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Enriching Live Collections of Wild Orchids and Pteridophytes of Kerala and Preparation of a Manual

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Final Report of the Research Project No. KFRI 440/2004

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PROJECT PROPOSAL

Project code	:	KFRI 440/2004
Project Title	:	Enriching live collections of wild orchids and pteridophytes of Kerala and preparation of a manual
Investigator(s)	:	M.S. Muktesh Kumar Forest Botany Department, Forest Ecology and Biodiversity Conservation Division

Objectives

1. To enrich the pteridophytes/orchids collection maintained at KFRI Campus to facilitate education of the public.
2. To maintain rare, endangered and endemic pteridophytes/orchids in live condition by reintroduction of these plants from their original locality.
3. Preparation of a manual of useful pteridophytes of Kerala

Project period	:	April 2004 to March 2007 (extended up to September 2008)
Funding agency	:	KSCSTE Plan Fund

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ABSTRACT

Conservation of endangered species, both *in situ* and *ex situ* preservations, are important. The *in situ* conservations, as in National Parks and Bioreserves, provide natural protection and intact environment, the *ex situ* conservation as in the green houses and botanical gardens can give material for closer observations and detailed studies, both for academic purposes and economic utilization. Considering the rapid decline in the natural resources there is urgent need to conserve and manage the existing rare and endangered species for posterity.

The present project was taken up with the objectives to enrich the live collections of ferns and orchids maintained in the pteridophyte/orchid house at KFRI campus to facilitate education for the students, teachers, researchers and even the common man to know the diversity of pteridophytes and orchids. The list of pteridophytes and orchids collected is given as Appendix 1 and 2, respectively. From among the useful pteridophytes collected, 66 species known to be highly useful have been included in this manual in order to highlight the importance of pteridophytes and their medicinal value and to create awareness among the public for conservation of this beautiful group of plants. Each species is dealt with a short description, distribution, medicinal uses, parts used, chemical constituents and other known uses from India and elsewhere have been compiled for the manual.

Introduction

The importance of the nature conservation and need to conserve the diversity is well known. Pteridophytes and orchids, with graceful appearance are distributed in various geo-climatic conditions throughout the world.

Conservation of endangered species, both *in situ* and *ex situ* preservations, are important. The *in situ* conservation, as in National Parks and Bioreserves, provides natural protection and intact environment, the *ex situ* conservation as in the green houses and botanical gardens can give material for closer observations and detailed studies, both for academic purposes and economic utilization. Considering the rapid decline in the natural resource there is urgent need to conserve and manage the existing rare and endangered species for posterity.

Role of fern/orchid house in environmental education programme

Pteridophytes are very popular as indoor and garden plants due to the shape and beauty of their frond. The fern fronds are largely used in floral bouquet and other floral arrangements. The fibres obtained from the petioles and rhizomes of ferns are used in decorating baskets, hats, cigar cases, tea strainers, etc. Ferns have been successfully used in the Ayurvedic, Unani, Homeopathic and other systems of medicine. They have an important role in folklore as well. Orchids are also very important in the cut flower trade and for their ornamental importance.

Maintenance of a fern/orchid house in the institute campus will help the students, teachers, researchers and even the common man to know the diversity of pteridophytes and orchids. About 66 species of pteridophytes available in Kerala State are known to be used for various medicinal purposes. In order to promote the importance of pteridophytes and their medicinal value, it is essential to promote awareness among the public for conservation of this beautiful group of plants.

Practical utility

Species conservation

From 13000 species of pteridophytes recorded in the world more than 1100 species are known from India. From Kerala 332 pteridophytes including 42 fern allies and 290 ferns are so far known (Easa 2003). With regard to the orchids among 1229 species recorded from India from Kerala 263 species are known (Nayar *et al.* 2006). Most of the rare and beautiful

species are restricted and localized to the interior of the forests. With a current rate of disturbances to forest ecosystem many species are likely to disappear. Conservation of the forest habitats together with the programmes to conserve the rare pteridophytes/orchids by *ex situ* methods are required for protect these beautiful plants from mass extinction from earth.

Environmental education

As a tourist centre, Peechi attracts lot of tourists. KFRI Campus is within the outskirts of Peechi-Vazhani Wildlife Sanctuary and also on the way to Peechi Dam. KFRI also imparts training on various aspects of biodiversity and environmental conservation to NGOs and students through collaborative efforts of foresters and scientists. The proposed fern/orchid house is very useful in providing information on the role of pteridophytes/orchids in the ecology of nature.

During the study 120 species of pteridophytes including fern and fern allies representing 28 families were collected. The list of genera under representative families is given as table1. The list of species is given as Appendix 1.

Table 1. Numerical representation of the pteridophytes collected

SI No.	Family	Genus	No. of Species
1	Adiantaceae	*Adiantum* *Cheilosoria* *Hemionitis* *Pityrogramma*	4 1 1 1
2	Aspleniaceae	*Asplenium*	14
3	Blechnaceae	*Blechnum* *Stenochlaena*	1 1
4	Cyatheaceae	*Cyathea*	1
5	Davalliaceae	Araiostegia Davallia *Humata* *Nephrolepis*	1 1 3 2
6	Dennstaedtiaceae	*Hypolepis* *Pteridium* *Sphenomeris*	1 1 1
7	Dryopteridaceae	*Dryopteris* *Polystichum* *Tectaria*	1 2 3

SI No.	Family	Genus	No. of Species
8	Equisetaceae	*Equisetum*	1
9	Gleicheniaceae	*Dicranopteris*	1
10	Grammitidaceae	*Grammitis*	2
11	Hymenophyllaceae	*Crepidomanes* *Hymenophyllum* *Meringium* *Microgonium*	4 2 1 1
12	Isotaceae	*Calamaria*	1
13	Lomariopsidaceae	*Bolbitis* *Elaphoglossum*	4 2
14	Lycopodiaceae	*Huperzia* *Lycopodiella* *Lycopodium*	5 1 1
15	Marattiaceae	*Angiopteris* *Marattia*	1 1
16	Marsileaceae	*Marsilea*	1
17	Oleandraceae	*Oleandra*	1
18	Ophioglossaceae	*Botrychium* *Ophioglossum*	1 3
19	Osmundaceae	*Osmunda*	1
20	Polypodiaceae	*Drynaria* *Lepisorus* *Leptochilus* *Loxogramme* *Microsorum* *Phlebodium* *Phymatosorus* *Pleopeltis* *Pyrrosia* *Tomophyllum*	1 2 3 3 2 1 3 1 5 1
21	Psilotaceae	*Psilotum*	1
22	Pteridaceae	*Acrostichum* *Actiniopteris* *Ceratopteris* *Pteris*	1 1 1 3
23	Salviniaceae	*Salvinia*	1

Sl No.	Family	Genus	No. of Species
24	Schizaeaceae	*Lygodium*	2
25	Selaginellaceae	*Bryodesma* *Selaginella*	1 3
26	Thelypteridaceae	*Cyclosorus* *Sphaerostephanos* *Thelypteris* *Trigonospora*	1 1 1 1
27	Vittariaceae	*Antrophyum* *Vittaria*	1 2
28	Woodsiaceae	*Diplazium* *Hypodematium*	1 1

Over 131 species of orchids were collected during the study. Numerical representation of the species belonging 43 genera is given below, however the list of species is given as Appendix 2.

Acampe - 3 species, *Aerides* - 2 species, *Arundina* - 1 species, *Bulbophyllum* - 11 species, *Calanthe* -1 species, *Cirrhopetalum* - 2 species, *Chiloschista* - 1 species, *Cleistostoma* - 1 species, *Coelogyne* - 4 species, *Cottonia* - 1 species, *Cymbidium*- 2 species, *Dendrobium*- 15 species, *Diplocentrum* -1 *species*, *Eria* - 12 species, *Eulopia* - 3 species, *Flickingeria* - 1 species, *Gastochilus* - 1 species, *Geodorum* - 1 species, *Kingidum* - 3 species, *Liparis* -2 species, *Luisia* - 5 species, *Nervilia* - 2 species, *Oberonia* - 23 species, *Papilionanthe* - 1 species, *Pholidota* -1 species, *Phretia* -1 species, *Podochilus* -1 species, *Polystachya* -1 species, *Pomatocalpa* -1 species, *Porpax* - 2 species, *Rhyncostylis* -1 species, *Robiquetia* - 2 species, *Schoenorchis* - 3 species, *Seidenfadineilla* - 2 species, *Sirhookera* - 2 species, *Smithsonia* - 3 species, *Tainiophyllum* - 1 species, *Thelasis* - 1 species, *Thrixspermum* - 2 species, *Trias* - 2 species, *Trichoglottis* -1 species, *Taprobanea* - 1 species, *Tropidia* - 1 species, *Vanda* - 3 species, *Vanilla* - 1 species and *Xenikophyton* -1 species.

Apart from wild orchids a few ornamental orchid hybrids such as, *Vanda* -5, *Oncidium* -2, *Dendrobium* -5, *Arachnis* - 3, *Paplionthae* - 2 were added in the orchid collection.

Publication of manual

From among the pteridophytes collected, 66 species that are known to be useful are included in this manual. Each species is dealt with a short description, distribution,

medicinal uses, parts used, chemical constituents and other known uses from India and elsewhere. Since there are several publications available on the orchid flora of Kerala, the descriptions and details are not included in this report. All the 66 species of useful pteridophytes included are arranged in an alphabetical order. The nomenclature has been updated according to www.theplantlist.org. The general view of the orchid/pteridophyte house is given in Plate 1, 2 & 3. A checklist of edible, fibre yielding ferns and of miscellaneous uses is also provided as Appendix 3-5. A glossary of medical terms used is also provided.

Useful pteridophytes

Pteridophytes, the primitive vascular plant groups with graceful appearance are distributed in various geo-climatic conditions throughout the world. They are represented by about 305 genera comprising more than 10,000 species all over the world (Dixit, 1984). About 19 genera and over 1,000 species are reported from India (Dixit, 1984; Bir, 1992). From Kerala 236 species of pteridophytes have been recorded (Nayar, 1997). Medicinal value of pteridphytes is known to man for more than 2000 years. Theophrastus (Ca 327-287BC) and Dioscorides (Ca 50AD) had referred to medicinal attributes of certain ferns. Mention has been made in the *Sushruta* and *Charaka* of the medicinal uses of *Marsilea minuta* Linn. and *Adiantum capillaries-veneris* Linn.f. in their *Samhitas* (Singh, 1999). The economic importance of ferns is well known. They are very popular as indoor and garden plants due to their shape and beauty of the frond. The fern fronds are largely used in floral bouquet. The fibres obtained from the petioles and rhizomes of ferns are used in decorating baskets, hats, cigar cases, tea strainers, etc. Ferns have been successfully used in the Ayurvedic, Unani, Homeopathic and other systems of medicines and have an important role in folklore as well. Kirtikar *et al.* (1935) have described 27 species of ferns having varied medicinal uses. Nayar (1959) recorded 29 medicinal ferns, Chopra, *et al.* (1956) have included 44 species and Nadkarni (1954) recorded 11 species of pteridophytes having medicinal importance,. Besides this, a detailed account of the various useful aspects of ferns throughout the world has been given by May (1978) where 105 medicinal ferns are listed. In the recent compilation by Singh (1999) 160 species of useful pteridophytes in India have been recorded based on the phytochemical, pharmacological and ethnobotanical studies. In the Ayurvedic drugs, ferns are used as an ingredient (Sivarajan and Indu Balachandran 1994; Warrier *et al.*, 1996). Nair (1985), Kumar and Madhusoodanan (1998) and Kumar *et al.* (1999) have recorded some ethnobotanical uses of pteridophytes.

Enumeration of species

Acrostichum aureum **L.**

Acrostichum aureum

Synonym: *Acrostichum auricomum* Kunze

Vernacular name: Machila

Pteridaceae

Rhizome erect, densely covered by scales all over. Stipes long, dark brown and scaly at the base abaxially rounded, adaxially grooved. Lamina oblong, simply pinnate, pinnae linear-oblong, deeply retuse, oblique margin entire, glabrous all over above and below, yellowish-green when fresh, brownish when dry, up to six pairs of pinnae in the distal part of the lamina are fertile. Sori acrostichoid; spores trilete, pale brown.

Distribution: Gregarious in tidal backwaters in fully exposed places. A common halophytic fern found near the saline areas of Kerala.

Parts used: Rhizome, leaves

Medicinal properties and uses: The rhizome is pounded and grated and is applied as a paste to heal the wounds and boils and used as an anthelmintic, vulnerary, is used in healing inveterate ulcers, used for worms and bladder complaints in China (Dixit and Vohra, 1984). Fertile fronds are used for syphilitic ulcers in Borneo. Fronds are also used as an antifungal agent.

Chemical constituents: B-sitosteral, Flavonoids, Tannins, Glucose, Fructose, Sucrose.

Actiniopteris radiata (Sw.) Link

Actiniopteris radiata

Synonym: *Asplenium radiatum* Sw.

Vernacular name: Mayoor sikha, Nayil kalshika

Pteridaceae

A herbaceous terrestrial or lithophytic palm-like fern with subercet rhizome, densely covered by scales. Stipes numerous. Fronds fan-like with numerous dichotomous segments which are rush-like in texture, veins few, sub parallel with distinct midrib. Sporangia borne in intramarginal grooves throughout, protected by the reflexed margin of the segments; spores trilete.

Distribution: Grows as large colony along roadsides in fully exposed dry places. Commonly distributed in dry areas of Chinnar and Attappady.

Parts used: Fronds, rhizome, whole plant.

Medicinal properties and uses: Plant is bitter and known to have the properties such as styptic, anthelmintic, astringent, sweet, cooling, acrid, constipating, haemostatic, antileprotic and as a febrifuge. It is used in the treatment for severe conditions of kapha and pitta, diarrhoea, dysentery, helminthiasis, haemoptysis, leprosy, skin diseases, diabetes and fever (Warrier *et al*., 1996). Fronds are chewed for sore throat and rhizome is boiled to prevent from dandruff in West Indies (Dixit and Vohra, 1984).

Adiantum capillus-veneris L.

Adiantaceae

Adiantum capillus-veneris

Plants with long creeping rhizome, densely clothed by lanceolate, acuminate, entire, brown scales. Stipes slender; lamina bipinnate, lobes slightly spreading, finely serrate except at the notches, veins dichotomously branched, terminal veinlets parallel to the soral outline, indusium reniform; spores trilete.

Distribution: A terrestrial fern common on rock crevices in moist and shady places between 300-2700m altitude. Reported form Pallivasal (Idukki) and Lakkidi (Wayanad) etc.

Parts used: Whole plant, fronds

Medicinal properties and uses: Leaves are official dye in the French, Austrian, Belgian, Croatico-Slovanica, Danish, Spanish, Portuguese, Romanian, Russian, Serbian, Swedish and Swiss Pharmacopeas (Quisumbing, 1951). In Philippines fronds are used for chest diseases and as an emmenagogue. It is also used as a stimulant, febrifige, expectorant, purgative, demulcent, emollient tonic, hair tonic, anticancer, hypoglycaemia, aphrodisiac, antibacterial, antifungal, antiviral, wound healer, anti implantation and quercetal.

Chemical constituents: Tannin, Kaempferal, Gallic acid, Quercetol, Astragalin, Tuteolol, Rutin, Triterpenoid, Isoquencitrin, Nocotiflorin, Quercituron, and Flavonoids, Naringenin, Hesperidin, Sulphuretin, Genistein and essential oils (Singh, 1999).

Other uses: The entire plant used as fibre. Due to the presence of tannic acid, gallic acid and essential oils, they produce a pleasant tonic flavour. Tincture is used in hair tonics and in alcoholic beverages.

Adiantum caudatum L.

Adiantum caudatum

Synonym: *Adiantum caudatum* var. *angustilobatum* Bonap.

Vernacular name: Nadappan pullu

Adiantaceae

Small terrestrial ferns with a short, erect rhizome bearing tufts of pinnately compound leaves on wiry brown petioles. Lamina simply pinnate with sub-sessile pinnules. Sori at the apices of lobes of lamina; spores tetral.

Distribution: This small terrestrial fern is found growing in shaded localities on earth cuttings, slopes or in crevices of rock in semi dry localities forming colonies.

This fern is reported from Nelliampathy, Parambikulam, Dhoni Hills (Palakkad); Thirunelly (Wayanad); Occasional on Ponmudi, Pali (Kottayam); Aryankavu, Kottarakkara-Kulathupuzha, Aruvikkara (Trivandrum); Konni, Adoor, Ranni (Pathanamthitta); Chinnar, Kumali, Kurisumala and Vandanmedu (Idukki).

Parts used: Leaves, roots, rhizome.

Medicinal properties and uses: Leaves are used to cure coughs, fever and diabetes also as remedy for skin diseases in Philippines (Quisumbing, 1951). The decoction of leaves and root is used for the treatment of chest complaints in Malaya (Burkill, 1966). The leaves are largely used as a substitute for *Adiantum capillus-veneris*. The juice of rhizome (about 4 teaspoonful twice a day) is given in case of fever, it is also prescribed for indigestion by the Nepalese (Manandhar, 1996).

Adiantum philippense L.

Synonym: *Adiantum lunulatum* Burm.f.

Vernacular names: Hamsapadhi, Nilamparanda

Adiantaceae

Rhizome erect or sub-erect; scales ovate-lanceolate. Stipes tufted, wiry, dark brown or black. Lamina lanceolate, simply pinnate; pinnae alternate, distinctly stalked, pinnae fan shaped, margin entire or subcrenate in sterile pinnae, pinnae pale green, glabrous. Sori continuous along the edge of the lobe, crescent shaped; spores triangular.

Adiantum philippense

Distribution: This species is more or less uniformly distributed throughout Kerala, commonly seen along fully or partially exposed roadsides and cuttings, between 200-1150m; very rarely seen as lithophytes.

Parts used: Rhizome, leaves and spores.

Medicinal properties and uses: Rhizome is used for the cure of gland swellings due to fever. Leaf extract is used in the treatment of dysentery, diseases of blood, ulcers, erysipelas and burning sensation. In Ayurveda the plant is recommended as a cure for epilepsy. The spores are said to be effective in the treatment of leprosy and other skin diseases (Nayar, 1959). The plant also has astringment, demulcent, pectoral, diaphoretic, emmenagogue, cooling, alternative and alexiteric properties. It is one of the constituents of Hansraj, the drug esteemed in India for coughs. The rootstock is considered good for fever and elephantiasis (Kirtikar *et al.*, 1935).

Adiantum poiretii Wikstr.

Synonym: *Adiantum crenatum* Poir.

Adiantaceae

Rhizome wiry, long creeping, much branched covered by appressed scales. Scales falcate, acuminate. Stipes tufted, dark brown, glossy. Lamina bipinnate, basal primary, basal secondary and tertiary pinnae terminated by a pinnule larger than the lateral ones; pinnule suborbicular, fan shaped. Sori in marginal notches, reniform; spores trilete.

Distribution: Terrestrial or amphibious herbaceous fern. Distributed in Devikulam, Munnar, Ellapatti (Idukki) and Koondale (Trivandrum).

Parts used: Whole plant, leaves, rhizome.

Medicinal properties and uses: Used as an emollient, in coughs and diseases of the chest. Leaf is smoked to cure colds. Decoction of rhizome is used to promote parturition. A demulcent drink and also for the cure of emetic disease in Europe (Nayar, 1959).

Angiopteris evecta (Forst.) Hoff.

Angiopteris evecta

Synonym: *Polypodium evectum* G. Forst.

Vernacular name: Churulikkilinthu, Vanchuruli

Marattiaceae

Rhizome erect, cylindrical, apex densely covered by dark brown hairs. Stipes long, tipular at the base. Lamina deltoid, bipinnate, pinnae subopposite, oblong lanceolate, dark green, margin serrate. Sori submarginal, ellipsoid; sporangia up to six pairs in two rows, compact, free; spores trilete.

Distribution: This large terrestrial fern grows in well-shaded, humid areas of evergreen forest on earth cuttings or among boulders on banks of canals in shaded as well as semi shaded areas. This species is found distributed in Silent Valley, Siruvani, Tiruvizhamkunnu (Palakkad); Bonacaud (Trivandrum); Chalakayam, Kulathupuzha, Pamba, Ponthanpuzha (Kollam); Devikulam, Kuttikkanam, Neriamangalam, Thakamani, Thankachi, Adimali (Idukki); Kuttampuzha (Ernakulam) and Nilambur (Malappuram).

Parts used: Tender stem, whole plant, tender leaves.

Medicinal properties and uses: The plant is anticancerous. The fresh croziers ground to a paste on granite and applied to the tumor (Mathew *et al*., 1996).

Chemical constituents: The plants contain active principles like Leucoanthocyanin, Leucodelphinidin and Leucocyanitin (Mathew *et al*., 1996).

Other uses: The massive stem is cooked and eaten by the tribals of Assam. An intoxicating drink called '*ruchshi*' is also prepared out of it. The stem is widely used as a support for transporting orchids. The plant yields aromatic oil and is used for purifying coconut oil in South Sea Islands.

Asplenium nidus L.

Asplenium nidus

Synonym: *Asplenium antiquum* Makino

Vernacular name: Maravazha

Aspleniaceae

Rhizome erect or suberect, densely scaly at the apex. Stipes tufted, grey-green, abaxially rounded. Lamina simple, elliptic to lanceolate, apex acuminate, margin entire, veins indistinct above, simple or forked once, dark green, glabrous. Sori usually distributed towards the distal one-third to three fourth part of the frond, linear along vein, stretching above from the midrib, not reaching the margin, indusiate, indusia pale brown; spores ellipsoid.

Distribution: This fern is found as an epiphyte on trees of evergreen forest between 500-1050m, rarely terrestrial. Distributed in Neriamangalam, Thankamani, way to Mangaladevi temple, Painavu, Moozhiyar, Poomkavanam (Idukki), Vazhachal (Trichur), Nelliampathy, Silent Valley Dam site (Palakkad) and Chulakayam (Kollam).

Parts used: whole plant

Medicinal properties and uses: It is used as a deputative and sedative in Philippines (Quisumbing, 1951). The plant is antibacterial and used in sore and ulcer (Singh, 1999).

Other uses: It is grown as an ornamental fern and also used in ornamental plaitory (Fosberg, 1942).

Asplenium polyodon G. Foster var. ***bipinnatum*** (Sledge) Sledge

Synonym: *Asplenium falcatum* var. *bipinnatum* Sledge

Aspleniaceae

Rhizome sub erect, densely scaly at the apex, scales lanceolate, dark brown, long acuminate, entire. Stipes tufted, dark brown to black. Lamina lanceolate simple pinnate, imparipinnate, vein distinct above and below, forked up to five times. Sori linear, median or submedian along the veins, parallel, more or less uniformly distributed, indusiate, indusia pale brown, narrow, entire; spores plano convex or reniform.

Distribution: This fern is found epiphytic or lithophytic on fully or partially exposed

roadsides or forest floor between 600-1400m. Distributed in Poovanchola, Panchalithode (Palakkad); Munnar Hills (Idukki); Muhamma, Vennikulam (Alleppey).

Parts used: Whole plant.

Medicinal properties and uses: The plant is used in the treatment for the enlargement of the spleen, incontinence of urine, jaundice and malaria in North Africa (Manickam and Irudayaraj, 1992).

Blechnum orientale L.

Vernacular name: Neettippana

Blechnaceae

Rhizome erect densely clothed by scales all over. Stipes tufted, dark or reddish brown at the base. Lamina ovate to linear lanceolate. Sori linear along either side of the costa; indusia dark brown; spores spherical or ovoid.

Blechnum orientale

Distribution: This is a medium sized terrestrial fern found growing as isolated plants or in colonies all over the plains and foot region of the Ghats in open exposed localities, commonly on steep earth cuttings. It is reported from Munnar Hills, Kamashi, Neriamangalam, Perumedu (Idukki); Punalur, Adoor, Thenmalai (Kollam); Aruvikara, Bonacaud, Ponmudi (Trivandrum); Konni (Pathanamthitta); Pambakada (Ernakulam) and Vaikam road (Kottayam).

Parts used: Rhizome, fresh fronds

Medicinal properties and uses: Fresh fronds are used as a poultice for boils in Malaya; rhizome is used as an anthelmintic in China, as cure for intestinal wounds. Bladder complaints in India, Polynesia and as a diaphoretic, aromatic and aperative in Philippines (Dixit and Vohra, 1984).

Chemical constituents: Chlorogenic acid, P-coumeric acid, Caffeic acid, P. hydroxybenzoic acid and Proto catechuric acid (Singh, 1999).

Other uses: The rhizome is eaten as a substitute for food during the scarcity in Malaya.

Botrychium lanuginosum Wall. ex Hook. & Grev**.**

Botrychium lanuginosum

Synonym: *Osmundopteris lanuginosa* (Wall. ex Hook. & Grev.) Nishida

Ophioglossaceae

Rhizome erect, solitary, young bud arising from the matured rhizome, densely clothed by pale yellowish brown unicellular hairs. Stipes pale green, terete, fleshy, plicate, sparsely covered by unicellular hairs. Lamina angular ovate or deltoid ovate, usually divided into three primary sterile branches, each bijointifid or tripinnatifid; fertile branch arising from the stalk of the middle sterile branch, tripinnate or quadripinnate; sporangia borne in groups or in two alternate rows on the ultimate segments, spherical, sessile, dehisced by vertical slit; spores pale green, globoid in distal view.

Distribution: This medium-sized terrestrial herbaceous fern grows as isolated plants on densely shaded humid forests floor on moss-covered rocks. This species is found distributed in Silent Valley National Park (Palakkad); Eravikulam Hills, Munnar, Devikulam, Thalachor kadavu, Mannavan Shola (Idukki) and Ponmudi (Trivandrum).

Parts used: Tender plant, root

Medicinal properties and uses: Plant antidysentric and antibacterial (Singh, 1999)

Chemical constituents: P-coumaric acid, Caffeic acid and P-hydroxy benzoic acid.

Other uses: Tender portions are cooked as vegetable.

Calamaria coromandelina (L. f.) Kuntze

Calamaria coramandeliana

Synonym: *Isoetes coramandeliana* L.f.

Isoetaceae

Corm subterranean, broadly obconical to hemispherical, fleshy, withered in well matured, larger plants bearing fibrous roots all over. Leaves tufted, erect, linear, grass-like, herbaceous and glabrous. Sporangia borne at the base of the leaves,

heterosporangiate; megasporangia common, plano convex or reniform. Sporangial wall very thin, transparent with many horizontal trabeculae on the inner surface. Microsporangia similar to megasporangia. Megaspores granular whitish, triangular, trilete; microspores whitish when dry, powdery monolete.

Distribution: This terrestrial fern is found on fully exposed wet or marshy border of lakes or ponds as large colonies in the plains.

Parts used: Whole plant

Medicinal properties and uses: Plant gives out a melancholy fluid used by the Europeans in the treatment of spleen and liver diseases (May, 1978).

Ceratopteris thalictroides (L.) Brongn.

Synonym: *Acrostichum thalictroides* L.

Pteridaceae

Ceratopteris thalictroides

Aquatic plant, stock erect or sub erect, bearing thick fibrous or fleshy long roots densely on the abaxial side, apex covered by scales. Fronds arranged in rosette. Lamina dimorphous, glabrous, pale green. Fertile lamina ovate, tripinnate, ultimate segment needle-like, margin reflexed and completely covering the lower surface on which two rows of larger sporangia are borne. Spores trilete.

Distribution: Common in wetlands and marshy places of Kerala. Gregarious in fully exposed canals at foothills, paddy fields, ponds and other such marshy places between sea level upto 100m altitude.

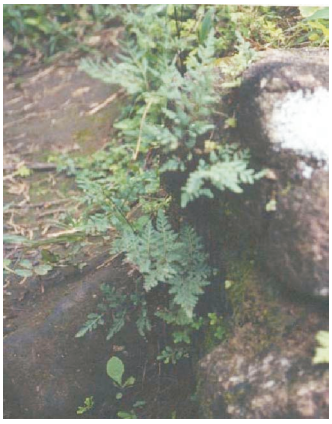
Parts used: Fronds, tender leaves, whole plant.

Medicinal properties and uses: The fronds are used as poultice in skin diseases. They are reported to be toxic and styptic.

Chemical constituents: Lipids with Pulmite, Stearic acid, Olic acid and Linoleic fatty acid and β-carotenes (Singh, 1999).

Other uses: Young fronds are used as vegetable and also as a green manure for the paddy fields.

Cheilosoria tenuifolia (Burm. f.) Trev.



Cheilosoria tenuifolia

Synonym*: Cheilanthes tenuifolia* (Burm.f) Sw.

Vernacular name: Kalppana

Adiantaceae

An attractive fern with densely creeping rhizome. Stipes crowded dark brown or reddish-brown, rounded below, grooved above, glabrous; Lamina ovate-lanceolate quadripinnate below, tripinnatifid or tripinnate at the middle, bipinnatified or bipinnate above. Sori marginal on each ultimate lobe; spores dark brown.

Distribution: Gregarious in fully exposed canals at foothills or paddy fields or other such marshy places.

Part used: Rhizome, root, whole plant

Medicinal properties and uses: Tribals use the extract of the rhizome and roots as a general tonic (Dixit, 1989). Roots vulnerary. The decoction of the plant is used for hair wash.

Chemical constituents: Ecdyzone analogues and Cheilanthone A&B (Singh, 1999).

Other uses: The Santhals, a tribal group of Bihar, consider this plant having magical religious effect and they prescribe the extract of roots for such sickness that are attributed to witch crafts or by the evil influence.

Cyathea gigantea (Wall. ex Hook.) Holft .

Cyathea gigantea

Synonym: *Alsophila gigantea* Wall. ex Hook.

Vernacular name: Marappannal, Kalyanathavai

Cyatheaceae

Tree-like fern, with large trunks and persistent swollen bases of stipes, bearing crown of fronds at the apex; trunk densely covered by scales. Lamina bipinnate, deltoid, primary pinnae about 12 pairs; secondary pinnae about 20 pairs, dark green when fresh, brownish when dry. Sori median on the veins, spherical, forming two zig-zag rows sub

marginally, exindusiate, sporangia numerous.

Distribution: This terrestrial tree fern is found frequently on the banks of rivulets and streams in well-shaded protected and moist localities. Reported from Bonecaud, Ponmudi, Kattur R.F. Suryakandhi (Trivandrum); Elappara, Kuttikkanam, Munnar (Idukki); Punalur, Kulathupuzha (Kollam) Peringal kuttu, Chedalthe (Kozhikode), Chandanathode (Kannur); Adukkum near Erattupetta, Karimalai (Kottayam); silent Valley National Park, Near Dam site, Way to Valiyaparathode, Silent Valley throughout the Ghat region.

Parts used: Fronds, rhizome

Medicinal properties and uses: Fronds are anti-inflammatory. Rhizome used against snakebite.

Chemical constituents: Starch, Proteins, Amino acids, Sugar, Steroid, Alkaloids, Phenolic compounds, Flavanoids, Saponins, Catechins and Tannins.

Other uses: The trunks are dried and kept in houses for their attractive appearance. The fronds are used for decoration.

Cyclosorus parasiticus (L.) Farw.

Synonym:*Christella parasitica* (L.) H. Lev.

Vernacular name: Cherula

Thelypteridaceae

Cyclosorus parasiticus

Rhizome long creeping, rarely erect with linear lanceolate scales. Stipes, grey-green, covered by few short or long hairs at the top. Lamina deltoid, broadly ovate or cordate; pinnae opposite at the base, subopposite to alternate at the distal part. Sori median or submarginal on the veins, up to five pairs, often the lowermost vein bearing sori. Indusia densely hairy; spores bean shaped.

Distribution: Very common throughout Kerala in partially shaded places in the evergreen forests

Parts used: Tender leaves, whole plant

Medicinal properties and uses: It is used in the treatment of gout and rheumatism

Chemical constituents: Sugars, Starch and Amino acids

Other uses: Tender leaves used as vegetables by the tribals of Attappady (Manilal *et al*., 2000).

Dicranopteris linearis (Burm.f.) Underwood

Synonym: *Gleichenia dichotoma* (Thunb.) Hook.

Gleicheniaceae

Rhizome thick bearing wiry roots, abaxially and laterally covered by deciduous brown hairs. Stipes scattered, grey brown, hairy at the base. Lamina long, primary branches forked three or four times; stipules clasping the rachis, pale green or glaucous green; sori submedian on the acroscopic veinlet consisting about 60 sporangia.

Dicranopteris linearis

Distribution: Gregarious along fully exposed roadsides between 850-2200m.

Parts used: Whole plant, rhizome, fronds, stipes

Medicinal properties and uses: Rhizome is used as anthelmintic in Assam. Fronds are used for asthma in Madagascar. Fluid extracted from the fronds shows antibacterial and anticancerous properties. It is also used in epileptic fits and asthma. The plant extract improves fertility in sterile women (Singh, 1999).

Other uses: Stipes are used for making writing pens (Dixit and Vohra, 1984). Splints obtained by cracking the outer covering of the long leaf stalks and pulling out the ribbon like vascular bundles are woven into mats, chair seats, punches, caps, fishing traps, coiled baskets and belts. Ropes, hats and cigar cases are also made form them (Manickam and Irudayaraj, 1992).

Diplazium esculentum (Retz.) Sw.

Synonym: *Diplazium malabaricum* Spreng.

Vernacular names: Churula, Parappanna, Sonae

Woodsiaceae

Rhizome erect, densely scaly at the apex. Stipes tufted, dark brown or black at the base. Lamina deltoid, apex acuminate, bipinnate with simply pinnate apex. Pinnae up to seven pairs, dark green glabrous. Sori linear, all along the veins except the base and apex; indusia pale brown with wavy margin; spores finely granulose.

Diplazium esculentum

Distribution: Terrestrial fern growing as large colonies in open marshy places along stream and canals up to 1100 m. Common in Kerala Ghats.

Parts used: Fronds, rhizome

Medicinal properties and uses: Fronds antimalarial, used in the treatment of jaundice, ear-ache and constipation (Singh, 1999). A decoction of young leaves used for haemoptysis and cough in Philippines (Quisumberg, 1951). Paste of tender frond is applied to treat scabies and boils, its juice (about 4 teaspoonful twice a day) is given in curing malarial fever (Manandhar, 1996). Rhizome is used in the treatment of cough, asthama, phthisis, fever, dyspepsia, stomachache, antidysenteric, as an insect and pest repellent and as an anthelmintic (Singh, 1999).

Chemical constituents: Protein, Vitamin B, Iron, Calcium, Phosphorus, Steroids, Triterpenoids, Flavonoides, Flavones and Sugar (Singh, 1999).

Other uses: the young fronds are used as an important leafy vegetable and known to be rich in nutrient contents.

Drynaria quercifolia (Linn.) J. Sm.

Synonym: *Polypodium quercifolium* L.

Vernacular name: Mathilpanna

Polypodiaceae

Rhizome short creeping densely clothed by dark brown soft scales, the fronds are of two types, sterile fronds become brown on aging and are small and some what

Drynaria quercifolia

concave, fertile fronds are long-stalked, large pinnately lobed, leathery, having a network of small quadrangular areolas. Sori seated at the juncture of veins, more or less in two rows along each primary vein, orbicular; spores reniform.

Distribution: It is more or less uniformly distributed throughout Kerala. This fern is grown as an epiphyte or lithophyte in fully or partially shaded places from 400-1200 m altitude.

Parts used: Rhizome, whole plant.

Medicinal properties and uses: The rhizome is bitter, it is used as an antibacterial, anodyne, constipating, anti-inflammatory, tonic, in the treatment of typhoid, fever, phthisis, dyspepsia, cough, arthralgia, cephalalgia, diarrhoea, foul ulcers and other inflammations. It is very specific in the treatment of Migraine (Warrier *et al.*, 1996). The decoction of the plant is used in typhoid fever (Dixit and Vohra, 1984) and is also used as anthelmintic, pectoral, expectorant, tonic dyspepsia and astringent. Fronds are useful in poulticing swellings.

Dryopteris cochleata (D. Don) C. Cha

Synonym: *Aspidium cochleatum* (D. Don) H. Christ

Vernacular name: Thaye

Dryopteridaceae

Rhizome short creeping densely clothed by scales all over. Stipes grey-brown when dry, fronds dimorphic; lamina lanceolate, bipinnate. Fertile pinnule oblong, acute, margin lobed. Sori one per lobe, indusia reniform; spores dark brown

Distribution: Terrestrial plants frequently seen along fully exposed roadsides, dry places or clearings between 400-1400m altitudes. This species is reported from Silent Valley, Nelliampathy, Pothundy to Kaikatty, Valiyaparathode, Silent Valley (Palakkad); Meppadi, Periya, Sultan Battery (Wayanad); Munnar Hills, Elapara, Kallar, Kumali, Kuttikkanam, Thalapara, Thankamani, Bank of Thannithode (Idukki); Ponmudi Estate (Trivandrum) and Begur Forest (Kannur)

Parts used: Rhizome, root, whole plant

Medicinal properties and uses: The whole plant is crushed in a bowl and the extract is given (twice a day) orally in case of snakebite. Besides, a paste of the plant is also applied on the bite wound to prevent infection (Varma *et al.*, 1995). The rhizome is antibacterial and antiepileptic (Singh, 1999). A small portion of the rhizome of the plant is powdered and

taken with water (twice a day) in rheumatism, epilepsy and leprosy (Shah and Singh, 1990). Juice of root (about 2 teaspoonful twice a day before meal) is given to treat amoebic dysentery (Manandhar, 1996).

Other uses: Tender portions are cooked as vegetable.

Equisetum giganteum L.

Synonym: *Equisetum ramosissimum* Desf.

Vernacular name: Cherappullu

Equisetaceae

Rhizome long creeping, subterranean, branched, dark brown, terete with ridges and furrows with nodes and internodes, bearing fibrous roots and aerial stem. Aerial stem, pale green distinguished into nodes and internodes, lateral branches one to five, borne around the nodes at the base of the nodal sheath; leaves scale-like borne on the upper edge of the nodal sheath. Sporangia borne on the underside of closely fitted, peltate, sporophylls with sporophore; spores homosporous, green.

Distribution: This species is found growing in swampy areas near margins of streams and rivers in sandy soil often amongst bushes. Distributed in few localities, Changanacherry (Kottayam); Anavai, Bhavani riverbank and Chindaki (Palakkad).

Parts used: Stem, young shoot.

Medicinal properties and uses: Powdered stem dissolved in water is used for enema during stomach upset in children. Barren women drink rhizome decoction to facilitate fertilization in South Africa (May, 1978). Plant is known to have diuretic, haemostatic, haemopritic, antirheumatic, antifungal and antiviral properties. A few pieces of the branches made in to a paste is used as local application for the treatment of fracture and the dislocation of bones (Das, 1997).

Chemical constituents: 3-methodoxy-pyridine, Nicotine, Paulstine, Thymene, Dimethyl sulphane, Iso-quercitrin, Galiteolin, Equisetrin, Equisetonin, Ascorbic acid, Kaempferol, Quercetin, Epigenin, Vitamin C, Lipids and Sterols (Singh and Viswanathan, 1996).

Other uses: Young shoot is eaten raw or boiled by Saanich Indians; *Equisetum* species in general is considered as an indicator of mineral. They are used to clean utensils and also for polishing wood.

Hemionitis arifolia (Burm.f.) Moore

Hemionitis arifolia

Synonym: *Asplenium arifolium* Burm.f.

Vernacular names: Pattichevian, Elicheviyan, Chilanthippacha, Poonakkathi, Manthamare

Adiantaceae

An attractive fern with characteristic fronds. Rhizome erect when young and creeping when mature. Densely covered by scales. Stipes compact, numerous, blackish brown. Lamina simple dimorphic, cordiform pale green. Sori continuous along the veins filling the entire surface of the lamina when mature; spores trilete and spherical.

Distribution: Common throughout Kerala especially on the cuttings and slopes of laterite areas. This low altitude ferns are frequently seen along the roadsides and clearings in fully exposed dry places between 20-1400m altitude.

Parts used: Fronds, Rhizome

Medicinal properties and uses: The fronds are used in the treatments of aches and as a vermifuge. Crushed juice is used in burns and menstrual disorders. It is also used as an anti-fertility and anti-flatulence agent. Rhizome has antibacterial property.

Chemical constituents: P-coumeric acid, Caffeic acid, Ferulate, P-hydroxybenzoic acid, Protocate-churic acid and Vanillic acid (Singh, 1999).

Humata immersa (Wall. ex C. Presl) Mett.

Synonym: *Leucostegia immersa* (Wall.) Presl

Davalliaceae

Rhizome long, creeping, densely covered by hairs and scales all over. Stipes scattered, pale or grey brown, rounded abaxially, stramineous and grooved adaxially. Lamina ovate, bipinnatified or tripinnate, primary pinnae up to 8 pairs, apex acuminate, base cuneate, secondary pinnae up to 8 pairs, in the basal primary pinnae of the largest frond, Lamina yellowish green, glabrous, texture soft herbaceous. Sori submarginal on the basal acroscopic lobe of the pinnule at the vein end. Indusia orbicular, pale brown,spores ellipsoid or plano convex.

Distribution: This is found as terrestrial or lithophytic fern on fully or partially exposed dry places along roadside, clearings or forest edges between 800-1300m. This species is reported from Anamalais and Wayanad.

Parts used: Young fronds, rhizome

Medicinal properties and uses: The paste of rhizome is applied on boils in Nepal (Manandhar, 1996). Rhizome is antibacterial and also used in constipation.

Other uses: Young fronds are cooked with potato and eaten with rice in Darjeeling, West Bengal (Dixit and Vohra, 1984).

Hymenophyllum javanicum Spring

Synonym: *Mecodium javanicum* (Spreng.) Copel.

Hymenophyllaceae

Hymenophyllum javanicum

Small filmy ferns, rhizome thin, wingless at the basal part, narrowly winged above, glabrous. Lamina oblong, lanceolate, bipinnatifid, ultimate segments oblong, rachis and costa broadly winged, margin entire, dark green, glabrous. Sori terminal on the ultimate segments, elliptic, involucre bivalved, free up to the base, acute, entire, glabrous, receptacles not extruded.

Distribution: Found inside the forest at 1500 and 2000m altitudes. Distributed in Chandanathode (Wayanad); Agastiar Hills (Trivandrum) and Silent Valley National Park (Palakkad).

Parts used: whole plant

Medicinal properties and uses: The dried fern mixed with garlic and onion is sometimes smoked by the local people to cure headache (Manickam and Irudayaraj, 1992).

Hypodematium crenatum (Forsk.) Kuhn.

Synonym: *Aspidium crenatum* (Forssk.) Kuhn

Woodsiaceae

Rhizome prostrate, densely clothed by scales giving a spongy structure to the rhizome.

Stipes closely arranged, stramineous to pale brown, densely scaling at the very base, glabrous and glossy above; lamina broadly ovate, basal half tripinnatified to quadripinnatified, distal half bipinnatified, pinnae 2-4 pairs, subopposite, pale green with herbaceous texture; sori median on the veinlets in two rows along the costules, indusia reniform, entire densely covered by short stiff hairs; spores reniform, planoconvex or ellipsoid.

Distribution: Found as lithophytes on fully exposed dry stones, crevices or wall crevices along roadsides between 900-1250 m. This species have been reported from Thekkady.

Parts used: Rhizome, leaves

Medicinal properties and uses: Rhizome is used as an antibacterial agent. Leaves are used to facilitate conception in women.

Chemical constituents: Phenols and Flavanoids, Neringenin, Aureusidin and Hesperidin.

Hypolepis glandulifera Brownsey et Chionnock

Synonym: *Cheilanthes dicksonioides* var. *phyllochaena* Kunze

Dennstaedtiaceae

Rhizome long creeping, slender, subterranean, densely covered by long septate dark brown hairs all over. Stipes scattered, abaxially rounded, adaxially grooved, pale brown, densely haired at the very base. Lamina deltoid, broad, bipinnate towards the apex, base subtruncate, quadripinnate at the base with primary, secondary and tertiary pinnae. Sori up to 4 pairs per pinnule, submarginal to the lobes, subterminal to the acroscopic veinlets. Spores elongate, pale green.

Distribution: This terrestrial fern is reported from Munnar Hills (Idukki), Agasthiar Hills and Ponmudi Hills (Trivandrum).

Parts used: Frond

Medicinal properties and uses: The fronds are used for poultice for boils in Malaysia

Loxogramme involuta (D.Don) C. Presl.

Polypodiaceae

Rhizome long, creeping, densely scaly; scales yellowish brown to pale brown. Stipe is dark

or reddish brown and scaly at the base. Fronds scattered, elliptic or linear lanceolate, entire, with flattened, winged midrib slightly raised. Lamina succulent, pale green or yellowish green. Sori linear, mostly in the distal part of the frond. Spores monolete, reniform, plano convex or ellipsoid.

Distribution: It is found as an epiphyte or lithophyte growing inside the forest. Very rare in Kerala.

Parts used: Rhizome

Medicinal properties and uses: The paste of rhizome is applied to heal cuts and wounds (Manandhar, 1996).

Lycopodiella cernua (L.) P.C. Ser.

Synonym: *Lepidotis cernua* (L.) P. Beauv.

Lycopodiaceae

An erect plant with terete stem, bearing branched roots at the base. Cones terminal on the ultimate branches, sporophylls yellowish green, sporangia reniform; spores trilete, pale green.

Lycopodiella cernua

Distribution: Found commonly in Malappuram, Wayanad, Palakkad, Kozhikode and Idukki Districts. Very common in shady places and cutting edges.

Parts used: Whole plant, rhizome

Medicinal properties and uses: The decoction of the plant is given in beri-beri, cough, chest complaints; embrocation of the ashes in vinegar for skin eruptions. The rhizome is used for nervous disorders, rheumatism and also given in fever and dropsy. (Manickam and Irudayaraj, 1992).

Chemical constituents: Cernuine, Nicotine, Lipids, Desmethyl sterol and Methyl sterol (Singh, 1999).

Other uses: It is cultivated as an ornamental plant in the Philippines.

Lycopodium japonicum Thunb.

Synonym: *Stachygynandrum japonicum* (Thunb.) P. Beauv.

Vernacular names: Velan pacha, Kalchetta

Lycopodium japonicum

Lycopodiaceae

Terrestrial, herbaceous, stem prostrate, about a meter long. Occasionally rooting at intervals, branching aniso-dichotomously, primary branches alternate, secondary branches alternate, unequal. Leaves spirally arranged, ascending, overlapping, subulate, entire, pale green. Cones borne on the ultimate branches, pedunculate; cones cylindrical; sporophyll sprouting both in young and mature cones, uniform, ovate; spores trilete.

Distribution: Found in fully exposed roadsides and cuttings of high altitude grasslands near streams. Distributed in Munnar, Peerumedu, Methuppu, Mannavan shola (Idukki) and Vythiri (Wayanad).

Parts used: Spores, whole plant.

Medicinal properties and uses: The plants are diuretic, antiseptic, used in rheumatism and diseases of lungs and kidneys. The spores are used in pharmacy as water repellant and protective dusting powder for the preparation of suppositories; extracts from plants are made into a paste and used as kidney stimulants (Manickam and Irudayaraj, 1992). Plants smoked with *Selaginella rupestris* for relief of headache; decoction is used as a diuretic and as anti spasmatic in South Africa (May, 1978).

Other uses: The spores are highly inflammable and under the name of vegetable bristone have been used in the manufacture of fire works and for stage lighting in theaters. This plant is considered as biological accumulator of aluminium.

Lygodium flexuosum (Linn.) Sw.

Synonym: *Hydroglossum flexuosum* (L.) Willd.

Vernacular name: Vallippana, Nayppallu, Chathavalli.

Schizaeaceae

Large terrestrial climbing fern common everywhere on lowlands in fairly open places. Rhizome short creeping with dark brown, multicellular, uniseriate, tubular hairs

throughout the rhizome. Stipes closely arranged, dark brown and densely hairy at the base, stramineous and glabrous above, fronds oblong-lanceolate, tripinnate, primary pinnae alternate, stalk forked and bearing a dormant bud on the forking axis, forked branch bears two to three pairs of forked pinnules alternately. Sporangia arranged adaxially on long finger-like spikes along the margin of the pinnules, about five pairs, alternate, protected by indusium; spores yellowish green.

Lygodium flexuosum

Distribution: Occasional on the Kerala Ghats, along fully or partially exposed roadsides, rich in laterite areas between 20-800m altitude.

Parts used: Young shoots, whole plant, rhizome, leaves.

Medicinal properties and uses: Plants are used as expectorant. Rhizome boiled with mustard oil and is locally applied to carbuncle and in the treatment of rheumatism, sprains, scabies, ulcers, eczema and coughs (Dixit and Vohra, 1984). The aqueous extracts of the rhizome are used for the treatment of gonorrhea. The part of rhizome is applied for piles and rhizome is also tied on the waist (Singh *et al*, 1989), part of plant is applied in case of herpes, juice of this plant (about 3 teaspoon full twice a day) is given to relieve fever. It is an anti-ovulatory and also used in the treatment of jaundice (Manandhar, 1996).

Other uses: Tender portions are eaten as vegetable, stems may be used for tying rice sheaves.

Lygodium microphyllum (Cav.) R. Br.

Synonym: *Hydroglossum scandens* (L.) Willd.

Vernacular name: Cheruvallippana

Schizaeaceae

Terrestrial, climbing ferns, rhizome long creeping, covered by dark hairs. Stipes and rachis brown; primary branches borne on the adaxial side of the rachis, bearing a dormant apex with dense, short hairs. Secondary rachis and stalk of the pinnules narrowly winged above, lateral pinnules up to four pairs. Pinnules pale green, sporangia borne on the surface of the

finger-like lobes all round the margin of the pinnules except at the cordate base, up to six pairs in two rows per lobe, each one covered by an indusium; spores trilete.

Distribution: Distributed in few localities of Kerala such as Mavelikkara (Alappuzha); Ponmudi (Thiruvananthapuram); Vallakkadavu (Idukki); Chandanathode (Wayanad); Kadamthuruthy (Ernakulam); Silent Valley National Park (Palakkad) and widespread all over Malabar.

Parts used: Leaves, stem

Medicinal properties and uses: A decoction of the leaves is given in dysentery. It is used as one of the ingredients in many lotions. Leaves are applied in the form of poultices for skin diseases and swelling. Crushed leaves are used to cure hiccough (Manickam and Irudayaraj, 1992).

Other uses: In Liberia the stems are used for catching fish by making fence or wire across a small stream. The slender graceful fern is cultivated in gardens to cover pillars and bowers. The young leaves are eaten in Java. Old stems, which become tough are used for binding basket, making and plating.

Marattia cicutifolia Kaulf.

Synonym: *Marattia fraxinea* Sm.

Marattiaceae

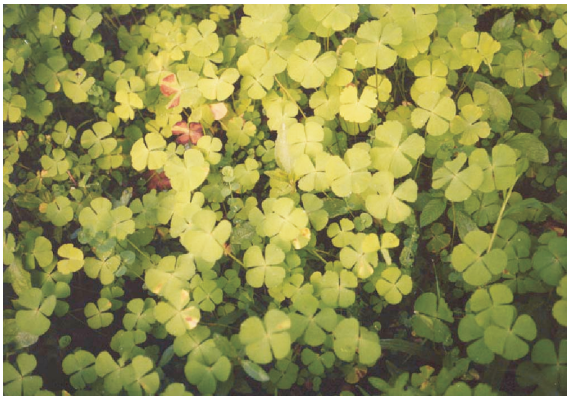
Rhizome erect, massive, fleshy, bearing dense spirally arranged leaf bases; stipular flaps one on either side of the leaf base, flabellate, thick at the bottom, gradually becoming thinner towards the margin. Stipes long, covered by scales and hairs when young. Lamina bipinnate, deltoid, pinnae up to 16 pairs, subopposite, pinnules up to 20 pairs, shortly stalked, margin serrate, dark green above, pale green below, texture thick, herbaceous. Sori submarginal on each vein, ellipsoid, sporangia up to 12 pairs on two rows; spores monolete and round.

Distribution: This terrestrial fern is found along fully shaded streams between 900-1875m. Reported from Silent Valley National Park.

Parts used: Whole plant

Medicinal properties and uses: The plant extract is used as a remedy for ankylostomiasis in Usambara and South Africa (May 1978).

Marsilea minuta L.



Marsilea minuta

Synonym: *Marsilea diffusa* var. *approximata* A. Braun

Vernacular names: Pappada pullu, Neeraral

Marsileaceae

Rhizome long creeping, branched, subterranean green when aquatic plants, pale or dark brown when terrestrial; roots borne usually on nodes. Stipes scattered. Leaves four, sessile, arranged at the tip of the stipe in cloverleaf model, obovate or wedge shaped, pale or dark green, soft herbaceous. Sporocarps borne at the nodes in clusters alternately five per cluster; sporocarp with micro and mega sporangia producing two kinds of bean shaped spores with small pale brown papillae.

Distribution: This aquatic or semi aquatic fern is seen in ponds, paddy fields and marshy places. It is a cumbersome weed in the paddy fields. Reported from Mavelikkara (Alllappuzha); Neeleswaram (Kasaragode); Walayar, Anamooly, Dhoni (Palakkad); Kollam and Ernakulam.

Parts used: Whole plant, tender leaves

Medicinal properties and uses: Plants are used in cough, spastic condition of leg, muscles etc. and also in sedatum and insomnia. The plant are known to be sweet, astringent, refrigerant, acrid, emollient, anodyne, hyphotic, ophthalmic, diuretic, constipating, expectorant, aphrodisiac, depurative and febrifuge. It is useful in psychopathy, ophthalmia, strangury, diarrhoea, leprosy, skin diseases, haemorrhoids, dyspepsia and fever (Warrier *et al*., 1996)

Chemical constituents: Protein (24-36%), B-carotene, Sodium, Potassium, Calcium and Phosphorus (Singh, 1999).

Other uses: The leaves and sprouts are cooked as vegetable and sold in the markets.

Microsorum punctatum (Linn.) Copel.

Synonym: *Acrostichum punctatum* L. f.

Polypodiaceae

Rhizome short creeping, densely scaly at the apex. Fronds closely arranged in two rows, base decurrent up to the base of the frond without distinct stipe; pinnae dark green when fresh, blackish when dry, glabrous. Sori numerous, distributed all over the lower surface of the pinnae except the basal part; spores yellowish green; exine finely granulose.

Microsorum punctatum

Distribution: This medium-sized epiphytic fern grows on tree trunks in semi exposed as well as shaded localities in forests and occasionally found also on shaded sheltered surfaces of boulders. This species is commonly found in Silent Valley, Nelliampathy, Siruvani, Muthikulam, Thathamangalam Estate, Kaikatty, Mukkali, Pathenthode, Valiyaparathode, above Karadimalai estate (Palakkad); Vythiri, Sultan Battery, Chandanathode, Konnoth, Thirunelly, Periya (Wayanad); way to Munnar, Munnar Hills, Chelloth, Kaliyar, Neriamangalam, Thommenkuthu (Idukki); Thundathal range (Ernakulam), Ponmudi, Karamanyar, Athirumala (Trivandrum); Kulathupuzha (Kollam) and Vellarimala (Kozhikode).

Parts used: Leaves

Medicinal properties and uses: Leaves and juice are used as a purgative, diuretic and for healing wound (May, 1978).

Nephrolepis cordifolia (Linn.) Presl.

Synonym: *Aspidium cordifolium* (L.) Sw.

Vernacular names: Aranappana, Modhirakizhang

Davalliaceae

Rhizome erect, densely scaly all over, scales lanceolate, uniformly pale brown, bearing thick wiry roots which bears spherical, fleshy, densely scaly tubers. Stipes tufted, densely scaly below and

Nephrolepis cordifolia

sparsely scaly above. Lamina linear-oblong-lanceolate, pinnae about 30 pairs, spreading, alternate, sessile base unequal, cordate, acroscopic base, auricled. Pinnae pale green, glabrous. Sori sub marginal in two rows, indusia reniform, dark brown; spores reniform or plano convex, yellowish brown; exine granulose.

Distribution: Found as an epiphyte or lithophyte along fully shaded stream banks. It is found distributed in Vythiri, Meppadi (Wayanad), Nelliampathy, Silent Valley (Palakkad), Devicolam, Pamba and Thannikudy (Idukki).

Parts used: Frond, rhizome

Medicinal properties and uses: The rhizome is reported to be antibacterial and is used in cough, rheumatism, chest congestion, nose blockage and loss of appetite (Singh, 1999). Pinnae are anti-tussive, styptic, antifungal, used in coughs, wounds and for the treatment of jaundice, a decoction of the fresh fronds is given as a drink.

Chemical constituents: The plant contains P-coumaric acid, Caffeic acid, Ferulic acid, Sinapic acid, P-hydroxybenzoic acid, Protocatechuic acid and Vanillic acid (Singh, 1999)

Other uses: Tubers are used as vegetable in Garhwal, Darjeeling and Bhutan (Dixit and Vohra, 1984).

Oleandra musifolia (Bl.) Presl

Synonym: *Aspidium musifolium* Blume

Oleandraceae

Oleandra musifolia

Rhiome long, creeping, branched, bearing two alternate rows of thick wiry, stiff roots on the abaxial side, densely covered by scales all over. Fronds simple, borne in pairs in opposite rhizome branch. Stipes articulate, phyllopodium grey brown, polished extending as midrib. Lamina oblong lanceolate, straight, slightly falcate; frond pale or yellowish green, glossy, texture chartaceous. Sori in two flexuose rows along the midrib, indusia reniform; spores reniform or plano convex, pale green in colour.

Distribution: This plant is found as an epiphyte or lithophyte along fully or partially shaded stream or stream banks or roadsides between 900-1700 m. altitude. Occasional on

Anamalais and also reported from Kakki and Pamba Hills.

Parts used: Whole plant, rhizome, stipe

Medicinal properties and uses: A decoction of the stipe is considered to be an emmenagogue. Rhizome is used in snakebite in Philippines (May, 1978). Plant is also used as an anthelmintic.

Chemical constituents: Filicine, N-octa, Cossanal, Lignocerrate, B-sitosterol, Nerrifoloxide (Singh, 1999).

Ophioglossum lusitanicum subsp. ***coriaceum*** (A. Cunn.) R.T. Clausen

Synonym: *Ophioglossum gramineum* Willd.

Ophioglossaceae

Rhizome subglobose to cylindrical, tuberous, bearing one to three fronds at the apex, many thick fleshy roots all over; sterile blade linear, acuminate alternate at base, margin entire. Fertile stalk arising from the base of the sterile blade, flatterned with three or four veins at the base.

Ophioglossum lusitanicum subsp. *coriaceum*

Distribution: Common throughout the hilly, rocky areas of Malabar and also reported from Sastham Kottah (Kollam) and Thekkady (Idukki).

Parts used: Root, rhizome, fronds

Medicinal properties and uses: The plant yields a mucilaginous and astringent decoction which is used in angina. The fronds are considered toxic and styptic and are used in contusions, wounds and haemorrhages. The tribals use a warm decoction of the rhizome as a lotion for boils (Manickam and Irudayaraj, 1992). It is also know to have antibacterial, anticancerous, antiseptic, detergent and vulnerary properties (Singh, 1999).

Chemical constituents: Flavonoid, Triglycoside.

Ophioglossum pendulum L.

Synonym: *Ophioderma pendula* (L.) Presl

Ophioglossaceae

Rhizome short, creeping. Fronds ribbon like fleshy, unbranched or branched towards the apex, margin entire, venation indistinct. Spikes solitary from the fronds, unbranched, arising below the middle.

Ophioglossum pendulum

Distribution: Very rare species reported only from Periyar Tiger Reserve, Idukki. Grows as an epiphytic tumour nest on huge trees in evergreen forests with the association of other epiphytic ferns like *Asplenium nidus, Nephrolepis sp*. etc.

Parts used: Spores, whole plant

Medicinal properties and uses: Plant used as hair tonic, spores given to babies at birth to purge meconium (May, 1978).

Ophioglossum reticulatum L.

Synonym: *Ophioglossum holm-nielsenii* B. Ollg.

Ophioglossaceae

Rhizome erect, cylindrical, tuberous, bearing long, thick, fleshy roots, fronds one to two; petiole dark green, terete, fleshy, glabrous; blade simple, usually cordate, entire; spike arising from the base of the sterile bladé, oblong-lanceolate; spore sac arranged in two alternate compact rows, dehise by horizontal slits; spores spherical, trilete, and colourless.

Ophioglossum reticulatum

Distribution: This small terrestrial fern forms small clumps in well-protected humid localities in rich loamy soil. This species is reported from Chembra peak (Wayanad); very rarely occurring in Kanjoor, Ponmudi (Trivandrum) and Thangacherry (Kollam).

Parts used: Fleshy fronds, rhizome.

Medicinal properties and uses: Used as a cooling agent and in the treatment of inflammations and wounds. Fronds used as a tonic and styptic. Used in contusions and

haemorrages (Singh, 1999).

Other uses: Fleshy fronds are eaten as vegetable.

Osmunda regalis Linn.

Synonym: *Aphyllocalpa regalis* (L.) Lag., D. García & Clemente

Osmundaceae

A large hardrous terrestrial fern usually restricted to wet areas (near streams, gutters, etc.) at higher elevation. Rhizome erect or suberect, massive, scales absent. Stipes tufted, numerous. Lamina lanceolate, bipinante, alternate or subopposite. Fertile pinnules compressed, panicle bearing large spherical sporangia all over the branches; spores trilete.

Distribution: A common terrestrial herbaceous fern, forms extensive coloures at an altitude above 700m. exposed localities on rocky banks of streams and rivers. Reported from Thirunelly, Vythiri (Wayanad); Silent Valley National Park (Palakkad); Munnar, Devikulam, Kurisumalai (Idukki) and Ponmudi (Thiruvananthapuram).

Parts used: Fronds, whole plant

Medicinal properties and uses: Fronds are used as tonic, styptic and also for the treatment of rickets, rheumatism and for intestinal gripping (Nayar, 1959; Dixit and Vohra, 1984).

Phlebodium aureum (L.)

Synonym: *Chrysopteris aurea* (L.) Link

Polypodiaceae

Rhizome long creeping densely clothed by glossy ferruginous scales all over, scales dark brown at the base. Stipes scattered, abaxially rounded and dark brown, glabrous and glossy all over. Lamina ovate; Pinnae up to 13 pairs, sub-opposite or alternate above, margin entire, pale green above, glaucous below, glabrous. Sori median in two rows along the costa, round or elliptic, exindusiate, yellowish green superficial.

Distribution: Very rare species reported from Agasthya mala (Trivandrum) and also found cultivated in gardens. This terrestrial fern is found near in the road cuttings.

Parts used: Rhizome

Medicinal properties and uses: In Mexico rhizome is used for the treatment of cough, fever and reported to be sudorific (Singh, 1999).

Phymatosorus nigrescens (Bl.) P.C. Ser.

Synonym: *Phymatodes nigrescens* (Blume) J. Sm.

Polypodiaceae

Phymatosorus nigrescens

Rhizome short, creeping, terete, sparsely scaly at the apex. Stipes scattered, more or less terete, grey-brown, glabrous and glossy. Lamina ovate, pinnatifid, pinnae dark green when fresh, dark brown when dry, glabrous. Sori sub-median, one per larger areole, prominent; spores macolete, yellowish green.

Distribution: This epiphytic fern is restricted to hilly terrain, found on wet mossy rocks and on tree trunks in the dense forest above 800m altitude. Reported from Sultan Battery. Chedaleth, Chandanathode way to Periya, Vythiri (Wayanad); Pamba to Ayyappan temple, Velara R.F., Kaliyar, Thommenkuttu, Chinnakanal, Lockart Gap, Munnar (Idukki); Way to Valiyaparathode, Silent Valley National Park, Pandemala (Palakkad); Chalakayam (Kollam); Ponmudi Forest near Kurisumalai, Surya Kanti river side (Trivandrum); Sabarigiri, Moozhiyar (Pathanamthitta); Adukkam (Kottayam); Chedaleth, Anakampoil, Heerakapara and Vellarimala (Kozhikode).

Other uses: In Borea it is considered as an edible fern (Manickam and Irudayaraj, 1992).

Pityrogramma calomelanos (L.) Link

Synonym: *Acrostichum calomelanos* L.

Vernacular name: Vellichuruli

Adiantaceae

Pityrogramma calomelanos

Plants with erect rhizome, densely scaly at the apex. Stipes tufted, scaly at the very base, glabrous and glossy above. Lamina lanceolate, margin entire, pinnae dark green, glabrous and glossy above, covered by silver coloured waxy powder below. Sori along veins covered by entire surface when mature; spores trilete.

Distribution: This fern is considered as an indicator for human interaction and found near

inhabiting areas throughout Kerala. Usually terrestrial, rarely lithophytes along roadsides in fully exposed dry places. Generally found at an altitude in between 100-1800m.

Parts useds: Whole plant

Medicinal properties and uses: Plant decoction is used for kidney trouble in the Philippines, tea prepared out of the frond is used as a cure for flu, hypertension, fever and cough in Trinidad (Dixit and Vohra, 1984). The rhizomes are considered anthelmintic in South Africa. A decoction of the frond is taken for boils in the mouth and nose. The fronds are also used for asthama and cold and chest congestion.

Chemical constituents: Flavonoids, Calomelanols, Di-hydrochalcons, Chalcones, Flavones, Rhamnocitrin, Genkwamin, Pteriside, Pterosin, Calamelano-lactone, Seque-terpene (Singh, 1999).

Other uses: It is widely cultivated as an ornamental plant.

Pleopeltis macrocarpa (Bory ex Willd.) Kaulf.

Synonym: *Drynaria lepidotum* Fee

Polypodiaceae

Rhizome long creeping, densely covered by scales. Fronds simple; monomorphic; stipes scattered dark brown, abaxially rounded; lamina linear-elliptic, margin entire; sori superficial, median between the midrib and margin of the frond distributed towards the distal half of the lamina, hemispherical; spores monolete, ellipsoid or planoconvex.

Distribution: Found as epiphytes or lithophyte in open areas. Distributed in Perumala, Mannavan shola (Idukki) and Ponmudi (Trivandrum).

Parts used: Fronds, rhizome

Medicinal properties and uses: Decoction of the fronds is used for cold and sore throat and itches in South Africa. Rhizome is also used as a febrifuge and for the treatment for coughs in Mexico and Guatemala (May, 1978).

Polystichum moluscens (Bl.) T. Moore

Dryopteridaceae

Rhizome erect, densely scaly all over, scales prominent, dark brown at the base, pale brown above. Stipe tufted, pale brown to stramineous, abaxially rounded, adaxially grooved, densely clothed by brown scale at the very base. Lamina ovate lanceolate, bipinnate,

pinnae up to 20 pairs; pinnule opposite at the base subopposite or alternate above, subsessile; pinnae dark green, texture coriaceous. Sori up to 4 pairs per lobe, terminal on the veinlets, indusia small, dark brown; spores plano convex, dark brown.

Distribution: This terrestrial fern commonly found inside the forest, at the forest edge all along fully or partially exposed roadsides between 1200 - 2700m. Occassional on Anamalais and Munnar Hills of Kerala.

Parts used: Frond, sporophyll

Medicinal properties and uses: Sporophyll extract is an antibacterial agent

Other uses: Several horticultural varieties are growing in green houses and in the open for its elegance. Fronds attain large size and are used for the *preparation of curries*.

Polystichum squarrosum (D. Don) Fee

Synonym: *Aspidium squarrosum* D. Don

Dryopteridaceae

Rhizome erect or suberect, densely scaly, scales elliptic, lanceolate acute, edge toothed. Stipes tufted, covered with filiform brown scales at the base. Lamina bipinnate, lanceolate; pinnae up to 30 pairs, opposite or subopposite, dark green, rachis and costa bearing dense long branched hairs and scales; pinnules glabrous. Sori in two submarginal rows, borne at the end of veinlets, filling the entire surface of the pinnule when mature; indusia rufouse brown, glabrous; spores copious, reniform.

Distribution: Very rare species, found terrestrial inside the shola.

Parts used: Sporophylls

Medicinal properties and uses: The sporophyll extract is used as an antibacterial agent (Singh, 1999).

Psilotum nudum (L.) P. Beauv.

Synonym: *Bernhardia antillarum* Mull. Hal.

Psilotaceae

It is an erect, slender, shrubby plant with creeping rhizome. Stem slightly branched, dark green, glabrous. Synangia borne at the axis of the scale leaves, sporangia trilocular.

Psilotum nudum

Spores numerous, monolete, elongated, reniform.

Distribution: It is generally found in the cervices of rocks, but rarely occurs as an epiphyte. Occasionally found in Alleppey and Palakkad District, and also reported from Mannavan Shola, Thanikkudi (Idukki) and Sultan Battery (Wayanad) of Kerala.

Parts used: Whole plant and spores.

Medicinal properties and uses: The oily spores are given to infants to arrest diarrhoea. The juice of the herb showed antibacterial activity against *Micrococcus pyogenes* and *Pseudomonas aeruginosa* and also used as a purgative (Manickam and Irudayaraj, 1992).

Chemical constituents: Psilotin, Apigenin, Acacetin, Gankwanin, Amentoflavone, Hinokiflavone, Pislotic acid, Gibberlin, GA36, Desmethylosterol, Methylo-sterol, Alkanetrioles (Singh, 1999).

Other uses: In Hawai the herb is used to prepare a kind of tea, which is administered to children suffering from thrush.

Pteridium aquilinum (L.) Kuhn.

Synonym: *Pteridium aquilinum* var. *lanuginosum* Henriq.

Vernacular name: Theeppana

Dennstaedtiaceae

Pteridium aquilinum

Rhizome long, creeping and stout, densely covered by multicellular, uniseriate hairs all over. Stipes scattered, dark brown to black. Lamina tripinnate, quadripinnatified with a continued apical growth for a longer period, ovate-deltoid in outline, pinnules lanceolate, entire and unlobed. Sporangia on an intramarginal vein connecting the apices of veinlets and protected by the reflexed margin of leaflets on the upper surface; spores tetrahedral and with a minutely papillose exine.

Distribution: This large shaggy fern of higher elevations gregarious on fully exposed grassy slopes on the forest edge, roadsides and clearings between 600-2700m. altitude. Reported from Munnar, Kuttikkanam, Devikulam (Idukki); Ponmudi, Anchuzhikathode, Agastiar Hills (Trivandrum); Sultan Battery (Wayanad) and Muthikulam (Palakkad).

Parts used: Rhizome, whole plant

Medicinal properties and uses: Rhizome is astringent, anthelmintic and is useful in diarrhoea and for the treatment of inflammation in the gastric and intestinal mucous membranes. Decoction of rhizomes and fronds is given in the chronic disorders of viscera and spleen. Rhizome is boiled in oil and is made into an ointment for healing wounds. Fronds are reported to be poisonous and sometimes fatal to the grazing animals (Dixit and Vohra, 1984). The fern is commonly known as 'bracken fern' with varied economic use.

Other uses: *Dyes* - Throughout the world it has been used as a dye plant. The colonists is Plymouth made an olive green dye out of bracken tops mordanted with alum and copper. *Pattern material* - The boiled roots are used as the chief black pattern material among the washo, mono and yokut Indians. The untreated rhizome was the only strictly brown pattern material used in weaving by North American Indians. *Glass making* - Before the introduction of soda from sea salt and others, the alkali ashes of burnt plants were used in glass making in Europe and the British Isles. *Food and fodder* - in times of scarcity the rhizomes are boiled or roasted and eaten or ground into powder and used for making bread. The bitterness due to the presence of starch is removed by washing. Japanese eat brickled bracken-fern called '*Tsukamono*' as a side dish. They are the largest consumers of the bracken in the world. The rhizomes are used for brewing a kind of beer. They are also employed as a feed for stock, especially pigs. The tender fronds are used as vegetable and also employed in soups. The green fronds are used as fodder. *Miscellaneous* - The dried fronds are employed as packing material. Japanese tried this fern as a source of paper pulp. Bracken is used as litter for cattle and horses in coffee plantations; the manure thus formed is rich in phosphor and potash (Manickam and Irudayaraj, 1992)

Pteris cretica L.

Synonym: *Pteris serraria* Sw.

Pteridaceae

Rhizome erect, densely scaly at apex, scales ovate-lanceolate, dark brown. Stipes tufted, long, pale brown, abaxially rounded, adaxially grooved, glabrous, glossy. Lamina ovate, simply pinnate with bipartite or tripartite or simple pinnule; pinnule up to 7 pairs; pinnae dark green, glabrous, texture coriaceous. Sori linear all along the margin except at the base and distal part of the pinna; spores dark brown.

Distribution: This fern is commonly found in high altitude evergreen forests and sholas along stream banks between 850-2250m. Very rare in Kerala.

Reported from Silent Valley National Park, Kaikatty, Nelliampathy (Palakkad), Idlimottai and Mannavan Shola (Idukki).

Parts used: Fronds

Medicinal properties and uses: The fronds antibacterial which, are made in to paste and applied in wounds (Singh, 1999).

Pteris quadriaurita Retz.

Synonym: *Pteris biaurita* Tardieu

Local name : Njandu thurappan

Pteridaceae

Rhizome sub erect, scales lanceolate, pale brown, transparent and membranaceous, margin with long thin hairs. Stipes pale brown, stramineous, glabrous, glossy above. Lamina deltoid, bipinnatified, basal pinnae forked at the base; pinnae dark green, texture thick herbaceous to sub coriaceous; spores with rucate exine.

Pteris quadriaurita

Distribution: Distributed from 30-2400m altitude in all kinds of habitats. Common throughout Kerala.

Parts used: Rhizome

Medicinal properties and uses: The paste of rhizome is applied to take out the pus and hasten the recovery of boils.

Pteris vittata L.

Synonym: *Pteris costata* Bory

Pteridaceae

Rhizome sub-erect, thick, covered by scales at the apex; scales ovate lanceolate, membranaceous, pale brown. Stipes tufted, abaxially rounded, adaxially grooved, pale

Pteris vittata

brown. Lamina lanceolate, simply pinnate, pinnae up to 35 pairs, opposite or sub-opposite, linear lanceolate, apex acuminate; pinnae pale green glabrous, texture herbaceous. Sori all along the margin up to the base except the apex; spores yellowish green with tangent thread-like thickenings.

Distribution : It grows along fully exposed roadsides on stone crevices at 1280 m. It is reported from Aryankavu (Kollam) and throughout Northern Kerala.

Parts used: Whole plant

Medicinal properties and uses: Plant extract is used as demulcent, hypotensive, tonic, antiviral, and as antibacterial (Singh, 1999).

Other uses: Plants used as fodder and also useful for thatching.

Pyrrosia lanceolata Farewell

Synonym: *Acrostichum dubium* Poir.

Vernacular name: Thirippana

Polypodiaceae

Pyrrosia lanceolata

Rhizome long creeping, densely covered by scales, scales lanceolate, uniformly pale brown with a reddish brown spot at the sub-basal region. Stipes scattered, pale brown, densely scaly at the very base, rest of the part sparsely covered by stellate hairs. Fronds simple, margin entire or wavy, veins immersed, frond dark green upper surface, brownish lower surface; sori irregularly distributed mainly in the distal part of the pinna, orbicular, dark brown, naked; spores reniform or plano-convex.

Distribution: This fern usually growing as an epiphytic or lithophyte, forming mats on the rocks or trees, often covering the whole tree or rocks. It is seen inside the forest, forest edge and also along fully or partially exposed roadsides.

This species is commonly found in Munnar Hills (Idukki); Vennikulam, Muhamma, Pathiramanal (Alleppey); Kottiyoor (Kannur); Eara-Changanachery, Vagamon (Kottayam); Bhavani river side, Mukkali, Kanjirapuzha, Cherunelli, Ranimedu, Nelliampathy, Pathrakadavu, Parathode, Silent Valley, Siruvani dam site (Palakkad); Kallar estate (Trivandrum); Chittiyarmedu, Calicut Universtiy Campus, Kadampuzha, Thiruvangad,

Pattakarimba, Nilambur (Malappuram); Thenmala (Kollam); Arayadathupalam, Mankavu, Vellimadukunnu (Kozhikode) Adivaram, Chandanathode, Vythiri and Sugandhagiri (Wayanad).

Parts used: Whole plant, Fronds

Medicinal properties and uses: A decoction of the fern is used in South Africa for curing colds and sore throats. In Mexico, a tea prepared from the fronds which is used for itch (Manickam and Irudayaraj, 1992).

Pyrrosia piloselloides (L.) M.G. Price

Synonym: *Drymoglossum piloselloides* (Linn.) Presl.

Vernacular name: Seetha thali, Marattamala

Polypodiaceae

Rhizome long creeping wiry, densely clothed by scales all over, fronds simple, dimorphous; stipes scattered; sterile leaf orbicular, ovate elliptic or lanceolate; lamina fleshy pale or dark green; fertile fronds oblong, margin entire; sori acrostichoid; sporangia intermingled with stellate hairs; spores reniform or plano convex.

Pyrrosia piloselloides

Distribution: This small epiphytic fern forms loose colonies on trunks and branches of trees in exposed localities. This species is reported from Ranni (Pathanamthitta), Kottarakkara (Kollam); Mavelikkara (Alleppey) Thodupuzha (Idukki) and throughout the plains of Malabar.

Parts used: Leaves

Medicinal properties and uses: Used as a cooling agent for the treatment of swellings, sprains, etc. and also for relieving pain (Nayar, 1959).

Salvinia adnata Desv.

Synonym: *Salvinia molesta* Mitch.

Vernacular name: African payal

Salviniaceae

Aquatic free floating form, stem spongy terete, branched with nodes and internodes bearing submerged leaves which are modified in to root-like organs covered by brown septate hairs, normal leaves spongy due to the presence of hairs. Sporocarp borne in clusters on submerged leaves, sessile, densely hairy with micro and mega sporangium borne in micro and mega sporocarp respectively.

Salvinia adnata

Distribution: It is common in southern Kerala as an exotic weed in the paddy fields and in back waters.

Parts used: Whole plant

Medicinal properties and uses: Plant used as an antifungal agent

Chemical constituents: Protein, Tannin, Iron, Calcium, Phosphorus (Singh, 1999)

Other uses: Plant eaten as food, used for the biogas production and as green manure. This plant can act as an additional source of raw materials in the paper industry for the manufacture of low-grade paper (Manickam and Irudayaraj, 1992).

Selaginella delicatula (Desv.) Alston

Synonym: *Lycopodium canaliculatum* L.

Vernacular name: Nilam petta

Selaginellaceae

Selaginella delicatula

Stem erect or sub-erect, rooting at the base only, lateral branches many, alternate, tripinnate. Leaves scattered and oblique on main stem, arranged in four rows on lateral branches. Spike borne on ultimate branches, quadrangular, sporophylls uniform, ovate, acuminate, entire, microspores green, megaspores pale brown.

Distribution: This fern is commonly found on stonewalls or cervices of rocks along roadsides up to an altitude of 1000m.

Common in Kerala Ghats, reported from Namallayas, Aruvikkara, Ponmudi (Trivandrum) Adoor, Konni (Pathanamthitta) Vaikom road, Pampakada (Ernakulam), Kallar, Kuttikkanam, Neriamangalam, Pulluparai to Peruvanthanam, Munnar (Idukki); Varkala, Vennikulam (Alleppey); Mancheri and Nilambur (Malappuram).

Parts used: Whole plant

Medicinal properties and uses: The plant juice is antibacterial and the extract of the plant is suggested for wound healing by the tribals of Nilambur (Nair, 1985).

Selaginella parkeri (Hook. & Grev.) Spring

Synonym: *Lycopodium parkeri* Hook. & Grev.

Selaginellaceae

Stem prostrate, rooting occasionally all over. Leaves at the base of the main stem, uniform, ovate, acute, entire, dimorphic, sporophylls uniform, broadly ovate, dentate, megasporangia borne at the basal region, microsporangia towards the distal part of the cone, microspores pale brown, triangular with rounded corners, megaspores 3 per sporangia, pale green, spherical.

Distribution: Terrestrial on moist earth banks along the earthcuttings between 110-1200m. This species is rare in Kerala. Reported from Munnar.

Parts used: Frond

Medicinal properties and uses: Fronds used as an antibacterial agent (Singh, 1999).

Selaginella tamariscina (P. Beauv.) Spring

Synonym: *Lycopodium involvens* Sw.

Vernacular names: Garudapacha, Kalthamarai

Selaginella tamariscina

Selaginellaceae

Stem erect, rooting at the base only, terete without branches, quadripinnate; lateral branches about eight pairs; leaves on main stem uniform, scattered broadly ovate, acute entire; leaves on distal most part of the main axis and on lateral branches dimorphic; cones terminal on ultimate branches, quadrangular; sporophylls uniform,

ovate, acuminate, entire; microspores reddish-brown.

Distribution: Found as terrestrial or lithophytes along fully or partially shaded stream banks or road sides. They are also seen growing on forest floor and at forest edges.

This species is distributed in Agastyar Hills, Ponmudi Hills, Anamalai, Kallar (Trivandrum); Changanacherry (Kottayam); Karappara river side, Chempotty river bank, Kunthipuzha river bank- Silent Valley, Valiaparathode, Siruvani (Palakkad); Pakshipathalam (Wayanad); Munnar, Neriamangalam and Pamba dam-Vandiperiyar (Idukki).

Parts used: Whole plant, spores

Medicinal properties and uses: Spores are used by the ladies as a substitute of vemilion powder, the 'Sindoor' in Nepali language (Manandhar, 1996). Plant is considered to help to rejuvanate life, also used in the prolapse of rectum, cough, bleeding piles, gravel aminorrhoea and as an antibacterial (Singh, 1999).

Sphaerostephanos unitus (L.) Holttum

Synonym: *Aspidium cucullatum* Blume

Thelypteridaceae

Rhizome wide creeping, densely scaly at the apex; scales lanceolate, brown, margin entire with short ascicular hairs. Stipes long, thick, grooved,scaly at the very base. Lamina lanceolate, subopposite or alternate, sessile, pinnate; pinnae dark green. Sori submarginal mostly on all veins; indusia glabrous; spores reniform.

Distribution: Found on roadsides and periphery of the forest areas. Common throughout Kerala.

Parts used: Rhizome

Medicinal properties and uses: The rhizome extract is used as an antibacterial agent (Singh, 1999).

Sphenomeris chinensis (L.) Maxon

Synonym: *Odontosoria chinensis* (L.) J. Smith

Dennstaedtiaceae

Rhizome short creeping, branched closely and irregularly, bearing roots on the abaxial side, densely covered by hair-like scales all over. Lamina lanceolate, about one third of the distal part of the lamina, progressively narrowed, tripinnatified or quadripinnate, bipinnitied

distal part. Sori submarginate on the vein end of each lobe, uninerval or binerval, spores dark brown.

Distribution: These terrestrial ferns are found as large colonies along the fully exposed roadcuttings between 700-2400m altitude. Found distributed in Munnar (Idukki); Ponmudi Hills, Agastiar Hills (Trivandrum) and Palakkad Hills (Palakkad).

Parts used: Leaves

Medicinal properties and uses: Leaves used internally for chronic enteritis in Mauritius (Dixit and Vohra, 1984). It is used to produce red dye (Fosberg, 1942).

Chemical constituents: The leaves contain Protocatechualdehyde, Protocatechuric acid, Syringic acid and Vitexin.

Stenochlaena palustris (Burm.f.) Beddome

Synonym: *Acrostichum palustre* (Burm. f.) C. B. Clarke

Vernacular name: Pannavalli

Blechnaceae

Huge terrestrial, climbing fern with green, glabrous rhizome, often reaching the top of the highest trees, palmately arranged groups of roots on the abaxial side. Fronds scattered, dimorphic. Sterile fronds with ovate or oblong-lanceolate lamina, margin coarsely serrate. Fertile fronds borne at the distal part of the plant with much contracted pinnae. Sori borne all over the lower surface of the fertile segments; spores monolete, plano convex or reniform, pale green.

Stenochlaena palustris

Distribution: The terrestrial climbing fern is found along partially shaded roadsides or inside the forest in fully shaded places. It is also seen along canals, marshy places, along coastal areas.

Distributed in Munnar Hills, Kozhikanam, Painavu (Idukki); Bonacaud, Kallar to Ponmudi (Trivandrum); Kottarakkara, Palaruvi, Aryankavu (Kollam); Kuttikad, Chalakudy, Vazhachal, Athirappilly R.F. (Trichur); Chandanathode (Wayanad); Eera, Ponthenpuzha (Kottayam); Mukkali Forest, Mandampotty Forests and Parambikulam (Palakkad) throughout Malabar.

Parts used: Young shoot, rhizome, leaves

Medicinal properties and uses: Fronds antibacterial, given for the treatment of fever, skin diseases, throat and gastric ulcers (Singh, 1999). Leaves and rhizomes are used as a cooling agent and in the treatment of burns and ulcers.

O**ther uses**: the young shoots are eaten raw as salad or sometimes cooked and eaten. Owing to their durability when submerged in salt water, the rhizomes are utilized as cordage in binding fish traps and as anchor ropes. They are also used for making baskets (Manickam and Irudayaraj, 1992).

Tectaria coadunata (J. Sm.) C. Chr.

Synonym: *Aspidium cicutarium* subsp. *coadunatum* (Wall. ex Hook. & Grev.) C. Chr.

Dryopteridaceae

Rhizome short creeping, densely scaly at the apex, scales ovate-lanceolate. Stipes scattered glabrous and glossy all over. Lamina ovate, bipinnate or bipinnatified with primary and secondary pinnae. Sori on the end of the secondary pinnae; indusia dark brown; spores reniform or spherical.

Tectaria coadunata

Distribution: It is common throughout the Ghat region and reported from Munnar, Neriamangalam, Thekkady, Poomkavanam to Sabarimala, Kuttikkanam (Idukki); Chandanathode (Wayanad); Dharbhakulam, Ponmudi (Trivandrum); Moozhiyar (Pathanamthitta); Puthukad, Vazhachal, Vettilapara, Chalakkudy (Trichur); Thiruvizham kunnu, Pothundi to Kaikatty (Palakkad).

This medium sized terrestrial fern found on slopes in well shaded to semi shaded localities on rather dry soil.

Parts used: Rhizome, Tender plant

Medicinal properties and uses: Plant antibacterial, used in asthma, bronchitis, stings of honey bee (Singh, 1999). Extract from fresh rhizome is used for preventing diarrhoea in children in Darjeeling District (Dixit and Vohra, 1984). The cooked tender portion is used for the curing stomach trouble (Manandhar, 1996).

Chemical constituents: Phenols and Flavonoids like Mangiferin and Aureusidin (Singh, 1999).

Other uses: Tender portions are cooked as vegetable in Nepal, and also used in curry or salad (Manandhar, 1996).

Tectaria wightii (Clarke) Ching Sin

Dryopteridaceae

Rhizome short creeping, densely scaly at the apex. Stipe clustered, dark brown at the base, grey-brown or stramineous above. Lamina ovate, simply pinnate, pinnae up to six pairs, pale green when fresh, adaxially reddish-brown when dry, glabrous, fertile pinnae contracted ones. Sori numerous, exindusiate; spores ellipsoid or reniform.

Tectaria wightii

Distribution: It is distributed in Munnar Hills (Idukki); Kummattanthode, Silent Valley National Park (Palakkad); Kallar to Ponmudi, Puthencad (Trivandrum) Palaruvi, Aryankavu (Kollam); Punnamala and Sholayar (Thrissur). Occasional on Kerala Ghats. This terrestrial fern seen as solitary or as small colonies along fully or partially shaded moist stream banks between 100-1050 m altitude.

Parts used: Rhizome

Medicinal properties and uses: The rhizome of the plants is anthelmintic (Dixit and Vohra, 1984).

Tectaria zeylanica (Houtt.) Sledge

Synonym: *Helminthostachys zeylanica* (L.) Hook.

Vernacular name: Pazhutharakkali

Dryopteridaceae

A small fleshy herb with a thick, creeping rhizome. Petiole green and cylindrical; lamina palmately divided into three main stalked segments which are often pinnate, bearing linear oblong pinnules, entire or slightly toothed. Sporangia in groups, pendent on a small crested stalk. Spores trilete.

Tectaria zeylanica

Distribution: This is a small terrestrial fern found as isolated groups in semi-shaded

localities in the plains in humid areas near water sources. This species is distributed in Nilambur, Parakadavu (Malappuram) and Kovalam near Thiruvallam (Trivandrum).

Parts used: Young fronds, rhizome, spike

Medicinal properties and uses: The fronds are reported to be aperient, intoxicant and anodyne, also used in sciatica, as an antiviral, antipyretic, anti-inflammatory and intoxicant. The rhizome is used in dysentery, catarrah, sciatica, malaria and also as a tonic and mild aperient (Dixit and Vohra, 1984). A decoction of the plant is given for curing impotency and the juice of the leaves is used to relieve blisters on the tongue. The decoction of rhizome is used for the treatment of impotency, whooping cough, phthisis. In combination with the rhizome of *Chlorophyum tuberosum* and roots of *Bombax ceiba* made into a paste when applied for one month relieves waist pain and used also as a tonic (Singh *et al*., 1989). The powder of the rhizomes is given for spermatorrhoea and for improving memory power (Singh and Maheshwari, 1992).

Chemical constituents: Stigmasterol, Fucosterol and Dulcital.

Other uses: Young fronds and fleshy rhizomes are cooked and eaten during scarcity of food in Gorakhpur, Garhwal and Assam (Manickam and Irudayaraj, 1992). Young leaves are used as salad or cooked as vegetable in the Philippines. Tender stalks are also edible. The leaf stalk are used for braiding the fronds.

Thelypteris interrupta (Willd.) K. Iwats.

Synonym: *Cyclosorus interruptus* (Willd.) H. Ito

Thelypteridaceae

Rhizome wide creeping, profusely branched, scaly at the apex; scales ovate, margin entire, glabrous. Stipes long, black and scaly at the base. Lamina elliptic lanceolate, simply pinnate, pale green. Sori median on the veins, up to eight pairs in two rows arranged in 'V 'shape, indusiate; indusia hairy, sporangial stalk bearing capitate hairs; spores monolete, pale brown, ellipsoid.

Distribution: It is seen frequently as large colonies in open marshy places, lakes, walls and border of paddy fields from the sea level to 1400m. Distributed throughout Kerala.

Parts used: Rhizome and sporophyll

Medicinal properties and uses: Rhizome and sporophyll as antibacterial agent.

Trigonospora caudipinna (Ching) Sledge

Thelypteridaceae

Rhizome scaly at the apex; scales ovate-lanceolate, margin fimbriate. Stipe numerous, tufted, slightly shorter in sterile ones, pale brown. Lamina ovate lanceolate, terminated by a pinna bearing lobes larger than the lateral ones. Sori up to six pairs in two parallel rows, median on the veins; indusia densely covered by long or short ascicular hairs; spores tetra hedral.

Distribution: Found abundant on stones in streams of the forest areas between 750-1600m. Commonly occurring in Kerala.

Parts used: Tender portions and rhizome

Medicinal properties and uses: Juice of rhizome (about 3 teaspoonful thrice a day) is given in case of fever by Nepalese (Manandhar, 1996).

Other uses: Tender portions are cooked as vegetables.

Vittaria elongata Sw.

Synonym: *Vittaria hildebrandtii* Hieron.

Vittariaceae

Rhizome short, creeping, branched, densely clothed by scales all over; scales lanceolate, uniformly dark, uniformly thickened, gland tipped. Fronds simple, linear-lanceolate, midrib distinct, dark green, texture chartaceous, flexuous. Sori marginal, erect when mature; spores monolete, ellipsoid, plano convex.

Vittaria elongata

Distribution: This epiphytic fern is found from sea level to 1250m. Common in Kerala Ghats.

Parts used: Leaves

Medicinal properties and uses: Leaves are used for rheumatism by the tribals of Andaman Islands.

Plate 1. Wild Orchids in the Orchidarium

Seidenfia versicolor

Trias stocksii

Rhynchostylis retusa

Eulophia cullenii

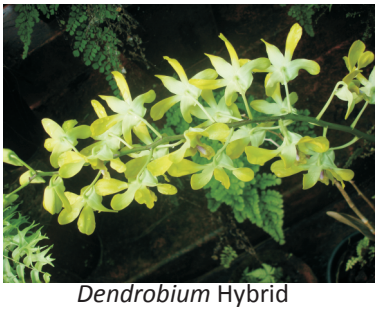
Phaius luridus

Dendrobium anceps

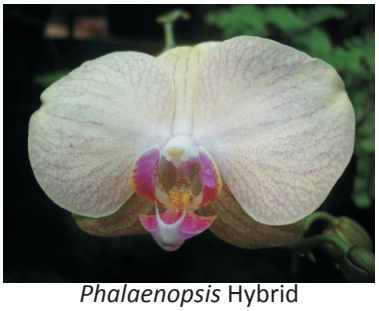
Oberonia sp.

Bulbophyllum sterile

Luisia birchea



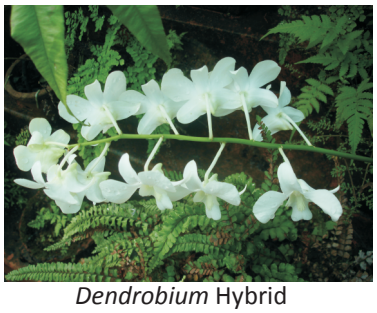
Dendrobium Hybrid



Phalaenopsis Hybrid

Dendrobium Hybrid

Dendrobium Hybrid



Dendrobium Hybrid

Dendrobium Hybrid

Plate 2. General View - Orchid/fern House

Plate 3. General View - Orchid/fern House

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Appendix 1. List of Ferns collected

Acrostichum aureum L.

Actiniopteris radiata (Sw.) Link

Adiantum capillus-veneris Linn.

A. caudatum L.

A. philippense L.

A. poiretii Wikstr.

Angiopteris evecta (Forst.) Hoff.

Antrophyum plantagineum (Cav.)Kaulf.

Araiostegia pulchra (D. Don) Copel.

*Asplenium auritum*Sw.

A. barteri Hook.

A. crinicaule Hance

A. decrescens Kunze

A. ensiforme Wall. ex Hook & Grev.

A. formosum Willd.

A. laciniatum D.Don

A. nidus L.

A. phyllitidis D.Don

A. polyodon G. Forst.

A. polyodon var*. bipinnatum* Sledge

A. praemorsum Sw.

A. serricula Fee

A. tenuifolium D.Don

Blechnum orientale L.

Bolbitis angustipinna (Hayata) H. Ito

B. appendiculata (Willd.) K. Iwats.

B. semicordata (Baker) Ching

B.subcrenata Hook. & Grev.

Botrychium lanuginosum Wall. ex Hook. & Grev.

Bryodesma wightii (Hieron.) Sojak

Calamaria coromandelina (L. f.) Kuntze

Ceratopteris thalictroides (L.) Brongn.

Cheilosoria tenuifolia (Burm. f.) Trev.

Crepidomanes intramarginale (Hook. & Grev.) Copel.

C. latealatum (Bosch) Copel.

C. proliferum Bostock

C. schmidtianum (Zenker ex Taschner) K. Iwats.

Cyathea gigantea (Wall. ex Hook.) Holft.

Cyclosorus parasiticus (L.) Farw.

Davallia bullata Wall. ex Hook.

Dicranopteris linearis (Burm.f.) Underwood

Diplazium esculentum (Retz.) Sw.

Drynaria quercifolia (Linn.) J. Sm.

Dryopteris cochleata (D. Don) C. Cha

Elaphoglossum beddomei Sledge

E. nilgiricum Krajina ex Sledge

Equisetum giganteum L.

Grammitis attenuata Kunze

G. pilifera Ravi & J.Joseph

Hemionitis arifolia (Burm.f.) Moore

Humata immersa (Wall. ex C. Presl) Mett.

H. immersa (Wall. ex C. Presl) Mett.

H.repens (L. f.) J. Small ex Diels

Huperzia ceylanica (Spring) Rothm.

H. hamiltonii (Spreng.) Trevis.

H. niligarica (Spring) R.D. Dixit

H. phlegmaria (L.) Rothm.

H.squarrosa (G. Forst.) Trevis.

Hymenophyllum exsertum Wall. ex Hook.

H. javanicum Spring

Hypodematium crenatum (Forsk.) Kuhn.

Hypolepis glandulifera Brownsey et Chionnock

Lepisorus amaurolepidus (Sledge) Bir & Trikha

L. nudus (Hook.) Ching

Leptochilus bahupunctika B.K.Nayar, Madhus. & Molly

L. decurrens Blume

L. thwaitesianus Fee

Loxogramme chinensis Ching

L. cuspidata (Zenker) M.G. Price

L. involuta (D.Don) C. Presl.

Lycopodiella cernua (L.) P.C. Ser.

Lycopodium japonicum Thunb.

Lygodium flexuosum (Linn.) Sw.

L. microphyllum (Cav.) R. Br.

Marattia cicutifolia Kaulf.

Marsilea minuta L.

Meringium denticulatum (Sw.) Copel.

Microgonium bimarginatum Bosch

Microsorum membranaceum (D. Don) Ching

M.punctatum (Linn.) Copel.

Nephrolepis auriculata (L.) Trimen

N. cordifolia (Linn.) Presl.

Oleandra musifolia (Bl.) Presl

Ophioglossum lusitanicum subsp. *Coriaceum* (A.Cunn.) R.T.Clausen

O. pendulum L.

O. reticulatum L.

Osmunda regalis L.

Phlebodium aureum (L.) J. Sm.

Phymatosorus cuspidatus subsp. *beddomei* (S.R. Ghosh) Fraser-Jenk.

P. membranifolium (R. Br.) S.G. Lu

P. nigrescens (Bl.) P.C. Ser.

Pityrogramma calomelanos (L.) Link

Pleopeltis macrocarpa (Bory ex Willd.) Kaulf.

Polystichum moluscens (Bl.) T. Moore

P. squarrosum (D. Don) Fee

Psilotum nudum (L.) P. Beauv.

Pteridium aquilinum (L.) Kuhn.

Pteris cretica L.

P. quadriaurita Retz.

P. vittata L.

Pyrrosia heterophylla (L.) M.G. Price

P. lanceolata (L.) Farw.

P. lanceolata Farewell

P. piloselloides (L.) M.G. Price

P. porosa (C. Presl) Hovenkamp

Salvinia adnata Desv.

Selaginella delicatula (Desv.) Alston

S. parkeri (Hook. & Grev.) Spring

S. tamariscina (P. Beauv.) Spring

Sphaerostephanos unitus (L.) Holttum

Sphenomeris chinensis (L.) Maxon

Stenochlaena palustris (Burm.f.) Beddome

Tectaria coadunata (J. Sm.) C. Chr.

T. wightii (Clarke) Ching Sin

T. zeylanica (Houtt.) Sledge

Thelypteris interrupta (Willd.) K. Iwats.

Tomophyllum perplexum (Parris) Parris

Trigonospora caudipinna (Ching) Sledge

Vittaria elongata Sw.

V. montana Manickam

Appendix 2. List of Orchids collected

Acampe ochracea (Lindl.) Hochr.

A. praemorsa (Roxb) Blatt. & McCann

A. rigida (Buch.-Ham. Ex J.E.Sm) P.F Hunt

Aerides crispa Lindl.

A. ringens (Lindl.) Fischer

Arundina graminifolia (D.Don) Hochr.

Bulbophyllum aureum (J.D. Hook.) J. J. Sm

B. elegantulum (Rolfe) J.J.Sm.

B. fimbriatum (Lindl.) Rchb.f.

B. orezii Sathish

B. keralensis Muktesh & Stephen

B. maskeliyense (Rolfe) J.J.Sm.

B. sterile (Lam.) Suresh

B. rheedei Manilal & Sathish

B. silentvalliensis M.P. Sharma & S.K. Srivastava

B. tremulum Weight.

B. xylophyllum Par. & Rchb.

Calanthe sylvatica (Thouars) Lindl.

Cirrhopetalum gamblei J.D.Hook.

C. neilgherrense Wight

Chiloschista glandulosa Blatt. & McCann.

Cleistostoma tenuifolia (L) Garay.

Coelogyne breviscapa Lindl.

C. mossiae Rolfe.

C. nervosa A. Rich.

C. odoratissima Lindl.

Cottonia peduncularis (Lindl.) Rchb.f.

Cymbidium aloifolium (L) Sw.

C. bicolor Lindl.

Dendrobium anamalayanam Chandr.

D. aqueum Lindl.

D. crepidatum Lindl. & Paxt.

D. haemoglossum Thw.

D. herbaceum Lindl.

D. heterocarpum Wall.ex. Lindl.

D. heyneanum Lindl.

D. jerdonianum Wight.

D. macrostachyum Lindl.

D. microbulbon A.Rich

D. nanum J.D. Hook.

D. ovatum (L) Kraenzil.

D. panduratum C

D. peguanum Lindl.

D. wightii Hawakes & Heller.

Diplocentrum recurvum Lindl.

Eria albiflora Rolfe.

E. dalzellii (Hook. Ex Dalz.) Lindl.

E. exilis J.D. Hook.

E. microchilose (Dalz.) Lindl.

E. muscicola var. Brevilinguis Joseph & Chandrasegharan

E. mysorensis Lindl.

E. nana A.Rich.

E. pauciflora Wight

E. polystachya A.Rich.

E. pseudoclavicaulis Blatt.

E. reticosa Wight

E. tiagii Manilal, Sathish & Wood

Eulophia cullenii (Wt.) Bl.

E. epidendreae (Koen.) Schlt.

E. gramineae Lindl.

Flickingeria nodosa (Dalz.) Seidenf.

Gastrochilus acaulis (Lindl.) Kuntze

Geodorum densiflorum (Lam.) Schltr.

Kingidium deliciosum (Rchb.f) Sweet.

K. mysorensis (Saldanha) Sathish

K. niveum Sathish

Liparis elliptica Wight

L. odorata (Willd.)Lindl.

Luisia abrahami Vatsala

L. birchea Bl.

L. evangelinae Blatt. & McCann

L. macrantha Blatt. & McCann

L. zeylanica Lindl.

Nervilia aragoana Gaud

N. plicata (Andr.) Schltr.

Oberonia agastyamalayana Sathish

O. anamalayana Joseph

O. bicornis Lindl.

O. brachyphylla Blatt. & McCann

O. brunoniana Wight

O. chandrasekharanii Nair, Rch.& Ansari

O. ensiformis (Sm.)Lindl.

O. gammiei King & Pantl.

O. mucronata (D.Don)Ormerod & Seidenf.

O. josephii Saldanha

O. longifolia Muktesh & Stephen

O. longibracteata Lindl.

O. pakshipadalensis Muktesh & Stephen

O. platycaulon Wight.

O. proudlockii King & Pantl.

O. recurva Lindl.

O. santapaui Kapadia

O. sebastiana Shetty & Vivek

O. tenuis Lindl.

O. thwaitesii J.D. Hook

O. verticillata Wight

O. wightiana Lindl.

O. wynadensis Sivadasan & Balakrishnan

Papilionanthe cylindrica (Lindl.)Seidenf.

Pholidota imbricata W.J.Hook

Phretia elegans Lindl.

Podochilus malabaricus Wight.

Polystachya concreta (Jacq) Garay & Sweet.

Pomatocalpa apicata Breda.

Porpax jerdoniana (Wight) Rolfe.

P. reticulata Lindl.

Rhyncostylis retusa (L.)Bl.

Robiquetia gracilis (Lindl.) Garay

R. josephiana Manilal & Sathish

Schoenorchis jerdoniana (Wight) Garay

S. manilaliana Muktesh & Stephen

S. nivea (Lindl.) Schltr.

Seidenfadineilla filiformis (Rchb.f.) E.A.Christ & Ormerod

S. rosea (Wight) Sathish

Sirhookera lanceolata (Wight) Kuntze

S. latifolia (Wight) Kuntze

Smithsonia maculata (Dalz.) Saldanha

S. straminea Saldanha

S. viridiflora (Dalz.) Saldanha

Tainiophyllum scaberulum J.D. Hook.

Thelasis pygmaea (Griff) Bl.

Thrixspermum walkeri Seidenf. & Ormerod

T. pulchellum (Thw) Schltr.

Trias bonaccordensis Sathish

T. stocksii Benth. Ex. J.D. Hook.

Trichoglottis tenera (Lindl.) Rchb.f.

Tropidia angulosa (Lindl.) Bl.

Taprobanea spathulata (L.)Christ.

Vanda tesselata (Roxb) Hook.ex G.

V. testacea (Lindl.) Rchb.f.

V. thwaitesii J.D. Hook

Vanilla wightiana (Lindl.) ex J.D. Hook

Xenikophyton smeeanum (Rchb.f.)

Appendix 3. Edible Pteridophytes of Kerala

Sl No.	Name of species	Parts used
1	*Angiopteris evecta* (Forst.) Hoff.	Tender stem and leaves
2	*Blechnum orientale* L.	Rhizome
3	*Botrychium lanuginosum* Wall. ex Hook. & Grev.	Tender portions
4	*Calamaria coromandelina* (L. f.) Kuntze	Corms (famine food)
5	*Ceratopteris thalictroides* (L.) Brongn.	Young fronds
6	*Cyclosorus parasiticus* (L.) Farw.	Young fronds
7	*Diplazium esculentum* (Retz.) Sw.	Young fronds
8	*Dryopteris cochleata* (D. Don) C. Cha	Tender portions
9	*Equisetum giganteum* L.	Young shoot
10	*Humata immersa* (Wall. ex C. Presl) Mett.	Young fronds
11	*Lygodium flexuosum* (Linn.) Sw.	Tender portions
12	*Marsilea minuta* L.	Tender leaves
13	*Nephrolepis cordifolia* (Linn.) Presl.	Tubers
14	*Ophioglossum reticulatum* L.	Fleshy fronds
15	*Phymatosorus nigrescens* (Bl.) Pic. Ser.	Tender portions
16	*Polystichum moluscens* (Bl.) T. Moore	Young fronds
17	*Pteridium aquilinum* (L.) Kuhn.	Rhizome, tender fronds
18	*Salvinia adnata* Desv.	Tender leaves
19	*Stenochlaena palustris* (Burm.f.) Beddome	Young shoot
20	*Tectaria coadunata* (J. Sm.) C. Chr.	Tender portions
21	*Tectaria zeylanica* (Houtt.) Sledge	Tender stalk, young leaves
22	*Trigonospora caudipinna* (Ching) Sledge	Tender portions

Appendix 4. Fiber Yielding Pteridophytes of Kerala

Sl No.	Name of species	Parts used
1.	*Dicranopteris linearis* (Burm.f.) Underwood	Stipes and rhizome
2.	*Tectaria zeylanica* (Houtt.) Sledge	Leaf stack
3.	*Lygodium flexuosum* (Linn.) Sw.	Old stem
4.	*Lygodium microphyllum* (Cav.) R. Br.	Old stem
5.	*Stenochlaena palustris* (Burm.f.) Beddome	Mature stipes and rhizome

Appendix 5. Pteridophytes with Miscellaneous use

Sl No.	Name of species	Parts used
1.	*Acrostichum aureum* L.	Anti-termitic agent
2.	*Adiantum capillus-veneris* L.	Flavouring agent
3.	*Angiopteris evecta* (Forst.) Hoff.	Base for transporting orchids, aromatic oils for perfumery
4.	*Ceratoperis thalictroides* (L.) Brongn.	Green manure for rice field
5.	*Cheilosoria tenuifolia* (Burm. f.) Trev.	Magico religious beliefs
6.	*Cyathea gigantea* (Wall. ex. Hook.) Holtt.	Decoration orchid planting base
7.	*Equisetum giganteum* L.	Cleaning agent for utensils
8.	*Lycopodium japonicum* Thunb.	Inflamable spores for decorative fire works
9.	*Pteridium aquilinum* (L.) Kuhn.	Dyes, pattern material, fodder, packing material, green manure, raw in glass making
10.	*Pteris vittata* L.	Fodder for cattle and thatching.

Glossary of Medical Terms Used

Acrid: biting pungent

Amenorrhoea: failure of menstruation

Alexiteric: protective to infectious diseases

Anodyne: a medicine that allays pain

Anthelmintic: destroying or expelling worms

Antibacterial: substance that destroys bacteria

Antidysentric: prevents dysentry

Antiepileptic: prevent the disorder of the nervous system, causing fits

Antifertility: prevent fertilization

Antiflabulent: prevent formation of gas in the digestive tract

Antifungal: substance that destroys fungus

Antiinflammatory: prevent inflammation

Antileprotic: prevents leprosy

Antimalarial: prevent malarial infection

Antiovulatory: prevent ovulation

Antipyretic: counteracting fever

Antiseptic: a chemical sterilizing substance to kill or control pathogenic microbes

Anti-tussive: that which prevents cough

Aperient: a laxative or mild cathartic

Aphrodisiac: a drug, which stimulates sexual desire

Arthralgia: pain in a joint

Astringent: having power to contract organic tissues

Carbuncle: an infection of the skin and subcutaneous tissue by *Staphylococcus aureus*

Catarrh: inflammation of a mucous membrane, usually associated with an increase in the amount of normal secretion of mucus

Cephalalgia: headache

Constipation: difficulty in emptying the bowels

Contution: an injury that dissolves skin without breaking it

Demulcent: soothing

Depurative: purifying

Detergent: cleaning agent

Diaphoretic: a drug which induces perspiration

Diuretic: promoting the flow of urine

Dropsy: an excessive accumulation of clear or watery fluid in any of the tissues or cavities or the body

Dyspepsia: indigestion

Emetic: causing vomiting

Emmenagogue: medicine intended to restore the menses

Emollient: softening

Epilepsy: an affection of the nervous system resulting from excessive or disordered discharge of cerebral neurons

Erysipelas: an inflammatory disease generally affecting the face marked by a bright redness of the skin

Expectorant: aiding the secretion of the mucous membrane of the air passages and the removal of fluid by spitting

Febrifuge: anything which reduces fever

Gripe: a sharp pain in the stomach

Haemoptysis: spitting of blood

Haemostatic: checking bleeding

Haemostatic: styptic

Haemostyptic: astringent, checking bleeding

Hiccough: a diaphragmatic spasm causing a sudden inhalation which is interrupted by a spasmodic closure of the glottis producing a noise

Insomnia: inability to sleep

Intoxicant: causing intoxication or make drunk

Ophthalmic: of or for the eyes

Pectoral: effective in diseases of the chest

Phthisis: any wasting disease in which the whole body or part of the body is involved

Poultice: a soft mush prepared by various substances with oily or watery fluids

Purgative: strongly laxative

Refrigent: cooling

Sciatica: neuritis of the sciatic nerve

Sedative: having a calming effect

Styptic: having the power to arrest bleeding

Sudorific: promoting sweating

Thrush: a contagious disease caused by a fungus in infants and children caused by *Candida albicans*

Vulnerary: useful in healing wound