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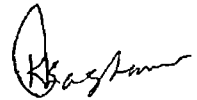
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## DECLARATION

I hereby declare that this dissertation entitled **Cataloguing of Medicinal Plants in Vellanikkara Rubber Estate** is a bonafide record of research work done by me and that this dissertation has not previously formed the basis for award to me of any degree diploma or other similar title of any other University or Society

Vellanikkara

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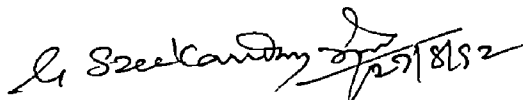


K K RAGHAVAN

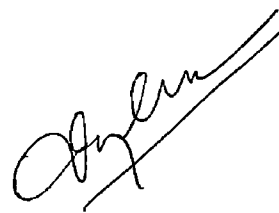
## CERTIFICATE

Certified that this dissertation entitled Cataloguing of Medicinal Plants in Vellanikkara Rubber Estate is a record of research work done independently by SRI K K RAGHAVAN under our guidance and supervision and that it has not previously formed the basis for the award of any degree diploma or fellowship to him

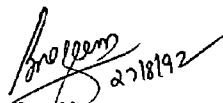
We the undersigned members of the Advisory Committee of SRI K K RAGHAVAN a candidate for the Post Graduate Diploma in Natural Rubber Production agree that the dissertation may be submitted by him in partial fulfilment of the requirement of the Diploma



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## ACKNOWLEDGEMENT

I wish to place on record my deep sense of gratitude and indebtedness to

**Dr G Sreekandan Nair** Professor and Head Department of Plantation Crops and Spices College of Horticulture Vellanikkara for his valuable guidance encouragement and inspiring criticisms at various stages of this study and in the preparation of the dissertation

**Sri P J George** Deputy Director Germplasm Division Rubber Research Institute of India Kottayam who with his rich experience in the field has guided me in the proper conduct of the study and made useful suggestions for improving the dissertation

**Dr P A Nazeem** Associate Professor Department of Plantation Crops and Spices College of Horticulture Vellanikkara for her critical evaluation of the manuscript and valuable suggestions in enriching the dissertation

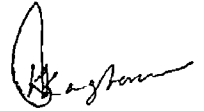
**Dr Alice Kurian** Associate Professor Department of Plantation Crops and Spices College of Horticulture Vellanikkara for her efforts made in critically going through the entire manuscript and giving useful suggestions for its improvement

Thanks are due to **Dr Luckins C Babu** Associate Professor **Sri T Premkumar** Assistant Professor College of Forestry Vellanikkara and **Sri C George Thomas** Junior Assistant Professor Department of Agronomy College of Horticulture Vellanikkara for their generousness in helping me to identify the plants properly

I also use this occasion to express my sincere thanks to the authorities of Rubber Board and Agricultural University for providing opportunity and facilities to undergo the Post Graduate Diploma course in Natural Rubber Production

Vellanikkara

18-7 1992



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# *Introduction*

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## 1 INTRODUCTION

India is an evergreen emporium of medicinal plants. The drug resources of our country are vast and inexhaustible and it can be said without exaggeration that India could supply the whole of the civilized world with medicinal herbs. Most of the drugs of established therapeutic value used in the pharmacopoeias of different countries grow in great abundance and often in a state of nature in many parts of India. Medicinal properties, some genuine, some otherwise, have been attributed to a large variety of plants, more than 15 000 in number. India possesses climatic conditions varying from the torrid to the frigid zone. It embraces vast tracts of tropical plants, temperate hills and valleys, irrigated soil, moist and dry climates. It is an accepted fact that the tropical rain forests are the richest biome on earth. In terms of human existence, the tropical rain forests represent a store of renewable natural resources which have for eons, by virtue of their richness in both flora and fauna, contributed a myriad of items for the survival and well being of man. These include basic food supplies, clothes, shelter, fuel, spices, industrial raw materials and medicines (ethical drugs).

No one would seriously challenge the fact that man is still largely dependent on plants in treating his ailments. It is clear that plants can be useful in their crude or advanced

forms as drugs that plants offer a source of drugs in their pure state and that biologically active secondary metabolites from plants can serve as templates for the synthesis of modern drugs. A large number of angiosperm species including medicinal plants are projected to become extinct within a decade or so due to the mass extinction process as a consequence of disappearance of the rain forest due to encroachment and extensive cultivation and indiscriminate collection.

Traditionally practitioners of the Indian systems of medicines Ayurveda Unani Sidha made up their own prescriptions for their patients but now a days most of their remedies are manufactured products. The increasing demands of the pharmaceutical industry have created problems of supply and one of the major difficulties being experienced by the Indian system of medicine is the scarcity of medicinal plants for the manufacture of genuine remedies. For certain drugs like penicillin aspirin etc we still depend on plant sources. So there is urgent need to create greater general awareness amongst the population as a whole the medicinal and economic value of these plants so that this heritage may be wisely used and exploited and at the same time conserved for future generation.

As indicated earlier natural resources are now being threatened by deforestation and conversion of the land for agricultural purposes. Vast area is being converted into plantations

like rubber tea etc Natural Rubber plantation industry which took its tiny first step into our country at the dawn of the present century now covers more than 4 50 lakh hectares spread over in almost all states where rubber can grown as a commercial crop In this steady progress towards its proliferation the natural vegetation in large areas is destroyed during weeding operations at the time of cultivation However a large number of herbs and shrubs (more than 100 species) of annual or perennial nature are growing as under growths in the plantations Weeds compete with rubber for light in the initial years and for moisture and nutrients at the later stage Hence these plants are being eradicated during the cultural practices adopted in the plantation as they are harmful to the main crop Weed control is one of the most important cultural practices in rubber plantations especially during the immature phase The cost of manually controlling weeds amounts upto 34% of the total cost of cultivation in the unproductive immature phase of rubber making the most costly component Weed control is to be carried out in mature areas also

The lush natural flora of shade tolerant weed plants growing in the plantations contains a large number of species which are widely used in the folk medicines and indigenous medicines Identification and cataloguing of the most important species of medicinal value will provide valuable information on the richness

of these plants in these areas. It will also help to identify the species which can be tried as intercrops in rubber plantations. And it was in this context the present study was undertaken.

# *Review of Literature*

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## 2 REVIEW OF LITERATURE

Plants have always played a major role in the treatment of human diseases. Use of plants for medical treatment in India dates back over 5000 years and has become codified in the Ayurveda which contains over 8000 herbal remedies. Ayurveda, in fact is the very foundation stone of the ancient medical science of India. It is followed by Susruta and Charaka. After the period of Tantras and Siddhas the glories of Hindu Medicine waned and declined due to the invasion of India by the Greeks, Scythians and Mohammedans successively. No original works were written and a good deal of existing Ayurvedic literature was mutilated or lost. When the British rule was established the western system was introduced. Of late considerable interest has been evinced by the public and by the medical profession regarding the use of indigenous drugs in the treatment of diseases. It is argued that apart from economic considerations these drugs are more suited to the habits of the people and the climatic condition prevailing in this country.

The study of Indian indigenous drugs was first begun in the early part of the last century and it was then confined chiefly to the collection of available information about various medicinal plants. Hortus Malabaricus by Von Rheedes (1678) was the

first systemic work which codified the medicinal use of plants of India. The other earliest contributions were from Sir William Jones who wrote a memoir entitled *Botanical observations on select plants*. This was followed in 1810 by John Fleming's *Catalogue of Indian Medicinal Plants and Drugs*. Ainslie's *Materia Medica of Hindustan* in 1813 and Roxburgh's *Flora Indica* in 1874. O. Shingnessy's (1841) *The Bengal Dispensatory and Pharmacopoeia* was the first book of its kind which dealt exclusively with the properties and uses of medicinal plants used in Bengal. In 1868 a *Pharmacopoeia of India* was published by Waring. Mohideen Sheriff (1869) published his *Supplement to the Pharmacopoeia of India* which added considerable utility to Waring's work. *Materia Medica of Madras* by the same author was edited and published by Hooper. It is a very useful work dealing with drugs growing in the Madras Presidency and in use there. Dymock's (1883) *Vegetable Materia Medica of Western India*. *Pharma Cographia Indica* in 1890-93 under the joint editorship of Dymock, Warden and Hooper are some of the other works. It is a most careful and useful compilation containing a mass of information regarding the uses of the indigenous materia medica in the Eastern and Western medicine. *A Dictionary of the Economic products of India* by Sir George Watt (1889-1904) gives a summary of all the previous work on the medicinal plants. Works published later such as Kanailal Dey's *Indigenous Drugs of India* and Kirtikar and Basu's *Indian Medicinal Plants* are

largely summaries and compilation from the above mentioned literature. In the latter work plates illustrating various important medicinal herbs are given which greatly help the worker in differentiating them from plants with which they are apt to be confused. Rao (1914) gives description and medicinal uses of 3535 plants of Travancore State.

Another work on the subject is the Wealth of India which is being published from 1949 under the auspices of the Council of Scientific and Industrial Research. In these the results of investigation of many drugs are given. Mooss (1953) in his Ayurvedic Flora Medica deals with the properties and notes on identification of important medicinal plants. Indian Materia Medica of Nadkarni (1954) is a worthy work on the subject. Chopra's (1956) Glossary of Indian Medicinal Plants gives brief notes on Pharmacological action and uses, chemical constituents etc. of common medicinal plants of India. Chopra's Indigenous Drugs of India (1958) explains in detail the pharmacopoeial and allied drugs, drugs used in the indigenous medicines, common bazar medicines of India etc. Dastur (1962) in his Medicinal Plants of India and Pakistan describes the morphological characters, action and uses of common medicinal plants of India and Pakistan.

Mooss (1976) reports the vegetable drugs that can be used as single drug remedies with much benefit as first aid.



and in certain cases of common ailments Dey (1988) introduces the Indian Medicinal Plant used in Ayurvedic preparations

### **Chemical constituents of Medicinal Plants**

It is well known that plants generally owe their virtues as medicinal agents to certain characteristic constituents like alkaloids glycosides saponins flavonoids tannins volatile oil steroids and/or terpenoids resin and mucilage present in them. Plants synthesise these organic compounds during their metabolic process when they grow. The nature and amount of these chemical substances vary according to the agro climatic conditions growth stage etc of the plant (Chopra et al 1958). Orthodox medicine today relies to a great extent upon chemicals first located in plants like morphine vincristine digoxine etc. Salicylic acid contained in Willow bark and violets is the glycosidal forerunners of aspirin. Penicillin one of most famous antibiotics vital in curing viral diseases is a contribution from the lowest form of plant life (fungi).

The plants which provide almost all the known cures of human illness can be dangerous too. The cardiac glycosides and pyrolizidine alkaloids are lethal to human when they are administered indiscriminately. The deadly night shade Atropa belladonna which produces the alkaloids hyoscyamine and

hyoscine ingested in over dose is fatal but carefully controlled dose of belladonna is a valuable spasmolytic agent (Mossa et al 1987)

The total effect of a plant when it is administered in its original complex biochemical package is rarely produced by the isolated active principle. For example the root of Rauvolfia serpentina was introduced into western medicine as a tranquilizer. When reserpine one of the major alkaloids of this plant was used for this purpose numerous cases were reported that patients treated with reserpine becoming depressed while there was no report of patients who had received total extract of roots becoming depressed. We can elucidate the reason for this beneficial total effect of the plant extract as a synergistic or modifying action of the accompanying chemicals in the extract on the pharmacological activity of the main constituents (Mossa et al 1987)

The alkaloids give a bitter taste to the plant and a considerable number of medicinal drugs owe their curative properties to these principles. Many naturally derived drugs like morphine from poppy, nicotine from tobacco, cocaine from cocoa, caffeine from coffee etc are alkaloids of plant origin (Chopra et al 1958). Nearly 30 alkaloids have been detected from the roots of Rauvolfia serpentina and reserpine is the most

important one (Duke 1985) Codeine emetine quinine etc are other examples of alkaloids of plant origin

Glycosides are much wider in occurrence than alkaloids and they are sugar containing compounds They constitute major classes of drugs like digitalis glycosides sennosides rutin arbutin etc Saponins are glycosides generally with sterols or triterpenes as their aglycones Saponin containing natural ingredients are sarsaparilla alfalfa fenugreek licorice etc (Mossa et al 1987)

Essential oils also known as volatile oils are usually complex mixtures of a wide variety of organic compounds like hydro carbons alcohols ketones phenols acids aldehydes esters oxides sulphur compounds etc eg clove cinnamon peppermint lemon and orange oils

Further it is known that at least 121 chemical substances of known structure are still extracted from plants that are useful as drugs throughout the world (Farnsworth and Soejarto 1988) According to an estimate of world Health Organisation (WHO) approximately 80% of the people in developing countries rely chiefly on traditional medicines for their primary health care needs of which a major portion involves the use of plant extracts or their active principles Even in the United States where synthetic dominates the drug market scene plant product still

represent an important source of prescription drugs using as extracted form purified drugs source of chemicals and herbal remedies (Farnsworth and Soejarto 1988)

### **Weeds in rubber plantations**

The agro climatic conditions under which the rubber is grown are favourable for the luxuriant and rapid growth of different weeds. As the land is cleared for planting whether it is new planting or replanting vigorous growth of natural weed species dominates the area. Chromolaena odorata (Eupatorium odoratum) is the most common noxious weed found in such areas. The other weeds commonly found in the rubber plantations in South India are Lantana aculeata, Mimosa pudica, Imperata cylindrica, Pennisetum polystygon, Borreria spp and a variety of other plants (Potty et al 1980). Rubber in its first two years does not occupy an area more than 10-15% of the land leaving the balance portion exposed to weed population. Weeds are a serious problem in all rubber plantation as they compete with rubber for sunlight, water and nutrients resulting in the suppressed growth of the latter especially during its initial period of growth. Uncontrolled growth of weeds will also hinder cultural operations. Hence weed control is an important cultural practice in rubber plantations. The weeds are controlled either by manual weeding or by the chemical herbicides. Establishment of leguminous cover crops in plantation is another practice to smother the

weeds It is reported that the cost of weed control accounts to 34% of the total cost of cultivation in the immature phase of rubber making it the most costly component. Regeneration of weeds is less in mature plantation because by that time the canopy of rubber tree would have closed.

When the weeds in the plantations are examined it was noted that many of them are useful medicinal plants. Those medicinal plants which are having good local demands can be tried as intercrops in plantations utilising the vast area now under rubber. This step will also help to conserve the endangered species.

#### **Cultivation of medicinal plants**

The collection of drugs scattered in forests is a very difficult task and often the cost of collection increases considerably the price of the crude drugs and their preparation. The disadvantages regarding the collection of drugs when they are growing in a state of nature in scattered areas are difficulty of access and transport when the natural home of the drug plant is far away, sparse distribution, indiscriminate collection which may lead to exterminations, ignorance of collectors generally leading to the admixture of genuine with spurious plants. Due to the destruction of forests, over grazing of meadows, expansion of industry and urbanization as well as excessive collection

in the wild of rare and endangered plants the natural resources of medicinal plants are being depleted day by day

It is on account of these difficulties a suggestion was made to cultivate them In order to ensure a regular supply of all drugs of standard quality to the pharmaceutical industry it is essential that drugs growing in a state of nature should be brought under systematic cultivation and those which are exotics should be introduced and cultivated Medicinal plants such as digitalis cinchona ipecacuanha pyrethrum etc have been tried in botanical gardens and in the tea and coffee plantations At present the cultivation of drugs and narcotics occupy only a very small percentage of the total area under cultivation Cinchona hemp tobacco opium etc occupy a comparatively small acreage (Chopra et al 1958)

Of late more interest is being given in cultivation of drug plants in India A number of drug farms have been started In Kashmir digitalis belladonna hyoscyamus pyrethrum senna etc have proved successful in certain parts In Karnataka State cultivation of wattle pyrethrum derris cinchona geranium peppermint and tung tree is successful The Indian Council of Agricultural Research through co ordinated research projects is also sponsoring such activity in several zones in north-eastern northern and southern India Rauvolfia serpentina is now cultivated in different parts of the country due to its high demand in the

market Various agencies now promoting cultivation of different medicinal plants which are having good demand in the market and fetches an additional income It is recently reported that Vinca rosea is being cultivated on a large scale along with other crops Nair et al (1991) reported the possibility of growing 13 medicinal/aromatic plants as intercrops in 8 20 year old coconut plantations The potential plants identified are Greater galangal Periwinkle Panikurkka Iruveli Channakkuva Ocimum (3 species) Koduveli Sarpagandha (2 species) Mango ginger and Kacholam The growth of these plants was not affected by the shade Successful cultivation of medicinal plants in coconut plantations will bring out additional income to the lakhs of farmers

Attempts to cultivate medicinal plants in rubber plantations have been reported recently Annual report of the Rubber Research Institute of India Kottayam (1987 88) mentions that certain shade tolerant medicinal plants can be cultivated as intercrops in the rubber plantations during the unproductive period More than 24 species have been reported as potential intercrops In a planting system (trench planting system) adopted by the Rubber Research Institute of India it is reported that about 12000 numbers of Koduveli or 18000 numbers of Karimkurunji or 36000 numbers of Sarpagandhi plants can be planted per hectare as intercrops in the rubber plantations Certain shade tolerant species like Adhatoda bedommie (cheria

adalodakam) Adhatoda vasica (valia adalodakom) Rauvolfia serpentina (Sarpagandhi) Holostemma annulare (Adapathiyar) Kaempferia galanga (Kacholam) Alpinia galanga (Aratha) Sida rhombifolia (Kurumthotty) Peuraria sp (Kattupayar) Desmodium sp (Kattuzhunnu) Strobilanthus haenianus (Karimkunjı) etc are reported to be shade tolerant species which can be successfully cultivated in rubber plantations (Vijayakumar et al 1989)

The trials conducted at the Central Experiment Station of the RRII showed that biological bunds raised with Strobilanthus haenianus were found to perform well in conserving soil and water Strobilanthus sp was also found to attract honey bees for four months Rauvolfia serpentina Holostemma annulare Sida rhombifolia and Peuraria sp (Kattupayar) did not perform well under mature canopy Adhatoda bedommie A vasica Strobilanthus haenianus Plumbago rosea Kaempferia rotunda K galanga and Alpinia galanga were found to come up well under deep shade (RRII 1989)

It is reported from trials on harvesting of Strobilanthus haenianus Adhatoda vasica Adhatoda bedommie Plumbago rosea Alpinia galanga and Kaempferia rotunda that the raising of these medicinal plants in mature rubber estate can fetch additional income

To study the yield potentials and nutrient requirements of intercrops and the effect of intercrops on latex yield a



statistically laid out trial has been initiated at the Central  
Experiment Station Chethackel (RRII 1990)

# *Materials and Methods*

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### 3 MATERIALS AND METHODS

The present study was carried out in the Department of Plantation Crops and Spices College of Horticulture Vellanikkara during the period 1991-92. Collection and identification of the plants was conducted in the Vellanikkara Rubber Estate owned by the Kerala Agricultural University at its main campus. The area is located at 10°31' N latitude and 76°13' E longitude at an altitude of 40 metres above M.S.L. The average annual rainfall in the locality during the last three years is 2758 mm. Relative humidity ranges from 51 to 88. The details of materials and techniques adopted during the course of investigation are presented hereafter.

The Vellanikkara Rubber Estate covers a total extent of 88.07 ha and it comprises rubber plants/trees aged 4 to 50 years. The old and uneconomic trees are not under tapping at present. It is thickly populated with numerous weed species as undergrowths. No cultural operations are being done in this area. The other areas where replanting done since 1978 are well maintained. Planting and upkeep operations are satisfactory.

Collection and identification of plants growing as undergrowths were made from replanted areas of 1978 and 1979. This is the Priyadarsini block which is located just behind the

Estate Office and Factory The total extent of this block is 8 50 ha comprising 2 00 ha of 1978 and 6 50 ha of 1979 replantings The soil is of laterite type with rocky patches here and there Topography is of undulating nature Planting distances adopted in the plantation were 4 9 x 4 9 and 4 6 x 4 6 meters Soil conservation measures have been undertaken in the area Initial planting density was 423/ha where as the present stand is only 352/ha The casualties were due to wind and drought in the subsequent years after planting and are seen at random in the plantation Planting materials used were budded stumps of the clone RRIM 628 RRIM 623 RRII 105 and RRIM 600 Canopy is moderately dense in the entire block Light penetration is more in the vacant patches

Cultural operations have been done satisfactorily Manuring is done using rubber mixture of the grade NPK 10 10 4 Usually 1 kg of this mixture is given in two equal split doses per tree as pre and post monsoon application Leguminous ground cover (Pueraria phaseoloides) established in the early years have been almost completely vanished now due to closure of canopy Traces of this legume are even now seen at random Weeding is another cultural operation practiced in the plantation Usually 2-3 rounds of slashing of weeds using sickle are carried out Cattle grazing is strictly controlled

Abnormal leaf fall and pink are the common diseases found in the plantation during monsoon period. Powdery mildew due to Oidium attack during the refoliation stage followed by wintering is another major disease. Prophylactic spraying using copper fungicides is conducted every year against abnormal leaf fall just before the out break of south west monsoon.

The growth of the trees is average though not uniform. Since 1987 tapping is conducted in the block.

A large number of herbs and shrubs of annual or perennial nature are growing as under growths in the plantation. Collection and identification of the flora found in the rubber estate with special reference to the medicinal plant species was carried out. The study was conducted for preparing detailed floristic accounts and for building up herbaria of economically important medicinal plants. The whole area was intensively studied and collection made regularly in different seasons. Complete sets of plants from the area were collected and recorded. Field book for labelling the plants and for recording notes about them in field was used. The data for each species recorded with care and precision at the time of collection. Specimens collected were serially numbered with dates of collection. Plant parts with flowers were collected where ever it was available. In the absence of flowers sterile twigs were collected.

The details recorded in the field note book include propagation and distribution methods habits habitats vernacular names and uses other information etc Pressing of the plant specimens was carried out in plant press to remove the moisture and for drying completely Blotting paper was used for the purpose When the plants got completely dried they were removed from the press and placed in ordinary news papers Later on these dried specimens were glued on herbarium sheets and relevant informations of the plants were noted

A survey of the literature on the naturally occurring medicinal plants was carried out The information on medicinal properties and uses found scattered in books on medical botany in anthropological writings in a variety of review articles and in other sources were also collected Literature survey on the folklore medicinal and indigenous medicinal use of the plants was also carried out Available informations on the main ingredients responsible for the medicinal properties of plants were collected from the literature Enquiries with local people were also made regarding the local importance and uses

## *Results and Discussion*

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#### 4 RESULTS AND DISCUSSION

The information on collected plants relating to binomial nomenclature vernacular name family morphological description their distribution chemical constituents responsible for medicinal properties action and uses of 50 plants are described here under

##### 1 Achyranthes aspera Linn

Vernacular name Kadalati

Family Amaranthaceae

Description Annual or perennial herb Stem erect not much branched Leaves few usually thick elliptic or obovate rounded at the apex finely or softly pubescent on both sides petiole 6-20 mm long Flowers greenish white numerous stiffly deflexed against the woolly pubescent rachis in elongated terminal spikes which are at first short but soon lengthen reaching as much as 50 cm long in fruiting Perianth 4-5 almost or nearly free glabrous and shining perianth lobes ovate oblong finely pointed with narrow white membranous margins Stames 5 staminodes truncate fimbriate Gynoecium bicarpellary syncarpous ovary superior Fruit (utricle) oblong or ovoid enclosed in the hardened perianth Seeds oblong and brown Propagation is through seeds (Hooker 1875)





**Distribution** Throughout India In Vellanikkara plantation, they are found in scattered clusters

**Constituents** The seed yields saponin The dry plants contain potassium chloride a fat and alkaloid (Mossa et al 1987)

**Action and uses** Roots fruits and plant as a whole is medicinal The herb is diuretic laxative stomachic astringent alterative antiperiodic and purgative Its juice is given in diarrhoea dysentery menorrhagia piles rheumatism inflammation of internal organs skin diseases etc The juice in large doses hastens labour pains or causes abortion The decoction is a good diuretic in renal dropsies The dried plant is given to children for colic and also as an astringent in gonorrhoea Water in which the crushed plant has been boiled is given in pneumonia The infusion of the root is given as a mild astringent

The seeds and leaves are considered emetic and are useful in hydrophobia The ash of the herb contains a large quantity of potash with honey it is given in cough and asthma Paste made from the leaf bud is used to treat wounds and injuries The ash of the plant in coconut oil is used for earache and against puss secretion from the ear (Kirtikar and Basu 1935 Nadkarni 1954 Pal and Jain 1989 Neogi et al 1989)

## 2 Aerva lanata Juss

Vernacular name Cheroola

Family Amaranthaceae

Description Perennial erect or prostrate herb with a long tap root branches many terete pubescent or woolly tomentose striate Leaves alternate elliptic or obovate entire pubescent above more or less white with cottony hairs beneath petioles 3-6 mm long often obscure Flowers greenish white very small sessile, often bisexual in small dense sub sessile axillary heads or spikes 6-13 mm long often closely crowded and forming globose clusters Perianth oblong obtuse sometimes apiculate silky hairy on the back Utricle broadly ovoid acute seed smooth polished and black Propagation is through seeds (Gamble 1957)

Distribution A common weed throughout India In small population among other weeds in the field studied

Constituents Contain some tannin The whole plant contains palmitic acid sitosterol and  $\alpha$ -amyrin (Mossa et al 1987)

Action and uses The plant is diuretic and demulcent In Sri Lanka it is used as a remedy for cystitis The root is demulcent diuretic useful in strangury It is also used in the treatment of headache It is used for cough also as a vermifuge for children A decoction of plant mixed with milk taken twice daily

will reduce the bleeding during pregnancy (Anonymous 1948  
Mooss 1953 Rajagopalan 1990)

### 3 Biophytum sensitivum DC

Vernacular name Mukkutty

Family Oxalidaceae

Description Annual stem long or short hispidly pubescent  
Leaves sensitive crowded into a rosette on the top of the stem  
petiole short rachis slender glabrous or hairy leaflets opposite  
Flowers dimorphic yellow peduncles many Sepals 5 lanceolate  
 acuminate petals 5 much exceeding the sepals lobes rounded  
and spreading Stamens 10 filaments free styles 5 stigmas  
notched at the apex or bifid Capsule ovoid or oblong Cells  
few seeded Seeds ovoid transversely striate (Gamble 1957)

Distribution Throughout the hotter parts of India Mostly under  
the sparse canopy in the plantation

Action and uses The leaves are bitter diuretic relieve strangury  
They allay thirst in bilious fevers The seeds are powdered  
and applied to wounds and with butter to abscesses to promote  
suppuration The root in decoction is given in gonorrhoea and  
lithiasis A decoction of the leaves is used as an expectorant  
and the pounded leaves are applied to wounds and bruises A

decoction of the leaves is given in asthma and snake bite. The plant is used as a tonic and mild stimulant (Kirtikar and Basu 1935)

#### 4 Boerhaavia diffusa Linn

Vernacular name Thazhuthama

Family Nyctaginaceae

Description A spreading herb with a stout root stock and many erect or spreading branches. Stems slender, cylindrical, thickened at the nodes, often purplish. Leaves at each node in unequal pairs, broadly ovate or sub-orbicular, rounded at the apex, green and glabrous above, the margins entire, often coloured pink. Flowers very small, shortly stalked or nearly sessile, 4-10 together in small umbels, arranged in slender, long-stalked corymbose axillary and terminal panicles. Perianth 3 mm long. Stamens 2 or 3, slightly exerted. Fruit oval, broadly and bluntly 5-ribbed, very glandular (Hooker 1875)

Distribution Throughout India. Plenty in the moist part of the estate.

Constituents The active principle of the herb is the alkaloid punarnavine. There are also large quantities of Potassium nitrate and other Potassium salts present in the plant (Nadkarni 1954)

Action and uses The plant is bitter astringent to the bowels useful in biliousness blood impurities heart diseases anaemia inflammations asthma The leaves are useful in dyspepsia tumours enlargement of the spleen abdominal pains The leaves are having a sharp taste appetizer alexiteric used in ophthalmia and for eye wounds useful in joint pains The seeds are tonic expectorant carminative useful in muscular pain lumbago scabies scorpion sting purify the blood hasten delivery

Medicinally the most important part of the herb is the root it is diuretic laxative stomachic diaphoretic and anthelmintic as a diuretic the root is particularly useful in diseases of heart and kidneys in gonorrhoea and dropsy It is also given in oedema anaemia intestinal colic cough and pleurisy Taken in large doses it acts as an emetic

The leaf juice is given in jaundice and other liver complaints The drug appears to exert a much more powerful effect on certain types of cases of ascites ie those due to early cirrhosis of the liver and chronic peritonites (Dastur 1962 Mooss 1976 Drury 1985)

##### 5 Calotropis gigantea R Br

Vernacular name Erikku

Family Asclepiadaceae

Description A common shrubby weed about 1.2 m high bark yellowish white furrowed branches stout more or less covered

with fine appressed cottony pubescence Leaves sessile opposite and decussate thick glaucous green elliptic or obovate oblong acute clothed beneath and more or less above with fine cottony tomentum with slightly cordate or often amplexicaul base Flowers purplish or white arranged in axillary umbellate cymes pedicels much longer than the flowers covered with cottony wool buds ovoid Calyx divided to the base 5 sepals cottony Corolla with 5 petals gamopetalous corona consists of fleshy laterally compressed scales radiating from the large staminal column Stamens 5, filaments connate in a fleshy tube around the ovary (staminal tube) the apex of the staminal tube united with much dilated stigmatic disc to which the anthers are also coherent forming the pentagonal gynostegium Ovary superior bicarpillary Fruit known as follicles broad thick fleshy ventricosa green Seeds numerous broadly ovate flattened tomentose brown propagation is by seeds (Gamble 1957)

Distribution Throughout India Seen on the peripheral sides of the plantation

Constituents Contains bitter resins akundarin and calotropin Latex contains uscharin calotoxin calactin (Chopra et al 1956)

Action and uses The plant is purgative alexipharmic antelmintic cures leprosy leucoderma ulcers tumours piles diseases

of the spleen the liver and the abdomen The juice is anthelmintic and laxative cures piles The root bark is diaphoretic expectorant emetic cures asthma and syphilis in form of paste applied to elephantiasis The flower is sweet bitter anthelmintic analgesic astringent cures inflammations tumours rat bite good in ascites The milk is bitter heating purgative cures leucoderma tumours ascites diseases of the abdomen useful in leprosy scabies ring worm of the scalp asthma enlargement of spleen and liver dropsy applied to painful joints The flowers are stomachic and good for the liver The leaves are applied to paralysed parts painful joints swellings heal wounds Tincture of leaves used in intermittent fevers

The root bark and juice of the plant are used in medicine for their emetic diaphoretic alterative and purgative properties The plant is a popular remedy for snake bite and scorpion sting The juice of young leaves is poured into the ears in cases of ear ache

Other uses Bark fibre silky and for making nets lines twine and strings Seed oil is used for burning Floss from fruits for stuffing beds pillows etc Wood for making gunpowder Calotropis latex is used to a limited extent in the tanning industry (Kirtikar and Basu 1935 Mooss 1976 Duke 1985)

6 Calycopteris floribunda Lam

Vernacular name   Varavalli   Pullani

Family                Combretaceae

Description    A scandent shrub   young branches slender and rusty  
Leaves opposite   ovate lanceolate or elliptic oblong   both surfaces  
more or less tomentose   the lower rusty and pitted   base usually  
rounded   Flowers sessile   yellowish green   in fubrous pubescent  
terminal panicles   Calyx densely hairy with in the mouth of the  
tube and tube produced above the ovary   long in fruit   strongly  
3 nerved and reticulately veined   Corolla with small petals  
Stamens unequal   much shorter than the calyx lobes   Ovary densely  
villous outside   ovules 3   pendulous from the apex of the cell  
with long funicles   Fruit oblong or ellipsoid   5 ribbed   pubescent  
or tomentose   crowned by the persistent calyx lobes (Gamble  
1957)

Distribution    Western Peninsula in deciduous forests   Orissa and  
Assam   Sparsely distributed in the Vellanikkara Rubber Estate

Constituents    The leaves contain tannin and a yellow crystalline  
flavone calycopterin (Chopra et al   1958)

Action and uses   The leaves are considered laxative and anthel  
mintic   It is bitter, astringent   in colic   grind and administered  
with butter as cure for dysentery and malaria   externally applied  
for ulcers   The juice is given in puerperal fever and applied



to the body as a diaphoretic. The root ground to a paste with that of Croton oblongifolium is applied to snake bite. Fruit with various spices is used in jaundice. In Cambodia the stems and leaves are considered tonic and depurative; they are administered as an infusion during the 15 days which follow delivery (Kirtikar and Basu 1935).

**Other uses** The stems store a large quantity of water and the stem juice is taken by the forest tribes in India for allaying thirst when water is scarce. The wood is used for making tool handles (Chopra et al 1958, Agarwal 1990).

#### 7 Cardiospermum halicacabum Linn

Vernacular name Valluuzhinja

Family Sapindaceae

**Description** Annual and perennial. A small delicate wiry smooth climber. Leaves alternate ternate smooth leaflets coarsely toothed very acute at the apex and narrowed at the base. Flowers bisexual and unisexual white in few-flowered umbellate cymes. Peduncle slender stiff axillary provided beneath the cyme with 2 opposite usually circinate tendrils. Sepals and petals 4 one pair of each longer. Stamens 8 style 3 fid and very short. Capsules shortly stalked subglobose or more commonly depressed pyriform trigonous truncate at top winged at the angles bladdery veined. Seeds black globose with a small conspicuous white heart shaped aril (Chopra 1977).

Distribution Common throughout India Abundant in the study area

Constituents The plant contains saponin Stigmasterol (glycoside) and quebrachytol from airdried plant and proanthocyanidin and apigenin from an alcoholic extract of the roots (Chopra et al 1940 Oliverbeaver 1983)

Action and uses The whole plant rubbed up with water is applied to rheumatism and stiffness of the limbs It is prescribed in snake bite The root is diaphoretic diuretic emetic laxative stomachic given in bleeding piles gonorrhoea rheumatism worms etc Leaves are administered for pulmonic complaints and mixed with castor oil are given internally for lumbago and rheumatism The whole plant steeped in milk is applied to reduce swellings and hardened tumours The fried leaves are considered emmenagogue The leaves mixed with jaggery and boiled in oil are specific in sore eyes

The juice of the plant promotes the catamenial flow during the menstrual period It is also a demulcent in gonorrhoea and in pulmonary infection It is dropped into the ears to cure earache and discharge from the meatus The root is given in scorpion sting In certain countries the leaves are applied to cuts and injuries and used as a stimulant and diuretic The seeds are a tonic in fever (Rao 1914 Mooss 1953 Dastur 1962)

8 Cleome viscosa Linn

Vernacular name Kattukaduku

Family Capparidaceae

Description Annual herbaceous erect softly pubescent Leaves 3 5 foliolate leaflets hairy ovate or obovate Flowers yellow axillary racemed and long pedicelled Sepals 4 oblong lanceolate glandular pubescent outside Petals 4 oblong obovate stamens 12 20 ovary sessile ovules many Capsules glandular pubescent Seeds small granular (Hooker 1875)

Distribution Abundant throughout tropical and warm India Appears chiefly in the rainy season Seen distributed in the studied area

Constituents Seeds contain a fixed oil which on standing deposited a crystalline substance containing myristic acid palmitic acid and viscoside acid A new flavone called viscosin is also isolated (Chopra et al 1958)

Action and uses The plant has a bitter taste cooling stomachic laxative diuretic anthelmintic reduces tumours and inflammations useful in skin diseases itching ulcers leprosy good in malarial fevers and fevers due to indigestion enriches the blood and is useful in blood diseases and uterine complaints Cures cough and earache The leaves favour digestion and dispel intestinal fermentation the juice cures earache useful in piles and lumbago as a local stimulant

The seeds are used as anthelmintic vesicant and carminative. Also given in fevers and diarrhoea. The plant is said to be astringent and antispasmodic. The roots and seeds are considered cardiac stimulants (Kirtikar and Basu 1935, Dastur 1962, Menon 1976).

#### 9 Clerodendron infortunatum Linn

Vernacular name Peruku Peruvellam Peringalam

Family Verbenaceae

**Description** A shrub clothed with brownish hairs, branches bluntly quadrangular. Leaves large, ovate, acuminate, thinly hairy on both sides, entire or denticulate, reticulately veined, base cordate or rounded. Flowers in large terminal, erect, pubescent panicles. Calyx persistent, corolla densely pubescent outside, white tinged with pink. Filaments, ovary and style glabrous. Seeds drupe, black, nearly globose, enclosed wholly by the enlarged pink calyx (Hooker 1875).

**Distribution** Throughout India. Very common in rubber plantations as undergrowth.

**Constituents** Leaves contain a bitter substance, clerodin, which act as a vermifuge. Leaves also contain proteinase and peptidase (Chopra et al 1956).

Action and uses The plant has a bitter pungent taste with flavour tonic aphrodisiac antipyretic anthelmintic useful in biliousness Kapha tridosha leucoderma thirst burning sensation foul odours diseases of the blood

The leaves and roots are used externally for tumours and certain skin diseases The fresh juice is employed as a vermifuge and also as a bitter tonic and febrifuge in malarial fevers The fresh juice or decoction is given as a rectal enema for killing ascaris The leaves enter into the composition of pills used in chest complaint with cough and difficult expectoration Leaves and flowers are prescribed in scorpion-sting The sprouts are recommended for snake bite

Leaf oil is used for making soaps and wood as fuel (Kirtikar and Basu 1935 Agarwal 1990)

#### 10 Corchorus olitorius Linn

Vernacular name Chanam

Family Tiliaceae

Description A herbaceous glabrous annual plant with erect branched slender stem Leaves light green lanceolate serrate acute or acuminate often with two teeth at the base of the blade prolonged into filiform appendage over 6 mm long petioles hairy short Flowers solitary or up to 3 on short thick stalks small yellow Sepals 5 petals 5 stamens numerous Style short stigma

microscopically papillage Carpels 5 united with a 5 locular ovary Capsules linear cylindrical erect 10 ribbed beaked glabrous 5 valved Seeds numerous black (Hooker 1875)

Distribution Widely spread in India Seen in the exposed areas of the rubber plantation

Constituents The plant contains the glycosides corchorin corchoroside A corchoroside B and olitorin The seed contain saponins (Chopra et al 1969 Mossa et al 1987)

Action and uses Leaves of the plant are demulcent tonic diuretic alterative alexiteric useful in chronic cystitis gonorrhoea and dysuria Infusion of the leaf is tonic and febrifuge It is astringent to the bowels remove tumours pain ascites abdominal tumours and piles The dried plant roasted and powdered is used in visceral obstruction A cold infusion is given to patients recovering from acute dysentery to restore the appetite and improves the strength The seeds are purgative Fruit contains vitamin C (Mossa et al 1987)

Other uses Seed oil as lubricant and seeds oil cake as manure fibres widely used for making antiseptic surgical dressings sacs tents and coarse woven fabrics etc (Agarwal 1990)

11 Curculigo orchioides Gaertn

Vernacular name Nilapana

Family Amaryllidaceae

Description Root-stock stout short or elongate with copious fleshy root fibres Leaves sessile or petiolate linear lanceolate membranous glabrous or sparsely softly hairy base sheathing (Plate 1) Flowers star like bright yellow on short clavate scape distichous the lowest bisexual the upper male Perianth segments elliptic-oblong acute hairy on the back Stamens small filaments short anthers linear Ovary lanceolate the cells 6 8 ovulate stigma 3 cleft Capsules 1 4 seeded with a slender beak Seeds oblong testa grooved in wavy lines black shining Propagation by root stock (Gamble 1957)

Distribution Western Peninsula Bengal Assam Very common in the rubber plantation

Action and uses The root stock is bitter sweet heating alterative appetizer aphrodisiac fattening carminative demulcent diuretic vulnerary tonic and antipyretic it is useful in piles biliousness fatigue diseases of the blood bronchitis ophthalmia diarrhoea lumbago gonorrhoea gleet pains in the joints asthma colic etc The powdered rhizome put into cuts is said to stop bleeding and to dry up the wounds Used as poultic for itch and skin diseases (Rao 1914 Chopra et al 1958 Dastur 1962 Mooss 1976 Narayanaswamy 1987)

Plate 1 Curculigo orchioides (Nilapana) growing  
in rubber plantation





12 Cyclea peltata Hook f and Thoms

Vernacular name Padakizhangu/Padathali

Family Menispermaceae

Description A climbing shrub Leaves peltate deltoid acute or sub acute (Plate 2) Flowers in axillary panicles Calyx companulate 4 lobed Corolla an irregularly 4 lobed cup Male flowers hispid or glabrous Anthers 4 5 connate crowning the staminal column Ovary single Drupe pilose Seed curved cotyledons slender (Hooker 1875)

Distribution From Konkan down to south and from Assam and Khasia Hills east wards Common in the rubber plantations

Constituents The rhizome contains a bitter amorphous alkaloid cyclein Traces of the alkaloid are also found in the leaves Other alkaloids present are burmannaline base C base D d tetrandrine dl tetrandrine d isochondrodendrine (Anonymous 1950 Chopra et al 1969)

Action and uses Leaves are used for preparing beverage rhizome in antifebrile medicine Roots are used in indigenous system for a variety of ailments jaundice stomachache fever leprosy and asthma (Chopra et al 1969 Agarval 1990)

Plate 2 Cyclea peltata (Padakizhangu) growing  
in rubber plantation



13 Cynodon dactylon Pers

Vernacular name Karuka

Family Gramineae (Poaceae)

Description A perennial glabrous grass. Stems slender, creeping, rooting at the nodes, forming matted tufts with slender, short, erect or ascending flowering branches. Leaves narrowly linear or lanceolate, glaucous, soft, usually conspicuously distichous in the barren shoots and at the base of the stems, sheaths with or without hairs, tight. Inflorescence consisting of 2-6 spikes radiating from a slender green or purplish peduncle, rachis slender, compressed or angular. Spikelets 1.7-2.5 cm long. Involucral glumes lanceolate, acute to subulate, mucronulate, the upper slightly longer. Anthers oblong. Propagation is by seeds and stem cuttings (Gamble 1957).

Distribution Widely spread in India. Distributed in patches in the plantation area.

Constituents The grass contains cynodin, triticin, vitamin C and hydrocyanic acid (Mossa et al 1987).

Action and uses The grass is diuretic, astringent, and styptic. It is used in dropsy, haematuria, and vomiting. The plant is also useful in biliousness, thirst, burning sensation, bad taste in the mouth, hallucinations, epileptic fits, fatigue, leprosy, scabies.

skin diseases dysentery fever erysipelas epistaxis

A decoction of the roots is diuretic and is used in dropsy secondary syphilis etc An infusion of the root is useful in bleeding piles The expressed juice is astringent and is used as an application to fresh cuts and wounds It is also useful in catarrhal ophthalmia

The roots crushed and mixed with curds are used in cases of chronic gleet The fresh juice is also used in gout and rheumatism (Chopra et al 1956 Singh et al 1979)

#### 14 Cyperus rotundus Linn

Vernacular name Muthanga

Family Cyperaceae

Description Glabrous stolons elongate slender 10-20 cm long bearing hard ovoid tunicate black fragrant tubers root fibres clothed with flexuous hairs stem sub solitary 10-75 cm long triquetrous at the top sometimes tuberous at the base Leaves shorter or longer than the stem narrowly linear finely acuminate flat one nerved Umbel simple or compound rays 2-8 the longest reaching 7-5 cm long bearing short spikes of 3-10 slender spreading red brown spikelets Bracts 3 variable in length Spikelets variable in length linear sub acute red brown 10-50 flowered compressed rachilla with hyaline wings Glumes oblong obtuse or slightly apiculate back reddish brown

3 7 nerved sides margins and tip hyaline Stamens 3 Stigmas  
3 elongate much exerted Nut broadly ovoid trigonous and  
greyish black (Gamble 1957)

Distribution Throughout India Common in the plantation

Constituents Tubers yield essential oil of antibiotic activity  
The essential oil contains about 27 components comprising pinene  
traces of cineole sesquiterpenes (hydrocarbons epoxides ketones)  
monoterpenes and new alcohol Iso cyperol The fatty oil contains  
neutral waxy substance glycerol linolonic linolic oleic  
myristic and stearic acids (Chopra et al 1956 1969)

Action and uses The root is diuretic emmenagogue diaphoretic  
anthelmintic vulnerary useful for ulcers and sores fevers  
dyspepsia urinary concretions It is pungent acrid cooling  
astringent bitter appetiser stomachic useful in leprosy  
thirst blood diseases biliousness dysentery vomiting  
epilepsy ophthalmia erysipelas They are held in great esteem  
as a cure for disorders of the stomach and irritation of the  
bowels The fresh tubers are applied to the breast as a  
galactagogue The small tubers act on the lungs and liver The  
tubers are given in large doses as an anthelmintic for round  
worms (Chopra et al 1956 Dastur 1962 Mooss 1976)

15 Desmodium gangeticum Dc

Vernacular name Orila

Family Leguminosae (Papilionaceae)

Description An under shrub stem irregularly angled glabrescent branches angled clothed with appressed white hairs Leaves I foliate petioles 1-2 cm long stipules scarious linear subulate striate at the base Leaflets membranous ovate oblong acute or slightly acuminate the margins some what wavy glabrous and green above paler and clothed with dense soft whitish appressed hairs beneath reticulately veined base rounded truncate or sub cordate Flowers in copious ascending terminal and axillary racemes 15 30 cm long arranged in few flowered fascicles along a slender pubescent some what angular rachis Pedicels filiform pubescent calyx hairy teeth triangular longer than the companulate tube Corolla violet or white standard 3 mm broad cuneate at the base Pods sub falcate indehiscent sparsely clothed with minute hooked hairs the lower edge rounded the upper straight (Gamble 1957)

Distribution Found throughout India Distributed in singles in the estate

Constituents Contain Indol 3 alkylamines showing antidepressant activity 12 alkaloids consisting of carboxylated and decarboxylated tryptamines  $\beta$  carbolines and  $\beta$  phenylethylamines have been isolated (Oliverbeaver 1983)



Action and uses The root is astringent in diarrhoea tonic diuretic useful in chronic fevers biliousness chronic affections of the chest and lungs cough vomiting asthma and nausea It is hot and bitter alterative aphrodisiac anthelmintic fattening useful in piles inflammations alexipharma prevents the death of the foetus in the womb and used in hemiplegia

The plant is considered antipyretic and antidiarrhoeal The root is prescribed in combination with other drugs for the treatment of snake bite and scorpion-sting

The stem is used for paper making (Kirtikar and Basu 1935)

16 Elephantopus scaber Linn

Vernacular name Anachovadi (Kozhuppa)

Family Compositae

Description A common weed Rootstock short giving off many stout fibrous roots stem usually dichotomously branched strigose with appressed white hairs Leaves mostly radical large lie flat on the ground forming a spreading rosette obovate oblong rounded or sub acute coarsely serrate dentate more or less hairy on both surfaces base tapering into an obscure petiole Cauline leaves smaller than the radical sessile or nearly so Heads numerous sessile closely packed forming a large flat topped terminal inflorescence surrounded at the base by 3 large stiff

broadly ovate cordate conduplicate conspicuously nerved leafy bracts Involucral bracts in 2 series enclosing 4 flowers bracts of outer row half as long as those of the inner Corolla violet exerted tube long slender limb deeply cleft on one side causing the 5 linear lobes to present a palmate appearance Style much exerted the arms recurved Achenes truncate finely 10 ribbed slightly pubescent (Chopra 1977)

Distribution Throughout India Seen throughout the estate

Action and uses The plant is astringent cardiac tonic alterative febrifuge antipyretic alexipharmic and used in snake bite A decoction of roots and leaves is emollient given in dysuria diarrhoea dysentery and swellings or pains in stomach The root is also given to arrest vomiting powdered with pepper applied to tooth-ache Bruised leaves boiled in coconut oil applied to ulcers and eczema Alcoholic extract of whole shoot shows antibiotic activity Root decoction is good for fever The plant is also good for treating leprosy (Menon 1976)

The plant is vulnerary cures biliousness remove foul taste from the mouth useful in all poisoning from the bites or from the nailes of animals bronchitis and small pox

The herb is tasteless with a flavour tonic laxative analgesic used in griping inflammations tonic to the brain

lesses sleep The leaves are used in pains and piles The flowers are aphrodisiac tonic expectorant cures liver troubles good in syphilis The plant is much used as a diuretic and febrifuge Paste made from the root is applied for pimples The root also given to new mother to help her milk flow (Chopra et al 1956 Anderson 1986)

17 Emilia sonchifolia Dc

Vernacular name Muyaicheviyan

Family Compositae

Description A glabrous slender herb erect or diffuse variously branched Leaves variable the lower petioled lyrate or obovate toothed or entire the cauline more or less amplexicaul and auricled usually acute Heads few laxly corymbose without bracteoles beneath the head flowers purplish peduncles very slender glabrous Involucere cylindric bracts almost equalling the corollas linear oblong acute with scarious margins Pappus copious white soft nearly equalling the involucral bracts Achenes narrowly oblong 5 ribbed brown scabrid on the ribs (Gamble 1957)

Distribution Common throughout India Distributed throughout the estates

Action and uses A decoction of the plant is febrifuge and given in infantile tympanitis and bowel complaints The pure juice of

the leaves is poured drop by drop into the eyes in night blindness and inflammations of eyes. It is also used in ear sores. The root is used for diarrhoea. Plant juice is antiseptic and applied on wounds and cuts.

In Indochina a decoction of the leaves is prescribed as an antipyretic. The plant is also used as an astringent, anti-asthmatic and vulnerary. The leaves are used to cure sore throat. Roots boiled and liquid drunk as treatment of tuberculosis (Kirtikar and Basu 1935, Anderson 1986, Neogi et al 1989, Agarwal 1990).

#### 18 Euphorbia hirta Linn

Vernacular name Nelapala

Family Euphorbiaceae

Description Annual herb erect or ascending hispid with long crisped hairs. Stems usually terete, branches often 4 angled. Leaves opposite, obliquely oblong-lanceolate or obovate-lanceolate, acute or sub-acute, serrulate or dentate. Involucres numerous, crowded in small axillary, shortly pedunculate, globose cymes. Gland minute, globose. Flowers male and female. Stamen without floral envelopes. Ovary 3-celled, capsule appressedly hairy. Seeds ovoid, trigonous, light reddish-brown (Gamble 1957).

Distribution Throughout the hotter parts of India. Distributed throughout the estate.

Constituents      Contain alkaloid and essential oil 1 inositol is isolated (Chopra et al 1958)

Action and uses      The juice of the plant is given in dysentery and colic and the milk applied to destroy warts Decoction is used in asthma and chronic bronchial affections The plant is used in worms bowel complaints and cough in childhood It is prescribed in gonorrhoea The herb is as an astringent in chronic diarrhoea and dysenteries It is applied to ulcers oedemas and phlegmons The juice is considered tonic narcotic and antiasthmatic An extract of the plant has sedative effect on the mucous membrane of the respiratory and genito urinary tract (Kirtikar and Basu 1935 Chopra et al 1958)

#### 19 Ficus hispida Linn

Vernacular name      Parom

Family                      Urticaceae

Description      A shrub All parts of the plant more or less hispid pubescent Leaves usually opposite petiolate membranous ovate oblong apiculate toothed or entire the lower surface hispid pubescent the upper hispid scabrid Receptacles yellowish when ripe with bracts scattered on the sides on peduncles in pairs from the axils of the leaves Male flowers rather numerous near the apex of the receptacle containing the galls Sepals 3 concave hyaline stamen 1 anther broad filaments

short Gall flowers pedicellate Perianth 0 Ovary smooth globose  
style short stigma dilated Achenes ovoid (Hooker 1875)

Distribution More or less throughout India This shrub is  
common in the rubber plantations

Constituents Contain saponin (Chopra et al 1958)

Action and uses All parts are bitter cooling acrid astringent  
to the bowels antidysenteric useful in Kapha ulcers bilious  
ness psoriasis anaemia piles jaundice haemorrhage of the  
nose and mouth diseases of the blood

The fruit is aphrodisiac tonic lactagogue emetic The  
powdered fruit heated with water to form a poultice is applied  
to buboes It is also given to milch cattle to dry up their milk

The fruit seeds and bark are possessed of valuable emetic  
properties (Kirtikar and Basu 1935)

20 Glycosmis cochinchinesis Pierre ex Engler Syn Glycosmis  
pentaphylla correa

Vernacular name Panal

Family Rutaceae

Description An erect shrub twigs tomentose terete Leaves  
alternate 3 7 foliate the rachis terete tomentose stout up  
to 18 cm long Leaflets alternate or sub opposite elliptic rhomboid

or ovate acuminate or acute entire rarely obscurely toothed pubescent on both surfaces glandular especially on the leaf margin pellucid punctate thinly coriaceous aromatic when crushed

Flowers yellowish tetramerous in terminal softy pubescent panicles Berry ovoid pale orange verrucose with tufts of short hair or glabrescent when ripe (Gamble 1957)

Distribution A very common weed in the rubber plantation Seen throughout India

Constituents Leaves contain alkaloids glycosin arborine glycos minine and arborinine (Chopra et al 1969)

Action and uses The roots pounded and mixed with sugar are given in cases of low fever The wood bruised with water is administered internally as an antidote for snake bite An infusion of the dried leaves is given as a tonic and appetizer to women after delivery

The plant is an indigenous medicine for cough rheumatism anaemia jaundice leaf juice is used as vermifuge leaf paste with ginger in water is used in skin diseases Root extract used in facial inflammations Twigs are used as tooth brushes (Chopra et al 1969 Agarwal 1990)

21 Helicteres isora Linn

Vernacular name Valampiri

Family Sterculiaceae

Description A shrub young shoots clothed with stellate hairs  
 Leaves bifarious oblong obovate or roundish cordate suddenly  
 and shortly acuminate closely dotted on both surfaces with stellate  
 hairs more or less irregularly crenate serrate Flowers distinctly  
 bilabiate in axillary clusters of 2-6 together pedicels very  
 short, stellately tomentose Calyx tubular somewhat 2-lipped  
 Petals red at first fading to lead colour very unequal closely  
 reflexed on the calyx separate but with the claws closely hooked  
 together Staminal column fused with the gynophore much exserted  
 suddenly deflexed anthers 10 in a ring round the ovary Ovary  
 conical on a curved gynophore style as long as the ovary deflexed  
 Follicles 5 beaked spirally twisted into the form of a screw  
 stellately tomentose Seeds numerous angular (Gamble 1957)

Distribution Common in almost all parts of India as well as  
 in the estates Shows stumpy growth due to frequent slashing

Action and uses The fruits are demulcent astringent and useful  
 in the griping of bowels and flatulence of children The fruits  
 are also made into a liniment for ear sores and administered  
 internally for colic The bark is used in diarrhoea and dysentery



The juice of the root is having a beneficial effect in empyema stomach affections diabetes and is a favourite cure for snake bite The root and bark are expectorant demulcent astringent to the bowels antigalactagogue lessen griping and a cure for scabies when applied topically

Bark fibre and stem fibre are used for rough sacs canvas cordage string container bags etc Leaves as fodder rich in vitamin A wood as fuel and making gun powder charcoal (Kirtikar and Basu 1935, Agarwal 1990)

## 22 Heliotropium indicum Linn

Vernacular name Venalpacha

Family Boraginaceae

Description A coarse annual herb with stout stem and ascending branches more or less densely hirsute with spreading hairs Leaves alternate or often sub opposite ovate or ovate oblong the margins much undulate or sub serrate base rounded or cordate or narrowed often unequal sided and then suddenly contracted and decurrent into the petiole Petioles more or less winged Flowers pale violet numerous sessile in simple usually extra axillary bristly ebracteate spikes Calyx bristly with a few long hairs outside segments linear lanceolate unequal Corolla tube hairy outside narrowed upwards lobes orbicular oblong Stamens inserted below the middle of the corolla tube filaments

very short anthers ovate acute Fruit 2 lobed lobes compressed bluntly 4 ribbed produced above into a short blunt bidentate beak and containing 2 angular beaked hard 1 seeded pyrenes (Hooker 1875)

Distribution Very common in India Seen scattered in the plantations

Constituents It is stated to contain an alkaloid (Chopra et al 1940)

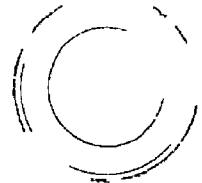
Action and uses The leaves are applied to ulcers wounds and boils The plant is diuretic astringent cures fevers and a decoction of the leaves and young shoots is taken for urticaria

The flowers in small doses are emmenagogue and abortifacient in higher doses Plasters of the roots and leaves are applied externally in ring worm and for rheumatism An infusion is used in venereal disease The leaves are used to cure gonorrhoea erysipelas and for stings of insects and reptiles (Kirt kar and Basu 1935 Chopra et al 1958)

23 Hemidesmus indicus R Br

Vernacular name Nannari Naruninti

Family Asclepiadaceae



Description It is known as Indian Sarsaparilla A perennial twining or prostrate shrub root stock woody stems numerous slender terete striate thickened at the nodes Leaves variable

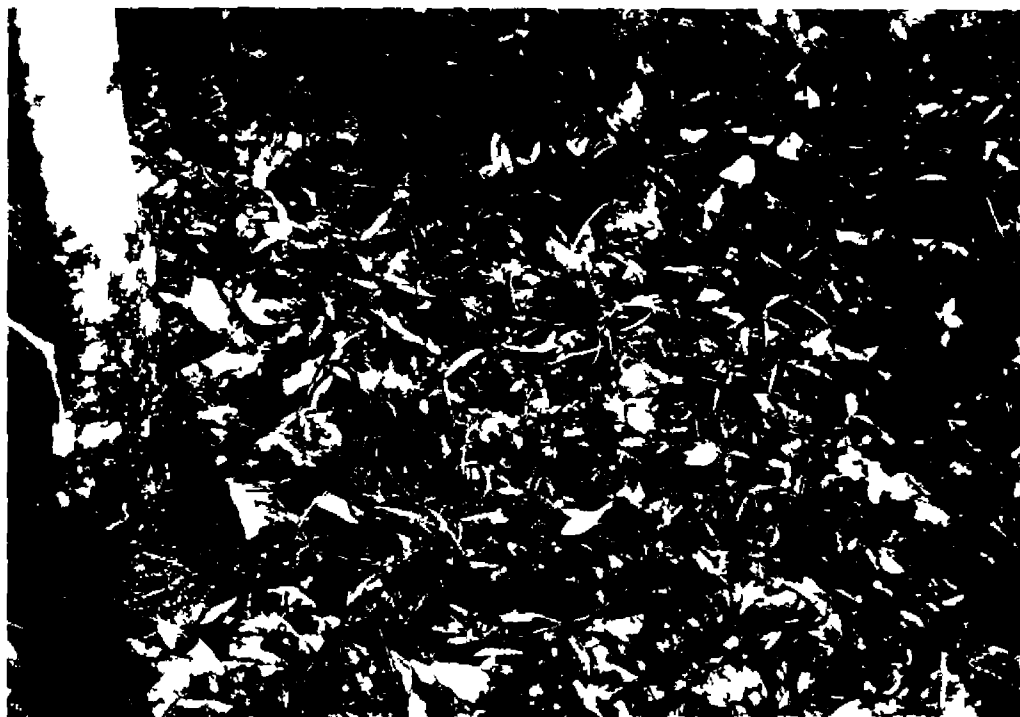
from elliptic oblong to linear lanceolate glabrous dark green often variegated with white above pale and sometimes silvery white and pubescent beneath (Plate 3) Flowers crowded in subsessile cymes in the opposite axils pedicels short clothed with numerous ovate acute imbricating bracts Calyx glabrous outside lobes ovate acute with membranous ciliolate margins Corolla greenish outside purple within tube very short lobes valvate fleshy Follicle very slender spreading Seed ovate oblong flattened black (Gamble 1957)

**Distribution** Seen in many parts of India Very common in the rubber plantation

**Constituents** The roots yield by simple distillation with water a steroptene which is a volatile acid The roots also contain an essential oil of which 80% consists of a crystalline material 2 hydroxy 4 methoxy benzaldehyde sterols (hemidosterol and hemidesmol) resins, tannin glycoside and saponin (Chopra et al 1958)

**Action and uses** The roots are an excellent substitute for sarasaparilla They are sweet demulcent alterative diaphoretic diuretic tonic and blood purifier The root is prescribed usually in the form of syrup It is aphrodisiac antipyretic alexiteric antidiarrhoeal astringent to the bowels cures leprosy leucoderma itching skin diseases fevers foul odour from the body loss of appetite asthma bronchitis leucorrhoea thirst burning

Plate 3 Hemidesmus indicus (Naruninti) growing  
in rubber plantation



sensation useful in piles rat bite poisoning eye troubles epileptic fits in children hemicrania pain in the joints and syphilis

The leaves are good for vomiting colds wounds and leucoderma The stem is diaphoretic diuretic laxative lessen inflammation good fo diseases of brain liver kidney gleet uterine complaints paralysis cough asthma and gargle is good for tooth ache

The root in combination with other drugs is prescribed in snake bite (Rao 1914 Chopra et al 1958 Narayanaswamy 1987)

#### 24 Hibiscus surattensis Linn

Vernacular name Pattuchembaratti

Family Malvaceae

Description Erect or trailing branches slender sparsely covered with recurved prickles Leaves orbicular or ovate acute to palmately 3 5 lobed with truncate base crenate serrate petioles prickly stipules broad leafy ear shaped toothed and ciliate Pedicels p ickly Involucral bracts 9 12 each consisting of a prickly stalk carrying a spatulate apiculate leaf like appendage prolonged downwards into a linear toothed ciliate spur Calyx membranous deeply divided lobes ovate acuminate the tips offer armed with stout recurved prickles with coloured mid and

marginal nerves and hairy margins Corolla yellow centre dark purple Capsules ovoid hairy (Gamble 1957)

Distribution Seen throughout India Seen in isolated population in the rubber plantation

Action and uses The mucilaginous flowers used as an emollient and pectoral A lotion of the leaf and stem is used for the treatment of penile irritation of any sort including venereal sores and urethritis It is sometimes applied as an ointment for the same purposes An infusion is also used as an injection into the urethra and vagina for gonorrhoea and other inflammations

Leaves given in coughs constipation and their decoction in skin diseases (Kirtikar and Basu 1935 Agarwal 1990)

## 25 Holarrhena antidysenterica Wall

Vernacular name Kodakappala

Family Apocynaceae

Description A shrub bark pale brown Leaves opposite subsessile elliptic membranous 6-12 inches long Flowers scented white in terminal corymbose cymes Calyx minute ciliate petals 5 tips rounded Follicles in pairs upto 15 inches long very narrow often dotted with white spots Seeds  $\frac{1}{2}$  inches long with a tuft of long brown hairs at the apex (Hooker 1875)

Distribution      Seen throughout India      Common in the rubber plantation

Constituents      The bark and seeds contain alkaloids - conessine kurchine kurchicine holarrhimine conarrhimine conamine conesimine isoconessimine conimine conessidine lettocine holarrhine etc (Chopra et al 1940)

Action and uses      The bark is bitter astringent anthelmintic stimulant tonic digestive stomachic expectorant antidysenteric and febrifugal cures fevers piles leprosy thirst skin diseases diseases of the spleen biliousness

The flowers are bitter appetiser anthelmintic used in diarrhoea diseases of the blood leucoderma The seeds are also used for the above purpose

The bark is vulnerary styptic good in headache lesses inflammation excessive menstrual flow The smoke is good for piles The leaves are astringent galactagogue tonic aphrodisiac remove pain in the muscles, cool the brain good in chronic bronchitis lumbago urinary discharges boils ulcers wounds useful to regulate menstruation used to fumigate the child and the mother after delivery

The seeds are carminative astringent aphrodisiac tonic given in affections of the chest asthma colic diuresis piles etc Pessaries made of the seeds and the bark give tone to the



relaxed uterine and vaginal tissues after child birth (Dastur 1962 Mooss 1976 Drury 1985)

26 Hyptis suaveolens Poit

Vernacular name Thrijada

Family Labiatae

Description A tall coarse branched very sweet smelling herbaceous plant varying in stature with obtusely 4-angled stems Leaves ovate sinuate and crenate denticulate slightly cordate hairy upper smaller Flowers small blue in colour when young capitate 2 4 together on an axillary peduncle (in globose heads) or in bracteate axillary racemiform cymes Filaments hairy Calyx compressed 2 lipped some what deflexed and with an inflexed ring of hairs in the mouth of calyx tube Nutlets compressed ovoid oblong emarginate at the tip pointed below ribbed (Hooker 1875)

Distribution Common throughout India Sparsely distributed in the plantation

Constituents Plant yield essential oil containing menthol 1 sabinene d limonene and azulenic sesquiterpenes (Chopra et al 1956 1969)

Action and uses The plant is pounded and applied to parasitical cutaneous diseases It is stimulant carminative sudorific in

catarrhal conditions lactagogue infusion is given in uterus infection plant paste in water as snuff in nose bleeding leaf juice in stomach pains antirheumatic and antisporific baths Root extract as appetiser The root is chewed with betel nuts as a stomachic (Chopra et al 1969 Agarwal 1990)

27 Ichnocarpus frutescens R Br

Vernacular name Palvalli

Family Apocynaceae

Description A large much branched twining shrub Young branches finely fulvous tomentose Leaves elliptic oblong acute or acuminate glabrous above slightly pubescent and pale beneath Flowers greenish white numerous in axillary and terminal rusty pubescent trichotomous pedunculate cymes Pedicels rusty pubescent often three together Calyx fulvous hairy lobes ovate acute Corolla tube with a narrow portion below the middle portion of the tube much inflated over the stamens the upper portion constricted below the lobes Stamens 5 gynaecium bicarpellary Follicle straight or slightly curved slender cylindric Seeds linear and black (Gamble 1957)

Distribution More or less throughout India Very common in rubber plantations

Action and uses The properties of root are similar to Hemidesmus indicus It is sweetish cooling approdisiac alterative tonic

cures thirst vomiting fever biliousness diseases of the blood and employed as a substitute for sarsaparilla A decoction of leaves and stalks is used in fever (Kirtikar and Basu 1935 Chopra et al 1956)

28 Jasminum angustifolium Vahl Enum

Vernacular name Kattumulla

Family Oleaceae

Description A twining shrub stems glabrous twigs pubescent Leaves simple numerous variable even on the same plant small usually 1.3-5 cm but sometimes attaining 9 cm ovate oval or oval lanceolate rounded at base sometimes attenuate obtuse or acute at apex glabrous

White flowers on longer slender pedicels solitary or more usually in threes at ends of short lateral divaricate twigs Calyx glabrous segments distant short filiform acute corolla tubed lobes 7 or 8 equalling the tube linear oblong very acute Stames 2 included in the corolla tube filaments short anthers oblong Ovary 2 celled style slender stigma capitate or linear Fruit a berry (Gamble 1957)

Distribution Seen in eastern and southern parts of India Sparsely seen in the plantation

Action and uses The bitter root grind small and mixed with the powdered root of Acorus calamus and lime juice and applied

externally in cases of ring worm (Kirtikar and Basu 1935)

29 Lantana aculeata Linn Syn Lantana camera

Vernacular name Arippu Kongini

Family Verbenaceae

Description A large scrambling evergreen shrub, twigs usually prickly pubescent Leaves opposite, ovate sub acute crenate-serrate, scabrid on both sides Flowers in heads which are permanently capitate, usually orange Peduncles hispid Calyx small Corolla-tube slender pubescent, cylindric lobes 4 Stamens 4 ovary 2 celled Fruit black shining (Gamble 1957)

Distribution Seen throughout India A common weed in the rubber plantation

Constituents Contains an essential oil (Chopra et al 1958)

Action and uses The plant is considered vulnerary diaphoretic, carminative antispasmodic A decoction is given in tetanus rheumatism and malaria It is a powerful tonic much used in atony of the abdominal viscera (Kirtikar and Basu 1935)

30 Leucas aspera spreng

Vernacular name Thumba

Family Labiatae

Description A pubescent annual herb 15 45 cm high stem erect and diffusely branched branches quadrangular Leaves sub sessile

or shortly petiolate linear oblong or oblong lanceolate entire or crenate hairy Flowers sessile in terminal and axillary whorls Calyx variable tubular tube curved contracted above the nutlets Corolla white enlarged and pubescent above annulate about the middle, upper lip 3 mm long densely white woolly lower lip about twice as long the middle lobe obovate rounded the lateral lobes small Stamens 4 gynoecium bicarpellary Nutlets oblong sub truncate at the apex smooth and brown (Gamble 1957)

Distribution Seen almost all parts of India Common in the estate

Constituents The leaves contain glucoside (Chopra et al 1956)

Action and uses All parts of plants stem leaves flowers and sometimes roots are used for medicinal purpose The plant is antipyretic and insecticidal The flowers used in cold The juice of the leaves is applied in psoriasis scabies and chronic skin eruptions The leaves are useful in chronic rheumatism Pounded leaves applied in scorpion sting The essence extracted by grinding flowers and leaves mixed with a little asafoetida and is given two or three times to check worms in the children The leaves have antibacterial activity and a bath in hot water with the leaves given to women after delivery (Chopra et al 1956 Agarwal 1990 Rajagopalan 1990)

31 Lygodium flexuosum (SW )

Vernacular name Vallipanna

Family Polypodiaceae

Description A fern fronds glabrous or slightly hairy pairs of fronds stipitate-pinnate with the pinnules again pinnate or variously lobed or sub palmate all serrulate sori protruding from the margin texture subcoriaceous

Distribution Common in South India and upto 5000 ft in Himalayas Seen commonly along the margins of cuttings in the plantation

Action and uses The plant is used as an expectorant The fresh root is boiled with mustard oil and used externally in rheumatism sprain scabies ulcers eczema and cut wounds It is a local application to carbuncles (Kirtikar and Basu 1935)

32 Merremia vitifolia Hallier F

Family Convolvulaceae

Description A perennial twiner stems long stout much branched the young ones clothed with spreading deciduous hairs Leaves when young are bronze-coloured palmately cut into 5 or sometimes 7 triangular acuminate lobes more or less hairy margins coarsely serrate dentate Flowers 1-7 in pedunculate cymes buds pointed bracts linear Calyx densely clothed outside with long spreading hairs Sepals more than 1.3 cm long enlarged in fruit broadly elliptic and obtuse Corolla yellow sub-companulate bands distinct

strongly lineate Stamens 5 epipetalous Gynoecium bicarpellary and syncarpous Capsules sub globose Seeds glabrous (Gamble 1957)

Distribution Throughout India Sparsely distributed in the plantation

Constituents Contain glucoside (Chopra et al 1956)

Action and uses The plant is given in strangury and urethral discharges The juice is cooling diuretic it is given with milk and sugar A lep is prepared consisting of the juice with lime juice one part opium  $\frac{1}{2}$  and Coptis teeta  $\frac{1}{4}$  which is applied around the orbit of the eye in inflammations The root is eaten raw as a remedy for stomach ache (Kirtikar and Basu 1935 Chopra et al 1956)

### 33 Mimosa pudica Linn

Vernacular name Thottavadi

Family Leguminosae (Mimosaceae)

Description A diffuse prickly under shrub Leaves sensitive digitately branched leaf stalks 2.5-5 cm long bristly pinnae 1-2 pairs 5-7.5 cm long sessile or nearly so their rachis clothed with ascending bristles Leaflets 12-20 pairs very small sessile leathery linear oblong bristly beneath Flowers small bisexual and unisexual tetramerous pink in globose heads usually

in axillary pairs all along the branches flower stalks prickly  
 Calyx very minute Corolla pink divided lobes 4 ovate oblong  
 obtuse Stamens 4 much exerted Pods flat slightly recurved  
 consisting of 3 5 one seeded joints which fall away from the  
 persistent sutures which are clothed with spreading yellowish  
 weak bristles the faces of the pods glabrous (Chopra 1977)

Distribution Grows throughout India Very common in the estate

Constituents Contain an alkaloid mimosine (Chopra et al 1956)

Action and uses The root is bitter and acrid vulnerary alexi  
 pharmic cures biliousness leprosy dysentery vaginal and uterine  
 complaints inflammations burning sensation fatigue asthma  
 leucoderma diseases of the blood

The root is resolvent alterative useful in diseases  
 arising from corrupted blood and biles bilious fevers piles  
 jaundice, ulcers small pox

The leaves and roots are useful in gravel and other  
 diseases of the kidneys piles and fistula A part of the leaves  
 is applied to hydrocele The leaf and stem in combination with  
 other drugs are recommended for the treatment of snake bite and  
 scorpion sting The plant is used externally in oedema  
 rheumatism, myalgia and tumours of the uterus (Kirtikar and Basu  
 1935 Dastur 1962)



34 Mollugo oppositifolia Linn

Vernacular name Kaipajira

Family Ficoidaceae

Description Diffuse prostrate or ascending stems numerous branched dichotomously with long internodes slender glabrous or pubescent near the ends Leaves in whorls of 4 5 unequal oblanceolate or linear lanceolate apiculate at the apex much tapered into the petiole which is therefore obscure Flowers white in axillary fascicles 2 or more pedicels filiform Calyx glabrous inside sepals oblong with membranous margins Stamens usually 3, ovary glabrous styles 3 very short stigma spreading Capsule ellipsoid a little shorter than the sepals 3 celled Seeds numerous sub reniform dark brown (Gamble 1957)

Distribution Seen in Gujarat southern parts of India Distributed in isolated patches scattered in the estate

Action and uses The plant is stomachic aperient and antiseptic Administered for suppression of the lochia Applied warm moistened with a little castor oil for earache The juice is applied in itch and other skin diseases (Kirtikar and Basu 1935 Chopra et al , 1956)

35 Naregamia alata Wight & Arn

Vernacular name Nilanarakam

Family Meliaceae

Description A small branching under-shrub Leaves alternate, 3-foliolate, petioles winged Flowers solitary or 2 together axillary, calyx 5 lobed, imbricate Petals 5 free elongate linear spatulate white Disk annular Staminal tube long slender cylindric below inflated near the top and sometimes cleft in 2 parts obscurely 10-crenate at the mouth anthers 10 appendaged at the apex Ovary 3 celled style filiform stigma capitate, ovules 2 in each cell collateral pendulous Fruit an ovoid-globose capsule, loculicidally 3 valved the cells 2-seeded Seed pendulous curved truncate at both ends cotylendons flat foliaceous (Gamble 1957)

Distribution Konkan N Kanara Western ghats upto 3000 ft In the estate it is seen in the spots where diffused light is available

Constituents Root bark contains alkaloid Naregamín (Chopra et al 1956)

Action and uses The root is sweet and cooling alexiteric volunerary, cures asthma, bronchitis biliousness ulcers The leaves and stem are given in decoction with bitters and aromatics as a remedy for biliousness

The root is a good emetic and cholagogue. It is useful in acute dysentery and as an expectorant. The plant is used in rheumatism and itch (Kirtikar and Basu 1935; Chopra et al 1956)

### 36 Narevelia zeylanica Dc

Vernacular name Kuruppakodi Vathakodi

Family Ranunculaceae

Description A common climbing shrub. Leaves 3 foliolate. Roots tuberous. Terminal leaflet generally transferred into a 3 branched tendril and other two opposite ovate-cordate. Flowers solitary and axillary. Peduncles small with a pleasant scent. Sepals 4-5 petals 6-12 narrow. Achenes red with long feathery styles. The plant propagates by seed or cuttings (Hooker 1875)

Distribution Tropical forests of Himalaya, Bengal, Assam, W Peninsulas. Seen scattered in the rubber estates.

Action and uses The tender stem used as tooth sticks in tooth ache. Crushed fresh roots applied in headache. The stem fibre is used for making ropes (Rao 1914; Anonymous 1966; Agarwal 1990)

### 37 Passiflora foetida Linn

Vernacular name Poochapazham

Family Passifloraceae

Description A slender foetid smelling climber with palmately 3 lobed leaves ciliate and denticulate with gland-tipped setaceous

hairs similar hairs also beneath and simple hairs above stipules lacinate with gland tipped segments Flowers greenish mostly solitary axillary with an involucre of finely pinnatifid bracteoles with capillary glandular segments Fruit like a small green goose berry (Gamble 1957)

Distribution Widely present in India Seen as a climber on other shrubs and rocks in the estate

Constituents Contain hydrocyanic acid (Chopra et al 1956)

Action and uses The leaves are applied on the head for giddiness and headache a decoction is given in biliousness and asthma The fruit is employed as an emetic The leaves are emmenagogue they are prescribed in hysteria The herb is used in the form of lotions or poultices for erysipelas and skin diseases with inflammation

Ripe fruits are edible (Kirtikar and Basu 1935 Oliver beaver 1983)

### 38 Phyllanthus niruri Linn

Vernacular name Kizhanelli

Family Euphorbiaceae

Description A much branched glabrous annual herb Leaf bearing branchlets slender spreading Leaves numerous small alternative arranged in 2 rows membranous usually having a fine bloom

on the under surface elliptic narrow at the base stipules 2  
 Flowers very small yellowish monoecious the males 1-3 the  
 females solitary in the axils Sepals of male flowers rounded  
 those of the female oblong sub acute with white margins Stamens  
 3 anthers sessile on a short column Styles minute free 2 lobbed  
 Capsules globose having several shallow lobes Seeds 3-gonous  
 (Chopra 1977)

Distribution Throughout the hot parts of India Common weed  
 in the estate area studied

Constituents Leaves contain bitter substance Phyllanthin dry  
 leaves yield bitter principles Hypophyllanthin and Phyllanthin  
 (Chopra et al 1956)

Action and uses The herb is astringent diuretic stomachic  
 cholagogal laxative deobstruent and bitter tonic It is given  
 for dropsical disorders gonorrhoea and other genito urinary  
 diseases jaundice constipation dyspepsia and dysentery The  
 juice of the plant is an efficacious dressing for offensive sores  
 used in ophthalmia

The fruit is bitter useful for tubercular ulcers wounds  
 sores bruises scabies ring worm The powdered leaves and  
 roots are made into poultice with rice water to lessen oedematous  
 swellings and ulcers

The fresh root is an excellent remedy for jaundice. The decoction of the root and leaves is a favourite remedy for the intermittent fevers. Fresh roots with rice water given for menorrhagia with milk given as a galactagogue (Kirtikar and Basu 1935; Mooss 1976).

### 39 Rauvolfia canescens Linn

Vernacular name Kattuamalpori

Family Apocynaceae

**Descriptio** It is a small erect shrub glabrous. Leaves in whorls of 4, unequal in size and elliptic. Flowers in corymbose or umbellate cymes. Calyx with 5 short lobes, round and ciliate. Corolla tube short, broad with 5 very short and rounded lobes. Stamens 5, included on the corolla tube. Filaments short and anthers small. Disc cup shaped or annular. Ovary with 2 carpels. Style filiform and stigma bifid. Fruit is drupe joined to the top, ovoid and red in colour. Propagation is through seeds (Gamble 1957).

**Distribution** It is found throughout South India, M.P. and Eastern India. It grows as undergrowth in the rubber plantation.

**Constituents** An alkaloid, rauwolfscine, has been isolated from the leaves. It is similar to yohimbine. Present throughout the plant. Reserpine also found in low content (Chopra et al 1956; 1958).

Action and uses Its roots are used as adulterant to Rauvolfia serpentina with low content of reserpine Plant is toxic cause vomiting paste of roots in mustard oil used as liniment in skin troubles bark extract in chronic skin diseases destroy parasites like ring worm

Rauwolscine has been found to be a depressant of the cardio vascular system It lowers the blood pressure and it is maintained in most cases indicating an action on the blood vessels (Chopra et al 1956 1958 Duke 1985 Agarwal 1990)

40 Rauvolfia serpentina Benth ex Kurz For

Vernacular name Chuvanna amalpori Sarpagandhi

Family Apocynaceae

Description A small erect shrub rarely reaching 0.9 m high bark pale Leaves in whorls of three thin lanceolate acute on acuminate glabrous bright green above pale beneath base tapering into a short stalk Inflorescence long stalked many flowered corymbose cymes 1.2 inches across stalk 2.5 inches long stout and bright red Flowers white often tinged with violet Calyx very small glabrous bright red Corolla tube long slender swollen a little above the middle lobes elliptic oblong rounded at the apex Stamens 5 epipetalous Superior ovary bicarpellary syncarpous Drupes single or didymous and connate purplish black when ripe The inflorescence of the plant with red pedicels and calyx and white corolla is striking (Hooker 1875)

**Distribution** Tropical Himalayas Hills of Uttar Pradesh Sikkim Assam Andamans Konkan N Kanara Western Ghats It is cultivated for medicinal uses Very sparse in the rubber plantations

**Constituents** More than 30 alkaloids have been isolated - mainly from roots Important ones are ajmaline ajmalinine ajmalicine serpentine serpentinine rauwolfine reserpine alloyohimbine chandrine deserpidine papaverine raunolinine rescinnamine sarpagine serpentinine serpine yohimbine etc Cerpacil the drug for blood pressure is manufactured from the roots Drugs used for actions of uterus and snake poison are also manufactured from roots Oleoresins glucose sucrose mineral salts etc are also present in roots stem etc (Chopra et al 1958 Duke 1985)

**Action and uses** The root is anthelmintic cures Tridosha ulcers poisonous effects of scorpion sting and snake bite It is a febrifuge and emmenagogue It has a marked sedative and hypnotic action it is a valuable remedy for insomania hypochondria hyperglycemia mental disorders high blood pressure certain forms of insanity Also used for hypertension neuropsychiatry gynecology

The root is used for fever dysentery and other painful intestinal ailments such as cholera gastritis etc In ayurvedic medicines it is used for worms ulcers scorpion sting and snake bite A decoction of the root is employed in labours to increase uterine contractions Juice of the leaves is instilled into the



eyes as a remedy for the opacity of the cornea (Chopra et al 1940 Lehane 1977 Duke 1985 Sheela 1990)

41 Scoparia dulcis Linn

Vernacular name Kallurikkı

Family Scrophulariaceae

Description Popularly known as Sweet Brown Weed An erect branched foetid herb with 3 nately whorled glandular and serrate leaves which are rhomboid or elliptic with tapering base Flowers 3 6 from each whorl on slender long pedicels Sepals 5 petals 5 gamopetalous white Stamens 4 Gynoecium bicarpellary Capsule very small, sub globose valves ultimately 2 fid (Gamble 1957)

Distribution Widely spread in India Seen near the boundaries of plantation

Constituents Contain an alkaloid an antidiabetic principle amellin (Chopra et al 1956)

Action and uses The plant is used as an infusion in ague Every part of the plant is emetic Used as a gargle for tooth ache A decoction of the root is given in blennorrhagia and in excessive menstruation

The root is astringent mucilaginous and emollient An infusion of the bitter leaves is prescribed in febrile conditions

and stomach troubles. It is diuretic and is a popular remedy for children. The leaf infusion is used in fever, cough, bronchitis, hot extract, diuretic, cold extract in kidney stone, roots, leaves and tips infusion in diarrhoea, dysentery, emetic, seed paste in water is a cooling drink, green plant, antidiabetic, good in anaemia, balances blood and urine sugar (Chopra et al 1956, Agarwal 1990).

#### 42 Sida rhombifolia Linn

Vernacular name Anakurunthottu

Family Malvaceae

Description A small erect under shrub. Branches rough clothed with minute stellate hairs. Leaves variable in shape, glabrous above, grey pubescent beneath, coarsely toothed towards the tip, entire towards the base. Petioles pubescent, swollen in the upper part. Flowers axillary. Calyx small, triangularly lobed, hairy and acuminate. Corolla yellow. Carpels 7-10 with 2 short awns. Seeds smooth and black (Hooker 1875).

Distribution A common weed seen in all parts of India. Found throughout the estate studied.

Constituents Leaves contain large amount of mucilage (Chopra et al 1956) and also rich in ephedrine (Agarwal 1990).

Action and uses The root and leaves are sweetish, aphrodisiac, tonic, remove tridosha, good in urinary complaints, discharges

and strangury useful in fever heart diseases burning sensations piles all kinds of inflammations

The plant combined with other drugs is prescribed as an antidote to snake venome and scorpion venome The root is commonly used in the treatment of rheumatism Roots are taken internally to help child birth Pounded leaves are applied on swellings The stem rich in mucilage is employed as demulcent and emollients Roots and leaves are used in tuberculosis The stem is febrifuge (Kritikar and Basu 1935 Chopra et al 1940 Agarwal 1990)

#### 43 Stachytarpheta indica Vahl

Family Verbenaceae

Description Annual herb stems erect dichotomously branched glabrous young branches nearly quadrangular Leaves elliptic obtuse or acute coarsely serrate base much tapering and decurrent into the petioles which are consequently obscure

Flowers sessile in long slender glabrous spikes reaching 30 cm long the rachis hollowed out beneath each flower bracts lanceolate subulate scariously margined near the base Calyx membranous tubular teeth 4 short acute Corolla deep blue glabrous tube slightly curved hairy inside limb 5 lobed Filaments slender hairy below Ovary glabrous style long filiform glabrous Fruit oblong ribbed splitting into 2 pyrenes (Hooker 1875)

Distribution Seen throughout India Plenty in the rubber holdings

Constituents Contain glucosidic substance (Chopra et al 1956)

Action and uses The plant is used externally for purulent ulcers and given internally for fevers and rheumatic inflammations It is much used in the treatment of dysentery The leaves are crushed and the juice used in the cure of eye troubles (such as cataract) and for open sores in childrens ears Also used to cure heart trouble (Kirtikar and Basu 1935 Chopra et al 1956)

44 Streblus asper Lour

Vernacular name Paruva

Family Moraceae

Description Commonly known as Rough Bush A rigid evergreen shrub or small tree Bark light grey or greenish with faint ridges rough when old Juice milky twigs hairy scabrid Leaves alternate rhomboid elliptic acute or acuminate more or less sinuate or crenate scabrid on both surfaces Flowers dioecious axillary Male flowers in globose pedunculate heads peduncles 1 4 together Perianth campanulate sepals 4 pubescent outside and imbricate in bud Stamens 4 inflexed in bud anthers reniform Female flowers solitary inconspicuous long peduncled perianth closely embracing the ovary sepals 4 enlarged in fruit Ovary 1 celled ovule pendulous styles 2 very long filiform connate at the base Fruit single seeded berry loosely enclosed by the enlarged sepals yellow when ripe (Hooker 1875)

Distribution Mostly drier parts of India Sparse in the rubber plantations

Constituents Bark contains bitter substance (Chopra et al 1956)

Action and uses Decoction of bark is given in fever dysentery and diarrhoea Roots are used as application to unhealthy ulcers and sinuses It is an antidote to snake poison The milky juice is antiseptic and astringent applied to chopped hands and sore heels

The plant is useful in leprosy piles diarrhoea dysentery elephantiasis tuberculous glands (Kirtikar and Basu 1935 Chopra et al 1958)

#### 45 Tragia involucrata Linn

Vernacular name Choriyanam Cherukodithuva

Family Euphorbiaceae

Description Commonly known as Stinging Nettle A perennial evergreen more or less hispid herb with scattered stinging hairs stems elongate slender and twining Leaves simple oblong cordate apex pointed in young leaves rounded in older leaves serrate covered with stinging hairs

Flowers shortly pedicellate in terminal axillary and leaf opposed usually hairy racemes Monoecious the male flowers upper most each with a bract white and green female flowers below the male flowers In male flowers sepals 3 concave glabrous

Stamens 3 Pistilloid small 3 fid In female flowers sepals 6  
 ovate hispid Ovary 3 lobed hispid styles 3 circinate  
 revolute united below in a stout cylindrical column Capsules round  
 3 lobed white hispid Seeds globose smooth (Gamble 1957)

Distribution Throughout India Common in the dense shaded canopy  
 of the estate

Action and uses The root is diaphoretic and alterative its  
 infusion is given in ardent fever and in itching of the skin The  
 root also forms the base of an external application in leprosy  
 Root also for pains in the legs and arms in form of a paste  
 used to aid the extraction of guinea worm The fruit rubbed over  
 the head with a little of water is useful in baldness for promoting  
 growth of hair (Chopra et al 1958 Dastur 1962 Behl and  
 Captain 1979)

46 Trianthema portulacastrum Linn

Family Ficoideaceae

Description A prostrate somewhat succulent herb stems more  
 or less angular much branched Leaves sub fleshy obliquely  
 opposite unequal the upper one of the pair the larger Flowers  
 solitary sessile almost concealed by the pouch of the petiole  
 Calyx lobes ovate acute stamens 10 20 Ovary truncate style  
 1 Capsules small almost concealed in the petiolar pouch Seeds  
 eniform dull black (Gamble 1957)

**Distribution** A common weed throughout India Seen along the boundaries of the plantation

**Constituents** Saponin and alkaloid Punarnavine have been isolated (Chopra et al 1958)

**Action and uses** The plant is alexiteric analgesic stomachic laxative alterative cures bronchitis heart diseases blood diseases anaemia inflammations piles ascites The root applied to the eyes cures corneal ulcers itching dimness of sight night blindness

The powdered root is given in combination with ginger as a cathartic and is used to induce abortion (Kirtikar and Basu 1935 Chopra et al 1958)

#### 47 Tridax procumbens Linn

**Vernacular name** Odiyanpachila

**Family** Compositae

**Description** A hispid procumbent herb with woody base some times rooting at the nodes upto 6 cm high Leaves ovate lanceolate lamina pinnatisect sometimes 3 lobed flowers in small long peduncled heads Ray florets strap shaped white disc florets yellow Achenes black narrowly obconical with feathery pappus (Hooker 1875)

**Distribution** Found as weed upto an altitude of 2 400 metre throughout India Seen throughout the estate studied

Action and uses Leaves are used in bronchial catarrh dysentery diarrhoea for restoring hairs check haemorrhages Leaf juice is antiseptic insecticidal depressant to respiratory organs Herb oil is used in insecticidal preparations (Anonymous 1976 Agarwal 1990)

48 Urena lobata Linn

Vernacular name Uram Udiram

Family Malvaceae

Description It is a common herb erect 5-10 cm high Leaves usually broader than long cordate serrate or toothed stellately hairy on both surfaces roundish angled lobes generally acute or acuminate varying in size and number Gland at the base of the mid rib and 2 adjacent nerves Petiole variable in length hairy Pedicels hairy short and clustered Calyx deeply divided lobes lanceolate and ciliate Corolla pink Stamens numerous monadelphous forming staminal tube around gynoecium anthers one celled Gynoecium multi carpellary syncarpous with axile placentation Styles twice as many as the carpels carpels separating on maturity from axis Capsules pubescent covered with blunt spines each spine having 2 straight bristles pointing downwards at an angle from the apex Seeds smooth rounded on the back and wedge shaped on the inner side (Hooker 1875)

Distribution A common weed in India Sparsely distributed in the study area



Constituents Seeds contain an enzyme urease (Chopra et al 1956)

Action and uses The root is employed as an external remedy for rheumatism It is a popular diuretic The leaves and roots are made into poultice and used as an emolient A decoction of root and stem is a remedy in windy colic

The flowers are used as an expectorant in coughs An infusion of the flowers is used as a gargle for aphthae and sore throat The root is widely used for procuring abortion A short piece of root is inserted into the vagina and left there for several hours (Chopra et al 1958 Agarwal 1990)

#### 49 Vernonia cinerea Less

Vernacular name Poovankuruntal

Family Compositae

Description Annual herb with erect hairy stem and branches Leaves variable broadly elliptic or lanceolate obtuse or acute smooth or hairy irregularly toothed or shallowly crenate serrate Flowers in heads Heads small about 20 flowers in lax divaricate terminal corymbs Flowers bisexual pinkish violet tubular and similar Pappus white the exterior row short Achenes oblong terete slightly narrowed at the base clothed with appressed white hairs (Gamble 1957)

Distribution Throughout India Spread all over in the estate

Constituents Presence of flavonoids sesquiterpene lactones and alkaloids are reported (Mossa et al 1987)

Action and uses The herb is diaphoretic anthelmintic alterative and bitter tonic A decoction is used to promote perspiration in febrile conditions The plant is stomachic astringent cures tridosha asthma and bronchitis The expressed juice is given in piles Used as a remedy for spasm and strangury

The roots are bitter diuretic and anthelmintic it is given in dropsy The flowers are used in conjunctivitis It also cures fever The seeds are used as an alexipharmic anthelmintic and it is an efficacious remedy for skin diseases like leucoderma psoriasis eczema and ring worm It is given in malaria along with quinine and it has been administered for amoebic dysentery intestinal worms etc The seeds are also used as an antidote and valuable as a tonic and stomachic given in intestinal colic dysuria flatulence and cough (Chopra et al 1956 Mossa et al 1987)

50 Zizyphus oenoplia Mill

Vernacular name Kottavalli

Family Rhamnaceae

Description A straggling shrub often semiscandent by its prickles young branches rusty tomentose Leaves numerous distichous ovate acute with pubescent tips minutely denticulate Flowers

12 20 in subsessile pubescent paniculate cymes which are slightly longer than the petioles Calyx hairy outside lobes ovate 5 in number Petals 5 obovate shorter than the calyx lobes exceeding the stamens Stamens 5 Disc with 10 short deeply pitted lobes glabrous ovary 2 celled styles 2 united to above the middle Drupe edible globose or obovoid one celled black shining pulp scanty (Hooker 1875)

Distribution Seen throughout the hotter parts of India The plant remains as stump due to slashing

Action and uses A decoction of the root bark is used to promote the healing of fresh wounds The fruit is used as an ingredient in the preparation of stomach ache pills (Kirtikar and Basu 1935)

Some of the species mentioned above are of very common occurrence in plantation and their population density is high Examples are Hemidesmus indicus Ichnocarpus frutescens Curculigo orchioides Cyclea peltata Clerodendron infortunatum Merremia vitifolia etc A large number of species are seen where the canopy is sparse Such plants include Achyranthes aspera Calycopteris floribunda Cynodon dactylon Glycosmis cochinchinensis Helicteres sora Hibiscus surattensis Naregamia alata Passiflora foetida Scoparia dulcis Sida rhombifolia Tragia involucreta Urena lobata etc A few are seen scattered and rare in the plantation These include Calotropis gigantea Cardiospermum halicacabum Desmodium gangeticum Rauvolfia serpentina and Narevelia zeylanica

Many other weeds are also seen in the plantation Eupatorium odoratum Berraria sp Alsycarpus rugosus Zornea gibbosa Triumfetta rhomboidea Blumea oxydonta Asytaceae sp Desmodium triflorum Kirganelia reticulata Cayratia pedata etc are some of the common species found in the estate. These plants are of little medicinal value. Moreover, they have not been fully investigated with reference to their economic importance. The regeneration of weed species is very high during onset of rain. Many of them are drought resistant and seen during different seasons of the year. Others dry up at the beginning of drought period and regenerated when the rainfall sets in through seeds and rhizome lying hidden underneath the soil surface.

## *Summary and Conclusion*

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## 5 SUMMARY AND CONCLUSION

The investigation revealed the presence of many medicinal plants growing as undergrowths in the rubber plantation. These plants are widely used by all sections of the population whether in local home remedies or in the medicaments of the different scientific systems of medicines or indirectly in the pharmaceutical preparation of modern medicine. It can be presumed that the vast area occupied by the rubber plantation industry in our country is richly endowed with a wide variety of plants of medicinal value which represent a great national resource. India officially recognises over 2500 plants as having medicinal value and it has been estimated that over 6000 plants are used in traditional folk and tribal medicine representing about 75 per cent of the medicinal needs of the country. Some of these plants are also abundant in rubber plantations.

The presence of a large number of weeds having medicinal value under the shade of rubber plantation give inference to the fact that they can be cultivated as intercrops in the plantation provided there is internal market demand and fetches a good remunerative profit. This will bring additional income to the lakhs of rubber growers from their limited unit areas. Plants like Pen desmus indicus and Curculigo orchioides which find a favourable growth under the dense canopy of rubber are of much commercial importance. But the impact of cultivation of these plants

on the growth and yield of rubber needs investigation. The experiments started at the Rubber Research Institute of India in this line will definitely bring out positive developments in the near future.

Further about 80 per cent of the raw materials for drugs used in the Indian system of medicine and homoeopathy are based on plant products. The credibility of these systems of medicine depends on having available authentic raw materials in sufficient quantities. With some 46 000 licenced pharmacies manufacturing the traditional remedies of these medicinal systems it is necessary to plan for large scale cultivation of medicinal plants and ensure that they are accurately identified, properly processed, free of adulterants and of acceptable quality. In areas where land is limiting these crops can be cultivated as intercrop. Moreover this will be an indirect attempt for the conservation of the endangered plants of medicinal importance.

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