

**Ethnobotanical and Vegetation studies in  
the Attappady Valley, Kerala, India**

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**BOTANY**

*by*

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**CERTIFICATE**

This is to certify that the thesis entitled, **Ethnobotanical and Vegetation studies in the Attappady Valley, Kerala, India** submitted by Mr. HARINARAYANAN, M. K. 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. HARINARAYANAN, M. K. has successfully completed the Qualifying Examination prescribed by the University of Calicut as part of the Ph.D. programme of the University.

(M. Sivadasan)

## Declaration

I hereby declare that the thesis entitled **Ethnobotanical and Vegetation studies in the Attappady Valley, Kerala, India**, is a record of research work carried out by me under the guidance of Prof. (Dr.) M. Sivadasan and the thesis has not previously formed the basis for the award of any degree or diploma of this or any other university or examination body.

Calicut University,  
01/12/2005.



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# Introduction

# 1. INTRODUCTION

Ethnoecology deals with the study of local people's interaction with the natural environment and it includes sub-disciplines such as ethnobiology, ethnobotany, ethnoentomology, ethnozoology, etc. Ethnobotany is that part of ethnoecology which concerns plants (Martin, 1995). It is the study of how people of a particular culture and region make use of indigenous plants (Veillenx & King, 1989). Factors like geographical isolation, uniqueness of the habitat, genetic differences, etc. affect a particular human population of an area in acquiring skills, developing concepts, techniques for earning subsistence, etc., which lay base stone in the ethnoecology. The knowledge gained by the local people of a particular area is generally acquired through generations by direct interaction with nature. Hence this orally transmitted information of a particular community is not rigid but renewed continuously by time.

Harshberger coined the term **Ethnobotany** in 1895, to indicate plants used by the aboriginals (Harshberger, 1896). This term was later accepted in modern science because of its scope and wide application in all walks of human life. Jones (1941) defined ethnobotany as the study of the interrelationship of primitive men and plants. Schultes (1962 & 1979) defined ethnobotany as the relationship between man and his ambient vegetation. It was in 1916 that Robbins and others described the broad definition of the term ethnobotany which went beyond identification and cataloguing of plants used by the primitive people and attributed to this discipline a study and evaluation of the knowledge of all phases of plant life amongst primitive societies, and of the effects of the vegetal environment upon the life, customs, beliefs and history of the people of such societies. Manilal (1989) and Arora (1997) defined ethnobotany as the entire realm of useful relationship between plants and man. Ethnobotany is probably best regarded as a field of bio-cultural inquiry, independent of any specific paradigm, yet rooted in a scientific epistemology (Balee, 2003).

One of the major sub-disciplines of ethnobotany is ethnomedicine. In the Indian context, ethnobotany is deep-rooted in different systems of medicine like Ayurveda, Siddha and Unani; so the ethnic and traditional knowledge existing worldwide heavily contributed to the advancement of modern medicine. Traditional medicine differs from Ethnomedicine from its well-organized, distinct systems of diagnosis and cure (Jain, 1995).

Over 53 million tribals belonging to 550 tribal communities representing 227 linguistic groups inhabit the Indian subcontinent. The tribal communities are spread over varied geographical regions and climatic zones of the country. Their way of living varies from hunting-gathering, cave dwelling nomadic to societies with settled cultures. They live in a symbiotic relationship with the forests and so in harmony with the ecosystem. A central point of all local health traditions of the tribals and their practitioners is their independent and self-sufficient nature.

Living close to nature, they have acquired a unique and specific knowledge especially concerning the local flora and fauna and their use in medicine. This knowledge is mostly unknown to the outside world. Because of the large number of people involved and the independent identity of the tribes, the amount of information available is immense.

With the classical systems of Indian medicine, plant species utilisation is much narrower compared to the usage of plant species in the various tribal systems. Ayurveda and Siddha, use 7500 plant species (Somanadhan, 1997).

The Alma Mater Conference of World Health Organisation (WHO) in 1978 declared that the primary health care is the key for attaining the goal and identified the vital role of the herbal plants in achieving health for all. United Nations Environmental Programme (UNEP) launched a global programme namely Man And Biosphere (MAB) worldwide under MAB India. The All India Co-ordinated Research Project on Ethnobiology (AICRPE), formed under MAB India has since its inception in 1982 concentrated on a multidisciplinary approach and involved about 24 research centres in India for

the in-depth study and analysis of diverse perspectives of Indian tribal life, culture and tradition. In phase I, 1982-88 an ethnobotanical study of about 65% of the tribal areas in the country was carried out. During phase II, that started in 1989, exploration of more than 20% of the tribal areas was completed. It is still an ongoing project. The aim of the project is research of the socio-economic problems of Indian tribals and on tribal claims on uses of plants and animals in diverse fields like medicine, food, fodder and fibre. The report of this programme has categorised a total of 9500 ethnobotanically important plant species (MoEF, 1994).

The ethnobotanical information gathered from the tribal people living in the rural and forest areas in India accounts 9500 wild species. Out of 7500 wild species used for medicinal purposes, about 950 are found to be new claims worthy of scientific scrutiny (KilBride, 1998). The researchers of present-era consider ethnobotany as a cost-effective means for locating new and useful compounds of great drug and pharmaceutical value. There are about 120 pure chemical compounds extracted from higher plants that are used in medicine throughout the world and 74% of these compounds have the same or related use as the plants from which they derived (Farnsworth, 1990).

There are many examples to project the importance of Ethnomedicine which plays an important role in modern medicine. Podophyllotoxin obtained from *Podophyllum peltatum* was formerly used by Amerindians to remove warts. The cytotoxic action of this led to its modern use in treating uterine warts, which formerly required surgery. In Indian perspective the age old traditional use of *Rauvolfia serpentina* in snake poison, epilepsy, high blood pressure, etc. led to its popularized use in allopathy in the same conditions.

Ethnobotany is essentially the wealth of a particular tribal community. It could be well understood by analyzing its major categories; but very distinct demarcation between the scopes of related interdisciplinary subjects is not always possible (Jain, 1995). Anyhow the knowledge gathered by the tribal

people in a particular geographical area can be analyzed by under the following categories:

1. Ethnomedicine
2. Ethno-Animal husbandry practices and plants in other ethnozoological use
3. Plants in everyday life related to:
  - a. Agricultural practices.
  - b. Rituals, customs, myths, belief, etc.
  - c. Subsistence.
  - d. Construction timbers.
  - e. Fire wood.

As ethnobotany is a multidisciplinary endeavour, it should be easy to enumerate the fields of study that contribute to the analysis of humans' interaction with the plant world. Knowledge in botany, some linguistics, a background in anthropology, chemistry, economics, etc. contributes very much to ethnobotanical studies. There are four major interrelated endeavours in ethnobotany: (1) basic documentation of traditional botanical knowledge, (2) quantitative evaluation of the use and management of botanical resources, (3) experimental assessment of the benefits derived from plants, both for subsistence and for commercial ends, and (4) applied projects that seek to maximize the value that local people attain from their ecological knowledge and resources (Martin, 1995).

Worldwide ethnobotany is much subjected to scientific curiosity. Its role in bringing out several new finding of species for the prosperity of humanity is highly appreciated. The Ginseng, Ginkgo, etc. are examples of such species with their uses that came from the ethnic or traditional knowledge. It is from Kerala the use of *Arogyappacha*, based on the knowledge of *Kani* tribe escalated to the widely known *Jeevani*- an ayurvedic preparation used as a general rejuvenation tonic. It is observed that the importance of ethnomedicines has been highly realized by various sections of the society and a long appreciated use of herbal medicines in health care programmes is gaining momentum day by day.

The concern for nature is different in primitive groups. For example they won't kill a gaur or an elephant but prey hare, deer, etc.; not a monkey but a giant squirrel. They identify the gregarious flowering of *Pelagu* (*Strobilanthus kunthianus*) every 12 years, which yields heavy harvest from the honeycombs. They notice the arrival of heavy rain once in every 12 year. They correlate every happening in nature with their living. Their isolated dwelling in the midst of splendid natural resources regularly enriched their knowledge, evolved several myths, taboos, habits, etc. which enabled them to surpass centuries.

The tribal people identify the importance of a particular plant by oral tradition or comparison or by experimentation. Culmination of such findings make them fit to a particular geographical area. Ethnomedicines used by the tribal people of Attappady can be compared to traditional medicines like Ayurveda, Siddha, etc. but wanting a codified pharmacopoeia. The informations are scattered among the minds of several ethnic healers. In their methods of treatment, they utilize not only plants but also clay, *silajit* - like mineral matters, flesh of some kinds of animals and also many mystic verses and prayers – psychological healing practices. There are medicines having curative, protective and promoter in action among the ethnobotanical knowledge.

Their way of treatment resembles other ethnic practices among various Indian tribes. It is noticed that the *Yandes* and the *Irulas* of south in all delivery cases give the patient a decoction of some wild herbs as an effective cure to all antinatal ailments (Jaggi, 1982). *Irula* women do not allow midwives to help them but entrust the job to their own husbands. *Santals* use tubers of *Curculigo orchioides* to treat impotence while *Irulas* utilize the root of *Mucuna pruriens*. Different uses of same medicine are also seen among different tribes. For example *Boerhavia diffusa* roots are employed in the treatment of rheumatic pain among Himalayan ethnic communities (Rajwar, 1983), while *Irulas* of Attappady use the same plant part for healing wound caused by wild boar attack.

It is estimated that more than 300 million indigenous people live in more than 70 countries in habitats ranging from Arctic to the rain forests of Asia. China and India together have 150 million indigenous tribal people. At least 5000 indigenous group can be distinguished by linguistic and cultural differences and by geographic separation (Maheshwari, 1996). These tribal populations depend on the local vegetation for curing most of their ailments. The wide range of ecotypes or cultivars of crops existing within these under-exploited or less modernized tribal farms offer a solution for the erosion of genetic diversity.

With the opening of new vistas of ethnobotanical studies, its scope has now widened in terms of the theoretical contributions to an understanding of plant-human relationships, as well as for the practical applications of the biological knowledge of tribal people in medicine, agriculture, health and industry. The uses of medicinal plants among the tribes in the treatment of various ailments are found unique in most cases. The geographic isolation of the area and different life-style followed by the tribal people lead to the development of their own way of dealing in all walks of life by utilizing the surrounding biodiversity.

The data collected through various ethnobotanical exploration methods, and stored in the form of documents, including photographs, films, herbarium specimens, raw drugs, etc. are to be protected from deterioration, and such materials must be protected from misuse by other people. Simultaneously the data collected should be protected through the rules of Intellectual Property Rights (IPR).

Ethnobotanists have traditionally directed their efforts towards one or two goals. Economic botanists sought to discover new natural products of commercial value, often for the benefit of the developed world, whereas ethno-environmentalists focused on achieving a theoretical understanding of how people perceive and manage the environment. Since the late 1960s, many ethnobotanists, building upon and modifying these early goals, have directed their attention to applying the results of their research to conservation

and development problems. The community projects in which they participate have various goals, including return of the research results to host communities, strengthening traditional systems of agricultural production, encouraging rational use of plants in health care and promoting traditional ecological knowledge (Martin, 1995).

In the relatively new scientific field of ethnobotany, plant scientists work with tribes, farmers, and ethnic healers to study how local plants are utilized in their day to day endeavours. While they have been concerned mainly with cataloguing these plants, contemporary ethnobotanist more collaborating with chemists analyze the compounds present in these plants; with agriculturists and foresters to identify new and feasible crops; and with anthropologists to gather more information on traditional cultures. The new synthesis in ethnobotany has generated a vast array of indigenous knowledge that is very much relevant to the conservation of biodiversity and the sustainable use of plant resources.

Briefly, ethnobotanical exploration and documentation among the ethnic groups are the need of present era where chances of cultural mixing up and adoption of modern technologies in all fields of life is happening. Due to rapid globalization, it is evident that the erosion-rate of knowledge base among the tribal people is high and the chances for getting the ethnic knowledge documented for the welfare of entire humanity are diminishing. Attappady Valley aboding tribal communities with a wealth of knowledge on plants were hence chosen to investigate on the ethnobotanical aspects with the following objectives:

1. To identify and describe the vegetation types.
2. To document the ethnobotanical knowledge of Attappady Valley
3. To study the taxonomy of ethnobotanically important plants.
4. To identify plants of the Non-Wood Forest Products (NWFP) category in eco-restoration activities of degraded lands.



Review of  
Literature

## 2. REVIEW OF LITERATURE

Ethnobotany is a rapidly expanding science. In the past nearly three decades it has considerably expanded, both in its concept and scope. Beginning with study of plants used by tribals for food, medicine and shelter it now includes studies like conservational practices of tribals, ethnopharmacology, ethnopharmacognosy, ethnomusicology, ethnogynaecology, etc. The literature on the subject is piling up at a very rapid pace.

Prior to the coining of the term ethnobotany, usage of plants by human beings found place in Sanskrit, Greek and Arabic literature, ethnographics, travelogues, herbals, etc. Later, systematic compilation works like *Indo-European Folk Tales & Greek legends* (Halliday, 1932), *Food and drinks in ancient India* (Ray, 1933), *Food and Drinks through ages, 2500 B.C to 1937* (Anonymous, 1937), *The economic plants of the Bible* (Moldenke, 1954), *Glossary of vegetable Drugs in Brahttrayi* (Singh & Chunekar, 1972), *Economic plants of ancient North China as mentioned in Shih Ching* (Keng, 1974), *Flora and Fauna in Sanskrit literature* (Banerjee, 1980), etc. appeared.

The term ethnobotany was coined by Harshberger in 1895 and the subject included mere identification and cataloguing of plants used by the primitive people (Harshberger, 1896). Robbins, Harrington and Marreco (1916) promulgated the broad definition of ethnobotany and considered it as a study and evaluation of the knowledge of all phases of plant life amongst primitive societies and effect of the vegetal environment upon the life, customs, beliefs and history of the people and gave emphasis on the linguistics. Cotton (1996) broadly defined this as traditional botanical knowledge. Now, ethnobotany is considered as an interdisciplinary science, in which many subjects like ethnology, linguistics, archaeology, agriculture, pharmacology, medicine, ecology, etc. are intertwined with anthropological botany, where the works are being taken up by variety of groups of workers like the botanists, the anthropologists, the ethnologists, the linguists, the sociologists, the paleobotanists, the archaeologists, the agriculturists, the geneticists, the geographers, and several others.

*An introduction to ethnobotany* (Faulks, 1958) is one of the important books on ethnobotany. It deals with (i) the goods and services obtained from vegetation for food, drink, inhalants, fumitories, masticatories, shelter, fuel, equipments, medicine, transport, rituals, disposal of wastes, control of pests along with means of production consumables, (ii) physical and psychological troubles caused by vegetation, i.e. food and drinks spoilage, disease and pests of plants and animals, irritants, (iii) influence of man on vegetation by way of destruction, conservation, etc., and (iv) relationship of vegetation with human civilization, i.e. selection of economic species, organized production, etc. It includes most of the topics of economic botany in general. The knowledge of plants that has come orally through generations and which normally forms the significant subject matter under ethnobotany was not discussed in this book except a few instances in historical perspective.

*The Nature and Status of ethnobotany* (Ford, 1978) contains 17 papers on various issues of ethnobotany. While the concept of ethnobotany has been elaborately dealt with in some of the papers, others are mostly of anthropological origin. Here also the empirical knowledge about the plant wealth finds little space.

*Glimpses of Indian Ethnobotany* (Jain, 1981) is the first book dealing purely with Indian ethnobotany. It has a compilation of articles on field studies in different phyto-geographical areas of India. The subject has also been dealt in general including historical perspectives of plants in folk life, songs, proverbs and tales. The book contains tribal uses of more than 1500 plants in different parts of our country, mostly recorded based on field studies in remote villages and forests. *Contribution to Indian Ethnobotany* (1989), *The Dictionary of Indian Folk medicine and Ethnobotany* (1991), *A Manual of Ethnobotany* (1995), are some of the major works of Jain. In 1984 Jain and others published a *Bibliography of Ethnobotany* and compiled a *World Directory of Ethnobotanists* (Jain *et al.*, 1986).

Menon (1996) edited a monumental work *The Encyclopaedia of Dravidian tribes* in three volumes which contains the historical perspective,

and anthropological as well as linguistic studies of Dravidian tribes. *Isthmian ethnobotanical Dictionary* by Duke (1986) is a reference book dealing with herbal folklore on tropical plants. The science of ethnobotany (Balick & Cox, 1996) is another significant contribution in this field of science. Balick (1996) explained the importance of ethnobotanical findings in the welfare of human beings.

## **2.1. Ethnobotany- An Overview**

Considering variety of interdisciplinary approaches to this subject, several hundreds research papers and general articles have appeared in a variety of publications, ranging from popular magazines, semi-scientific journals to the periodicals of very specialized nature, such as in Anthropology, Botany, Pharmacology, Traditional Medicine, Archaeology, Social Sciences, etc. Shah (1995) divided the ethnobotanical researches undertaken in different parts of the world into the following five categories: General ethnobotany, Classical ethnobotany, Paleoethnobotany, Ethnomedicine, and Ethnoagriculture.

Under ethnobotany the tribal people are generally studied with various aspects such as ethnology, anthropology, linguistics, history, folk taxonomy, etc. Such studies are undertaken by a team of interdisciplinary workers (Conklin 1967; Brown, 1977 & 1984). The ethnoarchaeobotany deals with the study of the excavations of archaeological remains such as seeds, pollens, wood remains, etc. as exemplified by the works of Chowdhari (1963), Renfrew (1973), Saraswat (1980), and others. The study of plants in the carvings and sculptures of the archaeological monuments or remains helps in knowing the earliest uses of plants in different periods. The works of Hasan (1963), Gupta (1971) and Sithole (1976) are some of the well-known studies in Indian tradition.

The ethnomedicobotany is of pharmacological perspective, which seeks the potential efficacy of the tribal or indigenous herbs in biological terms, as exemplified by the works of Wade Davis (1983b), and Montellano & Browner (1985). Harvey & Armitage (1961) and Kleiman (1973) studied plants

as part of a particular cultural system of beliefs and practices related to health and healings. Bodding (1927), Schultes (1962), Jain (1965), Morton (1975, 1977 & 1980), Sinha (1996) and contributed much on medicinal plants used by the human society.

The agricultural practices and harvesting techniques, etc. adopted by a tribal group or in an ethnic region, the origin, evolution and domestication of agricultural crops, etc. were studied under ethnoagriculture. The works of Barrau (1973), Ruddle (1979) and Phalen (1981) are some of the valuable contributions in this field of study.

## **2.2. Ethnobotany world over**

The modern approach to the science of ethnobotany evolved in the U. S. A. and the prominent centre for the ethnobotanical study is the Botanical Museum of the Harvard University in Massachusetts. Works of Schultes, Gordon Wasson, Siri von Reis Altschul, Timothy Plowman, E. Wade Davis are worth mentioning. Richard Evans Schultes conducted ethnobotanical exploration in regions like Oklahoma, Oaxaca, Mexico, and Amazon during the mid 20<sup>th</sup> century, and studied especially the hallucinogens, medicinal and toxic plants (Schultes, 1954, 1963a-c; Schultes & Raffauf, 1990).

Gordon Wasson is well known for his ethnomycological work who mainly studied the divine mushroom, *Ammanita muscaria*, which he claimed to be the plant of immortality, the *soma* (Wasson, 1969). Wade Davis made contributions in different fields of ethnobotany like general ethnobotany, group ethnobotany, ethnomedicine, etc. (Wade Davis, 1983a-c; Wade Davis *et al.*, 1983). In 1930, Melvin R. Gilmore founded the first ethnobotanical laboratory in the world at the Museum of Anthropology, University of Michigan. The primary purpose for this laboratory was to identify plant remains from archaeological sites.

Gunther (1945) conducted detailed ethnobotanical studies in the Western Washington area in U. S. A. In the field of classical ethnobotany and cross cultural studies of plant terms, or for studies in the classification of

plants by native people - folk taxonomy, the works of Berlin (1992), and Brown (1977 & 1984) are well known.

Samual, as early in 1800, reported the folklore of Tibet. Ethnobotany of Satars, an important tribe of Nepal, was reported by Siwakoti and Siwakoti (1999). Ethno-medico-botanical knowledge among the tribes of Bangladesh was reported by Rahman (1999), the ethnobotanical wealth of *Druk-Yul* tribes of Bhutan reported by Bhattacharyya (2003). Anderson (1985), investigated ethnobotany of *Akha* tribes of Thailand and reported 121 species and the medicinal uses attributed to them. Bhat *et al.* (1990) have reported 52 species of plants from Central Nigeria mainly of ethnomedicinal uses. Gill *et al.* (1993) documented 80 plant species of *Esan* people of Nigeria.

Presently, much emphasis is being given all over the world on Ethnomedicine or ethnomedicobotany and search for new therapeutic herbal drugs is in progress. Articles on this subject are being published in the journals like *Ethnopharmacology* (Ireland), *Economic Botany* (U. S. A.), *Fitotherapia* (Italy), *Journal of Economic and Taxonomic Botany* (India), *Bulletin of The Botanical Survey of India* (India), *Journal of Non-Timber Forest Products* (India), *Indian Journal of traditional knowledge* (India), *Natural Product Radiance* (India), *The Indian Forester* (India) and *Ethnobotany* (India). The World Health Organisation is also taking interest in this field and encouraging for research on traditional medicine in developing countries (Anonymous, 1977).

In 20<sup>th</sup> century alone, hundreds of groups of native people have become extinct or completely acculturated as their living areas were encroached upon by development. Ninety two tribes of Amazon Indians have disappeared since the turn of the century. Each group of Indians has different botanical knowledge from its neighbours, which is lost with the tribe. The number of food plants and medicinal plants available in the markets has been reduced. The ethnobotanical information needs to be utilized and integrated with the process of development. The preservation of ethnobotanical diversity

in the prevailing ecosystems should form an important item in any overall plan for tribal development in forest areas (Masheshwari, 1980).

The present review shows that ethnobotany is an interdisciplinary science, which involves a number of subjects like botany, ethnology, linguistics, archaeobotany, palaeobotany, pharmacology, toxicology, medicine, etc. and botanists, anthropologists, ethnologists, linguists, pharmacologists, agriculturists, geneticists, geographers, ayurvedic physicians, hakims, etc. are doing research work on this subject.

### **2.3. Ethnobotany in India**

Dr. E. K. Janaki Ammal (1956) initiated some studies in India on subsistence food and ethnobotany. Now, active ethnobotanical works are being conducted by the Botanical Survey of India, Central Council for Research in Ayurveda & Siddha, Central Council for Research in Unani Medicine, National Botanical Research Institute, Lucknow, National Bureau of Plant Genetic Resources, Delhi, Birbal Sahni Institute of Palaeobotany, Lucknow and Central Institute of Medicinal and Aromatic Plants, Lucknow, a number of Colleges and Universities. Since 1960, ethnobotanical research has experienced an upsurge in India. It was S.K. Jain, who streamlined the subject, trained and prompted a number of students in ethnobotanical research.

Kamboj and Dhavan (1982) reviewed the work on plants for fertility regulation in India. Ravi Sanker and Henry (1992) studied the ethnobotany of Adilabad District and brought out ethnobotanical information of 30 species used by *Gonds*, *Kolams*, *Lambadis*, *Naikponds* and *Pardhans*. Dutta and Nath (1998) described the medicinal uses of 63 plant species practised by the Mongoloid aboriginal, the *Deories* in Assam. Studies on ethnic medicines of Rajasthan were conducted by Joshi (1995). He noticed the use of about 250 species of angiosperms from the State. Sebastian (1984) also studied the ethnobotany of tribes of Rajasthan. Sinha (1996) identified 68 herbal medicines from the herbal vendors of Delhi and its suburbs. D'Souza (1996)

compiled the vast herbal knowledge of Bhil tribes of Maharashtra and Gujarat, in which the uses of about 150 plants are explained.

The *Society of Ethnobotanists* is also contributing to the science through its various activities like publishing news-letter, holding seminars and the training courses. Jain (1991) published a very resourceful dictionary of Indian folk medicine and ethnobotany. The society has brought out a World Directory of Ethnobotanists, which enlists about 500 workers, with their addresses and areas of interest (Jain *et al.*, 1986) and a bibliography of ethnobotany (Jain *et al.*, 1984). Studies on south Indian tribes, which mainly covers the anthropological aspects, by Thurston (1907) and Luiz (1962) are very significant. Pillai *et al.* (1989) studied the socio-economic condition of the tribes of Attappady region. Singh (1994) compiled most of the published information on anthropological, cultural and sociological aspects of the scheduled tribes of India. Verma (1995) provided a brief account on the tribal situation in India with the statistics of tribal population. Maheshwari (2003) edited a voluminous work on ethnobotany, covering the information from the entire Indian subcontinent.

Binu and others (1992) provided a comprehensive summary of ethnobotanical research carried out in different states and Union territories of India until 1991. Many ethnobotanical studies have been directed to special ailments. Jain (1967) enumerated about 200 plants associated with healing of broken or damaged bones. Tarafder (1983a & b) wrote on herbs used in gynaecological problems and fertility. As the forest dwellers often suffered from snake-bite, remedies for snake-bite are commonly reported. Roots of *Aristolochia indica* are considered as an antidote to snake venom in Bihar. Details on the anti-poisonous use of the species of *Aristolochia* used among *Kani* tribe of Kerala were reported by Rajasekharan and others (1989). Medicinal plants used by the *Kani* tribes in Tirunelveli Hills of Southern Western Ghats were reported by Ayyanar and Ignacimuthu (2005) in which uses of 28 plant species were documented for the treatment of poisonous bites and skin diseases. Handa (1986) and Jana *et al.* (1997) studied the ethnomedical properties of Indian orchids and their therapeutical applications.

Reddy *et al.* (2005), made detailed studies on the ethnobotany of nine orchid species of Eastern Ghats in Andhra Pradesh.

#### **2.4. Ethnobotanical investigations in the study region**

Iyer (1912) worked on the anthropological as well as sociological aspects of tribes of Cochin, which also included Malabar area. The studies carried out by Pisharoti (1935), Gnanambal (1952), and Mukherjee (1953) were also mainly with an anthropological point of view. Manilal (1981) reported on 26 primitive varieties of rice used by different tribes in Malabar, which inspired many botanists to undertake many challenging ethnobotanical studies. Radhakrishnan and others (1996a) documented the lesser known ethnomedicinal plants of Kerala. Radhakrishnan *et al.* (1996b), and Raveendran (1996) studied the edible wild plants utilised by the tribes of Kerala. Suresh Kumar (2001) conducted the ethnobotanical investigations on aphrodisiac and anticancer activities of wild orchids of Southern Western Ghats.

The Nilgiris of Western Ghats provided an excellent platform to the enthusiastic ethnobotanists because of the age-old tradition of tribes settled in its beautiful valleys. Rajasekaran (2000) studied the ecology and utilization of medicinal plants with special reference to selected tribal groups in the Nilgiri Biosphere Reserve. Raghunathan (1976) recorded several ethnic health-care practices of the tribal pockets of Nilgiris. Rajan (1992) documented the medicinal plants of Ootacamund in Nilgiris. Hosagoudar and Henry (1996a & b) studied the ethnobotany of *Kadars*, *Malasars* and *Muthuvans* of Anamalais and *Irular*, *Kurumbar* and *Paniyar* of Nilgiris. Henry *et al.* (1996) reported the ethno-medico-botany of the Southern Western Ghats of India. The medical lore of 125 potential medicinal species used by *Todas* of Nilgiris are recorded in this work. Mathur (1977) explained the tribal situation in Kerala in which several case-studies were discussed about the tribal-land alienation and indebtedness especially among the *Irulars* of Attappady. As part of the AICRPE under MAB programme, in 1982 the ethnobotany of tribals of Western Ghats was studied by The International School of Ayurveda, Coimbatore, and the

study included a preliminary account on the tribal situation in Attappady valley and documentation of about 64 species ethnobotanical with ethnobotanical significance (Damodaran & Panicker, 1989). Raghunathan (1976) carried out documentation of medicinal plants and the ethnic health-care practices among different tribal groups of Nilgiris in Tamilnadu. Medicinal uses of 93 plant species in the treatment of various ailments were briefly described and a list of 16 wild species with edible parts was also provided in the work.

Studies on NWFPs are also very important in the tribal life, because it is sometimes the only livelihood option of many tribal people. Ganeshan (1993) in a study from Mudumalai, within the Nilgiri Biosphere Reserve in Tamil Nadu, explained the collection and sales of 19 items through LAMPS, a tribal society with an increase in the lease amount paid and number of tribals involved in collection from 1986–1992. In a recent study (Moorthy *et al.*, 2003) collection and marketing of ten NWFPs from three places of Tamil Nadu namely Pollachi, Sathyamangalam and Kolli hills have been reported. Low wages accrued and long distance travel was reported as major constraints. In certain sites NWFP are reported to have auctioned for public while the tribal Societies failed to appear. In a study of Anil *et al.* (1996) in a *Malaya* tribal hamlet at Peechi-Vazhani Wild Life Sanctuary where 2.7 lakh rupees they received from the sale of NWFP during 1994 – 1995.

Extraction scenario of NWFPs in Kerala is unique and is very different from the rest of the world. Forests of Kerala were rich in biodiversity, forms the supply-base of the popular traditional systems of medicine and there is a high demand for the variety of plants that grow in the forest floor. The local market offers opportunity for a wide spectrum of trees, herbs, shrubs, climbers etc. The right for collection has been entrusted to the tribal population, living inside or in the forest fringes. They possess skills and traditional knowledge in collection and processing of plant parts. The collection and marketing has been monopolized by the Girijan Co-operative Societies by the Government in 1978 and the control of these bodies by an apex body known as the Federation in 1981.

Patterns in forest dependent life styles of a hunter-gatherer community of Nilambur Valley, known as the *Cholanaickans* were attempted by Anita (1993). In this work she has compared two settlements in relation to its proximity of external influences with that of foraging group formations foraging efficiency and time budgeting in gathering forest products. Comparison of the settlement inside the forest in relation to its proximity to town or market reveals very interesting results. Change in life style, resource requirements, utilization pattern etc. of settlement were looked at. Farthest settlements depend on forest to a great extent utilizing the resource more efficiently while the nearer ones have been using items replaced by easily available commodities. Settlement nearer to the town collects more of commercial produce. While at the farthest settlement gathers food and retain its traditional quality. The foraging group size, composition and efficiency for collecting various resources for subsistence and for market have been analyzed with respect to the proximity of these settlements to town.

A study on the economics of collection, marketing and utilization of NWFP's in Kerala was carried out by Shankar (1999). It has been found that of the 114 products listed; only 23 items were collected during his 16 years of study. Presence of Federation found to have improved the sales. There was found to have an increase in the number of Societies engaged in collection and a definite increase in the number of products marketed which shows that the Federation and Societies have tended to concentrate on a few commercially important products. The increase in quantity of key products is attributed to increase in prices and number of Societies involved in collection. The share of collectors did not increase and hence the Societies were benefited. Higher collection charges are provided for *Acacia concinna* and for the low demand products like *Sapindus laurifolius*, higher charges were paid to sustain the collection. Over years, increase in sales for the key products was attributed to increase in number of Societies engaged in collection, higher prices and higher share of collectors.

In a study carried out by Muraleedharan *et al.* (1997), on sustainable use of NWFPs in the Western Ghats, Kerala, products collected by the

*Kattunaickans* of Wayanad, the *Cholanaickans* of Nilambur Valley, and the *Irulas* of Attapady. Of the 229 NWFP species recorded from the study area, some are commercially exploited.

Landuse changes and its impact on the socio economic conditions of three tribals namely the *Kurichiyans*, *Kattunayackans* and the *Paniyans* in Wayanadu was carried out by Anita (1996). The landless, land-owned and the labour class among these groups and their dependence on the forest with change in land use was attempted. Gathering of forest products by the *Kattunayackans* and income generated through extraction has been attempted.

Ethnobotanical aspects of Chinnar Wild Life Sanctuary were studied by Ramakrishnan *et al.* (2000) and details of 141 species were reported. Kumar and Madhusoodanan (1998) reported the importance of 4 rare ferns of Chinnar Wild Life Sanctuary. Sajeev and Sasidharan (1997) also worked on the ethnobotany of the tribes of the same area. Bhat and Nesamani (1981) reported some of the ethnic medical practices and folklores in Idukki district. Kumar (2004) studied the floristics and tribal usage of Shola plants, and identified the use of 188 species by the *Muthuva* hill tribes. Johncy (2004) studied the ethnobotany of *Muthuva* hill tribes of Devikulam taluk, and noticed the toddy - tapping methods in wild palms, 145 single plant remedies for various ailments, 31 wild food plants, etc. Augustine and Sivadasan (2004) reported the ethnomedicinal usages of 66 species among 5 tribal groups in Idukki District.

In 1988 Pushpangadan and others published the astonishing finding of *Arogyappacha* of *Kani* tribe. Rajendran and Henry (1994) reported 41 species of plants used by the Kadars in Anamalai Hills.

The ethnobotany of Kannur district was reported by Ramachandran and Nair (1981) Thomas and Britt in 1999 surveyed the ethnobotanical information of Naduvil Panchayath in Kannur District. Binu (1999) reported the use of 323 ethnobotanically important species from the Pathanamthitta District which included six fern species and a gymnosperm.

Sankaranarayanan and Sashiraj in 1988 collected the ethnobotanical information from *Irula* tribes of Sholayur Panchayath area of Attappady. Ethnomedicines and tribal health status were dealt with several tribal groups in Kerala including *Kurumbas* of Attappady by Viswanathan Nair (1985). Some folklore medicines of *Irula* tribes of Attappady was listed by Gopalakrishnan and Krishna Prasad in 1992. A detailed ethnobotanical study conducted among the *Irulars* of Tamil Nadu by Ramachandran and Nair in 1981, broad to light the uses of 138 species of medicinal plants. The ethnobotanical value of 51 plant species was listed by Nadanakunjidam (2003).

As tribal people are more or less dependant in all walks of life on their surrounding forest areas, detailed studies on vegetation is important in assessing ethnobotanical information. The land degradation in Attappady was studied by Hoeschele in 1998, and detailed report on landuse, political, economic, cultural and ecological aspects were provided. In 1991, the human ecology and eco-restoration of Attappady valley was studied by Muraleedharan and Sankar in which vegetation as well as cultural aspects of tribal people are discussed in detail. Detailed vegetation studies were carried out in the Attappady Valley by Ganapathy (1980) and Basha (1987). in addition to the vegetation studies, Ganapathy (1980) conducted detailed studies on man-forest interactions and its implications on ecology and management, in which a brief account of ethnobotanical uses of plants were also provided.

Viewed in the light of the above works, it is obvious that ethnobotany of Kerala still demands an elaborative and in-depth study and it is in this backdrop the present study has been undertaken.



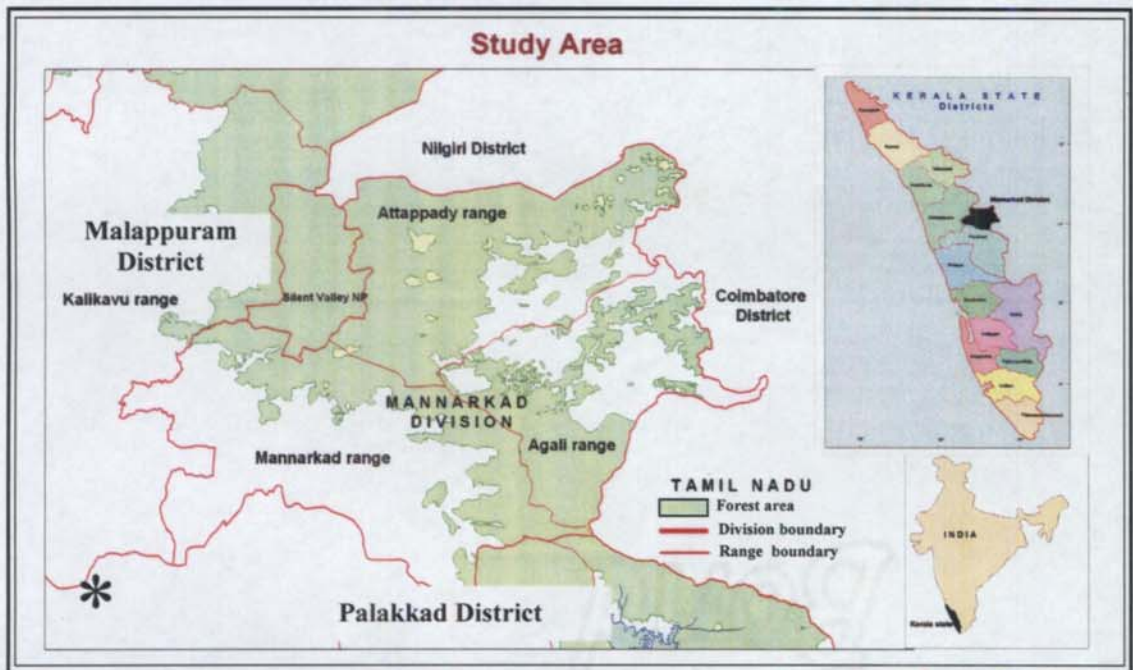
Study area  
and people

### 3. STUDY AREA AND PEOPLE

#### 3.1. Study area

Attappady Valley is situated in the portion of Western Ghats in Kerala State, between 10° 55' and 11° 14'N latitude and 76° 27' and 76° 48'E longitude (Fig. 1). This plateau is situated in the Mannarkad Taluk in Palakkad District of Kerala State. The area is bound on the north by the Nilgiri District and on the South by the Coimbatore District of Tamil Nadu State. The northwest boundary of Attappady is Malappuram District of Kerala State, and plains of Palakkad District are on the western side. The area is accessible by an all- weather road from Coimbatore in Tamil Nadu and from Mannarkad in Kerala. The entire Attappady plateau is the drainage basin of Bhavani River (Plate 1A), where Siruvani (Plate 1B), Varaharpallam, Kodungarapallam and Kunda are the major tributaries.

Fig. 1. Location Map of Attappady Valley



The total area of Attappady is 765 km<sup>2</sup> and is located at the eastern portion of Mannarkad Taluk. The entire area comes under three Grama

Panchayats namely Agali, Pudur and Sholayur, covering six revenue villages, viz. Agali, Kallamala, Pudur, Padavayal, Sholayur and Kottathara. Out of the total 765 km<sup>2</sup> geographical area, 465 km<sup>2</sup> is classified as forests., comprised of 293 km<sup>2</sup> as Reserved Forests and 172 km<sup>2</sup> as Vested Forests (nationalized private forests). The Reserved Forests are: 1) Silent Valley National Park – 89 km<sup>2</sup> (not considered for the present study), 2) Attappady Reserved Forests (Block I to V) – 140 km<sup>2</sup>, 3) Muthikkulam Reserved Forests (Block VI) – 64 km<sup>2</sup> (Ganapathy, 1980; Sathis, 1989). The remaining area is under private holdings.

### **3.1.1. Physiography**

Attappady is an east- sloping plateau. The watershed line at Mukkali comes about 550 m. asl and ascends to north to about 2300 m. asl at Nilgiris, and to south 3000 m. asl at Muthikkulam. The southern hills continuing from Muthikkulam forms the southern boundary and southern slopes of Nilgiris forms northern boundary. Eastern boundary is a series of rocky hills where the slope is gradually merging with the elevated plains of Tamil Nadu. The Malleeswaran mudi is of an altitude of 1664 m. msl which can be seen from the majority of tribal hamlets of Attappady and is the sacred mountain of all the three tribal groups (Plate 1C).

### **3.1.2. Climate and Rainfall**

Generally two climatic regimes are noticed in Attappady where the western portion is wet, warm and humid, while the eastern portion is dry and warm. The southern and western Attappady receives good rainfall, about 3000 mm on an average, majority- 68% from South-West monsoon, during June–September, 19% from the north-east monsoon, and 13% during the off season (Table 1a). Relatively dry tracts of northeast as well as eastern Attappady receives an average rainfall below 1000 mm, mainly from northeast monsoon showers. In the whole Attappady plateau, two main regimes of rainfall based on distributional pattern with a transitory stage can be recognized (Ganapathy, 1980). The rainfall data from Vattulakky meteorological observatory, located in the Eastern Attappady (Karat *et al.*,

2004) shows that the maximum amount forms 65% of rainfall is obtained from North-East monsoon, 27% from South-West monsoon, and 8% on the off season (Table 1b). Rain fall data of Mukkali meteorological observatory in Western Attappady shows the maximum precipitation is obtained from South-West monsoon (Basha, 1987).

Table 1a. Rainfall in Western Attappady (Mukkali Station)

| Sl. No | Period                  | Rain fall (mm) | Percentage |
|--------|-------------------------|----------------|------------|
| 1      | June-September (S.W.)   | 1536           | 68         |
| 2      | October-December (N.E.) | 430            | 19         |
| 3      | January-May             | 294            | 13         |
|        | Total                   | 2260           | 100        |

Table 1b. Rainfall in Eastern Attappady (Vattulakky Station)

| Sl. No | Period                  | Rain fall (mm) | Percentage |
|--------|-------------------------|----------------|------------|
| 1      | June-September (S.W.)   | 184            | 27         |
| 2      | October-December (N.E.) | 440            | 65         |
| 3      | January-May             | 58             | 08         |
|        | Total                   | 682            | 100        |

### 3.1.3. History of Attappady

Earlier the entire Attappady area belonged to the Zamorins of Kozhikode. British government reserved 290 km<sup>2</sup> of forest in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries. During 1950's, entire Attappady area remained as forest land, except some pockets where coffee and cardamom plantations were established.

The ownership of the private land in Attappady was with the three owners under Zamorins of Kozhikode. In anticipation of nationalization of private forests in Kerala during 1950's they started giving away the right to extract timber to contractors which resulted massive timber extraction which was the initial causal factor of denudation of Attappady (Sathis, 1989). The nationalization of private forests in 1971, influx of settler population in Attappady, land utilization changes by the starting of plantations – both private and public, utilization of reserved forests for sleepers and plywood during the colonial as well as post - independence period degraded and denuded of a good portion of the forest areas. The whole plateau was under

the virtual ownership of Zamorins of Kozhikode. In 1790, a part of the area came under the control of British administration. About 119 km<sup>2</sup> forest areas were acquired by land acquisition act for Rs. 1.03 lakhs. It was under British rule that 204 km<sup>2</sup> of area in Attappady was brought under Reserved Forest during the period 1900 to 1912. This was against the Government decision to protect evergreen forests. During the early 20<sup>th</sup> century the land was handled by *janmis* leased or sold the majority of area to private parties. It was a regular practice to give license to clear - fell large areas and to give on lease for cultivation. In anticipation of nationalization of private forests by the Government of Kerala, the landowners gave contract to clearfell their lands to retain ownership. The reason for forming motorable roads criss-cross in Attappady was for transporting timber obtained from clearfelling. As observed by a tribal at Jellippara, the timber of a single rose-wood tree was transported in 12 lorry loads.

The persons who took land for lease for a negligible amount of money became the owner of the land by way of the Land Reforms Act (1959) of the Government of Kerala promulgated in the late fifties of the 20<sup>th</sup> Century. The new landowners of western Attappady indiscriminately felled the trees and planted lemon grass and distilled it by burning the rest of trees. This can be observed in Jellippara, Karara, Ommala areas where lemon grass exterminates natural vegetation; while in the eastern Attappady where poor regeneration of trees and drought resulted in fallowing the agricultural lands, or conversion to dry land farming. Under these circumstances the inflow of settlers from south Kerala increased. During 1960–1970 these settlers encroached and occupied all the accessible fertile areas.

Under Vesting and Assignment Act of 1972, 172.07 km<sup>2</sup> in Attappady area was vested. This was implemented only during the late 1970's and the time lag experienced in the implementation, deteriorated forest which was under private ownership. Thus the present extent of forest area in Attappady is 465 km<sup>2</sup>. The present forest area in western Attappady is comprised of Moist Deciduous Forest, Semi-Evergreen Forest, Wet-Evergreen Forest, Forest plantations, Sholas and some patches of grasslands, while in eastern

Attappady the predominant natural vegetation is Dry-Deciduous Forests. Dry thickets and some private and forest plantations are also remaining. Started in 1996, under Attappady Wasteland Comprehensive Environment Conservation Project, Attappady Hills Area Development Society (AHADS) is involved in greening 507 km<sup>2</sup> of wasteland or degraded forestland through eco–restoration activities (AHADS, 2000).

### **3.2. Ethnic Communities**

There are three ethnic communities inhabiting in the Attappady Valley. The *Nannangadis* (burial earthen pots) unearthed from the plains of Koodappetty (Plate 1D) proves the existence of human habitation of the area in pre-historic times. During mid 1980's there were 138 tribal hamlets whereas during 2003 the number of hamlets increased to 187. As per the Census report of the Government of India, there are 24228 tribal people in Attappady (Anonymous, 1991). *Irulas*, *Mudugas* and *Kurumbas* are the three tribal groups in Attappady with a population of 24,370, 2746 and 1862 respectively (Dirar, 2002). Tribes of Attappady Valley belong to the Dravidian linguistic group. Among these groups, *Kurumbas* are treated as primitive tribes by Government of India, based on pre-agricultural level of technology, very low level of literacy and stagnant or declining population. *Muduga* and *Irula* tribes adopted more modern agricultural practices during the recent decades because of their close association with the Tamil as well as Malayali settlers in Attappady.

#### **3.2.1. Irula**

*Irula* tribe is the dominant tribal group in Attappady Valley. *Irulas* are living in the Eastern valley of Attappady where the rainfall is scarce (800-1800 mm). Plenty of pastoral lands are available and a good population are following partially a pastoral way of living. According to Thurston (1907) the name of this tribal group indicates their very dark complexion (Plate 1E). Apart from eastern Attappady, their geographical distribution in Nilgiris extends to Gudalur, Coonoor and Kotagiri Taluk of Nilgiri District. There are 13 clans of *Irula*, of which 12 are present in Attappady (Menon, 1996).

Plate 1. Study area



A. A view of River Bhavani



B. Siruvani River



C. A scene of sacred mountain peak - Malleeswaran Mudi



D. *Nannangadi* unearthed from Koodappetty



E. An Irula couple

They consider the Attappady Valley as their *ulakam*, the *Kurumba* as superior and *Muduga* as equal even though the *Muduga* consider the *Irula* as inferior. *Kurumba* and *Muduga* inter-marry, but not *Irula*. Most of the *Irulas* possess their own land and practise dry land farming and cultivate several millets, cereals, legumes, etc. following mixed cropping pattern. With failure of agriculture and loss of land, *Irulas* have turned to wage labour.

### **3.2.2. Muduga**

They are the second largest tribal group in Attappady. They live in medium altitude and medium rainfall (1800-3000 mm) locations in the western Attappady. *Mudugas* arrived in Attappady before *Irulas*. There are three exogamous groups among *Mudugas* (Menon, 1996). They are at present agricultural labourers in settler farms.

They practice mixed cropping pattern in their *panchakkadu* (farm land) and follow limited cultural operations in the farm. Formerly they were practicing shifting cultivation but forced to do settled agriculture. They cultivate majority of the crop plants of *Irulas*' and also several cash crops and plantation crops.

### **3.2.3. Kurumba**

*Kurumba* tribe is the primitive group in Attappady. *Kurumbas* live in the high lands of Attappady, in the high rainfall zone and still practise slash and burn agriculture. *Anavai* is considered as their original settlement area. They believe that the first living thing that emerged on the earth was a primordial elephant, which manifested itself at this place. They are not reluctant to rear cattle. As they have not received the ownership of land, alienation problems are not reported.

Exogamous dual organisations with four clans in each group (*tayaman-tampi* and *maman-machan*) are in existence at Attappady. Every *Kurumba* holds a totemic avoidance, and animal or bird which clansmen are forbidden to kill or eat (Menon, 1996). They depend on the surrounding

forests for all their basic needs and cultivate seasonal millets, pulses and vegetables. They collect NWFP from the forest and sell through traders or Societies.

### 3.3. Hamlet set up

A typical tribal hamlet in Attappady (*ooru*) is a cluster of houses built row-wise in a common land, which is called as *ooru bhoomi*. A hamlet is lead by a person called *Ooru Mooppan*. The *Mooppan* is the ruler of the hamlet, who is empowered to deal with all matters related to the hamlet and its inhabitants which include their cultural, social as well as religious matters. *Kuruthalai* - the minister, and *Bandari* - the treasurer assist *Mooppan*. All matters related to agriculture are dealt by *Mannukkaran*, who predicts the climate and controls the agricultural activities of the hamlet people. He undertakes worshiping of deities including *karadaivam*, and initiates sowing of seeds.

The Map (Fig. 2) shows the locations of hamlets distributed in Attappady Valley where Panchayath-wise distribution of three tribal groups inhabited is also provided. The tribal settlements in Attappady spread out in the whole valley. Typical hamlet setup of three tribal groups in Attappady is given in Plate 2A-E, and the type of vegetation around the hamlets is provided in table 2.

Table 2. Status of natural vegetation adjoining to tribal hamlets in Attappady valley.

| Group          | No. of hamlets in each vegetation type |     |     |     |    |    | Total Hamlets |
|----------------|--|-----|-----|-----|----|----|---------------|
|                | EG                                     | SEG | MDF | DDF | DF | AL |               |
| <i>Irula</i>   | -                                      | -   | 4   | 21  | 79 | 35 | 139           |
| <i>Kurumba</i> | 4                                      | 4   | 7   | -   | 3  | -  | 18            |
| <i>Muduga</i>  | 2                                      | 2   | 8   | -   | 3  | 11 | 26            |

EG: Evergreen forest; SEG: Semi-evergreen forest; MDF: Moist deciduous forest; DDF: Dry-deciduous forest; DF: Degraded forest; AL: Agricultural land.

Fig. 2. Location of tribal hamlets in three panchayath areas in Attappady Valley

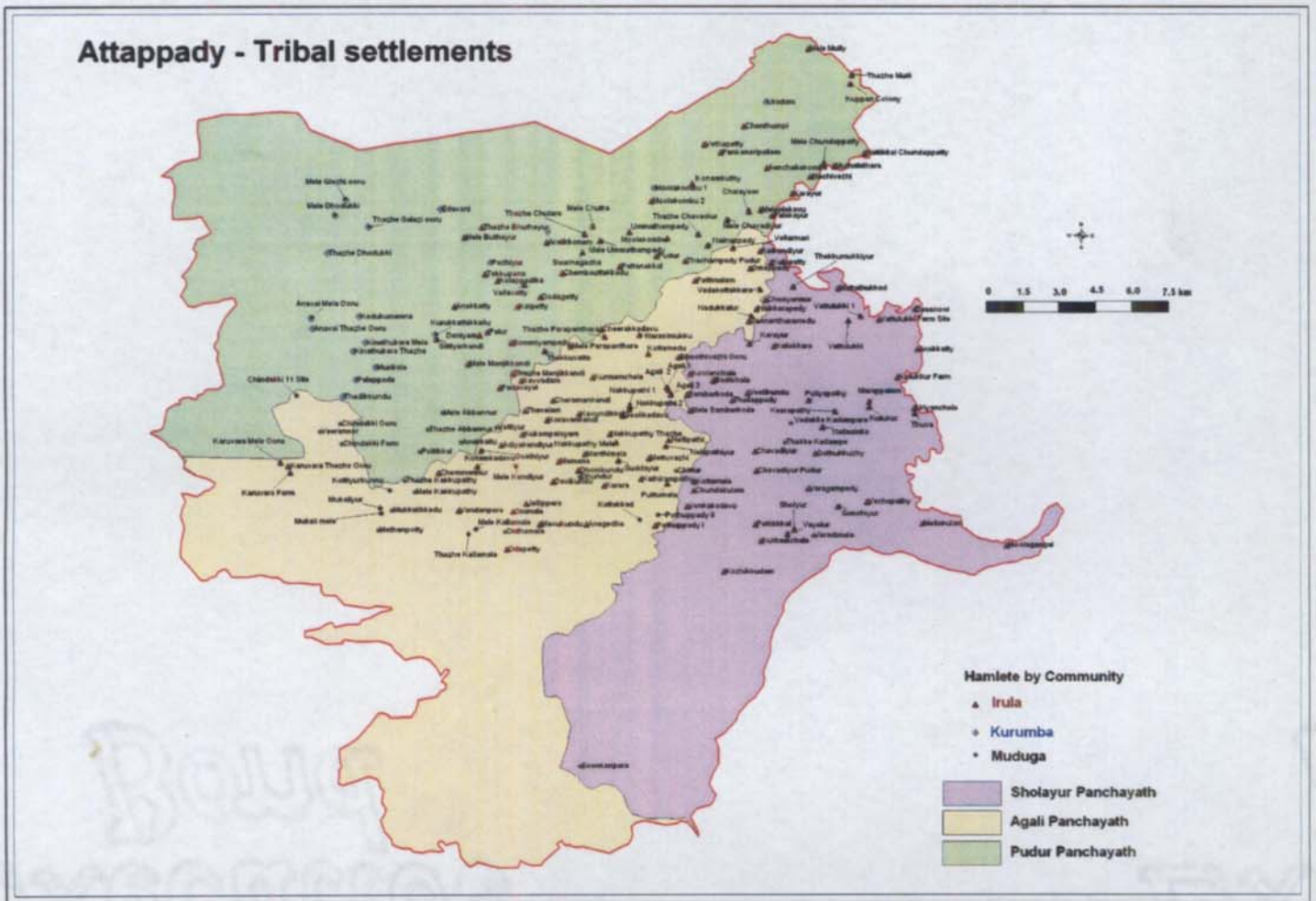


Plate 2. Hamlets



A. A Muduga hamlet at Kunchiyoor



B. Rows of houses in Kulukkoor Irula hamlet



C. Kurumba settlement at Anavai



D. Kadukumanna Kurumba hamlet



E. Irula settlement-Mully

Fig. 4. *Kurumba* hamlets in Attappady Valley

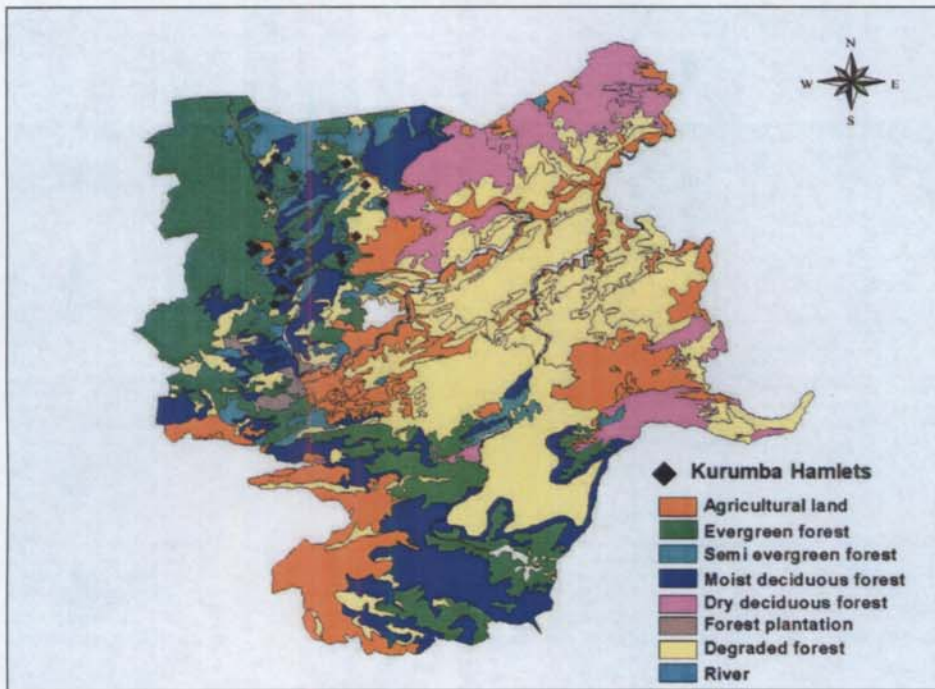
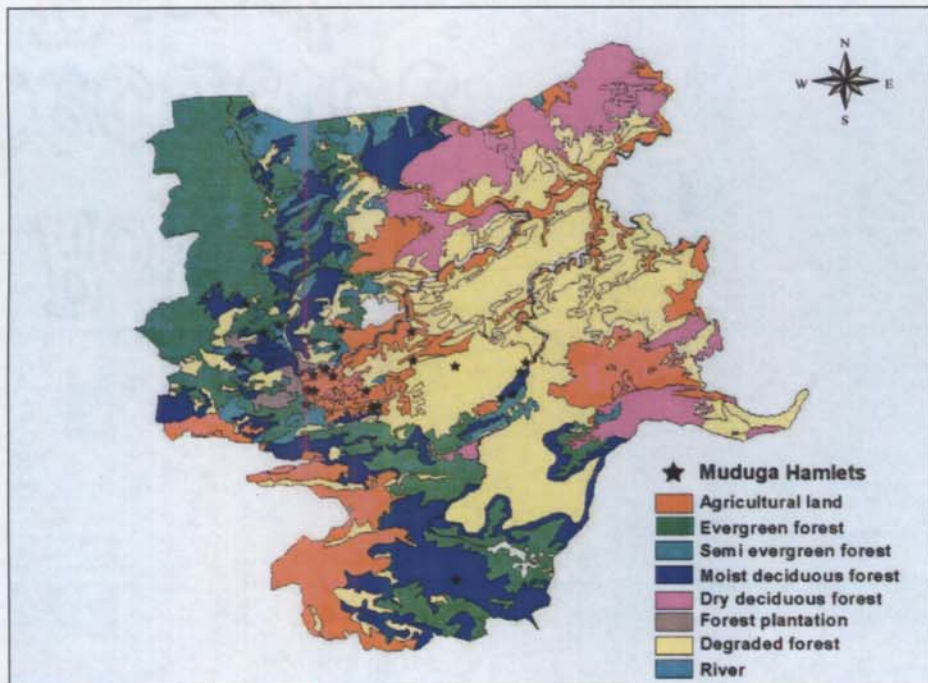


Fig. 5. *Muduga* hamlets in Attappady Valley

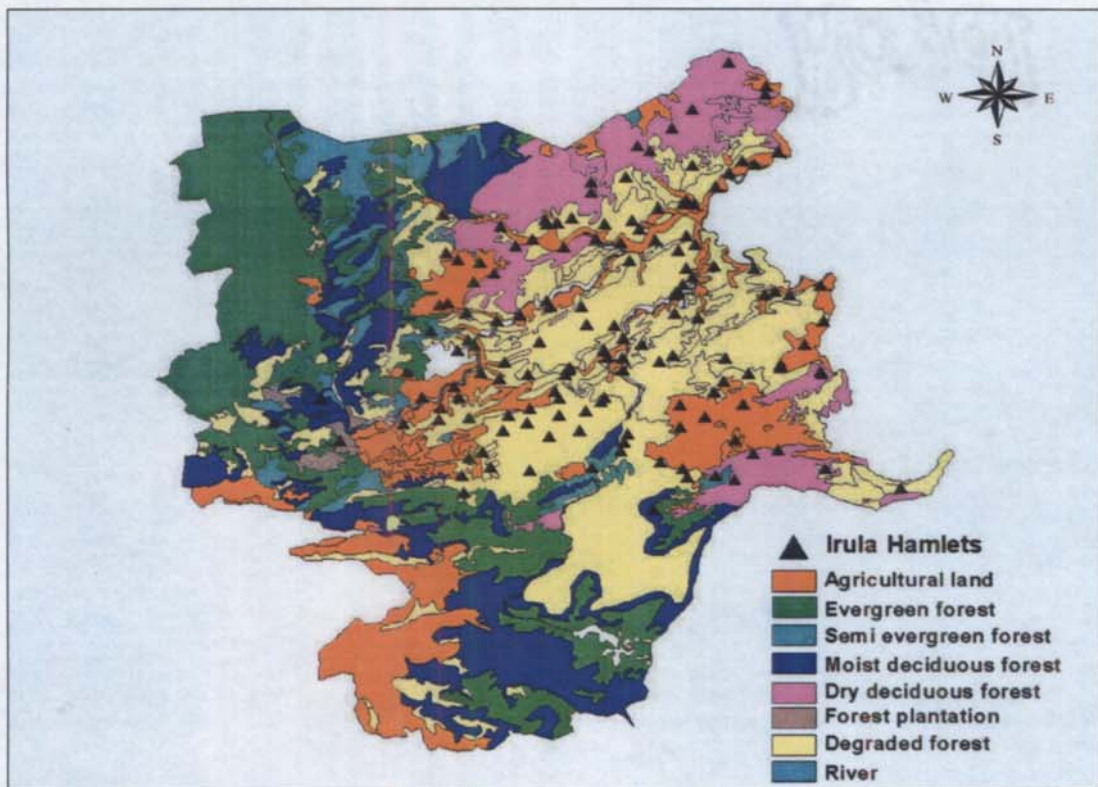


It is observed that majority of *Irula* settlements are located in the eastern Attappady (Fig. 3). Out of the total 139 *Irula* hamlets 21 are situated in Dry-deciduous forest and 79 are in degraded forests predominantly the Dry-deciduous formations, which cover 72% of the *Irula* hamlets. Four hamlets found in the moist deciduous forests are of recent origin, by bringing some *Irula* families as labourers for working in the Chindakki and Pothupadi farms.

The *Kurumba* hamlets are confined to the North-West corner of Attappady Valley (Fig. 4), where their surrounding forest formations are moist deciduous (39%), evergreen and semi-evergreen (22% each) and degraded forest (17%).

Majority of *Muduga* settlements are seen along the agricultural lands (42%), moist deciduous forest (31%) and the rest are distributed in evergreen, semi-evergreen and degraded forests of Attappady valley (Fig. 5).

Fig. 3. *Irula* hamlets in Attappady Valley



### 3.4. Agriculture and Animal Husbandry

Tribes of Attappady generally carry out the farming activities during the whole cropping season by residing in a temporary shed built in their own land and carry the harvested grains to the house in the hamlet. Tribal people call their agriculture land as *Kaadu* or *Panchakkadu*. Major crops under cultivation in Attappady Valley is provided in Table 3. Most of them are food crops and also have ethnobotanical significance.

Table 3. Major crops under cultivation in Attappady Valley

| Sl. No. | Species                       | Local Name   |
|---------|-------------------------------|--------------|
| 1       | 2                             | 3            |
| 1       | <i>Amaranthus caudatus</i>    | Keere        |
| 2       | <i>Anacardium occidentale</i> | Kasumavu     |
| 3       | <i>Brassica juncea</i>        | Kaduku       |
| 4       | <i>Cajanus cajan</i>          | Thuvara      |
| 5       | <i>Capsicum frutescens</i>    | Mulakai      |
| 6       | <i>Eleusine coracana</i>      | Kore, Ragi   |
| 7       | <i>Gossypium barbadense</i>   | Paruthy      |
| 8       | <i>Lablab purpureus</i>       | Amara        |
| 9       | <i>Macrotyloma uniflorum</i>  | Kollu        |
| 10      | <i>Mangifera indica</i>       | Mavu         |
| 11      | <i>Musa paradisiaca</i>       | Vazha        |
| 12      | <i>Paspalum scorbiculatum</i> | Varagu       |
| 13      | <i>Phaseolus mungo</i>        | Uzhunnu      |
| 14      | <i>Sorghum bicolor</i>        | Cholam       |
| 15      | <i>Vigna unguiculata</i>      | Payaru       |
| 16      | <i>Citrus aurantifolia</i>    | Cherunarakam |
| 17      | <i>Cucumis sativus</i>        | Vellari      |
| 18      | <i>Cucurbita pepo</i>         | Mathan       |
| 19      | <i>Lagenaria ciceraria</i>    | Chura        |
| 20      | <i>Moringa pterigosperma</i>  | Muringa      |
| 21      | <i>Oryza sativa</i>           | Nellu        |
| 22      | <i>Panicum miliare</i>        | Chama        |
| 23      | <i>Pennisetum americanum</i>  | Kambu        |
| 24      | <i>Sesamum orientale</i>      | Ellu         |
| 25      | <i>Tamarindus indica</i>      | Puli         |
| 26      | <i>Zea mays</i>               | Makkacholam  |
| 27      | <i>Arachis hypogea</i>        | Nilakadala   |
| 28      | <i>Vetiveria zizanioides</i>  | Ramacham     |
| 29      | <i>Cymbopogon citratus</i>    | Teruva       |
| 30      | <i>Elettaria cendamomum</i>   | Elam         |
| 31      | <i>Areca catechu</i>          | Kamuku       |

| 1  | 2                              | 3       |
|----|--------------------------------|---------|
| 32 | <i>Cocos nucifera</i>          | Tengu   |
| 33 | <i>Coffea arabica</i>          | Kappi   |
| 34 | <i>Manihot esculenta</i>       | Kappa   |
| 35 | <i>Jasminum sambac</i>         | Mulla   |
| 36 | <i>Lycopersicon esculentum</i> | Takkali |

The tribal people practise mixed farming, by sowing several types of seeds in the same field. Majority of crops are for their mere subsistence and a few for earning money. Weeding operation is carried out with *kothu*, a spade like iron implement. They cultivate traditional crops, which include certain cereals, millets and pulses. *Irulas* and *Mudugas* practice settled agriculture to a certain extent along with some long term crops like arecanut, coffee, pepper, etc.

Apart from agriculture, the afforestation activities of AHADS recently provided expertise in nursery raising of medicinal species and forest tree species to the tribal people (Plate 3A).

*Kurumbas* are strict advocates of shifting cultivation and practicing slash and burn method. Along with the traditional crops they cultivate mustard as an income-generating crop. They clandestinely cultivate *Ganja* in their agricultural land or in the hamlet premises.

Eastern Attappady provides wide meadows and rich palatable vegetation, very conducive for goat and cattle rearing (Plate 3B). *Irulas* who dominate in these valleys practise animal husbandry for their subsistence and survival. They invest their income in cattle and sell them when need of money. That is why in midst of eastern Attappady, at Kottathara a market flourished to sell and purchase animals.

*Irulas* usually do not practice stall-feeding. People of all age groups take the animals to the surrounding forest area in the morning and rear back to the hamlet in the evening. Children and old persons tend to be engaged in this work. Though they rear cattle they are not much fond of milk and other diary products.

Plate 3.



A. Nursery-raising for afforestation:  
an income generation programme  
for tribes conducted by AHADS

B. Vast stretches of pasture  
lands supports cattle-rearing



C. Meeting of tribal healers of  
Attappady Valley conducted  
during January 6-9, 2003 at AHADS, Agali

It is natural that some medical attention is required to these animals. There are some experts in veterinary care. In necessary cases, these persons are invited for specialized care. The most frequent ailments of the animals are fractures. A varied set of plants is employed for curing the fracture. During the treatment period these animals are stall-fed and given complete rest. Goats are also stall-fed during the initial post-delivery period.

*Irulas* utilize bullocks to plough their lands. One-time tilling of soil is usually done after the initial rains during June and also during August for different sets of crops. They give total rest to the ploughing animals on Mondays, because of their belief that the *Nandikeswaran*, the holy attendant of Lord Siva was born on Monday, who is the ancestor of cattle in the world. By following the Tamil culture, they decorate their cattle by painting the horns, adorn them with garlands, etc. after bathing them in river on *Pongal* day.

In all walks of tribal life in Attappady they rely on the surrounding vegetation. In other words, the vegetation defines their living by providing good harvest from the crops, enough firewood, construction timbers for their hut-making, surplus availability of NWFP's, etc. Their beliefs and myths have developed for the better living in harmony with nature.



# Methodology

## **4. METHODOLOGY**

Study of vegetation and ethnobotanical documentation of Attappady Valley were conducted during 1996-2003. The scope of eco-restoration using the species Non-Wood Forest Products in degraded locations was also looked into for benefiting tribes. The study consists of: 1) Survey and review of literature, 2) Field work for vegetation studies and Documentation of ethnic uses of plants, 3) Scope of eco-restoration using NWFP species and Species-site matching.

During phase I (1996-2003) of this work, basic informations were collected from literature and from the field; data processing was completed in phase II (2003-2005).

### **4.1. Survey and review of literature**

Literature pertaining to the field of study was surveyed to gain preliminary knowledge about the work and to interpret and analyse the data collected from the area.

### **4.2. Field work**

Field studies provide first - hand information about the use of various plants grouping in the area. The field studies were carried out during 1996-2003. Information was gathered from the local tribal healers and other knowledgeable tribal people in different hamlets at Attappady Valley. The base camp was at Agali, which is located in the central Attappady, and field trips were arranged to selected tribal hamlets. Repeated trips were made to the same areas during different seasons of the year for studying the maximum number of plants, especially annuals. Initial study trips during the first phase were utilised to familiarize with the land and people, vegetation types and also for the identification of plant species. Study of Vegetation Types was carried out during different periods. Assistance from the tribal people of the area was also utilised for gathering preliminary data.

### 4.3. Study of Vegetation Types

Plots of varying sizes in different vegetation types were established according to species - area curve developed earlier in the region (Ganapathy, 1980; Basha, 1987). In the plots, 10 x 10 m quadrats were demarked and the following observation on tree species  $\geq 10$  cm gbh were taken. The permanent vegetation was analyzed by the list count quadrat method. Besides listing of species, actual counting of individual species of over 10 cm at gbh has been made to evaluate their relative frequency, density, abundance, Importance Value Index (IVI) etc. (Mueller- Dombois & Ellenberg, 1978).

#### 4.3.1. Frequency

This refers to the degree of dispersion of individual species in an area and is usually expressed in terms of percentage occurrence. It can be calculated as:

$$\text{Percentage Frequency (F)} = \frac{\text{Number of quadrats of occurrence of a species}}{\text{Total number of quadrats studied}} \times 100$$

$$\text{Relative Frequency (R.F.)} = \frac{\text{Number of occurrence of a species}}{\text{Total number of occurrence of all species}} \times 100$$

#### 4.3.2. Density

This is an expression of the numerical strength of a species and can be calculated as:

$$\text{Density (D)} = \frac{\text{Total number of individuals of a species in all quadrats}}{\text{Total number of quadrats studied}} \times 100$$

$$\text{Relative Density (R.D.)} = \frac{\text{Number of individuals of the species}}{\text{Number of individuals of all species}} \times 100$$

### 4.3.3. Abundance

It is an appreciation of the number of individuals of different species in a community per quadrat in which they occur and calculated as:

$$\text{Abundance (Ab.)} = \frac{\text{Total number of individuals of a species}}{\text{Total number of quadrats of occurrence}} \times 100$$

$$\text{Relative Abundance (R.Ab.)} = \frac{\text{Abundance of individuals of the species}}{\text{Abundance of all species}} \times 100$$

### 4.3.4. Importance value index

A total picture of the ecological status of a species with respect to a particular community structure can be obtained only by synthesising the percentage values of R.F., R.D., and R.Ab. These values when added together give the importance value index (IVI) based on which an association is derived. Thus the I.V.I., as such gives the total picture of sociological structure of a species in a community.

A mere quantitative value of density, frequency and abundance has its own importance by the total picture of ecological status of a species with respect to the community can be obtained only by synthesizing the percentage values of R.D., R.F. and R.Ab. These values when added together give the I.V.I. based on which an association is derived.

### 4.3.5. To determine species richness and species diversity

#### a) Simpson's diversity index (D)

For studying the floristic richness and species diversity, Simpson's index was used. Simpson's index is derived using the following formula:

$$D = \frac{\sum n_i(n_i-1)}{N(N-1)}$$

where,

$n_i$  – the number of individuals of species  $i$ , and  $i = 1$  to  $K$

$K$  = total number of species

$N$  – the total number of individuals of all species in the plot (Simpson, 1949).

#### **b) Shannon-Wiener diversity index ( $H'$ )**

Species diversity was calculated by using Shannon-Wiener diversity index ( $H'$ )

$$H' = - \sum P_i \log P_i$$

where,

$P_i$  – proportion of the total number of individuals that occur in the species  $i$ , ie. ( $n_i / N$ )

$n_i$  – number of individuals of a species  $i$ , and  $i = 1$  to  $K$

$K$  – total number of species

$N$  – total number of individuals of all species in the sample (Shannon & Wiener, 1963).

#### **4.4. Documentation of ethnic uses of plants**

During phase II (1999-2003), field trips were utilised for establishing good acquaintance with the tribals, mingling with them in their way of living initially indirectly and then directly enquiring about the details of utility of plants for documentation from the site itself. Sharing of knowledge is also adopted for getting reliable information on plant uses. When disclosed the uses mentioned in the text and uses of other tribal groups of a particular plant encouraged them to express their way of use pertaining to that plant. Concerted efforts were made to extract accurate information from the tribal healers. The information collected was cross-checked by interviewing different persons of the same community and also with different communities for thoroughness and authenticity.

During such field trips the following informations of ethnobotanically important species were recorded in systematic way as per the procedure/format set by Martin (1995). The details were transferred onto the data sheets which consisted of :1) Collection Number, 2) Date, 3) The Name of Community and Settlement, 4) Locality of Collection, 5) Altitude, 6) Botanical Name, 7) Vernacular Name, 8) Life-form, 9) Habitat, Frequency of occurrence, 10) Part used, 11) Uses, 12) Characteristics of the Species, and 13) The Name of Informant.

Ethnobotanical uses of individual plants were systematically recorded. Maximum information was related to its use, method of administration, season, duration and were collected from the field and documented. The authenticity of the gathered informations on uses was ascertained based on credibility rating (Balick, 1996). The assessment of credibility rating is as given in the Table 4.

Table 4. Credibility rating

| No. | Category                                  | Credibility Rating |
|-----|---|--------------------|
| 1   | Collector uses or directly observed use   | I                  |
| 2   | Informant uses or directly observed use   | II                 |
| 3   | Informant bear/knew from a further source | III                |
| 4   | Use reported from the literature          | IV                 |
| 5   | Common knowledge                          | V                  |
| 6   | Credibility of use information unknown    | VI                 |

The authenticity of the gathered information were further ascertained by conducting a three-day meeting of tribal healers at the head quarter of AHADS at Agali, during January 6-9, 2003 (Plate 3C).

Participatory Rural Appraisal (PRA) is an approach towards the scientific documentation of local knowledge. PRA guarantee a good amount of flexibility, allowing the approach to be adapted to the very diverse cultural and ecological conditions under which ethnobotanists work (Martin, 1995 & Annamalai, 1999). Structured and semi structured interviews, surveys, talks, field trips with experts, direct observations, etc. had been conducted during the ethnobotanical explorations. Field surveys were discontinued following the Law of Diminishing Returns until 2003 when no more fresh data could be collected.

Family-wise categorisation of individual species was done and the data is presented in the alphabetical order of families under Chapter 6. Non-Angiosperm families are dealt separately after the Angiosperm families. Species were arranged alphabetically under their concerned families. The categorisations of ethnobotanically important species were detailed in Chapter 7. Accurate abbreviations of authors were provided based on Brummitt and Powell (1992). The treatment of the species included: 1) Name

of species with author citation, 2) A brief description of species, 3) Flowering and fruiting period, 4) Distribution, 5) Uses and with notes on dosage, and 6) Collection number and locality of collection.

#### **4.4.1. Collection, Identification and preparation of herbarium**

Plant specimens corresponding to their ethnobotanical usage were collected, preserved and herbaria prepared based on the methods invented by Jain and Rao (1977), Jain and Mudgal (1999) and Martin (1995). The identification of local plants was done using the floras published by Hooker (1872-1897), Gamble and Fischer (1915-1936), Matthew (1983), Henry *et al.* (1987 & 1989), and other regional floras of the Western Ghats published by Subramanian *et al.* (1987), Manilal (1988), Vajravelu (1990), Mohanan and Sivadasan (2002), Mohanan and Henry (1994), Anil Kumar (1994), Ramachandran and Nair (1988), Sasidharan and Sivarajan (1996) and Sivarajan and Philip Mathew (1996). The species have been compared with the specimens housed in CALI Herbarium, University of Calicut, Kerala. For pteridophyte species Manickam and Irudayaraj (1995), and Easa (2003), were referred. The herbarium specimens prepared were deposited in the Calicut University Herbarium (CALI) as voucher specimens.

#### **4.5. Scope of eco-restoration using NWFP-species**

Surveys were conducted to study the supply, demand and value of marketed products. Identification of the plant material and the cost for the same was recorded from the market. Based on a set of criteria, the NWFP-species were selected for eco-restoration programs. The criteria for selection of the species were: 1) NWFP-species, 2) Site suitability and low risk in cultivation, 3) Rare in the wild and hence cultivation only can meet high market requirements, 4) High value product, 5) Marketability/demand, 6) Simple methods for harvesting and semi-processing, 7) Raw material for multiple end users, 8) Easily marketed through Tribal co-operative societies, and 9) Multiple end-products.

#### **4.5.1. Species site matching of non-wood forest products species**

The species were selected on the basis of market demand and marketability. The medicinal properties were noted from Wealth of India (Anonymous, 1969), Warriar *et al* (1995) and from local enquiries. Later their ecological demands were identified (rainfall, elevation requirement and light conditions). Attappady Valley was classified for this purpose into: 1) Rainfall, 2) Light conditions, and 3) Elevation.

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Vegetation  
Studies

## 5. VEGETATION STUDIES

Within the study area varied vegetation types are found. Wet evergreen forests and their derivatives were found in the western Attappady while dry-deciduous forests and its derivatives were found in the eastern Attappady. Mainly the quantum of precipitation determines the forest type; the western side receives two monsoon rains and the eastern side receives only the retreating monsoon. Based on the classification of Champion and Seth (1968), nine forest types are identified in Attappady area.

1. West Coast tropical evergreen forests
2. West Coast tropical semi-evergreen forests
3. South Indian moist deciduous forests
4. Southern moist mixed deciduous forests
5. Southern tropical dry-deciduous forests
6. Southern tropical dry-deciduous scrub
7. Southern sub-tropical broad-leaved hill forests
8. Southern montane wet-temperate forests
9. Southern montane wet-grasslands

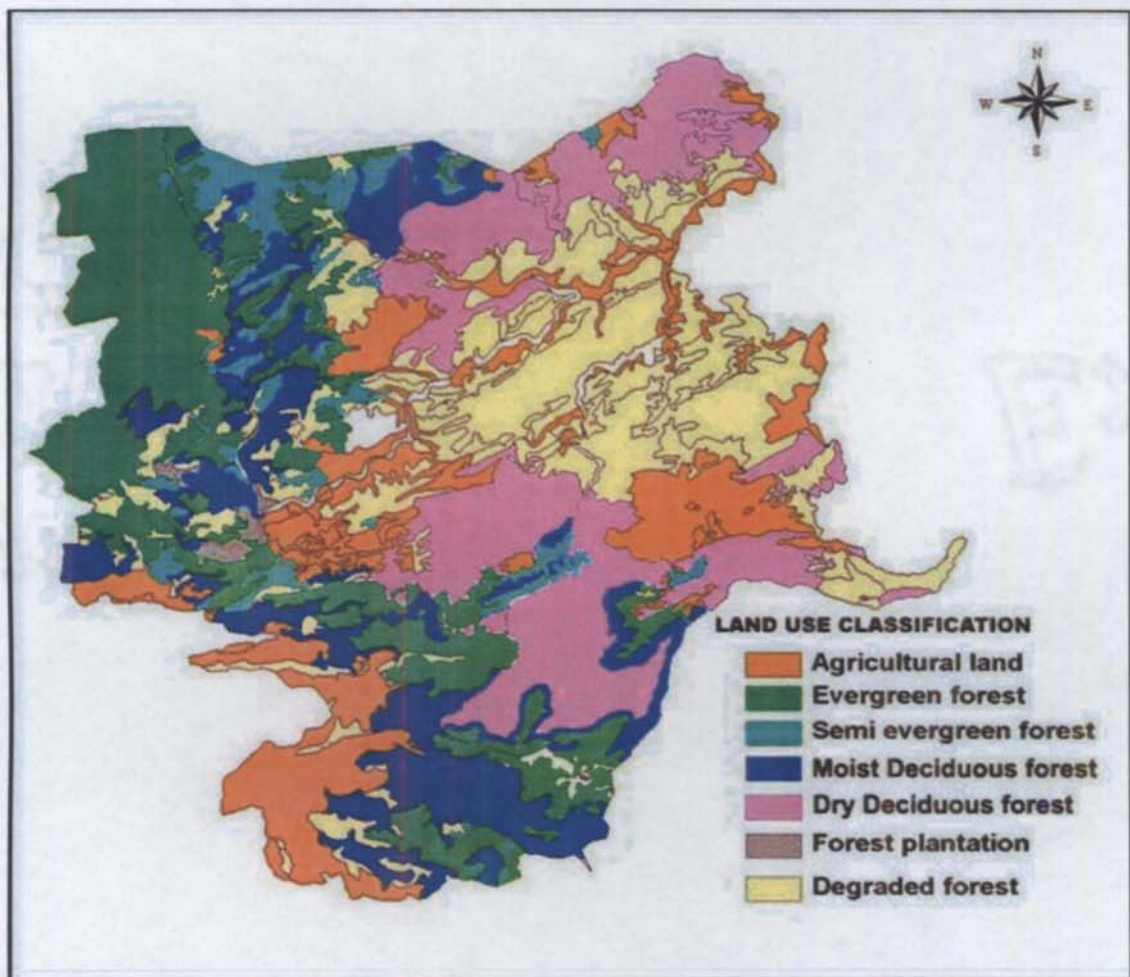
The total forest cover of the area at Attappady Valley is 465 km<sup>2</sup>, which includes 78 km<sup>2</sup> area as plantations. Degraded forest cover an area of 210 km<sup>2</sup>, 131 km<sup>2</sup> is dense (Muraleedharan & Sankar, 1991) and are mostly the erstwhile private forest vested with the government in 1971. Land-use classification and categories are shown in Table 5. and Fig. 6.

Almost all tribal hamlets are situated in or nearby these vegetation types and the tribal population depends on forests for NWFPs, wild tubers and meat, construction timber, etc. The surrounding forest area determines the way of living of these tribal people and vice versa. Because of this reason the forest areas are very much subjected to anthropogenic disturbances. These vegetation types found in Attappady area are discussed in detail.

Table 5. Land-use categories of Attappady

| Category                    | Area km <sup>2</sup> | Percentage total |
|-----------------------------|----------------------|------------------|
| Forests                     |                      |                  |
| Dense                       | 131                  | 17.8             |
| Degraded                    | 210                  | 28.7             |
| Grasslands                  | 46                   | 6.3              |
| Plantation                  | 78                   | 10.7             |
| Habitation with agriculture | 257                  | 35.2             |
| Rock                        | 5                    | 0.7              |
| Water bodies                | 4                    | 0.6              |
|                             | 731                  | 100              |

Fig. 6. Land-use classification of Attappady Valley



## 5.1. Plot studies

The detailed studies of the following different types of vegetation found in Attappady Valley have been carried out by laying plots.

### 5.1.1. West Coast Tropical evergreen forests

In Attappady Valley the West Coast Tropical evergreen forests are confined to the southwest Muthikkulam, Siruvani (Plate 4A), Kurukkankundu areas and in the northwest Silent Valley and Panthanthodu areas. High species representation is observed in this forest type. With their multiplicity of species these forests are in a state of biological equilibrium. They occur mostly in areas with a rainfall of 2000 mm and above and a short dry period of two to three months.

Above the ground flora of herbs, three superposed storey of trees can be observed. In the top storey trees are umbrella-shaped, in the middle they are more or less candle-flame shaped and the bottom storey plants are conical (Chandrasekharan, 1962a). They are characterized by the luxuriance of vegetation and formation of typical tiers. The top canopy trees grows to 50 m or more height, often characterized by fluted and flanged trunk, plank-buttresses (Plate 4B), clean cylindrical bole and spreading crown. In the top canopy, species like *Cullenia exarillata*, *Mesua ferrea*, *Vateria indica*, *Dipterocarpus bourdillonii*, *D. indicus*, *Palaquium ellipticum*, *Persea macrantha*, etc. are dominating. In the second tier, epiphytes such as orchids, ferns, and mosses are common. In this storey, species like *Reinwardtiadendron anamallayanum*, *Myristica dactyloides*, *Agrostistachys borneensis*, species of *Eugenia*, etc. are dominating. The lower tier consists of emergents of top canopy trees and species like *Clerodendrum viscosum*, *Arenga wightii*, *Jambosa munroii*, *Cinnamomum zeylanicum*, *Litsea stocksii*, etc. are seen. Lianas are few, represented by species like *Gnetum ula*, *Smilax zeylanica*, *Connarus paniculatus*, *Artabotrys zeylanicus*, etc.

Due to the closed canopy, the ground is devoid of grasses and the seedlings of some of the tree species mostly represent the vegetation here. However a few species like *Laportea crenulata*, *Apama siliquosa*, *Costus*

*speciosus*, species of *Arisaema*, *Elettaria cardamomum*, etc. are sometimes seen in the canopy gaps. *Ochlandra travancorica* is common along the watercourses where the species composition is almost similar to the West Coast tropical evergreen forest type (Plate 4C).

### 5.1.1.1. Quadrat studies

The location for plot studies was selected at Siruvani. The area is situated at an elevation of 800-850 m, receives high rainfall and is comparatively less disturbed. One tribal hamlet is located in the premises, but no disturbance has been noticed. This type of vegetation is evergreen in nature and an association of *Cullenia- Palaquium- Myristica* was noticed as evidenced by IVI values (Table 6).

Table 6. Vegetation analysis of West Coast Tropical Evergreen Forest at Siruvani (50x50m)

| No. | Species                                 | Total No. of individuals | Relative Density | Relative Frequency | Relative Abundance | IVI   |
|-----|---|--------------------------|------------------|--------------------|--------------------|-------|
| 1   | 2                                       | 3                        | 4                | 5                  | 6                  | 7     |
| 1   | <i>Cullenia exarillata</i>              | 142                      | 25.04            | 10.12              | 10.15              | 45.31 |
| 2   | <i>Palaquium ellipticum</i>             | 60                       | 10.58            | 8.5                | 5.11               | 24.19 |
| 3   | <i>Myristica dactyloides</i>            | 59                       | 10.41            | 7.69               | 5.45               | 23.55 |
| 4   | <i>Reinwardtiadendron anamallayanum</i> | 47                       | 8.29             | 8.1                | 4.2                | 20.59 |
| 5   | <i>Gomphandra tetrandra</i>             | 34                       | 6                | 6.88               | 3.57               | 16.45 |
| 6   | <i>Mesua ferrea</i>                     | 31                       | 5.47             | 5.69               | 3.95               | 15.09 |
| 7   | <i>Agrostistachys borneensis</i>        | 28                       | 4.94             | 6.07               | 3.34               | 14.37 |
| 8   | <i>Hydnocarpus laurifolia</i>           | 23                       | 4.06             | 4.86               | 3.43               | 12.35 |
| 9   | <i>Holigarna arnottiana</i>             | 22                       | 3.88             | 5.26               | 3.02               | 12.16 |
| 10  | <i>Eugenia</i> sp.                      | 16                       | 2.82             | 4.86               | 2.38               | 10.06 |
| 11  | <i>Actinodaphne bourdillonii</i>        | 14                       | 2.47             | 4.05               | 2.5                | 9.02  |
| 12  | <i>Euodia lunu-ankenda</i>              | 11                       | 1.94             | 2.83               | 2.81               | 7.58  |
| 13  | <i>Memecylon</i> sp.                    | 9                        | 1.59             | 2.02               | 3.22               | 6.83  |
| 14  | <i>Diospyros pruriens</i>               | 8                        | 1.41             | 1.62               | 3.57               | 6.6   |
| 15  | <i>Atlantia wightii</i>                 | 5                        | 0.88             | 0.81               | 4.57               | 6.16  |
| 16  | <i>Flacourtia montana</i>               | 6                        | 1.06             | 1.62               | 2.68               | 5.36  |
| 17  | <i>Euonymus angulatus</i>               | 6                        | 1.06             | 2.43               | 1.79               | 5.28  |
| 18  | <i>Litsea floribunda</i> .              | 6                        | 1.06             | 2.02               | 2.14               | 5.22  |
| 19  | <i>Cinnamomum macrocarpum</i>           | 6                        | 1.06             | 2.02               | 2.14               | 5.22  |
| 20  | <i>Elaeocarpus munronii</i>             | 5                        | 0.88             | 2.02               | 1.79               | 4.69  |
| 21  | <i>Syzigium munronii</i>                | 2                        | 0.35             | 0.4                | 3.57               | 4.32  |
| 22  | <i>Mallotus tetracoccus</i>             | 4                        | 0.71             | 1.21               | 2.38               | 4.3   |
| 23  | <i>Elaeocarpus tuberculatus</i>         | 4                        | 0.71             | 1.62               | 1.79               | 4.12  |

| 1  | 2                               | 3 | 4    | 5    | 6    | 7    |
|----|---------------------------------|---|------|------|------|------|
| 24 | <i>Persea macrantha</i>         | 4 | 0.71 | 1.62 | 1.79 | 4.12 |
| 25 | <i>Calophyllum apetalum</i>     | 3 | 0.53 | 0.81 | 2.62 | 4.02 |
| 26 | <i>Croton malabaricus</i>       | 2 | 0.35 | 0.81 | 1.79 | 2.95 |
| 27 | <i>Cryptocarya lawsoni</i>      | 2 | 0.35 | 0.81 | 1.79 | 2.95 |
| 28 | <i>Clerodendrum viscosum</i>    | 2 | 0.35 | 0.81 | 1.79 | 2.95 |
| 29 | <i>Dysoxylum malabaricum</i>    | 1 | 0.18 | 0.4  | 1.79 | 2.37 |
| 30 | <i>Mangifera indica</i>         | 1 | 0.18 | 0.4  | 1.79 | 2.37 |
| 31 | <i>Dimocarpus longan</i>        | 1 | 0.18 | 0.4  | 1.79 | 2.37 |
| 32 | <i>Turpinia malabarica</i>      | 1 | 0.18 | 0.4  | 1.79 | 2.37 |
| 33 | <i>Artocarpus heterophyllus</i> | 1 | 0.18 | 0.4  | 1.79 | 2.37 |
| 34 | <i>Hopea racophloea</i>         | 1 | 0.18 | 0.4  | 1.79 | 2.37 |

Out of the 34 species encountered, top frequency rates were observed in *Cullenia exarillata*, *Palaquium ellipticum*, *Myristica dactyloides*, *Reinwardtiidendron anamallayanum*, *Gomphandra tetrandra*, *Mesua ferrea* and *Agrostistachys borneensis* and species like *Hopea racophloea*, *Artocarpus heterophyllus*, *Turpinia malabarica*, *Dimocarpus longan*, *Mangifera indica* and *Dysoxylum malabaricum* were of rare occurrence. The comparatively high values of relative density, relative frequency and relative abundance of *Cullenia exarillata* was because of its profuse regeneration in the area. The IVI ranged from 2.37 to 45.31.

The herbaceous flora includes *Laportea crenulata*, *Pandanus thwaitesii*, *Piper hymenophyllum*, *P. trioicum*, *Elettaria cardamomum*, etc. The existing records indicate that this type of forest has undergone least disturbance and hence no attempt was made to compare it with the same type of forest in another area. However, this forest type, which represents the climax, serves as a baseline to deduce further inferences. The Simpson's Index of diversity was 0.11 while the Shannon's Index was 2.71 showing high diversity.

### 5.1.2. West Coast semi-evergreen forests

It is a closed forest with heterogeneous mixture of evergreen and deciduous species. It would be proper to call a community semi-evergreen, only if it has more than 50% of the evergreen species (Chandrasekharan,

1962b). There are no typical or definite middle stories but undergrowth is often dense. These forests are of secondary origin; the climatic climax having been displaced by direct or indirect human action (Champion & Seth, 1968).

This type of forests is confined to Karuvara, Mukkali, Chindakki areas of north-west Attappady and Muthikkulam, Pothuppady and Kurukkankundu (Plate 4D) areas of south-west Attappady. Compared to wet-evergreen forests, this type of forest can be easily identified with less species abundance. Buttressing is rare in occurrence. Lianas are abundant in this forest area and 3-tier grouping cannot be well demarcated. A mixture of wet-evergreen species and deciduous species are found in this type of forest. It is found in continuation of wet-evergreen forest as in Muthikkulam or in separate patches as in Mukkali. Butteresses are rarely observed. The undergrowth is comprised of many small evergreen shrubs. Lianas are quite prevalent and are frequently represented by *Spatholobus roxburghii*, *Entada rheedii* and a few others.

In the top crown, species like *Terminalia paniculata*, *T. bellerica*, *Lagerstroemia microcarpa*, *Tectona grandis*, *Bombax malabaricum*, *Vateria indica*, *Tetrameles nudiflora*, *Dillenia pentagyna*, *Albizia chinensis*, *A. odoratissima*, *Pterocarpus marsupium*, etc. were seen. Middle canopy was comprised of *Grewia tiliifolia*, *Holarrhena pubescens*, *Mallotus philippinensis*, *Trema orientalis*, *Wrightia tinctoria*, etc. The lowermost canopy is formed with shrubs like *Helecteres isora*, *Desmodium velutinum*, *D. gangeticum*, *Strobilanthes heyneanus*, *Chromolaena odorata* etc. Lianas are represented by species like *Entada rheedii*, *Calycopteris floribunda*, *Acacia intsia* and *Dioscorea wallichii*. The ground flora, which is seasonal, is composed of *Acalypha indica*, *Mimosa pudica*, *Rauvolfia densiflora*, *Biophytum reinwardtii*, etc. Bamboos are sometimes present in pure patches.

Plate 4 . Forest types in Attappady Valley



A. Tropical evergreen forest at Siruvani



B. Buttress formation



C. Riverine forest at Karuvara



D. Semi - evergreen forest at Kurukkankundu

### 5.1.2.1. Quadrat studies

The location selected for plot-studies was in Mukkali forest area. The area was about 550-600 m above sea level, located in the western Attappady. Cholakkadu, Mukkali and Karuvara hamlets were in proximity and a good proportion of settler population was also noticed. However, anthropogenic disturbances were less observed in the region.

It was observed that the community studied comprised evergreen species and was more than 50%. It consisted of 20 species, where *Vateria indica* was with highest density followed by *Hopea parviflora*, *Xanthophyllum flavescens*, *Xanthophyllum flavescensm*, *Persea macrantha*, and *Baccaurea courtallensis*. Species of rare occurrence were *Dillenia pentagyna*, *Eugenia* sp., *Macranga peltata*, *Memecylon* sp., *Lophopetalum wightianum*, *Holigarna arnotiana*, *Mallotus tetracoccus*, *Elaeocarpus tuberculatus*, *Canarium strictum* and *Calophyllum apetalum*.

The IVI ranged from 7.62 to 50.36. The lianas observed were *Entada rheedii*, *Anodendron paniculatum*, *Jasminum azoricum*, *Connarus monocarpus*, etc. The ground floor vegetation was comprised of *Schumanianthes virgatus*, *Costus speciosus*, *Sarcandra grandifolia* etc.

Regarding the community structure it may be mentioned that area showed an association of *Vateria-Hopea-Xanthophyllum*, which dominated the IVI (Table 7). The Simpson's Index was 0.11, while the Shannon's index of diversity was 2.51.

Table 7. Vegetation analysis of Semi-Evergreen Forest at Mukkali (50x20 m)

| Sl. No. | Species                         | Total No. of individuals | Relative Density | Relative Frequency | Relative Abundance | IVI   |
|---------|---------------------------------|--------------------------|------------------|--------------------|--------------------|-------|
| 1       | 2                               | 3                        | 4                | 5                  | 6                  | 7     |
| 1       | <i>Vateria indica</i>           | 16                       | 25.81            | 14.71              | 9.84               | 50.36 |
| 2       | <i>Hopea parviflora</i>         | 11                       | 17.74            | 5.88               | 16.91              | 40.53 |
| 3       | <i>Xanthophyllum flavescens</i> | 4                        | 6.45             | 2.94               | 12.3               | 21.69 |
| 4       | <i>Persea macrantha</i>         | 4                        | 6.45             | 8.82               | 4.09               | 19.36 |
| 5       | <i>Baccaurea courtallensis</i>  | 4                        | 6.45             | 5.88               | 6.15               | 18.48 |

| 1  | 2                               | 3 | 4    | 5    | 6    | 7     |
|----|---------------------------------|---|------|------|------|-------|
| 6  | <i>Garcinia gummi-gutta</i>     | 3 | 4.84 | 8.82 | 3.07 | 16.73 |
| 7  | <i>Artocarpus hirsutus</i>      | 3 | 4.84 | 8.82 | 3.07 | 16.73 |
| 8  | <i>Hydnocarpus laurifolia</i>   | 3 | 4.84 | 3.88 | 4.61 | 13.33 |
| 9  | <i>Myristica dactyloides</i>    | 2 | 3.23 | 2.94 | 6.15 | 12.32 |
| 10 | <i>Tetrameles nudiflorus</i>    | 2 | 3.23 | 5.88 | 3.07 | 12.18 |
| 11 | <i>Calophyllum apetalum</i>     | 1 | 1.61 | 2.94 | 3.07 | 7.62  |
| 12 | <i>Canarium strictum</i>        | 1 | 1.61 | 2.94 | 3.07 | 7.62  |
| 13 | <i>Elaeocarpus tuberculatus</i> | 1 | 1.61 | 2.94 | 3.07 | 7.62  |
| 14 | <i>Mallotus tetracoccus</i>     | 1 | 1.61 | 2.94 | 3.07 | 7.62  |
| 15 | <i>Holigarna arnotiana</i>      | 1 | 1.61 | 2.94 | 3.07 | 7.62  |
| 16 | <i>Lophopetalum wightianum</i>  | 1 | 1.61 | 2.94 | 3.07 | 7.62  |
| 17 | <i>Memecylon sp.</i>            | 1 | 1.61 | 2.94 | 3.07 | 7.62  |
| 18 | <i>Macranga peltata</i>         | 1 | 1.61 | 2.94 | 3.07 | 7.62  |
| 19 | <i>Eugenia sp.</i>              | 1 | 1.61 | 2.94 | 3.07 | 7.62  |
| 20 | <i>Dillenia pentagyna</i>       | 1 | 1.61 | 2.94 | 3.07 | 7.62  |

### 5.1.3. South Indian Moist-deciduous forests

This kind of forest is dense, with luxuriant vegetation. Trees are tall, showing characteristic deciduous nature during the winter season. Buttress formation and cauliflory are of little occurrence. Fruits usually mature and fall down before the onset of monsoon season. These forests contain a large number of commercial timber species including teak. There will be a dry span during the summer and the habitat conditions are truly reflected in vegetation where adaptations to withstand moisture deficiency is common.

This type of forest is dominating in the Achanvettumala, Chindakki (Plate 5A), Anavai, Thadikkundu areas in the northern side and Siruvani, Chittoor, Sholayur areas of southern side. The top canopy consisted of *Terminalia paniculata*, *T. bellerica*, *Tectona grandis*, *Lagerstroemia microcarpa*, etc, the second story is with *Grewia tiliifolia*, *Mallotus philippensis*, *Wrightia tinctoria*, etc. and the lower tier with shrubs like *Helicteres isora*, *Strobilanthes ciliatus*, *Chromolaena odorata*, etc. Bamboo is of frequent occurrence.

### 5.1.3.1. Quadrat studies

The moist deciduous forest selected for plot-studies was at Anavai, located at about 800–900 m. msl along the northern portion of Attappady. Both monsoons are received in this area and a dry spell of 4 – 5 months was observed. Vast stretches of moist-deciduous forest formations were seen in this area.

The community at Anavai consists of *Helicteres-Grewia-Dalbergia* association. Species like *Lagerstroemia microcarpa*, *Grewia tiliifolia*, *Tectona grandis*, *Dalbergia latifolia*, etc. which are all characteristic of the moist deciduous forests were observed. Out of the 23 tree species found, *Helicteres isora* and *Grewia tiliifolia* exhibit high density values. *Trema orientalis*, *Buchanania lanzan*, *Terminalia paniculata*, *Schleichera oleosa*, *Flacourtia indica*, etc. were of rare occurrence. IVI ranged from 5.04–88.61 (Table 8). The Simpson's Index was 0.33 while Shannon's Index of diversity was 1.59.

Lianas and climbers were common, represented by *Ichnocarpus frutescens*, *Clematis gouriana*, *Naravelia zeylanica*, *Asparagus racemosus*, etc. The ground cover of herbs were with seasonal plants like *Triumfetta rhomboidea*, *Sida alnifolia*, *Ageratum conyzoides*, *Alysicarpus monilifer*, etc. *Chromolaena odorata* and *Lantana camara* were of common occurrence.

Table 8. Vegetation analysis of Moist-deciduous forest at Anavai ((50x20 m)

| Sl. No. | Species                         | Total No. of individuals | Relative Density | Relative Frequency | Relative Abundance | IVI   |
|---------|---------------------------------|--------------------------|------------------|--------------------|--------------------|-------|
| 1       | 2                               | 3                        | 4                | 5                  | 6                  | 7     |
| 1       | <i>Helicteres isora</i>         | 87                       | 46.77            | 20.83              | 21.01              | 88.61 |
| 2       | <i>Grewia tiliifolia</i>        | 63                       | 33.87            | 18.75              | 16.91              | 69.53 |
| 3       | <i>Dalbergia latifolia</i>      | 6                        | 3.23             | 10.42              | 2.90               | 16.55 |
| 4       | <i>Pavetta tomentosa</i>        | 3                        | 1.61             | 4.17               | 3.62               | 9.40  |
| 5       | <i>Albizia odoratissima</i>     | 3                        | 1.61             | 4.17               | 3.62               | 9.40  |
| 6       | <i>Maesa indica</i>             | 3                        | 1.61             | 4.17               | 3.62               | 9.40  |
| 7       | <i>Lagerstroemia microcarpa</i> | 2                        | 1.08             | 2.08               | 4.83               | 7.99  |
| 8       | <i>Holigarna arnottiana</i>     | 2                        | 1.08             | 2.08               | 4.83               | 7.99  |
| 9       | <i>Ziziphus rugosa</i>          | 2                        | 1.08             | 2.08               | 4.83               | 7.99  |
| 10      | <i>Cinnamomum microcarpum</i>   | 2                        | 1.08             | 4.17               | 2.42               | 7.67  |
| 11      | <i>Mangifera indica</i>         | 1                        | 0.54             | 2.08               | 2.42               | 5.04  |
| 12      | <i>Tectona grandis</i>          | 1                        | 0.54             | 2.08               | 2.42               | 5.04  |
| 13      | <i>Mallotus philippensis</i>    | 1                        | 0.54             | 2.08               | 2.42               | 5.04  |
| 14      | <i>Kydia calycina</i>           | 1                        | 0.54             | 2.08               | 2.42               | 5.04  |
| 15      | <i>Pongamia pinnata</i>         | 1                        | 0.54             | 2.08               | 2.42               | 5.04  |

| 1  | 2                            | 3 | 4    | 5    | 6    | 7    |
|----|------------------------------|---|------|------|------|------|
| 16 | <i>Trema orientalis</i>      | 1 | 0.54 | 2.08 | 2.42 | 5.04 |
| 17 | <i>Buchnanian lanzan</i>     | 1 | 0.54 | 2.08 | 2.42 | 5.04 |
| 18 | <i>Terminalia paniculata</i> | 1 | 0.54 | 2.08 | 2.42 | 5.04 |
| 19 | <i>Pterocarpus marsupium</i> | 1 | 0.54 | 2.08 | 2.42 | 5.04 |
| 20 | <i>Clerodendrum viscosum</i> | 1 | 0.54 | 2.08 | 2.42 | 5.04 |
| 21 | <i>Bauhinia malabarica.</i>  | 1 | 0.54 | 2.08 | 2.42 | 5.04 |
| 22 | <i>Schleichera oleosa</i>    | 1 | 0.54 | 2.08 | 2.42 | 5.04 |
| 23 | <i>Flacourtia indica</i>     | 1 | 0.54 | 2.08 | 2.42 | 5.04 |

#### 5.1.4. Southern moist mixed deciduous forests

This type of forest was found over considerable areas, which experienced the climate appropriate to tropical evergreen or semi-evergreen forests; soil and configuration being insufficient to account for the absence of the latter and abrupt changes to it being encountered. These forests were of secondary origin; the climatic climax having being displaced by anthropogenic disturbances. An undergrowth of evergreen species was often found in this type of forest.

In Attappady it occurred in very few localized areas mainly associated with semi-evergreen forests where anthropogenic disturbances were more. This type of forest was seen in the steep slopes along the banks of river Bhavani and in some areas in Kurukkankundu, etc.

Species composition was similar to the moist-deciduous forests, but more regeneration of evergreen species was found. Top canopy species were invariably deciduous ones like *Tectona grandis*, *Pterocarpus marsupium*, *Terminalia paniculata*, etc. The lower strata of canopy was with *Glycosmis pentaphylla*, *Leea indica*, *Strobilanthus ciliatus*, etc. that were of frequent occurrence. As this type was not that dominant, quadrat studies were not conducted.

#### 5.1.5. Southern tropical Dry- deciduous forests

In this type of forests the upper canopy was closed, but not very dense. It was formed by a mixture of trees practically all of which were deciduous during the dry season. The lower canopy was composed of entirely deciduous species as although evergreens or sub-evergreens were present

they were inconspicuous and mainly confined to the more sheltered spots (Chadraseskharan, 1962c). Many of the species have strong adaptations for xerophytic life and in drier areas thorny species occurred in larger proportion. Barks of many tree species were very thick and fissured.

This type of forest prevailed in the comparatively dry belts of Attappady, where annual precipitation was about 800-1200 mm; the bulk of precipitation was brought about by the retreating (northeast) monsoon extending from October to December. Patches of dry-deciduous forests were found in the northern and northeast portions of Attappady like Mully, Pudur, Aralikkonam, Puliappathy, Thuva (Plate 5B) etc. Comparatively, the forest was poor and the frequency of commercially important species was low. These areas were heavily grazed; trees lopped for fodder and firewood. Trees of lower height-classes were occurring in this forest type. Species like *Acacia chundra*, *Tectona grandis*, *Chloroxylon swietenia*, *Albizia amara*, *Diospyros montana*, etc. formed the tree components. Sometimes, pure stands of *Anogeissus latifolia*, *Albizia amara*, etc. were seen.

#### **5.1.5.1. Quadrat studies**

The Dry-deciduous forest selected for plot studies was at Puliapathy, where human disturbances were comparatively less. The area received rainfall only from the retrieval of monsoon during October – November. It was located in the eastern Attappady at an altitude of 600 – 650 m above sea level.

Out of 25 species encountered, *Albizia amara* and *Tarenna asiatica* showed the highest density. Species like *Chloroxylon swietenia*, *Clausena indica*, *Benkara malabarica*, *Flacourtia indica*, etc. were of rare occurrence. The presence of non-palatable species like *Flacourtia indica*, *Benkara malabarica*, *Chloroxylon swietenia*, etc. was an indicator of grazing. The IVI ranged from 5.03 – 24.79 (Table 9). The Simpson's Index was 0.05 while the Shannon's index of diversity was 2.97.

The top canopy was formed mainly with *Albizia amara*. The herbs and shrubs were represented with *Acalypha alnifolia*, *Justicia tranqui-barriensis*,

*Boerrhaevia diffusa*, etc. Lianas are represented by *Ziziphus oenoplea*, *Pterolobium hexapetalum*, *Acacia pennata*, *Ichnocarpus frutescens*, *Dioscorea pentaphylla* and *Derris scandens*.

Table 9. Vegetation analysis of Dry-deciduous forest at Puliypathy (50x20 m)

| Sl. No. | Species                       | Total No. of individuals | Relative Density | Relative Frequency | Relative Abundance | IVI   |
|---------|-------------------------------|--------------------------|------------------|--------------------|--------------------|-------|
| 1       | <i>Albizia amara</i>          | 11                       | 11.11            | 4.76               | 8.92               | 24.79 |
| 2       | <i>Tarenna asiatica</i>       | 11                       | 11.11            | 6.35               | 6.68               | 24.14 |
| 3       | <i>Canthium dicoccum</i>      | 6                        | 6.06             | 1.59               | 14.58              | 22.23 |
| 4       | <i>Erythroxylum monogynum</i> | 7                        | 7.07             | 9.52               | 2.84               | 19.43 |
| 5       | <i>Grewia laevigata</i>       | 8                        | 8.08             | 6.35               | 4.86               | 19.29 |
| 6       | <i>Diospyros montana</i>      | 7                        | 7.07             | 7.94               | 3.4                | 18.38 |
| 7       | <i>Acacia chundra</i>         | 5                        | 5.05             | 6.35               | 3.04               | 14.44 |
| 8       | <i>Naringi crenulata</i>      | 5                        | 5.05             | 6.35               | 3.04               | 14.44 |
| 9       | <i>Euphorbia antiquorum</i>   | 4                        | 4.04             | 6.35               | 2.43               | 12.82 |
| 10      | <i>Anogeissus latifolia</i>   | 4                        | 4.04             | 6.35               | 2.43               | 12.82 |
| 11      | <i>Ziziphus oenoplea</i>      | 4                        | 4.04             | 4.76               | 3.23               | 12.03 |
| 12      | <i>Mundulea sericea</i>       | 4                        | 4.04             | 4.76               | 3.23               | 12.03 |
| 13      | <i>Atlantia monophylla</i>    | 3                        | 3.03             | 1.59               | 17.29              | 11.91 |
| 14      | <i>Pleiospermium alatum</i>   | 3                        | 3.03             | 3.17               | 3.65               | 9.85  |
| 15      | <i>Lantana camara</i>         | 3                        | 3.03             | 3.17               | 3.65               | 9.85  |
| 16      | <i>Diospyros malabarica</i>   | 2                        | 2.02             | 1.59               | 4.86               | 8.47  |
| 17      | <i>Premna corymbosa</i>       | 2                        | 2.02             | 3.17               | 2.43               | 7.62  |
| 18      | <i>Butea monosperma</i>       | 2                        | 2.02             | 3.17               | 2.43               | 7.62  |
| 19      | <i>Cordia myxa</i>            | 2                        | 2.02             | 3.17               | 2.43               | 7.62  |
| 20      | <i>Azadirachta indica</i>     | 1                        | 1.01             | 1.59               | 2.43               | 5.03  |
| 21      | <i>Premna tomentosa</i>       | 1                        | 1.01             | 1.59               | 2.43               | 5.03  |
| 22      | <i>Chloroxylon swietenia</i>  | 1                        | 1.01             | 1.59               | 2.43               | 5.03  |
| 23      | <i>Clausena indica</i>        | 1                        | 1.01             | 1.59               | 2.43               | 5.03  |
| 24      | <i>Benkara malabarica</i>     | 1                        | 1.01             | 1.59               | 2.43               | 5.03  |
| 25      | <i>Flacourtia indica</i>      | 1                        | 1.01             | 1.59               | 2.43               | 5.03  |

### 5.1.6. Southern tropical Dry-deciduous scrub

Champion and Seth (1968) defined this type of forest as a degraded stage of dry-deciduous forest. A low, broken, ground cover of shrubby growth 3-6 feet height, including some tree species reduced to similar conditions, usually many stemmed from the base. Many of these plants are distasteful to cattle or thorny. Thin grass-cover occurred throughout on the ground. It was associated with Dry-deciduous forests. More anthropogenic disturbances like grazing, fire, felling of trees, etc. in the dry-deciduous forests resulted in its degradation and formation of such scrubs. This type of vegetation was seen

at Mully (Plate 5C), Pudur, Kulukkoor, etc. Flora have resemblance with dry-deciduous forests where pure formations of *Euphorbia antiquorum*, *Pterolobium hexapetalum*, *Dodonea angustifolia*, *Mundulea sericea*, etc. were seen in some areas. In the vast stretches of dry-deciduous forests and scrubs, some tall trees were occurring only along with the water courses.

#### 5.1.6.1. Quadrat studies

The site selected for plot-studies is at Kulukkoor. The area falls under a zone with an altitude of 600-650 m. Sparse vegetation was seen along this tract where heavy grazing was observed. Regeneration was very few or completely wanting. The climatic conditions were similar to that of Dry-deciduous forests.

Compared to the Dry-deciduous forests of Puliapathy, species density and diversity were found sharply reduced at Kulukkoor. Non-palatable species like *Euphorbia antiquorum* and *Flacourtia indica* were dominating in this area. Climbers like *Sarcostemma acidum*, *Leptadenia reticulata* are seen in the less disturbed sites. Herbs were poorly observed where *Justicia tranqui-barriensis*, *Stachytarpheta indica*, etc. were also found. Formations of *Lantana camara*, *Pterolobium hexapetalum*, *Euphorbia antiquorum*, etc. were common in the highly disturbed undulating terrains. IVI ranged from 54.81 – 190.39, with *Euphorbia antiquorum* dominating (Table 10). The Simpson's Index was 0.52, while the Shannon's index of diversity was 0.68.

Table 10. Vegetation analysis of Dry-deciduous Scrub at Kulukkoor (50x10 m)

| Sl. No. | Species                     | Total No. of individuals | Relative Density | Relative Frequency | Relative Abundance | IVI    |
|---------|-----------------------------|--------------------------|------------------|--------------------|--------------------|--------|
| 1       | <i>Euphorbia antiquorum</i> | 7                        | 77.78            | 71.43              | 41.18              | 190.39 |
| 2       | <i>Flacourtia indica</i>    | 1                        | 11.11            | 14.29              | 29.41              | 54.81  |
| 3       | <i>Naringi crenulata</i>    | 1                        | 11.11            | 14.29              | 29.41              | 54.81  |

#### 5.1.7. Southern sub-tropical broad-leaved hill forest

It is the transition belt of Shola forests. This type of evergreen forest has been described as 'stunted rain forest', but the vegetation is not so luxuriant, the trees bearing smaller and with shape-less boles, and often festooned with

Plate 5. Forest types in Attappady Valley



A. Moist - deciduous forest at Chindakki



B. Undisturbed Dry deciduous forest at Thuva



C. Disturbed Dry - deciduous scrub. Inset: burned Arjun tree (*Terminalia cuneata*)



D. Grassland formation at Keerippara



E. Weed infested patch of evergreen forest at Singampara

herbaceous and cryptogamic epiphytes (Champion & Seth, 1968). It was found in at altitudes ranging from 1200-1750 m, where annual precipitation was very high. This type of forest was seen in the upper reaches of Silent Valley.

Species composition was very diverse and represented with *Calophyllum apetalum*, *Bischofia javanica*, etc. The ground floor was with *Strobilanthes barbatus*, *Psychotria glandulosa*, *Ophiorrhiza mungos*, etc. Patches of this type of forest is seen in the upper reaches of the area and hence plot studies were not attempted.

#### **5.1.8. Southern montane wet temperate forests**

This type of forest is otherwise called as 'Shola', distributed all along the northern boundary especially in the Silent Valley area from altitude 1900 m msl upwards. The mean annual temperature was roughly between 18–24° C and falls to 5° C or below in winter. The floristic components include *Symplocos cochinchinensis* ssp. *aurina*, *Rhododendron nilgircum*, *Litsea wightiana*, *Hydnocarpus alpine*, etc. in the upper strata; *Strobilanthes kunthianus*, *Gaultheria fragrantissima*, etc. form the lower layer.

It is a closed evergreen forest; the trees being mostly short-boled and the canopy height was comparatively low. Strong winds prevailing in the area gave rise to dense and rounded crown of trees. This kind of forests was usually found in patches in the protected pockets or declivities in the rolling grassland (Chadraseskharan, 1962d). Vegetation studies by laying quadrats were not attempted here.

#### **5.1.9. Southern montane wet grassland**

It was seen in association with 'shola' forests. In the low level grasslands, species like *Cymbopogon flexuosus*, *Heteropogon contortus*, etc. dominated. A few deciduous tree species like *Embllica officinalis*, *Wendlandia notoniana*, *Careya arborea* and the palm *Phoenix loureiroi* - all fire-resistant species, were seen scattered among the low level grasslands (Plate 5D). While in the high level grasslands in at elevation of 1500 m and above,

*Arundinella setosa*, *Pollinia trispicata*, etc. dominated. As this type was associated with wet temperate forests in high altitudes, it was distributed in the northern hill tracts of Attappady, especially in Silent Valley area; hence, plot studies were not conducted. Rainfall was heavy; due to the sloppy nature of the terrain, the run-off was fast. They were directly exposed to strong wind, which lead to a stunted growth of the high-altitude grasses.

## **5.2. Vegetation Analysis**

Although nine distinct vegetation types have been identified in Attappady valley, detailed analysis of the vegetation have been attempted only in five. This is due to the fact most of the tribal hamlets were situated in and around these vegetation types almost all the species of ethnobotanical importance having, the vegetation types not investigated in detail were located in isolated patches and covered only small areas.

The dominant vegetation type in Attappady valley is southern tropical dry-deciduous forests followed by West Coast tropical evergreen forests and south Indian moist deciduous forests. In the drier tract of Eastern Attappady, the southern tropical dry-deciduous scrubs were found. Area under the vegetation types has guided the arrival on the number of plots to be laid out in each type (Table 11).

### **5.2.1. West Coast tropical evergreen forests**

The details of vegetation analysis of this forest type as provided in Table 6, is similar to that arrived at by other workers (Ganapathy, 1980; Pascal, 1984; Basha, 1987). All these authors derived an association of *Cullenia-Palaquium-Myristica* in the wet-evergreen forests of Attappady. Basha (1987) had reported dominance of *Myristica* only where selective felling of *Cullenia* and *Palaquium* was attempted in Attappady. Similar diversity in tree species having  $\geq 10$  cm gbh have been reported by Ganapathy (1980). The Simpson's index showed high diversity like the one reported by Singh *et al.* (1984).

The tribals of Attappady forage these forest species like *Myristica*, *Cinnamomum*, *Persea*, etc. for their subsistence. Weed infestation was also noticed in several forest areas near to plantations like rubber, cashew, etc. which forms a threat to its species composition and ecosystem functioning (Plate 5E).

### **5.2.2. West Coast tropical Semi-evergreen forests**

This vegetation type is found in regions with lesser rainfall. The type was dominated by *Vateria* and *Hopea*. Pascal (1984) arrived at similar observations while investigating the similar forest types in Karnataka. Species diversity was high as per Simpson's and Shannon-Wiener indices of diversity. More species than wet-evergreen forests were of ethnobotanical importance like *Vateria indica*, *Persea macarantha*, *Baccauraea courtallencia*, *Canarium strictum*, etc. was noticed from this type of vegetation.

### **5.2.3. South Indian Moist-deciduous forests**

This type of forests in Attappady represents a degradation stage of evergreen forests due to fire and removal of timber. The number of species was less and the diversity was low. This type was dominated by one or two species and tiering was almost absent within the canopy. As the canopy was opened up, the ground flora was rich and contained many species of herbs and shrubs which were of ethnobotanical significance.

### **5.2.4. Southern tropical Dry-deciduous forests**

The Dry-deciduous forest was the most prominent vegetation in the eastern Attappady where the precipitation was around 800-1200mm per year. The plot at Puliypathy represents a comparatively undisturbed vegetation of dry-deciduous forests. There were 25 species in a plot of 1000 m<sup>2</sup> and high IVI values are obtained for *Albizia amara*, *Tarenna asiatica* and *Canthium dicoccum*, respectively. The dominance by *Tarenna asiatica* in undisturbed dry deciduous formation has been reported by Chandrasekara (2000) in Chinnar Wild Life Sanctuary (WLS). The species diversity was high and contained many species of ethnobotanical importance.

### 5.2.5. Southern tropical Dry-deciduous scrubs

The scrub forests represent a degradational stage of dry-deciduous forests and was dominated by few species especially *Euphorbia antiquorum*, *Flacourtia indica* and *Naringi crenulata*. The species diversity will be low if the grazing pressure is very high.

The abstract of results obtained from the plot studies are provided in Table 11.

Table 11. Abstract of Quadrat studies conducted

| Sl. No. | T.V                                     | L.P        | A       | S.P      | N.P | N.E | IVI          | D    | H'   |
|---------|---|------------|---------|----------|-----|-----|--------------|------|------|
| 1       | West Coast tropical evergreen           | Siruvani   | 800-850 | 50 x 50m | 2   | 34  | 2.37-45.31   | 0.11 | 2.71 |
| 2       | West Coast semi-evergreen               | Mukkali    | 550-600 | 50 x 20m | 1   | 20  | 7.62-50.36   | 0.11 | 2.51 |
| 3       | South Indian moist deciduous forests    | Anavai     | 800-900 | 50 x 20m | 2   | 23  | 5.04-88.61   | 0.33 | 1.59 |
| 4       | Southern tropical dry-deciduous forests | Puliapathy | 600-650 | 50 x 20m | 4   | 25  | 5.03-24.79   | 0.05 | 2.97 |
| 5       | Southern tropical Dry-deciduous scrubs  | Kulukoor   | 600-650 | 50 x 10m | 2   | 3   | 54.81-190.39 | 0.52 | 0.68 |

T.V - Type of vegetation, L.P - Location of plot, A - Altitude (m), S.P - Size of plot, N.P - Number of plots, N.E - No. of species encountered, D - Simpson's Diversity Index, H' - Shannon-Wiener Diversity Index

### 5.3. Evidences of foraging ethnobotanically important species in the study plots

Tribals of Attappady depend on forests for livelihood. They extract and use different varieties of plants from forests. In Table 12, a list of species for which evidences of foraging for their uses observed during the vegetation studies were provided.

Table 12. Evidence noticed in study plots on extraction and utilization of plant parts

| Sl. NO. | Species                       | Habit | Habitat | Use                          | Nature of extraction   |
|---------|-------------------------------|-------|---------|------------------------------|--|
| 1       | 2                             | 3     | 4       | 5                            | 6  |
| 1       | <i>Cinnamomum macrocarpum</i> | Tree  | WEG     | Bark collected as a spice    | Looping of pole-size trees for extracting bark.                |
| 2       | <i>Vateria indica</i>         | Tree  | SEG     | NWFP for market              | Cuts on bark for oozing out the resin.                         |
| 3       | <i>Canarium strictum</i>      | Tree  | SEG     | NWFP for market              | Cuts on bark for oozing out the resin.                         |
| 4       | <i>Helicteres isora</i>       | Tree  | MDF     | Bark for tying purposes      | Bark peeled for fibres   |
| 5       | <i>Grewia tiliifolia</i>      | Tree  | MDF     | Bark for tying purposes      | Bark peeled for fibres   |
| 6       | <i>Dalbergia latifolia</i>    | Tree  | MDF     | Bark used in tribal medicine | Strips of bark found collected                                 |
| 7       | <i>Mangifera indica</i>       | Tree  | MDF     | Fruits for market            | Lopped branches noticed for the collection of fruits easy      |
| 8       | <i>Trema orientalis</i>       | Tree  | MDF     | Bark used in tribal medicine | Bark peeled off for medicine preparation                       |
| 9       | <i>Pterocarpus marsupium</i>  | Tree  | MDF     | For making wooden mortar     | Stumps observed  |
| 10      | <i>Erythroxylum monogynum</i> | Tree  | DDF     | Fire wood                    | Stumps observed  |
| 11      | <i>Tarenna asiatica</i>       | Tree  | DDF     | Fire wood                    | Stumps observed  |
| 12      | <i>Anogeissus latifolia</i>   | Tree  | DDF     | Fire wood                    | Branches found collected                                       |
| 13      | <i>Mundulea sericea</i>       | Tree  | DDF     | Fire wood                    | Stumps observed  |
| 14      | <i>Naringi crenulata</i>      | Tree  | DDF     | Construction timber          | Stumps found; poles for hut construction                       |
| 15      | <i>Albizia amara</i>          | Tree  | DDF     | Fire wood & toiletaries      | Collection of branches for firewood and leaves for toiletaries |
| 16      | <i>Acacia chundra</i>         | Tree  | DDF     | Fire wood                    | Collection of branches for firewood                            |
| 17      | <i>Tectona grandis</i>        | Tree  | MDF     | Construction timber          | Branches lopped  |
| 18      | <i>Diospyros montana</i>      | Tree  | DDF     | Firewood                     | Branches lopped  |
| 19      | <i>Premna corymbosa</i>       | Tree  | DDF     | Food                         | The branch-lets removed for collecting leaves                  |
| 20      | <i>Albizia odoratissima</i>   | Tree  | MDF     | Firewood                     | Found lopped   |
| 21      | <i>Senna tora</i>             | Shrub | MDF     | Leafy vegetable              | Young shoots found removed                                     |
| 22      | <i>Glycosmis mauritiana</i>   | Shrub | MDF     | Sticks                       | Straight twigs found cut                                       |
| 23      | <i>Murraya koenigii</i>       | Tree  | DDF     | Culinary purposes            | Twigs are collected  |
| 24      | <i>Jatropha curcas</i>        | Shrub | DDF     | Seeds for sale purpose       | Dried fruit husk seen, where seeds removed                     |
| 25      | <i>Ricinus communis</i>       | Shrub | MDF     | Seeds for sale purpose       | Fruit bunches found harvested                                  |
| 26      | <i>Opuntia dillenii</i>       | Shrub | DDF     | Fruits edible                | Ripe fruits found collected                                    |
| 27      | <i>Celosia polygonoides</i>   | Herb  | DDF     | Leafy vegetable              | Tender shoots found removed                                    |

| 1  | 2                               | 3       | 4   | 5                 | 6                                      |
|----|---------------------------------|---------|-----|-------------------|--|
| 28 | <i>Chenopodium ambrosioides</i> | Herb    | DDF | Ethnomedicine     | Tender shoots found removed            |
| 29 | <i>Lycopersicon esculentum</i>  | Herb    | DDF | Vegetable         | Mature fruits removed                  |
| 30 | <i>Pimpinella heyniana</i>      | Herb    | MDF | Leafy spice       | Tender shoots found removed            |
| 31 | <i>Ocimum tenuiflorum</i>       | Herb    | DDF | Leaves for market | Tender shoots found removed            |
| 32 | <i>Solanum americanum</i>       | Herb    | DDF | Leafy vegetable   | Tender shoots found removed            |
| 33 | <i>Carmona retusa</i>           | Shrub   | DDF | Animal husbandry  | Shoots found removed                   |
| 34 | <i>Aristolochia indica</i>      | Herb    | DDF | Leafy vegetable   | Plants found uprooted                  |
| 35 | <i>Cyclea peltata</i>           | Climber | MDF | Ethnomedicine     | Plants found uprooted                  |
| 36 | <i>Hemidesmus indicus</i>       | Climber | MDF | Ethnomedicine     | Plants found uprooted                  |
| 37 | <i>Leptadaenia reticulata</i>   | Climber | DDF | Leafy vegetable   | Tender shoots and leaves found removed |
| 38 | <i>Naravelia zeylanica</i>      | Climber | MDF | Ethnomedicine     | Plants found uprooted                  |
| 39 | <i>Secamone emetica</i>         | Climber | DDF | Palatable species | Leafy shoots found largely removed     |
| 40 | <i>Ichnocarpus frutescens.</i>  | Climber | MDF | Rope              | The vines found collected              |

DDF – Dry-deciduous forest, MDF– Moist deciduous forest, WEG – Wet-evergreen Forest, SEG – Semi-evergreen forest

Evidences of extraction are provided for 21 tree species. Of these one belongs to wet-evergreen forests, two to semi-evergreen forests, seven to moist-deciduous forests and the rest two to dry-deciduous formations. Of the non-tree category 19 species were identified as herbs and shrubs. Of these total of 19 species 8 belong to moist deciduous forest category, and the rest to the dry-deciduous formations.

Thus it can be inferred that the dry-deciduous forest provide maximum number of ethnobotanically important species followed by moist deciduous forests. The contributions of wet-evergreen forests and semi-evergreen forests are negligible.

## 6. TREATMENT OF ETHNOBOTANICALLY IMPORTANT SPECIES

### I. ANGIOSPERMS

#### A. DICOTYLEDONS

##### ACANTHACEAE

**Andrographis paniculata** (Burm. f.) Wall. ex Nees in Wall., Pl. Asiat. Rar. 3: 116. 1832; Clarke in Hook. f., Fl. Brit. India 4: 501. 1884; Gamble, Fl. Pres. Madras 1048. 1924; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3:1152. 1983; Kumari in Henry *et al.*, Fl. Tamilnadu 2: 140. 1987; Manilal, Fl. Silent Valley 202. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 331. 1988; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 342: 1994; Mohanan & Sivad., Fl. Agasthyamala 503. 2002. *Justicia paniculata* Burm. f., Fl. Ind. 9. 1768. **Sirunangai (I).**

Herbs, to 1 m high. Leaves linear-obovate, 6 x 1 cm, acuminate at both ends, margin entire. Panicle branches zigzag, to 20 cm long; bracts lanceolate, minute. Calyx sparsely glandular-hairy, 2 mm long. Corolla bilipped, whitish with pink spots, 5 x 2.5 mm, tube glandular hairy without. Stamens 2, bearded, exerted; anthers bearded. Ovary puberulous; style sparsely hairy. Capsule oblong, compressed, 1-1.5 cm long. Seeds 8-12, minutely hairy, acute; retinacula hooked.

*Fl. & Fr.*: November-January.

*Distribution*: Peninsular India and Sri Lanka. Moist deciduous forests of Sholayur, c. 750 m; rare. *HN 301*.

*Usage*: A plant with all parts is chopped and a handful is boiled in one glass of water and reduced to half. This decoction is administered as a first-aid for snake-bite. The spot of bite is widened immediately after the incident to allow the outflow of impure blood. The whole plant is well ground into a paste and applied thickly over the spot of bite and wrapped with a cloth. Intake of the decoction has to be continued for a week. Efficiency of the treatment, as most of the tribal healers claim, will depend on some *mantras* and spiritual effects. Further, *Irulas* believe that eating of mongoose meat reduces the ill effects of snake-bite.

**Blepharis maderaspatensis** (L.) Roth, Nov. Pl. Spec. 320. 1821; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1168. 1983; Kumari in Henry *et al.*, Fl. Tamilnadu 2: 143. 1987; Vajr., Fl. Palghat Dist. 346. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 345. 1994; Mohanan & Sivad., Fl. Agasthyamala 507. 2002. *Acanthus maderaspatensis* L., Sp. Pl. 639. 1753. *Blepharis boerhaviifolia* Pers., Syn. Pl. 2180. 1806; Wight, Ic. t. 458. 1841; Clarke in Hook. f., Fl. Brit. India 4: 478. 1884; Gamble, Fl. Pres. Madras 1013. 1924. **Palavan Chedi (I)**.

Prostrate herbs; shoots hairy, wiry; rooting at nodes. Leaves whorled, 4 per node, 2 large and two small, 1-2.5 x 0.5-1.5 cm. oblong-lanceolate, glaucous beneath, acute at both ends, coarsely toothed, membranous; sessile to shortly petioled. Inflorescence axillary, 1-3-flowered cymes; flowers white with pinkish tinge and yellow spot on lip; bracts with glochidiate spinous teeth. Outer calyx lobes oblong; inner smaller. Corolla 1 cm long, bilipped. Stamens 4, didynamous; anthers 1-celled, bearded. Disc annular. Ovary 2-celled; ovules 2 in each cell. Capsules ellipsoid. Seeds 4, discoid, compressed.

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

*Distribution*: Tropical Africa to India. Shaded grounds in the Dry-deciduous forests of Mully, c.700 m; locally abundant. *HN 014*.

*Usage*: Shoots ground with shoots of *Kalakarande* (*Sida acuta*) and applied over abscessed boils fastens breaking of abscesses and release of puss.

**Justicia tranquebariensis** L.f., Suppl. Pl. 85.1781; Hook. f., Fl. Brit. India 4: 530. 1885; Gamble, Fl. Pres. Madras 1079. 1924; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1190. 1983; Kumari in Henry *et al.*, Fl. Tamilnadu 2: 151. 1987; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 349. 1994. **Uppanamchedi, Ganinch (I)**.

Herbs, to 75 cm high; base woody, branchlets terete, appressed white-pubescent. Leaves ovate-suborbicular, 1.5 x 1.3 cm, puberulous on both sides; base rounded, apex obtuse-rounded, apiculate; petiole to 0.7 cm long. Spikes mostly terminal, to 10 cm long, axillary ones smaller; bracts elliptic to

ovate, 8 x 4.5 mm, pubescent, apiculate; bracteoles lanceolate, 7 x 1.5 cm, acute. Calyx-lobes 5, to 7 mm long, ciliate, acuminate. Corolla to 0.8 cm across, whitish with pink lines, puberulous without, bilipped. Stamens 2, curved. Ovary pubescent; style 6 mm long, hairy. Capsule pubescent, tapering below into a solid beak. Seeds 4, suborbicular, tiny.

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

*Distribution*: Peninsular India and Sri Lanka. Dry-deciduous forests of Mully, c. 700 m; frequent. *HN 307*.

*Usage*: Leaves are ground, diluted in water and filtered. A piece of cloth dipped in it is placed over eyelids for conjunctivitis. This is repeated for several times a day and continued for three days. Leafy shoots are collected, washed in water, ground well into a paste and applied around eyes at bed-time to cure pain and inflammation of eyes. If necessary, the treatment may be continued for three days.

***Strobilanthus ciliatus*** Nees in Wall., *Pl. Asiat. Rar.* 3: 85. 1832; Hook. f., *Fl. Brit. India* 4: 439. 1884; Sasidh. & Sivar., *Flow. Pl. Thrissur For.* 348. 1996; Sivar. & P. Mathew, *Fl. Nilambur* 521. 1997. *Nilgirianthus ciliatus* (Nees) Bremek., *Verh. Acad. Wet. Afd. Natuurk. Sect. 2*, 41: 172. 1944; V. S. Ramach. & V. J. Nair, *Fl. Cannanore* 345. 1988. **Karimkurinji (K & M)**.

Shrubs, to 1.5 m high, stem possess lenticels. Leaves opposite, 12 x 5 cm, base acute-acuminate, margin toothed, apex acuminate. Inflorescence axillary, to 5 cm long; bracts lanceolate, subcoriaceous. Calyx hairy, lobes lanceolate, acuminate. Corolla to 1 cm long, slender, bilipped. Stamens didynamous; anthers bicelled. Disc small. Ovary 2-celled; ovules 2 in each. Capsule 4 seeded.

*Fl. & Fr.*: October-December.

*Distribution*: Peninsular India. Moist deciduous forest of Mukkali, c. 550 m; frequent. *HN 380*.

*Usage*: An NWFP species; roots are collected and sold to tribal co-operative societies. During 2001-2002, 13402.5 Kg of dried roots were sold through Kurumba co-operative society, Chindakki (table 13). The fresh roots collected

from the tribal people were chopped, dried, filled in gunny-bags and marketed to Ayurvedic Medicine manufacturers by the society. In Ayurveda, the roots are well known for its anti-rheumatic property.

## AIZOACEAE

**Corbichonia decumbens** (Forssk.) Exell, J. Bot. 73: 80. 1935; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 663. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 177. 1983. *Orygia decumbens* Forssk., Fl. Egypt-Arab. 103. 1775; Hook. f., Fl. Brit. India 2: 664. 1879; Gamble, Fl. Pres. Madras 551. 1919. *Glinus trianthemoides* Heyne ex Wight & Arn., Prodr. Fl. Ind. Orient. 362. 1834. **Erumenelengi (I).**

Spreading prostrate herbs; branchlets glabrous. Leaves alternate, pairs unequal, obovate-suborbicular, 3 x 1.5 cm & 1.5 x 1 cm, fleshy, glabrous, base cuneate or attenuate, margin entire, apex rotund-obtuse, mucronate; petiole to 4.5 mm long, sheathing. Flowers to 7 mm across, pink, leaf-opposed, in cymes, to 7 cm long; peduncle to 4 cm long; bracteoles 3.5 mm long; pedicel to 4 mm long. Calyx 5, elliptic, 4 mm long, mucronate. Petals absent. Stamens many, inserted at the base of calyx; staminodes many, connate at base. Ovary globose, 5-celled; style 5, filiform. Capsule subglobose, 5 mm diameter, loculicidal. Seeds small, reniform.

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

*Distribution*: Dry zones of tropical Asia and Africa. Farm land of Koodappetty, c. 600m; frequent. *HN 129*.

*Usage*: A handful of crushed plant is boiled in about 100 ml of coconut oil and applied externally before sunrise as a remedy for curing migraine. The roots are ground well and applied over wounds appearing usually on legs believed to have caused by sorcery. It is believed that this application is to be accompanied by chanting of *mantra* by an exorcist and is necessary for the healing process.

## AMARANTHACEAE

**Achyranthes aspera** L., Sp. Pl. 204: 1753; Hook. f., Fl. Brit. India 4: 730. 1885; Gamble, Fl. Pres. Madras 1176. 1925; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1296. 1983. Kumari in Nair *et al.*, Fl. Tamilnadu 2: 188. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 375. 1988; Vajr., Fl. Palakkad Dist. 385. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 375. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 367. 1996; Sivar. & P. Mathew, Fl. Nilambur 557. 1997. **Irumuli, Erumbuly (I, K & M).**

Subshrubs to 1 m high. Leaves elliptic-obovate, 2.5-6 x 2-4 cm, pubescent below, base cuneate, margin entire, apex acute; petiole to 1 cm long. Spikes to 30 cm long; peduncle sparsely pubescent. Flowers 3 mm across; bracts broadly ovate, 3 mm long; bracteoles ovate, concave, 3 mm, midribs excurrent, spiny. Tepals 5, lanceolate, 3.5 mm long. Stamens 5; filaments 2 mm long; staminodes fimbriate, prominently appendaged within. Ovary 1-ovuled. Utricle 1-seeded.

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

*Distribution*: Pantropical. Dry-deciduous forests of Agali, c. 600 m; frequent. HN 025.

*Usage*: Roots ground well into a paste and administered for asthma. When symptoms are seen, take a small quantity of the paste and mix with water and administer orally. This helps the patient to reduce the affliction. *Iruilas* use the whole plant to relieve limb-pain. A single plant is collected, chopped and boiled in two glasses of water, reduced into half and administered in empty stomach during morning and evening, for seven days to cure limb-pain.

**Amaranthus caudatus** L., Sp. Pl. 990. 1753; Hook. f., Fl. Brit. India 4: 719. 1885; Gamble, Fl. Pres. Madras 1170. 1925; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1305. 1983. Kumari in Nair *et al.*, Fl. Tamilnadu 2: 191. 1987; Sivar. & P. Mathew, Fl. Nilambur 560. 1997. **Porikeere (I, K & M) Plate 6A.**

Herbs to 1 m high. Leaves obovoid to rhomboid, 10-15 x 3-5 cm, base and apex shortly acuminate, margin entire; petiole to 10 cm long. Panicles terminal and axillary, pendulous, to 20 cm long; bracts and bracteoles spatulate, to 5 mm long, awned. Male flowers 4 mm across; tepals 5, unequal. Stamens 5; filaments 2.5 mm long; anthers oblong. Female flowers 3 mm across. Tepals 5, subequal, lanceolate, to 4 mm long. Ovary 0.7 mm across; styles 3, to 1 mm long. Utricle circumsessile. Seeds dark brown to black coloured.

*Fl. & Fr.* : October-December.

*Distribution*: Cosmopolitan. Farm lands of Pattimalam, c. 600 m; frequent. *HN 036*.

*Usage*: Cultivated for its seeds. Seeds roasted, mixed with honey and eaten. As a ritual this is eaten after the fasting on *Sivarathri* day. This food-item is considered as very nutritious and tasty.

**Amaranthus spinosus** L., Sp. Pl. 991. 1753; Hook. f., Fl. Brit. India 4: 718. 1885; Gamble, Fl. Pres. Madras 1170. 1925; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1307. 1983; Kumari in Henry *et al.*, Fl. Tamilnadu 2: 191. 1987; Manilal, Fl. Silent Valley 226. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 378. 1988; Vajr., Fl. Palghat Dist. 387. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 377. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 369. 1996; Sivar. & P. Mathew, Fl. Nilambur 561. 1997; Mohanan & Sivad., Fl. Agasthyamala 541. 2002.

**Mullukkeere (I, K & M).**

Herbs to 1 m high; armed, spines axillary, to 1.5 cm long, paired or clustered subtending the inflorescence. Leaves elliptic-lanceolate, 4-8 x 2-4 cm, base acute, apex acutely emarginate; petiole to 5 cm long. Fascicles axillary or aggregated into terminal panicles, to 10 cm long; bracts and bracteoles ovate-lanceolate, to 1.5 mm long, bristle-tipped. Flowers 1.5 cm across. Male: Tepals 5, unequal, with prominent midrib; outer lobes 2, naviculate, 1.7 mm long, awned, curved outwards; inner lobes 3, oblong. Stamens 5; filaments 2.5 mm long; anthers sagittate. Female: Tepals 5,

subequal, oblong, flat, base obtuse, apex acute. Ovary 0.7 mm across; styles 2, to 1 mm long. Utricle circumsessile. Seeds dark brown.

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

*Distribution*: Native of America. Naturalised in the warmer regions of the World. Waste lands of Kathirampathy, c. 650 m; frequent. *HN* 177.

*Usage*: Young shoots are used as a vegetable.

**Amaranthus viridis** L., Sp. Pl. (ed. 2) 1405. 1763; Hook. f., Fl. Brit. India 4: 720. 1885; Gamble, Fl. Pres. Madras 1171. 1925; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1308. 1983; Kumari in Henry *et al.*, Fl. Tamilnadu 2: 191. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 378. 1988; Vajr., Fl. Palghat Dist. 387. 1990. M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 377. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 369. 1996; Sivar. & P. Mathew, Fl. Nilambur 561. 1997. *A. fasciatus* Roxb., Fl. Ind. 3: 609. 1832. *A. gracilis* Desf., Tabl. Ecole Bot. 43. 1804. **Keere (I, K & M)**.

Herbs to 1 m high. Leaves deltoid-ovate to rhomboid, 3-8 x 2-5 cm, base truncate to acute, margin entire, apex acutely emarginate; petiole 4-8 cm long. Panicles terminal and axillary; bracts and bracteoles ovate-lanceolate, 1.5 mm long, mid-vein prominent; bracteoles shorter. Male flowers to 2 mm across. Tepals 3, oblong-lanceolate, 1.5 mm long, straight or curved outwards. Stamens 3, free, filaments 1 mm long. Female flowers to 1.5 mm across. Tepals as in male flowers. Ovary 0.7 mm across; styles 2. Utricle indehiscent, subcompressed, rugose, 1.2 mm wide, brownish.

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

*Distribution*: Pantropical. Waste lands of Konamkuthy, c. 750 m; frequent. *HN* 236.

*Usage*: Tender leafy shoots are used as a vegetable. Curry is made out of sliced shoots of *Keere* in well boiled *Tumare (Cajanus cajan)*.

**Celosia argentea** L., Sp. Pl. 205. 1753; Hook. f., Fl. Brit. India 4: 714. 1885; Gamble, Fl. Pres. Madras 1166. 1925; N. Rani & K. M. Matthew in K.

M. Matthew, Fl. Tamilnadu Carnatic 3: 1308. 1983; Kumari in Henry *et al.*, Fl. Tamilnadu 2: 192. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 378. 1988; Vajr., Fl. Palghat Dist. 387; Sivar. & P. Mathew, Fl. Nilambur 562. 1997.

**Keere (I, K & M).**

Herbs, to 1.25 m high; stem angular. Lower leaves elliptic-ovate, upper linear-lanceolate; 7-13 x 0.5-1.5 cm, base cuneate to attenuate, apex acute; petiole to 1 cm long. Spikes dense, cylindric, to 10 cm long. Flowers 4 mm across; bracts lanceolate, 6 mm long, scarious, acute; bracteoles oblanceolate, curved, slightly shorter, persistent. Tepals 5, broadly obovate-lanceolate, to 6 mm long, hyaline, base rounded to obtuse, margin entire, apex apiculate. Stamens 5; filaments 2 mm long. Ovary 2.5 mm across; style 4.5 mm long; stigma minutely forked. Capsule globose, 4 mm diameter, included in perianth. Seeds reticulate, blackish.

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

*Distribution*: Cosmopolitan; probably native of Africa. Waste lands of Konamkuthy, c. 750 m; frequent. *HN 080*.

*Usage*: Tender shoots and leaves are used as vegetable. This is generally consumed during pregnancy as a nutritious food item.

**Celosia polygonoides** Retz., Obs. Bot. 2 : 12. 1781; Hook. f., Fl. Brit. India 4: 715. 1885; Gamble, Fl. Pres. Madras 1166. 1925; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1310. 1983; Kumari in Henry *et al.*, Fl. Tamilnadu 2: 192. 1987. **Teyyakkeere (I).**

Herbs to 50 cm high. Leaves deltoid-ovate, 2.5-3 x 1.5-2 cm, base truncate, margin entire, apex subacute; petiole to 2 cm long. Spikes lax, thyriform, puberulous, to 10 cm long. Flowers rose-coloured, 2 mm across; bract hyaline, acute, each subtending 3-5 flowers, oblong-obovate, 1.5 mm; bracteoles oblong-lanceolate, to 1 mm long, hyaline. Tepals 5, oblong-obovate, 1.5 mm long, base rounded, apex acute. Stamens 5; filaments 1 mm long. Ovary 1 mm across; style 0.5 mm long, forked. Capsule urceolate, exserted from perianth, 3 mm diameter, apex obtuse, thickened, breaking off like a cap with embedded style. Seeds 4-8, smooth.

*Fl. & Fr.*: August-December.

*Distribution*: India & Sri Lanka. Waste lands of Konamkuthy, c. 750 m; frequent. *HN 128*.

*Usage*: A leafy vegetable; used for preparing dishes along with *Tumare* (*Cajanus cajan*).

## ANACARDIACEAE

**Buchanania lanzan** Spreng., J. Bot. (Schrader) 2: 234. 1800; Gamble, Fl. Pres. Madras 258. 1918; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 306. 1983; Chithra in Nair *et al.*, Fl. Tamilnadu 1: 87. 1983; Vajr., Fl. Palghat Dist. 136. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 127. 1994; Sivar. & P. Mathew, Fl. Nilambur 168. 1997; Mohanan & Sivad., Fl. Agasthyamala 178. 2002. *B. latifolia* Roxb., Fl. Ind. 2: 385. 1832; Hook. f., Fl. Brit. India 2: 23. 1876. **Murasi (J)**.

Trees to 8 m tall; branchlets with prominent leaf-scars, sericeous; tender shoots hairy. Leaves broadly ovate, 15-20 x 10-15 cm, base round, margin entire, apex obtuse-retuse; petiole stout, to 2 cm long, tomentose. Panicles long, pyramidal, to 15 cm high, branch-axes divaricate, many, villous. Flowers c. 4 mm across. Calyx-lobes 5, to 1.5 mm long. Petals 5, cream-coloured, oblong-ovate, 2.5 mm long. Stamens 10. Drupe globose, to 1 cm wide, blackish when ripe.

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

*Distribution*: India and Myanmar. Waste lands of Konamkuthy, c. 750 m; frequent. *HN 133*.

*Usage*: Fruit edible when ripe, usually consumed by children of shepherds.

**Mangifera indica** L., Sp. Pl. 209. 1753; Hook. f., Fl. Brit. India 2 : 13. 1876; Gamble, Fl. Pres. Madras 259. 1918; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 308. 1983; Chithra in Nair *et al.*, Fl. Tamilnadu 1: 88. 1983; Manilal, Fl. Silent Valley 67. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 117. 1988; Vajr., Fl. Palghat Dist. 138. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 129. 1994; Sasidh. & Sivar.,

Flow. Pl. Thrissur For. 122. 1996; Sivar. & P. Mathew, Fl. Nilambur 169. 1997; Mohanan & Sivad., Fl. Agasthyamala 181. 2002. **Mave maram (I, K & M).**

Trees to 35 m tall; branchlets glabrous. Leaves oblong or elliptic-lanceolate, to 20 x 4.5 cm, coriaceous, base cuneate-subacute, margin entire, apex acuminate; petiole to 3 cm long. Panicles terminal, to 25 cm long; flowers male or polygamous. Male: 3.5 mm across; calyx-lobes 5, ovate, 2 mm long, hairy, caducous. Petals 5, cream-coloured, oblong-obovate, 4 mm long, imbricate, subequal, nerves at base gland-crested; fertile stamen solitary, 1-5 mm long; staminodes 4. Bisexual: 5 mm across. Sepals and petals same as male flower. Disc cupular, 4-5-lobed. Stamens 5, inserted inside disc, fertile stamen solitary; filaments free; anthers ovoid; staminodes 3 or 4, gland-tipped. Ovary oblique, sessile, one-celled; style lateral, 1 mm long; stigma simple. Drupe ovoid-oblong, fleshy, to 8 cm diameter, ovoid, glabrous, resinous.

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

*Distribution:* Indo-Malesia. Riverine forests of Mully, c. 700 m; frequent. *HN* 198.

*Usage:* A decoction of the bark is prepared along with a pinch of cumin seeds and administered for asthma and related bronchial troubles. There is a belief that fresh bark pieces from tall trees growing along a river are to be taken and administer in the form of aqueous decoction as a course of 21 days is prescribed for curing it.

## APIACEAE

**Centella asiatica** (L.) Urban in Mart., Fl. Bras. 11(1): 287. 1879; Gamble, Fl. Pres. Madras 556. 1919; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 676. 1983; Manilal, Fl. Silent Valley 124. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 205. 1988; Chandrab. in Nair *et al.*, Fl. Tamilnadu 1: 179. 1983; Vajr., Fl. Palghat Dist. 222. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 213. 1994; Sasidh. & Sivar.,

Flow. Pl. Thrissur For. 209. 1996; Sivar. & P. Mathew, Fl. Nilambur 308. 1997; Mohanan & Sivad., Fl. Agasthyamala 297. 2002. *Hydrocotyle asiatica* L., Sp. Pl. 234. 1753; Clarke in Hook. f., Fl. Brit. India 2: 669. 1879. **Varache (I)**.

Prostrate herbs with perennial rootstock; stem puberulous, creeping with long stolons, rooting at nodes. Leaves simple, in rosettes, orbicular-reniform, 1-2.5 x 1.5-5 cm, chartaceous, puberulous, base cordate, margin crenate-dentate, apex rotund; petiole to 12 cm long, sheathing at base. Umbels, simple, c. 3-flowered; peduncles to 1 cm long; involucral bracts 2, hooded, 2.5 mm long; pedicel to 0.5 mm long. Flowers 1.5 mm across. Calyxlobes 5, triangular, 0.5 mm long. Petals 5, purplish, to 1.5 mm long. Stamens 5, to 1 mm long; filaments 0.5 mm long. Ovary 2-celled; ovule 1 per cell; styles 2, distant, free from the disc, 0.5 mm long; stigmas 2, simple. Mericarps laterally flattened, to 0.2 cm wide.

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

*Distribution*: Tropical Asia and Africa. Moist locations in the farm lands of Kathirampathy, c. 650 m; frequent. *HN 205*.

*Usage*: Whole plant is made into a paste and administered to the size of a gooseberry in the morning and evening continuously for 1 week for curing leucorrhoea.

**Pimpinella heyneana** (DC.) Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 46: 115. 1877; Hook. f., Fl. Brit India 2: 684. 1879; Gamble, Fl. Pres. Madras 560. 1969; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 682. 1983; Chandrab. in Nair *et al.*, Fl. Tamilnadu 1: 180. 1983; Manilal, Fl. Silent Valley 126. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 207. 1988; Sasidh. & Sivar., Flow. Pl. Thrissur For. 212. 1996; Sivar. & P. Mathew, Fl. Nilambur 309. 1997. *Helosciadium heyneanum* DC., Prodr. 4: 106. 1830. **Kozhijeera (K & M)**.

Herbs to 0.75 m high; branchlets glabrous. Leaves trifoliolate, to 7 cm long; leaflets oblong-lanceolate, deeply lobed, 3-5 x 1.5 - 2.5 cm, glabrous, base obtuse, margin serrate, apex acuminate; petiole to 8 cm long; petiolule 1



Treatment of  
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cm long. Umbels to 7 cm long; peduncle to 10 cm long; rays 5-20; flowers c. 15 per ray; bracts 1 or 2, lanceolate, caducous; bracteoles 1-3, about 1.5 cm long, caducous; pedicel 0.5-1 cm long. Flowers 1.5 mm across. Petals 5, white, ovate, 0.5 mm long, apex inflexed. Stylopodium flat. Stamens 5; filaments 0.5 mm long. Ovary 0.5 mm across, base puberulous, 2-celled; ovule 1 per cell; style 0.5 mm long. Fruit ovoid, to 2 mm wide; mericarps glabrous. Carpophore bipartite.

*Fl. & Fr.:* December-March.

*Distribution:* India, Myanmar and Sri Lanka. Waste land of Kathirampathy, c. 650 m; frequent. *HN 280.*

*Usage:* Leaves are added to curries as a spice, or ground with coconut to make chutney.

## APOCYNACEAE

**Carissa carandas** L., Mant. Pl. 52. 1767; Hook. f., Fl. Brit. India 3: 630. 1882; Gamble, Fl. Pres. Madras 804. 1922; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 905. 1983; Srinivasan in Henry *et al.*, Fl. Tamilnadu 2: 75. 1987. **Kallachedi (I).**

Spiniscent shrubs, to 5 m high; spines to 3 cm long; latex milky. Leaves obovate, 5 x 3 cm, base acute to cuneate, margin entire, apex obtuse, apiculate; petiole to 4 mm long. Inflorescence terminal or axillary; peduncle puberulous, to 2.5 cm long; pedicel to 5 mm long. Calyx lobes 5, linear-lanceolate, to 4 mm long, acute. Corolla 2 cm across; tube 1.7 cm long; lobes 5, elliptic-oblong, 1 cm long, mucronate. Stamens 5; filaments 0.5 mm long; anthers 2.5 mm long. Ovary 2 mm across; style 8 mm. Berry ellipsoid, 1.5 cm across.

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

*Distribution:* Indo-Malesia. Dry-deciduous forest of Pattimalam, c. 600 m; frequent. *HN 60.*

*Usage:* The spines are used in the ceremonial piercing of ear-lobes of babies. The ripe fruits are eaten.

***Ichnocarpus frutescens*** (L.) R.Br. in Aiton, Hort. Kew. ed. 2. 69. 1811; Hook. f., Fl. Brit. India 3: 669. 1882; Gamble, Fl. Pres. Madras 820. 1923; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 912. 1983; Srinivasan in Henry *et al.*, Fl. Tamilnadu 2: 77. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 278. 1988; Vajr., Fl. Palghat Dist. 281. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 292. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 280. 1996; Sivar. & P. Mathew, Fl. Nilambur 414. 1997; Mohanan & Sivad., Fl. Agasthyamala 439. 2002. *Apocynum frutescens* L., Sp. Pl. 213. 1753. **Kodambekodi (I)** Plate 6B.

Climbing shrubs; tender parts rusty-pubescent. Leaves oblong, 4-7 x 2-3.5 cm, acute at both ends; petiole, to 0.7 cm long. Cymes paniculate, axillary and terminal, rusty pubescent; peduncles to 8 cm long; pedicel to 4 mm long. Calyx cupular; lobes 5, subequal, ovate, alternating with 5 glandular scales, to 1.5 mm long, hirsute without, acute. Corolla dull white, 6 mm across, lobes 5, overlapping to right, 3 mm long, pubescent, reflexed, acuminate. Stamens 5, anthers sagittate, 1 mm long, connivent around stigma. Ovaries 2, to 0.5 mm across; ovules many; style 0.5 mm long, Disc of 5 linear glands. Follicles divergent, to 12 cm long; seeds basally furrowed; coma apical, to 1 cm long.

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

*Distribution*: Indo-Malesia and Australia. Dry-deciduous forest of Konamkuthy, c. 700 m; frequent. *HN 222*.

*Usage*: Leafy shoots are collected to feed goats. The vines are used as a rope in hut making.

***Rauvolfia serpentina*** (L.) Benth. ex Kurz, For. Fl. Myanmar 2: 171. 1877; Hook. f., Fl. Brit. India 3: 632. 1882; Gamble, Fl. Pres. Madras 807. 1923; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 917. 1983; Srinivasan in Henry *et al.*, Fl. Tamilnadu 2: 79. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 279. 1988; Vajr., Fl. Palghat Dist. 282. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 293. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 282. 1996; Sivar. & P. Mathew, Fl.

Nilambur 417. 1997; Mohanan & Sivad., Fl. Agasthyamala 443. 2002. *Ophioxylon serpentinum* L., Sp. Pl. 1043. 1753. **Amalpori (M & K).**

Subshrubs to 0.75 m high. Leaves 2 or 3 per node, broadly oblanceolate, 10-15 x 3-5 cm, base attenuate, margin entire, apex acute to shortly acuminate; petioles to 2 cm long. Corymbs axillary, to 5 cm long; pedicel to 0.5 cm long. Calyx-lobes 5, ovate-lanceolate, acute. Corolla 5 mm across; tube 1 cm; lobes 5, obovate, 3 mm long, obtuse. Stamens 5; filaments 0.2 mm long; anthers 1.5 mm long. Ovary 1 mm across; style 5 mm long; stigma calyptriform. Drupes ovoid or oblong, connate below, 0.7 cm across, blackish when ripe.

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

*Distribution*: South and south east Asia. Moist deciduous forest of Kurukkankundu, c. 700 m; not frequent. *HN 292.*

*Usage*: Plants uprooted and the root portion is marketed as a raw-drug for Ayurvedic medicines. This is known for its use in reducing blood pressure, antidote for the bites of poisonous reptiles and insects and also as a febrifuge.

**Wrightia tinctoria** (Roxb.) R. Br., Mem. Wern. Nat. Hist. Soc. 1: 74. 1811; Hook. f., Fl. Brit. India 3: 653. 1882; Gamble, Fl. Pres. Madras 815. 1923; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 921. 1983; Srinivasan in Henry *et al.*, Fl. Tamilnadu 2: 80. 1987; Manilal, Fl. Silent Valley 175. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 281. 1988; Vajr., Fl. Palghat Dist. 283. 1990. M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 295. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 283. 1996; Sivar. & P. Mathew, Fl. Nilambur 420. 1997; Mohanan & Sivad., Fl. Agasthyamala 446. 2002. *Nerium tinctorium* Roxb., Orient. Repert. 1: 39. 1791. **Goppampale (I).**

Trees to 8 m tall. Leaves 6-14 x 3-6 cm, sparsely hispid along nerves below, base truncate or attenuate; petiole to 4 mm long. Pedicel to 1.5 cm long. Calyx 4 mm long; lobes 5, ovate, acute, 2 mm long. Corolla 2.5 cm across; tube 0.3 mm long; lobes 5, oblong, puberulous within, acute; corona

scales in 2-3 series, filiform, fimbriate. Stamens 5; anthers 5 mm long, acute, tip barbed. Ovary 1.5 mm across, style 5 mm long. Mericarps paired, apically jointed, cylindrical, curved, 25 cm long.

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

*Distribution*: India, Myanmar and Timor. Dry-deciduous forest of Mully, c. 700 m; frequent. *HN 156*.

*Usage*: A few drops of latex of this tree are mixed with milk and kept for a few minutes for quick fermentation and consumed later. This is a refreshing and nutritious food item, especially for the shepherd boys. Musical pipes are made from the stem of this tree.

## ARISTOLOCHIACEAE

***Aristolochia indica*** L., Sp. Pl. 760. 1753; Hook. f., Fl. Brit. India 5: 75. 1886; Gamble, Fl. Pres. Madras 1202. 1925; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1345. 1983; Kumari in Henry, Fl. Tamilnadu 2: 201. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 383. 1988; Vajr., Fl. Palghat Dist. 394, 1990. M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 381. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 373. 1996; Mohanan & Sivad., Fl. Agasthyamala 546. 2002. **Irukodi, Urikodi (I)**.

Twining herbs. Leaves 6-10 x 2-4 cm, ovate-lanceolate, base subcordate, margin entire, apex acute to acuminate; petiole to 1 cm long. Inflorescence axillary, monochasial racemes; bracts minute; pedicel to 1.5 cm long. Flowers dark purple, 6 cm long; Perianth tube to 2.5 cm long, puberulus within, lip 3.5 cm long, rolled back. Stamens 6; anthers 1 mm long. Ovary 1 x 2.5 cm. Capsule to 4 cm long, 6-ridged. Seeds triangular, flat, to 0.5 cm across.

*Fl. & Fr.*: November-March.

*Distribution*: Indo-Malesia. Dry-deciduous forests of Koodapetty, c. 600 m; frequent. *HN 182*.

*Usage*: Crush the roots with onion and inhaled several times through a cloth piece to get relief from headache. A piece of crushed root chewed and held at

the aching tooth. This treatment reduces gradually the pain and inflammation and cures the tooth ache when used daily for a week period. During the spread of Malaria, a decoction of the root is given in empty stomach to the suspected patients for three days, as a curative medicine. The leaf paste is applied over wounds and swelling caused by wasp stings, ulcers on legs, etc. for speedy healing.

**Thottea siliquosa** (Lam.) Ding Hou, *Blumea* 27(2): 327. 1981; Kumari in Henry *et al.*, *Fl. Tamilnadu* 2: 202. 1987; Manilal, *Fl. Silent Valley* 229. 1988; V. S. Ramach. & V. J. Nair, *Fl. Cannanore* 384. 1988; Vajr., *Fl. Palghat Dist.* 395. 1990; M. Mohanan & A. N. Henry, *Fl. Thiruvananthapuram* 381. 1994; Sasidh. & Sivar., *Flow. Pl. Thrissur For.* 374. 1996; Sivar. & P. Mathew, *Fl. Nilambur* 573. 1997; Mohanan & Sivad., *Fl. Agasthyamala* 548. 2002. *Apama siliquosa* Lam., *Encycl.* 1: 91. 1783; Gamble, *Fl. Pres. Madras* 1200. 1925. *Bragantia wallichii* R. Br. ex Wight, *lc. t.* 520. 1841; Hook. f., *Fl. Brit. India* 5: 73. 1886. **Peele (M)**.

Shrubs to 2 m high. Leaves elliptic-lanceolate, triplinerved, 20 x 6 cm, shining above, glabrous beneath, base cuneate, margin entire, apex acute; shortly petioled, to 3 mm long. Flowers in compressed axillary cymes; perianth lobes fleshy, purple, to 3 mm long. Stamens 6. Ovary to 2 mm across; ovules many; style absent; stigma 6-lobed. Siliqua elongate, cylindrical, to 5 cm long. Seeds trigonous.

*Fl. & Fr.*: October-February.

*Distribution*: Peninsular India and Sri Lanka. Semi-evergreen forest of Karuvara, c. 650 m; locally abundant. *HN 290*.

*Usage*: An aqueous decoction of roots is taken internally as a course of 21 days is prescribed as an effective medicine for epilepsy. The tribal healer medicates the drug by chanting some *mantras* and gives it to the patient every day. Three pinches of crushed roots, boiled in one glass of water, and reduced it to half is administered in the morning. For curing body-pain and joint-pain, bath for seven days in lukewarm water medicated by boiling some crushed roots is advised.

## ASCLEPIADACEAE

**Calotropis gigantia** (L) R. Br. in Aiton, Hort. Kew., ed. 2, 2: 78. 1811; Hook. f., Fl. Brit. India 4: 17. 1883; Gamble, Fl. Pres. Madras 832. 1923; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 929. 1983; Srinivasan in Henry *et al.*, Fl. Tamilnadu 2: 81. 1987; Manilal, Fl. Silent Valley 176. 1988; Vajr., Fl. Palghat Dist. 285. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 297. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 285. 1996; Sivar. & P. Mathew, Fl. Nilambur 237. 1997. *Asclepias gigantea* L., Sp. Pl. 214. 1753. **Erukkile, Erukku (I).**

Shrub to 1.5 m tall, latex milky; shoots and inflorescences covered with soft, loose, white wool. Leaves elliptic to oblong, 8-16 x 2.5-7 cm, base clasping-cordate, margin entire, apex obtuse. Inflorescence an umbellate panicle, c. 10 cm long; bracts and bracteoles lanceolate, to 1 cm long. Calyx-lobes ovate, ciliate, glandular, to 0.5 cm long. Corolla pale purple, 4 cm across, lobes ovate, leathery. Pollinia pendulous; pollinial bags oblong, flattened; caudicles indistinct. Corona single, trifid at apex, 1.3 cm long. Ovaries 0.3 cm across; styles 1 cm long. Follicle oblong, inflated, 10 x 5 cm; seeds oblong to ovate; coma long, silky.

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

*Distribution*: Tropical Asia. Dry thickets of Mulli, c. 700m; locally abundant. *HN 017*.

*Usage*: The latex is applied over the wounds caused by dog bites. This is said to help the patient to escape from Rabies infection. The latex is mixed with the leaf-juice of *Veppemaram* (*Azadirachta indica*) and applied over the snake-bite. This is used as a first-aid for all types of snake-bites.

**Caralluma attenuata** Wight, Ic. t. 1268. 1848; Hook. f., Fl. Brit. India 4: 76. 1883; Gamble, Fl. Pres. Madras 861. 1923; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 932. 1983; Srinivasan in Henry *et al.*, Fl. Tamilnadu 2: 81. 1987. **Kallekku (I).**

Stout, fleshy herbs, to 45 cm high; stem obtusely angular, tapering to the tip. Leaves caducous, leaving scars on the stem. Racemes terminal; pedicel 3 mm long. Calyx 5-lobed; lobes ovate, acuminate. Corolla dark purple; tube short, broad-campanulate, purple-streaked; lobes valvate in bud, subrotate in flower, folded back, fringes purple. Staminal-corona purple; staminal column short; anthers truncate at apex. Pistils 2, ovoid, free; style apically 5-angled. Follicles 2, narrow, cylindrical, to 12 cm long.

*Fl. & Fr.:* July-October.

*Distribution:* South India and Sri Lanka. Dry-deciduous forests and thickets of Mully, c. 700 m; frequent. *HN 020*.

*Usage:* A shoot piece of about 3 inch in length is ground and mixed in half-a-glass of water. This is administered in empty stomach, possibly in the morning, for three consecutive days to cure typhoid. This is also a remedy for bleeding piles. The size of a gooseberry, of ground shoot is administered in the morning, in empty stomach for a week. The stem is cut into small pieces and fried in castor oil with a pinch of salt and crushed onion and is administered for debility, and also considered as a general medicine for all ailments.

***Gymnema sylvestre*** (Retz.) R. Br. ex Roem. & Schult. in L., *Syst. Veg.* 6; 57. 1820; Hook. f., *Fl. Brit. India* 4: 29. 1883; Gamble, *Fl. Pres. Madras* 839. 1923; K. M. Matthew & N. Rani in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 946. 1983; Srinivasan in Henry *et al.*, *Fl. Tamilnadu* 2: 85. 1987; V. S. Ramach. & V. J. Nair, *Fl. Cannanore* 283. 1988; Vajr., *Fl. Palghat Dist.* 289. 1990; Sasidh. & Sivar., *Flow. Pl. Thrissur For.* 289. 1996; Sivar. & P. Mathew, *Fl. Nilambur* 426. 1997. *Periploca sylvestris* Retz., *Obs. Bot.* 2: 15. 1781. **Sakkarekodi (I, K & M).**

Twiners; tender parts pubescent; latex milky. Leaves elliptic to obovate, 1.5-5 x 1-4 cm, pubescent along nerves below, base obtuse, margin entire, apex abruptly acute. Flowers small, in axillary cymes; peduncle 1-1.5 cm long. Calyx lobes obovate, 1 mm long, scabrous without, obtuse. Corolla 4 mm across, dull yellow; lobes recurved, glabrous. Pollinial bags 0.2 mm long.

Corona with 5, fleshy processes in the sinuses of the lobes. Ovaries 0.1 mm across; style 0.5 mm long. Follicles lanceolate, glabrous, 7 cm long, dark green coloured.

*Fl. & Fr.*: August-December.

*Distribution*: Indo-Malesia. Dry-deciduous forest of Konamkuthy, c. 700 m; not frequent. *HN 186*.

*Usage*: The leaves are dried in sunlight and powdered. Diabetic patients are advised to administer this regularly in empty stomach. Three pinches of the powder mixed in half a glass of water is administered.

**Hemidesmus indicus** (L.) R. Br. in Aiton. f., Hort. Kew., ed. 2, 2 : 75. 1811; Gamble, Fl. Pres. Madras 825. 1923; Hook. f., Fl. Brit. India 4: 4. 1883; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 947. 1983; Manilal, Fl. Silent Valley 178. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 284. 1988; Vajr., Fl. Palghat Dist. 290. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 301. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 289. 1996; Sivar. & P. Mathew, Fl. Nilambur 427. 1997; Mohanan & Sivad., Fl. Agasthyamala 455. 2002. *Periploca indica* L., Sp. Pl. 211. 1753. **Nannari (I, K & M)**.

Twining shrubs. Leaves linear-oblong to 3-8 x 0.5-2 cm, linear, oblong, opposite, decussate; petiole very short. Flowers 5-15, in axillary fascicles; pedicels to 0.5 cm long. Calyx-lobes imbricate, glandular within. Corolla faded yellow; lobes valvate. Stamens connivent around styles; filaments incurved; pollinia erect; pollinal bags spherical, closely appressed to the sheathy caudicle. Corona single, corolline. Styles 1 mm long; stigma circular. Follicles stout terete to 8 cm long. Seeds oblong; coma brownish white.

*Fl. & Fr.*: August-December.

*Distribution*: India and Sri Lanka. Moist deciduous forest of Mukkali, c. 550 m; frequent. *HN 031*.

*Usage*: The root is made into a paste and applied externally several times a day, for 10 days, over itches and similar skin problems in children. The root-paste is used as a deodorant and applied externally. For stomach ulcer, the

root-paste is prepared with three leaves of *Elanthe* (*Ziziphus mauritiana*) and a small piece of bark of *Kankonge* (*Celastrus paniculatus*) and administered in empty stomach regularly for three weeks in the morning.

**Holostemma ada-kodien** Schult. in Roem. & Schult., Syst. Veg. 6: 95. 1820; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 949. 1983; Srinivasan in Henry *et al.*, Fl. Tamilnadu 2: 86. 1987; Vajr., Fl. Palghat Dist. 290. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 298. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 291. 1996. *Sarcostemma annulare* Roth., Nov. Pl. Sp. 178. 1821. *Holostemma rheedii* Wall., Pl. As. Rar. 2: 51. 1831; Hook. f., Fl. Brit. India 4: 21. 1883. *Holostemma annulare* (Roxb.) Schum. in Engl. & Prantl., Pflanzenfam. 4. 2: 250. 1895; Gamble, Fl. Pres. Madras 834. 1923; Mohanan & Sivad., Fl. Agasthyamala 450. 2002. *Asclepias annularis* Roxb., Fl. Ind. 2: 37. 1832. **Paalkizhangu (K & M)**.

Twining shrubs. Leaves narrowly cordiform, 8 x 4 cm, chartaceous, puberulous below, base cordate, apex obtusely acute; petiole to 4 cm long. Flowers in lateral cymes, 5-7, in axillary clusters; peduncle 0.5 cm long; bracts 2 mm long; pedicel to 1.5 cm long. Calyx lobes ovate, imbricate, 4 x 3 mm, ciliate, subacute. Corolla lobes 1.5 cm long, pale purple, ovate, concave, bent in the middle, connate below, acute. Pollinia pendulous; pollinial bags oblong, flat, 2 mm long; caudicle brownish, 1 mm long; receptacle oblong, 7 mm long. Corona single, reduced to pentagonous, fleshy annulus below the staminal column. Ovary subglobose; style 4.5 mm long; stigma horny. Follicles unequal, wall very thick; seeds cordate, thin, flat, 4 mm diameter.

*Fl. & Fr.*: September-December.

*Distribution*: South Asia. Moist deciduous Forest of Mukkali, c. 550 m; frequent. HN 323.

*Usage*: The ground-roots are made to the size of a gooseberry, and mixed with water and taken twice a day for three days for curing stomach pain.

**Leptadenia reticulata** (Retz.) Wight & Arn. in Wight, Contrib. Bot. India 47. 1834 & Icon. Pl. Ind. Orient. t. 350. 1840; Hook. f., Fl. Brit. India 4: 63. 1883; Gamble, Fl. Pres. Madras 850. 1923; Britto, K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 950.1983; Srinivasan in Henry *et al.*, Fl. Tamilnadu 2: 87. 1987; Vajr., Fl. Palghat Dist. 291. 1990. *Cynanchum reticulatum* Retz., Obs. Bot. 2: 15. 1781. **Pale dagu (I)** Plate 6C.

Straggling shrubs; stem wiry; latex watery. Leaves ovate-lanceolate, 8 x 4 cm, chartaceous, base rounded, apex acute; petiole to 2 cm long. Flowers many, in axillary or terminal umbellate cymes; peduncle to 1 cm long; bracts to 4 mm long; bracteoles scaly; pedicel to 1 cm long. Calyx cupular; lobes subequal, triangular, valvate, densely pubescent. Corolla pale yellow, 5 mm across, campanulate; lobes linear, valvate, 4 mm long, glabrous without, bearded within, recurved, acute. Pollinia suberect; pollinial bags spherical, pellucid; caudicle obscure, receptacle blackish. Corona double; outer corolline, massive, alternating with corolla-lobes; inner on with 5 annular lobes around staminal column. Ovaries 1 mm across; style minute; stigma bifid. Follicles paired, cylindric, acute to both ends, 6 cm long. Seeds oblong; coma brownish white.

*Fl. & Fr.*: September-December.

*Distribution*: Indo-Malesia to Madagascar. Open areas in Dry-deciduous forests of Kottathara, c.600 m; rare. *HN 310*.

*Usage*: Fresh leaves are sliced, fried in coconut oil, sprinkled with common salt and administered continuously for one month, during mid-day meals, cures back-pain. The leaf-juice when used as a nasal drop cause sneezing and cures cold.

**Pergularia daemia** (Forsk.) Chiov., in Result. Sci. Misc. Stafn. Paoli. Somal. Ital. 1: 115. 1916; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 955. 1983; Srinivasan in Henry *et al.*, Fl. Tamilnadu 2: 87. 1987; Vajr., Fl. Palghat Dist. 291. 1990. *Asclepias daemia* Forsk., Fl. Aeg.- Arab. 51. 1775. *Cynanchum extensum* Jacq., Misc. 2: 353. 1782. *Daemia extensa* (Jacq.) R. Br. in Aiton, Hort. Kew. (ed. 2) 2: 76. 1811; Hook.

f., Fl. Brit. India 4: 20. 1883. *Pergularia extensa* (Jacq.) N. E. Br. in Dyer, Fl. Cap. 4: 758. 1908; Gamble, Fl. Pres. Madras 836. 1923. **Velipparuthy (I)**.

Straggling shrubs. Leaves cordiform, 6 x 8 cm, chartaceous, base cordate, margin entire, apex acute; petiole to 5 cm long. Racemes umbelliform, axillary; peduncle to 12 cm long, bracts and bracteoles linear. Calyx-lobes subequal, imbricate, 4 mm long, glandular. Corolla pale greenish, 2 cm wide, campanulate; tube slightly inflated. Pollinia pendulous. Corona double; outer flap-like; inner alternating with outer, with basal processes, apex 2-fid. Ovary 1.5 mm across; Style 4.5 mm long. Follicles paired, curved, basally swollen, to 8 cm long. Seeds 7 mm long, obtuse; coma brownish white, silky.

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

*Distribution*: Paleotropics. Dry-deciduous Forest of Mully, c. 700 m; frequent. *HN 032*.

*Usage*: The latex is applied over scorpion-bite to allay pain and inflammation. Leaves are crushed and 5-6 drops of the juice mixed with one tablespoon of honey in a single dose is administered to cure cough and fever of children. Tender leaves are fried in coconut oil with pieces of onion and administered regularly for one month to a person suffering from epilepsy. Fresh leaves are collected and wrapped in a cloth and used as a pillow to get sound sleep in the night.

**Secamone emetica** (Retz.) R. Br. ex Schult. in L., Syst. Veg. 6: 124. 1820; Hook. f., Fl. Brit. India 4: 13. 1883; Gamble, Fl. Pres. Madras 829. 1923; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 958. 1983; Srinivasan in Henry *et al.*, Fl. Tamilnadu 2: 88. 1987; Mohanan & Sivad., Fl. Agasthyamala 453. 2002. *Periploca emetica* Retz., Obs. Bot. 2: 14. 1781. **Kezhukkikodi (I)**.

Climbers, profusely branched; old stem bark possess deep crevices; latex milky. Leaves linear, 6 x 1.5 cm, base attenuate to cuneate, apex acutely apiculate; petiole to 0.5 cm long. Cymes axillary; peduncle to 1.5 cm long; bracts and bracteoles lanceolate, 1.5 mm long; pedicel to 4 mm long.

Calyx cupular, subequal, triangular, valvate, 2 mm long, pubescent without, acute. Corolla yellowish, 6 mm across, campanulate; lobes oblong, recurved, 3 mm long, imbricate, acute. Pollinia erect; pollinal bags 4, spherical, 0.2 mm wide; receptacle short; anther tips inflexed, connivent around style. Corona single, staminal, beaked; staminal column 1.5 mm long. Ovary 0.7 mm across; styles exerted; stigma capitate. Follicles paired, to 8 cm long. Seeds oblong, to 7 mm long; coma silky, dull white.

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

*Distribution*: Peninsular India and Sri Lanka. Dry-deciduous forest of Puliapathy, c. 650 m; frequent. *HN 101*.

*Usage*: Leaves and shoots are used as fodder for goats.

**Wattakaka volubilis** (L.f.) Stapf, Bot. Mag. Sub t. 8976. 1922; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 963. 1983; Srinivasan in Henry *et al.*, Fl. Tamilnadu 2: 90. 1987; Manilal, Fl. Silent Valley 180. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 286. 1988; Vajr., Fl. Palghat Dist. 293. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 300. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 294. 1996. *Asclepias volubilis* L. f., Suppl. 170. 1781. *Hoya viridiflora* R. Br., Mem. Wern. Nat. Hist. Soc. 1: 27. 1811. *Dregea volubilis* (L.f.) Benth. ex Hook. f. in Hook. f., Fl. Brit. India 4: 46. 1883. *Marsdenia volubilis* (L.f.) Cooke, Fl. Pres. Bombay 2: 166. 1904; Gamble, Fl. Pres. Madras 2: 846. 1923. **Palekodi (I)**.

Woody climbers. Leaves cordiform, 8 x 6 cm, base rounded, apex shortly acuminate; petiole to 2.5 cm long. Umbellate cymes axillary, c. 25-flowered; peduncle 2.5 cm long; bracts concave, 0.7 mm across; pedicel to 2 cm long. Calyx-lobes lanceolate, imbricate, 3 mm long, puberulous without, ciliate, subacute, glandular. Corolla pale green, 1.5 cm across, rotate; lobes ovate, overlapping to right in bud, ciliate, subacute. Pollinal bags sessile; receptacle 0.2 mm long. Corona single, staminal, fleshy. Ovaries globose, 1.5 mm across; style 1.5 mm long. Follicles with woody pericarp, oblong, apex blunt.

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

*Distribution:* Indo-Malesia and China. Waste lands of Narasimukku, c. 700 m; frequent. *HN 329*.

*Usage:* Fresh leaves are collected, wrapped in a cloth and used as a pillow to get sound sleep in the night.

## ASTERACEAE

***Ageratum conyzoides*** L., Sp. Pl. 839. 1753; Hook. f., Fl. Brit. India 3: 243. 1881; Gamble, Fl. Pres. Madras 677. 1921; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 762. 1983; Chandrasekaran in Henry *et al.*, Fl. Tamilnadu 2: 29. 1987; Manilal, Fl. Silent Valley 147. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 241. 1988; Vajr., Fl. Palghat Dist. 248. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 252. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 244. 1996; Sivar. & P. Mathew, Fl. Nilambur 359. 1997. ***Appe chedi (M)***.

Herb to 0.75 m high. Leaves 4-8 x 3-5 cm, puberulous, ovate, base acute, margin crenate, apex gradually acute; petiole to 4 cm long. Peduncle laxly branched, to 1.5 cm long. Capitulum 5 mm across. Phyllaries oblong-lanceolate, scabrous, 4 mm long, serrulate towards apex, acute. Florets 50-75, white to light blue. Palea 3 mm long, finely ciliate along margin. Pappus 2.5 mm long. Corolla 0.8 mm across. Stamens 5; anthers 0.5 mm long. Ovary slightly curved, style 2.5 mm long; stigma obtuse. Achenes narrowed below, sparsely scabrous.

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

*Distribution:* Pantropical. Moist Deciduous Forests of Kallamala, c. 600 m; locally abundant. *HN 254*.

*Usage:* Equal quantities of shoots of *Appechedi* and *Kaattappe* are crushed and the juice is applied several times over all types of wounds for fast healing.

***Blumea mollis*** (D. Don) Merr., Philipp. J. Sci. (Bot.) 5: 395. 1910; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 169. 1980; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 771. 1983;

Chandrasekaran in Henry *et al.*, Fl. Tamilnadu 2: 34. 1987; Manilal, Fl. Silent Valley 152. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 244. 1988; Vajr., Fl. Palghat Dist. 249. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 256. 1994; Sivar. & P. Mathew, Fl. Nilambur 364. 1997; Mohanan & Sivad., Fl. Agasthyamala 372. 2002. *Erigeron molle* D. Don, Prodr. Fl. Nepal. 172. 1825. *Blumea wightiana* DC. in Wight, Contrib. Bot. Ind. 14. 1834; Hook. f., Fl. Brit. India 3: 261. 1881; Gamble, Fl. Pres. Madras 686. 1921. *B. neilgherriensis* Hook. f., Fl. Brit. India 3: 261. 1881. **Miche (M)**.

Herbs to 1 m high; branchlets thinly glandular-pubescent. Leaves obovate, 7 x 3.5 cm, thinly pubescent on both surfaces, base acute, stem-clasping in lower leaves, margin irregularly serrate, teeth pointed, apex-subacute; subsessile or shortly petiolate. Inflorescence dense, in axillary and terminal panicles. Capitula campanulate, 6 mm across, pale purple. Involucre bracts many-seriate, silky pubescent without; inner ones scarious, ciliate on margins. Bisexual florets: Corolla pinkish, 1.5 mm across; tube 4 mm long; lobes 5. Stamens 5; anthers 2 mm long. Ovary oblong, sub-angulate, 0.7 mm across; style 4.5 mm long; stigma subulate. Female florets: Corolla 0.4 mm across; tube 3 mm. Ovary 0.7 mm across; style 3.5 mm; stigma subulate. Achenes to 1 cm long, ribbed; pappus white, silky.

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

*Distribution*: Indo-Malesia to Australia and Africa. Wastelands of North Ommala, c. 600m; locally abundant. *HN 259*.

*Usage*: Leaves are crushed along with equal quantity of *Appe* (*Ageratum conyzoides*) leaves and a pinch of lime. Apply this mixture over scorpion bite for curing pain and inflammation.

**Chromolaena odorata** (L.) King & Robinson, Phytologia 20: 204. 1970; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 776. 1983; Chandrasekaran in Henry *et al.*, Fl. Tamilnadu 2: 35. 1987; Manilal, Fl. Silent Valley 152. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 247. 1988; Vajr., Fl. Palghat Dist. 250. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 257. 1994; Sasidh. & Sivar., Flow. Pl.

Thrissur For. 248. 1996; Sivar. & P. Mathew, Fl. Nilambur 366. 1997. *Eupatorium odoratum* L., Syst. Nat. ed. 10, 2; 1205. 1759; Hook. f., Fl. Brit. India 3: 244. 1881; Grierson in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 1: 143. 1980. *E. conyzoides* Vahl, Symb. Bot. 3: 96. 1794. **Kaattappe, Communist Chedi (M).**

Subshrubs to 3 m high; aromatic, viscid-pubescent. Leaves opposite, simple, obovate to deltoid-ovate, 6-8 x 3-5cm, chartaceous, puberulous above, pubescent below, base acute, margin coarsely serrate, apex acute; petiole to 1.5 cm long. Panicle corymbose, much branched; capitula stalked, homogamous, disciform; receptacle slightly convex; involucre cylindric, to 1 cm long. Phyllaries many seriate, scarious, unequal, acute; outer ovate, concave, 1.5 mm long, pubescent; inner oblong to linear, 7 mm long, ciliate above. Bisexual florets pale blue coloured. Corolla tubular, 1.2 mm across; tube gradually widened above, 4.5 mm long; lobes 5, ovate, 0.5 mm wide, acute. Stamens 5; filaments filiform, linear, flat. Ovary linear, 4 mm long, angular, narrowed below; style 8 mm long, bifid; stigma truncate, puberulous. Achenes scabrid; pappus uniseriate, 4.5 mm long, barbellate.

*Fl. & Fr.*: December-March.

*Distribution*: Native of America; now widely naturalized in Tropical Asia. Openings in moist deciduous forest of Karuvara, c. 600 m; locally abundant. *HN 272.*

*Usage*: For getting fast relief from body pain the leaves are made into a paste and applied all over the body, half an hour before bath. Leaf juice is commonly used for healing wounds.

***Eclipta prostrata*** (L.) L., Mant. Pl. 286. 1771; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 783. 1983; Chandrasekaran in Henry *et al.*, Fl. Tamilnadu 2: 37. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 249. 1988; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 259. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 249. 1996; Sivar. & P. Mathew, Fl. Nilambur 369. 1997. *E. alba* (L.) Hassk., Pl. Jav. rar. 528. 1848; Hook. f., Fl. Brit. India 3: 304. 1881; Gamble, Fl. Pres.

Madras 705. 1921; Vajr., Fl. Palghat Dist. 252. 1990. *Verbesina alba* L., Sp. Pl. 902. 1753. *V. prostrata* L., Sp. Pl. 902 1753. **Kanjunni (M)**.

Herbs to 50 cm high; axillary branchlets short. Leaves opposite, simple, lanceolate, 4-6 x 1-1.5 cm, hirsute on both surfaces, base cuneate, decurrent, margin irregularly serrate-dentate, apex acute, subsessile or shortly petiolate. Capitula 1-3, axillary and terminal, stalked, heterogamous, radiate, 0.7-1 cm across; involucre campanulate. Outer florets female, biseriate; inner, bisexual. Disc florets: Corolla 1.3 mm across, 2 mm long; lobes 5, deeply cleft, oblong, acute. Stamens 5, anthers linear, 1 mm long. Ovary oblong, 1.5 mm across, pubescent above; style 1.5 mm long, arms thick, puberulous, tip obtuse. Ray florets: Corolla white, 2.5 mm long, ray oblanceolate, 1.5 x 0.5 mm, 3-toothed. Ovary oblong, triquetrous, 2 mm across, pubescent above, narrowed below; style 1.5 mm long. Achenes oblong, hairy; pappus of 2, minute, acute, connate scales, 0.4 mm long.

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

*Distribution*: Pantropical. Wet areas in moist deciduous forests of Konamkuthy, c.750 m; frequent. *HN 230*.

*Usage*: Whole plant is taken, crushed, boiled in coconut oil, filtered and applied on the scalp before bath for a month regularly, which provides cooling effect, deep sleep and promotes hair growth. It also prevents premature greying of hair.

**Elephantopus scaber** L., Sp. Pl. 814. 1753; Hook. f. Fl. Brit. India 3: 242. 1881; Gamble, Fl. Pres. Madras 676. 1921; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 784. 1983; Chandrasekaran in Henry *et al.*, Fl. Tamilnadu 2: 38. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 249. 1988; Vajr., Fl. Palghat Dist. 252. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 260. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 249. 1996; Sivar. & P. Mathew, Fl. Nilambur 370. 1997. **Anayadi (M)**.

Herbs to 40 cm high, stiff; subscapigerous; strigose. Leaves subradical, closely alternate, simple, obovate to oblanceolate, 10-14 x 4-5 cm,

strigose above and along nerves below, base cuneate to acute, margin serrate, apex broadly acute; petiole to 2 cm long. Capitula homogamous, sessile, aggregated in dense, stalked glomerules, 1 cm across, subtended by 3 ovate floral leaves; receptacle flat; involucre tubular. Phyllaries biseriate oblanceolate, scarious; outer 4, glabrous without, 5 x 1 mm; inner 4, strigose without, 7 x 1.5 mm, Florets 3-5, purple, bisexual. Pappus uniseriate of 5 stiff setose hairs, to 5 mm long. Corolla 4 mm across; tube cylindrical, 6 mm long; lobes 5, equal, oblong, palmately spreading, acute. Stamens 5, exerted; filaments filiform. Ovary oblong, indistinctly ribbed, hairy; style 8 mm long, dilated and hairy above, shortly bifid, acute, recurved. Achenes 10-ribbed.

*Fl. & Fr.*: September-December.

*Distribution*: Pan tropical. Moist deciduous forests of Mukkali, c. 550 m; frequent. *HN 267*.

*Usage*: Roots of a few plants are ground well along with equal quantity of onion. This paste is applied over Erysipelas (a kind of skin disease) seen in children, continuously for a week, two times a day.

**Pentanema indicum** (L.) Ling, Acta Phyt. Sin. 10: 179. 1965; Vajr., Fl. Palghat Dist. 258. 1990; Sivar. & P. Mathew, Fl. Nilambur 373. 1997. *Inula indica* L., Sp. Pl. ed. 2. 1237. 1763. *Vicoa auriculata* Cass., Ann. Sci. Nat. (Paris) 17: 418. 1829; Hook. f., Fl. Brit. India 3: 297: 1881. *Vicoa indica* (L.) DC. in Wight, Contrib. Bot. India 10. 1834; Gamble, Fl. Pres. Madras 701. 1921; N. Rani & K. M. Mathew in K. M. Mathew, Fl. Tamilnadu Carnatic 3: 830. 1983; Chandrasekaran in Henry *et al.*, Fl. Tamilnadu 2: 54. 1987; Manilal, Fl. Silent Valley 162. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 258. 1988; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 271. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 256. 1996; Mohanan & Sivad., Fl. Agasthyamala 397. 2002. **Suryachakram (I)**.

Herbs to 75 cm high; branchlets striate. Leaves alternate or subopposite, simple, lanceolate, 3-5 x 0.4-0.7 cm, chartaceous, scabrous, base amplexicaul, auriculate, margin serrulate, apex acute, sessile. Capitulum solitary, axillary and terminal, long-stalked, heterogamous, radiate,

1.5 cm across; receptacle convex, pitted; involucre campanulate. Phyllaries multi-seriate, linear, subequal, 3 x 0.7, acute. Outer florets female, uni-seriate; inner bisexual. Disc florets: corolla 0.7 mm across; tube 2.5 mm long; lobes 5, ovate, acute, recurved. Stamens 5, included; anthers linear, 1.5 mm long, tailed. Ovary oblong, 0.7 mm across, pubescent; style 2.2 mm long, bifid; stigma obtuse. Ray florets: corolla yellowish; tube 1.5 mm long; ray oblong, 6 x 1 mm, toothed above, with a curved tail near mouth. Ovary oblong, 0.7 mm across, glabrescent; style 2 mm long, bifid; stigma acute. Achenes obovate; pappus filiform, to 3 mm long.

*Fl. & Fr.*: December-March.

*Distribution*: India, China, Thailand and W. Africa. Wastelands of Kookkampalayam, c. 650 m; frequent. *HN 349*.

*Usage*: The paste from leaves is applied on the forehead of children to subside head ache and giddiness due to cold.

***Tridax procumbens*** L., Sp. Pl. 900. 1753; Hook. f., Fl. Brit. India 3: 311. 1881; Gamble, Fl. Pres. Madras 711. 1921; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 821. 1983; Chandrasekaran in Henry *et al.*, Fl. Tamilnadu 2: 51. 1987; Manilal, Fl. Silent Valley 160. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 255. 1988; Vajr., Fl. Palghat Dist. 256. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 268. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 255. 1996; Sivar. & P. Mathew, Fl. Nilambur 381. 1997. **Adatodappan chedi, Pukavetti (I)**.

Procumbant herbs. Leaves opposite, simple, lanceolate to ovate, 4 x 1.5 cm, acute at both ends, margin coarsely serrate. Capitulum pale yellow, solitary, 1.5 cm wide, long-stalked; heterogamous; receptacle flat or convex; involucre campanulate. Phyllaries many seriate. Outer florets female, uni-seriate; inner ones bisexual, many numbered. Disc florets: Corolla pale yellowish, 2 mm across; tube 6 mm long; lobes 5, oblong, 1 mm wide, ciliate, acute. Stamens 5, anthers 2 mm long. Ovary oblong, 2 mm across; style 7.5 mm long, bifid, pubescent. Ray florets cream to yellow coloured; tube narrowly cylindrical, hairy without, deeply trilobed. Ovary oblong, truncate, 2.5

mm across, pubescent without; style 6 mm long, bifid; stigma subulate. Achenes turbinate, silky-villous, smooth or ribbed; pappus of slender, setose hairs, to 4 mm long.

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

*Distribution*: Native of tropical America; now wide spread throughout tropics and sub-tropics. Open areas in the Dry-deciduous forest of Kallakkara, c.600 m; locally abundant. *HN 309*.

*Usage*: The juice of crushed leaves is mixed with a pinch of lime and made into a paste applied over wounds for fast healing.

***Vernonia divergens*** (Roxb.) Edgew., *J. Asiat. Soc. Bengal* 21: 172. 1853; Hook. f., *Fl. Brit. India* 3: 234. 1881; Gamble, *Fl. Pres. Madras* 673. 1921; N. Rani & K. M. Matthew in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 828.1983; Chandrasekaran in Henry *et al.*, *Fl. Tamilnadu* 2: 52. 1987; Manilal, *Fl. Silent Valley* 161. 1988; V. S. Ramach. & V. J. Nair, *Fl. Cannanore* 257. 1988; Vajr., *Fl. Palghat Dist.* 258. 1990; Sasidh. & Sivar., *Flow. Pl. Thrissur For.* 256. 1996; Sivar. & P. Mathew, *Fl. Nilambur* 383. 1997; Mohanan & Sivad., *Fl. Agasthyamala* 394. 2002. *Eupatorium divergens* Roxb., *Fl. Ind.* 3: 414. 1832. *Decaneurum divergens* (Roxb.) DC., *Prodr.* 5: 68, 1836.

***Puthagane (I), Ambukane (M)***.

Shrubs to 2 m high; tender parts thinly pubescent. Leaves elliptic-obovate, 6-10 x 2.5-4 cm, chartaceous, minutely hirsute above, pubescent below, acute to acuminate at both ends, margin serrate; petiole to 1 cm long. Inflorescence a dense, terminal, corymbose cymes. Capitula sessile, 1 cm long, c. 5-flowered; receptacle small; involucre tubular, 0.4 cm across. Phyllaries thick-scarious, obtusely mucronate; outer ovate, concave, 2.5 x 1.5 mm, margin ciliate; inner ones oblong, concave, 4.5 x 1.5 mm, margin ciliate to entire. Corolla 3 mm across; tube 4 mm long, lobes 5, lanceolate. Stamens 5; anthers 2.3 mm long. Ovary oblong, 2.5 mm across, narrowed below; style 7 mm long; stigma linear, puberulous, acute. Achenes ribbed; pappus uniseriate, unequal, to 4.5 mm long.

*Fl. & Fr.*: December-January.

*Distribution:* Indo-Malesia. Wastelands of Puttumala, c. 750 m; common. *HN* 244.

*Usage:* A handful of leaves are taken (*Mudugas* use the whole plant), ground well with 2-3 pinches of cumin seeds and administered for curing indigestion and stomach pain. Two dosages in a single day are generally suggested.

## BALANOPHORACEAE

**Balanophora fungosa** J. R. & G. Forst., Char. Gen. Pl. 100. t. 50. 1776, ssp. **indica** (Arn.) Hansen, Dansk Bot. Ark. 28: 100. 1972; K. M. Matthew & N. Rani in Fl. Tamilnadu Carnatic 3: 1383. 1983; Kumari in Henry *et al.*, Fl. Tamilnadu 2: 220. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 403. 1988; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 402. 1994; Sivar. & P. Mathew, Fl. Nilambur 599. 1997; Mohanan & Sivad., Fl. Agasthyamala 587. 2002. *Langsdorffia indica* Arn., Ann. Nat. Hist. 2: 37. 1838. *Balanophora indica* (Arn.) Wall. ex Griff., Trans. Linn. Soc. London 20: 95. 1846; Hook. f., Fl. Brit. India 5: 237. 1886; Gamble, Fl. Pres. Madras 1263. 1925. **Bomb (K)** Plate 6D.

Dioecious plants; stem stout, cylindrical, irregularly lobed below. Leaves 7-15, closely spiral, suborbicular, concave or slightly cucullate, 1.5-2.5 x 1.5-2 cm, thick, subacute or obtuse, stipulate. Male: Heads pale yellow, ovoid to ellipsoid, cylindrical, 6-9 x 5-6 cm. Pedicels 1-1.5 x 0.3 cm; bracts truncate. Tepals 4, oblong to lanceolate, 4-6 x 3 mm, fleshy, shortly connate, acute. Synandrium oblong-cylindrical, 4-6 x 3 mm, raised on a short torus; anthers 4, horse-shoe shaped. Female: Heads rusty-brown, globose, 3-4.5 x 3-4 cm. Ovary globose; style filiform, 1-1.5 mm long, pointed, stigmatic above. Spadicles club-shaped, 0.8-1.5 mm long.

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

*Distribution:* Indo-Malesia and Australia. Semi-evergreen forest of Karuvara, c. 650 m; frequent. *HN* 355.

Plate 6.



A. Cultivation of *Amaranthus caudatus*



B. *Ichnocarpus frutescens*



C. *Leptadaenia reticulata*



D. *Balanophora fungosa* ssp. *indica*

*Usage:* Collected and sold as a raw-drug on demand. This is used as a raw-drug for the preparation of ayurvedic medicines as a substitute for *Athithippali* (*Scindapsus officinalis*), which is utilised for diarrhoea, bronchitis and helminthiasis.

## BASELLACEAE

**Basella alba** L., Sp. Pl. 272. 1753; Kumari in Henry *et al.*, Fl. Tamilnadu 2: 194. 1987. **Basella rubra** L., Sp. Pl. 272. 1753; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1327. 1983; Hook. f., Fl. Brit. India 5: 20. 1886; Gamble, Fl. Pres. Madras 1185. 1925. **Sirivasale (I)**.

Twining; fleshy; rhizomatous vines; stem wiry. Leaves alternate, ovate-elliptic to oblanceolate, sub-succulent, 6 x 3 cm, base subacute, margin entire, apex obtuse; petiole 0.5-1 cm long. Spikes 7-10 cm long, with many sessile flowers. Flowers pentamerous. Perianth pale yellowish; lobes 5. Stamens 5, basally dilated. Ovary globose, 1-celled; ovule 1; styles stigmatiferous. Pseudo-berry 0.6 cm across. Seed 1.

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

*Distribution:* Native of tropical Asia and Africa; often cultivated. Dry-deciduous forests of Mully, c. 700 m; rare. *HN 105*.

*Usage:* A leafy vegetable; curry made out of leaves and tender shoots with *Tumare* (*Cajanus cajan*) cures indigestion and makes bowel loose.

## BOMBACACEAE

**Cullenia exarillata** Robyns, Bull. Jard. Bot. Nat. Belg. 40: 249. 1970; Chandrab. in Nair *et al.*, Fl. Tamilnadu 1: 38. 1987; Manilal, Fl. Silent Valley 30. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 66. 1988; Vajr., Fl. Palghat Dist. 87. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 84. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 64. 1996; Sivar. & P. Mathew, Fl. Nilambur 98. 1997; Mohanan & Sivad., Fl. Agasthyamala 105. 2002. **Cullenia excelsa** Wight, Ic. t. 1761, 1762. 1851; Mast. in Hook. f., Fl.

Brit. India 1: 350. 1874; Dunn in Gamble, Fl. Pres. Madras 101. 1915.

**Thengimaram (M).**

Large trees to 40 m tall; young shoots lepidotous. Leaves subovate-elliptic upto 11 X 4 cm, glabrous above, lepidote beneath, base cuneate, margin undulate; apex caudate acuminate. Flowers yellow, in umbellate clusters on the old wood and branches. Peduncle to 1.5 cm long, 4-angled. Involucre bracts 3-5, united to a campanulate tube, to 1.2 cm long, irregularly lobed. Petals absent. stamens 3-4 cm long. Ovary to 8 mm across, 5-celled, densely covered with stipulate scales; ovule many; style woolly. Capsule globose, to 10 cm wide, covered with minutely puberulous spines, splitting into 5 valves. Seeds 2-5, ovoid, 3 angled, exarillate.

*Fl. & Fr.*: November-March.

*Distribution*: Endemic to Southern Western Ghats. Evergreen forest of Siruvani, c. 800 m; frequent. *HN 206*.

*Usage*: Seeds are roasted and eaten as food.

## BORAGINACEAE

**Carmona retusa** (Vahl) Masamune, Trans. Nat. Hist. Soc. Taiwan 30: 61. 1940; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 996. 1983; Ramamurthy in Henry *et al.*, Fl. Tamilnadu 2: 97. 1987; Vajr., Fl. Palghat Dist. 302. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 310. 1994. *Cordia retusa* Vahl, Symb. Bot. 2: 42. 1791. *Ehretia microphylla* Lam., Illustr. 1: 425. 1792; Gamble, Fl. Pres. Madras 891. 1923. *E. buxifolia* Roxb., Pl. Corom. t. 57. 1796 & Fl. Ind. 2: 343. 1824; Hook. f., Fl. Brit. India 4: 144. 1883. *Carmona microphylla* (Lam.) Don, Gen. Hist. 4: 391. 1837. **Otte (I).**

Subshrubs to 1.5 m high. Leaves alternate, clustered with axillary leaves, obovate-spathulate, thick, white-glandular above, each with a bristle, sparsely scabrous along nerves below, base cuneate, margin entire, apex obtuse-truncate, bluntly 3-7-toothed; petiole to 0.5 cm long. Flowers axillary, solitary, bracteate; pedicel to 0.5 cm long. Calyx-lobes 5, unequal, elliptic-

oblong, 5 mm long, herbaceous, scabrous below in and out, decurrent, obtuse or apiculate. Corolla cream, 0.7 cm across, sub-rotate; tube 2 mm long; lobes 5, oblong-elliptic, imbricate, 5 mm long, herbaceous, obtuse. Stamens 5; filaments, to 2 mm long; anthers oblong, 2 mm long. Ovary globose, 1 mm across; style-arms 2, 5 mm long; stigma capitate. Drupe globose, of 4 pyrenes, 0.4 cm wide.

*Fl. & Fr.*: September-January.

*Distribution*: Indo-Malesia. Dry-deciduous forest of Pattimalam, c. 600 m; not frequent. *HN 354*.

*Usage*: To trap hen-ticks and bed bugs, place freshly cut shoots in the Hen-coops, and near beds at night. The bugs and ticks will be trapped in the sticky leaves and are killed burning the twigs the next day.

***Cordia wallichii*** G. Don, *Gen. Syst.* 4: 379. 1837; Gamble, *Fl. Pres. Madras* 887. 1923; K. M. Matthew & N. Rani in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 1000. 1983; Manilal, *Fl. Silent Valley* 185. 1988; V. S. Ramach. & V. J. Nair, *Fl. Cannanore* 294. 1988; Vajr., *Fl. Palghat Dist.* 302. 1990; M. Mohanan & A. N. Henry, *Fl. Thiruvananthapuram* 1994; Sasidh. & Sivar., *Flow. Pl. Thrissur For.* 301. 1996. *C. tomentosa* Wall. in Roxb., *Fl. Ind.* 2: 339. 1824. *C. obliqua* Wight, *lc. t.* 1378. 1848. *C. obliqua* Willd. var. *wallichii* (Don) Clarke in Hook. f., *Fl. Brit. India* 4: 137. 1883. *C. obliqua* Willd. var. *tomentosa* (Wall.) Kazmi, *J. Arnold Arbor.* 51. 143. 1970. Ramamurthy in Henry *et al.*, *Fl. Tamilnadu* 2: 98. 1987. **Viri (I)**.

Trees upto 10 m tall. Leaves ovate-orbicular; 6-10 x 5-10 cm; glabrescent above, fulvous tomentose below, base truncate to cordate, apex obtuse; petiole to 4 cm long. Flowers white, fragrant, in lax peduncled cymes, to 6 cm long. Calyx 8 mm long, pubescent without. Corolla 9 mm across, whitish, tube 6 mm long; lobes 5 mm wide. Stamens 5, hairy at base; filaments 5 mm long. Ovary 2.5 mm across. Drupe 1.5 cm wide, ovoid, seed single.

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

*Distribution:* South West India. Dry-deciduous forests of Konamkuthy, c.650 m; rare. *HN 161*.

*Usage:* A piece of bark of size about 2 x 2 inch is ground well and prepare gruel with broken rice. This is a strong vermifuge suggested to persons of all age groups. Single time administration is usually suggested.

**Trichodesma indicum** (L.) R. Br., Prodr. 149. 1810; Hook. f., Fl. Brit. India 4: 153. 1883; Gamble, Fl. Pres. Madras 899. 1923; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 993. 1983; Ramamoorthy in Henry *et al.*, Fl. Tamilnadu 2: 101. 1983; Vajr., Fl. Palghat Dist. 304. 1990. *Borago indica* L., Sp. Pl. 137. 1753. **Peelichedi, Gani Tumbe (I)**.

Herbs to 75 cm high. Leaves 5-8 x 1-1.5 cm, opposite, sessile, amplexicaul, hirsute-pubescent below, base auriculate, margin entire, apex acute, Calyx-lobes 5, hastate at base, 1-ribbed, scabrous without. Corolla light blue, 1 cm across; tube 4 mm long; throat with yellow glandular spots; lobes 5, acuminate, apiculus recurved. Stamens 5, exserted; connectives twisted. Ovary quadrilocular, ovules 1 each; style 5 mm long. Nutlets 5 mm wide, smooth on the outer, rugosely pitted on the inner face.

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

*Distribution:* Afghanistan, Subtropical Himalayas, India, Myanmar, Philippines and Mauritius. Wastelands near hamlet premises of Mully, c. 700m; frequent. *HN 009*.

*Usage:* The roots are ground well in to a paste and applied externally over the snakebite, as a first-aid. Two spoons full of crushed root is mixed well in half glass of water, filtered and administered single time for stomach-ache.

## BRASSICACEAE

**Brassica juncea** (L.) Czern. & Coss. in Czern., Consp. Pl. Chark. 8. n. 5. 1859; Hook. f., Fl. Brit. India 1: 157. 1872; Gamble, Fl. Pres. Madras 1: 38. 1915; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 32. 1983; Chithra in Nair *et al.*, Fl. Tamilnadu 1: 11. 1983; Manilal, Fl. Silent

Valley 7. 1988; Vajr., Fl. Palghat Dist. 54. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 54. 1994. *Sinapis juncea* L., Sp. Pl. 668. 1753.  
**Kadugu (K).** NB 4702

Herbs to 1 m high. Leaves lyrate to pinnatifid, lobes 2-3 pairs, lateral lobes broad; terminal ones ovate, irregularly dentate; upper leaves often simple, oblanceolate, 7-15 x 2.5-7.5 cm, glabrous above, glaucous below, attenuate to decurrent at base, margin irregularly dentate, apex obtuse; petiole to 1 cm long. Racemes terminal, to 20 cm long; pedicel to 1.5 cm long. Flowers 8 mm across. Sepals 4, oblong, 6 x 1 mm, subequal, glabrous, obtuse. Petals 4, yellowish, oblong, limb 4.5 mm, claw to 3.5 mm long. Disc with 4 glands. Stamens 6; filaments unequal; anthers oblong. Ovary stipitate, oblong, to 5 mm across; ovules to 20; style to 2 mm long; stigma capitate. Siliquae subterete, 2.5-5 cm x 2.5 mm, glabrous, torulose. Seeds in 1 row, ovoid.

*Fl. & Fr.*: October-December.

*Distribution*: Central and East Asia and Europe. Cultivated in India. Farm lands of Anavai, c. 800 m; frequent. *HN 228*.

*Usage*: Cultivated for its seeds; threshed, sun dried and sold to *Kurumba* co-operative society. The seeds and seed-oil are known for anti-rheumatic and skin protective action and purchased as a raw-drug by Ayurvedic companies for the preparation of medicines.



## BURSERACEAE

**Canarium strictum** Roxb., Fl. Ind. Orient. 175. 1834; Hook. f., Fl. Brit. India 1: 534. 1875; Gamble, Fl. Pres. Madras 172. 1915; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 225. 1983; Henry in Nair *et al.*, Fl. Tamilnadu 1: 64: 1983; Manilal, Fl. Silent Valley 47. 1988; Vajr., Fl. Palghat Dist. 186. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 108. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 86. 1996; Sivar. & P. Mathew, Fl. Nilambur 129. 1997; Mohanan & Sivad., Fl. Agasthyamala 147. 2002. **Kungilyam (K & M).**

Trees to 30 m tall; branchlets velvety-tomentose. Leaves odd-pinnate, to 20 cm long; leaflets 3-9 pairs, opposite, oblong, 7-12 x 5-6 cm, thick-coriaceous, subglabrous above, rusty-villous below, base obtuse or subcordate, margin crenulate, apex acuminate, slightly mucronate; petiole to 3 cm long, rachis tomentose; petiolule to 6 mm long. Reduced axillary racemes to 10 cm long, interrupted; peduncle to 7 cm long; bract caducous; pedicels short in male and elongate in female. Flowers trimerous, polygamous, to 8 mm across. Male: Calyx-tube campanulate, pubescent without, 5 mm long; lobes 3, triangular. Petals 3, pale yellow, oblong, 7 x 3.5 mm, concave, apiculate. Disc annular, c. 6 lobed, apically pilose, intrastaminal. Staminal tube to 3 mm long. Stamens 6, free from disc; filaments 1 to 2 mm long; anthers subequal; pistillode short. Bisexual: Calyx-tube 4 mm long, pubescent without; lobes 3, triangular, 0.5 mm long. Petals 3, oblong, to 8 mm long. pubescent without. Disc obscurely lobed. Staminal tube to 3 mm long; anthers subequal. Ovary to 3.5 mm across. pilose, 3-celled; ovule 1 per cell; style to 1.5 mm long; stigma capitate. Drupe oblong, 4 x 1.5 cm, dark blue coloured when ripe.

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

*Distribution*: India and Upper Myanmar. Evergreen forest of Kurukkankundu, c. 750 m; frequent. *HN 256*.

*Usage*: Dark brown resin exuded from incisions on the trunk. This is collected and sold for the preparation of Ayurvedic medicines, used against chronic cutaneous diseases and rheumatic pain. It is noticed that the material is occasionally substituting *charalam* (*Pinus roxburghii*), which possess similar properties.

It is known as Black dammar in Commerce which is used as incense and illuminant, manufacturing of bottling-wax and in varnish industry.

**Commiphora caudata** (Wight & Arn.) Engl. in A. & C. DC., Monogr. Phan. 4: 27.1883; Gamble, Fl. Pres. Madras 171. 1915; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 227. 1983; Henry in Nair *et*

*al.*, Fl. Tamilnadu 1: 65. 1983. *Protium caudatum* Wight & Arn., Prodr. Fl. Ind. Orient. 176. 1834; Hook. f., Fl. Brit. India 1: 530. 1875. **Kiluva (I)**.

Trees upto 10 m tall; branchlets glabrous; stem greenish; bark peeling off. Leaves alternate, 3-7 foliolate, to 15 cm long; leaflets opposite, elliptic, 5 x 2.5 cm, chartaceous, glabrous, glossy above, subglaucous below, base attenuate, margin entire, apex caudate; petiole to 6 cm long; petiolule in laterals, to 0.5 cm long. Cymes in axillary panicles; peduncle to 15 cm long; bract linear, to 2 mm long; bracteole short; pedicel to 4 mm long. Male flowers: Calyx-tube, to 2.5 mm long; lobes 4, deltoid. Petals 4, cream, oblanceolate, to 4 mm long, corniculate. Disc enclosed in calyx. Stamens 8, free, inserted on the margins of disc; filaments unequal, 1 - 2 mm long; pistillode short. Bisexual: calyx-tube 4 mm long; lobes 4, ovate, 1 mm long. Petals 4, cream, oblong, to 4 mm, reflexed. Ovary ovoid, 1.5 mm across, 2-celled; ovules 2 per cell; style to 1 mm long; stigma bilobed. Drupe globose, 1.5 x 1 cm; single seeded.

*Fl. & Fr.*: March-June.

*Distribution*: India and Sri Lanka. Dry-deciduous forest of Puliapathy, c. 650 m; frequent. *HN 340*.

*Usage*: The leafy twigs are collected and fed to goats. Mature branches are sometimes planted and grown near the hamlets for the same purpose.

## CACTACEAE

**Cereus pterogonus** Lam., Cact. Gen. Sp. Nov. 59. 1839; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 659. 1983; Vajr., Fl. Palghat Dist. 219: 1990. **Kallicheddi (I)** Plate 7A.

Shrubs to 5 m high; base woody; stem columnar, fleshy, 3 - 9 angled, to 8 cm across; areoles echinate, lanate; spines c. 15, unequal, 0.5-3 cm long. Leaves absent. Flowers lateral, sessile, to 15 cm across. Perianth-tube terete at base, to 10 cm long, funnel-shaped with a few scales below. Tepals numerous; outer ones greenish-white; inner ones white, oblong, lanceolate, 5-7 cm long, to 1.5 cm broad. Stamens numerous, inserted at various levels on

the perianth; filaments slender; anthers oblong, to 2.5 mm long. Ovary angular, to 3 x 1 cm, with scales and areoles; ovules numerous; style to 10 cm long; stigmatic lobes c. 15, to 1 cm long. Berry spiny.

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

*Distribution:* Pantropical. Farm land boundaries at Thoova, c. 650 m; frequent. *HN 334.*

*Usage:* A piece of the stem is hung from the roof in front of house with the belief that it will expel evil spirits. The stem retains its vigour for longer periods because of its xerophytic nature. The stem piece gradually shrinks and then replaced with a fresh one.

**Opuntia striata** Haw., Suppl. Pl. Succ. 79. 1819. var. **dillenii** (Ker-Gawl.) L. Benson, Cact. Succ. J. (Los Angeles) 41: 126. 1969; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 661. 1983. *Cactus dillenii* Ker-Gawl. in Edwards, Bot. Reg. 3: t. 255. 1818. *Opuntia dillenii* (Ker-Gawl.) Haw., Suppl. Pl. Succ. 79. 1819; Clarke in Hook. f., Fl. Brit. India 2: 657. 1879; Gamble, Fl. Pres. Madras 548. 1919; Ramamoorthy in Nair *et al.*, Fl. Tamilnadu 1: 176. 1983; Vajr., Fl. Palghat Dist. 219. 1990. **Kallichedi (I).**

Woody shrubs to 2 m high; branches flattened, ovate, spiny, fleshy, jointed; spines 5-7 per areole, 1-5 cm long. Leaves scaly, deciduous. Flowers, to 5 cm across. Perianth many, yellow. Stamens many; filaments 1-2 cm long; anthers 2 mm long. Ovary 2.5 cm across, glochidiate; style apically branched. Berry obovoid, fleshy, purplish red when ripe, spiny, tubercled. Seeds many.

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

*Distribution:* Native of tropical America, now naturalised in India. Farm lands of Nakkupathy, c. 600 m; frequently seen along farm boundaries. *HN 219.*

*Usage:* A lump of clay is taken in which some latex of this plant is dripped. This is mixed up with water and applied over muscular sprains. While getting dried, water is sprinkled over this for three hours and then washed. The ripe fruits of this plant are tasty and eaten. Care should be taken to remove the central round spine, which is embedded in the pulp.

## CAESALPINIACEAE

**Bauhinia racemosa** Lam., Encycl. 1: 390. 1785; Baker in Hook. f., Fl. Brit. India 2: 276. 1878; Gamble, Fl. Pres. Madras 406. 1919; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 485. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 128. 1983; Manilal, Fl. Silent Valley 90. 1988; Vajr., Fl. Palghat Dist. 179. 1990; Sasidh. & Sivar., Flow. Pl. Thrissur For. 160. 1996; Sivar. & P. Mathew, Fl. Nilambur 228. 1997; Mohanan & Sivad., Fl. Agasthyamala 162. 2002. *Piliostigma racemosa* (Lam.) Benth. in Miq., Pl. Jungh. 262. 1852.

### **Aacha maram (I).**

Trees to 12 m tall; branchlets tomentose. Leaves ovate-orbicular, 4.5 x 5 cm, thin-coriaceous; leaflets connate to two third of their length, grey-pubescent below, glabrous above, base cordate, margin entire, apex obtuse; petiole to 1 cm long. Racemes axillary or terminal, to 12 cm long, pubescent; peduncle to 1.5 cm long; bract lanceolate, to 2 mm long; bracteole to 1 mm long; pedicel to 2 mm. Flowers 1.5 cm across. Calyx tube campanulate, deeply 5 lobed; lobes oblong, to 1 cm long. Petals 5, dull white, oblong, 1.5 x 0.2 cm. Stamens 10; filaments to 0.7 mm long; anthers 1 cm long. Ovary compressed, to 8 mm across; ovules many, stigma sub-sessile. Pod oblong, 15-22 x 1.5-2 cm, twisted, compressed, thick, glabrous. Seeds ovoid.

*Fl. & Fr.*: March-September.

*Distribution*: India and Sri Lanka. Farm lands of Mully, c. 700 m; frequent. HN 083.

*Usage*: Juice extracted from the fresh leaves (about 30 ml) is administered in complicated delivery. After delivery of foetus, a decoction made out of a handful of *Kore (Eleusine coracana)* powder is also provided for expelling the placenta.

**Cassia fistula** L., Sp. Pl. 377. 1753; Hook. f., Fl. Brit. India 2: 261. 1878; Gamble, Fl. Pres. Madras 400. 1919; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 500. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 129. 1983; Manilal, Fl. Silent Valley 91. 1988; V. S. Ramach. & V. J. Nair, Fl.

Cannanore 164. 1988; Vajr., Fl. Palghat Dist. 181. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 165. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 163. 1996; Sivar. & P. Mathew, Fl. Nilambur 233. 1997; Mohanan & Sivad., Fl. Agasthyamala 229. 2002. **Kondai (I, K & M)**.

Trees to 10 m tall; branchlets glabrous. Leaves to 40 cm long; leaflets 4-6 pairs, opposite, oblong-broadly ovate, 4-13 x 2-7 cm, thick-coriaceous, nerves plaited, arching, glabrous above, pubescent below, base subacute-cuneate, margin entire, apex gradually tapering, emarginate; petiole 3-6 cm long; petiolule, to 1 cm long; stipules caducous. Racemes terminal, 20 - 40 cm long, pendulous; peduncle 2-5 cm long; bract ovate, to 7 mm long; pedicel elongate, 3-7 cm long. Flowers, to 4 cm across. Calyx-lobes 5, reflexed ovate, 1 x 0.6 cm, apex obtuse. Petals 5, golden yellow, obovate, 3.5 x 2 cm. Stamens 10, upper 3 short, with erect filaments, to 7.5 mm long and basifixed anthers, to 3 mm long; lower 3, large with curved filaments, to 3 cm long and dorsifixed anthers, to 5 mm long; medium 4, with erect filaments, to 1 cm long and versatile anthers with curved beak, to 6.5 mm long. Ovary appressed-pubescent; ovules numerous; style to 5 mm long; stigma punctiform. Pod shortly stipitate, oblong, terete, glabrous, 40-60 cm long, 2 cm across, dark, indehiscent. Seeds embedded in a sticky pulp.

*Fl. & Fr.*: January-June.

*Distribution*: Indo-Malesia. Moist deciduous forest of Katirampathy, c. 700 m; not frequent. *HN*. 164.

*Usage*: The bark is used for brewing alcohol and consumption of such prepared alcohol is said to cure all digestive problems and stomach disorders.

**Pterolobium hexapetalum** (Roth) Sant. & Wagh, Bull. Bot. Surv. India 5: 108. 1964; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 515. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 133. 1983; Vajr., Fl. Palghat Dist. 183. 1990. *Reichardia hexapetala* Roth, Nov. Pl. Sp. 210: 1821. *Caesalpinia lacerans* Roxb., Fl. Ind. 2: 367. 1832. *Pterolobium indicum* A. Rich., Fl. Abyss. 1: 247. 1847; Baker in Hook. f., Fl. Brit. India 2: 259. 1878; Gamble, Fl. Pres. Madras 395. 1919. **Inde (I)**. Plate 7B.

Armed straggler; branchlets stellate-tomentose; thorns recurved. Leaves bipinnate, to 15 x 7 cm; pinnae c. 6 pairs, to 5.5 cm long; leaflets 8-10 pairs, oblong-oblongate, 1 x 0.5 cm, glabrous, base cuneate-truncate, margin entire, apex obtuse; petiole to 3 cm long; stipules and stipels caducous. Racemes terminal and axillary, to 15 x 5 cm; peduncle to 5 cm long; bracts subulate; bracteoles 0; pedicel to 2 cm long. Flowers 1.5 cm across. Calyx-tube short, to 4 mm long, persistent; lobes 5, unequal; lower one longest, to 6 mm long; others obovate, oblongate, to 4 mm long, hooded. Petals 5, whitish, subequal, 6 x 2.5 mm, pubescent, clawed, base callose. Stamens 10, free; filaments subequal, 5.5-6.5 mm long, subulate, basally villous; anthers uniform. Ovary sessile; ovule 1; style subulate, to 6 mm long; stigma dilated. Pod samaroid, oblong, 4 x 1 cm, indehiscent, apically winged, wings reddish. Seed solitary at base, obovoid, 7 x 5 mm.

*Fl. & Fr.*: June-November.

*Distribution*: Endemic to Peninsular India. Dry thickets of Puliapathy, c. 650 m; locally abundant. *HN 073*.

*Usage*: These plants are seen abundantly along the valleys of Eastern Attappady and when in bloom yields quality honey in the surrounding honeycombs. It is believed that the gregarious flowering of this species is an indicator of good harvest from agricultural crops.

***Senna auriculata*** (L.) Roxb., *Fl. Ind.* 2: 349. 1832. *Cassia auriculata* L., *Sp. Pl.* 379. 1753; Hook. f., *Fl. Brit. India* 2: 263. 1878; Gamble, *Fl. Pres. Madras* 402. 1919; Britto in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 497. 1983; Vajr. in Nair *et al.*, *Fl. Tamilnadu* 1: 129. 1983; Vajr., *Fl. Palghat Dist.* 180. 1990. **Aaveeram (I)**.

Shrubs to 2 m high; branchlets densely tomentose. Leaves 5-10 cm long; leaflets 7-12 pairs, oblong-obovate, 1-2 x 0.5-1 cm, glabrous above, puberulous below, base cuneate-truncate, margin entire, apex obtuse, mucronate; petiole to 1.5 cm long, rachis with linear, stipitate glands opposite to leaflets; petiolule, to 4 mm long; stipules foliaceous, reflexed, reniform to 1 cm long, persistent. Racemes corymbose, terminal and axillary, to 10 cm

long; peduncle and pedicel, to 2 cm long; bract stipular; bracteole linear, to 1 mm long. Flowers 3.5 cm across. Calyx lobes 5, ovate, 1.5 x 1 cm, unequal. Petals 5, bright yellow, ovate-orbicular, 3 x 2 cm. Stamens 10; upper 3 staminodes; antheriferous ones 7; lower 2 large, anthers curved; one medium; 4 short. Ovary to 1.5 cm across; ovules c.15; style, to 1 cm long. Pods stipitate, flat, 10 x 1.5 cm; seeds c. 8, ovoid.

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

*Distribution*: Sri Lanka, India and Myanmar; cultivated in the tropics. Dry-deciduous forests of Koodappetty, c.600 m; common. *HN 098*.

*Usage*: Flowering shoots of this along with *Maave maram* (*Mangifera indica*) and *Veppe maram* (*Azadirachta indica*) are made into a bunch and tied along the boundaries of the agricultural lands and on the roof corners of their dwelling places. This is called as *Kappu kettal*, which is done during *Makara samkramam* day (mid January). *Irulas* clean their houses and wash the walls with lime before this day. They believe the *Sankranti* goddess visits all houses and inspects hygienity. The bark is used in the curing of leather, which is rarely practiced. Retting of leather is done in the water, where the crushed bark pieces are immersed.

***Senna occidentalis*** (L.) Link, Handb. 2: 140. 1831. *Cassia occidentalis* L., Sp. Pl. 377. 1753; Baker in Hook. f., Fl. Brit. India 2: 262. 1878; Gamble, Fl. Pres. Madras 401. 1919; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 505. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 130. 1983; V. S. Ramach. & V. J. Nair, Fl. Cannanore 165. 1988; Vajr., Fl. Palghat Dist. 182. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 166. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 163. 1996; Sivar. & P. Mathew, Fl. Nilambur 235. 1997. **Kokkirichedi (I)**.

Subshrubs to 1.5 m high; branchlets glabrescent. Leaves to 15 x 6.5 cm; leaflets 4 or 5 pairs, opposite, oblong-lanceolate, 3.5-7 x 1.5-2.5 cm, glabrous, base rotund, margin entire, apex obtuse or acute, apiculate; petiole to 4 cm long, with a sessile, globose gland at its base; stipules 0.6 cm long, caducous. Racemes axillary and terminal, corymbose, to 5 cm long; peduncle

to 2 cm long; bracts linear-lanceolate; pedicel to 1.5 cm long. Calyx lobes ovate, 0.5 – 0.7 cm long. Petals yellow, oblong-obovate, 1.5 x 1 cm, claw to 1.5 mm long. Stamens 10; upper 3 staminodes, antheriferous ones 7. Ovary subsessile, to 1.5 cm across; ovules many. Style to 0.8 cm long. Pod short stipitate, flat, 12 x 1 cm, compressed. Seeds c. 20, ovoid.

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

*Distribution*: Native of South America; now naturalised in Asia. Riverine forests of Mully, c.700 m; frequent. *HN 007*; Wastelands of Mully, c. 700 m; frequent. *HN 018*.

*Usage*: Roots are ground well and applied on the scorpion bite area soon after the incident to allay poison. Leaves are fried, powdered and applied regularly over burn-scars to regain pigmentation. Regular use of this cures Leucoderma.

**Senna tora** (L.) Roxb., *Fl. Ind.* 2: 340. 1832. *Cassia tora* L., *Sp. Pl.* 376. 1753; Baker in Hook. f., *Fl. Brit. India* 2: 265. 1878; Gamble, *Fl. Pres. Madras* 401. 1919; Britto in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 510. 1983; Vajr. in Nair *et al.*, *Fl. Tamilnadu* 1: 131. 1983; Vajr., *Fl. Palghat Dist.* 182. 1990; V. S. Ramach. & V. J. Nair, *Fl. Cannanore* 166. 1988; M. Mohanan & A. N. Henry, *Fl. Thiruvananthapuram* 166. 1994; Sasidh. & Sivar., *Flow. Pl. Thrissur For.* 164. 1996; Sivar. & P. Mathew, *Fl. Nilambur* 236. 1997. **Dagare (I)**.

Subshrubs to 1.5 m high; branchlets glabrous. Leaves to 4 cm long; leaflets 3 pairs, obovate, 1.5-3 x 1-1.5 cm, glabrous above, pubescent below, base oblique, margin entire, apex obtuse; petiole to 2 cm long; rachis with 2 glands between the lowest pair of leaflets; petiolule to 2 mm long; stipules linear, falcate, to 1 cm long. Flowers in terminal corymbose racemes; bracteoles 2, linear; pedicel to 1 cm long. Calyx 5 mm long, pubescent, apex obtuse. Petals golden yellow, obovate, subequal, 9 x 4.5 mm, claw to 0.2 cm long. Stamens 10; upper 3 staminodes. Ovary to 1.5 cm across, curved; ovules many; style to 4 mm long. Pod short-stipitate, flat, compressed, to 9 cm long, glabrous. Seeds c. 20, oblong.

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

*Distribution*: Native of South America; now wide spread in India. Waste lands of Chavadiyoor, c. 600 m; locally abundant. *HN 300*.

*Usage*: Fresh roots are ground well and a quantity of the size a gooseberry is administered in empty stomach for three days for curing constipation. This application is also prescribed for pain in the lower abdomen, caused by taking impure food. Intake of decoction of roots is suggested for those suffering from heart problems. The use of this medicine (decoction) prepared with one plant's root per day, for a course of one week is said to allay heart pain.

**Tamarindus indica** L., Sp. Pl. 34. 1753; Baker in Hook. f., Fl. Brit. India 2: 273. 1878; Gamble, Fl. Pres. Madras 409. 1919; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 516. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 133. 1983; V. S. Ramach. & V. J. Nair, Fl. Cannanore 168. 1988; Vajr., Fl. Palghat Dist. 184. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 170. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 166. 1996; Sivar. & P. Mathew, Fl. Nilambur 237. 1997. **Puli (I)**.

Trees to 20 m tall; branchlets warty, tomentose. Leaves evenpinnate, to 8 x 2 cm; leaflets, to 15 pairs, narrowly oblong, 1.5 x 0.7 cm, glabrous or puberulous, base and apex obtuse, margin entire; petiole to 7 mm long; stipules caducous. Racemes terminal on short branchlets, to 5 x 2 cm; peduncle to 1 cm long; bracts and bracteoles ovate, oblong, coloured; pedicels to 5 mm long; buds pinkish-red. Flowers 1 cm across. Calyx-tube narrowly turbinate, to 6 mm long; lobes 4, subequal, oblong, to 1 cm long. Petals 3, yellow; outer one, to 1 x 0.3 cm, rolled up, pink-dotted; laterals clawed, subequal, 1-1.5 x 0.7-1 cm, oblong-oblongeolate; lower pair scaly. Staminal sheath to 7 mm, subterete. Stamens 3, monadelphous; filaments to 6 mm long, base pubescent; anthers oblong; staminodes 2, bristly. Ovary stipitate, to 8 mm across; ovules numerous. Pod oblong, to 10 x 1 cm, sub-compressed, fruit-wall crustaceous, mesocarp pulpy, endocarp septate, leathery, indehiscent. Seeds 1-8, obovoid-orbicular, 1 x 1 cm, compressed.

*Fl. & Fr.*: September-January.

*Distribution:* Native in tropical Africa, introduced and widely grown in India; now widespread in the tropics. Dry-deciduous forest of Mulli often planted, c. 700 m; frequent. *HN 099*.

*Usage:* The ash obtained from burning of wood is ground along with the seed of *Pongamaram* (*Pongamia pinnata*) and applied over inflammatory or other types of abscessions. The wood and branches are used as fire wood. The ripe fruits are collected, removed the fruit-rind and seeds, and dried the pulp in sunlight. The dried pulp is then crushed in a wooden mortar with common-salt and stored. This is used for culinary purposes.

## CANNABACEAE

***Cannabis sativa*** L., Sp. Pl. 1027. 1753; ssp. ***indica*** (Lam.) Small & Cronq., Taxon 25: 426. 1976. *C. indica* Lam., Encycl. 1: 695. 1785. *C. sativa* sensu Roxb., Fl. Ind. 3: 772. 1832, non L. 1753; Hook. f., Fl. Brit. India 5: 487. 1888; Fischer in Gamble, Fl. Pres. Madras 1350. 1928; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1506. 1983; Kumari in Henry *et al.*, Fl. Tamilnadu 2: 250. 1987. **Kinchavu, Kanchavu (I, M & K)**. Plate 7C.

Dioecious shrubs, to 2 m high; branchlets angled, pubescent. Leaves opposite below, alternate above, 7-9-fid below, 3-5-fid above; leaflets subsessile, lanceolate, 6-9 x 0.7-1.5 cm, scabrid above, pubescent below, base cuneate, margin serrate, apex acuminate; petiole 2-4 cm long; stipules lanceolate, to 1 cm long. Male flowers about 5 mm across. Tepals 5, free, oblong, c. 5 mm long, herbaceous, puberulous without, subacute. Stamens 5; anthers with sessile, orange glands along the grooves. Female flowers: bracts 2; outer spathaceous, hairy without, acuminate, enveloping the inner; inner herbaceous entire, enclosing the pistil. Perianth hyaline or absent. Ovary ovoid, to 2 mm across; style-arms 5 mm long, caducous. Achens globose, compressed, 4 x 3 mm, shiny. Seeds hard, brownish.

*Fl. & Fr.:* November-March.

*Distribution:* Probably native of Central Asia. Planted / run wild in the farmlands of Konamkuthy, c. 700 m; common. *HN 234*.

*Usage:* Two flowering shoots are chopped in to small pieces and mixed with two eggs and prepared Omelette. Administer this for severe stomachache. Single time administration will be sufficient to cure the trouble. The leafy shoots of this plant is smoked sometimes for its hallucinating effect. *Erukku* (*Calotropis gigantea*) leaves are rolled after putting inside some crushed dry shoots of *Kanchavu*; burn one end and inhale the smoke.

## CAPPARACEAE

**Capparis zeylanica** L., Sp. Pl. (ed. 2), 720. 1762; Hook. f., Fl. Brit. India 1: 178. 1872; Gamble, Fl. Pres. Madras 46. 1915; Britto & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 43. 1983; Srinivasan in Nair *et al.*, Fl. Tamilnadu 1: 14: 1983; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 56. 1994; Sasidh. & Sivar., Fl. Thrissur For. 42. 1996; *C. horrida* L. f., Suppl. Pl. 264. 1781; Hook. f., Fl. Brit. India 1: 178. 1872.

### **Godanti (I).**

Thorny stragglers; thorns recurved; new branches arching, rusty; branchlets stellate-tomentose. Leaves elliptic-ovate, to 6.5 x 5 cm, base cuneate, margin entire, apex obtuse, mucronate; petiole to 8 mm long; Flowers cream fading to purple about 5 cm across, pedicel 1 cm long. Sepals 4, elliptic, outer 1.5 x 0.9 cm; inner 1 x 0.7 cm. Petals 4, oblong, 2 x 0.9 cm. Stamens numerous; filaments to 3.5 cm long. Disc 1 mm across. Gynophore to 4 cm long. Ovary ellipsoid, 2 mm across; stigma capitate. Fruits ovoid, pendulous, 5 x 3 cm, smooth, blood red when ripe, pulpy inside. Seeds ovoid, many, about 5 mm across.

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

*Distribution:* Indo-Malesia and China. Dry-deciduous forest of Puliapathy, c. 650 m; frequent. *HN 052*. Dry-deciduous forest of Pattimalam, c. 600 m; frequent. *HN 147*.

*Usage:* Leaves and shoots are used as a fodder for goats. Leafy shoots are collected, tied to a bundle, and hung in the shed to feed goats.

**Gynandropsis gynandra** (L.) Briq., *Annuaire Conserv. Jard. Bot. Geneve* 17: 382. 1914. *Cleome gynandra* L., *Sp. Pl.* 671. 1753; Britto & K. M. Matthew in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 46. 1983; Srinivasan in Nair *et al.*, *Fl. Tamilnadu* 1: 16. 1983; M. Mohanan & A. N. Henry, *Fl. Thiruvananthapuram* 57. 1994. *G. pentaphylla* (L.) DC., *Prodr.* 1: 238. 1824; Hook. f., *Fl. Brit. India* 1: 171. 1872; Gamble, *Fl. Pres. Madras* 40. 1915. *Cleome pentaphylla* L., *Sp. Pl. (ed. 2)*, 983. 1763. **Velechedi (I)**.

Herbs to 75 cm high; stem glandular-pubescent. Leaves 3-5 foliolate, 7.5 x 6.5 cm; leaflets obovate; middle one 3-5 x 2-3cm; laterals 1-3 x 0.5-1.5 cm, base cuneate, margin entire, apex acute; petiole to 15 cm long. Racemes corymbose, to 25 cm long; pedicel to 3 cm long. Flowers 2.5 cm across. Calyx 4, equal, ovate, to 4 mm long. Corolla 4, pale pink, obovate, 1.5x 0.5 cm, claw to 1 cm long. Androphore 1.5-2.5 cm long. Stamens 6; filaments 1.5 cm long; anthers 3 mm long. Gynophore to 1 cm long. Ovary oblong, to 1.5 cm across; stigma discoid. Capsule terete, 7-10 cm long, striate, glandular, beak 5 mm. Seeds 1.5 mm across.

*Fl. & Fr.*: September-December.

*Distribution*: Pantropical. Open areas in Dry-deciduous forest of Konamkuthy, c. 750 m; locally abundant. *HN 223*.

*Usage*: To cure ear-ache, apply two drops of leaf-juice are applied in each ear twice a day.

## CASUARINACEAE

**Casuarina litorea** L., *Diss. Stickman* 12. 1754, "Cassarina". *C. equisetifolia* L., *Amoen. Acad.* 4: 413. 1759; Hook. f., *Fl. Brit. India* 5: 598. 1888; Fischer in Gamble, *Fl. Pres. Madras* 1389. 1928; K. M. Matthew & N. Rani in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 1536. 1983; Kumari in Henry *et al.*, *Fl. Tamilnadu* 2: 257. 1983; V. S. Ramach. & V. J. Nair, *Fl. Cannanore* 442. 1988; Vajr., *Fl. Palghat Dist.* 458. 1990; M. Mohanan & A. N. Henry, *Fl. Thiruvananthapuram* 440. 1994. **Chavokku (I)**.

Trees to 20 m tall; branchlets greenish, to 15 cm long, arising from the axils of reduced leaves. Leaves c. 7 in a node, scaly, alternating with ribs of

the upper node, 0.5-1 mm long, acute. Male spikes 3-6 x 0.3 cm. Tepals 2, lanceolate, scarious, thinly ciliate, acute. Stamen 1, inflexed in bud; filament to 2 mm long; anther pointed at both ends. Female spikes 1 or more, 0.4-0.8 x 0.3-0.4 cm, shortly stalked; bract and bracteoles 1.5-2 mm, persistent, woody. Tepals absent. Ovary ovoid, 1 mm; style filiform, to 0.8 cm long. Carpophores ovoid or oblong-cylindric, 1.5-3 x 1-2 cm; nutlets compressed, winged, tipped by persistent style.

*Fl. & Fr.*: October-December.

*Distribution*: Malay Islands, Australia, and Pacific. Farm lands of Kottathara, c. 600 m; cultivated. *HN 359*.

*Usage*: Poles of this tree is widely used in the construction of huts. The poles are obtained from the trees occasionally planted in their farm-lands or purchased from Anakkatti market to make the skeleton of roof.

## CELASTRACEAE

**Cassine albens** (Retz.) Kosterm., Gard. Bull. Singapore 39: 178. 1986. *Schrebera albens* Retz., Obs. Bot. 6: 25. t. 3. 1791. *Mangifera glauca* Rottb., Nye Saml. Kongel. Danske Vidensk. Selsk. Skr. 2: 534, t. 4, f. 1. 1783. *Elaeodendron glaucum* sensu Lawson in Hook. f., Fl. Brit. India 1: 623. 1875, p.p., non Pers., 1805; Gamble, Fl. Pres. Madras 211. 1918. *Cassine glauca* (Rottb.) O. Ktze, Rev. Gen. Pl. 1: 114. 1891; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 254. 1983; Ramamurthy in Nair *et al.*, Fl. Tamilnadu 1: 72. 1983. **Siluppan, Mukurthi (I)**.

Trees to 20 m tall; branchlets glabrous; foliage dense. Leaves decussate, ovate-oblong, 8-11 x 4-6 cm, coriaceous, base obtuse, margin serrate-crenate, apex acute-acuminate; petiole to 2 cm long. Cymes corymbose, to 6 cm long; peduncle to 5 cm long; pedicel to 6 mm long. Flowers to 0.8 cm across. Calyx lobes 5, subequal. Petals 5, yellowish green, oblong, 4 mm long, reflexed. Disc sinuate. Stamens 5, inserted below disc; filaments 1.5 mm long. Ovary conical, angular, 2-3 celled; ovules 2 per cell. Drupe oblong, to 1 cm long, yellow when ripe. Seed single.

*Fl. & Fr.*: July-January.

*Distribution:* India and Sri Lanka. Dry-deciduous forest of Pattimalam, c. 600 m; frequent. *HN 345*.

*Usage:* Leafy shoots are collected to feed goats. Branches are lopped, the leafy twigs are made to small bundles and hung in the shed to feed.

**Celastrus paniculatus** Willd., Sp. Pl. 1: 1125. 1797; Wight, Ic. t. 158. 1839; Lawson in Hook. f., Fl. Brit. India 1: 617. 1875; Gamble, Fl. Pres. Madras 208. 1918; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 255.1983; Ramamurthy in Nair *et al.*, Fl. Tamilnadu 1: 73. 1983; V. S. Ramach. & V. J. Nair, Fl. Cannanore 95. 1988; Vajr., Fl. Palghat Dist. 117. 1990; Sasidh. & Sivar., Flow. Pl. Thrissur For. 105. 1996; Sivar. & P. Mathew, Fl. Nilambur 142. 1997. **Kangonge Kodi (I & M)**. Plate 7D.

Lianas; young branches with lenticels. Leaves ovate to orbicular, 6-11 x 3-6.5 cm, pubescent below; base cuneate, margin serrated, apex acute to acuminate. Panicles terminal, to 15 cm long. Flowers polygamous. Calyx-tube cupular; lobes sub-orbicular, 0.5 mm long. Petals greenish-white, ovate to oblong, reflexed, 0.5 mm across. Male: disk cupular, lobed. Stamens 5, arising from the margin of disk; pistillode conical. Female: ovary adnate to the disc, 2- 5 celled; ovules two per cell; stigmas 3, recurved; staminodes 5. Capsule obovoid, to 1 cm diameter. Seeds with red pulp.

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

*Distribution:* South Asia and Australia. Dry-deciduous Forests of Mully, c. 700 m; rare. *HN 038*. Dry-deciduous Forests of Elachivazhi, c. 650 m; rare. *HN 118*.

*Usage:* Roots ground well in water, and made into a paste and applied all over the body for seven days to cure boils of infants. Leaf-juice is applied several times over deep wounds for speedy healing. Root-paste is applied externally for fever, associated with jaundice. In addition to this, three pinches of root paste are mixed in half a glass of water and boiled with cumin-seeds and equal quantity of black goat's milk. This is taken twice daily for a maximum of four days according to the severity of disease.

## CHENOPODIACEAE

**Chenopodium ambrosioides** L., Sp. Pl. 219. 1753; Wight, Ic. t. 1786. 1852; Hook. f., Fl. Brit. India 5: 4. 1886; Gamble, Fl. Pres. Madras 1181. 1925; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1322. 1983; Kumari in Henry *et al.*, Fl. Tamilnadu 2: 195. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 380. 1988; Vajr., Fl. Palghat Dist. 389. 1990. **Pasimuttchedi, Nattachedi (f).**

Subshrubs to 75 cm high; branchlets angular, ribbed, glabrous or thinly pubescent. Leaves oblong-lanceolate, 5-10 x 1-2.5 cm, base decurrent, margin coarsely toothed, apex acute; petiole to 3 cm long. Panicles axillary or terminating the branchlets, 5-8 cm long. Flowers about 2 mm across. Tepals broadly ovate, 1 mm long, acute to obtuse at both ends. Stamens 5; filaments short. Ovary 0.8 mm across, capped with glandular vesicles; stigmas 3-5, filiform. Utricle 1.5 mm across. Seed horizontal, 1 mm across.

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

*Distribution*: Pantropical. Hamlet premises of Chavadiyoor, c. 600 m; common. *HN 183*.

*Usage*: Shoots of this along with *Tottasurungi* (*Mimosa pudica*) and *Uppanamchedi* (*Justicia tranquebariensis*) are taken in equal quantities (one plant each for single application), ground well into a paste and apply externally against frantic crying of children in fever. Remove this with a piece of cloth after a deep sleep of the baby. Single-time application is suggested. When whole plant is ground well and applied all over the body half an hour before bath, it cures reddish boils and other skin troubles in children. The leaves are made into a paste and a single dose is given internally to stop diarrhoea in children.

## CLUSIACEAE

**Garcinia gummi-gutta** (L.) Robs., Brittonia 20 (2): 103. 1968; Ramamurthy in Nair *et al.*, Fl. Tamilnadu 1: 27. 1983; Manilal, Fl. Silent Valley 19. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 54. 1988; Vajr.,

Fl. Palghat Dist. 70. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 71. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 52. 1996; Sivar. & P. Mathew, Fl. Nilambur 68. 1997; Mohanan & Sivad., Fl. Agasthyamala 84. 2002. *Cambogia gummi-gutta* L., Gen. Pl. ed. 5. 522. 1754. *Garcinia cambogia* (Gaertn.) Desr. in Lam., Encycl. 3: 701. 1792; Anderson in Hook. f., Fl. Brit. India 61. 1874; Gamble, Fl. Pres. Madras 73. 1915; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 94. 1983. *G. conicarpa* Wight, Ic. t. 121. 1839. **Kudampuli (M & K).**

Trees to 20 m tall; branchlets glabrous. Leaves decussate, oblong-lanceolate or elliptic, 8-15 x 3-4.5 cm, coriaceous, glabrous, base and apex tapering, margin entire; petiole to 2 cm long, canaliculate. Flowers polygamodioecious, 5-7 numbers in axillary, umbellate clusters; pedicel to 1 cm long. Male: 1 cm across. Sepals 4, bi-seriate, ovate-suborbicular; outer ones to 6 mm long; inner ones to 8 mm long. Petals yellowish, 4, unequal, ovate or oblong, 0.8-1 x 0.6-0.8 cm, thick. Stamens, c. 20 numbers, connate on a central column; filaments short; anthers basifixed, 0.5 mm long, longitudinally dehiscent. Female flowers, to 1.5 cm across. Ovary to 0.8 mm across, grooved, 2-3-celled, smooth; ovule 1 per cell; style 1.5 mm long; stigma bilobed, margins papillate. Berry elliptic-oblong, 5 x 4 cm, mamillate, 6-8 grooved.

*Fl. & Fr.:* March-June.

*Distribution:* South India and Sri Lanka. Semi-evergreen forest of Keerippara, c. 550 m; frequent. *HN 243.*

*Usage:* Mature fruits are collected and marketed to local agents or to society. After proper drying the material is either sold for culinary purpose or as a raw-drug for Ayurveda medicines. In Ayurveda it is used in the treatment of ulcers, inflammations, haemorrhoids, diarrhoea and dysentery, flatulent colic etc.

## COMBRETACEAE

**Anogeissus latifolia** (Roxb. ex DC.) Wall. ex Guill. & Perr., Seneg. Tent. 1: 280. 1832; Hook. f., Fl. Brit. India 2: 450. 1878; Gamble, Fl. Pres.

Madras 466. 1919; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 574. 1983; Chandrab. in Nair *et al.*, Fl. Tamilnadu 1: 148. 1983; V. S. Ramach. & V. J. Nair, Fl. Cannanore 196. 1988; Vajr., Fl. Palghat Dist. 166. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 181. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 176. 1996; Sivar. & P. Mathew, Fl. Nilambur 253. 1997; Mohanan & Sivad., Fl. Agasthyamala 248. 2002. *Conocarpus latifolia* Roxb. ex DC., Prodr. 3 : 17. 1828. **Vecha (f)**.

Trees to 20 m tall; branchlets grey-pubescent. Leaves alternate, elliptic ovate, 9 x 5 cm, glabrous, rusty below, base rotund, margin entire, apex obtuse-rotund, green turning red before falling; petiole to 2 cm long. Flowers 4 mm across, axillary, in dense cymose heads, to 1.5 cm long; peduncle to 2.5 cm long. Calyx-tube 3 mm long, pubescent; lobes 5, yellow, persistent. Petals absent. Stamens 5+5, exserted; filaments to 1.5 mm long. Ovary to 2 mm across, tomentose; ovules 2, pendulous; style to 1 mm long, villous. Fruits clustered into a globose head, 1 x 1.5 cm, broadly 2-winged, ending in persistent calyx-tube. Seeds solitary.

*Fl. & Fr.*: July-December.

*Distribution*: India, Sri Lanka and Pakistan. Dry-deciduous forest of Konamkuthy, c. 600m; locally abundant. *HN 040*.

*Usage*: This is one of the good source of fire wood in places where it grows.

**Terminalia chebula** Retz., Obs. Bot. 5. 31. 1788; Hook. f., Fl. Brit. India 2: 446. 1878, in part; Gamble, Fl. Pres. Madras 464. 1919; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 583. 1983; Chandrab. in Nair *et al.*, Fl. Tamilnadu 1: 150. 1983; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 183. 637. 1994; Mohanan & Sivad., Fl. Agasthyamala 250. 2002. *Myrobalanus chebula* (Retz.) Gaert., Fruct. Sem. Pl. 2: 91, t. 97, f. 2. 1790. **Kadukkai (f)**.

Trees to 10 m tall; branchlets rusty-villous or glabrescent. Leaves alternate or opposite, ovate or elliptic-obovate, 15 x 7 cm, glabrous, densely woolly below, base rounded, margin entire, apex subacute, apiculate; petiole to 2 cm long; glands 2, at the base of leaf-blade, sessile. Spikes axillary, 5-7

cm long, simple or branched; peduncle to 1.5 cm long; bracteoles 3 mm long. Flowers 4 mm across. Calyx-tube villous; lobes 5, cream, triangular. Petals absent. Stamens 10; filaments, to 6 mm long. Ovary 1-celled; style 5 mm long. Drupe obovoid or oblong-ellipsoid, 4 x 2.5 cm, glossy, glabrous, brownish yellow when ripe. Seed single.

*Fl. & Fr.*: March-December.

*Distribution*: South Asia. Farm land of Konamkuthy, c. 750 m; rare. *HN 089*.

*Usage*: Dried fruits are crushed and put in a handful of coconut oil along with two pinches of *Kunthirikkam* (resinous exudate of *Vateria indica*). Heat this mixture for a while and smear over the affected area for curing rheumatic pain in legs. Fruits are also forms an NTFP item, which is a valuable raw-drug in Ayurveda, having anti-ageing and antiseptic properties.

**Terminalia cuneata** Roth, Nov. Pl. Sp. 379. 1821. *Terminalia arjuna* (Roxb. ex DC.) Wight & Arn., Prodr. 314.1834; Clarke in Hook. f., Fl. Brit. India 2: 447. 1878; Gamble, Fl. Pres. Madras 465. 1919; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 581. 1983; Chandrab. in Nair *et al.*, Fl. Tamilnadu 1: 149. 1983; Manilal, Fl. Silent Valley 102. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 178. 1988; Vajr., Fl. Palghat Dist. 196. 1990. *Pentaptera arjuna* Roxb. ex DC., Prodr. 3:14. 1828. **Mathi maram (I)**. Plate 7E.

Trees to 50 m tall; base buttressed; branchlets pubescent. Leaves alternate to subopposite, oblong or obovate-elliptic, 12 x 5 cm, coriaceous, glabrous, base obtuse-subcordate, margin crenulate, apex obtuse; petiole to 1.5 cm long, with 2 glands close to the base of leaf-blade. Spikes axillary, to 10 cm long; peduncle to 5 cm long; bracteoles linear, to 1 mm long. Flowers to 4 mm across. Calyx-tube 2 mm long, pubescent ; lobes 5, dull white, triangular, 1.5 mm long, glabrous. Petals absent. Stamens 10; filaments 4 mm long. Ovary ovoid, 1-celled; ovules 2-3, pendulous; style to 4 mm long. Drupe ovoid to 6 cm long, with 5 equal wings, apex notched.

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

Plate 7.



A. *Cereus pterogonus*



B. *Cannabis sativa* ssp. *indica* in the background  
(grown in the hamlet premises)



C. *Pterolobium hexapetalum*



D. *Celastrus paniculatus*



E. Buttress formation of *Terminalia cuneata*. Inset: Bark, leaves

*Distribution:* India and Sri Lanka. Riverine forest of Thuva, c. 650 m; frequent. HN 328.

*Usage:* Leaves are crushed and applied regularly over the scalp during bath to remove dandruff. Bark-pieces are crushed and tied with a cloth on the lower abdomen to cure stomach upset. Leaves are crushed and mixed in the stagnant water for stupefying fishes, and later to easily catch them.

## COMPANULACEAE

**Lobelia nicotianifolia** Roth ex Roem. & Schult. in L., Syst. Veg. 5: 47. 1819; Clarke in Hook. f., Fl. Brit. India 3: 427. 1881; Gamble, Fl. Pres. Madras 736. 1921; Chandrasekaran in Henry *et al.*, Fl. Tamilnadu 2: 57. 1987; Manilal, Fl. Silent Valley 163. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 260. 1988; Vajr., Fl. Palghat Dist. 260. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 272. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 258. 1996; Sivar. & P. Mathew, Fl. Nilambur 386. 1997; Mohanan & Sivad., Fl. Agasthyamala 400. 2002. **Kattupukale (M)**.

Shrubs to 2 m high; stem hollow, marked with leaf scars. Leaves spirally arranged, narrow at both ends, ovate-lanceolate, 28 x 7 cm, subsessile, closely serrate. Racemes terminal, to 50 cm long, pubescent; bracts foliar, ovate-acuminate; pedicels to 2 cm long. Calyx 5-lobed at base; lobes lanceolate, acuminate, to 1.3 cm long. Corolla split to the base over, white, spathaceous and falcately bent down, to 1.7 cm long. Staminal-tube erect, to 1.5 cm long; anthers connate, to 5 mm long. Ovary 2-celled. Capsule globose, 2-valved. Seeds many.

*Fl. & Fr.:* February-June.

*Distribution:* Indo-Malesia. Moist deciduous forest of Kallamala, c. 650 m; frequent. HN 324.

*Usage:* One spoon of crushed roots with equal quantity of fenugreek (*Foeniculum vulgare*) and a piece of garlic (*Allium sativum*) are taken and ground well into a paste. This paste is applied daily for a month over psoriasis after bath to cure the disease.

## CONVOLVULACEAE

**Evolvulus alsinoides** (L.) L., Sp. Pl. 392. 1762; Hook. f., Fl. Brit. India 4: 220. 1883; Gamble, Fl. Pres. Madras 923. 1923; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1015. 1983; Chitra in Henry *et al.*, Fl. Tamilnadu 2: 225. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 299. 1988; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 313. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 306. 1996; Sivar. & P. Mathew, Fl. Nilambur 444. 1997; Mohanan & Sivad., Fl. Agasthyamala 470. 2002.

### **Vishnukkiranthi (I).**

Prostrate herbs, branched to all sides from the base; stem wiry, hairy. Leaves elliptic, oblong to lanceolate, to 1 x 0.6 cm long, hairy, base acute, margin thinly sericeous, apex obtusely apiculate; petiole to 0.3 cm long. Flowers solitary; pedicel to 0.5 cm long, jointed to a stalk. Calyx lobes sericeous without, 4 x 1 mm, acute. Corolla blue, 1 cm across, rotate. Stamens 5, exserted, to 3 mm long; anthers 1.5 mm long. Ovary 0.8 mm across; styles 2, bifid, 4 mm long. Capsule 5 mm across, 2-celled.

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

*Distribution*: Pantropical. Exposed areas in the Dry-deciduous forests of Agali, c. 600 m; common. *HN 341*.

*Usage*: Shoots are ground well along with garlic (*Allium sativum*) and applied during bed-time over Erysipelas of children. This has to be continued for about one month for total cure.

## CUCURBITACEAE

**Citrullus colocynthis** (L.) Schrad., Linnaea 12: 414. 1838; C. B. Clarke in Hook. f., Fl. Brit. India 2: 620. 1879; Gamble, Fl. Pres. Madras 536. 1919; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 636. 1983; Kumari in Nair *et al.*, Fl. Tamilnadu 1: 170. 1983. *Cucumis colocynthis* L., Sp. Pl. 1011. 1753. **Methukkumkai (I).**

Trailing herbs; branchlets hirsute. Leaves narrowly triangular, deeply 3-5-lobed; lobes pinnatifid-sinuous, 6-10 x 4-7 cm long, chartaceous, rigid, densely villous-hirsute below, terminal lobe large; sinuous ones obtuse; tendril simple, slender; petiole to 3 cm long. Flowers solitary. Male: 1 cm across; pedicel to 1.5 cm long. Calyx-tube 2 mm long; lobes linear, 2 cm long, hirsute without. Corolla yellow, hirsute, petals ovate, 8 x 4 mm. Stamens 3; filaments short, anthers to 5 mm long. Female: ovary ovoid, 8 x 4 mm; style to 1 mm long. Fruit globose, 7 x 5 cm, striped green and white when young, yellow when ripe. Seeds ovoid, 6 x 3.5 mm.

*Fl. & Fr.*: October-January.

*Distribution*: N. Africa and Asia. Fallow land at Koodappetty, c 600 m; frequent. *HN 039*.

*Usage*: In abnormal stomach bulging (symptoms like tumor formation) a fruit of the plant is sliced, fried with few drops of coconut oil and administered in empty stomach regularly for a month. The healer also chants several *mantras* and make offerings to God, etc. which are believed to assist in curing the disease.

**Coccinia grandis** (L.) Voigt, Hort. Sub. Calc. 59. 1845; K. M. Matthew & Britto in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 637. 1983; Kumari in Nair *et al.*, *Fl. Tamilnadu* 1: 170. 1983; V. S. Ramach. & V. J. Nair, *Fl. Cannanore* 198. 1988; Vajr., *Fl. Palghat Dist.* 212. 1990; M. Mohanan & A. N. Henry, *Fl. Thiruvananthapuram* 208. 1994. *Bryonia grandis* L., *Mant. Pl.* 126. 1767. *Coccinia indica* Wight & Arn., *Prodr.* 347. 1834; Gamble, *Fl. Pres. Madras* 537. 1919. *Cephalandra indica* (Wight & Arn.) Naud., *Ann. Sci. Nat. Bot. ser.* 5. 5: 16. 1866; Clarke in Hook. f., *Fl. Brit. India* 2: 621. 1879. **Tonde kodi (I)**.

Scandent vines; branchlets pubescent, stem glabrous. Leaves deeply 5-lobed, 2-7.5 x 4-5.5 cm, chartaceous, glabrous, punctate above, glandular below; basal cordate, margin denticulate, apex obtuse, mucronate; tendril simple; petiole 3.5- 6.5 cm. Flower solitary, dioecious. Male: 1.5 cm across; pedicel to 5 cm long. Calyx-tube campanulate, 6 x 5 mm, glabrous; lobes subulate, 3.5 mm long. Corolla campanulate, white; 1.5 x 1 cm, glabrous

without, villous within. Stamens 3, inserted at the base of calyx tube; filaments connate into a column; anthers connate, triplicate, flexuous, 7 x 4 mm. Female: 2.5 cm across; pedicel to 1.5 cm long. Calyx tube campanulate, 7 x 5 mm. Petals white, 1.2 x 1 cm. Ovary oblong, 1.2 x 0.3 cm; ovules many; style 7 mm; stigma tripartite, fimbriate; staminodes 3, about 3 cm long. Fruit ovoid-oblong, 5 x 2.5 cm, red when ripe. Seeds compressed.

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

*Distribution*: Peninsular India and Sri Lanka. Riverine forests of Mully, c 700 m; common. *HN 113*.

*Usage*: A piece of the stem of about 6" length is sliced and boiled in two glasses of water and reduced to half. Administer the same in the morning regularly for one month to reduce obesity.

**Cucumis sativus** L., Sp. Pl. 1012. 1753; Clarke in Hook. f., Fl. Brit. India 2 : 620. 1879; Gamble, Fl. Pres. Madras 535. 1919; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 642. 1983; Kumari in Nair *et al.*, Fl. Tamilnadu 1: 171. 1983; Sivar. & P. Mathew, Fl. Nilambur 288. 1997. **Vellary (I, K & M)**.

Monoecious trailing herbs; stem hirsute. Leaves broadly cordate-ovate, palmately 3-5 lobed 12-18 x 10-15 cm, densely hairy. Petiole to 12 cm long. Male flowers clustered, to 2 cm across; pedicel to 1.5 cm long. Calyx tube to 7 mm long; lobes linear, to 6 mm long. Corolla yellow coloured, 1.5 cm long. Stamens 3; filaments reduced, flexuous, 4 mm wide; pistillode globose to 1 cm wide. Female flowers solitary, axillary, 3 cm across. Ovary ellipsoid, 1 cm wide, tubercled; style 4 mm long; stigma 4 mm long. Fruit shape varied, narrowly or broadly oblong, pale to dark green or pale yellow coloured, glabrous. Seeds whitish, oblong, 8-10 x 3-5 mm, both ends subacute.

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

*Distribution*: Native in the Himalayan region, cultivated in many tropical and subtropical countries. Farm lands of Kottathara, c.600 m; frequent. *HN 347*.

*Usage:* Cultivated for the fruits; either sold in the market or consumed as a vegetable.

**Cucurbita maxima** Duch. in Lam., *Encycl.* 2: 151. 1786; Clarke in Hook. f., *Fl. Brit. India* 2: 622. 1879; K. M. Matthew & Britto in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 642. 1983; Kumari in Nair *et al.*, *Fl. Tamilnadu* 1: 171. 1983; Vajr., *Fl. Palghat Dist.* 212. 1990. **Mathan (I, K & M).**

Prostrate herbs; stem cylindrical; elongate; grooved. Leaves more or less reniform with 5 rounded shallow lobes, 6-19 x 7-30 cm, coarsely hairy, margin minutely dentate. Tendrils 2-6-fid. Male flowers: peduncles 10-17 cm long, calyx tube club-shaped, 5-10 mm long, lobes 5, linear, hairy. Corolla 4-7 cm long, campanulate, lobes 5, reflexed, yellow coloured. Stamens 3, filaments thick, glanduliform, 5-8 mm long; anthers 13-17 mm long. Female flowers: peduncle 5-7 cm long, solitary. Fruits large and of various forms; pulp fibrous. Seeds 20-24 x 12-14 mm, ovate, yellowish white coloured.

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

*Distribution:* Cosmopolitan, mostly cultivated. Farm lands of Konamkuthy, c. 750 m; frequent. *HN 231.*

*Usage:* Leaves are used as a vegetable during the pre and post delivery period in cases of general debility and also used as a vegetable. Fruits are either sold in the market or consumed as a vegetable. The seeds are fried with a pinch of salt and consumed.

**Lagenaria siceraria** (Molina) Standley, *Publ. Field Columbian Mus. Bot. ser. Chicago* 3: 435. 1930; K. M. Matthew & Britto in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 646. 1983; Kumari in Nair *et al.*, *Fl. Tamilnadu* 1: 172. 1983; Vajr., *Fl. Palghat Dist.* 217. 1990; Sivar. & P. Mathew, *Fl. Nilambur* 291. 1997. *Cucurbita siceraria* Molina, *Sagg. Chile* 33. 1782. *C. lagenaria* L., *Sp. Pl.* 1010. 1753. **Surai (I).**

Scandent herbs. Leaves suborbicular-cordate, 10-40 x 10-40 cm, angular, shortly 3-lobed, apex acute or shortly acuminate; basal sinus broad and deep. Male flowers: peduncles as long as the petiole. Calyx tube 2-3 cm

long, sepals narrow; petals 3-4 x 2-3 cm, tomentose, apex emarginate; staminal filaments 3-4 mm long; anthers glossy, 8-10 cm long. Female flowers: peduncle shorter than male; calyx tube 2-3 mm long. Ovary long, villous. Fruits various shaped, greenish-yellow coloured. Seeds 7-20 mm long.

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

*Distribution:* Tropical Asia and Africa; cultivated in the warmer regions of the world. Farm lands of Konamkuthy, c. 650 m; frequent. *HN 235.*

*Usage:* Cultivated for its fruits; tender ones used as vegetable. The mature fruits are dried, removed the seeds and pulp by cutting the neck portion and the shell is used as a vessel for storing grains and seeds.

**Luffa cylindrica** (L.) Roem., Syn. Monogr. 2: 63. 1846; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 646. 1983; Kumari in Nair *et al.*, Fl. Tamilnadu 1: 173. 1983; Manilal, Fl. Silent Valley 118. 1988; Vajr., Fl. Palghat Dist. 260. 1990; V. S. Ramach. & V. J. Nair, Fl. Cannanore 203. 1988; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 208. 1994; Sivar. & P. Mathew, Fl. Nilambur 292. 1997. *Momordica cylindrica* L., Sp. Pl. 1009. 1753. *Luffa aegyptiaca* Miller, Gard. Dict. (ed. 4) 500. 1785; Hook. f., Brit. India 2: 614. 1879; Gamble, Fl. Pres. Madras 533. 1919. *L. pentandra* Roxb., Fl. Ind. 3: 712. 1832. **Peechil (M).**

Large climbing shrubs; stem 5-angular, branchlets glabrous. Leaves palmately 5-lobed, 18 x 12 cm, lobes ovate, base cordate, margin sharply serrate, apex acuminate; petiole 3-5 cm long. Tendrils 3-fid, puberulous. Flowers to 6 cm long, monoecious. Male: racemes axillary, to 8 cm, apically clustered, lax at base; peduncle to 10 cm long; pedicel to 8 mm long. Calyx-tube broadly campanulate, to 8 mm long; lobes 5, lanceolate, 1 x 0.7 cm. Corolla bright yellow, campanulate; petals 5, Stamens 5; filaments to 8 mm long, inserted to calyx-tube, free. Female: solitary, co-axillary with male flowers. Fruits fusiform, cylindrical, to 20 cm long, longitudinally white striped, fibrous within. Seeds ovate, flat, margin slightly winged.

*Fl. & Fr.:* September-December.

*Distribution:* Paleotropics; often cultivated. Wastelands of Kallamala, c. 650 m; frequent. *HN 279*.

*Usage:* Leaves and roots, about 5 gm each are taken along with a spoon of *Parisu* (*Ficus exasperata*) bark powder, boiled in milk and administered at early morning for 21 days for curing difficulty in breathing.

**Momordica charantia** L., Sp. Pl. 1009. 1753; Hook. f., Fl. Brit. India 2: 616. 1879; Gamble, Fl. Pres. Madras 532. 1919; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 648. 1983; Kumari in Nair *et al.*, Fl. Tamilnadu 1: 172. 1983; Manilal, Fl. Silent Valley 119. 1988; Vajr., Fl. Palghat Dist. 214. 1990; Sivar. & P. Mathew, Fl. Nilambur 293. 1997. **Kattukaippa (M)**.

Vines, much branched; branchlets slender, villous. Leaves orbicular, membranous, deeply 5-7 lobed, 10 x 8 cm, villous, base cordate, margin dentate, apex acute; petiole to 4 cm long. Flowers solitary monoecious. Male: 2 cm across; bract reniform-orbicular, to 0.8 cm long; peduncle to 7 cm long. Calyx-tube campanulate, to 0.5 mm long, glabrescent. Corolla yellow; petals 5, 1.5 cm long, subequal, villous. Stamens 3; pistillodes 3, lobed. Female: pedicel 5-8 cm; bract reniform-orbicular. Ovary fusiform, rostrate, muricate; ovules many. Fruit oblong, 4 -7 cm long, tuberculate. Seeds ovoid, compressed, sculptured.

*Fl. & Fr.:* August-November.

*Distribution:* Paleotropics. Openings in Moist deciduous forest of Mukkali, c. 550 m; rare. *HN 326*.

*Usage:* About ten leaves are crushed along with a pinch of cumin (*Cuminum cyminum*) seeds and boiled in a glass of water; reduce to half and consumed two times a day for two consecutive days for expelling worms and curing fever in children.

**Mukia maderaspatana** (L.) M. Roem., Syn. Monogr. 2. 47. 1846; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic t. 3: 650. 1983; Kumari in Nair *et al.*, Fl. Tamilnadu 1: 173. 1983; V. S. Ramach. & V. J. Nair,

Fl. Cannanore 200. 1988; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 209. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 204. 1996; Sivar. & P. Mathew, Fl. Nilambur 294. 1997. *Cucumis maderaspatanus* L., Sp. Pl. 1012. 1753. *Bryonia cordifolia* L., Sp. Pl. 1012. 1753. *B. scabrella* L. f., Suppl. Pl. 424. 1781. *Mukia scabrella* (L. f.) Arn. in Hook.'s J. Bot. 3: 276. 1841; Hook. f., Fl. Brit. India 2: 623. 1879. *Melothria maderaspatana* (L.) Cogn. in DC., Monogr. Phan. 3: 623. 1881; Gamble, Fl. Pres. Madras 539. 1919. **Siluppiri (M).**

Climbing vines; branchlets hispid. Leaves ovate-deltoid, angular or 3- 5 lobed, 4-6.5 x 4-6 cm, chartaceous, scabrid above, hispid below; base cordate, margin denticulate, apex acuminate, mucronate; petiole 2-4 cm long. Male flowers 6 mm across. Calyx-tube 3 mm long; villous; lobes linear, 2 mm long. Corolla yellow; petals ovate, to 3 mm long, villous without. Stamens 3; filaments 1.5 mm long; anthers oblong, 1 mm long; pistillode 0.5 mm long. Female: 1- 4 flowers in a cluster. Ovary 3 mm across, villous; style 2.5 mm long. Fruit globose, sessile, 1 x 0.8 cm. Seeds numerous, pitted.

*Fl. & Fr.:* August-December.

*Distribution:* Paleotropics. Moist deciduous forest of Kathirampathy, c. 650 m; frequent. *HN 211.*

*Usage:* Few leaves are put in a fire-place for a few seconds, pressed out the juice a few drops are given with honey in cases of digestive block in children.

## DILLENACEAE

**Dillenia pentagyna** Roxb., Pl. Corom. t. 20. 1795; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1: 38. 1872; Dunn in Gamble, Fl. Pres. Madras 8. 1915; Ramamurthy in Nair *et al.*, Fl. Tamilnadu 1: 2. 1983; Manilal, Fl. Silent Valley 2: 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 36. 1988; Vajr., Fl. Palghat Dist. 44. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 42. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 25. 1996; Sivar. & P. Mathew, Fl. Nilambur 34. 1997; Mohanan & Sivad., Fl. Agasthyamala 49. 2002. **Ponne (M).**

*Distribution:* Endemic to Southern Western Ghats. Semi-evergreen forest of Mukkali, c. 550 m; frequent. *HN 171*.

*Usage:* Wounds are made on the trunk to extract the resin. The exudates dry and stick on the stem, collected in large pieces and sold.

## EBENACEAE

**Diospyros montana** Roxb., Pl. Corom. t. 48. 1795; Hook. f., Fl. Brit. India 3: 555. 1882, in part; Gamble, Fl. Pres. Madras 776. 1923; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 867. 1983; Bhargavan in Henry *et al.*, Fl. Tamilnadu 2: 67. 1987; Sasidh. & Sivar., Flow. Pl. Thrissur For. 271. 1996. **Vakkana maram (I)**.

Small trees to 10 m tall. Leaves elliptic-ovate to oblong, 4-9 x 2-3 cm, glabrescent above, thinly tomentose below, base truncate, margin entire, apex acute to obtuse; petiole to 0.8 cm long. Flowers axillary. Male: in short umbels, usually 3-flowered; peduncle to 0.5 cm long. Calyx lobes 4, ovate, imbricate, to 2.5 mm long, ciliate, obtuse, basally connate. Corolla pale-greenish, 7 mm across, campanulate, lobes 4, ovate, 2.5 mm long, subacute. Stamens 16, in pairs, unequal; filaments short; anthers, to 4 mm, apex awned. Pistillode conical. Male: solitary, pedicel, to 0.4 cm. Calyx and corolla similar to male flowers. Ovary globose, 0.7 mm across, locules 8; style 1.5 mm; stigma capitate. Staminodes 4, to 5 mm long. Berry ovoid, 2 cm across, yellowish orange when ripe with persistent calyx. Seeds 8.

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

*Distribution:* Indo-Malesia to Australia. Dry-deciduous forest of Kottathara, c. 600 m; frequent. *HN 356*.

*Usage:* Wood and branches are utilized as firewood.

## ERYTHROXYLACEAE

**Erythroxylum monogynum** Roxb., Pl. Corom. t. 88. 1798 & Fl. Ind. 2: 449. 1832; Hook. f., Fl. Brit. India 1: 414. 1874; Gamble, Fl. Pres. Madras 127. 1915; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3:

182. 1983; Chithra in Nair *et al.*, Fl. Tamilnadu 1: 47. 1983; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 94. 1994. **Seppulinche (I)**.

Woody shrubs to 5 m high, many branched from the base. Leaves elliptic-obovate, to 4 x 1.5 cm, glabrous above, base cuneate, margin entire, apex obtuse; petiole to 5 mm long; stipules to 1.5 mm long. Flowers c. 1 cm across, axillary, solitary or clustered; bracteoles to 1.5 mm long; pedicel to 8 mm long. Calyx cupular; lobes ovate, to 2 mm long, basally united, persistent. Petals pale white, oblong, 5 mm long. Staminal tube 2 mm long. Stamens 10; filaments subequal. Ovary ellipsoid, ribbed, 2 mm across, single-celled; ovule 1, pendulous; styles 3; stigma capitate. Drupe oblong, 8 x 2.5 mm, apiculate, orange-red when ripe. Seed-1.

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

*Distribution*: India and Sri Lanka. Dry-deciduous forests of Puliypathy, c.650 m; locally abundant. *HN 063*.

*Usage*: The root portion of one or two dried mature plants are dug out from the forest area. The heartwood portion is taken and sliced into small pieces. These are placed in a small earthen pot and its mouth covered with small branches and leaves of the same plant. Then a large earthen pot is buried in the ground. Invert the smaller pot on the larger one and fix the neck portion tightly with mud. Then the smaller pot is heated with firewood kept in the surrounding of the smaller one for a day. The dark coloured exudate from the heartwood will slowly accumulate on the lower pot. It is collected after cooling. This is used in the treatment of all sorts of skin diseases.

## EUPHORBIACEAE

***Acalypha alnifolia*** Klein ex Willd., Sp. Pl. 4: 525. 1805; Hook. f., Fl. Brit. India 5: 415. 1887; Gamble, Fl. Pres. Madras 1330. 1925; N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1405. 1983; Vajr., Fl. Palghat Dist. 418. 1990; Chandrab. in Henry *et al.*, Fl. Tamilnadu 2: 220. 1987. **Chinnemaram (I)**.

Shrubs to 3 m high; branchlets hispid. Leaves elliptic-ovate, 2-2.5 x 1.5-2 cm, base rounded, margin serrate, apex acute to obtuse. Male flowers: in slender, elongate, cylindrical spikes, to 8 cm long, usually in lower axils; anthers 0.2 mm long, vermiculiform, sessile. Female: spikes short, terminal, to 1.5 cm long; bracts cupular, dentate, enclosing ovary. Ovary 2 mm across, tomentose; styles 3, to 0.7 cm long, each with filiform hairs.

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

*Distribution*: Endemic to Peninsular India. Dry-deciduous forests and thickets of Mully, c. 700 m; locally abundant. *HN 016*.

*Usage*: To cure summer-boils in children, apply a paste of shoots during bath-time for one-week duration. The leaf-paste is applied to the scalp of babies as a hair-wash for increased hair growth. Paste of roots, approximately 10 gm, is diluted in water and given internally, two times a day to cure stomach-ache in adults.

**Baccaurea courtallensis** (Wight) Muell.-Arg. in DC., Prodr. 14: 459. 1856; Hook. f., Fl. Brit. India 5: 367. 1887; Gamble, Fl. Pres. Madras 1310. 1925; Chandrab. in Henry *et al.*, Fl. Tamilnadu 2: 222. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 409. 1988; Vajr., Fl. Palghat Dist. 421. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 407. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 393. 1996; Sivar. & P. Mathew, Fl. Nilambur 606. 1997; Mohanan & Sivad., Fl. Agasthyamala 599. 2002. *Pierardia courtallensis* Wight, Ic. t. 1912. 1852. *B. sapida* Bedd., Fl. Sylv. t. 280. 1872. **Uvane (M)**. Plate 8A.

Small dioecious trees, to 10 m. Leaves alternate, clustered towards the tip of branches, 6-13 x 2-5 cm, oblanceolate, acuminate at apex, attenuate at base. Flowers in simple spikes, crimson coloured. Male spikes axillary or lateral dense clusters; female usually in dense drooping clusters from the main trunk towards the base. Perianth 1-seriate; lobes 4-5. Stamens 4-8, free. Pistillode present in male flowers. Ovary subglobose, 0.2-0.3 across, 2-5-celled; ovules 2 in each cell; stigma free or united at base. Fruit ovoid to globose fleshy capsule, to 2.5 cm across, pubescent without, orange-red on

Shrubs to 3 m high; branchlets hispid. Leaves elliptic-ovate, 2-2.5 x 1.5-2 cm, base rounded, margin serrate, apex acute to obtuse. Male flowers: in slender, elongate, cylindrical spikes, to 8 cm long, usually in lower axils; anthers 0.2 mm long, vermiculiform, sessile. Female: spikes short, terminal, to 1.5 cm long; bracts cupular, dentate, enclosing ovary. Ovary 2 mm across, tomentose; styles 3, to 0.7 cm long, each with filiform hairs.

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

*Distribution*: Endemic to Peninsular India. Dry-deciduous forests and thickets of Mully, c. 700 m; locally abundant. *HN 016*.

*Usage*: To cure summer-boils in children, apply a paste of shoots during bath-time for one-week duration. The leaf-paste is applied to the scalp of babies as a hair-wash for increased hair growth. Paste of roots, approximately 10 gm, is diluted in water and given internally, two times a day to cure stomach-ache in adults.

**Baccaurea courtallensis** (Wight) Muell.-Arg. in DC., Prodr. 14: 459. 1856; Hook. f., Fl. Brit. India 5: 367. 1887; Gamble, Fl. Pres. Madras 1310. 1925; Chandrab. in Henry *et al.*, Fl. Tamilnadu 2: 222. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 409. 1988; Vajr., Fl. Palghat Dist. 421. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 407. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 393. 1996; Sivar. & P. Mathew, Fl. Nilambur 606. 1997; Mohanan & Sivad., Fl. Agasthyamala 599. 2002. *Pierardia courtallensis* Wight, Ic. t. 1912. 1852. *B. sapida* Bedd., Fl. Sylv. t. 280. 1872. **Uvane (M)**. Plate 8A.

Small dioecious trees, to 10 m. Leaves alternate, clustered towards the tip of branches, 6-13 x 2-5 cm, oblanceolate, acuminate at apex, attenuate at base. Flowers in simple spikes, crimson coloured. Male spikes axillary or lateral dense clusters; female usually in dense drooping clusters from the main trunk towards the base. Perianth 1-seriate; lobes 4-5. Stamens 4-8, free. Pistillode present in male flowers. Ovary subglobose, 0.2-0.3 across, 2-5-celled; ovules 2 in each cell; stigma free or united at base. Fruit ovoid to globose fleshy capsule, to 2.5 cm across, pubescent without, orange-red on

ripening. Seeds 2-5, discoid, to 1 cm across, covered with fleshy aril.

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

*Distribution*: Endemic to southern Western Ghats. Semi-evergreen forests of Mukkali, c.550 m; rare. *HN 281*.

*Usage*: A decoction of the bark is administered for stomach ulcer. Use of fresh bark pieces is suggested. About six square inches of fresh bark is collected from a mature tree, crushed and boiled in two glasses of water and reduced to half. The decoction shall be taken in empty stomach, during early morning and evening for a week.

**Breynia retusa** (Dennst.) Alston, *Ann. Roy. Bot. Gard. (Peradeniya)* 11: 204. 1929; N. Rani in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 1415. 1983; Chandrab. in Henry *et al.*, *Fl. Tamilnadu* 2: 222. 1987; Manilal, *Fl. Silent Valley* 246. 1988; V. S. Ramach. & V. J. Nair, *Fl. Cannanore* 411. 1988; Vajr., *Fl. Palghat Dist.* 422. 1990; Mohanan & Henry, *Fl. Thiruvananthapuram* 408. 1994; Sasidh. & Sivar., *Flow. Pl. Thrissur For.* 396. 1996; Sivar. & P. Mathew, *Fl. Nilambur* 608. 1997; Mohanan & Sivad., *Fl. Agasthyamala* 600. 2002. *Phyllanthus retusus* Dennst., *Schluess. Hort. Malab.* 24. 1818. *Phyllanthus patens* Roxb., *Fl. Ind.* 3: 667. 1832. *Melanthesa turbinata* Wight, *lc. t.* 1897. 1852. *M. obliqua* Wight, *lc. 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. **Tannithalangu, Kodiveeti (I)**.

Shrubs to 2.5 m high. Leaves 1.5 x 1 cm, alternate, membranous, elliptic, glaucous beneath, base rounded, margin entire, apex obtuse. Flowers unisexual, pendulous, solitary, axillary. Male flowers brownish yellow, 0.2 cm. across. Pedicels 1 cm long. Perianth 0.4 cm long, accrescent in fruit. Stamens 3; filaments united. Female flowers 0.6 cm across. Perianth campanulate, 0.4 cm. long. Ovary globose, 3 celled; ovules 2 in each cell; stigmas 3; styles slender, bifid. Fruits globose, orange on ripening.

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

*Distribution*: Sri Lanka to Indo-China. Riverine forest of Mully, c. 700 m; frequent. *HN 246*.

*Usage:* An aqueous paste of stem bark is prepared and rubbed gently over the small reddish boils in children. It is washed after an hour. Repeat the procedure for three days for total cure. The shoot as its name indicates, is used as a 'shock-absorber' while carrying water pots, from river to the hamlet. A bundle of fresh shoots are collected, ground well and made into a loose paste by adding water. This is applied externally over the abdomen of cows during delivery to remove obstructions thus assisting easy delivery.

**Bridelia retusa** (L.) Spreng., Syst. Veg. 3: 48. 1826; N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1417. 1983; Hook. f., Fl. Brit. India 5: 268. 1887; Chandrab. in Henry *et al.*, Fl. Tamilnadu 2: 223. 1987; Vajr., Fl. Palghat Dist. 423. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 409. 1994; Mohanan & Sivad., Fl. Agasthyamala 602. 2002. *Cluytia retusa* L., Sp. Pl. 1042. 1753. *B. crenulata* Roxb., Fl. Ind. 3: 734. 1832. *B. roxburghiana* (Muell.-Arg.) Gehrm., Bot. Jahrb. Syst. 41. 95. 30. 1908; Gamble, Fl. Pres. Madras 280. 1925. *B. airy-shawii* P. T. Li, Acta Phyt. Sin. 20: 117. 1982; Sasidh. & Sivar., Flow. Pl. Thrissur For. 397. 1996; Sivar. & P. Mathew, Fl. Nilambur 610. 1997. **Mullu gonge (I & M).**

Trees to 18 m tall; stem thorny. Leaves alternate, simple, elliptic-oblong, 5-15 x 3-7 cm, chartaceous, puberulous below, base obtuse, margin entire, apex retuse; petiole to 1 cm long; stipules lanceolate. 0.7 cm long, deciduous. Spikes axillary, clustered; bracts scaly. Flowers pedicellate. Male: 7 mm across. Tepals 10, biseriate; outer ones ovate-lanceolate, 3 mm long, truncate, acute; inner ones obovate, 2 mm long, cuneate, obtuse. Stamens 5, monadelphous, borne on a gonophore; filaments short. Pistillode bifurcate. Disc annular. Female: tepals 10, biseriate, lanceolate; outer 2.5 mm long, inner 1.5 mm long, puberulous without, truncate, acute. Ovary half-inferior, globose, 2 x 1 mm, bilocular; ovules 4, pendulous; styles 2, forked, 2 mm long; stigmatiferous. Disc with an inner, membranous, fimbriate corona, enclosing basal part of ovary. Drupe globose, 0.8 cm across, blackish when ripe; pyrenes 2. Seed one in each pyrene.

*Fl. & Fr.:* July-December.

*Distribution:* Indo-Malaya. Dry-deciduous forest of Vechappathy, c. 600m; not common. *HN* 335.

*Usage:* Trunk and branches are utilized as firewood. *Gongeyoor* - the name of a hamlet is derived from the name of this tree.

***Bridelia scandens*** (Roxb.) Willd., Sp. Pl. 4: 979. 1806; Hook. f., Fl. Brit. India 5: 2. 698. 1887; Gamble, Fl. Pres. Madras 1281. 1925; Chandrab. in Henry *et al.*, Fl. Tamilnadu 2: 223. 1987; Manilal, Fl. Silent Valley 247. 1988; Vajr., Fl. Palghat Dist. 424. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 409. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 397. 1996; Sivar. & P. Mathew, Fl. Nilambur 611. 1997; Mohanan & Sivad., Fl. Agasthyamala 603. 2002. *Clusia scandens* Roxb., Pl. Corom. t. 173. 1802.

**Valli mullankaini, Kodigonge (I).**

Straggling shrubs to 5 m high; young stem fulvous pubescent. Leaves elliptic to obovate, 12 x 5.5 cm, pubescent beneath, base obtuse, margin entire, apex retuse or rounded; petioles to 0.6 cm long, fulvous pubescent. Flowers in axillary fascicles, to 20 cm long. Male flowers 0.3 cm across. Sepals 1.5 mm long, ovate-acute. Petals spatulate, yellowish, 1.5 mm long. Female flowers 0.5 cm across. Drupe 0.5 - 0.6 cm. across, globose, blackish, calyx persistent.

*Fl. & Fr.:* December-March.

*Distribution:* Endemic to Peninsular India. Moist deciduous forests of Mukkali, c. 550m; frequent. *HN* 315.

*Usage:* Leaves crushed and tied on the knee joints with a cloth piece during bed-time, regularly for a month cures pain and inflammation related to Rheumatism.

***Euphorbia hirta*** L., Sp. Pl. 454. 1753; Gamble, Fl. Pres. Madras 1275. 1925; Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1434. 1983; Chandrab. in Henry *et al.*, Fl. Tamilnadu 2: 228. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 415. 1988; Manilal, Fl. Silent Valley 249. 1988; Vajr., Fl. Palghat Dist. 428. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 415.

1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 403. 1996; Sivar. & P. Mathew, Fl. Nilambur 619. 1997; Mohanan & Sivad., Fl. Agasthyamala 608. 2002. *Chamaesyce hirta* (L.) Millisp., Publ. Field Columbian Mus. Bot. Ser. 2: 303. 1909. *Euphorbia pilulifera* auct. non L., 1753: Hook. f., Fl. Brit. India 5: 250. 1887. **Palepidrkkku (I, M & K).**

Herbs to 50 cm high. Leaves decussate, broadly oblong to elliptic-lanceolate, 2.5 x 1.5 cm, base obliquely truncate, margin serrulate to serrate, apex obtuse; petiole to 0.3 cm long, stipulate. Cyathia c. 25, aggregated in single or paired, subsessile, axillary clusters. Involucre campanulate, 0.7 x 0.6 mm; glands 5, minute, reddish. Male florets 4-6, ebracteolate; stalk to 0.3 mm long; anther 0.2 mm long. Female: laterally pendulous. Ovary 0.8 mm across; styles 3, bifid from base, erect, 0.4 mm long; stigma obtuse. Capsule pubescent, 2 mm across. Seeds 4-angled, to 1 mm long, minutely furrowed.

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

*Distribution:* Pantropical. Wastelands of Kulukkoor, c. 650 m; frequent. *HN* 311.

*Usage:* A whole plant and *Uppanamchedi* (*Justicia tranquebariensis*) are ground well and mixed with one spoon of powder of *Athimaram* (*Ficus racemosa*) bark powder. This is administered during bed-time for one week period to cure leucorrhoea. Latex is used in tattooing skin. Dip a needle in the latex and make punctures (as dots) of required shapes on skin. Sprinkle charcoal powder on it and wipe after sometime.

***Euphorbia thymifolia*** L., Sp. Pl. 454. 1753; Hook. f., Fl. Brit. India 5: 252. 1887; Gamble, Fl. Pres. Madras 1276. 1925; N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1439. 1983; Chandrab. in Henry *et al.*, Fl. Tamilnadu 2: 230. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 416. 1988; Vajr., Fl. Palghat Dist. 429. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 416. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 404. 1996; Sivar. & P. Mathew, Fl. Nilambur 620. 1997. *Chamaesyce thymifolia* (L.) Millisp., Publ. Field Mus. Nat. Hist. Bot. ser. 2: 412. 1909. **Kalkeere (I).**

Softly hispid prostrate herbs. Leaves opposite, suborbicular to oblong, 2.5-5 x 2.5-4.5 mm, base obliquely cordate, margin serrulate, apex obtuse; subsessile, stipulate. Cyathia axillary, solitary. Involucre campanulate, 0.8 x 0.7 mm; glands minute. Male florets 1-4, ebracteolate; stalk 0.5 mm long; anthers 0.2 mm long. Female flowers pendulous. Ovary 0.8 x 0.7 mm, tomentose; style 3, forked from base, minute. Capsule ripening within the cyathium, appressed, hairy, 1.5 mm across. Seeds 4-angular, 1 mm long.

*Fl. & Fr.*: December-March.

*Distribution*: Tropical Asia. Barren terrains of Choriyanur, c. 600 m; frequent. HN 241.

*Usage*: If white portion of eyes is wounded, a shoot is plucked and the latex is carefully dripped from the cut end to the affected area. Single-time application is suggested.

**Givotia moluccana** (L.) Sreem., Taxon 24: 696. 1975. *Croton moluccanum* L., Sp. Pl. 1005. 1753. *Givotia rottleriformis* Griff., Calcutta J. Nat. Hist. 4: 388. 1844; Hook. f., Fl. Brit. India 5: 395. 1887; Gamble, Fl. Madras 1342. 1925; N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1443. 1983; Vajr., Fl. Palghat Dist. 430. 1990; Chandrab. in Henry *et al.*, Fl. Tamilnadu 2: 222. 1987. **Boothali (I)**.

Dioecious trees to 15m tall; stem and branches fulvous-tomentose. Leaves alternate, ovate, 8-18 x 5-20 cm, coriaceous, glabrous above, tomentose below, base subcordate, margin toothed, apex shortly acuminate; petiole 8-12 cm long. Panicles lax, subterminal, pendulous, 15-25 cm long; bracts linear. Flowers 6 mm across; pedicel jointed. Tepals 10, biseriate, ovate, imbricate; outer tepals 5 x 3 mm, incurved, subacute; inner petaloid, 7 x 4 mm, shortly connate, obtuse. Stamens 8-20, exserted; filaments free, unequal; Disc 4, free. Ovary globose, bi or trilobular; ovules 2 or 3, pendulous; styles 2, forked from base. Drupe subglobose, 2.5 cm across, fulvous-tomentose. Seed-1, globose.

*Fl. & Fr.*: March-July.

*Distribution*: Peninsular India and Sri Lanka. Dry-deciduous forests of Mully,

c. 700 m; frequent. *HN 002*.

*Usage:* Bark is crushed, dried and powdered; one spoon of powder is mixed in one glass of water and administered in empty stomach during the morning about 6 O'clock, continuously for two weeks to cure bleeding piles. Wood is used for making drums.

**Homonoia riparia** Lour., Fl. Cochinch. 637. 1790; Hook. f., Fl. Brit. India 5: 455. 1887; Gamble, Fl. Pres. Madras 1333. 1925; N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1447. 1983; Chandrab. in Henry *et al.*, Fl. Tamilnadu 2: 232. 1987; Manilal, Fl. Silent Valley 251. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 420. 1988; Vajr., Fl. Palghat Dist. 431. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 418. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 405. 1996; Sivar. & P. Mathew, Fl. Nilambur 624. 1997. *Adelia neriifolia* Roth, Nov. Pl. Sp. 375. 1821. **Gudavanchi (M)**.

Shrubs to 3 m high; young branches pubescent. Leaves linear lanceolate, 15-20 x 1.5-2.5 cm, apex acute, base cuneate; petiole to 0.7 cm long. Spikes axillary and terminal, to 10 cm long. Male: 5 mm across. Tepals 3, pinkish, puberulous without, 3 mm long. Stamens many; anthers tiny. Female: 4 mm across. Tepals 5, brownish, ovate, puberulous without, 2 mm long. Ovary 2 mm across, puberulous; styles 3 mm long. Capsule 4 mm across, subglobose, puberulous.

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

*Distribution:* Indo-Malesia and South China. Rocky River beds, c. 1000m; locally abundant. *HN 266*.

*Usage:* The roots are used to cure urinary colics. A decoction made with crushed roots is given internally at early morning and bed-time to the patient for a month. Two glasses of boiled water with the roots and reduced to one, is taken twice daily.

**Jatropha curcas** L., Sp. Pl. 1006. 1753; Hook. f., Fl. Brit. India 5: 383. 1887; Gamble, Fl. Pres. Madras 2: 1340. 1925; N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1449. 1983; Chandrab. in Henry *et al.*, Fl. Tamilnadu 2:

232. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 420. 1988; Vajr., Fl. Palghat Dist. 431. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 418. 1994; Sivar. & P. Mathew, Fl. Nilambur 625. 1997. **Tonde maram (I)**.

Shrubs to 3 m high; branches with leaf scars. Leaves 3-5 lobed, cordiform, 10-16 x 6-12 cm, base cordate, margin entire, apex acute; stipules deciduous. Cymes to 12 cm long. Flowers yellowish green, 6 mm across. Perianth bi-seriate, 5+5, outer sepals ovate, to 4 mm long; inner tepals petaloid, obovate, to 6 mm long. Stamens 5+5. Filaments 3 mm long. Ovary trilobular; ovules 3, pendulous; styles 3. Disk glands 5, free, yellow. Capsule subglobose, 3 x 2.5 cm, rugose when dry. Seeds ovate, blackish.

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

*Distribution*: Native of tropical America; now wide spread in Paleotropics. Hamlet premises of Mully, often cultivated as a hedge plant, c. 700 m; frequent. *HN 015*.

*Usage*: Young shoots are used as toothbrush; regular use removes stains on tooth and cures toothache. Dried fruits are collected, split opened and the seeds are sold to the local buyers. There is good demand for the seeds in Coimbatore area of Tamilnadu for extracting oil for industrial purposes and the cake is utilised as manure.

**Mallotus philippensis** (Lam.) Muell.-Arg., *Linnaea* 34: 196. 1865; Hook. f., *Fl. Brit. India* 5 : 442. 1887; Gamble, *Fl. Pres. Madras* 1322. 1925; N. Rani in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 1456. 1983; Chandrab. in Henry *et al.*, *Fl. Tamilnadu* 2: 234. 1987; V. S. Ramach. & V. J. Nair, *Fl. Cannanore* 422. 1988; N. Rani in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 1456. 1983; Vajr., *Fl. Palghat Dist.* 433. 1990; Mohanan & Henry, *Fl. Thiruvananthapuram* 420. 1994; Sasidh. & Sivar., *Flow. Pl. Thrissur For.* 408. 1996; Sivar. & P. Mathew, *Fl. Nilambur* 629. 1997; Mohanan & Sivad., *Fl. Agasthyamala* 612. 2002. *Croton philippense* Lam., *Encycl.* 2: 206. 1786. *Rottlera tinctoria* Roxb., *Pl. Corom. t.* 168. 1802. **Kathivettimaram (I)**. Plate 8B.

Trees to 10 m tall. Leaves alternate, ovate-lanceolate, 6-18 x 2-10 cm, pubescent below, base acute to rounded, margin entire, apex acute to acuminate; petiole, to 8 cm long, red-glandular. Racemes terminal, to 15 cm long. Male: tepals 4, free, obovate, 3 mm long, acute, recurved. Stamens many. Filaments 1 mm long; anther cells unequal, to 0.7 mm long. Female: tepals 3, lanceolate, bifid. Ovary 2 mm across, pubescent, trilocular; styles to 3.5 mm long. Capsule 3-valved, 1 cm across, red-glandular. Seeds globose, black coloured.

*Fl. & Fr.*: July-December.

*Distribution*: Indo-Malesia and Australia. Stream banks in Dry-deciduous forest of Kavundikkal, c. 650 m; frequent. *HN 325*.

*Usage*: A handful of leaves is made into a paste and applied externally over the body one hour before bath while a small portion, 3-4 pinches, is mixed in hot water is administered during four menstrual days. This helps the women to conceive during the next ovulation period.

**Phyllanthus amarus** Schum. & Thonn., Kongel. Danske Vidensk. Selsk. Skr. 4: 195. 1829; N. Rani in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 1464. 1983; Chandrab. in Henry *et al.*, *Fl. Tamilnadu* 2: 236. 1987; V. S. Ramach. & V. J. Nair, *Fl. Cannanore* 424. 1988; Vajr., *Fl. Palghat Dist.* 435. 1990; Mohanan & Henry, *Fl. Thiruvananthapuram* 423. 1994; Sasidh. & Sivar., *Flow. Pl. Thrissur For.* 412. 1996; Sivar. & P. Mathew, *Fl. Nilambur* 635. 1997; Mohanan & Sivad., *Fl. Agasthyamala* 616. 2002. *P. fraternus* Webster, *Contrib. Gray Herb.* 176: 53. 1955. *P. niruri* auct., non L., 1753: Hook f., *Fl. Brit. India* 5: 298. 1887; Gamble, *Fl. Pres. Madras* 1290. 1925. **Sirunelli (J, K & M).**

Herbs to 40 cm high. Leaves oblong, 9 x 4 mm, glaucous below, obtuse at both ends, margin entire; petiole to 1.5 mm long. Stipules lanceolate, scarious. Male flowers few, terminal. Tepals 5, ovate; stamens 3, exserted; filaments connate. Female flowers many. Tepals 5, oblong; styles recurved; stigma obtuse; disc ovate, acute. Capsule dehiscent, 2 mm wide. Seeds tuberculate.

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

*Distribution:* Native of America; now naturalised in tropics. Farm lands of Mully, c. 700 m; frequent. *HN 006*. River bed at Mully, c. 700 m; frequent. *HN 121*.

*Usage:* The whole plant is ground well and a gooseberry-size paste is administered in goat's milk twice daily for seven consecutive days to cure jaundice. In some cases tender leaves of castor are also added. Another method is by grinding well the whole plant and rolling to small beads and drying in sunlight for making tablets. Two tablets are powdered, and mixed with honey and administered twice daily. Use of oil is restricted during the treatment period.

**Phyllanthus emblica** L., Sp. Pl. 982. 1753; Hook. f., Fl. Brit. India 5 : 289. 1887; N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1466. 1983; Chandrab. in Henry *et al.*, Fl. Tamilnadu 2: 236. 1987; Manilal, Fl. Silent Valley 253. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 414. 1988; Vajr., Fl. Palghat Dist. 436. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 424. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 412. 1996; Sivar. & P. Mathew, Fl. Nilambur 636. 1997; Mohanan & Sivad., Fl. Agasthyamala 617. 2002. *Emblica officinalis* Gaertn., Fruct. 2: 122. 1791; Gamble, Fl. Pres. Madras 1295. 1925. **Nelli (I)**.

Trees to 10 m tall. Leaves linear-oblong, 1 x 0.3 cm, base truncate to subcordate, apex apiculate; stipules minute, linear, Flowers polygamous, in axillary fascicles. Male: 3 mm across; tepals 6, oblanceolate, 1.5 mm long, obtuse. Stamens 3, connate, 0.3 mm long; anthers connate by their connectives, Disc-glands 6. Female: 4.5 mm across; tepals 6, valvate, oblanceolate, 2.5 mm long, truncate, obtuse. Ovary 1.5 mm across; styles fimbriate, 2.5 mm long, recurved, stigmatiferous. Drupe depressed-globose, fleshy, juicy, indehiscent, 3 cm across. Seeds trigonous.

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

*Distribution:* Throughout the tropics. Dry-deciduous forest of Kadampara, c.650 m; frequent. *HN 096*.

*Usage:* The bark is crushed and applied as poultice over fractures in goat or calf and wrapped tightly by a cloth-piece immersed in gingili oil. Keep the animal stall-fed for 21 days for the re-union of bones. Fresh fruits are edible and collected and marketed. They are consumed fresh or pickled.

**Ricinus communis** L., Sp. Pl. 1007. 1753; Hook. f., Fl. Brit. India 5: 457. 1887; Gamble, Fl. Pres. Madras 1335. 1925; N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1471. 1983; Chandrab. in Henry *et al.*, Fl. Tamilnadu 2: 239. 1987; Manilal, Fl. Silent Valley 254. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 426. 1988; Vajr., Fl. Palghat Dist. 440. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 425. 1994; Sivar. & P. Mathew, Fl. Nilambur 641. 1997. **Kotte (I, M & K).**

Shrubs to 4 m high. Leaves alternate, palmatifid, c. 6 lobed, peltate; lobes lanceolate, 10-18 x 5-8 cm, thinly pubescent below, margin serrate, apex acuminate; petiole to 20 cm long. Inflorescence paniculate racemes, terminal, to 20 cm long. Male flowers 1.5 cm across. Perianth cupular, lobes 3-5, lanceolate, valvate, 4 mm long, margin inrolled, acuminate. Stamens numerous; filaments connate and repeatedly branched. Female flowers 0.6 cm across. Tepals 5, subequal, lanceolate, valvate, 5 mm long, acute. Ovary globose, 3 mm across, trilocular; ovules 3, pendulous; styles 3-4 mm long, papillose, stigmatiferous. Disc absent. Capsule trilobed, 2 cm across, prickly. Seeds oblong, marbled, shiny.

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

*Distribution:* Native of tropical Africa; widely cultivated throughout tropics. Marginal forest land of Mully, c. 700 m; frequent. *HN 003.*

*Usage:* Oil extracted from the seeds is applied over the belly during the last period of pregnancy and also after delivery to protect the skin from stretching and contracting. This oil is applied externally to babies before bath to improve the health of the skin.

**Tragia involucrata** L., Sp. Pl. 980. 1753; Hook. f., Fl. Brit. India 5: 465. 1888; Gamble, Fl. Pres. Madras 1332. 1925; N. Rani in K. M. Matthew, Fl.

Tamilnadu Carnatic 3: 1479. 1983; Chandrab. in Henry *et al.*, Fl. Tamilnadu 2: 240. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 427. 1988; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 421. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 415. 1996; Sivar. & P. Mathew, Fl. Nilambur 645. 1997. **Kodithoove (K)**.

Twiners; shoots densely pubescent. Leaves simple, elliptic-ovate to obovate, 5-10 x 2-5 cm, base acute, margin serrate, apex acuminate; petiole to 2 cm long. Male flowers 1.5 mm across, bract spatulate. Tepals 3, to 1 mm long. Stamens 3; anthers 0.3 mm long. Female flowers 3 mm across, ebracteate. Tepals 6, to 1.5 mm long, sericeous without. Ovary 1.5 mm across; styles 3, to 0.5 mm long. Capsule to 1 cm long, hispid.

*Fl. & Fr.*: November-January.

*Distribution*: India and Sri Lanka. Wastelands of Anavai, c. 750m; frequent. *HN 269*.

*Usage*: Medicated oil is prepared by adding the crushed root of a mature plant in 100 ml of coconut oil and boiling. This oil is applied on the forehead and scalp during early morning to cure Migraine.

**Trewia nudiflora** L., Sp. Pl. 1193. 1753; Hook. f., Fl. Brit. India 5: 423. 1887; Gamble, Fl. Pres. Madras 1319. 1925; N. Rani in K. M. Mathew, Fl. Tamilnadu Carnatic 3: 1482. 1983; Chandrab. in Henry *et al.*, Fl. Tamilnadu 2: 241. 1987; Vajr., Fl. Palghat Dist. 440. 1990; Sivar. & P. Mathew, Fl. Nilambur 645. 1997. *T. polycarpa* Benth. in Benth. & Hook. f., Gen. Pl. 3: 318. 1880; Sasidh. & Sivar., Flow. Pl. Thrissur For. 416. 1996. **Unninaava (U)**.

Trees to 15 m; branchlets fulvous-pubescent. Leaves broadly ovate, 5-18 x 4-10 cm, base cordate-truncate, margin entire, apex shortly acuminate; petiole to 6 cm long. Male flowers: racemes to 10 cm long; flowers 5 mm across. Tepals ovate, 2.5 mm long, puberulous. Filaments 3 mm long; anthers 1 mm long. Female: racemes short; flowers 2.5 mm across. Ovary globose, 2 mm across, bilocular; styles 2, to 5 mm long. Drupe globose, to 1.5 cm across.

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

*Distribution:* Indo-Malesia. Riverine forest of Chavadiyoor, c. 600 m; frequent. *HN 162.*

*Usage:* Wood is used for making planks for goat-shed. By making horizontal cuttings on the wood, it is used as a ladder for goats to climb into the elevated shed.

## FLACOURTIACEAE

**Flacourtia indica** (Burm. f.) Merr., *Interpr. Herb. Amboin.* 377. 1917; K. M. Matthew & Britto in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 59. 1983; Srinivasan in Nair *et al.*, *Fl. Tamilnadu* 1: 18. 1983; Manilal, *Fl. Silent Valley* 9. 1988; V. S. Ramach. & V. J. Nair, *Fl. Cannanore* 49. 1988; Vajr., *Fl. Palghat Dist.* 60. 1990; M. Mohanan & A. N. Henry, *Fl. Thiruvananthapuram* 61. 1994. *Gmelina indica* Burm. f., *Fl. Ind.* 132, t. 39, f. 5. 1768. *Flacourtia ramontchi* L'Herit., *Strip. Nov.* 3: 59. t.30 & 30-B. 1785; Hook. f. & Thoms. in Hook. f., *Fl. Brit. India* 1: 194. 1872; Dunn in Gamble, *Fl. Pres. Madras* 54. 1915. *F. sepiaria* Roxb., *Pl. Corom.* t. 68. 1796. **Narimoratte (I).**

Small trees to 8 m tall; new shoots with elongate thorns and coppery foliage. Leaves subopposite or alternate, obovate, 2-3.5 x 1-1.5 cm, glabrous, base attenuate, margin entire, apex acute to obtuse; petiole to 5 mm long. Racemes short, to 1 cm long; pedicel to 3 mm long. Flowers 3 mm across. Sepals 4 or 5, cream, basally connate, ciliate. Petals 0. Male Flowers: stamens numerous, unequal; filaments 2 and 3.5 mm. Female: Ovary 3-celled; ovules 2 per cell; styles 3, stout; stigma tri-fid. Drupes globose, to 4 mm diameter, red when ripe. Seeds obovoid, 3-5.

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

*Distribution:* Paleotropics. Dry-deciduous forest of Puliappathy, c. 650 m; frequent. *HN 148.*

*Usage:* Ripe fruits are freshly consumed, which is available in plenty during the season.

## LAMIACEAE

**Hyptis suaveolens** (L.) Poit., Ann. Mus. Natl. Hist. Nat. Paris 7: 472, t. 29, f. 2. 1806; Hook. f., Fl. Brit. India 4: 630. 1885; Gamble, Fl. Pres. Madras 1129. 1924; Srinivasan in Henry *et al.*, Fl. Tamilnadu 2: 174. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 364. 1988; Vajr., Fl. Palghat Dist. 376. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 365. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 360. 1996; Sivar. & P. Mathew, Fl. Nilambur 547. 1997; Mohanan & Sivad., Fl. Agasthyamala 532. 2002. *Ballota suaveolens* L., Syst. Nat. (ed. 10) 1100. 1759. **Kattu thulasi (M)**.

Subshrubs to 2 m high; branches tetragonous, glandular-hairy. Leaves ovate, 3-8 x 2-7 cm, strigose, base truncate to acute, margin irregularly serrulate, apex acute; petiole to 2 cm long. Flowers in axillary verticils of cymes, c. 6-flowered, pedicel to 1 cm long. Calyx campanulate; tube 4 mm long, 10-ribbed; lobes 5, subequal, linear, 4 mm long, acuminate. Corolla blue, 5 mm across, lobes 5, bi-lipped; mid lob of lower lip folded, short and bifid. Stamens 4, didynamous; filaments 3 mm long, bearded; anthers 2-celled, 0.8 mm long. Ovary 1 mm; style gynobasic, 4.5 mm long; stigma shortly bifid. Nutlets: 2 oblong, and 2 aborted, seen as rudimentary structures at base. Seeds minute, brownish.

*Fl. & Fr.*: November-January.

*Distribution*: Native of Central America; now Pantropical. Open areas in Moist deciduous forest of Siruvani, c. 750 m; locally abundant. *HN 302*.

*Usage*: A handful of leaves are boiled in 100 ml coconut oil, filtered and smeared against itches in children. The leaves are dried and powdered, and a spoon of this is added in 1 glass of water and a decoction is made. The decoction is a pediatric medicine for fever.

**Leucas aspera** (Willd.) Spreng., Syst. Veg. 2: 743. 1825; Hook. f., Fl. Brit. India 4: 690. 1885; Gamble, Fl. Pres. Madras 1150. 1924; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1259. 1983; Vajr., Fl. Palghat Dist. 377. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 366.

1994. *Phlomis aspera* Willd. in Link, Enum. Hort. Berol. 2: 621. 1809. *Phlomis plukenetii* Roth, Nov. Pl. Sp. 261. 1821. *Leucas plukenetii* (Roth) Spreng., Syst. Veg. 2: 743. 1825. **Tumbe (I)**.

Herbs to 50 cm high, scabrid. Leaves linear-lanceolate, 2-8 x 0.5-0.8 cm, puberulous, base cuneate, margin entire to serrate, apex acute; petiole to 0.3 cm long. Verticils terminal and axillary; bracts lanceolate, equalling calyx. Calyx tubular, 6 mm long, upper half strigose without, glabrous below; mouth oblique, 10-toothed; teeth unequal, linear, 1 mm long. Corolla 4 x 1 mm; tube 6 mm long, upper lip 3.5 mm long, villous without; lower lip 8 mm long. Stamens 4; filament pairs 4.5 and 6 mm long; anthers 0.6 mm long. Ovary 0.5mm across; style to 8 mm long. Seeds minute.

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

*Distribution*: Indo-Malesia. Dry-deciduous forest of Pattimalam, c. 600 m; frequent. *HN 035*.

*Usage*: The leaf-juice is mixed with common salt and applied over foul ulcers of cattle for speedy healing. Sneezing of cattle is treated by applying the leaf-juice into the nostrils with a piece of cloth tied on a small stick.

***Ocimum americanum* L.**, Cent. Pl. 1: 15.1755; Srinivasan in Henry *et al.*, Fl. Tamilnadu 2:179. 1987; Vajr., Fl. Palghat Dist. 436. 1990; Sasidh. & Sivar., Flow. Pl. Thrissur For. 1996. *Ocimum canum* Sims, Bot. Mag. 51: t. 2452. 1823; Hook. f., Fl. Brit. India 4: 607. 1885; Gamble, Fl. Pres. Madras 1111. 1924; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1269.1983; V. S. Ramach. & V. J. Nair, Fl. Cannanore 368. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 368. 1994. **Sirutulasi (I)**.

Herbs to 50 cm high; branchlets puberulous, quadrangular. Leaves elliptic-lanceolate, 3 x 1.5 cm, base truncate, margin sparingly serrate, apex acute; petiole to 1.5 cm long. Inflorescence, to 15cm long; bracts ovate, acute, stalked; pedicel 2 mm long. Calyx bilipped; each 2 mm long, sericeous without, villous within. Corolla white, 4 x 1 mm; tube 1.5 mm long; lobes 5, upper lip 2.5 mm long, lower lip 3 mm long, sericeous without. Stamens 4;

filaments to 5 mm long. Ovary 0.5 mm across; style 5.5 mm long. Nutlets ellipsoid.

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

*Distribution:* Paleotropics. Farmlands near Karuvara hamlet, c. 700 m; frequent. *HN 336*.

*Usage:* Plants are plucked and tied together to a small bundle as a brush and used to repel insects on cattle.

**Ocimum basilicum** L., Sp. Pl. 597. 1753; Hook. f., Fl. Brit. India 4: 608. 1885; Gamble, Fl. Pres. Madras 1111. 1924; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1268.1983; Srinivasan in Henry *et al.*, Fl. Tamilnadu 2: 179. 1987. *O. americanum* L., Cent. Pl. 1: 15. 1755; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 368. 1994; Sivar. & P. Mathew, Fl. Nilambur 550. 1997. **Rama tulasi (I)**. Plate 8C.

Subshrubs to 1 m high; stem quadrangular. Leaves elliptic-ovate to lanceolate, 5 x 2.5 cm, acute on both ends, margin serrulate; petiole to 2 cm long. Inflorescence to 15 cm long; bracts oblanceolate, ciliate, acuminate; pedicel 3 mm long. Calyx-lobes 5, upper lip 3 mm long, lower lip 4 mm, glabrous without, hairy within, enlarged in fruit. Corolla cream coloured, 8 mm across; tube inflated below; lobes 5, bilipped. Stamens 4; filament pairs 6 and 7 mm. Ovary small; style 9 mm long; seeds brownish, mucilagenous when wet.

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

*Distribution:* Paleotropics. Planted in the hamlet premises of Kottathara, c.600 m; rare. *HN 225*.

*Usage:* Crush and eat 4-5 shoots daily, continuously for three months, in the morning and evening, as a medicine to treat venereal diseases.

**Ocimum gratissimum** L., Sp. Pl. 1197. 1753; Hook. f., Fl. Brit. India 4: 608. 1885; Gamble, Fl. Pres. Madras 1111. 1924; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1270.1983; Srinivasan in Henry *et al.*, Fl. Tamilnadu 2: 180. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore

368. 1988; Vajr., Fl. Palghat Dist. 380. 1990; Sasidh. & Sivar., Flow. Pl. Thrissur For. 362. 1996. **Raja tulasi (I).**

Subshrubs to 1.5 m high; branchlets glabrescent, quadrangular. Leaves obovate, 10 x 6 cm, acute on both ends, margin serrate; petiole to 6 cm long. Inflorescence to 15 cm long; bract oblanceolate; pedicel 3 mm long. Calyx-lobes 5, persistent, enlarged in fruits, lower lip smaller. Corolla pale white coloured, 4 mm across; tube 2.5 cm long, bilipped; lobes 5, pubescent without. Stamens 4; filaments to 4.5 mm long; anthers 0.8 mm long. Ovary 1 mm across; style 7 mm long. Nutlets 4, or one aborts.

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

*Distribution:* Pantropical. Dry-deciduous forest of Pattimalam, c. 600 m; frequent. *HN 010.*

*Usage:* Whole plant is ground with *Pasimuttu chedi* (*Chenopodium ambrosioides*) and gently smeared all over the body for curing fever and drowsiness in children. Remove the paste with a cloth piece after one hour.

**Ocimum tenuiflorum** L., Sp. Pl. 597. 1753; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1271.1983; Srinivasan in Henry *et al.*, Fl. Tamilnadu 2: 180. 1987; Vajr., Fl. Palghat Dist. 380. 1990; Sivar. & P. Mathew, Fl. Nilambur 551. 1997. *O. sanctum* L., Mant. Pl. 1: 85. 1767; Hook f., Fl. Brit. India 4: 609. 1885; Gamble, Fl. Pres. Madras. 1111. 1924. **Tulasi (I).**

Subshrubs to 1 m high; branchlets hispid, terete. Leaves elliptic--oblanceolate, 4 x 2 cm, base truncate, margin serrate, apex acutely apiculate; petiole to 2 cm long. Inflorescence to 10cm long; bracts broadly ovate, sessile; pedicel to 3 mm long, longer than calyx. Calyx purple; lobes 5; hispid without, glabrous within. Corolla pale white, purplish within, 3.5 mm across, bilipped; lobes 5, lower lip longer, sericeous, obtuse. Stamens 4; filaments to 3.5 mm long. Ovary 0.5 mm across; style 4.5 mm long. Seeds brownish.

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

*Distribution:* Paleotropics. Dry Thickets of Pattimalam, c.600 m; frequent. *HN 046.*

*Usage:* Leaf paste is applied regularly over itches for easy curing. In asthma and similar breathing troubles 2-3 leafy shoots are regularly administered by chewing in the morning.

## LAURACEAE

**Cinnamomum macrocarpum** Hook. f., Fl. Brit. India 5: 133. 1886; Gamble, Fl. Pres. Madras 1225. 1925; Vajr., Fl. Palghat Dist. 402. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 392. 1994; Mohanan & Sivad., Fl. Agasthyamala 566. 2002. *C. iners* sensu Wight, Ic. t. 122, 130. 1839, non Reinw. ex Bl., 1826. **Ilavangam, Karuppa (K & M).**

Trees to 25 m tall; branches glabrous. Leaves 10-20 x 2.5-5.5 cm, acuminate at apex, attenuate at base, glabrous on both sides, 3-ribbed. Panicles axillary and sub-terminal, many branched. Peduncles 6-8 cm long. Perianth lobes 0.2-0.25 cm long, sub-equal. Stamens in 2 rows with an additional row of staminodes; filaments with 2 stipitate glands. Ovary ellipsoid, minute; stigma peltate. Fruit bluish violet when ripe. Seeds single.

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

*Distribution:* Endemic to southern Western Ghats. Moist deciduous forest of Kurukkankundu, c. 750 m; frequent. *HN 296.*

*Usage:* The bark is collected and sold from saplings and small trees. Large trees are often found untouched. There is high demand for the material in the market, as a spice and also as a raw-drug for Ayurvedic medicines.

**Litsea stocksii** (Meisner) Hook. f., Fl. Brit. India 5: 176. 1886; Gamble, Fl. Pres. Madras 1236. 1925; K. M. Matthew, Mat. Fl. Tamilnadu Carnatic 1: 322. 1981; Chandrasekaran in Henry *et al.*, Fl. Tamilnadu 2: 211. 1987; Manilal, Fl. Silent Valley 237. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 395. 1994. *Tetranthera oblonga* Nees var. *stocksii* Meisner in DC., Prodr. 15: 205. 1864. **Kolisera (I & M).**

Small trees to 6 m tall. Leaves lanceolate-oblong, to 12 x 4 cm, coreaceous, glaucous below, base narrow, margin entire, apex acute.

Umbellules axillary, silky tomentose. Tepals pale yellow, tube oblong-turbinate. Berry seated on cup-shaped perianth tube.

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

*Distribution*: Endemic to southern Western Ghats. Along ravines in Dry-deciduous forests of Thuva, c. 750 m; frequent. *HN 071*.

*Usage*: Stem is used for making handle of hammers due to strength and flexibility.

## LOGANIACEAE

***Strychnos nux-vomica*** L., Sp. Pl. 189. 1753; Hook. f., Fl. Brit. India 4: 90. 1883; Gamble, Fl. Pres. Madras 868. 1923; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 966. 1983; Chandrab. in Henry *et al.*, Fl. Tamilnadu 2: 92. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 289. 1988; Vajr., Fl. Palghat Dist. 296. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 303. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 297. 1996; Sivar. & P. Mathew, Fl. Nilambur 430. 1997. **Itty (I)**. Plate 8D.

Trees to 20 m tall. Leaves orbicular to ovate, 8.5 x 7.5 cm, coriaceous, glabrous, base attenuate, margin entire, apex obtuse; petiole to 1 cm long; bracts 5 mm long; bracteoles 1.5 mm long; pedicel 1.3 mm long. Flowers in terminal cymes. Calyx lobes 5, pubescent. Corolla yellowish green, 8 mm across, tube 7 mm long, lobes 5, hairy within. Stamens 5. Ovary pubescent, ovules many; style, to 9 mm long; stigma capitate. Fruit a berry, 5-8 cm across, orange-red colour when ripe. Seeds to 4, compressed.

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

*Distribution*: Indo-Malesia. Farm lands of Vatlakki, c. 600 m; rare. *HN 050*.

*Usage*: A paste of the pulp of ripe fruits is applied over a particular kind of skin disease which resemble psoriasis. A paste of the bark is smeared several times externally to the body parts to cure pain.

***Strychnos potatorum*** L. f., Suppl. Pl. 148. 1781; Hook. f., Fl. Brit. India 4: 90. 1883; Gamble, Fl. Madras 868. 1923; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 967. 1983; Chandrab. in Henry *et*

*al.*, Fl. Tamilnadu 2: 92. 1987; Vajr., Fl. Palghat Dist. 296. 1990. **Sillemaram (I)**.

Trees to 8 m tall. Leaves ovate, 4-7 x 2.5 cm, chartaceous, base truncate, margin entire, apex acuminate; petiole to 3 mm long. Cymes axillary, on old wood; bracts 5 mm long; bracteoles 1.5 mm long; pedicel 2 mm long. Calyx 1.5 mm long; lobes 5, puberulous. Corolla dull white coloured, 4 mm across; tube to 4.5 mm long, tomentose at throat; lobes 5. Stamens 5; filaments 0.4 mm long; anthers 1 mm long. Ovary 1 mm across, glabrous; ovules a few; style 4.5 mm long. Berry 1.5 cm across, thin-shelled, dark blue when ripe. Seed 1-2, orbicular, to 5 mm across.

*Fl. & Fr.*: June-December.

*Distribution*: Peninsular India and Sri Lanka. Dry-deciduous forest of Vattlakki, c. 600 m; frequent. *HN 165*.

*Usage*: Wood pieces are burned in the boundaries of agricultural fields at night to frighten wild pigs. It burns with a cracking sound and scattering amber to close vicinity and frightens them from crossing the field. Fruits are crushed and put in stagnant water enabling easy catch of fish by stupefying them. It is believed that if dried bark pieces are secretly placed somewhere in the enemies' house, it make the residents quarrel, and finally result in evacuating the area.

## LYTHRACEAE

**Lagerstroemia microcarpa** Wight, Ic. t. 109. 1839; Srinivasan in Nair *et al.*, Fl. Tamilnadu 1: 165. 1983; Manilal, Fl. Silent Valley 112. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 192. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 202. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 195. 1996; Sivar. & P. Mathew, Fl. Nilambur 227. 1997; Mohanan & Sivad., Fl. Agasthyamala 286. 2002. *Lagerstroemia lanceolata* Wall. ex Clarke in Hook. f., Fl. Brit. India 2: 576. 1879; Gamble, Fl. Pres. Madras 513. 1919. *L. thomsonii* Koehne in Engler, Pflanzenr. 216 (17): 251. 1903, Gamble, Fl. Pres. Madras 513. 1919. **Bega (M)**.

Large trees to 35 m tall; bark smooth, white, peeling off in large flakes. Leaves to 10 x 4.5 cm, elliptic-lanceolate, acuminate, glabrous, white beneath. Flowers in compound terminal panicles. Calyx white, shortly tomentose; teeth reflexed. Corolla pinkish white, obovate-obtuse, crispate, to 1 cm long. Capsule up to 2 cm long.

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

*Distribution:* Endemic to Western Ghats. Moist deciduous forest of Karuvara, c. 650 m; not frequent. *HN 247.*

*Usage:* It is believed that if a piece of bark of *Bega* along with a root piece of *Mullgonge* (*Briedelia retusa*) is made into a paste and applied on the sole, the applicant will escape from an evil deed done by enemies.

## MALVACEAE

***Abutilon hirtum*** (Lam.) Sweet, Hort. Brit. 53. 1826; Dunn in Gamble, Fl. Pres. Madras 91. 1915; Britto & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 106. 1983; Chandra bose in Nair *et al.*, Fl. Tamilnadu 1: 32. 1983; Sivar. & Pradeep, Malv. South. Penin. India 190. 1996; Mathew, Fl. Nilambur 88. 1997; *Sida hirta* Lam., Encycl. 1: 7. 1783. *Sida graveolens* Roxb. (Hort. Beng. 50. 1814, *nom. nud.*) ex Hornem., Hort. Hafn. Suppl. 77. 1819. *Abutilon graveolens* var. *hirtum* (Lam.) Mast. in Hook. f., Fl. Brit. India 1: 327. 1874. **Tuthi (I).** Plate 8E.

Shrubs to 2 m high, stem densely pubescent with short stellate hairs. Leaves 5-7 x 5-7 cm, ovate to suborbicular, velvety, cordate at base, acute-acuminate at apex; petioles 5-8 cm long, densely clothed with minute hairs; stipules falcate. Flowers axillary, solitary, to 3cm. across. Calyx campanulate, 5-lobed, yellowish-green. Corolla orange-yellow with a purplish centre, 5-lobed; Staminal column to 7 mm long. Ovary ovoid; style arms many; stigmas purplish. Schizocarp globose, 1 x 1.5 cm. densely stellate. Seeds reniform, 3 per cell.

*Fl. & Fr.:* November-January.

*Distribution:* Semi-arid tropics of the World. Dry-deciduous forests of Kottathara, c. 600 m; locally abundant. *HN 294*.

*Usage:* Leaves are used in the treatment of piles. Fresh leaves are cleaned in water, sun-dried and powdered; one tea spoon of powder is taken on a banana leaf, diluted in onion juice and pressed into the bulged-out portion of rectum. The same mixture is also recommended to administer for a week, one spoon per day in empty stomach for total cure. The treatment have to be performed only by an expert tribal healer.

Plate 8.



A. *Baccaurea courtallensis*. Inset: flowering stages -1. Male flowers, 2. Female flowers



B. *Mallotus philippensis*



C. *Ocimum basilicum*



D. *Strychnos nux-vomica*



E. *Abutilon hirtum*

**Gossypium barbadense** L., Sp. Pl. 693. 1753; Dunn in Gamble, Fl. Pres. Madras 102. 1915; Britto & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 111. 1983; Chandrab. in Nair *et al.*, Fl. Tamilnadu 1: 33. 1983; Sivar. & Pradeep, Malv. South. Penin. India 28. 1996. *Hibiscus barbadensis* (L.) O. Ktze., Rev. Gen. Pl. 1: 67. 1891. **Paruthy (I).**

Shrubs to 2 m high; stem stellate-pubescent. Leaves alternate, deeply 3-7 lobed, 12 x 15 cm, base cordate, margin entire, tip acute. Petiole to 20 cm long, gland-dotted, glabrescent. Stipules to 3 cm long. Flowers axillary, solitary. Calyx to 8 mm long, gland-dotted. Corolla funnel-form; petals yellow, fading purple, 6 x 6 cm. Staminal column 2.5 cm long, 5 toothed at apex, filaments 2.3 mm long. Ovary 9 mm long, 3-celled; style 2.5 cm long; stigmas 3, 11 mm long. Fruit a capsule, 3-4 locular, broad at base, tapering to an acute tip. Seeds 5-8 per loculus, 0.5 cm across, blackish. Lint white or creamy.

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

*Distribution*: Native of South America; now widely cultivated in all tropical countries. Farm lands of Chavadiyoor, c. 600 m; cultivated. *HN 221*.

*Usage*: During the last period of pregnancy, a decoction of roots of *Paruthy* is administered for 10-15 days to promote easy delivery. A handful of roots is taken and chopped, and a decoction is prepared in two glasses of water, by boiling and reducing it to half; and half of it is administered in the morning and the rest in the evening time.

**Sida acuta** Burm. f., Fl. Ind. 147. 1768; Dunn in Gamble, Fl. Pres. Madras 90. 1915; Britto & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 127. 1983; Chandrab. in Nair *et al.*, Fl. Tamilnadu 1: 36. 1983; Manilal, Fl. Silent Valley 28. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 63. 1988; Vajr., Fl. Palghat Dist. 82. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 81. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 61. 1996; Sivar. & Pradeep, Malv. South. Penin. India 238. 1996; Sivar. & P. Mathew, Fl. Nilambur 88. 1997; Mohanan & Sivad., Fl. Agasthyamala 99. 2002. **Kalakarande (I, K & M).**

Subshrubs to 1 m high; branchlets minutely stellate-pubescent. Leaves oblong-lanceolate, 1.5-7 x 0.5-2 cm, glabrescent, base obtuse, margin serrate, apex acuminate; petiole to 0.8 cm long; stipules unequal, linear to lanceolate, 0.4-1 cm long. Flowers to 1.5 cm across, axillary, solitary or clustered; pedicel jointed above middle portion, 0.1-0.3 cm long. Calyx-tube 0.4 cm long; lobes 5, 0.4 cm long, acuminate. Petals 5, pale yellow, obliquely ovate, 0.8 x 0.5 cm, ciliate at base. Staminal column 3 mm long, hispid. Ovary ovoid, 1 mm across, 6-celled; style 0.5 cm long; Schizocarp 5 mm long, wrinkled; mericarps many, rugose on the back, awns 2, scabrous, glabrous. Seeds trigonous, 2 mm wide.

*Fl. & Fr.*: September-January.

*Distribution*: Pantropical. Dry-deciduous forests of Vannanthara, c. 600 m; locally abundant. *HN 227*.

*Usage*: Aerial parts are used for making brooms. Plants collected are sun-dried and tied to a handy bundle which is used as broomstick. *Mudugas* found retaining this plant while weeding their agricultural fields.

***Sida alnifolia*** L., Sp. Pl. 684. 1753; Sivar. & Pradeep, Sida Contr. Bot. 16: 69. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 61. 1996; Sivar. & Pradeep, Malv. South. Penin. India 241. 1996; Sivar. & P. Mathew, Fl. Nilambur 89. 1997. *S. retusa* L., Sp. Pl. 2: 962. 1763. *S. rhombifolia* L., Sp. Pl. 684. 1753. var. *retusa* (L.) Mast. in Hook. f., Fl. Brit. India 1: 324. 1874; Chandrab. in Nair *et al.*, Fl. Tamilnadu 1: 37. 1983. *S. rhombifolia* L., ssp. *retusa* (L.) Borssum, Blumea 14: 198. 1966; V. S. Ramach. & V. J. Nair, Fl. Cannanore 64. 1988; Vajr., Fl. Palghat Dist. 84. 1990. **Kurunthotti (K & M)**.

Subshrubs to 1 m high; branchlets stellate-tomentose. Leaves variable, ovate-elliptic or rhomboid, 4-5 x 1.5-3.5 cm, glabrous above, stellate-hairy below, base cuneate, margin proximately entire, distally biserrate, apex obtuse or truncate; petiole 2-5 mm long; stipules setaceous, longer than petioles. Flowers 2 cm across, solitary; pedicel to 3-5 mm long. Calyx-tube 4 mm long, stellate-pubescent; lobes 5, triangular, 3 mm long. Petals 5, dull yellow, oblique-rhomboid, 1 x 0.8 cm, emarginate. Staminal column to 4 mm long, hairy. Ovary spherical, c. 10 celled; styler branches to 4 mm long.

Schizocarp 4 mm long; mericarps 7-10, tomentose at apex. Seeds ovoid, 1.5 mm wide.

*Fl. & Fr.*: September-January.

*Distribution*: Indo-Malesia. Waste land of Kathirampathy, c. 700 m; frequent. *HN 079*.

*Usage*: An NTFP species; plants uprooted and marketed. Huge quantities of root is required for the preparation of Ayurvedic medicines, especially used for rheumatic complaints, within the state.

***Thespesia lampas*** (Cav.) Dalz. ex Dalz. & Gibs., Bombay Fl. 19. 1861; Hook. f., Fl. Brit. India 1: 345. 1874; Britto & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 133. 1983; Chandrab. in Nair *et al.*, Fl. Tamilnadu 1: 37. 1983; Manilal, Fl. Silent Valley 29. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 64. 1988; Vajr., Fl. Palghat Dist. 84. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 82. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 63. 1996; Sivar. & Pradeep, Malv. South. Penin. India 40. 1996; Sivar. & P. Mathew, Fl. Nilambur 94. 1997; Mohanan & Sivad., Fl. Agasthyamala 101. 2002. *Hibiscus lampas* Cav., Diss. 3: 154. t. 56. f. 2. 1787; Dunn in Gamble, Fl. Pres. Madras 98. 1915. **Kattuparuthy (J), Kolukkatta (K & M)**.

Subshrubs to 2 m high; branchlets stellate tomentose. Lower leaves orbicular, apically palmately 3-lobed; upper ones ovate, 5-10 x 6-9 cm, stellate tomentose above, woolly below, base cordate, margin entire, apex acuminate; petiole to 4 cm long; stipules subulate. Flowers axillary, solitary; peduncle to 8 cm long; pedicel to 1.5 cm long; flowers 6 cm across; epicalyx segments 6-8, subulate. Calyx-tube to 1 cm long; lobes 5, subulate, triangular, teeth-like. Corolla 5, obovate, yellow with crimson centre, stellate-tomentose without. Staminal column to 1.5 cm long. Ovary 5-celled; ovules 6-8 per cell; style to 1 cm long. Capsule ovoid, pointed, 3-5 valved, scabrous, dehiscent, 2.5 cm long. Seeds numerous, ovoid, angular, glabrescent.

*Fl. & Fr.*: October-January.

*Distribution*: South and South east Asia, tropical East Africa. Moist deciduous forest of Mukkali, c. 550 m; frequent. *HN 293*

*Usage:* For curing jaundice, the roots are ground well and administered in the size of a gooseberry in goat milk, twice daily in empty stomach consequently for 7 days.

## MELIACEAE

**Azadirachta indica** A. Juss., Mem. Mus. Hist. Nat. 19: 221, t. 2, f. 5. 1832; Gamble, Fl. Pres. Madras 127. 1915; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 234. 1983; Nair & Rajan in Nair *et al.*, Fl. Tamilnadu 1: 67. 1983; Vajr., Fl. Palghat Dist. 113. 1990; Sasidh. & Sivar., Flow. Pl. Thrissur For. 100. 1996. **Veppe maram (I, K & M).**

Trees to 15m tall. Leaves odd pinnate, 20 x 10 cm; leaflets about 7 pairs, subopposite, oblong lanceolate, falcate, inequilateral, 4.5-7.5 x 1.5-2.5 cm, base oblique, cuneate, margin serrate, apex acuminate; petiole to 5 cm long. Panicles axillary, to 15 cm long; peduncle to 5 cm long; bracteole scaly; pedicel 5 mm long. Flowers pentamerous, 8 mm across. Calyx lobes ovate, 0.7 mm long, connate at base. Petals 5, white coloured, free, oblong-obovate, 5 x 1.5 mm, attenuate at base, tomentose, imbricate. Staminal tube, to 4 mm long, glabrous, apically 10 lobed; lobes truncate. Stamens 10; anthers sessile. Ovary 3-celled; ovules 2 per cell; style to 3 mm long; stigma tri-lobed. Drupe ovoid, 1.5 x 0.5 cm, yellowish when ripe. Seed solitary, ellipsoid, to 1 cm long.

*Fl. & Fr.:* March-June.

*Distribution:* Indo-Malesia. Dry-deciduous forests of Nakkupathi, c.600 m; frequent. *HN 199.*

*Usage:* In cases of severe stomach pain, fresh leaves are ground into a paste and a gooseberry-size of the same is taken along with a crushed onion and half a teaspoon of turmeric powder as a single dose. During the outbreak of chicken-pox the branches are spread along with the shoots of *Varali* (*Dodonaea viscosa*) and the patient is instructed to lie on this for initial three days. The leaf-paste is also applied all over the body.

## MENISPERMACEAE

**Cyclea peltata** (Lam.) Hook. f. & Thoms., Fl. India 201. 1855 & in Hook. f., Fl. Brit. India 1: 104. 1872, *pro parte*; Dunn in Gamble, Fl. Pres. Madras 31. 1915; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 19. 1983; Chithra in Nair *et al.*, Fl. Tamilnadu 1: 7. 1983; Manilal, Fl. Silent Valley 5. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 42. 1988; Vajr., Fl. Palghat Dist. 51. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 50. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 36. 1996; Sivar. & P. Mathew, Fl. Nilambur 46. 1997; Mohanan & Sivad., Fl. Agasthyamala 66. 2002. *Menispermum peltatum* Lam., Encycl. 4: 96. 1797. *Cyclea burmannii* (DC.) Hook. f. & Thoms., Fl. Ind. 201. 1855 & Fl. Brit. India 1: 104. 1872. *Clypea burmanni* Wight & Arn., Prodr. 1: 14. 1834. *Cyclea arnotii* Meisner, Ann. Mag. Nat. Hist. Ser. 3, 18: 19. 1866; Gamble, Fl. Pres. Madras 31. 1915. *Cocculus burmanni* DC., Syst. Nat. 1: 517. 1817. **Kuruppa (I)**.

Twiners. Leaves cordate, 6-11 x 4-7 cm, coriaceous, peltate, pubescent below, base truncate, margin entire, apex acuminate, mucronate; petiole to 4 cm long. Inflorescence axillary, pseudo-racemes, to 8 cm long. Male flowers: calyx globose, broadly campanulate. Corolla 5-8, connate, unequal, light greenish. Stamens 4, connate into a peltate synandrium. Female: calyx 1, linear. Corolla 1, subulate. Carpel 1, gibbous at base; style bi or trifid; staminodes 6. Drupes obovoid. Seed-1, ovate.

*Fl. & Fr.*: March-June.

*Distribution*: India and Sri Lanka. Dry-deciduous forests of Chavadiyoor, c.650 m; common. *HN 091*.

*Usage*: A piece of root of about 6 inch length is ground well, mixed in a glass of water, filtered and administered. A single dose is sufficient to cure stomach pain and remove blocks with in the bowel. Leafy vines are tied over the waist portion of children for the same effect. Cleansing the stomach will soon result by excretion of urine and stool. Fresh rhizomes crushed in coconut oil, cured for at least one week, are applied on foot during jungle walk to repel leeches.

Roots are also marketed as an NTFP item, which is utilised in Ayurveda primarily as an agent for general health and as an antifebrile medicine.

## MIMOSACEAE

**Acacia chundra** (Roxb. ex Rottl.) Willd., Sp. Pl. 4: 1078. 1806; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 524. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 133. 1983; Vajr., Fl. Palghat Dist. 185. 1990. *Mimosa chundra* Roxb. ex Rottl., Ges. Naturf. Freunde Berlin Neue Schriften 4: 207. 1803. *M. sundra* Roxb., Pl. Corom. 225. 1811. *Acacia sundra* (Roxb.) DC., Prodr. 2: 458. 1825; Baker in Hook. f., Fl. Brit. India 2: 295. 1878, *pro parte*; Gamble, Fl. Pres. Madras 428. 1919. **Karungali (I)**.

Trees to 10 m tall; branchlets glabrous, reddish. Leaves alternate, 6-15 cm long; pinnae 10-20 pairs, 1-2 cm long; leaflets 35-50 pairs, elliptic, 4 x 1 mm, glabrous, base oblique, margin entire, apex subacute; petiole to 2 cm long; rachis glabrous, with glands at the basal and the 2 uppermost pinnae; stipular thorns short, hooked, to 8 mm long. Spikes axillary, to 8 cm long, 1-3 in a cluster; peduncle to 2 cm long. Flowers 2 mm across. Calyx tube 5-lobed, 0.5 mm long, glabrous. Petals 5, white, villous. Stamens numerous, 3.5 mm long, basally connate. Ovary stipitate, falcate, to 1.5 mm across; style to 3 mm long. Pods stipitate, 10 x 2 cm, flat, thin, brown. Seeds c. 6, ovoid, to 6 mm wide.

*Fl. & Fr.*: June-September.

*Distribution*: Peninsular India, Sri Lanka and Myanmar. Dry-deciduous forest of puliappathy, c. 650 m; frequent. *HN 158*.

*Usage*: Wood is used for making handles of agricultural implements, and as firewood.

**Acacia leucophloea** (Roxb.) Willd., Sp. Pl. 4: 1083. 1806; Baker in Hook. f., Fl. Brit. India 2: 294. 1878; Gamble, Fl. Pres. Madras 427. 1919; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 527. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 135. 1983. **Vela Maram (I)**. Plate 9A.

Trees to 15 m tall; bark whitish yellow, branchlets velvety, thorny. Leaves alternate, to 6cm long; pinnae 7 pairs, 1-3.5 cm long; leaflets, to 30 pairs, elliptic, 2 x 0.5 mm, glabrous above, pubescent below, base oblique, margin ciliate, apex acute; petiole to 1cm long, glanded, glands opposite to 4 uppermost pinnae; rachis pubescent; thorns to 1 cm long, straight. Panicle terminal, to 30 cm long; flower heads to 7 mm across, 2-3 in a cluster, bracts minute; bracteoles in an involucre, in the middle of peduncle. Flowers 1 mm across, sessile. Calyx 5-lobed, tubular, to 1 mm long. Petals pale yellow, to 2 mm long. Stamens, to 30 numbers; filaments basally connate. Ovary to 0.5 mm across; style to 1 mm long. Pod sessile, flat, 12 x 1 cm, rusty-tomentose. Seeds to 10 numbers, angular.

*Fl. & Fr.*: September-January.

*Distribution*: Indo-Malesia. Dry-deciduous forest of Agali, c. 600 m; frequent. HN 157.

*Usage*: For treating fracture and muscular sprain in cattle or goats, the crushed bark is applied over the affected area. A piece of cloth immersed in Gingily oil and is wrapped over the affected part. For treating fracture, sliced bamboo pieces are placed on the area and tightly wrapped with the ropes taken from the bark of *Aacha* (*Bauhinia racemosa*). Keep the animal stall-fed for 21 days for complete cure. Take three litres of water in an earthen pot and put one kilogram of crushed bark in it. Tightly close the mouth with a cloth-piece and keep the pot in a dark place for nine days. Smash two *Poovanpazham* (bananas) and put into the pot and keep it in the same way for three days. Administer one ounce each to goat / calf and two ounce to cattle during the treatment period. The bark is used for brewing alcohol. Consumption of this gives relief from muscular as well as rheumatic pain and sprain.

**Acacia nilotica** (L.) Willd. ex Del., Descr. Egypte, Hist. Nat. III. 79. 1813. ssp. *indica* (Benth.) Brenan, Kew Bull. 12: 84. 1957; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 528. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 135. 1983; Vajr., Fl. Palghat Dist. 186. 1990. *Mimosa nilotica* L.

Sp. Pl. 521. 1753. *A arabica* Baker in Hook.f., Fl. Brit. India 2: 293. 1878, non (Lam.) Willd., 1808; Gamble, Fl. Pres. Madras 425. 1919. *A. arabica* Hook. f. var. *indica* Benth. in Hook's London J. Bot. Kew Gard. Misc. 1: 500. 1842. *Mimosa arabica* Lam., Encycl. 1: 19. 1183. **Karuvelam (I).**

Trees to 8 m tall; branchlets grey-pubescent; tender shoots reddish. Leaves alternate, to 4.5 cm long; pinnae 4 or 5 pairs, 1-3.5 cm long; leaflets, to 20 pairs, elliptic, glabrous, 4 x 1 mm, base oblique, obtuse, margin entire, apex rotund; petiole to 1 cm long, with a gland near the lowermost pinnae; rachis with several glands; stipular thorns straight, to 2 cm long. Flower heads globose, 1 cm across, solitary or 2-3 in an axillary cluster, c. 50 flowers per head; peduncle to 1.5 cm long; involucre of 2 bracteoles near or above the mid-peduncle. Flowers 1 cm across. Calyx-tube 5-toothed, 1 mm long. Petals 5, yellowish, 2.5 mm long. Stamens c. 70; filaments 5 mm long, basally connate. Ovary stipitate, terete, 1 mm across; style to 6 mm long. Pod stipitate, 18 x 1.5 cm. Seeds c. 13.

*Fl. & Fr.*: August-December.

*Distribution*: North India to North Africa through West Asia. Dry-deciduous forest of Puliapathy, c. 650 m; frequent. *HN 065*.

*Usage*: Small pieces of bark are chewed for curing toothache and related inflammation. Bark pieces are collected from a mature tree after scraping the outer skin. The bark is used in brewing alcohol; consumption of the same is considered as a general tonic for health.

**Acacia pennata** (L.) Willd., Sp. Pl. 4: 1090.1806; Baker in Hook. f., Fl. Brit. India 2:297. 1878; Gamble, Fl. Pres. Madras 429. 1919; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 530.1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 135. 1983; Manilal, Fl. Silent Valley 92. 1988; Vajr., Fl. Palakkad Dist. 186. 1990; V. S. Ramach. & V. J. Nair, Fl. Cannanore 168. 1988; Sasidh. & Sivar., Flow. Pl. Thrissur For. 167. 1996; Sivar. & P. Mathew, Fl. Nilambur 239. 1997. **Seenge (I).**

Prickly straggling shrubs. Leaves alternate, 7-14 cm long; pinnae c.14 pairs, 3.5-6 cm long; leaflets 40-50 pairs, 5 x 1 mm, elliptic, glabrous above, base truncate, margin ciliate, apex acute; petiole with a gland near the

middle; rachis obscurely prickled. Inflorescence a raceme, terminal and axillary, to 15 cm long. Flowers 3 mm wide. Calyx tube 5 lobed, 2.5 mm long. Petals creamy to 3 mm long. Pod stipitate, flat; 8-14 x 2-3 cm. Seeds c. 10.

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

*Distribution*: Paleotropics. Riverine forest of Mully, c. 700 m; rare. *HN 116*. Moist deciduous forests of Katirampathy, common; c. 700 m. *HN 213*.

*Usage*: Tender leaves are ground well and made into a poultice and put on the forehead for curing frequent headache. This is also effective for migraine, when applied in the early morning when the initial symptoms are expressed. Leaves are crushed and applied in stagnant water to stupefy fishes enabling easy catch.

***Acacia sinuata*** (Lour.) Merr., *Trans. Amer. Philos. Soc.* 24(2): 186. 1935; Britto in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 532. 1983; Vajr. in Nair *et al.*, *Fl. Tamilnadu* 1: 136. 1983; Vajr., *Fl. Palghat Dist.* 186. 1990; Sivar. & P. Mathew, *Fl. Nilambur* 168. 239. 1997. *Mimosa sinuata* Lour., *Fl. Cochinch.* 653. 1790. *M. concinna* Willd., *Sp. Pl.* 4: 1039. 1806. *Acacia concinna* (Willd.) DC., *Prodr.* 2: 464. 1825; Baker in Hook. f., *Fl. Brit. India* 2: 296. 1878; Gamble, *Fl. Pres. Madras* 429. 1919; Sasidh. & Sivar., *Flow. Pl. Thrissur For.* 1996. *A. concinna* var. *rugata* (Benth.) Baker in Hook. f., *Fl. Brit. India* 2: 297. 1878. *A. rugata* (Lam.) J. Voigt, *Hort. Suburb. Calc.* 263. 1845, non Benth., 1842; Gamble, *Fl. Pres. Madras* 429. 1919. **Sinikkai (I, K & M)**.

Straggling shrubs; branchlets apically yellowish-tomentose, basally glabrescent, warty; thorns hooked. Leaves alternate, to 10 cm long; pinnae 8-15 pairs, 1.5-4.5 cm; leaflets 15-35 pairs, linear, 3-5 x 2 mm, pubescent, base oblique, margin entire, apex obtuse, apiculate; petiole to 3 cm long, prickled below; gland dark coloured, attached below the middle of petiole; rachis prickled; glands opposite to 2 uppermost pinnae; stipules ovate. Flower-heads to 1 cm across, in terminal and axillary panicles, to 10 cm long; peduncle to 1 cm long; bracts ovate, to 5 mm long; bracteoles to 1 mm long. Flowers 2 mm across, sessile. Calyx-tube elongate, 5-lobed, 3 mm long. Petals 5, cream coloured, 3.5 mm long. Stamens numerous, to 4 mm long,

basally connate. Ovary stipitate, terete, 1 mm across, glabrous; style to 4.5 mm long. Pods indehiscent, to 10 cm long, surface shining.

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

*Distribution*: Indo-Malesia. Moist deciduous forest of Karuvara, c. 700 m; locally abundant. *HN 173*.

*Usage*: Mature fruits are collected and sold as an NTFP item. The dried fruits are pounded and utilised in the industrial sector mainly located in Tamilnadu for the preparation of detergents.

***Albizia amara*** (Roxb.) Boivin, Encyl. 19. 34. 1838; Baker in Hook. f., Fl. Brit. India 2: 381. 1878; Gamble, Fl. Pres. Madras 432. 1919; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 136. 1983; V. S. Ramach. & V. J. Nair, Fl. Cannanore 169. 1988. *Mimosa amara* Roxb., Pl. Corom. t. 122. 1799. *Acacia amara* Willd., Sp. Pl. 4: 1074. 1806. **Oonchal (I)**. Plate 9B.

Trees to 20 m tall. Leaves 12 x 9 cm; pinnae 9-13 pairs, 3-5 cm long; leaflets 20-25 pairs, narrow-elliptic, 8 x 2.5 mm, base subacute, margin sparsely ciliate, apex acute; petiole pubescent with gland above middle; rachis pubescent, glands opposite to uppermost pinnae. Inflorescence racemose; flowers 25-30 per head. Calyx companulate. Corolla dull-white coloured. Stamens many, united towards the base; filaments exerted. Pod flat, compressed, 8-20 x 2-3 cm, strongly nerved, straight or wavy along margins, indehiscent. Seeds ovoid, laterally compressed, to 0.5 cm wide.

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

*Distribution*: India, Sri Lanka and parts of East Africa. Dry-deciduous forests of Pattimalam, c. 600 m; locally abundant. *HN 163*.

*Usage*: The tender leaves are collected during February-March, dried in sunlight and powdered in wooden mortar and stored for the whole year. This powder is used for hair and body wash. Apply this powder over scalp as a hair-wash during bath, which gives coolness to head, cures dandruff and promotes hair growth. During excessive heat in summer, crushed bark is wrapped around the head for cooling effect and to prevent sudden hair loss. Continuous application of this for three days cures the summer-boils. Bark of this tree is crushed and tied externally for limp due to any damage of bone in

goats. The broken portion of leg of goats/ calves wrapped with the crushed bark is tightly covered by a cloth piece immersed in gingili oil. If required, a support with thin Bamboo pieces is also given. The goat is stall-fed for 21 days. Wood is used for making hoes. Mature leaves are crushed and added in stagnant water for easy catch of fishes by stupefying them.

**Albizia odoratissima** (L.f.) Benth. in Hook., Lond. J. Bot. 3: 88. 1844; Baker in Hook. f., Fl. Brit. India 2: 299. 1878; Gamble, Fl. Pres. Madras 431. 1919; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 539. 1983; Manilal, Fl. Silent Valley 93. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 170. 1988; Vajr., Fl. Palghat Dist. 187. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 173. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 168. 1996; Sivar. & P. Mathew, Fl. Nilambur 241. 1997; Mohanan & Sivad., Fl. Agasthyamala 236. 2002; *Mimosa odoratissima* L.f., Suppl. Pl. 437. 1781. *Acacia odoratissima* Willd., Sp. Pl. 4: 1063. 1806. **Billu maram (M)**.

Trees to 20 m tall; branchlets appressed-pubescent. Leaves 15-20 cm long; pinnae 3-5 pairs, 6-13 cm long; leaflets 6-15 pairs, oblong-elliptic, terminal ones obovate, 0.7-2.5 x 0.4-0.8 cm, puberulous or glabrescent, base oblique, truncate, margin entire, apex obtuse; petiole to 5 cm long, glabrous, with a discoid gland; rachis glabrescent, with gland opposite to uppermost pinnae; stipules caducous. Flower-heads to 1 cm across, in umbellate to corymbose panicles, to 15 cm long; peduncle to 2 cm long; bracts subulate, to 4 mm long. Flowers 4 mm across, sessile. Calyx-tube 5-lobed, 1 mm long, pubescent. Petals 5, cream coloured, to 5 mm long, pubescent without. Staminal tube to 3 mm long. Stamens numerous; filaments to 1 cm long. Ovary stipitate, to 2 mm across; style to 1 cm long. Pod sessile, compressed, flat, 15 x 3 cm, strongly nerved, drying black. Seeds 10-12, ovoid.

*Fl. & Fr.*: June-October.

*Distribution*: Indo-Malesia. Moist deciduous forest of Kurukkankundu, c. 750 m; frequent. *HN 262*.

*Usage*: A small piece of bark is ground with onion and administered to control vomiting.

Plate 9.



A. *Acacia leucophloea*. Inset: debarked tree



B. *Albizia amara*



C. *Dalbergia latifolia* - debarked



D. *Mundulea sericea*



E. *Pongamia pinnata*



F. *Vigna radiata* var. *sublobata*

**Entada rheedii** Spreng., Syst. Veg. 325. 1825; Vajr., V. S. Ramach. & V. J. Nair, Fl. Cannanore 170. 1988; Fl. Palghat Dist. 188. 1990; Sasidh. & Sivar., Flow. Pl. Thrissur For. 170. 1996; Sivar. & P. Mathew, Fl. Nilambur 243. 1997; Mohanan & Sivad., Fl. Agasthyamala 237. 2002. *E. pursaetha* DC., Prodr. 2: 425. 1825; Vajr. in Henry *et al.*, Fl. Tamilnadu 1: 138. 1983. *E. scandens* auct., non Benth., 1841: Baker in Hook. f., Fl. Brit. India 2: 287. 1878; Gamble, Fl. Pres. Madras 417. 1919. **Onthatti (M)**.

Tall woody climbers; branchlets glabrescent. Leaves alternate, bipinnate, to 11 cm long; pinnae 2 pairs, 4-11 cm; leaflets 4 pairs, evenpinnate, ovate, to 5 x 2.5 cm, chartaceous, glabrous, base subacute, margin entire, apex obtuse; petiole to 3 cm long, pulvinate; rachis grooved, tendril forked, hooked; petiolule to 3 mm long; stipules small, setaceous. Spikes pendulous, to 20 cm long, axillary, on lateral branchlets; peduncle to 8 cm long; bracts linear. Flowers polygamous, to 5 mm across. Bisexual: calyx-tube 5-toothed, campanulate, 0.8 mm long. Corolla 5, cream coloured, 4 cm long. Stamens 10, free; filaments apically dilated, subequal; anthers oblong, 3 mm long. Ovary stipitate; ovules many; style to 4 mm long; stigma minute. Male flowers: stamens to 7 mm long; anthers gland-crested. Pod elongate, flat, 75 x 8 cm, woody, valves splitting transversely into single seeded segments; seeds 8-12, ovoid, to 5 cm across, brownish.

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

*Distribution*: Indo-Malesia. Semi-evergreen forests of Mukkali, c. 550 m; rare. HN 252.

*Usage*: Seeds from mature pods are collected and washed in running water for seven days. The kernels of such seeds are boiled along with rice for lunch. It cures back-pain if consumed for a week.

**Pithecellobium dulce** (Roxb.) Benth. in Hook., London J. Bot. 3: 199. 1844; Baker in Hook. f., Fl. Brit. India 2: 302. 1878; Gamble, Fl. Pres. Madras 434. 1919; Britto in K. M. Mathew, Fl. Tamilnadu Carnatic 3: 548. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 139. 1983; Vajr., Fl. Palghat Dist. 189. 1990.

*Mimosa dulcis* Roxb., Pl. Corom. 1: 67. t. 99. 1798. *Inga dulcis* (Roxb.) Willd., Sp. Pl. 4: 1005. 1806. **Kodukkaapuli (I)**.

Trees to 15 m tall; armed; branchlets densely tomentose. Leaves alternate, bipinnate; pinnae 2 pairs; leaflets oblong-oblongeolate, 2-3.5 x 0.5-1.5 cm, inequilateral, glabrous, base and apex obtuse, margin entire; petiole to 1 cm long, with a solitary apical concave gland; petiolule to 1 mm long; stipular spines erect, to 2 cm long; Flower-heads in paniced spikes, terminal or axillary; 10 x 2 cm; peduncle to 2 cm long; bract small; bracteole close to calyx. Flowers 5 mm across, pentamerous. Calyx-tube 5-lobed, campanulate, 1 mm long, pubescent. Petals 5, cream coloured, to 4 mm long, connate in the middle, valvate, densely tomentose without. Staminal tube to 3mm long. Stamens numerous, monadelphous; filaments to 7 mm long. Ovary sessile, minute; ovules many; stigma minute. Pod strap-shaped, 8 x 1 cm, circinate, moniliform, turgid, dehiscent. Seeds orbicular, aril whitish.

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

*Distribution*: Native of tropical America; cultivated in the tropics. Hamlet premises of Guddayoor, often planted, c. 700 m; frequent. *HN 178*..

*Usage*: The ripe fruits are edible, highly relished by tribal people; seen planted around most of the hamlets.

***Prosopis juliflora* (Sw.) DC.**, Prodr. 2: 447. 1825; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 549. 1983. **Dillimaram (I)**.

Small trees to 8 m tall; crown spreading; branchlets glabrous; spines straight, axillary, to 1.5 cm long. Leaves alternate, bipinnate; pinnae 1 or 2 pairs, to 8 cm long; leaflets 15-18 pairs, oblong, 1-1.8 x 0.25-0.3 cm, inequilateral, glabrous, base and apex obtuse, margin entire; petiole to 3 cm long, prolonged above as a bristle; rachis with a solitary gland; stipules spinescent. Spikes axillary, 1-4 in a cluster; peduncle 1.5-2.5 cm long; bracteole linear, to 1.5 mm long; pedicel to 0.5 mm long. Flowers 1.5 mm across. Calyx-tube campanulate, 0.8 mm long, 5-toothed. Petals 5, cream coloured, 2.5 mm, pilose within, united below. Stamens 10, free; filaments 4.5 mm long. Ovary stipitate, to 2 mm across, pubescent; ovules many; style 2

mm long. Pod 18 x 0.8 cm, slightly curved, compressed, septate, pulpy inside, indehiscent. Seeds ovoid.

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

*Distribution*: Northern South America, Central America to Mexico and Antilles; widely naturalized in tropical Asia. Farm lands of Vattlakki, c. 600 m; frequent.

*HN 072.*

*Usage*: Fallen ripe fruits are collected and used as cattle feed. The wood and branches are used as firewood.

## MORACEAE

**Ficus exasperata** Vahl, Enum. 2: 197. 1806; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1520. 1983; Chithra in Henry *et al.*, Fl. Tamilnadu 2: 253. 1987; Manilal, Fl. Silent Valley 259. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 432. 1988; Vajr., Fl. Palghat Dist. 447. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 431. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 429. 1996; Sivar. & P. Mathew, Fl. Nilambur 665. 1997; Mohanan & Sivad., Fl. Agasthyamala 632. 2002. *F. asperrima* Roxb., Fl. Ind. 3: 554. 1832; Hook. f., Fl. Brit. India 5:522. 1888; Fischer in Gamble, Fl. Pres. Madras 1366. 1928. **Parisu (M), Chagare (I).**

Small trees to 10 m tall; all parts rugose. Leaves alternate, upper ones opposite, subdistichous, broadly oblong-elliptic, 12-20 x 7-10 cm, hairy at both sides, base rounded to acute, margin entire to sparingly toothed, apex acute to shortly acuminate; petiole to 3 cm long, glandular at the basal nerve-axile; stipules paired. Figs dioecious, axillary, solitary, globose or ellipsoid, to 1.5 cm diameter, pubescent without, ripening to yellow; peduncle to 1.5 cm long; bracts 2-3, lateral; internal bristles copious, white coloured, shorter than flowers. Tepals 3-6, free, linear-spathulate, white-hairy. Male: ostiolar, 1-2-seriate. Stamen 1; filament 0.5 mm long; anther oblong, parallel, 0.8 mm long. Female: sessile. Ovary obovoid, 0.4 mm across; style filiform, 0.8 mm long; stigma obscurely bifid. Achenes oblong, to 9 mm long, slightly keeled, reticulate.

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

*Distribution:* East Africa, Arabia, India and Sri Lanka. Moist deciduous forest of Kathirampathy, c. 700 m; frequent. *HN 210*.

*Usage:* Stem is employed in the making of flute. This plant also so called as *Kugal chagare*.

**Ficus hispida** L. f., Suppl. Pl. 442. 1781; Hook. f., Fl. Brit. India 5: 522. 1888; Fischer in Gamble, Fl. Pres. Madras 1367. 1928; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1522. 1983; Chithra in Henry *et al.*, Fl. Tamilnadu 2: 254. 1987; Manilal, Fl. Silent Valley 259. 1988; Vajr., Fl. Palghat Dist. 477. 1990; V. S. Ramach. & V. J. Nair, Fl. Cannanore 432. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 433. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 429. 1996; Sivar. & P. Mathew, Fl. Nilambur 666. 1997; Mohanan & Sivad., Fl. Agasthyamala 633. 2002. *F. oppositifolia* Roxb., Pl. Corom. t. 124. 1799. *F. daemonia* J. Koenig ex Vahl, Enum. Pl. 2: 198. 1806. **Tunali (M)**.

Trees to 8 m tall; branchlets hispid. Leaves decussate, often in unequal pairs, broadly oblong to elliptic-lanceolate, 18 x 10 cm, coriaceous, glaucescent above, hispid below, scabrid on both sides, base truncate to rounded, margin entire or minutely toothed, apex abruptly acute; petiole with a subnodal gland, to 4 cm long; stipules lanceolate, to 1 cm long. Figs dioecious, on special shoots and on branchlets, depressed-globose, base narrowed, 2-2.5 cm across, ripening to yellow, sticky-pubescent without; peduncle stout, 0.5 cm long; bracts triangular, to 2 mm long; orifice raised, closed by 5-6 apical bracts. Perianth cupular, truncate, to 2 mm long, glabrous, ostiolar, 2-seriate. Stamen 1, sub-sessile; anther oblong, parallel, unequal, to 1 mm long, sessile or stalked. Ovary depressed-globose, 0.7 mm wide; style 1.5 mm long, hairy, tip clavate. Gall flowers similar, but larger, distinctly stalked. Achenes lenticular, 1.5 mm long, keeled, with prominent hilum.

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

*Distribution:* Indo-Malesia to Australia. Moist deciduous forest of Siruvani, c. 750 m; frequent. *HN 348*.

*Usage:* Leaves are given to cattle along with the leaves of *Moongil* (*Bambusa bambos*) as feed, soon after delivery, for the easy falling of placenta.

**Ficus racemosa** L., Sp. Pl. 1060. 1753; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1526. 1983; Chithra in Henry *et al.*, Fl. Tamilnadu 2: 255. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 433. 1988; Vajr., Fl. Palghat Dist. 448. 1990; Sasidh. & Sivar., Flow. Pl. Thrissur For. 430. 1996; Sivar. & P. Mathew, Fl. Nilambur 668. 1997; Mohanan & Sivad., Fl. Agasthyamala 635. 2002. *F. glomerata* Roxb., Pl. Corom. t. 123. 1799; Hook. f., Fl. Brit. India 5: 535. 1888. **Athimaram (I)**.

Trees to 20 m tall; branchlets white-pilose. Leaves oblanceolate, to 18 x 6 cm, glaucous above, glabrous below, base rounded to acute, margin entire, apex acute; petiole glandular at the basal nerve-axils, 3-5 cm long; stipules lanceolate, 1-1.5 cm long. Recaptacles monoecious, cauliflorous, subglobose, 1.5-2.5 cm across, fig-wall thick, soft, ripening reddish yellow; peduncle to 7 mm long; Perianth shortly cupular; pedicel to 3 mm long. Stamens 2, exserted; filaments connate below. Ovary sessile, brownish, 1.5 mm across; style to 3 mm long.

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

*Distribution:* Indo-Malesia to Australia. Kathirampathy hamlet premises, c. 650m; frequent. *HN 268*.

*Usage:* Bark is used for curing leucorrhoea. A piece of bark of about 6 square inch size is collected and a decoction is prepared in two glasses of water reduced to half, which is administered in the morning and evening. The process is continued for one month (instead of fresh bark, dried bark powder can be used for the same purpose). Equal quantity of dried bark powder and *Nellikai* (*Phyllanthus emblica*) mixed in honey is given twice a day for three weeks to anaemic patients to increase blood production. Half-mature fruits are used in culinary preparations. Fruits are boiled first, crushed and fried with coconut oil and salted.

**Ficus religiosa** L., Sp. Pl. 1059. 1753; Roxb., Fl. Ind. 3: 547. 1832; Hook. f., Fl. Brit. India 5: 513. 1888; Fischer in Gamble, Fl. Pres. Madras

1363. 1928; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1527. 1983; Chithra in Henry *et al.*, Fl. Tamilnadu 2: 255. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 434. 1988; Vajr., Fl. Palghat Dist. 450. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 433. 1994. **Aale maram (I).**

Trees to 30 m tall. Leaves broadly ovate, 5-13 x 4.5-12 cm, coriaceous, base truncate, margin sinuate, apex abruptly acuminate, cusp to 8 cm long; petiole to 12 cm long, glandular at the apex; stipules ovate-lanceolate, to 1.5 cm long. Receptacles monoecious, axillary, sessile, globose, 4-6 mm across, ripening to dark pink; fig-wall thick; basal bracts cupular, to 4 mm long, margin truncate, puberulous, persistent. Male: Sessile. Tepals 2, free, 0.7 mm long. Stamen 1; filament 0.2 mm long. Female: Sessile. Tepals 3-4, free, linear, 1 mm long, brownish, glabrous. Ovary oblong, 1 mm across, reddish brown; style 1.5 mm long, dilated above.

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

*Distribution:* East Himalayas; planted and naturalised in India and neighbouring countries. Riverine forest at Thavalam, c. 650m; rare. *HN 276.*

*Usage:* The ash of burned young shoots is mixed in gingelly oil and applied externally over scurf regularly until it cures. The same mixture is applied over bee-stings to reduce inflammation and pain. The prop roots are cut into small pieces and boiled in coconut oil and applied over scalp regularly for enhancing hair growth.

**Streblus asper** Lour., Fl. Cochinch. 615. 1790; Hook. f., Fl. Brit. India 5: 489. 1888; Fischer in Gamble, Fl. Pres. Madras 1353. 1928; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1534. 1983; Chithra in Henry *et al.*, Fl. Tamilnadu 2: 256. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 434. 1988; Vajr., Fl. Palghat Dist. 450. 1990; Sasidh. & Sivar., Flow. Pl. Thrissur For. 430. 1996; Sivar. & P. Mathew, Fl. Nilambur 672. 1997. **Siruchagare (I).**

Small trees to 8 m tall; dioecious; branches stiff. Leaves elliptic-obovate, 9 x 3.5 cm, scabrid, base cuneate, margin toothed, apex acute; petiole, to 0.4 cm long; stipules caducous. Male flowers: in stalked clusters; peduncle to 1 cm long. Tepals 4, free, lanceolate, concave, 2.5 mm long,

puberulous without, subacute. Stamens 4; filaments 2.5 mm long. Female flowers stalked; stalk, to 1 cm long, elongating in fruit; bracts and bracteoles ovate, 2.5 mm long, puberulous, obtuse. Tepals 4, ovate, concave, 4 mm long, puberulous, subacute. Ovary ovoid, 3 mm across; style to 9 mm long. Drupe enclosed by enlarged perianth.

*Fl. & Fr.*: October-March.

*Distribution*: India, China and Malesia. Dry-deciduous forests of Vattlakki, c. 600 m; frequent. *HN 166*.

*Usage*: Leafy shoots are collected to feed goats.

## MORINGACEAE

***Moringa pterygosperma*** Gaertn., *Fruct.* 2: 314. 1791; Hook. f., *Fl. Brit. India* 2: 45. 1876; Srinivasan in Nair *et al.*, *Fl. Tamilnadu* 1: 90. 1983; Vajr., *Fl. Palghat Dist.* 140. 1990. *M. oleifera* auct., non Lam., 1785 : Gamble, *Fl. Pres. Madras* 269. 1918; K. M. Matthew & Britto in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 314. 1983. ***Moringa maram* (f).**

Trees to 10 m tall, wood soft, bark corky. Leaves imparipinnate, tripinnate, to 50 cm long; leaflets elliptic obovate, glaucous below, base rotund, margin entire, apex rounded; petiole to 8 cm long, pulvinate. Flowers in terminal or axillary, lax, divaricate panicles, to 20 cm long,. Bracts and bracteoles small, linear. Flowers 1.5 cm. across. Calyx lobes 5, oblong, subequal, to 1.5 cm long. Petals 5, creamy-white coloured, unequal. Disc small. Stamens inserted on the disc, fertile-5; filaments pubescent. Ovary stipitate; ovules many. Fruits elongate, 3-valved, corky, pitted inside. Seeds globose, winged.

*Fl. & Fr.*: November-March.

*Distribution*: Cultivated in India and other tropical countries. Planted in the farm lands of Koodappetty, c. 600 m; frequent. *HN 130*.

*Usage*: Fresh bark is crushed and a decoction is prepared which is given to reduce obesity. About 6 sq.inch of bark is crushed and boiled in two glasses of water, reduced to half and administered equally in morning and evening. Treatment is suggested for one month.

## MYRSINACEAE

**Embelia tsjeriam-cottam** (Roem. & Schult.) DC., Trans. Linn. Soc. London 17: 131. 1834; Gamble, Fl. Pres. Madras 753. 1921; Chithra in Henry *et al.*, Fl. Tamilnadu 2: 60. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 392. 1994; Mohanan & Sivad., Fl. Agasthyamala 566. 2002. *Ardisia tsjeriam-cottam* Roem. & Schult., Syst. 4: 518. 1819. *Embelia robusta* sensu Clarke in Hook. f., Fl. Brit. India 3: 515. 1882, non Roxb., 1820. **Kotte (M)**.

Shrubs to 1.5 m high; young stem densely brown pubescent. Leaves 3-8 x 2-4.5 cm, elliptic-obovate, caudate acuminate at apex, attenuate at base, slightly dentate on margins, punctate above. Racemes, 4-6 cm long. Peduncle brown pubescent. Bracts minute, subulate, pubescent. Pedicel to 2.5 mm long. Calyx tube minute; lobes to 1 mm across, triangular. Corolla lobes to 2.5 mm long, glabrous, punctate without. Ovary globose. Seeds globose, to 3 mm wide.

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

*Distribution*: India and Myanmar. Moist deciduous forest of Mukkali, c. 550 m; frequent. *HN 297*.

*Usage*: Eating of some kind of fish upset digestion and make the bowel blackish. In such situation, a small piece of root ground into a paste and administered single-time give relief to the bowel problems.

## MYRTACEAE

**Syzygium cumini** (L.) Skeels, U. S. Dept. Agri. Bur. Pl. Industr. Bull. 248: 25. 1912; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 594. 1983; Chithra in Nair *et al.*, Fl. Tamilnadu 1: 156. 1983; Manilal, Fl. Silent Valley 188. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 181. 1988; Vajr., Fl. Palghat Dist. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 188. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 181. 1996; Sivar. & P. Mathew, Fl. Nilambur 262. 1997; Mohanan & Sivad., Fl. Agasthyamala 261. 2002. *Myrtus cumini* L., Sp. Pl. 471. 1753. *Eugenia jambolana* Lam., Encycl. 3: 198. 1789; Roxb., Fl. Ind. 2: 484. 1832; Hook. f.,

Fl. Brit. India 2: 499. 1879. *Syzygium jambolanum* (Lam.) DC., Prodr. 3: 259. 1828; Gamble, Fl. Pres. Madras 481. 1919. **Naave (I, K & M)**.

Trees to 25 m tall; branchlets glabrous. Leaves decussate, ovate-lanceolate, 5-12 x 2.5-6.5 cm, coriaceous, glabrous, glossy above, base cuneate-obtuse, margin entire, apex acuminate; petiole to 2 cm long. Cymes paniced, axillary or terminal, to 10 cm long; peduncle 4 cm long; pedicel to 4 mm long. Flowers 1 cm across. Calyx-tube turbinate, 2 mm long, glabrous; lobes 4, obscure. Petals 4, cream coloured, orbicular, 2.5 mm wide, concave, connate into calyptra. Stamens numerous; filaments subulate, 2-5 mm long. Ovary 2 mm across, 2-celled; ovules many per cell; style subulate, to 5 mm long. Berry globose, deep violet when ripe. Seed solitary.

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

*Distribution*: Indo-Malesia. Riverine forest of Thoova, c. 700 m; frequent. *HN 188*.

*Usage*: Fruits are edible when ripe, largely available in summer months.

## NYCTAGINACEAE

**Boerhavia diffusa** L., Sp. Pl. 3. 1753; Gamble, Fl. Pres. Madras 1162. 1925; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1287. 1983; Kumari in Henry *et al.*, Fl. Tamilnadu 2: 188. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 373. 1988; Vajr., Fl. Palghat Dist. 383. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 373. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 366. 1996; Sivar. & P. Mathew, Fl. Nilambur 556. 1997. *B. repens* L., Sp. Pl. 3. 1753; Hook. f., Fl. Brit. India 4: 709. 1885. *B. procumbens* Banks ex Roxb., Fl. Ind. 1: 148. 1820. **Serende (I)**.

Diffuse herbs with rootstock. Leaves ovate, chartaceous, glabrous below, base cordate, margin entire, apex obtuse to acute; 1.2-4 x 1-3.5 cm; petiole to 3 cm long. Panicles axillary and terminal, to 8 cm long, many flowered. Perianth deep pink coloured, 4 mm wide. Stamens 2 or 3, filaments 3 mm long. Ovary stalked; style as long as filaments; stigma peltate. Anthocarp club-shaped, 2.5 mm long, glandular-hairy, top rounded.

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

*Distribution:* South Asia. Open areas in the Dry-deciduous forest of Mully, c. 700 m; frequent. *HN 004*.

*Usage:* The root-paste is externally applied over the wounds caused by the attack of wild boar. Wounds will heal soon without causing infection. Leaves are used as a vegetable.

## OXALIDACEAE

**Biophytum reinwardtii** (Zucc.) Klotzsch in Peters, *Reise Mossamb.* Bot. 1: 85. 1862; Edgew. & Hook. f. in Hook. f., *Fl. Brit. India* 1: 437. 1874; Gamble, *Fl. Pres. Madras* 133. 1915; Vajr. in Nair *et al.*, *Fl. Tamilnadu* 1: 50. 1983; V. S. Ramach. & V. J. Nair, *Fl. Cannanore* 76. 1988; Vajr., *Fl. Palghat Dist.* 98. 1990; Mohanan & Henry, *Fl. Thiruvananthapuram* 95. 1994; Sasidh. & Sivar., *Flow. Pl. Thrissur For.* 76. 1996; Mohanan & Sivad., *Fl. Agasthyamala* 126. 2002. *Oxalis reinwardtii* Zucc., *Abh. Akad. Munch.* 1: 274. 1829-1830. **Suryakalchappu (M)**.

Small erect herbs to 15 cm high; stem unbranched. Leaves with rachis 1.5-8 cm long; leaflets 5-15 pairs, basal smaller, 0.3 x 0.2 cm, ovate; upper ones 0.8 x 0.5 cm, oblong, oblique at base, sparsely ciliate on margins; rachis hirsute. Umbels many flowered. Peduncles slender, 2-10 cm long, pubescent. Bracts 2 mm long, lanceolate, pubescent outside. Pedicels 3-5 mm long, longer than bracts. Sepals 3-4 mm long, lanceolate, hairy outside. Corolla yellow, funnel shaped, lobes 4-5 mm long, ovate-lanceolate. Capsule 3 mm long, ovoid. Seeds minute, ovoid.

*Fl. & Fr.:* August-December.

*Distribution:* Indo-Malesia and China. Moist deciduous forest of Mukkali, c. 550 m; locally abundant. *HN 287*.

*Usage:* An oil is prepared by taking equal quantities of whole plant of this along with *Sivalikkodi* (*Rubia cordifolia*) which is believed to have a 'power' in enticing girls.

**Oxalis corniculata** L., *Sp. Pl.* 435. 1753; Hook. f., *Fl. Brit. India* 1: 436. 1874; Gamble, *Fl. Pres. Madras* 132. 1915; K. M. Matthew & Britto in K.

M. Matthew, Fl. Tamilnadu Carnatic 3: 190. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 51. 1983; V. S. Ramach. & V. J. Nair, Fl. Cannanore 77. 1988; Vajr., Fl. Palghat Dist. 98. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 96. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 76. 1996; Sivar. & P. Mathew, Fl. Nilambur 115. 1997; Mohanan & Sivad., Fl. Agasthyamala 128. 2002. **Puli daagu (I)**.

Diffuse herbs; branchlets creeping, rooting at nodes, softly pilose. Leaves digitately 3-foliolate; leaflets obcordate, sparsely pubescent, 0.5-1.5 x 0.8-1.7 cm, pilose, base cuneate, margin entire, apex emarginate; petiole to 2.5 cm long. Pseudo-umbels axillary, 1-6 flowered, pilose; peduncle 3-12 cm long; bracts 2, linear, to 4 mm long; bracteole to 2 mm long; pedicel 0.5-1.5 cm long. Flowers l. 8 mm across. Sepals 5, ovate, to 2.5 mm long. Petals yellow coloured, oblanceolate, 6 x 3 mm, puberulous without, apex emarginate or obtuse. Staminal tube to 1.5 mm long. Stamens 10; filaments unequal, 2.5 and 3.5 mm long. Ovary 5-celled; ovules many per cell; style to 1.8 mm long. Capsule oblong, to 1.5 cm long, abruptly tapering above, puberulous. Seeds many per locule, ovoid or ellipsoid, transversely ridged.

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

*Distribution*: Cosmopolitan. Waste lands of Kathirampathy, c. 650 m; frequent. HN 209.

*Usage*: Leaves are ground along with coconut, salt and cumin seeds, and a chutney is prepared for consumption as a side dish.

## PAPAVERACEAE

**Argemone mexicana** L., Sp. Pl. 508. 1753; Hook. f., & Thoms. in Hook. f., Fl. Brit. India 1: 117. 1872; Dunn in Gamble, Fl. Pres. Madras 35. 1915; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 29. 1983; Srinivasan in Nair *et al.*, Fl. Tamilnadu 1: 8. 1983; Vajr., Fl. Palghat Dist. 54. 1990. **Sulli (I)**.

Prickly herbs to 1 m high; latex yellow. Leaves oblong or obovate, 9-11 x 4-5.5 cm, chartaceous, glaucous; margin spinulose-dentate, base sub-amplexicaule, sessile. Flowers terminal, solitary, to 5.5 cm across; pedicel to

6 mm long. Bracts leafy. Sepals 1 x 0.8 cm. Petals 3+3, golden-yellow coloured, obovate; outer ones 2.5 x 1.5 cm; inner ones 3 x 2 cm, cuneate, entire, obtuse. Stamens c. 50; filaments to 3 cm long. Ovary 1.5 x 0.6 cm, 1-celled; ovules 5- 7; stigma sub-sessile, purple coloured. Capsule oblong, to 4.5 x 2 cm, spinous. Seeds many, to 2 mm wide, blackish.

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

*Distribution*: Native of West Indies; now widely naturalized in the tropics. Dry-deciduous forests of Thekkumukkiyur, c.600m; common. *HN 194*.

*Usage*: A drop of latex is taken in the tip of fore-finger and smeared gently around the eyelids before going to bed for curing the pain around eyes. Care should be taken to avoid its contact inside the eyes. The latex is applied over the buds of syphilis, to subside.

## PAPILIONACEAE

***Abrus precatorius*** L., *Syst. Nat.* ed. 12, 472. 1767; Baker in Hook. f., *Fl. Brit. India* 2: 175. 1876; Gamble, *Fl. Pres. Madras* 349. 1918; Britto in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 333. 1983; Vajr. in Nair *et al.*, *Fl. Tamilnadu* 1: 90. 1983; Vajr., *Fl. Palakkad Dist.* 145. 1990; Mohanan & Henry, *Fl. Thiruvananthapuram* 133. 1994; Sasidh. & Sivar., *Flow. Pl. Thrissur For.* 129. 1996; Sivar. & P. Mathew, *Fl. Nilambur* 173. 1997. **Kunni (I)**.

Stragglers. Leaves 10 x 15 cm, even-pinnate; leaflets 10-13 pairs, 1-2 x 0.5-0.8 cm, opposite, oblong, glabrous above, obtuse at both ends, margin entire, apex apiculate; petiole to 1cm long; stipules linear, to 2.5 mm long. Inflorescence a pseudo-raceme, to 10 cm long; peduncle to 5cm long. Flowers 1 cm across. Calyx-tube narrowly campanulate, apex truncate. Corolla exerted, dull white; standard ovate, wings oblong, keels curved. Stamens 9. Ovary sub-sessile, pubescent; ovules many. Pod 4.5 x 1cm, pilose, thin-septate, wrinkled. Seeds subglobose, creamy, very hard.

*Fl. & Fr.*: August-November.

*Distribution*: Pantropical. Dry-deciduous forests of Chavadiyoor, c. 600 m; rare. *HN 273*.

*Usage:* An aqueous extract of root is administered for stomach pain, especially in children. A piece of root, about 3- 5" length, is ground well in water, filtered and consume. Single dose application is usually suggested.

**Butea monosperma** (Lam.) Taub. in Engl.& Prantl, Pflanzenfam. 3(3): 368. 1894; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 344. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 93. 1983; V. S. Ramach. & V. J. Nair, Fl. Cannanore 127. 1988; Vajr., Fl. Palghat Dist. 147. 1990; Sivar. & P. Mathew, Fl. Nilambur 205. 1997. *Erythrina monosperma* Lam., Encycl. 1: 391. 1785. *Butea frondosa* Koen. ex Roxb., Asiat. Res. 3: 369. 1792; Baker in Hook. f., Fl. Brit. India 2: 194. 1876; Gamble, Fl. Pres. Madras 357. 1918. *Plaso monosperma* (Lam.) Kuntze, Rev. Gen. Pl. 1: 102. 1891. **Saanthuviri (I).**

Trees to 10 m tall; branchlets densely tomentose. Leaves trifoliate; leaflets 15 x 12 cm, broadly ovate, coriaceous, glabrous above, sericeous below, base cuneate, margin entire, apex obtuse, retuse; petiole to 20 cm long; petiolule to 0.5 cm long. Racemes to 30 cm long; flowers clustered at the nodes of rachis; pedicel to 3 cm long. Flowers 5 cm across. Calyx-tube 1 cm long, velvety; upper lobes connate, lower deltoid. Corolla reddish-orange; standard lanceolate, 5.5 x 2.5 cm, silky-pubescent without, claw 0.8 cm long; wings falcate, 4.5 x 1.5 cm, adnate to keel; keels 7 x 2 cm, incurved, beaked, claw 1 cm long. Staminal sheath 6 cm long, thick, curved; filaments 2 cm long. Ovary 2.5 cm across; ovules 2; style 4 cm long. Pods 16 x 5 cm, long stalked, pubescent. Seeds compressed, pale brown.

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

*Distribution:* Tropical Asia. Riverine forest of Mully, c. 700 m; rare. *HN.* 172; Moist deciduous forests of Katirampathy, c. 700 m; common. *HN.* 213.

*Usage:* Poles are used in hut-construction. Smooth, durable and beautiful poles are the attraction for this species.

**Cajanus cajan** (L.) Millsp., Publ. Field Columbian Mus. Bot. ser. Chicago 2: 53. 1900; Britto in K. M. Matthew, Fl. Tamilnadu Camatic 3: 345. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 93. 1983; Vajr., Fl. Palghat Dist. 177.1990; Sivar. & P. Mathew, Fl. Nilambur 206. 1997. *Cystisus cajan* L., Sp.

Pl. 739. 1753. *Cajanus indicus* Spreng., Syst. Veg. 3: 248. 1826; Baker in Hook. f., Fl. Brit. India 2: 217. 1876; Gamble, Fl. Pres. Madras 369. 1918. **Tumare (I, K & M).**

Shrubs to 3 m high; branchlets silky-pubescent. Leaves 3-foliolate to 14 cm long; leaflets oblong, 4-8 x 1-3 cm, chartaceous, velvety-pubescent below, base cuneate-subacute, margin entire, apex acute-acuminate, apiculate; petiole to 2 cm long; petiolule to 4 mm long; stipules subulate, 2 mm long. Inflorescence of terminal panicles and axillary racemes, to 20 cm long; bracts ovate, to 8 mm long, deciduous; pedicel to 1.5 cm long. Calyx-tube velvety-pubescent, 3.5 mm across; Corolla exserted, yellow coloured; standard suborbicular, to 1.2 cm long; wings narrow; keels 1 cm long. Stamens 9 + 1; anthers uniform. Ovary to 6 mm, woolly; ovules 4-6; style to 5 mm long, pubescent; stigma capitate. Pod linear-oblong, 8 x 1 cm, puberulous, stiff-horned. Seeds 4-6 per pod, ovoid-oblong, to 8 mm wide.

*Distribution:* World wide. Farm lands of Pattimalam, c. 600 m; frequent. *HN 095.*

*Usage:* Cultivated for seeds; threshed, sun dried and stored or sold. Selling of *Tumare* is one of the major sources of income for all the tribal people in Attappady. Majority of dishes are prepared in the cooked *Tumare*, by adding vegetables, especially leafy items.

**Clitoria ternatea** L., Sp. Pl. 753. 1753; Baker in Hook. f., Fl. Brit. India 2: 208. 1876; Gamble, Fl. Pres. Madras 365. 1918; Britto in K. M. Matthew, Fl. Tamilnadu Camatic 3: 350. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 95. 1983; Vajr., Fl. Palghat Dist. 148. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 137. 1994. **Sangu pushpam (I).**

Vines; branchlets appressed-tomentose. Leaves odd. pinnate, 9 x 6 cm; leaflets 2 or 3 pairs, opposite, ovate, 2.5-4 x 1.5-2.5 cm, base and apex obtuse, margin entire; petiole to 1.5 cm long; petiolule 3 mm long; stipules striate, to 2.5 mm long, persistent; stipels subulate, to 1 mm long. Flowers 3 cm across, axillary, solitary; bracts to 1.5 mm long; bracteoles orbicular, 1 cm long, persistent; pedicel 1 cm long. Calyx-tube to 7 mm long, membranous;

upper lobes subconnate, to 6 mm long; lower one to 1 cm long. Corolla exserted, deep blue; petals clawed; standard obovate, 4.5 x 2.5 cm, base attenuate, apex round, retuse; wings oblong, falcate, 2.5 x 1 cm, adnate to keel; keels obovate, incurved, 2 x 0.5 cm. Staminal sheath to 1.2 cm. Stamens 9+1; filaments unequal, 4 and 5 mm long; anthers uniform. Ovary stipitate, 7 mm across, tomentose; ovules many; style to 1 cm long, curved, apex dilated. Pod linear, oblong, to 9 cm long, compressed, apically beaked. Seeds 10-15, reniform, 7 x 5 mm.

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

*Distribution*: Widely cultivated in the tropics; probably a native of South America. Waste lands of Narasimukku, c. 650 m; frequent. *HN 192*.

*Usage*: The paste of the roots smeared all over the body of those suffering from jaundice for three successive days. This treatment is suggested for the patients showing the symptom of yellowish skin, in addition to the oral treatment (see *Phyllanthus amarus* for more details).

**Dalbergia lanceolaria** L.f., Suppl. Pl. 316. 1781. ssp. **paniculata** (Roxb.) Thoth., Bull. Bot. Surv. India 25: 171. 1985. *Dalbergia paniculata* Roxb., Pl. Corom. t. 114. 1799; Hook. f., Fl. Brit. India 2: 236. 1876; Gamble, Fl. Pres. Madras 383. 1918; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 385. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 103. 1983. **Boovare (I)**.

Trees to 15 m tall; branchlets densely pubescent. Leaves 13 x 8 cm; leaflets 5-6 pairs, alternate, oblong-obovate, 2-4 x 1-2.5 cm, chartaceous, base cuneate-obtuse, margin entire, apex obtuse; petiole to 2 cm long, pubescent; petiolule 3 mm long. Panicles terminal and sometimes axillary on new shoots, 15 x 7 cm; peduncle 2 cm long, pubescent; pedicel 3 mm long. Flowers 1 cm across. Calyx-tube 4 mm long, rusty-tomentose; lobes unequal, ciliate. Corolla white, tinged with pink; standard ovate-oblong, to 1 x 0.5 mm; wings 8 x 3 mm; keels 7 x 3 mm. Staminal sheath 5 mm long. Stamens 5+5; filaments 3 mm long. Ovary 3 mm across, glabrous; style 2 mm long. Pod shortly stipitate, lanceolate, 7 x 1.5 cm. Seed 1 or rarely 2.

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

*Distribution:* India and Myanmar. Dry-deciduous forests of Vatlakki, c. 600 m; rare. *HN 066*.

*Usage:* A handful of leaves is put in a fireplace for sometime, crushed well and pressed on the crown of head for some time. This causes the release of accumulated phlegm and gives relief to cold and giddiness. Used as firewood and also for making coffins among some clans of *Irulas*.

***Dalbergia latifolia*** Roxb., Pl. Corom. t. 113. 1799; Baker in Hook. f., Fl. Brit. India 2: 231. 1876; Gamble, Fl. Pres. Madras 383. 1918; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 384. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 103. 1983; Manilal, Fl. Silent Valley 154. 1988; Vajr., Fl. Palghat Dist. 154. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 144. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 137. 1996; Sivar. & P. Mathew, Fl. Nilambur 185. 1997; Mohanan & Sivad., Fl. Agasthyamala 200. 2002. **Eetty (M)**. Plate 9C.

Trees to 25 m tall. Leaves 10-20 cm long; leaflets 3-4 pairs, obovate-orbicular, 3.5-5 x 3-4.5 cm, glabrous above, puberulous below, base subacute, margin entire, apex rotund, retuse; petiole to 9 cm long, pulvinate. Panicles to 9 cm long, axillary; peduncle 1 cm long; pedicel 1 mm long. Flowers 4 mm across. Calyx-tube 4 mm long; lobes subequal, to 1.5 mm long. Corolla purplish white, petals clawed; standard obovate, 6 x 3.5 mm; wings 6 x 2 mm; keels 5.5 x 3.5 mm. Stamens 9, monadelphous, filaments to 2 mm long. Pod oblong-lanceolate, 9.5 x 2 cm. Seeds 1-3.

Fl. & Fr.: April-October.

*Distribution:* Indo-Malesia. Moist deciduous forests of Mukkali, c. 550 m; frequent. *HN 197*.

*Usage:* Pieces of bark with the whole plant of *Nikadi kodi* (*Clematis gouriana*), bark of *Aame* (*Trema orientalis*) and some other special herbs are crushed together and mixed in water. This is given for patients suffering from blood cancer and similar malignant diseases. Wood is used for making handles of agricultural implements. The wood is considered as the best firewood, but emit more smoke on combustion.

**Desmodium gangeticum** (L.) DC., Prodr. 2: 327. 1825; Hook f., Fl. Brit India 2: 168. 1876; Gamble, Fl. Pres. Madras 244. 1918; Britto in K. M. Mathew, Fl. Tamilnadu Carnatic 3: 394.1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 106. 1983; V. S. Ramach. & V. J. Nair, Fl. Cannanore 137. 1988; Vajr., Fl. Palghat Dist. 157. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 146. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 139. 1996; Sivar. & P. Mathew, Fl. Nilambur 193. 1997; Mohanan & Sivad., Fl. Agasthyamala 137. 2002. *Hedysarum gangeticum* L., Sp. Pl. 746. 1753. *H. collinum* Roxb., Fl. Ind. 3: 439. 1832. **Ottele (M)**.

Subshrubs to 1 m high; branchlets sericeous. Leaves oblong-obovate, 4-10 x 2-5 cm, puberulous above, appressed-tomentose below, base obtuse-subacute, margin entire, apex acute, apiculate; petiole to 2 cm long; stipules narrowly ovate, scarious, 1 cm long; stipels 6 mm long. Racemes terminal and axillary, to 20 cm long; peduncle 5 cm long; primary bracts linear, to 3 mm long; secondary bracts to 1.5 mm long; pedicel to 4 mm long. Flowers 3 mm across. Calyx-tube 4 lobed, unequal, to 1- 2 mm long. Corolla lilac coloured; standard broadly obovate, 5 mm long; wings 3 mm long; keels 4 mm long. Staminal sheath 3.5 mm long. Stamens 9 + 1. Ovary sessile, 3 mm across; ovules c. 8; style 1.5 mm long. Pod to 2 cm long; articles 5 or 6, broadly oblong, hooked-pubescent; seeds 2 mm wide.

*Fl. & Fr.*: November-February.

*Distribution*: Paleotropics. Moist deciduous forests of Pothupadi, c. 750 m; common. *HN 042*.

*Usage*: Sun-dried leaves are powdered and mixed in coconut oil (a handful of powder for 250 ml of oil), boiled to evaporate the moisture content and stored. This oil is smeared regularly over the body of children to cure itching and other similar skin troubles. Uprooted plants are bundled and marketed as an NTFP item, mainly utilised for the preparation of Ayurvedic medicines as a component in *Dasamoola* (a combination of the root portion of 10 plant species).

**Desmodium triangulare** (Retz.) Merr., J. Arnold Arbor. 23: 170. 1942; van Meeuwen, Reinwardtia 6: 261. 1962; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 107. 1983; Manilal, Fl. Silent Valley 78. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 149. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 141. 1996; *Hedysarum triangulare* Retz., Obs. Bot. 3: 40. 1783. *Desmodium cephalotes* (Roxb). Wall. ex Wight & Arn. var. *congestum* (Wight & Arn.), Prain, in J. Asiat. Soc. Bengal 66: 389. 1897; Gamble, Fl. Pres. Madras 344. 1918. *D. triangulare* (Retz.) Merr., var. *congestum* (Prain) Sant., Kew Bull. 1948: 276. 1948; V. S. Ramach. & V. J. Nair, Fl. Cannanore 140. 1988; Vajr., Fl. Palghat Dist. 159. 1990; Sivar. & P. Mathew, Fl. Nilambur 196. 1997; Mohanan & Sivad., Fl. Agasthyamala 208. 2002. **Elumbu chedi (M)**.

Undershrubs to 1.5 m high; stem triquetrous, silky hairy. Leaves trifoliate, to 10 cm long, leaflets 6 x 3 cm, silky hairs on both sides when young, glabrescent above on ageing; base cuneate, margin entire, apex acuminate; petioles silky hairy, to 3 mm long. Stipules subulate, to 1 cm long. Inflorescence in axillary umbels; peduncles and pedicels, to 0.2 cm long, densely silky hairy. Bracts subulate, to 0.4 cm long. Calyx tube campanulate, 0.2 cm long, lobes unequal, silky pubescent. Corolla creamy white; standard 0.6 cm long, wings 0.4 cm long, keels 0.5 cm long, stamens monadelphous. Ovary 0.3 cm across; style incurved; stigma capitate. Pods to 2 cm long, oblong, slightly curved, 4-6 jointed, hairy. Seeds 3 mm wide.

*Fl. & Fr.*: August-November.

*Distribution*: Indo-Malesia and China. Moist deciduous forests of Kunchiyoor, c. 650 m; frequent. *HN 276*.

*Usage*: Roots are collected, chopped, sun-dried and powdered in a wooden mortar. A handful of the powder is mixed in 250 ml of coconut oil and boiled to a specific maturation. This oil is applied regularly to the painful body parts, especially on the knee to get relief of pain.

**Desmodium triflorum** (L.) DC., Prodr. 2: 334. 1825; Hook. f., Fl. Brit. India 2 : 173. 1876; Gamble, Fl. Pres. Madras 347. 1918; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 399. 1983; Vajr. in Nair *et al.*, Fl.

Tamilnadu 1: 107.1983; Manilal, Fl. Silent Valley 79. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 136. 1988; Vajr., Fl. Palghat Dist. 159. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 147. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 141. 1996; Sivar. & P. Mathew, Fl. Nilambur 198. 1997. *Hedysarum triflorum* L., Sp. Pl. 749. 1753. **Nilappulise (M)**.

Prostrate herbs, rooting at nodes; branchlets elongate, pilose. Leaves trifoliolate, 6 mm long; leaflets obovate, 4-6 x 4-5 mm; laterals equilateral, glabrous above, pubescent below; base cuneate, margin entire, apex obtuse-retuse; petiole to 5 mm long; stipules obliquely ovate, 4 mm long. Flowers 3 mm across, 3-5 in a cluster; pedicel to 6 mm long. Calyx-tube 5-lobed, unequal, to 1-2 mm long; Corolla pink; standard obovate, 3 mm long; wings 2 mm long; keels 4 mm long. Staminal sheath 4 mm long. Stamens 9+1. Ovary 4 mm across; style 2 mm long, incurved. Pod to 1 cm long; articles 4-6, hooked-pubescent. Seeds broadly oblong, 1.2 mm wide.

*Fl. & Fr.:* September-December.

*Distribution:* Indo-Malesia and Australia. Farm lands of Kavundikkal, c. 650 m; locally abundant. *HN 320*.

*Usage:* A handful of plant is collected and washed. It is ground well and applied on the body of infants for stopping continuous child cry. After sleep of the child, it is wipe out with a wet cloth.

The whole plant is made into a paste by grinding well with coconut oil. This is heated in a tumbler by adding salt and applied on the soles of feet to remove corns. Usually a three-days application is required for getting complete recovery.

**Desmodium triquetrum** (L.) DC., Prodr. 2: 326. 1825; Baker in Hook. f., Fl. Brit. India 2: 163. 1876; Gamble, Fl. Pres. Madras 345. 1918. Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 107. 1983; Manilal, Fl. Silent Valley 79. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 141. 1988; Vajr., Fl. Palghat Dist. 159. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 149. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 141. 1996; Sivar. & P. Mathew, Fl. Nilambur 198. 1997; Mohanan & Sivad., Fl. Agasthyamala 208. 2002. *Hedysarum triquetrum* L., Sp. Pl. 746. 1753. **Palemattu chedi (I)**.

Subshrubs to 1.25 m high; stem triquetrous, glabrescent. Leaves 1-foliolate, 12-16 x 3-6 cm, glabrous above, hairy on the nerves beneath, ovate-lanceolate, base truncate, margin entire, apex acuminate; petiole 4-7 cm long, broadly winged; stipules obliquely ovate, to 8 mm long. Flowers 4 mm across, in long terminal and axillary racemes; peduncle to 9 cm long. Calyx-tube 5-lobed, to 1 mm long. Corolla bluish-purple; standard obovate, 3 mm long; wings 2 mm long; keels 4 mm long. Stamens 9+1. Ovary 4 mm across; style 2 mm long. Pod, to 1 cm long; articles 6-8, puberulous. Seeds oblong, 2 mm wide.

*Fl. & Fr.*: September-December.

*Distribution*: Indo-Malesia to Pacific Islands and China. Moist deciduous forests of Katirampathi, c. 650 m; rare. *HN 289*.

*Usage*: Fresh leaves are crushed, pressed and the juice extracted is applied over chest for suppressing pediatric asthma. This is to be practiced two times a day, for a period of one month.

**Indigofera linnaei** Ali, Bot. Not. 111: 549. 1958; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 421. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 112. 1983; V. S. Ramach. & V. J. Nair, Fl. Cannanore 147. 1988; Sasidh. & Sivar., Flow. Pl. Thrissur For. 145. 1996; Sivar. & P. Mathew, Fl. Nilambur 1997. *Hedysarum prostratum* L., Mant. Pl. 102. 1767. *Indigofera enneaphylla* L., Mant. Pl. 272, 571. 1771, *nom. Superfl.* Hook. f., Fl. Brit. India 2: 94. 1876; Gamble, Fl. Pres. Madras 309. 1918. **Nandenganni (I)**.

Prostrate trailing herbs; branchlets appressed, hirsute. Leaves odd-pinnate, to 3 cm long; leaflets 4-5 pairs, oblanceolate, 3 x 7 mm, membranous, densely hirsute below, base cuneate, margin entire, apex obtuse; stipules 2, cuspidate; petiole 2 mm long. Racemes axillary, to 8 mm long, many flowered; bracts ovate; peduncle 1 cm long. Flowers 2.5 mm across. Calyx-tube 1 mm long; lobes setaceous. Corolla glabrous, pinkish; petals clawed; standard obovate, 5 mm long; wings 5 mm long; keels 4 mm long. Staminal sheath 3 mm long. Ovary stipitate; ovules 2; style apically incurved. Pod ellipsoid, 4 mm long, turgid, white-hirsute. Seeds 2.

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

*Distribution:* Indo-Malesia to Australia and West Africa. Open gravelly grounds of Katirampathy, c. 700 m; locally abundant. *HN 176*.

*Usage:* The whole plant is ground into a paste and a small quantity of the size of a gooseberry is mixed in hot water and administered for a single time to cure swelling and other problems related to rat-bite. The patient should not take bath on the treatment day. For indigestion and stomach obstruction in cattle exhibited by giddiness, reluctance in feeding, etc. a handful of roots of 10-15 plants ground with one-fourth quantity of cumin is administered for single time.

**Lablab purpureus** (L.) Sweet, Hort. Brit. (ed. 1) 481. 1827; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 430. 1983; V. S. Ramach. & V. J. Nair, Fl. Cannanore 148. 1988; Vajr., Fl. Palghat Dist. 165. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 155. 1994. *Dolichos purpureus* L., Sp. Pl. (ed. 2) 1021. 1763. *D. lablab* L., Sp. Pl. 725. 1753; Baker in Hook. f., Fl. Brit. India 2: 209. 1876; Gamble, Fl. Pres. Madras 367. 1918. **Avarai (I, K & M)**.

Vines; branchlets glandular-pubescent. Leaves 3-foliolate, to 18 cm long; terminal leaflet ovate-deltoid; laterals ovate, 6-9 x 5-8 cm, chartaceous, pubescent, base truncate-obtuse, margin ciliate, apex acuminate, apiculate; petiole to 10 cm long; petiolule 4 mm long; stipules lanceolate, ciliate. Racemes to 10 cm long; peduncle to 15 cm long; bracts ovate to 3 mm long; bracteoles oblong, appressed to calyx. Flowers 2.5 cm across. Calyx-tube campanulate, tomentose, 3 mm long. Corolla exserted; petals clawed; standard orbicular, 1.5 x 2.5 cm, auricled with 2 appendages at base; wings obovate, 1.5 x 0.8 cm; keels oblong, 2.2 x 0.5 cm. Stamens 9+1; filaments unequal; anthers uniform. Ovary stipitate, 8 mm across, pubescent; style incurved, to 1 cm long; stigma capitate. Pod septate. Seeds brown to black coloured.

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

*Distribution:* Widely cultivated in the tropics. Farm lands of Nakkuppathy, c. 600 m; frequent. *HN 242*.

*Usage:* Cultivated for the tender fruits which are used as vegetable.

**Mucuna pruriens** (L.) DC., Prodr. 2: 405. 1825; Baker in Hook. f., Fl. Brit. India 2: 187. 1876; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 116. 1983; Manilal, Fl. Silent Valley 84. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 149. 1988; Vajr., Fl. Palghat Dist. 167. 1990; Sasidh. & Sivar., Flow. Pl. Thrissur For. 147. 1996; Sivar. & P. Mathew, Fl. Nilambur 216. 1997. *Dolichos pruriens* L. in Stickman, Diss. Herb. Amb. 23. 1754. *Mucuna prurita* Hook. J. Bot. Misc. 2: 348, t. 13. 1831, *nom. superfl.*; Gamble, Fl. Pres. Madras 1: 356. 1918. **Poonaikalikodi, Keviri (I).**

Twining shrubs; branchlets downy-pubescent. Leaves, to 16 cm long, trifoliate, leaflets ovate-rhomboid; terminal 9 x 7.5 cm; laterals 10 x 7 cm, oblique, white-pubescent above, silky beneath, base truncate, margin entire, apex acute; petiole to 10 cm long; petiolule 6 mm long. Racemes axillary, drooping, to 18 cm long; peduncle to 5 cm long; Flowers 4 cm long. Calyx-tube 6 mm long, pubescent. Corolla purplish; standard ovate, 2.5 cm long; wing 3 cm long; keels 4 cm long. Staminal sheath, to 2.5 cm long; filaments to 1 cm long. Ovary 1 cm across; style 3.5 cm long. Pod curved at both ends, 8 cm long, covered with stinging grey hairs. Seeds 4-6.

*Fl. & Fr.*: October-January.

*Distribution*: India, Myanmar and Sri Lanka. Openings in Moist Deciduous Forest of Karuvara, c. 650 m; frequent. *HN 327*.

*Usage*: Few pieces of root are ground well in water and applied externally one hour before bath for extra health and vigour. The treatment is to be continued for 10 days.

**Mundulea sericea** (Willd.) Cheval., Compt. Rend. 180: 1521. 1925; Britto in Matthew, Fl. Tamilnadu Camatic 3: 435. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 116. 1983; Vajr., Fl. Palghat District 166. 1990. *Cytisus sericeus* Willd., Sp. Pl. 3: 112. 1802. *Tephrosia suberosa* DC., Prodr. 2: 249. 1825. *Mundulea suberosa* (DC.) Benth. in Miq. Pl. Jungh. 248. 1852; Baker in Hook. f., Fl. Brit. India 2: 110. 1876; Gamble, Fl. Pres. Madras 314. 1918. **Ponnaveeram (I).** Plate 9D.

Small trees to 3.5 m tall; branchlets silky-tomentose. Leaves odd-pinnate, 15 x 5 cm; leaflets 8-10 pairs, opposite, ovate, 4 x 1 cm, glabrous

above, silky below, sericeous, base obtuse, margin ciliate, apex acuminate, apiculate; petiole to 1.5 cm long; petiolule 2 mm long; stipules lanceolate, 3 mm long. Pseudo-racemes terminal, corymbose, to 6 cm long; peduncle to 1 cm long; bracts 2.5 mm long; pedicels fascicled, 1.5 cm long. Flowers 1.5 cm across. Calyx campanulate, 6 mm long; lobes triangular, unequal; upper lobes connate, 1 mm long; lower one 1.5 mm long. Corolla violet coloured, petals clawed, standard orbicular, 2 x 1.5 cm, sericeous without, punctuate; wings oblong-ovate, 1.6 x 0.5 cm; keels obovate, 2 x 0.5 cm, incurved. Staminal sheath to 2 cm long. Stamens monadelphous; vexillary one free; filaments, incurved, alternate ones dilated at apex. Ovary 2 cm across, sessile; style 4 mm long, incurved; stigma capitate. Pod linear, 10 x 1.5 cm, velvety, compressed. Seeds many, reniform.

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

*Distribution*: Africa, Madagascar, Sri Lanka and India. Dry-deciduous forest of Pattimalam, c. 600 m; locally abundant. *HN 085*.

*Usage*: Stem provides good firewood; poles are occasionally used for making temporary sheds.

**Pongamia pinnata** (L.) Pierre, *Fl. For. Cochinch.* Sub. t. 385. 1899; Britto in K. M. Mathew, *Fl. Tamilnadu Carnatic* 3: 441.1983; Vajr. in Nair *et al.*, *Fl. Tamilnadu* 1: 117. 1983; V. S. Ramach. & V. J. Nair, *Fl. Cannanore* 151. 1988; Vajr., *Fl. Palghat Dist.* 167. 1990; Mohanan & Henry, *Fl. Thiruvananthapuram* 156. 1994; Sasidh. & Sivar., *Flow. Pl. Thrissur For.* 148. 1996; Sivar. & P. Mathew, *Fl. Nilambur* 224. 1997; Mohanan & Sivad., *Fl. Agasthyamala* 215. 2002. *Cytisus pinnata* L., *Sp. Pl.* 741. 1753. *Pongamia glabra* Vent., *Jard. Malm.* t. 28. 1803; Baker in Hook. f., *Fl. Brit. India* 2: 240. 1876. *Derris indica* (Lam.) Bennet, *J. Bombay Nat. Hist. Soc.* 68: 303.1971. *Galadupa indica* Lam., *Encycl.* 2: 594. 1788. **Ponga maram (J)**. Plate 9E.

Trees to 15-20 m tall. Leaves alternate, pulvinate, odd-pinnate, 20 x 10 cm; leaflets 3-5 pairs, opposite, ovate, 4-12 x 3-6 cm base acute, margin entire, apex acuminate; petiole 4.5 cm long; petiolules 0.8 cm long; stipules 2 mm long. Inflorescence of lax pseudo-racemes or panicles, to 20 cm long. Flowers 1 cm across. Calyx-tube truncate, deep pinkish. Corolla pinkish-

white; standard sub-orbicular, to 1.2 cm long, wings oblong, to 1.2 cm long; keels obtuse, to 1 cm long. Stamens 10, monadelphous; vexillary stamen free; filaments 3 mm long. Ovary sessile, 5 mm across; ovules 2; style incurved, glabrous; stigma capitate. Pod obliquely oblong, 4 x 3 cm, woody, compressed, indehiscent. Seed 1, reniform.

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

*Distribution*: Indo-Malesia. Riverine forest of Mully, c. 700 m; frequent. *HN 024*.

*Usage*: Seeds are ground well with a pinch of the ash obtained from burnt-branches of *Puliamaram* (*Tamarindus indica*) and is applied over inflammatory or other types of abscissions. It is applied during bed-time, swelling will grown-up and rupture by midnight. *Irulas* believe that the soul of this tree will attend the *Karamada* theru- a festival at *Karamada* temple in Tamilnadu, which is celebrated during February-March. (Trees remain deciduous during that period). Honey combs are also not harvested during that time because bees carry all the honey to *Karamada* temple. Some clans (*Uppili*- those who brought salt for the first time) of *Irulas* use the branches to make 'funeral chariots', to carry the corpse to the burial place.

***Pseudarthria viscida*** (L.) Wight & Arn., Proadr. Fl. Ind. Orient. 209. 1834; Hook. f., Fl. Brit. India 2:154.1876; Gamble, Fl. Madras 334. 1918; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 442. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 117. 1983; Vajr., Fl. Palghat Dist. 168. 1990; V. S. Ramach. & V. J. Nair, Fl. Cannanore 151. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 156. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 149. 1996; Sivar. & P. Mathew, Fl. Nilambur 199. 1997; Mohanan & Sivad., Fl. Agasthyamala 216. 2002. *Hedysarum viscidum* L., Sp. Pl. 747. 1753.

**Moovele (I).**

Subshrubs to 1 m high; branchlets villous, viscid. Leaves trifoliolate, 7 x 6.5 cm; terminal leaflet ovate-rhomboid, twice as long as the laterals; laterals obliquely ovate, 5 x 4 cm, base cuneate-obtuse, margin ciliate, apex acute, mucronate; petiole to 4.5 cm long; petiolule 3 mm long; stipules lanceolate, setaceous, 5 mm long; stipels 2 mm long. Racemes lax, to 20 cm

long; flowers in pairs or clusters; peduncle 3.5 cm long; bracts lanceolate, 2.5 mm long; bracteoles subulate; pedicel to 1 cm long. Flowers 2.5 mm across. Calyx-tube campanulate, 1.5 mm long; lobes lanceolate; upper lobes subconnate, 1.5 mm long; lower one 2.5 mm long. Corolla exerted, rose coloured; petals clawed; standard obovate, to 4 mm long; wings obliquely oblong, to 5 mm long, spurred; keels obtuse, to 5 mm long. Staminal sheath to 4 mm long. Stamens 9+1; filaments subequal, 1 mm long; anthers uniform. Ovary oblong, terete, 4 mm across; tomentose; ovules numerous; style 2 mm long, incurved, glabrous; stigma capitate. Pod linear, oblong, 1.5 x 0.5 cm, flat, compressed, hooked-pubescent. Seeds 4, reniform, glossy.

*Fl. & Fr.*: September-January.

*Distribution*: Peninsular India and Sri Lanka. Moist deciduous forest of Pothuppady, c. 750 m; frequent. *HN 043*; Riverine forest of Mully, c. 700 m; frequent. *HN 048*.

*Usage*: The tender leaves are fried in coconut oil and eaten along with meals twice a day for increased lactation. This is practiced when lactation is not adequate. Plants uprooted, bundled and marketed as an NTFP item, mainly utilised for the preparation of Ayurvedic medicines, as a component in *Dasamoola*.

**Pterocarpus marsupium** Roxb., Pl. Corom. 1. 116. 1799; Hook. f., Fl. Brit. India 2 : 239. 1876; Gamble, Fl. Pres. Madras 385. 1918; K. M. Matthew, Fl. Tamilnadu Carnatic 3: 445. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 118. 1983; V. S. Ramach. & V. J. Nair, Fl. Cannanore 152. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 156. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 149. 1996; Sivar. & P. Mathew, Fl. Nilambur 187. 1997; Mohanan & Sivad., Fl. Agasthyamala 217. 2002. **Karavengai (K & M)**.

Trees to 25 m tall; exuding reddish resin when wounded; branchlets pubescent. Leaves odd-pinnate, 17-22 cm long; leaflets 3 pairs, alternate, elliptic-oblong, 7-9 x 4.5-9.5 cm, coriaceous, pubescent below, base obtuse-truncate, margin entire, apex emarginate; petiole to 5 cm long; petiolule to 7 mm long. Panicles to 15 cm long; pedicel to 3 mm long. Flowers 2 cm across. Calyx-tube 8 mm long. Corolla golden yellow; standard 1.5 x 1 cm; wings 1

and boiled in goat-milk and administered twice a day. The whole plant is crushed and boiled in water and cooled. This water is used to wash hair and scalp during bath, regularly for one month to reduce premature graying of hair. To cure inflammations and swellings, the leaf-paste is applied over it at bed-time and left over night. It is repeated for three days. When stomach bulging associated with horripilation and reluctance in feeding is observed in cattle, roots of two mature plants are ground with a piece of garlic and half a handful of cumin seeds and administered for three consecutive days.

**Vigna mungo** (L.) Hepper, Kew Bull. 12: 128. 1956; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 478. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 125. 1983; Vajr., Fl. Palghat Dist. 177. 1990. *Phaseolus mungo* L., Mant. Pl. 1: 101. 1767; Baker in Hook. f., Fl. Brit. India 2: 313. 1876; Gamble, Fl. Pres. Madras 363. 1918. **Uzhunnu (I)**.

Erect herbs to 30 cm high; branchlets strigose. Leaves 3-foliolate; leaflets oblong-lanceolate, chartaceous; terminal one 7 x 4 cm; laterals 5 x 3 cm, scattered-strigose, base obtuse, margin entire, apex subacute; petiole to 10 cm long; petiolule to 4 mm long; stipules peltate. Inflorescence axillary. Calyx hairy, greenish. Corolla pale yellow coloured; standard 1 cm long; wings and keels obovate 0.5 cm, incurved. Pod to 5 x 0.6 cm, with stiff, elongate hairs. Seeds oblong, to 4.5 mm long.

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

*Distribution*: Native of India; cultivated in tropical Africa and Asia. Farm lands of Pattimalam, c. 600 m; frequent. *HN 049*.

*Usage*: Cultivated and the gram is sold to settlers or in the local market.

**Vigna radiata** (L.) Wilczek., Fl. Congo Belge. 6: 386. 1954, var. **sublobata** (Roxb.) Verdc., Kew Bull. 24: 559. 1970; Vajr. in Nair *et al.*, Fl. Tamilnadu, 1: 126; 1983; Manilal, Fl. Silent Valley 89. 1988; Vajr., Fl. Palghat Dist. 176. 1990. **Kallevelukkara chedi (M)**. Plate 9F.

Slender twiners; indumentum of spreading or deflexed white hairs. Leaves stipulated, pinnately trifoliate; leaflets slightly lobed, obtuse, 3-5 x 2-4 cm, golden silky above, grey pubescent below, base obtuse, margin entire,

apex acuminate; petioles, to 8 cm long. Racemes axillary, condensed; peduncles to 10 cm long; pedicel small. Flowers to 1.5 cm across. Calyx campanulate, long; teeth 3-angular, ciliate. Corolla yellow, standard reflexed, orbicular, broader than long; wings orbicular-obovate; keels narrowed into an elongate, twisted and curved beak. Stamens 9+1. Ovary densely brownish-hairy; style elongate; stigma oblique. Pods narrow-linear, to 5 cm, compressed, dark brown hairy. Seeds blackish.

*Fl. & Fr.*: August-November.

*Distribution*: Indo-Malesia. Open areas in the moist deciduous forests of Mukkali, c. 500 m; rare. *HN 270*.

*Usage*: For curing severe tooth-ache, the root nodules are chewed after gargling with luke-warm salt water. In case of inflammation on chin or jaw, apply externally the leaf-juice of *Ummam* (*Datura metel*) mixed with a pinch of common salt several times.

***Vigna unguiculata* (L.) Walp., Rep. 1: 779. 1842, ssp. *cylindrica* (L.) Verde., Kew Bull. 24: 544. 1970; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 480. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 126. 1983. *Dolichos unguiculatus* L., Sp. Pl. 725. 1753. *Phaseolus cylindricus* L., Herb. Amb. 23. 1754. *D. catjang* Burm. f., Fl. Indica 161. 1768. *Vigna catjang* (Burm. f.) Walp., Linnaea 13: 533. 1839; Baker in Hook. f., Fl. Brit. India 2: 205. 1876; Gamble, Fl. Pres. Madras 365. 1918. *V. sinensis* (L.) Hassk., Cat. Hort. Bot. Bogor. 279. 1844, ssp. *cylindrica* (L.) Eselt. in Hedr., Veg. New York 1 (2): 11. 1931. **Payaru (I, K & M)**.**

Vine; branchlets glabrous. Leaves 3-foliolate, to 15 cm; leaflets ovate-deltoid, 5-8 x 4-6 cm, chartaceous, glabrous, base oblique, truncate, margin entire, apex acute-acuminate, apiculate; petiole to 10 cm long; petiolule to 4 mm long; stipules peltate, to 1.5 cm long, acuminate. Flowers in umbellate clusters, axillary; peduncle to 18 cm long; pedicel to 4 mm long. Calyx-tube 3.5 mm long; lobes to 4 mm across. Pods 12 x 0.4 cm, sparsely puberulous. Seeds many to 4 mm wide.

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

*Distribution:* Cultivated in world tropical countries. Farm lands of Mully, c. 700 m; frequent. *HN 034*.

*Usage:* The pods are freshly used as a vegetable.

**Vigna unguiculata** (L.) Walp., Rep. 1: 779. 1892; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 126. 1983; Vajr., Fl. Palghat Dist. 177. 1990, ssp. **unguiculata**. *Dolichos unguiculatus* L., Sp. Pl. 725. 1753. *D. biflorus* L., Sp. Pl. 727. 1753; Baker in Hook. f., Fl. Brit. India 2: 210. 1876; Gamble, Fl. Pres. Madras 367. 1918. *Vigna sinensis* (L.) Savi ex Hassk., Cat. Hort. Bogor. 279. 1844. **Kollu (I)**.

Climbing herbs; branchlets densely villous. Leaves 3-foliolate, to 5 cm long; leaflets ovate-rhomboid, 2-3.5 x 1-2 cm, chartaceous, villous, base obtuse-cuneate, margin entire, apex acute, apiculate; petiole to 3.5 cm long; petiolule to 5 mm long; stipule lanceolate, to 7 mm long. Flowers in axillary clusters; bract lanceolate, to 7 mm long; bracteole linear, to 4 mm; pedicel to 1.5 mm long. Calyx-tube pubescent, to 1.5 mm long. Corolla yellowish-green coloured; standard obovateoblong, to 1.2 cm long; wings and keels to 1 cm long. Pod oblong, 5 x 0.6 cm, falcate, pubescent; seeds 4-6, to 4 mm wide.

*Distribution:* Cultivated in South Asia. Farm lands of Pattimalam, c. 600 m; frequent. *HN 346*.

*Usage:* Cultivated for its seeds; the plants with pods are threshed, seeds are sun-dried and consumed or sold in the market. This is one of the major pulse crop cultivated in eastern Attappady. The dish prepared by *Kollu* is highly relished along with the food of *Kore (Eleusine coracana)*.

## PASSIFLORACEAE

**Passiflora foetida** L., Sp. Pl. 959. 1753; Gamble, Fl. Pres. Madras 524. 1919; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 630. 1983; Srinivasan in Nair *et al.*, Fl. Tamilnadu 1: 169. 1983; Manilal, Fl. Silent Valley 114. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 197. 1988; Vajr., Fl. Palghat Dist. 210. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 207. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 198. 1996; Sivar. & P.

Mathew, Fl. Nilambur 286. 1997; Mohanan & Sivad., Fl. Agasthyamala 259. 2002. **Pottari (I & M)**.

Slender vines; stem hispid. Leaves usually 3-lobed, suborbicular, 10 x 8 cm, pubescent on both sides, base cordate, margin subentire to ciliate, apex acute; petiole to 1.5 cm long; stipules sub-reniform, to 1 cm long, deeply cleft into glandular processes. Flowers axillary, solitary, to 4 cm across; peduncle 4 cm long; bracts and bracteoles to 3 cm long, deeply pinnatisect, glandular-pubescent. Calyx-tube short, saucer-shaped; lobes ovate-lanceolate, to 1.5 cm wide, apically spurred. Petals white, slightly shorter than calyx-lobes. Outer corona hairs to 1 cm long and inner ones to 0.2 cm. Disc annular. Androgynophore 0.6 cm long; filaments flat, to 0.5 cm long. Ovary globose, 1 x 0.8 mm, stiff-pilose; styles to 4 mm long. Berry sub-globose, yellowish when ripe, 4 x 3 cm; seeds ellipsoid.

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

*Distribution*: Native of tropical America; now naturalized in India, China, and Africa. Dry-deciduous forest of Puliapathy, c. 650 m; frequent. *HN 074*.

*Usage*: The ripe fruits are edible, which are largely consumed by shepherd children.

## PEDALIACEAE

**Sesamum orientale** L., Sp. Pl. 634. 1753; K. M. Mathew & N. Rani in K. M. Mathew, Fl. Tamilnadu Carnatic 3: 1140. 1983; V. S. Ramach. & V. J. Nair, Fl. Cannanore 329. 1988; Vajr., Fl. Palghat Dist. 337. 1990; Sivar. & P. Mathew, Fl. Nilambur 487. 1997. *S. indicum* L., Sp. Pl. 634. 1753; Clarke in Hook. f., Fl. Brit. India 4: 387. 1884; Gamble, Fl. Pres. Madras 1002. 1924; Chandrab. in Henry *et al.*, Fl. Tamilnadu 2: 138. 1983. **Ellu (I)**.

Herbs to 70 cm high, pubescent; stem 4-angled. Lower leaves opposite, deeply lobed, upper ones simple, linear-oblong, 8-10 x 2-4 cm, chartaceous, base attenuate; petiole to 7 cm long. Flowers axillary, solitary, pink or rose coloured. Calyx lobes 5, persistent. Corolla 2.5 x 1.8 cm. Stamens 4. Ovary bilateral, 3.5 x 2 mm; style 1 cm long. Disc yellow

coloured. Capsule oblong, bilateral 2 x 0.8 cm, apically beaked. Seeds brown or black.

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

*Distribution*: Tropical Africa and Asia. Farm lands of Vatlakki, c. 600 m; frequent. *HN 153*.

*Usage*: Seeds are either sold in the market or seldom made into eatables by adding boiled jaggery into it.

## PIPERACEAE

**Piper longum** L., Sp. Pl. 29. 1753; Hook. f., Fl. Brit. India 5: 83. 1886, Gamble, Fl. Pres. Madras 1205. 1925; Kumari in Henry *et al.*, Fl. Tamilnadu 2: 204. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 387. 1988; Vajr., Fl. Palghat Dist. 398. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 384. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 376. 1996; Sivar. & P. Mathew, Fl. Nilambur 577. 1997. *Chavica roxburghii* Miq., Syst. Piperac. 239. 1844.

### **Thippili (M).**

Slender undershrubs, weak stemmed, creeping, rooted at nodes. Leaves broadly ovate, 10 x 6 cm, glabrous, base rounded to cordate, margin entire, apex shortly acuminate; upper ones sessile, lower petioled, to 2 cm long. Flowering shoots erect. Male Spikes to 7 cm long, greenish-yellow coloured; female spike compressed, to 3 cm long. Berries sunken, reddish black when ripe.

*Fl. & Fr.*: August-November.

*Distribution*: Indo-Malesia. Moist deciduous forest of Kallamala, c. 650 m; locally abundant. *HN 282*.

*Usage*: Crush the root and leaves along with a leaf of *Goppampale* (*Wrightia tinctoria*), garlic (*Allium sativum*) and two black pepper (*Piper nigrum*) grains and make it into a paste. Apply the paste on decayed tooth, twice or thrice a day for three days for curing tooth-ache. Vines are collected, leaves removed, bundled and marketed as an NWFP item which is utilised in the Ayurvedic medicines for its action against bronchial problems.

## PLUMBAGINACEAE

**Plumbago zeylanica** L., Sp. Pl. 151. 1753; Hook. f., Fl. Brit. India 3: 480. 1882; Gamble, Fl. Pres. Madras 744. 1921; Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 845. 1983; Chandrab. in Henry *et al.*, Fl. Tamilnadu 2: 59. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 260. 1988; Vajr., Fl. Palghat Dist. 262. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 273. 1994; Sivar. & P. Mathew, Fl. Nilambur 389. 1997. **Otte (I)**.

Undershrubs to 2.5 m high. Leaves elliptic-ovate, 4-8 x 2-4 cm, base truncate to attenuate, apex acutely apiculate, glabrous; petiole to 1 cm long. Racemes 6-9 cm long. Calyx tubular, to 1.2 cm long. Corolla white, to 1 cm across, salvar shaped, tube 1.5 cm long; lobes 5. Stamens 5; filaments 1.5 cm long. Ovary 3 mm, unilocular; style 1 cm long. Capsule 5-valved, enclosed in persistent calyx, glandular hairy. Seeds flattened.

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

*Distribution*: Pantropical. Open wastelands of Kottamala, c. 700 m; frequent. *HN 338*.

*Usage*: A small piece of root and one or two leaves and garlic (*Allium sativum*) are ground in one's own urine and made to a watery paste. This is applied with a cock feather over foul ulcers, for speedy healing.

## RANUNCULACEAE

**Clematis gouriana** Roxb. ex DC., Syst. Nat. 1: 138. 1817; Hook. f. & Thoms. in Hook. f., Fl. Brit. India 1 : 4. 1872; Dunn in Gamble, Fl. Pres. Madras 3. 1915; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1. 1983; Ramamurthy in Nair *et al.*, Fl. Tamilnadu 1: 1. 1983; Manilal, Fl. Silent Valley 1. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 35. 1988; Vajr., Fl. Palghat Dist. 1. 1990. Mohanan & Henry, Fl. Thiruvananthapuram 40. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 24. 1996; Sivar. & P. Mathew, Fl. Nilambur 33. 1997. **Nikadikodi (M)**, **Cheerappu (K)**.

Climbers. Leaves 2 or 3-pinnate, 14 x 10 cm; leaflets oblong, ovate-lanceolate, 3-6 x 1-2.5 cm, 3-5-nerved, pubescent below, base obtuse, margin coarsely toothed, apex acuminate; petiole twining, to 6 cm long; petiolule to 1 cm long. Panicles dense, to 15 cm long, sparsely pubescent; peduncle 3-6 cm long; pedicel to 1.5 cm long. Flowers 7 mm across. Sepals 4, cream coloured, oblong or obovate, 6 x 2 mm, revolute, puberulous. Petals absent. Stamens c. 30-35; filaments linear. Carpels 10-15, oblong or linear; ovule 1 per cell; style to 2.5 mm long, persistent, stigma clavate. Achenes to 7 cm long, sessile, ovoid; style feathery, to 5 cm long; seeds to 0.8 mm wide, narrowly linear.

*Fl. & Fr.*: October-January.

*Distribution*: Indo-Malesia. Moist deciduous forest of Chindakki, c. 650 m; frequent. *HN 135*.

*Usage*: A decoction of whole plant along with the barks of *Eetty* (*Dalbergia latifolia*) and *Aame* (*Trema orientalis*) prescribed as a remedy for blood cancer.

**Naravelia zeylanica** (L.) DC., *Syst. Nat.* 1: 167. 1817; Hook. f., & Thoms. in Hook. f., *Fl. Brit. India* 1: 7. 1872; Dunn in Gamble, *Fl. Pres. Madras* 3. 1915; K. M. Matthew & Britto in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 2. 1983; Ramamoorthy in Nair *et al.*, *Fl. Tamilnadu* 1: 1. 1983; Manilal, *Fl. Silent Valley* 1. 1988; V. S. Ramach. & V. J. Nair, *Fl. Cannanore* 35. 1988; Vajr., *Fl. Palghat Dist.* 44. 1990; Mohanan & Henry, *Fl. Thiruvananthapuram* 41. 1994; Sasidh. & Sivar., *Flow. Pl. Thrissur For.* 24. 1996; Sivar. & P. Mathew, *Fl. Nilambur* 33. 1997; Mohanan & Sivad., *Fl. Agasthyamala* 48. 2002. *Atragea zeylanica* L., *Sp. Pl.* 542. 1753.  
**Valiyanikadikodi (M), Thalachithari (I).**

Climbing shrubs; stem pubescent. Leaves trifoliolate, to 15 cm long, lateral leaflets ovate, 9 x 6 cm, pubescent; base rounded, margin serrate, apex acuminate; terminal leaflet modified to a tendril, to 12 cm long; petiole to 4.5 cm long; petiolule to 2 cm long. Panicles terminal and axillary, to 15 cm long, pubescent; peduncle to 6 cm long; pedicel to 3.5 cm long. Calyx 4-5,

ovate, 6 mm long, tomentose. Petals to 8 lobes, greenish-yellow coloured, to 8 mm long, glabrous. Stamens c. 30; filaments ligulate. Carpels c. 20; ovule 1 per cell; style to 2 mm long; stigma clavate. Achenes c. 20 in a cluster, spirally twisted.; feathery tailed. Seed to 5 mm wide.

*Fl. & Fr.:* November-February.

*Distribution:* South East Asia. Moist deciduous forest of Karuvara, c. 700 m; frequent. *HN 275.*

*Usage:* Pieces of roots are crushed with an onion and inhaled through a cloth piece. Repeat after a short interval to reduce sneezing, which helps to expel phlegm and cleanse the lungs. The leaves boiled partially and wrapped on the knee joint to reduce rheumatic pain. A thin layer of aqueous root paste is applied on the neck region three times on a single day for curing whooping cough.

## RHAMNACEAE

**Ziziphus mauritiana** Lam., *Encycl.* 3: 319. 1789; K. M. Matthew & Britto in K. M. Matthew, *Fl. Tamilnadu Camatic* 3: 271. 1983; Chithra in Nair *et al.*, *Fl. Tamilnadu* 1: 78. 1983. *Z. jujuba* Lam., *Encycl.* 3: 318. 1789; Lawson in Hook. f., *Fl. Brit. India* 1: 632. 1875; Gamble, *Fl. Pres. Madras* 219. 1918. *Rhamnus jujuba* L., *Sp. Pl.* 194. 1753. **Ilanthe (I).**

Trees to 8 m tall; branchlets woolly; stipular thorns recurved, to 0.6 mm long. Leaves orbicular-rotund, 2-3 x 1.5-3 cm, grey and glabrous above, rusty-tomentose below, base oblique, subcordate, margin glandular-denticulate, apex rotund, retuse; petiole to 8 mm long. Cymes axillary, c. 20 flowered, in dense fascicles; peduncle much reduced, to 0.5 mm long; pedicel to 4 mm long. Flowers 5 mm across. Calyx-tube to 0.5 mm long, woolly; lobes ovate, 1 mm long. Petals ovate, pale green coloured, 1 mm across. Disc 10-lobed, grooved. Stamens 1 mm long. Ovary embedded in disc, 2-celled; ovule 1, ascending; styles 2, connate to middle; stigma bifid. Drupe oblong globose, 1 x 0.5 cm, 1-2 celled, rugose. Seed 1-2.

*Fl. & Fr.:* July-December.

*Distribution:* Paleotropics. Farm lands of Vatlakki, c. 600 m; frequent. *HN 054.*

*Usage:* Fruits are collected in plenty during October- December. Ripe fruits are edible while immature fruits are occasionally pickled.

**Ziziphus oenopia** (L.) Miller, Gard. Dict. ed.8 1768; Lawson in Hook. f., Fl. Brit. India 1: 634. 1875; Gamble, Fl. Pres. Madras 220. 1918; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 272. 1983; Chithra in Nair *et al.*, Fl. Tamilnadu 1: 78. 1983; V. S. Ramach. & V. J. Nair, Fl. Cannanore 101. 1988; Vajr., Fl. Palghat Dist. 121. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 118. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 110. 1996; Sivar. & P. Mathew, Fl. Nilambur 147. 1997; Mohanan & Sivad., Fl. Agasthyamala 166. 2002. *Rhamnus oenopia* L., Sp. Pl. 194. 1753. **Jooli (J, K & M).**

Straggling shrubs to 5 m high; branchlets densely tomentose; thorns recurved, to 1 cm long. Leaves ovate-lanceolate, 4-6.5 x 1.5-3 cm, asymmetric, glabrescent above, sericeous below, base oblique, subacute-obtuse, margin denticulate, apex acute-acuminate; petiole to 5 mm long. Cymes axillary, in umbellate clusters, c. 8 flowered; peduncle to 4 mm long; bracteole subulate; pedicel to 2.5 mm long. Flowers 3 mm across. Calyx-tube to 0.5 mm long; lobes triangular-ovate, 1 mm long. Petals pale green coloured, obovate, 1 mm across. Disc 10-lobed, pitted. Stamens 5; filaments 0.8 mm long; anthers 0.5 mm long. Ovary embedded in disc; ovule solitary, 2-celled; styles 2, connate to middle; stigma bifid. Drupe globose, 4 mm across, rugose, woody, single celled. Seed 1, ovoid, 4 mm wide.

*Fl. & Fr.:* August-December.

*Distribution:* Tropical Asia and Australia. Throughout the hotter parts of India. Moist deciduous forest of Mukkali, c. 550 m; frequent. *HN 351.*

*Usage:* Fruits are edible and available from September onwards.

**Ziziphus rugosa** Lam., Encycl. 3: 319. 1789; Lawson in Hook. f., Fl. Brit. India 1: 636. 1875; Gamble, Fl. Pres. Madras 221. 1918; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 273. 1983; Chithra in Nair *et al.*, Fl. Tamilnadu 1: 78. 1983; Manilal, Fl. Silent Valley 58. 1988; V. S.

Ramach. & V. J. Nair, Fl. Cannanore 101. 1988; Vajr., Fl. Palghat Dist. 121. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 119. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 110. 1996; Sivar. & P. Mathew, Fl. Nilambur 148. 1997; Mohanan & Sivad., Fl. Agasthyamala 166. 2002. **Ungatte (I, K & M).**

Straggling shrubs to 6 m high; branchlets woolly; thorns stout, recurved, to 1 cm long. Leaves orbicular-rotund, 4-6 x 2.5-6 cm, woolly below, base cordate, margin serrulate, apex rotund, mucronate; petiole, to 8 mm long. Cymes in panicles, axillary or terminal, to 40 cm long, woolly; peduncle to 10 cm long, with recurved spines; pedicel 1-3 mm long. Flowers 4 mm across. Calyx-tube campanulate, 1 mm long; lobes 5, ovate, pale green coloured, 2 mm long. Petals absent. Disc 5-lobed. Stamens 5; filaments 1.5 mm long; anthers 0.5 mm long. Ovary ovoid, tomentose, 2-celled; ovule solitary, erect; styles 2, connate below the middle; stigma bifid. Drupe pyriform, single celled, whitish when ripe, 0.5 x 0.5 cm across. Seed-1 obovoid, turgid, 4 mm wide.

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

*Distribution*: India, Sri Lanka, Bangladesh and Myanmar. Moist deciduous forests of Mukkali, c. 550 m; frequent. *HN 352*.

*Usage*: The fruits are eaten when ripe, which are available during summer season. Leaf-paste is applied half an hour before bath on the knee joints in rheumatic pain.

## RUBIACEAE

**Benkara malabarica** (Lam.) Tirveng., Taxon 32: 440. 1983; Sasidh., Biodiv. Doc. Kerala 6: 210. 2003. *Randia malabarica* Lam., Encycl. 3: 25. 1789; Hook. f., Fl. Brit. India 3: 111. 1880; Gamble, Fl. Pres. Madras 616. 1921; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 696. 1983. *Gardenia fragrans* J. Koenig ex Roxb., Pl. Corom. t. 137. 1800. *Griffithia fragrans* (Roxb.) Wight & Arn., Prodr. Fl. Ind. Orient. 400. 1834; *Xeromphis malabarica* (Lam.) Raju, Excurs. Fl. Himach. 13. 1966. **Ketturangi (I).** Plate 10A.

Small trees to 5 m tall; armed, spines short, to 1 cm long. Leaves decussate or clustered, obovate-oblongate, 8 x 4 cm, base cuneate, apex obtusely apiculate; petiole to 0.7 cm long. Flowers in axillary, umbel-like corymbose cymes; bracts and bracteoles free or connate. Calyx turbinate, 5 x 2.5 mm; teeth 5, valvate, triangular, acute. Corolla white, 2 cm across, salverform; tube cylindrical, 4.5 mm long, with a ring of hairs within; lobes 5, oblong, 8 mm long, recurved, obtusely acute. Stamens 5, between the lobes, exserted; filaments 0.5 mm long. Ovary 3 mm across; style 5 mm long; stigma fusiform, 6 mm long. Berry globose, 0.8 cm across. Seeds conical.

*Fl. & Fr.*: June-November.

*Distribution*: Peninsular India and Sri Lanka. Dry-deciduous forest of Puliappathy, c. 650 m; not frequent. *HN 053*.

*Usage*: Pieces of bark tied to the cradle induces deep sleep in children. Applying the shoot juice externally over the head and shoulders of babies also provides deep sleep.

**Canthium coromandelicum** (Burm.f.) Alston in Trimen, Handb. Fl. Ceylon (Suppl.) 6: 152. 1903; Sivar. & P. Mathew, Fl. Nilambur 315. 1997. *Gmelina coromandelica* Burm. f., Fl. Ind. 132. 1768. *Canthium parviflorum* Lam., Encycl. 1: 602. 1785; Hook. f., Fl. Brit. India 3: 136. 1880; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 699. 1983; Swaminathan in Henry *et al.*, Fl. Tamilnadu 2: 2. 1987; Mohanan & Henry, Fl. Thiruvananthapuram 224. 1994; Mohanan & Sivad., Fl. Agasthyamala 310. 2002. *Plectronia parviflora* (Lam.) Bedd., Fl. Sylv. t. 124. 1872; Gamble, Fl. Pres. Madras 625. 1921. **Kaare (M)**.

Shrubs to 5 m high; spines to 4 cm long, supra-axillary. Leaves very variable, lower larger, 5-12 x 5-7 cm, upper smaller, 2-4 x 2-3 cm, base attenuate, margin entire, apex subacute; petiole to 7 mm long; stipules linear. Flowers in lax cymes; pedicels slender. Calyx cupular, to 0.25 cm long, minutely 4-toothed. Corolla greenish white; tube to 0.25 cm long; lobes triangular with subulate tip, throat densely hairy. Stamens 4, sessile. Ovary to

0.1 cm across; style short; stigma capitate. Drupe globose, 1-1.2 cm across. Seeds 1-2, to 0.5 cm wide, oblong.

*Fl. & Fr.:* June-October.

*Distribution:* Indo-Malesia. Dry-deciduous forests of Mully, c. 700 m; common. *HN 151.*

*Usage:* The bark is ground well and applied externally to cure muscular pain. Taking bath in hot water after one hour of application is also suggested. Equal numbers of fruits of *Kaare* and *Sillemaram* (*Strychnos potatorum*) are crushed along with the scrotum portion of a goat and kept in subsoil within an earthen pot for one month. This mixture is a strong fish poison, and a small portion of this is sufficient to stupefy fishes in large water bodies.

***Morinda pubescens*** J. E. Sm. in Rees, Cyclop. 24: 3. 1813; Mohanan & Henry, Fl. Thiruvananthapuram 237. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 228. 1996; Mohanan & Sivad., Fl. Agasthyamala 332. 2002. *M. tinctoria* Roxb., Fl. Ind. 2: 197. 1824; Hook. f., Fl. Brit. India 3: 156. 1880; Gamble, Fl. Pres. Madras 651. 1921. *Morinda coreia* Buch.- Ham., Trans. Linn. Soc. London 13: 537. 1822; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 718. 1983. *M. exserta* Roxb., Fl. Ind. 1: 545. 1832.

**Noone (I).**

Trees to 8 m tall. Leaves 10-15 x 4-8 cm, base cuneate, margin entire, apex acuminate; petiole to 2 cm long; stipules triangular, acute. Inflorescence a simple head, to 1.5 cm across, terminal, axillary or leaf-opposed. Calyx 4 x 3 mm long. Corolla white, 2 cm across; tube 1.5 cm long, glabrous within; lobes 5, oblong, 1 cm long. Stamens 5, exserted; filaments 4.5 mm long; anthers 5.5 mm long. Ovary 3 mm across; style 1.2 cm, forked. Syncarpium 2 cm across. Seeds 1-2, oblong or obovoid.

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

*Distribution:* Indo-Malesia. Dry-deciduous forest of Pattimalam, c. 600 m; not frequent. *HN 257.*

*Usage:* Timber is used for making agricultural implements like hoe, handles, etc. and also as firewood.

cm long; keels 1 x 0.6 cm. Stamens 5+5; filaments subequal, 5-7 mm long. Ovary 8 mm across, tomentose; ovules 2. Pod stipitate, 4.5 x 3.5 cm; wings broad.

*Fl. & Fr.:* September-December.

*Distribution:* India and Sri Lanka. Moist deciduous forest of Anavai, c. 800 m; frequent. *HN 174.*

*Usage:* The solidified resinous exudate is collected from the trunk, diluted in water or castor oil, and applied on the temple portion of children in a belief of keeping away evil-eye. Heartwood is used to make large wooden mortars and pestles. During the flowering season neighbouring honeycombs yield good quality honey. The honey has a yellow tint.

**Tephrosia purpurea** (L.) Pers., Syn. 2:329. 1807; Baker in Hook. f., Fl. Brit. India 2:112. 1876; Gamble, Fl. Pres. Madras 320.1918; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 470. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 123. 1983; V. S. Ramach. & V. J. Nair, Fl. Cannanore 156. 1988; Vajr., Fl. Palghat Dist. 174. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 159. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 155. 1996. *Cracca purpurea* L., Sp. Pl. 752. 1753. **Kolingi (I).**

Subshrubs to 1 m high, branchlets pubescent. Leaves to 7 cm long; leaflets 4-9 pairs, obovate, 2 x 0.8 cm, pubescent, base cuneate, margin entire, apex obtuse; petiole to 1 cm long; stipules lanceolate, to 5 mm long. Pseudo-racemes leaf-opposed, to 8 cm long; bract to 2 mm long; pedicel to 4 mm long. Calyx tube pubescent, lobes lanceolate. Corolla pinkish-purple coloured, standard orbicular, 8.5 mm long; wings 7.5 mm long; keels 6.5 mm long; Staminal sheath 5 mm long. Ovary appressed pubescent; style glabrous. Podes to 5 cm long, slightly curved, puberulous. Seeds to 7 numbers, ovoid.

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

*Distribution:* Indo-Malesia. Waste lands of Chavadiyoor, c. 650 m; locally abundant. *HN 179.*

*Usage:* The crushed roots are chewed for toothache. During constipation or when stomach is upset, roots of a single plant is freshly collected, ground well

**Mussaenda frondosa** L., Sp. Pl. 177. 1753; Hook. f., Fl. Brit. India 3: 89. 1880; Gamble, Fl. Pres. Madras 610. 1921; Swaminathan in Henry *et al.*, Fl. Tamilnadu 2: 15. 1987; Sivar. & P. Mathew, Fl. Nilambur 337. 1997; Mohanan & Sivad., Fl. Agasthyamala 336. 2002. **Vellalume (M)**.

Shrubs to 6 m high; tender portion densely tomentose. Leaves decussate, elliptic-ovate, 6- 8 x 4-5.5 cm, appressed-hirsute at both sides, base rounded to acute, apex acuminate; petiole to 1.5 cm long; stipules intrapetiolar, oblong-lanceolate. Cymes terminal, dense; peduncles and pedicels villous; bracts and bracteoles linear, deciduous. Calyx-tube truncate, 5-angled; lobes 5, linear-subulate, to 1 cm long. The petaloid leafy lobe white coloured, 8-10 x 4-5.5 cm. Corolla yellowish orange, 2 cm across, salverform; tube cylindric, 2.5 cm long, silky without, densely hairy within; lobes 5, ovate to obovate, 1 x 0.6 cm, acuminate, orange-red coloured. Stamens 5; filaments 2.5 mm long. Ovary 8 mm across; ovules many; style 3 cm long; stigma fusiform. Berry globose, 1.5 x 1 cm, sparingly hirsute. Seeds sub-compressed.

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

*Distribution*: Endemic to Peninsular India. Semi-evergreen forest of Mukkali, c. 550 m; frequent. *HN 249*.

*Usage*: A digestive problem characterised by whitish fecal matter (resembles the colour of bracts of *Vellalume*) is treated by the administration of root-paste half a size of gooseberry to the patient two times a day for two days.

**Psydrax umbellata** (Wight) Bridson, Kew Bull. 48: 762. 1993; Sasidh., Biodiv. Doc. Kerala 6: 233. 2004. *Canthium umbellatum* Wight, Ic. t. 1034. 1845; Hook. f., Fl. Brit. India 3: 132. 1880. *Canthium didyma* Bedd., Fl. Sylv. South India 1: 221. 1872, non Gaertn., 1806. *Plectronia didyma* (Gaertn.) Kurz var. *umbellata* (Wight) Gamble, Fl. Pres. Madras 624. 1921. *Canthium dicoccum* (Gaertn.) Teijsm. & Binn. var. *umbellatum* (Wight) Sant. & Merch., Bull. Bot. Surv. India 3: 107. 1961; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 697. 1983; Swaminathan in Henry *et al.*, Fl.

Tamilnadu 2: 2. 1987; Manilal, Fl. Silent Valley 129. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 212. 1988; Vajr., Fl. Palghat Dist. 229. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 223. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 217. 1996. **Oppemaram (I)**.

Lofty trees to 10 m high, tender parts pubescent. Leaves 8 -12 x 4-7 cm, elliptic-lanceolate, thick, shining above, base truncate, margin entire, apex acuminate; petiole to 1 cm long; stipules lanceolate. Inflorescence a densely umbellate cyme, 5-8 cm long; peduncle thick, to 0.6 cm across. Calyx 5-toothed, pubescent without, to 2 cm long. Corolla cream coloured, 6 mm across; tube villous within; lobes reflexed, 2 mm long. Stamens 5; filaments 1.5 mm long. Ovary 0.15 cm across; style 0.7 cm long; stigma capitate. Drupes 0.8 cm wide, obovoid.

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

*Distribution*: Indo-Malesia and China. Dry-deciduous forests of Mully, c. 700 m; rare. *HN 005*.

*Usage*: Leaves crushed and wrapped in a cloth to the loins, after delivery for easy dropping of placenta. *Irulas* consider this tree as sacred and worship by placing idols of deities under its shade.

**Rubia cordifolia** L., Mant. Pl. 197. 1771; Hook. f., Fl. Brit. Ind. 3: 202. 1881; Gamble, Fl. Pres. Madras 655. 1921; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu 3: 741. 1983; Swaminathan in Henry *et al.*, Fl. Tamilnadu 2: 23. 1987; Manilal, Fl. Silent Valley 142. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 234. 1988; Vajr., Fl. Palghat Dist. 243. 1990; Sivar. & P. Mathew, Fl. Nilambur 348. 1997. *R. munjista* Roxb., Fl. Ind. 1: 383. 1820. **Mullukkodi, Sivalikkodi (I & M)**.

Rugose vines; profusely branched, branches quadrangular, scabrous. Leaves 4-8, in whorles, simple, sessileovate, 5 x 3 cm, chartaceous, scabrid, base cordate, margin entire, apex acuminate; petiole to 3 cm long; stipules interpetiolar, ovate; deciduous. Flowers in terminal and axillary cymes, to 6 cm long. Calyx truncate, 1 mm long, glabrous. Corolla white, 4 mm across, shortly campanulate; lobes valvate, lanceolate, 2.5 mm long, reflexed.

Stamens between the corolla lobes, exerted; filaments small. Ovary globose, ovule 1 per cell; styles 2; stigmas capitate. Berry globose, fleshy, 3 mm across, purple coloured when ripe. Seed solitary.

*Fl. & Fr.*: September-January.

*Distribution*: Asia, Africa and Europe. Moist deciduous forest of Karuvara, c. 700 m; frequent. *HN 136*.

*Usage*: To cure the reddish patches appearing on the skin of infants, a small piece of root is ground well in water and smeared all over the body for three continuous days. Wipe off the paste using a wet cloth piece after one hour. Bathing is not suggested during the treatment period.

**Spermacoce hispida** L., Sp. Pl. 102. 1753; Hook. f., Fl. Brit. India 3: 200. 1881; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu 3: 742. 1983; Swaminathan in Henry *et al.*, Fl. Tamilnadu 2: 24. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 235. 1988; Mohanan & Sivad., Fl. Agasthyamala 359. 2002. *Spermacoce articularis* L. f., Suppl. Pl. 119. 1782; Sasidh. & Sivar., Flow. Pl. Thrissur For. 238. 1996; Sivar. & P. Mathew, Fl. Nilambur 349. 1997. *Borreria hispida* (L.) Schum. in Engler & Prantl, Pflanzenfam. 4 (4): 144. 1891, non Spruce ex Schum., 1888; Gamble, Fl. Pres. Madras 654. 1921. *Borreria articularis* (L.f.) F. N. Will., Bull. Herb. Boiss. Ser. 2, 5: 956. 1905; Vajr., Fl. Palghat Dist. 227. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 221. 1994. **Peelichedi, Sirupeelichedi (I & M)**.

Herbs to 25 cm high; stem hispid, purple coloured. Leaves oblong-elliptic to obovate, 1-2 x 0.8-1.5 cm, base attenuate, margin hispid, apex acute; stipules sheathing. Flowers in axillary verticillate cymes. Calyx tube 0.2 cm long, ovoid, hispid without, lobes 4, obovate. Corolla bluish-white, tube slender, 0.6 cm long, hairy at throat, lobes 4. Stamens 4, exerted. Capsule subglobose, 0.2 cm across, hispid without. Seeds 2, oblong, grooved.

*Fl. & Fr.*: August-January.

*Distribution*: Endemic to Peninsular India. Grasslands of Puttumala, c. 750 m; frequent. *HN 203*.

*Usage:* Two plants are crushed and a decoction is prepared in one glass of water, reduced to half. It is administered in the morning in empty stomach. This is repeated for continuous three days against general debility. A decoction of a whole plant along with a handful of *Kuruvevannasappu* (*Selaginella delicatula*) is administered in empty stomach for one month as a remedy for the disease with symptoms of gradually increasing excrescence on skin.

**Tarenna asiatica** (L.) Kuntze ex K. Schum., Bot. Tidsskr. 24: 332. 1902; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 744. 1983; Swaminathan in Henry *et al.*, Fl. Tamilnadu 2: 25. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 237. 1988; Vajr. Fl. Palghat Dist. 144; 1990; Mohanan & Henry, Fl. Thiruvananthapuram 246. 1994; Mohanan & Sivad., Fl. Agasthyamala 362. 2002. *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. **Tarani (I).**

Shrubs to 5 m high. Leaves oblong to oblanceolate, 15 x 5 cm, coriaceous, glabrous, base truncate, margin entire, apex acute; petiole to 1.5 cm long; stipules interpetiolar, scaly. Cymes trichotomous, corymbose, terminal, to 5 cm long; bracts linear; bracteoles minute. Calyx tube 3 mm wide; lobes 5, spreading, valvate, villous without. Corolla dull white coloured, 8 mm across, salver-form, tube 2.5 mm wide, villous within; lobes 5, twisted, oblong, 4.5 mm, reflexed, obtuse. Stamens 5, between the lobes, exserted; filaments short. Ovary hemispheric, 1.5 mm across, bilocular; ovules a few; style 6.5 mm long; stigma fusiform. Berry globose, 0.5 cm across, with a crown of persistent calyx-lobes.

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

*Distribution:* Indo-Malesia. Dry-deciduous forest of Mully, c. 700 m; frequent. *HN 125*. Dry thickets of Mully, c. 700 m; frequent. *HN 108*.

*Usage:* Leafy shoots are used in the preparation of trellis, because of its defoliating nature. Poles possess extra strength and durability and hence used in the hut or shed construction.

## RUTACEAE

**Aegle marmelos** (L.) Corr., Trans. Linn. Soc. London 5: 223. 1800; Hook. f., Fl. Brit. India 1: 516. 1875; Gamble, Fl. Pres. Madras 161. 1915; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 199. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 57. 1983; Vajr., Fl. Palghat Dist. 102. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 101. 1994. *Crateva marmelos* L., Sp. Pl. 444. 1753. **Billamaram (I)**.

Armed trees to 8 m tall; branchlets pubescent; spines axillary, to 5 cm long, straight. Leaves trifoliate; leaflets elliptic-lanceolate; terminal ones 4.5 x 2.5 cm, lateral ones 2.5 x 1 cm, glabrous, base rounded, margin sub-crenulate, apex obtuse; petiole 2.5 cm long. Panicles axillary 10 x 4.5 cm; peduncle to 1 cm long. Flowers, to 2.5 cm across. Calyx-tube cupular, to 5 mm long; lobes 5, triangular. Petals 5, white coloured, oblong, subequal, 1 x 0.6 cm. Disc obscure. Stamens numerous; filaments to 3 mm long. Ovary ovoid, 10-celled; stigma sessile, oblong. Berry ovoid, 10 x 8 cm, woody. Seeds numerous, embedded in pulp.

*Fl. & Fr.:* February-March.

*Distribution:* India and Sri Lanka; widely cultivated in South East Asia, Malesia, Tropical Africa and the United States. Dry-deciduous forest of Kottathara, c. 600 m; rare. *HN 350*.

*Usage:* A decoction made with a piece of bark administered during bed time is said to possess aphrodisiac property.

**Atalantia monophylla** (Roxb.) DC., Prodr. 1: 535. 1824; Hook. f., Fl. Brit. India 1: 511. 1875; Gamble, Fl. Pres. Madras 159. 1915; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 200. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 57. 1983; Manilal, Fl. Silent Valley 42. 1988. **Kurunthamaram (I)**.

Small trees to 5 m tall; armed, spines axillary. Leaves single foliolate, lanceolate, 4.5 x 2 cm. Racemes axillary, contracted, to 1.5 cm, c. 10 flowered; peduncle reduced. Flowers, to 1 cm across, fragrant. Calyx-tube irregularly lobed, glandular, to 0.5 cm long. Petals, to 0.8 cm long, cream coloured, obovate, pubescent. Stamens 8, connate, inserted outside the disk. Ovary 4-celled; ovules 1 or 2. Berry globose, to 2 cm across, persistent, ripening to orange colour. Seeds 1-2, ovoid.

*Fl. & Fr.*: November-February.

*Distribution*: Indo-Malesia. Dry-deciduous forest of Vechapathy, c.650 m; frequent. *HN 150*.

*Usage*: Boil water with a small piece of about 10" long of crushed root. Use this water for bathing. Continue this for one week for reducing heat sores and one month for curing itches on the skin. Roots and leaves crushed and a quantity of a gooseberry-size is boiled in two glasses of water, reduced to half. This decoction of roots and leaves taken in equal quantity is administered three times a day for continuous three days. This helps in curing heart-burn.

**Chloroxylon swietenia** DC., Prodr. 1: 625. 1824; Hook. f., Fl. Brit. India 1: 569. 1875; Gamble, Fl. Pres. Madras 152. 1915; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 201. 1983; Sasidh., Biodiv. Doc. Kerala 6: 92. 2004. *Swietenia chloroxylon* Roxb., Fl. Corom. t. 64. 1796; Roxb., Fl. Ind. 2: 400. 1832. **Porinchamaram (I)**.

Trees to 12 m tall; branchlets pubescent. Leaves even pinnate, 15 x 2.5 cm, leaflets 10-15 pairs, alternate or subopposite, lanceolate, 2 x 0.7 cm, glaucous below, base oblique, margin entire, apex obtuse; petiole to 2 cm long; petiolule to 2 mm long. Panicles terminal, to 10 cm long, pubescent; peduncle to 2 cm long; pedicel to 3 mm long. Calyx tube deeply lobed, pubescent; lobes 5, triangular, to 1.5 mm across. Petals 5, cream, ovate, 5 x 2.5 mm, pubescent without, clawed. Disc thick, 10-lobed, pubescent. Stamens 10, free; filaments subequal, to 2 mm long. Ovary embedded in disc, 3-lobed, 3-celled; ovules 4-8 per cell; style 0.5 mm long; stigma capitate.

Capsule oblong, 2.5 x 1 cm, 3-valved. Seeds 12 -15, oblong, compressed.

*Fl. & Fr.*: March-July.

*Distribution*: India, Sri Lanka and Malagasy. Dry-deciduous forest of Koodappetty; not frequent; c. 600 m. *HN 167*.

*Usage*: Leaves are employed in fish catching by mixing the ground leaves in stagnant water. Bark-paste is applied externally to treat certain kind of skin diseases. Wood of mature tree is used for making agricultural implements.

**Citrus aurantifolia** (Christm. & Panz.) Swingle, J. Wash. Acad. Sci. 3: 465. 1913 & in *Citrus Indust.* 1: 374. 1967; K. M. Matthew & Britto in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 203. 1983; Vajr. in Nair *et al.*, *Fl. Tamilnadu* 1: 58. 1983. *Limonia aurantifolia* Christm. & Panz., *Pflanzenr. Syst.* 1: 618. 1777. *Citrus acida* Roxb., *Fl. Ind.* 3: 390. 1832. *C. medica* L. var. *acida* (Roxb.) Hook. f., *Fl. Brit. India* 1: 515. 1875. **Eemby sedi (I, K & M)**.

Small tree to 3 m tall; thorns sharp, to 0.7 cm long. Leaves ovate or elliptic, 6-10 x 3-4.5 cm, margin serrate-crenate; petiole to 2 cm long. Flowers axillary; pedicel to 0.7 cm long. Calyx truncate or shallowly 4-5-lobed. Petals white coloured, lobes 4-5, oblong, thick, to 1 cm long. Disk annular. Stamens many, shorter than petals, united in groups. Ovary elliptic, c. 10-celled; style short, terete; stigma capitate. Fruit globose, 5 x 5 cm across, yellowish when ripe; vesicles elongate, pointed.

*Fl. & Fr.*: August-January.

*Distribution*: Native of Malesia; now widely cultivated in India. Farm lands of Kombe, c. 800 m; frequent. *HN 159*.

*Usage*: Cultivated for the fruits. Mature fruits are collected and either pickled or sold in the market.

**Clausena austroindica** Stone & Nair, *Nordic J. Bot.* 14: 491. 1994; Mohanan & Sivad., *Fl. Agasthyamala* 138. 2002. *C. heptaphylla* (Roxb.) Wight & Arn., *Prodr.* 95. 1834; Hook. f., *Fl. Brit. India* 1: 504. 1875; Gamble, *Fl. Pres. Madras* 155. 1915; Vajr. in Nair *et al.*, *Fl. Tamilnadu* 1: 59. 1983; Manilal, *Fl. Silent Valley* 44. 1988; V. S. Ramach. & V. J. Nair, *Fl. Cannanore*

82. 1988; Vajr., Fl. Palghat Dist. 103. 1990; Sasidh. & Sivar., Flow. Pl. Thrissur For. 81. 1996. *Amyris heptaphylla* Roxb., Fl. Ind. 2: 248. 1832.

**Karampe (I).**

Large shrubs to 5 m high; strongly aromatic. Leaves pinnate, to 25 cm long; leaflets lanceolate-obovate, gland dotted, chartaceous, base oblique, cunneate, margin crenate, apex acuminate. Flowers in axillary panicles, to 12 cm long. Calyx 5-lobed. Corolla lobes 5, imbricate, gland dotted. Stamens 8-10, inserted around the elongated disk; filaments unequal. Ovary 5 celled; style thick; stigma obtuse. Berry subglobose, to 1 cm across, 3-5 celled, pericarp glandular, fleshy, black coloured when ripe. Seeds oblong.

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

*Distribution:* Endemic to Southern Western Ghats. Dry-deciduous forests of Puliappathy, c. 650 m; frequent. *HN 062.*

*Usage:* Fruits are edible when ripe and mostly consumed by shepherd children.

**Glycosmis mauritiana** (Lam.) Tanaka, Bot. Not. 1928: 159. 1928 & Bull. Soc. Bot. France 75: 708. 1928; Brizicky, J. Arn. Arbr. 43: 90. 1962; K. M. Matthew, Britto & Stone in K.M. Matthew, Fl. Tamilnadu Carnatic 3: 205. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 60. 1983; Manilal, Fl. Silent Valley 45. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 84. 1988; Vajr., Fl. Palghat Dist. 104. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 103. 1994; Mohanan & Sivad., Fl. Agasthyamala 143. 2002. *Limonia mauritiana* Lam., Encycl. 3: 517. 1792. *L. pentaphylla* Roxb., Pl. Corom. t. 84. 1798, *non* Retz., 1788. *Glycosmis cochinchinensis* auct., *non* (Lour.) Pierre ex Engl., 1896; Gamble, Fl. Pres. Madras 153. 1915; *pro parte*. *G. pentaphylla* auct., *non* (Roxb.) DC. 1824: Bedd., Fl., Sylv. Anal. Gen. 43, t. 6, f. 6 (f.7). 1870; Hook. f., Fl. Brit. India 1: 499. 1875; Narayanaswami, Rec. Bot. Surv. India 14: 12. 1941; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 61. 1983. **Moolegili, Ulakodi (I).**

Shrubs to 3 m high. Leaves 3-5-foliolate; petiole to 2.5 cm long, rachis to 1.5 cm long; petiolules to 0.5 cm long; leaflets to 10 x 1.5-4 cm.

Inflorescence axillary, to 2.5 cm long, puberulent; peduncle to 0.5 cm long. Flowers to 6 mm long. Sepals 5, to 0.05 cm wide, puberulent. Petals elliptic, glabrous, 4-6 mm long. Filaments subulate; anthers ovate-elliptic. Ovary ovoid, seated on thin, slightly lobed disc, 4-5-celled. Fruits subglobose, to 1 cm across, pericarp pink when ripe. Seed single.

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

*Distribution*: Indo-Malesia. Riverine forest of Mully, c. 700 m; locally abundant. *HN 019*.

*Usage*: A paste made of leaves is applied in the forehead for curing headache. The root-paste is applied externally for continuous one week for fast curing of itches and skin troubles. Two root pieces are crushed and a decoction is prepared in one glass of water. Single administration of this cures stomach-ache. Root paste is scooped with fore finger and administered to those who suffer from bronchial troubles. This is to be taken in the early morning and late evening for continuous ten days. Stem is cut to convenient size to make sticks for cattle rearing.

**Limonia acidissima** L., Sp. Pl. (ed. 2.) 554. 1762; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 208. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 61. 1983; Sasidh., Biodiv. Doc. Kerala 6: 81. 2004. *Schinus limonia* L., Sp. Pl. 389. 1753. *Feronia elephantum* Correa, in Trans. Linn. Soc. London 5: 225. 1800; Hook. f., Fl. Brit. India 1: 516. 1875; Gamble, Fl. Pres. Madras 160. 1915. *F. limonia* (L.) Swingle, J. Washington Acad. Sci. 4: 328. 1914. **Vilamaram (I)**. Plate 10B.

Trees to 15 m tall; branchlets densely tomentose; armed, spines axillary, straight, 2.5 cm. Leaves 1-3 in a cluster, odd-pinnate, to 8 x 5.5 cm; leaflets 1-4 pairs, opposite, oblong or obovate, 4 x 2 cm, thin-coriaceous, glabrous, base cuneate, margin entire, apex obtuse; petiole and rachis flattened, narrowly winged; petiole to 2 cm long; petiolule 2 mm long. Racemes axillary or terminal, 5 x 3 cm; peduncle to 1 cm long; bracteoles scaly; pedicel to 1 cm long. Flowers 5-merous, polygamous, to 1 cm across. Male: calyx-tube small; lobes 5, to 1 mm long, pubescent without. Petals 5,

cream, oblong, to 5 mm long. Disc thick, annular, pubescent. Stamens 10-12, free, inserted around the disc; filaments 1.5 mm long, base dilated and densely villous; pistillode short. Bisexual: Stamens 10-12. Ovary ovoid, 6 mm across, 5 or 6-celled; ovules numerous, in several series; stigma sessile, oblong, fusiform. Berry globose, 8 x 5 cm, woody, indehiscent. Seeds numerous, oblong, compressed, embedded in pulp.

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

*Distribution*: Indo-Malesia. Dry-deciduous forest of Vatlakki, c. 600 m; not frequent. *HN 190*.

*Usage*: Pulp of mature fruits are edible, which are largely available in summer months.

**Murraya koenigii** (L.) Spreng. in L., *Syst. Veg.* 2: 315. 1826; Hook. f., *Fl. Brit. India* 1 : 503. 1875; Gamble, *Fl. Madras* 156. 1915; K. M. Matthew *et al.*, *Fl. Tamilnadu Carnatic* 3: 209. 1983; Vajr. in Nair *et al.*, *Fl. Tamilnadu* 1: 61. 1983; Sasidh. & Sivar., *Flow. Pl. Thrissur For.* 86. 1996; Sivar. & P. Mathew, *Fl. Nilambur* 128. 1997. *Bergera koenigii* L., *Mant. Pl.* 1: 563. 1771.

**Kariveppe maram (I).**

Shrubs to small trees, to 5 m tall; branchlets green to grey, glabrous. Leaves pinnate, to 20 cm long; leaflets 15-25, oblique, oblong-lanceolate, to 3 x 1.5 cm; petiolules, to 2 mm long. Inflorescence paniculate, corymbose, many-flowered. Flowers small, fragrant; pedicels to 4 mm long. Petals 5, white coloured, to 8 mm long. Stamens 10, unequal; anthers short. Style 4 mm long; stigma discoid-capitate; ovary glabrous, 2-celled; ovule 1-2 per cell. Fruit subglobose, 0.5 x 0.5 cm, purplish-black coloured when ripe. Seeds 1-2, greenish, to 0.3 cm wide.

*Fl. & Fr.*: August-October; March-May.

*Distribution*: Indo- Malesia and China. Dry-deciduous forest of Patimalam, c. 600 m; frequent. *HN 155*.

*Usage*: Leaves are fried and powdered. Half a spoon of this powder is mixed in honey and given occasionally in empty stomach in the morning, for getting relief from cough.

**Naringi crenulata** (Roxb.) Nicols. in Sald. & Nilcols., Fl. Hassan Dist. 387. 1976; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic t. 3: 211. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 61. 1983; Vajr., Fl. Palghat Dist. 105. 1990; V. S. Ramach. & V. J. Nair, Fl. Cannanore 84. 1988; Sasidh. & Sivar., Flow. Pl. Thrissur For. 84. 1996; Sivar. & P. Mathew, Fl. Nilambur 125. 1997. *Limonia crenulata* Roxb., Pl. Corom. t. 86. 1798 & Fl. Ind. 2: 381.1832; Gamble, Fl. Pres. Madras 157. 1915. **Ezhilavila (I)**.

Trees to 10 m tall; branchlets glabrous; armed, spines axillary, solitary or paired, straight, to 2 cm long. Leaves 3-5 in a cluster, 5-10 cm; leaflets 3 pairs, oblong, ovate or elliptic, 2-7 x 1-3 cm, glabrous below, base and apex subacute, margin crenulate; petiole to 3 cm long; petiole and rachis jointed, winged. Racemes axillary, subumbellate, to 3 cm long, c. 10 flowered; peduncle to 1 cm long; pedicel to 1.5 cm long. Flowers, to 1 cm across. Calyx-tube campanulate, puberulous; lobes 4 or 5, ovate, 2 mm across. Petals 4 or 5, white coloured, oblong, 6.5 x 3 mm, attenuate at base. Disc columnar. Stamens c.10, free, inserted around the disc; filaments subequal, to 3.5 mm long. Ovary oblong-obovoid, to 2 mm across, 4-celled; ovule 1 per cell; style to 2 mm long, thick; stigma capitate. Berry globose, to 8 mm wide. Seeds 3 or 4, ovoid.

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

*Distribution*: Indo-Malesia. Dry-deciduous forest of Vatlakki, c. 600 m; frequent. *HN 093*.

*Usage*: Fresh and dry leaves are smoked around the dwelling area to repel insects. Wood of pole size is used as pillars in hut construction.

**Pleiospermium alatum** (Wight & Arn.) Sw., J. Washington Acad. Sci. 6: 427. 1916; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 212. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 62. 1983. *Limonia alata* Wall. ex Wight & Arn., Prodr. Fl. Ind. Orient. 92. 1834; Hook. f., Fl. Brit. India 1: 508. 1875; Gamble, Fl. Pres. Madras 157. 1915. **Kurunthamaram (I)**.

Small trees to 8 m tall; branchlets tomentose; armed, spine solitary, axillary, to 2 cm long, straight. Leaves trifoliolate, 4-8 cm long; leaflets obovate, 3-6 x 2-4 cm, thin-coriaceous, glabrous, base cuneate, margin subentire, apex obtuse, retuse; petiole winged, to 2.5 cm long. Panicles terminal and axillary, to 8 cm long; peduncle to 2 cm long; pedicel to 3 mm long. Flowers 4 or 5-merous, 1.5 cm across. Calyx-tube campanulate, gland-dotted, pubescent; lobes 4 or 5, ovate, 2 mm long. Petals 4 or 5, cream coloured, obovate, 8 x 3.5 mm, puberulous without, clawed. Disc thick, cupular, c. 10-lobed. Stamens 10, free; filaments to 5 mm long; anthers oblong. Ovary obovoid, 5-celled; ovules 2 per cell, style to 3 mm long; stigma capitate. Berry globose, to 2.5 cm wide. Seeds c. 4.

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

*Distribution*: Indo-Malesia, China and Australia. Dry-deciduous forest of Puliapathy, c. 650 m; frequent. *HN 338*.

*Usage*: Leaves are fried with grains of *Solam* (*Sorghum bicolor*) and well powdered. A termite mound is broken on the top and this powder is slowly blown down through the hole. This results the outburst of insects which are collected with a pot, fried in coconut oil and eaten.

**Toddalia asiatica** (L.) Lam., *Tabl. Encycl.* 2: 116. 1797. Vajr. in Nair *et al.*, *Fl. Tamilnadu* 1: 62. 1983; Manilal, *Fl. Silent Valley* 46.1988; V. S. Ramach. & V. J. Nair, *Fl. Cannanore* 85. 1988. *Paullinia asiatica* L., *Sp. Pl.* 365. 1753; *Toddalia aculeata* (Smith) Pers., *Syn. Pl.* 1: 249. 1805, *nom. superfl.*; Hook. f., *Fl. Brit. India* 1: 497. 1875. *Scopalia aculeata* Smith, *Pl. Ic. Hact.* (ed.1) 2: t. 34.1790. *nom. superfl.* *Toddalia flouribunda* Wall., *Pl. As. Rar.* 3: 17, t. 232. 1832. *T. asiatica* (L.) Lam. var. *flouribunda* (Wall.) Kurz, *J. Asiat. Soc. Bengal Pt. 2, Nat. Hist.* 44: 130. 1875; Gamble, *Fl. Pres. Madras* 151. 1915; Vajr., *Fl. Palghat Dist.* 106. 1990; Sasidh. & Sivar., *Flow. Pl. Thrissur For.* 84. 1996. *T. asiatica* (L.) Lam. var. *gracilis* Gamble, *Fl. Pres. Madras* 151. 1915. *T. asiatica* (L.) Lam. var. *obtusifolia* Gamble, *Fl. Pres. Madras* 151. 1915; Sasidh. & Sivar., *Flow. Pl. Thrissur For.* 84. 1996.

**Erigunge (I & M).**

Scandent shrubs to 3m high, stem prickled, branchlets glandular-tomentose. Leaves trifoliolate; leaflets 3-9, 12 x 6 cm long, elliptic-oblong, pubescent below, glabrous above, base cuneate, margin crenate-serrate, apex obtuse, nerves prickled; petiole to 3 cm long. Inflorescence axillary and terminal in reduced axillary racemes, to 10 cm long, peduncle to 3 cm long, armed. Flowers pentamerous, dioecious, 7 mm across. Male: calyx lobes 5, pubescent, campanulate, tube small. Corolla 5, creamy-white coloured, glandular. Stamens 5, disc crenate, hairy; filaments connate. Female: Stamens absent. Ovary oblong, trilocular; ovules 2 per cell; stigma capitate. Drupe elliptic, gland dotted, to 3.5cm long. Seed single.

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

*Distribution:* Indo-Malesia, China and Australia. Riverine forest of Mully, c. 700 m; frequent. *HN 152.*

*Usage:* Grind fresh roots well and make a solution in water. This is administered for severe stomach pain caused by indigestion. Single-time application is suggested. For cold and fever apply the leaf paste all over body for immediate relief. Wipe out this paste after two hours. Taking bath is not advised during the treatment. Chew and slowly eat small pieces of roots regularly for curing mouth and stomach ulcers, gas formation, etc.

## SANTALACEAE

**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; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1381. 1983; Kumari in Henry *et al.*, Fl. Tamilnadu 2: 219. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 402. 1988; Vajr., Fl. Palghat Dist. 414. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 401. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 388. 1996; Sivar. & P. Mathew, Fl. Nilambur 598. 1997. *Sirium myrtifolium* Roxb., Pl. Corom. t. 2. 1795. *Santalum myrtifolium* Roxb., Fl. Ind. 1: 444. 1832. **Sandanam (I).**

Trees to 8 m tall. Leaves opposite, elliptic-ovate to lanceolate, 4-7 x 2.5-4 cm, subcoriaceous, base rounded to acute, margin entire, apex gradually acute. Inflorescence of paniculate cymes, to 2.5 cm long, terminal and axillary. Flowers bisexual, brownish-purple coloured, 6 mm across. Tepals 5, equal, basally connate into a campanulate tube, 2 mm long, shortly connate to the basal part of ovary; lobes ovate, thin-fleshy, 2.5 x 1.5 mm, minutely ciliate, acute. Stamens 5; filaments 1 mm long; anthers 0.7 mm long. Ovary globose, 7 mm across; ovules 2-3, pendulous; style 1.5 mm long; stigma 3-lobed. Disc of 5, fleshy, ovoid, obtuse scales, alternating with stamens. Drupe globose, 1 x 0.8 cm, beaked with the basal part of style. Seed single.

*Fl. & Fr.*: September-December.

*Distribution*: Peninsular India and Malesia. Dry-deciduous forest of Nakkupathy, c. 650 m; not frequent. *HN 238*.

*Usage*: Grind well the heart wood to get a quarter portion of the size of a gooseberry, mix it with the root-paste of *Mulegili* (*Glycosmis mauritiana*) diluted in half a glass of water, and taken two times a day for curing all types of fever.

## SAPINDACEAE

***Cardiospermum halicacabum* L.**, Sp. Pl. 366. 1753; Hiern in Hook. f., Fl. Brit. India 1 : 670. 1875; Gamble, Fl. Pres. Madras 244. 1918; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 292. 1983; Chithra in Nair *et al.*, Fl. Tamilnadu 1: 83. 1983; V. S. Ramach. & V. J. Nair, Fl. Cannanore 111. 1988; Vajr., Fl. Palghat Dist. 130. 1990; Sasidh. & Sivar., Flow. Pl. Thrissur For. 116. 1996; Sivar. & P. Mathew, Fl. Nilambur 161. 1997. **Chadukku pidukku chedi (I)**.

Climbing shrubs; branchlets tomentose. Leaves to 12 cm long; leaflets ovate-lanceolate, 3-5.5 x 1.5-4.5 cm, membranous, glabrous above, tomentose below, base obtuse-truncate, margin irregularly deeply incised, apex obtuse, mucronate; petiole to 2.5 cm long; petiolule to 5 mm long. Racemes axillary; peduncle to 10 cm long; bract subulate; pedicel to 4 mm

long. Male flowers: outer sepals suborbicular, 1.5 mm long; inner ones obovate, 6 x 4 mm. Petals 2+2, white coloured; upper ones oblong, 6 x 4 mm, basal to 5 mm long. Stamens 8; filaments, to 4 mm long, pilose. Bisexual: 5.5 mm long. Stamens 8; filaments 3 mm long, densely pilose. Ovary oblong, 4 mm across, 3-celled, tomentose; ovule 1 per cell; style 1-5 mm long; stigma 3-fid. Capsule swollen, obscurely 3-lobed, 3.5 x 3 cm, tomentose. Seeds globose, to 5 mm wide, black coloured.

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

*Distribution*: Pantropical. Waste lands of Chavadiyoor, c. 650 m; frequent. *HN* 180.

*Usage*: During the last months of pregnancy, rice is boiled with some shoots of this plant and eaten. This is said to aid easy delivery.

***Dodonaea viscosa*** (L.) Jacq., Enum. Syst. Pl. 19. 1760; Hiern in Hook. f., Fl. Brit. India 1: 697. 1875; Gamble, Fl. Pres. Madras 253. 1918; Chithra in Nair *et al.*, Fl. Tamilnadu 1: 84. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 125. 1994. *Dodonaea angustifolia* L. f., Suppl. Pl. 218. 1782; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 294. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 125. 1994. *Ptelea viscosa* L., Sp. Pl. 118. 1753. **Mantrachappu, Viraali (I)**.

Shrubs to 2 m high; branchlets gland-dotted. Leaves simple, elliptic-oblong, 5-11 x 2-3 cm, thin-coriaceous, gland-dotted, base attenuate, margin entire, apex obtuse-acute, subsessile. Inflorescence-axillary or terminal racemes or panicles, 2-6 cm long; peduncle to 1 cm long. Flowers apetalous. Male: 6 mm across; calyx 4 or 5, oblong, to 2 mm long, ciliate. Disc rudimentary. Stamens 4-10; filaments 0.8 mm long, glabrous; anthers to 3 mm long; pistillode to 1 cm long. Female: 3 cm across; calyx 4-5, ovate, 1 mm long. Ovary 2 mm across; style 5 mm long; stigma bi or trifid. Bisexual: 4 mm across, calyx lobes 4-5, pale green coloured, oblong-ovate, imbricate, to 2.5 mm long, subequal. Disc annular. Stamens 5-10, to 3 cm long, inserted outside the disc, free, subsessile. Ovary globose, 0.5 mm across, 2-4 celled; ovules 2 per cell; style 3 mm long; stigma bi or trifid. Capsule 1.5 x 2 cm,

winged. Seed globose, 1-3, to 3 mm wide.

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

*Distribution*: Pantropical. Dry thickets of Mully, c. 700 m; locally abundant. *HN 124*.

*Usage*: Leaves are ground well with water and applied the paste over lower abdomen to get relief from stomach obstruction. Wash off the paste after one hour. Cut-shoots possess defoliating nature and not easily attacked by termites, hence used in the construction of veils, trellis etc.

**Sapindus trifoliata** L., Sp. Pl. 367. 1753; Hiern in Hook. f., Fl. Brit. India 1: 682. 1875; Sivar. & P. Mathew, Fl. Nilambur 165. 1997; Sasidh. & Sivar., Flow. Pl. Thrissur For. 119. 1996. *Sapindus laurifolius* Vahl, Symb. Bot. 3: 54. 1794; Gamble, Fl. Pres. Madras 250. 1918; Vajr., Fl. Palghat Dist. 132. 1990; Chithra in Nair *et al.*, Fl. Tamilnadu 1: 85. 1983; V. S. Ramach. & V. J. Nair, Fl. Cannanore 114. 1988; Mohanan & Sivad., Fl. Agasthyamala 176. 2002. **Poocha maram (I, M & K)**.

Trees to 10 m tall; branchlets tomentose. Leaves even-pinnate, 15 x 12 cm; leaflets subopposite, 3 pairs, oblanceolate, 5-10 x 2.5-4 cm, base cuneate, margin entire, apex emarginate-retuse; petiole to 4 cm long; petiolule to 4 mm long. Panicles 10 cm long, rusty; peduncle to 2 cm long; pedicel to 2 mm long. Flowers 5 mm across. Male: Sepals 5, bi-seriate, ovate-orbicular, 3-4 mm long, imbricate, apex strigose. Petals 5. Stamens 8, inserted within disc; filaments unequal, free; pistillode small. Bisexual: Sepals 5, bi-seriate; outer ones oblong, 4 mm long; inner ones obovate, 3 mm long, ciliate. Petals 5, white coloured, obovate, 2.5 mm across, basal scales 2, attached on inner surface; outer surface with three woolly tufts. Disc annular, 5-lobed, strigose. Stamens 8. Ovary trigonous; ovule 1; style 1 mm long; stigma 3-lobed. Drupes ovoid, lobed, fleshy when ripe.

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

*Distribution*: South Asia. Riverine forest of Chavadiyoor, c. 600 m; frequent. *HN 086*.

*Usage:* Ripe fruits are collected, dried and used for house-hold purposes or marketed. The nuts used as a substitute for soap, for cleaning clothes, vessels etc. Put some nuts in hot water and keep for a few hours and the solution is used for cleaning purpose.

This is also sold as an NWFP item, valued for the saponins, which finds application as a textile auxiliary and used as detergent in the preparation of soaps and tooth-pastes.

## SAPOTACEAE

***Palaquium ellipticum*** (Dalz.) Baill., *Traite Bot. Med. Phan.* 1500. 1884; Gamble, *Fl. Pres. Madras* 764. 1921; Bhargavan in Henry *et al.*, *Fl. Tamilnadu* 2: 64. 1987; Manilal, *Fl. Silent Valley* 168. 1988; V. S. Ramach. & V. J. Nair, *Fl. Cannanore* 264. 1988; Vajr., *Fl. Palghat Dist.* 267. 1990; Mohanan & Henry, *Fl. Thiruvananthapuram* 278. 1994; Sasidh. & Sivar., *Flow. Pl. Thrissur For.* 267. 1996; Sivar. & P. Mathew, *Fl. Nilambur* 397. 1997; Mohanan & Sivad., *Fl. Agasthyamala* 414. 2002. *Bassia elliptica* Dalz. in Hook.'s *J. Bot. Kew Gard. Misc.* 3: 36. 1851. *Dichopsis ellipticum* (Dalz.) Benth., *Gen. Pl.* 2: 658. 1876; Clarke in Hook. f., *Fl. Brit. India* 3: 542. 1882.

### **Pali (K & M).**

Large trees to 40 m tall; stem covered with lenticels; latex milky. Leaves elliptic-ovate, 7-9 x 4-6 cm; base attenuate, apex twisted, obtusely acute. Flowers in axillary fascicles. Pedicel to 1.5 cm long. Sepals 6, in 2 rows, to 0.7 cm long. Corolla tube short; lobes white coloured, to 0.6 cm long. Stamens many; anthers long, apiculate, hairy at tip. Fruits a berry, fleshy when ripe, ellipsoid, to 4 cm long. Seeds 1-2.

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

*Distribution:* Endemic to Western Ghats. Semi-evergreen forests of Kurukkan kundu, c. 800 m; frequent. *HN 209.*

*Usage:* The ripe fruits are eaten during summer months while it is largely available.

## SCROPHULARIACEAE

**Scoparia dulcis** L., Sp. Pl. 116. 1753; Hook. f., Fl. Brit. India 4: 289. 1884; Gamble, Fl. Pres. Madras 964. 1924; N. Rani & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1100. 1983; Henry & Chithra in Henry *et al.*, Fl. Tamilnadu 2: 125. 1987; Manilal, Fl. Silent Valley 196. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 320. 1988; Vajr., Fl. Palghat Dist. 326. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 331. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 324. 1996; Sivar. & P. Mathew, Fl. Nilambur 477. 1997; Mohanan & Sivad., Fl. Agasthyamala 484. 2002.

### **Meenamkannichedi (I).**

Erect herbs to 60 cm high; stem angled. Leaves opposite or whorled, simple, 3.5 x 1 cm, punctate, elliptic-lanceolate, base cuneate, margin serrate, apex acute; petiole to 0.5 cm long. Flowers small, axillary, 1-2 per axil, pedicellate. Calyx-lobes 4, free, oblong, imbricate, 2.5 mm long, pubescent without, ciliate, acute. Corolla pale white coloured, 5 mm across, rotate; lobes 4, oblong, to 3.5 mm long, truncate, obtuse. Stamens 4, equal, exserted; filaments filiform, 2 mm long; anthers 2-celled. Ovary globose; style 2 mm long; stigma truncate. Capsule globose, enclosed in calyx, to 3 mm wide, septicial. Seeds many, reticulate.

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

*Distribution:* Native of tropical America; now pantropical. Farm lands of Konamkuthy, c. 750 m; frequent. *HN 229.*

*Usage:* To get relief from excessive body heat in summer, apply the paste of the whole plant over the head and forehead. Sprinkle water when the paste is dried and wash well after one hour. The paste when applied externally one hour before bath for three continuous days, it helps to cure the summer boils.

## SOLANACEAE

**Capsicum frutescens** L., Sp. Pl. 189. 1753; Gamble, Fl. Pres. Madras 941. 1921; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu

Carnatic 3: 1047.1983; Chithra in Henry *et al.*, Fl. Tamilnadu 112. 1987; Sasidh., Biodiv. Doc. Kerala 6: 314. 2004. *C. fastigiatum* Bl., Bijdr. 705. 1826. *C. minimum* Clarke in Hook. f., Fl. Brit. India 4: 239. 1883. **Cheeni mulakai (M)**.

Subshrubs to 1.5 m high. Leaves elliptic-ovate, 5-10 x 4-6 cm, puberulous along nerves, base obliquely rounded to acute, apex acuminate; petiole to 3 cm long. Flowers solitary or paired, axillary; pedicel to 1.5 cm long. Calyx cupular, 4 mm long, puberulous without, triangular, acute. Corolla white, 1.2 cm across, triangular-ovate, puberulous without, acute. Stamens 5, exerted; filaments 1.5 mm long. Ovary 1.5 mm across; style 4 mm long; stigma capitate. Berry elongate, to 1.5 cm wide, cylindrical, gradually tapering below, reddish when ripe. Seeds compressed, circular.

*Fl. & Fr.*: September-December.

*Distribution*: Native of tropical America; now widely cultivated as a vegetable crop. Moist deciduous forests of Mukkali, c. 500m; frequent. *HN 286*.

*Usage*: Fresh leaves are ground well along with the leaves of *Ambukane* (*Vernonia divergens*) in the excreta of goat and applied over a particular kind of skin disease characterized by blackish scales. Take bath in hot water after one hour. This procedure is continued for about one week or complete relief.

**Datura metel** L., Sp. Pl. 179. 1753; Clarke in Hook. f., Fl. Brit. India 4: 242. 1883; Gamble, Fl. Pres. Madras 941. 1923; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1052. 1983; Chitra in Henry *et al.*, Fl. Tamilnadu 2: 113. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 309. 1988; Vajr., Fl. Palghat Dist. 315. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 319. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 315. 1996; Sivar. & P. Mathew, Fl. Nilambur 461. 1997. *D. alba* Nees, Trans. Linn. Soc. London 17: 73. 1837. *D. fastuosa* L., Syst. Nat. (ed. 10) 932. 1759; Clarke in Hook. f., Fl. Brit. India 4: 243. 1883; Gamble, Fl. Pres. Madras 941. 1923. *D. fastuosa* L. var. *alba* (Nees) Clarke in Hook. f., Fl. Brit. India 4: 243. 1883; Gamble, Fl. Pres. Madras 941. 1923. **Ummam (M)**.

Subshrubs to 1 m high. Leaves elliptic to angulate, 10-18 x 7-15 cm, softly tomentose below, base unequally truncate, margin frequently lobed, apex acute; petiole to 10 cm long. Flowers solitary, axillary. Calyx 8 cm long; lobes lanceolate, 1.5 cm long, acute. Corolla white coloured with a violet shade, funnel shaped, 7 cm across; tube 10-15 cm long; limb 4 cm long. Stamens 5; filaments 8 cm long; anthers 1 cm long. Ovary 0.7 cm across; style 10 cm long. Capsule 4 cm across; spinous, spines short, stout, 0.7 cm long.

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

*Distribution:* Paleotropics. Farm lands of Naikkarppadi, c. 600 m; frequent. HN 319.

*Usage:* Take a fresh leaf, crush, cover it in a clean cloth and inhale through both nostrils three times. This has to be practiced in the early morning for getting relief from migraine. External application of the leaf-juice mixed with a pinch of common salt several times a day on chin or jaw is practised in inflammation related to tooth-ache.

**Lycopersicon esculentum** Miller, Gard. Dict. (ed. 8), n. 2. 1768; Clarke in Hook f., Fl. Brit. India 4: 237. 1883; Gamble, Fl. Pres. Madras 941. 1923; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1053. 1983; Chithra in Henry *et al.*, Fl. Tamilnadu 2: 113. 1987; Manilal, Fl. Silent Valley 192. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 313. 1988. *Solanum lycopersicum* L., Sp. Pl. 185. 1753. *Lycopersicon lycopersicum* (L.) Karsten, Deut. Fl. 966. 1882. **Siruthakkali (I).**

Herbs to 75 cm high; shoots sticky-pubescent. Leaves to 25 cm long, pinnatisect; lobes obliquely triangular-ovate, lower ones separating from leaf, terminal lobes acute; petiole to 2 cm long. Flowers solitary, axillary, pedicellate. Calyx-lobes 5, triangular, lanceolate, 6 mm wide, strigose without, acute, spreading in fruit. Corolla yellow coloured, 1.5 cm across, sub-rotate; lobes triangular, to 1 cm long, ciliate, acute. Stamens 5, connivent around style; filaments 2 mm long; anthers tapering into a sterile apex. Ovary bilocular; style 7 mm long; stigma obtuse. Berry slightly depressed, shiny,

reddish, globose, 1.5-3 cm across; pulp juicy. Seeds discoid, embedded in the pulp.

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

*Distribution*: East and South America, Mexico; widely cultivated in world countries. Farmlands and marginal forest land of Mully, c.700 m; frequent. *HN 033*.

*Usage*: Ripe fruits are collected from the wildy growing plants and used as a vegetable.

**Solanam americanum** Miller, Gard. Dict. ed. 8, 5. 1768; Sasidh. & Sivar., Flow. Pl. Thrissur For. 316. 1996; Sivar. & P. Mathew, Fl. Nilambur 463. 1997; Mohanan & Sivad., Fl. Agasthyamala 477. 2002. *Solanum nigrum* L., Sp. Pl. 186. 1753; Clarke in Hook. f., Fl. Brit. India 4: 229. 1883; Gamble, Fl. Pres. Madras 936. 1923; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1062. 1983; Chithra in Henry *et al.*, Fl. Tamilnadu 2: 116. 1987; Manilal, Fl. Silent Valley 194. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 312. 1988; Vajr., Fl. Palghat Dist. 319. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 322. 1994. *S. rubrum* Mill., Gard. Dict. (ed. 8) 4. 1768, non L., 1767. **Kakke daagu (I, K & M)**.

Herbs to 1 m high; branchlets sparsely scabrous. Leaves broadly ovate-elliptic, 8 x 5 cm, base decurrent, margin entire, apex acute; petiole, to 5 cm long. Flowers in umbellate cymes, c. 7-flowered; peduncle to 2 cm long; pedicel to 0.7 cm long. Calyx cupular, herbaceous; lobes 5, oblong, 2 mm long, puberulous without, acute. Corolla white, 6 mm across; lobes 5, oblanceolate, 5 mm long, basally decurrent, acute. Stamens 5; filaments 0.5 mm long; anthers 1.5 mm long. Ovary 1.5 mm across; style 2 mm long, pubescent below; stigma capitellate. Berry 0.5 cm across, juicy, blackish when ripe. Seeds discoid, embedded in the pulp, minutely pitted.

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

*Distribution*: Cosmopolitan. Waste lands of Konamkuthy; c. 750 m; frequent. *HN 258*.

*Usage*: Leaves and young shoots are used as a vegetable especially given for pregnant women. Ripe fruits are edible.

**Solanum incanum** L., Sp. Pl. 188. 1753; K. M. Matthew, Mat. Fl. Tamilnadu Carnatic 1: 278. 1981; Vajr., Fl. Palghat Dist. 319. 1990. *S. coagulana* Forsk., Fl. Arab. 47. 1775; Clarke in Hook. f., Fl. Brit. India 4: 236. 1883. **Gullavatane (I & M).**

Herbs to 0.75 m high; tomentose. Leaves ovate-elliptic, to 18 cm long, base truncate, apex acute, stellate pubescent. Cymes axillary. Flowers few, 1.5 cm across. Calyx lobes triangular, thick, prickly, to 0.6 cm long. Corolla violet coloured, to 1 cm long, woolly outside, acuminate. Stamens 5, attached to the throat of corolla, filaments short; conniving around the stigma. Berries ovoid, glabrous, to 2 cm wide; seeds 3 mm across.

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

*Distribution:* India. Waste lands of Mully, c. 700 m; frequent. *HN 028.*

Farm lands of Mully, c. 750 m; frequent. *HN 013.*

*Usage:* Fresh roots smeared or smelled by the hunting dogs said to increase their smelling ability.

**Solanum torvum** Sw., Nov. Gen. Sp. 47. 1788; Hook.f, Fl. Brit. India 4; 234. 1883; Gamble, Fl. Pres. Madras 937. 1923; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1064. 1983; Chithra in Henry *et al.*, Fl. Tamilnadu 2: 117. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 312. 1988; Vajr., Fl. Palghat Dist. 320. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 323. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 317. 1996; Sivar. & P. Mathew, Fl. Nilambur 466. 1997; Mohanan & Sivad., Fl. Agasthyamala 478. 2002. **Sunde (K & M).**

Armed shrubs to 3 m high; prickles scattered. Leaves sinuate, 8-15 x 6-12 cm, chartaceous, stellate-pubescent sparsely above and densely below, base obliquely subcordate to truncate, apex acute; petiole to 6 cm long. Corymbose cymes extra-axillary; peduncle to 5 cm long; pedicel to 1 cm long. Calyx cupular; lobes oblong, 4 mm wide, basally connate, pubescent without, acuminate. Corolla dull-white coloured, 2.5 cm across; lobes 5, oblong, 1.5 cm long, stellate-pubescent without, acute. Stamens 5, filaments 1.5 mm

long; anthers 7 mm long. Ovary 1.5 mm across; style 8.5 mm long; stigma obtuse. Berry globose, 1 cm across. Seeds circular, smooth.

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

*Distribution*: Throughout the tropics. Moist deciduous forest of Pakkulam, c. 650 m; frequent. *HN 248*.

*Usage*: Plants are uprooted and leaves are removed, tied into a bundle and marketed. The material is purchased by the Ayurvedic medicine manufacturers for substituting *Cheruvazhutina* (*Solanum melongena* var. *insanum*).

***Solanum violaceum*** Ortega, Nov. Pl. Descr. Dec. 56. 1798; Sasidh., Biodiv. Doc. Kerala 6: 318. 2004. *Solanum anguivi* ex auctt., non Lam., Hook. Exot. Fl. t. 199. 1822; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1058. 1983; Chithra in Henry *et al.*, Fl. Tamilnadu 2: 114. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 310. 1988; Vajr., Fl. Palghat Dist. 318. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 321. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 317. 1996; Sivar. & P. Mathew, Fl. Nilambur 464. 1997. *S. indicum* Hook. f., Fl. Brit. India 4: 234. 1883, non L., 1753; Gamble, Fl. Pres. Madras 938. 1923. **Siru sundai (I)**.

Shrubs to 1.5 m high; armed. Leaves sinuate, 10-13 x 6-9 cm, thick, chartaceous, prickly along the mid-nerve, base obliquely truncate, apex subacute; petiole to 2 cm long. Racemes extra-axillary, 8-10-flowered; peduncle to 7 cm long; pedicel to 1 cm long. Calyx cupular; lobes 5, triangular, 7 mm long, thick, prickly. Corolla blue-purple coloured, 2.5 cm across; lobes 1.5 cm long, acute. Stamens 5; filaments 0.5 mm long. Ovary 2.2 x 2 mm; style 1 cm long, pubescent; stigma acute. Berry globose, 0.8 cm across; seeds minutely pitted, to 2 mm wide.

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

*Distribution*: Indo-Malesia. Farm land of Koodappetty, c. 600 m; frequent. *HN 140*.

*Usage:* The mature fruits are collected, hammered to split and are put in salt water and later sun-dried. This is used to prepare a particular dish, called *vattakkulambu*.

## STERCULIACEAE

**Helicteres isora** L., Sp. Pl. 963. 1753; Hook. f., Fl. Brit. India 1: 365. 1874; Gamble, Fl. Pres. Madras 107. 1915; Britto & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 144. 1983; Chithra in Nair *et al.*, Fl. Tamilnadu 1: 39. 1983; Manilal, Fl. Silent Valley 31. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 67. 1988; Vajr., Fl. Palghat Dist. 89. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 85. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 66. 1996; Sivar. & P. Mathew, Fl. Nilambur 99. 1997; Mohanan & Sivad., Fl. Agasthyamala 107. 2002. **Kaviri (I, K & M)**.

Small trees to 6 m tall; branchlets apically stellate-tomentose. Leaves obovate to oblong, 14 x 10 cm, stellate-tomentose, base subcordate, margin irregularly serrulate, apex acuminate; petiole to 1.5 cm long. Cymes axillary, many flowered; peduncle short; bracts and braeteoles subulate, to 5 mm long; pedicel to 4 mm long. Flowers 2.5 cm across, irregular. Calyx-tube persistent, oblique, 2 cm long, brown-tomentose without; lobes 5, to 2 cm long, unequal. Petals 5, unequal, 3 x 1.5 cm, orange, bluish while fading; lower pair shortly clawed, claw 3.5 cm long, limb 1 x 0.5 cm. Receptacle raised into gynandrophore. Staminal tube short, cupular, lobed. Stamens 10, in a ring at the top of the column; staminodes 5. Ovary ovoid, 5-lobed, 5-celled; style curved, 3 mm long. Follicles greyish, spirally twisted, to 8 cm long, stellate, tomentose. Seeds wrinkled, to 2 mm wide.

*Fl. & Fr.:* August-March.

*Distribution:* Indo-Malesia and Australia. Moist deciduous forest of Konamkuthy, c. 750.m; frequent. *HN 087*.

*Usage:* A piece of bark is crushed and put in water and filtered. Put a piece of stone (*vellaramkallu* ie, milky quartz) in fire till its colour change and immediately put it into this water. Remove the stone from the water, allow it to cool and add crushed *Badam* nuts (*Prunus dulcis*) and *vella venkayam*

(*Allium sativum*). Administer 10 ml each in the morning and evening continuously for one month to cure diarrhoea, stomach disorders and vomiting sensation. Bark-peelings yield a very durable and flexible fibre, which is utilized for all types of tying works.

***Sterculia guttata*** Roxb. ex DC., Prodr. 1: 482. 1824. Hook. f., Fl. Brit. India 1: 355. 1874; Gamble, Fl. Pres. Madras 106. 1915; Britto & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 152. 1983; Chithra in Nair *et al.*, Fl. Tamilnadu 1: 42. 1983; Manilal, Fl. Silent Valley 33.1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 69. 1988; Vajr., Fl. Palghat Dist. 91. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 88. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 70. 1996; Sivar. & P. Mathew, Fl. Nilambur 103. 1997; Mohanan & Sivad., Fl. Agasthyamala 111. 2002. **Anjankam, Achangam (I, K & M).**

Trees to 25 m tall, young shoots pubescent. Leaves simple, ovate-oblong, to 13 x 5 cm, glabrous above, stellate pubescent below; base truncate, subcordate, margin entire, apex acuminate; stipules linear, to 1 cm long. Racemes terminal, to 15 cm long, woolly; peduncle reduced; bract subulate; pedicel to 8 mm long. Male flowers: 2.5 cm across. Calyx-tube cupular, pubescent; lobes 5, reddish brown, lanceolate, to 0.7 cm long, woolly without, stellate-tomentose within, glandular. Petals absent. Gynandrophore curved, glabrous. Stamens 10. Bisexual: gynandrophore stout, curved, glabrous. Stamens 10. Ovary 5 celled; ovules many per cell; style to 4 mm long. Follicles large, pubescent, orange-red coloured, 2 or 3-lobed, beaked. Seeds ellipsoid, blackish.

*Fl. & Fr.*: October-March.

*Distribution*: Indo-Malesia. Moist deciduous forest of Mukkali, c. 550 m; frequent. *HN 138*.

*Usage*: A decoction is made by crushing piece of bark with half the quantity of leaves of *Kalakarande* (*Sida acuta*), root of *Kattupayar* (*Centrosema pubescens*) and leaves of sweet potato (*Ipomoea batatas*). About 50 ml of this is administered to the women before delivery to avoid complications. Seeds largely available during summer months are roasted with salt and eaten.

## TILIACEAE

**Grewia laevigata** Vahl, Symp. Bot. 1: 34. 1790; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 44. 1983; Sasidh. & Sivar., Flow. Pl. Thrissur For. 72. 1996; Mohanan & Sivad., Fl. Agasthyamala 114. 2002. *G. wightiana* Drumm. ex Dunn in Gamble, Fl. Pres. Madras 117. 1915. *G. bracteata* auct., non Heyne ex Roth, 1821: Mast. in Hook. f., Fl. Brit. India 1: 389. 1874, *pro parte*; Britto & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 164. 1983. **Kalle (I)**.

Small trees to 5 m tall. Tender shoots tomentose. Leaves elliptic-oblong, 6-8 x 2.5-4 cm, stellate tomentose on both sides when young, glabrous on ageing, base round, margin finely serrate, apex acute; petioles tomentose, to 1 cm long. Flowers in axillary and leaf opposed cymes; bracts ovate-oblong, caducous. Peduncles to 3 cm long; pedicels to 1.3 cm long. Sepals 5, to 1.5 cm long. Petals yellow coloured, to 1.3 cm long, lobed at apex. Torus 0.5 cm wide; ovary glabrous. Drupes globose to 1 cm across.

*Fl. & Fr.*: September-January.

*Distribution*: South India and Sri Lanka. Dry-deciduous forest of Puliapathy, c. 650 m; frequent. *HN 342*.

*Usage*: Fruits orange-coloured when ripe, are edible. Root-paste is applied over pussy boils for its speedy maturation and breaking. Single time application during bed-time is suggested.

**Grewia tiliifolia** Vahl, Symb. Bot. 1: 35. 1790; Hook. f., Fl. Brit. India 1 : 386. 1874, in part; Dunn in Gamble, Fl. Pres. Madras 118. 1915; Britto & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 173. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 45. 1983; Manilal, Fl. Silent Valley 34. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 71. 1988; Vajr., Fl. Palghat Dist. 94. 1990; Sasidh. & Sivar., Flow. Pl. Thrissur For. 72. 1996; Sivar. & P. Mathew, Fl. Nilambur 108. 1997; Mohanan & Sivad., Fl. Agasthyamala 115. 2002. **Lumman (I), Uluman (K)**.

Trees to 25 m tall, branchlets pubescent. Leaves ovate-rotund, 5-11 x 4-8 cm; base oblique, subcordate, margin dentate, apex subacute; stipules

lanceolate. Cymes axillary, to 7 cm long; peduncle to 1 cm long, each 3-flowered; bract ovate; pedicel to 1 cm long. Flowers 1.5 cm across. Sepals to 1 cm long. Petals yellow coloured, spathulate, to 0.5 cm long, apically notched. Stamens many, to 4 mm long. Ovary 2-celled; ovules 2 per cell. Drupe globose, 8 mm across, 2-lobed.

*Fl. & Fr.*: March-June.

*Distribution*: Tropical Africa, India to Indo-China. Moist deciduous forest of Chittoor, c.700 m; frequent. *HN 168*.

*Usage*: Phloem fibres are crushed and applied over scalp regularly while taking bath to promote hair growth. This is also used as a scrubber for cleaning body, and as a substitute for soap. Seeds are edible when ripe.

***Grewia villosa*** Willd., Ges. Naturf. Freunde Berlin Neue Schriften 4: 205. 1803; Hook. f., Fl. Brit. India 1: 388. 1874; Dunn in Gamble, Fl. Pres. Madras 119. 1915; Britto & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 174. 1983; Vajr. in Nair *et al.*, Fl. Tamilnadu 1: 45. 1983; Vajr., Fl. Palghat Dist. 95. 1990. *G. orbiculata* G. Don, Gen. Hist. 1: 551. 1831, non Rottl. 1803. **Kadalakkalle (I)**.

Shrubs to 3 m high; branchlets rusty-velvety. Leaves ovate, cordate, 5-9.5 x 5-10 cm, thin-coriaceous, scabrid and stiff-pubescent above, stellate-velvety below, base cordate, with a deep sinus, margin serrulate, apex rotund, subacute; petiole to 2.5 cm long; stipules subulate, to 2 mm long. Cymes leaf-opposed or axillary, to 2.5 cm long; peduncle to 2 mm long; bract linear, to 5 mm long; pedicel to 6 mm long. Flowers 1.5 cm across. Sepals 5, lanceolate, 1 x 0.4 cm, villous without. Petals 5, spathulate, 5 x 3 mm, deeply emarginate. Torus to 1 mm wide, angular, glabrous, apex irregularly lobed. Stamens c. 10, to 4 mm long. Ovary spherical, densely villous, 2 mm across, 2-celled; ovules 2 per cell; style to 6 mm long, villous; stigma laciniate. Drupe 1.5 cm across, obscurely lobed, stiff-villous; rind crustaceous, coppery.

*Fl. & Fr.*: September-December.

*Distribution*: Paleotropics. Dry-deciduous forest of Pattimalam, c. 600 m; frequent. *HN 149*.

*Usage*: Fruits are edible when ripe and consumed by shepherd children.

## VERBENACEAE

**Clerodendrum phlomides** L. f., Suppl. Pl. 292. 1781; Hook. f., Fl. Brit. India 4: 590. 1885; Gamble, Fl. Pres. Madras 1099. 1924; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1220. 1983; Srinivasan in Henry *et al.*, Fl. Tamilnadu 2: 164. 1987; Sasidh., Biodiv. Doc. Kerala 6: 358. 2004. **Daggichedi (I)**.

Shrubs to 2 m high; foetid; branchlets tomentose. Leaves deltoid-ovate, 2-5 x 1.5-4 cm, pubescent on both surfaces, base truncate, margin entire to coarsely serrate, apex acute; petiole to 2.5 cm long. Panicles axillary and terminal, to 8 cm long; bracts ovate-lanceolate, 0.5 cm, acuminate; pedicel to 0.7 cm long. Calyx campanulate; lobes 5, ovate, 1.2 cm, acuminate. Corolla pale white coloured, 2 cm across; tube 1.5 cm long; lobes 5, sub equal, oblong-obovate, 0.8 cm long. Stamens 4, inserted below the corolla-tube; filament pairs 2 and 2.3 cm; anthers 3 mm. Ovary globose, 2 mm across; style 4 cm long; stigma 2-lamellate.

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

*Distribution*: India, Sri Lanka, Pakistan and Myanmar. Fallow farmland at Koodappetty, c. 600 m; locally abundant. *HN 126*.

*Usage*: The leafy shoots are fed to goats.

**Clerodendrum serratum** (L.) Moon, Cat. Pl. Ceylon 46. No. 382. 1824; Clarke in Hook. f., Fl. Brit. India 4: 592. 1885; Gamble, Fl. Pres. Madras 1100. 1924. K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1220. 1983; Srinivasan in Henry *et al.*, Fl. Tamilnadu 2: 165. 1987; Manilal, Fl. Silent Valley 214. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 354. 1988; Vajr., Fl. Palghat Dist. 365. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 388. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 351. 1996; Sivar. & P. Mathew, Fl. Nilambur 531. 1997; Mohanan & Sivad., Fl. Agasthyamala 522. 2002. *Volkameria serrata* L., Mant. Pl. 90. 1767. **Modathekku (M)**.

Shrubs to 2.5 m. Leaves obovate-lanceolate, 15-25 x 7-10 cm, base cuneate to decurrent, margin coarsely serrate along the upper half, apex acute to shortly acuminate; petiole stout, to 0.7 cm. Panicles terminal, to 20 cm long, pubescent; bracts lanceolate, 1 cm long. Calyx cupular, 6 mm long, 5-toothed, ciliate, acute. Corolla violet coloured, 2 cm across, tubular, bilipped; tube 1 cm; lobes 5, unequal, oblong, 1.3 x 0.7 cm, obtuse. Stamens 4, inserted in the upper half of tube; filaments to 3 cm long; anthers 1.5 mm long. Ovary globose, 2.5 mm across; style 3 cm long. Drupe 4-lobed, 1 cm across, violet when ripe.

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

*Distribution*: India, Nepal, Myanmar and Sri Lanka. Moist deciduous forest of Karuvara, c. 650 m; frequent. *HN 196*.

*Usage*: Plants are uprooted and roots are marketed. The roots are purchased by the Ayurvedic medicine manufacturers as *Cheruthekku*, which is primarily known for anti-asthmatic property.

**Clerodendrum viscosum** Vent., *Jard. Malm.* 1: t. 25. 1803; Srinivasan in Henry *et al.*, *Fl. Tamilnadu* 2: 165. 1987; Manilal, *Fl. Silent Valley* 214. 1988; V. S. Ramach. & V. J. Nair, *Fl. Cannanore* 354. 1988; Vajr., *Fl. Palghat Dist.* 365. 1990; Mohanan & Henry, *Fl. Thiruvananthapuram* 358. 1994; Sasidh. & Sivar., *Flow. Pl. Thrissur For.* 351. 1996; Sivar. & P. Mathew, *Fl. Nilambur* 531. 1997; Mohanan & Sivad., *Fl. Agasthyamala* 523. 2002. *C. infortunatum* Wight, *lc. t.* 1471. 1849, "*infortunata*", non L., 1753; Clarke in Hook. f., *Fl. Brit. India* 4: 594. 1885; Gamble, *Fl. Pres. Madras* 1100. 1924.

**Peethe, Uppukatti (M).**

Woody shrubs, to 6 m high; branchlets quadrangular, tomentose. Leaves elliptic-lanceolate, 20 x 12 cm, tomentose on both surfaces, base cordate, margin serrate, apex acuminate. Inflorescence a lax panicle, terminal, to 15 cm long. Calyx to 1 cm long; lobes lanceolate, glandular without. Corolla tubular, white coloured, bilipped; tube to 1.5 cm long, villous without. Stamens 4; filaments to 3 cm long; anthers to 1 mm long. Ovary

globose, 4-celled; ovules 1 per cell; style to 3 cm long; stigma 2-fid. Drupe black when ripe, 4-lobed.

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

*Distribution:* Indo-Malesia. Moist deciduous forest of Siruvani, c. 750; locally abundant. *HN 306*.

*Usage:* A bunch of tender leaves are crushed with a kind of small fish (*Varache*) caught from shallow streams and given to goats for immediate relief from dysentery.

**Gmelina arborea** Roxb., Pl. Corom. t. 246. 1815 & Fl. Ind. 3: 84. 1832; Hook. f., Fl. Brit. India 4: 581. 1885; Gamble, Fl. Pres. Madras 1097. 1924; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 300. 1983; Srinivasan in Henry *et al.*, Fl. Tamilnadu 2: 165. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 355. 1988; Vajr., Fl. Palghat Dist. 365. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 358. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 352. 1996; Sivar. & P. Mathew, Fl. Nilambur 535. 1997; Mohanan & Sivad., Fl. Agasthyamala 523. 2002. **Gooli (I & M)**.

Trees to 18 m tall; tender parts fulvous-tomentose. Leaves deltoid-ovate, 9-15 x 10-14 cm, thinly tomentose above, fulvous-tomentose below, base truncate to acute, apex acuminate; petiole to 10 cm long. Panicles terminal and from upper axils, to 12 cm long. Bracts lanceolate, to 6 mm long. Calyx lobes broadly ovate to 6 mm long. Corolla lobes 5, brownish-yellow coloured, 3.5 cm across; tube 1 cm long. Stamens 4; filament pairs unequal. Ovary 4 mm; ovule 1 per cell; style 2 cm long. Drupe 3.5 x 1.5 cm, yellowish when ripe, fleshy. Seeds single, hard.

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

*Distribution:* Indo-Malesia. Moist deciduous forest of Chittoor, c. 650 m; frequent. *HN 265*.

*Usage:* Heartwood is used to make large wooden mortars.

**Lantana camara** L., Sp. p1. 627. 1753; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1224. 1983. var. **aculeata** (L.)

Moldenke, *Torrea* 34: 9. 1934; Srinivasan in Henry *et al.*, *Fl. Tamilnadu* 2: 165. 1987; Manilal, *Fl. Silent Valley* 214. 1988; V. S. Ramach. & V. J. Nair, *Fl. Cannanore* 355. 1988; Vajr., *Fl. Palghat Dist.* 366. 1990; Mohanan & Henry, *Fl. Thiruvananthapuram* 359. 1994; Sasidh. & Sivar., *Flow. Pl. Thrissur For.* 353. 1996; Sivar. & P. Mathew, *Fl. Nilambur* 536. 1997; Mohanan & Sivad., *Fl. Agasthyamala* 524. 2002. *L. aculeata* L., *Sp. Pl.* 627. 1753; Clarke in Hook. f., *Fl. Brit. India* 4: 562, 1885; Gamble, *Fl. Pres. Madras* 1087. 1924.

**Nandavana chedi, Parale (I, K & M).**

Shrubs to 3 m high; stem 4-angled, armed. Leaves ovate, 10 x 6 cm, base cordate-acute, margin serrate, apex acute. Inflorescence axillary, condensed, corymbose-umbellate spikes; bracts lanceolate, to 0.7 cm long, hairy, persistent. Calyx cup-shaped, 0.2 cm long, shortly lobed. Corolla tube cylindrical, 1.2 cm long, puberulous without, lobes 5, dissimilar, orange, red or pink coloured. Stamens 4, inserted in the middle of corolla tube. Ovary globose, bilocular; ovule 1-per cell; style 1.5 mm long; stigma oblong. Berry globose, 0.5 cm wide, deep violet when ripe.

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

*Distribution*: Native of tropical America; widely naturalized in the tropics and subtropics. Dry thickets of Mully, c. 700 m; locally abundant. *HN 023*.

*Usage*: Ripe fruits are edible. Young shoots are used as toothbrush.

**Lantana indica** Roxb., *Fl. Ind.* 3: 89. 1832; K. M. Matthew & N. Rani in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 1224. 1983; Srinivasan in Henry *et al.*, *Fl. Tamilnadu* 2: 166. 1987; Manilal, *Fl. Silent Valley* 215. 1988. *L. indica* Roxb. var. *albiflora* Wight ex Clarke in Hook. f., *Fl. Brit. India* 4: 562. 1885; Vajr., *Fl. Palghat Dist.* 366. 1990. *L. wightiana* Wall. ex Gamble, *Fl. Pres. Madras* 1087. 1924. **Vellai Parale, Vettum Parale (I & M).**

Unarmed shrubs to 1m high; tender parts hirsute. Leaves ovate-orbicular, 4.5 x 3 cm charcateous, villous, base cordate, margin crenate, apex acute; petiole to 1 cm long. Spikes axillary and terminal, to 4 cm long; stalk 5 cm long; bracts ovate, 5-7 ribbed; Calyx 1.2 mm wide, margin entire, ciliate. Corolla whitish, 4 mm across, tubes short, lobes 5. Stamens 4. Ovary 0.7 mm

across; style 1.5 mm long. Berry globose.

*Fl. & Fr.*: October-December.

*Distribution*: India, Nepal and Thailand. Exposed gravelly ground in Moist deciduous forests of Konamkuthy, c. 750 m; rare. *HN 220*.

*Usage*: A handful of crushed plant is squeezed and the juice is mixed with the juice of half lemon fruit and a pinch of salt. Consumed twice a day for expelling worms. *Mudugas* use the whole plant in the same way, for the same effect and also for curing stomach pain especially in children.

**Premna corymbosa** (Burm.f.) Rottl. & Willd., Ges. Naturf. Freunde Berlin Neue Schriften 4: 187. 1803; Hook. f., Fl. Brit. India 4: 573. 1885; Gamble, Fl. Pres. Madras 1095. 1924; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1228. 1983; Srinivasan in Henry *et al.*, Fl. Tamilnadu 2: 167. 1987. *Cornutia corymbosa* Burm. f., Fl. Ind. 132, t. 41. 1768. *Premna cordifolia* Wight, Ic. Pl. Ind. orient. t. 1483. 1849, non Roxb., 1832. **Munne (I)**. Plate 10C.

Small trees to 5 m tall. Leaves elliptic-ovate to deltoid-oblong, 5-8 x 3-6 cm, base truncate to cordate, apex shortly acuminate; petiole to 2 cm long. Corymbs terminal, to 3 cm long. Calyx 3 mm long, puberulous without, obscurely 4-lobed; lobes obtuse. Corolla yellowish, 5 mm across; lobes deeply bilipped; upper lip hooded, 2 mm long; lower lobe concave, 2.5 mm long, villous within, obtuse. Stamens 4, included within corolla; filament pairs 1.5 and 2.5 mm long; anthers rounded, divergent. Ovary globose, 1 mm across; style 3.5 mm long. Drupe 4 mm across, blackish when ripe.

*Fl. & Fr.*: October-January.

*Distribution*: Peninsular India and Sri Lanka. Dry-deciduous forests of Vattalakki, c. 600 m; rare. *HN 274*.

*Usage*: Leafy shoots are collected to feed Goats. Young shoots are used as vegetable, which is said to provide good resistance to commonly occurring diseases like cold, fever, certain epidemic diseases, etc.

**Premna tomentosa** Willd., Sp. Pl. 3 : 314. 1800; Hook. f., Fl. Brit. India 4: 576. 1885; Gamble, Fl. Pres. Madras 1095. 1924; K. M. Matthew & N.

Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 1229. 1983; Srinivasan in Henry *et al.*, Fl. Tamilnadu 2: 168. 1987; Vajr., Fl. Palghat Dist. 368. 1990.

**Peete Maram (I).**

Trees to 8 m tall; branchlets tomentose. Leaves broadly ovate-cordate, 7-15 x 6-12 cm, chartaceous, densely tomentose below and along nerves above, base rounded to truncate, margin entire, apex acuminate; petiole to 4 cm long. Corymbose cymes terminal and axillary, to 8 cm long, pyramidal. Calyx 3 mm wide, stellate-pubescent without; lobes 5, obtuse. Corolla cream coloured, 4 mm across, tube 3 mm long, villous along the throat; lobes 5, suborbicular, to 2 mm long, obtuse. Stamens numerous, unequal; filament pairs 1.5 and 2 mm long; anthers rounded. Ovary truncate, puberulous; style 2.5 mm long; stigma unequally bifid. Drupe 5 mm wide.

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

*Distribution*: Peninsular India and Sri Lanka. Dry-deciduous forest of Mully, c. 750 m; frequent. *HN 104*.

*Usage*: The poles are of good durability and utilized in hut construction. Shepherd boys mix the inner bark of this tree (phloem) for solidifying milk to eat.

**Tectona grandis** L. f., Suppl. 151. 1781 ; Clarke in Hook. f., Fl. Brit. India 4: 570. 1885; Gamble, Fl. Pres. Madras 1092. 1924; K. M. Matthew & N. Rani in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1236. 1983; Srinivasan in Henry *et al.*, Fl. Tamilnadu 2: 169. 1987; V. S. Ramach. & V. J. Nair, Fl. Cannanore 358. 1988; Vajr., Fl. Palghat Dist. 369. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 361. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 354. 1996; Sivar. & P. Mathew, Fl. Nilambur 537. 1997. **Thekke maram (I)**. Plate 10D.

Trees to 30 m tall, branches angled. Leaves broadly elliptic-ovate, 30 x 20 cm, coriaceous, stellate tomentose beneath, base acute, margin entire, apex acuminate. Inflorescence terminal, dichotomously paniculate cymes, to 40 cm long; bracts lanceolate. Flowers actinomorphic, 6-8-merous. Calyx campanulate, 5- 7-lobed; lobes unequal; persistent, enlarged in seeds.

Corolla dull white, 1 cm across, sub-rotate; lobes to 7, spreading, subacute. Stamens to 7, exserted; anthers oblong. Ovary quadrilocular; ovule 1 per cell. Drupe sub globose, 1.5 cm wide; 4-celled. Seeds oblong, hard.

*Fl. & Fr.*: August-November.

*Distribution*: Indo-Malesia. Dry-deciduous forest of Nakkuppathy, c. 600m; frequent. *HN 304*.

*Usage*: Put some tender leaves in coconut oil and boil it for some time. Massaging with this oil will reduce body pain. A piece of bark, about 2 sq. in. is crushed, mixed in a glass of water and filtered. This is boiled with a pinch of common salt, pepper powder and tamarind, and is given to woman after delivery for the easy falling of placenta. This is continued for some more days for reducing the swelling in the lower abdomen. Poles are used in the construction of huts, sheds etc. Timber is of high quality for construction.

**Vitex altissima** L.f., *Suppl. Pl.* 294. 1781; Hook. f., *Fl. Brit. India* 4: 584. 1885; Gamble, *Fl. Pres. Madras* 1102. 1924; K. M. Matthew & N. Rani in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 1239. 1983; V. S. Ramach. & V. J. Nair, *Fl. Cannanore* 359. 1988; Vajr., *Fl. Palghat Dist.* 370. 1990; Mohanan & Henry, *Fl. Thiruvananthapuram* 361. 1994; Sivar. & P. Mathew, *Fl. Nilambur* 539. 1997; Mohanan & Sivad., *Fl. Agasthyamala* 526. 2002. *V. alata* Heyne ex Roth, *Nov. Pl. Sp.* 316. 1821; Hook. f., *Fl. Brit. India* 4: 584. 1885. **Mayila (I)**.

Trees to 15 m tall. Leaves 3-foliolate; central leaflet obovate-lanceolate, lateral ones oblanceolate, 7-18 x 2.5-6 cm, glabrescent above, thinly pubescent below, base acute, margin entire, apex acuminate, sessile; petiole to 10 cm long, base auriculate. Panicles racemose, terminal or from upper axils, to 25 cm long. Calyx cupular, 3.5 mm long, pubescent without; lobes 5, ovate, subacute. Corolla blue to pale purple coloured, 6 mm across; tube 4 mm long, puberulous without; throat villous within; upper lip 2.5 mm and lower lobe 3.5 mm wide, obtuse. Stamens 4; filament pairs unequal, hairy below; anthers 0.7 mm long. Ovary globose, 1

mm across; ovules 4; style 5.5 mm long; stigma 2-fid. Drupe globose, 0.5 cm wide. Seeds 2-4.

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

*Distribution:* India, Indo-China, Malesia and Sri Lanka. Dry-deciduous forest of Mully, c. 700 m; frequent. *HN 263*.

*Usage:* Bark is employed in curing menstrual disorders. A small piece of bark is ground into a paste and administered in empty stomach, for four days from the starting of menses. Wood is used as firewood.

## VITACEAE

**Cissus quadrangularis** L., Mant. Pl. 39. 1767; Gamble, Fl. Pres. Madras 233. 1918; Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 282. 1983; Ramamurthy in Nair *et al.*, Fl. Tamilnadu 1: 81. 1983; Mohanan & Henry, Fl. Thiruvananthapuram 121. 1994. *Vitis quadrangularis* (L.) Wall. ex Wight, Cat. Ind. Pl. 26. 1833; Hook. f., Fl. Brit. India 1: 645. 1875. **Narale (I)**.

Climbing shrubs; stem quadrangular, contracted at nodes; branchlets green coloured, glabrous. Leaves caducous, ovate-suborbicular, 3 x 3 cm, apex and base round, margin serrate; petiole, to 1 mm long; tendrils stout. Cymes umbellate, to 5 cm long; peduncle to 3 cm long; bracts and bracteoles rotund, to 1 mm long; pedicel to 1 cm long. Calyx obscurely 4-lobed, 1 mm wide. Petals 4, greenish-yellow coloured, red-tipped, ovate, 3 mm wide. Disc 4-lobed. Stamens 4. Ovary 1 mm across, 2-celled; ovules 2 per cell. Berry globose, 8 x 6 mm, apiculate; green turning dark red. Seeds smooth.

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

*Distribution:* Widespread in the drier parts of Africa, Arabia and Indo-Malesia. Dry-deciduous forest of Vattlakki, c. 600 m; frequent. *HN 189*.

*Usage:* Sometimes reluctance in feeding is observed in cattle without any reason or symptoms. The tribal healers take some water in a pot, puts a few fresh shoots of *Narale* in it, chants some prayers by touching the water and sprinkles it over the cattle said to cure this ailment. Pieces of stem are placed over fire and ground along with coconut for making chutney.

## ZYGOPHYLLACEAE

**Tribulus terrestris** L., Sp. Pl. 387. 1753; Hook. f., Fl. Brit. India 1 : 423. 1874; Gamble, Fl. Pres. Madras 130. 1915; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 185. 1983; Chithra in Nair *et al.*, Fl. Tamilnadu 1: 49. 1983; Sasidh., Biodiv. Doc. Kerala 6: 67. 2004. *T. lanuginosus* L., Sp. Pl. 387. 1753; Wight & Arn., Prodr. Fl. Ind. Orient. 145. 1834. **Nerinchi (I).**

Prostrate herbs, spreading; branchlets glabrous, sericeous. Leaves 2-4 cm; leaflets 4-5 pairs, pairs unequal, oblong, 7 x 4 mm, oblique, base obtuse-cuneate, margin entire, apex acute, mucronate; petiole to 7 mm long; stipules 2 or 3 in a cluster, lanceolate, to 0.3 mm long. Flowers to 1.5 cm across, axillary, solitary; pedicel to 1.5 cm long. Sepals 5, linear, to 5 mm long. Petals 5, golden yellow coloured, obovate, 7.5 x 4.5 mm. Disc annular, 10-lobed. Stamens 5+5, subtended by 5 glandular scales; filaments to 2.5 mm long. Ovary globose, 1.5 mm across, lobed, hirsute, 5-celled; ovules 2-per cell; style to 1.5 mm long; stigma many lobed. Schizocarp to 1 cm across, 5-angled; cocci-5, woody, each with a pair of unequal spines. Seeds solitary per coccus.

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

*Distribution:* Throughout the Tropical and warm temperate regions of the World. Wasteland of Mully, c. 700m; locally abundant. *HN 123.*

*Usage:* Three spoonful of dried fruits are boiled in a litre of water and the water is administered several times a day for a month to cure the pain in the lower abdomen (possibly due to problems related to kidneys). Root-paste with sugar is also given regularly for the patients with similar symptoms. Fruits are plucked and sold to the local buyers. These are dried in sun, packed in gunny-bags, and supplied to Ayurvedic medicine manufacturers as a raw-drug known for its diuretic and astringent properties, and also used in haemorrhages, epistaxis etc.

## B. MONOCOTYLEDONS

### AGAVACEAE

**Sansevieria roxburghiana** Schult. & Schult. f., Mant. Syst. Veg. 7: 357, Fl. 12 D & E. 1829; Hook. f., Fl. Brit. India 6: 271. 1892; Fischer in Gamble, Fl. Pres. Madras 1520. 1928; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1631. 1983; Chandrasekaran in Henry *et al.*, Fl. Tamilnadu 3: 34. 1989; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 477. 1994. *S. zeylanica* Roxb., Pl. Corom. 184. 1805, non (L.) Willd., 1799. **Sarpakkathale (I)**.

Herbs to 1 m tall; rootstock creeping, reddish when peeled. Leaves basal, sessile, with transverse stripes, subterete at base, apex flat, to 75 x 4 cm, fleshy, entire, glabrous, base sheathing, apex tapering to a subulate point. Scape solitary, stout; raceme to 50 cm long; peduncle to 20 cm long; bracts scarious, lanceolate, 6 x 3 mm. Flowers bisexual, 3-5 in a cluster, 2 cm across. Perianth-tube to 1 cm long; lobes 6, greenish with purple tinge, 1 x 0.5 mm, glabrous. Stamens 6, inserted near the middle of perianth lobes; filaments to 7 mm long; anthers oblong-linear, 2 mm long. Ovary 3-celled, obovoid, 1.5 mm across; ovule 1 per cell; style to 1.5 cm long; stigma simple. Berry globose, to 6 mm across.

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

*Distribution*: Native of Coromandel coast; now cultivated and run wild throughout India. Hamlet premises of Kadukumanna, c. 1000 m. Often cultivated. *HN 082*.

*Usage*: The basal portion of the plant is crushed and applied as a paste over snake bite. According to the tribal healers, this treatment requires the support of certain *spirits*. The leaves are immersed in water for retting. The fine quality fibres are extracted by beating the decaying leaves and used in odd jobs.

## AMARYLLIDACEAE

**Curculigo orchioides** Gaertn., Fruct. Sem. Pl. 1: 63, t. 16, f. 11. 1788; Hook. f., Fl. Brit. India 6: 279. 1892; Fischer in Gamble, Fl. Pres. Madras 1502. 1928; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1627. 1983; V. S. Ramach. & V. J. Nair, Fl. Cannanore 473. 1988; Chandrasekaran in Henry *et al.*, Fl. Tamilnadu 3: 32. 1989; Vajr., Fl. Palghat Dist. 505. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 476. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 467. 1996; Sivar. & P. Mathew, Fl. Nilambur 720. 1997; Mohanan & Sivad., Fl. Agasthyamala 716. 2002. *C. malabarica* Wight, Ic. t. 2043 - A. 1853. **Nilappanai (M), Ponne (I).**

Rhizomatous herbs to 20 cm high; rhizomes elongate, mucilaginous. Leaves lanceolate, 15-20 x 1-1.5 cm, base narrow, margin entire, apex acuminate; petiole short or absent; leaf sheaths persistent. Scapes many, slender, to 6 cm long. Racemes 8-10 cm long; bracts lanceolate, spathaceous. Flowers bisexual, sessile, 1.2 cm across. Perianth 6-lobed, yellowish, oblong-elliptic. Stamens 6; filaments filiform. Ovary 3-celled, oblong; ovules many in each cell; stigmas 3. Capsules oblong, to 2 cm long, 1-4 seeded. Seeds globose, glossy, beaked.

*Fl. & Fr.*: July-November.

*Distribution*: Indo-Malesia. Moist deciduous forests of Karara, c.600 m; locally abundant. *HN 202.*

*Usage*: *Mudugas* apply the paste made of rhizomes all over the body of children below three years old for increasing weight and improving health. The rhizome-paste is applied externally over insect stings regularly for three days. A piece of rhizome of about 2 inch in size is crushed, mixed with half a glass of milk and administered. This is said to be a strong anti-poisonous agent.

## ARECACEAE

**Areca catechu** L., Sp. Pl. 1189. 1753; Becc. & Hook. f. in Hook. f., Fl. Brit. India 6: 405. 1893; Fischer in Gamble, Fl. Pres. Madras 1555. 1931; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1670. 1983;

V. S. Ramach. & V. J. Nair, Fl. Cannanore 491. 1988; Bhargavan in Henry *et al.*, Fl. Tamilnadu 3: 51. 1989; Vajr., Fl. Palghat Dist. 525. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 490. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 481. 1996; Sivar. & P. Mathew, Fl. Nilambur 747. 1997.

**Adakkai (I, K & M).**

Monoecious palms; stem to 25 m tall and 15 cm across, with annular leaf scars. Leaves confined towards the apex of stem, to 1.5 m, prominently arching, reduplicate; leaflets many, linear or linear-lanceolate, praemorse at apex, sheath to 40 cm long. Spadices several on the axils of fallen leaves, to 50 cm long, branched, shortly peduncled; rachis angular, flattened, apex tapering; spikes flexuous or straight, to 20 cm; spathes bottle-like, coreaceous. Flowers monoecious; lower ones female, 1-3 at spike-base; upper ones male, uniseriate, many. Male flowers to 3 mm long. Sepals 3, triangular, basally connate, 1 mm long. Petals 3, ovate, 2.5 mm long. Stamens 6; pistillode to 3 mm, 2-fid. Female flowers to 1.5 cm long. Sepals obovate, to 8 mm long. Petals to 1.2 cm long. Ovary oblong, to 1 cm across, 1 celled; ovule solitary. Drupes 4.5 x 3 cm, mesocarp fibrous.

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

*Distribution*: Cultivated from India to the Solomon Islands and less commonly in Africa and Tropical America. Farm land of Pattimalam, cultivated, c. 600 m; frequent. *HN 021*.

*Usage*: As a masticatory and also to protect from evil spirit.

**Cocos nucifera** L., Sp. Pl. 1188. 1753; Becc. & Hook. f. in Hook. f., Fl. Brit. India 6: 482. 1893; Fischer in Gamble, Fl. Pres. Madras 1557. 1931; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1672. 1983; V. S. Ramach. & V. J. Nair, Fl. Cannanore 491. 1988; Bhargavan in Henry *et al.*, Fl. Tamilnadu 3: 52. 1989; Vajr., Fl. Palghat Dist. 529. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 493. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 481. 1996; Sivar. & P. Mathew, Fl. Nilambur 747. 1997. **Tengemaram (I, K & M).**

Monoecious palms; stem to 25 m tall and 30 cm across, with anular leaf scars. Leaves pinnatisect, to 6 m long; leaflets linear-ensiform, to 1 m x 1 cm, base narrow, apex tapering, acute; petiole to 2 m long. Spadices to 1 m long, paniced, branches to 40 cm long, flexuous; lower spathes 50 cm to 1.5 m, oblong, woody. Flowers monoecious, shortly pedicellate. Male flowers often paired. Sepals ovate, to 3 mm. Petals narrowly ovate, to 8 mm. Stamens 6; pistillode short. Female flowers globose, 1 per branch. Perianth-lobe slightly differentiated into sepals and petals; outer lobes broadly obovate, to 2.5 cm across; inner lobes orbicular, to 1 cm across. Ovary 3-celled; ovule 1 in each cell; style short. Drupe trigonous, ovoid, to 30 cm long, greenish yellow coloured; pericarp fibrous; endocarp stony with 3 basal pores. Seed coherent with the endocarp.

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

*Distribution*: Cultivated throughout the tropics. Farmlands of Palakayoor, cultivated, c. 600 m; frequent. *HN 361*.

*Usage*: Plaited palm leaves are occasionally purchased from planters at Anakkatti market and used for thatching roof. The kernel is utilised in culinary preparations.

**Phoenix loureiroi** Kunth, Enum. Pl. 3: 257. 1841; V. S. Ramach. & V. J. Nair, Fl. Cannanore 490. 1988; Vajr., Fl. Palghat Dist. 528. 1990; Sasidh. & Sivar., Flow. Pl. Thrissur For. 481. 1996; Sivar. & P. Mathew, Fl. Nilambur 746. 1997; Mohanan & Sivad., Fl. Agasthyamala 747. 2002. *P. humilis* Royle, Ill. Himal. 394, 397 & 399. 1849, var. *hanceana* Becc., J. Bot. Malesia 3: 379 & 392, 1890; *P. hanceana* var. *formosana* Becc., Philipp. J. Sci. 3: 339. 1908. *P. hanceana* var. *philippines* Becc., Philipp. J. Sci. 3: 339. 1908. *P. pusilla* Lour., Fl. Cochinch. 614. 1790, non Gaertn., 1788. **Eesi (I, K & M)**. Plate 10E.

Palms to 1.5 m high. Leaves to 2.5 m; leaflets to 15-30 x 0.8-1 cm. Spadices interfoliar. Male spadix to 40 cm long; spikes to 10 cm long, in clusters; spathes 15-20 cm long. Calyx-lobes 3, triangular. Petals 3, oblong. Stamens 6. Female spadix to 1 m long; spikes to 8 cm long; peduncle to 80

cm long. Ovary of 3 carpels; ovule 1. Drupe oblong, to 1.5 cm diameter, orange red.

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

*Distribution:* South east Asia to China. Dry-deciduous forest of Konamkuthy, c. 750 m; frequent. *HN 371*.

*Usage:* The leaves are collected, dried, tied together and used as broom. Fleshy pericarp of ripe fruits are edible.

## COMMELINACEAE

***Commelina benghalensis*** L., Sp. Pl. 41. 1753; Hook. f., Fl. Brit. India 6: 370. 1892; Fischer in Gamble, Fl. Pres. Madras 1539.1931; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1657. 1983; Bhargavan in Henry *et al.*, Fl. Tamilnadu 3: 43-44. 1989; V. S. Ramach. & V. J. Nair, Fl. Cannanore 481. 1988; Vajr., Fl. Palghat Dist. 516. 1990; Sasidh. & Sivar., Flow. Pl. Thrissur For. 473. 1996; Sivar. & P. Mathew, Fl. Nilambur 734. 1997. **Kaini, Kaine (I).**

Fleshy herbs to 0.75 m high; rootstock perennial. Leaves ovate, 3-5 x 2-3 cm, membranous, glabrescent, base subtruncate, asymmetrical, margin ciliate, apex acute-obtuse; petiole to 1 cm long; sheath to 1.5 cm long, apex with rufous hairs. Spathes clustered, funnel-shaped, 1.5 cm long, pubescent; upper cymes 2-flowered; lower one 1-2-flowered. Flowers cleistogamous, to 8 mm across. Sepals 3, to 2 mm long. Petals blue, larger ones broadly ovate, 3.5 x 4.5 mm. Fertile stamens to 2.5 mm long; staminodes to 5.5 mm long. Ovary glabrous, to 1 mm across; style to 1.5 mm long. Capsule ellipsoid; 3-celled, to 6 mm long. Seeds 5, 2-3 mm diameter.

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

*Distribution:* Africa, India, China, Japan and Malesia. Riverine forests of Palakayoor, c. 700 m; frequent. *HN 021*.

*Usage:* The leaf-paste is applied for the removal of sting of *Kulavi* insect<sup>1</sup> (*Vespa tropica*) from the spot of bite. Root portion of this plant is collected,

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<sup>1</sup> A furious as well as poisonous wasp.

dried and powdered. One spoon of powder is mixed in a glass of water and administered in the early morning to cure piles. This powder taken in a banana leaf and is employed to push inwards the protruded portion of rectum into anus. The leaves of *Kaine* are also used as a vegetable too.

## CYPERACEAE

**Cyperus malaccensis** Lam., Ill. I: 146. 1791; Clarke in Hook. f., Fl. Brit. India 6 : 608. 1893; Fischer in Gamble, Fl. Pres. Madras 1641. 1931; V. S. Ramach. & V. J. Nair, Fl. Cannanore 508. 1988; Vajr., Fl. Palghat Dist. 546. 1990. *Chlorocyperus malaccensis* (Lam.) Palla, Allg. Bot. Zeits. 17. Beil 6. 1912. **Korei (I)**.

Herbs to 1 m high; rhizomes woody, creeping, stoloniferous; stems robust, sharply trigonous. Leaves 15 - 20 cm, scabrid at apex. Bracts 3-5, to 15 cm long. Inflorescence broader than long; spikelets 4-10 in a spike, linear, dull yellowish- brown. Stamens 3; anthers linear. Ovar 1-celled; ovule 1; style short; stigmas 3. Glumes ovate to elliptic. Nuts trigonous, oblong, dark brown. *Fl. & Fr.*: October-December.

*Distribution*: Paleotropics. River beds of Siruvani at Kottathara, c. 600 m; locally abundant. *HN 245*.

*Usage*: The basal portion is ground well to a paste and applied externally over swellings caused by scorpion sting. A decoction of a handful of chopped basal portion is prepared in two glasses of water and boiled to half, and administered thrice a day for three days.

**Cyperus rotundus** L., Sp., Pl. 45. 1753; Hook. f., Fl. Brit. India 6: 614. 1893; Fischer in Gamble, Fl. Pres. Madras 641. 1931; K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1742. 1983; Bhargavan in Henry *et al.*, Fl. Tamilnadu 3: 74. 1989; V. S. Ramach. & V. J. Nair, Fl. Cannanore 511. 1988; Vajr., Fl. Palghat Dist. 548. 1990. **Muthangapullu (I)**.

Herbs to 20 cm high; stem sparsely tufted, rigid, triquetrous. Leaves flat, 9-15 x 0.1-0.2 cm, scabrous; sheaths stramineous or brown.

Inflorescence simple or compound, 4.6 cm; involucre bracts 3, unequal, to 10 cm; primary rays 5-7; secondary rays 1-3. Spikes 2-8-spikeletted, at right angles to rachis. Spikelets spicate, narrow-oblong, 0.5-2.5 x 0.1-0.2 cm, purplish, 10- 20-flowered; rachilla persistent, wing to 1.5 mm, pale. Glumes closely imbricating, ovate, 3-4 mm, membranous, mucronulate, sides 5-nerved, margin hyaline, apex subobtuse; keel green, 3-nerved. Stamens 3; filaments to 4 mm; anthers to 3 mm, red-crested. Stigmas 3. Nut oblong, trigonous, to 1 mm wide.

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

*Distribution:* Pantropical. Farm land of Chavadiyoor, c. 600 m; locally abundant. *HN 288.*

*Usage:* The rhizomatous portion is dried, powdered and given to babies along with *Kore (Eleusine coracana)* powder for good health.

## DIOSCOREACEAE

***Dioscorea oppositifolia*** L., Sp. Pl. 1033. 1753; Hook. f., Fl. Brit. India 6: 292. 1892; Fischer in Gamble, Fl. Pres. Madras 1512. 1928; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1635. 1983; Manilal, Fl. Silent Valley 316. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 474. 1988; Ramamurthy in Henry *et al.*, Fl. Tamilnadu 3: 36. 1989; Vajr., Fl. Palghat Dist. 508. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 479. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 469. 1996; Sivar. & P. Mathew, Fl. Nilambur 724. 1997; Mohanan & Sivad., Fl. Agasthyamala 718. 2002.  
**Reyyakizhangu (I), Chavalkizhangu (K & M).**

Vines; branchlets twining to right, glabrous. Leaves opposite or subopposite, ovate-suborbicular, 4-10 x 2-6 cm, thin-coriaceous, glabrous, base obtuse-rotund, margin entire, apex subacute-obtuse, mucronate; petiole to 4 cm long. Male plants: spikes paniced, clustered, 10-30 cm long; peduncle to 3 cm long; bracts linear, to 3 mm long; bracteoles scarious, triangular, to 1.5 mm long, subequal. Flowers 2 mm across. Perianth lobes oblanceolate, subequal, 1.5 & 2.5 mm. Stamens 6; filaments 0.5 mm long;

anthers subequal. Female plants: spikes solitary or paired, 6-9 cm long; peduncle to 2 cm long; bracts 1.5 mm long; bracteoles 1 mm long. Flowers distant, 2 mm across. Perianth lobes ovate, subequal, 1 & 1.5 mm long. Ovary to 4 mm across; style to 0.5 mm long. Capsule obovoid, 3 x 2.5 cm, stipitate. Seeds c. 6, orbicular, winged.

*Fl. & Fr.*: September-December.

*Distribution*: Indo-Malesia. Moist deciduous forest of Mukkali, c. 550 m; frequent. *HN 137*.

*Usage*: This is an edible tuber, highly relished by the tribal people. The tubers are boiled with a pinch of salt or baked in a hot-place and consumed. The tubers are soft, fibre-less, and tasty.

***Dioscorea pentaphylla*** L., Sp. Pl. 1032. 1753; Hook. f., Fl. Brit. India 6: 289. 1892; Fischer in Gamble, Fl. Pres. Madras 1511. 1928; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1635. 1983; V. S. Ramach. & V. J. Nair, Fl. Cannanore 474. 1988; Manilal, Fl. Silent Valley 317. 1988; Ramamurthy in Henry *et al.*, Fl. Tamilnadu 3: 36. 1989; Vajr., Fl. Palghat Dist. 508. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 479. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 469. 1996; Sivar. & P. Mathew, Fl. Nilambur 724. 1997. **Nooran kizhangu (I, K & M)**.

Vines; branchlets twining to left; prickled, pubescent, glabrescent. Leaves 3-5 foliolate, to 5-10 cm long, terminal one elliptic-ovate, 5-9 x 2-4 cm, lateral ones inequilateral, 3.5-7.5 x 1.8-3 cm, thin-coriaceous, rusty-pubescent below, sparsely so above, base subacute-attenuate, margin entire, apex acute, mucronate; petiole to 5.5 cm long, grooved; petiolule 0.7-1 cm long. Male plants: racemes axillary, solitary-clustered, sparsely prickled, 4-15 cm long, tomentose; bracts to 5 mm long; bracteoles connate, orbicular-ovate, to 2 mm long, woolly, inequilateral at base, apiculate, enveloping flowers at base; pedicel 1.5-2 mm long. Flowers 2 mm across. Perianth-lobes pubescent, 1-1.5 mm. Stamens 3; staminodes 3; pistillodes distinct. Female plants: spikes solitary or paired, 4-15 cm long; peduncle to 4 cm long; bracts to 2.5 mm long; bracteoles to 1.5 mm long. Flowers distant, to 6 mm long, 2

mm across. Perianth-lobes ovate, to 1.5 mm long. Ovary oblong, 4 mm across, tomentose, ribbed; style to 1 mm; stigma capitate. Capsule oblong, 2 x 1 cm, deeply angled, winged, glabrescent-glabrous. Seeds c. 6, subquadrate, apically winged.

*Fl. & Fr.*: September-December.

*Distribution*: Indo-Malesia and China. Moist deciduous forest of Kottamala, c. 650 m; frequent. *HN 081*.

*Usage*: This is one of the most common wild tuber consumed by the tribes of Attappady. The edible tubers are either baked or cooked with salt and eaten. These are less fibrous and tasty.

***Dioscorea tomentosa*** Koenig ex Spreng., *Pl. Min. Cognit.* Pugill. 2: 92. 1815; Hook. f., *Fl. Brit. India* 6: 289. 1892; Fischer in Gamble, *Fl. Pres. Madras* 1511. 1928; K. M. Matthew & Britto in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 1636. 1983; Manilal, *Fl. Silent Valley* 317. 1988; Ramamurthy in Henry *et al.*, *Fl. Tamilnadu* 3: 37. 1989; Vajr., *Fl. Palghat Dist.* 509. 1990; M. Mohanan & A. N. Henry, *Fl. Thiruvananthapuram* 479. 1994; Sasidh. & Sivar., *Flow. Pl. Thrissur For.* 469. 1996; Sivar. & P. Mathew, *Fl. Nilambur* 725. 1997; Mohanan & Sivad., *Fl. Agasthyamala* 718. 2002. **Jaalekizhangu (I, K & M)**.

Vines; branchlets twining to left, tomentose, sparsely prickled. Leaves 3-5 foliolate, 5-15 cm long, ovate-broadly elliptic or lanceolate, laterals oblique at base, inequilateral, leaflets 4-13 x 1.5-7.5 cm, coriaceous, dense-tomentose, base obtuse-subacute, margin entire, apex rotund-acute, mucronate, mucro to 6 mm; petiole 5-10 cm long; petiolule to 1.5 cm long. Male plants: spikes axillary and terminal, solitary or paired, 10-20 cm long; peduncle to 2.5 cm long; bracts to 2 mm long; bracteoles ovate, 1.5 mm long. Flowers 1.5 mm across. Perianth lobes tomentose, subequal, outer ones larger, to 1.5 mm long; Stamens 3, to 1 mm long; staminodes 3; pistillode short. Female plants: spikes axillary, paired, 5-15 cm long; peduncle 3-5 cm long, tomentose; bracteoles to 3 mm long. Flowers to 1 cm long, 3 mm across, velvety. Perianth lobes ovate, to 1.5 mm long. Ovary oblong, 3-7 mm

across, 3-celled; ovules 2 per cell; style 0.5 mm long; stigma capitate. Capsule oblong, 2-3 x 1-2 cm, tomentose. Seeds c. 3, obovoid, 1 x 0.4 cm, apically winged.

*Fl. & Fr.*: November-December.

*Distribution*: India and Sri Lanka. Moist deciduous forest of Chindakki, c. 650 m; frequent. *HN 353*.

*Usage*: Tubers are edible. Large tubers are produced in this species, which is considered as a famine food. The tubers are more fibrous, consumed after baking or cooking.

***Dioscorea wallichii*** Hook. f., *Fl. Brit. India* 6: 295. 1892; Fischer in Gamble, *Fl. Pres. Madras* 1512. 1928; V. S. Ramach. & V. J. Nair, *Fl. Cannanore* 475. 1988; M. Mohanan & A. N. Henry, *Fl. Thiruvananthapuram* 479. 1994; Sasidh. & Sivar., *Flow. Pl. Thrissur For.* 469. 1996. *D. aculeata* L., *Sp. Pl.* 1033. 1753, *pro parte*; Hook. f., *Fl. Brit. India* 6: 296. 1892. **Naare (K & M)**.

Climbers; stem twining to right, prickly at base. Leaves suborbicular, 8-15 x 5-15 cm, base cordate, margin entire, apex acuminate or cuspidate, glabrous; petiole 9 cm long. Male spikes 3-8 cm, slender, fascicled on long drooping panicles. Perianth 2-seriate, lobes oblong-lanceolate. Stamens 6. Female spikes simple 6-12 cm, lax. Ovary 0.3-0.5 cm long. Capsule broadly ovoid, 2-3 cm wide, 1.5-2 cm.

*Fl. & Fr.*: July-September.

*Distribution*: India, Myanmar and Thailand. Moist deciduous forest of Mukkali, c. 550 m; frequent. *HN 358*.

*Usage*: The tubers are boiled, salted and consumed. Tubers are more fibrous and considered by the tribal people as an inferior type of Yam.

## LILIACEAE

***Aloe vera*** (L.) Burm. f., *Fl. Ind.* 83. 1768; Fischer in Gamble, *Fl. Pres. Madras* 1520.1928; K. M. Matthew & Britto in K. M. Matthew, *Fl. Tamilnadu*

Carnatic 3: 1639. 1983. *A. perfoliata* L. var. *vera* L., Sp. Pl. 320. 1753. Bhargavan in Henry *et al.*, Fl. Tamilnadu 3: 37. 1989. **Chothukathale (I)**.

Herbs to 0.5 m high. Leaves radical, in rosettes, ensiform, 50 x 6 cm, succulent with a colourless gel inside, base truncate, margin spiny, apex gradually tapering. Scape racemose, to 1m; flowers down faced. Bracts lanceolate, 1 x 0.5 mm; pedicel to 6 mm long. Flowers bisexual, 3.5 cm long. Perianth tube terete, to 1.5 cm long, lobes 6, oblong, orange coloured. Stamens 3+3; filaments 2.2 and 2.4 cm; anthers oblong, sub-equal. Ovary 3-celled, to 5 x 3 mm; ovules many per cell; style elongate; stigma slightly lobed. Capsule ellipsoid-oblong, to 1.5 cm long.

*Fl. & Fr.*: September-December.

*Distribution*: Mediterranean, Canary Islands; naturalized in Florida, West Indies, Central America and Asia. Dry-deciduous forests of Koodappetty, c. 600 m; common. *HN 284*.

*Usage*: To cure boils and abscesses on skin, apply the pulp of leaves over the affected area. This makes the boil mature and burst easily. To cure stomach pain, a gooseberry-size of leaf pulp mixed with same quantity of jaggery is administered once in empty stomach. The pulp applied on burns helps fast healing. The whole plant is hung on the roof of dwelling place. The plants selected for this purpose are with a reddish tinge, which are locally called *Ratta kathale*. This deed is believed to bring prosperity to the house.

**Gloriosa superba** L., Sp. Pl. 305. 1753; Hook. f., Fl. Brit. India 6: 358. 1892; Fischer in Gamble, Fl. Pres. Madras 1519. 1928; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1643. 1983; Manilal, Fl. Silent Valley 320. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 477. 1988; Bhargavan in Henry *et al.*, Fl. Tamilnadu 3: 40. 1989; Vajr., Fl. Palghat Dist. 510. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 482. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 471. 1996; Sivar. & P. Mathew, Fl. Nilambur 729. 1997. **Kodan (I)**.

Climbers; branchlets glabrous. Leaves alternate, opposite or whorled, oblong-lanceolate, sessile, 5-12 x 1-4 cm, flat, chartaceous, glabrous, base

cordate, amplexicaul, margin entire, apex acuminate, tendrilled. Flowers bisexual, axillary, solitary, 8-10 cm across,; pedicel 8-13 cm long, apex reflexed. Perianth lobes 6, oblong-lanceolate 6 x 1 cm, reflexed or spreading, subequal, glabrous, narrow at base, margin wavy, apex acuminate. Stamens 6, spreading; filaments 3.5-4.5 cm; anthers oblong-linear, 1 x 0.2 cm, versatile, slightly curved. Ovary oblong, 3-celled, 1 x 0.5 cm; ovules many per cell; style to 4.5 cm long, striate, deflexed; stigmas-3. Capsule ellipsoid-oblong, 5 x 2 cm, torulose. Seeds many, globose, to 4 mm diameter, dorsally compressed, warty.

*Fl. & Fr.*: October-December.

*Distribution*: Paleotropics. Moist deciduous forest of Kathirampathy, c. 700 m; frequent. *HN 215*.

*Usage*: Leaves are used in the treatment of snake-bite. This along with equal quantity of *Kevisi* (*Capparis zeylanica*) leaves are crushed and applied externally over the point of bite, after removing the impure blood from the wound.

**Protasparagus racemosus** (Willd.) Oberm., S. Afr. J. Bot. 2: 244. 1983. *Asparagus racemosus* Willd., Sp. Pl. 2: 152. 1799; Hook. f., Fl. Brit. India 6: 316. 1892; Fischer in Gamble, Fl. Pres. Madras 1517. 1928; K. M. Matthew & Britto in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1639. 1983; Manilal, Fl. Silent Valley 318. 1988; Bhargavan in Henry *et al.*, Fl. Tamilnadu 3: 38. 1989; Mohanan & Henry, Fl. Thiruvananthapuram 481. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 470. 1996; Sivar. & P. Mathew, Fl. Nilambur 727. 1997; Mohanan & Sivad., Fl. Agasthyamala 721. 2002. **Chedichal, Tinampori (K), Chatavalli (M).**

Prickly climbing shrubs; branchlets glabrous; spines erect. Leaves scaly; cladodes 2-6, linear, sickle shaped, to 2 x 0.7 cm, base narrow, margin entire, apex acuminate. Racemes axillary, 1-3 in a cluster, to 6 cm long, bracts triangular. Flowers 6 mm wide, strongly scented. Perianth white, 3 x 0.8 mm. Stamens 6, adnate to the base of perianth; anthers ovoid, blackish.

Ovary obovoid, 3-celled; ovules 2; style 3-fid at apex; stigmas 3, recurved. Berry globose, to 6 mm. Seeds 3-6, globose, blackish.

*Fl. & Fr.*: October-January.

*Distribution*: Paleotropics. Moist deciduous forests of Katirampathy, c.700 m; frequent. *HN 078*.

*Usage*: Apply the leaf-paste externally for speedy healing of deep wounds. From the fresh tuber collected, a piece of about 10 inch size is washed in water and its skin and central fibres are removed. Further it is made into a paste and administered two times daily for curing heart burn. Continue this for three days. For patients suffering from urinary infection, the whole plant is sun-dried and powdered, two teaspoon of this powder is boiled in a glass of goat-milk and reduced to half, filtered and administered once a day for seven days.

## MARANTACEAE

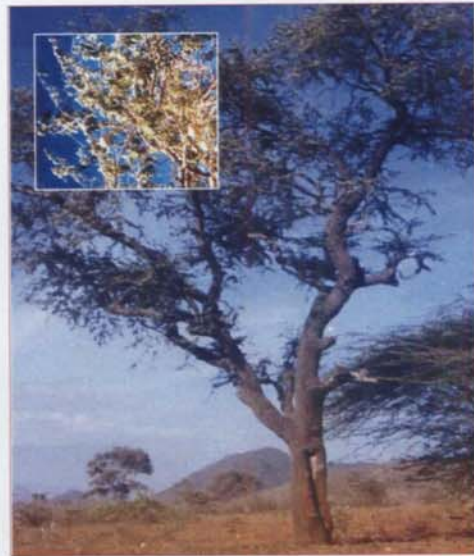
**Schumannianthus virgatus** (Roxb.) Rolfe, J. Bot. 14: 244. 1907; Fischer in Gamble, Fl. Pres. Madras 1494. 1928; Ramamoorthy in Henry *et al.*, Fl. Tamilnadu 3: 30. 1989; Manilal, Fl. Silent Valley 315. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 471. 1988; Vajr., Fl. Palghat Dist. 502. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 475. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 464. 1996; Sivar. & P. Mathew, Fl. Nilambur 717. 1997; Mohanan & Sivad., Fl. Agasthyamala 712. 2002. *Phrynium virgatum* Roxb., Asiat. Res. 11: 324. 1810. *Clinogyne virgata* (Roxb.) Benth. ex Baker in Hook. f., Fl. Brit. India 6: 528. 1892. *Maranta virgata* (Roxb.) Wall. ex Wight, Ic. t. 2015. 1853. **Kaattukoove (M)**. Plate 10F.

Rhizomatous herbs, to 4 m high, joints knotted. Leaf-stalk often winged, terete and pulviniform towards the apex; leaves distichous, oblong to oblong-lanceolate, to 30 x 10 cm, base rounded-cuneate, margin entire, apex caudate acuminate; inflorescence a panicle, dichotomously branched, lax-

Plate 10



A. *Benkara malabarica*



B. *Limonia acidissima*



C. *Premna corymbosa*



D. *Tectona grandis*



E. *Phoenix loureiroi*



F. *Schumannianthus virgatus*

flowered, to 40 cm long; bracts 2-6 cm, linear-lanceolate. flowers in pairs, 2 cm across. Calyx 3, to 0.6 cm long, lanceolate, deciduous, free. Corolla tubular, unequally 3-lobed. Fertile stamen 1; anther 1-celled. Staminodes 2, petaloid, whitish. Ovary inferior, villous, 3-celled; ovule 1 per cell; style stout, dilated at the apex. Fruit a capsule, to 1 cm long. Seeds globose.

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

*Distribution*: South India and Sri Lanka. Semi-evergreen forest of Mukkali, c.550 m; locally abundant. *HN 255*.

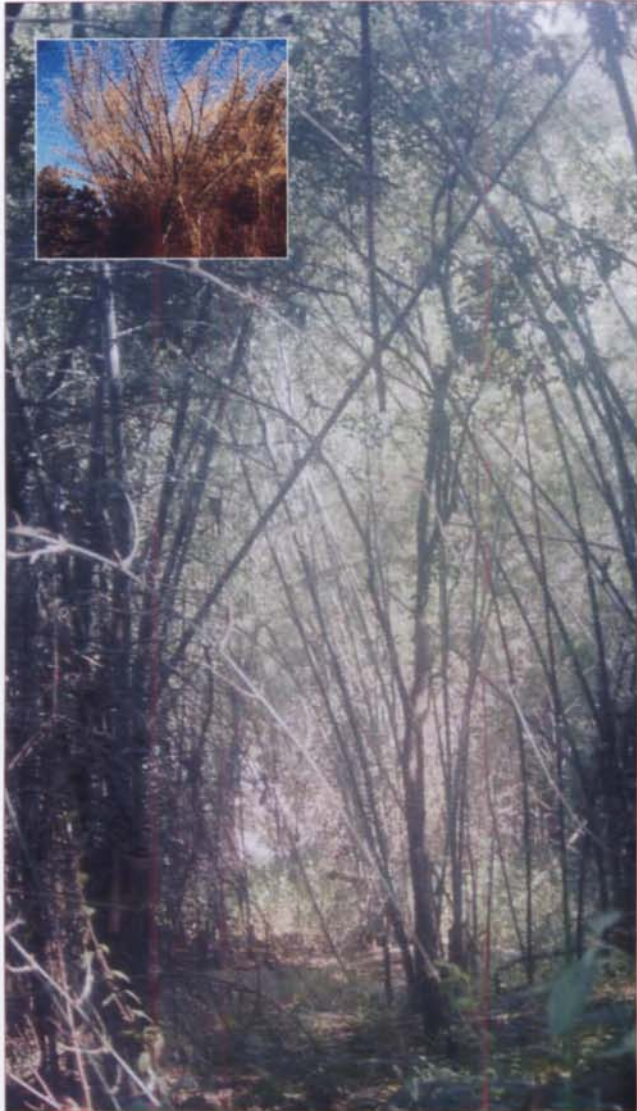
*Usage*: Rhizome-paste is applied externally on legs of the children who have weak legs and difficulty in walking. This application strengthens legs when used regularly for long periods; depending upon the severity of problem the treatment is further continued.

## POACEAE

**Bambusa bambos** (L.) Voss in Vilm., Blumengartn. 1: 1189. 1896; Sasidh. & Sivar., Flow. Pl. Thrissur For. 563. 1996; Mohanan & Sivad., Fl. Agasthyamala 805. 2002. *Arundo bambos* L., Sp. Pl. 81. 1753. *Bambos arundinacea* Retz., Obs. Bot. 5: 24. 1788. *Bambusa arundinacea* (Retz.) Willd., Sp. Pl. 2: 245. 1799; Hook. f., Fl. Brit. India 7: 395. 1896; Fischer in Gamble, Fl. Pres. Madras 1859. 1934; Britto & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 3: 1808. 1983; V. J. Nair in Henry *et al.*, Fl. Tamilnadu 3: 93. 1989; V. S. Ramach. & V. J. Nair, Fl. Cannanore 528. 1988; Mohanan & Henry, Fl. Thiruvananthapuram 563. 1994; Sivar. & P. Mathew, Fl. Nilambur 818. 1997. **Moongil (I, K & M)**. Plate 11A-E.

Plants to 35 m tall; culms thick, woody; culm-sheaths glabrescent, broad, triangular. Leaf-sheaths linear, to 12 x 1.2 cm, glabrous; ligule short, entire white hairy; leaves linear-lanceolate, acute at both ends; petiole short. Panicles compound, leafy or leafless, with spikelets clustered in heads on spicate branchlets. Spikelets oblong, terete, 0.8-2 x 0.4 cm, 3-6-flowered. Bracts glume-like. Glumes broadly ovate, to 5.5 mm long, mucronate; lemmas coriaceous, oblong, to 6.5 mm long, glabrous, mucronate; paleas to 7 mm

Plate 11. Bamboo in tribal life



A. Pure stands of bamboo (*Bambusa bambos*) along river Bhavani. Inset: gregarious flowering



B. Harvested bamboo



C. Wall framed with bamboo splints



D. Bamboo hut



E. Basket made of bamboo

long, 2-keeled, ciliate; lodicules 3, membranous, ciliate. Stamens 6; filaments free. Style 1; stigmas 3. Grain linear-oblong, furrowed on one side.

*Fl. & Fr.:* Gregariously flowering once in 30-35 years. During 2002-2003, gregarious flowering was noticed in the southern Attappady.

*Distribution:* India and Sri Lanka. Moist deciduous forest of Sholayoor, c. 750 m; frequent. *HN 097*.

*Usage:* Mature stem is split longitudinally and trellises are prepared for cattle shed, goat-pen, hen-coops etc. The mature culms are used in the construction of huts. These are split, sliced and interweaved on the sidewalls of huts. After drying, mud is pasted over this. Bamboo splints are also used to make the structure of roof. The grains are collected and stocked which provides a substitute for rice and is a gourmet's delight. Several materials like mats, trellis, baskets etc are prepared with bamboo splints.

**Cymbopogon flexuosus** (Nees ex Steud.) Wats. in Atkins., *Gaz. N. W. Prov. India* 392. 1882; Fischer in Gamble, *Fl. Pres. Madras* 1756. 1934; K. M. Matthew, *Mat. Fl. Tamilnadu Carnatic* 1: 388. 1981; V. J. Nair in Henry *et al.*, *Fl. Tamilnadu* 3: 103. 1989; Vajr., *Fl. Palghat Dist.* 569. 1990; Sasidh. & Sivar., *Flow. Pl. Thrissur For.* 509. 1996; Sivar. & P. Mathew, *Fl. Nilambur* 806. 1997; Mohanan & Sivad., *Fl. Agasthyamala* 809. 2002. *Andropogon flexuosus* Nees ex Steud., *Syn. Pl. Glum.* 1: 388. 1854. *A. nardus* L., *Sp. Pl.* 1046. 1753, var. *flexuosus* (Nees ex Steud.) Hack. in DC., *Monogr. Phan.* 6: 603. 1889; Hook. f., *Fl. Brit. India* 7: 207. 1896. **Teruve (I, K & M).**

Aromatic grass to 1.5 m high; culms tufted; nodes glabrous, hairy. Leaf blades flat, 25-80 x 0.5-1.8 cm, linear-lanceolate, rough, base rounded, margin scabrous, apex acute; ligule membranous, to 0.8 cm long. Panicles lax, greyish, drooping, to 35 cm long; spathes to 5 cm long; spatheoles to 3 cm long; rachis glabrous. Lower glumes of sessile spikelets narrowly winged, ciliolate on margins and wings; lower glumes of pedicellate spikelets, lanceolate, acuminate, to 0.4 cm long; pedicel to 0.2 cm.

*Fl. & Fr.:* October-November.

*Distribution:* India and Southeast Asia. Grasslands in Kathirampathi forest area, c.700 m; locally abundant, often cultivated. *HN 170*.

*Usage:* Equal quantity of roots and leaves are ground well to a paste and applied externally on foot itches. This is applied during bedtime for one week.

**Cynodon dactylon** (L.) Pers., Syn. Pl. 1: 85. 1805; Hook. f., Fl. Brit. India 7: 288. 1896; Fischer in Gamble Fl. Pres. Madras 1835. 1934; Britto & K. M. Matthew in K. M. Matthew Fl. Tamilnadu Carnatic 3: 1829. 1983; V. J. Nair in Henry *et al.*, Fl. Tamilnadu 3: 104. 1989; V. S. Ramach. & V. J. Nair, Fl. Cannanore 532. 1988; Vajr., Fl. Palghat Dist. 570. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 533. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 510. 1996; Sivar. & P. Mathew, Fl. Nilambur 823. 1997; Mohanan & Sivad., Fl. Agasthyamala 810. 2002. *Panicum dactylon* L., Sp. Pl. 58. 1753. **Arukam Pullu (I)**.

Plants to 25 cm high; rooting at nodes and forms a thick cover on the ground; culms slender, glabrous at nodes. Leaf sheaths 0.6-3.5 cm; ligule membranous, shortly ciliate, to 0.5 mm; leaf blades oblong, 1.5-10 cm long, flat or folded, softly scaberulous. Spikes 3 or 4, digitate, 1-sided, oblong, 1.5-5 cm long. Spikelets to 2.5 mm long, sessile, laterally compressed, biseriate, 1-flowered. Glumes lanceolate, subequal, persistent, scaberulous along keel; upper glume 1.7 mm long, lower glume 1.3 mm long; lemma and palea 2 mm long. Anthers 3, to 1 mm long. Caryopsis linear, 0.7 mm long.

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

*Distribution:* Tropical and warm temperate regions of the world. Dry thickets of Kallakkara, c. 650 m; locally abundant. *HN 200*.

*Usage:* Some shoots and *Gani Tumbe* (*Trichodesma indicum*) are taken with water and cow's urine in a tumbler. This is sprinkled all around the house premises with the belief that it will expel the evil spirits. Shoots of this are also used for sprinkling water over the head of pregnant women by chanting some mantras, in a faith of protecting her from evil spirits. This sacred water is also taken internally every day in the morning after completing eight months of pregnancy.

**Dendrocalamus strictus** (Roxb.) Nees, *Linnaea* 9: 476. 1835; Hook. f., *Fl. Brit. India* 7 : 404. 1896; Fischer in Gamble, *Fl. Pres. Madras* 1858. 1934; Britto & K. M. Matthew in K. M. Matthew, *Fl. Tamilnadu Carnatic* 1832. 1983; V. J. Nair in Henry *et al.*, *Fl. Tamilnadu* 3: 106. 1989; V. S. Ramach. & V. J. Nair, *Fl. Cannanore* 534. 1988; Sivar. & P. Mathew, *Fl. Nilambur* 819. 1997. *Bambusa stricta* Roxb., *Pl. Corom. t.* 80. 1798. **Moongil (I)**.

Plants to 10 m high; culms with narrow cavity; culm-sheaths with golden brown hairs; imperfect blade narrowly triangular. Leaf blades 8 x 1.2 cm, stiff, linear-lanceolate, shortly petiolate. Inflorescence a compound panicle, to 40 cm long; spikelets clustered in globose heads; heads to 3 cm across. Bracts glume-like, 1 or more, spiny, with spikelets in axils; spikelets spiny, hairy, to 1 cm long. Glumes ovate, to 3 mm long, hairy; fertile lemmas 2 or 3, ovate-lanceolate, 6 mm, spine-tipped, hairy without; paleas oblong, 5 mm long, 2-keeled, ciliate. Stamens 6; anthers to 4 mm long. Caryopsis ovoid-subglobose.

*Fl. & Fr.*: Gregariously flowering once in 30-35 years.

*Distribution*: Peninsular India and Java. Dry-deciduous forest of Agali, c. 600 m; frequent. *HN 261*.

*Usage*: Dried clumps are used as firewood. Grains are edible (as Forest Department planted this species in different years, bamboos of all age groups are common in the forest area and flowering is noticed in different years).

**Desmostachya bipinnata** (L.) Stapf in Oliver, *Fl. Cap.* 7: 632. 1900; Fischer, *Fl. Pres. Madras* 1819. 1934; Britto & K. M. Matthew in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 1832. 1983; V. J. Nair in Henry *et al.*, *Fl. Tamilnadu* 3: 106. 1989. *Briza bipinnata* L., *Syst. Nat.* (ed.10) 875. 1759. *Eragrostis cynosuroides* (Retz.) P. Beauv., *Essai Agrostogr.* 71 & 162. 1812; Hook. f., *Fl. Brit. India* 7: 324. 1896. **Darppa (I & M)**.

Perennial grass; culms stout to 1 m high; nodes glabrous. Leaf sheaths densely flabellate, leathery; ligule membranous, lacerate, 0.5 mm long; blades flat or folded, tufted. Flowers in panicle-like spikes; spikes clustered. Spikelets about 10-flowered, linear-oblong, to 7 mm long, laterally

compressed, sessile. Glumes unequal, lanceolate; lemma lanceolate, to 1.5 mm long, rigid, keeled; palea keeled. Stamens 3.

*Fl. & Fr.*: November-January.

*Distribution*: Throughout the Middle East to Indo-China; North and tropical Africa. Wastelands of Puttumala, c. 700 m; locally abundant. *HN 207*.

*Usage*: Occasionally used for thatching small sheds and huts.

**Eleusine coracana** (L.) Gaertn., *Fruct.* 1: 8, t. 1. 1788; Hook. f., *Fl. Brit. India* 7: 294. 1896; Fischer in Gamble, *Fl. Pres. Madras* 1858. 1934; Britto & K. M. Matthew in K. M. Matthew, *Fl. Tamilnadu Carnatic* 1848. 1983; V. J. Nair in Henry *et al.*, *Fl. Tamilnadu* 3: 111. 1989. *Cynosurus coracana* L., *Syst. Nat.* (ed. 10) 2: 875. 1759. **Kore (I, K & M)**.

Tufted grass to 1 m high; nodes glabrous. Leaf sheaths 5-15 cm long, compressed, glabrous; ligule hairy; blades 10-25 x 0.6-1 cm, linear, convolute, overlapping the culms, base truncate, apex acuminate, glabrous. Spikes to 15 cm, suberect; rachis of the inflorescence trigonous, pubescent at base. Spikelets to 6 mm long, congested, ovoid, glabrous. Glumes oblong, margin scaberulous, acute; lemma broadly ovate; palea ovate, margin scaberulous. Stamens 3, stigma plumose. Caryopsis globose, dark red or brown coloured.

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

*Distribution*: Widely cultivated in Paletropics. Farmlands of Mully, c. 700 m; commonly cultivated. *HN 029*.

*Usage*: Fruits are fried and powdered, mixed with coconut oil and applied over wounds for speedy healing. The wounds are not to be washed till they are healed. Cultivated in open areas as a rainfed crop by all the three groups. The grains are the staple food of majority tribal people and is largely cultivated in farmlands. The grains powdered, boiled and delicious cakes, called as *Korepputtu*, are prepared.

**Oryza sativa** L., *Sp. Pl.* 333. 1753; Hook. f., *Fl. Brit. India* 7 : 92. 1896; Fischer in Gamble, *Fl. Pres. Madras* 1844. 1934; Britto & K. M. Matthew in K.

M. Matthew, Fl. Tamilnadu Carnatic 1878. 1983; V. J. Nair in Henry *et al.*, Fl. Tamilnadu 3: 130. 1989; Vajr., Fl. Palghat Dist. 582. 1990. **Nellu (I, K & M)**.

Grass to 1 m high, stout, branched; nodes glabrous. Leaves narrow, flat, to 50 x 1 cm, flat. Panicles narrowly pyramidal, to 20 cm. Spikelets laterally compressed, 1-flowered. Glumes very small, subulate. Lemma & palea chartaceous, strongly ribbed. Lodicules 2. Stamens 6. Style 2, free; ovary ellipsoid. Grain narrowly oblong, free within the lemma and palea.

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

*Distribution*: Widely cultivated in tropical and subtropical countries of the World. Farmlands of Kathirampathy, c. 650 m; frequent. *HN 260*.

*Usage*: Cultivated as a kharif crop for its grains, which is the staple food of some tribal people.

**Panicum sumatrense** Roth ex Roem. & Schult., Syst. Veg. 2: 434. 1817; Manilal, Fl. Silent Valley 359.1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 549. 1988. *P. psilopodium* Trin., Gram. Panic. 217. 1826; Hook. f., Fl. Brit. India 7: 46. 1896; Fischer in Gamble, Fl. Pres. Madras 1782. 1934; Britto & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 1882. 1983; V. J. Nair in Henry *et al.*, Fl. Tamilnadu 3: 131. 1989; Sivar. & P. Mathew, Fl. Nilambur 843. 1997. **Saame (I, K & M)**.

Culms to 1 m high, stout, usually branched; nodes glabrous. Leaf-blades oblong-lanceolate, 25 x 1 cm, flat, base truncate, apex acuminate, glabrous. Panicles narrowly pyramidal, to 20 cm long, contracted. Spikelets ellipsoid, to 3.5 mm long, glabrous, acute. Lower glume broadly ovate, to 1 mm long, 3- 5-nerved, obtusely acute; upper glume ovate-lanceolate, to 2.5 mm long, acute; lower lemma to 2.5 mm long; upper lemma pallid, smooth, to 2.2 mm long, glabrous, obscurely 3-nerved. Ovary ellipsoid. Caryopsis globose, pale brown coloured

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

*Distribution*: Pantropical. Farmlands of Mukkali, c. 550 m; frequent. *HN 030*.

*Usage*: Cultivated for its grains. Gruel is usually prepared with this.

**Paspalum scrobiculatum** L., Mant. Pl. 1: 29. 1767; Hook. f., Fl. Brit. India 7: 10. 1896; Fischer in Gamble, Fl. Pres. Madras 1772. 1934; Britto & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 1887. 1983; Manilal, Fl. Silent Valley 360. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 551. 1988; V. J. Nair in Henry *et al.*, Fl. Tamilnadu 3: 132. 1989; Vajr., Fl. Palghat Dist. 582. 1990; M. Mohanan & A. N. Henry, Fl. Thiruvananthapuram 553. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 522. 1996; Sivar. & P. Mathew, Fl. Nilambur 845. 1997; Mohanan & Sivad., Fl. Agasthyamala 838. 2002. *P. orbiculare* Forst., Fl. Ins. Aust. Prodr. 7: 1786; Fischer in Gamble, Fl. Pres. Madras 1772. 1934. **Varagu (I, K & M).**

Tufted grass, culms to 70 cm high; nodes glabrous. Leaf sheaths to 15 cm long, glabrous; ligule a ciliate rim; blades 10-40 x 0.3-0.7 cm, linear, base rounded, apex acute, glabrous. Racemes 2-5, to 10 cm long, axis flattened. Spikelets 2 mm, globose, in two rows. Lower glume obscure, upper glume ovate; lower lemma ovate, membranous, upper lemma ovate, crustaceous; palea orbicular. Stamens 3; stigma plumose. Caryopsis plano-convex, free with in the lemma and palea.

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

*Distribution*: India and Pakistan. Farmlands of Narasimukku, c. 700 m; frequent. *HN 154*.

*Usage*: Cultivated for its grains. Gruel or cake with the powder is commonly prepared with this.

**Pennisetum americanum** (L.) Leeke, Z. Naturwiss. 79: 52. 1807. *Panicum americanum* L., Sp. Pl. 56. 1753. *Alopecurus typhoides* Burm. f., Fl. Ind. 27. 1768. *Pennisetum typhoides* (Burm. f.) Stapf & C. E. Hubb., Bull. Misc. Inform. Kew 1933: 271. 1933; Fischer in Gamble, Fl. Pres. Madras 1792. 1934; Britto & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 1888. 1983. *P. typhoideum* (Burm. f.) L. C. Rich. in Pers., Syn. 1: 72. 1805; Hook. f., Fl. Brit. India 7: 82. 1896. **Kambu (I).**

Grass, culms to 1.3 m high. Leaf sheaths to 12 cm long; ligule villous; blades 10-45 x 0.3-0.5 cm, linear, base rounded, apex acute, glabrous.

Panicles cylindrical, stout, to 25 cm long; rachis thick, villous; involucre densely packed all round the rachis, bristled. Spikelets 2-3, to an involucre, pedicellated. Lower glume 0, upper glume very short; lemmas subequal. Stamens 3. Grain narrowly oblong, enclosed in slightly hardened lemma and palea.

*Distribution:* India, Africa and South Europe. Farmlands of Koodappetty, c. 600 m; frequent. *HN 041*.

*Usage:* Cultivated for its grains. Gruel is prepared with grains or cake with the powder.

**Sorghum bicolor** (L.) Moench., *Methodus* 207. 1794; V. J. Nair in Henry *et al.*, *Fl. Tamilnadu* 3: 139. 1989. *Holcus bicolor* L., *Mant. Pl.* 2: 301. 1771. *Sorghum vulgare* Pers., *Syn. Pl.* 1: 101. 1805. **Solam (I, K & M)**.

Stout grass, culms to 2 m high. Leaf-blades flat, sheaths often shorter than internodes, sheaths pubescent along margins, ligules short membranous. Panicles terminal, to 15 cm long, contracted or loose. Spikelets in clusters, 2-3 in each cluster, one sessile and hermaphrodite, others pedicelled and staminate. Florets 2, lower floret usually reduced to an empty lemma, upper one hermaphrodite in pedicelled spikelets. Lodicules 2, truncate, ciliate. Stamens 3; stigmas 2, plumose. Caryopsis ovate, off-white coloured.

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

*Distribution:* Native of Tropical Africa; introduced elsewhere. Farmlands of Konamkuthy, c. 700 m; frequent. *HN 134*.

*Usage:* Grains powdered and a kind of cake is prepared, which is eaten with curries.

**Themeda triandra** Forssk., *Fl. Aegypt.-Arab.* 178. 1775; Fischer in Gamble, *Fl. Pres. Madras* 1746. 1934; Britto & K. M. Matthew in K. M. Matthew, *Fl. Tamilnadu Carnatic* 3: 1908. 1983; Manilal, *Fl. Silent Valley* 366. 1988; V. S. Ramach. & V. J. Nair, *Fl. Cannanore* 555. 1988; M. Mohanan & A. N. Henry, *Fl. Thiruvananthapuram* 561.1994; Sasidh. & Sivar., *Flow. Pl.*

Thrissur For. 527. 1996; Sivar. & P. Mathew, Fl. Nilambur 815. 1997; Mohanan & Sivad., Fl. Agasthyamala 848. 2002. *Anthistiria imberbis* Retz., Obs. Bot. 3: 11. 1783; Hook. f., Fl. Brit. India 7: 211. 1896. **Mechilpullu (I)**.

Perennial grass to 2 m; densely tufted. Leaves to 50 x 1 cm, linear-lanceolate, round to shallowly cordate at base, ligules fimbriate, membranous. Panicles to 75 cm long, with flabelliform clusters of spikelets. Involucral spikelets 2 pairs, 0.6 -1.2 cm long, elliptic-lanceolate, tubercled-hairy. Lower floret empty; upper male. Sessile spikelets solitary, awned; awn to 6 cm long; lower floret empty; upper bisexual. Pedicelled spikelets 2 in a raceme, awnless. Pedicels 0.2 - 0.3 cm long.

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

*Distribution*: Paleotropics. Dry-deciduous forest of Konamkuthy, c. 750 m; frequent. *HN 088*.

*Usage*: This is used for thatching purposes.

**Zea mays** L., Sp. Pl. 971. 1753; Hook. f., Fl. Brit. India 7: 102. 1896; Fischer in Gamble, Fl. Pres. Madras 1704. 1934; Britto & K. M. Matthew in K. M. Matthew, Fl. Tamilnadu Carnatic 1887. 1983; V. J. Nair in Henry *et al.*, Fl. Tamilnadu 3: 146. 1989. **Makka solam (I, K & M)**.

Annual, monoecious grass; culms to 2m high; nodes beared. Leaf sheath 5-20 cm long, terete, densely pubescent along the margins; ligule a pubescent ring; blades 20-90 x 3-10 cm, lanceolate; flat, broad, base cordate, margin ciliate, apex acute, sparsely hairy on both surface. Male panicle to 40 cm long, terminal, racemosely arranged. Female panicle to 25 cm long, solitary, axillary. Spikelet 2-nate, 2-flowered.

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

*Distribution*: Native of South America; widely cultivated in world countries. Farmlands of Chavadiyoor, c. 650 m; frequently cultivated. *HN 226*.

*Usage*: The straw is largely used in thatching huts and sheds. Seeds form a principal cereal.

## ZINGIBERACEAE

**Costus speciosus** (Koen.) Smith, Trans. Linn. Soc. London 1: 249. 1791; Baker in Hook. f., Fl. Brit. India 6: 249. 1892; Fischer in Gamble, Fl. Pres. Madras 1490. 1928; Ramamurthy in Henry *et al.*, Fl. Tamilnadu 3: 30. 1989; Manilal, Fl. Silent Valley 311. 1988; V. S. Ramach. & V. J. Nair, Fl. Cannanore 467. 1988; Vajr., Fl. Palghat Dist. 498. 1990; Mohanan & Henry, Fl. Thiruvananthapuram 475. 1994; Sasidh. & Sivar., Flow. Pl. Thrissur For. 459. 1996; Sivar. & P. Mathew, Fl. Nilambur 707. 1997; Mohanan & Sivad., Fl. Agasthyamala 708. 2002. **Sullithandu (M)**.

Fleshy herbs to 1.25 m high, rhizomatous. Leaves broadly oblong to lanceolate, 10-30 x 3-8 cm, chartaceous, glabrescent above, pubescent below, base tapering, margin entire, apex abruptly acuminate; ligule short, to 2 cm long; sheath to 5 cm, tubular; petiole to 1 cm long. Spikes dense, terminal, globose, to 4 cm across; bracts ovate, reddish, to 2 cm long, bracteoles oblong, reddish, to 1 cm long. Calyx tubular, to 2 cm long, glabrous, base puberulous, 3 lobed; lobes triangular, to 5 mm long. Corolla white; lobes elliptic-oblong, to 4 x 0.8 cm. Labellum white, with a yellow centre, broadly obovate, 5 x 4.5 cm, margin incurved, base hairy. Stamen in an oblong petaloid process, to 2.5 cm long, pubescent without; anther to 5 mm long. Ovary globose, to 1 cm across, 3-lobed, 3-celled; ovules many per cell; style to 4 cm long; stigma crescent-shaped, ciliate; nectariferous hollows present. Fruit a globose or ovoid capsule.

*Fl. & Fr.*: August-November.

*Distribution*: Indo-Malesia. Undergrowth in moist deciduous forest of Kallamala, c. 650 m; locally abundant. *HN 317*.

*Usage*: The stem is pressed and the juice is dripped on the crown of head for relief from fever and shivering. Single application is normally advised.

## 2. GYMNOSPERMS

### CYCADACEAE

**Cycas circinalis** L., Sp. Pl. 1188. 1753; Thiselton Dyer in Hook. f., Fl. Brit. India 5: 656. 1888; Fischer in Gamble, Fl. Pres. Madras. 1394. 1928; Vajr., Fl. Palghat Dist. 459. 1990. **Eentha maram (I)**. Plate 12A.

Palm-like trees to 5 m tall, rarely branched. Leaves spirally arranged forming a crown, pinnate, to 1.75 m long, rachis spiny at base; leaflets linear, entire. Male cones terminal, to 0.75 m; microsporophylls with upturned tips. Megasporophylls to 15 cm long, with apical portion ovate-lanceolate, pectinate. Ovules 3-5 on each side, each 3-5 cm across, yellow when ripe.

*Fl. & Fr.*: January-August.

*Distribution*: Indo-Malesia and Tropical East Africa. Moist deciduous forests of Nallasinga, c.700 m; frequent. *HN 318*.

*Usage*: A piece of bark is crushed and ground well with a small piece of the root of *Erukku (Calotropis gigantea)* and a small piece of bark of *Itti (Strychnos nux-vomica)*. This mixture is applied externally over sides of forehead for curing migraine. Continuous application for prolonged days is not suggested. A piece of bark is ground in water to make a paste and is applied externally all over the body, one hour before bath for two continuous weeks. This is recommended to the ill-healthy and pale children to become healthy. Leaves are used for outdoor decoration during festivals and other special occasions.

## 3. PTERIDOPHYTES

### ACTINOPTERIDACEAE

**Actinopteris radiata** (Sw.) Link, Fil. Sp. Hort. Ref. Bot. Berol. 80. 1841; Dixit, Cens. Ind. Pterid. 68. 1984; Manickam & Irudayaraj, Pterid. Fl. Western Ghats 81. 1992; Easa, Biodiv. Doc. Kerala 5: 23. 2003. *Asplenium radiatum* Sw., Schrad. J. Bot. 1800: 50. 1801. *Actinopteris dichotoma* Kuhn, Bot. Zeit. 504. 1871. **Siru kallu pase (I)**. Plate 12B.

Rhizomatous herb, to 15 cm high; rhizome suberect, subglobose, 1-2 cm thick, densely covered by scales; scales lanceolate, 7 x 1 mm, apex acuminate, margin entire. Stipes numerous, tufted, up to 15 cm long in fertile fronds, to 10.5 cm long in sterile ones, to 2 mm thick, abaxially grooved, adaxially rounded, pale brown at the base, pale green above; soft, thin, transparent scales distributed on the stipes sparsely all over. Laminae flabellate, semicircular or wedge-shaped, up to 3.5 x 5.5 cm, repeatedly, dichotomously divided up to six times; segments rachiform, up to 2 mm wide, apex acute, margin entire; lamina pale green; coriaceous; soft, pale brown scales distributed densely in younger laminae, sparsely in older ones. Sporangia borne in intramarginal grooves, protected by the reflexed margin of the segments.

*Distribution:* India, Sri Lanka, United Arab Republic, Iran, Pakistan, Africa, Mascaran Isls. & Afghanistan. Exposed earth cuttings, c. 700 m; locally abundant. *HN 106*.

*Usage:* An aqueous paste is prepared with the tender shoots and *Periya kallupase* (*Parahemionitis cordata*) and applied externally during bed-time over the reddish boils appearing on the skin of infants/babies. Application may require three days for complete cure.

## ANGIOPTERIDACEAE

**Angiopteris evecta** (Forst.) Hoff., Comm. Soc. Reg. Gott. 12: 29. 1796; Dixit, Cens. Ind. Pterid. 2. 1984; Manickam & Irudayaraj, Pterid. Fl. Western Ghats 56. 1992; Easa, Biodiv. Doc. Kerala 5: 15. 2003. *Polypodium evectum* Forst., Prodr. 81. 1786. **Aanavanangi (I, M & K)**. Plate 12C.

Rhizomatous shrub, to 2 m high; rhizome erect, cylindrical, to 24 cm diameter, apex densely covered by dark brown hairs. Stipes up to 1.5 m long, 5 cm thick, stipular at the base, abaxially rounded, adaxially flattened, bearing whitish linear streaks all over, glabrous. Lamina deltoid, up to 2.45 x 1.6 m, bipinnate; pinnae up to 16 pairs, sub opposite, stalk to 3 cm long, oblong-lanceolate, to 65 x 24 cm with a terminal pinnule similar to the lateral

ones, base truncate; pinnules up to 25 pairs, subopposite, shortly stalked, oblong-lanceolate, up to 14 x 2 cm, apex acuminate, base subtruncate, margin serrate in the distal part of the pinnae, crenate in the rest; pinnae dark green, glabrous. Sori submarginal, ellipsoid; sporangia up to six pairs in two rows, compact, free.

*Distribution:* India, China, Japan, Tropical Australia, New Caledonia, Malagasy & Malaya to Polynesia. Along stream banks in evergreen forest of Kurukkankundu, c. 750 m; rare. *HN 208*.

*Usage:* This plant is said to be having magical properties. It is believed that if plant parts are kept in an amulet and tied on any part of the body, it will provide great confidence and courage to the person. It is also considered as a bewitching agent.

## ATHYRIACEAE

***Diplazium esculentum*** (Retz.) Sw. in Schrad., J. Bot. 1801 (1), 312. 1803; Dixit, Cens. Ind. Pterid. 132. 1984; Manickam & Irudayaraj, Pterid. Fl. Western Ghats 242. 1992; Easa, Biodiv. Doc. Kerala 5: 66. 2003. *Hemionitis esculenta* Retz., Obs. Bot. 6: 38. 1791. **Churuli (I & M)**.

Rhizomatous herb, to 1.2 m high; rhizome erect, to 4 cm thick, densely scaly at the apex; scales linear-lanceolate, 8 x 1 mm. Stipes tufted, up to 62 cm long, 8 mm thick, sparsely scaly at the base, glabrous above; purplish bands scattered throughout the stipe and rachis. Lamina deltoid, up to 110 x 60 cm, apex acuminate, base truncate, bipinnate with simply pinnate apex; pinnae up to seven pairs, basal 1-2 pairs opposite or subopposite, rest of the pairs alternate, stalked; stalk to 3 cm long, narrowly deltoid with a deeply lobed terminal pinna, up to 40 x 30 cm, apex acuminate, base truncate; pinnules up to 15 pairs, alternate, basal few pairs sessile, up to 3 cm apart, oblong-lanceolate, up to 11 x 1.5 cm, apex acuminate, base truncate, margin serrate at the apex, shallowly lobed or crenate in the rest; lobes broadly deltoid, oblique, margin serrate, apex toothed. Pinnae dark green, glabrous

on both surfaces. Sori up to 1.5 mm wide, linear, all along the veins except the base and apex; indusia pale brown with wavy margin.

*Distribution:* Asia, Java, Malesia, Molukkas, New Guinea, Philippines, Polynesia and Sri Lanka. Along stream banks in evergreen forest of Kurukkankundu, c. 750 m; rare. *HN 214*.

*Usage:* Young fronds are collected in the morning, the rachis split and spread in sunlight till evening. This is used as a vegetable during supper.

## EQUISETACEAE

***Equisetum ramosissimum*** Desf., Fl. Atlant. 2: 398. 1800; Dixit, Cens. Ind. Pterid. 20. 1984; Manickam & Irudayaraj, Pterid. Fl. Western Ghats 44. 1992, ssp. *debile* (Roxb. ex Vaucher) Hanke, Amer. Fern J. 52: 33. 1962; Easa, Biodiv. Doc. Kerala 5: 12. 2003. *E. debile* Roxb. ex Vaucher, Mem. Soc. Phys. Hist. Nat. Gener. 1: 287. 1821. **Moottuppullu (I)**. Plate 12D.

Rhizomatous herb to 1 m high; rhizome long creeping, subterranean, branched, dark brown, terete with ridges and furrows, to 0.8 cm thick, with nodes and internodes, bearing fibrous roots and aerial stem, internodal length up to 3 cm, each node bears up to 0.5 cm tall cylindrical sheath. Aerial stem pale green coloured, glabrous, coriaceous; distinguished into nodes and internodes; internodal region tubular, to 8 cm long, surface with many ridges and furrows, nodal region not distinguishable, concolorous with internodal part, the dark brown upper edge of the nodal sheath apparently looking like the node; lateral branches 1-5, borne around the nodes at the base of the nodal sheath; leaves scale-like, borne on the upper edge of the nodal sheath, to 8 x 1 mm. Cones borne at the tip of the main stem or branches, to 1 x 0.4 cm; sporangia borne on underside of peltate sporophylls with sporophore.

*Distribution:* Philippines, Indonesia, New Guinea, Vannatu, New Caledonia, Fiji. Marshy river beds, c. 750 m; frequent. *HN 184*.

*Usage:* Dried shoots are powdered and applied over wounds for speedy healing. For curing summer-boils, fresh shoot-paste is applied externally during night time for three consecutive days.

## HEMIONITIDACEAE

**Parahemionitis cordata** (Roxb. ex Hook. & Grev.) Fraser-Jenk., New Sp. Syndr. 187. 1997; Easa, Biodiv. Doc. Kerala 5: 26. 2003. *Hemionitis cordata* Roxb. ex Hook. & Grev., Ic. Fil. t. 64. 1828. *Asplenium arifolium* Burm. f., Fl. Ind. 231. 1768. *Hemionitis arifolia* (Burm.) Moore, Ind. Fil. 114. 1859; Dixit, Cens. Ind. Pterid. 79. 1984; Manickam & Irudayaraj, Pterid. Fl. Western Ghats 93. 1992. *Hemionitis cordifolia* Roxb. ex Bedd., Ferns S. India, t. 53. 1864. **Periya kallu pasai (I)**.

Rhizomatous herbs, to 25 cm high; rhizome erect when young, short, creeping when mature, to 2 cm thick, densely covered by scales; scales ovate-lanceolate, 3.5 x 0.5 mm. Stipes compact, numerous, dark brown coloured; shining, brittle, to 30 cm long in fertile fronds, to 23 cm in sterile ones, 2 mm thick, terete, densely scaly all over when young, sparsely so when mature. Lamina simple, dimorphic, cordiform, up to 9 x 6 cm, fertile ones up to 7 x 10 cm, deltoid, trilobed, entire; lamina pale green coloured, lower surface of the sterile laminae is covered with long, soft, pale brown scales. Sori continuous along the veins filling the entire surface of the lamina when mature, intermixed with hairs and scales.

*Distribution:* Tropical countries. Shady localities in the ravines of Mully, c. 700 m; rare. *HN 107*.

*Usage:* An aqueous paste is prepared with the whole plant of this and tender shoots of *Siru kallupase* (*Actinopteris radiata*) and applied externally during bed-time over the reddish boils appearing on the skin of infants/babies. Application may require three days for complete cure.

## POLYPODIACEAE

**Drynaria quercifolia** (L.) J. Sm., in Hook's J. Bot. 3: 398. 1841; Manickam & Irudayaraj, Pterid. Fl. Western Ghats 312. 1992; Easa, Biodiv. Doc. Kerala 5: 81. 2003. *Polypodium quercifolium* L., Sp. Pl. 2: 1087. 1753. **Kallothi (I)**. Plate 12E.

Plate 12.



A. *Cycas circinalis*



B. *Actiniopteris radiata*



C. *Angiopteris evecta*



D. *Equisetum ramosissimum* ssp. *debile*



E. *Drynaria quercifolia*

Epiphytic, rhizomatous herb, to 50 cm high; rhizome short creeping, to 5 cm thick, densely clothed by scales; scales linear lanceolate, about 12 x 2 mm. Nest leaves ovate, 24 x 17 cm, apex acute, margin lobed; stipes up to 22 x 0.7 cm, grey-brown, abaxially rounded, adaxially grooved, narrowly winged on either side, glabrous. Lamina oblong, up to 77 x 50 cm, pinnately lobed, terminated by a pinnule similar to the lateral ones, base decurrent; lobes up to 15 pairs, basal pairs much reduced; oblong-lanceolate, apex acute, margin entire, base decurrent; pinnae pale green, glabrous, coriaceous. Sori seated at the juncture of veins, more or less in two rows along each primary vein, orbicular, up to 2.5 mm in diameter.

*Distribution:* Asia, Papua New Guinea, Fiji, Polynesia, and Tropical Australia. Moist deciduous forest of Kathirampathy, c. 700 m; frequent. *HN 344*.

*Usage:* *Irulas* believe that they can keep away the evil spirits from their house if *Kungilyam* (resin of *Canarium strictum*) is smoked at the basal portion of *Kallothi* in the evenings.

## SELAGINELLACEAE

***Selaginella delicatula*** (Desv. ex Poir.) Alston, J. Ind. Bot. 70: 282. 1932; Dixit, Cens. Ind. Pterid. 12. 1984; Manickam & Irudayaraj, Pterid. Fl. Western Ghats 40. 1992; Easa, Biodiv. Doc. Kerala 5: 7. 2003. *Lycopodium delicatulum* Desv. ex Poir. in Lamk., Encycl. Suppl. 3: 584. 1814. *L. flaccidum* Bory in Bel., Voy. Bot. Ilp. 9 1833. ***Kuruvevannasappu (M)***.

Herb to 30 cm high; stem erect or suberect, rooting at the base only; lateral branches many, alternate, tripinnate. Leaves scattered and oblique on main stem, arranged in four rows on lateral branches; lateral leaves about 2.5 x 1.5 mm, ovate, obtuse, entire; median leaves ovate, 2 x 1 mm, entire. Spikes borne on ultimate branches, quadrangular, up to 2 x 0.2 cm; sporophylls uniform, ovate, acuminate, entire, 2 x 1 mm.

*Distribution:* India, Philippines, Moluccas, Borneo, Annam, Cambodia, Tonkin, Thailand, Vietnam, Taiwan, Myanmar, Peninsular Malesia, Nepal and New Guinea. Shady localities in the Semi-evergreen forest of Mukkali, c. 550 m; locally abundant. *HN.314*.

*Usage:* The whole plant is ground with *sirupeelichedi* (*Spermacoce hispida*) and a decoction is made in water and administered half a glass each in the morning and evening for three weeks to cure the disease characterised by small protuberance on the skin.



Ethnobotanical  
Analysis

## 7. ETHNOBOTANICAL ANALYSIS

India harbours very high plant diversity with about 17000 species of flowering plants (Nair & Daniel, 1986). It is estimated that about 9500 species of flowering plants are ethnobotanically important in India (MoEF, 1994). This constitutes 55% of the Indian flora. The compilation based on the floristic studies carried out so far shows that there are 4679 taxa of flowering plants in Kerala (Sasidharan, 2004). The floristic studies conducted in the Palakkad District including the entire Attappady Valley revealed the presence of 1355 species of flowering plants (Vajaravelu, 1990) and this number is far less than the actual number of species. Sasidharan (2004), based on survey of literature, reported the occurrence of 2541 species in the entire Palakkad District. The present study identified 256 species of ethnobotanical importance. This is nearly two times greater than those found in Chinnar Wild Life Sanctuary (Nair, 2000a) and Peechi-Vazhani Wild Life Sanctuary (Anil, 2004).

### 7.1. Use-wise classification of ethnobotanically important species

A list of ethnobotanically important species (256) of Attappady Valley depending on their uses is provided in Appendix 1. There are 11 different types of uses. Category-wise utilisation of the same is provided in Table 13 and Figs. 7A & 7B. It is evident that bulk of the use (41.5%) is ethnomedicinal. The next largest category is food plants (11.7%). Another important use is in Animal husbandry (7.6%) followed by use as firewood. Altogether 11 categories of use include 342 plants with multiple uses of certain species.

Table 13. Ethnobotanical utilisation of species in Attappady Valley

| Sl.No. | Category of use          | Number of uses | Percentage |
|--------|--------------------------|----------------|------------|
| 1      | Ethnomedicines           | 142            | 41.5       |
| 2      | Food plants (from wild)  | 40             | 11.7       |
| 3      | Animal husbandry uses    | 26             | 7.6        |
| 4      | Firewood                 | 23             | 6.7        |
| 5      | Food plants (cultivated) | 22             | 6.4        |
| 6      | NWFP                     | 21             | 6.1        |
| 7      | Customs/Rituals etc      | 20             | 5.8        |
| 8      | Miscellaneous uses       | 17             | 5.0        |
| 9      | Construction purposes    | 16             | 4.7        |
| 10     | Implements               | 9              | 2.7        |
| 11     | Fish poisons             | 6              | 1.8        |
|        | Grand total              | 342            | 100        |

Fig. 7A. Category-wise ethnobotanical uses

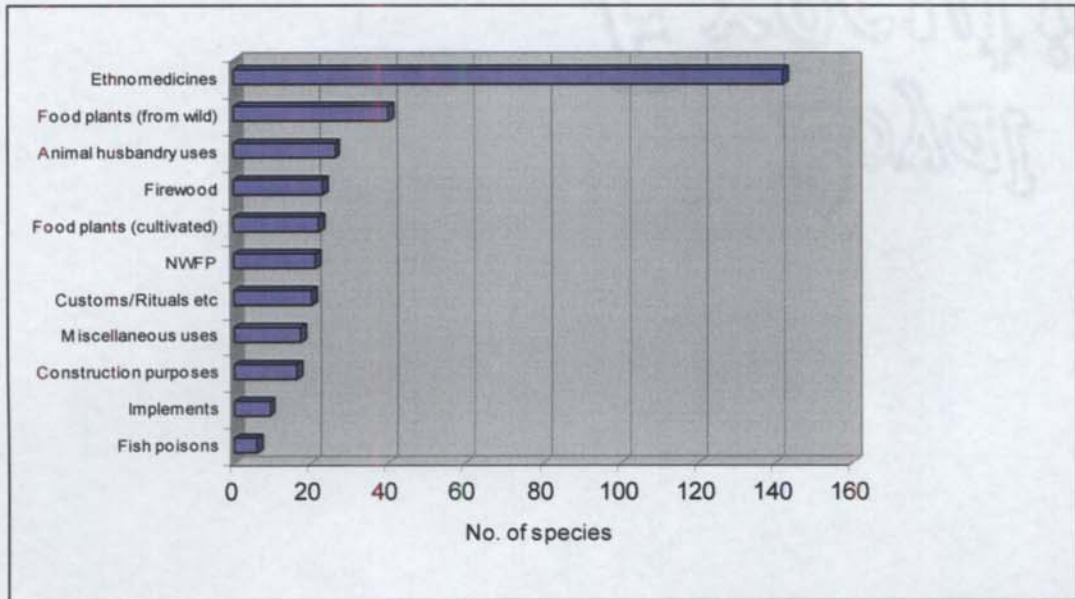


Fig. 7B. Category-wise percentage of ethnobotanical uses

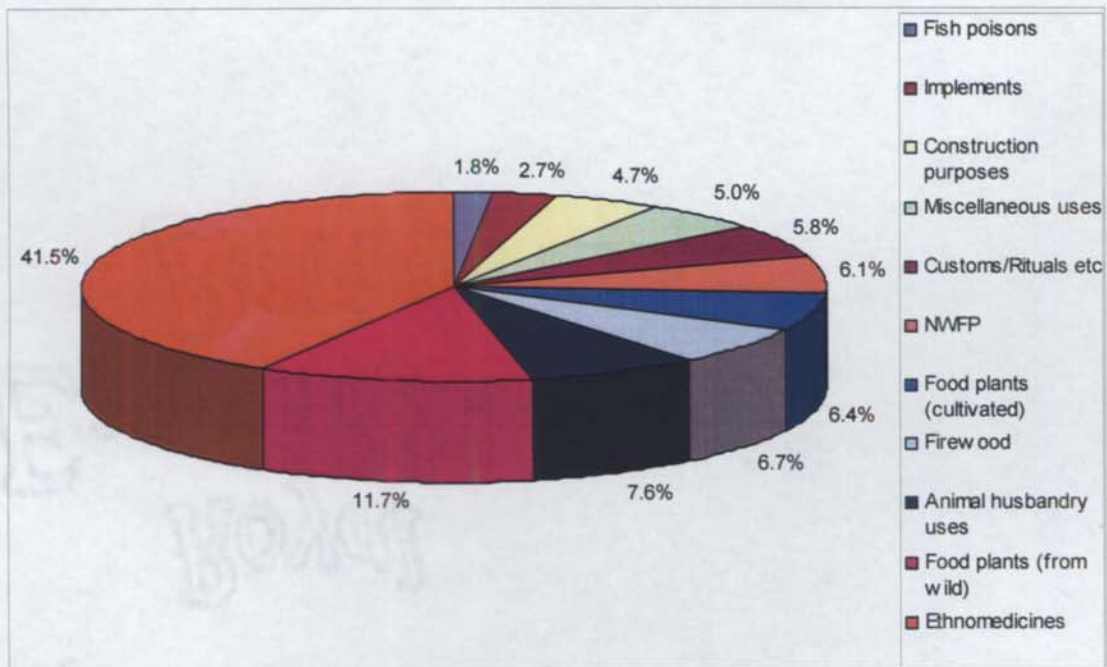


Plate 14. Ethnic Animal Husbandry practices



A. An elevated goat-pen; wood of *Unnina* (*Trewia nudiflora*) is used to climb-in



B. Ground-level goat-pen



C. An Irula lady with her goat



D. An Irula shepherd man



E. Cattle in the vicinity of hamlet

**Plate 13. Ethnic healing practices**



A. Collection of medicine from forest



B. Processing of medicines for treatment purposes:  
Rangiyamma, Kunchiyoor



C. Healer cum Mooppan of Kadukumanna



D. Healing by Valliyamma, Chindakky

- c. *Caralluma attenuata* is a succulent herbaceous species found in the dry tracts of Attappady Valley. A decoction made from the stem of the plant is very effective in the treatment of the piles and with maximum credibility rating of one.
- d. *Senna occidentalis* is a sub-shrub found in the moist and dry tracts of Attappady Valley. The leaf-powder is used in the treatment of *leucoderma*. The species has a maximum credibility of one.
- e. *Dalbergia latifolia* is a tree species used in the treatment of leukaemia, which was practised by the late Valliyamma of Chindakky, a famous tribal healer.
- f. *Eleusine coracana* is primarily used as a food. The fine powder of grains is used as a poultice over fresh wounds to arrest bleeding and speedy healing.

#### **7.1.2. Animal husbandry**

There are 26 species having very significant uses in animal husbandry among the tribes of Attappady Valley. As cattle and goats are closely attached to the day today life of tribes (Plate 14A-E), the majority of species are utilised in various aspects related to cattle rearing. A few ethnic uses in animal husbandry that are very peculiar to the Attappady Valley are given below.

- a. *Acacia leucophloea* is a tree species, of which the bark is used as a bonesetter in cattle, which is used externally and internally in a fermented form.
- b. *Solanum incanum* is a sub-shrub found in the dry localities at Attappady. The crushed roots when smelled to the hunting dogs is said to increase its smelling ability. This helps to easy catch of the prey.
- c. *Carmona retusa* is a sub-shrub found in the dry tracts of Attappady where the leafy shoots are used as an effective tick-trap. When shoots placed nearby the coat or in the hencoop during night, the organisms (ticks) falling on it are stuck to it and they are later killed by burning.

Plate 14. Ethnic Animal Husbandry practices



A. An elevated goat-pen; wood of *Unninava* (*Trewia nudiflora*) is used to climb-in



B. Ground-level goat-pen



C. An Irula lady with her goat



D. An Irula shepherd man



E. Cattle in the vicinity of hamlet

### 7.1.3. Customs, rituals, etc.

The sylvan surroundings they live made entry to several plants in their customs, rituals, beliefs, festivals, etc.; some of such important ones are shown in Plate 15A-H. There are 20 species found utilised in their customary practises and rituals. The details of a few exceptional species are given below.

- a. *Pongamia pinnata* is a species found in the riverine forests of Attappady. The branches of this tree are made into a ladder-like frame, to take the corpse into the burial place.
- b. *Angiopteris evecta* is a pteridophyte species found in the river-banks at Attappady. The young fronds are believed to possess magical effects when kept some where in the body in the form of an amulet. The tribal people also use it for enchantment.
- c. *Benkara malabarica* is a small tree found in the dry localities of Attappady. The bark of this tree when placed in the cradle provide deep sleep to the child.

Seed Exchange: It is worthy of explain the seed exchange of tribal people in Attappady. On *Sivarathri* day, representatives from almost all tribal hamlets in Attappady assemble at Chemmannur temple, where they spill a portion of their seeds in and around the temple for getting better harvest during the next season. They also pick up new seeds from the ground for cultivation. Thus, this custom forms a venue for the exchange of seeds among them.

### 7.1.4. Food plants

There are 40 species found in the wild, which provide food for the ethnic people. In addition to this, 22 species are under cultivation by following ethnic agricultural practices (Plate 16A-E) which also provides food. A few very important are listed below.

- a. *Amaranthus caudatus* is a species grown by the tribes for its grains. The reports show that universally it has wide cultivation among the tribal people; hence a brief note on this species is provided below.

Plate 15. Ethnic customs, rituals and beliefs



A. The chariot made of *Pongamaram* (*Pongamia pinnata*) for carrying corpse to burial place



B. The burial place of Irulas, where the vegetation is undisturbed



C. *Oppe maram* (*Psydrax umbellata*)- a sacred tree of Irulas



D. Seeds are offered to god on Shivarathri day at Chemmannur temple premises



E. Picking of seeds from Chemmannur temple for next crop



F. *Kappu kettal* in the corners of farm lands



G. *Kappu kettal* on the roof of dwelling place



H. *Kathale* (*Aloe vera*) hung on the roof of dwelling place

Plate 16. Ethnic agricultural practices



A. Dry land paddy (*Oryza sativa*) cultivation at Kathirampathy



B. Mixed cropping of solam (*Sorghum bicolor*) and Ellu (*Sesamum orientale*)



C. Farm lands in the midst of forest land at Anavai



D. Tribal farmland at Kadukumanna surrounded by thick forest



E. Drying of harvested Makka solam (*Zea mays*). Inset: Cleaning the Makka solam

The grain amaranth were grown as a principal crop by the Aztec 500 to 1000 years ago, and was noted to be a source of nourishing food of infants which provide energy and strength to soldiers on extended trips. While the grain amaranth were the principal species used on the South American continent, amaranth have been cultivated as a vegetable crop for over 2000 years, and continue to be used essentially worldwide even during the present day.

Amaranth grain is considered to have a unique composition of protein, carbohydrates and lipids. The unique protein composition with regard to quality and quantity has been studied and reviewed by Bressaini (1989) and Lehman (1989). Grain amaranth has higher protein (12-18%) than other cereal and has significantly higher lysine content. When amaranth flour is mixed with rice, maize or wheat flour, the protein quality (based on casein) rises from 72 to 90, 58 to 81 and 32 to 52 respectively. Amaranth seed protein also differs from that of other cereal grains by the fact that 65% of protein is found in the germ and 35% in the endosperm, as compared to an average of 15% in the germ and 85% in the endosperm for other cereals. Amaranth starch is also possessing unique size, much smaller than that found in other cereal grains. The grain consists of approximately 5 to 9% oil. The amaranth oil contains were tocotrientols (forms of vitamin E) which are known to lower cholesterol levels in mammalian systems. In addition to the unique characteristics of the major components of proteins, carbohydrates and lipids, amaranth grains also contain to cereal grains. (Stallnecht, and Schaeffer, 1993).

- b. *Premna corymbosa* is a species utilised as a leafy vegetable. They consider the dishes prepared with this provide resistance to diseases.

#### **7.1.5. Miscellaneous uses**

There are plants having miscellaneous uses like making of household implements, musical instruments, etc., some of which are provided hereunder (Plate 17A-G). *Mudugas* make the wooden mortars with *Gooli maram*

Plate 17. Implements and Musical instruments



A. Wooden mortar made of *goolimaram* (*Gmelina arborea*)



B. Wooden mortar made of *karavenga* (*Pterocarpus marsupium*)



C. Drying of Easi (*Phoenix laureiroi*) leaves for broom making



D. *Kogalu* The musical pipe made of *Goppampale* (*Wrightia tinctoria*)



E. *Davilu* - The drum made of *Bootali* (*Givotia moluccana*)



F. The earthen drum - rope made of *Sarppa kathale* (*Sanseveria roxburghiana*)



G. Pounding of *Kore* using a specialized granite mortar with wooden handle.

(*Gmelina arborea*) while Kurumbas use *Karavenga* (*Pterocarpus marsupium*). The tribal people of Attappady make the *kore* (*Eleusine coracana*) flour with a granite mortar. The popular and peculiar wind instrument *kogalu* is usually made of *Goppampale* (*Wrightia tinctoria*) and the body of their musical drum *Davilu* is made of *Bootali* (*Givotia moluccana*).

As they are very fond of the meat of rodents and jungle fowl, there are certain devices they developed for their trapping and catching. *Kattiri* made with bamboo function as a scissor that kill the prey or render it handicapped (Plate 18A-C).

## 7.2. Multiple uses of ethnobotanically significant species

Out of the 256 ethnobotanically important species recorded from Attappady Valley, 191 species (74%) have single use. There are 50 species (20%) which possess 2 uses, 12 species (5%) with 3 uses and 2 species with 5 uses (Table 15; Fig. 9 and Appendix 2).

Table 15. Multiple uses of ethnobotanical species

| Sl.No. | No. of uses | No. of species | Percentage |
|--------|-------------|----------------|------------|
| 1      | 1           | 191            | 74.6       |
| 2      | 2           | 50             | 19.5       |
| 3      | 3           | 12             | 4.7        |
| 4      | 4           | 1              | 0.4        |
| 5      | 5           | 2              | 0.8        |
|        | Total       | 256            | 100        |

Fig. 9. Percentage of multiple uses of ethnobotanical species

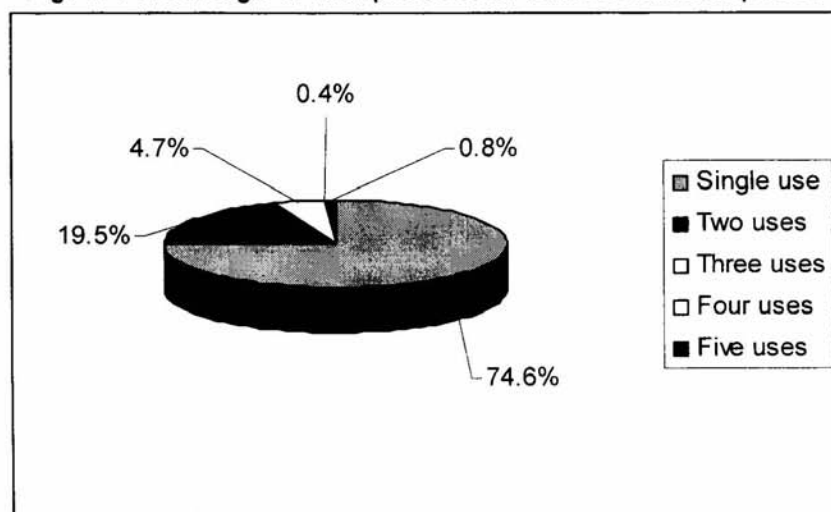


Plate 18. Traps



A. Bird trap (*Kathare*): Frame made of *Moongil* (*Bambusa bambos*) and string made of *Aacha* bark (*Bauhinia racemosa*)



B. Demonstrating the functioning of bird-trap



C. Rock-trap for small rodents; stem of *Vecha* (*Anogeissus latifolia*) is used to support the rock

### 7.3. Parts of ethnobotanically important species used

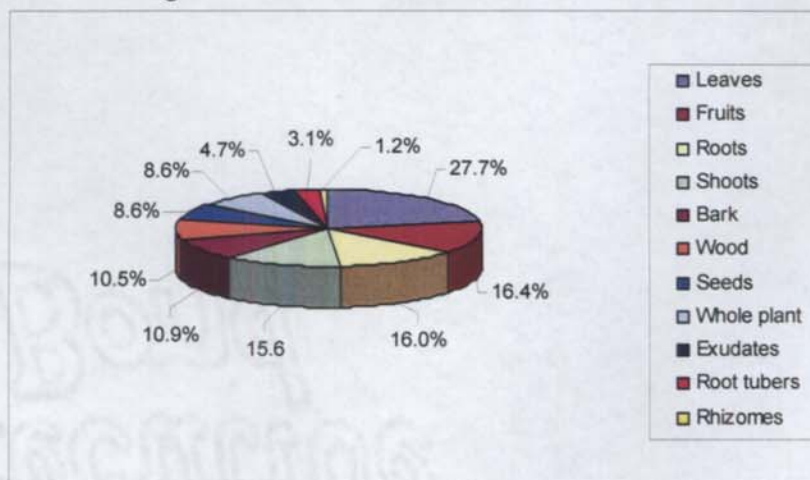
The names of parts of 256 ethnobotanically important species which are used by the tribal people of Attappady are furnished in Table 16,; Fig. 10 and Appendix 3.

Among the parts used, leaves rank high (21%) followed by fruits, roots and shoots (13% each). It is evident from the Table and Figure that leaves, fruits, roots and shoots comprises 60% of the parts used. The studies conducted by Joshi (1995) among the tribes of Rajasthan also noticed high utilisation of leaves (40%).

Table 16. Plant Parts of ethnobotanical uses

| No. | Parts used  | No. of species | Percentage |
|-----|-------------|----------------|------------|
| 1   | Leaves      | 71             | 27.7       |
| 2   | Fruits      | 42             | 16.4       |
| 3   | Roots       | 41             | 16.0       |
| 4   | Shoots      | 40             | 15.6       |
| 5   | Bark        | 28             | 10.9       |
| 6   | Wood        | 27             | 10.5       |
| 7   | Seeds       | 22             | 8.6        |
| 8   | Whole plant | 22             | 8.6        |
| 9   | Exudates    | 12             | 4.7        |
| 10  | Root tubers | 8              | 3.1        |
| 11  | Rhizomes    | 3              | 1.2        |

Fig. 10. Plant Parts of ethnobotanical uses



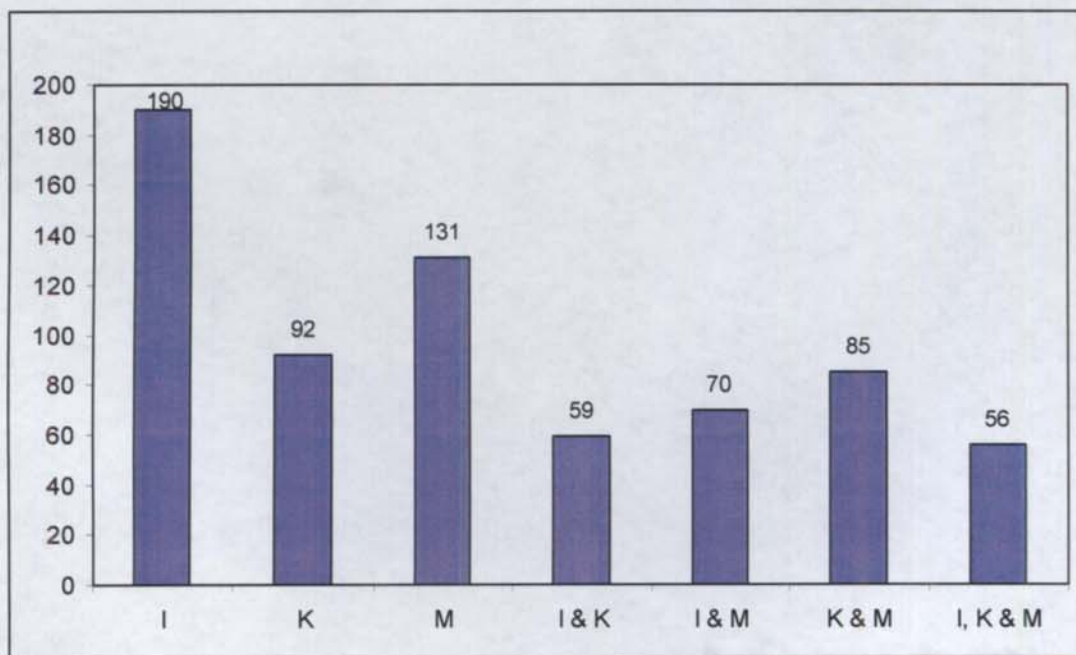
#### 7.4. Tribe-wise uses of ethnobotanically significant species

Among the 256 ethnobotanically important species noticed from Attappady Valley, *Irulas* possess the knowledge of 190 species. It is evident from the table and figure that *Muduga* holds the knowledge of 131 species and *Kurumba* 92 species. Knowledge of use of 56 species is shared by all the three tribal groups. *Irula* and *Muduga* share the knowledge of 70 plants, while *Irula* and *Kurumba* share that of only 59 species. *Kurumba* and *Muduga* share the knowledge of highest number of species (85) because of their cultural mingling and more or less similar habitat conditions (Table 17, Fig. 11 and Appendix 4).

Table 17. Tribe-wise uses of ethnobotanically important species

| Sl.No. | Group   | No. of species |
|--------|---|----------------|
| 1      | <i>Irula</i>                                    | 190            |
| 2      | <i>Kurumba</i>                                  | 92             |
| 3      | <i>Muduga</i>                                   | 131            |
| 4      | <i>Irula</i> and <i>Kurumba</i>                 | 59             |
| 5      | <i>Irula</i> and <i>Muduga</i>                  | 70             |
| 6      | <i>Kurumba</i> and <i>Muduga</i>                | 85             |
| 7      | <i>Irula</i> , <i>Kurumba</i> and <i>Muduga</i> | 56             |

Fig. 11. Tribe-wise uses of ethnobotanically significant species



I. *Irula*, K. *Kurumba*, M. *Muduga*

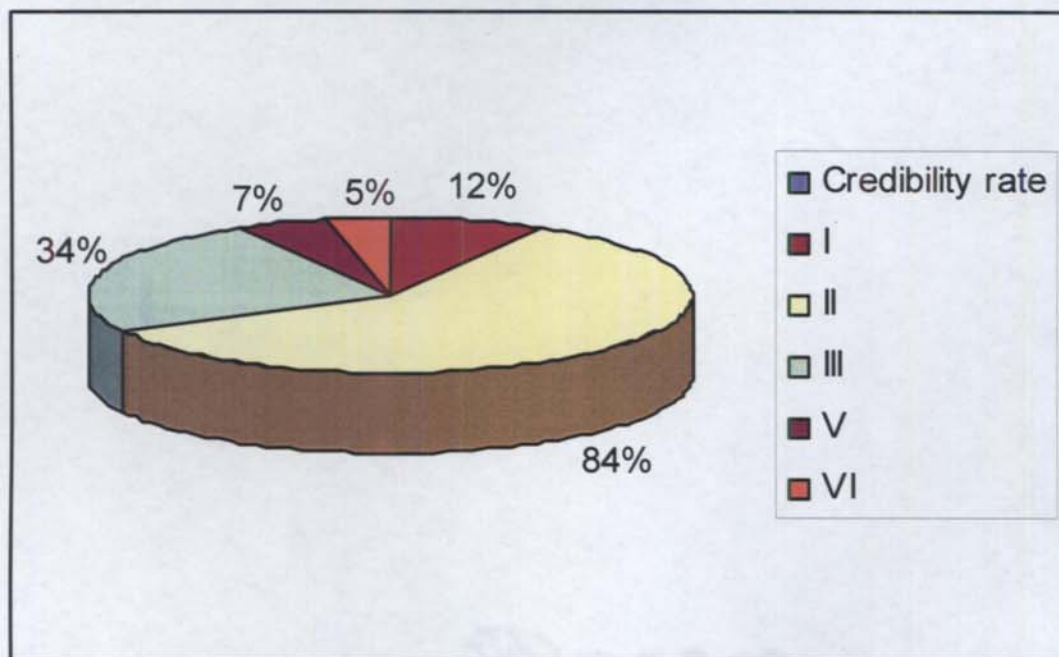
### 7.5. Credibility of Ethnobotanically important species

Species wise credibility rating of 256 ethnobotanically important plants found in Attappady Valley is provided in Appendices 5 and 6. The Appendix 5 provides the credibility rates of ethnomedical information of individual species, and it shows that out of the 142 species used in ethnomedicine, 12 species hold rating I (8%), 84 species possess rating II (59%), and 32 species have rating III (24%). (Table 18, Fig. 12).

Table 18. Credibility rating for ethnomedicinal species

| Sl.No. | Credibility rating | No. of species | Percentage |
|--------|--------------------|----------------|------------|
| 1      | I                  | 12             | 8          |
| 2      | II                 | 84             | 59         |
| 3      | III                | 34             | 24         |
| 4      | IV                 | 0              | 0          |
| 5      | V                  | 7              | 5          |
| 6      | VI                 | 5              | 4          |
|        | Grand Total        | 142            | 100        |

Fig. 12. Percentage of Credibility rating for ethnomedicinal species



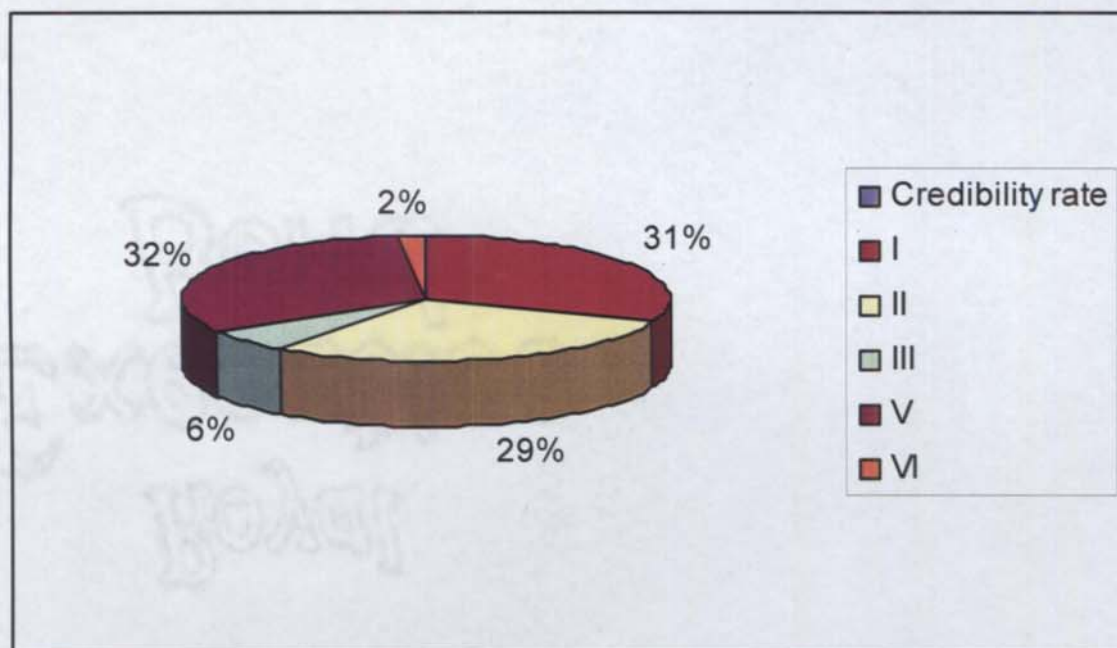
The Appendix 6 explains the credibility rating of non-ethnomedicinal species, in which 161 species are included. Rating of I is observed in the case of 50 species (31%), II for 47 species (29%) and III for 10 species (6%),

32% of species are coming in rating V, which is the common knowledge shared by all (Table 19, Fig. 13). The absence of rank-IV in the rating of both categories is because of their oral tradition of health care.

Table 19. Credibility rating for non-ethnomedicinal species

| Sl.No. | Credibility rate | No. of species | Percentage |
|--------|------------------|----------------|------------|
| 1      | I                | 50             | 31         |
| 2      | II               | 47             | 29         |
| 3      | III              | 10             | 6          |
| 4      | IV               | 0              | 0          |
| 5      | V                | 51             | 32         |
| 6      | VI               | 3              | 2          |
|        | Grand Total      | 161            | 100        |

Fig. 13. Percentage of Credibility rating for non-ethnomedicinal species



### 7.6. Habit wise classification of Ethnobotanically important species

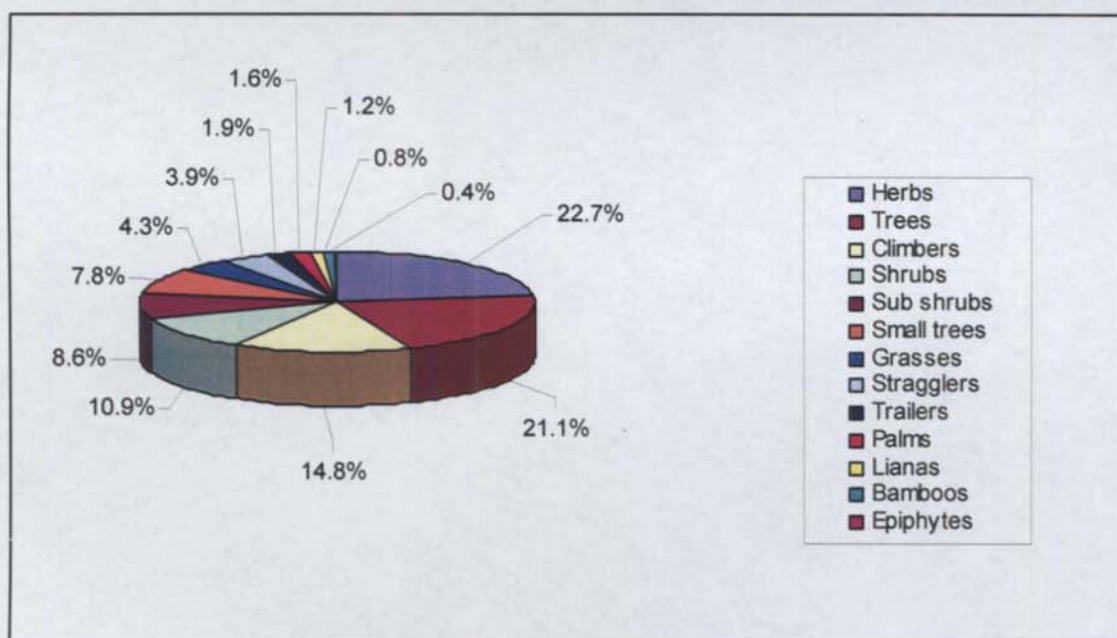
The habit of the 256 ethnobotanically significant species of the study area has been provided in the Appendix 7.

It is evident that the herbs and trees are the dominating categories with 22 and 21% respectively of the total species (Table 20, Fig. 14), followed by climbers, shrubs and sub-shrubs.

Table 20. Habit of ethnobotanical species

| Sl.No. | Habit       | No. of species | Percentage |
|--------|-------------|----------------|------------|
| 1      | Herbs       | 58             | 22.7       |
| 2      | Trees       | 54             | 21.1       |
| 3      | Climbers    | 38             | 14.8       |
| 4      | Shrubs      | 28             | 10.9       |
| 5      | Sub shrubs  | 22             | 8.6        |
| 6      | Small trees | 20             | 7.8        |
| 7      | Grasses     | 11             | 4.3        |
| 8      | Stragglers  | 10             | 3.9        |
| 9      | Trailers    | 5              | 1.9        |
| 10     | Palms       | 4              | 1.6        |
| 11     | Lianas      | 3              | 1.2        |
| 12     | Bamboos     | 2              | 0.8        |
| 13     | Epiphytes   | 1              | 0.4        |
|        | Total       | 256            | 100        |

Fig. 14. Habit-wise percentage of ethnobotanically important species



### 7.7. Habitat wise classification of plants

The present study of ethnobotany reveals that the habitat of 33.2 % of plants is Dry-deciduous forests, followed by moist deciduous forest with 24.6%. In the farm lands occurrence of 21.5% is found, either cultivated or in wild condition. Wastelands in Attappady Valley contribute 9.3% of plants. In

the semi-evergreen forests, only 3.12% is represented and only two species found in evergreen forests (Table 21).

Table 21. Habitat class of ethnobotanical species

| Sl.No | Forest type                              | No. of plants | Percentage of representation |
|-------|--|---------------|------------------------------|
| 1     | Evergreen                                | 2             | 0.8                          |
| 2     | Semi-evergreen                           | 8             | 3.12                         |
| 3     | Moist deciduous forest                   | 63            | 24.6                         |
| 4     | Dry-deciduous forest                     | 85            | 33.2                         |
| 5     | Riverine forests                         | 19            | 7.4                          |
| 6     | Waste lands                              | 24            | 9.3                          |
| 7     | Farm lands (including cultivated plants) | 55            | 21.5                         |
|       | Total                                    | 256           | 100                          |

The extractivism studied by Anil (2004) revealed the findings in the Peechi Vazhani Wild Life Sanctuary where moist deciduous forest harboured 66% of species, which was the dominating vegetation type in the area.

### 7.8. Family-wise representation

The family wise representation of the 256 of ethnobotanically important species is provided in Table 22. It is evident from the table that 37 families are represented by single species, 13 by two, 7 by three each, 3 by four, 2 by five etc. The most dominant families are Rutaceae (11), Poaceae (14), Euphorbiaceae (16) and Papilionaceae (23), (Table 23, Fig. 15). There are nine non-angiospermic families. In total, the 256 species spread over in 85 families.

Table 22. Family-wise representation of species

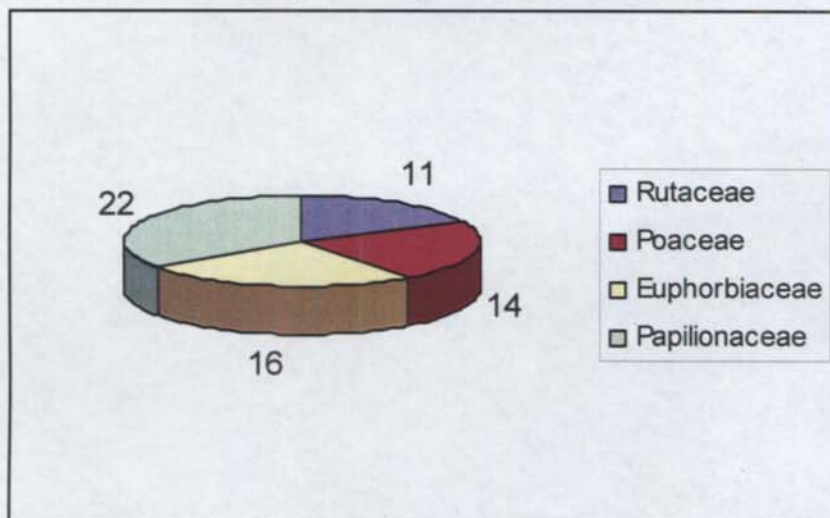
| Sl. No. | Family           | Total |
|---------|------------------|-------|
| 1       | Acanthaceae      | 3     |
| 2       | Agavaceae        | 1     |
| 3       | Aizoaceae        | 1     |
| 4       | Amaranthaceae    | 6     |
| 5       | Amaryllidaceae   | 1     |
| 6       | Anacardiaceae    | 2     |
| 7       | Apiaceae         | 2     |
| 8       | Apocynaceae      | 4     |
| 9       | Arecaceae        | 3     |
| 10      | Aristolochiaceae | 2     |
| 11      | Asclepiadaceae   | 9     |
| 12      | Asteraceae       | 8     |
| 13      | Basellaceae      | 1     |
| 14      | Bombacaceae      | 1     |
| 15      | Boraginaceae     | 3     |
| 16      | Brassicaceae     | 1     |
| 17      | Burseraceae      | 2     |
| 18      | Cactaceae        | 2     |
| 19      | Caesalpiniaceae  | 7     |
| 20      | Cannabinaceae    | 1     |
| 21      | Capparaceae      | 2     |
| 22      | Cassuarinaceae   | 1     |
| 23      | Celastraceae     | 2     |
| 24      | Chenopodiaceae   | 1     |
| 25      | Clusiaceae       | 1     |
| 26      | Combretaceae     | 3     |
| 27      | Commelinaceae    | 1     |
| 28      | Companulaceae    | 1     |
| 29      | Convolvulaceae   | 1     |
| 30      | Cucurbitaceae    | 8     |
| 31      | Cyperaceae       | 2     |
| 32      | Dilleniaceae     | 1     |
| 33      | Dioscoreaceae    | 4     |
| 34      | Dipterocarpaceae | 1     |
| 35      | Ebenaceae        | 1     |
| 36      | Erythroxylaceae  | 1     |
| 37      | Euphorbiaceae    | 16    |
| 38      | Flacourtiaceae   | 1     |
| 39      | Lamiaceae        | 6     |
| 40      | Lauraceae        | 2     |
| 41      | Liliaceae        | 3     |

| Sl. No. | Family                  | Total |
|---------|-------------------------|-------|
| 42      | Loganiaceae             | 2     |
| 43      | Lythraceae              | 1     |
| 44      | Malvaceae               | 5     |
| 45      | Marantaceae             | 1     |
| 46      | Meliaceae               | 1     |
| 47      | Menispermaceae          | 1     |
| 48      | Mimosaceae              | 10    |
| 49      | Moraceae                | 5     |
| 50      | Moringaceae             | 1     |
| 51      | Myrsinaceae             | 1     |
| 52      | Myrtaceae               | 1     |
| 53      | Nyctaginaceae           | 1     |
| 54      | Oxalidaceae             | 2     |
| 55      | Papaveraceae            | 1     |
| 56      | Papilionaceae           | 22    |
| 57      | Passifloraceae          | 1     |
| 58      | Pedaliaceae             | 1     |
| 59      | Piperaceae              | 1     |
| 60      | Plumbaginaceae          | 1     |
| 61      | Poaceae                 | 14    |
| 62      | Ranunculaceae           | 2     |
| 63      | Rhamnaceae              | 3     |
| 64      | Rubiaceae               | 8     |
| 65      | Rutaceae                | 11    |
| 66      | Santallaceae            | 1     |
| 67      | Sapindaceae             | 3     |
| 68      | Sapotaceae              | 1     |
| 69      | Scrophulariaceae        | 1     |
| 70      | Solanaceae              | 7     |
| 71      | Sterculiaceae           | 2     |
| 72      | Tiliaceae               | 4     |
| 73      | Verbenaceae             | 9     |
| 74      | Vitaceae                | 1     |
| 75      | Zingiberaceae           | 1     |
| 76      | Zygophyllaceae          | 1     |
| 77      | Non Angiosperm families | 9     |
|         | Total species           | 256   |

Table 23. First four dominant Families with number of species represented

| Sl.No. | Family        | No. of species | Percentage |
|--------|---------------|----------------|------------|
| 1      | Rutaceae      | 11             | 18         |
| 2      | Poaceae       | 14             | 22         |
| 3      | Euphorbiaceae | 16             | 25         |
| 4      | Papilionaceae | 22             | 35         |
|        | Total         | 64             | 100        |

Fig. 15. Major families represented



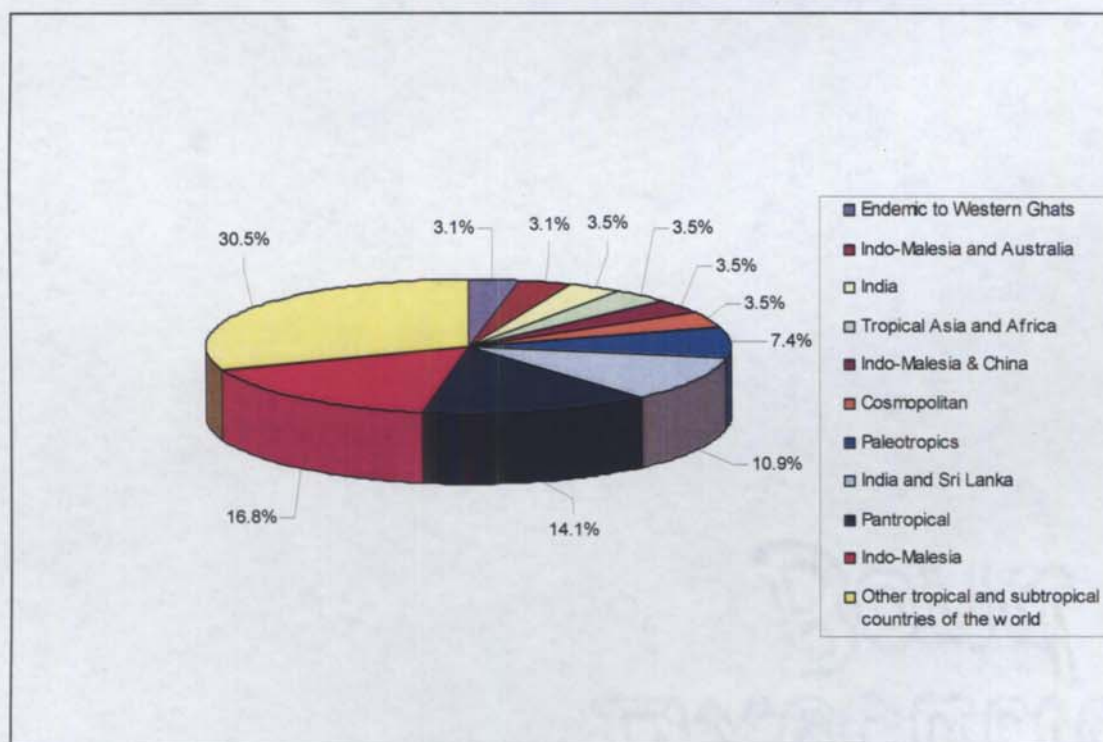
### 7.9. Phylogeography of the ethnobotanically significant species

The phylogeographical linkages of the ethnobotanically important species studies provided in Table 24 and Fig. 16. It is noticed that 3.15% of the species studied are endemic to Western Ghats region (out of 3.15%, 2.3% of plants are endemics restricted to Southern Western Ghats), and 3.5% are exclusively found in India. Out of the total 256 species, 16.8% have Indo-Malesian distribution and 11% shows distribution in India and Sri Lanka. Plants exhibits pantropical distribution accounts for 14% and 7.4% for paleotropical. Distribution in India, Indo-Malesia and China, tropical Asia and Africa, and cosmopolitan countries shows 3.5% each. Distribution in Indo-Malesia and Australia accounts 3.15%. The rest of plants, 78 species (30.5%), show an extended distribution in other tropical and subtropical countries of the world (Table 24, Fig. 16).

Table 24. Phytogeographical linkages of ethnobotanically important plants in Attappady Valley

| Sl.No | Distribution  | No. of plants | Percentage of representation |
|-------|---|---------------|------------------------------|
| 1     | Endemic to Western Ghats                              | 8             | 3.15                         |
| 2     | Indo-Malesia and Australia                            | 8             | 3.15                         |
| 3     | India   | 9             | 3.50                         |
| 4     | Tropical Asia and Africa                              | 9             | 3.50                         |
| 5     | Indo-Malesia & China                                  | 9             | 3.50                         |
| 6     | Cosmopolitan  | 9             | 3.50                         |
| 7     | Paleotropics  | 19            | 7.40                         |
| 8     | India and Sri Lanka                                   | 28            | 11.00                        |
| 9     | Pantropical   | 36            | 14.00                        |
| 10    | Indo-Malesia  | 43            | 16.80                        |
| 11    | Other tropical and subtropical countries of the world | 78            | 30.50                        |
|       | Total   | 256           | 100                          |

Fig. 16. Percentage of Distribution of Ethnobotanical Species



The studies conducted by Sasidharan (2004) found about 30% of the plants of Kerala are Peninsular Indian endemics. Studies conducted by Basha *et al.* (1992) in the Silent Valley National Park showed that 18.6% of floristic elements as Indo-Srilankan. Suresh (1999) also reported that Sri Lankan elements are fairly well represented in the same area. The present study

revealed that the percentage plants with distribution restricted only in India is 6.65%. Western Ghats, Sri Lanka and Malesia are more similar in geographical and climatic characteristics, and hence the affinity of floristic elements of these countries is more. About 11% of the plants of the present study are Indo-Sri Lankan and 16.8% of Indo-Malesian in distribution.

#### **7.10. Vernacular names**

The vernacular names of plants used by tribes are very peculiar and interesting. Most of the names used for the studied plants are based on ethnic dialect. Many of the names are associated with their use eg., *Anavanangi* (*Ana* = Elephant, *vanangi* = respect) which means the plant having the capacity of receiving respect from an Elephant. Furthermore, the young fronds of this fern resembles the curling nature of an Elephant-trunk. Some of the names of hamlets were also derived based on the plant names- eg., *Karayur* (*Kare* = *Canthium coromandelicum*, *oor* = hamlet) and *Varagampady* (*Varagu* = *Paspalum scorbiculatum*, *pady* = field). *Mantimala* is a hamlet associated with the name of Rhesus monkey (*Manti* = monkey, *mala* = Mountain). *Konamkuthy* is associated with their ritual, where a ceremonial sacrificing of buffalo (*Konam* = buffalo, *kuthy* = killing) was practised. The Vernacular names of ethnobotanically significant species studied from the Attappady valley is furnished in Appendix 8.

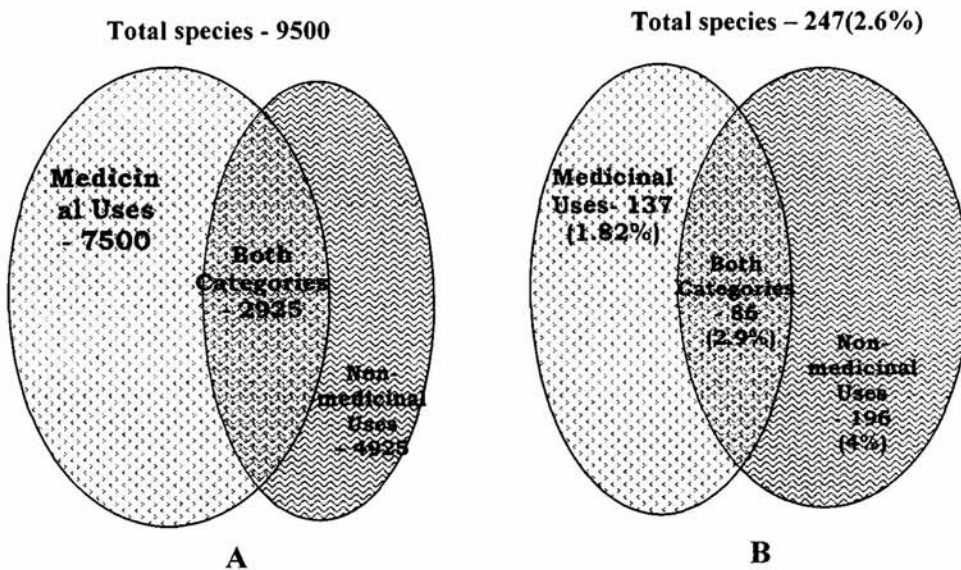
#### **7.11. Uniqueness of tribal knowledge system**

Tribal pharmacopoeia of Attappady Valley is found to be unique. Out of the 142 ethnomedicinal species, 111 (78%) are of single-drugs and only 47 (33%) are used in combinations (Appendix 5). The Muduvass of Idukki use 145 single-drug remedies to treat more than 50 diseases (Johncy, 2004). High single-drug remedies dominated in the study points to its dissimilarity with Ayurvedic system of treatment where majority are poly-herbal (Appendix 5). Among these ethnomedicinal species 41 out of 142 are not used in Ayurvedic medicines. The non-ethnomedicines are also very unique; when compared to the national data, it constitutes 4%.

### 7.11.1 Comparison with National Data

The present study shows the use of 256 ethnobotanically important species from the Attappady Valley of which nine are non-angiosperm species. Out of the 1355 species reported from the district (Vajravelu, 1990), the present study accounts for 18.9%. The angiosperm flora of the state constitutes 4670 species (excluding 9 Gymnosperm taxa) and this study accounts for 5.5%. Out of the 9500 ethnobotanical species of the country, 2.7% of species are from Attappady Valley. A comparison of the uses of the ethnobotanically important plants of the study area with that of the country is shown in Fig. 17.

Fig. 17. Comparison of ethnobotanical uses of plants in Attappady Valley (B) with National data (A)



Based on above observations it is evident that the ethnobotanical data derived from the present study in Attappady Valley is possibly evolved independently through generations.

297A

15



Utilisation of  
NWFP species  
in Eco-restoration  
activities

## 8. UTILISATION OF NWFP SPECIES IN ECO - RESTORATION ACTIVITIES

Non-Wood Forest Products (NWFP) comprise goods of biological origin other than wood, derived from forests, other wooded lands and trees outside forests (Vantomme *et al.*, 2002), as agreed in the international expert consultation of NWFP held in Yogyakarta, Indonesia in 1995. The parallel term for NWFP is Non-Timber Forest Products (NTFP). Timber is wood of some specific quality or dimension. Trees providing timber and fuel wood are grown similarly and their anatomy is also same. Hence the word NWFP is considered as more scientific (Chandrasekharan, 2000). NWFPs play an important role in the tribal life. Tribal communities residing inside or in the vicinity of forests depend partly or solely on these species for their basic needs and to a significant extent for their subsistence. The fast depletion of forest resources, increased pressure on land and increased commercial exploitation of forests negatively affect the tribal people who depend mainly on NWFPs for their livelihood (Muraleedharan *et al.*, 1997).

Tribal people are directly involved in the collection of NWFP. They collect NWFP and sell to the Tribal Service Co-operative Societies. Out of the 119 commercially important NWFPs listed by the Forest Department, only a few easily marketable items are procured by the selected Societies. For instance, the tribal service societies procured only 32 items at Wayanad, 27 items at Nilambur and 38 items at Attappady during 1995-96 (Muraleedharan *et al.*, 1997). In Attappady, during the period of the present study, only the *Kurumba* Co-operative society located at Chindakki is involved in the procurement, partial processing and sale of NWFPs. Details of NWFP collection in Attappady is provided in table 25.

Table 25. Details of NWFP collection in Attappady during Apr. 1998-Mar. 2002.

| Name  | Season of collection    | Plant part | Form  | Quantity Collected (Kg.) |             |            |            | Av./year  |
|---|-------------------------|------------|-------|--------------------------|-------------|------------|------------|-----------|
|   |                         |            |       | 01.04.98-                | 01.04.1999- | 01.04.2000 | 01.04.2001 |           |
|   |                         |            |       | 31.03.99                 | 31.03.2000  | 31.03.2001 | 31.03.2002 |           |
| <i>Kungilyam-grade 1. (Canarium strictum)</i> | All season              | Resin      | Dried | 86.800                   | 109.400     | 151.950    | 232.700    |           |
| <i>Kungilyam-grade 2. (Canarium strictum)</i> | All season              | Resin      | Dried | 4021.750                 | 2698.450    | 2550.900   | 2606.750   |           |
| <i>Kungilyam-grade 3. (Canarium strictum)</i> | All season              | Resin      | Dried | 305.600                  | 169.900     | 688.000    | 206.050    |           |
| <i>Kungilyam (Total)</i>                      |                         |            |       | 4414.150                 | 2977.750    | 3390.850   | 3045.500   | 3457.063  |
| <i>Thenu (Apis dorsata)</i>                   | All season              | Hon-ey     | -     | 3736.335                 | 81.700      | 299.700    | 993.650    | 1502.850  |
| <i>Mezhu (Apis dorsata)</i>                   | All season              | Wax        | -     | 100.650                  | 44.000      | 15.500     | 19.450     | 44.900    |
| <i>Cheenikka (Acacia concinna)</i>            | April-July              | Fruit      | Dried | 54211.200                | 2428.000    | 4425.800   | 48051.250  | 25081.563 |
| <i>Urunchikka (Sapindus laurifolius)</i>      | April-May               | Fruit      | Dried | 27.000                   | 784.000     | 247.500    | ---        | 264.625   |
| <i>Kadukka (Terminalia chebula)</i>           | April-September         | Fruit      | Dried | 342.500                  | ---         | 13.000     | ---        | 88.875    |
| <i>Kattu Thippali (Piper longum)</i>          | April, December-January | Root       | Dried | 14.000                   | ---         | 328.000    | 548.000    | 222.500   |
|   |                         |            | Fresh | ---                      | ---         | ---        | 21.000     | 5.250     |
| <i>Pathirippoo (Myristica malabarica)</i>     | May-June                | Aril       | Dried | 1.000                    | 6.500       | 7.800      | 45.900     | 15.300    |
| <i>Padakkizhangu (Cyclea peltata)</i>         | All season              | Root       | Dried | 1350.500                 | 215.200     | 914.050    | 2894.300   | 1343.513  |
| <i>Nannari (Hemidesmus indicus)</i>           | July-September          | Root       | Dried | 957.700                  | 5.000       | 6.000      | 2.500      | 242.800   |
| <i>Kudampuli (Garcinia gummi-gutta)</i>       | July-October            | Fruit      | Dried | 525.900                  | 71.600      | 20.700     | 2.500      | 155.175   |
| <i>Moovila (Pseudarthria viscida)</i>         | September-February      | Root       | Fresh | 36897.000                | ---         | ---        | ---        | 9224.250  |
|   |                         |            | Dried | ---                      | 2705.000    | 8358.000   | 13721.500  | 6196.125  |
| <i>Orila (Desmodium gangeticum)</i>           | September-January       | Root       | Fresh | 15197.000                | ---         | ---        | 4609.000   | 4951.500  |
|   |                         |            | Dried | ---                      | 2479.000    | 752.000    | 7098.500   | 2582.375  |
| <i>Kurunthotti (Sida rhombifolia)</i>         | August-January          | Root       | Fresh | 9674.000                 | ---         | 99.500     | 870.500    | 2661.000  |
|   |                         |            | Dried | ---                      | 565.000     | 711.000    | 5236.500   | 1628.125  |
| <i>Cheruthekkku (Clerodendrum serratum)</i>   | October                 | Root       | Fresh | 4000.000                 | ---         | ---        | ---        | 1000.000  |
| <i>Chunda (Solanum torvum)</i>                | September-February      | Root       | Fresh | 3369.000                 | 376.000     | 21.000     | 2294.000   | 1515.000  |
|   |                         |            | Dried | ---                      | 704.000     | 3716.000   | 7235.000   | 2913.750  |
| <i>Nellikka (Phyllanthus emblica)</i>         | November-January        | Fruit      | Fresh | 4820.000                 | ---         | 429.000    | 3968.000   | 2304.250  |
|   |                         |            | Dried | ---                      | ---         | 387.000    | ---        | 96.750    |
| <i>Amalpori (Rauwolfia serpentina)</i>        | August-September        | Root       | Dried | ---                      | ---         | 1.800      | 0.200      | 0.500     |
| <i>Athithippali (Balanophora indica)</i>      | January-February        | shoot      | Fresh | ---                      | 82.400      | ---        | ---        | 20.600    |
|   |                         |            | Dried | ---                      | ---         | ---        | 862.000    | 215.500   |
| <i>Kanimkurinj (Strobilanthes ciliatus)</i>   | December-February       | Root       | Dried | ---                      | ---         | ---        | 13402.500  | 3350.625  |
|   |                         |            | Rs.   | 10,60,741                | 7,02,701    | 3,700.59   | 15,27,623  | 9,15,281  |

Kungilyam (*Canarium strictum*), Nellikkai (*Phyllanthus emblica*), Shekakai *Acacia concinna*), etc. are the important Minor Forest Products in the area. Honey, tubers of *Dioscorea* spp., etc. are collected for domestic consumption. It is estimated that about 1000 persons are engaged in collection of Minor Forest Products in the Attappady valley (Ganapathy. 1980).

Worldwide there is high demand for medicinal plants as the demand for herbal products is growing at the rate of 7% per annum. Within India there are more than 10,000 herbal drug formulations for all types of ailments, and they solely depend on our rich medicinal plants diversity. Over 95% of the medicinal plants used by Indian industry today is collected from the wild while only less than 20 species of medicinal plants are under commercial cultivation. More than 70% of the plant collections involve destructive harvesting, which poses a definite threat to the medicinal plants diversity (Anonymous, 1997).

In India more than 3000 NWFPs exist, which are derived from the forests or wild sources. It is estimated that among these, 325 species are of commercial importance; while 879 species are locally used; 677 species have high localised potential and 1343 species are grouped as other lesser known (Shiva & Mathur, 1996). Nair (2000b) dealt the details of 160 potential NWFP species of Kerala forests. The Forest Department of Kerala has identified 120 products under NWFP, in which less than 100 plant species are involved. The above NWFPs are having wide utilisation in various industries involved in Ayurvedic medicine manufacturing (eg. *Terminalia chebula*, *Protasparagus racemosus*, etc.), food production (eg. Honey, *Phyllanthus emblica* etc.), allopathic pharmaceuticals, soap/shampoo/toiletries (*Acacia sinuata*, *Sapindus laurifolius*, etc.), paint manufacture (*Myristica malabarica*, *Parmelia* spp. etc.) etc. The major consumers of NWFPs in Kerala are certainly the Ayurvedic medicine manufacturers.

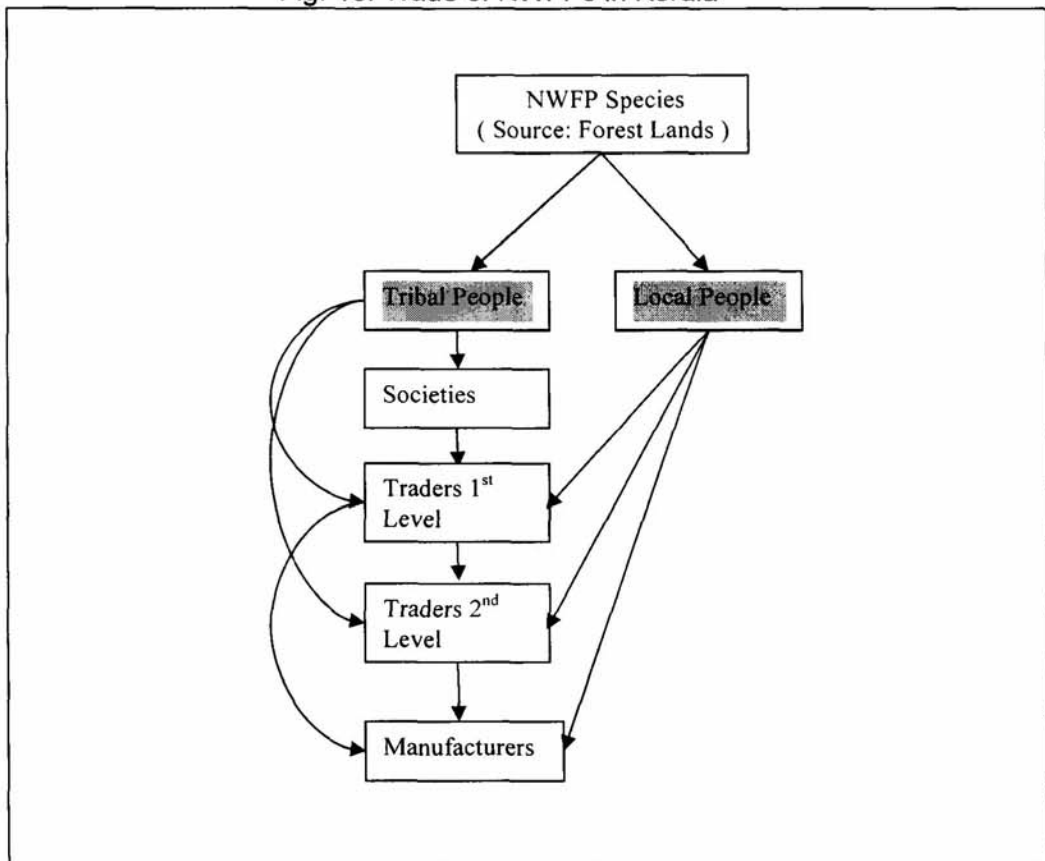
Marketing of NWFPs is unique in its structure and functioning. Tribal people are directly involved in the collection of NWFPs and sell the same to Tribal Service Co-operative Societies. The concerned Divisional Forest Officer is

responsible to monitor NWFP collection in a sustainable manner. Society sells these products on behalf of its apex body, the SC-ST Federation. The study of NWFPs in Attappady revealed that the tribal people who are engaged in their collection cover a distance of 5-10 km, and carry the same to the society located at Chindakky or its collection centres in various other localities in Attappady.

### 8.1. The supply

The raw-materials, resource base, foragers, traders and the tribal societies of Kerala, involved in the supply of medicinal plants to the manufacturers in Kerala are providedt below. The main source of medicinal plant raw material supply is the forests, marginal forestlands and the wastelands or fallow agricultural lands. The flow of medicinal plants from the source to the manufacturers is shown in Figure 18.

Fig. 18. Trade of NWFPs in Kerala



## **8.2. The resource base**

Medicinal plants exist in a variety of habitats in a range of climatic conditions through out India and forests of Himalayas in India and Nepal. Forest types supporting medicinal plants are Tropical Evergreen forests, Semi-Evergreen forests, Moist mixed Deciduous Forests, Dry mixed Deciduous Forests, Scrub jungles, Laterite Thorn Forests, Southern Montane wet scrub, Southern Montane Wet grasslands, Southern Montane Wet Temperate Forests and Forest plantations (Nambiar *et al.*, 1985). Non-forest areas include plantations including Teak and rubber, Marginal lands including, homesteads, stream sides, river banks and wastelands.

## **8.3. Foragers**

Foragers are people involved in collection the medicinal plants and selling it to the markets. Tribal people, who account for 1.1% of the total population of the state (Anonymous, 1991), only have the right to procure the NWFPs from the forests. Since time immemorial, tribes depended on forests for their survival. Besides hunting activities, dependence was mainly on fuelwood, edible tubers, fruits and a meagre collection of medicinal plants for their own use. Even though tribes depend on agriculture and work as labourers, collection of NWFP is a major component in the economy of tribal communities (Thomas & Bai, 1993). Other group of foragers are local people dwelling in the forest fringes and illegally collect these products from the forests and plantations. Cultivation in homesteads and harvesting and marketing by farmers are also a minor source of supply in Attappady Valley.

## **8.4. The Tribal Society - Girijan Service Co-operative Society (GSCS)**

Until 1979, NWFP's from the forests flowed outside by contract system. Contractors employed tribes for collecting the resources from the forests and exploit them thoroughly by paying very low wages. In 1979, the State Government granted the exclusive right of collection of 120 items to the tribes

through Girijan Service Co-operative Societies (GSCS) with an apex body of Kerala State SC/ST Federation (Muraleedharan *et al.*, 1997). Unfortunately, the functioning of these Societies in the last 16 years was not satisfactory in many ways. More over, the redundant and non-enterprising nature of Societies resulted in closing down of many collection depots.

Studies conducted by Thomas (1996) revealed that contribution of NWFP as an income source varied from 12% - 88% with an average of 58% in the State. Study also reports an increase in the annual revenues of NWFP from 16.93 to Rs. 38.42 lakhs in 1990-1991. At present, out of the total 33 GSCS in the State only 70% of GSCS are functioning properly (Anil, 2004).

### **8.5. The demand**

In India, since ancient age, diverse systems of medicine such as Ayurveda, Sidha, Unani, Yoga and the Naturopathy, and Tibetan system of medicine were practiced. Rapid advancement in the Allopathic field gave set back to all other systems of medicine. Prompt action and quick recovery by Allopathic medicine made it very popular. Even then, plant-based medicine did cause a mounting concern with in the country and outside.

In Kerala, above 8,000-10,000 air dried metric tonnes (AMDT) of *Andrographis paniculata* are consumed by the Ayurvedic industry and more than 40,000 ADMT of *Sida rhombifolia* are used in the country. The quantum of *Rauvolfia serpentina* exploited ranges from 10,000-50,000 tonnes/year (Anonymous, 1997). Sufficient quantities of raw drugs are not obtaining from the wild sources during recent years because of the high demand in the market (Vaidyamadham, 2005). For balancing the market demand and production, the only solution is to cultivate the source plants in a commercial scale.

The Indian Forest Policy of 1988 and the subsequent resolution on participation in natural forest management emphasise the need for people's participation in natural forest management. The policy document asserts that

local communities should be motivated to identify themselves with the development and protection of the forests from which they derive benefits (Bhattacharya & Mitra, 2001). The salient features of the National Forest Policy of 1988, *inter alia* are meeting the basic needs especially fuelwood, fodder and small timber for the rural and tribal people and maintaining the intrinsic relationship between forests and the tribals and other indigent people living in the vicinity of forests. In our country there are only 75 million ha. of forest area which works out to 22% of the total geographical area. This is far below the requirement of 33% as per National Forest Policy-1988 (Annamalai, 1999). Nair (2000b) remarked that the NWFP plants are currently being cultivated in forest and non-forest areas, which in turn yield both tangible and non-tangible benefits to the forest dwellers and tribal people. To support the traditional way of life of the tribal people who depend forest resources for their subsistence, planting of various plant species in and around forest areas is recognised as one of the major activity. Joint Forest Management (JFM) which is introduced after 1988 and now being adopted in 16 states in India is one among such activity.

#### **8.6. Criteria for selecting NWFP species**

There are enough reasons to incorporate NWFP species in the various afforestation programmes of Government agencies, NGOs, and the public. Some of them are 1) In India estimated annual deforestation had been about 1.3 million hectares during 1970s. The present deforestation rate is about 120,000 hectares per annum (Chandrasekharan, 2000). Compensatory afforestation activities should be increased to cope up this alarming rate of deforestation. 2) NWFPs play a major role to ensure sustainable forestry through multiple-use management. NWFPs when grown along with wood in an integrated manner, would increase the over all productivity of the forest. This can also support conservation of biological diversity. 3) Domestication and planting of NWFP species in private land holdings and wastelands is one of the alternatives for minimising the impact of increasing demand. The objective of natural

resource/biodiversity conservation can be achieved to a certain extent by cultivation of these species. Development of NWFPs in agroforestry system has the advantage of diversifying the economic base and enhancing the supply of these products for domestic consumption as well as to meet market demand. 4) It is estimated that nearly 400 million people living in and around forest in India depend on NWFPs for their sustenance and supplemental income (Chandrasekharan, 2000). Possibility of continuous income from NWFP can provide an incentive to adopt it as a most important alternative to shifting cultivation in upland areas and fallow agricultural lands. 5) NWFPs are locally grown and its multifarious knowledge base is to a large extent empirical and often linked to local culture. So it is easy to cultivate, harvest, partial processing, marketing or consuming these NWFPs by using traditional knowledge, compared to other commercial crops. 6) Growing NWFPs in a commercial scale ensure a more remunerative price to the primary producer.

There is ample scope for cultivation of NWFP species under various afforestation programmes, wasteland planting, etc. Teak and Pulpwood plantation areas of Kerala Forest Department can be utilised for growing NWFP (Babu, 2000). Anyhow, suitable sites for cultivation of NWFP species have been identified during the perambulations carried out during the present study period of various locations in Attappady Valley. The plant species proposed to be cultivated have been short-listed based on a set of criteria, which are listed below:


1. Site suitability and low risk in cultivation
2. Rare in the wild and hence cultivation only can meet high market requirements
3. High value product
4. Marketability/demand
5. Simple methods for harvesting and semi- processing

6. Raw material for multiple end users
7. Easily marketed through Tribal co- operative societies
8. Multiple end products


#### **8.6.1. Selected species for eco-restoration**

Thirty NWFP species have been selected for including in the eco-restoration activities at Attappady Valley. Of the 30 species, ten species are those which are not being used by the tribals of Attappady, but found to be suitable for cultivation in the area and very useful for the revenue generation by their introduction under the eco-restoration programme. They include nine tree species, five shrubs, seven herbs, eight climbers and one bamboo. Database on 30 species are provided here on a standardised format (Templates 1.1 to 1.30).


## Template 1.1

|  |  |  |
|--|--|--|
| <b>SPECIES</b>                         | <i>Canarium strictum</i> Roxb.   |  |
| <b>FAMILY</b>                          | Burseraceae  |  |
| <b>COMMON NAME</b>                     | Thelli   |  |
| <b>HABIT &amp; HABITAT</b>             | Tree; Wet Evergreen Forests  |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Tropical climate, high rainfall zones                                  |  |
| <b>MODE OF PROPAGATION</b>             | Seeds  |  |
| <b>PLANTING MATERIAL</b>               | 400 trees / ha   |  |
| <b>SEMI - PROCESSING</b>               | Nil  |  |
| <b>USES &amp; UTILISATION</b>          | Antirheumatic in action; also used in varnish/paint industry           |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 0.6 – 3 t per ha; Rs. 75/kg.   |  |
| <b>MARKETABILITY</b>                   | Local and regional demand  |  |
| <b>RISKS</b>                           | No reports   |  |
| <b>GESTATION PERIOD</b>                | 15 year onwards  |  |
| <b>RECOMMENDATION</b>                  | Suited for North Ommala, Kurukkankundu, Thadikkundu, Kadugamanna areas |  |


## 1.2

|  |   |  |
|--|---|--|
| <b>SPECIES</b>                         | <i>Croton tiglium</i> L.  |  |
| <b>FAMILY</b>                          | Euphorbiaceae   |  |
| <b>COMMON NAME</b>                     | Neervalam   |  |
| <b>HABIT &amp; HABITAT</b>             | Small tree; Deciduous Forest                                      |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Open areas and well drained soils                                 |  |
| <b>MODE OF PROPAGATION</b>             | Seeds   |  |
| <b>PLANTING MATERIAL</b>               | 3 kg per ha   |  |
| <b>SEMI - PROCESSING</b>               | Drying  |  |
| <b>USES &amp; UTILISATION</b>          | Purgative; Ayurvedic medicines and industrial purposes (seed oil) |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 150 – 250 kg per ha annually; Rs. 60 – 75/kg                      |  |
| <b>MARKETABILITY</b>                   | Local and regional demand   |  |
| <b>RISKS</b>                           | No reports  |  |
| <b>GESTATION PERIOD</b>                | 3 <sup>rd</sup> years onwards                                     |  |
| <b>RECOMMENDATION</b>                  | Suited for eastern Attappady                                      |  |


### 1.3

|  |   |  |
|--|---|--|
| <b>SPECIES</b>                         | <i>Garcinia gummi-gutta</i> (L.) Robs.  |  |
| <b>FAMILY</b>                          | Clusiaceae  |  |
| <b>COMMON NAME</b>                     | Kudappuli   |  |
| <b>HABIT &amp; HABITAT</b>             | Tree; Evergreen Forests   |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Tropical climate; humus rich soil   |  |
| <b>MODE OF PROPAGATION</b>             | Seeds   |  |
| <b>PLANTING MATERIAL</b>               | 400 trees per ha  |  |
| <b>SEMI - PROCESSING</b>               | Cleaning and drying   |  |
| <b>USES &amp; UTILISATION</b>          | Treatment of obesity; ayurvedic, other pharmaceutical uses and in food industry |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 0.5 t of dry fruit rind per ha; Rs. 60-75/kg                                    |  |
| <b>MARKETABILITY</b>                   | High local, regional and global demand  |  |
| <b>RISKS</b>                           | No reports  |  |
| <b>GESTATION PERIOD</b>                | 10 <sup>th</sup> year onwards   |  |
| <b>RECOMMENDATION</b>                  | Suited for Mukkali, karuvara, Anavai areas.                                     |  |


### 1.4

|  |   |  |
|--|---|--|
| <b>SPECIES</b>                         | <i>Gmelina arborea</i> Roxb.                                      |  |
| <b>FAMILY</b>                          | Verbenaceae   |  |
| <b>COMMON NAME</b>                     | Kumizhu   |  |
| <b>HABIT &amp; HABITAT</b>             | Tree, Moist Deciduous Forest                                      |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Tropical climate and moderate rainfall                            |  |
| <b>MODE OF PROPAGATION</b>             | Seeds   |  |
| <b>PLANTING MATERIAL</b>               | 400 trees per ha  |  |
| <b>SEMI - PROCESSING</b>               | Cleaning, chopping, and drying                                    |  |
| <b>USES &amp; UTILISATION</b>          | Cardiotonic; ayurvedic medicines. Wood for furniture.             |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 1.5-2 t of dried roots and basal portion per ha; Rs. 10 – 15 / kg |  |
| <b>MARKETABILITY</b>                   | Good local and regional demand                                    |  |
| <b>RISKS</b>                           | No reports  |  |
| <b>GESTATION PERIOD</b>                | 12-15 years   |  |
| <b>RECOMMENDATION</b>                  | Suited for Karara, Jellippara, Chittoor areas.                    |  |


### 1.5

|  |  |  |
|--|--|--|
| <b>SPECIES</b>                         | <i>Phyllanthus emblica</i> L.                          |  |
| <b>FAMILY</b>                          | Euphorbiaceae  |  |
| <b>COMMON NAME</b>                     | Nelli  |  |
| <b>HABIT &amp; HABITAT</b>             | Tree; Deciduous Forest                                 |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Tropical climate with moderate rainfall                |  |
| <b>MODE OF PROPAGATION</b>             | Seeds, root suckers                                    |  |
| <b>PLANTING MATERIAL</b>               | 400 plants per ha.                                     |  |
| <b>SEMI - PROCESSING</b>               | Cleaning   |  |
| <b>USES &amp; UTILISATION</b>          | General debility; ayurvedic medicine and food industry |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 2.5 t of fruits annually; Rs. 4 – 8 per kg             |  |
| <b>MARKETABILITY</b>                   | Local and regional demand                              |  |
| <b>RISKS</b>                           | No reports   |  |
| <b>GESTATION PERIOD</b>                | 7 <sup>th</sup> years onwards                          |  |
| <b>RECOMMENDATION</b>                  | Suited for Mattathukadu, Mechappathi and Mully areas   |  |


### 1.6

|  |  |  |
|--|--|--|
| <b>SPECIES</b>                         | <i>Strychnos potatorum</i> L. f.                         |  |
| <b>FAMILY</b>                          | Loganiaceae  |  |
| <b>COMMON NAME</b>                     | Thettamparal   |  |
| <b>HABIT &amp; HABITAT</b>             | Tree; Dry-deciduous Forest                               |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Low rain fall zones                                      |  |
| <b>MODE OF PROPAGATION</b>             | Seeds  |  |
| <b>PLANTING MATERIAL</b>               | 400 trees per ha   |  |
| <b>SEMI - PROCESSING</b>               | Cleaning and drying                                      |  |
| <b>USES &amp; UTILISATION</b>          | Anti-diabetic; ayurvedic medicine                        |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 0.5 to 1 t dried seeds per ha annually; Rs. 15-20 per kg |  |
| <b>MARKETABILITY</b>                   | Local and regional demand                                |  |
| <b>RISKS</b>                           | No reports   |  |
| <b>GESTATION PERIOD</b>                | 8 <sup>th</sup> years onwards                            |  |
| <b>RECOMMENDATION</b>                  | Suited for Vechapathy, , Chavadiyoor areas.              |  |


### 1.7

|  |  |  |
|--|--|--|
| <b>SPECIES</b>                         | <i>Symplocos cochinchinensis</i> (Lour.) Moore<br>ssp. <i>laurina</i> (Retz.) Nootb. |  |
| <b>FAMILY</b>                          | Symplocaceae   |  |
| <b>COMMON NAME</b>                     | Pachotti   |  |
| <b>HABIT &amp; HABITAT</b>             | Tree; Evergreen Forests  |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Tropical and temperate climate with high rainfall                                    |  |
| <b>MODE OF PROROGATION</b>             | Ayurvedic medicines  |  |
| <b>PLANTING MATERIAL</b>               | Seeds  |  |
| <b>SEMI - PROCESSING</b>               | 750 plants / ha  |  |
| <b>USES &amp; UTILISATION</b>          | Drying   |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | Skin diseases; ayurvedic medicines   |  |
| <b>M MARKETABILITY</b>                 | 3 – 3.5 t of dried bark; Rs. 6 – 10 per kg   |  |
| <b>RISKS</b>                           | High local and regional demand   |  |
| <b>GESTATION PERIOD</b>                | 8 – 12 years   |  |
| <b>RECOMMENDATION</b>                  | Suited for <i>Kurumba</i> settlement areas.  |  |


### 1.8

|  |  |  |
|--|--|--|
| <b>SPECIES</b>                         | <i>Tamarindus indica</i> L.                        |  |
| <b>FAMILY</b>                          | Caesalpinaceae                                     |  |
| <b>COMMON NAME</b>                     | Puli, Valan-puli                                   |  |
| <b>HABIT &amp; HABITAT</b>             | Tree; Dry-deciduous Forest                         |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Tropical climate; low rainfall zones               |  |
| <b>MODE OF PROPAGATION</b>             | Seeds  |  |
| <b>PLANTING MATERIAL</b>               | 400 trees per ha                                   |  |
| <b>SEMI - PROCESSING</b>               | Removing of shell and seeds                        |  |
| <b>USES &amp; UTILISATION</b>          | Anti-scorbutic; ayurvedic medicines, food industry |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 2-5 t per ha annually; Rs. 10 per kg               |  |
| <b>MARKETABILITY</b>                   | Local and regional demand                          |  |
| <b>RISKS</b>                           | Nil  |  |
| <b>GESTATION PERIOD</b>                | 8 <sup>th</sup> years onwards                      |  |
| <b>RECOMMENDATION</b>                  | Suits to the whole Eastern Attappady.              |  |


### 1.9

|  |   |  |  |
|--|---|--|--|
| <b>SPECIES</b>                         | <i>Terminalia chebula</i> Retz.   |  |  |
| <b>FAMILY</b>                          | Combretaceae  |  |  |
| <b>COMMON NAME</b>                     | Kadukka   |  |  |
| <b>HABIT &amp; HABITAT</b>             | Tree; Dry-deciduous Forest  |  |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Open areas, well drained soil   |  |  |
| <b>MODE OF PROPAGATION</b>             | Seeds from mature fruits  |  |  |
| <b>PLANTING MATERIAL</b>               | 400 trees / ha  |  |  |
| <b>SEMI - PROCESSING</b>               | Drying  |  |  |
| <b>USES &amp; UTILISATION</b>          | Antimalarial, antiaging drug; Ayurvedic and other Pharmaceutical industries |  |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 8-10 t of dried fruits / ha; Rs. 5-10 / kg.                                 |  |  |
| <b>MARKETABILITY</b>                   | Local, regional and global demand   |  |  |
| <b>RISKS</b>                           | No reports  |  |  |
| <b>GESTATION PERIOD</b>                | 8 years onwards   |  |  |
| <b>RECOMMENDATION</b>                  | Suited for Mully, Pudur and Nallasinga areas of Eastern Attappady.          |  |  |


### 1.10

|  |   |  |  |
|--|---|--|--|
| <b>SPECIES</b>                         | <i>Adhatoda zeylanica</i> Medic.                                |  |  |
| <b>FAMILY</b>                          | Acanthaceae   |  |  |
| <b>COMMON NAME</b>                     | Adalodakam  |  |  |
| <b>HABIT &amp; HABITAT</b>             | Shrubs; Moist deciduous forests                                 |  |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Well drained soil, partial shade conditions                     |  |  |
| <b>MODE OF PROPAGATION</b>             | Stem cuttings   |  |  |
| <b>PLANTING MATERIAL</b>               | 5000 cuttings / ha  |  |  |
| <b>SEMI - PROCESSING</b>               | Cutting and drying  |  |  |
| <b>USES &amp; UTILISATION</b>          | 1.8 – 2 t / ha; Rs. 15-20 / kg.                                 |  |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | Bronchial troubles  |  |  |
| <b>MARKETABILITY</b>                   | Ayurvedic medicines and other pharmaceuticals                   |  |  |
| <b>RISKS</b>                           | No reports  |  |  |
| <b>GESTATION PERIOD</b>                | 24 months   |  |  |
| <b>RECOMMENDATION</b>                  | Suits to all locations in Attappady, as a pure crop/live-fence. |  |  |


### 1.11

|  |   |  |
|--|---|--|
| <b>SPECIES</b>                         | <i>Indigofera tinctoria</i> L.  |  |
| <b>FAMILY</b>                          | Papilionaceae   |  |
| <b>COMMON NAME</b>                     | Neelamari   |  |
| <b>HABIT &amp; HABITAT</b>             | Shrubs; Deciduous Forest  |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Open areas; well drained soils  |  |
| <b>MODE OF PROPAGATION</b>             | Seeds   |  |
| <b>PLANTING MATERIAL</b>               | 3 kg per ha   |  |
| <b>SEMI - PROCESSING</b>               | Cleaning  |  |
| <b>USES &amp; UTILISATION</b>          | Trichogenic and antimalarial; ayurvedic medicines and dye industry                  |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 2.5 – 3 t of fresh leaves; Rs. 10 – 15 per kg and 1 t of roots; Rs. 25 – 35 per kg. |  |
| <b>MARKETABILITY</b>                   | High local and regional demand  |  |
| <b>RISKS</b>                           | No reports  |  |
| <b>GESTATION PERIOD</b>                | 18 months   |  |
| <b>RECOMMENDATION</b>                  | Suited for the whole Attappady area   |  |


### 1.12

|  |   |  |
|--|---|--|
| <b>SPECIES</b>                         | <i>Nilgirianthus ciliatus</i> (Nees) Bremek.          |  |
| <b>FAMILY</b>                          | Acanthaceae   |  |
| <b>COMMON NAME</b>                     | Karimkurinji  |  |
| <b>HABIT &amp; HABITAT</b>             | Shrub; semievergreen and Moist Deciduous Forest       |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Tropical climate with high rainfall                   |  |
| <b>MODE OF PROPAGATION</b>             | Stem cuttings   |  |
| <b>PLANTING MATERIAL</b>               | 5000 cuttings / ha                                    |  |
| <b>SEMI - PROCESSING</b>               | Cleaning, cutting and drying                          |  |
| <b>USES &amp; UTILISATION</b>          | Antirheumatic; Ayurvedic medicines                    |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 10 t of fresh roots per ha; 4-6 / kg.                 |  |
| <b>MARKETABILITY</b>                   | Local and regional demand                             |  |
| <b>RISKS</b>                           | Mixing of other spp. of Nilgirianthus are often found |  |
| <b>GESTATION PERIOD</b>                | 24 months   |  |
| <b>RECOMMENDATION</b>                  | Shaded localities in western Attappady.               |  |


### 1.13

|  |  |  |  |
|--|--|--|--|
| <b>SPECIES</b>                         | <i>Ricinus communis</i> L.   |  |  |
| <b>FAMILY</b>                          | Euphorbiaceae  |  |  |
| <b>COMMON NAME</b>                     | Avanakku   |  |  |
| <b>HABIT &amp; HABITAT</b>             | Shrub; Deciduous Forest  |  |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Open areas ; Tropical and subtropical climate                                      |  |  |
| <b>MODE OF PROPAGATION</b>             | Seeds  |  |  |
| <b>PLANTING MATERIAL</b>               | 2 Kg per ha  |  |  |
| <b>SEMI - PROCESSING</b>               | Cleaning   |  |  |
| <b>USES &amp; UTILISATION</b>          | Purgative and anti-inflammatory; Ayurvedic medicines and other industrial purposes |  |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 0.5-0.8 t seeds per ha annually; Rs. 15-20/kg. 1.5 t of root per ha; Rs 3-4/kg     |  |  |
| <b>MARKETABILITY</b>                   | Local and regional demand  |  |  |
| <b>RISKS</b>                           | No reports   |  |  |
| <b>GESTATION PERIOD</b>                | 2 <sup>nd</sup> year onwards   |  |  |
| <b>RECOMMENDATION</b>                  | Suited for entire eastern Attappady areas  |  |  |


### 1.14

|  |   |  |
|--|---|--|
| <b>SPECIES</b>                         | <i>Solanum violaceum</i> Ortega             |  |
| <b>FAMILY</b>                          | Solanaceae                                  |  |
| <b>COMMON NAME</b>                     | Putharichunda                               |  |
| <b>HABIT &amp; HABITAT</b>             | Shrub; Deciduous Forests                    |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Open areas                                  |  |
| <b>MODE OF PROPAGATION</b>             | Seeds                                       |  |
| <b>PLANTING MATERIAL</b>               | 3 kg per ha                                 |  |
| <b>SEMI - PROCESSING</b>               | Cleaning and cutting                        |  |
| <b>USES &amp; UTILISATION</b>          | Ayurvedic medicines                         |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 2.5 – 3 t per ha; Rs. 15 – 25 per kg        |  |
| <b>MARKETABILITY</b>                   | Local and regional market                   |  |
| <b>RISKS</b>                           | Mixing of other Solanum spp. often noticed. |  |
| <b>GESTATION PERIOD</b>                | 18 months                                   |  |
| <b>RECOMMENDATION</b>                  | Suited for the whole Attappady area         |  |


### 1.15

|  |   |  |  |
|--|---|--|--|
| <b>SPECIES</b>                         | <i>Aloe vera</i> (L.) Burm. f.  |  |  |
| <b>FAMILY</b>                          | Liliaceae   |  |  |
| <b>COMMON NAME</b>                     | Kuttarvazha   |  |  |
| <b>HABIT &amp; HABITAT</b>             | Herb; Dry-deciduous Forest  |  |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Low rainfall zones  |  |  |
| <b>MODE OF PROPAGATION</b>             | Roof suckers  |  |  |
| <b>PLANTING MATERIAL</b>               | 10000 plants per ha.  |  |  |
| <b>SEMI - PROCESSING</b>               | Cleaning  |  |  |
| <b>USES &amp; UTILISATION</b>          | Trichogenic, tranquiliser and antimalarial; Ayurvedic and other pharmaceutical uses |  |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 6-8 t fresh leaves / ha; Rs. 3-6 / kg   |  |  |
| <b>MARKETABILITY</b>                   | High local, regional and global demand  |  |  |
| <b>RISKS</b>                           | No reports  |  |  |
| <b>GESTATION PERIOD</b>                | 18 months   |  |  |
| <b>RECOMMENDATION</b>                  | Suited for areas like Mully, Pattimalam, Koodappetty etc. of Eastern Attappady      |  |  |


### 1.16

|  |  |  |  |
|--|--|--|--|
| <b>SPECIES</b>                         | <i>Andrographis paniculata</i> (Burm. f.) Wall. ex Nees                    |  |  |
| <b>FAMILY</b>                          | Acanthaceae  |  |  |
| <b>COMMON NAME</b>                     | Kiryatha   |  |  |
| <b>HABIT &amp; HABITAT</b>             | Herb; Deciduous Forests  |  |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Moderate rainfall, well drained and exposed soil                           |  |  |
| <b>MODE OF PROPAGATION</b>             | Seeds  |  |  |
| <b>PLANTING MATERIAL</b>               | 3 kg / ha  |  |  |
| <b>SEMI - PROCESSING</b>               | Cleaning   |  |  |
| <b>USES &amp; UTILISATION</b>          | Antimaterial and immunomodulator; ayurvedic and other pharmaceutical uses. |  |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 0.75-1 t dried whole plant / ha; Rs. 40-45 / kg                            |  |  |
| <b>MARKETABILITY</b>                   | Local, regional and global demand  |  |  |
| <b>RISKS</b>                           | No reports   |  |  |
| <b>GESTATION PERIOD</b>                | 6-8 months   |  |  |
| <b>RECOMMENDATION</b>                  | Thavalam, Narasimukku, Pattanakkallu area.                                 |  |  |


### 1.17

|  |   |  |
|--|---|--|
| <b>SPECIES</b>                         | <i>Desmodium gangeticum</i> (L.) DC.                                    |  |
| <b>FAMILY</b>                          | Papilionaceae   |  |
| <b>COMMON NAME</b>                     | Orila   |  |
| <b>HABIT &amp; HABITAT</b>             | Herb; Moist Deciduous Forest  |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Partially shaded areas, well drained soil                               |  |
| <b>MODE OF PROPAGATION</b>             | Seeds   |  |
| <b>PLANTING MATERIAL</b>               | 4 kg. per ha.   |  |
| <b>SEMI - PROCESSING</b>               | Drying and bundling   |  |
| <b>USES &amp; UTILISATION</b>          | General debility, heart diseases, galactagogue; ayurvedic medicines     |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 1.75 – 2 t / ha; Rs. 18-20 /kg.   |  |
| <b>MARKETABILITY</b>                   | Local and regional demand   |  |
| <b>RISKS</b>                           | Mixing of <i>Desmodium velutinum</i> roots                              |  |
| <b>GESTATION PERIOD</b>                | 7 months  |  |
| <b>RECOMMENDATION</b>                  | Suits to different localities in Western Attappady, as a rain-fed crop. |  |


### 1.18

|  |   |  |
|--|---|--|
| <b>SPECIES</b>                         | <i>Ocimum tenuiflorum</i> L.  |  |
| <b>FAMILY</b>                          | Lamiaceae   |  |
| <b>COMMON NAME</b>                     | Tulasi  |  |
| <b>HABIT &amp; HABITAT</b>             | Herb; Deciduous Forests   |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Low to moderate rainfall, well drained soil   |  |
| <b>MODE OF PROPAGATION</b>             | Seeds, stem cuttings  |  |
| <b>PLANTING MATERIAL</b>               | 3 kg per ha.  |  |
| <b>SEMI - PROCESSING</b>               | Nil   |  |
| <b>USES &amp; UTILISATION</b>          | Antiasthmatic; ayurvedic and other pharmaceutical uses  |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 1.25 to 1.5 t of fresh leaves per ha; Rs. 4-6 / kg. Whole plant 2.5 – 3 t / ha; Rs. 5 per kg.                         |  |
| <b>MARKETABILITY</b>                   | Local regional and global demand  |  |
| <b>RISKS</b>                           | No reports  |  |
| <b>GESTATION PERIOD</b>                | 12 months   |  |
| <b>RECOMMENDATION</b>                  | Suited for Kottathara, Pattimalam areas (as irrigated crop); Chittoor, Jallippara, Kallamala areas (as rainfed crop). |  |


### 1.19

|  |  |  |
|--|--|--|
| <b>SPECIES</b>                         | <i>Plumbago indica</i> L.                      |  |
| <b>FAMILY</b>                          | Plumbaginaceae                                 |  |
| <b>COMMON NAME</b>                     | Chettikkoduveli                                |  |
| <b>HABIT &amp; HABITAT</b>             | Herb; Moist Deciduous Forest                   |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Moderate to high rainfall, well drained soil   |  |
| <b>MODE OF PROPAGATION</b>             | Stem cuttings                                  |  |
| <b>PLANTING MATERIAL</b>               | 300-350 kg stem cuttings per ha                |  |
| <b>SEMI - PROCESSING</b>               | Cleaning and bundling                          |  |
| <b>USES &amp; UTILISATION</b>          | Skin diseases; ayurvedic medicines, soaps etc. |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 3-3.5 t per ha; Rs. 25-50 / kg.                |  |
| <b>MARKETABILITY</b>                   | High local and regional demand                 |  |
| <b>RISKS</b>                           | Root of <i>P. zeylanica</i> often mixed        |  |
| <b>GESTATION PERIOD</b>                | 18 months                                      |  |
| <b>RECOMMENDATION</b>                  | Suited for Thavalan – Plamaram areas.          |  |


### 1.20

|  |   |  |
|--|---|--|
| <b>SPECIES</b>                         | <i>Pseudarthria viscida</i> (L.) Wt. & Arn.               |  |
| <b>FAMILY</b>                          | Paoilionaceae   |  |
| <b>COMMON NAME</b>                     | Moovila   |  |
| <b>HABIT &amp; HABITAT</b>             | Herb; Deciduous Forest                                    |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Tropical climate; moderate to high rainfall               |  |
| <b>MODE OF PROPAGATION</b>             | Seeds   |  |
| <b>PLANTING MATERIAL</b>               | 3 kg per ha   |  |
| <b>SEMI - PROCESSING</b>               | Cutting and drying  |  |
| <b>USES &amp; UTILISATION</b>          | General debility and antirheumatic Ayurvedic medicines    |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 1.5 – 2 t per ha; Rs. 20 per kg                           |  |
| <b>MARKETABILITY</b>                   | Local and regional demand                                 |  |
| <b>RISKS</b>                           | No reports  |  |
| <b>GESTATION PERIOD</b>                | 8 <sup>th</sup> months                                    |  |
| <b>RECOMMENDATION</b>                  | Suited for Karara, Chittoor, Kathirampathy and Sholayoor. |  |


### 1.21

|  |  |  |
|--|--|--|
| <b>SPECIES</b>                         | <i>Rauvolfia serpentina</i> (L) Benth. ex Kurz                     |  |
| <b>FAMILY</b>                          | Apocynaceae  |  |
| <b>COMMON NAME</b>                     | Sarpagandhi, Amalpori  |  |
| <b>HABIT &amp; HABITAT</b>             | A subshrub, Moist deciduous to evergreen forests                   |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Tropical & subtropical with high rainfall                          |  |
| <b>MODE OF PROPAGATION</b>             | By seeds, stem/root cuttings                                       |  |
| <b>PLANTING MATERIAL</b>               | 6 Kg / ha  |  |
| <b>SEMI - PROCESSING</b>               | Cleaning, cutting and drying                                       |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 1.5-2 t of dry roots per ha; Rs. 110-150 per kg.                   |  |
| <b>USES &amp; UTILISATION</b>          | Sedative, CNS depressant. Ayurvedic medicines, alkaloid extraction |  |
| <b>MARKETABILITY</b>                   | Local, regional and global demand                                  |  |
| <b>RISKS</b>                           | Other spp. of <i>Rauvolfia</i> are often mixed                     |  |
| <b>GESTATION PERIOD</b>                | 18 months  |  |
| <b>RECOMMENDATION</b>                  | Suited for Kallamala, Mukkali, Anavai areas                        |  |


### 1.22

|  |   |  |
|--|---|--|
| <b>SPECIES</b>                         | <i>Acacia sinuata</i> (Lour.) Merr.                       |  |
| <b>FAMILY</b>                          | Mimosaceae  |  |
| <b>COMMON NAME</b>                     | Cheenikka   |  |
| <b>HABIT &amp; HABITAT</b>             | Straggler; Moist Deciduous Forest                         |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Tropical climate; moderate to high rainfall               |  |
| <b>MODE OF PROPAGATION</b>             | Seeds   |  |
| <b>PLANTING MATERIAL</b>               | 2 kg seeds per ha   |  |
| <b>SEMI - PROCESSING</b>               | Drying  |  |
| <b>USES &amp; UTILISATION</b>          | Toiletries; soap and shampoo industries                   |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 0.75 – 3 t per ha; Rs. 7 – 10 per kg                      |  |
| <b>MARKETABILITY</b>                   | Regional demand   |  |
| <b>RISKS</b>                           | No reports  |  |
| <b>GESTATION PERIOD</b>                | 3 <sup>rd</sup> years onwards                             |  |
| <b>RECOMMENDATION</b>                  | Suited for the barren, gravely hills of western Attappady |  |


### 1.23

|  |   |  |
|--|---|--|
| <b>SPECIES</b>                         | <i>Protasparagus racemosus</i> (Willd.) Oberm.  |  |
| <b>FAMILY</b>                          | Liliaceae   |  |
| <b>COMMON NAME</b>                     | Sathavari   |  |
| <b>HABIT &amp; HABITAT</b>             | Climber; Moist Deciduous Forest   |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Tropical climate; humus rich soil   |  |
| <b>MODE OF PROPAGATION</b>             | Seeds   |  |
| <b>PLANTING MATERIAL</b>               | 3 kg per ha   |  |
| <b>SEMI - PROCESSING</b>               | Cleaning and bundling   |  |
| <b>USES &amp; UTILISATION</b>          | Galctagogue, laxative and for general debility; Ayurvedic medicines and other pharmaceuticals |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 1.5 – 2 t fresh root tubers per ha; Rs. 6 – 10 per kg   |  |
| <b>MARKETABILITY</b>                   | Local, regional and global demand   |  |
| <b>RISKS</b>                           | No reports  |  |
| <b>GESTATION PERIOD</b>                | 24 months   |  |
| <b>RECOMMENDATION</b>                  | Suited for Mukkali, Cholakkad, Kallamala areas  |  |


### 1.24

|  |  |  |
|--|--|--|
| <b>SPECIES</b>                         | <i>Embelia ribes</i> burm.   |  |
| <b>FAMILY</b>                          | Myrsinaceae  |  |
| <b>COMMON NAME</b>                     | Vizhal   |  |
| <b>HABIT &amp; HABITAT</b>             | Climber; Evergreen and Semievergreen Forests                                       |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Tropical and subtropical climate with high rainfall                                |  |
| <b>MODE OF PROPAGATION</b>             | Seeds  |  |
| <b>PLANTING MATERIAL</b>               | 2500 plants per ha   |  |
| <b>SEMI - PROCESSING</b>               | Cleaning and drying  |  |
| <b>USES &amp; UTILISATION</b>          | Analgesic anthelminke and antiaging, Ayurvedic medicines.                          |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 0.5-0.8 tonnes of dry fruits per ha  |  |
| <b>MARKETABILITY</b>                   | High local and regional demand   |  |
| <b>RISKS</b>                           | Mixing of dry fruits of <i>Maesa indica</i> often found                            |  |
| <b>GESTATION PERIOD</b>                | 4 <sup>th</sup> year onwards   |  |
| <b>RECOMMENDATION</b>                  | Suited to <i>Kurumba</i> settlement areas, Vendavetty, Kurukkankundu and Siruvani. |  |


### 1.25

|  |   |  |
|--|---|--|
| <b>SPECIES</b>                         | <i>Holostemma ada-kodien</i> Schult.                    |  |
| <b>FAMILY</b>                          | Asclepiadaceae  |  |
| <b>COMMON NAME</b>                     | Adapathian  |  |
| <b>HABIT &amp; HABITAT</b>             | Twiner; Moist deciduous forests                         |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Moderate rainfall, well drained soil                    |  |
| <b>MODE OF PROPAGATION</b>             | Seeds, root cuttings                                    |  |
| <b>PLANTING MATERIAL</b>               | 0.75 kg seeds / ha.                                     |  |
| <b>SEMI - PROCESSING</b>               | Cleaning, cutting and drying                            |  |
| <b>USES &amp; UTILISATION</b>          | General debility, Cataract; Ayurvedic medicines         |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 0.8 – 1 t of dry root tubers per ha; Rs. 120 – 150 / kg |  |
| <b>MARKETABILITY</b>                   | High local and regional demand                          |  |
| <b>RISKS</b>                           | <i>Ipomoea</i> spp. tubers are often mixed              |  |
| <b>GESTATION PERIOD</b>                | 18 months   |  |
| <b>RECOMMENDATION</b>                  | Suits to Thavalam-Kallamala areas                       |  |


### 1.26

|  |  |  |
|--|--|--|
| <b>SPECIES</b>                         | <i>Piper attenuatum</i> B.-Ham.                |  |
| <b>FAMILY</b>                          | Piperaceae                                     |  |
| <b>COMMON NAME</b>                     | Kattumukku                                     |  |
| <b>HABIT &amp; HABITAT</b>             | Climbing shrub, wet evergreen forests          |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | In shades                                      |  |
| <b>MODE OF PROPAGATION</b>             | Stem cuttings                                  |  |
| <b>PLANTING MATERIAL</b>               | 3000 plants / ha                               |  |
| <b>SEMI - PROCESSING</b>               | Cleaning, drying and bundling                  |  |
| <b>USES &amp; UTILISATION</b>          | Diuretic; Ayurvedic medicines                  |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 2-2.25 t of dried stem per ha; Rs. 8-10 / kg.  |  |
| <b>MARKETABILITY</b>                   | Local and regional demand                      |  |
| <b>RISKS</b>                           | No reports                                     |  |
| <b>GESTATION PERIOD</b>                | 5-8 years                                      |  |
| <b>RECOMMENDATION</b>                  | Suits to Karuvara, Galazi, Kurukkankundu areas |  |

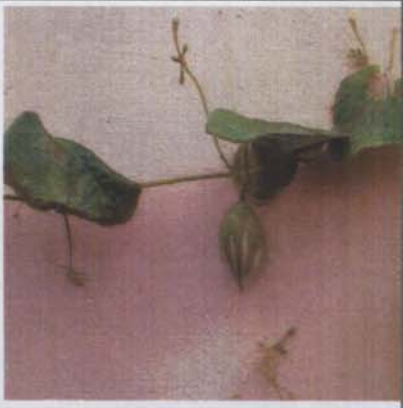
### 1.27

|  |  |  |  |
|--|--|--|--|
| <b>SPECIES</b>                         | <i>Piper longum</i> L.   |  |  |
| <b>FAMILY</b>                          | Piperaceae   |  |  |
| <b>COMMON NAME</b>                     | Tippali  |  |  |
| <b>HABIT &amp; HABITAT</b>             | Climbing stumb; Evergreen and semi-evergreen forest                        |  |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Tropical climate, medium to high rainfall zones                            |  |  |
| <b>MODE OF PROPAGATION</b>             | Stem cuttings  |  |  |
| <b>PLANTING MATERIAL</b>               | 4500 plants / ha   |  |  |
| <b>SEMI - PROCESSING</b>               | Cleaning, drying and bundling  |  |  |
| <b>USES &amp; UTILISATION</b>          | Antiasthmatic and antihepatotoxic; Ayurvedic and other pharmaceutical uses |  |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 1-1.5 t dried vines / ha; Rs. 6-10 / kg.                                   |  |  |
| <b>M MARKETABILITY</b>                 | Local and regional demand  |  |  |
| <b>RISKS</b>                           | No reports   |  |  |
| <b>GESTATION PERIOD</b>                | 3-5 years  |  |  |
| <b>RECOMMENDATION</b>                  | Mukkali, Kallamala, Thadikkudu areas                                       |  |  |


### 1.28

|  |   |  |  |
|--|---|--|--|
| <b>SPECIES</b>                         | <i>Tinospora cordifolia</i> (Willd.) Miers. ex Hook. f. & Thoms.  |  |  |
| <b>FAMILY</b>                          | Menispermaceae  |  |  |
| <b>COMMON NAME</b>                     | Chittamrithu  |  |  |
| <b>HABIT &amp; HABITAT</b>             | Climber; Deciduous Forest   |  |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Low rainfall zones  |  |  |
| <b>MODE OF PROPAGATION</b>             | Stem cuttings and seeds   |  |  |
| <b>PLANTING MATERIAL</b>               | 4500 plants per ha.   |  |  |
| <b>SEMI - PROCESSING</b>               | Bundling  |  |  |
| <b>USES &amp; UTILISATION</b>          | Antipyretic, antihepatotoxic and antimalarial Ayurvedic medicines |  |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 1 - 2 t of fresh vines per ha; Rs. 5 - 8 per kg                   |  |  |
| <b>MARKETABILITY</b>                   | High local and regional demand                                    |  |  |
| <b>RISKS</b>                           | Stem of <i>T. sinensis</i> often found mixed                      |  |  |
| <b>GESTATION PERIOD</b>                | 30 months   |  |  |
| <b>RECOMMENDATION</b>                  | Suited for the whole Eastern Attappady                            |  |  |

### 1.29

|  |  |  |
|--|--|--|
| <b>SPECIES</b>                         | <i>Trichosanthes cucumerina</i> L.                 |  |
| <b>FAMILY</b>                          | Cucurbitaceae                                      |  |
| <b>COMMON NAME</b>                     | Kaippanpatolam                                     |  |
| <b>HABIT &amp; HABITAT</b>             | Climber; Deciduous Forests                         |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Tropical climate, well drained soil                |  |
| <b>MODE OF PROPAGATION</b>             | Seeds  |  |
| <b>PLANTING MATERIAL</b>               | 4 kg. seeds / ha                                   |  |
| <b>SEMI - PROCESSING</b>               | Drying and bundling                                |  |
| <b>USES &amp; UTILISATION</b>          | Antihepatotoxic and laxative; ayurvedic medicines  |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 0.7 to 0.8 t per ha, Rs. 75-100 per kg.            |  |
| <b>MARKETABILITY</b>                   | High local and regional demand                     |  |
| <b>RISKS</b>                           | Mixing of cultivated snake gourd vines often found |  |
| <b>GESTATION PERIOD</b>                | 7 months   |  |
| <b>RECOMMENDATION</b>                  | Suits to entire Attappady area.                    |  |

### 1.30

|  |   |  |
|--|---|--|
| <b>SPECIES</b>                         | <i>Pseudoxytenanthera nitcheyi</i> (Munro) Naith. |  |
| <b>FAMILY</b>                          | Poaceae   |  |
| <b>COMMON NAME</b>                     | Eramkol   |  |
| <b>HABIT &amp; HABITAT</b>             | Bamboo, Moist Deciduous Forest                    |  |
| <b>ECOLOGICAL REQUIREMENTS</b>         | Open areas, well drained soil                     |  |
| <b>MODE OF PROPAGATION</b>             | Culms with basal portion                          |  |
| <b>PLANTING MATERIAL</b>               | 400 plants / ha.                                  |  |
| <b>SEMI - PROCESSING</b>               | Cutting and bundling                              |  |
| <b>USES &amp; UTILISATION</b>          | Handicrafts                                       |  |
| <b>PRODUCTIVITY &amp; MARKET PRICE</b> | 1.8 lakhs culms / ha; Rs. 2-5 per culm            |  |
| <b>MARKETABILITY</b>                   | Domestic and export potential                     |  |
| <b>RISKS</b>                           | No reports  |  |
| <b>GESTATION PERIOD</b>                | 5 year onwards, upto 30 years.                    |  |
| <b>RECOMMENDATION</b>                  | Suited for barren hills of western Attappady      |  |

## 8.6.2. Species-site suitability

### 8.6.2.1. Trees

The site suitability of nine tree species selected for inclusion in the eco-restoration programme at Attappady is provided in table 26.

Table 26. Species-site suitability for trees

| Sl. No. | Species  | Rain fall zone |                |                | Light condition |                | Altitude specifications |                |
|---------|--|----------------|----------------|----------------|-----------------|----------------|-------------------------|----------------|
|         |  | r <sub>1</sub> | r <sub>2</sub> | r <sub>3</sub> | l <sub>1</sub>  | l <sub>2</sub> | a <sub>1</sub>          | a <sub>2</sub> |
| 1       | <i>Canarium strictum</i>                             | -              | -              | √              | -               | √              | √                       | √              |
| 2       | <i>Croton tiglium</i>                                | √              | √              | -              | √               | -              | √                       | -              |
| 3       | <i>Garcinia gummi-gutta</i>                          | -              | -              | √              | -               | √              | √                       | √              |
| 4       | <i>Gmelina arborea</i>                               | -              | √              | √              | √               | -              | √                       | -              |
| 5       | <i>Phyllanthus emblica</i>                           | √              | √              | √              | √               | -              | √                       | √              |
| 6       | <i>Strychnos potatorum</i>                           | √              | √              | -              | √               | -              | √                       | -              |
| 7       | <i>Symplocos cochinchinensis</i> ssp. <i>laurina</i> | -              | -              | √              | -               | √              | √                       | √              |
| 8       | <i>Tamarindus indica</i>                             | √              | √              | -              | √               | -              | √                       | -              |
| 9       | <i>Terminalia chebula</i>                            | √              | √              | -              | √               | -              | √                       | √              |

r<sub>1</sub>= < 800 mm, r<sub>2</sub>= 800 to 1600 mm, r<sub>3</sub> = > 1600 mm; l<sub>1</sub> = Open, l<sub>2</sub>= Shade; a<sub>1</sub>= 600-1000 m, a<sub>2</sub>= 1000-1600 m.

The tree species *Canarium strictum* is suitable for high rainfall areas at elevations above 600 m. It requires partial shade for good growth. Similar ecological niche is shared by *Symplocos cochinchinensis* ssp. *laurina* and *Garcinia gummi-gutta*.

Tree species suited for low/medium rainfall and open canopy conditions are *Croton tiglium*, *Gmelina arborea*, *Phyllanthus emblica*, *Strychnos potatorum*, *Tamarindus indica* and *Terminalia chebula*.

### 8.6.2.2. Shrubs

Five NWFP species belonging to shrubs have been chosen as given in Table 27. All of them can be cultivated in the elevation range 600-1000 m. Among these, *Nilgirianthus ciliatus* can also be cultivated in higher elevations (1000-1600 m). Of the shrubs three can be cultivated in the open, while two in partial shade. All the species can be grown in rainfall regimes above 800 mm,

while *Adhatoda zeylanica*, *Ricinus communis* and *Solanum violaceum* can be cultivated in drier tracts (rainfall below 800 mm).

Table 27. Species-site suitability for Shrubs

| Sl. No. | Species                      | Rain fall zone |                |                | Light condition |                | Altitude specifications |                |
|---------|------------------------------|----------------|----------------|----------------|-----------------|----------------|-------------------------|----------------|
|         |                              | r <sub>1</sub> | r <sub>2</sub> | r <sub>3</sub> | l <sub>1</sub>  | l <sub>2</sub> | a <sub>1</sub>          | a <sub>2</sub> |
| 1       | <i>Adhatoda zeylanica</i>    | √              | √              | √              | -               | √              | √                       | -              |
| 2       | <i>Indigofera tinctoria</i>  | -              | √              | √              | √               | -              | √                       | -              |
| 3       | <i>Nilgiranthus ciliatus</i> | -              | √              | √              | -               | √              | √                       | √              |
| 4       | <i>Ricinus communis</i>      | √              | √              | -              | √               | -              | √                       | -              |
| 5       | <i>Solanum violaceum</i>     | √              | √              | √              | √               | -              | √                       | -              |

r<sub>1</sub> = < 800 mm, r<sub>2</sub> = 800 to 1600 mm, r<sub>3</sub> = > 1600 mm; l<sub>1</sub> = Open, l<sub>2</sub> = Shade; a<sub>1</sub> = 600- 1000 m, a<sub>2</sub> = 1000- 1600 m.

### 8.6.2.2. Herbs

Seven species of herbs having NWFP importance have been chosen (Table 28). All species can be grown at elevations ranging from 600-1000 m except *Rauvolfia serpentina*, which can also be grown in higher elevations. Most of the herbs are suitable for cultivation in the open, while a few can be grown as undergrowth (*Pseudarthria viscida*, *Desmodium gangeticum* and *Rauvolfia serpentina*) under shade. Most of the species selected can be cultivated in all the three rainfall conditions (especially 800-1600 mm) except *Rauvolfia serpentina* which demands higher rainfall conditions.

Table 28. Species-site suitability for Herbs

| Sl. No. | Species                        | Rain fall zone |                |                | Light condition |                | Altitude specifications |                |
|---------|--------------------------------|----------------|----------------|----------------|-----------------|----------------|-------------------------|----------------|
|         |                                | r <sub>1</sub> | r <sub>2</sub> | r <sub>3</sub> | l <sub>1</sub>  | l <sub>2</sub> | a <sub>1</sub>          | a <sub>2</sub> |
| 1       | <i>Aloe vera</i>               | √              | √              | -              | √               | -              | √                       | √              |
| 2       | <i>Andrographis paniculata</i> | √              | √              | √              | √               | -              | √                       | √              |
| 3       | <i>Desmodium gangeticum</i>    | -              | √              | √              | -               | √              | √                       | √              |
| 4       | <i>Ocimum tenuiflorum</i>      | √              | √              | √              | √               | -              | √                       | √              |
| 5       | <i>Plumbago indica</i>         | -              | √              | √              | √               | -              | √                       | √              |
| 6       | <i>Pseudarthria viscida</i>    | √              | √              | -              | -               | √              | √                       | √              |
| 7       | <i>Rauvolfia serpentina</i>    | -              | -              | √              | -               | √              | √                       | √              |

r<sub>1</sub> = < 800 mm, r<sub>2</sub> = 800 to 1600 mm, r<sub>3</sub> = > 1600 mm; l<sub>1</sub> = Open, l<sub>2</sub> = Shade; a<sub>1</sub> = 600- 1000 m, a<sub>2</sub> = 1000- 1600 m.

#### 8.6.2.4. Climbers

Climbers play an important role in the ecosystem structure and functioning and hence eight species belonging to this habit have been chosen for the eco-restoration programme (Table 29). All the species prefer an elevation range of 600- 1000 m, while *Embelia ribes*, *Piper attenuatum* and *Trichosanthes cucumerina* can be cultivated in areas belonging to 1000-1600 m. Most climbers prefer to grow under a partial canopy while a few can be grown in the open (*Acacia sinuata*, *Holostemma ada-kodien*, *Tinospora cordifolia* and *Trichosanthes cucumerina*). Similarly all of them can be grown only in rainfall regimes above 800 mm. Two species viz., *Tinospora cordifolia* and *Trichosanthes cucumerina* can be cultivated in areas with rainfall less than 800 mm.

Table 29. Species-site suitability for Climbers

| Sl. No. | Species                         | Rain fall zone |                |                | Light condition |                | Altitude specifications |                |
|---------|---------------------------------|----------------|----------------|----------------|-----------------|----------------|-------------------------|----------------|
|         |                                 | r <sub>1</sub> | r <sub>2</sub> | r <sub>3</sub> | l <sub>1</sub>  | l <sub>2</sub> | a <sub>2</sub>          | a <sub>3</sub> |
| 1       | <i>Acacia sinuata</i>           | -              | √              | √              | √               | -              | √                       | -              |
| 2       | <i>Embelia ribes</i>            | -              | -              | √              | -               | √              | √                       | √              |
| 3       | <i>Holostemma ada-kodien</i>    | -              | √              | √              | √               | -              | √                       | -              |
| 4       | <i>Piper attenuatum</i>         | -              | -              | √              | -               | √              | √                       | √              |
| 5       | <i>Piper longum</i>             | -              | √              | √              | -               | √              | √                       | -              |
| 6       | <i>Protasparagus racemosus</i>  | -              | √              | √              | -               | √              | √                       | -              |
| 7       | <i>Tinospora cordifolia</i>     | √              | √              | -              | √               | -              | √                       | -              |
| 8       | <i>Trichosanthes cucumerina</i> | √              | √              | √              | √               | -              | √                       | √              |

r<sub>1</sub>= < 800 mm, r<sub>2</sub>= 800 to 1600 mm, r<sub>3</sub>= > 1600 mm; l<sub>1</sub>= Open, l<sub>2</sub>= Shade; a<sub>1</sub>= 600- 1000 m, a<sub>2</sub>= 1000- 1600 m.

The Bamboo species, *Pseudoxytenanthera ritcheyi* can be planted in medium and high rainfall zones (>800 mm). It prefers open areas in all altitudes (600-1600 m) at Attappady Valley.

Over 60% of the species in the select-lists (Tables 26-29) are suitable for dry areas and this is justified by the fact that low rainfall areas are dominant in the land use of Attappady valley.

The effect of involvement of the tribal people in the activities of the Joint Forest management in the degraded areas by the cultivation of medicinal plants for continued practice of traditional health care systems has been proved to be positive in Madhya Pradesh in India (Bhattacharya & Mitra, 2001). The Malleeswara Project designed and implemented by the Kerala Forest Department in Attappady is also a success story of people's participation in the management of forest resources. In the study area, Attappady Hills Area Development Society (AHADS) is attempting the planting of several tree species during 2002-'03 in the degraded sites which includes certain ethnobotanically important species (Table 30).

Table 30. List of Ethnobotanically important species used for planting in the study area by AHADS

| No | Species                        | No. of seedlings produced and planted during 2002- '03 |            |             |            |
|----|--------------------------------|--|------------|-------------|------------|
|    |                                | Localities   |            |             |            |
|    |                                | Palliyara  | Kottathara | Chundapetty | Pattimalam |
| 1  | 2                              | 3  | 4          | 5           | 6          |
| 1  | <i>Acacia chundra</i>          | 1500   | -          | -           | -          |
| 2  | <i>Acacia leucophloea</i>      | 4740   | 1000       | -           | -          |
| 3  | <i>Acacia nilotica</i>         | 15755  | 12350      | 4500        | -          |
| 4  | <i>Adathoda vascula</i>        | -  | -          | -           | 1          |
| 5  | <i>Albivzia amara</i>          | 7300   | -          | -           | 9          |
| 6  | <i>Aloe vera</i>               | -  | -          | -           | 10         |
| 7  | <i>Azadirachta indica</i>      | 31548  | 11520      | 26000       | -          |
| 8  | <i>Bambusa bambos</i>          | 40220  | 19021      | -           | -          |
| 9  | <i>Cassia fistula</i>          | 907  | 1000       | 3000        | 25         |
| 10 | <i>Cassine glauca</i>          | -  | -          | 125         | -          |
| 11 | <i>Casuarina litorea</i>       | 8570   | -          | -           | -          |
| 12 | <i>Clitoria ternatea</i>       | -  | -          | -           | 40         |
| 13 | <i>Desmodium gangeticum</i>    | -  | -          | -           | 176        |
| 14 | <i>Ficus benghalensis</i>      | 5  | -          | -           | 526        |
| 15 | <i>Ficus religiosa</i>         | -  | -          | 170         | -          |
| 16 | <i>Garcinia indica</i>         | -  | -          | 90          | -          |
| 17 | <i>Gmeliena arborea</i>        | 2640   | -          | 2500        | -          |
| 18 | <i>Holostemma ada-kodien</i>   | -  | -          | -           | 10         |
| 19 | <i>Indigofera tinctoria</i>    | -  | -          | -           | 227        |
| 20 | <i>Plumbago indica</i>         | -  | -          | -           | 5          |
| 21 | <i>Pongamia pinnata</i>        | 5970   | 1152       | 3700        | 2288       |
| 22 | <i>Protasparagus racemosus</i> | -  | -          | -           | 321        |
| 23 | <i>Pseudarthria viscida</i>    | -  | -          | -           | 176        |
| 24 | <i>Pterocarpus marsupium</i>   | -  | 425        | -           | 676        |
| 25 | <i>Sansevaria roxburghiana</i> | -  | -          | -           | 1          |
| 26 | <i>Santalum album</i>          | 850  | 8750       | 1670        | 340        |
| 27 | <i>Solanum nigrum</i>          | -  | -          | -           | 3          |

| 1  | 2                         | 3     | 4    | 5    | 6    |
|----|---------------------------|-------|------|------|------|
| 28 | <i>Solanum violaceum</i>  | -     | -    | -    | 19   |
| 29 | <i>Syzigium cumini</i>    | -     | -    | 1000 | -    |
| 30 | <i>Tamarindus indica</i>  | 11663 | 5573 | 8575 | 3552 |
| 31 | <i>Tectona grandis</i>    | 8786  | -    | 4500 | -    |
| 32 | <i>Wrightia tinctoria</i> | 2160  | -    | -    | -    |

It is evident from the above observations that there is ample scope for cultivating NWFP species in Attappady Valley. This is ecologically benefited by greening the degraded sites. The efforts will also enhance the economic status of tribal people by the sustainable extraction and sale of NWFPs, which enable them to interact more with nature by continuing their traditional way of life. This condition is essentially required for the utilization, protection and upgradation of ethnobotanical knowledge.



Summary

## 8. SUMMARY

Attappady Valley is located on the Western Ghats in the north-east portion of Palakkad district of Kerala state. The total geographic area of the valley constitutes 765 km<sup>2</sup> where 465 km<sup>2</sup> are classified as forests. In this small piece of land, nine forest types occurs because of the altitudinal and climatic variations. In the present study, detailed investigations on different types of vegetation like tropical evergreen, semi-evergreen, moist deciduous, Dry-deciduous and dry scrub forest formations found in Attappady valley were carried out. The IVI and Simpson's Diversity Index noticed from the tropical evergreen forests are the lowest and the Shannon-Wiener Diversity Index is the highest among all the types of vegetation studied. The dry scrub vegetation shows highest IVI values and Simpson's Index and lowest Shannon-Wiener Index which indicate its less diversity. Observations on foraging in these forest types indicated that dry-deciduous forests are with high level of extraction compared to other forest formations.

In Attappady Valley anthropogenic disturbances are very high which eventually degrade the quality of forests. The climatic climax formations of tropical forests - the wet evergreen forests - have its present presence in very restricted localities at Attappady Valley and are also under threat of human pressure.

The ethnobotanical studies conducted among the three tribal groups, *Irula*, *Kurumba* and *Muduga*, of Attappady Valley revealed 342 different uses of 256 species of plants found in the wild as well as in cultivated condition. The generations-long trials and errors on plant-uses resulted in a time tested cumulative knowledge-base among the tribal people. This enabled them to lead a healthy life by utilising the available natural resources in a sustainable manner.

Ethnobotany is not at all rigid; it permits renewal of the acquired knowledge continuously in the course of time. As long as the tribals depend on

their surrounding vegetation for existence and subsistence, the ethnic experimentation on plants will continue, which lead them to identify more suitable way of its utilisation.

Economy is a major factor to enable the ethnic people of Attappady Valley to live in their own traditional way by following their customs, rituals and beliefs, and at the same time providing good education to the new generation. To improve the tribal economy the most eco-friendly option is the cultivation of NWFPs in their own surroundings. This certainly would contribute to their economy, and at the same time provide greenery to the degraded lands.

A package for planting 30 suitable NWFP species with planting tips as well as species-sight suitability for different rainfall zones prevailing in Attappady Valley is provided. Utilisation of tribal expertise in the maintenance and harvesting accounts high in this endeavour. These herbal plantations enable them to utilise the resources in a most natural way and sustainable manner.

The major observations and findings of the present study are furnished hereunder:

1. Although, nine distinct vegetation types are seen in the Attappady Valley, only five have been studied in detail. This is because these vegetation types occur in and around tribal hamlets and hold ethnobotanically important species.
2. The five important vegetation types studied in detail are:
  - i. West coast tropical evergreen forest
  - ii. West coast semi-evergreen forest
  - iii. South Indian moist deciduous forest
  - iv. Southern tropical Dry-deciduous forest
  - v. Southern tropical Dry-deciduous scrub
3. The most dominant species-association in the Wet evergreen forest is *Cullenia-Palaquim-Myristica*. The diversity is very high indicating least disturbance.

4. The dominant species-association in the Semi-evergreen forest type is *Vateria-Hopea-Xanthophyllum* with dominance of *Persea*, *Baccauria* and *Garcinia*. The Simpson's Index of diversity is same as that of the Wet evergreen. The Shannon's Index is lesser indicating more disturbance.
5. Species like *Grewia*, *Dalbergia*, *Albizia*, etc. dominate the Moist deciduous forests. The Simpson's Index and Shannon's Index indicate less diversity and more disturbance.
6. The species-association in the Dry-deciduous forest is *Albizia-Tarenna-Canthium* followed by *Erythroxylum*, *Grewia*, etc. The species diversity is high.
7. The Scrub forest type is represented by only three tree species: *Euphorbia*, *Flacourtia* and *Naringi*. Herbs and shrubs are poorly represented on the forest floor.
8. The study identified 40 plants under use by tribals within the five study plots. Of these 21 species belong to trees (one to Wet evergreen, two to Semi-evergreen, seven to Moist deciduous and the rest 11 to Dry-deciduous forests).
9. Of the total 19 species among the non-wood category identified in the study plots, eight belong to Moist deciduous and 11 to Dry-deciduous forests, which clearly indicate that latter provides maximum number of ethnobotanically important species.
10. The present study identified 256 species of ethnobotanical importance and use by the tribal communities of Attappady Valley.
11. Of these, 142 species belong to the group ethnomedicines followed by 40 species in the food plant category. Other dominant use-categories are animal husbandry (26), firewood (23) and customs and rituals (20).
12. Of the 142 species in the category of ethnomedicines 95 (37%) are exclusively used in medicine. Forty seven species belong to both categories.

13. Of the 256 species, 58 belong to herbs, 54 to trees, 38 to climbers and 28 to shrubs, indicating that the category of herbs are the most important one.
14. Habitat-wise 85 species belong to the Dry-deciduous forest category while 63 belong to Moist deciduous forest category. Fifty five species are found in agricultural lands. This indicates that Dry-deciduous forest contributes maximum number of ethnobotanical species.
15. Phytogeographically out of the 256 species studied, 16.8% have Indo-Malesian distribution, 14% pantropical, 11% in India and Sri Lanka, and paleotropical distribution accounts for 7.4%. Only 3.15% of species are endemic to the Western Ghats.
16. The most dominant family is Papilionaceae followed by Euphorbiaceae, Rutaceae and Poaceae.
17. Of the 256 ethnobotanically important species recorded from Attappady Valley 191 (74%) species are of single-use.
18. Species-wise credibility rating of ethnomedicinal plants indicates that 59% belong to category II while 24% belong to category III. In the class of non-ethnomedicinal species 32% belong to class V, 31 to class I and 21 to class II. Most of the species belong to credibility rate 2 and 3 indicating continuation of traditional knowledge and practise by the tribal people.
19. Among the three tribal groups *Irulas* are familiar with 190 plant species, *Muduga* with 131 and *Kurumba* with 92. *Kurumbas* and *Mudugas* share maximum number of species showing similarity of ecological conditions of their hamlets.
20. Leaves dominate the plant-parts used by the tribals followed by fruits, roots, shoots, etc.
21. Tribal pharmacopoeia of Attappady Valley consists of 142 ethnomedicinal species, of these 78% are single-drugs. Single remedy dominates in the tribal healing system.

22. Thirty species belong to Non Wood Forest Products category have been identified for eco restoration activities for deriving economic benefits in Attappady Valley on the basis of eight criteria. Of the 30 species, ten species are those which are not being used by the tribals of Attappady, but found to be suitable for cultivation in the area and very useful for the revenue generation by their introduction under the eco-restoration programme.

23. The study identified three rainfall zones, three light conditions and three altitudinal ranges for cultivating these plants.

24. Nine species of trees, seven species of shrubs, five species of herbs and eight species of climbers have been identified for cultivation in various zones of Attappady.

## APPENDICES

### Appendix - 1. Species wise ethnobotanical uses

| SI.No. | Species                                | Use categories |    |   |    |     |      |    |   |    |     |      |
|--------|--|----------------|----|---|----|-----|------|----|---|----|-----|------|
|        |  | 1              | 2  | 3 | 4  | 5   | 6    | 7  | 8 | 9  | 10  | 11   |
| i      | ii                                     | iii            | iv | v | vi | vii | viii | ix | x | xi | xii | xiii |
| 1      | <i>Abrus precatorius</i>               | +              | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 2      | <i>Abutilon hirtum</i>                 | +              | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 3      | <i>Acacia chundra</i>                  | -              | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 4      | <i>Acacia leucophloea</i>              | -              | +  | - | -  | -   | +    | -  | - | -  | -   | +    |
| 5      | <i>Acacia nilotica</i>                 | +              | -  | - | -  | -   | +    | -  | - | -  | -   | +    |
| 6      | <i>Acacia pennata</i>                  | +              | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 7      | <i>Acacia sinuata</i>                  | -              | -  | - | -  | -   | -    | -  | - | +  | -   | -    |
| 8      | <i>Acalypha alnifolia</i>              | +              | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 9      | <i>Achyranthes aspera</i>              | +              | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 10     | <i>Actinopterys radiata</i>            | +              | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 11     | <i>Aegle marmelos</i>                  | +              | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 12     | <i>Ageratum conyzoides</i>             | +              | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 13     | <i>Albizia amara</i>                   | +              | +  | - | -  | +   | +    | -  | + | -  | -   | -    |
| 14     | <i>Albizia odoratissima</i>            | +              | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 15     | <i>Aloe vera</i>                       | +              | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 16     | <i>Amaranthus caudatus</i>             | -              | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 17     | <i>Amaranthus spinosus</i>             | -              | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 18     | <i>Amaranthus viridis</i>              | -              | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 19     | <i>Andrographis paniculata</i>         | +              | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 20     | <i>Angiopteris evecta</i>              | -              | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 21     | <i>Anogeissus latifolia</i>            | -              | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 22     | <i>Areca catechu</i>                   | -              | -  | + | -  | -   | -    | -  | - | -  | -   | +    |
| 23     | <i>Argemone mexicana</i>               | +              | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 24     | <i>Aristolochia indica</i>             | +              | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 25     | <i>Atalantia monophylla</i>            | +              | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 26     | <i>Azadirachta indica</i>              | +              | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 27     | <i>Baccaurea courtallensis</i>         | +              | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 28     | <i>Balanophora fungosa ssp. indica</i> | -              | -  | - | -  | -   | -    | -  | - | +  | -   | -    |
| 29     | <i>Bambusa bambos</i>                  | -              | -  | - | +  | -   | -    | +  | + | -  | -   | -    |
| 30     | <i>Basella alba</i>                    | +              | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 31     | <i>Bauhinia racemosa</i>               | +              | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 32     | <i>Benkara malabarica</i>              | +              | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 33     | <i>Biophytum reinwardtii</i>           | -              | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 34     | <i>Blepharis maderaspatensis</i>       | +              | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 35     | <i>Blumea mollis</i>                   | +              | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 36     | <i>Boerhavia diffusa</i>               | +              | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 37     | <i>Brassica juncea</i>                 | -              | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 38     | <i>Breynia retusa</i>                  | +              | +  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 39     | <i>Bridelia retusa</i>                 | -              | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 40     | <i>Bridelia scandens</i>               | +              | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 41     | <i>Buchanania lanzan</i>               | -              | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 42     | <i>Butea monosperma</i>                | -              | -  | - | +  | -   | -    | -  | - | -  | -   | -    |
| 43     | <i>Cajanus cajan</i>                   | -              | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 44     | <i>Calotropis gigantea</i>             | +              | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 45     | <i>Canarium strictum</i>               | -              | -  | - | -  | -   | -    | -  | - | +  | -   | -    |

| i  | ii  | iii | iv | v | vi | vii | viii | ix | x | xi | xii | xiii |
|----|---|-----|----|---|----|-----|------|----|---|----|-----|------|
| 46 | <i>Cannabis sativa</i> ssp. <i>indica</i>           | +   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 47 | <i>Canthium coromandelicum</i>                      | +   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 48 | <i>Capparis zeylanica</i>                           | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 49 | <i>Capsicum frutescens</i>                          | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 50 | <i>Caralluma attenuata</i>                          | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 51 | <i>Cardiospermum halicacabum</i>                    | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 52 | <i>Carissa carandas</i>                             | -   | -  | + | -  | -   | -    | +  | - | -  | -   | -    |
| 53 | <i>Carmona retusa</i>                               | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 54 | <i>Cassia fistula</i>                               | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 55 | <i>Cassine albens</i>                               | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 56 | <i>Casuarina litorea</i>                            | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    |
| 57 | <i>Celastrus paniculatus</i>                        | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 58 | <i>Celosia argentea</i>                             | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 59 | <i>Celosia polygonoides</i>                         | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 60 | <i>Centella asiatica</i>                            | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 61 | <i>Cereus pterogonus</i>                            | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 62 | <i>Chenopodium ambrosioides</i>                     | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 63 | <i>Chloroxylon swietenia</i>                        | +   | -  | - | +  | +   | -    | -  | - | -  | -   | -    |
| 64 | <i>Chromolaena odorata</i>                          | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 65 | <i>Cinnamomum macrocarpum</i>                       | -   | -  | - | -  | -   | -    | -  | - | +  | -   | -    |
| 66 | <i>Cissus quadrangularis</i>                        | -   | +  | + | -  | -   | -    | +  | - | -  | -   | -    |
| 67 | <i>Citrullus colocynthis</i>                        | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 68 | <i>Citrus aurantifolia</i>                          | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 69 | <i>Clausena austroindica</i>                        | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 70 | <i>Clematis gouriana</i>                            | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 71 | <i>Clerodendrum phlomidis</i>                       | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 72 | <i>Clerodendrum serratum</i>                        | -   | -  | - | -  | -   | -    | -  | - | +  | -   | -    |
| 73 | <i>Clerodendrum viscosum</i>                        | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 74 | <i>Clitoria ternatea</i>                            | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 75 | <i>Coccinia grandis</i>                             | +   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 76 | <i>Cocos nucifera</i>                               | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    |
| 77 | <i>Commelina benghalensis</i>                       | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 78 | <i>Commiphora caudata</i>                           | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 79 | <i>Corbichonia decumbens</i>                        | +   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 80 | <i>Cordia wallichii</i>                             | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 81 | <i>Costus speciosus</i>                             | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 82 | <i>Cucumis sativus</i>                              | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 83 | <i>Cucurbita maxima</i>                             | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 84 | <i>Cullenia exarillata</i>                          | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 85 | <i>Curculigo orchioides</i>                         | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 86 | <i>Cycas circinalis</i>                             | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 87 | <i>Cyclea peltata</i>                               | +   | -  | - | -  | -   | -    | -  | - | +  | -   | -    |
| 88 | <i>Cymbopogon flexuosus</i>                         | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 89 | <i>Cynodon dactylon</i>                             | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 90 | <i>Cyperus malaccensis</i>                          | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 91 | <i>Cyperus rotundus</i>                             | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 92 | <i>Dalbergia lanceolaria</i> ssp. <i>paniculata</i> | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 93 | <i>Dalbergia latifolia</i>                          | +   | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 94 | <i>Datura metel</i>                                 | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 95 | <i>Dendrocalamus strictus</i>                       | -   | -  | - | -  | -   | +    | +  | - | -  | -   | -    |

| i   | ii                               | iii | iv | v | vi | vii | viii | ix | x | xi | xii | xiii |
|-----|----------------------------------|-----|----|---|----|-----|------|----|---|----|-----|------|
| 96  | <i>Desmodium gangeticum</i>      | +   | -  | - | -  | -   | -    | -  | - | +  | -   | -    |
| 97  | <i>Desmodium triangulare</i>     | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 98  | <i>Desmodium triflorum</i>       | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 99  | <i>Desmodium triquetrum</i>      | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 100 | <i>Desmostachya bipinnata</i>    | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    |
| 101 | <i>Dillenia pentagyna</i>        | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 102 | <i>Dioscorea oppositifolia</i>   | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 103 | <i>Dioscorea pentaphylla</i>     | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 104 | <i>Dioscorea tomentosa</i>       | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 105 | <i>Dioscorea wallichii</i>       | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 106 | <i>Diospyros montana</i>         | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 107 | <i>Diplazium esculentum</i>      | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 108 | <i>Dodonaea viscosa</i>          | +   | +  | - | +  | -   | -    | -  | - | -  | -   | -    |
| 109 | <i>Drynaria quercifolia</i>      | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 110 | <i>Eclipta prostrata</i>         | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 111 | <i>Elephantopus scaber</i>       | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 112 | <i>Eleusine coracana</i>         | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 113 | <i>Embelia tsjeriam-cottam</i>   | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 114 | <i>Entada rheedii</i>            | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 115 | <i>Equisetum ramosissimum</i>    | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 116 | <i>Erythroxylum monogynum</i>    | +   | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 117 | <i>Euphorbia hirta</i>           | +   | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 118 | <i>Euphorbia thymifolia</i>      | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 119 | <i>Evolvulus alsinoides</i>      | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 120 | <i>Ficus exasperata</i>          | +   | -  | - | -  | -   | -    | -  | + | -  | -   | -    |
| 121 | <i>Ficus hispida</i>             | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 122 | <i>Ficus racemosa</i>            | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 123 | <i>Ficus religiosa</i>           | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 124 | <i>Flacourtia indica</i>         | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 125 | <i>Garcinia gummi-gutta</i>      | -   | -  | - | -  | -   | -    | -  | - | +  | -   | -    |
| 126 | <i>Givotia moluccana</i>         | +   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 127 | <i>Gloriosa superba</i>          | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 128 | <i>Glycosmis mauritiana</i>      | +   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 129 | <i>Gmelina arborea</i>           | -   | -  | - | -  | -   | -    | -  | + | -  | -   | -    |
| 130 | <i>Gossypium barbadense</i>      | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 131 | <i>Grewia laevigata</i>          | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 132 | <i>Grewia tiliifolia</i>         | +   | -  | - | +  | -   | +    | -  | - | -  | -   | -    |
| 133 | <i>Grewia villosa</i>            | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 134 | <i>Gymnema sylvestre</i>         | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 135 | <i>Gynandropsis gynandra</i>     | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 136 | <i>Helicteres isora</i>          | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 137 | <i>Hemidesmus indicus</i>        | +   | -  | - | -  | -   | -    | -  | - | +  | -   | -    |
| 138 | <i>Holostemma ada-kodien</i>     | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 139 | <i>Homonoia riparia</i>          | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 140 | <i>Hyptis suaveolens</i>         | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 141 | <i>Ichnocarpus frutescens</i>    | -   | +  | - | +  | -   | -    | -  | - | -  | -   | -    |
| 142 | <i>Indigofera linnaei</i>        | +   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 143 | <i>Jatropha curcas</i>           | +   | -  | - | -  | -   | -    | -  | - | +  | -   | -    |
| 144 | <i>Justicia tranquebariensis</i> | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 145 | <i>Lablab purpureus</i>          | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |

| i   | ii  | iii | iv | v | vi | vii | viii | ix | x | xi | xii | xiii |
|-----|---|-----|----|---|----|-----|------|----|---|----|-----|------|
| 146 | <i>Lagenaria siceraria</i>                  | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 147 | <i>Lagerstoemia microcarpa</i>              | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 148 | <i>Lantana camara</i> var. <i>aculeata</i>  | -   | -  | - | -  | -   | -    | +  | - | -  | -   | +    |
| 149 | <i>Lantana indica</i>                       | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 150 | <i>Leptadenia reticulata</i>                | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 151 | <i>Leucas aspera</i>                        | +   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 152 | <i>Limonia acidissima</i>                   | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 153 | <i>Litsea stocksii</i>                      | -   | -  | - | -  | -   | -    | -  | + | -  | -   | -    |
| 154 | <i>Lobelia nicotianifolia</i>               | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 155 | <i>Luffa cylindrica</i>                     | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 156 | <i>Lycopersicon esculentum</i>              | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 157 | <i>Mallotus philippensis</i>                | +   | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 158 | <i>Mangifera indica</i>                     | +   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 159 | <i>Momordica charantia</i>                  | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 160 | <i>Morinda pubescens</i>                    | -   | -  | - | -  | -   | +    | -  | + | -  | -   | -    |
| 161 | <i>Moringa pterygosperma</i>                | +   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 162 | <i>Mucuna pruriens</i>                      | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 163 | <i>Mukia madraspatana</i>                   | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 164 | <i>Mundulea sericea</i>                     | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 165 | <i>Murraya koenigii</i>                     | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 166 | <i>Mussaenda frondosa</i>                   | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 167 | <i>Naravelia zeylanica</i>                  | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 168 | <i>Naringi crenulata</i>                    | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 169 | <i>Ocimum americanum</i>                    | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 170 | <i>Ocimum basilicum</i>                     | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 171 | <i>Ocimum gratissimum</i>                   | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 172 | <i>Ocimum tenuiflorum</i>                   | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 173 | <i>Opuntia striata</i> var. <i>dillenii</i> | +   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 174 | <i>Oryza sativa</i>                         | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 175 | <i>Oxalis corniculata</i>                   | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 176 | <i>Palaquim ellipticum</i>                  | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 177 | <i>Panicum sumatrense</i>                   | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 178 | <i>Parahemionitis cordata</i>               | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 179 | <i>Paspalum scorbiculatum</i>               | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 180 | <i>Passiflora foetida</i>                   | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 181 | <i>Pennisetum americanum</i>                | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 182 | <i>Pentanema indicum</i>                    | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 183 | <i>Pergularia daemia</i>                    | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 184 | <i>Phoenix loureiroi</i>                    | -   | -  | - | -  | -   | -    | -  | + | -  | -   | -    |
| 185 | <i>Phyllanthus amarus</i>                   | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 186 | <i>Phyllanthus emblica</i>                  | -   | +  | - | -  | -   | -    | +  | - | +  | -   | -    |
| 187 | <i>Pimpinella heyneana</i>                  | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 188 | <i>Piper longum</i>                         | +   | -  | - | -  | -   | -    | -  | - | +  | -   | -    |
| 189 | <i>Pithecellobium dulce</i>                 | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 190 | <i>Pleiospermium alatum</i>                 | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 191 | <i>Plumbago zeylanica</i>                   | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 192 | <i>Pongamia pinnata</i>                     | +   | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 193 | <i>Premna corymbosa</i>                     | -   | +  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 194 | <i>Premna tomentosa</i>                     | -   | -  | - | +  | -   | +    | -  | - | -  | -   | -    |
| 195 | <i>Prosopis juliflora</i>                   | -   | +  | - | -  | -   | +    | -  | - | -  | -   | -    |

| i   | ii                              | iii | iv | v | vi | vii | viii | ix | x | xi | xii | xiii |
|-----|---------------------------------|-----|----|---|----|-----|------|----|---|----|-----|------|
| 196 | <i>Protasparagus racemosus</i>  | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 197 | <i>Pseudarthria viscida</i>     | +   | -  | - | -  | -   | -    | -  | - | +  | -   | -    |
| 198 | <i>Psyrax umbellata</i>         | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 199 | <i>Pterocarpus marsupium</i>    | -   | -  | + | +  | -   | +    | -  | + | -  | -   | +    |
| 200 | <i>Pterolobium hexapetalum</i>  | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 201 | <i>Rauvolfia serpentina</i>     | -   | -  | - | -  | -   | -    | -  | - | +  | -   | -    |
| 202 | <i>Ricinus communis</i>         | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 203 | <i>Rubia cordifolia</i>         | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 204 | <i>Sanseveria roxburghiana</i>  | +   | -  | - | +  | -   | -    | -  | - | -  | -   | -    |
| 205 | <i>Santalum album</i>           | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 206 | <i>Sapindus trifoliata</i>      | -   | -  | - | -  | -   | -    | -  | - | +  | -   | +    |
| 207 | <i>Schumannianthus virgatus</i> | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 208 | <i>Scoparia dulcis</i>          | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 209 | <i>Secamone emetica</i>         | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 210 | <i>Selaginella delicatula</i>   | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 211 | <i>Senna auriculata</i>         | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 212 | <i>Senna occidentalis</i>       | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 213 | <i>Senna tora</i>               | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 214 | <i>Sesamum orientale</i>        | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 215 | <i>Sida acuta</i>               | -   | -  | - | -  | -   | -    | -  | + | -  | -   | -    |
| 216 | <i>Sida alnifolia</i>           | -   | -  | - | -  | -   | -    | -  | - | +  | -   | -    |
| 217 | <i>Solanum americanum</i>       | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 218 | <i>Solanum incanum</i>          | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 219 | <i>Solanum torvum</i>           | -   | -  | - | -  | -   | -    | -  | - | +  | -   | -    |
| 220 | <i>Solanum violaceum</i>        | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 221 | <i>Sorghum bicolor</i>          | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 222 | <i>Spermacoce hispida</i>       | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 223 | <i>Sterculia guttata</i>        | +   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 224 | <i>Streblus asper</i>           | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 225 | <i>Strobilanthus ciliatus</i>   | -   | -  | - | -  | -   | -    | -  | - | +  | -   | -    |
| 226 | <i>Strychnos nux-vomica</i>     | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 227 | <i>Strychnos potatorum</i>      | -   | +  | + | -  | +   | -    | -  | - | -  | -   | -    |
| 228 | <i>Syzigium cumini</i>          | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 229 | <i>Tamarindus indica</i>        | -   | -  | + | -  | -   | +    | +  | - | -  | +   | -    |
| 230 | <i>Tarenna asiatica</i>         | -   | -  | - | +  | -   | +    | -  | - | -  | -   | -    |
| 231 | <i>Tectona grandis</i>          | +   | -  | - | +  | -   | +    | -  | - | -  | -   | -    |
| 232 | <i>Tephrosia purpurea</i>       | +   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 233 | <i>Terminalia chebula</i>       | +   | -  | - | -  | -   | -    | -  | - | +  | -   | -    |
| 234 | <i>Terminalia cuneata</i>       | +   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 235 | <i>Themeda triandra</i>         | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    |
| 236 | <i>Thespesia lampas</i>         | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 237 | <i>Thottea siliquosa</i>        | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 238 | <i>Toddalia asiatica</i>        | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 239 | <i>Tragia involucrata</i>       | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 240 | <i>Trewia nudiflora</i>         | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 241 | <i>Tribulus terrestris</i>      | +   | -  | + | -  | -   | -    | -  | - | +  | -   | -    |
| 242 | <i>Trichodesma indicum</i>      | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 243 | <i>Tridax procumbens</i>        | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 244 | <i>Vateria indica</i>           | -   | -  | - | -  | -   | -    | -  | - | +  | -   | -    |
| 245 | <i>Vernonia divergens</i>       | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |

| i   | ii  | iii | iv | v | vi | vii | viii | ix | x | xi | xii | xiii |
|-----|---|-----|----|---|----|-----|------|----|---|----|-----|------|
| 246 | <i>Vigna mungo</i>                              | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 247 | <i>Vigna radiata</i> var. <i>sublobata</i>      | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 248 | <i>Vigna unguiculata</i> ssp. <i>ungiculata</i> | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 249 | <i>Vigna unguiculata</i> ssp. <i>cylindrica</i> | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 250 | <i>Vitex altissima</i>                          | +   | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 251 | <i>Wattakaka volubilis</i>                      | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 252 | <i>Wrightia tinctoria</i>                       | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 253 | <i>Zea mays</i>                                 | -   | -  | - | +  | -   | -    | -  | - | -  | +   | -    |
| 254 | <i>Ziziphus mauritiana</i>                      | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 255 | <i>Ziziphus oenoplia</i>                        | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 256 | <i>Ziziphus rugosa</i>                          | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |

1= Ethno medicine; 2 =Animal husbandry; 3 = Customs, rituals etc.; 4 = Construction timber; 5 = Fish poison; 6 = Firewood; 7 = Food plants; 8 = Implements; 9 = Saleable products; 10 = Under cultivation and 11 = Miscellaneous uses

**Appendix - 2. Multiple uses of ethnobotanically important species**

| SI.No. | Species                                       | No. of uses |
|--------|---|-------------|
| i      | ii  | iii         |
| 1      | <i>Abrus precatorius</i>                      | 1           |
| 2      | <i>Abutilon hirtum</i>                        | 1           |
| 3      | <i>Acacia chundra</i>                         | 1           |
| 4      | <i>Acacia leucophloea</i>                     | 3           |
| 5      | <i>Acacia nilotica</i>                        | 3           |
| 6      | <i>Acacia pennata</i>                         | 2           |
| 7      | <i>Acacia sinuata</i>                         | 1           |
| 8      | <i>Acalypha alnifolia</i>                     | 1           |
| 9      | <i>Achyranthes aspera</i>                     | 2           |
| 10     | <i>Actinopterys radiata</i>                   | 1           |
| 11     | <i>Aegle marmelos</i>                         | 1           |
| 12     | <i>Ageratum conyzoides</i>                    | 1           |
| 13     | <i>Albizia amara</i>                          | 5           |
| 14     | <i>Albizia odoratissima</i>                   | 2           |
| 15     | <i>Aloe vera</i>                              | 2           |
| 16     | <i>Amaranthus caudatus</i>                    | 1           |
| 17     | <i>Amaranthus spinosus</i>                    | 1           |
| 18     | <i>Amaranthus viridis</i>                     | 1           |
| 19     | <i>Andrographis paniculata</i>                | 1           |
| 20     | <i>Angiopteris evecta</i>                     | 1           |
| 21     | <i>Anogeissus latifolia</i>                   | 1           |
| 22     | <i>Areca catechu</i>                          | 2           |
| 23     | <i>Argemone mexicanum</i>                     | 1           |
| 24     | <i>Aristolochia indica</i>                    | 1           |
| 25     | <i>Atalantia monophylla</i>                   | 1           |
| 26     | <i>Azadirachta indica</i>                     | 2           |
| 27     | <i>Baccaurea courtallensis</i>                | 1           |
| 28     | <i>Balanophora fungosa</i> ssp. <i>indica</i> | 1           |
| 29     | <i>Bambusa bambos</i>                         | 3           |
| 30     | <i>Basella alba</i>                           | 2           |
| 31     | <i>Bauhinia racemosa</i>                      | 2           |
| 32     | <i>Benkara malabarica</i>                     | 1           |
| 33     | <i>Biophytum reinwardtii</i>                  | 1           |
| 34     | <i>Blepharis maderaspatensis</i>              | 2           |
| 35     | <i>Blumea mollis</i>                          | 1           |
| 36     | <i>Boerhavia diffusa</i>                      | 2           |
| 37     | <i>Brassica juncea</i>                        | 1           |
| 38     | <i>Breynia retusa</i>                         | 3           |
| 39     | <i>Bridelia retusa</i>                        | 1           |
| 40     | <i>Bridelia scandens</i>                      | 1           |
| 41     | <i>Buchanania lanzan</i>                      | 1           |
| 42     | <i>Butea monosperma</i>                       | 1           |
| 43     | <i>Cajanus cajan</i>                          | 1           |
| 44     | <i>Calotropis gigantea</i>                    | 2           |
| 45     | <i>Canarium strictum</i>                      | 1           |
| 46     | <i>Cannabis sativa</i> ssp. <i>indica</i>     | 2           |

| i  | ii   | iii |
|----|--|-----|
| 47 | <i>Canthium coromandelicum</i>               | 2   |
| 48 | <i>Capparis zeylanica</i>                    | 1   |
| 49 | <i>Capsicum frutescens</i>                   | 1   |
| 50 | <i>Caralluma attenuata</i>                   | 1   |
| 51 | <i>Cardiospermum halicacabum</i>             | 1   |
| 52 | <i>Carissa carandas</i>                      | 2   |
| 53 | <i>Carmona retusa</i>                        | 1   |
| 54 | <i>Cassia fistula</i>                        | 1   |
| 55 | <i>Cassine albens</i>                        | 1   |
| 56 | <i>Casuarina litorea</i>                     | 1   |
| 57 | <i>Celastrus paniculatus</i>                 | 1   |
| 58 | <i>Celosia argentea</i>                      | 1   |
| 59 | <i>Celosia polygonoides</i>                  | 1   |
| 60 | <i>Centella asiatica</i>                     | 1   |
| 61 | <i>Cereus pterogonus</i>                     | 1   |
| 62 | <i>Chenopodium ambrosioides</i>              | 1   |
| 63 | <i>Chloroxylon swietenia</i>                 | 3   |
| 64 | <i>Chromolaena odorata</i>                   | 1   |
| 65 | <i>Cinnamomum macrocarpum</i>                | 1   |
| 66 | <i>Cissus quadrangularis</i>                 | 3   |
| 67 | <i>Citrullus colocynthis</i>                 | 1   |
| 68 | <i>Citrus aurantifolia</i>                   | 1   |
| 69 | <i>Clausena austroindica</i>                 | 1   |
| 70 | <i>Clematis gouriana</i>                     | 1   |
| 71 | <i>Clerodendrum phlomidis</i>                | 1   |
| 72 | <i>Clerodendrum serratum</i>                 | 1   |
| 73 | <i>Clerodendrum viscosum</i>                 | 1   |
| 74 | <i>Clitoria ternatea</i>                     | 1   |
| 75 | <i>Coccinia grandis</i>                      | 2   |
| 76 | <i>Cocos nucifera</i>                        | 1   |
| 77 | <i>Commelina benghalensis</i>                | 1   |
| 78 | <i>Commiphora caudata</i>                    | 1   |
| 79 | <i>Corbichonia decumbens</i>                 | 2   |
| 80 | <i>Cordia wallichii</i>                      | 1   |
| 81 | <i>Costus speciosus</i>                      | 1   |
| 82 | <i>Cucumis sativus</i>                       | 1   |
| 83 | <i>Cucurbita maxima</i>                      | 1   |
| 84 | <i>Cullenia exarillata</i>                   | 1   |
| 85 | <i>Curculigo orchioides</i>                  | 1   |
| 86 | <i>Cycas circinalis</i>                      | 1   |
| 87 | <i>Cyclea peltata</i>                        | 2   |
| 88 | <i>Cymbopogon flexuosus</i>                  | 1   |
| 89 | <i>Cynodon dactylon</i>                      | 1   |
| 90 | <i>Cyperus malaccensis</i>                   | 1   |
| 91 | <i>Cyperus rotundus</i>                      | 1   |
| 92 | <i>Dalbergia lanceolaria ssp. paniculata</i> | 1   |
| 93 | <i>Dalbergia latifolia</i>                   | 2   |
| 94 | <i>Datura metel</i>                          | 2   |
| 95 | <i>Dendrocalamus strictus</i>                | 2   |

| i   | ii                               | iii |
|-----|----------------------------------|-----|
| 96  | <i>Desmodium gangeticum</i>      | 2   |
| 97  | <i>Desmodium triangulare</i>     | 1   |
| 98  | <i>Desmodium triflorum</i>       | 1   |
| 99  | <i>Desmodium triquetrum</i>      | 1   |
| 100 | <i>Desmostachya bipinnata</i>    | 1   |
| 101 | <i>Dillenia pentagyna</i>        | 1   |
| 102 | <i>Dioscorea oppositifolia</i>   | 1   |
| 103 | <i>Dioscorea pentaphylla</i>     | 1   |
| 104 | <i>Dioscorea tomentosa</i>       | 1   |
| 105 | <i>Dioscorea wallichii</i>       | 1   |
| 106 | <i>Diospyros montana</i>         | 1   |
| 107 | <i>Diplazium esculentum</i>      | 1   |
| 108 | <i>Dodonaea viscosa</i>          | 3   |
| 109 | <i>Drynaria quercifolia</i>      | 1   |
| 110 | <i>Eclipta prostrata</i>         | 1   |
| 111 | <i>Elephantopus scaber</i>       | 1   |
| 112 | <i>Eleusine coracana</i>         | 1   |
| 113 | <i>Embelia tsjeriam-cottam</i>   | 1   |
| 114 | <i>Entada rheedii</i>            | 1   |
| 115 | <i>Equisetum ramosissimum</i>    | 1   |
| 116 | <i>Erythroxylum monogynum</i>    | 2   |
| 117 | <i>Euphorbia hirta</i>           | 2   |
| 118 | <i>Euphorbia thymifolia</i>      | 1   |
| 119 | <i>Evolvulus alsinoides</i>      | 1   |
| 120 | <i>Ficus exasperata</i>          | 1   |
| 121 | <i>Ficus hispida</i>             | 1   |
| 122 | <i>Ficus racemosa</i>            | 1   |
| 123 | <i>Ficus religiosa</i>           | 1   |
| 124 | <i>Flacourtia indica</i>         | 1   |
| 125 | <i>Garcinia gummi-gutta</i>      | 1   |
| 126 | <i>Givotia moluccana</i>         | 2   |
| 127 | <i>Gloriosa superba</i>          | 1   |
| 128 | <i>Glycosmis mauritiana</i>      | 2   |
| 129 | <i>Gmelina arborea</i>           | 1   |
| 130 | <i>Gossypium barbadense</i>      | 1   |
| 131 | <i>Grewia laevigata</i>          | 1   |
| 132 | <i>Grewia tiliifolia</i>         | 3   |
| 133 | <i>Grewia villosa</i>            | 1   |
| 134 | <i>Gymnema sylvestre</i>         | 1   |
| 135 | <i>Gynandropsis gynandra</i>     | 1   |
| 136 | <i>Helicteres isora</i>          | 1   |
| 137 | <i>Hemidesmus indicus</i>        | 2   |
| 138 | <i>Holostemma ada-kodien</i>     | 1   |
| 139 | <i>Homonoia riparia</i>          | 1   |
| 140 | <i>Hyptis suaveolens</i>         | 1   |
| 141 | <i>Ichnocarpus frutescens</i>    | 2   |
| 142 | <i>Indigofera linnaei</i>        | 2   |
| 143 | <i>Jatropha curcas</i>           | 2   |
| 144 | <i>Justicia tranquebariensis</i> | 1   |
| 145 | <i>Lablab purpureus</i>          | 1   |

| i   | ii  | iii |
|-----|---|-----|
| 146 | <i>Lagenaria siceraria</i>                  | 1   |
| 147 | <i>Lagerstoemia microcarpa</i>              | 1   |
| 148 | <i>Lantana camara</i> var. <i>aculeata</i>  | 2   |
| 149 | <i>Lantana indica</i>                       | 1   |
| 150 | <i>Leptadenia reticulata</i>                | 1   |
| 151 | <i>Leucas aspera</i>                        | 2   |
| 152 | <i>Limonia acidissima</i>                   | 1   |
| 153 | <i>Litsea stocksii</i>                      | 1   |
| 154 | <i>Lobelia nicotianifolia</i>               | 1   |
| 155 | <i>Luffa cylindrica</i>                     | 1   |
| 156 | <i>Lycopersicon esculentum</i>              | 1   |
| 157 | <i>Mallotus philippensis</i>                | 2   |
| 158 | <i>Mangifera indica</i>                     | 2   |
| 159 | <i>Momordica charantia</i>                  | 1   |
| 160 | <i>Morinda pubescens</i>                    | 2   |
| 161 | <i>Moringa pterygosperma</i>                | 2   |
| 162 | <i>Mucuna pruriens</i>                      | 1   |
| 163 | <i>Mukia madraspatana</i>                   | 1   |
| 164 | <i>Mundulea sericea</i>                     | 1   |
| 165 | <i>Murraya koenigii</i>                     | 1   |
| 166 | <i>Mussaenda frondosa</i>                   | 1   |
| 167 | <i>Naravelia zeylanica</i>                  | 1   |
| 168 | <i>Naringi crenulata</i>                    | 1   |
| 169 | <i>Ocimum americanum</i>                    | 1   |
| 170 | <i>Ocimum basilicum</i>                     | 1   |
| 171 | <i>Ocimum gratissimum</i>                   | 1   |
| 172 | <i>Ocimum tenuiflorum</i>                   | 1   |
| 173 | <i>Opuntia striata</i> var. <i>dillenii</i> | 1   |
| 174 | <i>Oryza sativa</i>                         | 1   |
| 175 | <i>Oxalis corniculata</i>                   | 1   |
| 176 | <i>Palaquim ellipticum</i>                  | 1   |
| 177 | <i>Panicum sumatrense</i>                   | 1   |
| 178 | <i>Parahemionitis cordata</i>               | 1   |
| 179 | <i>Paspalam scorbiculatum</i>               | 1   |
| 180 | <i>Passiflora foetida</i>                   | 1   |
| 181 | <i>Pennisetum americanum</i>                | 1   |
| 182 | <i>Pentanema indicum</i>                    | 1   |
| 183 | <i>Pergularia daemia</i>                    | 1   |
| 184 | <i>Phoenix loureiroi</i>                    | 1   |
| 185 | <i>Phyllanthus amarus</i>                   | 1   |
| 186 | <i>Phyllanthus emblica</i>                  | 3   |
| 187 | <i>Pimpinella heyneana</i>                  | 1   |
| 188 | <i>Piper longum</i>                         | 2   |
| 189 | <i>Pithecellobium dulce</i>                 | 1   |
| 190 | <i>Pleiospermium alatum</i>                 | 1   |
| 191 | <i>Plumbago zeylanica</i>                   | 1   |
| 192 | <i>Pongamia pinnata</i>                     | 2   |
| 193 | <i>Premna corymbosa</i>                     | 2   |
| 194 | <i>Premna tomentosa</i>                     | 2   |
| 195 | <i>Prosopis juliflora</i>                   | 2   |

| i   | ii                              | iii |
|-----|---------------------------------|-----|
| 196 | <i>Protasparagus racemosus</i>  | 1   |
| 197 | <i>Pseudarthria viscida</i>     | 2   |
| 198 | <i>Psydrax umbellata</i>        | 1   |
| 199 | <i>Pterocarpus marsupium</i>    | 5   |
| 200 | <i>Pterolobium hexapetalum</i>  | 1   |
| 201 | <i>Rauvolfia serpentina</i>     | 1   |
| 202 | <i>Ricinus communis</i>         | 1   |
| 203 | <i>Rubia cordifolia</i>         | 1   |
| 204 | <i>Sanseveria roxburghiana</i>  | 2   |
| 205 | <i>Santalum album</i>           | 1   |
| 206 | <i>Sapindus trifoliata</i>      | 2   |
| 207 | <i>Schumannianthus virgatus</i> | 1   |
| 208 | <i>Scoparia dulcis</i>          | 1   |
| 209 | <i>Secamone emetica</i>         | 1   |
| 210 | <i>Selaginella delicatula</i>   | 1   |
| 211 | <i>Senna auriculata</i>         | 1   |
| 212 | <i>Senna occidentalis</i>       | 1   |
| 213 | <i>Senna tora</i>               | 1   |
| 214 | <i>Sesamum orientale</i>        | 1   |
| 215 | <i>Sida acuta</i>               | 1   |
| 216 | <i>Sida alnifolia</i>           | 1   |
| 217 | <i>Solanum americanum</i>       | 1   |
| 218 | <i>Solanum incanum</i>          | 1   |
| 219 | <i>Solanum torvum</i>           | 1   |
| 220 | <i>Solanum violaceum</i>        | 1   |
| 221 | <i>Sorghum bicolor</i>          | 1   |
| 222 | <i>Spermacoce hispida</i>       | 1   |
| 223 | <i>Sterculia guttata</i>        | 2   |
| 224 | <i>Streblus asper</i>           | 1   |
| 225 | <i>Strobilanthus ciliatus</i>   | 1   |
| 226 | <i>Strychnos nux-vomica</i>     | 1   |
| 227 | <i>Strychnos potatorum</i>      | 3   |
| 228 | <i>Syzigium cumini</i>          | 1   |
| 229 | <i>Tamarindus indica</i>        | 4   |
| 230 | <i>Tarenna asiatica</i>         | 2   |
| 231 | <i>Tectona grandis</i>          | 3   |
| 232 | <i>Tephrosia purpurea</i>       | 2   |
| 233 | <i>Terminalia chebula</i>       | 2   |
| 234 | <i>Terminalia cuneata</i>       | 2   |
| 235 | <i>Themeda triandra</i>         | 1   |
| 236 | <i>Thespesia lampas</i>         | 1   |
| 237 | <i>Thottea siliquosa</i>        | 1   |
| 238 | <i>Toddalia asiatica</i>        | 1   |
| 239 | <i>Tragia involucrata</i>       | 1   |
| 240 | <i>Trewia nudiflora</i>         | 1   |
| 241 | <i>Tribulus terrestris</i>      | 3   |
| 242 | <i>Trichodesma indicum</i>      | 1   |
| 243 | <i>Tridax procumbens</i>        | 1   |
| 244 | <i>Vateria indica</i>           | 1   |
| 245 | <i>Vernonia divergens</i>       | 1   |

| i   | ii  | iii |
|-----|---|-----|
| 246 | <i>Vigna mungo</i>                              | 1   |
| 247 | <i>Vigna radiata</i> var. <i>sublobata</i>      | 1   |
| 248 | <i>Vigna unguiculata</i> ssp. <i>ungiculata</i> | 1   |
| 249 | <i>Vigna unguiculata</i> ssp. <i>cylindrica</i> | 1   |
| 250 | <i>Vitex altissima</i>                          | 2   |
| 251 | <i>Wattakaka volubilis</i>                      | 1   |
| 252 | <i>Wrightia tinctoria</i>                       | 1   |
| 253 | <i>Zea mays</i>                                 | 2   |
| 254 | <i>Ziziphus mauritiana</i>                      | 1   |
| 255 | <i>Ziziphus oenoplia</i>                        | 1   |
| 256 | <i>Ziziphus rugosa</i>                          | 1   |

**Appendix – 3. Plant parts used**

| SI.No. | Species                                | 1   | 2  | 3 | 4  | 5   | 6    | 7  | 8 | 9  | 10  | 11   |
|--------|--|-----|----|---|----|-----|------|----|---|----|-----|------|
| i      | ii                                     | iii | iv | v | vi | vii | viii | ix | x | xi | xii | xiii |
| 1      | <i>Abrus precatorius</i>               | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 2      | <i>Abutilon hirtum</i>                 | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 3      | <i>Acacia chundra</i>                  | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 4      | <i>Acacia leucophloea</i>              | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 5      | <i>Acacia nilotica</i>                 | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 6      | <i>Acacia pennata</i>                  | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 7      | <i>Acacia sinuata</i>                  | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 8      | <i>Acalypha alnifolia</i>              | +   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 9      | <i>Achyranthes aspera</i>              | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 10     | <i>Actinopterus radiata</i>            | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 11     | <i>Aegle marmelos</i>                  | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 12     | <i>Ageratum conyzoides</i>             | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 13     | <i>Albizia amara</i>                   | +   | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 14     | <i>Albizia odoratissima</i>            | -   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 15     | <i>Aloe vera</i>                       | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 16     | <i>Amaranthus caudatus</i>             | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 17     | <i>Amaranthus spinosus</i>             | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 18     | <i>Amaranthus viridis</i>              | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 19     | <i>Andrographis paniculata</i>         | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 20     | <i>Angiopterus evecta</i>              | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 21     | <i>Anogeissus latifolia</i>            | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 22     | <i>Areca catechu</i>                   | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 23     | <i>Argemone mexicanum</i>              | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    |
| 24     | <i>Aristolochia indica</i>             | +   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 25     | <i>Atalantia monophylla</i>            | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 26     | <i>Azadirachta indica</i>              | +   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 27     | <i>Baccaurea courtallensis</i>         | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 28     | <i>Balanophora fungosa ssp. indica</i> | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 29     | <i>Bambusa bambos</i>                  | +   | +  | - | -  | -   | +    | -  | - | -  | +   | -    |
| 30     | <i>Basella alba</i>                    | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 31     | <i>Bauhinia racemosa</i>               | +   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 32     | <i>Benkara malabarica</i>              | -   | +  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 33     | <i>Biophytum reinwardtii</i>           | -   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 34     | <i>Blepharis maderaspatensis</i>       | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 35     | <i>Blumea mollis</i>                   | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 36     | <i>Boerhavia diffusa</i>               | +   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 37     | <i>Brassica juncea</i>                 | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 38     | <i>Breynia retusa</i>                  | -   | +  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 39     | <i>Bridelia retusa</i>                 | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 40     | <i>Bridelia scandens</i>               | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 41     | <i>Buchanania lanzan</i>               | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 42     | <i>Butea monosperma</i>                | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |

| i  | ii                                 | iii | iv | v | vi | vii | viii | ix | x | xi | xii | xiii |
|----|------------------------------------|-----|----|---|----|-----|------|----|---|----|-----|------|
| 43 | <i>Cajanus cajan</i>               | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 44 | <i>Calotropis gigantea</i>         | +   | -  | - | +  | -   | -    | -  | - | -  | -   | -    |
| 45 | <i>Canarium strictum</i>           | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    |
| 46 | <i>Cannabis sativa ssp. indica</i> | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 47 | <i>Canthium coromandelicum</i>     | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 48 | <i>Capparis zeylanica</i>          | -   | +  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 49 | <i>Capsicum frutescens</i>         | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 50 | <i>Caralluma attenuata</i>         | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 51 | <i>Cardiospermum halicacabum</i>   | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 52 | <i>Carissa carandas</i>            | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 53 | <i>Carmona retusa</i>              | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 54 | <i>Cassia fistula</i>              | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 55 | <i>Cassine albens</i>              | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 56 | <i>Casuarina litorea</i>           | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 57 | <i>Celastrus paniculatus</i>       | +   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 58 | <i>Celosia argentea</i>            | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 59 | <i>Celosia polygonoides</i>        | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 60 | <i>Centella asiatica</i>           | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 61 | <i>Cereus pterogonus</i>           | -   | +  | - | +  | -   | -    | -  | - | -  | -   | -    |
| 62 | <i>Chenopodium ambrosioides</i>    | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 63 | <i>Chloroxylon swietenia</i>       | +   | -  | + | -  | -   | -    | -  | - | -  | +   | -    |
| 64 | <i>Chromolaena odorata</i>         | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 65 | <i>Cinnamomum macrocarpum</i>      | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 66 | <i>Cissus quadrangularis</i>       | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 67 | <i>Citrullus colocynthis</i>       | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 68 | <i>Citrus aurantifolia</i>         | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 69 | <i>Clausena austroindica</i>       | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 70 | <i>Clematis gouriana</i>           | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 71 | <i>Clerodendrum phlomidis</i>      | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 72 | <i>Clerodendrum serratum</i>       | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 73 | <i>Clerodendrum viscosum</i>       | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 74 | <i>Clitoria ternatea</i>           | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 75 | <i>Coccinia grandis</i>            | -   | +  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 76 | <i>Cocos nucifera</i>              | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 77 | <i>Commelina benghalensis</i>      | +   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 78 | <i>Commiphora caudata</i>          | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 79 | <i>Corbichonia decumbens</i>       | -   | -  | - | -  | -   | -    | +  | - | -  | -   | +    |
| 80 | <i>Cordia wallichii</i>            | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 81 | <i>Costus speciosus</i>            | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 82 | <i>Cucumis sativus</i>             | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 83 | <i>Cucurbita maxima</i>            | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 84 | <i>Cullenia exarillata</i>         | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 85 | <i>Curculigo orchioides</i>        | -   | -  | - | -  | -   | -    | -  | - | +  | -   | -    |
| 86 | <i>Cycas circinalis</i>            | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 87 | <i>Cyclea peltata</i>              | -   | -  | - | -  | -   | -    | +  | - | -  | -   | +    |

| i   | ii  | iii | iv | v | vi | vii | viii | ix | x | xi | xii | xiii |
|-----|---|-----|----|---|----|-----|------|----|---|----|-----|------|
| 88  | <i>Cymbopogon flexuosus</i>                         | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 89  | <i>Cynodon dactylon</i>                             | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 90  | <i>Cyperus malaccensis</i>                          | -   | -  | - | -  | -   | -    | -  | + | -  | -   | -    |
| 91  | <i>Cyperus rotundus</i>                             | -   | -  | - | -  | -   | -    | -  | + | -  | -   | -    |
| 92  | <i>Dalbergia lanceolaria</i> ssp. <i>paniculata</i> | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 93  | <i>Dalbergia latifolia</i>                          | -   | -  | + | -  | -   | -    | -  | - | -  | +   | -    |
| 94  | <i>Datura metel</i>                                 | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 95  | <i>Dendrocalamus strictus</i>                       | -   | +  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 96  | <i>Desmodium gangeticum</i>                         | +   | -  | - | -  | -   | -    | -  | + | -  | -   | -    |
| 97  | <i>Desmodium triangulare</i>                        | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 98  | <i>Desmodium triflorum</i>                          | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 99  | <i>Desmodium triquetrum</i>                         | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 100 | <i>Desmostachya bipinnata</i>                       | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 101 | <i>Dillenia pentagyna</i>                           | -   | -  | - | -  | -   | -    | -  | + | -  | -   | -    |
| 102 | <i>Dioscorea oppositifolia</i>                      | -   | -  | - | -  | -   | -    | -  | + | -  | -   | -    |
| 103 | <i>Dioscorea pentaphylla</i>                        | -   | -  | - | -  | -   | -    | -  | + | -  | -   | -    |
| 104 | <i>Dioscorea tomentosa</i>                          | -   | -  | - | -  | -   | -    | -  | + | -  | -   | -    |
| 105 | <i>Dioscorea wallichii</i>                          | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 106 | <i>Diospyros montana</i>                            | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 107 | <i>Diplazium esculentum</i>                         | +   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 108 | <i>Dodonaea viscosa</i>                             | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 109 | <i>Drynaria quercifolia</i>                         | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 110 | <i>Eclipta prostrata</i>                            | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 111 | <i>Elephantopus scaber</i>                          | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 112 | <i>Eleusine coracana</i>                            | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 113 | <i>Embelia tsjeriam-cottam</i>                      | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 114 | <i>Entada rheedii</i>                               | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 115 | <i>Equisetum ramosissimum</i>                       | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 116 | <i>Erythroxyllum monogynum</i>                      | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 117 | <i>Euphorbia hirta</i>                              | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    |
| 118 | <i>Euphorbia thymifolia</i>                         | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 119 | <i>Evolvulus alsinoides</i>                         | -   | -  | + | -  | -   | -    | -  | - | -  | +   | -    |
| 120 | <i>Ficus exasperata</i>                             | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 121 | <i>Ficus hispida</i>                                | -   | -  | + | -  | +   | -    | -  | - | -  | -   | -    |
| 122 | <i>Ficus racemosa</i>                               | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 123 | <i>Ficus religiosa</i>                              | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 124 | <i>Flacourtia indica</i>                            | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 125 | <i>Garcinia gummi-gutta</i>                         | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 126 | <i>Givotia moluccana</i>                            | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 127 | <i>Gloriosa superba</i>                             | +   | +  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 128 | <i>Glycosmis mauritiana</i>                         | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 129 | <i>Gmelina arborea</i>                              | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 130 | <i>Gossypium barbadense</i>                         | -   | +  | - | -  | +   | -    | +  | - | -  | -   | -    |
| 131 | <i>Grewia laevigata</i>                             | -   | -  | + | -  | +   | -    | -  | - | -  | +   | -    |
| 132 | <i>Grewia tiliifolia</i>                            | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |

| i   | ii  | iii | iv | v | vi | vii | viii | ix | x | xi | xii | xiii |
|-----|---|-----|----|---|----|-----|------|----|---|----|-----|------|
| 133 | <i>Grewia villosa</i>                       | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 134 | <i>Gymnema sylvestre</i>                    | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 135 | <i>Gynandropsis gynandra</i>                | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 136 | <i>Helicteres isora</i>                     | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 137 | <i>Hemidesmus indicus</i>                   | -   | -  | - | -  | -   | -    | -  | + | -  | -   | -    |
| 138 | <i>Holostemma ada-kodien</i>                | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 139 | <i>Homonoia riparia</i>                     | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 140 | <i>Hyptis suaveolens</i>                    | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 141 | <i>Ichnocarpus frutescens</i>               | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 142 | <i>Indigofera linnaei</i>                   | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 143 | <i>Jatropha curcas</i>                      | -   | +  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 144 | <i>Justicia tranquebariensis</i>            | +   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 145 | <i>Lablab purpureus</i>                     | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 146 | <i>Lagenaria siceraria</i>                  | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 147 | <i>Lagerstoemia microcarpa</i>              | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 148 | <i>Lantana camara</i> var. <i>aculeata</i>  | -   | +  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 149 | <i>Lantana indica</i>                       | +   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 150 | <i>Leptadenia reticulata</i>                | +   | -  | - | +  | -   | -    | -  | - | -  | -   | -    |
| 151 | <i>Leucas aspera</i>                        | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 152 | <i>Limonia acidissima</i>                   | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 153 | <i>Litsea stocksii</i>                      | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 154 | <i>Lobelia nicotianifolia</i>               | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 155 | <i>Luffa cylindrica</i>                     | +   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 156 | <i>Lycopersicon esculentum</i>              | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 157 | <i>Mallotus philippensis</i>                | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 158 | <i>Mangifera indica</i>                     | -   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 159 | <i>Momordica charantia</i>                  | -   | -  | + | -  | +   | -    | -  | - | -  | -   | -    |
| 160 | <i>Morinda pubescens</i>                    | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 161 | <i>Moringa pterygosperma</i>                | +   | -  | + | -  | +   | -    | -  | - | -  | -   | -    |
| 162 | <i>Mucuna pruriens</i>                      | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 163 | <i>Mukia madraspatana</i>                   | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 164 | <i>Mundulea sericea</i>                     | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 165 | <i>Murraya koenigii</i>                     | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 166 | <i>Mussaenda frondosa</i>                   | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 167 | <i>Naravelia zeylanica</i>                  | +   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 168 | <i>Naringi crenulata</i>                    | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 169 | <i>Ocimum americanum</i>                    | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 170 | <i>Ocimum basilicum</i>                     | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 171 | <i>Ocimum gratissimum</i>                   | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 172 | <i>Ocimum tenuiflorum</i>                   | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 173 | <i>Opuntia striata</i> var. <i>dillenii</i> | -   | -  | - | +  | +   | -    | -  | - | -  | -   | -    |
| 174 | <i>Oryza sativa</i>                         | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 175 | <i>Oxalis corniculata</i>                   | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 176 | <i>Palaquim ellipticum</i>                  | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 177 | <i>Panicum sumatrense</i>                   | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    |

| i   | ii                              | iii | iv | v | vi | vii | viii | ix | x | xi | xii | xiii |
|-----|---------------------------------|-----|----|---|----|-----|------|----|---|----|-----|------|
| 178 | <i>Parahemionitis cordata</i>   | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 179 | <i>Paspalum scorbiculatum</i>   | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 180 | <i>Passiflora foetida</i>       | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 181 | <i>Pennisetum americanum</i>    | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 182 | <i>Pentanema indicum</i>        | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 183 | <i>Pergularia daemia</i>        | +   | -  | - | +  | -   | -    | -  | - | -  | -   | -    |
| 184 | <i>Phoenix loureiroi</i>        | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 185 | <i>Phyllanthus amarus</i>       | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 186 | <i>Phyllanthus emblica</i>      | -   | -  | + | -  | +   | -    | -  | - | -  | -   | -    |
| 187 | <i>Pimpinella heyneana</i>      | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 188 | <i>Piper longum</i>             | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 189 | <i>Pithecellobium dulce</i>     | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 190 | <i>Pleiospermium alatum</i>     | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 191 | <i>Plumbago zeylanica</i>       | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 192 | <i>Pongamia pinnata</i>         | -   | +  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 193 | <i>Premna corymbosa</i>         | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 194 | <i>Premna tomentosa</i>         | -   | -  | + | -  | -   | -    | -  | - | -  | +   | -    |
| 195 | <i>Prosopis juliflora</i>       | -   | -  | - | -  | +   | -    | -  | - | -  | +   | -    |
| 196 | <i>Protasparagus racemosus</i>  | -   | -  | - | -  | -   | -    | -  | - | +  | -   | -    |
| 197 | <i>Pseudarthria viscida</i>     | +   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 198 | <i>Psydrax umbellata</i>        | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 199 | <i>Pterocarpus marsupium</i>    | -   | -  | - | +  | -   | -    | -  | - | -  | +   | -    |
| 200 | <i>Pterolobium hexapetalum</i>  | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 201 | <i>Rauvolfia serpentina</i>     | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 202 | <i>Ricinus communis</i>         | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 203 | <i>Rubia cordifolia</i>         | -   | +  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 204 | <i>Sanseveria roxburghiana</i>  | +   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 205 | <i>Santalum album</i>           | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 206 | <i>Sapindus trifoliata</i>      | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 207 | <i>Schumannianthus virgatus</i> | -   | -  | - | -  | -   | -    | -  | - | +  | -   | -    |
| 208 | <i>Scoparia dulcis</i>          | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 209 | <i>Secamone emetica</i>         | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 210 | <i>Selaginella delicatula</i>   | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 211 | <i>Senna auriculata</i>         | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 212 | <i>Senna occidentalis</i>       | +   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 213 | <i>Senna tora</i>               | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 214 | <i>Sesamum orientale</i>        | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 215 | <i>Sida acuta</i>               | +   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 216 | <i>Sida alnifolia</i>           | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 217 | <i>Solanum americanum</i>       | +   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 218 | <i>Solanum incanum</i>          | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 219 | <i>Solanum torvum</i>           | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 220 | <i>Solanum violaceum</i>        | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 221 | <i>Sorghum bicolor</i>          | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 222 | <i>Spermacoce hispida</i>       | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |

| i   | ii  | iii | iv | v | vi | vii | viii | ix | x | xi | xii | xiii |
|-----|---|-----|----|---|----|-----|------|----|---|----|-----|------|
| 223 | <i>Sterculia guttata</i>                  | -   | -  | + | -  | -   | +    | -  | - | -  | -   | -    |
| 224 | <i>Streblus asper</i>                     | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 225 | <i>Strobilanthus ciliatus</i>             | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 226 | <i>Strychnos nux-vomica</i>               | -   | -  | + | -  | +   | -    | -  | - | -  | -   | -    |
| 227 | <i>Strychnos potatorum</i>                | -   | -  | - | -  | +   | -    | -  | - | -  | +   | -    |
| 228 | <i>Syzygium cumini</i>                    | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 229 | <i>Tamarindus indica</i>                  | -   | -  | - | -  | +   | -    | -  | - | -  | +   | -    |
| 230 | <i>Tarenna asiatica</i>                   | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 231 | <i>Tectona grandis</i>                    | +   | -  | + | -  | -   | -    | -  | - | -  | +   | -    |
| 232 | <i>Tephrosia purpurea</i>                 | +   | -  | - | -  | -   | -    | +  | - | -  | -   | +    |
| 233 | <i>Terminalia chebula</i>                 | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 234 | <i>Terminalia cuneata</i>                 | +   | -  | + | -  | -   | -    | -  | - | -  | -   | -    |
| 235 | <i>Themeda triandra</i>                   | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 236 | <i>Thespesia lampas</i>                   | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 237 | <i>Thottea siliquosa</i>                  | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 238 | <i>Toddalia asiatica</i>                  | +   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 239 | <i>Tragia involucrata</i>                 | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 240 | <i>Trewia nudiflora</i>                   | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    |
| 241 | <i>Tribulus terrestris</i>                | -   | -  | - | -  | +   | -    | +  | - | -  | -   | -    |
| 242 | <i>Trichodesma indicum</i>                | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 243 | <i>Tridax procumbens</i>                  | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 244 | <i>Vateria indica</i>                     | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    |
| 245 | <i>Vernonia divergens</i>                 | +   | -  | - | -  | -   | -    | -  | - | -  | -   | +    |
| 246 | <i>Vigna mungo</i>                        | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 247 | <i>Vigna radiata var. sublobata</i>       | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    |
| 248 | <i>Vigna unguiculata ssp. unguiculata</i> | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    |
| 249 | <i>Vigna unguiculata ssp. cylindrica</i>  | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 250 | <i>Vitex altissima</i>                    | -   | -  | + | -  | -   | -    | -  | - | -  | +   | -    |
| 251 | <i>Wattakaka volubilis</i>                | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    |
| 252 | <i>Wrightia tinctoria</i>                 | -   | +  | - | +  | -   | -    | -  | - | -  | -   | -    |
| 253 | <i>Zea mays</i>                           | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 254 | <i>Ziziphus mauritiana</i>                | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 255 | <i>Ziziphus oenoplia</i>                  | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |
| 256 | <i>Ziziphus rugosa</i>                    | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    |

1 = Leaves, 2 = Shoots, 3 = Bark, 4 = Exudates, 5 = Fruits, 6 = Seeds, 7 = Roots, 8 = Root tubers, 9 = Rhizomes, 10 = Wood, 11 = Whole plant

Appendix 4. Tribe-wise representation of ethnobotanical species

| SI.No. | Species                                       | Irula | Kurumba | Muduga |
|--------|---|-------|---------|--------|
| i      | ii  | iii   | iv      | v      |
| 1      | <i>Abrus precatorius</i>                      | +     | -       | -      |
| 2      | <i>Abutilon hirtum</i>                        | +     | -       | -      |
| 3      | <i>Acacia chundra</i>                         | +     | -       | -      |
| 4      | <i>Acacia leucophloea</i>                     | +     | -       | -      |
| 5      | <i>Acacia nilotica</i>                        | +     | -       | -      |
| 6      | <i>Acacia pennata</i>                         | +     | +       | +      |
| 7      | <i>Acacia sinuata</i>                         | +     | +       | +      |
| 8      | <i>Acalypha alnifolia</i>                     | +     | -       | -      |
| 9      | <i>Achyranthes aspera</i>                     | +     | +       | +      |
| 10     | <i>Actinopteris radiata</i>                   | +     | -       | -      |
| 11     | <i>Aegle marmelos</i>                         | +     | +       | +      |
| 12     | <i>Ageratum conyzoides</i>                    | +     | -       | -      |
| 13     | <i>Albizia amara</i>                          | -     | -       | +      |
| 14     | <i>Albizia odoratissima</i>                   | +     | -       | -      |
| 15     | <i>Aloe vera</i>                              | +     | +       | +      |
| 16     | <i>Amaranthus caudatus</i>                    | +     | +       | +      |
| 17     | <i>Amaranthus spinosus</i>                    | +     | +       | +      |
| 18     | <i>Amaranthus viridis</i>                     | +     | -       | -      |
| 19     | <i>Andrographis paniculata</i>                | +     | +       | +      |
| 20     | <i>Angiopteris evecta</i>                     | +     | -       | -      |
| 21     | <i>Anogeissus latifolia</i>                   | -     | +       | +      |
| 22     | <i>Areca catechu</i>                          | +     | -       | -      |
| 23     | <i>Argemone mexicana</i>                      | +     | -       | +      |
| 24     | <i>Aristolochia indica</i>                    | +     | -       | -      |
| 25     | <i>Atalantia monophylla</i>                   | +     | +       | +      |
| 26     | <i>Azadirachta indica</i>                     | -     | -       | +      |
| 27     | <i>Baccaurea courtallensis</i>                | -     | +       | -      |
| 28     | <i>Balanophora fungosa</i> ssp. <i>indica</i> | +     | +       | +      |
| 29     | <i>Bambusa bambos</i>                         | +     | -       | -      |
| 30     | <i>Basella alba</i>                           | +     | +       | -      |
| 31     | <i>Bauhinia racemosa</i>                      | +     | -       | -      |
| 32     | <i>Benkara malabarica</i>                     | -     | -       | +      |
| 33     | <i>Biophytum reinwardtii</i>                  | +     | -       | -      |
| 34     | <i>Blepharis maderaspatensis</i>              | -     | -       | +      |
| 35     | <i>Blumea mollis</i>                          | +     | -       | -      |
| 36     | <i>Boerhavia diffusa</i>                      | -     | +       | -      |
| 37     | <i>Brassica juncea</i>                        | +     | -       | +      |
| 38     | <i>Breynia retusa</i>                         | +     | -       | -      |
| 39     | <i>Bridelia retusa</i>                        | +     | -       | +      |
| 40     | <i>Bridelia scandens</i>                      | +     | -       | +      |
| 41     | <i>Buchanania lanzan</i>                      | +     | -       | -      |
| 42     | <i>Butea monosperma</i>                       | +     | +       | +      |
| 43     | <i>Cajanus cajan</i>                          | +     | -       | +      |
| 44     | <i>Calotropis gigantea</i>                    | -     | +       | +      |
| 45     | <i>Canarium strictum</i>                      | +     | +       | +      |
| 46     | <i>Cannabis sativa</i> ssp. <i>indica</i>     | +     | -       | +      |

| i  | ii  | iii | iv | v |
|----|---|-----|----|---|
| 47 | <i>Canthium coromandelicum</i>                      | +   | -  | - |
| 48 | <i>Capparis zeylanica</i>                           | -   | -  | + |
| 49 | <i>Capsicum frutescens</i>                          | +   | -  | - |
| 50 | <i>Caralluma attenuata</i>                          | +   | -  | - |
| 51 | <i>Cardiospermum halicacabum</i>                    | +   | -  | - |
| 52 | <i>Carissa carandas</i>                             | +   | -  | - |
| 53 | <i>Carmona retusa</i>                               | +   | +  | + |
| 54 | <i>Cassia fistula</i>                               | +   | -  | - |
| 55 | <i>Cassine albens</i>                               | +   | -  | - |
| 56 | <i>Casuarina litorea</i>                            | +   | +  | - |
| 57 | <i>Celastrus paniculatus</i>                        | +   | +  | + |
| 58 | <i>Celosia argentea</i>                             | +   | -  | - |
| 59 | <i>Celosia polygonoides</i>                         | +   | -  | - |
| 60 | <i>Centella asiatica</i>                            | +   | -  | - |
| 61 | <i>Cereus pterogonus</i>                            | +   | +  | + |
| 62 | <i>Chenopodium ambrosioides</i>                     | +   | -  | - |
| 63 | <i>Chloroxylon swietenia</i>                        | +   | +  | + |
| 64 | <i>Chromolaena odorata</i>                          | -   | +  | + |
| 65 | <i>Cinnamomum macrocarpum</i>                       | +   | -  | - |
| 66 | <i>Cissus quadrangularis</i>                        | +   | -  | - |
| 67 | <i>Citrullus colocynthis</i>                        | +   | +  | + |
| 68 | <i>Citrus aurantifolia</i>                          | +   | -  | - |
| 69 | <i>Clausena austroindica</i>                        | -   | +  | + |
| 70 | <i>Clematis gouriana</i>                            | +   | -  | - |
| 71 | <i>Clerodendrum phlomidis</i>                       | -   | -  | + |
| 72 | <i>Clerodendrum serratum</i>                        | -   | +  | + |
| 73 | <i>Clerodendrum viscosum</i>                        | +   | -  | - |
| 74 | <i>Clitoria ternatea</i>                            | +   | -  | + |
| 75 | <i>Coccinia grandis</i>                             | -   | -  | - |
| 76 | <i>Cocos nucifera</i>                               | +   | -  | - |
| 77 | <i>Commelina benghalensis</i>                       | +   | -  | - |
| 78 | <i>Commiphora caudata</i>                           | +   | -  | - |
| 79 | <i>Corbichonia decumbens</i>                        | -   | -  | + |
| 80 | <i>Cordia wallichii</i>                             | -   | -  | + |
| 81 | <i>Costus speciosus</i>                             | +   | +  | + |
| 82 | <i>Cucumis sativus</i>                              | +   | +  | + |
| 83 | <i>Cucurbita maxima</i>                             | -   | +  | + |
| 84 | <i>Cullenia exarillata</i>                          | +   | +  | + |
| 85 | <i>Curculigo orchoides</i>                          | +   | -  | - |
| 86 | <i>Cycas circinalis</i>                             | +   | +  | + |
| 87 | <i>Cyclea peltata</i>                               | -   | +  | + |
| 88 | <i>Cymbopogon flexuosus</i>                         | +   | +  | + |
| 89 | <i>Cynodon dactylon</i>                             | +   | -  | - |
| 90 | <i>Cyperus malaccensis</i>                          | -   | -  | + |
| 91 | <i>Cyperus rotundus</i>                             | +   | -  | - |
| 92 | <i>Dalbergia lanceolaria</i> ssp. <i>paniculata</i> | -   | -  | + |
| 93 | <i>Dalbergia latifolia</i>                          | -   | -  | + |
| 94 | <i>Datura metel</i>                                 | +   | -  | - |
| 95 | <i>Dendrocalamus strictus</i>                       | -   | +  | + |
| 96 | <i>Desmodium gangeticum</i>                         | -   | -  | + |

| i   | ii                               | iii | iv | v |
|-----|----------------------------------|-----|----|---|
| 97  | <i>Desmodium triangulare</i>     | +   | -  | - |
| 98  | <i>Desmodium triflorum</i>       | +   | -  | - |
| 99  | <i>Desmodium triquetrum</i>      | -   | +  | + |
| 100 | <i>Desmostachya bipinnata</i>    | +   | +  | + |
| 101 | <i>Dillenia pentagyna</i>        | +   | +  | + |
| 102 | <i>Dioscorea oppositifolia</i>   | -   | +  | + |
| 103 | <i>Dioscorea pentaphylla</i>     | -   | +  | + |
| 104 | <i>Dioscorea tomentosa</i>       | +   | -  | - |
| 105 | <i>Dioscorea wallichii</i>       | +   | +  | + |
| 106 | <i>Diospyros montana</i>         | +   | -  | - |
| 107 | <i>Diplazium esculentum</i>      | +   | -  | - |
| 108 | <i>Dodonaea viscosa</i>          | -   | -  | + |
| 109 | <i>Drynaria quercifolia</i>      | -   | -  | + |
| 110 | <i>Eclipta prostrata</i>         | +   | +  | + |
| 111 | <i>Elephantopus scaber</i>       | -   | -  | + |
| 112 | <i>Eleusine coracana</i>         | -   | -  | + |
| 113 | <i>Embelia tsjeriam-cottam</i>   | -   | -  | + |
| 114 | <i>Entada rheedii</i>            | +   | -  | - |
| 115 | <i>Equisetum ramosissimum</i>    | +   | -  | - |
| 116 | <i>Erythroxylum monogynum</i>    | +   | +  | + |
| 117 | <i>Euphorbia hirta</i>           | +   | -  | - |
| 118 | <i>Euphorbia thymifolia</i>      | +   | -  | - |
| 119 | <i>Evolvulus alsinoides</i>      | -   | -  | + |
| 120 | <i>Ficus exasperata</i>          | +   | -  | + |
| 121 | <i>Ficus hispida</i>             | +   | +  | + |
| 122 | <i>Ficus racemosa</i>            | +   | -  | - |
| 123 | <i>Ficus religiosa</i>           | +   | -  | - |
| 124 | <i>Flacourtia indica</i>         | -   | +  | + |
| 125 | <i>Garcinia gummi-gutta</i>      | +   | -  | - |
| 126 | <i>Givotia moluccana</i>         | +   | -  | - |
| 127 | <i>Gloriosa superba</i>          | +   | -  | - |
| 128 | <i>Glycosmis mauritiana</i>      | -   | +  | + |
| 129 | <i>Gmelina arborea</i>           | +   | -  | - |
| 130 | <i>Gossypium barbadense</i>      | +   | -  | - |
| 131 | <i>Grewia laevigata</i>          | +   | +  | + |
| 132 | <i>Grewia tiliifolia</i>         | +   | -  | - |
| 133 | <i>Grewia villosa</i>            | +   | -  | - |
| 134 | <i>Gymnema sylvestre</i>         | +   | -  | - |
| 135 | <i>Gynandropsis gynandra</i>     | -   | +  | + |
| 136 | <i>Helicteres isora</i>          | +   | +  | + |
| 137 | <i>Hemidesmus indicus</i>        | -   | +  | + |
| 138 | <i>Holostemma ada-kodien</i>     | -   | +  | + |
| 139 | <i>Homonoia riparia</i>          | -   | -  | + |
| 140 | <i>Hyptis suaveolens</i>         | +   | -  | - |
| 141 | <i>Ichnocarpus frutescens</i>    | +   | -  | - |
| 142 | <i>Indigofera linnaei</i>        | +   | -  | - |
| 143 | <i>Jatropha curcas</i>           | +   | +  | + |
| 144 | <i>Justicia tranquebariensis</i> | +   | -  | - |
| 145 | <i>Lablab purpureus</i>          | +   | +  | + |
| 146 | <i>Lagenaria siceraria</i>       | +   | +  | + |

| i   | ii  | iii | iv | v |
|-----|---|-----|----|---|
| 147 | <i>Lagerstoemia microcarpa</i>              | -   | +  | + |
| 148 | <i>Lantana camara</i> var. <i>aculeata</i>  | +   | +  | + |
| 149 | <i>Lantana indica</i>                       | -   | -  | + |
| 150 | <i>Leptadenia reticulata</i>                | +   | -  | - |
| 151 | <i>Leucas aspera</i>                        | +   | -  | - |
| 152 | <i>Limonia acidissima</i>                   | +   | -  | - |
| 153 | <i>Litsea stocksii</i>                      | +   | -  | - |
| 154 | <i>Lobelia nicotianifolia</i>               | -   | -  | + |
| 155 | <i>Luffa cylindrica</i>                     | -   | -  | + |
| 156 | <i>Lycopersicon esculentum</i>              | +   | +  | + |
| 157 | <i>Mallotus philippensis</i>                | +   | -  | + |
| 158 | <i>Mangifera indica</i>                     | +   | +  | + |
| 159 | <i>Momordica charantia</i>                  | -   | -  | + |
| 160 | <i>Morinda pubescens</i>                    | +   | -  | - |
| 161 | <i>Moringa pterygosperma</i>                | +   | -  | - |
| 162 | <i>Mucuna pruriens</i>                      | +   | -  | + |
| 163 | <i>Mukia madraspatana</i>                   | -   | -  | + |
| 164 | <i>Mundulea sericea</i>                     | +   | -  | - |
| 165 | <i>Murraya koenigii</i>                     | +   | -  | + |
| 166 | <i>Mussaenda frondosa</i>                   | -   | -  | + |
| 167 | <i>Naravelia zeylanica</i>                  | +   | +  | + |
| 168 | <i>Naringi crenulata</i>                    | +   | -  | - |
| 169 | <i>Ocimum americanum</i>                    | +   | -  | - |
| 170 | <i>Ocimum basilicum</i>                     | +   | -  | - |
| 171 | <i>Ocimum gratissimum</i>                   | +   | -  | - |
| 172 | <i>Ocimum tenuiflorum</i>                   | +   | -  | - |
| 173 | <i>Opuntia striata</i> var. <i>dillenii</i> | +   | -  | - |
| 174 | <i>Oryza sativa</i>                         | +   | +  | + |
| 175 | <i>Oxalis corniculata</i>                   | +   | +  | + |
| 176 | <i>Palaquim ellipticum</i>                  | -   | +  | + |
| 177 | <i>Panicum sumatrense</i>                   | +   | +  | + |
| 178 | <i>Parahemionitis cordata</i>               | +   | -  | - |
| 179 | <i>Paspalum scorbiculatum</i>               | +   | +  | + |
| 180 | <i>Passiflora foetida</i>                   | +   | -  | - |
| 181 | <i>Pennisetum americanum</i>                | +   | +  | + |
| 182 | <i>Pentanema indicum</i>                    | +   | -  | - |
| 183 | <i>Pergularia daemia</i>                    | +   | -  | - |
| 184 | <i>Phoenix loureiroi</i>                    | +   | +  | + |
| 185 | <i>Phyllanthus amarus</i>                   | +   | +  | + |
| 186 | <i>Phyllanthus emblica</i>                  | +   | +  | + |
| 187 | <i>Pimpinella heyneana</i>                  | -   | +  | + |
| 188 | <i>Piper longum</i>                         | -   | -  | + |
| 189 | <i>Pithecellobium dulce</i>                 | +   | -  | - |
| 190 | <i>Pleiospermium alatum</i>                 | +   | -  | - |
| 191 | <i>Plumbago zeylanica</i>                   | +   | -  | - |
| 192 | <i>Pongamia pinnata</i>                     | +   | -  | - |
| 193 | <i>Premna corymbosa</i>                     | +   | -  | - |
| 194 | <i>Premna tomentosa</i>                     | +   | -  | - |
| 195 | <i>Prosopis juliflora</i>                   | +   | -  | - |
| 196 | <i>Protasparagus racemosus</i>              | -   | +  | + |

| i   | ii                              | iii | iv | v |
|-----|---------------------------------|-----|----|---|
| 197 | <i>Pseudarthria viscida</i>     | -   | +  | + |
| 198 | <i>Psydrax umbellata</i>        | +   | -  | - |
| 199 | <i>Pterocarpus marsupium</i>    | +   | +  | + |
| 200 | <i>Pterolobium hexapetalum</i>  | +   | -  | - |
| 201 | <i>Rauvolfia serpentina</i>     | -   | +  | + |
| 202 | <i>Ricinus communis</i>         | +   | +  | + |
| 203 | <i>Rubia cordifolia</i>         | -   | +  | + |
| 204 | <i>Sanseveria roxburghiana</i>  | +   | +  | - |
| 205 | <i>Santalum album</i>           | +   | -  | - |
| 206 | <i>Sapindus trifoliata</i>      | -   | -  | + |
| 207 | <i>Schumannianthus virgatus</i> | -   | -  | + |
| 208 | <i>Scoparia dulcis</i>          | +   | -  | - |
| 209 | <i>Secamone emetica</i>         | +   | -  | - |
| 210 | <i>Selaginella delicatula</i>   | -   | +  | - |
| 211 | <i>Senna auriculata</i>         | +   | -  | - |
| 212 | <i>Senna occidentalis</i>       | +   | -  | - |
| 213 | <i>Senna tora</i>               | +   | +  | + |
| 214 | <i>Sesamum orientale</i>        | +   | -  | - |
| 215 | <i>Sida acuta</i>               | +   | +  | + |
| 216 | <i>Sida alnifolia</i>           | -   | +  | + |
| 217 | <i>Solanum americanum</i>       | +   | +  | + |
| 218 | <i>Solanum incanum</i>          | +   | -  | - |
| 219 | <i>Solanum torvum</i>           | -   | +  | + |
| 220 | <i>Solanum violaceum</i>        | +   | -  | - |
| 221 | <i>Sorghum bicolor</i>          | +   | +  | + |
| 222 | <i>Spermacoce hispida</i>       | +   | -  | + |
| 223 | <i>Sterculia guttata</i>        | -   | +  | + |
| 224 | <i>Streblus asper</i>           | +   | -  | - |
| 225 | <i>Strobilanthus ciliatus</i>   | -   | +  | + |
| 226 | <i>Strychnos nux-vomica</i>     | +   | -  | - |
| 227 | <i>Strychnos potatorum</i>      | +   | -  | - |
| 228 | <i>Syzygium cumini</i>          | +   | +  | + |
| 229 | <i>Tamarindus indica</i>        | +   | -  | - |
| 230 | <i>Tarenna asiatica</i>         | +   | -  | - |
| 231 | <i>Tectona grandis</i>          | +   | +  | + |
| 232 | <i>Tephrosia purpurea</i>       | +   | -  | - |
| 233 | <i>Terminalia chebula</i>       | +   | -  | - |
| 234 | <i>Terminalia cuneata</i>       | +   | -  | - |
| 235 | <i>Themeda triandra</i>         | +   | -  | - |
| 236 | <i>Thespesia lampas</i>         | -   | -  | + |
| 237 | <i>Thottea siliquosa</i>        | -   | -  | + |
| 238 | <i>Toddalia asiatica</i>        | +   | -  | - |
| 239 | <i>Tragia involucrata</i>       | -   | +  | - |
| 240 | <i>Trewia nudiflora</i>         | +   | -  | - |
| 241 | <i>Tribulus terrestris</i>      | +   | -  | - |
| 242 | <i>Trichodesma indicum</i>      | +   | -  | - |
| 243 | <i>Tridax procumbens</i>        | +   | +  | + |
| 244 | <i>Vateria indica</i>           | -   | +  | + |
| 245 | <i>Vernonia divergens</i>       | +   | -  | + |
| 246 | <i>Vigna mungo</i>              | +   | -  | - |

| i   | ii  | iii | iv | v |
|-----|---|-----|----|---|
| 247 | <i>Vigna radiata</i> var. <i>sublobata</i>      | -   | -  | + |
| 248 | <i>Vigna unguiculata</i> ssp. <i>ungiculata</i> | +   | -  | - |
| 249 | <i>Vigna unguiculata</i> ssp. <i>cylindrica</i> | +   | +  | + |
| 250 | <i>Vitex altissima</i>                          | +   | -  | - |
| 251 | <i>Wattakaka volubilis</i>                      | +   | -  | - |
| 252 | <i>Wrightia tinctoria</i>                       | +   | -  | + |
| 253 | <i>Zea mays</i>                                 | +   | +  | + |
| 254 | <i>Ziziphus mauritiana</i>                      | +   | -  | - |
| 255 | <i>Ziziphus oenoplia</i>                        | -   | -  | + |
| 256 | <i>Ziziphus rugosa</i>                          | -   | +  | + |

**Appendix 5. Credibility rating for ethnomedicinal species**

| Sl. No. | Species                            | Usage                                | Single | Combination | Species used in Ayurveda | Credibility rating |
|---------|------------------------------------|--------------------------------------|--------|-------------|--------------------------|--------------------|
| i       | ii                                 | iii                                  | iv     | v           | vi                       | vii                |
| 1       | <i>Abrus precatorius</i>           | Stomach ache                         | +      | -           | +                        | II                 |
| 2       | <i>Abutilon hirtum</i>             | Piles                                | +      | -           | -                        | II                 |
| 3       | <i>Acacia nilotica</i>             | Tooth ache                           | +      | -           | +                        | V                  |
| 4       | <i>Acacia pennata</i>              | Migrain                              | +      | -           | -                        | III                |
| 5       | <i>Acalypha alnifolia</i>          | Boils                                | +      | -           | -                        | III                |
| 6       | <i>Achyranthes aspera</i>          | Asthma, limb pain                    | +      | -           | +                        | II                 |
| 7       | <i>Actinopteris radiata</i>        | Paediatrics                          | -      | +           | +                        | II                 |
| 8       | <i>Aegle marmelos</i>              | Anti-rheumatic                       | +      | -           | +                        | III                |
| 9       | <i>Ageratum conyzoides</i>         | Wound healing                        | +      | +           | -                        | V                  |
| 10      | <i>Albizia amara</i>               | Hair, body wash; veterinary medicine | +      | -           | -                        | V                  |
| 11      | <i>Albizia odoratissima</i>        | Antiemetic                           | +      | -           | +                        | II                 |
| 12      | <i>Aloe vera</i>                   | Stomach ache                         | +      | +           | +                        | II                 |
| 13      | <i>Andrographis paniculata</i>     | Anti poisonous                       | -      | +           | +                        | II                 |
| 14      | <i>Argemone mexicana</i>           | Veneral disease                      | +      | -           | +                        | VI                 |
| 15      | <i>Aristolochia indica</i>         | Tooth ache                           | +      | -           | +                        | I                  |
| 16      | <i>Atalantia monophylla</i>        | Itches, Heart burn                   | +      | -           | -                        | III                |
| 17      | <i>Azadirachta indica</i>          | Stomach ache, Chicken pox            | +      | +           | +                        | I                  |
| 18      | <i>Baccaurea courtallensis</i>     | Ulcer                                | +      | -           | -                        | II                 |
| 19      | <i>Basella alba</i>                | Indigestion                          | -      | +           | +                        | II                 |
| 20      | <i>Bauhinia racemosa</i>           | Maternity care                       | +      | -           | -                        | II                 |
| 21      | <i>Benkara malabarica</i>          | Sleeplessness                        | +      | -           | +                        | II                 |
| 22      | <i>Blepharis maderaspatensis</i>   | Boils                                | -      | +           | -                        | II                 |
| 23      | <i>Blumea mollis</i>               | Wound healing                        | -      | +           | -                        | V                  |
| 24      | <i>Boerhavia diffusa</i>           | Wound healing                        | +      | -           | +                        | III                |
| 25      | <i>Breynia retusa</i>              | Boils; veterinary medicine           | +      | -           | -                        | III                |
| 26      | <i>Bridelia scandens</i>           | Rheumatic pain                       | +      | -           | +                        | II                 |
| 27      | <i>Calotropis gigantea</i>         | Dog bite, Antipoisonous              | +      | +           | +                        | III                |
| 28      | <i>Cannabis sativa ssp. indica</i> | Stomach ache                         | -      | +           | +                        | II                 |
| 29      | <i>Canthium coromandelicum</i>     | Muscular pain                        | +      | -           | +                        | II                 |
| 31      | <i>Capsicum frutescens</i>         | Skin disease                         | -      | +           | -                        | II                 |
| 32      | <i>Caralluma attenuata</i>         | Piles                                | +      | +           | -                        | I                  |
| 33      | <i>Cardiospermum halicacabum</i>   | Pregnancy care                       | +      | -           | +                        | III                |
| 34      | <i>Celastrus paniculatus</i>       | Wound healing, Boils, Jaundice       | +      | +           | +                        | II                 |
| 35      | <i>Centella asiatica</i>           | Leucorrhoea                          | +      | -           | +                        | III                |
| 36      | <i>Chenopodium ambrosioides</i>    | Boils, Diarrhoea                     | +      | +           | +                        | III                |
| 37      | <i>Chloroxylon swietenia</i>       | Skin disease                         | +      | -           | -                        | II                 |
| 38      | <i>Chromolaena odorata</i>         | Body ache                            | +      | -           | -                        | II                 |
| 39      | <i>Citrullus colocynthis</i>       | Stomach bulging                      | +      | -           | +                        | III                |
| 40      | <i>Clematis gauriana</i>           | Blood cancer                         | -      | +           | -                        | II                 |
| 41      | <i>Clitoria ternatea</i>           | Jaundice                             | +      | -           | +                        | II                 |
| 42      | <i>Coccinia grandis</i>            | Obesity                              | +      | -           | +                        | II                 |
| 43      | <i>Commelina benghalensis</i>      | Insect bite, Piles                   | +      | +           | -                        | II                 |

| i  | ii  | iii  | iv | v | vi | vii |
|----|---|--|----|---|----|-----|
| 44 | <i>Corbichonia decumbens</i>                        | Migraine, Wound healing; veterinary medicine | +  | - | -  | II  |
| 45 | <i>Cordia wallichii</i>                             | Vermifuge                                    | +  | - | +  | II  |
| 46 | <i>Costus speciosus</i>                             | Fever  | +  | - | +  | II  |
| 47 | <i>Curculigo orchioides</i>                         | General debility, Antipoisonous              | +  | + | +  | II  |
| 48 | <i>Cycas circinalis</i>                             | Migraine, General health                     | -  | + | +  | II  |
| 49 | <i>Cyclea peltata</i>                               | Stomach pain                                 | +  | + | +  | I   |
| 50 | <i>Cymbopogon flexuosus</i>                         | Itches                                       | +  | - | +  | II  |
| 51 | <i>Cyperus malaccensis</i>                          | Scorpion sting                               | +  | - | +  | III |
| 52 | <i>Cyperus rotundus</i>                             | General health                               | -  | + | +  | II  |
| 53 | <i>Dalbergia lanceolaria</i> ssp. <i>paniculata</i> | Cold   | +  | - | -  | II  |
| 54 | <i>Dalbergia latifolia</i>                          | Blood cancer                                 | -  | + | +  | II  |
| 55 | <i>Datura metel</i>                                 | Migraine                                     | +  | - | +  | III |
| 56 | <i>Desmodium gangeticum</i>                         | Skin disease                                 | +  | - | +  | II  |
| 57 | <i>Desmodium triangulare</i>                        | Limb pain                                    | +  | - | -  | II  |
| 58 | <i>Desmodium triflorum</i>                          | Foot corns                                   | +  | - | +  | III |
| 59 | <i>Desmodium triquetrum</i>                         | Asthma                                       | +  | - | +  | II  |
| 60 | <i>Dodonaea viscosa</i>                             | Stomach obstruction; veterinary medicine     | +  | - | -  | II  |
| 61 | <i>Eclipta prostrata</i>                            | Hair growth                                  | +  | - | +  | II  |
| 62 | <i>Elephantopus scaber</i>                          | Erisepalasis                                 | -  | + | +  | II  |
| 63 | <i>Embelia acutipetalum</i>                         | Stomach obstruction                          | +  | - | +  | III |
| 64 | <i>Entada rheedii</i>                               | Back pain                                    | +  | - | -  | III |
| 65 | <i>Equisetum ramosissimum</i>                       | Wound healing                                | +  | - | -  | II  |
| 66 | <i>Erythroxylum monogynum</i>                       | Skin disease                                 | +  | - | -  | I   |
| 67 | <i>Euphorbia hirta</i>                              | Leucorrhoea                                  | -  | + | +  | II  |
| 68 | <i>Euphorbia thymifolia</i>                         | Wounds in the eye                            | +  | - | +  | II  |
| 69 | <i>Evolvulus alsinoides</i>                         | Erisepalasis                                 | -  | + | +  | II  |
| 70 | <i>Ficus exasperata</i>                             | Asthma                                       | -  | + | +  | II  |
| 71 | <i>Ficus racemosa</i>                               | Leucorrhoea, Anaemia                         | +  | + | +  | II  |
| 72 | <i>Ficus religiosa</i>                              | Scruf, Bee sting                             | +  | - | +  | II  |
| 73 | <i>Givotia moluccana</i>                            | Stomach ache, Piles                          | +  | - | -  | III |
| 74 | <i>Gloriosa superba</i>                             | Antipoisonous                                | -  | + | +  | III |
| 75 | <i>Glycosmis mauritiana</i>                         | Head ache, Skin disease, Stomach ache, Fever | +  | - | +  | II  |
| 76 | <i>Gossypium barbadense</i>                         | Pregnancy care                               | +  | - | +  | II  |
| 77 | <i>Grewia laevigata</i>                             | Boils  | +  | - | -  | II  |
| 78 | <i>Grewia tiliifolia</i>                            | Body wash                                    | +  | - | +  | V   |
| 79 | <i>Gymnema sylvestre</i>                            | Diabetes                                     | +  | - | +  | VI  |

| i   | ii                                   | iii  | iv | v | vi | vii |
|-----|--------------------------------------|--|----|---|----|-----|
| 80  | <i>Gynandropsis gynandra</i>         | Ear ache                                     | +  | - | -  | II  |
| 81  | <i>Helicteres isora</i>              | Diarrhoea,<br>Stomach disorders,<br>Vomiting | -  | + | +  | II  |
| 82  | <i>Hemidesmus indicus</i>            | Skin disease,<br>Ulcer, Deodorant            | +  | + | +  | II  |
| 83  | <i>Holostemma ada-kodien</i>         | Stomach pain                                 | +  | - | +  | III |
| 84  | <i>Homonoia riparia</i>              | Urinary troubles                             | +  | - | +  | II  |
| 85  | <i>Hyptis suaveolens</i>             | Skin disease,<br>Fever                       | +  | - | -  | II  |
| 86  | <i>Indigofera linnaei</i>            | Swellings, Rat bite; veterinary medicine     | +  | - | -  | II  |
| 87  | <i>Jatropha curcas</i>               | Tooth ache                                   | +  | - | +  | V   |
| 88  | <i>Justicia tranquebariensis</i>     | Conjunctivitis,<br>Inflammation in eyes      | +  | + | -  | VI  |
| 89  | <i>Lantana indica</i>                | Stomach pain                                 | +  | - | -  | II  |
| 90  | <i>Leptadenia reticulata</i>         | Back pain, Cold                              | +  | - | +  | I   |
| 91  | <i>Leucas aspera</i>                 | Mumps; veterinary medicine                   | -  | + | +  | II  |
| 92  | <i>Lobelia nicotianifolia</i>        | Psoriasis                                    | -  | + | -  | III |
| 93  | <i>Luffa cylindrica</i>              | Bronchial troubles                           | -  | + | +  | II  |
| 94  | <i>Mallotus philippensis</i>         | Pregnancy inducer                            | +  | - | +  | VI  |
| 95  | <i>Mangifera indica</i>              | Bronchial troubles                           | -  | + | +  | II  |
| 96  | <i>Momordica charantia</i>           | Vermifuge                                    | -  | + | +  | II  |
| 97  | <i>Moringa pterygosperma</i>         | Obesity                                      | +  | - | +  | III |
| 98  | <i>Mucuna pruriens</i>               | General debility                             | +  | - | +  | II  |
| 99  | <i>Mukia madraspatana</i>            | Indigestion                                  | +  | - | +  | III |
| 100 | <i>Murraya koenigii</i>              | Cough  | +  | - | +  | I   |
| 101 | <i>Mussaenda frondosa</i>            | Diarrhoea                                    | +  | - | +  | II  |
| 102 | <i>Naravelia zeylanica</i>           | Phlegm, Whooping cough, Limb pain            | +  | - | +  | VI  |
| 103 | <i>Ocimum basilicum</i>              | Veneral disease                              | +  | - | +  | II  |
| 104 | <i>Ocimum gratissimum</i>            | Fever  | -  | + | +  | II  |
| 105 | <i>Ocimum tenuiflorum</i>            | Asthma                                       | +  | - | +  | III |
| 106 | <i>Opuntia striata var. dillenii</i> | Sprain                                       | +  | - | -  | II  |
| 107 | <i>Parahemionitis cordata</i>        | Paediatrics                                  | -  | + | +  | II  |
| 108 | <i>Pentanema indicum</i>             | Cold   | +  | - | -  | III |
| 109 | <i>Pergularia daemia</i>             | Inflammation,<br>Cough, Fever,<br>Epilepsy   | +  | + | +  | V   |
| 110 | <i>Phyllanthus amarus</i>            | Jaundice                                     | +  | - | +  | II  |
| 111 | <i>Piper longum</i>                  | Tooth ache                                   | -  | + | +  | III |
| 112 | <i>Plumbago zeylanica</i>            | Foul Ulcer                                   | -  | + | +  | I   |
| 113 | <i>Pongamia pinnata</i>              | Absessions                                   | -  | + | +  | II  |
| 114 | <i>Protasparagus racemosus</i>       | Heart burn, urinary infection                | +  | - | +  | II  |
| 115 | <i>Pseudarthria viscida</i>          | Lactation                                    | +  | - | +  | II  |

| i   | ii   | iii   | iv | v | vi | vii |
|-----|--|---|----|---|----|-----|
| 30  | <i>Psydrax umbellata</i>                   | Maternity care  | +  | - | -  | II  |
| 116 | <i>Ricinus communis</i>                    | Maternity care  | +  | - | +  | III |
| 117 | <i>Rubia cordifolia</i>                    | Skin disease  | +  | - | +  | II  |
| 118 | <i>Sanseveria roxburghiana</i>             | Antipoisonous   | +  | - | -  | II  |
| 119 | <i>Santalum album</i>                      | Fever   | -  | + | +  | II  |
| 120 | <i>Schumannianthus virgatus</i>            | Muscle development                                      | +  | - | -  | II  |
| 121 | <i>Scoparia dulcis</i>                     | Boils   | +  | - | +  | II  |
| 122 | <i>Selaginella delicatula</i>              | Protuberance on skin                                    | -  | + | -  | I   |
| 123 | <i>Senna occidentalis</i>                  | Anti poisonous, Leucoderma                              | +  | - | +  | I   |
| 124 | <i>Senna tora</i>                          | Stomach obstruction, Heart burn                         | +  | - | +  | I   |
| 125 | <i>Spermacoce hispida</i>                  | General debility  | +  | + | +  | I   |
| 126 | <i>Sterculia guttata</i>                   | Maternity care  | -  | + | +  | II  |
| 127 | <i>Strychnos nux-vomica</i>                | Skin disease, Body ache                                 | +  | + | +  | III |
| 128 | <i>Tectona grandis</i>                     | Body pain, Maternity care                               | +  | - | +  | II  |
| 129 | <i>Tephrosia purpurea</i>                  | Tooth ache, Premature hair greying; veterinary medicine | +  | - | +  | II  |
| 130 | <i>Terminalia chebula</i>                  | Rheumatic pain  | -  | + | +  | II  |
| 131 | <i>Terminalia cuneata</i>                  | Dandruff, Stomach obstruction                           | +  | - | +  | II  |
| 132 | <i>Thespesia lampas</i>                    | Jaundice  | +  | - | +  | III |
| 133 | <i>Thottea siliquosa</i>                   | Epilepsy  | +  | - | -  | III |
| 134 | <i>Toddalia asiatica</i>                   | Stomach pain, Cold, Ulcer                               | +  | - | +  | II  |
| 135 | <i>Tragia involucrata</i>                  | Migraine  | +  | - | +  | II  |
| 136 | <i>Tribulus terrestris</i>                 | Stomach pain  | +  | - | +  | II  |
| 137 | <i>Trichodesma indicum</i>                 | Stomach pain  | +  | - | -  | III |
| 138 | <i>Tridax procumbens</i>                   | Wound healing   | +  | - | +  | I   |
| 139 | <i>Vernonia divergens</i>                  | Stomach pain  | +  | - | -  | I   |
| 140 | <i>Vigna radiata</i> var. <i>sublobata</i> | Tooth ache  | +  | - | +  | II  |
| 141 | <i>Vitex altissima</i>                     | Menstrual disorders                                     | +  | - | +  | III |
| 142 | <i>Wattakaka volubilis</i>                 | Sleeplessness   | +  | - | +  | III |

I. Collector uses or directly observed use; II. Informant uses or directly observed use; III. Informant bear/knew from a further source; IV. Use reported from the literature; V. Common knowledge; VI. Credibility of use information unknown

**Appendix 6. Credibility rating for non-ethnomedicinal species**

| SI.No. | Species                                       | 1   | 2  | 3 | 4  | 5   | 6    | 7  | 8 | 9  | 10  | Credibility rate |
|--------|---|-----|----|---|----|-----|------|----|---|----|-----|------------------|
| i      | ii  | iii | iv | v | vi | vii | viii | ix | x | xi | xii | xiii             |
| 1      | <i>Acacia chundra</i>                         | -   | -  | - | -  | +   | -    | -  | - | -  | -   | V                |
| 2      | <i>Acacia leucophloea</i>                     | +   | -  | - | -  | +   | -    | -  | - | -  | +   | I                |
| 3      | <i>Acacia nilotica</i>                        | -   | -  | - | -  | +   | -    | -  | - | -  | +   | II               |
| 4      | <i>Acacia pennata</i>                         | -   | -  | - | +  | -   | -    | -  | - | -  | -   | III              |
| 5      | <i>Acacia sinuata</i>                         | -   | -  | - | -  | -   | -    | -  | + | -  | -   | I                |
| 6      | <i>Achyranthes aspera</i>                     | -   | +  | - | -  | -   | -    | -  | - | -  | -   | II               |
| 7      | <i>Albizia amara</i>                          | +   | -  | - | +  | +   | -    | +  | - | -  | -   | I                |
| 8      | <i>Albizia odoratissima</i>                   | -   | -  | - | -  | +   | -    | -  | - | -  | -   | II               |
| 9      | <i>Aloe vera</i>                              | -   | +  | - | -  | -   | -    | -  | - | -  | -   | I                |
| 10     | <i>Amaranthus caudatus</i>                    | -   | -  | - | -  | -   | -    | -  | - | +  | -   | I                |
| 11     | <i>Amaranthus spinosus</i>                    | -   | -  | - | -  | -   | +    | -  | - | -  | -   | II               |
| 12     | <i>Amaranthus viridis</i>                     | -   | -  | - | -  | -   | +    | -  | - | -  | -   | I                |
| 13     | <i>Angiopteris evecta</i>                     | -   | +  | - | -  | -   | -    | -  | - | -  | -   | VI               |
| 14     | <i>Anogeissus latifolia</i>                   | -   | -  | - | -  | +   | -    | -  | - | -  | -   | II               |
| 15     | <i>Areca catechu</i>                          | -   | +  | - | -  | -   | -    | -  | - | -  | +   | III              |
| 16     | <i>Azadirachta indica</i>                     | -   | -  | - | -  | -   | -    | -  | - | -  | +   | I                |
| 17     | <i>Balanophora fungosa</i> ssp. <i>indica</i> | -   | -  | - | -  | -   | -    | -  | + | -  | -   | II               |
| 18     | <i>Bambusa bambos</i>                         | -   | -  | + | -  | -   | +    | +  | - | -  | -   | II               |
| 19     | <i>Basella alba</i>                           | -   | -  | - | -  | -   | +    | -  | - | -  | -   | II               |
| 20     | <i>Bauhinia racemosa</i>                      | -   | -  | - | -  | +   | -    | -  | - | -  | -   | V                |
| 21     | <i>Biophytum reinwardtii</i>                  | -   | +  | - | -  | -   | -    | -  | - | -  | -   | III              |
| 22     | <i>Blepharis maderaspatensis</i>              | -   | +  | - | -  | -   | -    | -  | - | -  | -   | II               |
| 23     | <i>Boerhavia diffusa</i>                      | -   | -  | - | -  | -   | +    | -  | - | -  | -   | II               |
| 24     | <i>Brassica juncea</i>                        | -   | -  | - | -  | -   | -    | -  | - | +  | -   | II               |
| 25     | <i>Breynia retusa</i>                         | +   | -  | - | -  | -   | -    | -  | - | -  | +   | V                |
| 26     | <i>Bridelia retusa</i>                        | -   | -  | - | -  | +   | -    | -  | - | -  | -   | V                |
| 27     | <i>Buchanania lanzan</i>                      | -   | -  | - | -  | -   | +    | -  | - | -  | -   | V                |
| 28     | <i>Butea monosperma</i>                       | -   | -  | + | -  | -   | -    | -  | - | -  | -   | V                |
| 29     | <i>Cajanus cajan</i>                          | -   | -  | - | -  | -   | -    | -  | - | +  | -   | V                |
| 30     | <i>Calotropis gigantea</i>                    | -   | -  | - | -  | -   | -    | -  | - | -  | +   | II               |
| 31     | <i>Canarium strictum</i>                      | -   | -  | - | -  | -   | -    | -  | + | -  | -   | I                |
| 32     | <i>Cannabis sativa</i> ssp. <i>indica</i>     | -   | -  | - | -  | -   | -    | -  | - | -  | +   | II               |
| 33     | <i>Canthium coromandelicum</i>                | -   | -  | - | +  | -   | -    | -  | - | -  | -   | III              |
| 34     | <i>Capparis zeylanica</i>                     | +   | -  | - | -  | -   | -    | -  | - | -  | -   | V                |
| 35     | <i>Carissa carandas</i>                       | -   | +  | - | -  | -   | +    | -  | - | -  | -   | II               |
| 36     | <i>Carmona retusa</i>                         | +   | -  | - | -  | -   | -    | -  | - | -  | -   | V                |
| 37     | <i>Cassia fistula</i>                         | -   | -  | - | -  | -   | -    | -  | - | -  | +   | II               |
| 38     | <i>Cassine albens</i>                         | +   | -  | - | -  | -   | -    | -  | - | -  | -   | V                |
| 39     | <i>Casuarina litorea</i>                      | -   | -  | + | -  | -   | -    | -  | - | -  | -   | V                |
| 40     | <i>Celosia argentea</i>                       | -   | -  | - | -  | -   | +    | -  | - | -  | -   | V                |
| 41     | <i>Celosia polygonoides</i>                   | -   | -  | - | -  | -   | +    | -  | - | -  | -   | V                |

| i  | ii                             | iii | iv | v | vi | vii | viii | ix | x | xi | xii | xiii |
|----|--------------------------------|-----|----|---|----|-----|------|----|---|----|-----|------|
| 42 | <i>Cereus pterogonus</i>       | -   | +  | - | -  | -   | -    | -  | - | -  | -   | II   |
| 43 | <i>Chloroxylon swietenia</i>   | -   | -  | + | +  | -   | -    | -  | - | -  | -   | II   |
| 44 | <i>Cinnamomum macrocarpum</i>  | -   | -  | - | -  | -   | -    | -  | + | -  | -   | III  |
| 45 | <i>Cissus quadrangularis</i>   | +   | +  | - | -  | -   | +    | -  | - | -  | -   | II   |
| 46 | <i>Citrus aurantifolia</i>     | -   | -  | - | -  | -   | -    | -  | - | +  | -   | V    |
| 47 | <i>Clausena austroindica</i>   | -   | -  | - | -  | -   | +    | -  | - | -  | -   | V    |
| 48 | <i>Clerodendrum phlomidis</i>  | +   | -  | - | -  | -   | -    | -  | - | -  | -   | V    |
| 49 | <i>Clerodendrum serratum</i>   | -   | -  | - | -  | -   | -    | -  | + | -  | -   | I    |
| 50 | <i>Clerodendrum viscosum</i>   | +   | -  | - | -  | -   | -    | -  | - | -  | -   | II   |
| 51 | <i>Coccinia grandis</i>        | -   | -  | - | -  | -   | +    | -  | - | -  | -   | I    |
| 52 | <i>Cocos nucifera</i>          | -   | -  | + | -  | -   | -    | -  | - | -  | -   | I    |
| 53 | <i>Commiphora caudata</i>      | +   | -  | - | -  | -   | -    | -  | - | -  | -   | I    |
| 54 | <i>Corbichonia decumbens</i>   | +   | -  | - | -  | -   | -    | -  | - | -  | -   | I    |
| 55 | <i>Cucumis sativus</i>         | -   | -  | - | -  | -   | -    | -  | - | +  | -   | V    |
| 56 | <i>Cucurbita maxima</i>        | -   | -  | - | -  | -   | -    | -  | - | +  | -   | V    |
| 57 | <i>Cullenia exarillata</i>     | -   | -  | - | -  | -   | +    | -  | - | -  | -   | III  |
| 58 | <i>Cyclea peltata</i>          | -   | -  | - | -  | -   | -    | -  | + | -  | -   | II   |
| 59 | <i>Cynodon dactylon</i>        | -   | +  | - | -  | -   | -    | -  | - | -  | -   | II   |
| 60 | <i>Dalbergia latifolia</i>     | -   | -  | - | -  | +   | -    | -  | - | -  | -   | I    |
| 61 | <i>Dendrocalamus strictus</i>  | -   | -  | - | -  | +   | +    | -  | - | -  | -   | V    |
| 62 | <i>Desmodium gangeticum</i>    | -   | -  | - | -  | -   | -    | -  | + | -  | -   | I    |
| 63 | <i>Desmostachya bipinnata</i>  | -   | -  | + | -  | -   | -    | -  | - | -  | -   | V    |
| 64 | <i>Dillenia pentagyna</i>      | -   | +  | - | -  | -   | -    | -  | - | -  | -   | III  |
| 65 | <i>Dioscorea oppositifolia</i> | -   | -  | - | -  | -   | +    | -  | - | -  | -   | V    |
| 66 | <i>Dioscorea pentaphylla</i>   | -   | -  | - | -  | -   | +    | -  | - | -  | -   | V    |
| 67 | <i>Dioscorea tomentosa</i>     | -   | -  | - | -  | -   | +    | -  | - | -  | -   | V    |
| 68 | <i>Dioscorea wallichii</i>     | -   | -  | - | -  | -   | +    | -  | - | -  | -   | V    |
| 69 | <i>Diospyros montana</i>       | -   | -  | - | -  | +   | -    | -  | - | -  | -   | V    |
| 70 | <i>Diplazium esculentum</i>    | -   | -  | - | -  | -   | +    | -  | - | -  | -   | V    |
| 71 | <i>Dodonaea viscosa</i>        | +   | -  | + | -  | -   | -    | -  | - | -  | -   | II   |
| 72 | <i>Drynaria quercifolia</i>    | -   | +  | - | -  | -   | -    | -  | - | -  | -   | VI   |
| 73 | <i>Eleusine coracana</i>       | -   | -  | - | -  | -   | -    | -  | - | +  | -   | V    |
| 74 | <i>Erythroxylum monogynum</i>  | -   | -  | - | -  | +   | -    | -  | - | -  | -   | I    |
| 75 | <i>Euphorbia hirta</i>         | -   | +  | - | -  | -   | -    | -  | - | -  | -   | II   |
| 76 | <i>Ficus exasperata</i>        | -   | -  | - | -  | -   | -    | +  | - | -  | -   | II   |
| 77 | <i>Ficus hispida</i>           | +   | -  | - | -  | -   | -    | -  | - | -  | -   | II   |
| 78 | <i>Flacourtia indica</i>       | -   | -  | - | -  | -   | +    | -  | - | -  | -   | V    |
| 79 | <i>Garcinia gummi-gutta</i>    | -   | -  | - | -  | -   | -    | -  | + | -  | -   | II   |
| 80 | <i>Givotia moluccana</i>       | -   | -  | - | -  | -   | -    | -  | - | -  | +   | I    |
| 81 | <i>Glycosmis mauritiana</i>    | -   | -  | - | -  | -   | -    | -  | - | -  | +   | I    |
| 82 | <i>Gmelina arborea</i>         | -   | -  | - | -  | -   | -    | +  | - | -  | -   | I    |
| 83 | <i>Grewia tiliifolia</i>       | -   | -  | + | -  | +   | -    | -  | - | -  | -   | I    |
| 84 | <i>Grewia villosa</i>          | -   | -  | - | -  | -   | +    | -  | - | -  | -   | II   |
| 85 | <i>Hemidesmus indicus</i>      | -   | -  | - | -  | -   | -    | -  | + | -  | -   | I    |
| 86 | <i>Ichnocarpus frutescens</i>  | +   | -  | + | -  | -   | -    | -  | - | -  | -   | I    |
| 87 | <i>Indigofera linnaei</i>      | +   | -  | - | -  | -   | -    | -  | - | -  | -   | I    |

| i   | ii  | iii | iv | v | vi | vii | viii | ix | x | xi | xii | xiii |
|-----|---|-----|----|---|----|-----|------|----|---|----|-----|------|
| 88  | <i>Jatropha curcas</i>                      | -   | -  | - | -  | -   | -    | -  | + | -  | -   | II   |
| 89  | <i>Lablab purpureus</i>                     | -   | -  | - | -  | -   | -    | -  | - | +  | -   | V    |
| 90  | <i>Lagenaria siceraria</i>                  | -   | -  | - | -  | -   | -    | -  | - | +  | -   | V    |
| 91  | <i>Lagerstoemia microcarpa</i>              | -   | +  | - | -  | -   | -    | -  | - | -  | -   | II   |
| 92  | <i>Lantana camara</i> var. <i>aculeata</i>  | -   | -  | - | -  | -   | +    | -  | - | -  | +   | V    |
| 93  | <i>Leucas aspera</i>                        | +   | -  | - | -  | -   | -    | -  | - | -  | -   | I    |
| 94  | <i>Limonia acidissima</i>                   | -   | -  | - | -  | -   | +    | -  | - | -  | -   | V    |
| 95  | <i>Litsea stocksii</i>                      | -   | -  | - | -  | -   | -    | +  | - | -  | -   | II   |
| 96  | <i>Lycopersicon esculentum</i>              | -   | -  | - | -  | -   | +    | -  | - | -  | -   | V    |
| 97  | <i>Mallotus philippensis</i>                | -   | -  | - | -  | +   | -    | -  | - | -  | -   | II   |
| 98  | <i>Mangifera indica</i>                     | -   | -  | - | -  | -   | -    | -  | - | +  | -   | I    |
| 99  | <i>Morinda pubescens</i>                    | -   | -  | - | -  | +   | -    | +  | - | -  | -   | II   |
| 100 | <i>Moringa pterygosperma</i>                | -   | -  | - | -  | -   | -    | -  | - | +  | -   | I    |
| 101 | <i>Mundulea sericea</i>                     | -   | -  | - | -  | +   | -    | -  | - | -  | -   | I    |
| 102 | <i>Naringi crenulata</i>                    | -   | -  | - | -  | -   | -    | -  | - | -  | +   | II   |
| 103 | <i>Ocimum americanum</i>                    | +   | -  | - | -  | -   | -    | -  | - | -  | -   | VI   |
| 104 | <i>Opuntia striata</i> var. <i>dillenii</i> | -   | -  | - | -  | -   | +    | -  | - | -  | -   | I    |
| 105 | <i>Oryza sativa</i>                         | -   | -  | - | -  | -   | -    | -  | - | +  | -   | V    |
| 106 | <i>Oxalis corniculata</i>                   | -   | -  | - | -  | -   | +    | -  | - | -  | -   | II   |
| 107 | <i>Palaquim ellipticum</i>                  | -   | -  | - | -  | -   | +    | -  | - | -  | -   | III  |
| 108 | <i>Panicum sumatrense</i>                   | -   | -  | - | -  | -   | -    | -  | - | +  | -   | V    |
| 109 | <i>Paspalam scorbiculatum</i>               | -   | -  | - | -  | -   | -    | -  | - | +  | -   | V    |
| 110 | <i>Passiflora foetida</i>                   | -   | -  | - | -  | -   | +    | -  | - | -  | -   | II   |
| 111 | <i>Pennisetum americanum</i>                | -   | -  | - | -  | -   | -    | -  | - | +  | -   | V    |
| 112 | <i>Phoenix loureiroi</i>                    | -   | -  | - | -  | -   | -    | +  | - | -  | -   | I    |
| 113 | <i>Phyllanthus emblica</i>                  | +   | -  | - | -  | -   | +    | -  | + | -  | -   | I    |
| 114 | <i>Pimpinella heyneana</i>                  | -   | -  | - | -  | -   | +    | -  | - | -  | -   | V    |
| 115 | <i>Piper longum</i>                         | -   | -  | - | -  | -   | -    | -  | + | -  | -   | II   |
| 116 | <i>Pithecellobium dulce</i>                 | -   | -  | - | -  | -   | +    | -  | - | -  | -   | V    |
| 117 | <i>Pleiospermium alatum</i>                 | -   | -  | - | -  | -   | -    | -  | - | -  | +   | III  |
| 118 | <i>Pongamia pinnata</i>                     | -   | +  | - | -  | -   | -    | -  | - | -  | -   | I    |
| 119 | <i>Premna corymbosa</i>                     | +   | -  | - | -  | -   | +    | -  | - | -  | -   | I    |
| 120 | <i>Premna tomentosa</i>                     | -   | -  | + | -  | +   | -    | -  | - | -  | -   | II   |
| 121 | <i>Prosopis juliflora</i>                   | +   | -  | - | -  | +   | -    | -  | - | -  | -   | I    |
| 122 | <i>Pseudarthria viscida</i>                 | -   | -  | - | -  | -   | -    | -  | + | -  | -   | II   |
| 123 | <i>Pterocarpus marsupium</i>                | -   | +  | + | -  | +   | -    | +  | - | -  | +   | I    |
| 124 | <i>Pterolobium hexapetalum</i>              | -   | -  | - | -  | -   | -    | -  | - | -  | +   | I    |
| 125 | <i>Rauvolfia serpentina</i>                 | -   | -  | - | -  | -   | -    | -  | + | -  | -   | II   |
| 126 | <i>Sanseveria roxburghiana</i>              | -   | -  | + | -  | -   | -    | -  | - | -  | -   | II   |
| 127 | <i>Sapindus trifoliata</i>                  | -   | -  | - | -  | -   | -    | -  | + | -  | +   | II   |
| 128 | <i>Secamone emetica</i>                     | +   | -  | - | -  | -   | -    | -  | - | -  | -   | I    |
| 129 | <i>Senna auriculata</i>                     | -   | +  | - | -  | -   | -    | -  | - | -  | -   | II   |
| 130 | <i>Sesamum orientale</i>                    | -   | -  | - | -  | -   | -    | -  | - | +  | -   | V    |
| 131 | <i>Sida acuta</i>                           | -   | -  | - | -  | -   | -    | +  | - | -  | -   | I    |
| 132 | <i>Sida alnifolia</i>                       | -   | -  | - | -  | -   | -    | -  | + | -  | -   | I    |
| 133 | <i>Solanum americanum</i>                   | -   | -  | - | -  | -   | +    | -  | - | -  | -   | V    |

| i   | ii  | iii | iv | v | vi | vii | viii | ix | x | xi | xii | xiii |
|-----|---|-----|----|---|----|-----|------|----|---|----|-----|------|
| 134 | <i>Solanum incanum</i>                    | +   | -  | - | -  | -   | -    | -  | - | -  | -   | III  |
| 135 | <i>Solanum torvum</i>                     | -   | -  | - | -  | -   | -    | -  | + | -  | -   | I    |
| 136 | <i>Solanum violaceum</i>                  | -   | -  | - | -  | -   | +    | -  | - | -  | -   | II   |
| 137 | <i>Sorghum bicolor</i>                    | -   | -  | - | -  | -   | -    | -  | - | +  | -   | V    |
| 138 | <i>Sterculia guttata</i>                  | -   | -  | - | -  | -   | +    | -  | - | -  | -   | V    |
| 139 | <i>Streblus asper</i>                     | +   | -  | - | -  | -   | -    | -  | - | -  | -   | II   |
| 140 | <i>Strobilanthus ciliatus</i>             | -   | -  | - | -  | -   | -    | -  | + | -  | -   | II   |
| 141 | <i>Strychnos potatorum</i>                | +   | +  | - | +  | -   | -    | -  | - | -  | -   | I    |
| 142 | <i>Syzygium cumini</i>                    | -   | -  | - | -  | -   | +    | -  | - | -  | -   | I    |
| 143 | <i>Tamarindus indica</i>                  | -   | +  | - | -  | +   | +    | -  | - | +  | -   | I    |
| 144 | <i>Tarenna asiatica</i>                   | -   | -  | + | -  | +   | -    | -  | - | -  | -   | I    |
| 145 | <i>Tectona grandis</i>                    | -   | -  | + | -  | +   | -    | -  | - | -  | -   | I    |
| 146 | <i>Tephrosia purpurea</i>                 | +   | -  | - | -  | -   | -    | -  | - | -  | -   | I    |
| 147 | <i>Terminalia chebula</i>                 | -   | -  | - | -  | -   | -    | -  | + | -  | -   | II   |
| 148 | <i>Terminalia cuneata</i>                 | -   | -  | - | +  | -   | -    | -  | - | -  | -   | I    |
| 149 | <i>Themeda triandra</i>                   | -   | -  | + | -  | -   | -    | -  | - | -  | -   | I    |
| 150 | <i>Trewia nudiflora</i>                   | +   | -  | - | -  | -   | -    | -  | - | -  | -   | II   |
| 151 | <i>Tribulus terrestris</i>                | -   | +  | - | -  | -   | -    | -  | + | -  | -   | I    |
| 152 | <i>Vateria indica</i>                     | -   | -  | - | -  | -   | -    | -  | + | -  | -   | I    |
| 153 | <i>Vigna mungo</i>                        | -   | -  | - | -  | -   | -    | -  | - | +  | -   | V    |
| 154 | <i>Vigna unguiculata ssp. unguiculata</i> | -   | -  | - | -  | -   | -    | -  | - | +  | -   | V    |
| 155 | <i>Vigna unguiculata ssp. cylindrica</i>  | -   | -  | - | -  | -   | -    | -  | - | +  | -   | V    |
| 156 | <i>Vitex altissima</i>                    | -   | -  | - | -  | +   | -    | -  | - | -  | -   | V    |
| 157 | <i>Wrightia tinctoria</i>                 | -   | -  | - | -  | -   | -    | -  | - | -  | +   | I    |
| 158 | <i>Zea mays</i>                           | -   | -  | + | -  | -   | -    | -  | - | +  | -   | V    |
| 159 | <i>Ziziphus mauritiana</i>                | -   | -  | - | -  | -   | +    | -  | - | -  | -   | V    |
| 160 | <i>Ziziphus oenoplia</i>                  | -   | -  | - | -  | -   | +    | -  | - | -  | -   | V    |
| 161 | <i>Ziziphus rugosa</i>                    | -   | -  | - | -  | -   | +    | -  | - | -  | -   | V    |

1. Animal husbandry, 2. Customs, rituals etc., 3. Construction timber, 4. Fish poison, 5. Firewood, 6. Food plants, 7. Implements, 8. Saleable products, 9. Under cultivation and 10. Miscellaneous uses. I. Collector uses or directly observed use; II. Informant uses or directly observed use; III. Informant bear/knew from a further source; IV. Use reported from the literature; V. Common knowledge; VI. Credibility of use information unknown.

Appendix 7. Habit of ethnobotanically significant species

| Sl. No. | Species                                | 1   | 2  | 3 | 4  | 5   | 6    | 7  | 8 | 9  | 10  | 11   | 12  | 13 |
|---------|--|-----|----|---|----|-----|------|----|---|----|-----|------|-----|----|
| i       | ii                                     | iii | iv | v | vi | vii | viii | ix | x | xi | xii | xiii | xiv | xv |
| 1       | <i>Abrus precatorius</i>               | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 2       | <i>Abutilon hirtum</i>                 | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 3       | <i>Acacia chundra</i>                  | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 4       | <i>Acacia leucophloea</i>              | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 5       | <i>Acacia nilotica</i>                 | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 6       | <i>Acacia pennata</i>                  | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    | -   | -  |
| 7       | <i>Acacia sinuata</i>                  | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    | -   | -  |
| 8       | <i>Acalypha alnifolia</i>              | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 9       | <i>Achyranthes aspera</i>              | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 10      | <i>Actinopterys radiata</i>            | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 11      | <i>Aegle marmelos</i>                  | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 12      | <i>Ageratum conyzoides</i>             | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 13      | <i>Albizia amara</i>                   | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 14      | <i>Albizia odoratissima</i>            | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 15      | <i>Aloe vera</i>                       | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 16      | <i>Amaranthus caudatus</i>             | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 17      | <i>Amaranthus spinosus</i>             | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 18      | <i>Amaranthus viridis</i>              | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 19      | <i>Andrographis paniculata</i>         | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 20      | <i>Angiopteris evecta</i>              | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 21      | <i>Anogeissus latifolia</i>            | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 22      | <i>Areca catechu</i>                   | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    | -   | +  |
| 23      | <i>Argemone mexicana</i>               | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 24      | <i>Aristolochia indica</i>             | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 25      | <i>Atalantia monophylla</i>            | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 26      | <i>Azadirachta indica</i>              | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 27      | <i>Baccaurea courtallensis</i>         | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 28      | <i>Balanophora fungosa ssp. indica</i> | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 29      | <i>Bambusa bambos</i>                  | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    | +   | -  |
| 30      | <i>Basella alba</i>                    | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 31      | <i>Bauhinia racemosa</i>               | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 32      | <i>Benkara malabarica</i>              | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 33      | <i>Biophytum reinwardtii</i>           | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 34      | <i>Blepharis maderaspatensis</i>       | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 35      | <i>Blumea mollis</i>                   | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 36      | <i>Boerhavia diffusa</i>               | -   | -  | - | -  | -   | -    | -  | + | -  | -   | -    | -   | -  |
| 37      | <i>Brassica juncea</i>                 | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 38      | <i>Breynia retusa</i>                  | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 39      | <i>Bridelia retusa</i>                 | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 40      | <i>Bridelia scandens</i>               | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    | -   | -  |
| 41      | <i>Buchanania lanzan</i>               | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 42      | <i>Butea monosperma</i>                | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 43      | <i>Cajanus cajan</i>                   | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 44      | <i>Calotropis gigantea</i>             | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 45      | <i>Canarium strictum</i>               | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 46      | <i>Cannabis sativa ssp. indica</i>     | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |

| i  | ii   | iii | iv | v | vi | vii | viii | ix | x | xi | xii | xiii | xiv | xv |
|----|--|-----|----|---|----|-----|------|----|---|----|-----|------|-----|----|
| 47 | <i>Canthium coromandelicum</i>                         | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 48 | <i>Capparis zeylanica</i>                              | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    | -   | -  |
| 49 | <i>Capsicum frutescens</i>                             | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 50 | <i>Caralluma attenuata</i>                             | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 51 | <i>Cardiospermum halicacabum</i>                       | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 52 | <i>Carissa carandas</i>                                | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    | -   | -  |
| 53 | <i>Carmona retusa</i>                                  | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 54 | <i>Cassia fistula</i>                                  | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 55 | <i>Cassine albens</i>                                  | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 56 | <i>Casuarina litorea</i>                               | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 57 | <i>Celastrus paniculatus</i>                           | -   | -  | - | -  | -   | -    | -  | + | -  | -   | -    | -   | -  |
| 58 | <i>Celosia argentea</i>                                | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 59 | <i>Celosia polygonoides</i>                            | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 60 | <i>Centella asiatica</i>                               | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 61 | <i>Cereus pterogonus</i>                               | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 62 | <i>Chenopodium ambrosioides</i>                        | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 63 | <i>Chloroxylon swietenia</i>                           | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 64 | <i>Chromolaena odorata</i>                             | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 65 | <i>Cinnamomum macrocarpum</i>                          | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 66 | <i>Cissus quadrangularis</i>                           | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 67 | <i>Citrullus colocynthis</i>                           | -   | -  | - | -  | -   | -    | -  | - | +  | -   | -    | -   | -  |
| 68 | <i>Citrus aurantifolia</i>                             | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 69 | <i>Clausena austroindica</i>                           | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 70 | <i>Clematis gouriana</i>                               | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 71 | <i>Clerodendrum phlomidis</i>                          | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 72 | <i>Clerodendrum serratum</i>                           | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 73 | <i>Clerodendrum viscosum</i>                           | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 74 | <i>Clitoria ternatea</i>                               | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 75 | <i>Coccinia grandis</i>                                | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 76 | <i>Cocos nucifera</i>                                  | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    | -   | +  |
| 77 | <i>Commelina benghalensis</i>                          | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 78 | <i>Commiphora caudata</i>                              | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 79 | <i>Corbichonia decumbens</i>                           | -   | -  | - | -  | -   | -    | -  | - | +  | -   | -    | -   | -  |
| 80 | <i>Cordia wallichii</i>                                | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 81 | <i>Costus speciosus</i>                                | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 82 | <i>Cucumis sativus</i>                                 | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 83 | <i>Cucurbita maxima</i>                                | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 84 | <i>Cullenia exarillata</i>                             | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 85 | <i>Curculigo orchoides</i>                             | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 86 | <i>Cycas circinalis</i>                                | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    | -   | +  |
| 87 | <i>Cyclea peltata</i>                                  | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 88 | <i>Cymbopogon flexuosus</i>                            | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    | -   | -  |
| 89 | <i>Cynodon dactylon</i>                                | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    | -   | -  |
| 90 | <i>Cyperus malaccensis</i>                             | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 91 | <i>Cyperus rotundus</i>                                | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 92 | <i>Dalbergia lanceolaria</i> ssp.<br><i>paniculata</i> | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 93 | <i>Dalbergia latifolia</i>                             | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 94 | <i>Datura metel</i>                                    | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 95 | <i>Dendrocalamus strictus</i>                          | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    | +   | -  |
| 96 | <i>Desmodium gangeticum</i>                            | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |

| i   | ii                               | iii | iv | v | vi | vii | viii | ix | x | xi | xii | xiii | xiv | xv |
|-----|----------------------------------|-----|----|---|----|-----|------|----|---|----|-----|------|-----|----|
| 97  | <i>Desmodium triangulare</i>     | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 98  | <i>Desmodium triflorum</i>       | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 99  | <i>Desmodium triquetrum</i>      | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 100 | <i>Desmostachya bipinnata</i>    | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    | -   | -  |
| 101 | <i>Dillenia pentagyna</i>        | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 102 | <i>Dioscorea oppositifolia</i>   | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 103 | <i>Dioscorea pentaphylla</i>     | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 104 | <i>Dioscorea tomentosa</i>       | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 105 | <i>Dioscorea wallichii</i>       | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 106 | <i>Diospyros montana</i>         | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 107 | <i>Diplazium esculentum</i>      | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 108 | <i>Dodonaea viscosa</i>          | -   | -  | - | +  | -   | -    | -  | - | -  | -   | +    | -   | -  |
| 109 | <i>Drynaria quercifolia</i>      | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 110 | <i>Eclipta prostrata</i>         | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 111 | <i>Elephantopus scaber</i>       | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    | -   | -  |
| 112 | <i>Eleusine coracana</i>         | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 113 | <i>Embelia tsjeriam-cottam</i>   | -   | -  | - | -  | -   | -    | -  | + | -  | -   | -    | -   | -  |
| 114 | <i>Entada rheedii</i>            | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 115 | <i>Equisetum ramosissimum</i>    | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 116 | <i>Erythroxylum monogynum</i>    | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 117 | <i>Euphorbia hirta</i>           | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 118 | <i>Euphorbia thymifolia</i>      | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 119 | <i>Evolvulus alsinoides</i>      | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 120 | <i>Ficus exasperata</i>          | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 121 | <i>Ficus hispida</i>             | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 122 | <i>Ficus racemosa</i>            | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 123 | <i>Ficus religiosa</i>           | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 124 | <i>Flacourtia indica</i>         | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 125 | <i>Garcinia gummi-gutta</i>      | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 126 | <i>Givotia moluccana</i>         | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    | -   | -  |
| 127 | <i>Gloriosa superba</i>          | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 128 | <i>Glycosmis mauritiana</i>      | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 129 | <i>Gmelina arborea</i>           | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 130 | <i>Gossypium barbadense</i>      | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 131 | <i>Grewia laevigata</i>          | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 132 | <i>Grewia tiliifolia</i>         | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 133 | <i>Grewia villosa</i>            | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 134 | <i>Gymnema sylvestre</i>         | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 135 | <i>Gynandropsis gynandra</i>     | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 136 | <i>Helicteres isora</i>          | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 137 | <i>Hemidesmus indicus</i>        | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 138 | <i>Holostemma ada-kodien</i>     | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 139 | <i>Homonoia riparia</i>          | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 140 | <i>Hyptis suaveolens</i>         | -   | -  | - | -  | -   | -    | -  | + | -  | -   | -    | -   | -  |
| 141 | <i>Ichnocarpus frutescens</i>    | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    | -   | -  |
| 142 | <i>Indigofera linnaei</i>        | -   | -  | - | -  | -   | -    | -  | - | +  | -   | -    | -   | -  |
| 143 | <i>Jatropha curcas</i>           | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 144 | <i>Justicia tranquebariensis</i> | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 145 | <i>Lablab purpureus</i>          | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 146 | <i>Lagenaria siceraria</i>       | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 147 | <i>Lagerstoemia microcarpa</i>   | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |

| i   | ii  | iii | iv | v | vi | vii | viii | ix | x | xi | xii | xiii | xiv | xv |
|-----|---|-----|----|---|----|-----|------|----|---|----|-----|------|-----|----|
| 148 | <i>Lantana camara</i> var. <i>aculeata</i>  | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 149 | <i>Lantana indica</i>                       | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 150 | <i>Leptadenia reticulata</i>                | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 151 | <i>Leucas aspera</i>                        | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 152 | <i>Limonia acidissima</i>                   | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 153 | <i>Litsea stocksii</i>                      | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 154 | <i>Lobelia nicotianifolia</i>               | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 155 | <i>Luffa cylindrica</i>                     | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 156 | <i>Lycopersicon esculentum</i>              | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 157 | <i>Mallotus philippensis</i>                | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 158 | <i>Mangifera indica</i>                     | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 159 | <i>Momordica charantia</i>                  | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 160 | <i>Morinda pubescens</i>                    | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 161 | <i>Moringa pterygosperma</i>                | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 162 | <i>Mucuna pruriens</i>                      | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 163 | <i>Mukia madraspatana</i>                   | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 164 | <i>Mundulea sericea</i>                     | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 165 | <i>Murraya koenigii</i>                     | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 166 | <i>Mussaenda frondosa</i>                   | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 167 | <i>Naravelia zeylanica</i>                  | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 168 | <i>Naringi crenulata</i>                    | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 169 | <i>Ocimum americanum</i>                    | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 170 | <i>Ocimum basilicum</i>                     | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 171 | <i>Ocimum gratissimum</i>                   | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 172 | <i>Ocimum tenuiflorum</i>                   | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 173 | <i>Opuntia striata</i> var. <i>dillenii</i> | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 174 | <i>Oryza sativa</i>                         | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 175 | <i>Oxalis corniculata</i>                   | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 176 | <i>Palaquim ellipticum</i>                  | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 177 | <i>Panicum sumatrense</i>                   | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    | -   | -  |
| 178 | <i>Parahemionitis cordata</i>               | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 179 | <i>Paspalum scrobiculatum</i>               | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    | -   | -  |
| 180 | <i>Passiflora foetida</i>                   | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 181 | <i>Pennisetum americanum</i>                | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    | -   | -  |
| 182 | <i>Pentanema indicum</i>                    | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 183 | <i>Pergularia daemia</i>                    | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 184 | <i>Phoenix loureiroi</i>                    | -   | -  | - | -  | -   | -    | -  | - | -  | -   | +    | -   | +  |
| 185 | <i>Phyllanthus amarus</i>                   | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 186 | <i>Phyllanthus emblica</i>                  | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 187 | <i>Pimpinella heyneana</i>                  | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 188 | <i>Piper longum</i>                         | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 189 | <i>Pithecellobium dulce</i>                 | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 190 | <i>Pleiospermium alatum</i>                 | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 191 | <i>Plumbago zeylanica</i>                   | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 192 | <i>Pongamia pinnata</i>                     | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 193 | <i>Premna corymbosa</i>                     | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 194 | <i>Premna tomentosa</i>                     | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 195 | <i>Prosopis juliflora</i>                   | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 196 | <i>Protasparagus racemosus</i>              | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 197 | <i>Pseudarthria viscida</i>                 | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 198 | <i>Psydrax umbellata</i>                    | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    | -   | -  |

| i   | ii   | iii | iv | v | vi | vii | viii | ix | x | xi | xii | xiii | xiv | xv |
|-----|--|-----|----|---|----|-----|------|----|---|----|-----|------|-----|----|
| 199 | <i>Pterocarpus marsupium</i>                     | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 200 | <i>Pterolobium hexapetalum</i>                   | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    | -   | -  |
| 201 | <i>Rauvolfia serpentina</i>                      | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 202 | <i>Ricinus communis</i>                          | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 203 | <i>Rubia cordifolia</i>                          | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 204 | <i>Sanseveria roxburghiana</i>                   | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 205 | <i>Santalum album</i>                            | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 206 | <i>Sapindus trifoliata</i>                       | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 207 | <i>Schumannianthus virgatus</i>                  | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 208 | <i>Scoparia dulcis</i>                           | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 209 | <i>Secamone emetica</i>                          | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 210 | <i>Selaginella delicatula</i>                    | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 211 | <i>Senna auriculata</i>                          | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 212 | <i>Senna occidentalis</i>                        | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 213 | <i>Senna tora</i>                                | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 214 | <i>Sesamum orientale</i>                         | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 215 | <i>Sida acuta</i>                                | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 216 | <i>Sida alnifolia</i>                            | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 217 | <i>Solanum americanum</i>                        | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 218 | <i>Solanum incanum</i>                           | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 219 | <i>Solanum torvum</i>                            | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 220 | <i>Solanum violaceum</i>                         | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 221 | <i>Sorghum bicolor</i>                           | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    | -   | -  |
| 222 | <i>Spermacoce hispida</i>                        | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 223 | <i>Sterculia guttata</i>                         | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 224 | <i>Streblus asper</i>                            | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 225 | <i>Strobilanthus ciliatus</i>                    | -   | -  | + | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 226 | <i>Strychnos nux-vomica</i>                      | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 227 | <i>Strychnos potatorum</i>                       | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 228 | <i>Syzigium cumini</i>                           | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 229 | <i>Tamarindus indica</i>                         | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 230 | <i>Tarenna asiatica</i>                          | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 231 | <i>Tectona grandis</i>                           | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 232 | <i>Tephrosia purpurea</i>                        | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 233 | <i>Terminalia chebula</i>                        | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 234 | <i>Terminalia cuneata</i>                        | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 235 | <i>Themeda triandra</i>                          | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    | -   | -  |
| 236 | <i>Thespesia lampas</i>                          | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 237 | <i>Thottea siliquosa</i>                         | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 238 | <i>Toddalia asiatica</i>                         | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    | -   | -  |
| 239 | <i>Tragia involucrata</i>                        | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 240 | <i>Trewia nudiflora</i>                          | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 241 | <i>Tribulus terrestris</i>                       | -   | -  | - | -  | -   | -    | -  | - | +  | -   | -    | -   | -  |
| 242 | <i>Trichodesma indicum</i>                       | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 243 | <i>Tridax procumbens</i>                         | +   | -  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 244 | <i>Vateria indica</i>                            | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 245 | <i>Vernonia divergens</i>                        | -   | +  | - | -  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 246 | <i>Vigna mungo</i>                               | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 247 | <i>Vigna radiata</i> var. <i>sublobata</i>       | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 248 | <i>Vigna unguiculata</i> ssp. <i>unguiculata</i> | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |

| i   | ii                                       | iii | iv | v | vi | vii | viii | ix | x | xi | xii | xiii | xiv | xv |
|-----|--|-----|----|---|----|-----|------|----|---|----|-----|------|-----|----|
| 249 | <i>Vigna unguiculata ssp. cylindrica</i> | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 250 | <i>Vitex altissima</i>                   | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 251 | <i>Wattakaka volubilis</i>               | -   | -  | - | -  | -   | -    | +  | - | -  | -   | -    | -   | -  |
| 252 | <i>Wrightia tinctoria</i>                | -   | -  | - | +  | -   | -    | -  | - | -  | -   | -    | -   | -  |
| 253 | <i>Zea mays</i>                          | -   | -  | - | -  | -   | -    | -  | - | -  | +   | -    | -   | -  |
| 254 | <i>Ziziphus mauritiana</i>               | -   | -  | - | -  | +   | -    | -  | - | -  | -   | -    | -   | -  |
| 255 | <i>Ziziphus oenoplia</i>                 | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    | -   | -  |
| 256 | <i>Ziziphus rugosa</i>                   | -   | -  | - | -  | -   | +    | -  | - | -  | -   | -    | -   | -  |

1 = Herb, 2 = Sub shrub, 3 = Shrub, 4 = Small tree, 5 = Tree, 6 = Straggler, 7 = Climber, 8 = Liana, 9 = Trailer, 10 = Grass, 11 = Bamboo, 12 = Palm, 13 = Epiphyte

**Appendix 8. Botanical and Vernacular names of plants**

| <b>Sl.No.</b> | <b>Species</b>                         | <b>Vernacular name</b>       |
|---------------|--|------------------------------|
| i             | ii                                     | iii                          |
| 1             | <i>Abrus precatorius</i>               | Kunni                        |
| 2             | <i>Abutilon hirtum</i>                 | Tuthi                        |
| 3             | <i>Acacia chundra</i>                  | Karungali                    |
| 4             | <i>Acacia leucophloea</i>              | Vela Maram                   |
| 5             | <i>Acacia nilotica</i>                 | Karuvelam                    |
| 6             | <i>Acacia pennata</i>                  | Seenge                       |
| 7             | <i>Acacia sinuata</i>                  | Sinikkai                     |
| 8             | <i>Acalypha alnifolia</i>              | Chinne maram                 |
| 9             | <i>Achyranthes aspera</i>              | Erumbuly, Irumuli            |
| 10            | <i>Actinopteris radiata</i>            | Siru kallu pase              |
| 11            | <i>Aegle marmelos</i>                  | Billa maram                  |
| 12            | <i>Ageratum conyzoides</i>             | Appe chedi                   |
| 13            | <i>Albizia amara</i>                   | Oonchal                      |
| 14            | <i>Albizia odoratissima</i>            | Billu maram                  |
| 15            | <i>Aloe vera</i>                       | Chothukathale                |
| 16            | <i>Amaranthus caudatus</i>             | Porikkeere                   |
| 17            | <i>Amaranthus spinosus</i>             | Mullukkeere                  |
| 18            | <i>Amaranthus viridis</i>              | Keere                        |
| 19            | <i>Andrographis paniculata</i>         | Sirunangai                   |
| 20            | <i>Angiopteris evecta</i>              | Anavanangi                   |
| 21            | <i>Anogeissus latifolia</i>            | Vecha                        |
| 22            | <i>Areca catechu</i>                   | Adakkai                      |
| 23            | <i>Argemone mexicanum</i>              | Sulli                        |
| 24            | <i>Aristolochia indica</i>             | Irukodi, Urikodi             |
| 25            | <i>Atalantia monophylla</i>            | Kurunthamaram                |
| 26            | <i>Azadirachta indica</i>              | Veppe maram                  |
| 27            | <i>Baccaurea courtallensis</i>         | Uvane                        |
| 28            | <i>Balanophora fungosa ssp. indica</i> | Bomb                         |
| 29            | <i>Bambusa bambos</i>                  | Moongil                      |
| 30            | <i>Basella alba</i>                    | Sirivasale                   |
| 31            | <i>Bauhinia racemosa</i>               | Aacha maram                  |
| 32            | <i>Benkara malabarica</i>              | Ketturangi                   |
| 33            | <i>Biophytum reinwardtii</i>           | Suryakal chappu              |
| 34            | <i>Blepharis maderaspatensis</i>       | Palavan chedi                |
| 35            | <i>Blumea mollis</i>                   | Miche                        |
| 36            | <i>Boerhavia diffusa</i>               | Serende                      |
| 37            | <i>Brassica juncea</i>                 | Kadugu                       |
| 38            | <i>Breynia retusa</i>                  | Kodiveeti, Tannithalangu     |
| 39            | <i>Bridelia retusa</i>                 | Mullu gonge                  |
| 40            | <i>Bridelia scandens</i>               | Kodigonge, Valli mullankaini |
| 41            | <i>Buchanania lanzan</i>               | Murasi                       |
| 42            | <i>Butea monosperma</i>                | Saanthuviri                  |
| 43            | <i>Cajanus cajan</i>                   | Tumare                       |
| 44            | <i>Calotropis gigantea</i>             | Erukkile, Erukku             |
| 45            | <i>Canarium strictum</i>               | Kungilyam                    |

| i  | ii  | iii                        |
|----|---|----------------------------|
| 46 | <i>Cannabis sativa</i> ssp. <i>indica</i>           | Kanchavu, Kinchavu         |
| 47 | <i>Canthium coromandelicum</i>                      | Kaare                      |
| 48 | <i>Capparis zeylanica</i>                           | Godanti                    |
| 49 | <i>Capsicum frutescens</i>                          | Cheeni mulakai             |
| 50 | <i>Caralluma attenuata</i>                          | Kallekku                   |
| 51 | <i>Cardiospermum halicacabum</i>                    | Chadukku pidukku chedi     |
| 52 | <i>Carissa carandas</i>                             | Kalla chedi                |
| 53 | <i>Carmona retusa</i>                               | Otte                       |
| 54 | <i>Cassia fistula</i>                               | Kondai                     |
| 55 | <i>Cassine albens</i>                               | Mukurthi, Siluppan         |
| 56 | <i>Casuarina litorea</i>                            | Chavokku                   |
| 57 | <i>Celastrus paniculatus</i>                        | Kankong, Kangonge Kodi     |
| 58 | <i>Celosia argentea</i>                             | Keere                      |
| 59 | <i>Celosia polygonoides</i>                         | Teyyakkeere                |
| 60 | <i>Centella asiatica</i>                            | Varache                    |
| 61 | <i>Cereus pterogonus</i>                            | Kallicheddi                |
| 62 | <i>Chenopodium ambrosioides</i>                     | Nattachedi, Pasimuttuchedi |
| 63 | <i>Chloroxylon swietenia</i>                        | Kattappe                   |
| 64 | <i>Chromolaena odorata</i>                          | Communist Chedi            |
| 65 | <i>Cinnamomum macrocarpum</i>                       | Ilavangam                  |
| 66 | <i>Cissus quadrangularis</i>                        | Narale                     |
| 67 | <i>Citrullus colocynthis</i>                        | Methukkumkai               |
| 68 | <i>Citrus aurantifolia</i>                          | Eembi sedi                 |
| 69 | <i>Clausena austroindica</i>                        | Karampe                    |
| 70 | <i>Clematis gouriana</i>                            | Nikadikodi, Cheerappu      |
| 71 | <i>Clerodendrum phlomidis</i>                       | Daggichedi                 |
| 72 | <i>Clerodendrum serratum</i>                        | Modathekku                 |
| 73 | <i>Clerodendrum viscosum</i>                        | Uppukatti                  |
| 74 | <i>Clitoria ternatea</i>                            | Sankupushpam               |
| 75 | <i>Coccinia grandis</i>                             | Tonde kodi                 |
| 76 | <i>Cocos nucifera</i>                               | Tenge maram                |
| 77 | <i>Commelina benghalensis</i>                       | Kaine, Kaini               |
| 78 | <i>Commiphora caudata</i>                           | Kiluva                     |
| 79 | <i>Corbichonia decumbens</i>                        | Erumenelengi               |
| 80 | <i>Cordia wallichii</i>                             | Viri                       |
| 81 | <i>Costus speciosus</i>                             | Sulli                      |
| 82 | <i>Cucumis sativus</i>                              | Vellary                    |
| 83 | <i>Cucurbita maxima</i>                             | Mathan                     |
| 84 | <i>Cullenia exarillata</i>                          | Thengimaram                |
| 85 | <i>Curculigo orchoides</i>                          | Nilappanai, Ponne          |
| 86 | <i>Cycas circinalis</i>                             | Eentha maram               |
| 87 | <i>Cyclea peltata</i>                               | Kuruppa                    |
| 88 | <i>Cymbopogon flexuosus</i>                         | Teruve                     |
| 89 | <i>Cynodon dactylon</i>                             | Arukam Pullu               |
| 90 | <i>Cyperus malaccensis</i>                          | Korei                      |
| 91 | <i>Cyperus rotundus</i>                             | Muthangapullu              |
| 92 | <i>Dalbergia lanceolaria</i> ssp. <i>paniculata</i> | Boovare                    |
| 93 | <i>Dalbergia latifolia</i>                          | Eetty                      |
| 94 | <i>Datura metel</i>                                 | Ummam                      |
| 95 | <i>Dendrocalamus strictus</i>                       | Moongil                    |

| i   | ii                               | iii                           |
|-----|----------------------------------|-------------------------------|
| 96  | <i>Desmodium gangeticum</i>      | Ottele                        |
| 97  | <i>Desmodium triangulare</i>     | Elumbu chedi                  |
| 98  | <i>Desmodium triflorum</i>       | Nilappulise                   |
| 99  | <i>Desmodium triquetrum</i>      | Palemuttu chedi               |
| 100 | <i>Desmostachya bipinnata</i>    | Darppa                        |
| 101 | <i>Dillenia pentagyna</i>        | Ponne                         |
| 102 | <i>Dioscorea oppositifolia</i>   | Reyyakizhangu, Chavalkizhangu |
| 103 | <i>Dioscorea pentaphylla</i>     | Nooran kizhangu               |
| 104 | <i>Dioscorea tomentosa</i>       | Jaalekizhangu                 |
| 105 | <i>Dioscorea wallichii</i>       | Nare                          |
| 106 | <i>Diospyros montana</i>         | Vakkana maram                 |
| 107 | <i>Diplazium esculentum</i>      | Churuli                       |
| 108 | <i>Dodonaea viscosa</i>          | Mantrachappu, Viraali         |
| 109 | <i>Drynaria quercifolia</i>      | Kallothi                      |
| 110 | <i>Eclipta prostrata</i>         | Kanjunni                      |
| 111 | <i>Elephantopus scaber</i>       | Anachuvadi                    |
| 112 | <i>Eleusine coracana</i>         | Kore                          |
| 113 | <i>Embelia tsjeriam-cottam</i>   |                               |
| 114 | <i>Entada rheedii</i>            | Onthatti                      |
| 115 | <i>Equisetum ramosissimum</i>    | Moottuppullu                  |
| 116 | <i>Erythroxylum monogynum</i>    | Seppulinche                   |
| 117 | <i>Euphorbia hirta</i>           | Palepidrkkku                  |
| 118 | <i>Euphorbia thymifolia</i>      | Kalkeere                      |
| 119 | <i>Evolvulus alsinoides</i>      | Vishnukiranthi                |
| 120 | <i>Ficus exasperata</i>          | Chagare                       |
| 121 | <i>Ficus hispida</i>             | Tunali                        |
| 122 | <i>Ficus racemosa</i>            | Athimaram                     |
| 123 | <i>Ficus religiosa</i>           | Aale maram                    |
| 124 | <i>Flacourtia indica</i>         | Narimoratte                   |
| 125 | <i>Garcinia gummi-gutta</i>      | Kudampuli                     |
| 126 | <i>Givotia moluccana</i>         | Boothaali                     |
| 127 | <i>Gloriosa superba</i>          | Kodan                         |
| 128 | <i>Glycosmis mauritiana</i>      | Moolegili, Ulakodi            |
| 129 | <i>Gmelina arborea</i>           | Gooli                         |
| 130 | <i>Gossypium barbadense</i>      | Paruthy                       |
| 131 | <i>Grewia laevigata</i>          | Kalle                         |
| 132 | <i>Grewia tiliifolia</i>         | Lumman, Uluman                |
| 133 | <i>Grewia villosa</i>            | Kadalakkalle                  |
| 134 | <i>Gymnema sylvestre</i>         | Sakkarekodi                   |
| 135 | <i>Gynandropsis gynandra</i>     | Vele                          |
| 136 | <i>Helicteres isora</i>          | Kaviri                        |
| 137 | <i>Hemidesmus indicus</i>        | Nannari                       |
| 138 | <i>Holostemma ada-kodien</i>     | Paalkizhangu                  |
| 139 | <i>Homonoia riparia</i>          | Gudavanchi                    |
| 140 | <i>Hyptis suaveolens</i>         | Kattu thulasi                 |
| 141 | <i>Ichnocarpus frutescens</i>    | Kodambekodi                   |
| 142 | <i>Indigofera linnaei</i>        | Nandenganni                   |
| 143 | <i>Jatropha curcas</i>           | Tonde maram                   |
| 144 | <i>Justicia tranquebariensis</i> | Ganinch, Uppanamchedi         |
| 145 | <i>Lablab purpureus</i>          | Avarai                        |

| i   | ii  | iii                             |
|-----|---|---------------------------------|
| 146 | <i>Lagenaria siceraria</i>                  | Surai                           |
| 147 | <i>Lagerstoemia microcarpa</i>              | Bega                            |
| 148 | <i>Lantana camara</i> var. <i>aculeata</i>  | Nandavana chedi, Parale         |
| 149 | <i>Lantana indica</i>                       | Vellai parale, Vettum parale    |
| 150 | <i>Leptadenia reticulata</i>                | Paledagu                        |
| 151 | <i>Leucas aspera</i>                        | Tumbe                           |
| 152 | <i>Limonia acidissima</i>                   | Vilamaram                       |
| 153 | <i>Litsea stocksii</i>                      | Kolisera                        |
| 154 | <i>Lobelia nicotianifolia</i>               | Kattupukale                     |
| 155 | <i>Luffa cylindrica</i>                     | Peechil                         |
| 156 | <i>Lycopersicon esculentum</i>              | Siruthakkali                    |
| 157 | <i>Mallotus philippensis</i>                | Kathivettimaram                 |
| 158 | <i>Mangifera indica</i>                     | Mave maram                      |
| 159 | <i>Momordica charantia</i>                  | Kattukaippa                     |
| 160 | <i>Morinda pubescens</i>                    | Noone                           |
| 161 | <i>Moringa pterygosperma</i>                | Moringa maram                   |
| 162 | <i>Mucuna pruriens</i>                      | Keviri, Poonaikalikodi          |
| 163 | <i>Mukia madraspatana</i>                   | Siluppuri                       |
| 164 | <i>Mundulea sericea</i>                     | Ponnaveeram                     |
| 165 | <i>Murraya koenigii</i>                     | Kariveppe maram                 |
| 166 | <i>Mussaenda frondosa</i>                   | Vellelume                       |
| 167 | <i>Naravelia zeylanica</i>                  | Thalachithari, Valiyanikadikodi |
| 168 | <i>Naringi crenulata</i>                    | Ezhilavila                      |
| 169 | <i>Ocimum americanum</i>                    | Sirutulasi                      |
| 170 | <i>Ocimum basilicum</i>                     | Rama thulasi                    |
| 171 | <i>Ocimum gratissimum</i>                   | Raja thulasi                    |
| 172 | <i>Ocimum tenuiflorum</i>                   | Thulasi                         |
| 173 | <i>Opuntia striata</i> var. <i>dillenii</i> | Kallichedi                      |
| 174 | <i>Oryza sativa</i>                         | Nellu                           |
| 175 | <i>Oxalis corniculata</i>                   | Puli daagu                      |
| 176 | <i>Palaquim ellipticum</i>                  | Pali                            |
| 177 | <i>Panicum sumatrense</i>                   | Saame                           |
| 178 | <i>Parahemionitis cordata</i>               | periya kallu pasai.             |
| 179 | <i>Paspalam scorbiculatum</i>               | Varagu                          |
| 180 | <i>Passiflora foetida</i>                   | Pottari                         |
| 181 | <i>Pennisetum americanum</i>                | Kambu                           |
| 182 | <i>Pentanema indicum</i>                    | Suryachakram                    |
| 183 | <i>Pergularia daemia</i>                    | Velipparuthy                    |
| 184 | <i>Phoenix loureiroi</i>                    | Eesi                            |
| 185 | <i>Phyllanthus amarus</i>                   | Sirunelli                       |
| 186 | <i>Phyllanthus emblica</i>                  | Nelli                           |
| 187 | <i>Pimpinella heyneana</i>                  | Kozhijeera                      |
| 188 | <i>Piper longum</i>                         | Thippili                        |
| 189 | <i>Pithecellobium dulce</i>                 | Kodukkaapuli                    |
| 190 | <i>Pleiospermium alatum</i>                 | Kurunthamaram                   |
| 191 | <i>Plumbago zeylanica</i>                   | Otte                            |
| 192 | <i>Pongamia pinnata</i>                     | Ponga maram                     |
| 193 | <i>Premna corymbosa</i>                     | Munne                           |
| 194 | <i>Premna tomentosa</i>                     | Peetemaram                      |
| 195 | <i>Prosopis juliflora</i>                   | Dillimaram                      |

| i   | ii                              | iii                              |
|-----|---------------------------------|----------------------------------|
| 196 | <i>Protasparagus racemosus</i>  | Chatavalli, Chedichal, Tinampori |
| 197 | <i>Pseudarthria viscida</i>     | Moovele                          |
| 198 | <i>Psydrax umbellata</i>        | Oppemaram                        |
| 199 | <i>Pterocarpus marsupium</i>    | Karavengai                       |
| 200 | <i>Pterolobium hexapetalum</i>  | Inde                             |
| 201 | <i>Rauvolfia serpentina</i>     | Amalpori                         |
| 202 | <i>Ricinus communis</i>         | Kotte                            |
| 203 | <i>Rubia cordifolia</i>         | Mullukkodi, Sivalikkodi          |
| 204 | <i>Sanseveria roxburghiana</i>  | Sarpakkathale                    |
| 205 | <i>Santalum album</i>           | Sandanam                         |
| 206 | <i>Sapindus trifoliata</i>      | Poochamaram                      |
| 207 | <i>Schumannianthus virgatus</i> | Kaattukoove                      |
| 208 | <i>Scoparia dulcis</i>          | Meenamkannichedi                 |
| 209 | <i>Secamone emetica</i>         | Kezhukkikodi                     |
| 210 | <i>Selaginella delicatula</i>   | Kuruvevannasappa                 |
| 211 | <i>Senna auriculata</i>         | Aaveeram                         |
| 212 | <i>Senna occidentalis</i>       | Kokkiri chedi                    |
| 213 | <i>Senna tora</i>               | Dagare                           |
| 214 | <i>Sesamum orientale</i>        | Ellu                             |
| 215 | <i>Sida acuta</i>               | Kalakaranda                      |
| 216 | <i>Sida alnifolia</i>           | Kurunthotti                      |
| 217 | <i>Solanum americanum</i>       | Kakke daagu                      |
| 218 | <i>Solanum incanum</i>          | Gullavatane                      |
| 219 | <i>Solanum torvum</i>           | Sunde                            |
| 220 | <i>Solanum violaceum</i>        | Siru sundai                      |
| 221 | <i>Sorghum bicolor</i>          | Solam                            |
| 222 | <i>Spermacoce hispida</i>       | Peelichedi                       |
| 223 | <i>Sterculia guttata</i>        | Anjangum, Achangum               |
| 224 | <i>Streblus asper</i>           | Siruchagare                      |
| 225 | <i>Strobilanthus ciliatus</i>   | Karimkurinji                     |
| 226 | <i>Strychnos nux-vomica</i>     | Itty                             |
| 227 | <i>Strychnos potatorum</i>      | Sillemaram                       |
| 228 | <i>Syzigium cumini</i>          | Naave                            |
| 229 | <i>Tamarindus indica</i>        | Pulia maram                      |
| 230 | <i>Tarenna asiatica</i>         | Tarani                           |
| 231 | <i>Tectona grandis</i>          | Thekke maram                     |
| 232 | <i>Tephrosia purpurea</i>       | Kolingi                          |
| 233 | <i>Terminalia chebula</i>       | Kadukkai                         |
| 234 | <i>Terminalia cuneata</i>       | Mathi maram                      |
| 235 | <i>Themeda triandra</i>         | Mechil pullu                     |
| 236 | <i>Thespesia lampas</i>         | Kattuparuthy, Kolukkatta         |
| 237 | <i>Thottea siliquosa</i>        | Peele                            |
| 238 | <i>Toddalia asiatica</i>        | Erigunge                         |
| 239 | <i>Tragia involucrata</i>       | Kodithoove                       |
| 240 | <i>Trewia nudiflora</i>         | Unnina                           |
| 241 | <i>Tribulus terrestris</i>      | Nerinchi                         |
| 242 | <i>Trichodesma indicum</i>      | Peelichedi                       |
| 243 | <i>Tridax procumbens</i>        | Adatodappan chedi, Pukavetti     |
| 244 | <i>Vateria indica</i>           | Vellappantham                    |
| 245 | <i>Vernonia divergens</i>       | Ambukane, Puthagane              |

| i   | ii  | iii                  |
|-----|---|----------------------|
| 246 | <i>Vigna mungo</i>                              | Uzhunnu              |
| 247 | <i>Vigna radiata</i> var. <i>sublobata</i>      | Kallevelukkara chedi |
| 248 | <i>Vigna unguiculata</i> ssp. <i>ungiculata</i> | Kollu                |
| 249 | <i>Vigna unguiculata</i> ssp. <i>cylindrica</i> | Payaru               |
| 250 | <i>Vitex altissima</i>                          | Mayila               |
| 251 | <i>Wattakaka volubilis</i>                      | Palekodi             |
| 252 | <i>Wrightia tinctoria</i>                       | Goppampale           |
| 253 | <i>Zea mays</i>                                 | Makka solam          |
| 254 | <i>Ziziphus mauritiana</i>                      | <i>Elanthe,</i>      |
| 255 | <i>Ziziphus oenopia</i>                         | Jooli                |
| 256 | <i>Ziziphus rugosa</i>                          | Ungatte              |

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