 1639. 1931; Kukenth. in Engl., Pflanzenr. IV.20 (101): 292. 1936; Rao & Verma, Cyperac. N.E. India 11. 1982; Koyama, Gard. Bull. Singapore 30: 144. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 212. 1985. *Anosporum cephalotes* (Vahl) Kurz, J. Asiat. Soc. Bengal 45(2): 159. 1876; Lye, Nord. J. Bot. 1: 186. 1981.

Erect, rhizomatous perennial herbs; rhizome short, creeping, producing slender stolons, rooting at nodes; culms solitary or few together, 14-32 cm tall, trigonous. Leaves

2 to many, basal, 5.5-20 x 0.2-0.4 cm, narrowly linear, gradually tapering to acute apex, scabrid on margins towards apex; sheaths upto 6 cm long, lower ones purplish. Inflorescence capitate, 1-1.5 x 1-1.8 cm, ovoid or globose; leafy bracts 3-5, the longest upto 15 cm long. Spikelets congested, 4-7 x 3-4 mm, ovate-acute, compressed, brown with yellowish margins. Glumes 3-4 x 1.5-2 mm, ovate, mucronate, subcoriaceous, brown, 1-2 basal ones empty. Stamens 3; anthers c. 1 mm long, linear. Style 3-4 mm long; stigmas 3. Nut to 1.5 x 1 mm, ovoid, trigonous.

Fl. & Fr.: Aug. - Oct.

Distr.: From India through Indo-China, northeastwards to southern China, and eastwards to Malesia and northern Australia. A common species, usually seen in wet or flooded paddy fields. *CNS 1202* (Chandiroor).

Cyperus compressus L., Sp. Pl. 46. 1753; Thw., Enum. Pl. Zeyl. 342. 1864; Clarke, J. Linn. Soc. Bot. 21: 97. 1884 & in Hook. f., Fl. Brit. India 6:605. 1893; Fischer in Gamble, Fl. Pres. Madras 1640. 1931; Kukenth. in Engl., Pflanzenr. IV.20(101): 156. f. 4A-D. 1935; Hooper in Sald. & Nicols., Fl. Hassan Dist. 663. 1976; Mani. & Sivar., Fl. Calicut 318. 1982; Britto & Matthew in Mathew, Fl. Tam. Carnatic 3:1734. 1983; Koyama, Gard. Bull. Singapore 30:138. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 194. 1985; Ramach. & Nair, Fl. Cannanore 504. 1988; Vajravelu, Fl. Palghat Dist. 543. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 506. 1994; Sivar. & Mathew, Fl. Nilambur 770. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 491. 1996.

Erect, tufted, non-rhizomatous annual herbs; culms 15-40 cm tall, triquetrous. Leaves few, basal, 10-25 x 0.2 - 0.4 cm, linear, acuminate, flat or folded; sheaths upto 6 cm long, pale brown. Inflorescence simple, 5-12 cm long an as wide; leafy bracts 2-5, the longest one upto 22 cm long. Spikelets 7-20 x 2.5-4 mm, oblong to linear, compressed, greenish and turning straw-coloured at full maturity. Glumes 3-4 x 2-2.5 mm, ovate-mucronate, keeled, pale green. Stamens 3. Stigmas 3. Nut upto 1.5 x 1 mm, obovoid, triquetrous, apiculate, dark brown.

Fl. & Fr.: Throughout the year.

Distr.: Cosmopolitan. Weed of cultivated and waste places. *CNS 1385* (Thottappally).

Cyperus difformis L., Cent. Pl. 2:6. 1756; Boeck., Linnaea 35: 586. 1868; Clarke, J. Linn. Soc. Bot. 21: 133. 1884 & 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; Mani & Sivar., Fl. Calicut 318. 1982; Rao & Verma, Cyperac. N.E. India 12. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1736. 1983; Koyama, Gard. Bull. Singapore 30: 143. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 206. 1985; Ramach. & Nair, Fl. Cannanore 504. 1988; Vajravelu, Fl. Palghat Dist. 544. 1990; Sivar. & Mathew, Fl. Nilambur 771. 1996.

Erect, tufted, non-rhizomatous annual herbs; roots reddish, culms 20-48 cm tall, acutery triquetrous with concave sides. Leaves few, basal, 9-30 x 0.3-0.5 cm, linear-acute, flat; sheaths 2-6 cm long, brown. Inflorescence compound, 3-6 cm across, branches ending in congested globose clusters of spikelets; leafy bracts 2-3; the lowest upto 20 cm long. Spikelets 2-5 x c. 1 mm, linear, obtuse. Glumes c. 0.7 x 1 mm, orbicular, apex rounded or emarginate, margins broadly white-hyaline, keel yellowish. Stamens 1-2. Stigmas 3. Nut c. 0.5 mm long, elliptic, trigonous, apiculate, pale brown.

Fl. & Fr.: Throughout the year.

Distr.: Tropical and warm temperate regions of the Old World. Very common species, found as a weed in rice fields and other wet and marshy places. *CNS 1267* (Nedumudi).

Cyperus diffusus Vahl, Enum. Pl. 2:321. 1806; Boeck., Linnaea 35:534. 1868; Clarke in Hook. f., Fl. Brit. India 6:603. 1893; Fischer in Gamble, Fl. Pres. Madras 1639. 1931; Blake, J. Arnold Arb. 28: 215. 1947; Rao & Verma, Cyperac. N.E. India 14. 1982; Koyama, Gard. Bull. Singapore 30: 139. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:197. 1985. subsp. **macrostachyus** (Boeck.) Koyama, Gard. Bull. Singapore 30:139. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:198. 1985; Sivar. & Mathew, Fl. Nilambur 772. 1996. *Cyperus diffusus* Vahl var. *macrostachyus* Boeck., Linnaea 35:534. 1868; Kukenth. in Engl., Pflanzenr. IV. 20(101): 209. 1936; Rao & Verma, Cyperac. N.E. India 14. 1982; Ramach. & Nair, Fl. Cannanore 505. 1988.

Erect, single or tufted, perennials; rhizome short, corm-like, covered with brown scales; culms 45-100 cm tall, trigonous, triquetrous below the inflorescence. Leaves several, basal, 37-95 x 1-2 cm, linear, abruptly acute at apex, flattish margins scabrous, prominently 3-nerved; sheaths upto 10 cm long, purple-brown. Inflorescence compound to decompound, 20-35 cm across, diffuse; primary rays many; leafy bracts 5-9, the longest upto 73 cm long and 2 cm wide. Spikelets sessile, 8-12 x 1.5-2 mm, linear-oblong, flattened, acute, 25-30-flowered. Glumes c. 1.5 x 1 mm, ovate-obtuse, closely imbricating, strongly keeled, keel excurrent into a mucro, margins white-hyaline. Stamens 2-3. Stigmas 3. Nut c. 1.5 x 0.5 mm, ellipsoid, triquetrous, apiculate, dark brown to black.

Fl. & Fr.: Nov. - Feb.

Distr.: From India, Indo-China and eastwards to Malesia. In wet or marshy areas. *CNS 2310* (Mancombu), *Madhu 12067* (CALI) (Aroor).

Cyperus digitatus Roxb., Fl. Ind. ed. 1, 1:209. 1820; Clarke in Hook. f., Fl. Brit. India 6: 618. 1893; Fischer in Gamble, Fl. Pres. madras 1642. 1931; Kukenth. in Engl., Pflanzenr. IV.20 (101): 55. 1935; Blake, J. Arnold Arb. 28:213. 1947; Hooper in Sald. & Nicols., Fl. Hassan Dist. 664. 1976; Rao & Verma, Cyperac. N.E. India 20. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:1736. 1983; Koyama, Gard. Bull. Singapore 30:127. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:170. 1985; Mohanan & Henry, Fl. Thiruvananthapuram 507. 1994. *Cyperus hookeri* Boeck., Linnaea 36: 308. 1870. *Cyperus digitatus* Roxb. var. *hookeri* (Boeck.) Clarke in Hook. f., Fl. Brit. India 6: 618. 1893.

Erect, tufted, shortly, rhizomatous perennials; culms 30-65 cm tall, triquetrous above, trigonous below. Leaves basal, 15-45 x 0.5-1 cm, linear, acute, flat, scabrid on margins; sheaths upto 20 cm long, purple coloured. Inflorescence compound or decompound; leafy bracts 4-8, the longer ones upto 45 cm long; primary rays 4 to 10, unequal. Spikelets 6-10 x 1-1.5 mm, linear, weakly flattened, straw-coloured. Glumes 1.5-2 mm long, narrowly elliptic, keeled on back, pale straw-coloured. Stamens 3.

Stigmas 3. Nut c. 1 x 0.5 mm, oblong-elliptic, trigonous, apiculate, greyish-brown, minutely puncticulate.

Fr. & Fr.: Oct. - Mar.

Distr.: Pantropical. In wet rice fields. *CNS 1367* (Kavalam).

Cyperus distans L., Suppl. 103. 1781; Thw., Enum. Pl. Zeyl. 344. 1864; Clarke, J. Linn. Soc. Bot. 21: 144. 1884 & in Hook. f., Fl. Brit. India 6: 607. 1893; Fischer in Gamble, Fl. Pres. Madras 1640. 1931; Kukenth. in Engl., Pflanzenr. IV.20(101): 137. 1935; Blake, J. Arnold Arb. 28: 214. 1947; Hooper in Sald. & Nicols., Fl. Hassan Dist. 665. 1976; Mani. & Sivar., Fl. Calicut 315. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:1737. 1983; Koyama, Gard. Bull. Singapore 30: 135. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:189. 1985; Ramach. & Nair, Fl. Cannanore 505. 1988; Mani., Fl. Silent Valley 338. 1988; Vajravelu, Fl. Palghat Dist. 544. 1990; Sivar. & Mathew, Fl. Nilambur 773. 1996.

Erect, rhizomatous perennials; rhizome short, knotty; culms solitary or few together, 27-80 cm tall, triquetrous, thickened at base. Leaves few, basal, 8-51 x 0.4-0.7 cm, linear, apex acuminate, scabrid on margins; sheaths 6-15 cm long, purple-brown. Inflorescence compound to decompound; leafy bracts 4-6, the lowest upto 42 cm long; rays 5-12, very unequal. Spike loose, broadly ovate-pyramidal, distantly bearing 8 to 20 spikelets. Spikelets 0.8-2.2 x 0.1 cm, linear, subterete; rachilla flexuous, winged. Glumes distantly disposed on weakly zig-zag rachilla, 1.5 - 2 x 1 mm, ovate-oblong, obtuse, margins white-hyaline. Stamens 3; anthers oblong. Stigmas 3. Nut c. 1.5 x 0.5 mm, oblong, trigonous, apiculate, dark brown, minutely puncticulate.

Fl. & Fr.: Sep. - Dec.

Distr.: Pantropics. Common in waste places and road sides. *CNS 1802* (Kuthiyathodu).

Cyperus exaltatus Retz., Obs. Bot. 5: 11. 1789; Boeck., Linnaea 36:319. 1870; Clarke, J. Linn. Soc. Bot. 21: 186.1884 & in Hook. f., Fl. Brit. India 6. 617. 1893; Fischer in Gamble, Fl. Pres. Madras 1642. 1931; Kukenth. in Engl. Pflanzenr. IV.20(101): 64, f. 9.

A-F. 1935; Hooper in Sald. & Nicols., Fl. Hassan Dist. 665. 1976; Rao & Verma, Cyperac. N.E. India 19. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1737. 1983; Koyama, Gard. Bull. Singapore 30: 129. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 173. 1985; Ramach. & Nair, Fl. Cannanore 506. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 284. 1988; Vajravelu, Fl. Palghat Dist. 545. 1990; Sivar. & Mathew, Fl. Nilambur 773. 1996. *Cyperus venustus* R. Br., Prodr. Fl. Nov. Holl. 217. 1810; Thw., Enum. Pl. Zeyl. 432. 1864. *Cyperus altus* Nees in Wight, Contr. Bot. India 84. 1834. *Cyperus exaltatus* Retz. var. *amoenus* Clarke, J. Linn. Soc. Bot. 21: 187. 1886. ***Wara-pullu*** Rheede, Hort. Malab. 12: 77, t. 42. 1693.

Erect, tufted, shortly rhizomatous perennials; rhizome short, woody; culms robust, 60-130 cm tall, trigonous, smooth. Leaves few, basal, 15-45 x 0.6-1.2 cm, linear, acute, flat, scabrid on margins; sheaths 5-20 cm long, spongy, purple-brown. Inflorescence compound to decompound, 15-30 cm across; leafy bracts 4-6, the longest upto 45 cm long; primary rays 5-9, unequal. Spike 2-5 x 1-1.5 cm, cylindrical, digitately disposed, subsessile or peduncled. Spikelets 6-10 x 1-2 mm, linear, flattened, reddish-brown. Glumes 1.5-2 x 1-1.5 mm, ovate, obtuse, mucronate, keel green, sides brown. Stamens 3. Stigmas 3. Nut c. 1 x 0.5 mm, elliptic, trigonous, yellow-brown.

Fl. & Fr..: Aug. - Jan.

Distr.: Pantropics. Common in wet fields and marshy areas. *CNS 2308* (Thiruvanandoor).

Cyperus haspan L., Sp. Pl. ed. 1, 45. 1753; Thw., Enum. Pl. Zeyl. 343. 1864; Clarke, J. Linn. Soc. Bot. 21: 119. 1884 & in Hook. f., Fl. Brit. India 6: 600. 1893; Fischer in Gamble, Fl. Pres. Madras 1640. 1931; Kukenth. in Engl., Pflanzenr. IV.20(101): 247, f. 28. E-G. 1936; Hooper in Sald. & Nicols., Fl. Hassan Dist. 666. 1976; Mani. & Sivar., Fl. Calicut 315. 1982; Rao & Verma, Cyperac. N.E. India 13. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:1738. 1983; Koyama, Gard. Bull. Singapore 30:142. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:203. 1985; Ramach. & Nair, Fl. Cannanore 507. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 508. 1994; Sivar. & Mathew, Fl. Nilambur 774. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 492. 1996. *Cyperus juncoides*

Lam., Ill. 1:147. 1791. *C. haspan* subsp. *juncoides* (Lam.) Kukenth. in Fedde, Report. 23:184. 1926 & in Engl., Pflanzenr. IV. 20(101): 249. 1936; Hooper in Sald. & Nicols., Fl. Hassan Dist. 666. 1976; Mani. & Sivar. Fl. Calicut 315. 1982. *Cyperus haspan* f. *evoluta* Valck., Sur. Gesl. Cyp. Mal. Arch. 92. 1898. *Cyperus haspan* var. *flaccidissimus* Kukenth. in Engl., Pflanzenr. IV. 20(101): 248. 1936.

Erect, spaced, rhizomatous perennials; rhizome long, creeping; roots red-purple; culms 15-35 cm tall, triquetrous. Leaves few, basal, 2-10 x 0.2-0.5 cm, linear, apex acute, sometimes reduced to lanceolate appendage of sheaths; sheaths upto 5 cm long, reddish brown. Inflorescence compound, many-rayed, 4-9 cm across, ultimate branches ending in digitately arranged clusters of spikelets; leafy bracts 2-3, the longest upto 6 cm long. Spikelets 5-10 x 1-2 mm, linear-lanceolate, compressed. Glumes 1.5-2 x 0.5-1 mm, oblong-ovate, mucronulate, keeled. Stamens 2-3; connective bristly at top. Stigmas 3. Nut c. 0.5 x 0.5 mm, obovoid, trigonous, broadly stipitate, cream-yellow, verruculose.

Fl. & Fr.: Throughout the year.

Distr.: Pantropical. Common in marshy and wet places. *CNS 1209* (Pattanakkad), *CNS 1419* (Kalavoor).

Cyperus iria L., Sp. Pl. ed. 1, 45. 1753; Thw., Enum. Pl. Zeyl. 344. 1864; Clarke, J. Linn. Soc. Bot. 21: 137. 1884 & in Hook. f., Fl. Brit. India 6: 606. 1893; Fischer in Gamble, Fl. Pres. Madras 1640. 1931; Kukenth. in Engl., Pflanzenr. IV.20(101):150. 1935; Blake, J. Arnold. Arb. 28: 214. 1947; Hooper in Sald. & Nicols., Fl. Hassan Dist. 666. 1976; Mani. & Sivar., Fl. Calicut 318. 1982; Rao & Verma, Cyperac. N.E. India 15. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1738. 1983; Koyama, Gard. Bull. Singapore 30: 139. 1977 & in Dassan & Fosb., Rev. Handb. Fl. Ceylon 5:196. 1985; Ramach. & Nair, Fl. Cannanore 507. 1988; Vajravelu, Fl. Palghat Dist. 545. 1990; Sivar. & Mathew, Fl. Nilambur 774. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 492. 1996.

Erect, not tufted, non-rhizomatous annuals; culms 12-50 cm tall, triquetrous. Leaves few, basal, 10-50 x 3-6 mm, linear, flat, gradually acuminate, scabrous on upper margins; sheaths 1-3 cm long, purplish-brown. Inflorescence compound, 8-15 cm across,

diffuse, branches spicate; leafy bracts 3-5, the longest upto 35 cm long. Spikelets 4-5 x 1.5-2 mm, linear-oblong, bearing 6-10 florets, yellowish. Glumes distant, 1-1.5 x 1-15 mm, obovate-orbicular, apex rounded or emarginate, keeled, yellowish, margins white-hyaline. Stamens 2-3. Stigmas 3. Nut 1-1.5 x c. 0.5 mm, obovate, triquetrous, stipitate, brown.

Fl. & Fr.: Spt. - Nov.

Distr.: Widely distributed in Asia from Iran and Afganistan through Indian subcontinent, north-eastwards to China and Japan and eastwards to Malesia and Australia. Common weed in wet and flooded paddy fields. *CNS 2521* (Cheppad).

Cyperus malaccensis Lamk., Ill. 1:146. 1971; Clarke, J. Linn. Soc. Bot. 21: 147. 1884 & in Hook. f., Fl. Brit. India 6:608. 1893; Fischer in Gamble, Fl. Pres. Madras 1641. 1931; Kukenth. in Engl., Pflanzenr. IV.20(101): 86. 1935; Blake, J. Arnold Arb. 28: 214. 1974; Mani. & Sivar., Fl. Calicut 317. 1982; Ramach. & Nair, Fl. Cannanore 508. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 284. 1988. ***Pota-pullu*** Rheede, Hort. Malab. 12: 99, t. 53. 1693. ***Pota***.

Erect, tufted, rhizomatous perennials; rhizome long, creeping, woody, emitting stolons, clothed with ovate, brown scales; culms 80-180 cm tall, triquetrous, 3-winged above, spongy, smooth. Leaves mostly reduced to bladeless purplish sheaths, sometimes the upper sheath with short lamina, 3.5-15 x 0.5-1.3 cm, linear-lanceolate, acuminate; sheaths 8-35 cm long, mouth acute. Inflorescence compound, upto 15 cm across, corymbose, many-rayed; leafy bracts 3, the longest upto 20 cm long and 1 cm wide. Spikelets 1.5-2.5 cm long and 1-1.5 mm wide, linear, subterete. Glumes distichous, 1.5-2 x 1-1.5 mm, ovate-obtuse, muticous, margins yellow, incurved, 1-2 basal ones empty. Stamens 3; anthers c. 1 mm long, linear, connective shortly produced, red. Stigmas 3. Nut upto 2 x 0.5 mm, narrowly oblong, trigonous, brown to black, minutely puncticulate.

Fl. & Fr.: Sep. - Dec.

Distr.: Widely spread in eastern hemispheres, from Mesopotamia through India to S. China, Northern Australia and Polynesia. A gregarious species along the salt-marshes in tidal areas. *CNS 1387* (Aroor).

Cyperus mitis Steud., Syn. Pl. Glumac. 2: 316. 1855; Kukenth. in Engl., Pflanzenr. IV.20(101): 103. 935; Abeywick., Ceylon J. Sci. Biol. Sci. 2(2): 134. 1959; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:184. 1985. *Cyperus stenostachys* Benth. var. *indica* Clarke in Hook. f., Fl. Brit. India 6: 614. 1893. *Cyperus subcapitatus* Clarke in Hook. f., Fl. Brit. India 6:616. 1893. *Cyperus scarious* sensu Koyama, Gard. Bull. Singapore 30:133. 1977, non R. Br. 1810.

Erect, non-tufted, rhizomatous perennials; rhizome long, covered with brown scales, stolons slender, tubers globose; culms 20-30 cm tall, trigonous. Leaves few, shorter than to equalling the culm, 1-3 mm wide, linear, flat, apex acuminate; sheaths 2-6 cm long, brown. Inflorescence simple or subcompound, 2-5 x 2-3 cm; leafy bracts 2-4, the lowest one erect, much exceeding the inflorescence. Spikelets 5-9 x 1.5-2 mm, linear, acute, compressed, reddish-brown; rachilla winged. Glumes 2-3 x 1.5-2 mm, ovate, obtuse, reddish-brown, margins hyaline. Stamens 3; anthers 1-2 mm long. Stigmas 3. Nut 1-1.5 x c. 0.5 mm, oblong, trigonous, apiculate, brown.

Fl. & Fr.: Oct. - Dec.

Distr.: Madagascar, India to Indo-China, Malesia and Australia. In rice fields. *Madhu 12071* (Aroor) (CALI), *CNS 1805* (Thrikunnapuzha).

Cyperus nutans Vahl, Enum. Pl. 2: 363. 1806; Boeck., Linnaea 35: 597. 1868; Clarke, J. Linn. Soc. Bot. 21:143. 1884 & in Hook. f., Fl. Brit. India 6:607. 1893; Fischer in Gamble, Fl. Pres. Madras 1640. 1931; Kukenth. in Engl., Pflanzenr. IV.20(101): 144, f. 5. A-D. 1935; Kern, Reinwardtia 3: 31. 1954; Hooper in Sald. & Nicols., Fl. Hassan Dist. 667. 1976; Rao & Verma, Cyperac. N.E. India 16. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1739. 1983; Koyama, Quart. J. Taiwan Mus. 14: 168. 1961 & in Gard. Bull. Singapore 30: 136. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:190. 1985;

Vajravelu, Fl. Palghat Dist. 546. 1990; Sivar. & Mathew, Fl. Nilambur 775. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 492. 1996.

Erect, single, rhizomatous perennials; rhizome short, corm-like; culms 60-100 cm tall, trigonous, triquetrous below the inflorescence. Leaves few, basal, 16-30 x 0.8-1.5 cm, linear, acute, scabrous on upper margins, subcoriaceous; sheaths 10-20 cm long, reddish-brown. Inflorescence compound, 10-40 x 10-20 cm, lax, ultimate branches spicate; leafy bracts 4-6, very unequal, the longest upto 30 cm long; spike loose, penicillate. Spikelets 6-12 x 1-1.5 mm, linear, subterete, light brown; rachilla winged, wings hyaline. Glumes 2-2.5 x c. 1 mm, oblong-obtuse, keeled, mucronate, yellow-brown, margins white-hyaline. Stamens 3. Stigmas 3. Nut 1-1.5 x 0.5 mm, oblong to ovate-oblong, triquetrous, apiculate, brown.

Fl. & Fr.: Feb. - Apr.

Distr.: India, Southern China and Malesia. In wet and floded paddy fields. *CNS 1742* (Thottappally).

Cyperus platystylis R. Br., Prodr. Fl. Nov. Holl. 214. 1810; Clarke in Hook. f., Fl. Brit. India 6: 598. 1893; Fischer in Gamble, Fl. Pres. Madras 1639. 1931; Kukenth. in Engl., Pflanzenr. IV.20(101): 150. 1935; Blake, J. Arnold Arb. 28:214. 1947; Rao & Verma, Cyperac. N.E. India 12. 1982; Koyama, Gard. Bull. Singapore 30:140. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 198. 1985. *Cyperus pallidus* Nees (Linnaea 9: 284 1835, *nom. nud.*) in Wight, Contr. Bot. India 79. 1834; Thw., Enum. Pl. Zeyl. 34. 1864. *Anosporum pallidum* (Nees) Boeck., Linnaea 36: 412. 1870.

Erect, non-tufted, shortly rhizomatous perennials; culm solitary, rarely 2, 35-80 cm tall, triquetrous Leaves few, basal, 32-70 x 0.5-1 cm, linear, gradually acuminate, scabrid on margins and midrib, subcoriaceous; sheaths 7-12 cm long, compressed, basal ones bladeless, purple. Inflorescence compound to decompound, 7-12 cm wide, 4-7 cm high, corymbiform; leafy bracts 4-8; the longest 30-55 cm long, upto 8 mm wide; primary rays 10-14. Spikelets digitate in groups of 3-7 at apices of raylets, each 6-15 x 3-4 mm, linear-lanceolate, acute, compressed, golden-brown. Glumes 2-2.5 x 1.5-2 mm, ovate-obtuse,

mucronulate, keel green, golden-brown. Stamens 3; anthers c. 0.5 mm long, linear, connective produced into a bristly appendage. Style flattened, ciliate; stigmas 3. Nut 1.5-2 x 0.5-1 mm, oblong-ovate, trigonous, brownish, angles corky thickened, yellowish.

Fl. & Fr.: Sep. - Dec.

Distr.: From India and Sri Lanka and through Malesia, northern and eastern Australia. Usually seen in marshy areas, swamps and in the margins of ponds in large communities. *CNS 1266* (Nedumudi).

Cyperus procerus Rottb., Descr. Icon. Rar. Nov. Pl. 29, t. 5, f. 3. 1773; Thw., Enum. Pl. Zeyl. 343. 1864; Clarke, J. Linn. Soc. Bot. 21:152. 1884 & in Hook. f., Fl. Brit. India 6:610. 1893; Fischer in Gamble, Fl. Pres. Madras 1641. 1931; Kukenth. in Engl., Pflanzenr. IV.20(101): 91. 1935; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:1741. 1983; Koyama, Gard. Bull. Singapore 30: 136. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:192. 1985; Sivar. & Mathew, Fl. Nilambur 777. 1996.

Erect, non-tufted, shortly rhizomatous perennials; rhizome stoloniferous, the stolons slender, long, distantly covered with scales; culms solitary or few together, 55-120 cm tall, triquetrous. Leaves few, basal, 30-75 x 0.7-1.2 cm, linear, gardually acuminate, canaliculate, spongy or subcoriaceous, scabrid-margined distally; sheaths upto 30 cm long, purplish. Inflorescence compound, 11-15 x 9-15 cm; leafy bracts 3-4, the longest upto 55 cm long; primary rays 3-7, very unequal. Spikelets 0.8-3 x 0.2 - 0.35 cm, oblong to linear-lanceolate, compressed, pale coloured, tinged with red-brown. Glumes 2-3 x 1.5-2 mm, ovate-obtuse, pale brownish and stained with reddish-brown. Stamens 3. Stigmas 3. Nut 1-1.5 x 0.5 mm, obovoid, triquetrous, apiculate, brown.

Fl. & Fr.: Feb. - Apr.

Distr.: India, Sri Lanka, Indo-China, Malesia and Australia. Usually seen in marshy areas and rice fields. *CNS 2307* (Nooranad).

Cyperus pygmaeus Rottb., Descr. Rar. Nov. Pl. 20, t. 14, f. 4-5. 1773; Nees in Wight, Contr. Bot. India 72. 1834; Clarke, J. Linn. Soc. Bot. 21: 28, 81, t. 2, f. 10. 1884; Blake, J.

Arnold Arb. 28: 219. 1947; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1742. 1983; Koyama, Gard. Bull. Singapore 30:146. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 214. 1985; Vajravelu, Fl. Palghat Dist. 547. 1990. *Juncellus pygmaeus* (Rottb.) Clarke in Hook. f., Fl. Brit. India 6: 596. 1893; Fischer in Gamble, Fl. Pres. Madras 1629. 1931. *Cyperus michelianus* (L.) Delile subsp. *pygmaeus* (Rottb.) Aschers. & Graebn., Synops. Mitteleur. Fl. 2(2): 273. 1903; Hooper in Sald. & Nicols., Fl. Hassan Dist. 667. 1976.

Erect, tufted, non-rhizomatous annual herbs; culms 7-21 cm tall, trigonous. Leaves 1 to 3 for a culm, basal, 4-11 x 0.2 - 0.4 cm, linear, flat or canaliculate, scabrid on upper margins, apex acuminate; sheaths upto 3.5 cm long, light reddish-brown. Inflorescence congested in a lobed head, 0.8-1.5 cm long and as wide; leafy bracts 3-8, spreading, much exceeding the inflorescence, the longest upto 12 cm long and 4 mm wide. Spikelets 3-5 x 1.5-2 mm, broadly ovate, strongly flattened. Glumes distichous, 1.5-2 x 0.5 mm, lanceolate, keeled mucronate, 3-5-nerved, pale green. Stamens 1-2. Style c. 1 mm long; stigmas 2 or 3. Nut c. 1 mm long, oblong, planoconvex to flattened-trigonous, pale brown.

Fl. & Fr.: Feb. - May.

Distr.: Widely spread in Eurasia, from Mediterranean region and East Africa through Asia Minor and India to Southeasern Asia Malesia and Australia. Common in wet lowlands and as a weed in paddy fields. Sometimes the culms are very much reduced and these plants spread in rice fields as tufted cushions. *CNS 2515* (Kavalam).

Cyperus rotundus L., Sp. Pl. 45. 1753; Thw., Enum. Pl. Zeyl. 343. 1864; Boeck., Linnaea 36: 283. 1870; Clarke, J. Linn. Soc. Bot. 21: 167. 1884 & in Hook. f., Fl. Brit. India 6: 614. 1893; Fischer in Gamble, Fl. Pres. Madras 1641. 1931; Kukenth. in Engl., Pflanzenr. IV.20(101): 107, f. 13. 1935; Hooper in Sald. & Nicols., Fl. Hassan Dist. 669. 1976; Mani. & Sivar., Fl. Calicut 315. 1982; Rao & Verma, Cyperac. N.E. India 19. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:1742. 1983; Koyama, Gard. Bull. Singapore 30: 132. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 181. 1985; Ramach. & Nair,

Fl. Cannanore 511. 1988; Vajravelu, Fl. Palghat Dist. 548. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 510. 1994. ***Muthanga.***

Erect, non-tufted, rhizomatous perennials; rhizome stoloniferous, stolons terminated by an ellipsoidal or globose-ovoid tuber; culms bearing a corm-like enlargement at base, 12-45 cm tall, triquetrous. Leaves few, basal, 3-28 x 0.2-0.5 cm, linear, gradually acuminate; sheaths 1-7 cm long, light brownish. Inflorescence simple or compound, 2-11 cm across, primary rays 1-8; leafy bracts 2-4, usually shorter, but in some the lowest one exceeding the inflorescence. Spikelets 1-2.3 x 0.15 - 0.3 cm, linear, acute at apex, compressed, brown. Glumes 3-3.5 x 1.5-2 mm, ovate-elliptic, keeled, ferrugineous brown with pale narrow hyaline margins. Stamens 3. Stigmas long, 3. Nut 1-1.5 x 0.5 mm, obovate-oblong, trigonous, apiculate, brown.

Fl. & Fr.: Oct.-Jan.

Distr.: A cosmopolitan weed seen in tropical, subtropical and temperate regions of all the world. Common weed in waste lands. *CNS 1060* (Ambalapuzha), *CNS 1805* (Alappuzha beach).

Cyperus sphacelatus Rottb., Descr. Pl. Rar. Progr. 21. 1772 & in Descr. Ic. Rar. Nov. Pl. 26. 1773; Kern, Reinwardtia 2: 107, f. 5. 1952; Koyama, Gard. Bull. Singapore 30:135. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 186. 1985.

Erect annual herbs with brownish roots; culms tufted or solitary, 23-60 cm tall, triquetrous. Leaves few, 5-18 x 0.2 - 0.4 cm, linear, gradually accuminate, scabrid on upper margins; sheaths 2-7 cm long, pale straw-coloured. Inflorescence simple to compound, 6-17 cm across; primary rays 3-8, unequal, upto 10 cm long; leafy bracts 3-5, the longest upto 20 cm long. Spikelets 8-20 x 1.5-2 mm, linear-lanceolate, acute, flattened, straw-coloured with purple-brown flanks. Glumes 2-2.5 x 1.5-2 mm, elliptic to ovate, subacute, mucronate, straw-coloured with purple-brown stain on both sides of keel, keel greenish. Stamens 3. Style c. 1.5 mm long. Nut 1-1.5 x 0.5-1 mm, obovate, triquetrous with concave sides, brown.

Fl. & Fr.: Nov. - Feb.

Distr.: Tropical America and Tropical Africa; introduced to Sri Lanka, Malesia, Queensland and Tahiti. Common in waste lands. *CNS 1803* (Thrikunnapuzha).

Cyperus stoloniferus Retz., Obs. Bot. 4: 10. 1786; Clarke, J. Linn. Soc. Bot. 21: 172.1884 & in Hook. f., Fl. Brit. India 6: 615 1893; Fischer in Gamble, Fl. Pres. Madras 1641. 1931; Blake, Univ. Queensland Dept. Biol. Pap. 2, 2: 9, t. 7. 1943 & J. Arnold Arb. 28: 213. 1947; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1743. 1983; Koyama, Gard. Bull. Singapore 30: 132. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 180. 1985; Ramach. & Nair., Fl. Cannanore 512. 1988.

Erect, rhizomatous perennials; rhizome producing long, woody stolons, forming tubers at intervals; culms 15-35 cm tall, triquetrous. Leaves few, basal, shorter than the culm, 2-3 mm wide, glaucous; sheaths 2-4 cm long, pale. Inflorescenc subcompound, 2-4 cm across; rays short, spicate; bracts 3, the lowest suberect and much longer than the inflorescence. Spikelets 6-15 x 1.5-2 mm, linear-oblong, obtuse, subterete; rachilla broadly winged. Glumes 2-3 x 1.5-2 mm, ovate-obtuse, 1-2 basal empty, smaller. Stamens 3; anthers linear. Stigmas 3. Nut 1-1.5 mm long, ovoid, 3-angled, brown, apiculate.

Fl. & Fr.: May - Dec.

Distr.: Madagascar, Mauritius, India, Indo-China, Malesia and Australia. In sandy wet places. *CNS 2527* (Krishnapuram).

Cyperus tenuiculmis Boeck., Linnaea 36: 286. 1870; Kern, Reinwardtia 3:30. 1954; Hooper in Sald. & Nicols., Fl. Hassan Dist. 669. 1976; Mani. & Sivar., Fl. Calicut 316. 1982; Rao & Verma, Cyperac. N.E. India 18. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:1744. 1983; Koyama, Gard. Bull. Singapore 30: 135. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 187. 1985; Vajravelu, Fl. Palghat Dist. 548. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 511. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 493. 1996. *Cyperus zollingeri* sensu Clarke in Hook. f., Fl. Brit. India 6:613. 1893, non

Steudel, 1854; Fischer in Gamble, Fl. Pres. Madras 1138. 1935; Kukenth. in Engl., Pflanzenr. IV.20(101): 133. 1935; Blake, J. Arnold Arb. 28: 214. 1947; Kern, Reinwardtia 2:107. 1952.

Erect, rhizomatous perennials; rhizome corm-like or knotty and short-decumbent, often emitting short stolons; culms 30-70 cm tall, triquetrous. Leaves few, basal, 8-30 x 0.3-0.6 cm, linear, acuminate; sheaths light brown, basal ones bladeless. Inflorescence simple or compound, upto 18 cm long; rays 2-7; leafy bracts 2-5, the lowest upto 15 cm long; spikes upto 4 cm long, bearing 3-10 spikelets. Spikelets 1-2.3 x 0.15-0.2 cm, linear to linear-lanceolate, subquadrangular, straw-coloured. Glumes 3-4 x 2-2.5 mm, ovate-elliptic, acute, pale yellow to straw-coloured, margins hyaline. Stamens 3; connective shortly produced. Stigmas 3. Nut 1.5-2 x 1 mm, elliptic or obovate, triquetrous with concave sides, brown to black, minutely puncticulate.

Fl. & Fr.: Sep. - Nov.

Distr.: Throughout the tropics of the Old World. This was collected only once from the swampy areas in Chathiyara. *CNS 1779* (Chathiyara).

Cyperus tenuispica Steud., Synops. Pl. Glumac. 2:11. 1855; Fischer in Gamble, Fl. Pres. Madras 1640. 1931; Kukenth. in Engl., Pflanzenr. IV.20(101): 245, f. 28.A-D. 1936; Kern, Reinwardtia 2:116. 1952; Hooper in Sald. & Nicols., Fl. Hassan Dist. 670. 1976; Mani. & Sivar., Fl. Calicut 318. 1982; Rao & Verma, Cyperac. N.E. India 13. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1744. 1983; Koyama, Gard. Bull. Singapore 30: 143. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 205. 1985; Ramch. & Nair, Fl. Cannanore 512. 1988; Vajravelu, Fl. Palghat Dist. 548. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 511. 1994; Sivar. & Mathew, Fl. Nilambur 778. 1996.

Erect, tufted, non-rhizomatous annual herbs; roots reddish-purple; culms 12-32 cm tall, triquetrous. Leaves few, basal, 5-20 x 0.2-0.3 cm, linear, flat, gradually acuminate, scabrid on upper margins; sheaths upto 5 cm long, reddish-brown. Inflorescence compound to decompound 5-12 cm long and as wide; leafy bracts 1-3, the longest upto 12 cm long; primary rays 5-12. Spikelets digitate in clusters of 3-9, 3-7 x 1-1.5 mm, linear-

oblong, flattened. Glumes 0.5-1 x 0.5 mm, ovate-oblong, obtuse, mucronate, straw-coloured. Stamens 1 or 2. Stigmas 3. Nut upto 0.5 mm long, obovate, trigonous, white, minutely tuberculate.

Fl. & Fr.: Throughout the year.

Distr.: Widely distributed in the warmer regions of the world. Common in marshy fields and margins of ponds. *CNS 2520* (Kanjikuzhi).

DIPLACRUM R. Brown

Prodr. 240. 1810.

Diplacrum caricinum R. Br., Prodr. 241. 1810; Fischer in Gamble, Fl. Pres. Madras 1678. 1931; Kern, Blumea 11: 210, f. 8e. 1961; Hooper in Sald. & Nicols., Fl. Hassan Dist. 670. 1976; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 367. 1985; Ramach. & Nair, Fl. Cannanore 513. 1988. *Diplacerum zeylanicum* Nees in Wight, Contr. Bot. India 119. 1834. *Scleria caricina* (R. Br.) Benth., Fl. Austral. 7: 426. 1878; Clarke in Hook. f., Fl. Brit. India. 6: 688. 1893; Mani. & Sivar., Fl. Calicut 328. 1982; Rao & Verma, Cyperac. N.E. India 58. 1982.

Slender, procumbent, annual herbs, 5-15 cm tall; stems 3-angled, glabrous. Leaves 2-4 x 0.2-0.4 cm, linear, acute at apex, scabrid on upper margins, 3-nerved; sheaths upto 1 cm long; contraligule absent. Inflorescence of several, small globular axillary clusters, 4-6 mm wide; peduncles short, scarcely exserted from the sheath of the subtending leaf-like bract; terminal spikelet of each cluster female; staminate spikelet borne at the lowest axil of the glume. Spikelets with 3 or 4 glumes, lower glumes nearly setaceous; staminate glumes lanceolate; 1-nerved; pistillate glumes ovate-lanceolate, several-nerved, strongly folded, c. 2.5 mm long, greenish, 3-lobed. Stamen 1. Style slender; stigmas 3. Nut c. 1 mm across, globular, irregularly ribbed with 3 or more prominent longitudinal ribs, white.

Fl. & Fr.: Oct. - Nov.

Distr.: Tropical Asia from India through Indo-China and Southern China, north eastwards to northern Australia. Rare; once collected in wet grassy ground of AIR campus, Alappuzha. *CNS 2511* (AIR Campus, Kalavoor).

ELEOCHARIS R. Brown

Prodr. 224. 1810.

Annuals or perennials with rhizomes or slender stolons; culms tufted, erect, terete, angled or triquetrous, rarely septate. Leaves reduced to bladeless sheaths. Inflorescence a single, terminal, ebracteate spikelet. Spikelets terete, globose or ovoid, few to many flowered. Glumes spirally imbricate, sometimes subdistichous, basal 1 or 2 and uppermost empty. Flowers bisexual. Stamens 1-3; connectives appendaged. Style 2- or 3-fid, base dilated, persistent. Hypogynous bristles 4-10, equal or unequal, retrorsely scabrid. Nut obovoid, triquetrous or biconvex.

1a. Spikelets cylindrical, as wide as or slightly narrower than the thick culms; rhizomatous perennials.
  2a. Culms triquetrous, solid, not septate ..... **E. spiralis**
  2b. Culms terete, hollow, transversely septate.
    3a. Rhizome stoloniferous, bearing subglobose tubers; culms soft, strongly flattened when dry; glumes truncate at apex ..... **E. dulcis**
    3b. Rhizome not stoloniferous and without tubers; culms sub-rigid, not flattened when dry; glumes subacute at apex ..... **E. lankana**

1b. Spikelets ovoidal to ellipsoidal, much wider than slender culms; non rhizomatous annuals.
  4a. Floral glumes spirally imbricated; style 2-fid; nut biconvex.
    5a. Spikelets 3-4 mm wide; glumes scarcely keeled; stamens 3; hypogynous bristles 6-8, exceeding nut, ferrugineous to brown in colour ..... **E. geniculata**
    5b. Spikelets 1.5-2 mm wide; glumes distinctly keeled; stamens 1-2; hypogynous bristles 3-4, equal to nut, white ..... **E. atropurpurea**
  4b. Floral glumes distichous; style 3-fid; nut trignous ..... **E. retroflexa**

Eleocharis atropurpurea (Retz.) Presl, Rel. Haenk. 1: 196. 1828; Kunth, Enum. 2:151. 1837; Boeck., Linnaea 36: 458. 1870; Clarke in Hook. f., Fl. Brit. India 6: 627. 1893 & in Ill. Cyperac. t. 36, f. 6-9. 1909; Svens., Rhodora 31:227. 1929; Fischer in Gamble, Fl. Pres. Madras 1648. 1931; Koyama, J. Fac. Sci. Univ. Tokyo Bot. 8: 94. 1961; Hooper in Sald. & Nicols., Fl. Hassan Dist. 671. 1976; Rao & Verma, Cyperac. N.E. India 25. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:1946. 1983. *Scirpus atropurpureus* Retz., Obs. Bot. 5: 14. 1788; Roxb., Fl. Ind. 1: 221. 1820.

Erect, tufted, non-rhizomatous annual herbs; culms 3.5-12 cm tall, terete, filiform. Leaves reduced to bladeless sheaths; sheaths 0.5-1.5 cm long, membranous, purple coloured, mouth oblique. Inflorescence with a single, terminal spikelet. Spikelets 3-5 x 2-3 mm, oblong-ovoid, obtuse, densely many-flowered, wider than culm. Glumes spiral, 1-2 x 0.5 mm, ovate, obtuse, keeled, purplish. Stamens 1-2. Style short; stigmas 2. Hypogynous bristles 4, white, shorter to or as long as the nut, minutely retrorsely scabrous. Nut to 1 mm long, obovoid, biconvex, smooth, shining black.

Fl.& Fr.: Oct. - Dec.

Distr.: Cosmopolitan. In fallow marshy fields. *CNS 1397* (Kayamkulam).

Eleocharis dulcis (Burm. f.) Trin. ex Hensch., Vita Rumph. 186. 1833; Svens., Rhodora 31: 158. 1929; Blake, Proc. Soc. Queensl. 50:103. 1939 & J. Arnold Arb. 28: 277. 1947; Koyama, J. Fac. Sci. Univ. Tokyo Bot. 8: 97. 1961 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 259. 1985; Hooper in Sald. & Nicols., Fl.Hassan Dist.672. 1976; Mani. & Sivar., Fl. Calicut 319. 1982; Rao & Verma, Cyperac. N.E. India 23. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:1747. 1983. *Andropogon dulce* Burm. f., Fl. Ind. 219. 1768. *Scirpus plantaginoides* Rottb., Descr. Icon. 45. 1773. *Scirpus plantagineus* Retz., Obs. Bot. 5:14. 1799; Thw., Enum. Pl. Zeyl. 434. 1864. *Eleocharis plantaginea* (Retz.) Roem. & Schult., Syst. Veg. 2:150. 1817; Clarke in Hook. f., Fl. Bit. India 6: 625. 1893 & in Ill. Cyperac. t. 33, f. 1-5. 1909; Fischer in Gamble, Fl. Pres. Madras 1647. 1931.

Erect, tufted, rhizomatous perennials, 40-100 cm tall; rhizome short with long stolons, bearing brown to black, subglobose tubers; culms terete, transversely septate, shining green. Leaves reduced to bladeless sheaths; sheaths membranous, 5-10 cm long, purplish, mouth oblique. Inflorescence with a single spitelet. Spikelet as wide as the stem, 2-3 x 0.3-0.5 cm, cylindrical, terete, subobtuse, densely many-flowered; rachilla straight, wingless. Glumes spiral, 5-6 x 2-3 mm, obovate, obtuse, midrib prominent, narrow scarious margin at apex. Hypogynous bristles 6-8, much exceeding the style base, retrorsely scabrous brown. Stamens 3; anthers 2-3 mm, linear, apiculate. Style long; stigma 2-3. Nut 2-3 x 1-1.5 mm, obovate, biconvex.

Fl. & Fr.: Oct. - Dec.

Dist.: Widely distributed in the Old World tropics. A common species usually found in marshy areas, near margins of rice fields. *CNS 2507* (Thottappally).

Eleocharis geniculata (L.) Roem. & Schult., Syst. Veg. 2:150. 1817; Svens., Rhodora 41: 50. 1939; Koyama, J. Fac. Sci. Univ. Tokyo Bot. 8: 93. 1961 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 264. 1985; Hooper in Sald. & Nicols., Fl. Hassan Dist. 672. 1976; Mani.& Sivar., Fl. Calicut 319. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1748. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 512. 1994. *Scirpus geniculatus* L., Sp. Pl. ed. 1, 48. 1753. *Eleocharis capitata* R. Br., Prodr. Fl. Nov. Holl. 1:225. 1810; Thw., Enum. Pl. Zeyl. 351. 1846; Clarke in Hook. f., Fl. Brit. India 6:627. 1893; Fischer in Gamble, Fl. Pres. Madras 1648. 1931.

Erect, tufted, non-rhizomatous annual herbs; culms 10-21 cm tall, pale green, smooth. Leaves reduced to bladeless sheaths; sheaths 1-3 cm long, membranous, often tinged with red-brown on lower part, mouth acute. Inflorescence with a single terminal spikelet. Spikelets 3-6 x 3-4 mm, ovoid-globose, base rounded, apex obtuse, densely many-flowered, markedly wider than the stem. Glumes spiral, 1.5-2 x 1-1.5 mm, ovate-obtuse, membranous, pale brownish with green midvein. Stamens 3 or 2; anthers shortly apiculate. Style c. 1.5 mm long, style base depressed-conical; stigmas 2. Hypogynous

bristles 6, ferrugineous, slightly longer than the nut, sparingly retrorsely spinulose. Nut c. 2 x 0.5 mm, obovate, biconvex, smooth, shining black.

Fl.& Fr.: Aug. - Dec.

Distr.: Pantropics. A very common species usually on wet fields, marshy areas, includingrice fields. *CNS 1250* (Thottappally).

Eleocharis lankana Koyama, Bull. Natl. Sci. Mus. 17: 67, f. 1. 1974 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 260. 1985.

Erect, tufted perennial herbs; rhizome decumbent, 1.5-3.5 cm long; roots reddish-brown, thick; culms 25-47 cm long, terete, deep green, transversely septate. Leaves reduced to bladeless sheaths; sheaths 7-12 cm long, membranous, yellowish-green, reddish-brown towards the base, mouth obliquely truncate. Inflorescence with a single terminal spikelet. Spikelets 1.4 - 3.3 x 0.3 - 0.4 cm, cylindrical, apex subacute, many-flowered. Glumes spiral, 4.5-6 x 2-3 mm, ovate to elliptic, apex subacute. Stamens 3. Style 5-6 mm long; stigmas 2 or 3. Hypogynous bristles 6-8, shorter than or equalling the nut. Nut c. 2 x 1.5 mm, obovate, biconvex.

Fl. & Fr.: Jan. - May.

Dist.: Endemic to Sri Lanka. In fallow marshy fields. *CNS 1513* (Vallikavu at Chengannur).

Eleocharis retroflexa (Poir.) Urban., Symb. Antil. 2:165. 1900; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1748. 1983, ssp. **chaetaria** (Roem. & Schult.) Koyama, Bull. Natl. Sci. Mus. 17: 68, f. 2. 1974 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 265. 1985; Hooper in Sald. & Nicols., Fl. Hassan Dist. 673. 1976; Mani. & Sivar., Fl. Calicut 320. 1982; Ramach. & Nair, Fl. Cannanore 514. 1988; Sivar. & Mathew, Fl. Nilambur 779. 1996. *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; Svens., Rhodora 39: 250, t. 461, f. 10. 1937. *Scirpus retroflexus* Poir. in Lam.

Encycl. Meth. Bot. 6: 753. 1804. *Scirpus chaetaria* (Roem. & Schult.) Thw., Enum. Pl. Zeyl. 435. 1864.

Erect, tufted, non-rhizomatous annual herbs with pale brown fibrous roots; culms 5-14 cm long, filiform, mostly curved, 4-5-ribbed. Leaves reduced to bladeless sheaths; sheaths 1-2 cm long, membranous, reddish-brown, mouth acute, white-scarious. Inflorescence with a single terminal spikelet. Spikelets 3-4 x 1.5-2.5 mm, broadly ovate-obtuse, compressed. Glumes distichous, 2.5-3 x 1.5-2 mm, ovate-elliptic, keeled, subacute, sides purplish, margins hyaline. Stamens 2 or 3. Style c. 1 mm long, style-base conical; stigmas 3. Hypogynous bristles 6, as long as or slightly exceeding the style base, scabrous. Nut c. 1 mm long, broadly obovate, trigonous with ribbed edges, trabeculate, slightly yellow.

Fl. & Fr.: Oct. - Jan.

Distr.: Old World tropics. A very common species found in marshy areas, near river sides and margins of rice fields. *CNS 1375* (Kadakarappally), *CNS 2514* (Thamarakulam).

Eleocharis spiralis (Rottb.) Roem. & Schult., Syst. Veg. 2: 155. 1817; Clarke in Hook. f., Fl. Brit. India 6:621. 1893 & in Ill. Cyperac. t. 35, f. 5-7. 1909; Fischer in Gamble, Fl. Pres. Madras 1647. 1931; Blake, J. Arnold Arb. 28: 277. 1947; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1749. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:257. 1985; Ramach. & Nair, Fl. Cannanore 514. 1988. *Scirpus spiralis* Rottb. Descr. Icon. Rar. Nov. Pl. 45, t. 15, f. 1. 1773. *Limnochloa spiralis* (Rottb.) Nees in Wight, Contr. Bot. India 114. 1834.

Erect, tufted, rhizomatous perennials, 40-70 cm tall; rhizome short, stolons creeping; culms acutely triquetrous, not septate. Leaves reduced to bladeless sheaths; sheaths membranous, 2-4 mm long, pale brown, mouth with a setaceous appendage. Inflorescence with a single spikelet. Spikelet 1.5 - 3 x 0.3-0.5 cm, cylindrical, obtuse. Glumes spiral, 2-3 x 2-3 mm, cuneate, apex truncate, light brown, margins hyaline. Hypogynous bristles 4, shorter than the nut, pale brown. Stamens 3; anthers 1-2 mm long, linear. Style long; stigmas 3. Nut 1.5-2 x 1.2 mm, obovate, biconvex, brown.

Fl. & Fr.: Aug. - Sep.

Distr.: Pantropics. A very common species in wet places, marshy areas. *CNS 2133* (Pallithode).

FIMBRISTYLIS M. Vahl

Enum. Pl. 2: 285. 1805-1806 (*nom. cons.*).

Annuals or rhizomatous perennials; culms usually tufted, trigonous or laterally compressed. Leaves basal, narrow, sometimes reduced to sheaths; ligule membranous or hairy, sometimes absent. Inflorescence usually terminal, simple or compound, sometimes capitate, sometimes reduced to a single terminal spikelet; bracts leafy, setaceous, or scale-like Spikelets mostly ovoidal or ellipsoidal, terete or more or less laterally compressed. Glumes many, spirally imbricated, or all or some becoming distichous on a continuous axis, all alike and bearing a bisexual flower, basal one to few empty. Stamens 2 or 3. Style articulate with ovary, base dilated; stigmas 2 or 3. Nut trigonous or biconvex, smooth or tubercled.

1a. Spikelets 1 or 2, rarely 3.
  2a. Leaves reduced to bladeless sheaths.
    3a. Nut obovate, biconvex, transversely wrinkled with 5-8 ridges; spikelets 2-3 mm wide, acute at apex ..... **F. acuminata**
    3b. Nut oblong-cylindrical, trabeculate; spikelets 4-5 mm wide, obtuse at apex ..... **F. tetragona**
  2b. Leaves with well developed blades .
    4a. Style 3-fid; nut trigonous ..... **F. ovata**
    4b. Style 2-fid; nut biconvex.
      5a. Inflorescences with 1 to 3 spikelets; glumes broadly ovate-suborbicular; leaf blades well elongated ..... **F. schoenoides**
      5b. Inflorescences consistently with a single spikelet; glumes lanceolate; leaf blades remaining as a setaceous appendage of sheath ..... **F. polytrichoides**

1b. Spikelets a few to many, anthelate.

6a. Glumes, atleast the lower ones, distichously disposed; stigmas 3.

7a. Leaf blades filiform, semiterete, canaliculate, less than 1 mm wide; glumes reddish gland-dotted, pubescent ..... **F. cinnamometorum**

7b. Leaf blades linear, flattish, 1-4 mm wide; glumes not gland-dotted, glabrous.

8a. Perennials with short rhizome; culms 40-70 cm tall; glumes 3-4 mm long; lower glumes distichous with in a spikelet, upper glumes somewhat spirally imbricated; nut verruculose, straw-coloured ..... **F. eragrostis**

8b. Annuals without rhizome; culms 7-16 cm tall; glumes 2-2.5 mm long; all the glumes distichous within a spikelet; nut white tubercled, whitish-yellow ..... **F. narayanii**

6b. Glumes spirally imbricated; stigmas 3 or 2.

9a. Stigmas 2; nuts biconvex or oblong-cylindrical.

10a. Spikelets squarrose; nuts oblong-cylindrical, with clavate outgrowths ..... **F. dipsacea**

10b. Spikelets not squarrose; nuts biconvex, without clavate outgrowths.

11a. Inflorescence head-like, all spikelets sessile ..... **F. argentea**

11b. Inflorescence corymbose, all spikelets stalked.

12a. Margins of glumes broadly white or hyaline; styles hardly flattened, glabrous, not fimbriate .... **F. cymosa** ssp. **spathacea**

12b. Margins of glumes not white or hyaline; styles dorsiventrally flattened, fimbriate or long-ciliate atleast on upper part.

13a. Glumes pubescent.

14a. Annual without rhizome; spikelets rusty-brown; leaf-blades more than 10 cm long;

lowest bract longer than the corymb .... **F. pubisquama**

14b. Perennials with decumbent rhizome; spikelets greyish-brown; leaf-blades less than 5 cm long; lowest bract shorter than the corymb ..... **F. ferruginea**

13b. Glumes glabrous.

15a. Culms 5-17 cm tall; leaves acuminate at apex; spikelets 1-1.5 mm wide; nuts nearly smooth .... **F. aestivalis**

15b. Culms 15-64 cm tall; leaves obtuse at apex; spikelets 2-4 mm wide; nuts strongly trabeculate ..... **F. dichotoma**

9b. Stigmas 3; nuts triquetrous or trigonous.

16a. Leaves laterally flattened, acuminate; spikelets subglobose, obtuse; glumes obtuse at apex ..... **F. miliacea**

16b. Leaves dorsiventrally flattened, obtuse or rounded at apex; spikelets ovate or oblong, acute; glumes acute or acuminate at apex.

17a. Perennials with short rhizome; culms 28-60 cm tall, terete to trigonous; spikelets 10-20 mm long and 3-4 mm wide; glumes 5-7 mm long ..... **F. insignis**

17b. Annuals without rhizome; culms 10-28 cm tall, strongly compressed; spikelets 2-4 mm long and 1-2 mm wide; glumes 1-2 mm long ..... **F. microcarya**

Fimbristylis acuminata Vahl, Enum. Pl. 2: 285. 1806; Nees in Wight, Contr. Bot. India 96. 1834; Thw., Enum. Pl. Zeyl. 348. 1864; Clarke in Hook. f., Fl. Brit. India 6:631. 1893 & in Ill. Cyperac. t. 40, f. 5-8, 1909; Fischer in Gamble, Fl. Pres. Madras 1658. 1931; Hooper in Sald. & Nicols., Fl.Hassan Dist. 675. 1976; Rao & Varma, Cyperac. N.E. India 29. 1982; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 319. 1985; Ramach. &

Nair, Fl. Cannanore 515. 1988; Vajravelu, Fl. Palghat Dist. 549. 1990. *Fimbristylis setacea* sensu Clarke in Hook. f., Fl. Brit. India 6: 632. 1893, p.p., non Benth., 1843.

Erect or diffuse, non-rhizomatous perennials, 5-20 cm tall; culms obtusely trigonous, glabrous. Leaves reduced to bladeless sheaths; sheaths 3-6 mm long, laterally compressed, keeled on the back, light brown, mouth obliquely truncate, acute at apex; ligule absent. Inflorescence of a single terminal spikelet; bract absent. Spikelet 8-10 x 2-3 mm, ovoid-acute; rachilla narrowly winged. Glumes spiral, 4-4.5 x 1.5-2 mm, ovate-acute, midrib projecting beyond the glume-apex forming a green mucro; basal 2 glumes empty. Stamens 2; anthers c. 1 mm long, linear. Style 2-3mm long, linear, flat, ciliate; stigmas 2, c. 1 mm long. Nut 1.5-2 x 1.5-2 mm, obovoid, biconvex, transversely wrinkled with 5-8 ridges.

Fl. & Fr.: Aug. - Nov.

Distr.: Tropical Asia, from India to Malesia, also in Southern China. Usually seen in marshy places at low attitudes. It is a common weed in paddy fields. *CNS 2506* (Thankikavala).

Fimbristylis aestivalis (Retz.) Vahl, Enum. Pl. 2: 288. 1806; Clarke in Hook. f., Fl. Brit. India 6: 637. 1893; Blake, J. Arnold Arb. 35: 212. 1954; Koyama, J. Fac. Sci.Univ. Tokyo Bot. 8: 116. 1961 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 313. 1985; Kern, Reinwardtia 6:48. 1961; Hooper in Sald. & Nicols., Fl. Hassan Dist. 675. 1976; Mani. & Sivar., Fl. Calicut 326. 1982; Rao & Verma, Cyperac. N.E. India 32. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1751. 1983; Ramach. & Nair, Fl. Cannanore 515. 1988; Vajravelu, Fl. Palghat Dist. 549. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 513. 1994; Sivar. & Mathew, Fl. Nilambur 780. 1996. *Scirpus aestivalis* Retz., Obs. Bot. 4: 12. 1786.

Tufted, non-rhizomatous annuals; culms 5-17 cm tall, trigonous. Leaves few, basal, 3-8 cm long, 0.5-1 mm wide, margins incurved, apex acuminate, sparsely pilose on both surfaces; sheaths 5-15 mm long, compressed, keeled, light brown, densely pubescent. Inflorescence laxly corymbose, 2-4 cm across, rays 3-7; leafy bracts 2-4 filiform, the

longest upto 7 cm long. Spikelets solitary, 2.5-6 x 1-1.5 mm, oblong, acute, greenish-brown. Glumes spiral, c. 1 x 0.7 mm, ovate, yellow-brownish, keeled, keel green, excurrent to straight or recurved cusp. Stamen 1; anther oblong. Style linear, flat, pyramidally thickened at base; stigmas 2. Nut c. 0.5 mm long, obovate, yellowish.

Fl. & Fr.: Jan. - Apr.

Distr.: From India through Indo-China, eastwards to Malesia and northern Australia and north eastwards to China. Common in wet or moist sandy soil, banks of ponds and rivers and in rice fields. *CNS 2523* (Vandanam).

Fimbristylis argentea (Rottb.) Vahl, Enum. Pl. 2: 294. 1806; Nees in Wight, Contr. Bot. India 100. 1834; Thw., Enum. Pl. Zeyl. 348. 1864; Clarke in Hook. f., Fl. Brit. India 6: 640. 1893; Fischer in Gamble, Fl. Pres. Madras 1659. 1931; Kern, Reinwardtia 6:49. 1961 & in Steenis, Fl. Males. I, 7: 586. 1974; Hooper in Sald. & Nicols., Fl. Hassan Dist. 676. 1976; Mani. & Sivar., Fl. Calicut 325. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1752. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:314. 1985; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 286. 1988; Sivar. & Mathew, Fl. Nilambur 780. 1996; Sasi. & Sivar. Fl. Pl. Thrissur For. 494. 1996. *Scirpus argenteus* Rottb., Progr. 27. 1772. ***Mulen-pullu*** Rheede, Hort. Malab. 12: 101, t. 54. 1693.

Annuals, 5-10 cm tall; culms tufted, compressed, trigonous, glabrous. Leaves basal, 3-10 x 0.1 cm, linear, flat, margins involute; sheaths 5-12 mm long, laterally compressed, straw-coloured, lower ones bladeless, mouth oblique, membranous with dark brown spots; ligule absent. Inflorescence terminal, capitate, 1-2 cm across; bracts 2-3, the largest to 4 cm long. Spikelets 5-8 x 1-1.5 mm, oblong-cylindric, obtuse, brown; rachilla narrowly winged. Glumes spiral, 1-1.5 mm long, ovate, concave, acute at apex, keeled, 3-nerved, yellowish, margins hyaline. Stamen 1; anthers c. 0.5 mm, oblong. Style c. 1 mm long, linear, thickened at base, sparsely ciliate at top; stigma 2. Nut c. 0.5 mm, obovoid, obscurely vertically striate, biconvex, yellowish.

Fl. & Fr.: Oct. - Dec.

Distr.: 'South and Southeastern Asia, India, Sri Lanka, Thailand, Indo-China and Malesia. Usually seen in wet or moist sandy grounds and in rice fields. *CNS 1364* (Pallippuram).

Fimbristylis cinnamometorum (Vahl) Kunth, Enum. Pl. 2: 229. 1837; Kukenth., Mitt. Thur. Bot. Ver. N.F. 50: 9. 1943; Blake, J. Arnold Arb. 35: 220. 1954; Hooper in Sald. & Nicols., Fl. Hassan Dist. 676. 1976; Rao & Verma, Cyperac. N.E. India 39.1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1753. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:278. 1985; Mani, Fl. Silent Valley 342. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 514. 1994; Sasi. & Sivar., Fl. Thrissur For. 494. 1996. *Scirpus cinnamometorum* Vahl, Enum. Pl. 2:278. 1806. *Fimbristylis cyperoides* R. Br., Prodr. Fl. Nov. Holl. 228. 1810; Clarke in Hook. f., Fl. Brit. India 6: 650. 1893. *Abildgaardia cinnamometorum* (Vahl) Thw., Enum. Pl. Zeyl. 347. 1864. *Fimbristylis cyperoides* R. Br., var. *cinnamometorum* (Vahl) Clarke in Hook. f., Fl. Brit. India 6: 650. 1893; Fischer in Gamble, Fl. Pres. Madras 1659. 1931 (Fig. 72).

Erect, tufted, rhizomatous perennials; rhizome short, woody; culms 20-50 cm tall, semiterete or 3-sided, striate. Leaves many, 5-40 cm long, c. 0.5 mm wide, filiform, semiterete, canaliculate, subacute, 2-ranked; sheaths 2-9 cm long, membranous, hyaline, mouth oblique. Inflorescence compound, 3-8 cm long and as broad; bracts 2-4, filiform, the longest upto 7 cm long; rays 4-7. Spikelets solitary, 3-6 x 1-1.5 mm, oblong to lanceolate, acute, sessile or pedicellate, reddish-brown. Glumes distichous, 3-4 x 1-1.5 mm, ovate, boat-shaped, keeled, reddish gland-dotted, 1-2, light brown, basal ones smaller, empty. Stamens 3; anthers linear, connective distinctly produced. Style c. 2.5 mm long, pyramidal at base; stigmas 3. Nuts upto 1 x 0.5 mm, ellipsoid to obovate, trigonous, shortly stipitate, tuberculate, cream-white.

Fl. & Fr.: Sep. - Nov.

Distr.: Sri Lanka, India, Myanmar, Thailand, Sumatra, Philippines, New Guinea and N. Australia. In wet places. *CNS 2326* (A.I.R. Campus, Kalavoor).

Fimbristylis cymosa R. Br., Prodr. Pl. Nov. Holl. 228. 1810; Kern, Reinwardtia 6: 39. 1961 & in Steenis, Fl. Males. I, 7: 557. 1974; Mani. & Sivar., Fl. Calicut 325. 1982.subsp. **spathacea** (Roth) Koyama, Micronesica 1: 83. 1964 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 301. 1985; Britto & Matthew in Matthew, Fl. Tam, Carnatic 3: 1754. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 514. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 494. 1996. *Fimbristylis spathacea* Roth, Nov. Sp. Pl. 24. 1821; Clarke in Hook. f., Fl. Brit. India 6:640. 1893; Fischer in Gamble, Fl. Pres. Madras 1659. 1931; Kral, Sida 4: 126. 1971. *Fimbristylis wightiana* Nees in Wight, Contr. Bot. India 99. 1834; Thw., Enum. Pl. Zeyl. 349. 1864.

Erect, tufted, rhizomatous perennials; rhizome very short, woody, covered with brown scales; culms compressed trigonous. Leaves several forming basal rosette, 6-15 x 1.5-3 mm, flat, linear, rigid, margins involute, scabrid; sheaths 2-4 cm long; ligule absent. Inflorescence compound, 2-5 x 1-4 cm; rays subumbellate to 1 cm long; bracts 3, erect, shorter than the inflorescence. Spikelets 3-4 x 1.5-2 mm, ovoid-obtuse, light brown; rachilla persistent, broadly winged. Glumes spiral, c. 1.5 x 1.2 mm, ovate-obtuse, slightly keeled, light brown coloured with broad hyaline margins. Stamens 2; anthers c. 6 mm long, linear. Style c. 0.5 mm long, linear; stigmas 2, longer than the style, short hairy. Nuts 0.7-0.8 x 0.5 mm, obovoid, biconvex, brown to black, sparsely verruculose or smooth.

Fl. & Fr.: Oct. - Mar.

Dist.: Tropical and subtropical regions of all world. This is usually seen in sandy areas near sea shores, river beds and marshy low lands. *CNS 1252* (Thottappally), *CNS 1102* (Pallithode).

Fimbristylis dichotoma (L.) Vahl, Enum. Pl. 2: 287. 1806; Fischer in Gamble, Fl. Pres. Madras 1658. 1931; Fischer, Kew Bull. 1935: 150. 1935; Blake, J. Arnold Arb. 35: 213. 1954; Kral, Sida 4:117. 1971; Hooper in Sald. & Nicols., Fl. Hassan Dist. 677. 1976; Mani. & Sivar., Fl. Calicut 326. 1982; Rao & Verma, Cyperac. N.E. India 31. 1982; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:306. 1985; Ramach. & Nair, Fl.

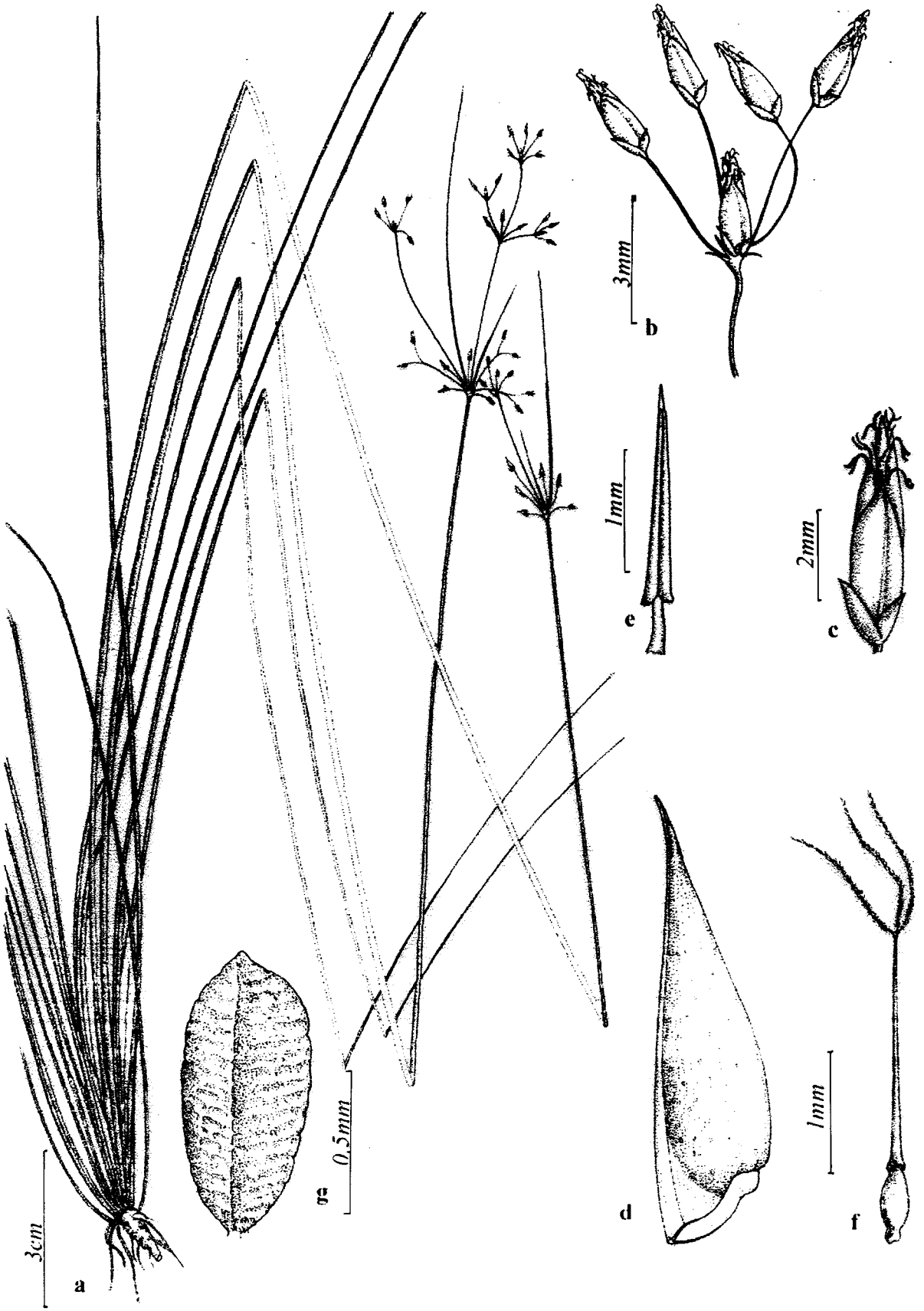


Fig. 72. *Fimbristylis cinnamometorum* (Vahl) Kunth: a. Habit; b. Spiklet cluster; c. Single spiklet; d. Glume; e. Stamen; f. Pistil; g. Nut

Cannanore 516. 1988; Mani., Fl. Silent Valley 342. 1988; Vajravelu, Fl. Palghat Dist. 550. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 515. 1994; Sivar. & Mathew, Fl. Nilambur 781. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 494. 1996. *Scirpus dichotomus* L., Sp. Pl. ed. 1, 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. 1893.

Key to the subspecies

1a. Ligule absent; achenes lightly brown; stamens 3; glumes membranous with hyaline margins, rounded or obtuase at apex. .....subsp. **glauca**

1b. Ligule a fringe of hairs; achenes cream-coloured; stamens 1 or 2; glumes chartaceous, subacute at apex, brown to chestnut-brown.

2a. Leaves and bracts densely pubescent; stamens mostly 1 ..... subsp. **podocarpa**

2b. Leaves and bracts glabrous or minutely scabrid; stamens mostly 2 .... subsp. **dichotoma**

subsp. **dichotoma**

Tufted, shortly rhizomatous annual or short-lived perennials; culms 25-64 cm tall, trigonous, compressed. Leaves basal, 10-30 x 0.2-0.4 cm, linear, flat, margins minutely scabrid on upper part, apex obtuse; sheaths 3-5 cm long, brownish; ligule a dense fringe of short hairs. Inflorescence compound, 6-11 cm long, 8-15 cm wide; rays 3-11; bracts 2-6, lowest 1-2 bracts longer than the inflorescence. Spikelets solitary or clustered, 5-8 x 2-3 mm, ovoid-ellipsoid, terete, subacute at apex, brown. Glumes spiral, 1.5-2.5 x 1.5-2 mm, broadly ovate, boat-shaped, apex subacute and mucronate, pale brown. Stamens usually 2. Style linear, flat, ciliate at top; stigmas 2. Nut c. 1 mm long, obovoid, biconvex, yellow, distinctly stipitate, cancellated with 7-13 rows of transversely oblong cells.

Fl. & Fr.: Sep. - Nov.

Distr.: All warmer parts ofthe whole world. Common in wet places and as a weed in cultivated lands. *CNS 1560* (Alappuzha).

subsp. **glauca** (Vahl) Koyama, Bot. Mag. (Tokyo) 87: 324. 1974 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 311. 1985. *Fimbristylis glauca* Vahl, Enum. Pl. 2:288. 1806.

Erect, tufted, rhizomatous perennials; rhizome short, oblique; culms 15-33 cm tall, trigonous, compressed. Leaves basal, several, 3-15 x 0.1-0.15 cm, linear, flat, apex obtuse, rigid, glaucous; sheaths 1-3 cm long, compressed, brown; ligule absent. Inflorescence simple 2-4 cm long, 2-3 cm wide; bracts 2-4, shorter than the inflorescence. Spikelets 4-7 x 2.5-3.5 mm, ovoid, obtuse, brownish. Glumes spiral, 1.5-2.5 x 1-1.5 mm, ovate, obtuse or rounded at apex, membranous, hyaline-margined, pale brown. Stamens 3. Stigmas 2. Nut c. 0.7 x 0.5 mm, obovoid, biconvex, brown, trabeculate with 6-8 rows of transversely oblong cells.

Fl. & Fr.: Aug. - Dec.

Distr.: Southern India and Sri Lanka. Usually seen in dry sandy soils. *CNS 1388* (Vandanam).

subsp. **podocarpa** (Nees & Meyen ex Nees) Koyama, Micronesica 1:87. 1964 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 310. 1985; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1754. 1983. *Fimbristylis podocarpa* Nees & Meyen ex Nees in Wight, Contr. Bot. India 98. 1834. *Fimbristylis diphylla* Vahl, var. *pluristriata* Clarke in Hook. f., Fl. Brit. India 6: 637. 1893. *Fimbristylis annua* Roem. & Schult., var. *podocarpa* (Nees & Meyen ex Nees) Kukenth., Bot. Jahrb. Syst. 59: 48. 1924.

Erect, non-rhizomatous, perennial herbs; culms 14-32 cm tall, trigonous, compressed. Leaves basal, 6-15 x 0.2-0.3 cm, linear, flat, apex obtuse, densely pubescent; sheaths 1-2 cm long, compressed; ligule a fringe of dense white hairs. Inflorescence simple, 1.5 - 3 cm long, 1.3-2.5 cm wide; bracts 2-4, densely pubescent. Spikelets solitary, 5-8 x 3-4 mm, ovoid, acute, brown. Glumes 1.5-2 x 1-1.5 mm, ovate, mucronate. Stamen 1. Stigmas 2. Nuts c. 1 x 1 mm, obovate biconvex, cancellated by 15-24 rows of transversely oblong hexagonal cells.

Fl. & Fr.: Nov. - Jan.

Distr.: India, Southern China, Indo-China and Malesia. In wet places. *CNS 1771* (Karumadi).

Fimbristylis dipsacea (Rottb.) Clarke in Hook. f., Fl. Brit. India 6: 635. 1893 & in Ill. Cyperac. t. 41, f. 4-7, 1909; Fischer in Gamble, Fl. Pres. Madras 1658. 1931; Blake, J. Arnold Arb. 35: 214. 1954; Kern, Blumea 9: 234. 1958; Koyama, J. Fac. Sci. Univ. Tokyo Bot. 8: 118. 1961 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:321. 1985; Hooper in Sald. & Nicols., Fl. Hassan Dist. 678. 1976; Rao & Verma, Cyperac. N.E. India 30. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1755. 1983; Vajravelu, Fl. Palghat Dist. 550. 1990. *Scirpus dipsaceus* Rottb., Descr. Icon. Rar. 56, t. 12, f. 1. 1773. *Echinolytrum dipsaceum* (Rottb.) Desv., J. Bot. 1: 21, t. 1. 1808. *Isolepis dipsacea* (Rottb.) Roem. & Schult., Syst. Veg. 2: 119. 1817; Thw., Enum. Pl. Zeyl. 350. 1864.

Tufted annuals; culms 2-8 cm tall, trigonous, glabrous. Leaves few, 1-3.5 cm long, narrowly linear to setaceous, sub-acute at apex; sheath 8-10 mm long, compressed, keeled on back, mouth truncate; ligule absent. Inflorescence umbelliform, lax, rays ending in solitary subglobose or oblong spikelets; bracts 4-5, erect, unequal. Spikelets 4-7 x 3-3.5 mm, squarrose; rachilla narrowly winged. Glumes spiral, c. 2 mm long (incl. awn), oblong, strongly keeled, keel 3-nerved, projecting beyond the glume-apex forming 1 mm long awn, margins scarious. Stamen 1; anthers 0.5 mm long. Style linear, slightly thickened at base; stigmas 2, longer than style. Nuts c. 0.5 mm long, oblong-obtuse, biconvex, sub-cylindric, brownish.

Fl. & Fr.: Apr. - May.

Distr.: Tropical Africa, Asia, India, Indochina and Malesia. Common in sandy soil, river beds and in sandy fields forming cushions. *CNS 2132* (Pathirappilly).

Fimbristylis eragrostis (Nees & Meyen ex Nees) Hance, J. Linn. Soc. Bot. 13: 132. 1873; Blake, J. Arnold Arb. 35: 215. 1954; Koyama, J. Fac. Sc. Univ. Tokyo Bot. 8: 117. 1961 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 275. 1985; Kern, Reinwardtia 6: 41. 1961 & in Blumea 15: 434. 1967; Hooper in Sald. & Nicols., Fl. Hassan Dist. 678. 1976; Rao & Verma, Cyperac. N.E. India 38. 1982; Britto & Matthew in Matthew, Fl.

Tam. Carnatic 3: 1755. 1983; Ramach. & Nair, Fl. Cannanore 516. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 515. 1994. *Abildgaardia eragrostis* Nees & Meyen ex Nees in Wight, Contr. Bot. India 95. 1834. *Fimbristylis nigrobrunnea* Thw., Enum. Pl. Zeyl. 434. 1864; Clarke in Hook. f., Fl. Brit. India 6: 648. 1893; Fischer in Gamble, Fl. Pres. Madras 1659. 1931 (Fig. 73).

Erect, rhizomatous perennials; rhizome short, clothed with dark brown old sheaths; culms 40-70 cm tall, compressed, tetragonous. Leaves many, basal, 4-30 cm long, 3-4 mm wide, linear, apex obtuse or rounded, apiculate, flat, scabrid on margins towards apex, subcoriaceous, lightly green; sheaths 2-4 cm long, yellowish-brown. Inflorescence simple to compound, 3-6 cm long and as wide; rays 2-6; bracts 3-5, unequal 0.5-1.5 cm long. Spikelets solitary, 0.5-2 x 0.2-0.3 cm, oblong or oblong-lanceolate, dark bown. Glumes 3-4 x 2-3 mm, broadly ovate, subacute at mucronate apex, keeled, yellowish-brown. Stamens 3. Stigmas 3. Nuts c. 1 x 0.5 mm, broadly obovate, apex rounded, trigonous, verruculose, straw-coloured.

Fl. & Fr.: Sep. - Nov.

Distr.: India, Sri Lanka, Indo-China and southern China. In wet places. *CNS 2276* (A.I.R. Campus, Kalavoor).

Fimbristylis ferruginea (L.) Vahl, Enum. Pl. 2: 291. 1806; Ness in Wight, Contr. Bot. India 97. 1834; Kunth, Enum. 2: 236. 1837; Clarke in Hook. f., Fl. Brit. India 6: 638. 1893; Kukenth., Bot. Jahrb. 59: 48. 1924; Fischer in Gamble, Fl. Pres. Madras 1658. 1931; Blake, J. Arnold Arb.35: 211. 1954; Hooper in Sald. & Nicols., Fl. Hassan Dist. 679. 1976; Mani. & Sivar., Fl. Calicut 324.1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1757. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 305. 1985; Ramach. & Nair, Fl. Cannanore 516. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 515. 1994. *Scirpus ferrugineus* L., Sp. Pl. ed. 1, 1: 50. 1753.

Erect, tufted, rhizomatous perennials; rhizome short, decumbent, woody, covered with brown scales; culms 20-67 cm tall, obtusely trigonous, glaucous-green. Leaves reduced, short-bladed, 0.5-8 cm long, 0.5-1.5 mm wide, linear, erect, scabrid on margins

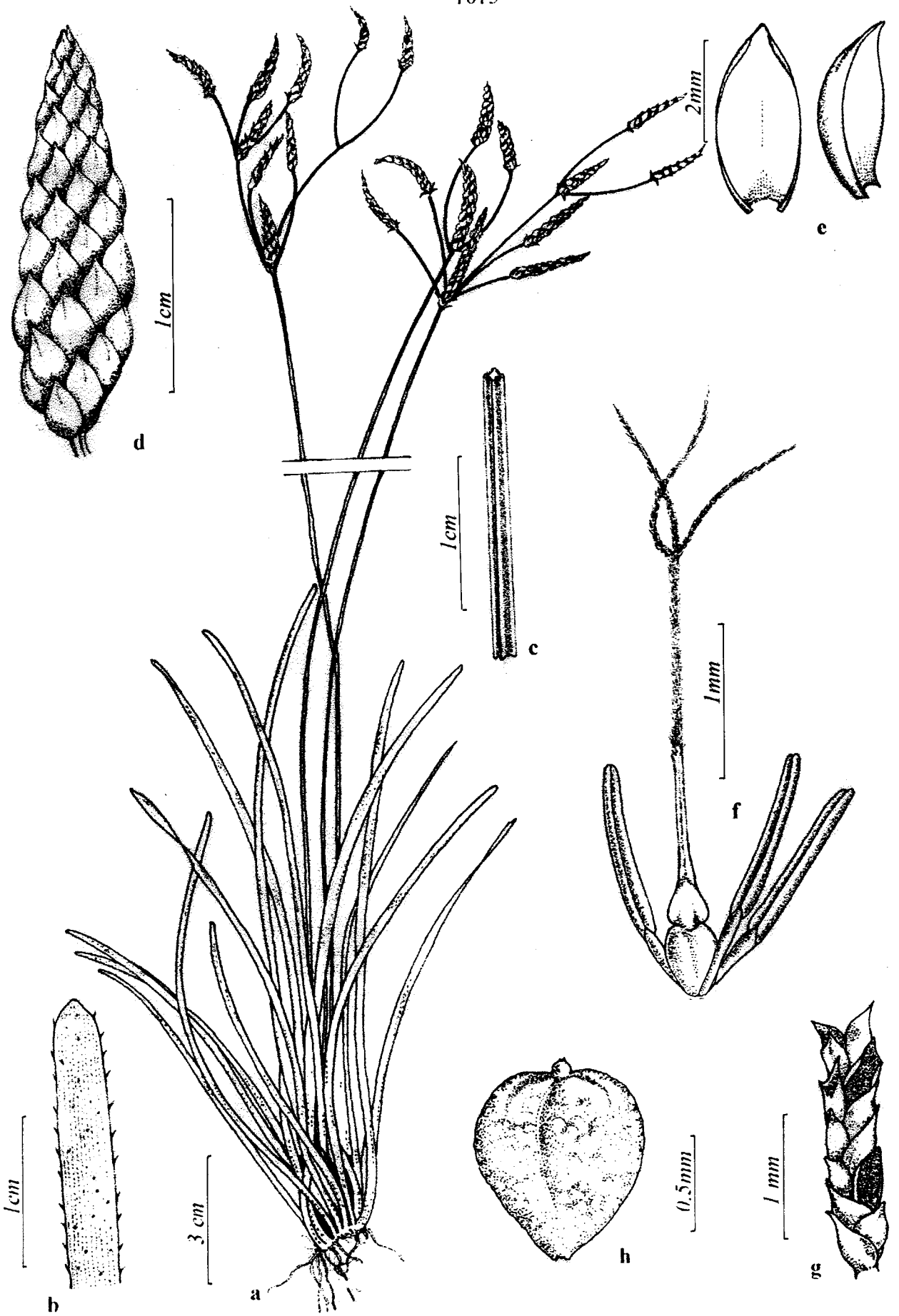


Fig. 73. *Fimbristylis eragrotis* (Nees & Meyen ex Nees) Hance: a. Habit; b. A portion of leaf blade; c. A portion of culm; d. Spikelet; e. Glume; f. Stamen & pistil; g. Rachilla; h. Nut.

at the top; sheaths 2-8 cm long, compressed, brown, margins hyaline; ligule a dense fringe of short hairs. Inflorescence simple, 1-4 cm long and wide; rays 3-7; bracts 2-3, the longest upto 2 cm long. Spikelets solitary, 8-15 x 3-4 mm, ovate to elliptic, terete, apex acute, brownish. Glumes spiral, basal 2 empty, fertile ones 3-4 x 2-2.5 mm, ovate-elliptic, mucronate, brownish. Stamens 3. Style linear, flat, densely ciliate; stigmas 2. Nuts c. 1 x 0.5 mm, obovate, biconvex, yellow-brown, trabeculate.

Fl. & Fr.: Aug. - Jan.

Distr.: Pantropical. Common species usually found in wet saline soil, marshy areas and in brackish water. *CNS 1718* (Pallana), *CNS 2524* (Kuthiyathodu).

Frimbristylis insignis Thw., Enum. Pl. Zeyl. 349 & 433. 1864; Clarke in Hook. f.,Fl. Brit. India 6: 645. 1893; Fischer in Gamble, Fl. Pres. Madras 1659. 1931; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 288. 1985 (Fig. 74).

Erect, rhizomatous, perennial herbs; rhizome very short; culms 28-60 cm tall, terete to trigonous. Leaves many, basal, 6-24 x 0.2-0.4 cm, linear, flat, scabrid on margins, apex obtuse or rounded, coriaceous; sheaths 1-2 cm long, pale brownish. Inflorescence simple or in part compound, 3-10 cm long, 3-5 cm wide; rays 2-5, very unequal, 1-3 cm long; bracts 2-3, the longest upto 1.3 cm long. Spikelets solitary, 1-2 x 0.3-0.4 cm, oblong or oblong-lanceolate, terete, acute at both ends, brown. Glumes spirally imbricated,5-7 x 2-3 mm, ovate, shallowly boat-shaped, apex acuminate, brown, strongly keeled, the lowest 2-4 empty and smaller than the rest. Stamens 3, yellow. Style upto 7 mm long, trigonous, hairy; stigmas 3. Nuts c. 1 x 0.5 mm, obovate, trigonous, whitish-brown.

Fl. & Fr.: Sep.- Nov.

Distr.: Sri Lanka, Thailand, Indo-China, southern China and Malesia. In wet places. *CNS 277* (A.I.R. Campus, Kalavoor).

Fimbristylis microcarya F.V. Muller, Fragm. 1: 200. 1859; Kern, Blumea 8: 111. 1955 & in Back. & Bakh. f., Fl. Java 3: 464. 1968. *Fmbristylis complanata* var. *microcarya* Clarke in Hook. f., Fl. Brit. India 6: 646. 1893, (Sphalm. "*microcarpa*"). *Fmbristylis autumnalis* var. *microcarya* (Muller) Kukenth., Bot. Jahrb. 69: 258. 1938; Koyama, J. Fac. Sci. Univ. Tokyo Bot. 8: 104. 1961.

Erect, tufted, non-rhizomatous annuals; culms 10-28 cm tall, slender, strongly compressed, ribbed. Leaves few, basal, 2-14 cm long, 1-3 mm wide, linear, flat, obtuse, many-nerved; sheaths 1-3.5 cm long, light brown; ligule a dense fringe of short hairs. Inflorescence compound, 1-4 cm long, 1-3 cm wide; rays 2-7; bracts 2-3, suberect, the longest upto 3.5 cm long and 2 mm wide. Spikelets 2-4 x 1-2 mm, ovoid, acute, brownish. Glumes spiral,1-1.5 x 1-1.5 mm, ovate, acute, mucronulate, keeled, yellowish brown with hyaline margins, basal 2 glumes empty. Stamens 2-3. Style linear, triquetrous; stigmas 3. Nuts upto 0.7 x 0.4 mm, obovoid, trigonous, whitish.

Fl. & Fr.: Aug. - Oct.

Distr.: Widely distributed in N. Australia and Queensland, also reported from India and E. Asia. Common in open wet places. *CNS 1227* (Thuravoor), *CNS 2526* (Neerkunnam).

Fimbristylis miliacea (L.) Vahl, Enum. Pl. 2: 287. 1806; Clarke in Hook. f., Fl. Brit. India 6: 644. 1893; Fischer in Gamble, Fl. Pres. Madras 1660. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 679. 1976; Mani. & Sivar., Fl. Calicut 325. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1757. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 296. 1985; Ramach. & Nair, Fl. Cannanore 517. 1988; Vajravelu, Fl. Palghat Dist. 551. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 516. 1994; Sivar. & Mathew, Fl. Nilambur 782. 1996. *Scirpus miliaceus* L., Syst. ed. 10, 868. 1759. *Fmbristylis littoralis* Gaud. in Freycinet, Voy. Bot. 413. 1826; Blake, J. Arnold Arb. 35: 127. 1954; Rao & Verma, Cyperac. N.E. India 36. 1982. *Trichelostylis miliacea* (L.) Nees in Wight, Contr. Bot. India 104, 1834.

Erect, tufted, non-rhizomatous annuals,10-40 cm tall; culms compressed, 4-sided with 2 sharp edges, glabrous. Leaves basal, equitant, 10-35 cm long, linear, laterally

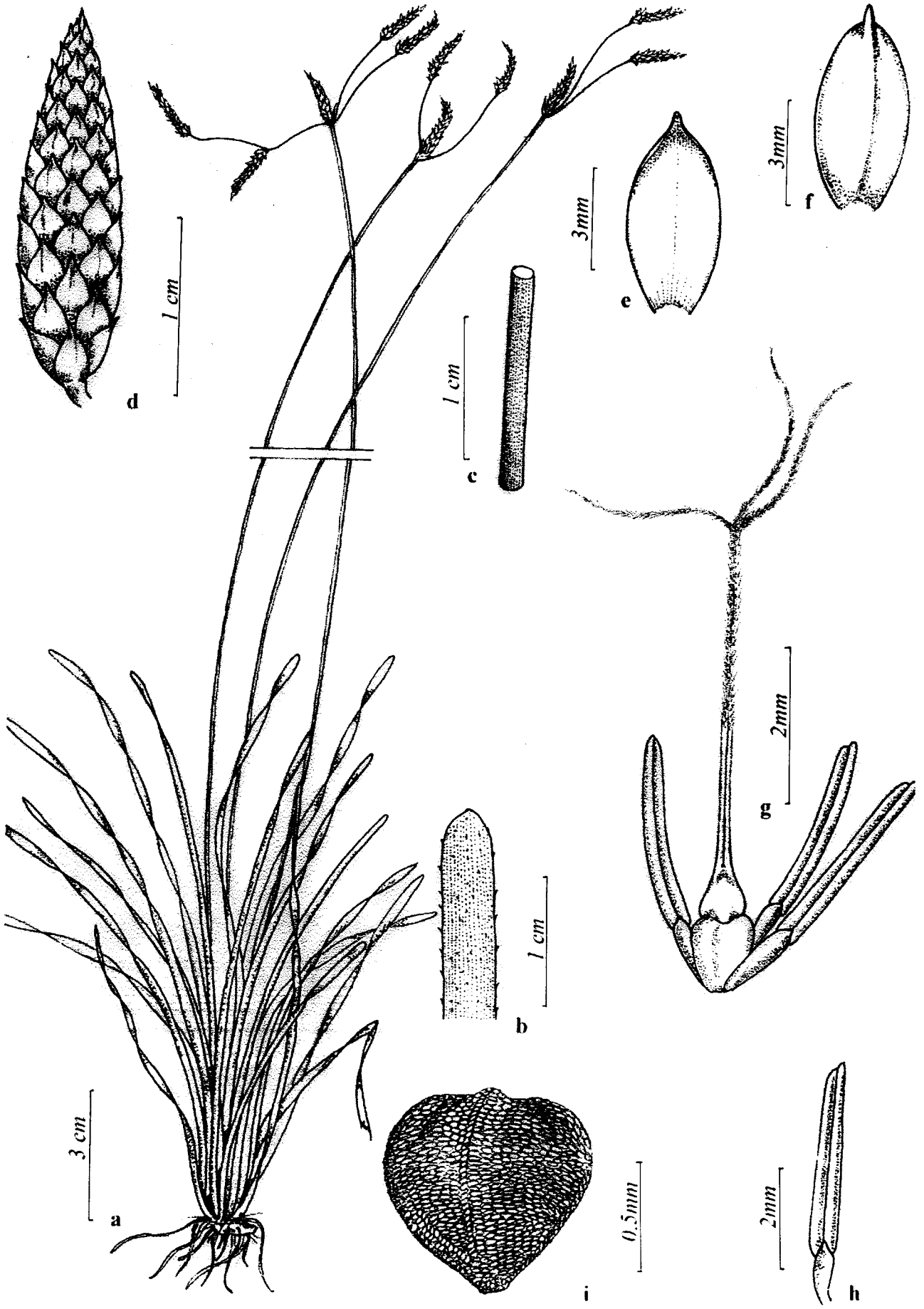


Fig. 74. *Fimbristylis insignis* Thw.: a. Habit; b. A portion of leaf blade; c. A portion of culm; d. Spikelet; e. Glume-ventral view; f. Glume-dorsal view; g. Stamen & pistil; h. Single stamen; i. Nut.

flattened, scabrid on margins; sheaths 2-8 cm long, laterally compressed, sharply keeled, lower sheaths bladeless; ligule absent. Inflorescence compound, 4-8 cm long and wide, loose, rays cymose; bracts 2-4, c. 1 cm long, setaceous. Spikelets solitary, 1.5-2.5 x 1.5-2 mm, globose, obtuse, rusty-brown; rachilla wingless. Glumes spiral, 1.2-1.5 x 1 mm, ovate, obtuse, scarcely keeled, 3-nerved, margins narrowly hyaline. Stamens 1-2; anthers c. 0.3 mm long. Style linear, triquetrous, ciliate at the base of stigmas; stigmas 3-fid, as long as the style. Nut 0.5-1 x 0.5 mm, obovoid, trigonous, verruculose.

Fl. & Fr.: Oct.- Nov.

Distr.: Tropical and subtropical regions of the world. A very common species usually found in marshy areas and also a characteristic weed of the rice fields. *CNS 1269* (Nedumudi).

Fimbristylis narayanii Fischer, Kew Bull. 1931: 46. 1931 & in Gamble, Fl. Pres. Madras 1660. 1931; Kern, Blumea 15: 438. 1967; Mani. & Sivar., Fl. Calicut 323. 1982; Mani., Fl. Silent Valley 343. 1988; Vajravelu, Fl. Palghat Dist. 551. 1990; Sivar. & Mathew, Fl. Nilambur 783. 1996.

Erect, tufted, non-rhizomatous annuals; culms 7-16 cm long, compressed, quadrangular. Leaves basal, 2-7 x 0.1-0.2 cm, linear, acute, scabrid on margins in the upper part; sheaths 0.5-1.5 cm long, compressed, stramineous. Inflorescence simple bearing 2-5 spikelets, 1-2 cm long and wide; bracts upto 5 mm long. Spikelets solitary, 6-10 x 1.5-3 mm, oblong, acute, brown, flat. Glumes distichous, 2-2.5 x 1-1.5 mm, ovate, acute, sides yellow brown, basal 1-2 glumes empty. Stamens 2; connective shortly produced. Stigmas 3. Nuts c. 1 x 0.5 mm, obovoid, trigonous, white tubercled, whitish to yellow.

Fl. & Fr.: Aug. - Oct.

Distr.: Endemic in South India. In wet places, crevices of rocks. *CNS 2332* (Noottavanpara).

Fimbristylis ovata (Burm. f.) Kern, Blumea 15: 126. 1967; Hooper in Sald. & Nicols., Fl. Hassan Dist. 679. 1976; Mani. & Sivar., Fl. Calicut 323. 1982; Rao & Verma, Cyperac. N.E. India 39. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1758. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Cylon 5: 273. 1985. *Carex ovata* Burm. f., Fl. Ind. 194. 1768. *Cyperus monostachyos* L., Mant. 2:180. 1771. *Abildgaardia monostachyos* (L.) Vahl, Enum. 2:296. 1805. *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. *Abildgaardia ovata* (Burm. f.) Kral, Sida 4: 71. 1971.

Erect, tufted, rhizomatous perennials; rhizome short, knotty; culms 10-42 cm tall, slender, thickened at base, 3-sided, compressed. Leaves many, 8-26 cm long, 0.5-1 mm wide, slenderly linear, apex subacute, scabrid on upper margins; sheaths 1-5 cm long, straw-coloured. Inflorescence a single terminal spikelet, the lower most glume modified into a setaceous bract, 6-7 mm long. Spikelets 8-15 x 3-6 mm, ovate, acute, slightly compressed, yellow-green. Lower glumes distichous, lower 1-2 glumes empty, awned, the upper ones becoming more or less spirally imbricated, 3-6 x 2-4 mm, broadly ovate, boat-shaped, acute, mucronate, keeled, pale yellowish. Stamens 3. Stigmas 3. Nut 2-2.5 x 1.5-2 mm, obovate, trigonous, shortly stipitate, tuberculate, cream-white.

Fl. & Fr.: Dec. - Mar.

Distr.: Widely distributed in the tropics and subtropics of the world. In wet sandy areas. *CNS 2525* (Vandanam), *Rejani 12039* (CALI) (Aroor).

Fimbristylis polytrichoides (Retz.) Vahl, Enum. Pl. 2:248. 1806; Clarke in Hook. f., Fl. Brit. India 6:632. 1893; Fischer in Gamble, Fl. Pres. Madras 1658. 1931; Mani. & Sivar., Fl. Calicut 323. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:1759. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 318. 1985. *Scirpus polytrichoides* Retz., Obs. Bot. 4: 11. 1789.

Erect, tufted, non-rhizomatous annuals, 25-40 cm tall; culms compressed, trigonous, glabrous. Leaves reduced to bladeless sheaths; sheaths laterally compressed, 1-3 cm long, yellowish brown, truncate; ligule with a row of short hairs. Inflorescence with

a single terminal spikelet; bract 1, 5-7 mm long. Spikelets 5-10 x 4-5 mm, ovoid-obtuse, straw-coloured; rachilla narrowly winged. Glumes spiral, 3-3.5 x 1.5-2 mm, ovate-obtuse, muticous, faintly keeled, basal 2 glumes empty, longer than the fertile ones. Stamens 1-2; anthers c. 1 mm long. Style c. 1 mm long, flat, linear, slightly dilated at base, ciliate at top; stigmas 2 or 3, c. 1 mm long. Nut 1-1.5 x c. 0.6 mm, obovoid, trigonous or biconvex, brownish, shortly stipitate, densely verruculose.

Fl. & Fr.: Oct. - Dec.

Dist.: Tropical Africa, Asia and Australia. In open wet places and sandy shores near the sea. *CNS 2330* (Pallithode).

Fimbristylis pubisquama Kern, Blumea 8(1): 131. 1955; Koyama, Bull. Natl. Sci. Mus. 17(1): 70. 1974 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 304. 1985. *Fimbristylis compressa* Boeck., Linnaea 38: 387. 1874, *nom. illigit.* non Roem. & Schult., 1817. Clarke in Hook. f., Fl. Brit. India 6: 639. 1893; Fischer in Gamble, Fl. Pres. Madras 1658. 1931.

Erect, tufted, non-rhizomatous annual herbs; roots golden-yellow; culms 14-50 cm tall, obtusely trigonous, glaucous-green. Leaves basal, 10-28 x 0.1-0.15 cm, semiterete or obtusely trigonous, apex long acuminate, ventrally shallowly canaliculate, glaucous-green; sheaths 3-8 cm long, brownish spotted, margins membranous, ciliate; ligule hyaline, with white hairs. Inflorescence compound, corymbose, 3-5 cm long, 3-6 cm wide, rays 2-6, cymose; bracts 1-3, the longest upto 8 cm long. Spikelets 4-7 x 1.5-3 mm, ovoid or ovoid-ellipsoidal, base rounded, apex sub-acute, reddish-brown, pubescent. Glumes spiral, 2-2.5 x 1-1.5 mm, ovate, mucronate, deeply rusty-brown, wholly pubescent, margins ciliate. Stamens 2. Style linear, flat; stigmas 2. Nut c. 1 x 0.5 mm, obovate, biconvex, yellow-brown.

Fl. & Fr.: Oct. - Nov.

Distr.: Southern India, Cambodia and Sri Lanka. In wet places near the seashore. *CNS 2328* (Thrikunnapuzha).

Fimbristylis schoenoides (Retz.) Vahl, Enum. Pl. 2:286. 1806; Clarke in Hook. f., Fl. Brit. India 6:634. 1893; Fischer in Gamble, Fl. Pres. Madras 1658. 1931; Kral, Sida 4:113. 1971; Hooper in Sald. & Nicols., Fl. Hassan Dist. 680. 1976; Mani. & Sivar., Fl. Calicut 324. 1982; Rao & Verma, Cyperac. N.E. India 30. 1982; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 315. 1985; Mohanan & Henry, Fl. Thiruvananthapuram 516. 1994; Sivar. & Mathew, Fl. Nilambur 783. 1996. *Scirpus schoenoides* Retz., Obs. Bot. 5:14. 1791. *Scirpus bispicatus* Roxb., Fl. Ind. 1: 223. 1820 (Fig. 75).

Erect, tufted, non-rhizomatous annuals; culms compressed, trigonous, glabrous. Leaves basal, shorter than stems, 10-20 x 0.1-0.2 cm, linear, margins involute, scabrid upwards; sheath 2-5 cm long, mouth obliquely truncate, ciliolate; ligule of a dense fringe of short hairs. Inflorescence simple with 1-4 spikelets; bract 1, erect, shorter than the inflorescence. Spikelets 5-10 x 3-4 mm, ovate-acute, pale yellow; rachilla narrowly winged. Glumes spiral, 2-3 x 2-3 mm, broadly ovate-mucronate, scarcely keeled, glabrous, many-nerved, basal few glumes empty. Stamens 2; anthers c. 0.5 mm long. Style 1-1.5 mm long, linear, flat, ciliate in the upper part; stigmas 2. Nuts 1-1.3 x 1 mm, obovoid, biconvex, brownish, stipitate, smooth.

Fl. & Fr.: Oct. - Dec.

Distr.: From India and Sri Lanka to Malesia and northern Australia, also extending northwards to southern China. This species is usually seen in sandy areas, along river banks and also along the margins of rice fields. *CNS 1770* (Karumadi).

Fimbristylis tetragona R. Br., Prodr. Fl. Nov. Holl. 226. 1810; Kunth, Enum. 2:242. 1837; Clarke in Hook. f., Fl. Brit. India 6:631. 1893; Fischer in Gamble, Fl. Pres. Madras 1658. 1931; Kukenth., Mitt. Thur. Bot. Ver. N.F. 50: 8. 1943; Blake, J. Arnold Arb. 35: 208. 1954; Koyama, J. Fas. Sci. Univ. Tokyo, Bot. 8:118. 1961 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 323. 1985; Hooper in Sald. & Nicols., Fl. Hassan Dist. 681. 1976; Mani. & Sivar., Fl. Calicut 324. 1982; Rao & Verma, Cyperac. N.E. India 29. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1761. 1983; Ramach. & Nair, Fl. Cannanore 517. 1988.

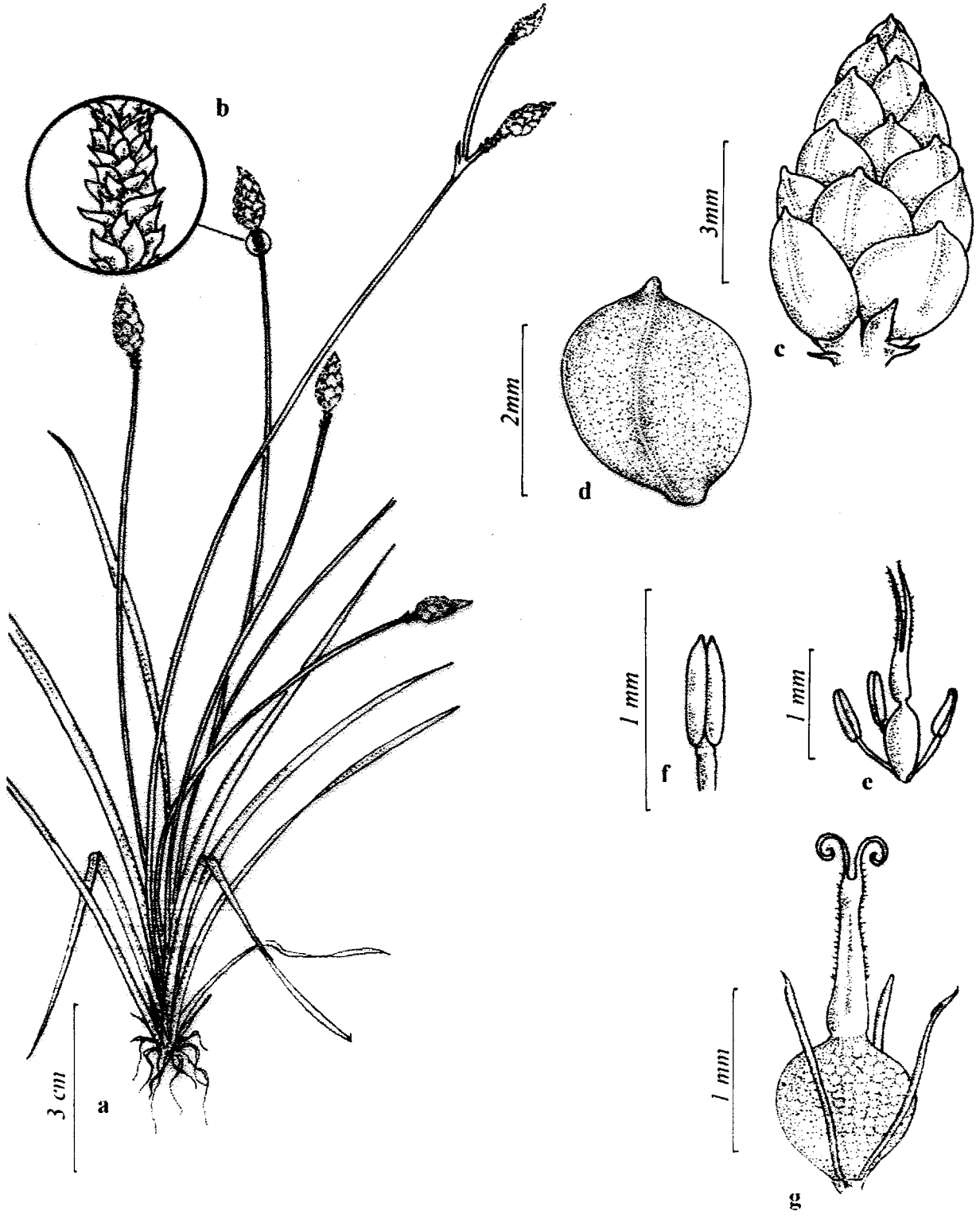


Fig. 75. *Fimbristylis schoenoides* (Retz.) Vahl: a. Habit; b. Rachilla ; c. Spikelet; d. Glume; e. Stamens and pistil; f. Single stamen; g.Filaments, style and nut.

Erect, tufted herbs, 15-30 cm tall; culms quadrangular, glabrous. Leaves reduced to bladeless sheaths; sheath laterally compressed, 1-3 cm long, keeled, straw-coloured, mouth oblique; ligule absent. Inflorescence a single terminal spikelet; bract absent. Spikelet 7-9 x 4-5 mm, ovoid-obtuse, brown; rachilla narrowly winged. Glumes spiral, 3-3.5 x 1.5-2 mm, obovate-obtuse, many-nerved, with yellowish hyaline margins, 2-3 basal ones empty. Stamen 1; anther 1-1.5 mm long. Style c. 1.5 mm long, flat, linear, slightly broader at base, sparsely ciliate on margins; stigmas 2, c. 0.5 mm long. Nut 1-5.2 x 0.5 mm, oblong, biconvex, subcylindric, yellowish, stipitate, trabeculate with 7-9 rows of cells on each face.

F. & Fr.: Oct. - Nov.

Distr.: Tropical southern Asia from India and Sri Lanka through Indo-China north eastwards to southern China and eastwards to Malesia and norther Australia. In wet and moist paddy fields. *CNS 1808* (Vallikunnam).

FUIRENA Rottboell

Descript. Icon. Nov. 70. 1773.

Perennial or annual herbs, sometimes with decumbent rhizome. Culms nodose and leafy throughout, terete or 4- or 5- angular. Leaves flat, linear-lanceolate; sheaths tubular, pubescent; ligules membranous, hyaline. Inflorescence of one to several sessile or pedunculate heads or glomerules of 1-6 clustered, ovoid to oblong spikelets. Glumes spirally imbricate, basal and upper ones empty, cuspidate at apex. Flowers bisexual. Hypogynous bristles 0 to 3, rarely 6, biseriate or uniseriate. Stamens 2 or 3. Style linear; stigma 3. Nut trigonous, ellipsoid, base stipitate, faces flat to slightly concave.

1a. Perennials with conspicuous rhizome; leaves glabrous; hypogynous bristles absent ..... **F. umbellata**

1b. Annuals with fibrous roots only; leaves pubescent or pilose; hypogynous bristles 3.

2a. Glumes 3-nerved, awn slender, pilose; hypogynous scales glabrous .... **F. ciliaris**

2b. Glumes 7-nerved, awn strong, thorn-like, scabrous; hypogynous scales ciliate ..... **F. capitata**

Fuirena capitata (Burm. f.) Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:151. 1985; Sivar. & Mathew, Fl. Nilambur 784. 1996. *Scirpus capitatus* Burm. f., Fl. Ind. 21. 1768. *Scirpus uncinatus* Willd., Sp. Pl. 1:300. 1798; Vahl, Enum. Pl. 2: 259. 1806. *Isolepis uncinata* (Willd.) Roem. & Schult., Syst. Veg. 2:1211. 1817. *Fuirena uncinata* (Willd.) Kunth, Enum. Pl. 2:184. 1837; Clarke in Hook. f., Fl. Brit. India 6:666. 1893; Fischer in Gamble, Fl. Pres. Madras 1669. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 684. 1976; Mani. & Sivar., Fl. Calicut 322. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1764. 1983; Ramach. & Nair, Fl. Cannanore 519. 1988.

Erect or decumbent, non-rhizomatous annual herbs with reddish-brown fibrous roots; culms tufted, 7-20 cm long, obtusely angled, ribbed, 3-5 nodose. Leaves 3-8 x 0.3-0.5 cm, linear to linear-lanceolate, apex subacute, pilose, several nerved; sheaths upto 2.5 cm long, pilose; ligules c. 1 mm long, membranous. Inflorescence bearing 2-4 glomerules of spikelets, 8-15 mm across, each bearing 5-22 spikelets. Spikelets sessile, 4-7 x 2-3 mm, ellipsoidal, squarrose. Glumes spiral, 2-2.5 x 1-1.5 mm, obovate or obovate-elliptic, apex obtuse, pilose on margins and on midrib, strongly keeled, 1-nerved on the keel and 3-nerved on each side, the two side nerves and the central one projecting beyond the glume forming 1 mm long awn. Hypogynous bristles 3, retrorsely scabrid. Hypogynous scales 3, 3-nerved, margins ciliate, truncate-round at apex. Stamens 3. Stigmas 3, papillose. Nuts to 1 x 0.5 mm, ovoid, triquetrous, stipitate at base, light brown.

F. & Fr.: Aug. - Dec.

Distr.: Confined to Sri Lanka and southern India.

In wet sandy soil and in open grassy habitats. *CNS 1610* (Punnapra), *CNS 2505* (Mannncherry).

Fuirena ciliaris (L.) Roxb., (Hort. Beng. 81. 1814 *nom. nud*).; Fl. Ind. ed. 1, 1:184. 1820; Hooper in Sald. & Nicols., Fl. Hassan Dist. 683. 1976; Mani. & Sivar., Fl. Calicut 322.

1982; Rao & Verma, Cyperac. N.E. India 47. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1763. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:150. 1985; Ramach. & Nair, Fl. Cannanore 518. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 516. 1994; Sivar. & Mathew, Fl. Nilambur 785. 1996. *Scirpus ciliaris* L., Mant. 2: 182. 1771. *Fuirena glomerata* Lam., Tabl. Encycl. 1: 150. 1791; Clarke in Hook. f., Fl. Brit. India 6: 666. 1893; Fischer in Gamble, Fl. Pres. Madras 1669. 1931. *Scirpus pilosus* Retz., Obs. Bot. 6: 19. 1791.

Erect, tufted, non-rhizomatous annual herbs; culms 10-34 cm tall, slender, obtusely angular, 2-4-noded, pubescent. Leaves 2.5 - 9 x 0.3-0.6 cm, linear or linear-lanceolate, base rounded, apex acute, wholly pubescent, 3-5-nerved, basal leaves reduced to bladless sheaths; sheaths to 2.5 cm long; ligules 1-2 mm long, hairy. Inflorescence with 1 to 3 glomerulous clusters of spikelets; clusters 1-2 cm across, bearing 4-10 spikelets; bracts leaf-like. Spikelets 5-10 x 2.5 - 3.5 mm, ovate or oblong-elliptic, squarrose, pubescent. Glumes spiral, 1.5-2 x 1 mm, oblong-obovate, pubescent, 3-nerved; awn c. 1 mm long, recurved. Hypogynous bristles 3, scabrid. Hypogynous scales 3, c. 1 x 0.5 mm, longitudinally rectangular with 3-denticulate apex, base long-stipitate. Stamens 3. Stigmas 3, papillose. Nuts c. 1 x 0.5 mm, obovate to elliptic, triquetrous.

F. & Fr.: Sep. - Jan.

Distr.: Widely distributed in tropical and subtropical regions of the Old World; Tropical Africa, Indian subcontinent, southeastern Asia, southern China, Japan, Malesia and Australia.

A very common species usually seen in wet open grounds and also as a weed in rice fields. *CNS 1565* (Kanjippadam).

Fuirena umbellata Rottb., Descr. Icon. Rar. Nov. Pl. 70, t. 19. 1773; Clarke in Hook. f., Fl. Brit. India 6:666. 1893 & in Ill. Cyperac. t. 59, f. 9. 1909; Fischer in Gamble, Fl. Pres. Madras 1669. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 683. 1976; Mani. & Sivar., Fl. Calicut 322. 1982; Rao & Verma, Cyperac. N.E. India 48. 1982; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:148. 1985; Ramach. & Nair, Fl. Cannanore

518. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 517. 1994; Sivar. & Mathew, Fl. Nilambur 785. 1996. *Fuirena pentagona* Wight & Arn. ex Nees in Wight, Contr. Bot. India 93. 1834. *Fuirena uncinata* sensu Thw., Enum. Pl. Zeyl. 347. 1864, non (Willd.) Kunth, 1837.

Erect, rhizomatous perennial herbs, 40-97 cm tall; rhizome short, thick, horizontal; culms sharply 4- or 5-angular, several noded, glabrous except below inflorescence. Leaves cauline, 7-18 x 0.5-1.2 cm, lanceolate to linear-lanceolate, base rounded, apex acute, 5-nerved, glabrous or ciliate at base; sheaths to 6 cm long; ligules membranous. Inflorescence paniculiform, with 3 to 10 glomerulous clusters of sessile spikelets; each glomerules bearing 4 to 10 spikelets; peduncles white-villose. Spikelets 6-10 x 2-3 mm, ovoid, acute, brownish-green at maturity, wholly pubescent; bracts 2-3, lowest one leaf-like. Glumes spiral, 2-2.5 x 1-1.5 mm, obovate, apex rounded, short-hairy, the midvein ending in a short, recurved, often pilose, 0.5-1 mm long awn. Hypogynous bristles absent. Hypogynous scales 3, c. 1.5 x 0.5 mm, obovate, subsessile with a very short claw at base, apex, truncate, 3-nerved, mid-nerve projecting into a short curled mucro, minutely ciliate at apex. Stamens 3; anthers c. 0.5 mm long. Style c. 1 mm long; stigmas 3. Nuts c. 1 x 0.5 mm, elliptic to obovate; triquetrous, apex beak-like.

F. & Fr.: Jun. - Dec.

Distr.: Pantropical. Common in wet places, marshy areas near rivers, canals, rice fields, etc. *CNS 2546* (Thrikunnapuzha).

HYPOLYTRUM Persoon

Syn. Pl. 1:70. 1805.

Hypolytrum nemorum (Vahl) Spreng., Syst. Veg. 1:233. 1825; Hooper in Sald. & Nicols., Fl. Hassan Dist. 685. 1976; Rao & Varma, Cyperac. N.E. India 53. 1982. subsp. **nemorum** Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:138. 1985; Ramach.& Nair, Fl. Cannanore 519. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 286. 1988; Mani., Fl. Silent Valley 343. 1988; Vajravelu, Fl. Palghat Dist. 551. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 517. 1994; Sivar. & Mathew, Fl. Nilambur 786. 1996;

Sasi. & 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; Thw., Enum. Pl. Zeyl. 346. 1864; Clarke in Hook. f., Fl. Brit. India 6: 678. 1893; Clarke, Ill. Cyperac. t. 106, f. 1-12. 1909; Fischer in Gamble, Fl. Pres. Madras 1673. 1931. ***Berra-kaida*** Rheede, Hort. Malab. 12:109, t. 58. 1693.

Erect, rhizomatous perennials, 60-110 cm tall; rhizome woody, short; culms triquetrous. Leaves basal and 1-3 upper on the culm, 60-95 x 1-2 cm, broadly linear, margins scabrid, apex acute, flattish-plicate, subcoriaceous, midnerve scabrid beneath; sheaths to 6 cm long, mouth truncate. Inflorescence terminal corymbose-panicle, compound to decompound, 3.5-6 cm tall, 4-7 cm across; bracts 2-3, leaf-like, lowest much exceeding the inflorescence. Spikelets 4-6 x 3-4 mm, globose to ellipsoidal. Glumes spiral, 2-2.5 x 1.5-2 mm, ovate-orbicular, obtuse, membranous, light brown. Hypogynous scales 2, hyaline, c. 1 mm long. Stamens 2. Style short; stigmas 2. Nuts 2-3 x 1.5-2 mm, broadly ovate, broadest at slightly below the middle, yellowish-brown.

Fl. & Fr.: Throught the year.

Distr.: Wide spread from India through Indo-China and Sothern China, eastwards to Malesia and to Fiji. In sacred groves. *CNS 1807* (Nangiarkulangara), *CNS 2513* (Sarangakavu at Venmony).

KYLLINGA Rottboell

Descrpt. Icon. Rar. Pl. 12. 1773 (*nom. cons.*).

Rhizomatous herbs; rhizome short or horizontally creeping, sometimes knotty; culms trigonous. Leaves basal; ligule absent. Inflorescence head-like with 1 to few sessile spikes; spikes cylindrical, ellipsoidal or globose; bracts 2-8, leaf-like. Spikelets bilaterally flattened, 1, 2 or rarely 3 or more flowers; rachilla deciduous as a whole. Glumes distichous, 4, sharply keeled, sometimes with a distinct wing on the keel, the 2 basal small, sterile, others larger, third glume fertile subtending a bisexual flower, fourth glume sterile. Stamens 2-3. Style capillary; stigmas 2. Nut strongly flattened, ovate to oblong, sometimes apiculate.

1a. Rhizome short or absent, culms tufted.

2a. Culms bulbose-thickened at base; head white, central spike globose, 5-6 mm long ..... **K. bulbosa**

2b. Culms hardly thickened at base; head greenish, central spike cylindrical, 8-15 mm long ..... **K. odorata** spp. **cylindrica**

1b. Rhizome long, culms solitary in linear rows along the length of the rhizome.

3a. Glumes winged ..... **K. nemoralis**

3b. Glumes not winged.

4a. Culms 35-65 cm tall, close together; rhizome 4-6 mm thick; leafy bracts 5-8 ..... **K. polyphylla**

4b. Culms 9-26 cm tall, more or less spaced; rhizome 2-3 mm thick; leafy bracts 3-4 ..... **K. brevifolia**

Kyllinga brevifolia Rottb., Descr. Icon. Rar. Nov. Pl. 13, t. 4, f. 3. 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; Koyama, Gard. Bull. Singapore 30: 163. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:248. 1985; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1765. 1983; Sivar. & Mathew, Fl. Nilambur 788. 1996. *Cyperus brevifolius* (Rottb.) Hassk., Cat. Hort. Bogor. 24. 1884; Kukenth. in Engl., Pflanzenr. IV.20(101): 600. 1936; Rao & Verma, Cyperac. N.E. India 6. 1982; Ramach. & Nair, Fl. Cannanore 503. 1988.

Erect, rhizomatous perennials; rhizome long, creeping, slender, covered with brownish scales; culms arranged in a single row along the rhizome, 9-26 cm long, triquetrous. Leaves basal, 1.5-17 x 0.1-0.3 cm, narrowly linear, acuminate, scabrid on margins in the upper part; sheaths membranous, 1.5-5 cm long, purplish-brown, lower ones bladeless. Inflorescence a terminal single globose head, 5-10 mm long and wide, greenish; leafy bracts 3-4, very unequal in length, the lowest upto 9 cm long. Spikelets c. 3 x 1 mm, oblong. Glumes 4, distichous, basal 2 sterile, small, 3rd glume fertile, c. 2.5 x 1 mm, ovate-mucronate, 4th glume sterile, c. 3 mm long, keeled. Stamens 1 or 2. stigmas 2. Nut 1-15 mm long, c. 0.5 mm wide, oblong, apiculate, biconvex, brown.

Fl. & Fr.: Jul. - Dec.

Distr.: Pantropical. Very common in wet places. *CNS 1341* (Noottavanpara).

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. *Schaenoides triceps* Rottb., Descr. Pl. Rar. Progr. 15. 1772, nom. ivalid. *Kyllinga triceps* Rottb., Descr. Icon. 14, t. 4, f. 6. 1773, *nom. illegit.*, Clarke in Hook. f., Fl. Brit. India 6:587. 1893; Fischer in Gamble, Fl. Pres. Madras 1623. 1931; Koyama, Gard. Bull. Singapore 30: 162. 1977; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:1768. 1983; Vajravelu, Fl. Palghat Dist. 553. 1990; Sivar. & Mathew, Fl. Nilambur 789. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 496. 1996. *Cyperus triceps* (Rottb.) Endl., Cat. Hort. Acad. Vindb. 1:94. 1842; Kukenth. in Engl., Pflanzenr. IV.20(101): 587. 1936; Kern, Rinwardtia 3: 61. 1954; Ramach.& Nair, Fl. Cannanore 513. 1988; Mani., Fl. Silent Valley 341. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 511. 1994. *Kyllinga tenuifolia* Steud., Syn. Pl. Glum. 2:69. 1855; Hooper in Sald. & Nicols., Fl. Hassan Dist. 688. 1976; Mani. & Sivar., Fl. Calicut 311. 1982.

Erect, tufted herbs; rhizome short, erect, not stoloniferous; culms 4-10 cm tall, slender, trigonous. Leaves few, 1-2 mm wide, linear, apex acuminate; sheaths 1-1.5 cm long, light brown. Inflorescence a head with 1-3 sessile, white spikes, central spike 5-8 mm long, ovoid-globose; bracts 3 or 4, linear, much exceeding the inflorescence. Spikelets 1.5-2 x 0.5 mm, oblong, 1-flowered. Glumes 4, distichous, ovate-oblong, acute, plicate on a smooth keel, basal 2 glumes smaller, empty, c. 0.5 mm long. Stamens 2. Stigmas 2. Nuts c. 1 x 0.5 mm, oblong, apiculate, brownish.

Fl. & Fr.: Aug. - Dec.

Distr.: From tropical Africa through India and Indo-China, northeastwards to southern China and eastwards to Malesia and northern Australia. Rare. *CNS 2516* (Chathiyara).

Kyllinga nemoralis (J.R. & G. Forster) Dandy ex Hutchins. & Dalziel, Fl. W. Trop. Africa 2:486, 487. 1936; Hooper in Sald. & Nicols., Fl. Hassan Dist. 687. 1976; Koyama, Gard. Bull. Singapore 30: 163. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:249.

1985; Mani. & Sivar., Fl. Calicut 311. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:1767. 1983; Vajravelu, Fl. Palghat Dist. 552. 1990; Sivar. & Mathew, Fl. Nilambur 789. 1996; Sasi. & Sivar. Fl. Pl. Thrissur For. 496. 1996. *Thryocephalon nemoralis* J.R. & G. Forster, Char. Gen. Pl. 130. 1776. *Kyllinga monocephala* Rottb., Descr. Icon. Rar. Nov. Pl. 13, t. 4, f. 4. 1773, nom. illegit., Clarke in Hook. f., Fl. Brit. India 6:588. 1893; Fischer in Gamble, Fl. Pres. Madras 1624. 1931. *Cyperus kyllingia* Endl., Cat. Hort. Acad. Vindb. 1:94. 1842; Rao & Verma, Cyperac. N.E. India 7. 1982; Ramach. & Nair, Fl. Cannanore 508. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 508. 1994.

Erect, rhizomatous perennials; rhizome long-creeping covered with brown scales; culms triquetrous. Leaves many, 2-15 x 0.2-0.4 cm, linear, margins scabrid on the upper part; sheaths 1-3 cm long, purple-brown. Inflorescence a head of globose spikes, the central spike longer than the others, white; leafy bracts 3-4, exceeding the inflorescence, the lowest upto 14 cm long. Spikelets many, 2.5-3 x 1-1.5 mm, ovate-elliptic. Glumes distichous, 2-2.5 mm long, boat-shaped, keeled, lower 2 glumes smaller, empty. Stamens 3. Stigmas 2. Nut 1-1.5 mm long, obovate or oblong, biconvex, brownish.

Fl. & Fr.: Jul. - Nov.

Distr.: Pantropics. A very common species found along road sides and waste places. *CNS 1330* (Angadikkal).

Kyllinga odorata Vahl, Enum. Pl. 2: 382. 1906, subsp. **cylindrica** (Nees ex Wight) Koyama, Gard. Bull. Singapore 30:161. 1977. & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:244. 1985. *Kyllinga cylindrica* var. *subtriceps* Nees ex Wight, Contr. Bot. India 91. 1834; Clarke in Hook. f., Fl. Brit. India 6:588. 1893; Fischer in Gamble, Fl. Pres. Madras 1624. 1931. *Kyllinga odorata* Vahl var. *cylindrica* (Nees ex Wight) Kukenth. ex Merr., J. Straits Branch Roy. Asiat. Soc. 76: 80. 1917. *Cyperus sesquiflorus* Mattfeld & Kukenth. subsp. *cylindricus* (Nees ex Wight) Koyama, Bot. Mag. Tokyo 83: 187. 1970. *Cyperus sesquiflorus* Mattfeld & Kukenth. var. *subtriceps* (Nees) Koyama, Quart. J. Taiwan Mus. 14: 191. 1961; Rao & Verma, Cyperac. N.E. India 6. 1982.

Erect, tufted, rhizomatous perennials; rhizome short, thick; culms 12-29 cm tall, triquetrous. Leaves few, 1.5-9 x 0.2-0.4 cm, linear, acute, scabrid on upper margins; sheaths 2-5.5 cm long, pale brown. Inflorescence a head with 1-3 spikes, 1-1.4 cm long, c. 1. cm wide, whitish-green; central spike 1-1.4 cm long, cylindrical; lateral spikes globose, much shorter than the central spike; leafy bracts 3-5, the lowest upto 8 cm long. Spikelets 2-2.5 mm long, elliptic, flattened. Glumes 4, basal 2 small, c. 2 mm long, upper two glumes c. 2.5 mm long, braodly ovate, folded with green, smooth keel. Stamens 2. Style short; stigmas 2. Nuts c. 1.5 x 1 mm, oblong, apiculate, biconvex, brown to black.

Fl. & Fr.: Aug. - Jan.

Distr.: Tropical Africa, tropical and subtropical Asia. Rare In moist places. *CNS 1741* (Cheriyanad).

Kyllinga polyphylla Willd. ex Kunth, Enum. Pl. 2:134. 1837; Koyama, Gard. Bull. Singapore 30: 163. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 247. 1985. *Kyllinga aromatica* Ridl., Trans. Linn. Soc. London 2:146. 1884. *Cyperus aromaticus* (Ridl.) Mattfeld & Kukenth. in Engl., Pflanzenr. IV.20(101): 581. 1936; Koyama, Bot. Mag. (Tokyo) 83: 186. 1970 (Fig. 76).

Erect, rhizomatous perennials; rhizome horizontally creeping, 4-6 mm thick, knotty, clothed with purple-brown scales; culms arranged in a row along the rhizome, 35-65 cm tall, triquetrous. Leaves 3 or 4 to a culm, short-bladed or reduced to sub-aphyllous sheaths; sheaths 4-15 cm long, purple-brown below. Heads bearing 1-3 spikes, 8-12 mm long, ovoid; leafy bracts 5-8, upto 16 cm long. Spikelets 3-3.5 mm long, ovate-elliptic, mucronate, keeled, keel spinulose; upper glume empty or male. Syle c. 2 mm long, deeply 2-cleft. Nut c. 1.5 mm long, ovate-oblong, lenticular, dark brown.

Fl. & Fr.: Aug. - May.

Distr.: Tropical Africa and Madagascar; introduced to Sri Lanka, Malesia, Fiji Isls., and West Indies. In marshy places. *CNS 2318* (Ezhupunna).

LIPOCARPHA R. Brown

in Tuckey, Narr. Exped. Zaire 5:459. 1818 (*nom. cons.*).

Lipocarpha sphacelata (Vahl) Kunth, Enum. Pl. 2:267. 1837; Clarke in Hook. f., Fl. Brit. India 6:667. 1893; Kern, Reinwardtia 6:32. 1961; Hooper in Sald. & Nicols., Fl. Hassan Dist. 688. 1976; Rao & Verma, Cyperac. N.E. India 49. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1769. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:252. 1985; Sivar. & Mathew, Fl. Nilambur 791. 1996; Sasi. & 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, Contr. Bot. India 92. 1834; Fischer in Gamble, Fl. Pres. Madras 1670. 1931.

Erect annual herbs with brownish fibrous roots; culms tufted, 12-23 cm tall, obtusely trigonous to subterete. Leaves basal, 2-3 to a culm, 3-14 x 0.2-0.4 cm, linear, apex sub-obtuse; sheaths upto 5 cm long, lower ones purplish, bladeless. Inflorescence a head of 2 to 5 spikelets, 6-12 x 4-8 mm, dark purple-brown; bracts 2 or 3, unequal, divergent, 1 or 2 lower leaf-like and well elongated. Spikelets 4-7 x 2.5-4 mm, ovoid, purple or brown. Glumes spiral, 1.5-2 x 1 mm, obovate-oblong, spathulate; inner scales 2, c. 1 mm long, oblong, hyaline. Stamens 1-2. Stigmas 3. Nuts 1-1.5 x 0.5 mm, oblong-elliptic, trigonous, apiculate, brown.

Fl. & Fr.: Sep. - Dec.

Distr.: Tropical Africa, India, Sri Lanka, Nepal, Thailand and tropical America. In open wet grassy habitats. *CNS 1778* (Chathiyara).

MARISCUS M. Vahl

Enum. Pl. 2:372. 1805-1806 (*nom. cons.*).

Annual or perennial, erect herbs, culms trigonous or subterete. Leaves basal, linear. Inflorescence terminal, solitary or umbellate heads or spikes, compact, compressed or terete; rachilla deciduous, winged or wingless. Spikelets with few to many glumes distichously disposed on a continuous simple axis. Glumes distichous, persistent on the

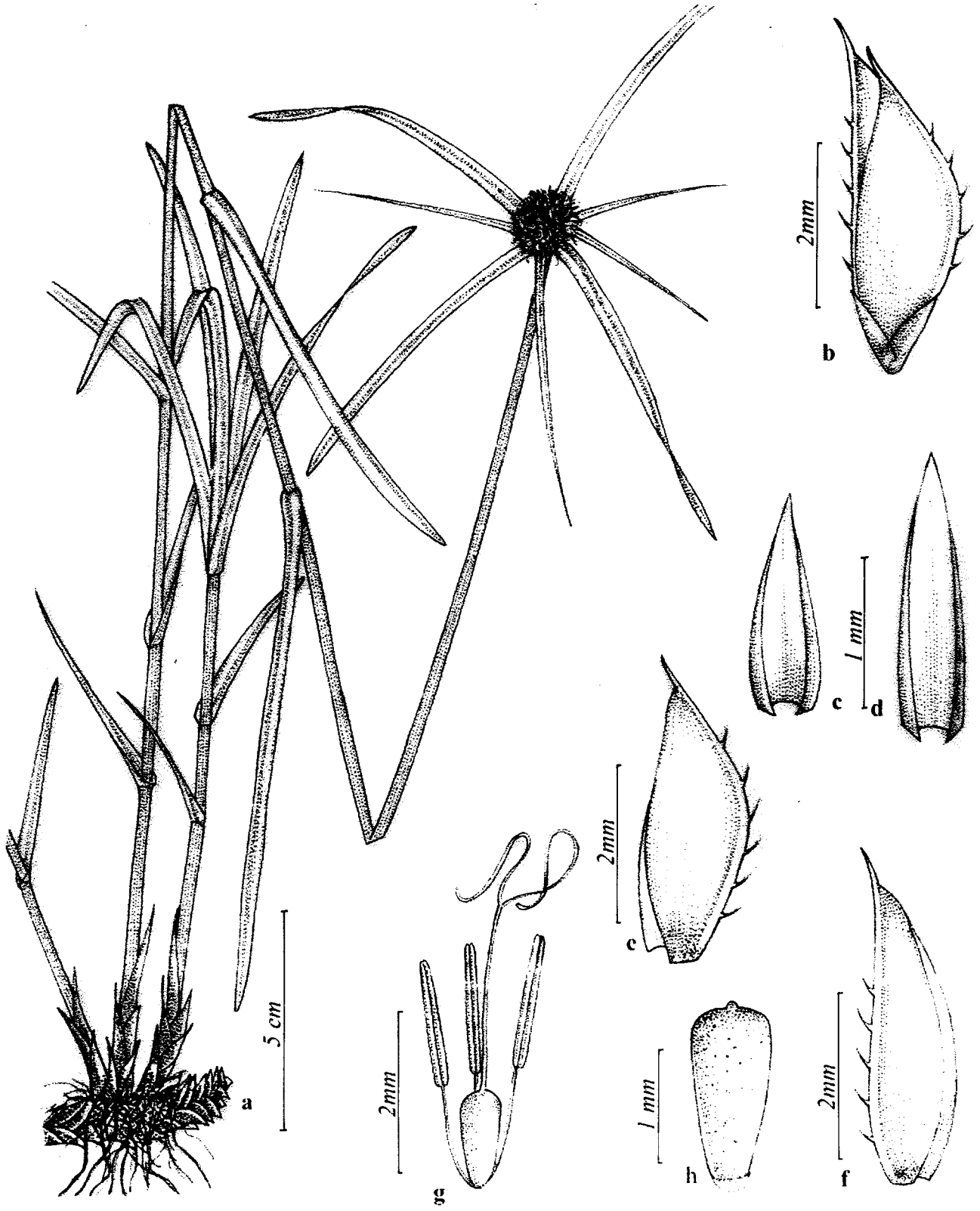


Fig. 76. *Kyllinga polyphylla* Willd. ex Kunth: a. Habit; b. Spikelet; c. First glume; d. Second glume; e. Third glume; f. Fourth glume; g. Stamens and pistil; h. Nut.

rachilla which disarticulates above the two lowest glumes (which are empty and smaller) leaving a knob or disk, with sometimes an annular ridge on its summit. Stamens 1, 2 or 3. Style 3-fid. Nut trigonous, linear-oblong, one of the side facing the rachilla.

1a. Spikelets crowded into a single globose head ..... **M. dubius**

1b. Spikelets digitate or crowded into many globose heads.

2a. Spikelets flattened, 3 to many-flowered; glumes folded on a conspicuous keel.

3a. Plants annual; glumes aristate.

4a. Spikelets digitate; rachilla winged ..... **M. maderaspatanus**

4b. Spikelets crowded into globose heads, rachilla not winged .... **M. squarrosus**

3b. Plants perennial; glumes not aristate.

5a. Spikelets lanceolate, spicate, straw-coloured ..... **M. javanicus**

5b. Spikelets linear, congested in a globose head, red-brown .... **M. compactus**

2b. Spikelets terete, 1 or 2-flowered; glumes not or scarcely keeled. .... **M. cyperinus**

Mariscus compactus (Retz.) Boldingh, Zakfl. Landb. Java 77. 1916; Druce, Rep. Bot. Soc. Exch. Club. 1916: 634. 1917; Fischer in Gamble, Fl. Pres. Madras 1645. 1931; Koyama, Gard. Bull. Singapore 30: 153. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:228. 1985; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1771. 1983; Vajravelu, Fl. Palghat Dist. 554. 1990; Sivar. & Mathew, Fl. Nilambur 792. 1996. *Cyperus compactus* Retz., Obs. Bot. 5:10. 1789; Kukenth. in Engl., Pflanzenr. IV.20(101): 423. 1936; Blake, J. Arnold Arb. 28: 221. 1947; Ramach.& Nair, Fl. Cannanore 503. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 506. 1994. *Cyperus dilutus* Vahl, Enum. Pl. 2:357. 1806. *Mariscus microcephalus* Presl, Reliq. Haenk. 1:182. 1828; Clarke in Hook. f., Fl. Brit. India 6:624. 1893. *Mariscus dilutus* (Vahl) Nees in Wight, Contr. Bot. India 90. 1834.

Erect perennials with short corm-like rhizome; culms 28-75 cm tall, obtusely trigonous, smooth. Leaves basal, few, 20-65 x 0.4-0.8 cm, linear, acuminate, canaliculate,

scabrid on margins and midrib towards the tip, glaucous-green; sheaths 7-11 cm long, reddish-brown. Inflorescence compound, 8.5-19x8-23 cm; leafy bracts 4-7, lower 3 much exceeding the inflorescence, the longest upto 70 cm long; primary rays 6-11. Spikelets congested in globose heads, 5-10 x 0.5-1 mm, linear, subterete, reddish-brown. Glumes distichous, 3-4 x 1-1.5 mm, linear-oblong, apex obtuse, keeled, sides reddish-brown, basal 2 glumes empty. Stamens 3; anthers linear. Stigmas 3. Nuts 1.5-2 x 0.5 mm, linear-oblong, trigonous, brown, apiculate.

Fl. & Fr.: Sep. - Mar.

Distr.: India, Southern China, Taiwan and Malesia. Rare. In wet low lands. *CNS 1453.* (Kavalam).

Mariscus cyperinus (Retz.) Vahl, Enum. Pl. 2: 377. 1806; Clarke in Hook. f., Fl. Brit. India 6:621. 1893; Fischer in Gamble, Fl. Pres. Madras 1644. 1931; Hooper in Sald. & Nicols., Fl. Hassan Dist. 689. 1976; Koyama, Gard. Bull. Singapore 30: 157. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:233. 1985; Mani. & Sivar., Fl. Calicut 312. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1771. 1983; Vajravelu, Fl. Palghat Dist. 554. 1990; Sasi. & Sivar. Fl. Pl. Thrissur For. 497. 1996. *Kyllinga cyperina* Retz., Obs. Bot. 6:21. 1791. *Cyperus cyperinus* (Retz.) Sur. Hest. Gesl. Cyper. Mal. Archip. 154. t. 6. f. 10. 1898; Kukenth. in Engl., Pflanzenr. IV.20(101): 518. 1936; Rao & Verma, Cyperac. N. E. India 20. 1982; Ramach. & Nair, Fl. Cannanore 504. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 507. 1994.

Erect, tufted perennials with short rhizome; culms 10-30 cm tall, triquetrous, smooth. Leaves many, basal, 5-20 x 0.2 - 0.5 cm, linear, long-acuminate, scabrid on margins; sheaths upto 4 cm long, basal reddish-brown. Inflorescence simple 1-1.5 x 1.5 - 2 cm, branches spicate, spike nearly capitate, subsessile; leafy bracts 4-7, the longest upto 15 cm long. Spikelets 3-5 x 1-1.5 mm, linear-lanceolate, subterete, greenish-straw coloured. Glumes distichous, 3-4 x 1.5-2 mm, elliptic, obtuse, muticous, inrolled. Stamens 3; anthers linear. Stigmas 3. Nuts 2-2.5 x 0.5-1 mm, oblong, trigonous, shortly apiculate, brown, slightly curved, minutely puncticulate.

Fl. & Fr.: May - Aug.

Distr.: From India to Malesia and northern Australia, also in eastern Asia extending northwards to southern China. A very common species growing in a variety of habitats. *CNS 1340* (Noottavanpara).

Mariscus dubius (Rottb.) Kukenth. ex Fischer in Gamble, Fl. Pres. Madras 1644. 1931. Hooper in Sald. & Nicols., Fl. Hassan Dist. 689. 1976; Koyama, Gard. Bull. Singapore 30: 158. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 237. 1985; Mani. & Sivar., Fl. Calicut 312. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:1772. 1983; Vajravelu, Fl. Palghat Dist. 554. 1990; Sivar. & Mathew, Fl. Nilambur 793. 1996; Sasi. & Sivar. Fl. Pl. Thrissur For. 497. 1996. *Cyperus dubius* Rottb., Descr. Icon. Rar. Pl. 20, t. 4, f. 5. 1773; Boeck., Linnaea 36: 336. 1870; Clarke, J. Linn. Soc. Bot. 21: 197. 1884; Kukenth. in Engl., Pflanzenr. IV.20(101): 563. 1936; Kern, Reinwardtia 6:65. 1961; Mani., Fl. Silent Valley 339. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 507. 1994. *Cyperus kyllingaeoides* Vahl, Enum. Pl. 2:312. 1806. *Mariscus dregeanus* Kunth, Enum. Pl. 2:120. 1837; Clarke in Hook. f., Fl. Brit. India 6:620. 1893.

Erect, tufted perennials with short rhizome; culms 15-38 cm tall, triquetrous, base bulbous, covered with brown membranous sheaths. Leaves many, basal, 16-30 x 0.2 - 0.4 cm, linear, gradually acuminate at apex, scabrid on margins towards the apex; sheaths 2-6 cm long, basal ones brown. Inflorescence simple, congested in a dense, hemispherical, ovoid, white, head, 1-2 cm long and wide; leafy bracts 3-5, the longest upto 20 cm long. Spikelets 5-8 x 1.5-2.5 mm, ovate-acute, turgid-flattened. Glumes 4-9, distichous, 2.5-3.5 x 2-3 mm, broadly ovate, apex subacute, whitish. Stamens 3; anthers c. 1.5 mm long, oblong. Stigma 3. Nuts 1.5-2 x 0.5 mm, oblong-ellipsoid, trigonous, light brownish.

Fl. & Fr.: Aug. - Dec.

Distr.: Tropical Africa through India and Indo-China, eastwards to Malesia. In sandy wastelands. *CNS 1751* (Vandanam), *Suresh 42455* (Alappuzha) (CALI).

Mariscus javanicus (Houtt.) Merr. & Metcalfe, Lingnan Sci. J. 21: 4. 1945; Koyama, Gard. Bull. Singapore 30: 153. 1979 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:227. 1985; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 288. 1988. *Cyperus javanicus* Houtt., Nat. Hist. 2: 13. 1782; Blake, J. Arnold. Arb. 28: 222. 1947; Ramach.& Nair, Fl. Cannanore 507. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 508. 1994. *Cyperus pennatus* Lam., Ill. 1:144. 1791; Clarke, J. Linn. Soc. Bot.21: 194. 1884; Kukenth. in Engl., Pflanzenr. IV.20(101): 476. 1936. *Mariscus albescens* Gaud. in Freyc., Voy. Bot. 415. 1827; Clarke in Hook. f., Fl. Brit. India 6:623. 1893. *Mariscus pennatus* (Lam.) Domin, Bibl. Bot. 85: 440. 1915; Fischer in Gamble, Fl. Pres. Madras 1645. 1931; Mani. & Sivar., Fl. Calicut 312. 1982. ***Ira*** Rheede, Hort. Malab. 12:103, t. 55. 1693. ***Valeera.***

Erect, tufted perennials with short rhizome; culms 40-85 cm tall, obtusely trigonous, glaucous-green. Leaves many, 45-100 x 0.5-1.3 cm, linear, gradually acuminate, scabrid on margins and midrib, coriaceous, glaucous-green; sheaths 5-12 cm long, basal ones dark brown. Inflorescence large, compound, 7-15 x 8-20 cm; primary rays 6-12; leafy bracts 5-7, the lower ones much exceeding the corymb, the longest upto 70 cm long. Spikelets densely spicate, 4-7 x 1.5-3 mm, oblong-lanceolate, acute, straw-coloured. Glumes distichous, 2.5-3.5 x 2-2.5 mm, broadly ovate, apex acute, subcoriaceous, keel greenish, pale brown, margins white hyaline, basal 2 glumes empty. Stamens 3. Stigmas 3. Nut 1-1.5 x 0.5-1 mm, obovate, trigonous, black-brown.

Fl.& Fr.: Throughout the year.

Distr.: Tropical Africa, Madagascar, through Indian subcontinent to southern China and the southern Ryukyus, as well as to Malesia, northern Australia and the Pacific Islands. Usually seen in sandy areas along the coastal belt. *CNS 1806* (Alappuzha beach).

Mariscus maderaspatanus (Willd.) Napper, J. E. African Nat. Hist. Soc. 28: 124. 1971; Hooper in Sald. & Nicols., Fl. Hassan Dist. 690. 1976; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1773. 1983. *Cyperus maderaspatanus* Willd., Sp. Pl. 1:278. 1797; Ramach. & Nair, Fl. Cannanore 508. 1988. *Mariscus squarrosus* Clarke in Hook. f., Fl.

Brit. India 6:623. 1893 (*quoad spec.)*; Fischer in Gamble, Fl. Pres. Madras 1645. 1931, non *Cyperus squarrosus* L. 1753.

Erect, tufted, non-rhizomatous annuals; culms 4-10 cm tall, triquetrous. Leaves few, basal, 3-8 x 0.1 - 0.3 cm, linear, gradually acuminate; sheaths 1-2.5 cm long, purple. Inflorescence simple or compound, 2-4 cm across; leafy bracts 2-4, the lowest upto 5.5 cm long. Spikelets digitate, 5-10 x 2-3 mm, oblong or linear, compressed. Glumes distichous, 2-3 x 0.5-1 mm, elliptic or ovate, strongly keeled with 0.5-1 mm long, recurved awn, basal 2 glumes empty. Stemen 1. Stigmas 3. Nuts c. 1 mm long, oblong, trigonous, brown, puncticulate.

Fl. & Fr.: Aug. - Oct.

Distr.: Tropical east Africa to S.E.Asia. In dry sandy areas. *CNS 2519* (Ponnamveli).

Mariscus squarrous (L.) Clarke in Hook. f., Fl. Brit. India 6:623. 1893; Hooper in Sald. & Nicols, Fl. Hassan Dist. 690. 1976; Koyama, Gard. Bull. Singapore 30:153. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:229. 1985; Mani. & Sivar., Fl. Calicut 312. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:1774. 1983; Vajravelu, Fl. Palghat Dist. 555. 1990. *Cyperus squarrosus* L., Cent. Pl. 2: 6. 1756; Ramach. & Nair, Fl. Cannanore 512. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 510. 1994. *Cyperus aristatus* Rottb., Descr. Pl. Rar. Progr. 22. 1772; Clarke in Hook. f., Fl. Brit. India 6: 606. 1893; Fischer in Gamble, Fl. Pres. Madras 1640. 1931; Kukenth. in Engl., Pflanzenr. IV.20(101): 502. 1936. *Mariscus aristatus* (Rottb.) Chermezon, Bull. Soc. Bot. France 85: 366. 1938.

Erect, tufted, non-rhizomatous annual herbs; culms 5-12 cm tall, triquetrous. Leaves 2-4 to a culm, 1.5-8 x 0.1-0.3 cm, linear, flat, gradually acuminate; sheaths upto 2.5 cm long, reddish-purple. Inflorescence simple,open, or often reduced to a single hemispherical head; rays 1-3; leafy bracts 2-4, the lowest upto 8 cm long; spikes 0.5-1.5 cm across, subglobose. Spikelets 6-12 x 3-4 mm, oblong or linear, compressed. Glumes distichous, 2-2.5 long (including awn), c. 1 mm wide, oblong-ovate, folded, apex

narrowed in to a recurved, c. 1 mm long awn, greenish; basal 2 glumes empty. Stamen 1. Stigma 3-fid. Nuts c. 1 x 0.5 mm, oblong-obovate, trigonous, apiculate, brown.

Fl. & Fr.: Aug. - Nov.

Distr.: Widely distributed in tropical and subtropical regions of the world. Common on wet sandy soil. *CNS 2518* (Aroor).

PYCREUS Palisot de Beauvois

Fl. Oware 2:48. 1816.

Annuals or perennials; culms usually tufted, triquetrous. Leaves well-developed, flat or canaliculate. Inflorescence simple or compound, anthelate; bracts leaf-like, often overtopping. Spikelets laterally flattened with few to many glumes distichously disposed on a continuous rachilla. Glumes all alike, bearing a bisexual flower at the axil. Stamens 1 or 2. Stigmas 2; style not thickened at base. Nut bilaterally flattened, with one edge facing the rhachilla, dark brown to black, apiculate.

1a. Nuts transversely wrinkled with oblong epidermal cells ..... **P. stramineus**

1b. Nuts smooth to puncticulate.

2a. Glumes truncate to emarginate at apex, the midvein excurrent beyond the glume apex into a recurved mucro ..... **P. pumilus**

2b. Glumes acute to subobtuse at apex, never emarginate nor cuspidate.

3a. Glumes 2.5 - 3 mm long, orbicular-obovate, margins broadly white-hyaline; spikelets 2-3.5 mm wide; culms mostly solitary.

4a. Rays loosely embraced by a two-lobed sheath; nut half the length of the glume ..... **P. macrostachyos**

4b. Rays closely embraced by a two-lobed sheath; nut half the length of the glume ..... **P. puncticulatus**

3b. Glumes 1.5-2 mm long, ovate, margins not white-hyaline; spikelets 1.5-2 mm wide; culms tufted ..... **P. polystachyos**

Pycreus macrostachyos (Lam.) J. Raynal, Kew. Bull. 23: 314. 1969; Hooper in Sald. & Nicols., Fl. Hassan Dist. 692. 1976. *Cyperus macrostachyos* Lam., Ill. Gen. 1:147. 1791. *Pycreus albomarginatus* Nees in Martius,Fl. Brasil. 2, 1: 9. 1842; Clarke in Hook. f., Fl. Brit. India 6:594. 1893; Fischer in Gamble, Fl. Pres. Madras 1628. 1931. *Cyperus albomarginatus* (Nees) Steud., Syn. Pl. Glum. 2: 10. 1854; Kukenth. in Engl., Pflanzenr. IV.20(101): 359. 1936.

Erect, non tufted, non-rhizomatous annuals; culms 30-60 cm tall, triquetrous, enlarged at base. Leaves few, basal, as long as the culm, 4-8 mm wide, linear, flat, gradually acuminate; sheaths 10-20 cm long, reddish-brown. Inflorescence compound, 12 x 15 cm, rays loosely embraced by a 2-lobed sheath; bracts 3-5, spreading, lower much exceeding the inflorescence. Spikelets 20-35 x 2.5-3 mm, compressed, brown; rachilla narrowly winged. Glumes distichous, 2.5-3 x 1.5-2 mm, ovate-acute, keel green, sides yellow, margins broadly white hyaline. Stamens 2. Stigmas 2. Nuts stipitate, 1.5-2 x 1 mm, oblong or obovoid, biconvex, apiculate, black, densely puncticulate.

Fl. & Fr.: Apr. - May.

Distr.: Pantropical. Along the margins of rice fields. *Madhu 39693* (Aroor) (CALI).

Pycreus polystachyos (Rottb.) Beauv., Fl. d'Oware & Benin 2: 48, t. 86, f. 2. 1807; Clarke in Hook. f., Fl. Brit. India 6:592. 1893; Hooper in Sald. & Nicols., Fl. Hassan Dist. 693. 1976; Koyama, Gard. Bull. Singapore 30: 149. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:219. 1985; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1777. 1983; Vajravelu, Fl. Palghat Dist. 557. 1990; Sivar. & Mathew, Fl. Nilambur 795. 1996; Sasi. & Sivar., Fl. Pl. Thrissur. For 498. 1996. *Cyperus polystachyos* Rottb., Descr. Icon. Rar. Nov. Pl. 39, t. 11, f. 1. 1773; Nees in Wight, Contr. Bot. India 75. 1834; Tw., Enum. Pl. Zeyl. 342. 1864; Boeck., Linnaea 35: 477. 1868; Clarke; J. Linn. Soc. Bot. 21: 51, t. 3, f. 27. 1884; Blake, J. Arnold Arb. 28: 220. 1947; Kern, Reinwardtia 3:48. 1954; Rao & Verma, Cyperac. N.E. India 10. 1982; Mani. & Sivar., Fl. Calicut 314. 1982; Mani., Fl. Silent Valley 340. 1988; Ramach. & Nair, Fl. Cannanore 510. 1988; Mohanan & Henry, Fl.

Thiruvananthapuram 510. 1994. *Pycreus odoratus* Urban, Symb. Ant. 2:164. 1900; Fischer in Gamble, Fl. Pres. Madras 1627. 1931.

Erect, tufted, annual herbs; culms 15-34 cm tall, trigonous. Leaves few, 2.5-15 x 0.2-0.4 cm, linear, flat, scabrid on margins in the upper part, gradually acuminate; sheaths 1.5-3.5 cm long, purple brown. Inflorescence compound with well developed rays, but often contracted in a subglobose or irregularly lobed head-like cluster of spikelets without rays; leafy bracts 3 to 5, upto 11 cm long. Spikelets 1-2 x 0.15-0.2 cm, linear or linear-lanceolate, strongly compressed, yellow to straw coloured. Glumes 1.5-2 x 1 mm, ovate, acute, distichous, keeled. Stamens 2, rarely 1. Stigmas 2. Nut c. 1 x 0.5 mm, oblong, biconvex, dark brown.

Fl. & Fr.: Throughout the year.

Distri: Widely distributed in the tropical and subtropical regions of the world. Common in roadsides, rice-fields, river banks and other marshy areas. *CNS 1251* (Thottappally).

Pycreus pumilus (L.) Nees in 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; Koyama, Gard. Bull. Singapore 30: 151. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:224. 1985; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:1778. 1983; Vajravelu, Fl. Palghat Dist. 557. 1990; Sivar. & Mathew, Fl. Nilambur 795. 1996. *Cyperus pumilus* L., Cent. Pl. 2:6. 1756; Kern, Reinwardtia 3:50 1954 & in Steenis, Fl. Males. I, 7: 650. 1974; Rao & Verma, Cyperac. N.E. India 9. 1982; Ramach. & Nair, Fl. Cannnanore 510. 1988. *Cyperus pulvinatus* Nees & Meyen in Wight, Contr. Bot. India 74. 1834; Thw., Enum. Pl. Zeyl. 342. 1864. *Pycreus nitens* Nees, Nov. Act. Acad. Caes. Leop.-Carol. German Nat. Cur. 19, Suppl. 1:53. 1843; Clarke in Hook. f., Fl. Brit. India 6:591. 1893.

Erect, tufted, non-rhizomatous annual herbs; culms 7-18 cm tall, triquetrous. Leaves few, basal, 5-12 x 0.1-0.2 cm, linear, flat, gradually narrowed to long, acuminate apex, sheaths 1.5-3 cm long, purplish-brown. Inflorescence simple to subcompound, 2-5 cm long and as wide; primary rays 1-5, upto 3 cm long; bracts 3-5, the longest 7-12 cm

long. Spikelets 5-12 x 2-2.5 mm, oblong, subacute, flattened, light greenish. Glumes distichous, closely imbricate, 1-1.5 x 1 mm, ovate-obtuse, the midnerve excurrent into a distinct mucro, sharply keeled, 1-2 basal ones empty. Stamens 2. Stigmas 2; longer than the style. Nut upto 1 x 0.5 mm, ellipsoid, biconvex, distinctly apiculate, brown, distinctly puncticulate.

Fl. & Fr.: Throughout the year.

Distr.: From India through Indo-China and southern China eastwards to Malesia and Australia. Common in marshy fields, sandy river sides and also in dry localities. *CNS 1804* (Alappuzha).

Pycreus puncticulatus (Vahl) Nees, Fl. Brasil. 2(1): 10. 1842; Clarke in Hook. f., Fl. Brit. India. 6: 593. 1893; Fischer in Gamble, Fl. Pres. Madras 1628. 1931; Koyama, Gard. Bull. Singapore 30: 149, f. 7. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:218 1985; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1779. 1983; Sivar. & Mathew, Fl. Nilambur 796. 1996. *Cyperus puncticulatus* Vahl, Enum. Pl. 2: 348. 1806; Thw., Enum. Pl. Zeyl. 342. 1864. *Cyperus baccha* Kunth, Enum. Pl. 2: 115. 1837.

Erect, annual herbs with brownish fibrous roots; culms 23-50 cm tall, triquetrous, smooth. Leaves few, basal, 9-30 x 0.4-0.8 cm, linear, flat, gradually acuminate; sheaths 4-16 cm long, rusty brown. Inflorescence compound, lax, 8-20 cm long and wide, rays closely embraced by a two-lobed sheath; leafy bracts 3-5, the lowest upto 27 cm long. Spikelets spreading, 12-27 x 2-3.5 mm, linear-oblong to oblong-lanceolate, subacute, compressed, brown. Glumes distichous, 2-3 x 1.5-2 mm, ovate-orbicular, folded with green keel, notched at apex, brown, margins, broadly whitish-hyaline, 1-2 basal ones empty. Stamens 2. Style c. 1.5 mm long. Nut stipitate, 1-1.5 x 1-1.5, obovoid, biconvex, emarginate at apex, dark brown, densely puncticulate.

Fl. & Fr.: Aug. - Dec.

Distr.: Southern India, Malay Peninsula and Cochinchina. Usually found in the rice fields, swamps and marshy areas. *CNS 1211* (Pattanakkad).

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, Gard. Bull. Singapore 30: 147. 1977 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:216. 1985; Vajravelu, Fl. Palghat Dist. 557. 1990; Sivar. & Mathew, Fl. Nilambur 797. 1996. *Cyperus stramineus* Nees in Wight, Contr. Bot. India 74. 1834; Clarke, J. Linn. Soc. Bot. 21: 39. 1884. *Cyperus substramineus* Kukenth. in Engl., Pflanzenr. IV.20(101): 398. 1936; Kern in Steenis, Fl. Males. I, 7: 653. 1974; Ramach. & Nair, Fl. Cannanore 512. 1988.

Erect, tufted, non-rhizomatous annuals; roots yellowish; culms 10-32 cm tall, very slender, obtusely trigonous, often weakly curved. Leaves 2 or 3 to a culm, 6-22 x c. 0.1 cm, narrowly linear, gradually tapering to long-acuminate apex; sheaths 2.5-5 cm long, purple. Inflorescence simple, upto 3 x 2 cm, often congested in a single, spike-like cluster; leafy bracts 2-3, the lower upto 10 cm long. Spikelets 6-20 x 2-3 mm, linear-oblong, acute, flattened, straw-yellowish. Glumes distichous, c. 2 x 1.5 mm, ovate, acute, mucronate, keeled. Stamens 2. Style c. 2 mm long; stigmas 2. Nuts c. 1 x 0.5 mm, broadly elliptic, biconvex, brown to black, transversely rugulose.

Fl. & Fr.: Aug. - Jan.

Distr.: India, Sri Lanka, Indo-China and Malay Peninsula. This species is usually found in marshy localities, rice fields and grass fields. *CNS 1390* (Cherthala).

REMIREA Aublet

Hist. Pl. Guian. Franc. 1:44. 1775.

Remirea maritima Aublet, Hist. Pl. Guian. Franc. 1: 45, t. 16. 1775; Kunth, Enum. Pl. 2:139. 1837; Boeck., Linnaea 35:435. 1868; Clarke in Hook. f., Fl. Brit. India 6:677. 1893; Fischer in Gamble, Fl. Pres. Madras 1673. 1931; Blake, J. Arnold Arb. 29:100. 1948. *Remirea pedunculata* R. Br., Prodr. Fl. Nov. Holl. 236. 1810. *Remirea maritima* var. *pedunculata* (R. Br.) Benth., Fl. Austr. 7:347. 1878; Kukenth., Bot. Jahrb. 59: 53. 1924. *Mariscus pedunculatus* (R. Br.) Koyama, Gard. Bull. Singapore 30:159. 1977 & in Dassan

& Fosb., Rev. Handb. Fl. Ceylon 5:240. 1985. *Cyperus pedunculatus* (R. Br.) Kern, Act. Bot. Neerl. 7:798. 1958 & in Steenis, Fl. Males. I, 7:644. 1974.

Erect, rhizomatous perennials; rhizome long, creeping, rooting nodes, covered with membranous, brown sheaths; culms solitary or few together at nodes of rhizome, 5-22 cm tall, trigonous, densely leafy throughout. Leaves many, cauline, 2-6 x 0.4-0.7 cm, lanceolate, spine-tipped, coriaceous, canaliculate, glaucous-green; sheaths 2-4 cm long, brown. Inflorescence terminal, capitate with 3-8 sessile, short spikes, 1.2-2 x 1.5-2.2 cm; leafy bracts 3-6, the longest upto 4 cm long. Spikelets 4-5 x 1.5-2 mm, ovate-acute, slightly compressed. Glumes 4, lower 3 empty, small, the fourth 3-4 x 1.5-2 mm, ovate, apex acute to mucronate, bearing a bisexual flower. Stamens 3; anthers linear. Stigmas 3. Nut c. 2x 0.5 mm, oblong, trigonous, black, puncticulate.

Fl. & Fr.: Aug. - Dec.

Distr.: Southern Asia, Malesia and northern Australia; also in tropical America from eastern Venezuela through the Guianans, south to Brazilian Parana. Common in sandy sea coasts. *CNS 1063* (Ambalapuzha beach), *CNS 2522* (Arattupuzha).

RHYNCHOSPORA Vahl

Enum. 2:229. 1805 ("Rynchospora") (*nom. cons.*)

Annual or perennial herbs; culms slender or robust, triquetrous, scape-like or nodose. Leaves basal and cauline, linear; sheaths closed without ligule. Inflorescence terminal and axillary corymbiform panicles, sometimes whole inflorescence reduced to a single terminal head. Spikelets lanceolate, ovate or elliptical; bracts leafy. Glumes 5-8, subdistichous or spiral, lower 3-4 empty, smaller. Hypogynous bristles 0 to 6. Stamens 2-3. Style slender, 2-fid or undivided; style-base spongy thickened, conical. Nut lenticular, spinose or with incurved margins.

1a. Inflorescence a single terminal globose or semiglobose head ..... **R. wightiana**

1b. Inflorescence paniculate ..... **R. corymbosa**

Rhynchospora corymbosa (L.) Britt., Trans. New York Acad. Sci. 11:84. 1892; Fischer in Gamble, Fl. Pres. Madras 1672. 1931; Blake, J. Arnold Arb. 29: 101. 1948; Hooper in Sald. & Nicols., Fl. Hassan Dist. 695. 1976; Rao & Verma, Cyperac. N.E. India 50. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1781.1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 336. 1985; Ramach. & Nair, Fl. Cannanore 520. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 518. 1994. *Scirpus corymbosus* L., Cent. Pl. 2: 7. 1756. *Rhynchospora aurea* Vahl, Enum. Pl. 2: 229. 1806; Boeck., Linnaea 37: 626. 1873; Clarke in Hook. f., Fl. Brit. India 6: 670. 1893.

Erect, tufted, rhizomatous perennial herbs; rhizome short, thick, withut stolons; culms triquetrous, 70-120 cm tall, several-nodose. Leaves basal and cauline, many, 35-80 x 1-2 cm, linear, flat, margins scabrid, apex long-acuminate, keeled, thinly coriaceous; sheaths to 10 cm long. Panicles corymbose, terminal, 15-30 cm long; rays c. 10, upto 10 cm long; leafy bracts 10-28 cm long. Spikelets 6-10 x 1-2 mm, lanceolate, subterete, acute, chestnut-brown, 2-3-flowered, lowest flower bisexual, upper one male. Glumes 5-7, subdistichous; lower ones smaller, ovate, upper ones 3-5 x 1.5-2 mm, oblong-ovate, light brown. Hypogynous bristles 6, in bisexual flowers and 1-3 in male flowers. Stamens 3. Style-baseconical, compressed, grooved on both sides. Nuts 2-3 x 1.5-2 mm, oblong-obovate, irregularly rugose, brown.

Fl. & Fr.: Aug. - Feb.

Distr.: Pantropics. Very common in marshy areas, near canals, rivers, margins of rice fields, etc. *CNS 1279* (Mancombu), *CNS 2512* (Thottappally).

Rhynchospora wightiana (Nees) Steud., Syn. 2: 148. 1855; Boeck., Linnaea 37: 544. 1872; Clarke in Hook. f., Fl. Brit. India 6: 669. 1893; Fischer in Gamble, Fl. Pres. Madras 1672. 1931; Kukenth., Bot. Jahrb. 74: 498. 1949; Kern, Blumea 9: 233. 1958; Mani. & Sivar., Fl. Calicut 321. 1982. *Haplostylis wightiana* Nees, Nov. Act. Ac. Caes. Leop.-Carol. 19, Suppl. 1:101. 1843. *Rhynchospora discolor* Hochst. ex Steud. Syn. 2: 148. 1855.

Erect, tufted, non-rhizomatous annuals; culms 15-25 cm tall, trigonous below, compressed above. Leaves basal, several, 6-7 x 0.2-0.3 cm, linear, gradually acute at apex, scabrid on margins towards the apex; sheaths 1-2 cm long, straw-coloured. Inflorescence capitate, c. 1 x 1.5 cm, subglobose, dense; bracts 5-6, unequal, lower ones exceeding the inflorescence, densely ciliate at the dilated base. Spikelets 2-flowered, 6-8 x 1 mm, linear-lanceolate, compressed, gloden-yellow coloured; lower flower female, upper one male. Glumes 6, subdistichous, 4-5 x 1-1.5 mm, ovate-acute, keeled, lower 2-3 glumes empty, smaller. Hypogynous bristles in the female flower 6, rigid, scabrous, 5-6 mm long, in the male flower 0-4, shorter. Stamens 2. Style shortly 2-fid. Nut oblong, compressed, tuberculate, black.

Fl. & Fr.: Aug. - Sep.

Distr.: S. India and Malesia. In low lying areas. *Bhargavan 53794* (Ambalappuzha) (MH).

RIKLIELLA J. Raynal

Adansonia (Ser. 2) 13(2): 154. 1973.

Rikliella squarrosa (L.) J. Raynal, Adansonia 13:154. 1973; Hooper in Sald. & Nicols., Fl. Hassan Dist. 696. 1976; Mani. & Sivar., Fl. Calicut 328. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:1782. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:254. 1985; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 288. 1988; Sasi. & Sivar., Fl. Pl. Thrissur. For 498. 1996. *Scirpus squarrosus* L., Mant. Pl. 181. 1771; Roxb., Fl. Ind. 1:224. 1820; Boeck., Linnaea 36: 734. 1870; Clarke in Hook. f., Fl. Brit. India 6: 663. 1893; Fischer in Gamble, Fl. Pres. Madras 1666. 1931; Kern, Reinwardtia 4: 93. 1956; J. Raynal, Adansonia 2, 8: 95. 1968; Rao & Verma, Cyperac. N.E. India 45. 1982. *Isolepis squarrosa* (L.) Roem. & Schult., Syst. Veg. 2:111. 1817; Thw., Enum. Pl. Zeyl. 350. 1864. ***Motta-pullu*** Rheede, Hort. Malab. 12: 72, t. 38. 1693.

Erect, tufted, non-rhizomatous, slender annual herbs with purplish fibrous roots; culms 5-15 cm tall, obtusely trigonous or subterete, whitish-green. Leaves few, basal, 1-6 cm long, 0.5-1 mm wide, filiform, apex acute, canaliculate, whitish-green; sheaths 1-2 cm

long, light reddish-brown, lower sheaths bladeless. Inflorescence a pseudolateral head with 1-3 spikelets, reddish-brown; bracts 1-2, the lower bract leaf-like, erect, upto 4 cm long. Spikelets sessile, 3-5 x 2.5-3.5 mm, ovate-elliptic to oblong-elliptic, squarrose, obtuse, deeply red-brown with pale green awns, many-flowered. Glumes spirally imbricated, 1-1.5 x 0.5 mm (including awn), obovate, 3-5-nerved, truncate at awned apex. Stamens 1 or 2. Stigmas 3, recurved. Nuts c. 0.5 mm long. obovate, trigonous, pale brown, minutely puncticulate.

Fl. & Fr.: Aug. - Dec.

Distr.: Southern Asia, from India and Sri Lanka through Malaya and Thailand to Indo-China. In wet sandy soil. *CNS 1051* (Vandanam).

SCHOENOPLECTUS (H.G.L. Reichenbach) Palla

Bot. Jahrb. Syst. 10: 298. 1888 (*nom. cons.*).

Annuals or perennials, sometimes with decumbent or long-creeping rhizomes; culms 3-sided or terete, solid, rarely transversely septate. Leaves reduced to bladeless sheaths surrounding the stem-bases, rarely developed. Inflorescence anthelate or congested in heads, bearing few to many spikelets, often pseudolateral; bracts 1 to several, appears to be the continuation of the culm (in pseudolateral inflorescence), rarely (*S. grossus*) all bracts leaf-like subtending the truly terminal inflorescence. Spikelets solitary or clustered, ovoid or ellipsoid, many-flowered. Glumes spirally imbricated, bearing a hermaphrodite flower at axil, lower 1-3 empty. Hypogynous bristles upto 6, needle-like, spinulose-scabrous. Stamens 1-3. Style continuous with the ovary, 2 or 3-fid. Nut trigonous or dorsiventrally lenticular, often transversely wrinkled, maturing brown or black.

1a. Inflorescences truly terminal; bracts leaf-like, 3 or 4, patent ..... **S. grossus**

1b. Inflorescences pseudolateral; lowest bract culm-like, erect, the base continuous with the culm.

2a. Culms transversely septate, hollow; inflorescence borne below the middle of the culm ..... **S. articulatus**

2b. Culms not septate, solid; inflorescence borne above the middle of the culm.

3a. Syle 3-fid; nut trigonous; hypogynous bristles absent .... **S. supinus** ssp. **lateriflorus**

3b. Style 2-fid; nut biconvex; hypogynous bristles 3-6.

4a. Inflorescence open with elongated rays; spikelets pedicelled; hypogynous bristles 3-4, plumosely fimbriate; nut smooth .... **S. littoralis** ssp. **subulatus**

4b. Inflorescence congested in ahead; spikelets sessile; hypogynous bristles 4-6, retrorsely scabrous; nut transversely wrinkled .... **S. juncoides**

Schoenoplectus articulatus (L.) Palla, Bot. Jahrb. Syst. 10: 229. 1889; Hooper in Sald. & Nicols., Fl. Hassan Dist. 697. 1976; Mani. & Sivar., Fl. Calicut 320. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1783. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:163. 1985. *Scirpus articulatus* L., Sp. Pl. ed. 1, 47. 1753; Clarke in Hook. f., Fl. Brit. India 6:656. 1893; Fischer in Gamble, Fl. Pres. Madras 1666. 1931; Koyama in J. Fac. Sci. Univ. Tokyo Bot. 7: 310. 1958; Rao & Verma, Cyperac. N.E. India 43. 1982; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 289. 1988. *Scirpus incurvatus* Roxb., Fl. Ind. ed. 1, 1:216. 1820. *Sirpus subarticulatus* Roxb., Fl. Ind. ed. 1, 1:217. 1820. *Isolepis articulata* (L.) Nees in Wight, Contr. Bot. India 108. 1834; Thw., Enum. Pl. Zeyl. 350. 1864. ***Tsjeli*** Rheede, Hort. Malab. 12:135, t. 71. 1693.

Erect, tufted, non-rhizomatous perennials, 25-50 cm tall; stem terete, transversely septate, hollow, glabrous, green. Leaves well developed in young plants; when mature leaves are not seen and base of the stem covered with 2-3 bladeless sheaths only; sheaths 5-10 cm long, cylindrical, mouth truncate. Inflorescence a pseudolateral head, seen below the middle of the stem, (1-3 cm long and wide). Bract 1, erect, continuous with the stem, much longer thanthe stem. Spikelets 8-15 x 3-4 mm, cylindrical, oblong-acute, sessile, rachilla wingless, persistent. Glumes spiral, 4-5 x 3-4 mm, ovate-acute, many-nerved, shortly keeled, margins hyaline. Hypogynous bristles absent. Stamens 3; anthers c. 1 mm

long, oblong. Style long; stigma 3. Nuts 1.5-2 x 1-1.3 mm, obovate, acutely triquetrous, apiculate, dark brown, inconspicuously wavy ridged.

Fl. & Fr.: Sep. - Jan

Distr.: India, Indo-China Malesia and Tropical Australia. Usually found in marshy places and shallow waters. *CNS 1080* (Aroor).

Schoenoplectus grossus (L.f.) Palla, Allg. Bot. Z. Syst. 17: Beibl. 3. 1911; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 154. 1985. *Sirpus grossus* L. f., Suppl. Sp. Pl. 104. 1781; Clarke in Hook. f., Fl. Brit. India 6: 659. 1893; Fischer in Gamble, Fl. Pres. Madras 1666. 1931; Koyama, J. Fac. Sci. Univ. Tokyo Bot. 7: 326. 1958; Rao & Verma, Cyperac. N.E. India 44. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1786. 1983.

Erect, tufted, rhizomatous perennials, to 150 cm tall; culms 3-angled, smooth, spongy, base corm-like. Leaves few, 1.5-2 cm wide, linear, as long as the stem; sheath spongy. Inflorescence a large terminal corymb, 6-8 x 6-8 cm; bracts 3-4, much exceeding the inflorescence, leaf-like. Spikelets solitary, 6-8 x 3-4 mm, ellipsoid, apex obtuse, many flowered, brown; rachilla wingless, persistent. Glumes spiral, 2-3 x 2-3 mm, ovate-obtuse, keeled, ciliolate on margins, brown. Hypogynous bristles 5-6, exceeding the nut, retrorsely scabrous. Stamens 3; anthers c. 1.5 mm, linear. Style 2-3 mm long; stigmas 3. Nuts c. 1.5 x 1 mm, obovate, trigonous, apiculate, brown.

Fl. & Fr.: Aug. - Dec.

Distr.: India, Indo-China, Malesia and the Boin Islands. Usually found in marshy places and shallow waters. *CNS 1280* (Mancombu), *CNS 2508* (Thakazhy).

Schoenoplectus juncoides (Roxb.) Palla, Bot. Jahrb. Syst. 10: 229. 1889; Hooper in Sald. Nicols., Fl. Hassan Dist. 697. 1976; Mani. & Sivar., Fl. Calicut 321. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1784. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 160. 1985. *Scirpus juncoides* Roxb., Fl. Ind. ed. 1, 1: 228. 1820; Koyama, J. Fas. Sci. Univ. Tokyo, Bot. 7:310 1958; Rao & Verma, Cyperac. N.E. India

42. 1982; Mohanan & Henry, Fl. Thiruvananthapuram 518. 1994. *Eleocharis juncoides* (Roxb.) Schult., Syst. Veg. Mant. 2:90. 1824. *Scirpus erectus* Clarke in Hook. f., Fl. Brit. India 6: 656. 1893, non Poiret, 1805; Fischer in Gamble, Fl. Pres. Madras 1666. 1931.

Erect, tufted, non-rhizomatous annuals, 15-50 cm tall; culms terete, smooth, glabrus. Leaves reduced to 2-3 membranous sheaths; sheaths 2-10 cm, brown, mouth mucronate. Inflorescence pseudolateral, head with 2-7 spikelets. Bract 1, erect, look like the continuation of the stem. Spikelets sessile, 0.5-1 x 0.3-0.4 cm, ovate, subobtuse, stramineous; rachilla wingless, persistent. Glumes spiral, 3-4 x 2-2.5 mm, ovate, obtuse, mucronate, slightly keeled, midrib prominent. Hypogynous bristles 5-6, unequal, longer ones exceeding the nut, retrorsely scabrous. Stamens 3; anthers c. 1 mm long, linear. Style c. 2 mm long; stigmas 2. Nuts 1.5-2 x 1.5 mm, obovate, biconvex, apiculate, shining black, transversely wrinkled.

Fl. & Fr.: Feb. - Apr.

Distr.: From Japan South to Malesia, South east to India, also to Hawai and Fiji. Common in the margins of paddy fields. *CNS 1507, 1513* (Vallikavu at Chengannur).

Schoenoplectus littoralis (Schrad.) Palla, Sitzber. Zool.-Bot. Ges. Wien 38: 49. 1888, subsp. **subulatus** (Vahl) Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 157. 1985. *Scirpus subulatus* Vahl, Enum. Pl. 2: 268. 1806. *Scirpus littoralis* Schrad., Fl. Germ. 1: 42, t. 5, f. 7. 1806; Clarke in Hook. f., Fl. Brit. India 6: 659. 1893; Fischer in Gamble, Fl. Pres. Madras 1667. 1931.

Erect, tufted, rhizomatous perennials, 70-150 cm tall; rhizome stoloniferous; culms terete, obtusely trigonous just below the inflorescence. Leaves reduced to bladeless sheaths; sheaths 5-20 cm long, membranous, brown, mouth with a hyline margin. Inflorescence pseudolateral, compound, 2-5 cm long. Bract 1, erect, continuous with the stem. Spikelets 8-12 x 3-4 mm, ovate-acute, reddish-brown; rachilla wingless, persistent. Glumes 3-4 x 2 mm, oblong, midrib prominent, excurrent into a short mucro at apex. Hypogynous bristles 3-4, ligulate-spathulate, reddish-brown coloured, fimbriate. Stamens

3; anthers 1.5-2 mm. Style long; stigmas 2. Nuts c. 2 x 1.5 mm, obovate, apiculate, brown to black.

Fl. & Fr.: Apr. - May.

Distr.: India, Malesia and Micronesia. This is not a common species, very rarely seen in shallow brackish water near the coast. *CNS 1647* (Kayamkulam).

Schoenoplectus supinus (L.) Palla, Sitzber. Zool. - Bot. Ges. Wien 38:49. 1888 & Bot. Jahrb. Syst. 10: 299. 1889. subsp. **lateriflorus** (J.F. Gmel.) Koyama in Hara, Stearn & Williams, Enum. Fl. Pl. Nepal 1: 119. 1978 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 158. 1985. *Scirpus lateriflorus* J.F. Gmel., Syst. Veg. 127. 1791; Blake, Proc. Roy. Soc. Queensland 62: 87. 1952. *Schoenoplectus lateriflorus* (J.F. Gmel.) Lye, Bot. Not. 124: 290. 1971; Hooper in Sald. & Nicols., Fl. Hassan Dist. 698. 1976; Mani. & Sivar., Fl. Calicut 320. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1784. 1983; Ramach. & Nair, Fl. Cannanore 520. 1988. *Scirpus supinus* auct. non L. 1753: Clarke in Hook. f., Fl. Brit. India 6: 655. 1893; Fischer in Gamble, Fl. Pres. Madras 1666. 1931.

Erect, non-rhizomatous annual herbs, 10-40 cm tall; culms tufted, smooth. Leaves reduced to bladeless sheaths; sheaths 2-3, 4-12 cm long, membranous, mouth truncate. Inflorescence pseudolateral head like or corymbose, upto 4 short rays, 1-2 cm long; bracts 1-2, lower one much exceeding the inflorescence, look like as the continuation of the stem, lower bract if present very short. Spikelets 5-8 x 2-3 mm, oblong-acute, straw-coloured; rachilla persistent, not winged. Glumes spiral, 1.5-2.5 x 1.5-2 mm, ovate-acute, mucronate, keeled, 3-nerved, margins hyaline. Hypogynous bristles absent. Stamens 3; anthers c. 0.5 mm, connective bristly at top. Style c. 0.5 mm; stigma 3, as long as the style. Nuts 1-1.5 x 1 mm, obovoid, trigonous, apiculate, transversely wrinkled, black.

Fl. & Fr.: Aug. - Dec.

Distr.: From India through Indo-China to Malesia and tropical Australia. A common species usually found in wet grassy places, margins of ponds, rice fields, etc. *CNS 2509* (Cherthalai).

SCLERIA P. Bergius

Kongl. Vetensk. Acad. Handl. 26: 142. 1765.

Annuals or perennials, rhizomatous or with fibrous roots. Stem triquetrous, many-noded. Leaves distant, flat or canaliculate; sheaths winged; contraligule convex or rotund. Inflorescence paniculate, consisting of a terminal panicle and some lateral ones; bracts foliar, often overtopping inflorescence. Spikelets all bisexual, or male and bisexual, or unisexual. Glumes distichous, basal one empty, keeled. Stamens 1-3; connectives crested. Style continuous with ovary; stigmas 3; hypogynous disk well developed or reduced. Nuts globose, ovoid, terete or trigonous, smooth or sculptured.

1a. Culms from woody rhizome; plants perennial.

2a. Leaves densely aggregated in pseudowhorls on the upper part of culms; disc. orange-red, 3-lobed, the lobes obtuse; nuts brown or black, rugosely pitted .... **S. sumatrensis**

2b. Leaves evenly distributed; disc white, 3-lobed, the lobes acute or absent; nuts white, smooth.

3a. Hypogynous disc well developed, 3-lobed, the lobes acute; leaves 3-6 mm wide ..... **S. levis**

3b. Hypogynous disc reduced to a narrow brown band; leaves 2-4 mm wide ..... **S. lithosperma**

1b. Culms tufted with fibrous roots only, without conspicuous rhizome; plants annual.

4a. Disc distinctly 3-lobed, the lobes acute; nuts trabeculate with regular vertical rows of pits, pubescent, beaked with a black persistent style base ..... **S. biflora**

4b. Disc shallowly 3-lobed, the lobes obtuse; nuts smooth, apex apiculate, white ..... **S. rugosa**

Scleria biflora Roxb., Fl. Ind. ed. 2, 3: 573. 1832; Clarke in Hook. f., Fl. Brit. India 6:687. 1893 & in Ill. Cyperac. t. 127, f. 1-2. 1909; Kern, Blumea 11: 197, f. 7C. 1961; Rao & Verma, Cyperac. N.E. India 57. 1982; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5:362. 1985; Sivar. & Mathew, Fl. Nilambur 798. 1996. *Scleria tessellata* sensu

Thw., Enum. Pl. Zeyl. 354. 1864, non Willd, 1805. *Scleria steudeliana* Miq., Fl. Ind. Batav. 3: 344. 1857; Boeck., Linnaea 38: 475. 1884.

Erect, tufted, non-rhizomatous, annual herbs; roots purplish, aromatic; culms 25-75 cm tall, triquetrous. Leaves scattered all along the culm, 12-32 x 0.3 - 0.6 cm, linear, apex, subacute, 3-nerved, scaberulous on upper margins; sheaths to 10 cm long, 3-sided, narrowly winged, scabrous on wing-edges; contraligule semiorbicular, margin ciliolate. Inflorescence with 2-4 panicles, terminal panicle large, 2.5-5.5 cm long, lateral ones smaller; primary bracts much longer than the inflorescence, secondary bracts setaceous. Male and female spikelets intermingled, solitary or paired. Male spikelets 3-4 mm long, lanceolate. Female spikelets 4-5 mm long, ovoid. Glumes 3, 3-4 mm long, ovate, acute. Stamens 2-3. Nuts c. 2 x 2 mm, depressed-globose, beaked with a black persistent style base, ceramic white, finely trabeculate with regular vertical rows of square pits, ferrugineous-pubescent on ridges between pit-rows; disk distinctly 3-lobed, lobes acute.

Fl. & Fr.: Aug. - Oct.

Distr.: From India and Sri Lanka through Indo-China and southern China, Ryukyu Islands, Philippines and western Malesia. In wet grass fields. *CNS 2296* (AIR campus, Kalavoor).

Scleria levis Retz., Obs. 4: 13. 1786; Kern, Blumea 11:164, f. 3h. 1961 & in Steenis, Fl. Males. I, 7: 732. 1974; Rao & Verma, Cyperac. N.E. India 58. 1982; Mani. & Sivar., Fl. Calicut 328. 1982; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 4:345. 1985; Mohanan & Henry, Fl. Thiruvananthapuram 519. 1994; Sivar. & Mathew, Fl. Nilambur 799. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 499. 1996. *Scleria zeylanica* Poir., Encycl. 7:3. 1806. *Scleria hebecarpa* Nees in Wight, Contr. Bot. India 117. 1834; Clarke in Hook. f., Fl. Brit. India 6:689. 1893; Fischer in Gamble, Fl. Pres. Madras. 1677. 1931.

Erect, rhizomatous perennials, 40-100 cm tall; rhizome short, creeping; culms trigonous, angles scabrid. Leaves scattered all along the stem, 20-32 x 0.3-0.6 cm, linear, gradually narrowed to an acute apex, margin scabrid; sheaths c. 8 cm long, winged; contraligule short, rounded, pubescent. Inflorescence narrow, with 1 terminal panicle and 1-2 smaller ones. Primary bract leaf-like, exceeding the inflorescence; secondary bract

setaceous. Spikelets unisexual, in clusters of 2-4; male spikelets 4 mm long, oblong; female spikelets 5-7 mm long, ovate. Glume c. 3 x 2 mm, ovate-acute, 1-nerved. Stamens 3; anthers c. 1.5 mm, linear. Style short; stigmas 3. Nut 2-3 x 2-3 mm, globose, apiculate, at first pubescent, later glabrous, white; disk lobes 3, lanceolate, acute.

Fl. & Fr.: Mar. - Oct.

Distr.: India and Sri Lanka, northeastwards to southern Japan and eastwards to Malesia and northern Australia. *CNS 1764* (Vandanam), *CNS 2510* (Vayalar West).

Scleria lithosperma (L.) Sw., Prodr. Fl. Ind. Occid. 18. 1788; Nees in Wight, Contr. Bot. India 117. 1834; Clarke in Hook. f., Fl. Brit. India 6: 685. 1893; Fischer in Gamble, Fl. Pres. Madras 1677. 1931; Kern, Blumea 11: 191, f. 6h. 1961; Hooper in Sald. & Nicols., Fl. Hassan Dist. 700. 1976. Rao & Verma, Cyperac. N.E. India 56. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1787. 1983; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 352. 1985; Ramach. & Nair, Fl. Cannanore 521. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 289. 1988; Vajravelu, Fl. Palghat Dist. 558. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 519. 1994; Sivar. & Mathew, Fl. Nilambur 799. 1996. *Scirpus lithospermus* L., Sp. Pl. 1:51. 1753. *Schoenus lithospermus* (L.) L., Sp. Pl. ed. 2, 1:65. 1762. *Scleria tenuis* Retz., Obs. Bot. 4:13. 1786; Roxb., Fl. Ind. ed. 2, 3:574. 1832. ***Kaden-pullu*** Rheede, Hort. Malab. 12: 89, t. 48. 1693.

Erect, tufted, rhizomatous perennials, 40-60 cm tall; rhizome woody, short; culms trigonous, smooth. Leaves dense at the middle part, scattered all along the stem, 8-33 x 0.2-0.4 cm, linear, margins scabrous, apex obtuse; sheaths narrow, 4-6 cm long, not winged, 3-sided; contraligule short, 1-2 mm long, obtuse, ciliate. Inflorescence narrow, loose, terminal panicle and 2-3 distant lateral ones. Primary bracts leaf-like, much longer than the inflorescence; secondary bracts setaceous. Spikelets few, bisexual, with one female flower and few male ones, 3-5 mm long. Glumes 3-4 mm long, ovate, acute, brown. Stamen 1; anthers 1-1.5 mm. Nut 2-3 x 2 mm, ovoid, obtusely trigonous, smooth, shining white; disk reduced to a narrow, brown ring.

Fl. & Fr.: Throughout the year.

Distr.: Pantropics. In sacred groves. *CNS 1703* (Chathiyara).

Scleria rugosa R. Br., Prodr. 240. 1810; Kern, Blumea 11: 206, f. 8b. 1961 & in Steenis, Fl. Males I, 7: 749. 1974; Rao & Verma, Cyperac. N.E. India 58. 1982; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 363. 1985; Sasi. & Sivar., Fl. Pl. Thrissur For. 499. 1996. *Scleria lateriflora* Boeck., Linnaea 38: 455. 1874. *Scleria flaccida* Clarke in Hook. f., Fl. Brit. India 6:688. 1893 & in Ill. Cyperac. t. 127, f. 3-5. 1909, non Steud., 1855. *Scleria zeylanica* Trimen, Handb. Fl. Ceylon 5:97. 1900, non Poir, 1806.

Tufted non-rhizomatous annuals, 10-30 cm long; culms 3-angled, smooth 6-15 x 0.2-0.4 cm, linear, apex obtuse, pubescent; sheaths 2-3 cm long, triquetrous, winged; contraligule 1-2 mm long, rounded, ciliate. Inflorescence a terminal panicle. Primary bract erect, exceeding the inflorescence, secondary one setaceous. Spikelets unisexual; male spikelets shortly peduncled, c. 2 mm long, lanceolate; female spikelets 3-4 mm long. Glumes 3-4 mm long, ovate, acute, long ciliate on the keel. Stamen 1; anthers c. 0.5 mm long. Nuts c. 2 x 1.5 mm, globose, apiculate, shorter than the subtending glumes, white, glabrous; disk shallowly 3-lobed, cup-like, lobes thick, obtuse.

Fl.& F.: Sep. - Nov.

Distr.: Widely occurring in Asia and Oceania, from India and Sri Lanka through Indo-China and southern China, northeastwards to Japan, and eastwards to Malesia, Micronesia, Australia and New Caledonia. This species is not very common; collected from wet grassy grounds. *CNS 1801* (Thottappally).

Scleria sumatrensis Retz., Obs. Bot. 5: 19, t. 2. 1789; Nees in Wight, Contr. Bot. India 116. 1834; Clarke in Hook. f., Fl. Brit. India 6: 693. 1894; Clarke, Ill. Cyperac. t. 129, f. 1-2. 1909; Fischer in Gamble, Fl. Pres. Madras 1678. 1931; Kern, Blumea 11:182, f. 5h. 1961; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 349. 1985.

Robust, perennial, rhizomatous herbs; rhizome thick, woody, knotty; culms 1-.2.5 m long, 3-sided, smooth or scabrid on angles. Leaves on the middle portion of culms, densely aggregated in 3 to 5 pseudowhorls, 18-39 x 0.7-1.2 cm, broadly linear, margins

scabrous, recurved, apex long acuminate, thinly coriaceous, 3-nerved; sheaths to 6 cm long, densely overlapping, 3-sided; contraligule 2-3 mm long, rounded, ciliate. Inflorescence consisting of 2 to 4 dense decompound panicles, 10-22 cm long; branches spreading. Female spikelets and male spikelets solitary or in clusters of 2 or 3, both sexes intermingled. Female spikelets 3-4 mm long, broadly ovoid, sessile, the two largest glumes 3-4 mm long, broadly ovate, acute, straw brown. Male spikelets sessile or short-peduncled, 3-4 mm long, lanceolate, yellowish-brown; stamens 3. Nuts 2-2.5 mm across, depressed-globose, apiculate, distinctly scrobiculate, dark greyish or black at maturity, sparsely puberulent; disk cup-like, half as long as to covering the greater part of nut, coriaceous, orange-red at maturity, 3-lobed, the lobes obtuse.

Fl. & Fr.: Oct. - Jan.

Distr.: From India and Sri Lanka northeastwards to Formosa, and eastwards to Malesia and tropical Australia. Banks of canals and marshes. *CNS 1716* (Thottappally).

137. **POACEAE** (R. Br.) Barnhart Bull.

Torrey Bot. Club 22: 7. 1895.

(GRAMINEAE *nom. alt.*)

1a. Culms woody with culm sheaths; blade base disarticulating from the sheath, petiolate .. .. **Bambusa**

1b. Culms not woody without culm sheaths; blade-base not disarticulating from the sheath, not petiolate.

2a. Spikelets unisexual, male and female spikelets in separate inflorescence or in different positions of the single inflorescence.

3a. Male and female spikelets in separate inflorescences; female spikelets not enclosed in a stony bract; leaves thick-coriaceous, rigid, glaucous, spiny ..... **Spinifex**

3b. Male and female spikelets in different positions of a single inflorescence; female spikelets enclosed in a stony bract, solitary, below, male in several pairs above; leaves not as above ..... **Coix**

2b. Spikelets bisexual, or with male or barren and bisexual spikelets mixed in the same inflorescence.

4a. Spikelets 1-many-flowered, breaking up at maturity above the glumes, or if falling entire then not 2-flowered with the lower floret male or sterile and the upper bisexual; spikelets usually laterally compressed or terete.

5a. Stamens 6.

6a. Leaf-sheaths inflated, spongy, forming floats; leaf-blades ovate-oblong or elliptic; floating grasses ..... **Hygroryza**

6b. Leaf-sheaths not inflated and not forming spongy floats; leaf-blades linear; grasses not floating.

7a. Tip of pedicel with 2 obscure lips; fertile lemma coriaceous, supported by 2 empty scales ..... **Oryza**

7b. Tip of pedicel without lips; fertile lemma papery, without scales ..... **Leersia**

5b. Stamens 1-3.

8a. Leaf-blade usually transversely veined between main veins ..... **Centotheca**

8b. Leaf-blade without transverse nerves.

9a. Spikelets with 1 fertile floret, with or without additional staminate or barren florets.

10a. Spikelets awned.

11a. Awns trifid ..... **Aristida**

11b. Awns simple.

12a. Lemma of the upper floret with a stout, twisted, flattened, geniculate awn from between the setaceous lobes of a bifid apex ..... **Jansenella**

12b. Lemma of the upper floret not awned as above.

13a. Inflorescence a solitary spiciform raceme; glume with long capillary awns, several times longer than the glumes ..... **Perotis**

13b. Inflorescence of several digitate racemes or spikes; glumes not awned as above ..... **Chloris**

10b. Spikelets not awned.

14a. Inflorescence a solitary raceme or spike ..... **Zoysia**

14b. Inflorescence of several digitate racemes or a panicle either open or contracted.

15a. Inflorescence a panicle, either open or contracted.

16a. Spikelets with one floret ..... **Sporobolus**

16b. Spikelets with 2-florets, one fertile and the other male or barren.

17a. Glumes unequal in size; second lemma with a bristle; panicles 5-25 cm long; ligules membranous .... **Arundinella**

17b. Glumes almost equal in size; second lemma not awned; panicles 1-10 cm long; ligules row of hairs ..... **Isachne**

15b. Inflorescence of several digitate racemes .... **Cynodon**

9b. Spikelets with 2 or more fertile florets.

18a. Rhachilla joints with long silky hairs enveloping the lemmas; tall reed-like grasses 1-4 m tall with large plumose panicles ..... **Phragmites**

18b. Rhachilla usually glabrous, rarely shortly hairy but then the hairs not enveloping the lemmas; slender grasses upto 1 m tall; panicles not plumose.

19a. Spikelets loosely to densley imbricate in digitate or sub-digitately arranged spikes.

20a. Lemmas aristate or awned; axis of the spikes ending in a sharp point ..... **Dactyloctenium**

20b. Lemmas not aristate; axis of the spikes ending in a spikelet ..... **Eleusine**

19b. Spikelets in open, contracted, or spike-like panicles.

21a. Lemmas lobed or toothed, nerves on the lemmas hairy ..... **Diplachne**

21b. Lemmas entire, never lobed or toothed, nerves on the lemmas glabrous ..... **Eragrostis**

4b. Spikelets 2-flowered, falling entirely at maturity, with the upper floret bisexual and the lower male or sterile.

22a. Spikelets dissimilar, often in pairs or in threes, one sessile and the other pedicelled, rarely solitary but then the upper lemma awned; glumes as long as the spikelets and enclosing the florets, more or less rigid; lower lemma not similar to upper glume in texture; upper lemma usually awned.

23a. Spikelets solitary, usually sessile and awned ..... **Dimeria**

23b. Spikelets paired or rarely in threes, both sessile and pedicelled spikelets present or rarely the pedicelled spikelet reduced.

24a. Joints of the rhachis and pedicels much swollen and fused to form a cylindric axis; raceme terete, readily disarticulating ..... **Rottboellia**

24b. Joints of the rhachis and pedicels not swollen and not fused to form a cylindric axis; raceme not terete.

25a. Pedicelled spikelet similar to the sessile, both fertile.

26a. Inflorescence a silky villous panicle, with an elongated central axis.

27a. Panicles contracted, spiciform; both spikelets in a pair, pedicelled; low grasses, culms upto 150 cm high ..... **Imperata**

27b. Panicles effuse; one of the spikelets in a pair, sessile, the other pedicelled; tall grasses, culms up to 3 m or more high ..... **Saccharum**

26b. Inflorescence of single raceme ..... **Pogonatherum**

25b. Pedicelled spikelet differing from the sessile in shape, both not fertile.

28a. Inflorescence a true or false panicle.

29a. Panicles of racemes interrupted by spathes.

30a. Racemes paired, usually one sessile and the other peduncled, collected into a much branched panicle; aromatic grasses ..... **Cymbopogon**

30b. Racemes fascicled; grasses not aromatic.

31a. Basal joints of racemes bulbous; spikelets in threes, one sessile and the other two pedicelled ..... **Apluda**

31b. Basal joints of racemes not bulbous; spikelets not as above.

32a. Racemes with 2 pairs of sessile involucral spikelets at base; awnless spikelets either sessile or pedicelled .. .. **Themeda**

32b. Racemes without 2 pairs of sessile involucral spikelets at base; awnless spikelets always pedicelled ..... **Pseudanthistiria**

29b. Panicles not interupted by spathes.

33a. Spikelets awnless; lower glume muricate or spinulose; branches of panicles whorled ..... **Vetiveria**

33b. Spikelets awned; lower glume smooth, not muricate or spinulose .. .. **Chrysopogon**

28b. **Inflorescence a solitary, digitate or subdigitate raceme.**

34a. **Racemes solitary** ..... **Heteropogon**

34b. **Racemes two to many.**

35a. **Racemes 2-7; joints and pedicels with a translucent median line; glumes often pitted** ..... **Bothriochloa**

35b. Racemes 2; joints and pedicels solid, without translucent median line.

36a. Pedicelled spikelets much reduced, usually represented by vestigial pedicels; lower glume of the sessile spikelets truncate or emarginate at apex ..... **Apocopis**

36b. Pedicelled spikelets well developed; lower glume of the sessile spikelets acute or acuminate ..... **Ischaemum**

22b. Spikelets similar, solitary or paired; glumes usually membranous, the lower often smaller or suppressed; lower lemma more or less similar to upper glume in texture; upper lemma usually without awns.

37a. Spikelets subtended by a solitary or an involucre of bristles.

38a. Bristle solitary, formed by the prolonged branch beyond the terminal spikelet; second lemma smooth, shining; aquatic or marsh grasses .... **Pseudoraphis**

38b. Bristles numerous, forming an involucre around the solitary or clustered spikelets, rarely solitary but then the second lemma transversely rugose.

39a. Inflorescence spiciform; second lemma more or less smooth; bristle falling with the spikelets.

40a. Bristles free to the base, slender, not painful to the touch .... **Pennisetum**

40b. Bristles connate to beyond the middle into a hard cup, rigid and spinous ..... **Cenchrus**

39b. Inflorescence paniculate or spiciform; second lemma transversely rugose; bristles persistent after the spikelets have fallen .... **Setaria**

37b. Spikelets not supported by bristles.

41a. Upper glume and first lemma 2-lobed or emarginate at their tips, awned or mucronate from the sinus of the lobes; spikelets silky-villous .... **Rhynchelytrum**

41b. Upper glume and first lemma entire at their tips, awnless or awned from the tips; spikelets not silky-villous.

42a. Spikelets with an annular callus at base, formed from the swollen lowest rhachilla and lower glume ..... **Eriochloa**

42b. Spikelets without an annular callus at base.

43a. Spikelets in more or less open panicles or panicles contracted and spike-like.

44a. Panicles contracted, cylindrical or spiciform.

45a. Spikelets lanceolate, acuminate, 5-8 mm long; first lemma acuminate or aristate .. **Hymenachne**

45b. Spikelets ovate or elliptic, more or less gibbous, obtuse or acute, 1-5 mm long; first lemma not aristate ..... **Sacciolepis**

44b. Panicles open, lax, never spiciform.

46a. Spikelets gibbous.

47a. Spikelets laterally much compressed; second glume not strongly many-nerved ..... **Cyrtococcum**

47b. Spikelets not laterally compressed, more or less terete; second glume strongly many-nerved ..... **Sacciolepis**

46b. Spikelets not gibbous.

48a. Upper glume as long as or longer than the second lemma; spikelets solitary at each node ..... **Panicum**

48b. Upper glume much shorter than the second lemma; spikelets in groups of 2-10, at each node ..... **Ottochloa**

43b. Spikelets in one-sided spikes or spike-like racemes; spikes or racemes usually digitate or somewhat distant along an axis, rarely solitary.

49a. Raceme solitary, terminal, spiciform; spikelets sunken in hollows of flat, thickened rhachis ..... **Stenotaphrum**

49b. Raceme 2-many, scattered on a central axis; spikelets not sunken.

50a. Glumes and lemmas with laterally compressed and thickened apices ..... **Acroceras**

50b. Glumes and lemmas not as above.

51a. Spikelets awned.

52a. Racemes digitate or subdigitate; second lemma aristate; glumes ciliate along the margins .... **Alloteropsis**

52b. Racemes alternately arranged on a central axis; second lemma never mucronate; glumes not ciliate.

53a. Leaf-blades ovate-elliptic or elliptic-lanceolate; lower glume awned; culms creeping or geniculate ..... **Oplismenus**

53b. Leaf-blades linear; lower glume not awned; culms erect or suberect ..... **Echinochloa**

51b. Spikelets awnless.

54a. Lower glume well-developed.

55a. Dorsal surface of the second lemma facing towards the rhachis of the raceme.

56a. Second lemma mucronate; spikelets often flattened .... **Urochloa**

56b. Second lemma not mucronate; spikelets often turgid.

57a. Glumes acuminate or awned, rarely acute; spikelets crowded, often in 3-4 rows; racemes spreading much longer than internode .... **Echinochloa**

57b. Glumes awnless; spikelets not crowded; often in 2 rows; racemes appressed to the common axis, shorter than or slightly longer than internode .... **Paspalidium**

55b. Dorsal surface of the second lemma facing away from the rhachis of the raceme or spike ..... **Brachiaria**

54b. Lower glume usually absent or reduced to minute scale or rim.

58a. Second lemma thin, cartilaginous with flat hyaline margins; spikelets binate or ternate, rarely solitary, but then lemmas with verrucose hairs ..... **Digitaria**

58b. Second lemma more or less crustaceous, usually with narrow inrolled margins; spikelets usually solitary.

59a. Dorsal surface of the second lemma facing away from the rhachis of the raceme; lower glume strictly absent; peduncles of inflorescence often 2-3, exserted from terminal sheaths ..... **Axonopus**

59b. Dorsal surface of the second lemma facing towards the rhachis of the raceme; lower glume reduced to minute scale or absent, if latter but then the spikelets orbicular; peduncles of inflorescence solitary .... **Paspalum**

ACROCERAS Stapf

in Prain, Fl. Trop. Afr. 9: 621. 1920.

Acroceras munroanum (Balansa) Henr., Blumea 3: 445. 1940; Bor, Grass. Burma, Ceylon, India & Pakistan 275. 1960; Sreekumar *et al.*, J. Econ. Tax. Bot. 3: 267. 1982; Sreekumar & Nair, Fl. Kerala-Grass. 212. 1991; Gould in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 21. 1994. *Panicum munroanum* Balansa in Morot, J. Bot. 4: 140. 1890. *Panicum latifolium* Hook. f., Fl. Brit. India 7: 39. 1896, p.p. *Acroceras crassiapiculatum* (Merr.) Alst. in Trimen, Handb. Fl. Ceylon 6 (Suppl.): 324. 1931; Bor, Fl. Assam Sci. 1 (Suppl.): 356. 1906.

Perennials. Culms 25-65 cm long, creeping or geniculate, rooting at the nodes. Leaves 2-9.5 x 0.5-0.9 cm, lanceolate, base rounded, margins scabrid, apex acuminate; sheaths 1.3-2.5 cm long; ligules membranous, fimbriate. Inflorescence a panicle of 4-6 spiciform racemes, 4-7.5 cm long, each raceme 1.5-3.5 cm long. Spikelets 3-4 mm long, elliptic, bluntly apiculate; pedicels 2-4 mm long, trigonous, scabrid. Lower glumes c. 3 x 1.5 mm, ovate-lanceolate, tip laterally compressed and thickened. Upper glume c. 3 x 1.5 mm, elliptic, tip laterally compressed and thickened. Lower floret empty. Upper floret bisexual. First lemma c. 3 x 1.5 mm, ovate, tip laterally compressed. Palea c. 2 mm long, elliptic-lanceolate, 2-keeled. Second lemma c. 3 mm long, elliptic, apiculate. Palea elliptic, tip notched and reflexed. Stamens 3. Stigmas plumose. Grains 2-3 x 1-1.5 mm, ovate, black.

Fl. & Fr.: Jan. - Apr.

Distr.: India, Myanmar, Malaya and Malaysia, Sri Lanka. In wet places. *CNS 1329* (Champakkulam).

ALLOTEROPSIS K.B. Presl

Rel. Haenk. 343. 1830.

Alloteropsis cimicina (L.) Stapf, Fl. Trop. Africa 9: 487. 1919; Fischer in Gamble, Fl. Pres. Madras 1766. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 276. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 707. 1976; Mani. & Sivar.,Fl. Calicut 339. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1790. 1983; Ramach. & Nair, Fl. Cannanore 525. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 214.1991; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 29. 1994; Mohanan & Henry, Fl. Thiruvananthapuram 524. 1994; Sivar. & Mathew, Fl. Nilambur 831. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 502. 1996. *Milium cimicinum* L., Mant. Pl. 2: 184. 1771. *Axonopus cimicinus* (L.) P. Beauv., Ess. Agrost. 154. 167.1812; Hook. f., Fl. Brit. India 7: 64. 1896.

Annuals. Culms 15-100 cm high, decumbent, canaliculate; nodes glabrous or tubercled hairy. Leaves 2-4.5 x 0.7-1.2 cm, oblong-lanceolate or lanceolate, rounded or cordate at base, margins ciliate with tubercle-based hairs, apex abruptly acute; sheath 5-12 cm long,covered with tubercle-based hairs; ligule truncate, fimbriate. Racemes 3-8, digitate, umbellate or corymbose, 4-15 cm long; rhachis angular, scabrid. Spikelets 2-flowered, 2-5 mm long excluding aristae, broadly elliptic. Glumes unequal; lower glume 1.5-2 x 1 mm, ovate-lanceolate, shortly acuminate, 3-nerved; upper glume 3-3.5 x 1 mm, broadly ovate, acuminae, 5-nerved. Lower floret male. Upper floret bisexual. First lemma 2-3 x 1 mm, ovate, 5-nerved. Second lemma 2-3 x 1 mm, elliptic, margins ciliate, aristate; arista 1-3 mm long, erect, scaberulous. Palea 1.5-3 x 0.5-1 mm, ovate or elliptic. Stamens 3, anthers 0.5-1 mm long, yellow. Ovary c. 0.5 mm, oblong; stigmas 0.5-1 mm, violet. Grain c. 1.5 x 1 mm, ovate.

Fl. & Fr.: Throughout the year.

Distr.: Old World Tropics. Very common along the roadsides and waste places, and also as a weed in cultivated lands. *CNS 3102* (Angadikkal), *CNS 2021* (Kidangara).

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, t. 7. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 707. 1976; Mani. & Sivar., Fl. Calicut 344. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1800. 1983; Ramach. & Nair, Fl. Cannanore 525. 1988; Mani., Fl. Silent Valley 346. 1988; Vajravelu, Fl. Palghat Dist. 563. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 32. 1991; Clayton in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 36. 1994; Mohanan & Henry, Fl. Thiruvananthapuram 524. 1994; Sivar. & Mathew, Fl. Nilambur 803. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 502. 1996. *Apluda aristata* L., Amoen. Acad. 4: 303. 1756; Fischer in Gamble, Fl. Pres. Madras 1750. 1934. *Apluda varia* Hack. in DC., Monogr. Phan. 6: 197. 1989, nom. superfl. based on *Apluda mutica* L., Hook. f., Fl. Brit. India 7: 150. 1896.

Annual or perennial herbs. Culms 40-140 cm high; nodes glabrous. Leaves 5-22 x 0.4-1 cm, elliptic-lanceolate or linear-lanceolate, base attenuate, apex setaceous; sheath to 7 cm long; ligule membranous. Inflorescence a false interrupted panicle, 5-40 cm long; racemes solitary from a peduncled, glabrous, pinkish spatheole. Spikelets 3-per raceme, 1 sessile, 2 pedicelled. Sessile spikelets 3-7 mm long, awned; lower male, upper bisexual; lower glume 3-7 x 1-2 mm, lanceolate, shortly bifid, margins narrowly winged in the upper half; upper glume 3-6 x 1-2 mm, boat-shaped, beaked, keeled. First lemma 2-4.5 x 0.5-1 mm, oblong-lanceolate, faintly 3-5-nerved. Palea equal to lemma, 2-keeled, 2-nerved. Stamens 3, anthers c. 1.5 mm long. Second lemma as long as the sessile spikelet, notched, 3-nerved; awn 5-12 mm long, glabrous. Palea 1-2 cx 0.5-1 mm, ovate, 2-keeled, hyaline. Stamens 3; anthers 2-3 mm long, cream in colour with violet margins. Ovary 0.5-1 mm, oblong; style c. 1.5 mm; stigmas 1.5-2.5 mm, pink, feathery. Sterile pedicelled spikelet 3-7 x 0.5-2 mm, lanceolate, shortly bifid, flat. Pedicelled spikelet 3-6 x 1-1.5 mm, oblong-lanceolate; pedicel 2-5 mm long, flat. Lower glume 3-6 x 1-1.5 mm, lanceolate, chartaceous. Upper glume equal in size and texture, ovate-lanceolate. Florets more or less similar to those of sessile spikelet; upper lemma entire, unawned.







Plate XXIV. A. *Eriocaulon sexangulare* L.; B. *Eragrostis riparia* (Willd.) Nees; C. *Rhynchelytrum repens* (Willd.) C.E.Hubb.

Fl. & Fr.: Aug. - Dec.

Distr.: Arabia, S.E. Asia to Australia. In waste places. *CNS 1373* (Aroor).

APOCOPIS Nees

Proc. Linn. Soc. Lond. 1: 93. 1841.

Apocopis mangalorensis (Hochst.) Henr., Blumea 4: 523. 1941; Bor, Grass. Burma, Ceylon, India & Pakistan 96. 1960; Mani. & Sivar., Fl. Calicut 332. 1982; Sreekumar & Nair, Fl. Kerala-Grass. 33. 1991; Clayton in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 37. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 503. 1996. *Amblyachyrum mangalorense* Hochst., Flora 39: 26. 1856.

Annuals. Culms 13-30 cm high, decumbent. Leaves 1-3.5 x 0.2-0.4 cm, lanceolate, apex acuminate, covered with tubercled hairs; sheath keeled, covered with tubercled hairs; ligules ovate, membranous. Racemes paired, 2-3.5 cm long. Spikelets 4-5 mm long, oblanceolate, yellowish-brown, awned. Lower glume 3-5 x 1.5-2 mm, obovate, apex retuse, ciliolate towards upper half, subcoriaceous. Upper glume 3-4 x 1-1.5 mm, linear, bifid and ciliolate at apex, keeled. Lower floret empty. Upper floret bisexual. First lemma 3-4 x 1.5-2 mm, ovate-oblong, apex truncate, hyaline. Palea 3-4 mm long, hyaline. Second lemma 3-4 x 0.5 mm, linear, awned; awn 1-1.5 cm long. Palea c. 2 x 1 mm, ovate-oblong, hyaline. Stamens 2; anthers yellow. Stigmas cream.

Fl. & Fr.: Sep. - Dec.

Distr.: Srilanka, Southern India and Myanmar. In wastelands. *CNS 1215* (Kanichukulangara Jn.).

ARISTIDA Linnaeus

Sp. Pl. 82. 1753.

Aristida setacea Retz., Obs. Bot. 4: 22. 1786; Hook. f., Fl. Brit. India 7: 225. 1896; Reng. & Tad., Handb. S. Ind. Grass. 225, t. 173. 1921; Fischer in Gamble, Fl. Pres. Madras 1809. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 412. 1960; Ramamoorthy in Sald. &

Nicols., Fl. Hassan Dist. 709. 1976; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1803. 1983; Ramach. & Nair, Fl. Cannanore 526. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 328. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 525. 1994; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 40. 1994.

Perennials. Culms 50-120 cm high, erect, tufted; nodes glabrous. Leaves 10-34 x 0.2-0.5 cm, linear or linear-lanceolate, base rounded, apex acuminate, convolute, glaucous; sheaths to 8 cm long; ligules fimbriate membranes. Panicles 15-35 cm long, contracted, branches erect. Spikelets 1-1.8 cm long, linear-lanceolate or lanceolate. Lower glume 7-10 x 0.5-1 mm, lanceolate, aristate, 1-nerved; arista 2-4 mm long. Upper glume 8-12 x 0.5-1 mm, lanceolate, keeled, aristate, 1-nerved; arista 2-4 mm long. Lemma 8-12 x 1 mm, linear, convolute, 3-awned; awns 1-3 cm long. Palea small, hyaline. Stamens 3; anthers c. 3 mm long, yellow. Ovary to 2 mm long, linear; stigmas 3-4 mm long, pink.

Fl. & Fr.: Throughout the year.

Distr.: Myanmar, India, Sri Lanka to Mascarene Isls. Very common along road-cuttings, waste places, hill-slopes, etc. *CNS 1303* (Pandavanpara at Chengannur).

ARUNDINELLA Raddi

Agrost. Brasil. 36, t. 1, f. 3. 1823.

Arundinella leptochloa (Nees ex Steud.) Hook. f., Fl. Brit. India 7: 76. 1896; Fischer in Gamble, Fl. Pres. Madras 1802. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 423. 1960; Mani. & Sivar., Fl. Calicut 346. 1982; Vajravelu, Fl. Palghat Dist. 565. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 336. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 526. 1994; Gould in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 62. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 504. 1996. *Panicum leptochloa* Nees ex Steud., Syn. Pl. Glum. 1: 62. 1854. *Arundinella lawsonii* Hook. f., Fl. Brit. India 7: 76. 1896.

Perennials. Culms 40-110 cm high, erect; nodes glabrous. Leaves 5-27 x 0.5-1.5 cm, linear-lanceolate or linear, base rounded or shallowly cordate, apex acuminate, tuberculate-pilose; sheaths to 12 cm long, tubercle-based hairy; ligules ovate, thin, membranous. Panicles 10-27 cm long, lax; branches to 8 cm long. Spikelets 3-4 mm long, elliptic-lanceolate. Lower glume 1.5-3 x 1-1.5 mm, ovate-acute, 3-nerved, nerves scaberulous. Upper glume 2-3 x 1-1.5 mm, ovate-lanceolate, 5-nerved. Lower floret male. Upper floret bisexual. First lemma 2-2.5 x 1-1.5 mm, ovate-oblong, 5-nerved. Palea 1.5-2 x 0.5-1 mm, oblong-elliptic, hyaline. Stamens 3. Second lemma 1-1.5 x 0.5-1 mm, oblong-elliptic, muricate. Palea c. 1 x 0.5 mm, oblong-lanceolate,delicate with wart-like out growths. Stamens 3; anthers pink. Stigmas 1-1.5 mm long, violet.

Fl. & Fr.: Throughout the year.

Distr.: Southern India and Sri Lanka. Along roadsides and wastelands. *CNS 1384* (Cherthala).

AXONOPUS. P. de Beauvois

Essai Agrost. 12: 154. 1812.

Axonopus compressus (Swartz) P. Beauv., Essai Agrost. 12: 154. 1812; Bor, Grass. Burma, Ceylon, India & Pakistan 278. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 712. 1976; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1808. 1983; Ramach. & Nair, Fl. Cannanore 527. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 216. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 527. 1994; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 71. 1994. *Milium compressum* Swartz, Prodr. Veg. Ind. Occ. 24. 1788. ***Erumapul.***

Perennials. Culms 10-110 cm long, creeping or stoloniferous, rooting at nodes; nodes bearded. Leaves 2-5 x 0.3-1.5 cm, oblong to linear-lanceolate, base rounded or shallowly cordate, margins ciliate, apex acute; sheaths keeled; ligules membranous, fimbriate. Racemes 2-6, binate, digitate or alternate on stalk, 2-10 cm long; rhachis trigonous. Spikelets 2-2.5 x 0.5-1 mm, oblong-elliptic or elliptic-lanceolate, sessile or shortly pedicelled, green or purplish. Lower glume absent. Upper glume 2-2.5 x 1 mm,

ovate or elliptic-lanceolate, 5-7-nerved. First lemma 2-2.5 x 1 mm, ovate, elliptic or elliptic-lanceolate, membranous, 5-nerved, epaleate. Second lemma 1.5-2 x 1 mm, ovate-oblong, crustaceous, faintly 3-5-nerved, bearded at apex. Palea 1.5-2 x 1 mm, oblong, margins infolded. Floret bisexual. Stamens 3; anthers c. 0.5 mm long. Ovary c. 0.5 mm, oblong; styles 0.5 mm; stigmas white.

Fl. & Fr.: Most of the seasons.

Distr.: Tropics and subtropics. Common along waste places, bunds of paddy fields, banks of backwaters, etc. This grass forms mats and serves as a very good sand-binder. Morphology of this grass is highly variable. The common 'carpet grass'. *CNS 1814* (Kuttamangalam), *CNS 1326* (Poopally).

BAMBUSA Schreber

Gen. 236. 1789; 828. 1791 (*nom. cons.*)

Bambusa bambos (L.) Voss in Vilmorin, Blumeng. Artnerci 1: 1189. 1896; Mc Clure, Blumea, Suppl. 3: 95. 1946; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 306. 1988. *Arundo bambos* L., Sp. Pl. 81. 1753. *Bombos arundinacea* Retz., Obs. Bot. 5: 24. 1788. *Bambusa arundinacea* (Retz.) Roxb., Pl. Corom. t. 79. 1796. Hook. f., Fl. Brit. India 7: 395. 1896; Fischer in Gamble, Fl. Pres. Madras 1859. 1934; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 712 1976; Mani. & Siver., Fl. Calicut 350. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1808. 1983; Ramach. & Nair, Fl. Cannanore 528. 1988; Vajravelu, Fl. Palghat Dist. 566. 1990; Harriman in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 74. 1994; Sivar. & Mathew, Fl. Nilambur 818. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 505. 1996. **Ily**. Rheede, Hort. Malab. 1: 25-26, t. 16. 1678.

Culms from a thick stoloniferous rhizome, erect, 10-20 cm across; culm sheaths broadly triangular, densely brownish-hairy within, and scattered hairy without. Leaves to 20 cm long; sheaths to 12 x .2 cm, linear, glabrous; ligule short, entire; petiole short. Inflorescence a compound panicle with the spikelets in heads. Spikelets 1-many-flowered, 0.8-2 cm long, oblong, terete. Bracts glume-like. Glumes 1-3, to 5.5 mm, broadly ovate, mucronate. Lemmas to 6.5 mm, lanceolate, mucronate, coriaceous,

glabrous. Paleas to 7 mm, 2-keeled, ciliate. Stamens 6. Style 1; stigmas 3. Caryopsis linearly cylindric.

Flowering or fruiting could not be observed during the present study. Collected in vegetative state only.

Distr.: India, Sri Lanka and Myanmar. Banks of stream. *CNS 1908* (Venmony).

BOTHRIOCHLOA. O. Kuntze

Rev. Gen. 2: 762. 1891.

Bothriochloa pertusa (L.) A. Camus in Ann. Soc. Linn. Lyon, n.s. 76: 164. 1931; Bor, Grass. Burma, Ceylon, India & Pakistan. 109. 1960; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1809. 1983; Sreekumar & Nair, Fl. Kerala-Grass. 54.1991; Mohanan & Henry, Fl. Thiruvananthapuram 527. 1994; Gould in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 83. 1994. *Holcus pertusus* L., Mant. Pl. 2: 301. 1771. *Amphilophis pertusa* (L.) Nash ex Stapf. Agric. News. W. Indies. 15: 179. 1916, & in Prain, Fl. Trop. Afr. 9: 175.1917; Fischer in Gamble, Fl. Pres. Madras 1731. 1934. *Dichanthium pertusum* (L.) Clayton, Kew Bull. 32: 4. 1977.

Perennials. Culms 40-80 cm long, tufted, erect, creeping or geniculate; nodes bearded. Leaves 4-18 x 0.2-0.4 cm, oblong or lanceolate, apex acuminate, usually crowded at base, hairy, glaucous; sheaths to 7 cm long, keeled; ligule membranous. Racemes 2-7 on a peduncle, digitate or subdigitate, each one 3-6.5 cm long, pilose. Sessile spikelets 3-4 mm long, elliptic-lanceolate; lower glume 3-4 x 1 mm, elliptic-lanceolate, shortly 2-fid at apex, densely hairy below the middle, with a deep circular pit above the middle; upper glume oblong-lanceolate, equalling the lower; lower floret empty; upper floret bisexual; first lemma 2-3 x 1 mm, ovate-lanceolate; palea absent; second lemma 1-2 mm long, awn 1.5-2 cm long; palea absent; stamens 3; ovary oblong; stigmas 1-2 mm long, pink; grain oblong. Pedicelled spikelet 3-4 mm long; lower glume 3-4 x 1 mm, elliptic; upper glume equalling lower, lanceolate; lower floret similar to that of sessile spikelets; upper floret male or empty.

Fl. & Fr.: Sep. - Feb.

Distr.: Arabia eastwards to S.E. Asia, Pakistan, India. Among the bunds of fields and wetlands. *CNS 1709* (Muhamma).

BRACHIARIA (Trinius) Grisebach

In Ledebour, Fl. Rossica 4: 469. 1853.

Annuals or perennials. Culms erect, sometimes creeping or ascending. Leaf-sheaths compact; ligule membranous, fimbriate; blades usually linear to lanceolate, rarely ovate, flat. Racemes terminal, horizontal or ascending; rhachis triquetrous or flat, narrowly or broadly winged. Spikelets ovoid-ellipsoid, paired or single. Glumes unequal, membranous, distant, sometimes scaly; lower glume adaxial, shorter than the spikelet; upper glume as long as spikelet; lower floret male or sterile; lower lemma similar to upper glume; upper lemma crustaceous, usually granulose; upper palea obtuse or sub-acute. Stamens 3. Caryopsis ovoid or ellipsoid.

1a. Spikelets 1-2 mm long ..... **B. reptans**

1b. Spikelets 2-4 mm long.

2a. Culms robust, 5-10 mm in diam. racemes 10-20 in number ..... **B. mutica**

2b. Culms not robust, often less than 5 mm in diam. creeping or decumbent; racemes usually 2-8 in number, rarely more than 10 but then the rhachis triquetrous.

3a. Rhachis flat; spikelets secund, solitary, regularly seated in two rows on the under surface of rhachis; racemes 1-7.

4a. Rhachis curved, ribbon-like, broadly winged; spikelets and leaves densely pubescent ..... **B. decumbens**

4b. Rhachis straight, not ribbon-like, narrowly winged; spikelets and leaves not densely pubescent.

5a. Racemes 2-3; leaves upto 5 cm long; spikelets 2-3 mm long ..... **D. distachya**

5b. Racemes 3-8; leaves upto 20 cm long; spikelets 3.5-4 mm long ..... **B. miliiformis**

3b. Rhachis triquetrous; spikelets not secund, often paired, not regularly seated in two rows; racemes 3-14 ..... **B. ramosa**

Brachiaria decumbens Stapf in Prain, Fl. Trop. Afr. 9: 528. 1919; Bor, Grass. Burma, Ceylon, India & Pakistan 281. 1960; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 86. 1994.

Perennials. Culms 35-150 cm long, decumbent or creeping and rooting at the lower nodes. Leaves 3-24 x 0.5-1.5 cm, oblong-linear or linear-lanceolate, base rounded, apex acuminate, densely pubescent on both surfaces; sheaths upto 18 cm long, densely pubescent. Racemes 1-7 in number, 3-9 cm long; rhachis flat, ribbon-like. Spikelets 4-5 mm long, broadly elliptic or ovate-elliptic, acute, densely pubescent. Lower glume 2-3 x 2-2.5 mm, ovate, base cordate, apex acute, 9-nerved. Upper glume 4-4.5 x 2.5-3 mm, ovate-elliptic, densely hairy without, 5-nerved. Lower floret male. Upper floret bisexual. First lemma 4-4.5 x 2.5-3 mm, ovate-elliptic, hairy without, 5-nerved. Palea c. 4 x 3 mm, elliptic-lanceolate, delicate, 2-keeled. Stamens 3; anthers 2-2.5 mm long, yellow. Second lemma 3.5-4 x 2-2.5 mm, elliptic-lanceolate, mucronate, crustaceous. Palea c. 3.5 x 2 mm, elliptic-lanceolate, crustaceous, 2-keeled. Stamens 3; anthers 2-2.5 mm long, yellow. Stigma c. 1.5 mm long, plumose, purple.

Fl. & Fr.: Nov. - Mar.

Distr.: Tropical Africa, introduced as a fodder grass in India, Australia and elsewhere.

Along roadsides and other waste places. *CNS 1830* (S.L. Puram).

Brachiaria distachya (L.) Stapf in Prain, Fl. Trop. Afr. 9: 565. 1919; Fischer in Gamble, Fl. Pres. Madras 1769. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 281. 1960; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1811. 1983; Ramach. & Nair, Fl. Cannanore 528. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 219. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 528. 1994; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl.

Ceylon 8: 87. 1994; Sivar. & Mathew, Fl. Nilambur 832. 1996. *Panicum distachyon* L., Mant. Altera. 183. 1771.

Annuals or perennials. Culms 12-40 cm long, creeping or decumbent, rooting at the nodes; nodes glabrous. Leaves 1-3.5 x 0.3-0.7 cm, lanceolate or elliptic-lanceolate, rounded or shallowly cordate at base, softly hairy or glabrous; sheaths 1-2.5 cm, ciliate along one margin; ligule a tuft of hairs or fimbriate. Racemes 2 or rarely 3, 1.5-3 cm long, hairy or puberulous below the rachis; rachis flat, narrowly winged, scabrid, hirsute at axils. Spikelets 2-3 mm long, elliptic, solitary. Pedicels c. 0.5 mm, triquetrous, pilose. Lower glume 1-1.5 x 1.5-2 mm, obovate or broadly ovate, acute at apex, 7-9-nerved. Upper glume 2-2.5 x 1-1.5 mm, broadly ovate, 5-7-nerved. Lower floret empty. Upper floret bisexual. First lemma c. 2 x 1 mm, 5-nerved. Palea c. 2 x 0.5 mm, oblong, hyaline, 2-nerved. Second lemma 2-2.5 x 1-1.5 mm, ovate, coriaceous or crustaceous, rugulose. Palea 2-2.5 x 0.5-1 mm, ovate-oblong, coriaceous or crustaceous, 2-keeled, rugulose. Stamens 3; anthers c. 1 mm. Ovary c. 0.5 mm, elliptic; stigma 0.5-1 mm. Caryopsis to 1 mm, ovoid, compressed.

Fl. & Fr.: Nov. - Mar.

Distr.: Pakistan, India to Sri Lanka, Myanmar and Thailand. Fairly common along the banks of backwaters and in wastelands, usually in coastal areas. *CNS 1561* (Kayamkulam), *CNS 2589* (Kommadi).

Brachiaria miliiformis (J. 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; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 714. 1976; Vajravelu, Fl. Palghat Dist. 567. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 220. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 528. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 505. 1996. *Panicum miliiforme* J. Presl. ex. C. Presl., Rel. Haenk. 1: 300. 1830. *Panicum distachyon* sensu Hook.f., Fl. Brit. India 7: 37. 1896, non L., 1771.

Annuals or perennials. Culms 25-110 cm long, creeping, rooting from lower nodes; nodes glabrous. Leaves 2-20 x 0.3-1.2 cm, lanceolate or linear-lanceolate, rounded or

shallowly cordate at base; sheaths glabrous or tubercled hairy; ligules fimbriate. Racemes 3-7 in number, 2.5-7 cm long; rachis flat. Spikelets 3.5-4 mm, elliptic or obovate, tapering and narrowed at base. Lower glume 1.5-2 x 1.5-2 mm, broadly ovate or obovate, 9-11-nerved. Upper glume 3-4 x 1.5-2 mm, ovate, acute, 7-9-nerved. Lower floret empty, epaleate. Upper floret bisexual. First lemma ovate, acute, 5-7-nerved. Second lemma 2.5-3.5 x 1-1.5 mm, elliptic or elliptic-oblong, acute, crustaceous, faintly 3-5-nerved, rugulose. Palea 2-3 x 1-1.5 mm, elliptic or elliptic-oblong, crustaceous, 2-keeled, 2-nerved, rugulose. Stamens 3; anthers c. 1 mm, orange-red. Ovary c. 0.5 mm, elliptic; stigmas violet or dark-brown.

Fl. & Fr.: Sep. - Feb.

Distr.: Indo-Malaysia. Very common along the road sides, wastelands and railway tracks usually in shades. *CNS 1336* (Mannarasala).

Brachiaria mutica (Forssk.) Stapf in Prain, Fl. Trop. Afr. 9: 526. 1919; Fischer in Gamble, Fl. Pres. Madras 1769. 1934; Bor, Grass.Burma, Ceylon, India & Pakistan 284. 1960; Sreekumar & Nair, Fl. Kerala-Grass. 221. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 529. 1994; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 89. 1994. *Panicum muticum* Forssk., Fl. Aegypt. 20. 1775; Hook. f., Fl. Brit. India 7: 34. 1896.

Tall perennials. Culms 40-120 cm high, robust, erect; nodes densely bearded. Leaves 8-26 x 0.5-2 cm, linear-lanceolate, rounded or shallowly cordate at base, acuminate at apex; sheaths covered with dense tubercle-based hairs; ligules membranous, fimbriate. Racemes 10-20 in number, each 2-7 cm long; rhachis flat, ribbon-like, laterally covered with solitary or paired stalked spikelets. Pedicels 0.5-2 mm long, with a few white bristles. Spikelets 2.5-3.5 mm, elliptic, arranged in 2 rows. Lower glume c. 1 x 0.5 mm, ovate, acute, scaly, 1-3-nerved. Upper glume 3-3.5 x 1-1.5 mm, ovate, acute, chartaceous, 5-nerved. Lower floret male. Upper floret bisexual. First lemma 3-3.5 x 1-1.5 mm, ovate, acute, chartaceous, 5-nerved. Palea 2.5-3 x 1-1.5 mm, elliptic or ovate-elliptic, hyaline, 2-keeled. Second lemma 2-3 x 1-1.5 mm, ovate, rounded at apex,

crustaceous, 3-nerved, rugulose. Palea 2-2.5 x 1 mm, ovate or ovate-elliptic, rounded at apex, crustaceous, 2-keeled, rugulose. Stamens 3; anthers 1-1.5 mm. Ovary oblong-elliptic; stigmas c. 1 mm.

Fl. & Fr.: Nov. - Mar.

Distr.: A native of America and W. Africa; widespread in all tropical regions. Very common, along the banks of streams, backwaters and rivers, usually in semiaquatic habitats. *CNS 1818* (Pallanthuruthi), *CNS 2024* (Punnamada).

Brachiaria ramosa (L.) Stapf in Prain, Fl. Trop. Afr. 9: 542. 1919; Fischer in Gamble, Fl. Pres. Madras 1770. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 284. 1960; Mani. & Sivar. Fl. Calicut 343. 1982; Britto & Matthew in Matthew Fl. Tam. Carnatic 3: 1812.1983; Sree kumar & Nair,Fl. Kerala-Grass. 223. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 529.1994; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 91. 1994; Sivar. & Mathew, Fl. Nilambur 832. 1996. *Panicum ramosum* L., Mant. Pl. 1: 29. 1767; Hook. f., Fl. Brit. India 7: 36.1896.

Annuals. Culms 20-70 cm long, decumbent; nodes glabrous or softly villous. Leaves 3-14 x 0.5-2.3 cm, linear-lanceolate, shallowly cordate or rounded at base, acuminate at apex, softly villous, stiff-scabrid along margins; sheaths 2-5 cm, densely pubescent; ligule a row of hairs. Racemes 5-14 in number, pseudopaniculate, each 2-6 cm long; rhachis angular. Spikelets 2.5-3 mm, broadly elliptic or ovate-elliptic, acute to cuspidate, pubescent or glabrous. Pedicels with or without long colourless hairs. Lower glume 1-1.5 x 2 mm, ovate or obovate, chartaceous, 7-nerved, softly hairy or glabrous. Upper glume 2.5-3 x 1.5-2 mm, ovate, chartaceous, 7-nerved, softly hairy or glabrous. Lower floret empty. Upper floret bisexual. First lemma 2.5-3 x 2 mm, ovate, chartaceous, 5-nerved. Palea c. 2 x 0.5 mm, oblong-lanceolate, hyaline, 2-keeled. Second lemma 2-2.5 x 1.5-2 mm, ovate, mucronate, crustaceous, rugose. Palea c. 2 x 1 mm, ovate, crustaceous, 2-keeled. Stamens 3; anthers c. 1 mm long. Ovary c. 0.5 mm long; stigmas c. 1 mm long.

Fl. & Fr.: Sep. - Apr.

Distr.: Senegal to Yemen and southwards to Malawi and S. Africa; Pakistan, India and Tropical Asia. A highly variable species. *CNS 1416* (Kalavoor).

Brachiaria reptans (L.) Gard. & C.E. Hubb. in Hook., Icon. Pl. tab. 3363. 1938; Bor, Grass. Burma, Ceylon, India & Pakistan 285. 1960; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1814. 1983; Sreekumar & Nair, Fl. Kerala-Grass. 224. 1991; Davidse in Dassan., Fosb. & Clayton, Rev. Handb.Fl. Ceylon 8: 94. 1994; Sivar. & Mathew, Fl. Nilambur 833. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 506. 1996. *Panicum reptans* L., Syst. Nat. ed. 10, 870. 1759. *Panicum javanicum* sensu Hook. f., Fl. Brit. India 7: 35. 1896, non Poir, 1816. *Urochloa reptans* (L.) Stapf in Prain, Fl. Trop. Afr. 9: 610. 1920; Fischer in Gamble, Fl. Pres. Madras 1775. 1934.

Annuals. Culms 12-35 cm long, creeping, rooting at the nodes; nodes sparsely bearded. Leaves 1.5-6.5 x 0.3-0.8 cm, lanceolate, base rounded, apex acuminate; sheaths to 2.5 cm long, ciliate on one margin; ligule a row of hairs. Panicles 2.5-5.5 cm long, terminal; racemes 3-6 in number, alternate, 1-3.5 cm long. Spikelets 1.5-2 mm long, elliptic, acute; pedciels c. 1 mm long. Lower glume 0.5-1 mm long, obovate,1-3-nerved. Upper glume 1.5-2 mm long, ovate, acute, 5-nerved. Lower floret empty. Upper floret bisexual. First lemma 1.5-2 x 1 mm, broadly ovate, acute, 7-nerved. Palea 1.5-2 x 1 mm, ovate, 2-keeled, hyaline. Second lemma c. 1 x 1 mm, ovate, mucronate, crustaceous, rugulose. Palea c. 1 x 1 mm,ovate, crustaceous, 2-keeled. Stamens 3. Stigmas purple, plumose.

Fl. & Fr.: Dec. - Jan.

Distr.: India, Pakistan, Tropical Asia; introduced throughout the tropics. In wetlands. *CNS 2022* (Thamarakulam).

CENCHRUS Linnaeus

Sp. Pl.1049. 1753.

Cenchrus echinatus L., Sp. Pl. ed. 1, 2: 1050. 1753; Bor, Grass. Burma, Ceylon, India & Pakistan 289. 1960; Gould in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 109. 1994 (Fig. 77).

Annuals. Culms geniculate 20-75 cm tall, tufted; nodes glabrous. Leaves 8-35 x 0.4-1.2 cm, linear-lanceolate, base rounded, apex acuminate, pilolse on upper surface, scabrid on margins; sheaths keeled, to 12 cm long; ligule a row of hairs. Panicles spike-like,4-10 cm long; rhachis angular with sharp-edged decurrent wings, puberulous. Spikelets 3-5, 6-7 mm long, enclosed by a deciduous involucre of bristles; involucre to 8 mm long; bristles unequal, outer smaller, retrorsely barbed. Lower glume c. 3 mm long, ovate, acute. Upper glume c. 5 mm long, ovate-lanceolate, 3-5-nerved. Lower floret male. Upper floret bisexual. First lemma 5-6 mm long, ovate-lanceolate. Palea c. 6 mm long, ovate-lanceolate, 2-nerved, delicate. Stamens 3. Second lemma c. 6 mm long, ovate-lanceolate, acute, 5-nerved. Palea c. 6 mm long, ovate-lanceolate, 2-nerved. Stamens 3; filaments 7-8 mm long. Ovary c. 1 mm long, globose; stigma plumose, c. 3 mm long, white. Grain 3-3.5 x 2.5-3 mm, ellipsoid.

Fl. & Fr.: Dec. - Mar.

Distr.: Native of the warmer parts of the Americas; introduced in India and Sri Lanka. In sandy sea-coast. *CNS 1744* (Arattupuzha).

CENTOTHECA Desvaux

in Nouv. Bull. Sci. Soc. Philom. Paris 2: 189. 1810.

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, t. 50. 1960; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1817. 1983; Ramach. & Nair, Fl. Cannanore 529. 1988; Mani., Fl. Silent Valley 349. 1988; Vajravelu, Fl. Palghat Dist. 567. 1990; Sreekumar & Nair, Fl. Kerala-

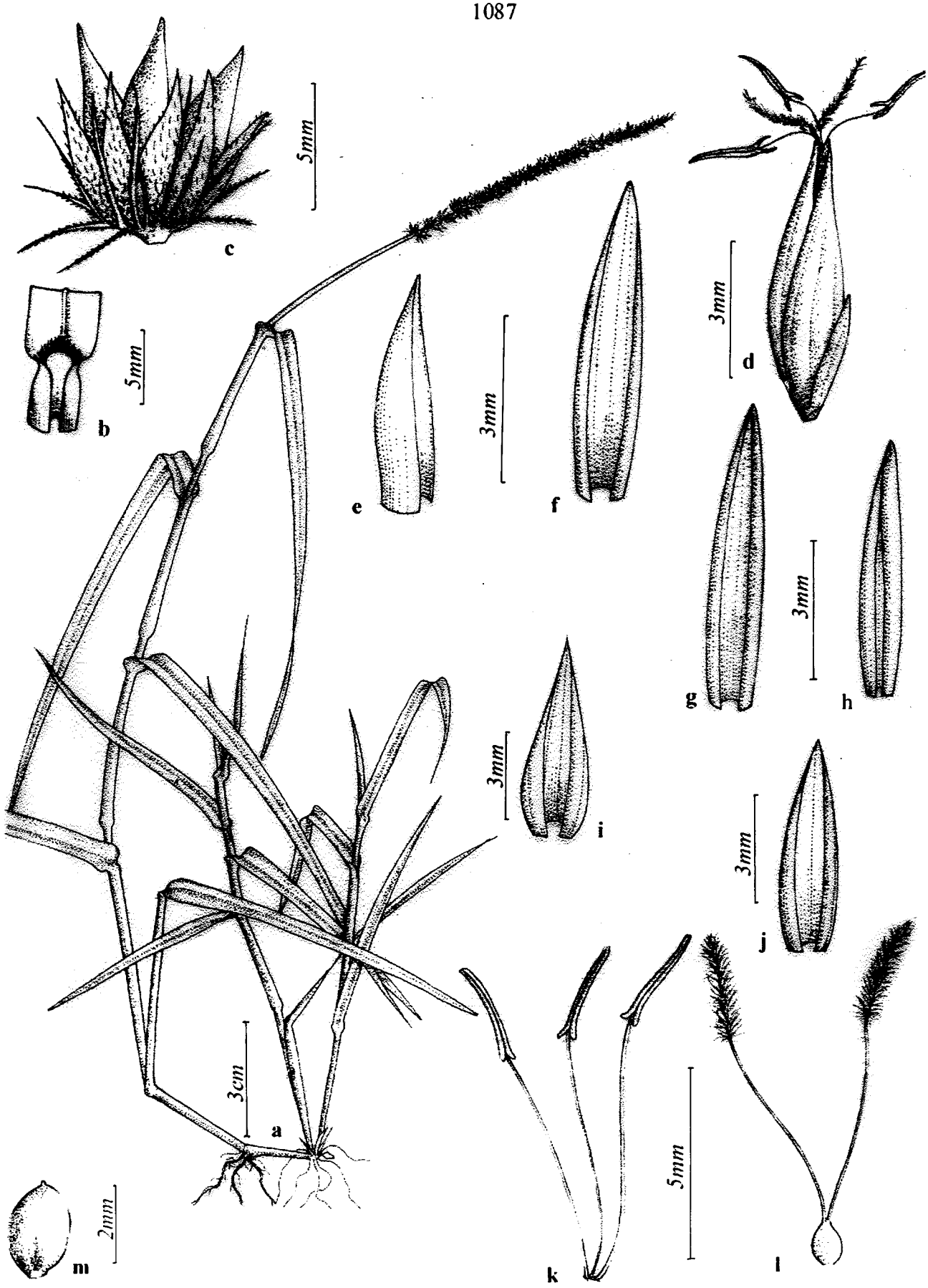


Fig. 77. *Cenchrus echinatus* L.: a. Habit; b. A portion of leaf with ligule; c. Spikelets (cluster); d. Single spikelet; e. Lower glume; f. Upper glume; g. First lemma; h. First palea; i. Second lemma; j. Second palea; k. Stamens; l. Pistil; m. Grain.

Grass. 354. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 530. 1994; Harriman in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 110. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 507. 1996. *Cenchrus lappaceus* L., Sp. Pl. ed. 2, 1488. 1763.

Perennials. Culms 30-80 cm high, tufted, erect; nodes glabrous. Leaves 6-20 x 1.3-3.2 cm, elliptic-lanceolate, base oblique, apex acute or acuminate, with prominent transverse veins; sheaths to 8.5 cm long, ciliate along the margins; ligules membranous. Panicles 8-20 cm long, pyramidal, lax. Spikelets 5-8 mm long, elliptic-oblong, 2-3-flowered. Lower glume 2-3 x 1-1.5 mm, ovate-lanceolate, 5-nerved. Upper glume to 3.5 mm long, lanceolate. Lemmas 3-4 x 1-2 mm, oblong, 5-7-nerved, glabrous or the upper ones with reflexed, tubercle-based bristles along the margins. Paleas c. 3 x 1 mm, elliptic, 2-keeled. Stamens 2-3. Stigmas pink. Grains to 1.5 mm long, obovoid.

Fl. & Fr.: Oct.- Feb.

Distr.: S.E. Asia, China, Polynesia and Tropical Africa. Common in shades of trees and thickets. *CNS 2129* (Kannadi).

CHLORIS O. Swartz

Prodr. 1: 25. 1788.

Chloris barbata Sw., Fl. Ind. Occid. 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; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 715. 1976; Mani. & Sivar., Fl. Calicut 338. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1820. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 307. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 531. 1994; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 113. 1994. ***Konda-pullu*** Rheede, Hort. Malab. 12: 95, t. 51. 1693.

Annuals. Culms tufted, erect, 10-50 cm high; nodes glabrous. Leaves 5-18 x 0.3-0.5 cm, linear or linear-lanceolate, rounded at base, acuminate, flat; sheaths to 8 cm long, keeled; ligules truncate, membranous. Spikes 4-14, digitate, purplish, each 2-6 cm long. Spikelets subsessile, 2-seriate,2-3 mm long, obovate, 2-3-flowered. Lower glume 1-2 mm

long, lanceolate, keeled. Upper glume c. 2 mm, lanceolate, hyaline, scabrid along the keel. Fertile lemmas 2-3 mm long, obovate, awned,densely stiff-cliate on margins and on keel; awn 4-6 mm long,scabrid. Paleas 2-2.5 x 1 mm, oblong-elliptic, hyaline; callus rounded, ciliate. Sterile lemmas 1-2 on a stalk, 0.5-1 mm long, obovate, truncate or emarginate, coriaceous, awned; awn 4-7 mm long. Stamens 3. Grains trigonous.

Fl. & Fr.: Sep. - Feb.

Distr.: Throughout the tropics. Very common, along the roadsides and waste lands; as a weed in cultivated fields and wetlands. *CNS 1082* (Thiruvizha).

CHRYSOPOGON Trinius

Fund. Agrost. 187. 1822 ('1820') (*nom. cons.*).

Chrysopogon aciculatus (Retz.) Trin., Fund. Agrost. 181. 1820; Fischer in Gamble, Fl. Pres. Madras 1738. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 115. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 716. 1976; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1822. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 307. 1988; Ramach. & Nair, Fl. Cannanore 530. 1988; Vajravelu, Fl. Palghat Dist. 568. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 59. 1991; Clayton in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 118. 1994; Mohanan & Henry, Fl. Thiruvananthapuram 531.1994; Sivar. & Mathew, Fl. Nilambur 805. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 507. 1996. *Andropogon aciculatus* Retz., Obs. Bot. 5: 22. 1789; Hook. f., Fl. Brit. India 7: 188. 1876. ***Kudira-pullu*** Rheede, Hort. Malab. 12: 79, t. 43. 1693. ***Sneha-pullu***.

Perennials. Culms to 60 cm long, creeping and decumbent; nodes glabrous. Leaves 2-8 x 0.3-0.5 cm, lanceolate or ovate-lanceolate, margin serrulate, apex acute to obtuse; sheaths slightly keeled; ligules annular, membranous. Panicle pyramidal, 4-8 cm long. Sessile spikelets 3-4 mm long, lanceolate, aristate; lower glume 3-4 mm long, lanceolate, apex 2-dentate; upper glume 3-4 x 1 mm, lanceolate, 3-nerved, scabrid at the back; lower floret empty, epaleate; upper floret bisexual, paleate; first lemma c. 2.5 x 1 mm, obovate, acute, 2-keeled, margins ciliate; second lemma c. 2.5 x 1 mm, ovate-

lanceolate, arista 3-5 mm long; palea 1.5-2 x 0.5 mm, oblong, hyaline; stamens 3; ovary c. 0.5 mm, oblong; stigmas 2 mm long, golden-yellow; caryopsis to 1.5 mm. Pedicelled spikelets 4-5 mm long, linear-lanceolate; pedicel 2.5-3 mm long; lower glume 4-5 x 1 mm, lanceolate, chartaceous; upper glume 4-5 x 1 mm, lanceolate, chartaceous, margins ciliate; lower floret empty; upper floret male, paleate; first lemma c. 3 x 1 mm, lanceolate, hyaline; second lemma 2-3 x 0.5-1 mm, lanceolate, margins ciliate; stamens 3, anthers 2 mm long.

Fl. & Fr.: Mar.- Dec.

Distr.: Tropics. 'The love grass'. Common along stream sides and banks of backwaters. Culms form thick carpets and act as a soil binder. *CNS 2216* (Angadikkal).

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; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 718. 1976; Mani. & Sivar., Fl. Calicut 331. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1826. 1983; Mani., Fl. Silent Valley 350. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 308. 1988; Vajravelu, Fl. Palghat Dist. 569. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 532. 1994; Gould in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 128. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 508. 1996. ***Catri-conda*** Rheede, Hort. Malab. 12: 133, t.70. 1693. ***Poochakal.***

Robust annual herbs. Culms 30-120 cm high, tufted; nodes glabrous. Leaves 10-45 x 1-2.5 cm, linear-oblong, cordate at base, margin scaberulous, acuminate at apex; sheaths to 6 cm long, glabrous; ligules ovate, membranous. Inflorescence terminal and axillary peduncled, false spikes,3-8 cm long, consisting of one female spikelet completely enclosed in a globose or ovoid basal cupule like bract. Male spikelets 2 or 3, exerted from the mouth of cupule, 5-12 x 2-4 mm, elliptic or elliptic-lanceolate. Lower glume 4-8 x 2-4 mm, ovate-elliptic, 2-keeled, winged on keels. Upper glume 3-7 x 2-3 mm, elliptic-

lanceolate, acuminate. Lower floret male. Upper floret male or barren. First lemma 4-8 x 1.5-2.5 mm, oblong-lanceolate, acuminate, hyaline. Palea 4-8 x 1.5-2.5 mm, elliptic-lanceolate or lanceolate, 2-keeled. Stamens 3, anthers 3-4 mm long. Second lemma 4-7 x 1-2 mm, elliptic or elliptic-lanceolate; hyaline. Palea 4-7 x 1-1.5 mm, elliptic-lanceolate, hyaline. Stamens 3; anthers 3-5 mm long. Female spikelets 4-14 mm long, globose or ovoid, bony, shining white or grey. Lower glume ovate-oblong, acute. Upper glume ovate. Lower floret female or barren. Upper floret female. Caryopsis 5-7 mm, subglobose, furrowed in the middle.

Fl. & Fr.: Oct. - Nov.

Distr.: Native of Tropical Asia; now throughout the tropics. Common along marshy places, banks of streams and other wetlands. Fruits are used for making necklaces by local people. CNS 1614 (Paruthikulam).

CYMBOPOGON K.P.J. Sprengel

Pl. Min. Cogn. Pugil. 2: 14. 1815.

Cymbopogon flexuosus (Nees ex Steud.) Wats. in Atkins, Gaz. N.W. Prov. India 392. 1882; Fischer in Gamble, Fl. Pres. Madras 1756. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 127. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 719. 1976; Soenarko,Reinwardtia 9: 353. 1977; Vajravelu, Fl. Palghat Dist. 569. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 71. 1991; Sivar. & Mathew, Fl. Nilambur 806. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For.509. 1996. *Andropogon flexuosus* Nees ex Steud., Syn. Pl. Glum. 1: 388. 1854. *Andropogon nardus* L., ssp. *flexuosus* (Nees ex Steud.) Hack. in DC., Monogr. Phan. 6: 603. 1889; Hook. f., Fl. Brit. India 7: 207. 1896. ***Ingi-pul.***

Perennials. Culms 80-240 cm high, tufted; nodes glabrous. Leaves 20-80 x 1-2 cm, linear, rounded at base, flat; sheaths glabrous; ligule ovate, membranous. Inflorescence a large complex greyish panicle; branches slender, flexuous, often drooping. Racemes paired,with a spatheole beneath. Spikelets binate, one sessile, other pedicelled. Sessile spikelets 4-5 mm long, elliptic-lanceolate; lower glume c. 3 x 1 mm, elliptic-lanceolate, keels winged towards apex; upper glume ovate-lanceolate, margins ciliate; lower floret

empty; upper floret bisexual; first lemma 2.5-3 x 1 mm, lanceolate, purplish, epaleate; second lemma c. 2 x 0.4 mm, deeply 2-fid, awned, hyaline, awn 6-10 mm; stamens 3, anthers 1-2 mm long; ovary c. 1 mm, oblong,stigmas 1-1.5 mm long; caryopsis c. 2 mm long, elliptic. Pedicelled spikelets 3-4 mm long, lanceolate; pedicels c. 2 mm long, densely villous; lower glume c. 3 x 1 mm, ovate-lanceolate; upper glume c. 3 x 1 mm, elliptic-lanceolate; lower floret male; upper floret wanting; first lemma c. 3 x 1 mm, elliptic-lanceolate; stamens 3, anthers 1.5-2 mm long.

Fl. & Fr.: Nov. - Feb.

Distr.: Indo-malaysia. The plant yield an inferior kind of lemon-grass oil. *CNS 1809* (Vazhuvadi).

CYNODON L.C. Richard

In Persoon, Syn. Pl. 1: 85. 1805.

Cynodon dactylon (L.) Pres., 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, t. 52. 1960; Jain, Bull. Bot. Surv. India 2: 139. 1967; Mani. & Sivar., Fl. Calicut 339. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1829. 1983; Ramach. & Nair, Fl. Cannanore 532. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab.360. 1988; Vajravelu, Fl. Palghat Dist. 570. 1990; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 137. 1994; Mohanan & Henry, Fl. Thiruvananthapuram 533. 1994; Sivar. & Matthew, Fl. Nilambur 823. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 510. 1996. *Panicum dactylon* L., Sp. Pl. 58. 1753. ***Beli-caraga*** Rheede, Hort. Malab. 12: 87, t. 47. 1693. **Karugapul**.

Slender, stoloniferous creeping perennials. Leaves 1-10 x 0.1-0.5 cm, linear-lanceolate, acuminate, glaucous; sheaths keeled; ligules fimbriate, membranous. Inflorescence of terminal, digitate 3-4 spikes; spikes 1-sided, oblong to 5 cm long. Spikelets sessile, 2-3 mm long, oblong-lanceolate, laterally compressed, 1-flowered. Lower glume 1.5-2 x 0.5 mm, lanceolate, chartaceous,1-nerved. Upper glume c. 2 x 0.5 mm, lanceolate, chartaceous, 1-nerved. Lemma 2-3 x 1.5-2 mm, boat-shaped, ovate-

oblong when spread, keeled. Palea 2-2.5 x 0.5-1 mm, boat-shaped or oblong when spread, chartaceous. Stamens 3; anthers 1-1.5 mm long. Ovary c. 0.5 mm long, oblong; stigmas 0.5-1 mm long, pink. Caryopsis c. 1 mm, linear.

Fl. & Fr.: Dec. - Jan.

Distr.: Pantropic.

Common along the banks of backwaters, roadsides, bunds of paddy fields and often in wastelands. CNS 1306 (Chengannur), CNS 1482 (Manaladi).

CYRTOCOCCUM Stapf

In D. Prain, Fl. Trop. Africa 9: 15. 1917 & 9: 745. 1920.

Perennials or annuals. Culms creeping. Leaves oblong, ovate or lanceolate, flat; ligule membranous. Inflorescence an effuse or contracted panicle. Spikelets obliquely obovate, laterally compressed, 2-flowered, deciduous. Glumes membranous, 3-5-nerved, subequal. Lower lemma similar to upper glume, empty, paleate or not. Upper lemma boat-shaped, 3-5-nerved. Palea narrow and as long as lemma. Upper floret bisexual. Stamens 3. Styles 2. Coryopsis obovoid.

1a. Pedicels short, rarely as long as the spikelets ..... **C. trigonum**

1b. Pedicels longer than the spikelets.

2a. Upper glume and lower lemma with brown wart-like outgrowths .... **C. muricatum**

2b. Upper glume and lower lemma smooth, without wart-like outgrowths .... **C. patens**

Cyrtococcum muricatum (Retz.) Bor, Grass. Burma, Ceylon, India & Pakistan 291. 1960; Sreekumar & Nair, Fl. Kerala-Grass. 230. 1991. *Panicum muricatum* Retz., Obs. Bot. 4: 18. 1786.

Annuals. Culms 10-50 cm long, creeping or trailing, rooting at the lower nodes. Leaves 2.5-7 x 0.5-1.5 cm, ovate-lanceolate, base cuneate and ciliate, apex acuminate;

sheaths ciliate along the margins; ligules membranous. Panicles 6-11 cm long, lax. Spikelets c. 2 mm long, obovate, purplish. Lower glume c. 1 mm long, ovate. Upper glume c. 1.5 x 1 mm, ovate-oblong, softly hairy with a few brown wart-like outgrowths. Lower floret empty, epaleate. Upper floret bisexual. First lemma c. 1.5 x 1 mm, ovate-oblong, softly hairy with a few brown wart-like outgrowths. Second lemma c. 1.5 x 1.5 mm, deltoid, crustaceous. Palea 1-1.5 mm long, oblong, crustaceous, 2-keeled. Stamens 3; anthers pale yellow.

Fl. & Fr.: Jul. - Nov.

Distr.: Southeast Asia. In moist shady places. *CNS 2590* (Karthikappally).

Cyrtococcum patens (L.) A. Camus, Bull. Mus. Hist. Nat. Paris 27: 118. 1921; Fischer in Gamble, Fl. Pres. Madras 1786. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 292. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 721.1976; Ramach. & Nair, Fl. Cannanore 533. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 231. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 534. 1994; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 142. 1994. *Panicum patens* L., Sp. Pl. 58. 1753. *Cyrtococcum radicans* (Retz.) Stapf in Hook., Icon. Pl. sub tab. 3096. 1922; Fischer in Gamble, Fl. Pres. Madras 1786. 1934. *Panicum radicans* Retz., Obs. Bot. 4: 18. 1786.

Annuals. Culms 15-55 cm long, creeping or trailing, rooting at the lower nodes. Leaves 2-6 x 0.4-1.2 cm, ovate-lanceolate, base cuneate, apex acuminate; sheaths softly villous, margins ciliate; ligules ovate. Panicles 5-14 cm long, lax. Spikelets 1-2 mm long, ovate or obovate, purplish-green. Lower glume c. 1x1 mm, ovate, acute. Upper glume 1-1.5 mm long, ovate or obovate. Lower floret empty, epaleate. Upper floret bisexual. First lemma c. 2 x 1.5 mm, ovate, 5-nerved. Second lemma 1.5-2 x 1 mm, deltoid, crustaceous. Palea c. 1.5 mm long, crustaceous, 2-keeled. Stamens 3; anthers cream. Stigmas pink.

Fl. & Fr.: Throughout the year.

Distr.: Widespread in Southeast Asia. In moist shady places. *CNS 2217* (Pulinkunnu).

Cyrtococcum trigonum (Retz.) A. Camus, Bull. Must. Hist. Nat. Paris 27: 118.1921; Fischer in Gamble, Fl. Pres. Madras 1785. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 292. 1960; Mani. & Sivar., Fl. Calicut 348.1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1831. 1983; Ramach. & Nair, Fl. Cannanore 534. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 232.1991; Mohanan & Henry, Fl. Thiruvananthapuram 535. 1994; Davidse in Dassan., Fosb. & Clayton, Rev. Hanmdb. Fl. Ceylon 8: 143. 1994; Sivar. & Matthew, Fl. Nilambur 835. 1996; Sasi. & 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 10-40 cm long, creeping or trailing, rooting at the nodes. Leaves 1-3 x 0.2-0.6 cm, elliptic-lanceolate, base narrowed, apex acuminate; sheaths softly villous, ciliate along one margin; ligules ovate, membranous. Panicles 2-5 cm long. Spikelets 1-2 mm long, obovate. Lower glume c. 1 x 1 mm, ovate, 3-nerved. Upper glume c. 2 x 1 mm, ovate, 3-nerved. Lower floret empty. Upper floret bisexual. First lemma c. 2 x 1 mm, ovate-oblong, 5-7-nerved. Second lemma c. 1.5 mm long, deltoid, crustaceous. Palea c. 1 mm long, oblong, crustaceous, 2-keeled. Stamens 3.

Fl. & Fr.: Sep. - Dec.

Distr.: India, Sri Lanka extending to S.E. Asia. In wastelands. *CNS 1334* (Bharanikkavu).

DACTYLOCTENIUM Willdenow

Enum. Pl. Hort. Berol. 1029. 1809.

Dactyloctenium aegyptium (L.) P. Beauv., Essai Agrost. Expl. t. 15. 1812; Fischer in Gamble, Fl. Pres. Madras 1840. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 489. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 721. 1976; Mani. & Sivar., Fl. Calicut 337. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1831. 1983; Ramach. & Nair, Fl. Cannanore 534. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab.308. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 367. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 535. 1994; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 147. 1994; Sivar. & Mathew, Fl. Nilambur 824. 1996; Sasi. & Sivar., Fl. Pl.Thrissur For.511. 1996. *Cynosurus aegyptius* L., Sp. Pl. 72. 1753. *Eleusine aegyptia*

(L.) Desf., Fl. Atlant. 1: 85.1798; Hook. f., Fl. Brit. India 7: 295. 1896. ***Kavaru-pullu*** Rheede, Hort. Malab. 12: 131, t. 69. 1693.

Annuals. Culms 30-60 cm long, creeping or geniculately ascending, rooting at the nodes; nodes glabrous. Leaves 5-20 x 0.3-0.6 cm, linear, rounded or shallowly cordate at base, acuminate, margins at base ciliate; sheaths to 5 cm long, keeled; ligules ovate, fimbriate, membranous. Spikes 2-6, digitate, each 2-5 cm long, oblong. Spikelets sessile, 2-3.5 mm long, ovate or oblong, 3-4-flowered, laterally compressed, densely imbricate, in 2 rows. Lower glume 1.5-2 x 1-1.5 mm, boat-shaped or ovate-acute when spread, keeled; keel scabrid. Upper glume 1.5-2 x 1-1.5 mm, ovate-elliptic or obovate, aristate, keeled; keel scabrid; arista c. 1.5 mm long, geniculate. Lemmas 1.5-3 x 1-1.5 mm, ovate, aristate; arista c. 1 mm long. Palea 1-1.5 x 1 mm, ovate-lanceolate, acuminate. Stamens 3; anthers c. 0.5 mm long. Grain c. 1 mm long, obovate or triangular, transversely rugose.

Fl. & Fr.: Most of the seasons.

Distr.: In tropical and warm temperate regions of Old World. Very common along the bunds of paddy fields, roadsides and as a weed in tapioca plots. *CNS 2085* (Mambuzhakari).

DIGITARIA Haller

Hist. Strip. Helv. 2. 244. 1768.

Annuals or perennials. Culms erect or ascending. Leaves oblong, flat, flaccid; sheaths usually lax and open; ligule membranous. Inflorescence terminal, of spike-like racemes, digitate or corymbose; rhachis winged. Spikelets 2-nate or 3-nate, rarely solitary, secund, oblong, flat on the front, convex on the back, articulated at tip of thickened pedicels. Lower glume a rim or a triangular scale, sometimes absent. Upper glume variable 1-5-nerved, rarely nerveless. Lower lemma membranous, 5-7-nerved, as long as spikelet, barren. Upper lemma cartilaginous, bearing a bisexual floret, 3-nerved. Palea hyaline, 2-nerved. Stamens 3. Styles 2; stigma plumose. Grains narrow-ellipsoid.

1a. Spikelets 1-2 mm long; hairs on the splikelets verrucose; lower glume absent ... . **D. longiflora**

1b. Spikelets 2-4 mm long; hairs on the spikelets not verrucose; lower glume usually present.

2a. Spikelets with glassy bristles; racemes usually 2, stiff ..... **D. bicornis**

2b. Spikelets without glassy bristles; racemes 2-15 in number.

3a. Lower glume absent or reduced to a rim; upper glume usually less than half the length of the spikelet ..... **D. setigera**

3b. Lower glume a triangular scale; upper glume always more than half the length of the spikelet.

4a. Rhachis distinctly serrate; racemes 2-12 in number; spikelets elliptic or elliptic-lanceolate, 2.5-3.5 mm long ..... **D. ciliaris**

4b. Rhachis smooth; racemes 2-4 in number; spikelets narrowly lanceolate, 3-4 mm long ..... **D. radicosa**

Digitaria bicornis (Lam.) Roem. & Schult., Hort. Brit. 24: n. 1578. 1830; Bor, Grass. Burma, Ceylon, India & Pakistan 299. 1960; Veldkamp, Blumea 21: 30. 1973; Mani. & Sivar., Fl. Calicut 335. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1836. 1983; Sreekumar & Nair, Fl. Kerala-Grass. 235. 1991; Gould. in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 162. 1994. *Paspalum bicorne* Lam., Tab. Encycl. Meth. Bot. 1: 176. 1791. *Digitaria biformis* Willd., Enum. Pl. Hort. Berol. 92. 1809; Bor, Grass. Burma, Ceylon, India & Pakistan 219. 1960. *Paspalum heterantherum* sensu Hook. f., Fl. Brit. India 7: 16. 1896, non Nees & Meyen, 1843.

Annuals. Culms to 50 cm high; nodes glabrous. Leaves 4-10 x 0.3-0.6 cm, linear-lanceolate, base rounded, apex acute or acuminate; sheaths lax, to 5 cm long; ligules to 3 mm long, truncate, membranous. Racemes usually 2, rarely 3 or more, each 5-12 cm long. Rhachis winged, serrate. Spikelets binate, heteromorphous, 2.5-3.5 mm long, oblong-elliptic, sessile ones glabrous or sparsely pubescent, pedicelled ones pectinate, pubescent. Lower glume scaly, sometimes absent. Upper glume 1-2.5 mm long, lanceolate, chartaceous, silky pubescent. Lower floret empty. Upper floret bisexual. First lemma

2.5-3.5 x 1 mm, elliptic-lanceolate, chartaceous, 7-nerved. Second lemma 2.5-3 x 1 mm, elliptic-lanceolate, acuminate, crustaceous. Palea 2.5-3 x 0.5-1 mm, elliptic-lanceolate, crustaceous, 2-keeled. Stamens 3; anthers c. 1 mm. Stigmas c. 1 mm long pink.

Fl. & Fr.: Mar. - Sep.

Distr.: Tropics and Subtropics; rare in Africa, throughout Malesia. Frequent in waste places, road sides and sea-shores. *CNS 1418* (Haripad), *CNS 2591* (Pallana).

Digitaria ciliaris (Retz.) Koel., Descr. Gram. 27. 1802; Veldkamp, Blumea 21: 32. 1973; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 723. 1976; Mani. & Sivar., Fl. Calicut 335. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1837. 1983; Ramach. & Nair, Fl. Cannanore 535. 1988; Vajravelu, Fl. Palghat Dist. 571. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 237. 1991; Gould in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 163. 1994; Mohanan & Henry, Fl. Thiruvananthapuram 536. 1994; Sivar. & Mathew, Fl. Nilambur 836. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 511. 1996. *Panicum ciliare* Retz., Obs. Bot. 4: 16. 1786. *Panicum adscendens* Kunth, Nov. Gen. et Sp. 1: 97. 1816. *Digitaria marginata* Link, Enum. Hort. Berol. 1: 102. 1821; Fischer in Gamble, Fl. Pres. Madras 1764. 1934, p.p. *Paspalum sanguinale* (L.) Lam., var. *rottleri* Hook. f., Fl. Brit. India 7: 15. 1896, p.p. *Digitaria adscendens* (Kunth) Henrard, Blumea 1: 92. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 298. 1960.

Annuals. Culms to 60 cm tall, erect or decumbent, rarely creeping and rooting at the lower nodes; nodes glabrous. Leaves 3-8 x 0.3-1 cm, oblong-linear or linear-lanceolate, rounded or shallowly cordate at base, acuminate at apex, flat; sheaths slightly keeled, glabrous or pilose; ligules ovate or truncate, membranous. Racemes 3-7, digitate or subdigitate, to 15 cm long. Rhachis winged, serrate. Spikelets binate, 2.5-3.5 mm long, elliptic or elliptic-lanceolate. Lower glume 2-5 mm long, triangular. Upper glume 2-2.5 mm long, lanceolate, 3-nerved. Lower floret empty, epaleate. Upper floret bisexual. First lemma 2.5-3.5 x 0.5 mm, elliptic or elliptic-lanceolate, 7-nerved. Second lemma 2.5-3 x 1 mm, elliptic or elliptic-lanceolate, acuminate, crustaceous, brownish-yellow in fruit.

Palea 2.5-3 x 1 mm, elliptic-lanceolate, subcoriaceous, 2-keeled, 2-nerved. Stamens 3; anthers c. 1 mm long. Ovary c. 1 mm long; stigmas c. 1 mm long, pink.

Fl. & Fr.: Sep. - Nov.

Distr.: Old World tropics. Common along waysides and open places. *CNS 1813* (Bhagavathipady), *CNS 2218* (Chakkumkari).

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; Veldkamp, Blumea 21: 66. 1973; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 724. 1976; Mani. & Sivar., Fl. Calicut 335. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1838. 1983; Mani., Fl. Silent Valley 351. 1988; Ramach. & Nair, Fl. Cannanore 536. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 239. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 536. 1994; Gould in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 167. 1994; Sivar. & Mathew, Fl. Nilambur 837. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For 512. 1996. *Paspalum longiflorum* Retz., Obs. Bot. 4:15. 1796. Hook. f., Fl. Brit. India 7:7. 1896, p.p. (Fig. 78).

Annuals. Culms 10-40 cm long, slender, creeping or geniculate, rooting at the nodes; nodes glabrous. Leaves 2-7 x 0.3-0.7 cm, elliptic-lanceolate, rounded or shallowly cordate at base, apex acute; sheaths keeled; ligules ovate, membranous. Racemes 2 or 3, digitate, 2-7 cm long. Rhachis flat, c. 0.5 mm wide, winged. Spikelets solitary, 1-2 mm long, ovate-elliptic, shortly hairy. Lower glume absent. Upper glume 1-2 x 1 mm, ovate-elliptic, chartaceous, 5-9-nerved. Lower floret empty. Upper floret bisexual. First lemma similar to the upper glume. Second lemma 1-1.5 x 1 mm, ovate-elliptic, crustaceous, Palea 1-1.5 x 0.5 mm, elliptic, 2-keeled, 2-nerved. Stamens 3; anthers c. 0.5 mm. Stigmas c. 1 mm long.

Fl. & Fr.: Sep. - Nov.

Distr.: Throughout the Old World Tropics. Common in waste places and open fields. *CNS 1305* (Lexmithop).

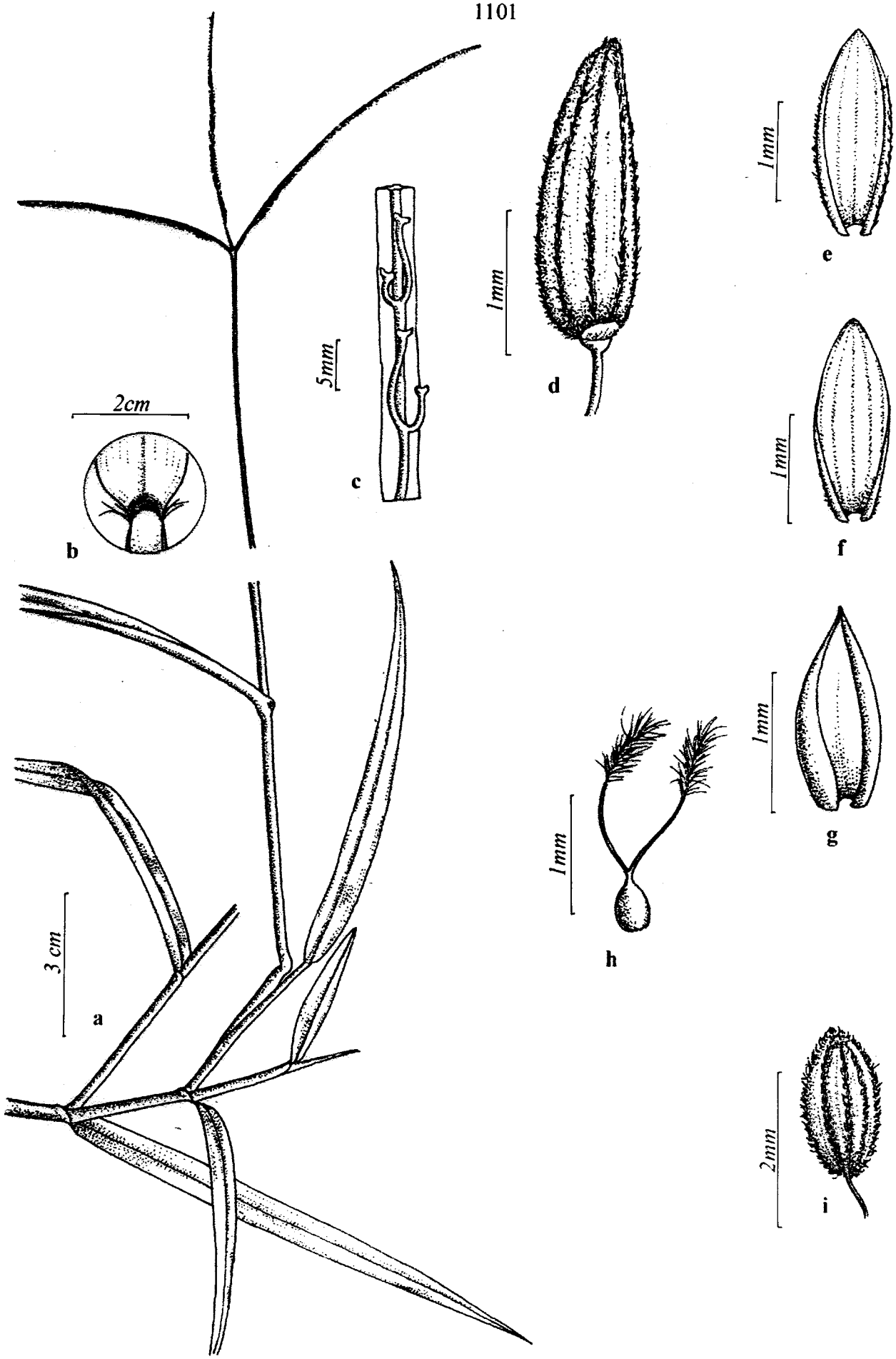


Fig. 78. *Digitaria longiflora* (Retz.) Pers.: a. Habit; b. A portion of the leaf with ligule; c. Rhachis; d. Spikelet; e. Upper glume; f. First lemma; g. Second lemma; h. Pistil; i. Fruiting spikelet.

Digitaria radicosa (Presl) Miq., Fl. Ind. Bat. 3:437. 1857; Veldkamp, Blumea 21: 35. 1973; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1838. 1983; Sreekumar & Nair, Fl. Kerala-Grass. 240. 1991. *Panicum radicosum* Presl, Rel. Haenk. 1:297. 1830. *Panicum timorense* Kunth, Enum. Pl. 1:83. 1833. *Digitaria timorensis* (Kunth) Bal. in Morot, J. Bot. 4:138. 1890; Bor, Grass. Burma, Ceylon, India & Pakistan 306. 1960. *Paspalum sanguinale* (L.) Lam., var. *debile* Hook. f., Fl. Brit. India 7: 16. 1896.

Annuals. Culms to 30 cm long, slender, creeping and rooting at the nodes; nodes glabrous. Leaves 2-7 x 0.3-0.5 cm, linear-oblong or elliptic-lanceolate, narrowed at base, apex acute or acuminate; sheaths keeled; ligules ovate. Racemes 2 or 3, 5-10 cm long, digitate or subdigitate. Rhachis winged, smooth. Spikelets binate, one sessile, other pedicelled, 3-4 mm long, oblong or lanceolate. Lower glume c. 2 mm long, triangular. Upper glume 1.5-3 x 0.5 mm, lanceolate, chartaceous, 3-nerved with overtopping pubescence. Lower floret empty. Upper floret bisexual. First lemma 3-4 x 1 mm, lanceolate, chartaceous. Second lemma 2.5 - 1 mm, elliptic-lanceolate crustaceous. Palea 2.5-3 x 0.5-1 mm, lanceolate, crustaceous, 2-keeled, 2-nerved. Stamens 3; anthers c. 0.5 mm long, violet. Ovary c. 0.3 mm, linear; stigmas purple.

Fl. & Fr.: Dec. - Mar.

Distr.: South-East Asia, Polynesia. In waste places and as a weed in cultivated fields. CNS 1365 (R. Block).

Digitaria setigera Roth ex Roem. & Schult., Syst. Veg. 2:474. 1817; Veldkamp in Blumea 21:37. 1973; Bor, Grass. Burma, Ceylon, India & Pakistan 305. 1960; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1839. 1983; Ramach. & Nair, Fl. Cannanore 536. 1988; Mani., Fl. Silent Valley 352. 1988; Sreekumar & Nair, Fl. Kerala -Grass. 241. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 537. 1994; Sivar. & Mathew, Fl. Nilambur 838. 1996. *Paspalum sanguinale* (L.). Lam. var. *extensum* Hook. f., Fl. Brit. India 7: 15. 1896. *Digitaria sanguinalis* (L.) Scop. var. *extensum* (Hook. f.) Rang. & Tad., Handb. S. Ind. Grass. 56, t. 74-75. 1921.

Annuals. culms to 1 m long, creeping; nodes glabrous. Leaves 3-6 x 0.3-0.6 cm, elliptic-lanceolate or linear, base rounded, apex acute; sheaths keeled; ligules to 5 mm long, ovate. Racemes 3-14, digitate or subdigitate, 4-15 cm long. Rhachis flat, winged, margins serrulate. Spikelets 2-3 mm long, elliptic-lanceolate. Lower glume absent. Upper glume c. 0.5 mm, ovate-lanceolate, chartaceous. Lower floret empty. Upper floret bisexual. First lemma 2-3 x 1 mm, elliptic or lanceolate, chartaceous, pubescent. Second lemma c. 2 x 1 mm, elliptic-lanceolate, crustaceous. Palea c. 2 x 1 mm, elliptic-lanceolate, crustaceous, 2-keeled, 2-nerved. Stamens 3; anthers c. 0.5 mm long. Ovary c. 0.5 mm, oblong; stigmas to 1 mm long, white.

Fl. & Fr.: Most of the seasons.

Distr.: Pantropics. Common along wayside and waste places. *CNS 2592* (Kuppapuram).

DIMERIA R. Brown

Prodr. 208. 1810.

Annuals or perennials, densely tufted, erect or geniculate. Leaves narrow-lanceolate or linear; sheaths tuberculate-pilose; ligule membranous. Inflorescence solitary or 2-3 spiciform digitate racemes. Rhachis not jointed, straight, rarely flexuous, flat or trigonous, winged or wingless. Spikelets solitary, secund, laterally compressed, 2-flowered. Glumes subequal, chartaceous or membranous, keel variously winged, apex acute to aristate. Lower lemma empty, epaleate, linear. Upper floret bisexual. Upper lemma emarginate with a geniculate awn at the sinus. Palea hyaline, linear or absent. Stamens 2. Styles 2. Gains linear-ellipsoid.

1a. Upper glume awnless, not winged.

2a. Spikelets 1-2 mm long; racemes upto 5.5 cm long; annuals ..... **D. ornithopoda**

2b. Spikelets 3.5-4.5 mm long; racemes 7-10 cm long; perennial ..... **D. copeana**

1b. Upper glume awned and winged all along the keel.

3a. Wing of the upper glume tapering to base; rhachis flat; nodes glabrous .... **D. lawsonii**

3b. Wing of the upper glume more or less uniformly broad; rhachis triquetrous; nodes bearded.

4a. Culms filiform and solitary; raceme 1; rhachis upto 4 cm long, winged on the margins; spikelets 6-6.5 mm long ..... **D. kalavoorensis**

4b. Culms robust, tufted and branched; racemes 1-3; rhachis upto 10 cm long, not winged on the margins; spikelets 7.5-8 mm long ..... **D. copei**

Dimeria copeana Sreekumar, Nair & N.C. Nair, J. Bombay Nat. Hist. Soc. 78(3): 577. 1981; Sreekumar & Nair, Fl. Kerala-Grass. 87. 1991.

Perennials. Culms 20-40 cm, capillary; nodes bearded. Leaves 20-40 x 0.1-0.2 cm, linear, acuminate, sparsely villous on upper surface; sheaths glabrous or very sparsely villous at base; ligule membranous, fimbriate at apex. Racemes 2, 7-10 cm long. Rhachis trigonous, more or less zig-zag, scabrid on the margins. Spikelets 3.5-4.5 mm long, oblanceolate, adpressed to rhachis. Callus 0.25-0.5 mm long, hairy. Lower glumes 3-4 mm long, oblong, acute, coriaceous. Upper glumes 4-4.5 mm long, elliptic, acute, margins hyaline, villous. Lower floret empty. Upper floret bisexual. First lemma c. 2.5 x 0.6 mm, oblanceolate, acute, hyaline, ciliate on the margins; palea O. Second lemma 3-3.5 mm long, oblong, acute, shortly bifid at apex, awns 8-10 mm long, epaleate. Stamens 2; anthers c. 2 mm long. Ovary c. 0.3 mm long, ovate; styles 2; stigma c. 10 mm long. Grain c. 2.25 x 0.3 mm, oblong, compressed.

Fl. & Fr.: Dec. - Mar.

Distr.: Endemic to Kerala. Rare. In wastelands

Note: This material could not be collected during the present study. The description is based on the protologue.

Dimeria copei Ravi, Blumea 41(1): 251. 1996.

Annuals. Culms branched and tufted, upto 70 cm tall; nodes bearded. Leaves upto 22 cm x 2 mm, linear, narrowed to the base; acuminate at apex; sheaths keeled, upto 10 cm long; ligules membranous, fimbriate-truncate at apex. Racemes 1 or 2 (or 3), upto 10

cm long; rhachis triquetrous, flattened on the back, densely ciliate on the margins. Spikelets 7.5 - 8 mm long including the awn of the upper glume, oblong-elliptic. Lower glume c. 5.5 x 0.6 mm, linear-oblong, acuminate-aristate at apex, keeled on the back, keel narrowly winged, ciliate all over. Upper glume c. 7 x 1.25 mm, oblong-elliptic, acuminate-awned at apex, awn 1-1.25 mm long, scaberulous, keeled, broadly winged all along the keel. Lower lemma c. 3 mm long, oblanceolate, acute at apex, hyaline, 1-nerved; ciliate on the margins above the middle, epaleate. Second lemma 3.5-4 x 0.75 mm, oblanceolate, hyaline, awned from the sinus of the bifid apex; awn 12-14 mm long. Palea c. 0.75 mm long, lanceolate. Stamens 2; anthers c. 1.5 mm long. Grain c. 2.5 x 0.3 mm, oblong-elliptic.

Fl. & Fr.: Nov. - Dec.

Distr.: Endemic to Kerala. Rare. In open wet grasslands. *CNS 2367* (A.I.R. Campus, Kalavoor).

Dimeria kalavoorensis Ravi., Blumea 41(1): 253. 1996.

Annuals. Culms solitary, unbranched and filiform, upto 40 cm long; nodes bearded. Leaves upto 5 cm x 2 mm, linear, narrowed to the base, acuminate at apex, beset with bulbous-based hairs on the margins; sheaths keeled, glabrous, closely enclosing the culm, upto 6 cm long; ligules membranous, timbriate-truncate at apex. Raceme solitary, 1-4 cm long. Rhachis triquetrous, flattened, narrowly winged on the margins, margins ciliate. Spikelets 6-6.5 mm long including the awn of the upper glume, elliptic-acuminate. Lower glume 4.5-5 x 0.5 mm, elliptic-oblong, acuminate-aristate at apex, keeled on the back, keel narrowly winged above the middle. Upper glume c. 5 x 1 mm, elliptic-oblong, acuminate-awned at apex, awn c. 0.5 mm long, broadly winged all along the keel, silky-ciliate all over the wing. Lower lemma c. 2.5 mm long, oblanceolate, base cuneate, acute at apex, hyaline, 1-nerved, ciliate on the margins above the middle, epaleate. Upper lemma c. 3 x 0.5 mm, oblanceolate, hyaline, awned from the sinus of the bifid apex; awn c. 1 cm long. Palea 0.5 mm long, elongate-triangular. Stamens 2; anthers c. 1 mm long. Grain 1-1.5 mm long, elliptic to oblong elliptic.

Fl. & Fr.: Nov. - Dec.

Distr.: Endemic to Kerala. In open sandy place. *CNS 2369* (A.I.R. Campus, Kalavoor).

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. *Dimeria pusilla* Thw., Enum. Pl. Zeyl. 369. 1864, var. *lawsonii* Hook. f., Fl. Brit. India 7: 103. 1896.

Annuals. Culms tufted, 10-35 cm high, usually geniculate; nodes glabrous. Leaves 2-8 x 0.1-0.3 cm, lanceolate or linear-lanceolate; sheaths keeled; ligules ovate membranous. Racemes solitary, 2-6 cm long. Rhachis flat, 0.5-0.75 mm wide, margin ciliate. Spikelets 5-7 mm long including awn, oblong-lanceolate. Lower glumes 4-5 x 0.3 mm, linear-lanceolate, acuminate or awned, chartaceous. Upper glumes 5-6 x 0.5 mm, elliptic-lanceolate, acuminate, awned; awns 1-1.5 mm long, narrowly winged. Lower floret empty. Upper floret bisexual. First lemma c. 1.5 x 0.5 mm, oblanceolate, hyaline, 1-nerved. Second lemma notched, 2-3 x 1 mm, hyaline, awned; awn 8-10 mm long, geniculate. Stamens 2; anthers c. 1 mm long. Ovary elliptic.

Fl. & Fr.: Oct. - Mar.

Distr.: Peninsular India and Sri Lanka. In open sandy palce. *CNS 2023* (Kumbolichira).

Dimeria ornithopoda Trin., 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. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 725. 1976; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3:1842. 1983; Mani., Fl. Silent Valley 352. 1988; Vajravelu, Fl. Palghat Dist. 571. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 98. 1991; Sasi. & Sivar., Fl. Pl. Thrissur For. 512. 1996.

Annuals. Culms 12-38 cm high, slender; nodes sparsely bearded. Leaves 1.8-6.5 x 0.2-0.4 cm, linear-lanceolate, apex acuminate; sheaths to 3.5 cm long. Racemes 2, rarely 3, 2.5-5.5 cm long; rhachis trigonous. Spikelets 1-2 mm long, lanceolate. Lower glume 1-2 x c. 0.5 mm, linear-lanceolate. Upper glume c. 2 x 0.5 mm, lanceolate, sparsely hairy.

Lower floret empty. Upper floret bisexual. First lemma 1-1.5 mm long, oblanceolate, delicate, ciliate at apex. Upper lemma c. 2 mm long, notched, awned, hyaline; awn 5-10 mm long. Stamens 2. Stigma c. 0.5 mm long.

Fl. & Fr.: Aug. - Dec.

Distr.: Tropical Asia, India, Nepal and Australia. Along rocky places. *CNS 1953* (Pandavanpara).

DIPLACHNE Palisot de Beauvois

Essai Agrost. 80. 1812.

Diplachne fusca (L.) P. Beauv. ex Roem. & Schult., Syst. Veg. 2:615. 1817; Hook. f., Fl. Brit. India 7: 329. 1896; Fischer in Gamble, Fl. Pres. Madras 1829. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 492. 1960; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1844. 1983; Nicols, Suresh & Mani., An Interpr. Hort. Malab. 310. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 368. 1991; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8:178. 1994. *Festuca fusca* L., Sp. Pl. ed. 2, 109. 1762. ***Tsjama-pullu*** Rheede, Hort. Malab. 12:83, t. 45. 1693.

Semi-aquatic perennials. Culms 40-80 cm high, erect, tufted; nodes glabrous. Leaves 15-45 x 0.3-0.6 cm, linear or linear-lanceolate, base rounded, apex acuminate, glaucous; sheaths to 25 cm long, keeled; ligules 4-5 mm long, ovate. Panicles 15-27 cm long, branches spreading. Spikelets 5-8 x 1-1.5 mm, linear-oblong, 4-6-flowered. Lower glume 1-2 x 1 mm, oblong. Upper glume 2-3 x 1 mm, oblong. Lemmas 4-5 x 1-1.5 mm, oblong, 3-lobed. Paleas 2-3 mm long, oblong, 2-keeled. Stamens 3. Ovary oblanceolate.

Fl. & Fr.: Dec. - May.

Distr.: Tropical and subtropical regions of the Old World and Australia. Common in salt-marshes. *CNS 1395* (Kayamkulam).

ECHINOCHLOA P. de Beauvois

Essai Agrost. 53: 161. 1812.

Annuals or perennials. Leaves linear, flat; ligule a line of hairs or often absent. Inflorescence of racemes, on a triquetrous, scabrid rhachis. Spikelets ovoid-ellipsoid or rounded, paired, convex on back. Glumes membranous, unequal; lower glume shorter, acute-acuminate, mucronate; upper glume as long as the spikelet, acute-acuminate, sometimes shortly awned. Lower lemma equalling the upper glume, paleate or not. Upper lemma crustaceous, smooth, glossy, acute, sometimes obtuse; palea as long as upper lemma, with rounded sides and flaps. Caryopsis broadly ellipsoid, dorsally flattened.

1a. Ligules present as fringes of hairs; spikelets awned ..... **E. stagnina**

1b. Ligules absent; spikelets awned or not.

2a. Spikelets awned or very rarely awnless, but then the upper glume and lower lemma acuminate or cuspidate ..... **E. crus-galli**

2b. Spikelets awnless.

3a. Racemes incurved at maturity; spikelets densely crowded, 3-5 mm long .. .. **E. frumentacea**

3b. Racemes not incurved, straight; spikelets openly spaced, 4-rowed, 2-4 mm long ..... **E. colona**

Echinochloa colona (L.) Link, Hort. Berol. 2: 209. 1833; Fischer in Gamble, Fl. Pres. Madras 1776. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 308, t. 34. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 726. 1976; Mani. & Sivar., Fl. Calicut 342. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1845. 1983; Ramach. & Nair, Fl. Cannanore 537. 1988; Vajravelu, Fl. Palghat Dist. 572. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 245.1991; Mohanan & Henry, Fl. Thiruvananthapuram 537. 1994; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 181. 1994; Sivar. & Mathew, Fl. Nilambur 839. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 513. 1996.

Annuals. Culms 10-80 cm high, erect; nodes glabrous. Leaves 3-25 x 0.2-0.7 cm, linear-lanceolate, rounded or shallowly cordate at base, apex acuminate; sheaths keeled; ligules absent. Panicles 3-15 cm long, spiciform; racemes 4-10, each 1-3 cm long. Spikelets 2-4 mm long, ovate-lanceolate, greenish-yellow or purplish. Lower glume 1-2 x 1-1.5 mm, ovate, acuminate, chartaceous, 5-nerved, hispid. Upper glume 2-4 x 1.5-2 mm, ovate or boat-shaped, acuminate, chartaceous, hispid. Lower floret barren. Upper floret bisexual. First lemma 2-4 x 1.5-2 mm, ovate, 7-nerved. Palea c. 2 x 1 mm, ovate-oblong, hyaline, 2-keeled. Second lemma 2-3 x 1 mm, ovate-elliptic. Palea 1.5-2 x 1 mm, ovate-oblong, mucronate, 2-keeled. Stamens 3; anthers c. 0.5 mm long, violet. Ovary c. 0.5 mm, oblong; stigmas pink.

Fl. & Fr.: Aug. - Dec.

Distr.: Throughout the tropics and subtropics. Very common in the paddy fields, wastelands, fallow fields and marshes along the bunds of paddy fields. *CNS 1819* (Nedumudi), *CNS 1265* (Kidangara).

Echinochloa crus-galli (L.) P. Beauv., Essai Agrost. 53: 161. 1812; Fischer in Gamble, Fl. Pres. Madras 1777. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 310. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 726. 1976; Ramach. & Nair, Fl. Cannanore 537. 1988; Vajravelu, Fl. Palghat Dist. 572. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 246. 1991; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 183. 1994; Sivar. & Mathew, Fl. Nilambur 839. 1996. *Panicum crus-galli* L., Sp. Pl. 56. 1753; Hook. f., Fl. Brit. India 7: 30. 1896.

Annuals. Culms to 80 cm high, robust, erect; nodes glabrous. Leaves 6-34 x 0.3-1.5 cm, rounded at base; sheaths keeled; ligules absent. Panicles 5-18 cm long; racemes 5-12, each 2-5 cm long. Spikelets 3-5 mm long, ovate-lanceolate, awned, hispid; awns 1-3 cm long. Lower glume 2-3 x 1.5-2 mm, ovate, cuspidate, 5-nerved. Upper glume 3-5 mm long, ovate-lanceolate, cuspidate, 5-nerved. Lower floret male or barren. Upper floret bisexual. First lemma c. 3 x 1.5 mm, ovate-lanceolate, awned, 5-7-nerved, scabrid. Palea 2-3 x 1 mm, elliptic-oblong, 2-keeled. Second lemma 3-4 x 1-2 mm, ovate, acuminate.

Palea 2-3 x 1 mm, elliptic-oblong, 2-keeled, 2-nerved. Stamens 3; anthers c. 1 mm long, yellow. Ovary c. 0.5 mm long, oblong; stigma c. 1 mm long, white.

Fl. & Fr.: Mar. - Sep.

Distr.: India, Myanmar, Malaya, Srilanka and South-east Asia.

Common in paddy fields and muddy wastelands. CNS 1264 (Nedumudi).

Echinochloa frumentacea Link, Hort. Berol. 1: 204. 1827; Bor, Grass. Burma, Ceylon, India & Pakistan 311. 1960; Britto & Matthew in Matthew Fl. Tam. Carnatic 3: 1845. 1983; Sreekumar & Nair, Fl. Kerala-Grass. 247. 1991; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 184. 1994. *Echinochloa colona* Link var. *frumentacea* Ridley, Fl. Malay Penins. 5: 223. 1925; Fischer in Gamble, Fl. Pres. Madras 1777. 1934. *Panicum crus-galli* L. var. *frumentaceum* (Link) Trimen, Syst. Cat. Ceylon Pl. 104. 1885; Hook. f., Fl. Brit. India 7: 31. 1896.

Annuals or perennials. Culms robust, 50-120 cm high, tufted; nodes glabrous. Leaves 10-25 x 0.6-1 cm, linear, rounded at base, apex acuminate; sheaths slightly keeled; ligule absent. Panicles pyramidal, to 18 cm long; racemes 8-18, each 1-3.5 cm long. Spikelets 2.5-4 mm long, ovate-acute or broadly elliptic, pubescent to hispid. Lower glume to 1.5 mm. Upper glume to 2 mm, apex with a short mucro. First lemma to 2.5 mm, mucronate, stiff-hispid without. Second lemma to 2 mm, pallid, with a short mucro. Grains to 1.5 mm long.

Fl. & Fr.: Jun. - Sep.

Distr.: Tropical E. Africa southwards to Rhodesia, India, Pakistan and Australia. Occasional along the banks of canals and streams near the paddy fields. *CNS 1661* (Pallanthuruthy).

Echinochloa stagnina (Retz.) P. Beauv., Essai. Agrost. 53: 161 & 171. 1812; Fischer in Gamble, Fl. Pres. Madras 1777. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 311. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 726. 1976; Ramach. & Nair, Fl.

Cannanore 537. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 248. 1991; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 187. 1994. *Panicum stagninum* Retz., Obs. Bot. 5: 17. 1789. *Panicum cruss-galli* sensu Hook. f., Fl. Brit. India 7: 30. 1896. p.p., non L. 1753.

Annuals. Culms 20-130 cm high, erect, tufted; nodes glabrous. Leaves flat, 7-30 x 0.6-1 cm, linear-lanceolate or linear, base rounded or narrowed, apex acuminate; sheaths keeled; ligule a row of hairs. Panicles pyramidal, open; racemes 5-14, secund, each 1-5 cm long. Spikelets c. 5 mm long, ovate or elliptic, acuminate or awned, hispid. Lower glume 2-3 x 1-1.5 mm, ovate, acuminate, scabrid or pectinate. Upper glume 5-6 x 2-3 mm, ovate-lanceolate, acuminate, pectinate. Lower floret male. Upper floret bisexual. First lemma 4-6 x 2-3 mm, pectinate along the nerves; awn 4-8 mm long. Stamens 3; anthers c. 2 mm long. Second lemma 4-5 x 1-2 mm, elliptic, acuminate. Palea 4-5 x 1-2 mm, elliptic, acuminate, 2-keeled. Stamens 3; anthers c. 2mm long. Ovary c. 1 mm long, oblong, stigmas violet.

Fl. & Fr.: Sep. - Feb.

Distr.: Tropical Asia and Africa. Common along the marshy places, paddy fields and wetlands. *CNS 1268* (Pallithode).

ELEUSINE Gaertner

Fruct. Sem. Pl. 1: 7. 1788.

Annuals or perennials. Culms tufted, slender or robust, flattened. Leaves flat or folded, linear; sheaths keeled; ligule membranous, ciliate. Spikes digitate, secund. Spikelets sessile, several-flowered, ovate, or narrowly oblong, laterally compressed, 2- or 3-seriate; rachilla continuous between lemmas. Glumes persistent, keeled, shorter than lemmas. Lemmas 3-nerved, keeled. Stamens 3. Caryopsis loose within a free hyaline pericarp.

1a. Ligule truncate; paleas not winged on keels; grains oblong never exposed ..... **E. indica**

1b. Ligule a row of hairs; paleas winged on keels; grains globose often exposed ..... **E. coracana**

Eleusine coracana (L.) Gaertn., Fruct. Sem. 1: 8, t. 1, f. 11. 1789; Hook. f., Fl. Brit. India 7: 299. 1896; Fischer in Gamble, Fl. Pres. Madras 1839. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 492. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 727. 1976; Mani. & Sivar., Fl. Calicut 339. 1982; Britto & Matthew in Matthew, Fl.Tam. Carnatic 3: 1848. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 308. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 370. 1991; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 191. 1994. *Cynosurus coracanus*, L., Syst. Nat. ed. 10, 2: 875. 1759. ***Tsjetti-pullu***, Rheede, Hort. Malab. 12: 149,t. 78. 1693. ***Pullu***.

Annuals or perennials. Culms erect, to 60 cm high; nodes glabrous. Leaves 10-60 x 0.3-1 cm, linear, base cordate, apex acuminate; sheaths keeled, compressed; ligule a row of hairs. Spikes digitate, 3-7 in number, 2-8 cm long, compact. Spikelets 4-6 mm long, ovate, 4-6-flowered. Lower glume 2-3 x 1.5-2.5 mm, ovate-oblong, 3-nerved, keeled. Upper glume 3-4 x 1.5-3 mm, ovate-lanceolate, 5-nerved, keeled. Lemmas 2-4 x 2-3 mm, ovate, acute, 3-nerved. Paleas 2-3 x 1-2 mm, ovate-oblong, 2-keeled, keels winged, scabrid. Stamens 3; anthers c. 1 mm long. Grain orbicular or globose, dark-brown, exposed.

Fl. & Fr.: Dec. - Mar.

Distr.: Widely cultivated in Old World tropics. Cultivated and sometimes runs wild. *CNS 1615* (Thakazhy).

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; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 727. 1976; Mani. & Sivar., Fl. Calicut 340. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1848. 1983; Ramach. & Nair, Fl. Cannanore 538. 1988; Mani., Fl. Silent Valley 353. 1988;

Varjavelu, Fl. Palghat Dist. 572.1990; Sreekumar & Nair, Fl. Kerala-Grass. 371.1991; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 193. 1994; Mohanan & Henry, Fl. Thiruvananthapuram 538. 1994; Sivar. & Mathew, Fl. Nilambur 824. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 513. 1996. *Cynosurus indicus* L., Sp. Pl. 72. 1753.

Annuals. Culms tufted, 10-50 cm high; nodes glabrous. Leaves 5-25 x 0.4-0.6 cm, linear-lancoleate or linear, base rounded, blunt at apex, often folded; sheaths keeled, softly pilose; ligule truncate, membranous. Spikes digitate or subdigitate,2-18, each 3-8 cm long. Spikelets 4-6 mm long, ovate or oblong, 3-6-flowered. Lower glume 1.5-2.5 x 0.5-1 mm, lanceolate, keeled, chartaceous, 3-nerved. Upper glume 2-3 x 1 mm, oblong, keeled, chartaceous, 5-nerved. Lemmas 2-3 x 1.5-2 mm, ovate-oblong, chartaceous, 3-nerved, sub acute. Paleas 2-2.5 x 1 mm, oblong-elliptic, 2-keeled, 2-nerved. Stamens 3; anthers c.0.5 mm long. Ovary c. 0.5 mm long, elliptic; stigmas c. 0.5 mm long, violet. Caryopsis subglobose, deeply grooved on one side, transversely rugose.

Fl. & Fr.: Throughout the year.

Distr.: Throughout the tropics and subtropics of whorld. Very common in open plain areas. *CNS 1338* (Thumboli), *CNS 2593* (Edathwa).

ERAGROSTIS N.M. Wolf

Gen. Pl. 23. 1776; Gen.Sp. 63, 65. 1781.

Annuals or perennials. Clums slender, sometimes glandular; nodes glabrescent to sparsely bearded. Leaves oblong,flat or inrolled; ligule a fimbriate rim. Inflorescence a terminal, open or contracted panicle; rachis often glandular. Spikelets laterally compressed; florets sheadding from base or apex, at maturity. Glumes subequal. Lemmas imbricate or not, 3-nerved, scabrid to asperulous on back, sometimes ciliate on margins. Palea slightly shorter than lemma, deciduous or persistent, 2-keeled, sometimes long ciliate. Stamens 2 or 3. Grains globose to ellipsoid.

1a. Spikelets not breaking up at maturity ..... **E. tef**

1b. Spikelets breaking up at maturity.

2a. Spikelets breaking up from the apex downwards.

3a. Culms just below the inflorescence viscous, often with sticky sand grains ..... **E. viscosa**

3b. Culms just below the inflorescence not viscous.

4a. Panicles upto 15 cm long; keels of the paleas ciliate.

5a. Panicles contracted, spiciform, 3-6 cm long ..... **E. riparia**

5b. Panicles effuse, 6-15 cm long ..... **E. tenella**

4b. Panicles 20-40 cm or more long, interrupted, spiciform; keels of the paleas smooth or scabrid, but never ciliate ..... **E. japonica**

2b. Spikelets breaking up from the base upwards.

6a. Lemmas upto 1.5 mm long.

7a. Spikelets 14-62-flowered, 5-25 mm long, 2-3 mm wide, pale green or purplish; pedicels 10 mm or more long ..... **E. tremula**

7b. Spikelets 3-17-flowered, upto 7 mm long and 1.5 mm wide, leaden-grey; pedicels upto 5 mm long.

8a. Lemmas often with a purple spot at the tip; culms slender, glandular below the panicles ..... **E. pilosa**

8b. Lemmas without purple spots; culms not glandular .... **E. gangetica**

6b. Lemmas over 1.5 mm long.

9a. Spikelets leaden-grey; leaves glaucous ..... **E. atrovirens**

9b. Spikelets pruplish or at least tinged with purple; leaves not glaucous.

10a. Spikelets broadly ovate or ovate-oblong, 2-4 mm wide .... **E. unioloides**

10b. Spikelets oblong-lanceolate, 1-2.5. mm wide.

11a. Culms 11-28 cm long; panicles 7-15 cm long; spikelets crowded, subsessile ..... **E. cumingii**

11b. Culms 30-97 cm long; panicles 10-28 cm long; spikelets not crowded, seated on long pedicels .... **S. subsecunda**

Eragrostis atrovirens (Desv.) Trin. ex Steud., Nom. Bot. ed. 2, 1: 562. 1840; Bor, Grass. Burma, Ceylon, India & Pakistan 503. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 729. 1976; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1834. 1983; Mani., Fl. Silent Valley 353. 1988; Ramach. & Nair, Fl. Cannanore 539. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 377. 1991; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 207. 1994; Mohanan & Henry, Fl. Thiruvananthapuram 538. 1994; Sivar. & Matthew, Fl. Nilambur 825. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 513. 1996. *Poa atrovirens* Desv., Fl. Atlant. 1: 73, t. 14. 1798.

Perennials. Culms 30-80 cm high, densely tufted; nodes glabrous. Leaves 4-15 x 0.2-0.4 cm, linear-lanceolate or linear-acuminate, base rounded or shallowly cordate, flat or rolled, glaucous; sheaths 2.5-6 cm long; ligule truncate, membranous. Panicles 14-30 cm long, lax. Spikelets 3-8 x 2-3 mm, ovate or ovate-oblong, 10-30-flowered, grey. Lower glume 1-2 x 0.5-1 mm, ovate-lanceolate, 1-nerved. Upper glume 1-2 x 0.5-1 mm, ovate-lanceolate, 1-nerved. Lemmas 2-2.5 x 1-1.5 mm, broadly ovate, acute, 3-nerved. Paleas c. 2 x 0.5 mm, elliptic-lanceolate, 2-keeled, keels ciliolate. Stamens 3; anthers c. 1 mm long. Ovary c. 0.5 mm long, oblong; stigmas 0.5-1 mm long. Grains c. 1 mm long, ellipsoid.

Fl. & Fr.: Throughout the year.

Dstr.: N. Africa to Zambia and Angola, India, Pakistan; Mauritania to Philippines. Very common along the banks of backwaters, canals and in wetlands. *CNS 1416* (Kalavoor), *CNS 2400* (Muhamma).

Eragrostis cumingii Steud., Syn. Pl. Glum. 1: 266. 1854; Bor, Grass. Burma, Ceylon, India & Pakistan 507. 1960; Mohanan & Sreekumar J. Econ. Tax. Bot. 3: 447. 1982; Ramach. & Nair, Fl. Cannanore 539. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 380. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 539. 1994.

Annuals. Culms 11-28 cm tall, erect; nodes glabrous. Leaves 2.5-7 x 0.1-0.3 cm, linear-lanceolate, apex acuminate, sparsely villous on upper surfaces; sheaths 1-3 cm long, striate, bearded at the mouth with long silky hairs; ligule a ring of short silky hairs. Panicles 7-15 cm long, widely spreading, effuse; branches 1.5-3 cm long, alternate, with 3-12 spikelets in each, angular. Spikelets 4-12 x 1-2 mm, oblong-lanceolate, 10-24-flowered, greenish, tinged with purple. Glumes 1-2 x 0.5 mm, ovate-lanceolate, acute, 1-nerved. Lemmas c. 2 x 1.5 mm, broadly ovate, acute, 3-nerved, coriaceous. Paleas c.1.5 x 0.5 mm, oblanceolate, apex obtuse, slightly curved, 2-keeled, 2-nerved. Stamens 2; filaments c. 0.5 mm long. Ovary ovate; styles c. 0.5 mm long. Grain c. 0.5 x 0.3 mm, ovate or orbicular.

Fl. & Fr.: Sep. - Jan.

Distr.: Myanmar, Malaysia, Philippines, and Australia. Along roadsides and wastelands. *CNS 1627* (Vandanam).

Eragrostis gangetica (Roxb.) Steud., Syn. Pl. Glum. 1: 266. 1854; Fischer in Gamble, Fl. Pres. Madras 1826. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 508. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 729. 1976; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1854. 1983; Ramach. & Nair, Fl. Cannanore 540. 1988; Vajravelu, Fl. Palghat Dist. 574. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 380. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 539. 1994; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 211. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For.514. 1996. *Poa gangetica* Roxb., Fl. Ind. 1: 341. 1820. *Eragrostis stenophylla* Hochst. ex Miq, Verh. Konink.-Nederl. Inst. 3: 4, 39. 1851, p.p.

Annuals. Culms tufted, 20-60 cm high, erect; nodes glabrous. Leaves 4-15 x 0.2-0.5 cm, linear-lanceolate or lanceolate, base rounded, apex acute or acuminate, green or glaucous; ligules truncate, fimbriate, membranous. Panicles 7-14 cm long, lax, grey. Spikelets 3-7 x 0.5-1.5 mm, ovate-oblong, 6-17-flowered, grey. Lower glume 0.5-1 x 0.5 mm, ovate-lanceolate, 1-nerved. Upper glume 1-1.5 x 0.5-1 mm, ovate-lanceolate, 1-nerved. Lemmas 1-1.5 x 0.5-1 mm, ovate-lanceolate, 3-nerved. Paleas c. 1 x 0.5 mm,

elliptic-lanceolate, 2-keeled, 2-nerved; keels scabrid. Stamens 3, violet with white connectives. Stigmas white. Grains c. 0.5 mm across, orbicular.

Fl. & Fr.: Jul. - Dec.

Distr.: Nepal, India, and Myanmar. Common in damp places, margins of streams and wetlands. *CNS 1616* (Pallana).

Eragrostis japonica (Thunb.) Trin., Mem., Acad. Sci. Petersb. Ser. 6. 1: 405. 1830; Rang. & Tad., Handb. S. Indian Grass. 294, t. 217. 1921; Bor, Grass. Burma,Ceylon, India & Pakistan 509. 1960; Mani. & Sivar., Fl. Calicut 348. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1855. 1983; Sreekumar & Nair, Fl. Kerala-Grass. 382. 1991; Lazarides in Dassan., Fosb. & Clayton,Rev. Handb. Fl. Ceylon 8: 212. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 514.1996. *Poa japonica* Thunb., Fl. Japon. 51. 1784. *Poa diarrhena* Schult., Syst. Veg. Mant. 2: 616. 1824. *Eragrostis diarrhena* (Schult.) Steud., Syn. Pl. Glum. 1: 266. 1854; Fischer in Gamble, Fl. Pres. Madras 1826. 1934. *Eragrostis interrupta* auct. non P. Beauv., 1812: Stapf in Hook. f., Fl. Brit. India 7: 316. 1896.

Annuals or perennials. Culms tufted, 30-92 cm high; nodes glabrous. Leaves 7-30 x 0.3-0.5 cm, linear or linear-lanceolate, base rounded or shallowly cordate, flat, glaucous; sheaths to 14 cm long, keeled; ligules truncate, membranous. Panicles 20-40 cm long or more, interrupted, spiciform, branches often verticillate. Spikelets 1.5-3 x 1 mm, ovate-oblong, 6-10-flowered, pale yellow. Lower glume c. 0.5 mm long, ovate, 1-nerved. Upper glume 0.5-1 x 0.5 mm, ovate-acute, 1-nerved. Lemmas c. 1 x 0.5 mm, broadly ovate, 3-nerved. Paleas 0.5-1 x 0.5 mm, oblong-lanceolate, 2-keeled, 2-nerved; keels scabrid. Stamens 2. Grains c. 0.5 mm long, ellipsoid.

Fl. & Fr.: Nov. - Apr.

Distr.: India, Pakistan; throughout S. and S.E. Asia to tropical S. Africa and Australia. Along the banks of streams and other wet places. *CNS 1825* (Sharangakavu at Venmony).

Eragrostis pilosa (L.) P. Beauv., Essai Agrost. 162. 175. 1812; Stapf in Hook. f., Fl. Brit. India 7: 323. 1896; Rang. & Tad., Handb. S. Indian Grass. 305. t. 225. 1921; Fischer in

Gamble, Fl. Pres. Madras 1827. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 512. 1960; Mani. & Sivar., Fl. Calicut 348. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1856. 1983; Vajravelu, Fl. Palghat Dist. 574. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 385. 1991; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 217. 1994. *Poa pilosa* L., Sp. Pl. 68. 1753.

Annuals. Culms 10-65 cm long, tufted, slender. Leaves 5-18 x 0.2-0.4 cm, linear, base rounded, apex acuminate; ligules membranous, fimbriate. Panicles 5-18 cm long, axils long pilose. Spikelets upto 4 mm long, oblong-lanceolate, 3-12-flowered, leaden-grey. Lower glume c. 0.5 mm long, lanceolate. Upper glume 0.5-1 mm long, lanceolate, 1-nerved. Lemmas 1-1.5 x 1 mm, ovate-lanceolate, 3-nerved. Paleas c. 1 mm long, oblong-lanceolate, 2-keeled, scabrid along the keels. Stamens 3. Grains c. 0.5 mm long, ellipsoid.

Fl. & Fr.: Jun. - Aug.

Distr.: India, Pakistan; tropical and warm temperate regions of the Old World; introduced in the New World. *CNS 2223* (Cherthala R.S.).

Eragrostis riparia (Willd.) Nees, Agrost. Bras. 512. 1829; Fischer in Gamble, Fl. Pres. Madras 1825. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 513. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 730. 1976; Mani. & Sivar., Fl. Calicut 347. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1857. 1983; Sreekumar & Nair, Fl. Kerala-Grass. 386. 1991; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 220. 1994. *Poa riparia* Willd. in Ges. Natur. Freunde Berlin, Neus Schriff. 4: 185. 1803. *Eragrostis tenella* (L.) P. Beauv. var. *riparia* (Willd.) Stapf in Hook. f., Fl. Brit. India 7: 315. 1896 (Plate XXIV: B).

Perennials. Culms densely tufted,10-30 cm long, geniculate; nodes glabrous. Leaves 2-8 x 0.2-0.4 cm, linear-lanceolate, base rounded, apex acuminate; sheaths to 3 cm long, slightly keeled; ligule a row of hairs. Panicles 3-6 cm long, contracted, spiciform. Sikelets 1.5-3 x 1-2 mm, oblong, 5-10-flowered, pale yellow. Lower glume c. 1 x 0.5 mm, ovate-lanceolate, 1-nerved. Upper glume c.1 mm long, ovate-lanceolate, 1-nerved.

Lemmas 1-1.5 x 0.5-1 mm, ovate-oblong, apex rounded, 3-nerved. Paleas 1-1.5 x 0.5 mm, obovate or obianceolate, 2-keeled, ciliate along the keels. Stamens 3. Ovary c. 0.5 mm long; stigma c.0.5 mm long. Grains c. 0.5 mm long, linear.

Fl. & Fr.: Jan. - Jul.

Distr.: Peninsular India, Philippines, Papua New Guinea and Srilanka. Common in dry, sandy localities along the coast and in wastelands and road sides. *CNS 1829* (Vandanam).

Eragrostis subsecunda (Lam.) Four. Mex. Pl. 2: 118. 1886; Sreekumar & Nair, Fl. Kerala-Grass. 386. 1991. *Poa subsecunda* Lam., Tab. Encycl. 1: 184. 1791.

Perennials. Culms 30-97 cm long, geniculate; nodes glabrous. Leaves 5-18 x 0.2-0.3 cm, linear-lanceolate or lanceolate, base rounded, apex acuminate; sheaths to 9 cm long, slightly keeled; ligules obscure. Panicles 10-28 cm long, lax, loosely spiculate, subsecund. Spikelets 3-10 x 1.5-2.5 mm, oblong or oblong-lanceolate, 10-24-flowered, purplish-green. Lower glume 1-2 x 0.5-1 mm, lanceolate, 1-nerved. Upper glume 2-2.5 x 0.5-1 mm, ovate-lanceolate, 1-nerved. Lemmas 2-2.5 x 1-1.5 mm, broadly ovate, acute, 3-nerved. Paleas 1.5-2 x 1 mm, elliptic-lanceolate, 2-keeled; keels ciliolate. Stamens 3; anthers c. 0.5 mm long, violet. Ovary c. 0.5 mm long, oblong; styles white. Grains 0.5-1 mm long, ovate.

Fl. & Fr.: Mar. - Sep.

Distr.: India, Sri Lanka and Bangladesh. In wetlands. *CNS 1782* (Chattiyara), *CNS 2496* (Pathirappilly).

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. Planta Panizz. Abiss. 1774.

Annuals. Clums 20-35 cm long, slender; nodes glabrous. Leaves 2-19 x 0.1-0.4 cm, linear-lanceolate or linear, base rounded, apex acuminate; sheaths to 3.5 cm long; ligules tufts of hairs. Panicles 6-12 cm long, contracted. Spikelets 2.5-4 mm long,

oblong, 4-8-flowered. Lower glume c. 0.5 mm long, lanceolate. Upper glume c. 1 mm long, ovate-lanceolate. Lemmas 1-1.5 x 1 mm, ovate-oblong, 3-nerved. Paleas c. 1 mm long, oblong, hyaline. Stamens 3.

Fl. & Fr.: Sep. - Dec.

Distr.: Native of Ethiopia; introduced into several parts of the world. In sandy sea-coast. *CNS 1627* (Ambalapuzha).

Eragrostis tenella (L.) P. Beauv. ex Roem. & Schult., Syst. Veg. 2: 576. 1817; Bor, Grass. Burma, Ceylon, India & Pakistan 513. 1960; Mani. & Sivar., Fl. Calicut 348. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1857. 1983; Ramach. & Nair, Fl. Cannanore 541. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 390. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 540. 1994; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 205. 1994; Sivar. & Mathew, Fl. Nilambur 826.1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 514. 1996. *Poa tenella* L., Sp. Pl. 69. 1753. *Poa plumosa* Retz., Obs. Bot. 4: 20. 1786. *Eragrostis plumosa* (Retz.) Link, Hort. Berol. 1: 192. 1827; Fischer in Gamble, Fl. Pres. Madras 1826. 1934. *Eragrostis tenella* (L.) P. Beauv. ex Roem. & Schult. var. *plumosa* (Retz.) Stapf in Hook. f., Fl. Brit. India 7: 315. 1896.

Annuals. Culms to 50 cm long, slender, tufted; nodes glabrous. Leaves 3-8 x 0.2-0.4 cm, linear-lanceolate, base rounded, apex acuminate, flat; sheaths to 4 cm long, with tuft of hairs at mouth; ligules membranous, fimbriate. Panicles 6-15 cm long, pyramidal, lax or contracted. Spikelets 1-3 x 1-1.5 mm, ovate or oblong-ovate, pale yellow, 4-8-flowered. Lower glume 0.5-1 x 0.5 mm, oblong-lanceolate, 1-nerved. Upper glume 1-1.5 x 0.5 mm, oblong-lanceolate, 1-nerved. Lemmas 1-1.5 x 0.5 mm, ovate-oblong, 3-nerved. Paleas c.1 x 0.5 mm, oblong-lanceolate, 2-keeled, keels ciliate. Stamens 3. Stigmas cream in colour. Grains c. 0.5 mm long, elliptic.

Fl. & Fr.: May - Dec.

Distr.: Peninsular India, Sri Lanka, Madagascar and Mascarenes. Fairly common in open areas. *CNS 1822* (Champakkulam), *CNS 1355* (Kuppapuram).

Eragrostis tremula (Lam.) Hochst. ex Steud., Syn. Pl. Glum. 1: 269. 1854; Stapf in Hook. f., Fl. Brit. India 7: 320. 1896; Rang. & Tad., Handb. S. Indian Grass. 297, t. 219-220. 1921; Fischer in Gamble, Fl. Pres. Madras 1827. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 514. 1960; Mani. & Sivar., Fl. Calicut 347. 1982; Ramach. & Nair in J. Econ. Tax. Bot. 3: 66. 1982; Ramach. & Nair, Fl. Cannanore 542. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 392. 1991. *Poa tremula* Lam., Tam. Encycl. Meth. Bot. 1: 185. 1791.

Annuals or perennials. Culms 25-75 cm high, erect or ascending; nodes glabrous. Leaves 4-18 x 0.2-0.4 cm, linear-lanceolate or lanceolate, base rounded, apex acuminate, flat; sheaths to 5 cm long; ligule a row of hairs. Panicles 13-30 cm long, very lax, bearded at axils; pedicels 1-3 cm long. Spikelets 0.5-2.5 x 0.2-0.3 cm, linear-oblong or oblong, 14-62-flowered. Lower glume c. 1 x 0.5 mm, ovate-lanceolate, 1-nerved. Upper glume more or less similar to the lower. Lemmas 1-1.5 x 1 mm, ovate-oblong, 3-nerved. Paleas 1-1.5 x 0.5-1 mm, elliptic-oblong, 2-keeled, 2-nerved, scabrid on the keels. Stamens 3. Grains c. 0.5 mm long, subglobose.

Fl. & Fr.: Sep. - Jan.

Distr.: India and Myanmar to Tropical Africa. In open areas. *CNS 1459* (Cherthala).

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; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 730. 1976; Mani. & Sivar., Fl. Calicut 347. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1858. 1983; Ramach. & Nair, Fl. Cannanore 542. 1988; Mani., Fl. Silent Valley 354. 1988; Vajravelu, Fl. Palghat Dist. 575. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 392. 1991; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 224. 1994; Mohanan & Henry, Fl. Thiruvananthapuram 540. 1994; Sivar. & Mathew, Fl. Nilambur 827.1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 514. 1996. *Poa unioloides* Retz., Obs. Bot. 5: 19. 1789. *Eragrostis amabilis* auct., non Wight & Arn. ex Nees, 1838: Stapf in Hook. f., Fl. Brit. India 7: 317. 1896; Rang. & Tad., Handb. S. Indian Grass. 295, t. 218. 1921.

Annuals. Culms tufted, 10-55 cm high, erect or geniculate; nodes glabrous. Leaves 3-18 x 0.2-0.5 cm, linear-lanceolate or lanceolate, base rounded or shallowly cordate, apex acuminate; sheaths to 5 cm long; ligules membranous. Panicles 5-15 cm long, lax. Spikelets 4-6 x 2-4 mm, broadly ovate or ovate-oblong, 10-32-flowered, purplish. Lower glume 1-1.5 x 0.5 mm, lanceolate, 1-nerved. Upper glume 1-2 x 0.5-1 mm, ovate-lanceolate. Lemmas 1.5-2.5 x 1-1.5 mm, broadly ovate, 3-nerved. Paleas 1-2 x 1 mm, elliptic, 2-keeled. Stamens 3, violet. Stigmas white. Grains c. 1 mm long, ellipsoid, reddish-brown.

Fl. & Fr.: Throughout the year.

Distr.: Indo-malaysia, and Africa. Very common in open areas and water-logged places. *CNS 1473* (Cheruthana), *CNS 1125* (Vandanam).

Eragrostis viscosa (Retz.) Trin., Mem., Acad. Sci. Petersb. Ser. 6, 1: 397. 1830; Fischer in Gamble, Fl. Pres. Madras 1826. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 515. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 730. 1976; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1859. 1983; Sreekumar & Nair, Fl. Kerala-Grass. 393. 1991; Lazarides in Dassan., Fosb. & Clayton, 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.

Annuals or perennials. Clums 14-35 cm, erect or geniculate; nodes glabrous. Leaves 3-9 x 0.2-0.4 cm, lanceolate, base rounded or shallowly cordate, apex acuminate; ligules fimbriate, membranous. Panicles 5-14 cm long, oblong; culms viscous below panicles. Spikelets 1-1.5 mm wide, oblong-lanceolate, pale yellow, 4-10-flowered. Lower glume 0.5-1 mm long, ovate-lanceolate, 1-nerved. Upper glume more or less similar to the lower. Lemmas 1-1.5 x 0.5 mm, ovate-oblong, 3-nerved. Paleas c. 1 x 0.5 mm, falcate, 2-keeled, ciliate along the keels. Stamens 3. Grains c. 0.5 mm long, ellipsoid.

Fl. & Fr.: Throughout the year.

Distr.: Kashmir; eastwards from Nigeria through India to Thailand and the Philippines, and southwards to S. Africa; a few records from tropical America. Frequent along roadsides and wastelands. *CNS 1835* (Cherthala).

ERIOCHLOA Humboldt, Bonpland et Kunth
Nov.Gen. Sp. 1: ed. qu. 94; ed. fol. 78. 1816.

Eriochloa procera (Retz.) C.E. Hubbard, Kew Bull. 1930: 256. 1930; Fischer in Gamble, Fl. Pres. Madras 1767. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 312. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 731. 1976; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1859. 1983; Sreekumar & Nair, Fl. Kerala-Grass. 250. 1991; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 233. 1994. *Agrostis procera* Retz., Obs. Bot. 4: 19. 1786. *Eriochloa polystachya* auct., non H.B.K., 1816: Hook. f., Fl. Brit. India 7: 20. 1896; Rang. & Tad., Handb. S. Indian Grass. 62, t. 78-79. 1921.

Annuals or perennials. Culms 32-90 cm high, tufted; nodes glabrous. Leaves 5-21 x 0.3-0.6 cm, linear or linear-lanceolate, base rounded, apex acuminate; sheaths to 8 cm long, keeled; ligules fimbriate, membranous. Panicles 7-22 cm long, lax; rachis triquetrous, bearing paired spikelets. Spikelets 3-4 mm long, elliptic-lanceolate, green or purplish. Lower glume absent or reduced to a ring. Upper glume 3-4 x 1-1.5 mm, ovate-lanceolate, 5-nerved. Lower floret barren, epaleate. Upper floret bisexual. First lemma 3-3.5 x 1-1.5 mm, chartaceous. Second lemma 2-2.5 x 1 mm, ovate-oblong, crustaceous, 3-5-nerved. Palea 2-2.5 x 1 mm, ovate-oblong, crustaceous, 2-keeled. Stamens 3. Stigmas reddish-brown.

Fl. & Fr.: Sep. - Feb.

Distr.: Tropical Africa; throughout S.E. Asia; introduced in tropical America. Common along the wetlands. *CNS 1462* (Mararikulam).

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, t. 6. 1690; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 734. 1976; Mani. & Sivar., Fl. Calicut 332.1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1862. 1983; Ramach. & Nair, Fl. Cannanore 543. 1988; Vajravelu, Fl. Palghat Dist. 577. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 112.1991; Mohanan & Henry, Fl. Thiruvananthapuram 542. 1994; Clayton in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 252. 1994; Sivar. & Mathew, Fl. Nilambur 807. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 516. 1996. *Andropogon contortus* L., Sp. Pl. 1045. 1753; Hook. f., Fl. Brit. India 7: 199. 1896; Rang. & Tad., Handb. S. Indian Grass. 207, t. 162-163. 1921.

Perennials. Culms 30-90 cm high, erect or geniculate; nodes glabrous. Leaves 3.5-20 x 0.3-0.5 cm, linear-lanceolate, base rounded, apex acute or blunt; sheaths to 4 cm long; ligules truncate, membranous, fimbriate. Raceme solitary, 2-5 cm long (excluding awns), with lower homogamous spikelet pairs and upper heterogamous ones, awns forming a twisted spire. Homogamous sessile spikelets 5-8 mm long, linear-lanceolate; lower glume 5-8 mm long, linear-lanceolate; upper glume 5-7 mm long, elliptic-lanceolate; lower floret empty; upper floret male; first lemma 4-8 x 1-1.5 mm, lanceolate; second lemma 4-6 x 1 mm, linear-lanceolate; stamens 3. Heterogamous pedicelled spikelets 5-8 mm long, elliptic-lanceolate; glumes, florets and lemmas similar to those of sessile spikelets. Heterogamous sessile spikelets 5-8 mm long, linear, awned; lower glume 5-8 x 1-1.5 mm, oblong, apex rounded; upper glume linear, keeled; lower floret empty; upper floret bisexual; first lemma 2-3 x 0.5-1 mm, oblong, ciliate towards apex; second lemma 2-3 mm long, 1-nerved, awn 3-8 cm long, densely hairy, tip contorted; ovary c. 1 mm long; stigmas 3-5 mm long, feathery. Heterogamous pedicelled spikelets 6-8 mm long, linear; glumes not broadly winged; florets similar to those of homogamous pedicelled spikelets.

Fl. & Fr.: Throughout the year.

Distr.: Tropical and warm temperate regions. Common in wastelands, along the sides of railway tracks and roads. *CNS 1386* (Cherthala).

HYGRORYZA Nees

R. Wight et Arn., Edinb. New Phil. J. 15: 380. 1833.

Hygroryza aristata (Retz.) Nees ex Wight & Arn., Edinb. New Phil. J. 15: 380. 1833; Hook. f., Fl. Brit. India 7: 95. 1896; Fischer in Gamble, Fl. Pres. Madras 1846. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 597, t. 67. 1960; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 309. 1988; Vajravelu, Fl. Palghat Dist. 578. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 429. 1991; Mohanan & Henry, Fl. Thiruvanathapuram 542.1994; Harriman in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 257. 1994. *Pharus aristatus* Retz., Obs. Bot. 5: 23. 1789. ***Nir-valli-pull*** Rheede, Hort. Malab. 10: 23, t. 12. 1690.

Annuals. Culms 10-45 cm long, floating; nodes bearded. Leaves 2.5-7.5 x 0.6-2 cm, ovate-oblong or lanceolate, base cordate, apex acute or obtuse, glaucous beneath; sheaths to 6 cm long, expanded, spongy, forming floats. Panicles 3.5-6 cm long, lax; pedicels with a red band below the middle. Spikelets 6-8 mm long, lanceolate, 1-flowered. Glumes wanting. Lemma 6-8 x 1-3 mm, lanceolate, acuminate, chartaceous, awned; awns 0.7-1.2 cm long, scabrid. Palea 6-8 x 1-2 mm, elliptic-lanceolate, keels scabrid or ciliate. Stamens 6. Grain oblong.

Fl. & Fr.: Nov. - Feb.

Distr.: India, Sri Lanka, Myanmar and South-east Asia. Common in fallow fields, often forms floating masses in lakes and slow-moving streams. *CNS 2640* (Purakkad).

HYMENACHNE Palisot de Beauvois

Essai Agrost. 48, 165. 1812.

Hymenachne acutigluma (Steud.) Gilliland, Gard. Bull. Singapore. 20: 314. 1963; Sreekumar & Nair, Fl. Kerala-Grass. 251. 1991. *Panicum acutiglumum* Steud., Syn. Pl. Gram.66.1854. *Hymenachne pseudointerrupta* C. Muell., Bot. Z. 19: 333. 1861; Fisc her

in Gamble, Fl. Pres. Madras 1784. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 313. 1960; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1863. 1983; Gould in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 258. 1994. *Panicum myuros* auct., non Lam., 1791: Hook. f., Fl. Brit. India 7: 39. 1896.

Perennials. Culms 60-200 cm long, creeping, rarely decumbent, rooting at the lower nodes, spongy below; nodes glabrous. Leaves 12-30 x 0.6-1.8 cm, linear-lanceolate or linear or lanceolate, base rounded or shallowly cordate, apex acuminate; sheaths to 15 cm long; ligules truncate, membranous. Panicles 15-30 cm long, spiciform, interrupted. Spikelets 5-8 mm long, elliptic-lanceolate. Lower glume 1.5-2.5 x 1 mm, ovate-lanceolate, acuminate, 3-nerved. Upper glume 3-4 x 1 mm, lanceolate, acuminate, 5-nerved. Lower floret empty. Upper floret bisexual. First lemma 5-8 x 1 mm, lanceolate, aristate, 5-nerved. Palea small. Second lemma 3-4 x 1 mm, oblong-lanceolate, acuminate, coriaceous. Palea 2-3 x 1 mm, elliptic-lanceolate, coriaceous, 2-keeled. Stamens 3. Ovary oblong; stigma 1-3 mm long.

Fl. & Fr.: Feb. - Sep.

Distr.: Nepal, India, Myanmar, Thailand, Indo-China, China, Malesia and Polynesia. Along, the stagnant waters, ditches, backwaters and in swamps. *CNS 1355* (Pallippuram), *CNS 2497* (Alappuzha).

IMPERATA Cyrillo

Pl. Rar. Neap. 2: 26, t. 11. 1792.

Imperata cylindrica (L.) Raeusch., Nom. Bot. ed. 3: 10. 1797; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 734. 1976; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1864. 1983; Ramach. & Nair, Fl. Cannanore 544. 1988; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 310. 1988; Mani., Fl. Silent Valley 355. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 114. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 543. 1994; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 263. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For.516. 1996. *Lagurus cylindricus* L., Syst. Nat. ed. 10, 878. 1759. *Saccharum koenigii* Retz. Obs. Bot. 5: 16. 1789. *Imperata arundinacea* Cyr., Pl. Rar. Neap. 2: 26.

1792; Hook. f., Fl. Brit. India 7: 106. 1896, p.p., Rang. & Tad., Handb.S. Indian Grass. 147, t. 128. 1921. *Imperata koenigii* (Retz.) P. Beauv. var. *major* Nees, Fl. Afr. Austr. 90. 1841. *Imperata cylindrica* (L.) P. Beauv. var. *koenigii* (Retz.) Dur. et Shinz., Consp. Flor. Afr. 5: 694. 1894; Fishcer in Gamble, Fl. Pres. Madras 1707. 1934. *Imperata cylindrica* (L.) P. Beauv., var. *major* (Nees) C.E. Hubb. ex Hubb. et Vaughan, Grass. Maur. 96. 1940; Bor, Grass. Burma, Ceylon, India & Pakistan 170. 1960. ***Kodi-pulla*** Rheede, Hort. Malab. 12: 107, t. 57. 1693.

Perennials. Culms 40-120 cm high, rhizomatous; nodes bearded. Leaves 12-50 x 0.5-1.2 cm, lanceolate or linear-lanceolate, base narrowed, mostly basal, glaucous; sheaths overlapping, to 8 cm long; ligule ovate, membranous. Panicles 4-18 cm long, spiciform, cylindrical, white silky hairy. Spikelets 2.5-4 mm long, lanceolate, similar, pedicelled, enveloped in long silky hairs. Lower glume 2-3 x 1 mm, lanceolate, long-pilose without. Upper glume similar. Lower floret empty. Upper floret bisexual. First lemma 1.5-2 x 1 mm, oblong-lanceolate, hyaline, apex ciliate. Second lemma 1-1.5 x 1 mm, elliptic-lanceolate, hyaline. Palea 0.5-1 mm long, obovate. Stamens 2; anthers c. 3 mm long, orange-yellow. Ovary oblong; stigmas 2-3 mm long.

Fl. & Fr.: Throughout the year.

Distr.: Warm and temperate parts of Asia, extending to Australia and East and South Africa. Along the banks of backwaters, river sides and fallow fields. *CNS 1817* (Venmony), *CNS 2498* (Thiruvizha).

ISACHNE R. Brown

Prodr. 196. 1810.

Isachne miliacea Roth ex Roem. & Schult., Syst. Veg. 2: 476. 1812; Hook. f., Fl. Brit. India 7: 25. 1896; Henrard, Blumea 3: 467. 1940; Fischer in Gamble, Fl. Pres. Madras 1797. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 582. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 736. 1976; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1867. 1983; Ved Prakash & Jain. Fasc. Fl. India. 14: 31. 1984; Mani., Fl. Silent Valley 356. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 424. 1991; Mohanan & Henry, Fl.

Thiruvananthapuram 544. 1994; Sivar. & Mathew, Fl. Nilambur 829. 1996. *Isachne dispar* auct., non Trin., 1828: Bor, Grass. Burma, Ceylon, India & Pakistan 580. 1960, p.p. *Isachne dispar* var. *villosa* Fischer in Gamble, Fl. Pres. Madras 1797. 1934.

Annuals. Culms to 25 cm long, erect or geniculate; nodes glabrous. Leaves 1-4 x 0.5-1.2 cm, ovate-lanceolate or lanceolate, base rounded or shallowly cordate, apex acuminate, flat, scabrid; sheaths to 3 cm long, ciliate along the margins; ligule a row of hairs. Panicles 2-5 cm long, lax. Spikelets 1.5-2 mm long, obovoid. Lower glume 1.5-2 x 1 mm, oblong or orbicular. Upper glume 1-1.5 x 1 mm, oblong. First lemma 1.5-2 x 1 mm, ovate-oblong. Palea c. 1.5 x 1 mm, oblong, delicate. Second lemma 1-1.5 x 1 mm, ovate, coriaceous. Stamens 3; anthers cream coloured. Stigma violet or pink.

Fl. & Fr.: Throughout the year.

Distr.: Nepal, India, S.E. Asia to China and Malesia.

Very common in marshy fields, wetlands, along the streams and also in paddy fields. *CNS 1325* (Angadikkal), *CNS 2127* (Eramallur).

ISCHAEMUM Linnaeus

Sp. Pl. 1049. 1753.

Annuals or perennials. Culms erect or creeping below and ascending. Leaves linear, base often narrowed into a short petiole; sheath auricled; ligule membranous, lacerate. Inflorescence of paired or digitate racemes; internodes and pedicels flattened or hollowed on the inner side; rachis many-jointed. Spikelets paired, sessile and pedicellate, similar or dissimilar. Lower glume flat, lower half often hardened, tuberculate or rugose, entire or bicuspidate at apex, winged or not. Upper glume boat-shaped, keeled towards apex, with short awns. Lower lemma membranous, keeled. Palea enclosing a male floret. Upper lemma hyaline, entire or 2-fid, awned from the sinus. Palea hyaline, enclosing a bisexual floret. Stamens 3. Styles 2, free; stigma plumose.

1a. Spikelets awnless; racemes hardly exserted from the spathe ..... **I. muticum**

1b. Spikelets prominently awned; racemes long-exserted from the spathe.

2a. Margins of the lower glume of the sessile spikelet expanded in the lower half and narrowly inflexed in the upper part.

3a. Lower glume of the sessile spikelet broadly or narrowly winged on both sides towards apex, wing often auriculate ..... **I. indicum**

3b. Lower glume of the sessile spikelet not winged towards apex, oblong-lanceolate, acuminate.

4a. Lower leaves petiolate, petioles to 4 cm long; upper glume of the sessile spikelet not winged at apex ..... **I. zeylanicolum**

4b. Lower leaves sessile; upper glume of the sessile spikelet with a obscure wing at the apex ..... **I. thomsonianum**

2b. Margins of the lower glume of the sessile spikelet narrowly and evenly inflexed from base to apex.

5a. Lower leaves petiolate ..... **I. rangacharianum**

5b. Lower leaves sessile.

6a. Tip of the lower glume of the sessile spikelet broadly winged on one side, wing auriculate; glumes flat, with or without a few side-nodules, nodules never interconnected ..... **I. mangaluricum**

6b. Tip of the lower glume of the sessile spikelet not winged; glumes with prominent side-nodules interconnected by usually sharp ridges and furrows.

7a. Lower leaves narrowed and tapering at base; lower glumes crustaceous below with deep furrows and ridges across the back; pedicelled spikelets reduced or empty ..... **I. rugosum**

7b. Lower leaves rounded or shallowly cordate at base; lower glumes coriaceous below the obscure ridges and furrows; pedicelled spikelets well-developed.

8a. Racemes 7-12 cm long; lower glume of the pedicelled spikelet broadly winged on one margin; leaves 8-25 cm long; sessile spikelets usually awnless .... **I. travancorense**

8b. Racemes 4-6 cm long; lower glume of the pedicelled spikelet narrowly winged on one margin; leaves 5.5-10 cm long; sessile spikelets usually awned .... **I. vembanadense**

Ischaemum indicum (Houtt.) Merr., J. Arnold Arb. 19: 320. 1938; Bor, Grass. Burma, Ceylon, India & Pakistan 180. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 737. 1976; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1869. 1983; Ramach. & Nair, Fl. Cannanore 545. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 136. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 545. 1994; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 279. 1994; Sivar. & Mathew, Fl. Nilambur 809. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 517.1996. *Phleum indicum* Houtt., Nat. Hist. 2, 13: 198, t. 90, f. 2. 1782. *Ischaemum ciliare* Retz., Obs. Bot. 6: 36. 1791; Hook. f., Fl. Brit. India 7: 133. 1896; Rang. & Tad., Handb. S.Ind. Grass. 159, t. 135-136. 1921. *Ischaemum aristatum* auct., non L, 1753: Fischer in Gamble, Fl. Pres. Madras 1721.1934.

Annuals. Culms 10-60 cm long, creeping and rooting at the nodes; nodes villous. Leaves 0.8-6.5 x 0.2-0.6 cm, linear-lanceolate, base rounded, apex acute, sparsely hairy; sheaths to 4.5 cm long, keeled; ligules ovate, membranous. Racemes 2,1.2-4.5 cm long. Sessile spikelets 4-5 mm long, ovate-oblong, awned; lower glume 4-5 x 1-1.5 mm, ovate-oblong, notched and acuminate at apex, subcoriaceous, broadly winged on either side in the upper half; upper glume 4-5 x 1.5-2 mm, boat-shaped, aristate, dorsally keeled; lower floret male; upper floret bisexual; first lemma 3-4 mm long, ovate-lanceolate, 2-keeled; stamens 3; second lemma 3-4 x 1.5-2 mm, notched, awned; palea oblong, hyaline; stamens 3; stigma c. 1 mm long. Pedicelled spikelets 4-5 mm long, ovate, awned; lower glume 3-4 x 1-1.5 mm, ovate-lanceolate, acuminate, winged on one margin; upper glume and the florets similar to those of the sessile spikelets.

Fl. & Fr.: Nov. - Jan.

Distr.: Old World tropics; introduced in the American tropics. Very common along road sides, wastelands, bunds of paddy fields. *CNS 1816* (Thakazhy), *CNS 1815* (Karumadi), *CNS 1826* (Thanneermukkam), *CNS 1357* (Cherthala).

Ischaemum mangaluricum (Hack.) Stapf ex C.E.C. Fischer in Gamble, Fl. Pres. Madras 1723. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 182. 1960; Mani. & Sivar., Fl. Calicut 333. 1982; Sreekumar & Nair, Fl. Kerala-Grass. 147. 1991. *Ischaemum 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 32-70 cm high, erect or geniculate; nodes glabrous. Leaves 4.5-15 x 0.3-0.7 cm, lanceolate or linear-lanceolate, base narrowed, apex acuminate; sheaths to 9 cm long; ligules 3-5 mm long, ovate, membranous. Racemes 2, 4-8 cm long; joints 4-5 mm long, turbinate. Sessile spikelets 4-6 mm long, oblong, awned; lower glume 4-6 x 1.5-2 mm, oblong, coriaceous, with or without 3-4 side nodules, chartaceous above, apex winged on one side; upper glume 4-6 x 1-2 mm, oblong-lanceolate, keeled on dorsal side; lower floret male; upper floret bisexual; first lemma 4-5 x 1-2 mm, oblong-lanceolate, hyaline; palea 3-4 x 1 mm, elliptic-lanceolate, hyaline, 2-keeled; stamens 3; second lemma 4-5 x 1.5-2 mm, notched, awned, awn 0.8-1.3 cm long; palea 3-4 x 1 mm, oblong, hyaline; stamens 3; ovary ovate; stigma reddish-brown. Pedicelled spikelets 4-5 mm long, ovate-oblong, awnless; lower glume 4-5 x 2-3 mm, ovate-oblong, broadly winged on one margin; upper glume, lemmas and paleas more or less similar to those of the sessile spikelets.

Fl. & Fr.: Oct. - Jan.

Distr.: Peninsular India and Sri Lanka. Along marshy places, fallow fields, wetlands and other damp places. *CNS 2354* (Thekkekara), *CNS 2343* (Mavelikara).

Ischaemum muticum L., Sp. .Pl. 1049. 1753; Hook. f., Fl. Brit. India 7: 132. 1896; Fischer in Gamble, Fl. Pres. Madras 1723. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 183. 1960; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 310. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 149. 1991; Mohanan & Henry, Fl.

Thiruvananthapuram 546. 1994; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 284. 1994. *Tagadi* Rheede, Hort. Malab. 12: 91, t. 49. 1693.

Perennials. Culms 12-60 cm long, creeping or trailing, stoloniferous, rooting at the nodes; nodes glabrous. Leaves 2-8 x 0.4-1.2 cm, lanceolate or ovate-lanceolate, base rounded or shallowly cordate, apex acuminate; sheaths to 4.5 cm long, ciliate along one margin; ligules truncate, membranous, fimbriate. Racemes 2, hardly exserted from the spathe, 1-3 cm long; joints 3-4 mm long, triangular, keeled. Sessile spikelets 5-7 mm long, oblong-acute, awnless; lower glume 5-6 x 1.5-3 mm, oblong, acute, coriaceous, 2-keeled, minutely winged towards apex; upper glume 5-7 x 2-3 mm, ovate-lanceolate, subcoriaceous, dorsally keeled; lower floret male; upper floret bisexual; first lemma 5-6 x 1.5-2 mm, ovate-lanceolate; palea 5-6 x 1-1.5 mm, oblong-lanceolate, 2-keeled; stamens 3; anthers c. 2 mm long; second lemma 5-7 x 1-2 mm, oblong-lanceolate, hyaline; palea elliptic, hyaline, 2-keeled; stamens 3; ovary ovate; stigmas feathery ,cream; grains c. 2 mm long, ovate. Pedicelled spikelets 4-6 mm long, oblong-lanceolate, awnless.

Fl. & Fr.: Aug. - Mar.

Distr.: Coasts of southern India, Myanmar, Sri Lanka, extending to Malaysia. Common along the banks of backwaters and in damp places, usually creeping and trailing, sometimes floating over the weeds growing in canals and backwaters. *CNS 1445* (Mahadevikadu at Thrikkunnapuzha), *CNS 2128* (Alappuzha).

Ischaemum rangacharianum Fischer, Kew Bull. 1933: 352. 1933 & in Gamble, Fl. Pres. Madras 1722. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 184. 1960; Vajravelu, Fl. Palghat Dist. 579. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 155. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 546. 1994; Sivar. & Matthew, Fl. Nilambur 809. 1996. *Ischaemum aristatum* auct., non L., 1753: Rang. & Tad., Handb. S. Ind. Grass. 151, t. 130-131. 1921.

Annuals. Culms 25-70 cm long, creeping and rooting at the nodes, geniculate; nodes glabrous. Leaves 3-11 x 0.5-1 cm, lanceolate or elliptic-lanceolate, upper ones rounded or shallowly cordate at base, lower ones narrowed and shortly petioled at base,

undulate at least on one margin, apex acuminate; petiole to 2 cm long; sheaths to 6 cm long; ligules 3-5 mm long, ovate, membranous. Racemes 2, adpressed together and appears as solitary, 3-7 cm long. Sessile spikelets 5-7 mm long, lanceolate, awned; lower glume 5-7 x 1-1.5 mm, oblong-lanceolate, coriaceous below with 4-5 conspicuous side-nodules, chartaceous above; upper glume 5-6 x 1 mm, elliptic-lanceolate, chartaceous, keeled on dorsal side; lower floret male; upper floret bisexual; first lemma 4-5 x 1 mm, oblong-lanceolate, hyaline; palea 4-5 x 1 mm, elliptic-lanceolate, 2-keeled, hyaline; stamens 3; second lemma 3-4 x 1-1.5 mm, notched and awned, awn 1-1.5 cm long; palea 3-4 x 0.5-1 mm, linear-oblong, hyaline, 2-keeled; ovary elliptic; stigmas purple-red. Pedicelled spikelets 4-5 mm long, lanceolate, awnless; lower glume 4-5 x 1-1.5 mm, oblong or obovate, broadly winged on one margin, wing auriculate, pink; upper glume and florets similar to those of sessile spikelets.

Fl. & Fr.: Oct. - Feb.

Distr.: Peninsular India. Common along road sides and waste places. *CNS 1823* (Vallikkunnam).

Ischaemum rugosum Salisb., Icon. Stirp. Rar. 1, t. 1. 1791; Hook. f., Fl. Brit. India 7: 127. 1896; Rang. & Tad., Handb. S. Ind. Grass. 153, t. 132.1921; Fischer in Gamble, Fl. Pres. Madras 1722. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 184. 1960; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1869. 1983; Sreekumar & Nair, Fl. Kerala-Grass. 159. 1991; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 288. 1994; Sivar. & Mathew, Fl. Nilambur 810. 1996.

Annuals or perennials. Culms 20-50 cm long, tufted, erect or geniculate; nodes villous. Leaves 4-10 x 0.3-0.6 cm, linear-lanceolate, base narrowed, apex acuminate; ligules ovate, membranous. Racemes 2, 3-5 cm long. Sessile spikelets 4-6 mm long, oblong-lanceolate, awned; lower glume 4-5 x 1.5-2 mm, oblong-lanceolate, coriaceous, below with prominent side-nodules connected by shallow ridges and furrows; upper glume 4-6 x 1-1.5 mm, oblong-lanceolate, keeled; lower floret male; upper floret bisexual; first lemma 4-5 x 1-1.5 mm, oblong-lanceolate; palea 4-5 x 1 mm, oblong-lanceolate, 2-keeled;

stamens 3; second lemma 3-4 x 1-1.5 mm, notched, awned, hyaline; awns to 1 cm long; palea 3-3.5 x 0.5-1 mm, oblong-lanceolate, hyaline, 2-keeled, with a few wart-like growths towards apex; stamens 3. Pedicelled spikelets oblong, awnless. Florets similar to those of the sessile spikelets.

Fl. & Fr.: Dec.- Mar.

Distr.: India, Pakistan; tropical Asia and tropical Africa; introduced to most tropical countries.

Margins of backwaters and wet-lands. *CNS 2594* (Thrikkunnapuzha).

Ischaemum thomsonianum Stapf ex Fischer in Gamble, Fl. Pres. Madras 1722. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 185. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 737. 1976; Sreekumar & Nair, Fl. Kerala-Grass. 163. 1991. *Ischaemum murinum* auct., non Forst., 1786: Hook. f., Fl. Brit. India 7: 135. 1896.

Annuals. Culms 20-100 cm long, creeping and rooting at the nodes; nodes sparsely bearded. Leaves 2-15 x 0.4-1 cm, lanceolate, base rounded or narrowed, apex acuminate, densely or sparsely hairy; sheaths keeled; ligules membranous, fimbriate. Racemes 2, 3-10 cm long. Sessile spikelets 5-6 mm long, elliptic-lanceolate, awned; lower glume 5-6 x 1.5-2 mm, ovate-lanceolate, bicuspidate, coriaceous; upper glume 5-6 x 1.5-2 mm, ovate-lanceolate, shortly bifid and aristate; lower floret male; upper floret bisexual; first lemma 4-5 x 1-1.5 mm, elliptic, acute; palea 4-4.5 x 1 mm, oblong-lanceolate, 2-keeled; stamens 3; second lemma 4-4.5 x 1-1.5 mm, notched, awned, hyaline, awn 1-1.5 cm long; palea 4-4.5 x 1 mm, oblong-lanceolate, hyaline, 2-keeled stamens 3. Pedicelled spikelets more or less similar to sessile spikelets.

Fl. & Fr.: Dec. - Mar.

Distr.: Peninsular India.

Note: This material has not been collected during the present study. The description provided herein is based on the protolgue.

Ischaemum travancorense Stapf ex Fischer, Kew Bull. 1933: 353.1933; Fischer in Gamble, Fl. Pres. Madras 1723. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 186. 1960; Sreekumar & Nair, Fl. Kerala-Grass. 165. 1991. *Ischaemum aristatum* sensu Hook. f., non L., 1753, subsp. *rottleri* Hook. f., Fl. Brit. India 7: 127. 1896.

Perennials. Culms 50-150 cm long, trailing or geniculate, rooting at the lower nodes; nodes glabrous. Leaves 8-25 x 0.8-1.5 cm, lanceolate, elliptic-lanceolate or linear-lanceolate, base cordate or rounded, apex acuminate; sheaths to 9 cm long; ligules 3-7 mm long, ovate, membranous. Racemes 2, adpressed together and appear solitary, 7-12 cm long; joints 4-5 mm long, turbinate. Sessile spikelets 6-8 mm long, oblong-lanceolate, awnless; lower glume 5-6 x 1.5-2 mm, ovate-oblong, crustaceous below with a few side-nodules connected by ridges, chartaceous above; upper glume 6-7 x 1.5-2 mm, ovate-lanceolate, subcoriaceous, dorsally keeled; lower floret male; upper floret bisexual; first lemma 5-6 x 1.5-2 mm, oblong-lanceolate, delicate; palea 4-5 x 1-1.5 mm, oblong-lanceolate, delicate, 2-keeled; stamens 3, orange-yellow; second lemma 4-5 x 1.5-2 mm, oblong-lanceolate, notched with a rudimentary awn in between; palea c. 4 mm long, oblong; stamens 3; ovary oblong; stigma yellow. Pedicelled spikelets 5-6 mm long, ovate-oblong, awnless; lower glume 5-6 x 2.5-3.5 mm, ovate-oblong, coriaceous, broadly winged on one margin; upper glume and florets similar to those of the sessile spikelets.

Fl. & Fr.: Aug.- Feb.

Distr.: Endemic to Kerala.

Common along the banks of backwaters, in muddy fields, sometimes trailing and floating over the weeds growing in canals and backwaters. *CNS 1364* (Nedumudi), *CNS 2499* (Alappuzha).

Ischaemum vembanadense Patil & D'Cruz., J. Bombay Nat. Hist. Soc. 70: 324. 1973; Sreekumar & Nair, Fl. Kerala-Grass. 168. 1991.

Perennials. Culms 35-100 cm long, trailing and rooting at the lower nodes, geniculate. Leaves 5.5-10 x 0.5-1 cm, lanceolate, base rounded or shallowly cordate;

sheaths ciliate along one margin; ligules ovate, membranous. Racemes 2, 4-6 cm long, adpressed together and appear solitary; joints 3-4 mm long, clavate. Sessile spikelets 5-6 mm long, oblong-lanceolate, awned; lower glume 5-6 x 1.5-2 mm, oblong-lanceolate, crustaceous below with 4-6 side-nodules, coriaceous above; upper glume 5-6 x 1.5 mm, ovate-lanceolate, dorsally keeled; lower floret male; upper floret bisexual; first lemma 5-6 x 1.5-2 mm, ovate-lanceolate; palea 5-6 x 1 mm, oblong-lanceolate, 2-keeled; stamens 3; second lemma 4-5 x 1-1.5 mm, deeply nothced, awned, hyaline, awn 1-1.5 cm long; palea 4-5 x 1 mm, oblong-lanceolate, hyaline; stamens 3; anthers yellow; stigmas violet. Pedicelled spikelets 5-6 mm long, oblong, awnless. Florets similar to those of the sessile spikelets.

Fl. & Fr.: Nov. - Jan.

Distr.: Endemic to Kerala. Trailing and floating over the weeds growing in backwater canals; it is often associated with *Ischaemum travancorense*. *CNS 1617* (Thrikunnapuzha).

Ischaemum zeylanicolum Bor, Grass. Burma, Ceylon, India & Pakistan 186. 1960; Nair & Ramach., Bull. Bot. Surv. India 22 (1-4): 193. 1980; Ramach. & Nair, Fl. Cannanore 545. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 169. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 547. 1994. *Ischaemum timorense* Kunth, var. *zeylanicum* Hack.in DC., Monogr. Phan. 6: 230. 1886. *Ischaemum timorense* sensu Hook. f., Fl. Brit. India 7: 136. 1896, p.p.

Annuals or perennials. Culms 35-85 cm long, trailing. Leaves 2.5-14 x 0.5-1 cm, elliptic-lanceolate, base tapering and narrowed into petiole, 0.2-4 cm long, apex acuminate; sheaths keeled; ligules ovate, membranous. Racemes 2, 2.5-6 cm long, hairy; joints 3-4 mm long, turbinate, densely long ciliate;with a tooth like projection on inner side towards base. Sessile spikelets 4-5 mm long, ovate-lanceolate, awned; lower glume c. 4 x 2 mm, ovate-lanceolate, bicuspidate; upper glume 4-5 x 1.5-2 mm, boat-shaped, aristate, hyaline; lower floret male; upper floret bisexual; first lemma 3-4 mm long, oblanceolate; palea 3-4 mm long, elliptic-lanceolate, 2-keeled; stamens 3; second lemma

3-4 mm long, notched,awned; awn 1-1.5 cm long; palea oblong-lanceolate, hyaline; stamens 3; stigmas violet. Pedicelled spikelets similar to the sessile spikelets.

Fl. & Fr.: Nov. - Feb.

Distr.: India and Sri Lanka. In shady and wet areas. *CNS 2353* (Thamarakulam).

JANSENELLA Bor

Kew Bull. 1955 : 96. 1955.

Jansenella griffithiana (C.Muell.) Bor, Kew Bull. 1955 : 98. 1955 & Grass. Burma, Ceylon, India & Pakistan 426. t. 45. 1960., Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 738. 1976; Ramach. & Nair, Fl. Cannanore 546. 1988; Mani., Fl. Silent Valley 357. 1988; Vajravelu, Fl. Palghat Dist. 580. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 348. 1991; Gould in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 294. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 518. 1996. *Danthonia griffithiana* C. Muell., Bot. zeit. 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.

Annuals. Culms 9-18 cm long, creeping and geniculate. Leaves 0.8-3.5 x 0.5-1 cm, elliptic-lanceolate, base amplexicaul, apex acuminate; sheaths slightly keeled; ligules ovate, membranous. Panicles densely compact, capitate, to 3.5 cm long. Spikelets 5-8 mm long, elliptic-lanceolate. Lower glume 4-5 mm long, lanceolate, acuminate. Upper glume 5-8 x 1-1.5 mm, lanceolate, caudate-acuminate, 3-5-nerved. Lower floret male. Upper floret bisexual. First lemma 4-5 x 1-2 mm, oblong-lanceolate, acuminate. Palea c. 3x1 mm, oblong, notched, hyaline, 2-keeled. Stamens 3. Second lemma 3-4 x 1-1.5 mm, oblong, notched, 2-aristate, with tufted hairs on either side, awned; awn to 1 cm long. Palea 2-3 mm long, linear-oblong, notched, 2-keeled, hairy on dorsal side. Stamens 3. Stigmas c.1 mm long.

Fl. & Fr.: Dec.- Jan.

Distr.: India, Sri Lanka. Muddy banks of canals. *CNS 1810* (Thamarakulam).

LEERSIA O.Swartz

Prodr. 1, 21. 1788 (*nom. 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. t. 68. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 738. 1976; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1871. 1983; Sreekumar & Nair, Fl. Kerala-Grass. 430. 1991; Harriman in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 295. 1994.

Perennials. Culms 45-160 cm long, erect or trailing; nodes bearded. Leaves 4-17 x 0.4-1 cm, linear-lanceolate, base rounded, apex acuminate, scaberulous; sheaths to 14 cm long; ligules membranous. Panicles 5-12 cm long, lax; branches to 5 cm long. Spikelets 4-5 mm long, oblong, compressed, 1-flowered, cream-yellow. Glumes reduced to a rim. Lemma 4-5 x 1.5-2 mm, oblong, coriaceous, 5-nerved, laterally compressed, keeled, scabrid along the nerves. Palea 2-3 x 1 mm, linear-oblong, coriaceous, 3-nerved, ciliate along the keels. Stamens 6; anthers c. 2 mm long, yellow. Ovary elliptic; stigmas cream-coloured.

Fl.& Fr.: Almost throughout the year.

Distr.: Tropis of the Old and new worlds. Very common along the streams, fallow fields, wetlands and marshes; sometimes trailing and floating over the weeds growing in canals and backwaters. *CNS 1270* (Nedumudi), *CNS 2634* (Thottappally).

OPLISMENUS Palisot de Beauvois

Fl. Oware 2: 14. 1810 ("1807").

Annuals or perennials. Culms creeping at base and rooting at nodes. Leaves ovate or elliptic-lanceolate, base oblique; ligules ciliate. Inflorescence spiciform secund racemes. Spikelets paired or solitary, 2-flowered, pedicels articulated. Lower glume lanceolate, 3-5-nerved, awned. Upper glume ovate or elliptic, awned or aristate. First lemma lanceolate, terminating into a bristly awn; paleate or not. Second lemma elliptic,

faintly 3-5-nerved. Palea similar, 2-nerved, enclosing a bisexual floret. Stamens 3. Styles 2, short; stigma plumose.

1a. Racemes under 2.5 cm long; lower floret epaleate, awns pale yellow, flexuous; lower lemma aristate ..... **O. burmannii**

1b. Racemes to 11 cm long; lower floret paleate, awns purplish, stiff; lower lemma acute, not aristate ..... **O. compositus**

Oplismenus burmannii (Retz.) P. Beauv., Essai Agrost. 54: 168, 169. 1812; Hook. f., Fl. Brit. India 7: 68. 1896; Fischer in Gamble, Fl. Pres. Madras 1778. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 317. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 742. 1976; Mani & Sivar., Fl. Calicut 341. 1982; Ramach. & Nair, Fl. Cannanore 547. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 256. 1991; Mohanan & Henry, Fl., Thiruvananthapuram 548. 1994; Gould in Dassan.,Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 322. 1994; Sivar. & Mathew, Fl. Nilambur 840. 1996; Sasi. & Sivar. Fl. Pl. Thrissur For. 519. 1996. *Panicum burmannii* Retz., Obs. Bot. 3: 10. 1783.

Annuals. Culms 20-50 cm long, prostrate or trailing, creeping and rooting at the nodes; nodes sparsely hairy. Leaves 1-5 x 0.6-1.2 cm, elliptic or elliptic-lanceolate, base oblique, margins undulate, apex acuminate, glabrescent; sheaths to 4 cm long, softly hairy; ligule a row of hairs. Inflorescence to 10 cm long; racemes 2-7, each 1-2.5 cm long; rachis triquetrous, densely villous. Spikelets 2-3 mm long, elliptic; pedicels bristly. Lower glume 1.5-2 x 1 mm, ovate-lanceolate, softly hairy, awned; awn 6-8 mm long, pale yellow, scabrid. Upper glume 1.5-2 x 1 mm, pale yellow. Lower floret barren. Upper floret bisexual. First lemma 2-3 x 1-1.5 mm, elliptic, aristate. Palea absent. Second lemma 1.5-2 x 1 mm , ovate-elliptic, subcoriaceous. Palea 1.5-2x1 mm, elliptic, subcoriaceous, 2-keeled. Stamens 3, pale yellow. Stigma c.1 mm long, cream coloured.

Fl. & Fr.: Nov. - Jan.

Distr.: Paleotropics.

Very common in moist and shady places forming mats along the shades of trees and bushes. *CNS 1339* (Noottavanpara at Chengannur).

Oplismenus compositus (L.) P. Beauv., Essai 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; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 742. 1976; Mani. & Sivar., Fl. Calicut 341. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1877. 1983; Mani., Fl. Silent Valley 358. 1988; Ramach. & Nair, Fl. Cannanore 547. 1988; Vajravelu, Fl. Palghat Dist. 581. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 257. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 548. 1994; Gould in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 322. 1994; Sivar. & Mathew., Fl. Nilambur 841. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 520. 1996. *Panicum compositum* L., Sp. Pl. 57. 1753.

Annuals. Culms 25-80 cm long, trailing, creeping and rooting at the lower nodes; nodes softly hairy. Leaves 1.5-7 x 0.8 - 2 cm, elliptic-lanceolate or ovate-lanceolate, base oblique, margins wavy, apex acuminate, hispid; sheaths to 6 cm long; ligule a row of hairs. Inflorescence 8-20 cm long, lax; racemes 4-8, each 1.5 - 11 cm long; rachis triquetrous, pilose. Spikelets paired, 3-4 mm long, elliptic, distant, subsessile. Lower glume 2-3 x 1 mm , lanceolate, awned; awn 4-6 mm long. Upper glume 2-3 x 1 mm, ovate-elliptic, aristate. Lower floret barren. Upper floret bisexual. First lemma 3-4 x 1-2 mm, ovate. Palea 1-2 mm long, lanceolate. Second lemma 2-3 x 1 mm, elliptic, subcoriaceous. Palea 2-3 x 1 mm, elliptic, subcoriaceous, 2-keeled. Stamens 3; anthers c. 1 mm long, purple. Stigma c 1 mm long, reddish. Grains c. 1mm long, ellipsoid.

Fl. & Fr.: Sep. - Jan.

Distr.: Tropical regions in Old and New Worlds. Very common in shady places. *CNS 1370* (Kadakarapally), *CNS 2342* (Pandanad).

ORYZA Linnaeus

Sp. pl. 333. 1753.

Annuals or perennials, often aquatic or in marshes. Leaves linear or oblong-lanceolate; ligule large, membranous. Inflorescence a panicle. Spikelets laterally compressed, pedicels dilated at apex, articulated above the rudimentary glumes, 1-flowered. Lemma chartaceous, strongly keeled, many-nerved, acute, awned or not. Palea similar, with narrow hyaline margins. Floret bisexual. Stamens 6. Styles 2; stigma plumose.

1a. Spikelets persistent; awns minute ..... **O. sativa**

1b. Spikelets deciduous; awns above 5 mm long ..... **O. rufipogon**

Oryza rufipogon Griff., Notul. 3: 5. 1851; Bor, Grass. Burma, Ceylon, India & Pakistan 605. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 743. 1976; Vajravelu, Fl. Palghat Dist. 582. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 432. 1991. *Oryza sativa* sensu Hook. f., Fl. Brit. India 7: 92. 1896, p.p.

Annuals. Culms to 80 cm high, erect, tufted; nodes glabrous. Leaves 15-35 x 0.8-1.2 cm, linear-lanceolate, base rounded, apex acuminate; sheaths to 20 cm long, keeled; ligules 0.5-1.5 cm long, ovate, membranous. Panicles 12-25 cm long, lax. Glumes 2-3 mm long, ovate, unequal. Lemmas 8-10 mm long, ovate-oblong, laterally compressed, 3-nerved, awned; awns 5-10 mm long. Palea 6-10 mm long, oblong. Stamens 6: anthers 2-3 mm long , yellow. Stigmas cream-coloured. Grains 5-6 mm long, elliptic.

Fl. & Fr.: Sep. - Feb.

Distr.: Endemic to India. Common, along the margins of ponds and other water courses; often grows as a weed in paddy fields. *CNS 2500* (Nedumudy).

Oryza sativa L., Sp. Pl. 333. 1753; Hook. f., Fl. Brit. India. 7: 92. 1896, p.p.; Fischer in Gamble, Fl. Pres. Madras 1844. 1934, p.p.; Bor., Grass. Burma, Ceylon, India & Pakistan 605. 1960; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1878. 1983; Vajravelu, Fl.

Palghat Dist. 582. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 433. 1991; Harriman in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 328. 1994.

Annuals. Culms 50-120 cm high, erect, rooting at the lower nodes; nodes glabrous. Leaves 25-60 x 0.5-1.2 cm, linear-lanceolate or linear, apex acuminate, scabrid; sheaths ciliate along the margins; ligules 2-3 mm long, membranous. Panicles 10-25 cm long, lax. Spikelets 7-10 mm long, oblong, awned or not. Glumes reduced. First lemma 7-10 mm long, oblong-lanceolate, empty. Second lemma 6-8 mm long, oblong-lanceolate, granulate, fertile. Palea oblong-lanceolate, acuminate. Grains oblong, tightly enclosed by the lemma and palea.

Fl. & Fr.: Sep. - Jun.

Distr.: Cultivated all over India; occassionally runs wild. *CNS 2635* (Kainakkari).

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. Gould in Dassan., Fosb. & Calyton, Rev. Handb. Fl. Ceylon 8: 330. 1994; Sivar. & Mathew, Fl. Nilambur 841. 1996. *Panicum nodosum* Kunth, Enum. Pl. 1: 97. 1833; Hook. f., Fl. Brit. India 7: 43. 1896.

Perennials. Culms 25-80 cm long, creeping, rooting at the lower nodes. Leaves 3-11 x 0.6-1.3 cm, elliptic-lanceolate, base rounded, apex acuminate; sheaths to 4 cm long, ciliate along one margin; ligules narrow, membranous. Panicles 6-14 cm long, lax; racemens 5-10, alternate, opposite, each 1-8 cm long. Spikelets 3-4 mm long, elliptic-lanceolate. Lower glume to 1.5 x 1 mm, ovate-lanceolate, 3-5-nerved. Upper glume 1.5-2 x 1 mm, elliptic-lanceolate, 7-nerved. Lower floret barren, epaleate. Upper floret bisexual. First lemma 3-4 mm long, elliptic-lanceolate. Second lemma c.3 x 1.5 mm, elliptic, subcoriaceous. Palea 2-3 x 1 mm, elliptic, subcoriaceous, 2-keeled. Stamens 3; anthers yellow. Stigmas purple.

Fl. & Fr.: May-Nov.

Distr.: India, Sri Lanka, Burma, extending to Malaysia and the Philippines. Common in shades of coconut plantations and banks of ponds and canals. *CNS 2219* (Mullakkal).

PANICUM Linnaeus

Sp. Pl. 55. 1753.

Annuals or perennials. Culms densely fascicled; nodes bearded or not. Sheaths hairy; ligules membranous, fimbriate or with pilose hairs. Inflorescence a panicle, branches ascending or spreading. Spikelets oblong, lanceolate or elliptic, acute or muticous, pedicelled, falling entire, 2-flowered. Glumes unequal, membranous. Lower glume about half the length of spikelets, sometimes as long as the spikelets. Upper glume as long as the spikelets, 6-11-nerved. First lemma similar to the upper glume. Palea hyaline, smaller, enclosing a male floret or empty. Second lemma as long as the spikelets, crustaceous, smooth or rugose, margins involute. Palea ovate, enclosing bisexual floret. Stamens 3. Styles 2, free; stigma plumose.

1a. Panicles much contracted, narrow, spiciform; branches densely spiculate .... **P. auritum**

1b. Panicles effuse, usually broader; branches widely spreading.

2a. Upper lemma transversely rugose ..... **P. maximum**

2b. Upper lemma smooth.

3a. Leaves broadly ovate, amplexicaul; spikelets slightly gibbous .... **P. brevifolium**

3b. Leaves linear, lanceolate or narrowly elliptic, not amplexicaul; spikelets symmetrical.

4a. Culms 1-2 m long; leaves 1-3.5 cm broad; lower florets epaleate ..... **P. notatum**

4b. Culms 0.1-1 m long; leaves 0.3-1 cm broad; lower florets paleate.

5a. Culms rhizomatous; leaves distichous; spikelets not opening at maturity ..... **P. repens**

5b. Culms not rhizomatous; leaves not distichous; spikelets normally opening at maturity.

6a. Culms spongy; lower glume broader than long, not cuspidate-acuminate; spikelets not gaping .... **P. paludosum**

6b. Culms not spongy; lower glume longer than broad, cuspidate-acuminate; spikelets widely gaping .... **P. trypheron**

Panicum auritum Presl ex Nees, Agrost. Bras. 176. 1829; Hook f., Fl. Brit. India 7: 40. 1896; Bor, Grass. Burma, Ceylon, India & Pakistan 324. 1960; Majumdar, Bull. Bot. Soc. Bengal 27: 53. 1973; Nair *et al.*, J. Econ. Tax. Bot 3: 270. 1982; Sreekumar & Nair, Fl. Kerala-Grass. 261-262. 1791.

Perennials. Culms 60-150 cm high, erect; nodes glabrous. Leaves 12-35 x 0.6-1.7 cm, linear-lanceolate, base cordate, apex acuminate; sheaths to 10 cm long, ciliate along one-margin, densely bearded at mouth; ligules membranous. Panicles 15-35 cm long, spiciform, much contracted; branches 2.5-9 cm long. Spikelets 2.5-3.5 mm long, ovate-lanceolate. Lower glume 1-1.5 x 0.5-1 mm, ovate, acuminate. Upper glume 2-2.5 x 1 mm, ovate. Lower floret barren. Upper floret bisexual. First lemma 2-3 x 1-1.5 mm, ovate-lanceolate, margins hyaline. Palea c. 1 mm long, oblong. Second lemma 2-2.5 x 0.5-1 mm, elliptic or ovate-lanceolate, acute, subcoriaceous. Palea 1.5-2 x 0.5-1 mm, oblong-lanceolate, subcoriaceous. Stamens 2 or 3; anthers yellow with violet margins. Ovary c. 1 mm long; stigmas pink. Grains 1-1.5 mm long, ovate.

Fl.& Fr.: Aug. - Mar.

Distr.: S.E. Asia and India. Common in open water-logged areas. *CNS 1819* (Mancombu), *CNS 1811* (Ramankary).

Panicum brevifolium L., Sp. Pl. 59. 1753; Fischer in Gamble, Fl. Pres. Madras 1783. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 324. 1960; Majumdar, Bull. Bot. Soc. Bengal 27: 54. 1973; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 744. 1976; Mani. & Sivar., Fl. Calicut 349. 1982; Ramach. & Nair,Fl. Cannanore 548. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 263. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 550. 1994; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 333. 1994; Sasi. & 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 15-75 cm, slender, creeping or geniculate; nodes glabrous. Leaves 1.5-6.5 x 1-2.5 cm, ovate, base cordate or amplexicual, oblique, with a few tubercle-based cilia, apex acute or acuminate; sheaths to 5 cm long, ciliate along one margin; ligules membranous, ciliate. Panicles 6-14 cm long, pyramidal, effuse; branches to 6.5 cm long, alternate or fascicled. Spikelets 1.5-2 mm long, ovate, slightly gibbous; pedicels to 1.5 cm long. Lower glume 1.5-2 x 0.5 mm, ovate-oblong, obtuse. Upper glume 1.5-2 x 1 mm, ovate-acute. Lower floret male. Upper floret bisexual. First lemma c.1.5 x 1 mm, ovate, acute, 3-nerved. Palea c. 1 x 0.5 mm, oblong, 2-keeled. Stamens 3. Second lemma c. 1 x 0.5 mm, ovate, dorsally convex, coriaceous. Palea c. 1 x 0.5 mm, elliptic, 2- keeled, coriaceous. Stamens 3; anthers cream-coloured. Ovary elliptic; stigma white. Grains c. 1 mm long, ovate.

Fl. & Fr.: Nov. - May.

Distr.: Paleotropics. Very common in moist and shady places and as an undergrowth in cultivated lands. *CNS 1466* (Kanichukulangara).

Panicum maximum Jacq., Collect. Bot. 1:76. 1787; Hook. f., Fl. Brit. India 7: 49. 1896; Fischer in Gamble, Fl. Pres. Madras 1783. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 327, t. 37. 1960; Majumdar, Bull. Bot. Soc. Bengal 27:53. 1973; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1879. 1983; Sreekumar & Nair, Fl. Kerala - Grass. 266. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 550. 1994; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8:336. 1994.

Perennials. Culms to 200 cm high, erect, tufted; nodes bearded. Leaves 20-50 x 1-1.5 cm, linear, base rounded, apex acuminate; sheaths to 30 cm long, glabrous or tubercle-based hairy; ligules membranous. Panicles 10-30 cm long, effuse, decompound; branches to 18 cm long, whorled at the lower nodes, alternate above; pedicels to 5 mm long. Spikelets 3-4 mm long, oblong, acute. Lower glume c. 1 x 1 mm, broadly ovate. Upper glume 2-3 x 1-1.5 mm, oblong, obtuse. Lower floret male. Upper floret bisexual. First lemma 2-3 x 1-1.5 mm, oblong. Palea c. 2.5 x 1 mm, elliptic-acute. Stamens 3. Second lemma c. 2 x 1 mm, ovate, acute, subcoriaceous, transversely rugose. Palea c.2 x 1.5 mm, elliptic, subcoriaceous, rugose. Stamens 3. Ovary elliptic; stigma pink. Grains c. 1.5 mm long, ovate.

Fl. & Fr.: Apr.-Aug.

Distr.: Tropical Africa, India, Pakistan; introduced to most other warm countries. Cultivated as a fodder grass, occassionally runs wild. *CNS 1831* (Thiruvizha).

Panicum notatum Retz., Obs. Bot. 4: 18. 1786; Bor, Grass. Burma, Ceylon, India & Pakistan 701. 1960; Majumdar, Bull. Bot. Soc. Beng. 27: 48. 1973; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1881. 1983; Sreekumar & Nair, Fl. Kerala-Grass. 267. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 550. 1994; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 339. 1994; Sivar & Mathew, Fl. Nilambur 842. 1996; Sasi & 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 to 2 m tall, erect; nodes glabrous. Leaves 7-20 x 1-3.5 cm, lanceolate, base subcordate, apex acuminate, flat, midrib prominent; sheaths to 10 cm long, ciliate along one margin; ligules membranous with a few long hairs benhind. Panicles 15-30 cm long, lax; branches to 21 cm long. Spikelets 2.5-3 mm long, ovate-oblong, acute; pedicels to 1.5 cm long. Lower glume c.2 x 1 mm, ovate-lanceolate, acute. Upper glume c. 2 x 1 mm, ovate. Lower floret barren. Upper floret bisexual. First lemma c. 2.5 x 1 mm, ovate. Palea absent. Second lemma c. 2 x 1.5 mm, ovate. Palea absent.

Second lemma c. 2 x 1.5 mm, ovate, subcoriaceous. Palea c. 2 x 1 mm, ovate, subcoriaceous. Stamens 3; anthers yellow. Ovary elliptic; stigmas c. 1 mm long, violet. Grains c. 1.5 mm long, ovate.

Fl. & Fr.: Aug. - Apr.

Distr.: Sri Lanka and India to China and South east Asia. In Sacred groves. *CNS 1783* (Kooritharakavu at Chattiyara).

Panicum paludosum Roxb., Fl. Ind. 1: 310. 1820; Fischer in Gamble, Fl. Pres. Madras 1783. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 329. 1960; Majumdar, Bull. Bot. Soc. Bengal 27 : 51. 1973; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 744. 1976; Mani & Sivar., Fl. Calicut 349. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1881. 1983; Ramach. & Nair, Fl. Cannanore 548. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 268. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 550. 1994; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 340. 1994; Sivar. & Mathew, Fl. Nilambur 843. 1996.

Aquatic or semi-aquatic perennials. Culms 30-80 cm long, spongy below, erect or geniculate and rooting at the lower nodes; nodes glabrous. Leaves 5-21 x 0.5-1 cm, linear-lanceolate, base subcordate, margins scaberulous, apex acute; sheaths to 8 cm long; ligules a ring of white hairs. Panicles 7-18 cm long, spreading, effuse; branches to 8 cm long, opposite or alternate. Spikelets 3-4.5 mm long, elliptic-lanceolate, acuminate. Lower glume c. 1 mm long, orbicular. Upper glume c. 3 x 1 mm, ovate, acute. Lower floret usually barren. Upper floret bisexual. First lemma c. 3 x 1 mm, elliptic-lanceolate, acuminate. Palea c. 2 mm long, oblong or absent. Second lemma c. 2.5 x 1 mm , elliptic, acute, subcoriaceous. Palea c. 2 x 1 mm, elliptic, subcoriaceous, auricled at base. Stamens 3; anthers orange. Ovary ovate; stigma pink. Grains c. 1 mm long, oblong.

Fl. & Fr.: Mar. - Aug.

Distr.: Nepal, India, Pakistan, Sri Lanka through Myanmar to S.E. Asia and tropical Australia. Common in wetlands, marshes, submerged or floating in shallow and still waters. *CNS 2320* (Vandanam).

Panicum repens L., Sp. Pl. ed. 2, 87. 1762; Hook. f., Fl. Brit. India 7: 49. 1896; Rang. & Tad., Handb. S. Ind. Grass. 99, t. 102-103. 1921; Fischer in Gamble, Fl. Pres. Madras 1783. 1934; Bor. Grass. Burma, Ceylon, India & Pakistan 330. 1960; Majumdar, Bull. Bot. Soc. Bengal 27: 51. 1973; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 745. 1976; Mani. & Sivar., Fl. Calicut 349. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1882. 1983; Ramach. & Nair, Fl. Cannanore 549. 1988; Sreekumar & Nair, Fl. Kerala - Grass. 271. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 551. 1994; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 343. 1994.

Perennials. Culms 30-75 cm long, erect or trailing, rhizomatous, rooting at the lower nodes; nodes glabrous. Leaves 7-24 x 0.4-0.7 cm, linear or linear-lanceolate, base shallowly cordate, apex acuminate, distichous, glaucous, scattered-pubescent on the upper surface; sheaths to 7 cm long, ciliate along the margins; ligules membranous, with dense tuft of hairs behind. Panicles 6-18 cm long. Spikelets 2.5-3.5 mm long, oblong-lanceolate, acute; pedicels 2-5 mm long. Lower glume c. 1 x 1.5 mm, ovate. Upper glume 2-3 x 1-1.5 mm, ovate-lanceolate, acute. Lower floret male. Upper floret bisexual. First lemma 2-3 x 1-1.5 mm, ovate-lanceolate. Palea c. 2.5 x 1 mm, oblong-lanceolate, hyaline, 2-keeled. Stamens 3. Second lemma 1.5-2. x 0.5-1 mm, oblong, subcoriaceous. Palea elliptic, subcoriaceous. Stamens 3. Ovary ovate; stigma c. 1 mm long.

Fl. & Fr.: Almost throughout the year.

Distr.: Tropical and subtropical areas of both hemispheres. Common along banks of backwaters, paddy fields, wetlands and marshes. *CNS 2636* (Vayalar).

Panicum trypheron Schult., Mant. Syst. Veg. 2: 244. 1824; Hook. f., Brit. India 7: 47. 1896; Rang. & Tad., Handb. S. Ind. Grass. 96, t. 101. 1921; Fischer in Gamble, Fl. Pres. Madras 1783. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 331. 1960; Majumdar,

Bull. Bot. Soc. Bengal 27: 47. 1973; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 745. 1976; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1883. 1983; Vajravelu, Fl. Palghat Dist. 583. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 273. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 551. 1994; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 346. 1994; Sivar. & Matthew, Fl. Nilambur 844. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 521. 1996.

Annuals. Culms 15-55 cm high, erect; nodes glabrous. Leaves 2.5 - 15 x 0.3-0.7 cm, linear to narrowly lanceolate, base rounded, margins serrulate and ciliolate, hairy; sheaths to 6 cm long, ciliate along one margin; ligules membranous, with long pilose tufts. Panicles 7-22 cm long, effuse; branches alternate and whorled. Spikelets 2.5-3.5 mm long, elliptic or ovoid, acuminate, distant, pink; pedicels to 1 cm long. Lower glume 1.5-2 mm long, ovate, acuminate. Upper glume 2-3 x 1-1.5 mm, ovate-lanceolate. Lower floret barren. Upper floret bisexual. First lemma 2-3 x 1-1.5 mm, ovate-oblong. Palea 1-1.5 mm long, oblong, hyaline, 2-keeled. Second lemma 1.5-2.5 x 1-1.5 mm, oblong, subcoriaceous. Palea 1.5-2 mm long, oblong-elliptic, subcoriaceous. Stamens 3. Ovary ovate; stigmas pink. Grains c. 1 mm long, ovate.

Fl. & Fr.: Aug. - Dec.

Distr.: Pakistan, India to S.E. Asia and China. Along road sides and wastelands. *CNS 1304* (Pandavanpara), *CNS 2501* (Pallipuram).

PASPALIDIUM Stapf

in Prain Fl. Trop. Africa 9: 582. 1920.

Annuals or perennials with erect or creeping and ascending culms. Leaves narrowly linear-lanceolate, acuminate or obtuse; sheaths compressed, glabrous; ligule a ciliate rim. Inflorescence of alternate spiciform racemes on a common axis, spreading or adpressed to the axis; rachis narrowly winged or triquetrous. Spikelets subsessile, regularly 2-seriate, closely imbricating, dorsally compressed, 2-flowered. Glumes dissimilar and unequal; lower smaller, abaxial, obtuse; upper as long as the spikelet.

Lower lemma similar to upper glume; palea a little shorter, margin involute, floret male or empty. Upper lemma crustaceous, with firm involute margins; palea equal to lemma, floret bisexual. Stamens 3. Styles 2, free; stigma plumose. Grains dorsally compressed, ellipsoid.

1a. Leaf-apex abruptly obtuse or blunt; lowest raceme shorter than internode; spikelets gibbously globose ..... **P. flavidum**

1b. Leaf-apex acute or acuminate, not blunt; lowest raceme as long or longer than the internode; spikelets dorsally compressed, not gibbous.

2a. Upper glume nearly as long as the spikelet; lower floret male, paleate ..... **P. geminatum**

2b. Upper glume about half the length of the spikelets; lower floret barren, epaleate ..... **P. punctatum**

Paspalidium flavidum (Retz.) A. Camus in Lecomte, Fl. Gen. Indo-Chine 7: 419. 1922; Fischer in Gamble, Fl. Pres. Madras 1774. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 333. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 745. 1976; Mani & Sivar., Fl. Calicut 343. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1884. 1983; Ramach. & Nair, Fl. Cannanore 549. 1988; Vajravelu, Fl. Palghat Dist. 583. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 278. 1991; Mohanan & Henry, Fl., Thiruvananthapuram 551. 1994; Gould in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 349. 1994; Sivar. & Mathew , Fl. Nilambur 844. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 521. 1996. *Panicum flavidum* Retz., Obs. Bot. 4: 15. 1786; Hook. f., Fl. Brit. India 7: 28. 1896; Rang. & Tad., Handb. S. Ind. Grass. 69, t. 82-83. 1921.

Annuals. Culms 15-65 cm long, tufted; nodes glabrous. Leaves 7-20 x 0.3-0.7 cm, linear, base round, apex blunt, flat; sheaths to 10 cm long, compressed, strongly keeled; ligules annular. Inflorescence 10-25 cm long, spiciform; racemes 4-8 in number, alternate, 1-2 cm long; rachis narrowly winged. Spikelets 10-25 per raceme, 1-3 mm long, globose, gibbous. Lower glume 0.5-1 x 1-1.5 mm, orbicular. Upper glume 2-3 x 1.5-2 mm, ovate. Lower floret barren. Upper floret bisexual. First lemma 2-3 x 1.5-2 mm,

ovate. Palea 1.5-2 x 1 mm, ovate-elliptic, hyaline, 2-keeled. Second lemma 1.5-2 x 1 mm, elliptic, crustaceous, granulose. Palea 1-2 x 1 mm, elliptic, crustaceous, 2-keeled. Stamens 3. Ovary oblong. Grains to 1.5 mm long, ovoid.

Fl. & Fr.: Jul. - Dec.

Distr.: Tropical Asia. Occassional along the sides of water courses and other wet or damp localities. *CNS 2130* (Chattiyara).

Paspalidium geminatum (Forssk.) Stapf in Prain, Fl. Trop. Afr. 9: 583. 1920; Fischer in Gamble, Fl. Pres. Madras 1774. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 333. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 745. 1976; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1884. 1983; Sreekumar & Nair, Fl. Kerala-Grass. 279. 1991; Gould in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8:350. 1994. *Panicum geminatum* Forssk., Aegypt.-Arab. 18. 1775. *Panicum paspaloides* Pers., Syn. Pl. 81. 1805; Hook. f., Fl. Brit. India 7: 30. 1896.

Perennials. Culms 25-130 cm long, creeping or floating, rooting at the lower nodes. Leaves 8-22 x 0.5 - 1.3 cm, lanceolate or linear-lanceolate, base rounded, apex acuminate; sheaths to 12.5 cm long; ligules tuft of hairs. Panicles 8-30 cm long, spiciform; racemes 8-25 in number, 1-3.5 cm long; rachis narrowly winged. Spikelets 2-4 mm long, ovate or elliptic. Lower glume 1-1.5 x 1.5-2 mm, ovate-lanceolate, rounded. Upper glume 2-3 x 1.5-2 mm, ovate, obtuse. Lower floret male. Upper floret bisexual. First lemma 3-3.5 x 1.5-2 mm, elliptic-acute. Palea 2-3 x 1-1.5 mm, broadly elliptic, hyaline, 2-keeled. Stamens 3. Second lemma 2-3 x 1.5-2 mm, elliptic-acute, coriaceous. Palea 2-2.5 x 1-1.5 mm, elliptic-acute, subcoriaceous, 2-keeled. Stamens 3; anthers yellow. Ovary ovate; stigma c. 1 mm long, cream-yellow in colour. Grains c. 1 mm long, ellipsoid.

Fl. & Fr.: Aug. - Mar.

Distr.: Tropical Africa and Asia. Common along the bunds of paddy fields, marshes, wetlands and other such damp places. *CNS 1357* (Pallippuram), *CNS 2637* (Thanneermukkom).

Paspalidium punctatum (Burm.) A. Camus in Lecomte, Fl. Gen. Indo-Chine. 7: 419. 1922; Fischer in Gamble, Fl. Pres. Madras 1774. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 333. 1960; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1885. 1983; Sreekumar & Nair, Fl. Kerala - Grass. 280. 1991; Gould in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 350. 1994. *Panicum punctatum* Burm., Fl. Ind. 26. 1768; Hook. f., Fl. Brit. India 7: 29. 1896.

Perennials. Culms 50-150 cm long, spongy, creeping or floating, rooting at the lower nodes, sometimes decumbent; nodes glabrous. Leaves 12-40 x 0.5-1.2 cm, linear or linear-lanceolate, base narrow or rounded, apex acute or acuminate; sheaths to 16 cm long, keeled; ligule a tuft of hairs. Panicles 25-45 cm long, spiciform; racemes 7-14, each 1.5-5 cm long. Spikelets 2.5-4 mm long, ovate or broadly elliptic. Lower glume 0.5-1 x 1 mm, ovate, truncate. Upper glume 2-3 x 1.5-2 mm, ovate, obtuse. Lower floret barren, epaleate. Upper floret bisexual. First lemma 2.5-3.5 x 1-1.5 mm, ovate-elliptic, acute. Second lemma c. 3 x 1.5 mm, broadly elliptic, acute, crustaceous, rugulose. Palea c.2 x 1 mm, elliptic-acute, crustaceous, 2-keeled, rugulose. Stamens 3. Ovary oblong; stigma c. 1 mm long.

Fl. & Fr.: May. - Mar.

Distr.: N. Africa, India, Tropical Asia. Along the bunds of fields, wetlands puddles and other water-logged areas. *CNS 2319* (Vandanam).

PASPALUM Linnaeus

Syst. Nat. ed. 10, 855, 1359. 1759.

Annuals or perennials. Culms creeping and ascending. Leaves linear to narrowly lanceolate; sheaths compressed; ligule a ciliate rim or a glabrous membrane. Inflorescence of spiciform racemes, digitate or alternate; rachis flat. Spikelets solitary or

paired, 2-seriate, 2-flowered, planoconvex or compressed. Lower glume absent. Upper glume as long as the spikelets. Lower lemma similar to upper glume, epaleate. Upper lemma crustaceous with firm involute margins. Palea similar with inflexed membranous margins, floret bisexual. Stamens 3. Styles 2, free; Stigma plumose.

1a. Spikelets 1-2 mm long; upper glume white ciliate along margins ..... **P. conjugatum**

1b. Spikelets 2-4 mm long; upper glume not ciliate along margins.

2a. Spikelets obovate or orbicular, obtuse ..... **P. scrobiculatum**

2b. Spikelets ovate-elliptic or lanceolate, acute ..... **P.distichum**

Paspalum conjugatum Berg., Act. Helv. Phys.-Math. 7: 129, t. 8. 1772; Hook. f., Fl. Brit. India 7: 11. 1896; Fischer in Gamble, Fl. Pres. Madras 1772. 1934; Bor, Burma, Ceylon, India & Pakistan 336. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 746. 1976; Mani. & Sivar., Fl. Calicut 337. 1982; Ramach. & Nair, Fl. Cannanore 550. 1988; Mani., Fl. Silent Valley 359. 1988; Vajravelu, Fl. Palghat Dist. 584. 1990; Sreekumar & Nair, Fl. Kerala- Grass. 285. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 552. 1994; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 352. 1994; Sivar. & Mathew, Fl. Nilambur 845. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 522. 1996.

Perennials. Culms to 150 cm long, creeping or stoloniferous, rooting at the nodes; nodes glabrous. Leaves 3-18 x 0.4 - 1.3 cm, lanceolate, base rounded or narrowed, apex acuminate; sheaths to 6 cm long, keeled, ciliate along one margin; ligules membranous. Racemes 2, 4-11 cm long, conjugate. Spikelets 1.5-2 mm long, orbicular or broadly elliptic, creamy-yellow. Lower glume absent. Upper glume 1-1.5 x 1 mm, orbicular or ovate, membranous, long ciliate along the margins. Lower floret barren. Upper floret bisexual. First lemma 1-1.5 x 1 mm, orbicular or ovate, membranous. Second lemma c. 1 x 1 mm, ovate or orbicular, crustaceous, 2-keeled. Stamens 3; anthers yellow. Stigmas white.

Fl. & Fr.: Throughout the year.

Distr.: Throughout the tropics. Very common in moist and shady places. *CNS 1327* (Angadikkal).

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; Brummitt, Taxon 32 (2) : 281. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 312. 1988; Sreekumar & Nair, Fl. Kerala - Grass. 286. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 552. 1994; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon. 8: 355. 1994. *Digitaria paspaloides* Michx., Fl. Borr. Amer. 1: 46. 1803. *Paspalum paspaloides* (Michx.) Scribn., Mem. Torr. Bot. Club. 5: 29. 1894; Mani. & Sivar., Fl. Calicut 337. 1982. ***Tereta-pullu*** Rheede, Hort. Malab. 12: 81, t. 44. 1693.

Perennials. Culms 20-60 cm long, creeping and rooting at the nodes, stoloniferous; nodes glabrous. Leaves 2.5-12 x 0.3 -0.6 cm, linear-lanceolate or linear, base rounded, apex acuminate; sheaths to 7 cm long; ligules membranous. Racemes 2, 2.5-6 cm long. Spikelets 3-4 mm long, elliptic or ovate-elliptic. Lower glume absent or a subulate scale. Upper glume 2.5-3.5 x 1-2 mm, elliptic-lanceolate, chartaceous, softly hairy or glabrous. Lower floret barren. Upper floret bisexual. First lemma elliptic-lanceolate. Upper lamma 2-2.5 x 1-1.5 mm, ovate-oblong, crustaceous. Palea 2-2.5 x 1-1.5 mm, ovate-oblong, crustaceous, 2-keeled. Stamens 3; anthers pale yellow. Ovary oblong; stigmas pink.

Fl. & Fr.: May - Dec.

Distr.: Tropics and subtropics of the world. Very common along the banks of back waters, in fallow fields and salt marshes. *CNS 1214* (Cherthala), *CNS 1305* (Chengannur).

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; Clayton, Kew Bull. 30(1): 101. 1975; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 747. 1976; Mani. & Sivar., Fl. Calicut 337.1982; Britto & Matthew in Matthew, Fl.Tam. Carnatic 3: 1887. 1983; Ramach. & Nair, Fl. Cannanore

551. 1988; Mani., Fl. Silent Valley 360. 1988; Varjavelu, Fl. Palghat Dist. 584. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 287. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 553.1994; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 356. 1994; Sivar. & Mathew, Fl. Nilambur 845. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 522. 1996. *Paspalum orbiculare* Forst., Fl. Ins. Aust. Prodr. 7. 1786; Fischer in Gamble, Fl. Pres. Madras 1772. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 340. 1960. *Paspalum commersonni* Lam., Tab. Encycl. 1: 175, t. 43/1. 1791; Bor, Grass. Burma, Ceylon, India & Pakistan 335, t. 38. 1960.

Annuals or perennials. Culms 15-80 cm high, tufted, erect or creeping and rooting at the lower nodes; nodes glabrous. Leaves 3.5-36 x 0.4-1 cm, lanceolate to linear, base rounded, apex acuminate; sheaths to 15 cm long; ligules membranous, ciliate. Racemes usually 2, rarely 3-5, 2.5-7 cm long; rachis flat. Spikelets 2-ranked or 3-ranked, 2-3.5 mm long, ovate-orbicular or obovate, obtuse. Lower glume absent. Upper glume 2-3.5 x 2-2.5 mm, ovate or orbicular, membranous. Lower floret barren. Upper floret bisexual. First lemma 2-3.5 x 2-2.5 mm, ovate or orbicular, crustaceous. Palea 2-2.5 x 1.5-2 mm, ovate or orbicular, crustaceous, inflexed. Stamens 3; anthers yellow or brown. Ovary c. 0.5 mm long; stigmas cream yellow or violet in colour.

Fl. & Fr.: Throughout the year.

Distr.: India, Pakistan; throughout the Old World tropics. Very common along the bunds of paddy fields, frequent in fallow fields, wetlands puddles and other water-logged areas. *CNS 1096* (Pallithode), *CNS 1833* (Cheriyanad), *CNS 1717* (Thottappally).

PENNISETUM L.C. Richard

in Persoon, Syn. Pl. 1: 72. 1805.

Annuals or perennials. Culms erect, stiff. Leaves linear, flat or convolute. Inflorescence a spike-like dense panicle; branches short with solitary or 2-5 spikelets in a fascicle, subtended by involucral bristles. Spikelets 1-2-flowered; involucral bristles scabrid or plumose. Glumes small, hyaline; lower often reduced; upper about half as the

length of spikelets. Lower lemma with incurving margins. Palea when present encloses a male floret. Upper lemma as long as the spikelet; palea 2-nerved, floret bisexual. Stamens 3; anthers often hairy at apex. Styles 2; stigma plumose.

1a. Culms pubescent below the inflorescence; lemmas similar, lower not 3-lobed; rhachis without winged ribs; anthers penicillate ..... **P. purpureum**

1b. Culms not pubescent below the inflorescence; lemmas dissimilar, lower of 3-lobed; rhachis with prominently winged ribs; anthers not penicillate.

2a. Spikelets solitary or in a groups of 2-5 in an involucre, at least one of them pedicelled, 4-6 mm long; bristles densely woolly plumose .... **P. pedicellatum**

2b. Spikelets solitary in an involucre, sessile, 3-4 mm long; inner bristles plumose, but not woolly ..... **P. polystachyon**

Pennisetum pedicellatum Trin., Mem. Acad.Sci. Petersb. Ser. 6, 3: 184. 1834; Hook. f., Fl. Brit. India 7: 86. 1896; Fischer in Gamble, Fl. Pres. Madras 1792. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 346. 1960; Vajravelu, Fl. Palghat Dist. 585. 1990; Sreekumar & Nair, Fl. Kerala-Grass.290. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 553. 1994; Sivar. & Mathew, Fl. Nilambur 846. 1996.

Annuals. Culms 40-120 cm high,erect, tufted; nodes glabrous. Leaves 7-20 x 0.4-1 cm, linear-lanceolate, base rounded, apex acuminate; sheaths to 12 cm long; ligules membranous, fimbriate. Panicles 6-16 cm long, spiciform, interrupted, purplish; rhachis puberulous. Involucre enclosing 1-5 spikelets, at least one of them pedicelled; bristles densely woolly plumose. Spikelets 4-6 mm long, lanceolate. Lower glume 1.5-2 x 0.5-1 mm, ovate-lanceolate, villous. Upper glume 2-3 x 1-1.5 mm, ovate-lanceolate, villous. Lower floret male or barren. Upper floret bisexual. First lemma 3-4 x 1-1.5 mm, ovate, apex 3-lobed. Palea minute. Stamens 3. Second lemma 2-2.5 x 1-1.5 mm, elliptic, coriaceous, 2-keeled. Ovary oblong; stigmas cream-yellow.

Fl. & Fr.: Oct. - Jan.

Distr.: West Africa and India. Very common along road sides and wasteplaces. *CNS 1353* (Pallippuram).

Pennisetum polystachyon (L.) Schult., Veg. Mant. 2: 146. 1824; Fischer in Gamble, Fl. Pres. Madras 1792. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 346, t. 39. 1960; Mani. & Sivar., Fl. Calicut 340. 1982; Ramach. & Nair, Fl. Cannanore 551.1988; Mani., Fl. Silent Valley 360. 1988; Vajravelu, Fl. Palghat Dist. 585. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 291.1991; Mohanan & Henry, Fl. Thiruvananthapuram 554.1994; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 366. 1994; Sivar. & Mathew, Fl. Nilambur 847. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For.522.1996. *Panicum polystachyon* L., Syst. Nat. ed. 10, 2: 870. 1759. *Cenchrus setosus* Sw., Prodr. Veg. Ind. OC. 26. 1788. *Pennisetum setosum* (Sw.) L.C. Rich. in Pers., Syn. Pl. 1: 72. 1805; Hook. f., Fl. Brit. India 7: 87. 1896 (Fig. 79).

Stout annuals. Culms to 1.5 m tall, erect; nodes glabrous. Leaves 10-30 x 0.4-1.3 cm, linear or linear-lanceolate, base rounded, apex acuminate, tubercle-based hairy or glabrous; sheaths to 22 cm long, keeled,villous at mouth; ligules membranous, fimbriate. Panicles 7-18 cm long, spiciform, cream-yellow or reddish-purple in colour; rhachis angular with sharp-edged decurrent wings. Involucre enclosing one sessile spikelet. Spikelets 3-4 mm long, lanceolate. Lower glume 0.5-1 mm long, ovate-acute. Upper glume c. 3 x 1.5 mm, ovate-lanceolate. Lower floret male or barren. Upper floret bisexual. First lemma c. 3 x 1.5 mm, ovate-lanceolate. Palea hyaline. Second lemma 2-3 x 1 mm, oblong-acute, coriaceous. Palea c. 2 x 1 mm, oblong, coriaceous. Stamens 3; anthers yellow. Ovary c. 0.5 mm long; stigma golden-yellow. Grains cylindric, dorsally compressed.

Fl. & Fr.: Oct. - Jan.

Distr.: Old World tropics. Very common along roadsides and waste places. *CNS 1215* (Cherthala), *CNS 2502* (Mararikulam).

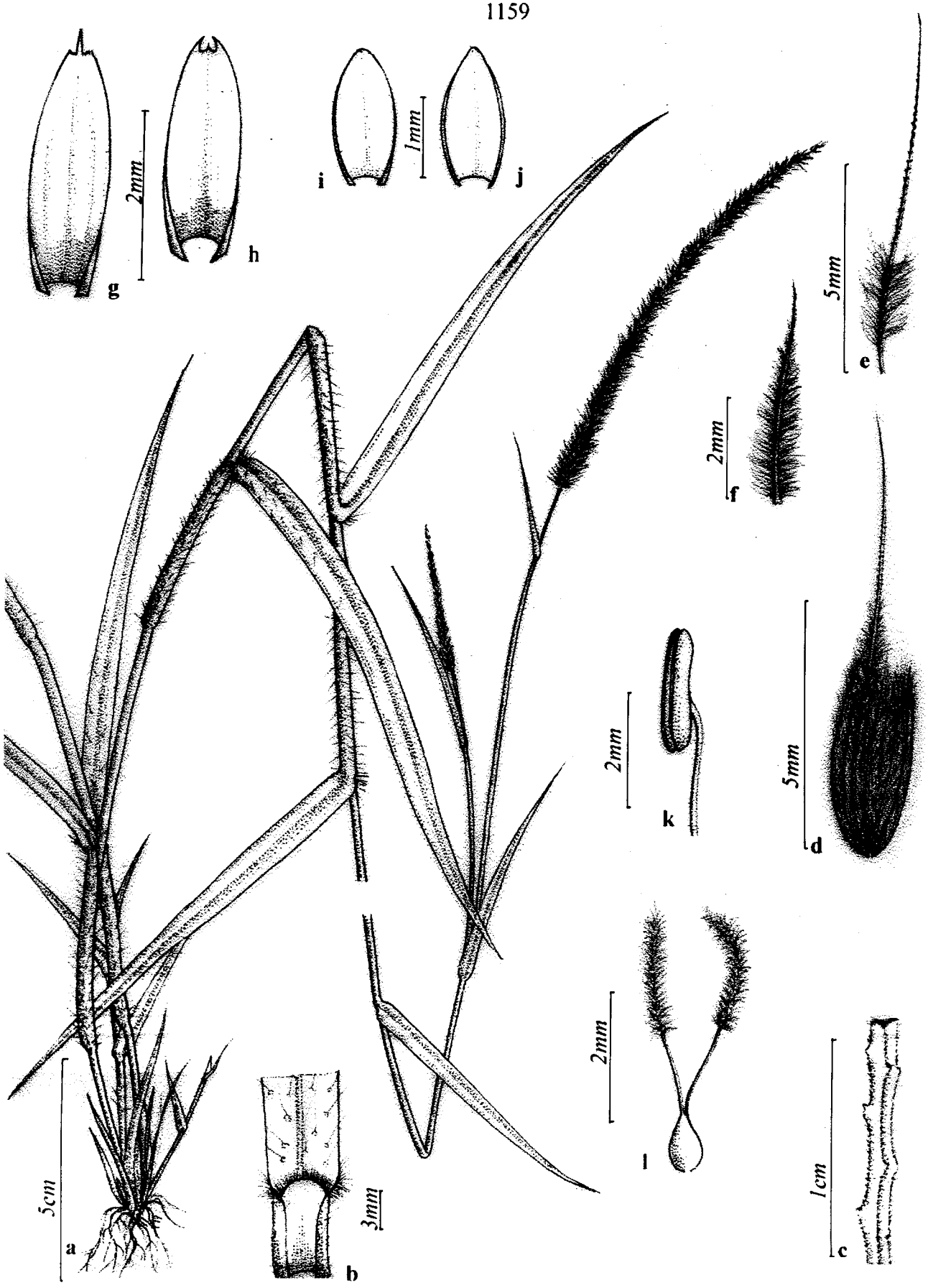


Fig. 79. *Pennisetum polystachyon* (L.) Schult.: a. Habit; b. A portion of leaf with ligule; c. Rhachis; d. Spikelet with involucre; e & f. Involucral bristiles; g. Lower glume; h.Upper glume; i & j. Palea; k. Single stamen; l. Pistil.

Pennisetum purpureum Schum., Beskr. Guin. Pl. 44. 1827; Bor, Grass. Burma, Ceylon, India & Pakistan 348. 1960; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1889. 1983; Ramach. & Nair, Fl. Cannanore 552. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 292. 1991; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 367. 1994.

Perennials. Culms 60-200 cm high, erect; nodes glabrous. Leaves 15-60 x 0.7-2.2 cm, linear or linear-lanceolate, base rounded, apex acuminate, scattered-pilose; sheaths to 25 cm long, slightly keeled; ligules membranous, fimbriate. Panicles 16-27 cm long, spiciform, compact, yellow, villous at base; rhachis densely pubescent. Involucre enclosing 1-4, sessile or pedicelled spikelets. Spikelets 5-6 mm long, lanceolate. Lower glume c. 0.5 mm long, ovate-acute, scaly or absent. Upper glume 1-2 x 0.5-1 mm, lanceolate. Lower floret male or barren. Upper floret bisexual. First lemma 4-5 x 1-2 mm, ovate-lanceolate, acuminate. Palea 3-4 x 1-1.5 mm, lanceolate, 2-keeled. Second lemma 5-6 x 1.5-2 mm, ovate-lanceolate, coriaceous. Palea 4-5x1 mm, lanceolate, subcoriaceous. Stamens 2 or 3; anthers penicillate at tip. Stigmas 2-4 mm long, cream-yellow.

Fl. & Fr.: Throughout the year.

Distr.: A native of tropical Africa but now introduced into many other tropical countries. Occasional along the banks of rivers, backwaters and in wasteplaces. *CNS 1861* (Kayamkulam).

PEROTIS W. Aiton

Hort. Kew. 1: 85. 1789.

Perotis indica (L.) O. Kuntze, Rev. Pl. 2: 287. 1891; Fischer in Gamble, Fl. Pres. Madras 1814. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 611, t. 72. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 748. 1976; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1889. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 312. 1988; Ramach. & Nair, Fl. Cannanore 552. 1988; Vajravelu, Fl. Palghat Dist. 585. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 434. 1991; Mohanan & Henry, Fl.

Thiruvananthapuram 554. 1994; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 370. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 523. 1996. *Anthoxanthum indicum* L., Sp. Pl. 28. 1753. *Perotis latifolia* Aiton, Hort. Kew. 1:85. 1789; Hook. f., Fl. Brit. India 7:98. 1896; Rang. & Tad., Handb. S. Indian Grass. 137, ff. 124 & 125. 1921. ***Tsjeria-kuren-pullu*** Rheede, Hort. Malab. 12: 117, t. 62. 1693.

Annuals. Culms to 40 cm tall, slender, erect or geniculate, tufted. Leaves 1.5-3 x 0.3-0.8 cm, oblong or ovate-lanceolate, base rounded, margins wavy and scabrid, apex acute or acuminate; sheaths to 3.5 cm long; ligules membranous, truncate. Spike 8-17 cm long, purplish. Spikelets linear, awned, spiral on rachis, 1-flowered, purplish. Lower glume to 2.5 mm long, narrowly elliptic, scabrid without, awn to 1.5 cm long. Upper glume c. 2 mm long, linear-lanceolate, awn to 1 cm long. Lemmas c. 1 mm long, linear-lanceolate. Palea c. 0.5 mm long, linear. Stamens 3. Grains c. 2 mm long, linear.

Fl. & Fr.: Most of the seasons.

Distr.: Sri Lanka, India, Nepal, Myanmar, Malaya, S.E. Asia. Very common along the roadsides and in wastelands. *CNS 1383* (Cherthala).

PHRAGMITES Adanson

Fam. 2: 34. 1763.

Phragmites karka (Retz.) Trin. ex Steud., Bot. ed. 2, 2: 324. 1841; Hook. f., Fl. Brit. India 7: 304. 1896; Fischer in Gamble, Fl. Pres. Madras 1807. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 416. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 748. 1976; Mani. & Sivar., Fl. Calicut 345. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1890. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 312. 1988; Vajravelu, Fl. Palghat Dist. 586. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 331. 1991. Mohanan & Henry, Fl. Thiruvananthapuram 554. 1994; Gould in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 373. 1994; Sasi. & Sivar., Fl. Pl. Thrissur For. 523. 1996. *Arundo karka* Retz., Obs. Bot. 4: 21. 1786. ***Nain-canna*** Rheede, Hort. Malab. 12: 139, t. 73. 1693. ***Vezhamkole***.

Perennials. Culms 1-4 m tall, reed-like, erect., rhizome creeping; nodes glabrous. Leaves 15-50 x 0.8-2 cm, linear to narrowly lanceolate, base rounded, margins scabrid, apex long acuminate; sheaths to 10 cm long; ligule a narrow rim or fringe of hairs. Panicles 15-40 cm long, pyramidal, lax, silkly hairy. Spikelets 8-14 mm long, linear-lanceolate, 3-6-flowered. Lower glume 3-4 x 1 mm, ovate-lanceolate. Upper glume 4-6 x 1-1.5 mm, elliptic-lanceolate. Lowest lemma barren, 0.8-1 cm long, narrowly elliptic. Fertile lemmas 8-12 x 0.5-1 mm, linear-lanceolate. Paleas 2-4 x 0.5 - 1mm, oblong-lanceolate, hyaline, 2-keeled. Stamens 3. Ovary linear.

Fl. & Fr.: Throughout the year.

Dist: Paleotropics.

Very common along the streams and rivers, banks of backwaters, in swamps and marshes. *CNS 2638* (R. Block), *CNS 1862* (Punnamada).

POGONATHERUM Palisot de Beauvois

Essai Agrost. 56, 176. 1812.

Slender annual or perennial erect herbs. Culms branching, leafy. Leaves flat, narrow. Racemes terminal, solitary. Spikelets 2-nate, one sessile the other pedicelled, 1-2-flowered. Glumes membranous; lower truncate, rounded; upper usually longer, keeled, 2-fid with a long slender awn from the sinus. Lemmas hyaline; lower usually absent from the pedicelled spikelet; upper 2-fid, with a slender awn from the sinus, palea broad, containing a bisexual floret. Stamens 1-2. Styles 2, free. Grain oblong.

1a. Spikelets 2.5 - 3 mm long; lower floret male; upper floret with 2 stamens; awns 1-1.5 cm long ..... **P. paniceum**

1b. Spikelets up to 2 mm long; lower floret empty; upper floret with 1 stamen; awns 2-3 cm long ..... **P. crinitum**

Pogonatherum crinitum (Thunb.) Kunth, Enum. Pl. 1:478. 1833; Hook. f., Fl. Brit. India 7: 141. 1896; Bor, Grass. Burma, Ceylon, India & Pakistan 200. 1960; Britto & Matthew

in Matthew, Fl. Tam. Carnatic 3: 1891. 1983; Sur, J. Econ. Tax. Bot. 6(3): 665. 1985; Mani., Fl. Silent Valley 360. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 176. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 555. 1994; Clayton in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 376. 1994; Sivar. & Mathew, Fl. Nilambur 812. 1996. *Andropogon crinitus* Thunb., Fl. Jap. 40, t. 7. 1784. *Pogonatherum paniceum* auct., non (Lam.) Hack., 1906: Als. in Trimen, Handb. Fl. Ceylon. 330 1931; Fischer in Gamble, Fl. Pres. Madras 1713. 1934.

Perennials. Culms densely tufted, 12-22 cm high; nodes sparsely villous. Leaves 1-4 x 0.1-0.4 cm, elliptic-lanceolate, base narrowed, apex acute; sheaths villous towards mouth; ligules membranous. Raceme solitary, 1-2.5 cm long, slender. Sessile spikelets 1.5-2 mm long, lanceolate, awned, yellow; lower glume c. 1 mm long, oblong; upper glume 1.5-2 mm long, ovate-lanceolate, awned; awns 15-25 mm long; lower floret empty; upper floret bisexual; first lemma c. 1 mm long, ovate-oblong, epaleate; second lemma c. 1.5 mm long, notched, awned; awn 2-3 cm long; palea c. 1 mm long, ovate-oblong, hyaline, 2-keeled; stamen 1; anthers pale yellow; stigmas cream coloured. Pedicelled spikelets similar.

Fl. & Fr.: Nov. - Jan.

Distr.: Afganistan, India, Pakistan, Japan and the Solomon Isls. Along river banks. CNS 2324 (Cheriyanadu).

Pogonatherum paniceum (Lam.) Hack., Allg. Bot. Z. 12: 178. 1906; Bor, Grass. Burma, Ceylon, India & Pakistan 202. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 749. 1976; Sur, J. Econ. Tax. Bot. 6(3): 666. 1985; Ramach. & Nair, Fl. Cannanore 552. 1988; Mani., Fl. Silent Valley 361. 1988; Vajravelu, Fl. Palghat Dist. 586. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 178. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 555. 1994; Clayton in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 377. 1994. *Saccharum paniceum* Lam., Encycl. Meth. Bot. 1: 595. 1785 & Tab. Encycl. 1: t. 40/3. 1791. *Pogonatherum saccharoideum* P. Beauv., Essai Agrost. 176, 177. 1812; Hook. f., Fl. Brit. India 7: 141. 1896.

Perennials. Culms to 50 cm high, tufted. Leaves 3-7 x 0.1-0.3 cm, lanceolate; sheaths keeled. Raceme solitary, 1.5-3.5 cm long, yellowish. Sessile spikelets 2.5-3 mm long, lanceolate, awned; lower glume c. 2 mm long, oblong, 2-3-lobed and ciliate at apex; upper glume 2-3 mm long, ovate-lanceolate, awned; awn 1-1.5 cm long; lower floret male; upper floret bisexual; first lemma c. 2 mm long, oblong, hyaline, ciliate at apex; palea linear-oblong; stamens 2; second lemma notched, awned; awn 1-1.5 cm long; palea ovate-oblong, fimbriate at apex; stamens 2. Pedicelled spikelets more or less similar to sessile spikelets.

Fl. & Fr.: May - June.

Dist.: India, Myanmar and Sri Lanka. Cultivated in gardens. *CNS 1618* (Champakkulm).

PSEUDANTHISTIRIA (Hack.) Hook. f.
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; Mani. & Sivar., Fl. Calicut 336. 1982; Mani., Fl. Silent Valley 361. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 181. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 555. 1994; Clayton in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 381. 1994; Sivar. & Mathew, Fl. Nilambur 812. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 524. 1996. *Andropogon umbellatus* Hack. in DC., Monogr. Phan. 6: 401. 1889.

Annuals. Culms 45-85 cm long, decumbent to erect, rooting at lower nodes, violet; nodes glabrous. Leaves 2.5-6 x 0.3 - 0.7 cm, elliptic or elliptic-lanceolate, base rounded, apex acuminate; sheaths to 3 cm long; ligules membranous, truncate. Inflorecence of subumbellate fascicle or racemes, subtended by a spathe, to 20 cm long. Sessile spikelets 2 in a raceme, 3-4 mm long, oblong, awned; lower glume 3-4 x 1 mm, elliptic-loblong, subcoriaceous; upper glume 3-4 mm long, elliptic-lanceolate; lower floret absent; upper floret bisexual; second lemma 2-3 mm long, oblanceolate; awn 1.5-2.5 cm

long; stamens 3. Pedicelled spikelets 3 in a raceme, 4-6 mm long, elliptic-lanceolate; lower glume 4-6 mm long, elliptic-lanceolate; lower glume 4-6 mm long, elliptic-lanceolate; upper glume 4-5 mm long, elliptic; upper floret male; stamens 3.

Fl. & Fr.: Nov. - Mar.

Dist.: South India and Sri Lanka. Rare. In waste places, usually in shades. *CNS 1673* (Thiruvizha).

PSEUDORAPHIS W. Griffith

Notul. Pl. Asiat. (Posthum. Pap.) 3:29. 1851.

Pseudoraphis spinescens (R. Br.) Vickery, Proc. Roy. Soc. Queensl. 62(7): 69. 1952; Bor, Grass. Burma, Ceylon, India & Pakistan 353. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 750. 1976; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1892. 1983; Vajravelu, Fl. Palghat Dist. 587. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 296. 1991; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 384. 1994. *Panicum spinescens* R.Br., Prodr. 193. 1810. *Pseudoraphis aspera* (Koen.) Pilger, Notizbl. Bot. Gard. Berlin 10: 210. 1928; Fischer in Gamble, Fl. Pres. Madras 1790. 1934. *Chamaeraphis spinescens* (R. Br.) Poir. in Lam., Encycl. Meth. Bot. Suppl. 2: 189. 1811; Hook. f., Fl. Brit. India 7: 62. 1896; Rang. & Tad., Handb. S. India Grass. 102, t. 104. 1921.

Annuals. Culms 25-80 cm long, decumbent; nodes wooly. Leaves 2-7 x 0.3-0.6 cm, linear-lanceolate or lanceolate, base rounded, apex acuminate, tubercle-based hairy, glaucous; sheaths to 7 cm long, strongly keeled; ligules membranous, truncate. Inflorescence pyramidal, 4-12 cm long; branches produced into bristles. Spikelets 4-7 mm long, narrowly lanceolate. Lower glume 0.5-1 mm long, ovate. Upper glume 4-7 x 1-1.5 mm, lanceolate, acuminate. Lower floret male. Upper floret female or bisexual. First lemma 4-6 x 1 mm, lanceolate. Palea 3-4 x 1 mm, elliptic-lanceolate, hyaline, 2-keeled. Stamens 3; anthers violet. Second lemma 2-3 x 1 mm, oblong, acute. Palea 1-2 x 1 mm,

oblong-lanceolate, hyaline. Ovary oblong; stigma pinkish. Grains linear-oblong, compressed.

Fl. & Fr.: Nov. - Jan.

Distr.: India, Sri Lanka, Myanmar and S.E. Asia generally, extending to China and Borneo and from New Guinea to Australia. In shallow stagnant waters and marshes, usually creeping and rooting on the muddy surface or floating. CNS 1772 (Purakkad).

RHYNCHELYTRUM C.G.D. Nees in Lindley
Nat. Syst. ed. 2, 378, 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. Tam. Carnatic 3: 1893. 1983; Sreekumar & Nair, Fl. Kerala-Grass. 297. 991; Gould in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 388. 1994. *Saccharum repens* Willd., Sp. Pl. ed. 4.1(1): 322. 1798. *Monachyron villosum* Parl. in Hook., Niger Fl. 191. 1841. *Tricholaena wightii* Arn. & Nees, Linnaea 16: 218. 1842; Hook. f., Fl. Brit. India 7: 65. 1896. *Rhynchelytrum villosum* (Parl.) Chiov. in Ann. Ist. Bot. Roma 8: 310. 1908; Fischer in Gamble, Fl. Pres. Madras 1791. 1934 (Plate XXIV: C).

Annuals. Culms 16-65 cm high, tufted; nodes softly villous. Leaves 4-15 x 0.2 - 0.6 cm, linear-lanceolate, apex acuminate; sheaths to 15 cm long; ligule a row of hairs. Panicles 6-14 cm long, pyramidal, reddish-brown. Spikelets 4-7 mm long, ovate, villous; pedicels 2-4 mm long, pilose at the tip. Lower glume 1-1.5 mm long, oblong, emarginate. Upper glume 3-5 x 1.5-2.5 mm, boat-shaped, gibbous, mucronate or aristate, 5-nerved, densely villous. Lower floret male or barren. Upper floret bisexual. First lemma 3-5 x 1.5-2.5 mm, ovate-lanceolate, aristate. Palea 3-5 x 1-1.5 mm, elliptic, hyaline, 2-keeled. Second lemma 2-3 x 1.5-2 mm, ovate-oblong, coriaceous. Palea c. 2 x 1 mm, elliptic, coriaceous. Stamens 3; anthers c. 2 mm long, yellow. Stigmas brownish.

Fl. & Fr.: Dec. - Feb.

Distr.: Throughout Africa, India, Pakistan; introduced in most other tropical countries. In waste sandy soil. *CNS 2220* (Kanichukulangara Jn.).

ROTTBOELLIA Linnaeus f.

Diss. Bot. Gram. Gen. 23. 1780 ("1779") (*nom. cons.*).

Rottboellia cochinchinensis (Lour.) Clayton, Kew Bull. 35(4): 817-818. 1981; Vajravelu, Fl. Palghat Dist. 587. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 183. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 556. 1994; Clayton in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 389. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 524. 1996. *Stegosia cochinchinensis* Lour., Fl. Cochinch. 1:51. 1790. *Rottboellia exaltata* L.f., Suppl. Pl. 114. 1781, non (L.) L.f., 1779; Hook. f., Fl. Brit. India 7: 156. 1896; Rang. & Tad., Handb. S. Ind. Grass. 175, t. 145. 1921; Fischer in Gamble, Fl. Pres. Madras 1759. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 206, t. 13. 1960; Mani. & Sivar., Fl. Calicut 332. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1894. 1983; Sivar. & Mathew, Fl. Nilambur 813. 1996.

Annuals. Culms 45-140 cm high, supported below by stilt roots; nodes glabrous. Leaves 10-45 x 0.4-1.5 cm, oblong-linear or linear-lanceolate, base narrowed, apex acuminate, flat; sheaths densely pubescent, to 11 cm long; ligules ovate, membranous. Spikes 5-12 cm long, cylindric, terminating in a tail, jointed; rachis obliquely fragile, crustaceous. Sessile spikelets 3-4 mm long, ovate, sunken in cavities of joints; lower glume 3-5 x 2-3 mm, ovate, coriaceous; upper glume 3-5 x 2-4 mm, boat-shaped, coriaceous; lower floret male; upper floret bisexual; first lemma 3-5 mm long, elliptic; palea 3-4 x 2 mm, ovate-lanceolate; stamens 3; second lemma 3-4 x 2-3 mm, boat-shaped; palea ovate; ovary oblong. Pedicelled spikelets 3-5 mm long, ovate-lanceolate; glumes green; lemmas hyaline.

Fl. & Fr.: Aug. - Jan.

Distr.: Tropical Asia, Africa, Malesia and Australia. Along moist waysides. *CNS 1294* (Angadikkal).

SACCHARUM Linnaeus

Sp. Pl. 54. 1753.

Perennial, tall reed like grasses; rhizomatous or caespitose; culms erect. Leaves linear, flat; ligule a ciliolate membrane. Inflorescence of terminal plumose panicles; rhachis fragile. Spikelets in pairs, one sessile, the other pedicellate; dorsally compressed, 2-flowered; callus truncate, usually long pilose. Glumes equal, membranous or coriaceous. Lower floret sterile, reduced to a hyaline lemma, the palea absent. Upper floret bisexual. Stamens 3. Styles 2, separate, plumose. Caryopsis terete.

1a. Glumes long pilose on the back; callus-hairs much shorter than the spikelets .... **S. arundinaceum**

1b. Glumes glabrous on the back; callus-hairs at least twice as long as the spikelets.

2a. Leaves 0.6-1.2 cm wide; culms 0.6-1.2 cm in diam., peduncles hairy below the panicles ..... **S. spontaneum**

2b. Leaves 2.5-4.5 cm wide; culms 2-4 cm in diam., peduncle glabrous below the panicles ..... **S. officinarum**

Saccharum arundinaceum Retz., Obs. Bot. 4: 14. 1786; Hook. f., Fl. Brit. India 7: 119. 1896; Fischer in Gamble, Fl. Pres. Madras 1709. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 211. 1960; Davidse in Dassan., Fosb. & Clayton, Rev. Handb.Fl. Ceylon 8: 391 1994. *Erianthus arundinaceum* (Retz.) Jesw., Suikerindustr. Ned.-Ind. 33: 399. 1925. ***Naim-kana***.

Perennials. Culms to 5 m tall, 2-3 cm in diam., nodes glabrous. Leaves 90-170 x 2-3 cm, linear, margins scabrous, apex acuminate; sheaths pubescent; ligule ciliolate. Panicle 30-70 cm long; pedicels shorter than the internode; internodes 4-7 mm long, long-pilose. Spikelets 2.5 - 4 mm long, lanceolate; callus short pilose, the hairs shorter than the spikelet. Lower glume 3-4 mm long, lanceolate, long-pilose on the back. Upper glume 3-4 mm long, lanceolate, 3-nerved, pilose on the back in the pedicelled spikelet. Lower lemma 2-3 mm long, 1-nerved, ciliate. Upper floret with the lemma 2-3 mm long, awned, ciliate. Stigmas purple.

Fl. & Fr.: Dec. - Apr.

Distr.: Sri Lanka and India to Malaysia. Along streams and field boarders. *CNS 1619* (Mavelikara).

Saccharum officinarum L., Sp. Pl. 54. 1753; Hook. f., Fl. Brit. India 7: 118. 1896; Fischer in Gamble, Fl. Pres. Madras 1709. 1934; Bor, Grass. Burma, Ceylon India & Pakistan 212. 1960; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1894. 1983; Sreekumar & Nair, Fl. Kerala-Grass. 185. 1991; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 392. 1994. *Saccharum sinense* Roxb., Pl. Corom. 3: 26, 232. 1819; Bor, Grass. Burma, Ceylon, India & Pakistan 212. 1960. ***Karubu***.

Perennials. Culms 2.5-5 m tall, 2-4 cm in diam., juicy, sweet. Leaves 100-180 x 2.5-4.5 cm, linear, margins scabrous, apex acuminate; sheaths glabrous or pubescent; ligule membranous. Panicle 45-80 cm long; raceme-internodes and pedicels usually glabrous. Spikelets 2.5-4 mm long; callus hairs 5-10 mm long, silky. Lower glume 2.5-3.5 mm long, lanceolate, glabrous. Upper glume 2.5-3.5 mm long, lanceolate. Lower lemma 2.5-3 mm long. Upper floret without lemma. Anthers yellow. Stigma purple.

Fl. & Fr.: Oct. - Dec.

Distr.: Cultivated for sugar production in all tropical and subtropical regions; probably native to New Guinea. *CNS 1717* (Thazhakkara).

Saccharum spontaneum L., Mant. Pl. 2: 183. 1771; Hook. f., Fl. Brit. India 7: 118. 1896; Rang. & Tad., Handb. S. Ind. Grass. 149, t. 129. 1921; Fisher in Gamble, Fl. Pres. Madras 1709. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 214. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 751. 1976; Mani. & Sivar., Fl. Calicut 345. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1895. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 312. 1988; Vajravelu, Fl. Palghat Dist. 588. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 185. 1991; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 393. 1994; Sivar. & Mathew, Fl. Nilambur 813. 1996. *Monachyron villosum*

Parl. in Hook., Niger Fl. 191. 1841. *Tricholaena wightii* Arn. & Nees, Linnaea 16: 218. 1842; Hook. f., Fl. Brit. India 7: 65. 1896. ***Kerpa*** Rheede, Hort. Malab. 12: 85, t. 46. 1693.

Perennials. Culms to 3 m high, erect, rhizomatous, nodes waxy. Leaves 45-110 x 0.6-1.2 cm, linear-lanceolate, base rounded, margins serrulate, apex accuminate, involute, glaucous; sheaths to 40 cm long, silky villous at the collar; ligules 4-5 mm long, ovate, membranous. Panicles 20-32 cm long, densely silky white. Spikelets paired, one sessile and the other pedicelled, similar, 3-4 mm long, lanceolate, reddish-brown; callus densely long villous. Lower glume 3-4 x 1 mm, ovate-lanceolate, subcoriaceous, margins hyaline, ciliate. Upper glume 3-4 x 1 mm, ovate-lanceolate, dorsally keeled, margins ciliate. Lower floret empty. Upper floret bisexual. First lemma c. 2 x 1 mm, ovate-acute, hyaline. Second lemma 2-2.5 mm long, linear-lanceolate, hyaline. Stamens 3; anthers yellow or reddish. Ovary oblong; stigma white. Pedicelled spikelets similar to sessile ones.

Fl. & Fr.: Most of the seasons.

Distr.: India and Pakistan; widely distributed. Common along the banks of rivers, canals, ponds and backwaters. *CNS 1382* (Cherthala), *CNS 2503* (Kayamkulam).

SACCIOLEPIS Nash

in N.L. Britton, Manual 89. 1901.

Annuals or perennials. Leaves linear, flat, flaccid. Inflorescence a contracted spike like cylindric panicle, continuous or interrupted, rarely effuse. Spikelets usually in a cluster, ovoid, turgid, 2-flowered. Glumes very unequal; lower glume minute or upto half as long as the spikelet; upper glume strongly nerved, saccate at base. Lower floret male or sterile, upper bisexual. Lower lemma equal to upper glume; palea 2-keeled. Upper lemma shorter, convex, crustaceous when mature; palea similar. Stamens 3. Grains ovoid.

1a. Panicles effuse; pedicels capillary; lower glume less than 1 mm long .... **S. curvata**

1b. Panicles contracted, spiciform; pedicels not capillary; lower glume more than 1.5 mm long.

2a. Culms spongy and floating below; panicles interrupted; spikelets 3-5 mm long ..... **S. interrupta**

2b. Culms not spongy and floating; panicles not interrupted; spikelets 1-3 mm long ..... **S. indica**

Sacciolepis curvata (L.) Chase, Proc. Biol. Soc. Washington 21: 8. 1908; Fischer in Gamble, Fl. Pres. Madras 1787. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 357. 1960; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1896. 1983; Gould in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 395. 1994. *Panicum curvatum* L., Syst. Nat. ed. 12, 2: 732. 1767. Hook. f., Fl. Brit. India 7: 42. 1896.

Annuals. Culms to 60 cm long, creeping, rooting at the lower nodes;nodes glabrous. Leaves 4-8 x 0.5-0.8 cm, lanceolate or linear-lanceolate, base shallowly cordate, apex acuminate, flat; sheaths 2-4 cm long, ciliate along one margin; ligules membranous, truncate. Panicles 5-10 cm long, effuse. Spikelets 2-3 mm long, ovate-lanceolate, gibbous, turgid; pedicel 2-4 mm long, capillary, flexuous. Lower glume c. 0.5 x 0.5 mm, ovate, obtuse. Upper glume 2.5-3 x 1-1.5 mm, lanceolate, acute or obtuse. Lower floret barren. Upper floret bisexual. First lemma 2.5-3 x 1 mm, lanceolate, 5-7-nerved. Palea 1.5-2 mm long, linear, 2-keeled, hyaline. Second lemma 1-1.5 mm long, ovate, coriaceous, hyaline. Palea c. 1 mm long. Stamens 3; anthers c. 1 mm long. Ovary c. 0. 25 mm long, ellipsoid; stigma purple.

Fl. & Fr.: Aug. - Jan.

Distr.: Peninsular India, Sri Lanka, E. and S. Africa. In sacred groves; usually in shady habitats. *CNS 2639* (Vandanam).

Sacciolepis indica (L.) A. Chase, Proc. Biol. Soc. Washington 21: 8. 1908; Fischer in Gamble, Fl. Pres. Madras 1787. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 357. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 751. 1976. Mani. & Sivar., Fl. Calicut 341. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1896. 1983; Ramach. & Nair, Fl. Cannanore 553. 1988; Mani., Fl. Silent Valley 362. 1988; Vajravelu,

Fl. Palghat Dist. 588. 1990; Sreekumar & Nair, Fl. Kerala - Grass. 298. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 557. 1994; Gould in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 396. 1994; Sivar. & Mathew, Fl. Nilambur 848. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 525. 1996. *Aira indica* L., Sp. Pl. 63. 1753 & in 'errata' 63, n. 1. *Panicum indicum* L., Mant. Pl. 2: 184. 1771, non Mill., 1768; Hook. f., Fl. Brit. India 7:41. 1896. ***Bocha-pul***.

Annuals. Culms 10-50 cm high, tufted, erect or ascending. Leaves 4-10 x 0.2 - 0.5 cm, linear-lanceolate, base narrow or rounded, apex acuminate, flat; sheaths to 6 cm long; ligules membranous, rounded. Panicles 1-6 cm long, spiciform. Spikelets 2-3 mm long, ovate-acute, slightly gibbous. Lower glume 1-1.5 x 1 mm, ovate-acute, clasping at base. Upper glume 2-3 x 0.5 - 1 mm, ovate-oblong. Lower floret male or barren. Upper floret bisexual. First lemma 2-3 x 0.5 - 1mm, ovate-lanceolate. Palea minute or absent. Second lemma c. 1 mm long, oblong-acute, coriaceous. Palea similar. Stamens 3; anthers deep violet. Stigmas violet.

Fl. & Fr.: Jul. - Dec.

Distr.: Indo-Malesia.

Roots aromatic. Very common in waste places, roadsides, as a weed in tapioca plots and rubber plantations; usually in moist, shady habitats. *CNS 1333* (Angadikkal), *CNS 1207* (Pattanakkad).

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; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 751. 1976; Mani. & Sivar., Fl. Calicut 341. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1897. 1983; Vajravelu, Fl. Palghat Dist. 589. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 299. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 557. 1994; Gould in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 397. 1994; Sivar. & Mathew, Fl. Nilambur 849. 1996.

Panicum interruptum Willd., Sp. Pl. 1: 341. 1798; Hook. f., Fl. Brit. India 7: 40. 1896; Rang. & Tad., Handb. S. Ind. Grass. 95, t. 99-100. 1921.

Annuals. Culms 25-90 cm long, erect, creeping or geniculate, spongy and floating, rooting at the nodes below; nodes glabrous. Leaves 5-30 x 0.3-1.2 cm, lanceolate or linear, base rounded, apex acute or acuminate; sheaths to 16 cm long; ligules ovate, membranous. Panicles 4-25 cm long, spiciform, interrupted. Spikelets 3-5 mm long, ovate-lanceolate. Lower glume 1-1.5 x 1 mm, ovate-oblong. Upper glume 3-5 x 1-2 mm, ovate-lanceolate. Lower floret male or barren. Upper floret bisexual. First lemma similar to the upper glume. Palea 2-3 mm olong, oblong, hyaline. Second lemma 2-3 x 1-1.5 mm, ovate-oblong, subcoriaceous. Palea 2-3 mm long, elliptic, 2-keeled, hyaline. Stamens 3; anthers violet. Stigmas pink. Grains c. 2 mm long, ovoid.

Fl. & Fr.: Throughout the year.

Distr.: Tropics of S.E. Asia. Very common in stagnant waters, wet lands and in marshy fields and as a weed in paddy fields. *CNS 1016* (Vandanam), *CNS 2131* (Kainakkari).

SETARIA Palisot de Beauvois

Essai Agrost. 51, 178. 1812(*nom. cons.*).

Annuals or perennials. Culms often tufted. Leaves flat or folded, rarely plicate; sheaths compact or loose; ligules ciliate to fimbriate membrane. Panicles open or spike-like. Spikelets oblong or ovoid, plano-convex, subtended by one to many bristles, 2-flowered, shortly pedicelled, pedicels articulated. Glumes unequal, lower smaller; upper as long as the spikelet. Lower floret sterile or male. Upper floret bisexual. First lemma thin, as long as the spikelet, paleate. Second lemma crustaceous, convex on the back, transversely rugose, margin involute; palea similar in size. Stamens 3. Styles 2; stigma plumose. Grains oblong or ellipsoid.

1a. Leaves plicately folded; panicles lax, widely spreading, greenish .... **S. barbata**

1b. Leaves flat, not plicately folded; panicles contracted, spiciform or cylindric, yellowish ..... **S. pumila**

Setaria barbata (Lam.) Kunth, Rev. Gram. 1: 47. 1829; Bor, Grass. Burma, Ceylon, India & Pakistan 360. 1960; Nair *et al.*, J. Econ. Tax. Bot. 3: 271. 1982; Sreekumar & Nair, Fl. Kerala-Grass. 303. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 558. 1994; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 403. 1994. *Panicum barbatum* Lam., Tab. Encycl. Meth. Bot. 1: 171. 1791. *Panicum flavescens* auct., non Sw., 1788: Hook. f., Fl. Brit. India 7: 56. 1896.

Annuals. Culms 20-75 cm long, decumbent, rooting at the lower nodes; nodes sparsely bearded. Leaves 4-15 x 0.5-2 cm, elliptic-lanceolate or lanceolate, base narrow or rounded, apex acuminate, plicate towards base, softly hispid; sheaths to 9 cm long, keeled, villous towards mouth; ligule a row of hairs. Panicles 4-12 cm long, lax; bristles 3-8 mm long, scabrid. Spikelets 2-3 mm long, elliptic. Lower glume c. 1 x 1 mm, ovate. Upper glume 1-2 x 1 mm, ovate-oblong, obtuse. Lower floret male. Upper floret bisexual. First lemma 2-3 x 1-1.5 mm, elliptic. Palea c. 2 x 1 mm, elliptic, hyaline, 2-keeled. Stamens 3. Second lemma 1.5-2.5 x 1-1.5 mm, elliptic or elliptic-lanceolate, acute, crustaceous, rugose. Palea 1-2 x 1-1.5 mm, elliptic, crustaceous, rugose, 2-keeled. stamens 3. Ovary oblong; stigmas purple.

Fl. & Fr.: Sep. - Jan.

Distr.: Tropical Asia and Africa; introduced in to the Americas. Occasional along road sides and wastelands. *CNS 1828* (Kayuamkulam R.S.).

Setaria pumila (Poir.) Roem. & Schult., Syst. Veg. 2: 891. 1817; Britto & Matthew in Matthew, Fl. Tam. Carnatics 3: 1901. 1983; Ramach. & Nair, Fl. Cannanore 554. 1988; Mani., Fl. Silent Valley 363. 1988; Vajravelu, Fl. Palghat Dist. 590. 1990; Sreekumar & Nair, Fl. Kerala - Grass. 309. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 559. 1994; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 411. 1994; Sivar. & Mathew, Fl. Nilambur 851. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For 526. 19996.

Panicum pumilum Poir., Encycl. Meth. Bot. Suppl. 4: 273. 1816. *Setaria pallide-fusca* (Schum.) Stapf & C.E. Hubb., Kew Bull. 1930: 259. 1930; Fischer in Gamble, Fl. Pres. Madras 1789. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 363. 1960. Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 753. 1976; Mani. & Sivar., Fl. Calicut 340. 1982. *Setaria glauca* sensu Hook. f., Fl. Brit. India 7: 78. 1896. p.p., non (L.) Beauv., 1812.

Annuals. Culms 30-105 cm high, erect; nodes glabrous. Leaves 5-23 x 0.4-1 cm, linear or lanceolate, base rounded, apex acuminate, sparsely hairy; sheaths to 8 cm long, keeled; ligules membranous, ovate. Panicles 4-10 cm long, spiciform, cylindric, yellowish; bristles 3-7 mm long, scabrid. Spikelets 2-2.5 mm long, ovate or subglobose. Lower glume 1-1.5 mm long, ovate-acute. Upper glume 1-2 mm long, ovate or orbicular. Lower floret male or barren. Upper floret bisexual. First lemma 2-2.5 x 1-2 mm, ovate-elliptic. Palea 1.5-2 x 1-1.5 mm, elliptic, hyaline, 2-keeled. Stamens 3. Second lemma 2-2.5 mm long, ovate, beaked, rugose. Palea 1.5-2 x 1 mm, ovate-oblong, crustaceous, rugose, 2-keeled. Stamens 3. Ovary oblong. Grains c. 1.5 mm long, ellipsoid.

Fl. & Fr.: Aug. - Jan.

Distr.: India, Pakistan; tropical and warm temperate regions of the Old World. Along roadsides and wastelands. *CNS 1628* (Ambalapuzha).

SPINIFEX Linnaeus

Mant. 163, 300. 1771.

Spinifex littoreus (Burm. f.) Merr., Philipp. J. Sci. Bot. 7: 229. 1912; Fischer in Gamble, Fl. Pres. Madras 1706. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 366. 1960; Mani. & Sivar., Fl. Calicut 336. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1903. 1983; Nicols., Suresh & Mani., An Interpr. Hort. Malab. 313. 1988; Sreekumar & Nair, Fl. Kerala -Grass. 311. 1991; Gould in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 418. 1994. *Stipa littorea* Burm. f., Fl. Ind. 29. 1768. *Spinifex squarrosus* L., Mant. Pl. 2: 300. 1771; Hook. f., Fl. Brit. India 7: 63. 1896; Rang. & Tad., Handb. S. Ind.

Grass. 104. t. 105-106. 1921. ***Ily-mullu*** Rheede, Hort. Malab. 12: 143, t. 75. 1693. ***Ravana-meesa***

Perennials. Culms 25-50 cm high, stoloniferous, woody, trailing and rooting at the nodes, glaucous; nodes glabrous. Leaves 4-14 x 0.3 - 0.6 cm, acicular, sharply acute, convolute, rigid, glaucous; sheaths to 4 cm long; ligule a row of hairs. Inflorescence globose, dioecious. Male inflorescence capitate consisting of several spikes, 5-15 cm long. Spikelets 8-12 mm long, lanceolate. Glumes ovate-lanceolate, coriaceous; lower glume 5-6 x 2-3 mm; upper glume 6-8 x 2-3 mm. First lemma 8-10 x 2-3 mm, oblong-lanceolate. Palea 8-10 x 1-2 mm, lanceolate, 2-keeled. Second lemma to 1 x 0.3 cm, elliptic-lanceolate, acuminate. Palea 8-10 x 1-2 mm, elliptic-lanceolate, hyaline, 2-keeled. Stamens 3. Female inflorescence 15-23 cm wide, capitate, globose, stiff-bristly; bristle to 11 cm long. Spikelets to 1 cm long, oblong.

Fl. & Fr.: Sept. - Mar.

Distr.: Sandy coasts of India, Sri Lanka and Myanmar. Common along the sea-shore; gregarious. *CNS 2504* (Ambalapuzha).

SPOROBOLUS R. Brown

Prodr. 169. 1810.

Annuals or perennials. Culms erect or creeping; nodes glabrous. Leaves narrow, flat or inrolled; ligules a fimbriate rim. Panicles effuse or spiciform. Spikelets small, ellipsoid, all alike, 1-flowered; rachilla disarticulating below the floret. Glumes membranous, unequal; lower glume smaller, nerveless; upper glume 1-nerved, with a fold between. Anthers 2 or 3. Grains oblong or ovoid, rounded or truncate, not beaked, pericarp thin, swelling when wet ejecting seed.

1a. Culms stoloniferous, creeping and spreading; basal leaves pungent; lower glume more or less equal to lemma; stamens 3 ..... **S. virginicus**

1b. Culms not stoloniferous, erect; basal leaves not as above; lower glume much shorter than lemma; stamens 2.

2a. Culms 8-25 cm high; panicles spiciform, contracted upto 8 cm long .... **S. piliferus**

2b. Culms much taller, upto 90 cm high; panicles effuse with spreading branches; upto 40 cm long ..... **S. indicus** var. **diander**

Sporobolus indicus (L.) R. Br., Prodr. 170. 1810, var. **diander** (Retz.) Jovet & Guedes, Taxon 22: 163. 1973; Sreekumar & Nair, Fl. Kerala-Grass. 437. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 560. 1994. *Agrostis diandra* Retz., Obs. Bot. 5: 19. 1789. *Sporobolus diander*(Retz.) P. Beauv., Essai Agrost 26: 147. 178. 1812; Hook. f., Fl. Brit. India 7: 247. 1896; Fischer in Gamble, Fl. Pres. Madras 1817. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 629. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 754. 1976; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1905. 1983; Mani., Fl. Silent Valley 364.1988; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 422. 1994; Sivar. & Matthew, Fl. Nilambur 852. 1996.

Perennials. Culms 30-75 cm high, erect tufted; nodes glabrous. Leaves 6-34 x 0.2-0.6 cm, linear-lanceolate or oblong, apex acuminate, flat or convolute, glaucous; sheaths to 9 cm long; ligules membranous, fimbriate. Panicles 10-33 cm long, pyramidal, effuse. Spikelets 1-2 mm long, ellipsoid, greyish, 1-flowered. Lower glume c. 0.5 mm long, oblong. Upper glume c. 1 mm long, ovate. Lemma 1.5-2 mm long, elliptic-lanceolate. Palea c. 1.5 mm long, elliptic, stamens 2. Grains to 1 mm long, oblong.

Fl. & Fr.: May - Oct.

Distr.: India, Pakistan to Myanmar, Sri Lanka and Australia. Very common in wastelands, roadsides and banks of backwaters. *CNS 1337* (Noottavanpara at Chengannur).

Sporobolus piliferus (Trin.) Kunth, Enum. Pl. 1: 211. 1833; Hook. f., Fl. Brit. India 7: 251. 1896; Fischer in Gamble, Fl. Pres. Madras 1817. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 632. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 754. 1976; Mani. & Sivar., Fl. Calicut 350. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1906. 1983; Mani., Fl. Silent Valley 265. 1988; Vajravelu, Fl. Palghat Dist. 591. 1990;

Sreekumar & Nair, Fl. Kerala-Grass. 438. 1991; Sasi. & Sivar., Fl. Pl. Thrissur For. 527. 1996. *Vilfa pilifera* Trin., Diss. Bot. 157. 1824.

Annuals. Culms 9-20 cm high, erect, tufted; nodes glabrous. Leaves 2-6.5 x 0.3-0.4 cm, linear or oblong, apex acuminate; flat, puberulous within; ligule a ring of hairs. Panicles 3-6 cm long, spiciform, interrupted; primary branches almost appressed to rachis, sticky-glandular. Spikelets 1-2 mm long, elliptic-lanceolate, yellowish. Lower glume c. 1 mm long, lanceolate. Upper glume 2-2.5 x 1 mm, oblong-lanceolate. Lemma 2-2.5 x 1 mm, ovate-lanceolate. Palea 1-2 x 1 mm, oblong, delicate. Stamens 2. Grains c. 1 mm long, ovate.

Fl. & Fr.: Sep. - Dec.

Distr.: E. Africa, India and Sri Lanka. On racks, in the thin layer of soil. *CNS 1812* (Noottavanpara).

Sporobolus virginicus (L.) Kunth, Rev. Gram. 1: 67. 1829; Hook. f., Fl. Brit. India 7: 249. 1896; Fischer in Gamble, Fl. Pres. Madras 1818. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 634. 1960; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1907. 1983; Sreekumar & Nair, Fl. Kerala-Grass. 441. 1991; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 427. 1994. *Agrostis virginica* L., Sp. Pl. 63. 1753.

Perennials. Culms stoloniferous, creeping and spreading by long, slender rhizomes, 15-60 cm long; nodes glabrous. Leaves 4-18 x 0.3-0.6 cm, lanceolate, base rounded, apex acuminate, inrolled; sheaths to 5 cm long; ligule a row of hairs. Panicles 5-12.5 cm long, narrow, somewhat appressed to rachis. Spikelets c. 2 mm long, lanceolate. Lower glume 1-2 mm long, lanceolate. Upper glume c. 2 mm long, ovate-lanceolate. Lemma c. 2 mm long, lanceolate. Palea 1-2 mm long, elliptic, delicate. Stamens 3; anthers brownish. Stigmas white.

Fl. & Fr.: Jul. - Oct.

Distr.: Tropics and subtropics throughout the world. Along coasts, in wet saline soil. *CNS 1820* (Mangadichira at Kayamkulam).

STENOTAPHRUM Trin.

Fund. Agrost. 175. 1822 ("1820").

Stenotaphrum dimidiatum (L.) Brongn. in Duperr., Bot. Voy. Coquille 127. 1831; Fischer in Gamble, Fl. Pres. Madras 1773. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 366, t. 41. 1960; Sreekumar & Nair, Fl. Kerala-Grass. 314. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 560. 1994; Gould in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 430. 1994. *Panicum dimidiatum* L., Sp. Pl. 57. 1753. *Stenotaphrum glabrum* Trin., Fund. Agrost. 176. 1820; Hook. f., Fl. Brit. India 7: 90. 1896.

Perennials. Culms 15-65 cm long, stoloniferous, creeping and rooting at the nodes, forming mats; nodes glabrous. Leaves 2.5 - 14 x 0.4 - 0.8 cm, oblong or linear-oblong, base rounded, apex obtuse, flat or folded; sheaths to 7 cm long, compressed, strongly keeled; ligule a fringe of hairs. Racemes solitary, 4-9 cm long, spiciform; rachis flat, zig-zag, hiding the spikelets. Spikelets 3-6 together, 4-5 mm long, elliptic or elliptic-lanceolate. Lower glume 1-1.5 mm long, ovate, ciliate at apex. Upper glume 3-4 x 2-3 mm, ovate-elliptic. Lower floret male or barren. Upper floret bisexual. First lemma 3-4 x 1-1.5 mm, elliptic-lanceolate, crustaceous. Palea 3-4 x 1-2 mm, elliptic-lanceolate, hyaline, 2-keeled. Second lemma 3-4 x 1-2 mm, elliptic. Palea c. 3 x 1.5 mm, elliptic-lanceolate. Stamens 3. Ovary oblong.

Fl. & Fr.: Jun. - Mar.

Distr.: Plains of India and East Africa. Common along the bunds of paddy fields, banks of streams, backwaters and canals. *CNS 1863* (Punnamada), *CNS 2221* (Alappuzha).

THEMEDA Forsskal

Fl. Aegypt.-Arab. 178. 1775.

Themeda triandra Forssk., Fl. Aegypt.-Arab. 178. 1775; Fischer in Gamble, Fl. Pres. Madras 1746. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 254, t. 27. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 756. 1976; Mani. & Sivar., Fl. Calicut 336. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1908. 1983; Ramach. & Nair, Fl. Cannanore 555. 1988; Mani., Fl. Silent Valley 366. 1988; Vajravelu, Fl. Palghat Dist. 591. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 202. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 561. 1994; Clayton in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 435. 1994; Sivar. & Mathew, Fl. Nilambur 815. 1996; Sasi. & Sivar., Fl. Pl. Thrissur For. 527. 1996. *Anthistiria imberbis* Retz., Obs. Bot. 3: 11. 1783; Hook. f., Fl. Brit. India 7: 211. 1896.

Perennials. Culms 50-170 cm high, erect, tufted; nodes glabrous. Leaves 10-25 x 0.4-0.8 cm, lanceolate, base rounded, apex acute, glabrescent; sheaths to 8 cm long, keeled; ligules membranous, fimbriate. Panicles 20-45 cm long; racemes to 6 x 3 cm; spatheoles 3-8 cm long, tuberculate-pilose. Involucral spikelets 2 pairs, 7-11 mm long, elliptic-lanceolate; lower glume 7-10 mm long, elliptic, 2-keeled; upper glume 7-10 x 1-2 mm, lanceolate; lower floret empty; upper floret male; first lemma 7-10 x 1-2 mm, elliptic-lanceolate; second lemma c. 1 mm long, ovate-acute; stamens 3. Sessile spikelets solitary in a raceme, 7-10 mm long, oblong; glumes oblong-lanceolate, lower 6-10 x 1-2 mm, upper 6-8 mm long; lower floret empty; upper floret bisexual; lemmas 3-5 mm long, elliptic, awns 2-5 cm long; stamens 3. Pedicelled spikelets 2 in a raceme, 6-10 mm long, lanceolate; glumes and spikelets more or less similar to those of the involucral spikelets.

Fl. & Fr.: Sep. - Mar.

Distr.: All warm and tropical regions of the Old World. Rare. Along hill-slopes. *CNS 1300* (Pandavanpara at Chengannur).

UROCHLOA Palisot de Beauvois

Essai Agrost. 52. 1812.

Urochloa panicoides P. Beauv., Essai. Agrost. 53, t. 11, f. 1. 1812; Fischer in Gamble, Fl. Pres. Madras 1775. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 372. 1960; Ramamoorthy in Sald. & Nicols., Fl. Hassan Dist. 757. 1976; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1912. 1983; Vajravelu, Fl. Palghat Dist. 592. 1990; Sreekumar & Nair, Fl. Kerala-Grass. 316. 1991; Gould in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 447. 1994; Sivar. & Mathew, Fl. Nilambur 851. 1996; *Panicum javanicum* Poir., Encycl. Meth. Bot. Suppl. 4: 274. 1816; Hook. f., Fl. Brit. India 7: 35. 1896; Rang. & Tad., Handb. S. Ind. Grass. 86, t. 93-94. 1921.

Annuals. Culms tufted 15-35 cm long, creeping and decumbent, rooting at the lower nodes; nodes bearded. Leaves 2.5 - 6.5 x 0.6-1.4 cm, ovate-lanceolate, base rounded or cordate, margins undulate on one side, apex acuminate; sheaths to 3.5 cm long, tuberculate-pilose; ligules row of hairs. Racemes 3-5, each 1.5-3.5 cm long; rhachis flat. Spikelets biseriate, 3-4 x 2-2.5 mm, elliptic, densely pubescent. Lower glume c. 1.5 x 1.5, ovate. Upper glume 3-4 x 2-2.5 mm, broadly ovate, acute. Lower floret male. Upper floret bisexual. First lemma 3-4 x 2-2.5 mm, broadly ovate, acute. Palea c. 3x2 mm, ovate-elliptic, hyaline, 2-keeled. Stamens 3. Second lemma 2-3 x 1.5-2 mm, elliptic, crustaceous, transversely rugose, mucronate. Palea c. 2 x 1.5 mm, ovate, crustaceous, rugose, 2-keeled. Stamens 3. Stigmas c. 1mm long, purple.

Fl. & Fr.: Nov. - Dec.

Distr.: Sudan to Yemen and southwards to S. Africa, India and Pakistan; introduced in Australia. In disturbed areas. *CNS 2025* (Chengannur).

VETIVERIA Bory de St.-Vincent

in Lemaire, Bull. Soc. Philom. Paris 1822: 43. 1822.

Vetiveria zizanioides (L.) Nash in Small, Fl. S.E.U.S. 67. 1903; Fischer in Gamble, Fl. Pres. Madras 1733. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 258. 1960; Mani.

& Sivar., Fl. Calicut 343. 1982; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1913. 1983; Sreekumar & Nair, Fl. Kerala-Grass. 203. 1991; Davidse in Dassan., Fosb. & Clayton, Rev. Handb. Fl. Ceylon 8: 448. 1994; Sivar. & Mathew, Fl. Nilambur 815. 1996. *Phalaris zizanioides* L., Mant. Pl. 2: 183. 1771. *Andropogon muricatus* Retz., Obs. Bot. 3: 43. 1783. *Andropogon squarrosus* auct., non L. f, 1781: Hook. f., Fl. Brit. India 7: 186. 1896.

Perennials. Culms to 180 cm high, erect, tufted; nodes glabrous. Leaves 30-60 x 0.4 - 1 cm, linear or linear-lanceolate, convolute, glaucous; sheaths to 30 cm long, keeled; ligules membranous. Panicles 15-37 cm long; pyramidal, contracted; racemes to 14 cm long, whorled. Spikelets in pairs, dissimilar. Sessile spikelets 3-5 mm long, lanceolate; lower glume 3-4 mm long, lanceolate, coriaceous, spinulose; upper glume 3-5 mm long, lanceolate; coriaceous; lower floret empty; upper floret bisexual; first lemma 3-4 x 1-2 mm, elliptic, second lemma 2-3 mm long, oblong; palea c. 2 mm long, oblong, hyaline; stamens 3; ovary elliptic. Pedicelled spikelets 3-4 mm long, lanceolate; glumes 3-4 mm long, lanceolate, coriaceous; lower floret empty; upper floret male; first lemma c. 3 mm long, elliptic; second lemma c. 2 mm long, lanceolate; Palea c. 1 mm long, oblong; stamens 3.

Fl. & Fr.: Jul. - Dec.

Distr.: India, Pakistan, Nepal, Myanmar, Sri Lanka and S.E. Asia.

Along the banks of streams and ponds. Roots aromatic. *CNS 1610* (Thiruvizha).

ZOYSIA Willdenow

Ges. Naturf. Fr. Berlin Neue Schriften 3: 440. 1801.

Zoysia matrella (L.) Merr., Philipp., J. Sci. Bot. 7: 230. 1912; Fischer in Gamble, Fl. Pres. Madras 1815. 1934; Bor, Grass. Burma, Ceylon, India & Pakistan 684. 1960; Britto & Matthew in Matthew, Fl. Tam. Carnatic 3: 1914. 1983; Ramach. & Nair, Fl. Cannanore 556. 1988; Sreekumar & Nair, Fl. Kerala-Grass. 445. 1991; Mohanan & Henry, Fl. Thiruvananthapuram 563. 1994; Lazarides in Dassan., Fosb. & Clayton, Rev. Handb. Fl.

Ceylon 8: 456. 1994. *Agrostis matrella* L., Mant. Pl. 2: 185. 1771. *Zoysia pungens* Willd. in Gest., Naturf. Freunde Berlin Neue Schr. 3: 441. 1801; Hook. f., Fl. Brit. India 7: 99. 1896.

Perennials. Culms 8-25 cm high, erect or geniculate, tufted, stoloniferous, forming mats; nodes glabrous. Leaves 2-7 x 0.2-0.3 cm, acicular, linear or lanceolate, rigid, convolute; sheaths to 2.5 cm long; ligules, membranous, fimbriate. Racemes 2-4 cm long, spiciform, solitary, often purplish. Spikelets 2-3 mm long, oblong-lanceolate, 1-flowered. Lower glume absent. Upper glume 2-3 mm long, oblong or ovate-lanceolate. Lemma 2-2.5 x 1 mm, ovate-lanceolate. Palea c. 2 mm long, oblong-lanceolate, 2-keeled. Stamens 3; anthers yellow. Stigmas cream coloured. Grains to 1.5 mm long, oblong-ovoid.

Fl. & Fr.: Mar. - Sep.

Distr.: Coasts along Indian Ocean, Chinese sea to Ryukya Isls., Malesia. Coastal, in wet saline soil. *CNS 2222* (Kumbolichira at Kayamkulam).

APPENDIX - I

LIST OF COMMON ORNAMENTAL PLANTS IN THE STUDY AREA

Acalypha hispida
Acalypha wilkesiana
Aglaonema pseudo-bracteatum
Allamanda cathartica
Alocasia macorrhiza
Alocasia plumbea
Alocasia sanderiana
Alove vera
Alpinia zerumbet
Alternanthera bettzickiana
Amaranthus tricolor
Angelonia salicariaefolia
Anthurium clarinervium
Antigonon leptopus
Arachnis flos-aeris
Aristolochia grandiflora
Artabotrys hexapetalus
Asclepias curassavica
Bambusa vulgaris
Barleria cristata
Barleria prionitis
Bauhinia acuminata
Bauhinia purpurea
Bauhinia tomentosa
Beloperone guttata
Bigonia epipsila
Bixa orellana
Bougainvillea glabra
Caesalpinia coriaria
Caesalpinia pulcherrima
Caesalpinia pulcherrima
Caladium bicolor
Calathea zebrina
Calliandra haematocephala
Callistemon citrinus
Cananga odorata
Canna indica
Cassia fistula
Cassia fistula
Cassia roxburghii
Catharanthus roseus
Celosia cristata
Cereus hexagonus
Cestrum nocturnum
Chirita lavandulcacea
Chrysothemis pulchella
Clerodendrum fragrans
Clerodendrum inerme
Clerodendrum paniculatum
Clerodendrum thomsonae

Clitorea ternatea
Codiaeum variegatum
Coleus blumei
Cordia sebestena
Cordyline terminalis
Costus malortieanus
Crossandra infundibuliformis
Cryptostegia grandiflora
Cyperus alternifolius
Cyrtostachys renda
Delonix regia
Dianthus caryophyllus
Dieffenbachia amoena
Dracaena godseffiana
Dracaena sanderiana
Duranta erecta
Epiphyllum oxypetalum
Epipremnum pinnatum
Episcia cupreata
Eugenia uniflora
Euphorbia milii
Euphorbia pulcherrima
Euphorbia tirucallii
Excoecaria bicolor
Ficus elastica
Ficus pumila
Gardenia jasminoides
Gomphrena globosa
Gynura procumbens
Haemanthus multiflorus
Hamelia patens
Hedychium coronarium
Helianthus annuus
Heliconia psittacorum
Heliconia rostrata
Hemigraphis colorata
Hibiscus mutabilis
Hibiscus rosa-sinensis
Hippeastrum reticulatum
Ipomoea quamoclit
Ipomoea tricolor
Iresine herbstii
Ixora coccinea
Ixora finlaysoniana
Jacaranda mimosaefolia
Jasminum angustifolium
Jasminum multiflorum
Jasminum sambac
Jatropha multifida
Jatropha podagrica
Kalanchoe pinnata
Kopsia fruticosa
Lagerstroemia speciosa
Licuala peltata
Malvaviscus penduliflorus
Melampodium paludosm
Michelia champaca
Mirabilis jalapa

Monstera deliciosa
Mussaenda philippica
Nelumbo nucifera
Nerium oleander
Nymphaea nouchali
Nymphaea pubescens
Ochna wightiana
Pachystachys lutea
Pandanus sanderi
Pellionia daveauana
Pellionia pulchra
Pentapetes phoenicea
Pereskia grandifolia
Petrea volubilis
Pilea cadieri
Pleomele reflexa
Pleomele variegata
Plumeria rubra
Polyalthia longifolia var. *pendula*
Polyscia balfouriana
Portulaca grandiflora
Pseuderanthemum reticulatum
Quassia amara
Rauwolfia tetraphylla
Ravenala madagascariensis
Rhoeo spathacea
Ruellia tuberosa
Ruta graveolens
Sansevieria trifasciata
Scindapus aureus
Senecio confusus
Setcreasea purpurea
Spathoglottis plicata
Tabebuia argentea
Tabebuia rosea
Tabernaemontana coronaria
Tagetes patula
Tecoma stans
Tecomaria capensis
Thunbergia alata
Thunbergia erecta
Thunbergia fragrans
Thunbergia grandiflora
Tithonia diversifolia
Tithonia rotundifolia
Vallaris solanacea
Zebrina pendula

APPENDIX – II

LIST OF ENDEMIC PLANTS

Aglaia elaeagnoidea (A. Juss.) Benth.

Aponogeton appendiculatus van Bruggen

Artocarpus hirsutus Lamk.

Arundinella leptochloa (Nees ex Stud.) Hook. f.

Asystasia dalzelliana Sant.

Bulbophyllum rheedi Mani. & Sathish.

Calamus travancoricus Bedd.

Calophyllum calaba L.

Canthium travancoricum (Bedd.) Hook. f.

Christisonia tubulosa (Wight) Benth. ex Hook. f.

Cinnamomum malabatrum (Burm. f.) Berchthold & Presl.

Colubrina travancorica Bedd.

Cyanotis arcotensis Rolla Rao

Dalbergia horrida (Dennst.) Mabberly

Dendrobium ovatum (Wild.) Kranzl.

Dimeria copeana Sreekumar *et al.*

Dimeria copei Ravi

Dimeria kalavoorensis Ravi

Dimeria lawsonii (Hook. f.) C.E.C. Fisch.

Eriocaulon cuspidatum Dalz.

Eusteralis deccanensis Panigrahi

Fimbristylis narayanii C.E.C. Fisch.

Helicanthes elastica (Desr.) Danser.

Heliotropium keralense Sivarajan & Manilal

Holigarna arnottiana Hook. f.

Hopea parviflora Bedd.

Hopea ponga (Dennst.) Mabb.

Impatiens diversifolia Wall. ex Wight & Arn.

Ischaemum thomsonianum Stapf. ex C.E.C. Fisch.

Ischaemum travancorense Stapf. ex Fisch.

Ischaemum vembanadense Patil & Cruz.

Ixora malabarica (Dennst.) Mabberly

Kamettia caryophyllata (Roxb.) Nicols. & Suresh

Lagerstroemia microcarpa Wight

Litsea coriacaea (Heyne ex Meissn.) Hook. f.

Mallotus atrovirens Muell. – Arg.

Memecylon malabaricum (Clarke) Cong.

Morinda reticulata Gamble

Murdannia crocea (Griff.) Faden ssp. *ochracea* (Dalz.) Faden

Mussaenda belilla Buch.-Ham.

Myristica malabarica Lamk.

Nymphoides macrospermum R.V. Nair

Nymphoides sivarajanii Joseph

Ochna gamblei King ex Brandis

Osbeckia virgata D. Don ex Wight & Arn.

Phyllocephalum rangacharii (Gamble) Narayana

Psychotria flavida Talbot

Rhamphicarpa longiflora (Arn.) Benth.

Rotala macrandra Koehne

Rotala malampuzhensis R.V. Nair ex Cook

Salacia fruiticosa Heyne ex Lawson

Sida fryxellii Sivar. & Pradeep

Strophanthus wightianus Wall. ex Wight

Syzygium travancoricum Gamble

Theriophonum infaustum N.E. Br.

Trevia polycarpa Benth. ex Hook. f.

Vateria indica L.

Zingiber cernum Dalz.

Zornia quilonensis Ravi

APPENDIX - III

LIST OF RARE PLANTS

Achronychia pedunculata (L.) Miq.

Aegiceras corniculatus (L.) Blanco

Aeschynomene aspera L.

Allophylus cobbe (L.) Raeusch.

Amaranthus graecizans L.

Aneilema montanum (Wight) Clarke

Anisochilus carnosus (L.f.) Wall.

Anodendron manubriatum Merr.

Aponogeton appendiculatus V. Bruggen

Atalantia monophylla (L.) Corr.

Bonamia semidigyna (Roxb.) Hallier f.

Brachiaria reptans (L.) Gard. & C.E. Hubb.

Bruguiera gymnorhiza (L.) Savigny

Bulbophyllum rheedei Mani. & Sathish.

Caesalpinia bonduc (L.) Roxb.

Caesalpinia nuga Ait.

Callicarpa tomentosa (L.) Murr.

Canthium dicoccum (Gaertn.) Teijs. & Binn.

Capparis floribunda Wight

Capparis moonii Wight

Cenchrus echinatus L.

Chonemorpha fragrans (Moon) Alston

Christisonia tubulosa (Wight) Benth. ex Hook. f.

Cipadessa baccifera (Roth) Miq.

Colubrina travancorica Bedd.

Combretum latifolium Blume

Commelina ensifolia R. Br.

Cosmostigma racemosum (Roxb.) Wight

Crotalaria laburnifolia L.

Crotalaria prostrata Rottl. ex Willd.

Cynanchum callialatum Buch.-Ham. ex Wight & Arn.

Cyperus bifax Clarke

Dalbergia candenatensis (Dennst.) Prain

Derris thyrsiflora (Benth.) Benth. var. *eualata* (Bedd.) Thoth.

Dimeria copeana Sreekumar

Dimeria copei Ravi

Dimeria kalavoorensis Ravi

Diplacrum caricinum R. Br.

Drypetes roxburghii (Wall.) Hurusawa

Drypetes sepiaria (Wight & Arn.) Pax & Hoffm.

Embelia basaal (Roem. & Schult.) DC.

Embelia tsjeriam-cottam (Roem. & Schult.) DC.

Eragrostis cumingii Steud.

Eragrostis subsecunda (Lam.) Four.

Eragrostis tremula (Lam.) Hochst. ex Steud.

Erycibe paniculata Roxb.

Eulophia epidendraea (Retz.) Fisch.

Eusteralis deccanensis Panigrahi

Excoecaria indica (Willd.) Muell. – Arg.

Fimbristylis cinnamometorum (Vahl) Kunth

Fimbristylis insignis Thw.

Fimbristylis narayanii C.E.C. Fisch.

Flagellaria indica L.

Fuirena capitata (Burm. f.) Koyama

Garcinia xanthochymus Hook. f. ex And.

Geophila repens (L.) Johnston

Girardinia diversifolia (Link) Friis

Glossostigma diandra (L.) Kuntze

Gomphia serrata (Gaertn.) Kanis

Habenaria viridiflora (Sw.) R. Br.

Hedyotis biflora (L.) R. Br. ex Wight & Arn.

Hedyotis nitida Wight & Arn.

Hiptage benghalensis (L.) Kurz

Hopea ponga (Dennst.) Mabb.

Hydrocera triflora (L.) Wight & Arn.

Hymenodictyon orixense (Roxb.) Mabb.

Indigofera nummulariifolia (L.) Livera ex Alston

Indigofera prostrta Willd.

Ischaemum thomsonianum Stapf. ex C.E.C. Fisch.

Ischaemum vembanadense Patil & Cruz.

Isonandra lanceolata Wight

Ixora malabarica (Dennst.) Mabb.

Jansenella griffithiana (Muell.) Bor

Jasminum azoricum L.

Kamettia caryophyllata (Roxb.) Nicols. & Suresh

Kandelia candel (L.) Druce

Kyllinga polyphylla Willd. ex Kunth

Leea robusta Roxb.

Lepisanthes tetraphylla (Vahl) Radlk.

Lindernia procumbens (Krock) Philcox

Ludwigia prostrata Roxb.

Lumnitzera racemosa Willd.

Maba buxifolia (Rottb.) Juss.

Madhuca neriifolia (Moon) H.J. Lam.

Mesua ferrea L.

Mollugo cerviana (L.) Ser.

Morinda reticulata Gamble

Myristica malabarica Lam.

Myxopyrum smilacifolium Bl.

Neptunia prostrata (Lam.) Baill.

Nesaea brevipes Koehne

Nymphoides aurantiacum (Dalz.) O. Kuntze

Nymphoides macrospermum R.V. Nair

Nymphoides sivarajanii Joseph

Oberonia bicornis Lindley

Ochna gamblei King ex Brandis

Ophiorrhiza mungos L.

Oroxylum indicum (L.) Benth. ex Kurz

Panicum auritum Presl ex Nees

Panicum notatum Retz.

Pavetta tomentosa Roxb. ex Smith

Persea macrantha (Nees) Kosterm.

Plumbago zeylanica L.

Polygonum strigosum R. Br.

Psychotria flavida Talbot

Pycnospora lutescens (Poir.) Schind.

Pycreus macrostachyos (Lam.) J. Raynal

Remirea maritima Aublet

Rhamphicarpa longiflora (Arn.) Benth.

Salacia fruticosa Heyne ex Lawson

Schefflera venulosa (Wight & Arn.) Harms

Scleria sumatrensis Retz.

Sesuvium portulacastrum (L.) L.

Setaria barbata (Lam.) Kunth

Sonneratia caseolaris (L.) Engl.

Sterculia guttata Roxb. ex DC.

Strophanthus wightianus Wall. ex Wight

Strychnos minor Dennst.

Symplocos cochinchinensis (Lour.) Moore

Syzygium lanceolatum (Lam.) Wight & Arn.

Syzygium travancoricum Gamble

Toddalia asiatica (L.) Lam.

Toxocarpus kleinii Wight & Arn. ex Wight

Trichosanthes lepiniana (Naud.) Cogn.

Tylophora tetrapetala (Dennst.) Suresh

Urochloa panicoides P. Beauv.

Uticularia bifida L.

Utricularia minutissima Vahl

Vatica chinensis L.

Wedelia biflora (L.) DC.

Xanthophyllum flavescens Roxb.

Zeuxine longilabris (Lindl.) Benth. ex Hook. f.

Zingiber cernum Dalzell

APPENDIX - IV

LIST OF ALIEN SPECIES

Acanthospermum hispidum DC.

Ageratum conyzoides L.

Alternanthera philoxeroides (Mart.) Griseb.

Alternanthera tenella Colla

Anacardium occidentale L.

Annona glabra L.

Antigonon leptopus Hook. & Arn.

Axonopus compressus (Swartz) P. Beauv.

Blainvillea acmella (L.) Philipson

Cabomba caroliniana Gray

Caladium bicolor (Ait.) Vent.

Calapogonium mucunoides Desv.

Cassia alata L.

Cassia sericea Sw.

Catharanthus pusillus (Murray) G. Don

Centrosema pubescens Benth.

Cereus pterogonus Lem.

Chromolaena odorata (L.) King & Robinson

Citharexylum subserratum Sw.

Clerodendrum paniculatum L.

Clerodendrum philippinum Schauer

Clitoria ternatea L.

Cordia cylindristachya Roem. & Schult.

Croton bonplandianus Baill.

Croton hirtus L'Herit.

Desmodium scorpiurus (Swartz) Desvaux

Diodia teres Walt.

Eichhornia crassipes (C. Martius) Solms-Laub.

Eleutheranthera ruderalis (Swartz) Sch.-Bip.

Euphorbia heterophylla L.

Evolvulus nummularius (L.) L.

Gliricidia sepium (Jacq.) Kunth ex Walp.

Guazuma ulmifolia Lam.

Hyptis rhomboidea Mart. & Gal.

Hyptis suaveolens (L.) Poit.

Ipomoea aquatica Forsk.

Ipomoea hederifolia L.

Ipomoea quamoclit L.

Ipomoea triloba L.

Kleinhovia hospita L.

Lagascea mollis Cav.

Lantana camara L.

Leucaena leucocephala (Lam.) de Wit

Mecardonia procumbens (Mill.) Small

Mikania cordata (Burm. f.) Robins.

Millingtonia hortensis L. f.

Mimosa invisa Mart.

Mimosa pudica L.

Mitracarpus hirtus (L.) DC.

Monochoria vaginalis (Burm. f.) Presl.

Morus australis Poir.

Muntingia calabura L.

Parthenium hysterophorus L.

Passiflora foetida L.

Pedilanthus tithymaloides (L.) Poit.

Peltophorum pterocarpum (DC.) Backer ex Heyne

Peperomia pellucida (L.) H.B.K.

Pilea microphylla (L.) Liebm.

Pithecellobium dulce (Roxb.) Benth.

Psidium guajava L.

Quisqualis indica L.

Richardia scabra L.

Ricinus communis L.

Rivina humilis L.

Ruellia tuberosa L.

Scoparia dulcis L.

Sesamum radiatum Schum.

Sesbania bispinosa (Jacq.) W. F. Wight

Solanum anguivi Lam.

Spermacoce assurgens Ruiz

Spermacoce latifolia Aublet

Spilanthes ciliata H.B.K.

Spilanthes radicans Jacq.

Spilanthes uliginosa Sw.

Struchium sparganophorum (L.) O. Kuntze

Synedrella nodiflora (L.) Gaertn.

Tithonia diversifolia (Hemsl.) A. Gray

Tridax procumbens L.

Turnera subulata J.E. Smith

Turnera ulmifolia L.

Vicoa indica (L.) DC.

Wedelia trilobata (L.) A.S. Hitchc.

Xanthium indicum Koen.

APPENDIX - V

LIST OF WILD RELATIVES OF CROP PLANTS

Abelmoschus moschatus Medik.

Alpinia calcarata Roscoe

Alpinia galanga (L.) Swartz

Amaranthus spinosus L.

Amaranthus viridis L.

Ampelocissus indica (L.) Planch.

Andrographis paniculata (Brum. f.) Wall. ex Nees

Artocarpus hirsutus Lam.

Asparagus racemosus Willd.

Atylosia scarabaeoides (L.) Benth.

Bambusa bambos (L.) Voss

Boerhavia diffusa L.

Brassica juncea (L.) Cosson

Canavalia cathrtica Thouars

Canavalia ensiformis (L.) DC

Canavalia rosea (Sw.) DC.

Carissa spinarum L.

Caryota urens L.

Cassia fistula L.

Cinnamomum malabatrum (Burm. f.) Bl.

Cissus latifolia Lam.

Coccinia grandis (L.) J. Voigt

Coix lacryma-jobi L.

Colocasia esculenta (L.) Schott

Corchorus aestuans L.

Corchorus olitorius L.

Costus speciosus (Koenig) Smith

Curcuma caesia Roxb.

Cymbopogon flexuosus Wats.

Dioscorea alata L.

Dioscorea bulbifera L.

Dioscorea pentaphylla L.

Echinochloa stagnina (Retz.) P. Beavu.

Eleusine indica (L.) Gaertn.

Flacourtia indica (Burm. f.) Merr.

Garcinia gummi-gutta (L.) Robson

Garcinia xanthochymus Hook. f. ex T. And.

Gloriosa superba L.

Hibiscus hispidissimus Griffith

Hibiscus surattensis L.

Indigofera tinctoria L.

Jasminum angustifolium (L.) Willd.

Jasminum azoricum L.

Jasminum multiflorum (Burm. f.) Andr.

Leersia hexandra Sw.

Luffa aegyptica Mill.

Madhuca neriifolia (Moon) H. J. Lam.

Mangifera indica L.

Mimusops elengi L.

Momordica dioica Roxb. ex Willd.

Mucuna pruriens (L.) DC.

Myristica malabarica Lam.

Ocimum americanum L.

Ocimum gratissimum L.

Olea dioica Roxb.

Oryza rufipogon Griff.

Passiflora foetida L.

Phyllanthus emblica L.

Piper longum L.

Piper nigrum L.

Psidium guajava L.

Rauvolfia serpentina (L.) Benth. ex Kurz

Ricinus communis L.

Saccharum spontaneum L.

Santalum album L.

Sesamum orientale L.

Sesamum radiatum Schum.

Sesamum radiatum Schum.

Setaria barbata (Lam.) Kunth

Setaria pumila (Poir.) Roem.

Solanum americanum Mill.

Solanum anguiri Lam.

Solanum capsicoides All.

Solanum torvum Sw.

Spondias pinnata (L. f.) Kurz

Syzygium caryophyllatum (L.) Alston

Syzygium cumini (L.) Skeels

Syzygium travancoricum Gamble

Syzygium zeylanicum (L.) DC.

Tinospora sinensis (Lour.) Merr.

Trichosanthes cucumerina L.

Trichosanthes nervifolia L.

Wrightia tinctoria (Roxb.) R. Br.

Zingiber officinale Rosc.

Zingiber zerumbet (L.) Smith

Ziziphus mauritiana Lam.

Ziziphus oenoplia (L.) Miller

Ziziphus rugosa Lam.

APPENDIX - VI

LIST OF MEDICINAL PLANTS

Abrus precatorius L.

Achronychia pedunculata (L.) Miq.

Achyranthes aspera L.

Acorus calamus L.

Acorus calamus L.

Aegle marmelos (L.) Corrn.

Aerva lanata (L.) Juss.

Albizia lebbeck (L.) Willd.

Alpinia calcarata Roscoe

Alpinia galanga (L.) Swartz

Alstonia scholaris (L.) R. Br.

Amaranthus spinosus L.

Andrographis paniculata (Burm. f.) Wall. ex Nees

Aristolochia indica L.

Asparagus racemosus Willd.

Azadirachta indica Juss.

Bacopa monnieri (L.) Pennell

Biophytum reinwardtii (Zucc.) Klotzsch

Boerhavia diffusa L.

Calotropis gigantea (L.) R. Br.

Cardiospermum helicacabum L.

Careya arborea Roxb.

Cassia occidentalis L.

Catharanthus roseus (L.) G. Don

Centella asiatica (L.) Urban

Cinnamomum verum. J.S. Presl

Cissampelos pareira L. var. *hirsuta* (Buch.-Ham. ex DC.) Forman

Clerodendrum indicum (L.) Kuntze

Clerodendrum serratum (L.) Moon

Clerodendrum viscosum Vent.

Clitoria ternatea L.

Coccinia grandis (L.) J. Voigt

Coleus ambonicus Lour.

Costus speciosus (Koenig) Smith

Curculigo orchioides Gaertn.

Curcuma caesia Roxb.

Cyathula prostrata (L.) Bl.

Cyclea peltata (Poir.) Hook. f. & Thoms.

Cymbopogon flexuosus (Nees ex Steud.) Wats.

Cynodon dactylon (L.) Pres.

Cyperus rotundus L.

Datura metel L.

Desmodium gangeticum (L.) DC.

Desmodium triflorum (L.) DC.

Drypetes roxburghii (Wall.) Hurusawa

Eclipta prostrata (L.) L.

Elephantopus scaber L.

Emilia sonchifolia (L.) DC. ex Wight

Euphorbia hirta L.

Euphorbia thymifolia L.

Evolvulus alsinoides (L.) L.

Ficus benghalensis L.

Ficus exasperata Vahl

Ficus racemosa L.

Ficus religiosa L.

Flacourtia indica (Burm. f.) Merr.

Garcinia gummi-gutta (L.) Robson

Gloriosa superba L.

Glycosmis pentaphylla (Retz.) DC.

Gmelina arborea Roxb.

Gymnema sylvestre (Retz.) R. Br. ex Schult.

Helicteres isora L.

Hemidesmus indicus (L.) R. Br.

Holarrhena pubescens (Buch.-Ham.) Wall. ex Don

Hydnocarpus pentandra (Buch.- Ham.) Oken

Hygrophila schulli (Ham.) M.R. & S.M. Almedia

Ichnocarpus frutescens (L.) R. Br.

Indigofera tinctoria L.

Ipomoea obscura (L.) Ker-Gawler

Ipomoea pes-caprae (L.) R. Br.

Ixora coccinea L.

Jatropha curcas L.

Justicia adhatoda L.

Lagenandra toxicaria Dalz.

Lawsonia inermis L.

Leucas aspera (Willd.) Link

Moringa oleifera Lam.

Murraya koenigii (L.) Spreng.

Mussaenda belilla Ham.

Myristica malabarica Lam.

Naravelia zeylanica (L.) DC.

Naregamia alata Wight & Arn.

Ocimum basilicum L.

Ocimum tenuiflorum L.

Oxalis corniculata L.

Phyllanthus amarus Schum. & Thonn.

Phyllanthus debilis Klein ex Willd.

Phyllanthus emblica L.

Physalis angulata L.

Piper longum L.

Piper nigrum L.

Pongamia pinnata (L.) Pierre

Pseudarthria viscida (L.) Wight & Arn.

Psilanthus travancorensis (Wight & Arn.) Loeroy

Pterocarpus marsupium Roxb.

Rauvolfia serpentina (L.) Benth. ex Kurz

Ricinus communis L.

Santalum album L.

Saraca asoca (Roxb.) de Wilde

Sarcostigma kleinii Wight & Arn.

Scoparia dulcis L.

Sida acuta Burm. f.

Sida alnifolia L.

Sida cordifolia L.

Solanum americanum Mill.

Solanum torvum sw.

Spermacoce hispida L.

Sphaeranthus africanus L.

Sphaeranthus indicus L.

Strychnos nux-vomica L.

Syzygium caryophyllatum (L.) Alston

Syzygium cumini (L.) Sekeels

Talinium portulacifolium (Forssk.) Asch. ex Schweinf.

Tamarindus indica L.

Terminalia bellirica (Gaertn.) Roxb.

Thespesia populnea (L.) Soland. ex Corr.

Tinospora cordifolia (Willd.) Hook. f. & Thoms.

Tinospora sinensis (Lour.) Merr.

Tragia involucrata L.

Trichosanthes cucumerina L.

Tylophora indica (Burm. f.) Merr.

Vateria indica L.

Vernonia cinerea (L.) Less.

Vitex negundo L.

Woodfordia fruticosa (L.) Kurz

Wrightia arborea (Dennst.) Mabb.

Wrightia tinctoria (Roxb.) R. Br.

Zingiber zerumbet (L.) J.E. Smith

REFERENCES

Abbasi, S.A., Naseema Abbasi & K.K.S. Bhatia. 1997. *Wetlands of India: Ecology and Thereats*. Vol. III. Discovery Publishing House, New Delhi.

Abbasi, S.A., Nipaney, P.C. & R. Soni. 1988. Aquatic weeds: distribution, impact and control. *J. Sci. Industr. Res.* 47: 650-661.

Ahmedullah, M. & M.P. Nayar. 1987. *Endemic Plants of the Indian Region.* Botanical Survey of India, Calcutta.

Anilkumar, N. 1993. Floristic study of Pathanamthitta District, Kerala. Ph.D. Thesis (Unpublished). University of Calicut, Kerala, India.

Arora, R.K. & E. Roshini Nayar. 1983. Wild relatives and Related species of Crop Plants in India – Their diversity and distribution. *Bull. Bot. Surv. India* 25(1-4): 35-45.

Ashish Kothari, 1997. *Understanding Biodiversity, Life, Sustainability and Equity.* Orient Longman Limited, New Delhi.

Babu, A. 1990. *Flora of Malappuram District* (Excluding Nilambur Forest Division). Ph.D. Thesis (Unpublished). University of Calicut, Kerala, India.

Backer, C.A. 1951. Turneraceae. In: C.G.G.J. van Steeins. *Fl. Males.* I. 4: 236-237.

Balasubramanyam, K. & N.C. Induchoodan. 1996. Plant diversity in Sacred groves of Kerala. *Evergreen* 36: 3-4.

Balgooy, M.M.J. van. 1987. Collecting. In: E.F. DeVogel, (Ed.), *Manual of Herbarium Taxonomy: Theory and Practice*. Rijksherbarium, Leiden, The Netherlands.

Beddome, R.H. 1868-1874. *Icones Plantarum Indiae Orientalis*. Gantz Brothers, Madras.

Beddome, R.H. 1869-1874. *The Flora Sylvatica for Southern India.* Gantz Brothers, Madras.

Bentham, G. & J.D. Hooker. 1862-1883. *Genera Plantarum.* Vols 1-3. London.

Bhaimy Sadasivan, 1997. *Vikasanarekha, Alappuzha District Panchayat* (in Malayalam), District Panchayath, Alappuzha.

Bor, N.L. 1960. *The Grasses of Burma, Ceylon, India and Pakistan.* Pergamon Press, London.

Ghosh, P. & A. Jaitly. (Eds.) 1993. *The road from Rio. Environment and Development policies issued in Asia.* Tata Energy Research Institute, New Delhi.

Greuter, W., F.R. Barrie, H.M. Burdet, W.G. Chaloner, V. Demoulin, D.L. Hawksworth, P.M. Jorgensen, D.H. Nicolson, P.C. Silva, P. Trechane & J. Mc Neill (Eds.) 1994. *International Code of Botanical Nomenclature* (Tokyo Code). Regnum Vegetabile Vol.131. Koeltz Scientific Books, Germany.

Gupta, O.P. 1979. *Aquatic weeds*: *Their menace and control.* New Delhi.

Henry, A.N. & P. Daniel, 1988. In defence of the much-maligned (Alpha) Taxonomy in India. *J. Bombay Nat. Hist. Soc.* 86: 206-212.

Hooker, J.D. 1872-1897. *The Flora of British India*, Vol. I-VII. Reeve & Co., London.

Jain, S.K. & R.R. Rao. 1977. *A Handbook of Field and Herbarium Methods.* New Delhi.

Joseph, K.T. 1991. *Nymphoides sivarajanii* (Menyanthaceae) – a new species from India *Willdenowia* 20(1-2): 135-138.

Joseph, K.T. 1991. *Observations on the Aquatic Angiosperms of Malabar (North Kerala).* Ph.D. Thesis (Unpublished). University of Calicut, Kerala, India.

Karthikeyan, S. & B.D. Sharma. 1985. A catalogue of species added to the Gamble's *Flora of the Presidency of Madras. J. Bombay Nat. Hist. Soc.* 80: 63-79.

Lawrence, G.H.M., A.F.G. Buchheium, G.S. Daniels, G.S. & H. Dolezal. 1968. *Botanico Periodicum Huntianum* (B.P.H.). Hunt Institute of Botanical Documentation, Pittsburgh.

Linnaeus, C. 1753. *Species Plantarum.* Vols. 1 & 2. Stockholm.

Lushington, A.W. 1915. *Vernacular list of trees, shrubs and woody climbers of the Madras Presidency.* Government Press, Madras.

Majumdar, N.C. & D.N.G. Bakshi. 1979. A few Linnaean specific names typified by the illustrations in Rheede's *Hortus Indicus Malabaricus. Taxon* 28: 353-354.

Manilal, K.S. & C. Sathishkumar. 1991. The reappearance of Van Rheede's Tsjerou Tecka Maravara as a new species of *Bulbophyllum* Thouars (Orchidaceae). *Rheedea* 1(1-2): 52-56.

Bourdillon, T.F. 1908. *The Forest Trees of Travancore.* Government Press, Trivandrum.

Bruggen, H.W.E. van. 1968. A new species of *Aponogeton* from India. *Blumea* 16: 264-265.

Chand Basha, S. 1998. Conservation and Management of Sacred Groves in Kerala. In: P.S. Ramakrishnan, K.G. Saxena & U.M. Chandrashekaran (Eds.), *Conserving The Sacred For Biodiversity Management.* Oxford & IBH, New Delhi. pp.337-347.

Cooke, T. 1901-1908. *The Flora of the Presidency of Bombay,* Vols. 1-3. Taylon & Francis, London.

Corner, E.J.H. 1939. Notes on the systematy and distribution of Malayan Phanerogames III. *Gad. Bull. Sing.* 10: 229-239.

Dassanayake, M.D. & F.R. Fosberg (Eds.) 1980-1991. *A Revised Handbook of Flora of Ceylon.* Vols. 1-7. Amerind Publishing Co., New Delhi.

Dassanayake, M.D., F.R. Fosberg & W.D. Clayton (Eds.). 1994-1995. *A Revised Handbook of Flora of Ceylon.* Vols. 8 & 9. Amerind Publishing Co., New Delhi.

Dhruvan Tandyekkal & Philip Mathew 1995. *Desmodium scorpiurus* (Swartz) Desvaux, Leguminosae-Papilionoideae): A new record for India. *Rheedea* 5(2): 177-179.

Dhruvan Tandyekkal & Philip Mathew. 1995. *Staurogyne glutinosa* (Wall. ex Clarke) O. Kuntze (Acanthaceae), a new record for Peninsular India. *Rheedea* 5(1): 60-62.

Farr, E.R., J.A. Leussink & F.A. Stafleu (Eds.). 1979. *Index Nominum Genericorum.* Vols. I-III. Bohn, Scheltema, Utrecht dr. W. Junk b.v., Publishers, The Hague.

Fischer, C.E.C. 1921. A survey of the flora of the Anamalai Hills in Coimbatore District, Madras Presidency. *Rec. Bot. Surv. India* 9: 1-218.

Fosberg, F.R. & M.M. Sachet. 1965. *Manual of Tropical Herbaria.* Regnum Vegetabile 39. Utrecht, Netherlands.

Fyson, P.F. 1932. *The Flora of the South Indian Hill Stations.* Vol. 1 & 2. Government Press, Madras.

Gamble, J.S. 1915-1936. *The Flora of the Presidency of Madras.* Adlard & Son Ltd., London.

Garcia D' Orta 1565. Coloquios des simples edrogas he cousas medicinais da India. Goa.

Manilal, K.S. & K. Raveendrakumar. 1998. Additions to the Flora of Kerala since Gamble (1935). *Rheedea* 8(2): 179-241.

Manilal, K.S. & V.V. Sivarajan. 1982. *Flora of Calicut.* Bishen Singh Mahendra Pal Singh, Dehra Dun.

Manilal, K.S. 1980. The Implication of Hortus Malabaricus with the Botany and History of Peninsular India. *In*: K.S. Manilal (Ed.), *Botany and History of Hortus Malabaricus*. Oxford & IBH, New Delhi. pp.1-5.

Manilal, K.S. 1988. *Flora of Silent Valley: Tropical Rain Forest of India.* Calicut University, Calicut.

Matthew, K.M. 1983. *The Flora of Tamil Nadu Carnatic*, Parts 1-3. The Rapinat Herbarium, Tiruchirappalli, Tamil Nadu.

Meyers, N. 1980. Present status and Future Prospects of Tropical Moist Forests. *Environm. Conserv.* 7: 101-114.

Mohanan, C.N. 1984. Studies on The Flora of Quilon District, Kerala. Ph.D. Thesis (Unpublished), Madras University, Madras.

Mohanan, M. & A.N. Henry. 1994. *Flora of Thiruvananthapuram District.* Botanical Survey of India, Calcutta.

Moore, H. & J. Dransfield, 1979. The typification of Linnaean Palms. *Taxon* 28: 59-70.

Nair, K.K.N. 1985-86. Additions to Gamble's Flora of the Presidency of Madras (1915-1936) from the state of Kerala, Tamil Nadu, Karnataka and Andhra Pradesh up to 1982. *Ind. J. For.* 8: 250-261 & 9: 204-219.

Nair, N.C. & P. Daniel, 1986. The Floristic Diversity of the Western Ghats and its conservation: A Review. *Proc. Ind. Acad. Sci.* (*Animal Sci./ Plant Sci.*) Suppl. pp.127-163.

Nair, N.C. 1964. *Mimosa invisa* Mart. (Mimosaceae) – a new record for India. J. *Bombay Nat. Hist. Soc.* 61: 469-471.

Nair, N.C., C.N. Mohanan & P.V. Sreekumar. 1982. *Stachytarpheta cayennensis* (L.C. Rich.) Schau. – a new record for India and with a key to the Indian species. *J. Bombay Nat. Hist. Soc.* 79(1): 230-232.

Nayar, M.P. & A.R.K. Sastry. 1987, 1988, 1990. *Red Data Book of Indian Plants*, Vols. I-III. Botanical Survey of India, Calcutta.

Nayar, M.P. 1980. Endemic Flora of Peninsular India and their significance. *Bull. Bot. Surv. India* 22: 12-13.

Nicolson, D.H., Suresh, C.R. & K.S. Manilal, 1988. An Interpretation of van Rheeds *Hortus Indicus Malabaricus*, Germany.

Philip Mathew & C.N. Umadevi. 1992. Reinstating *Leea robusta* Roxb. (Leeaceae). *Rheedea.* 2(1): 64-68.

Radford, A.E., W.C. Dickinson, J.R. Masse & C.R. Bell. 1974. *Vascular Plant Systematics.* New York & London.

Rajani, A. 1991. *Taxonomy of Cyperaceae of Kerala.* Ph.D. Thesis (Unpublished). University of Calicut, Kerala, India.

Rajendraprasad, M. 1995. The Floristic, structural and functional Analysis of sacred Groves of Kerala. Ph.D. Thesis (Unpublished). University of Kerala, Thiruvananthapuram.

Rama Rao, M. 1914. *Flowering Plants of Travancore.* Government Press, Trivandrum.

Ramachandran, V.S. & V.J. Nair. 1988. *Flora of Cannanore District.* Botanical Survey of India, Calcutta.

Raven, P.H. 1988. Our Diminishing Tropical Forests. *In*: E.O. Wilson & M. Peter Francis (Eds.), *Biodiversity.* National Academy Press, Washington D.C. pp.119-122.

Ravi, N. & P.N. Muraleedharan. 1988. *Cordia cylindristachya* Roem. & Schult. (Boraginaceae) naturalised in India. *Bull. Bot. Surv. India* 30(1-4): 171-173.

Ravi, N. 1969. A new species of *Zornia* Gmel. from South India. *J. Bombay Nat. Hist. Soc.* 66: 489-490.

Ravi, N. 1996. Another two new species of *Dimeria* (Poaceae) from Kerala, India. *Blumea* 41: 251-256.

Rheede tot Drakenstein, H.A. van. 1678-1703. *Hortus Indicus Malabaricus.* Vols. 1-12. Amsterdam; (Repr. ed. 1983, Dehra Dun).

Ridsdale, C.E. 1974. A revision of the family Leeaceae. *Blumea* 22: 57-100.

Saldanha, C.J. & D.H. Nicolson. 1976. *Flora of Hassan District, Karnataka, India.* Amerind Publishers, New Delhi.

Sasidharan, N. & V.P.K. Nambiar. 1981. *Eleutheranthera ruderalis* (Sw.) Sch.-Bip. (Compositae) – a new record for South India. *Ind. J. For.* 4(3): 240-241.

Sasidharan, N. & V.V. Sivarajan. 1996. *Flowering Plants of Thrissur Forests.* Scientific Publishers, Jodhpur.

Sivarajan, V.V. & A.K. Pradeep. 1990. *Sida fryxellii* - a new species of Malvaceae from Peninsular India. *Kew Bull.* 45(4): 725-727.

Sivarajan, V.V. & A.K. Pradeep. 1998. *Wedelia trilobata* (Linn.) A.S. Hitchc. (Asteraceae) – a new plant record for India. *Ind. J. For.* 11(2): 161-162.

Sivarajan, V.V. & C. Remesan. 1987. The Genus *Spilanthes* Jacq. in India. *J. Econ. Tax. Bot.* 10(1): 141-147.

Sivarajan, V.V. & C.N. Sunil. 1993. *Annona glabra* Linn. (Annonaceae) – a new record for India. *Rheedea* 3(1): 90-93.

Sivarajan, V.V. & K.S. Manilal. 1972. A new species of *Heliotropium* Linn. from South India. *J. Ind. Bot. Soc.* 51: 348-350.

Sivarajan, V.V. & Philip Mathew. 1996. *Flora of Nilambur.* Bishen Singh Mahendra Pal Singh, Dehra Dun.

Sivarajan, V.V. & Philip Mathew. 1984. Notes on Indian species of *Alternanthera* Forsk. (Amaranthaceae) (Kashmir Valley excluded) with a new record. *Ind. J. For.* 7(1): 46-53.

Sivarajan, V.V. & T. Usha. 1983. On reinstating *Mollugo stricta* Linn. (Molluginaceae). *Taxon* 32: 123-126.

Sivarajan, V.V., R. Vasudevan Nair & T.U. Ahmedkunju. 1987. Genus *Spermacoce* Linn. (Rubiaceae) in India. *Proc. Ind. Acad. Sci.* (Plant Sci.) 97(4): 347-358.

Sreedhara Menon. 1975. *Kerala District Gazetters – Alleppey.* Government of Kerala, Trivandrum.

Sreekumar, P.V. & V.J. Nair. 1991. *Flora of Kerala-Grasses.* Botanical Survey of India, Calcutta.

Sreekumar, P.V., V.J. Nair & N.C. Nair. 1981. *Dimeria copeana* – a new grass from Kerala, India. *J. Bombay Nat. Hist. Soc.* 78(3): 577-579.

Sunil, C.N. & V.V. Sivarajan 1994. *Voacanga grandifolia* (Miq.) Rolfe. (Apocynaceae) – a new record for Southern Peninsular India. *Rheedea* 4(2): 109-112.

Turril, W.B. 1964. Plant Taxonomy, Phytogeography and Ecology. *In*: *Vistas in Botany*. Vol.4. Pergamon Press, London.

Unnikrishnan, E. 1995. *Sacred Groves of North Kerala*: *An Eco-folklore study*. Jeevarekha, Thrissur, Kerala, India (in Malayalam).

Untawale, A.G. & T.G. Jagtap. 1998. Mangroves: No wastelands. *In*: *Survey of the Environment*. The Hindu, Madras. pp.71-74.

Vaczy, C. 1980. Hortus Indicus Malabaricus and its importance for the botanical nomenclature. *In*: K.S. Manilal (Ed.) *Botany and History of Hortus Malabaricus*. Oxford & I.B.H., New Delhi.

Vajravelu, E. 1990. *Flora of Palghat District*. Botanical Survey of India, Calcutta.

Vuppulluri, S.S. 1969. Some interesting plants from W. Bengal. *Ind. For.* 95: 311-313.

Wight, R. & Walker – Arnott. 1834. *Prodromus Florae Peninsulae Indiae Orientalis*. London.

Wight, R. 1838-1853. *Icones Plantarum Indiae Orientalis*. Madras.

Wight, R. 1840. *Illustrations of Indian Botany*. Glasgow.

INDEX TO FAMILIES AND GENERA

Abelmoschus Medikus 86
Abrus Adanson 199
Abutilon P. Miller 87
Acacia P. Miller 288
Acalypha L. 791
Acampe Lindl. 870
ACANTHACEAE Juss. 674
Acanthospermum Schrank 450
Acanthus L. 676
Achyranthes L. 752
Acorus L. 937
Acrocephalus Benth. 731
Acroceras Stapf 1070
Acronychia Forster & Forster. 143
Adenanthera L. 290
Adenosma R. Br. 615
Adenostemma Forster & Forster 450
Aegiceras Gaertner 484
Aegle Correa 144
Aerva Forssk. 753
Aeschynomene L. 199
Ageratum L. 451
Aglaia Lour. 154
Ailanthus Desf. 150
AIZOACEAE Ruddolphi 397
ALANGIACEAE DC. 403
Alangium Lam. 403
Albizia Durazzini 291
ALISMATACEAE Vent. 949
Allamanda L. 511
Allmania R. Br. ex Wight 754
Allophylus L. 181
Alloteropsis Presl 1071
Alpinia Roxb. 882
Alstonia R. Br. 512
Alternanthera Forssk. 755
Alysicarpus Necker ex Desv. 202
AMARANTHACEAE Juss. 751
Amaranthus L. 758
AMARYLLIDACEAE J. St.-Hil. 892
Ammannia L. 345
Amorphophallus Bl. ex Decaisne 937
Ampelocissus Planchon 171
ANACARDIACEAE Lindl. 185
Anacardium L. 186
Anamirta Colebrooke 36
Ananas P. Miller 892
Andrographis Nees 677
Aneilema R. Br. 908
Angelonia Humb. et Bonpland 616
Aniseia Choisy 579
Anisochilus Wall. ex Benth. 732
Anisomeles R. Br. 733
Annona L. 22
ANNONACEAE Juss. 22
Anodendron DC. 12
Antidesma L. 797
Antigonon Endl. 766
Aphanamixis Bl. 157
APIACEAE Lindl. 398
Apluda L. 1072
Apocopis Nees 1075
APOCYNACEAE Juss. 508
Aponogeton L. 953
APONOGETONACEAE Agardh. 953
Aporosa Bl. 798

ARACEAE Juss. 936
ARALIACEAE Juss. 402
Ardisia O. Swartz 487
Areca L. 927
ARECACEAE Schultz 926
Argyreia Lour. 580
Aristida L. 1075
Aristolochia L. 775
ARISTOLOCHIACEAE Juss. 775
Artabotrys R. Brown 28
Artocarpus Forster & Forster 848
Arundinella Raddi 1076
ASCLEPIADACEAE R. Br. 539
Asclepias L. 540
Asparagus L. 900
ASTERACEAE Dumort. 444
Asystasia Bl. 678
Atalantia Correa 145
Atylosia Wight & Arn. 203
Averrhoa L. 132
Avicennia L. 726
AVICENNIACEAE Endlicher 726
Axonopus P. Beau. 1077
Azadirachta Jussieu 158
Bacopa Aublet 616
Balsaminaceae A. Rich. 135
Bambusa Schreber 1078
Barleria L. 680
Barringtonia Forster & Forster 334
Basella L. 765
BASELLACEAE Moquin-Tandon 765
Bauhinia L. 267
Benincasa Savi 374
Benkara Adanson 407
Bergia L. 71
Bidens L. 452
BIGNONIACEAE Juss. 663
Biophytum A.P. de Candolle 134
Bixa L. 60
BIXACEAE Link. 60
Blainvillea Cassini 453
Blumea DC. 453
Blyxa Noronha ex Thouars 864
Boerhavia L. 749
BOMBACACEAE Kunth 113
Bombax L. 113
Bonamia Thouars 580
BORAGINACEAE Juss. 570
Borassus L. 928
Bothriochloa O. Kuntze 1079
Brachiaria (Trinius) Grisebach 1080
Brassica L. 50
BRASSICACEAE Burnett. 50
Breynia Forster & Forster 799
Bridelia Willd. 801
BROMELIACEAE Juss. 892
Bruguiera Lam. 307
Bulbophyllum Thouars. 870
Bulbostylis Kunth 972
Butea Roxb. ex Willd. 204
BUTOMACEAE Richard 950
Cabomba Aubl. 45
CABOMBACEAE A. Rich. 45
CACTACEAE Juss. 390
Caesalpinia L. 270
Cajanus Adanson 205
Caladium Vent. 938
Calamus L. 928
Callicarpa L. 709
Calophyllum L. 73
Calopogonium Desv. 206
Calotropis R. Br. 541

Calycopteris Lam. 315
Cananga Hook. .f. & Thoms. 29
Canavalia Adans. 206
Canna L. 888
CANNACEAE Juss. 888
Canscora Lam. 556
Cansjera Jussieu 162
Canthium Lam. 408
CAPPARACEAE Juss. 52
Capparis L. 52
Capsicum L. 603
Carallia Roxb. ex R. Br. 309
Cardiospermum L. 182
Careya Roxb. 336
Carica L. 372
CARICACEAE Dumort 372
Carissa L. 513
CARYOPHYLLACEAE Juss. 65
Caryota L. 929
Cascabela Rafinesque 515
Casearia Jacq. 61
Cassia L. 274
Casuarina Adanson 863
CASUARINACEAE R. Br. 863
Casytha L. 780
Catharanthus G. Don 516
Cayratia Juss. 172
Ceiba P. Miller 114
CELASTRACEAE R. Br. 164
Celosia L. 761
Cenchrus L. 1086
Centella L. 401
Centotheca Desvaux 1086
Centranthera R. Br. 617
Centrosema (DC.) Benth. 209
CERATOPHYLLACEAE Gray 863
Ceratophyllum L. 863
Cerbera L. 516
Cereus P. miller 390
Cestrum L. 604
Chasalia DC. 411
Chloris O. Swartz 1089
Chonemorpha G. Don 518
Christisonia Gardner 651
Chromolaena DC. 457
Chrysophyllum L. 493
Chrysopogon Trinius 1090
Cinnamomum Schaeffer 781
Cipadessa Bl. 159
Cissampelos L.
Cissus L. 174
Citharexylum L. 710
Citrullus Schrader ex Eckl. & Zeyh. 375
Citrus L. 145
Cleome L. 54
Clerodendrum L. 711
Clitoria L. 210
CLUSIACEAE Lind. 72
Coccinia Wight & Arn. 376
Cocos L. 930
Coffea L. 412
Coix L. 1091
Coldenia L. 573
Coleus Lour. 734
Colocasia Schott 939
Colubrina Richard ex Brongniart 167
COMBRETACEAE R. Br. 315
Combretum Loefling 316
Commelia L. 908
COMMELINACEAE R. Br. 907
CONNARACEAE R. Br. 190

Connarus L. 193
CONVOLVULACEAE Juss. 578
Conyza Lessing 458
Corchorus L. 123
Cordia L. 573
Coriandrum L. 402
Cosmos Cav. 459
Cosmostigma R. Wight 542
Costus L. 885
Crassocephalum Moench 459
CRASSULACEAE DC. 302
Crateva L. 53
Crinum L. 893
Crotalaria L. 211
Croton L. 803
Cryptocoryne Fisher ex Wydler 940
Cryptolepis R. Br. 542
Cryptostegia R. Br. 543
Cucumis L. 377
Cucurbita L. 377
CUCURBITACEAE Juss. 373
Curculigo Gaert. 894
Curcuma L. 884
Cuscuta l. 581
Cyanotis D. Don 913
Cyathula Bl. 762
Cyclea Wight & Arn. 38
Cymbopogon Sprengel 1092
Cynanchum L. 544
Cynodon L.C. Richard 1093
CYPERACEAE Juss. 970
Cyperus L. 976
Cyrtococcum Stapf 1094
Dactyloctenium Willd. 1096
Dalbergia L.f. 220
Datura L. 605
Delonix Rafinesque 283
Dendrobium O. swartz 872
Dendrophthoe Martius 785
Dentella Forster & Forster 412
Derris Lour. 223
Desmodium Desv. 226
Digitaria Haller 1097
DILLENIACEAE Salisb. 20
Dimera R. Br. 1104
Diodia L. 413
Dioscorea L. 897
DIOSCOREACEAE R. Br. 897
Diospyros L. 499
Diplachne P. Beau. 1108
Diplacrum R. Br. 996
Diplocyclos (Endlicher) Post & Kuntz 378
Dipteracanthus Nees 682
DIPTEROCARPACEAE Bl. 82
Dolichandrone (Fenzl) Seemann 664
Dopatrium Ham. ex Benth. 618
Drosera L. 303
Droseraceae Salisb. 303
Drymaria Willd. ex Schult. 65
Drypetes M. Vahl 807
Duranta L. 716
EBENACEAE Gurke 449
Ecbolium Kurz 683
Echinochloa P. Beau. 1109
Eclipta L. 460
Ehretia P. Browne 575
Eichhornia Kunth 904
ELAEOCARPACEAE Juss. ex DC. 127
Elaeocarpus L. 127
ELATINACEAE Dumort. 71

Eleocharis R. Br. 997
Elephantopus L. 461
Eleusine Gaertner 1112
Eleutheranthera Poir. ex Bose 462
Embelia Burman 487
Emilia Cassini 462
Epaltes cassini 463
Eragrostis N.M. Wolf 1114
Eranthemum L. 684
ERIOCAULACEAE Juss. 963
Eriocaulon L. 963
Eriochloa H.B.K. 1124
Erycibe Roxb. 582
Erythrina L. 235
Eucalyptus Brutelle 325
Eulphia R. Br. 873
Euphorbia L. 808
EUPHORBIACEAE Juss. 787
Eusteralis Rafinesque 735
Evolvulus L. 583
Excoecaria L. 816
FABACEAE Lindl. 194
Fagraea Thunb. 550
Ficus L. 851
Fimbristylis M. Vahl 1002
Fioria Mattei 88
Flacourtia Comm. ex Brutelle 61
Flacourtiaceae Rich. ex DC. 60
Flagellaria L. 926
Flagellariaceae Dumort 926
Flemingia Roxb. ex Ait. 237
Fuirena Rottb. 1027
Garcinia L. 79
Geissaspis Wight & Arn. 239
Geniosporum Wall. & Benth. 735
GENTIANACEAE Juss. 555
Geophila D. Don 414
Girardinia Gaud.-Beau. 844
Gisekia L. 392
Givotia Griffith 818
Glinus L. 392
Gliricidia H.B.K. 240
Glochidion Forster & Forster 821
Gloriosa L. 901
Glossostigma Wight & Arn. 621
Glycosmis Correa 146
Gmelina L. 717
Gomphia Schreber 152
Gomphrena L. 763
Gossypium L. 89
Grangea Adanson 464
Grewia L. 125
Guazuma P. Miller 115
Gymnema R. Br. 544
Habenaria Willd. 874
Hamelia Jacq. 415
Hedyotis L. 415
Helicanthes Danser 786
Helicteres L. 116
Heliotropium L. 575
Hemidesmus R. Br. 545
Heteropogon Pers. 1125
Hevea Aublet 822
Hewittia Wight & Arn. 585
Hibiscus L. 90
HIPPOCRATEACEAE Juss. 164
Hiptage J. Gaertner 131
Holarrhena R. Br. 519
Holigarna Hamilton ex Roxb. 187
Hopea Roxb. 82
Hoppea Willd. 556
Hugonia L. 128

Hybanthus Jacq. 59
Hydnocarpus Gaertner 62
Hydrilla L.C. Rich. 866
Hydrocera Bl. 136
HYDROCHARITACEAE Juss. 864
Hydrolea L. 569
HYDROPHYLLACEAE R. B4. 569
Hygrophila R. Br. 684
Hygroryza Nees 1126
Hymenachne P. Beau 1126
Hymenodictyon Wallich 427
Hypolytrum Pers. 1030
HYPOXIDACEAE R. Br. 894
Hyptis JACQ. 736
ICACINACEAE (Benth.) Miers 163
Ichnocarpus R. Br. 520
Impatiens L. 139
Imperata Cyrillo 1127
Indigofera L. 241
Indoneesiella Sreem. 687
Ipomoea L. 586
Isachne R. Brown 1128
Ischaemum L. 1129
Isonandra R. Wight 494
Ixora L. 428
Jansenella Bor 1138
Jasminum L. 502
Jatropha L. 822
Kalanchoe Adanson 302
Kamettia Kosteletzky 521
Kandelia Wight & Arn. 310
Kleinhovia L. 117
Knoxia L. 430
Kyllinga Rottb. 1031
Lagascea Car. 465
Lagenandra Dalz. 941
Lagerstroemia L. 346
LAMIACEAE Lindl. 728
Lannea Richard 187
Lantana L. 718
Laportea Gaud.-Beau. 845
Launaea Cassini 465
Lauraceae Juss. 780
Lawsonia L. 348
LECYTHIDACEAE Poit. 334
Leea Royen ex L. 178
LEEACEAE (DC.) Dumort 178
Leersia O. Swartz 1139
LEMANACEAE Gray 946
Lemna L. 947
LENTIBULARIACEAE Rich. 652
Lepidagathis Willd. 693
Lepisanthes Bl. 183
Leucaena Benth. 294
Leucas P. Brown 740
LILIACEAE Juss. 900
Limnocharis Humb. & Bonpl. 950
Limnophila R. Br. 622
LINACEAE DC. ex Gray 128
Lindernia Allioni 628
Lipocarypha R. Br. 1036
Litsea Lam. 783
Lobelia L. 481
LOBELIACEAE R. Br. 481
LOGANIACEAE R. Br. ex Mart. 549
Lophopetalum Wight & Arn. 164
LORANTHACEAE Juss. 784
Ludwigia L. 365
Luffa Miller 379
Luisia Gaud.-Beau. 879
Lumnitzera Willd. 319
Lycopersicon P. Miller 604

LYTHRACEAE J. St.-Hil. 345
Maba Forster & Forster 500
Macaranga Thousars 824
Madhuca Ham. ex Gmelin 497
MAGNOLIACEAE Juss. 21
Malachra L. 99
Mallotus Lour. 825
MALPIGHIACEAE Juss. 131
MALVACEAE Juss. 85
Malvastrum A. Gray 100
Malvaviscus Fabricius 101
Mangifera L. 188
Manihot P. Miller 829
Manilkara Adans. 497
Mariscus M. Vahl 1036
Martynia L. 668
Mecardonia Ruiz & Pavon 644
Melastoma L. 337
MELASTOMATACEAE Juss. 337
Melia L. 160
MELIACEAE Juss. 154
Melochia L. 118
Memecylon L. 338
MENISPERMACEAE Juss. 36
MENYANTHACEAE (Dumort.) Dumort. 557
Merremia Dennstedt ex Endl. 596
Mesua L. 83
Michelia L. 21
Microcarpaea R. Br. 644
Micrococca Benth. 831
Mikania Willd. 466
Millingtonia L.f. 664
Mimosa L. 294
Mimusops L. 498
Mirabilis L. 751
Mitracarpus J.A. Schult. & J.H. Schult. 431
Mitrasacme Labillardiere 550
MOLLUGINACEAE Hutch. 391
Mollugo L. 393
Momordica L. 381
Monochoria Persl 904
MORACEAE Link 848
Morinda L. 431
Moringa Adanson 190
MORINGACEAE R. Br. ex Dumort.
Morus L. 861
Mucuna Adans 248
Mukia Arn. 382
Muntingia L. 128
Murdannia Royle 915
Murraya L. 147
Musa L. 891
MUSACEAE Juss. 891
Mussaenda L. 434
Myristica Gronovius 779
MYRISTICACEAE R. Br. 779
MYRSINACEAE R. Br. 483
MYRTACEAE Juss. 324
Myxopyrum Bl. 507
NAJADACEAE Juss. 960
Najas L. 960
Naravelia Adans. 19
Naregamia Wight & Arn. 160
Nelumbo Adanson 42
NELUMBONACEAE (DC.) Dumort 42
Neptunia Lour. 296
Nesaea Comm. ex H.B.K. 349
NYCTAGINACEAE Juss. 749
Nymphaea L. 46
NYMPHAEACEAE Salisb. 46
Nymphoides J. Hill 557

Oberonia Lindl. 879
Ochna L. 153
OCHNACEAE DC. 152
Ocimum L. 742
Olea L. 507
OLEACEAE Hoff. & Link 502
ONAGRACEAE Juss. 365
Ophiorrhiza L. 434
OPILIACEAE (Benth.) Valeton 162
Oplismenus P. Beau 1139
Opuntia P. Miller 391
ORCHIDACEAE Juss. 869
OROBANCHACEAE Vent. 651
Oroxylum Vent. 665
Orthosiphon Benth. 746
Oryza L. 1142
Osbeckia L. 342
Ottelia Pers. 867
Ottochloa Dandy 1143
OXALIDACEAE R. br. 132
Oxalis L. 135
Pajanelia A.P. de Candolle 666
Pancratium L. 893
PANDANACEAE R. Br. 933
Pandanus Parkinson 933
Panicum L. 1144
Parsonsia R. Br. 522
Parthenium L. 467
Paspalidium Stapf 1150
Paspalum L. 1153
Passiflora L. 370
PASSIFLORACEAE Juss. ex Kunth. 370
Pavetta L. 435
PEDALIACEAE R. Br. 668
Pedalium Royen ex L. 669
Pedilanthus Poit. 831
Peltophorum (Vogel) Benth 284
Pennisetum L.C. Richard 1156
Peperomia Ruiz *et* Pavon 777
Peristrophe Nees 694
Perotis Aiton 1161
Persea P. Miller 784
Phaulopsis Willd. 695
Pholidota Lindl. ex Hook. 880
Phragmites Adans. 1162
Phyla Our. 719
Phyllanthus L. 832
Phyllocephalum Bl. 467
Physalis L. 606
PHYTOLACCACEAE R. Br. 765
Pilea Lindley 846
Piper L. 777
PIPERACEAE Agardh 777
Pistia L. 942
Pithecellobium Martius 299
Plectranthus L'Heritier 748
PLUMBAGINACEAE Juss. 483
Plumbago L. 483
Plumeria L. 523
POACEAE (R. Br.) Barnhart 1061
Pogonatherum P. Beau. 1163
Pogostemon Desf. 748
Polyalthia Bl. 30
Polycarpaea Lam. 66
Polycarpon L. 67
Polygala L. 63
POLYGALACEAE R. Br. 63
POLYGONACEAE Juss. 766
Polygonum L. 767
Pongamia Adans. 249
PONTEDERIACEAE Kunth 904
Portulaca L. 68
PORTULACACEAE Juss. 68
Potamogeton L. 959
POTAMOGETONACEAE Dumort 959
Pothos L. 943
Pouzolzia Gaud.-Beau. 846
Premna L. 720
Prosopis L. 300
Pseudanthistiria (Hack.) Hook. f. 1165
Pseudarthria Wight & Arn. 250
Pseudoraphis Griffith 1166
Psidium L. 325
Psilanthus Hook. f. 437
Psychotria L. 438
Pterocarpus Jacq. 251
Pueraria DC. 252
Pycnospora R. Br. ex Wight & Arn. 253
Pycreus P. Beau. 1044
Quisqualis L. 320
RANUNCULACEAE Juss. 19
Rauvolfia L. 523
Remirea Aublet 1048
RHAMNACEAE Juss. 167
Rhamphicarpa Benth. 645
Rhinacanthus Nees 696
Rhizophora L. 311
RHIZOPHORACEAE R. Br. 307

Rhynchelytrum Nees 1167
Rhynchospora Vahl 1049
Richardia L. 438
Ricinus L. 839
Rikliella Raynal 1051
Rivina L. 765
Rorippa Scopoli 51
Rotala L. 350
Rothia Pers. 254
Rottboellia L.f. 1168
Rourea Aublet 193
RUBIACEAE Juss. 405
Ruellia L. 697
Rungia Nees 697
RUTACEAE Juss. 140
Saccharum L. 1169
Sacciolepis Nash 1171
Sagitaria L. 949
Salacia L. 164
Samadera Gaertner 151
Samanea (de Candolle) Merr. 301
SANTALACEAE R. Br. 786
Santalum L. 786
SAPINDACEAE Juss. 181
Sapindus L. 184
SAPOTACEAE Juss. 493
Saraca L. 285
Sarcostigma Wight & Arn. 163
Sauropus Bl. 840
Schefflera Forster & Forster 402
Schleichera Willd. 184
Schoenoplectus (Reichenbach) Palla 1052
Scleria P. Bergius 1057
Scoparia L. 646
SCROPHULARIACEAE Juss. 613
Sebastiania Sprengel 841
Securinega Comm. ex Juss 841
Sesamum L. 670
Sesbania Scop. 254
Sesuvium L. 397
Setaria P. Beau 1174
Sida L. 102
SIMAROUBACEAE DC. 150
SMILACACEAE Vent. 903
Smilax L. 903
Smithia Ait. 257
SOLANACEAE Juss. 601
Solanum L. 609
Solena Lour. 383
Sonneratia L.f. 362
SONNERATIACEAE Engl. & Gilg 362
Spathodea P. Beau. 667
Spermacoce L. 439
Sphaeranthus L. 468
Sphenoclea Gaertner 482
SPHENOCLEACEAE Mart. ex DC. 482
Spilanthes Jacq. 470
Spinifex L. 1176
Spirodela Schleiden 947
Spondias L. 189
Sporobolus R. Br. 1177
Stachytarpheta Vahl 720
Staurogyne Wall. 698
Stemodia L. 649
Stenotaphrum Trin. 1180
Sterculia L. 118
STERCULIACEAE (DC.) Barth. 115
Streblus Lour. 862
Striga Lour. 649
Strophanthus DC. 525
Struchium P. Browne 472
Strychnos L. 554
Stylosanthes Sw. 258
Swietenia Jacq. 161
SYMPLOCACEAE Desf. 501
Symplocos Jacq. 501
Synedrella Gaert. 473
Syzygium R. Br. ex Gaertner 326
Tabernaemontana L. 526
Talinum Adanson 71
Tamarindus L. 286
Tarenna Gaertner 443
Tecoma Juss. 667
Tectona L.f. 723
Tephrosia Pers. 258
Teramnus Browne 261
Terminalia L. 320
Tetracera L. 20
Tetrastigma (Miq.) Planchon 177
Themeda Forssk. 1181
Theobroma L. 121
Theriophonum Bl. 944
Thespesia Solander ex Correa 109
TILIACEAE Juss. 122
Tiliacora Colebrooke 39
Tinospora Miers. 40
Tithonia Desf. ex Juss. 474

Toddalia A.L. jussieu 148
Tonningia Necker ex Juss. 925
Torenia L. 650
Toxocarpus Wight & Arn. 546
Tragia L. 842
Trema Lour. 847
Trevia L. 843
Trianthema L. 398
Trichosanthes L. 384
Tridax L. 474
Triphasia Lour. 149
Triumfetta L. 126
Tunbergia Retzius 705
Turnera L. 368
TURNERACEAE Kunth ex DC. 368
Tylophora R. B4. 547
Typha L. 935
TYPHACEAE Juss. 935
Typhonium Schott 944
ULMACEAE Mirb. 847
Urena L. 110
Urginea Steinheil 902
Urochloa P. Beau. 1182
URTICACEAE Juss. 844
Utricularia L. 652
Uvaria L. 34
Vallaris Burman 531
Vallisneria L. 868
Vateria L. 84
Vatica L. 85
VERBENACEAE J. Sc. Hil. 708
Vernonia Schreber 475
Vetiveria Bory e St.-Vincent 1182
Vicoa Cassini 477
Vigna Savi 262
VIOLACEAE Batsch. 59
VITACEAE Juss. 170
Vitex L. 723
Voacanga Du Petit-Thouars 532
Waltheria L. 122
Wattakaka Hasskarl 548
Wedelia Jacq. 477
Wolffia Horkel ex Schleiden 948
Woodfordia Salisb. 361
Wrightia R. Br. 535
Xanthium L. 480
Xanthophyllum Roxb. 64
Xylia Benth. 301
XYRIDACEAE Agardh 905
Xyris L. 1153
Zanonia L. 389
Zeuxine Lindl. 881
Zingiber Mill. 886
ZINGIBERACEAE Lindl. 882
Ziziphus P. Miller 168
Zornia Gmelin 265
Zoysia Willd. 1183

NBHH61