GTRP Pteridological Research

Ethno medicinal fern and fern-allies used by tribe *Malayalis* of Kolli Hills, Eastern Ghats, Tamil Nadu

[1] R. Revathi, R. Muthuraja[2], Binu Thomas[2*] and K. Raju[1]

[1]Department of Botany**,** Kandasami Kandar College, Velur - 638 182, Namakkal, Tamil Nadu, India

[2]Department of Botany, School of Life sciences, Bharathiar University, Coimbatore-641046, Tamil Nadu, India
*Corresponding author: binuthomasct@gmail.com

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Abstract

The present study deals with 50- species of ethno-medicinal pteridophytes which are utilized by tribe *Malayalis* in Kolli hills of Eastern Ghats, Tamil Nadu. These 50 species spreading over 27 families, 35 genera. The elder generation has sound knowledge about medicinal plants. From this study it is clear that *Kolli malayalis* possess vast knowledge on the medicinal plant resources in their surroundings and these medicinal plants continue to play a major role in healthcare needs of this tribal community.

Key words: Ethnomedicinal, ferns and fern-allies, *Malayalis*, Kolli Hills, Eastern Ghats

Introduction

The traditional system of medicine plays an important role in health care of rural and tribal people for all types of ailments. The traditional knowledge of medicinal plants has been well documented in *Charaka Samhita* and *Shusruta Samhita* (Kirtikar and Basu, 1975). Traditional knowledge of medicinal plants served as man's most important weapon against pathogen. According to study reports, it is found that about 85% of traditional medicines used for primary healthcare derived from plants globally (Pattanaik and Reddy, 2008). Today about 65% of Indian population depend on the traditional system of medicine. The popularity of traditional medicines has grown enormously during the recent years. The domestic demand for traditional medicines in India has increased recently (Henry *et al*., 1996).

Pteridophytes are seedless spore bearing vascular cryptogams which occupy a position between the lower non – seed bearing and higher seed bearing plants and form a generally much neglected group of plants (Binu Thomas and Rajendran, 2012). India has a rich population of pteridophytes, most of the species appear in either the region or in South Indian mountains called the Western and Eastern Ghats (Gowrisankar *et al*., 2011). These pteridophytes grow luxuriantly in moist, tropical and temperate forests. Out of 12, 000 species of pteridophytes that occur in the World flora, more than 1, 000 species belonging to 70 families and 191 genera likely to occur in India (Dixit and Vohra, 1984). Out of 1, 000 species of pteridophytes occurring in India, 170 species have been found to be used as food, flavour, dye, medicine, bio-fertilizers, oil, fiber and bio-gas production (Manickam and Irudayaraj, 1992).

The success of aboriginal, primitive or rural societies in understanding plants and their medicinal virtues is a result of long-standing and intimate association with the flora and their dependence on them. Several wild and cultivated plant species play a very important and vital role among their cultures. Their relationships with the plant world have evolved over generations of experience, practice, experimentation, trials and errors and have passed down to next generations by word of mouth. Their traditional knowledge has still remained especially with the indigenous tribal or rural people world over (Patil and Ahirrao, 2011). Therefore, practice of ethnomedicine is an important vehicle for understanding indigenous societies and their relationships with nature (Anyinam, 1995; Rai and Lalramnghinglova, 2010). The present study mainly aims to document the ethnomedicinal pteridophytes which are using *Malayali* tribe of

Kolli Hills and role of medicinal plants in their day to day life.

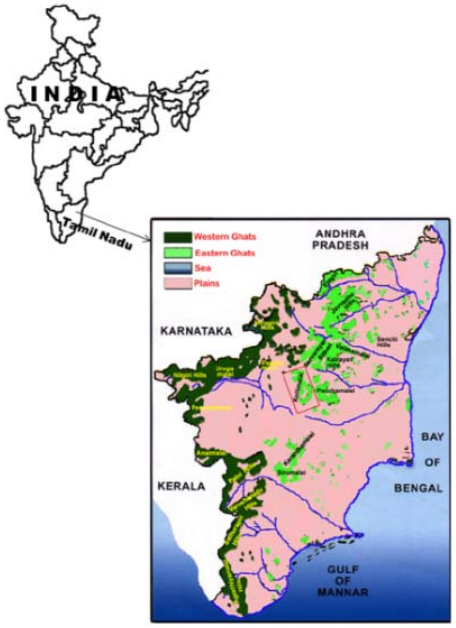


Plate-1: Map of Kolli hills in Eastern Ghats of Tamil Nadu, South India

Materials and methods

Study Area

Kolli hills form a major range in the Eastern Ghats, that is rich in biodiversity and tribal population. These hill ranges is situated in the Namakkal district of Tamil Nadu (11^0 10' - 11^0 30' N latitude, 78^0 20' – 78^0 30' E longitude) and extends to an area of about 418. 5 km^2 and elevation to an area of about 1000 and 1500 m above MSL (Plate-1). The average rainfall is about 1200 mm. The mean annual temperature in the hills ranges from 15°C to 35°C during March – June and averages between 18°C to 25°C during October – January (Lakshminarayanan, 2000). Kolli hills is drained by two rivers, *Vasistha nadhi* and *Sweta nadhi.* Because of its diverse topographical condition, this region is well situated for a range of medicinal plant species. It is a 'Naturalists Heaven' a treasure trove of medicinal plants (Gowrisankar *et al*., 2011). The vegetation of the Kolli hills varies from dry deciduous forest in the foot hills to semi-evergreen to evergreen shola pockets at high ranges. Among these dry deciduous forest types is more dominant. In addition to these the Southern tropical riparian forest occurs along the rivers and streams (Rajendran and Manian, 2011).

Study area: Kolli hills

Old tribal informant (*Kolli malayali*)

Tribal houses

Tribe: *Malayalis*

The indigenous people inhabiting the Kolli hills are *Malayalis*. They are popularly called as Known as *Kolli malayalis*. They are believed to be descendants of Proto Australoid group who lived here before Harappan period and possess wealth knowledge on local exploitation of medicinal plants in their part of life (Rajendran and Manian, 2011).

A) *Actiniopteris radiata* (Sw.) Link

E) *Asplenium decrescens* Kunze.

B) *Adiantum capillus - veneris* L.

F) *Blechnum orientale* L.

C) *Adiantum incisum* Forssk.

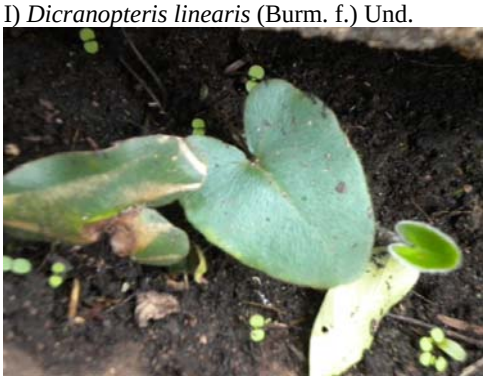
G) *Cheilanthes tenuifolia* (Burm.f) Sw.

D) *Adiantum raddianum* C. Presl.

H) *Cheilanthes mysurensis* Wall. *ex* Bedd.

I) *Dicranopteris linearis* (Burm. f.) Und.

M) *Drynaria quercifolia* (L.) J. Sm.



J) *Hemionitis arifolia* (Burm.) Moore.

N) *Pyrrosia lanceolata* Fare.

K) *Pityrogramma calamelanos* (L.) Link..

O) *Pyrrosia porosa* (C. Presl) Hov.

L) *Osmunda regalis* (L)

P). *Psilotum nudum* (L.) P. Beauv.

The tribe *Malayali's* are generally illiterate and speak a local dialect of Tamil, physically they resemble to the Semong of Malaya. It has been well established that tribal communities have survived on their traditional knowledge base. Traditional medicines are the primary healthcare resources for the *Malayali* tribes to protect and maintain their health. Tribal practitioners with in the community are curators of their society and have good knowledge of medicinal plants, diseases and treatment modalities. Besides, they have served as the custodians of biodiversity in this region. (Rengalakshmi, 2005; Viswanathan, 1987) (Plate - 2).

Ethnobotanical Survey

The ethnobotanical survey was conducted in the tribe *Malayalis* residing in Kolli hills during September 2011 to September 2012. More than 200 families and nearly 2500 members of tribes are found in the study area. During the study, A total of 10 informants, comprising of 8 males and 2 females were identified between the ages of 48 and 74 in the study area. Among them 4 were farmers, 4 were housewives and 2 regular tribal practitioners. The Ethnobotanical data were collected according to the methodology suggested by Jain, (2001). These were collected through questionnaire, interviews and discussions among the tribal practitioners in their local language. The voucher specimens were collected and identified by referring to standard flora (Beddome, 1983; Manickam and Irudayaraj, 1992; 2003). The data were meticulously entered into a field notebook and the voucher specimens were deposited in the Department of Botany, Kandaswami Kandar's College, Velur.

Results and Discussion

In the present investigation an attempt was made to document the ethno-medicnal pteridophytes which are utilized by tribe *Malayalis* in Kolli hills of Eastern Ghats. These ethno-medicinal pteridophytes of the study area has yielded in collection of 50 species spreading over 27 families, 35 genera (Plate 3-6; Fig. 1). The families are arranged in alphabetic order.

In order to infer the dominant families, an analysis were made and found that The familes like Adiantaceae, Polypodiaceae, Pteridaceae and Selaginellaceae is the largest families with 4 species each. The families like Dryopteridaceae, Ophioglossaceae and Schizaeaceae is the second dominant families with 3 species each, followed by Aspleniaceae, Cheilanthaceae, Hemionitidaceae, Lycopodiaceae is the third dominant family with 2 species and other families having 1 species each (Fig.2).

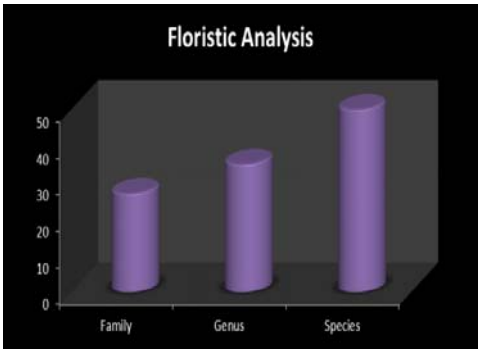


Fig. 1. Floristic analysis of ethno-medicinal pteridophytes of Kolli Hills

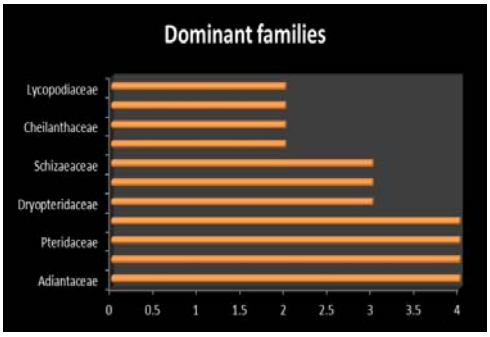


Fig.2. Analysis of Dominant families of ethno-medicinal pteridophytes of Kolli hills

In order to infer the dominant genera, an analysis were made and found that The genus like *Adiantum*, *pteris* and *Selaginella* are the dominant ones with 4 species each, followed by the other dominant genera like *Asplenium*, *Cheilanthes*, *Dryopteris*, *Pyrrosia*, *Lygodium* and *Christella* are having 2 species each and other generas having 1 species each (Fig.3).

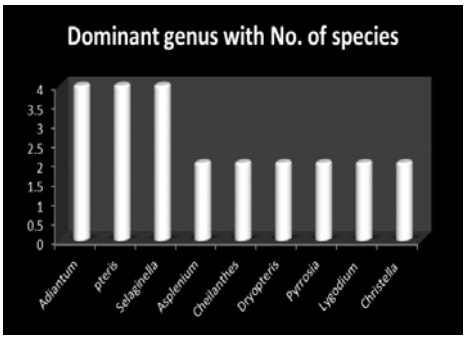


Fig.3. Analysis of dominant genera with respect to the no. of species

Based on the medico-potentiality of ethnomedicinal ferns and fern-allies used by tribe *Malayalis* of Kolli hills, the collected pteridophytes were used for various ailments like diarrhoea and dysentery, cuts and wounds, fever and cough, antidote for poisonous bites, various skin problems, body pain, urinary problems, stomach-ache, body swellings, rheumatism, asthma, kidney problems, headache and throat pain (Table-1). The Tribal practitioner(s) use specific plant parts and dosages in treatment of specific ailments. Plant products are consumed raw or taken as decoction (juice)/ infusion (oral treatment) and paste (external application). Fresh leaves, root and stem were more frequently used when compared to other parts of the plant. The formulation such as plant paste was quite common for external applications. Sometimes the healer may mix several plants as ingredients to cure a single disease. The most cases fresh plant material is used for the preparation of medicine. Alternatively, if the fresh plant parts are not available, dried plant materials are used. From this study it is clear that *Kolli malayalis* possess vast knowledge on the medicinal plant resources in their surroundings and these medicinal plants continue to play a major role in healthcare needs of this tribal community.

Table-1: Ethno medicinal values on fern and fern-allies

Sl No.	Botanical Name	Family	Local Name	Ethnomedicinal uses
1	*Actiniopteris radiata* (Sw.) Link	Actinopteridaceae	*Saava sedi*	The juice extracted from the stem is taken orally twice a day to treat diarrhoea and fever
2	*Adiantum capillus - veneris* L.	Adiantaceae	*Roaddu Keerai*	The whole plant is made into a paste along with aloe gel and applied externally in the affected places to treat cuts and wounds. The paste is also used as hair tonic by applied on head
3	*Adiantum incisum* Forssk.	Adiantaceae	*Sentharai*	The leaf powder is mixed with butter and used for controlling the internal burning of the body
4	*Adiantum lunulatum* Burm.	Adiantaceae	*Pasai*	The rhizome powder is used as antidote against snake bite. The whole plant is ground into a paste with turmeric and applied over the affected places to treat pimples and wounds
5	*Adiantum raddianum* C. Presl	Adiantaceae	*Parapadappai*	Whole plant is used in cough, asthma, fever, leprosy and hair falling
6	*Angiopteris evecta* (Forst.) Hoff.	Angiopteridaceae	*Yanai vanagi*	Decoction obtained from the leaf is taken orally along with lemon juice to treat intestinal ulcer and stomach ache
7	*Asplenium decrescens* Kunze.	Aspleniaceae	*Elaikalai*	The leaves shows antibacterial properties. The crushed leaves applied over the affected parts of the body

8	*Asplenium inaequilaterale* Willd.	Aspleniaceae	*Erathalai*	The crushed leaves applied over the affected parts of the body for body pain
9	*Diplazium esculentum* (Retz.) Sw.	Athyriaceae	*Pasali*	Handful of leaves are made into juice and taken orally twice a day to get relief from cold and cough
10	*Blechnum orientale* L.	Blechnaceae	*Palsai*	The juice extracted from the leaf is used to cure intestinal wounds
11	*Cheilanthes tenuifolia* (Burm.f) Sw.	Cheilanthaceae	*Paraisedi*	Fronds cut into pieces, made to a paste and applied on abscess
12	*Cheilanthes mysurensis* Wall. *ex* Bedd.	Cheilanthaceae	*Pachai*	The juice obtained from the leaves is mixed with hot water and taken orally along with honey to treat throat pain
13	*Leucostegia immersa* (Wall.) Presl.	Davalliaceae	*Thesachai*	The rhizome is mixed with water and turmeric and made into a paste. The mixture is tied with cloth over the affected places to treat swellings
14	*Dryopteris atrata* (Kunze) Ching	Dryopteridaceae	*Sanarai*	Powdered rhizome is taken with water daily twice for rheumatism
15	*Dryopteris cochleata* Buch. Ham. *ex* D. Don.	Dryopteridaceae	*Kalkarai*	Whole plant extract is given twice daily usually in case of snake bite
16	*Tectaria wightii* C.B. Clarke	Dryopteridaceae	*Thatharai*	The decoction thus obtained is taken orally twice a day to cure asthma
17	*Dicranopteris linearis* Burm. f.	Gleicheniaceae	*Padachai*	The Decoction of plant is laxative. The aqueous extract of fronds possesses antibacterial activity
18	*Hemionitis arifolia* (Burm.) Moore.	Hemionitidaceae	*Kalthamarai*	The paste of bothe roots and turmeric is applied over the affected places to cure cuts
19	*Pityrogramma calamelanos* (L.) Link.	Hemionitidaceae	*Aaswari sadai*	Whole plant parts are boiled with water and the decoction thus obtained is taken orally early in the morning to treat kidney problem
20	*Hymenophyllum javanicum* Spr.	Hymenophyllaceae	*Chakarathai*	The local people smoke the dried plant material mixed with garlic and onion to cure headache
21	*Odontosoria chinensis* (L.) J. Sm.	Lindsaeaceae	*Ochalai*	The decoction of leaves is used for chronic disorders
22	*Huperzia phlegmaria* Roth.	Lycopodiaceae	*Easwari sadai*	The whole plant is ground into a paste and applied over wounds
23	*Lycopodium japonicum* Thunb.	Lycopodiaceae	*Padapali*	The decoction of the plant is used as diuretic
24	*Marsilea minuta* L.	Marsileaceae	*Thanniyarilai*	The decoction of leaves along with ginger is used to cure cough and bronchitis
25	*Nephrolepis auriculata* (L.) Trim.	Oleandraceae	*Pasalithalai*	The paste of the leaves is applied as wound to check bleeding

26	*Botrychium lanuginosum* Wall. ex Hook.	Ophioglossaceae	*Nandu Kuddhi*	Shade dried whole plant parts are ground with the seeds of pepper and cumin seeds and taken orally to get relief from body pain
27	*Helminthostachys zeylanica* (L.) Hook.	Ophioglossaceae	*Nallar*	The decoction of rhizome is used for dysentery
28	*Ophioglossum reticulatum* L.	Ophioglossaceae	*Kalkurunjal*	The paste of the leaves is applied over the forehead to get relief from head ache
29	*Osmunda regalis* L.	Osmundaceae	*Thalachadi*	Fronds are used as tonic for rickets and rheumatism
30	*Ceratopteris thalictroides* (L.)Brongn.	Parkeriaceae	*Thalatharai*	The whole plant parts are ground into paste and mixed with turmeric. The mixture is applied over the affected places to cure skin diseases
31	*Drynaria quercifolia* (L.) J. Sm.	Polypodiaceae	*Aattukal kilangu*	Skin of rhizome is removed and it is made into a paste and boiled with pepper, cumin seeds, onion and garlic along with water. The mixture thus obtained is taken orally to get relief from body pain, knee pain and joint pain
32	*Microsorium punctatum* (L.) Copel.	Polypodiaceae	*Nundu Kuddhi*	Leaf is ground into juice applied over the affected places twice a day with hot water to heal wounds
33	*Pyrrosia lanceolata* Fare.	Polypodiaceae	*Kalsendai*	Leaf is made into paste with pepper and taken orally to treat sore throat
34	*Pyrrosia porosa* (C. Presl) Hov.	Polypodiaceae	*Kallottii*	The whole plant paste is applied over cuts made through knives
35	*Psilotum nudum* (L.) P. Beauv.	Psilotaceae	*Tharathani*	Whole plant decoction is mixed with turmeric and applied over the affected places to heal wounds.
36	*Pteris biaurita* L.	Pteridaceae	*Kuddhi*	The rhizome is ground into paste and applied over the affected places to get relief from body pain
37	*Pteris confusa* T.G. Walker	Pteridaceae	*Chanjalai*	Rhizome paste is applied over the boils.
38	*Pteris cretica* L. Mant.	Pteridaceae	*Thanarai*	The paste made from the leaf is tied with cloth and applied over the affected places to heal wounds
39	*Pteris vittata* L.	Pteridaceae	*Pannel sedi*	The whole plant parts are ground into paste and applied over the affected places for wound healing
40	*Pteridium aquilinum* (L.) Kuhn.	Pteridiaceae	*Thennarai*	The whole plant parts are ground into paste and applied over the affected places for cuts and wounds
41	*Anemia wightiana* Gardner	Schizaeaceae	*Kalkakadai*	The whole plant is used for the treatment of rheumatism
42	*Lygodium flexuosum* (Linn.) Sw.	Schizaeaceae	*Peraichi*	Rhizome powder is used in skin diseases

43	*Lygodium microphyllum* (Cav.) R.Br	Schizaeaceae	*Valliyilai*	The decoction of leaves is given in dysentery. Leaves are also applied in the form of poultices for skin diseases
44	*Selaginella delicatula* (Desv.) Alston	Selaginellaceae	*Thugalpoondu*	Plant juice is antibacterial and it is used for the healing of wounds by tribals
45	*Selaginella intermedia* (BI.) Spring.	Selaginellaceae	*Urakkannisedi*	The whole plant paste applied over the forehead for getting relief from headache
46	*Selaginella involvens* (Sw.) Spring.	Selaginellaceae	*Kallotti sedi*	The decoction of roots is given for cough. The fronds are crushed with rhizome of *Curcuma longa* L. is applied for poisonous bites
47	*Selaginella tenera* (Hook. & Grev.) Spring.	Selaginellaceae	*Sajivani*	The decoction of whole plant is used as diuretic
48	*Christella dentata* (Forssk.) Brown.	Thelypteridaceae	*Korai panai*	The paste obtained from the leaves is applied over the swellings over the body
49	*Christella parasitica* (L.) H. Lev.	Thelypteridaceae	*Panaisedi*	The juice obtained from the leaf is taken orally to treat swellings
50	*Vittaria elongata* Sw.	Vittariaceae	*Chamattai*	The leaf is ground into a paste and applied over the affected places to get relief from knee pain and therapeutic pain

Conclusion

The present study focalizes on the knowledge and usage of herbal medicine for the treatment of various ailments among the tribe *Malayalis* of Kolli hills, Eastern Ghats, Tamil Nadu, India. It also obvious that the conservation biological resources is essential for the well-being and the long term survival of mankind. The results of the present study provide evidence that medicinal plants continue to play an important role in the healthcare system of this tribal community and at the same time preserving ancient folklore systems to develop regional resource management, conservation of bio diversity and socio-economic development for future. In addition to this, ethnobotanical studies gives some clues to identify some phytochemicals it leads with the support of clinical trials to discover safe medicine for posterity.

The tribal people in the time immemorial have been preserving this folk knowledge in their scripts. But due to the invasion of modern synthetic medicine the new tribal generation doesn't like to practice and use these herbal preparations. Some of the threatened factors like, destruction of natural habitats by human interference, introduction of some exotic weeds such as *Parthenium hysterophorus, Lantana camera, Eupatorium* may spread as diverse range of undergrowth species, unsustainable use of resources, climatic changes and over exploitation of medicinal plants may adversely affect the existing pteridophytic diversity in the study area. However different types of strategies are required to adopt to conserve these plants.

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