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Diversity and Ethnobotanical Significance of Pteridophytes in Marunthuvazhmalai – The Southern Tip of Western Ghats in Peninsular India

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Abstract: The present study mainly focuses on the ethno-botanical importance of Pteridophytes which are widely used by the local people of Marunthuvazhmalai hills, southern Western Ghats. As many as 25 taxa of pteridophytes along with the botanical name, family name, habit, part used, and their ethno-botanical uses (if available) are provided. They comprise terrestrial, epiphytic, litho-phytic and hydophytic forms.
Keywords: Ethnomedicinal uses, Marunthuvazhmalai, Pteridophytes, and Western Ghats.

INTRODUCTION

Pteridophytes are one of the earliest groups of vascular plants and are popularly known as 'plant reptiles'. India has a rich variety of plants including 1200 species of ferns and fern allies. In India its distribution ranges from Himalayas, Western Ghats, and Eastern Ghats. They are the non-flowering fascinating plants among the plant kingdom [1, 2]. Based on the types of spores they are classified into homosporus and heterosporous [3]. In general, spore bearing vascular plants has some similarity with Pteridophytes in spore characteristics [4]. The spores play vital role in dispersal and distribution of Pteridophytes. In addition, the moisture level of Air, and soil as well as edaphic factors. India harbors a diversified and rich wealth of Pteridophytes flora due to its varied tophographic climatic condition and its geographical position. Palynolgy study is very useful for taxonomic purposes and may be useful for allergies studies [5].

In India the survey of Pteridophytes were started in late 19 Centuries by Beddome 1883-1892 [6-8]. In peninsular India the Eastern Ghats and Western Ghats has rich source of Pteridophytes [9-14]. The Kanyakumari district forms an ecotone of coastal and high altitude environment as it situated at the southern Western Ghats, associated with coastal ecosystem and network of wetlands [15-18]. Marunthuvazhmalai is a historic hillock situated at the Southern tip of Peninsular India and form the Southern extreme end of Western Ghats. Even though it is known for it rich diversity no detailed report available on the present status of Pteridophyte diversity of Maruthuvahmalai. With this view in mind the present work was planned and carried out.

MATERIALS AND METHODS

Marunthuvazhalmalai is a hillock located about 11km from Nagercoil and about 8 km from Kanyakumari. The term Marunthuvazhalmalai means "Mountain of Medicinal Plants". Marunthuvazhalmalai, is one of the major hill ranges in the south termination of the Western Ghats lying between North Latitude of $8^0, 9'$ and East latitude of $77^0, 33'$. The Elevation of the Hill measure about 800 feet above sea level. The area as a whole is very dry and has a hot tropical climate. Annual maximum temperature is 30^0 C, Annual Rain fall is 60mm.

A survey of pteridophytes in the study area conducted during the period of April 2012 to March 2013. Terrestrial, epiphytic, lithophytes and hydrophytes forms of pteridophytes were recorded. Diagnostic features of the entire specimen were studied and relevant field notes were made on fresh plant materials. Identification was made by referring to available literature and Pteridophytes floras [6-8, 19,20]. Data collection on ethnobotanical knowledge was carried out with the help of traditional healers using a Semi- structured Questionnaire and documented.

RESULTS AND DISCUSSION

There are 25 species of pteridophytes in the present study site Marunthuvazhmalai the southern tip of Western Ghats in peninsular India (Table 1). Of these, 20 taxa of pteridophytes are ethnomedicinally

important. They comprise terrestrial, epiphytic, lithophytic and hydrophytic forms. Among the pteridophytes studied in this site shows the maximum habitat preference (Table 2) by *Drynaria quercifolia* (Polypodiaceae), *Isoetus coromandelina* (Isoetaceae), *Lygodium microphyllum* (Schizaeceae) and *Pteris vitata* (Pteridance). Nine of them are preferred any two of the habitats. Among the 25 pteridophytes, eleven are only preferred by only one habitat. They are mainly terrestrial ones and three of them are hydrophytes.

Ethnobotanical significance of pteridophytes (Table 3) includes ailments like typhoid, rheumatism, epilepsy, and leprosy and kidney problem. They cure many symptoms like asthma, cold, fever, cough, body pain, swellings, liver problems, knee pain, joint pain, and sprains. Pteridophytes also known to have antibacterial, antifungal, antiseptic, anthelmintic and detergent properties [21-25]. Decoction of *O. gramineum* as a lotion for boils. *O. reticulatum* is used as a cooling agent, used for bruises and hemorrhages. Many of the Pteridophytes have the curative property in wounds and cuts. *Azolla pinnta* is a well-known bio-fertilizer.

Family-wise distribution shows that Ophioglossaceae dominates (6 taxa) in terms of species richness, followed by Parkeriaceae and Thelypteridaceae 2 species each, whereas 9 familes were monospecific (Figure 1). Genus wise distribution of pteridophytes in the study area shows that *Ophioglossum* had six species, whereas *Christella* and *Lygodium* have 2 species each. All the others are singly represented. Pteridophytes are popularly known as plant reptiles. Sekar *et al*. [26] reported thirty species from Kolli hills. They observed ethnomedicinal uses of *Actinopteris*, *Cerotopteris*, *Christella*, *Drynria*, *Hemionitis*, *Pteris* and *Salvinia*. Benjamin and Manickam [27] observed the medicinal pteridophytes (61 species) form the Western Ghats. Among them include *Isoetus, Lygodium, Marsilea, Ophioglossum gramineum, O. reticulatum, Phleobodium, Pityrogramma*, and *Salvinia.*

The present study reveals that the Marunthuvazhmalai has a rich pteridophyte flora than any other common coastal environments. Further phtyochemical studies will reveal the photochemical principles with curative effects.

Table-1: Checklist of pteridophytes found in the study area

Sl. No.	Botanical Name	Family
1	*Actinopteris radiata* (Sw.) Link.	Actinpteridaceae
2	*Adiantum latifolium* Lam.	Adiantaceae
3	*Azolla pinnata* R. Br.	Azollaceae
4	*Cerotopteris thalictroides* (L.) Brongn.	Parkeriaceae
5	*Cheilanthes mysurensis* Wall. Ex. Beddome	Sinopteridaceae
6	*Christella dentata* (Forssk) Brownsey and Jermy	Thelypteridaceae
7	*Christella parasitica* (L.)H. Lev.	Thelypteridaceae
8	*Cyclosorus interruptus* (Willd.) H. Ito	Thelypteridaceae
9	*Drynaria quercifolia* (L.) J. Sm.	Polypodiaceae
10	*Hemionitis arifolia* (Burm. F.) T. Moore	Parkeriaceae
11	*Isoetus coromandelina*L.f.	Isoetaceae
12	*Lygodium flexuosum* (L.) Sw.	Schizaeaceae
13	*Lygodium microphyllum* (Cav.) R. Br.	Schizaeaceae
14	*Marsilea minuta* L.	Marsileaceae
15	*Nephrolepis multiflora* (Roxb.) Jarret	Oleandraceae
16	*Ophioglossum gramineum*Willd.	Ophioglossaceae
17	*Ophioglossum nudicaule* L. f.	Ophioglossaceae
18	*Ophioglossum petiolatum* Hook.	Ophioglossaceae
19	*Ophioglossum polyphyllum* A. Braun ex Seubert.	Ophioglossaceae
20	*Ophioglossum reticulatum* L.	Ophioglossaceae
21	*Ophioglossum vulgatum* L. f.	Ophioglossaceae
22	*Phlebodium aureum* (L.) J. Sm.	Polypodiaceae
23	*Pityrogramma calamelanos* (L.) Link.	Parkeriaceae
24	*Pteris vitata* L.	Pteridaceae
25	*Salvinia molesta* Mitch.	Salviniaceae

Table-2: Habitat-wise distribution of pteridophytes in the study area

Sl. No.	Botanical Name	Lithophyte	Hydrophyte	Terrestrial	Epiphyte
1	*Actinopteris radiata* (Sw.) Link.	+	-	+	-
2	*Adiantum latifolium* Lam.	-	-	+	-
3	*Azolla pinnata* R. Br.	-	+	-	-
4	*Cerotopteris thalictroides* (L.) Brongn.	-	+	+	-
5	*Cheilanthes mysurensis* Wall. Ex. Beddome	-	-	+	-
6	*Christella dentata* (Forssk) Brownsey and Jermy	-	+	+	-
7	*Christella parasitica* (L.)H. Lev.	-	+	+	-
8	*Cyclosorus interruptus* (Willd.) H. Ito	-	+	+	-
9	*Drynaria quercifolia* (L.) J. Sm.	-	+	+	+
10	*Hemionitis arifolia* (Burm. F.) T. Moore	-	-	+	-
11	*Isoetus coromandelina*L.f.	-	+	+	+
12	*Lygodium flexuosum* (L.) Sw.	-	-	+	-
13	*Lygodium microphyllum* (Cav.) R. Br.	+	+	+	-
14	*Marsilea minuta* L.	-	+	+	-
15	*Nephrolepis multiflora* (Roxb.) Jarret	+	-	+	+
16	*Ophioglossum gramineum*Willd.	-	-	+	-
17	*Ophioglossum nudicaule* L. f.	-	-	+	+
18	*Ophioglossum petiolatum* Hook.	-	-	+	-
19	*Ophioglossum polyphyllum* A. Braun ex Seubert.	-	-	+	+
20	*Ophioglossum reticulatum* L.	-	-	+	-
21	*Ophioglossum vulgatum* L. f.	-	-	+	-
22	*Phlebodium aureum* (L.) J. Sm.	-	-	+	-
23	*Pityrogramma calamelanos* (L.) Link.	-	-	+	-
24	*Pteris vitata* L.	+	-	+	+
25	*Salvinia molesta* Mitch.	-	-	+	-

Abbreviations: (+) present; (-) absent

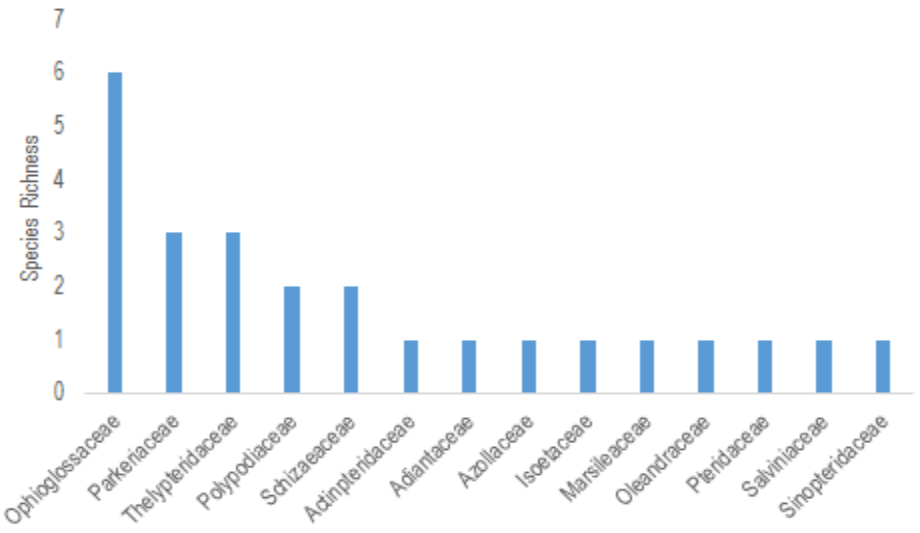

Fig-1: Family-wise distribution of plant species in the study area

Table-3: Ethnobotanical significance of pteridophytes of the study area

Sl. No.	Botanical Name	Part used	Ethnobotanical significance
1	*Actinopteris radiata* (Sw.) Link.	Whole plant	Anthelmintic and fever
2	*Adiantum latifolium* Lam.	Whole plant	Boiled decoction is applied to get relief from body pain
3	*Azolla pinnata* R. Br.	Whole plant	Good biofertilizer and the extract is an anti- fungal agent
4	*Cerotopteris thalictroides* (L.) Brongn.	Whole plant	Antifungal agent, plant paste mixed with turmeric and is applied for wounds and skin infections
5	*Cheilanthes mysurensis* Wall. Ex. Beddome	,,	Hot decoction is used for throat pain
6	*Christella dentata* (Forssk) Brownsey and Jermy	Leaves	The juice is used to relieve body pain
7	*Christella parasitica* (L.)H. Lev.	,,	The juice obtained is taken orally to treat swellings
8	*Cyclosorus interruptus* (Willd.)H.	Leaves	Used for treating burns, cough, malaria and general sickness
9	*Drynaria quercifolia* (L.) J. Sm.	Rhizome	The rhizome made into a paste and boiled with pepper, cumin seeds, onion and garlic along with water. It is taken orally to get relieve from body pain, knee pain and joint pain.
10	*Hemionitis arifolia* (Burm. F.) T. Moore	Whole plant	Plant is ground into a paste and applied over cut wounds
11	*Isoetus coromandelina*L.f.	,,	The plant gives out a fluid. It is used for liver problems.
12	*Lygodium flexuosum* (L.) Sw.	Leaves	The plant is used an expectorant. Leaf paste cures cuts, wounds, rheumatism and sprains.
13	*Lygodium microphyllum* (Cav.) R. Br.		Leaf is ground into a paste with turmeric and applied over the affected part. The juice made from tha plant is taken orally along with pepper to get relief from cough.
14	*Marsilea minuta* L.	Leaves	Used as a pot herb. It is an expectorant, aphrodisiac, cough relieving properties, useful in psychopathy, opthalmia leprosy, dyspepsia and fever
15	*Ophioglossum gramineum*Willd.	Whole plant and rhizome.	Plant yields a mucilaginous and astringent decoction. It is used in angina. Warm rhizome decoction as a lotion for boils. Antibacterial, anticancerous, antiseptic and detergent properties.
16	*Ophioglossum reticulatum* L.	Whole plant	Used as a cooling agent. Used to treat inflammations, wounds, bruises and haemorrages.
17	*Ophioglossum vulgatum* L. f.	,,	Possesses antiseptic, stypic and vulnerary properties.
18	*Phlebodium aureum* (L.) J. Sm.	Rhizome	Used for the treatment of fever and cough.
19	*Pteris vitata* L.	Whole plant	Plants are ground into paste and applied over the affected places for wound healing. The paste is mixed with pepper and taken orally to get relief from cold, cough and fever.
20	*Salvinia molesta* Mitch.	Whole plant	Plant extract is used an antifungal agent.

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