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Ecological study of flora is an important indication as it forms baseline data for the distribution of plant species or communities and their relation with physical environment of particular area

Soni Raj
Research Scholar
Department of Commerce
University of Kerala

Abstract

Pteridophytes are the primitive vascular plants, they are found scattered all over the globe and quite many of them occur in India. However, they are not found throught the country. Pteridophytes make as important contribution to the earth's plant diversity. Being the second largest group of vascular plants, they form a significant and dominant component of many plant communities. All human activities disturb the vegetation by eliminating many species. So an up to date study is very important for knowing about flora, especially in the case of pteridophytes. The present effort was undertaken to enumerate the pteridophytic species present in Kilavarai freshwater river situated in Palni hills of southern Western Ghats, Tamil Nadu, India, the study was carried out from December 2014 to January 2016. The result of the present study revealed that 36 pteridophytic species belonging to 25 genera distributed among 19 families were noted from the study site. Among the families recorded, Adiantaceae (16.67%) was found to be dominant and largest family comprising 6 species. Polypodiaceae and Pteridaceae (each of 11.11%) shared the second largest family status; they were represented by 4 species each. The third largest family was Lycopodiaceae (8.33%); it was represented by 3 species. The families Cheilanthaceae, Nephrolepidaceae and Selaginellaceae were recorded with each of 2 species (5.56%) and 11 families were represented by single species (2.78%). Moreover, terrestrial species (27 species) were found to be more in number than epiphytic (5 species), 3 species were found as both epiphytic and lithophytic species and 1 species was recorded as purely lithophytic.

Key words: *1.Pteridophytes 2.Kilavarai 3.Palni hills 3.Western Ghats.*

Introduction

Pteridophytes may comprise a significant component of the forest ecosystem. Ferns have measurable indications that may reflect the effects of change in environmental factors. The ferns are not only taxonomic oddities but those are plants with dynamic relationship to their environment (Verma and Khullar, 2010). Ecological study of flora is an important indication as it forms baseline data for the distribution of plant species or communities and their relation with physical environment of particular area (Bir and Vasudeva, 1972).

Western Ghats are very rich and varied in flora because of its diversified topography and varied climatic conditions. The region is considered to be one of 34 major hot spots of biological diversity in the world (Myers, 2003). Though the pteridophytes occur in abundance in the tropical, sub-tropical and moist deciduous forests of India, large scale destruction of forests has drastically affected the diversity of

pteridophyte species. The life-cycle of the ferns and fern-allies is dependent upon the existence of forests, but due to habitat destruction many species have been reduced and the rare ferns are being extinct or are on the verge of extinction (Dixit, 2000). A survey of literature shows that are rich in the diversity of plants including the angiosperm to the lower group such as pteridophytes, bryophytes, lichens, fungi and algae. But the works carried out with the lower group of plants are very limited. However, pteridophytic plants have not received sufficient attention by plant explorer of forest of upper palani hills due to difficulties in the species identification. Therefore, present work deals with the distribution of pteridophytes in Kilavarai freshwater river situated in the upper Palni hills of Southern Western Ghats, Dindigul district, Tamilnadu, India.

Materials and methods

Study area

The present study was carried out in Kilavarai freshwater river, located in the upper Palni hills of Kodaikanal situated in Southern Palni hills (10^0 23' 89.62''N and 77^0 31' 50.69''E) of Western Ghats, Dindigul district, Tamil Nadu, India. This perennial river develops into Vanderavu huts flows west upto Amaravathy reservoir. The flowing area of the river, with varying degree of slopes leading into short and height waterfalls, like Polur waterfalls. Kilavarai river is located along Kilavarai – Polur – Kumbur villages path. The experimental river has been utilized for domestic and agricultural purposes of the inhabitants of near and around the villages.

Survey and Identification

An extensive and intensive floristic survey of the pteridophyte was carried out during December 2014 to January 2016, by employing collection, identification and verification. Specimens of pteridophytic plants found in the study area were collected and processed in the laboratory. The specimens were poisoned with mercuric chloride. Herbaria for the plant specimens which have been prepared and deposited in the Post Graduate and Research Department of Botany, Saraswathi Narayanan College, Madurai. The pteridophytic plants were identified using standard keys and flora: The Ferns of Southern India Madras: A handbook to the ferns of British India Ceylon and Malay Peninsula and The Ferns of British India by R.H. Beddome (1873, 1892 & 1865-1870), Fern Flora of the Palni Hills (South India) by V.S. Manickam (1986), Pteridophyte Flora of the Western Ghats – South India by Manickam and Irudayaraj, (1992), Pteridophyte Flora of Nilgiris, South India (Manickam and Irudayaraj, (2003) and through comparison with the online floras. The documented species were arranged based on Pichi-Sermolli's (1977) system for the present systematic treatment.

Result and Discussion

The present survey reveals that a total of 36 pteridophytic species belonging to 25 genera distributed among 19 families were documented (Table 1) from the study area. Among the pteridophytic species recorded, Adiantum was represented by 6 species and which was found to be the dominant genus, and it was followed by the genus, Pteris with 3 species. A total of 5 genera viz., Cheilanthes, Christella, Nephrolepis, Pyrrosia and Selaginella were represented with each of 2 species and and the rest of the 17 genus were represented as monospecific genus. Among the families recorded, Adiantaceae (16.67%) was found to be dominant and largest family comprising 6 species.

Table 1: Pteridophytic diversity of Kilavarai freshwater river.

(Terrestrial (T), Epiphyte (E), Lithophyte (L))

S. N	Plant Name	Family	Habitat
1.	Huperzia phlegmaria (L.) Holub	Lycopodiaceae	E
2.	Lycopodiella cernua (L.) Pic.	Lycopodiaceae	T
3.	Lycopodium clavatum auct. Clarke	Lycopodiaceae	T
4.	Selaginella involvens (Sw.) Spring	Selaginellaceae	E
5.	Selaginella wightii Hieron	Selaginellaceae	E
6.	Equisetum ramosissimum Desr.	Equisetaceae	T
7.	Angiopteris evecta (G. Forst.) Hoffm.	Angiopteridaceae	T
8.	Osmunda hugeliana Presl.	Osmundaceae	T
9.	Dicranopteris linearis (Burm.f.) Underwood,	Glecheniaceae	T
10.	Drynaria quercifolia (L.) J. Sm	Polypodiaceae	E
11.	Lepisorus nudus (Hook.)ching	Polypodiaceae	E / L
12.	Pyrrosia lanceolata Farewell	Polypodiaceae	E / L
13.	Pyrrosia porosa (C.Presl) Hovenkamp	Polypodiaceae	E / L
14.	Doryopteris concolor (Langsd. Et Fisch.) Kuhn	Sinopteridaceae	L
15.	Cheilanthes bullosa Kuntze	Cheilanthaceae	T
16.	Cheilanthes mysurensis Wall.	Cheilanthaceae	T
17.	Pteridium aquilinum (L.) Kuhn	Pteridaceae	T
18.	Pteris biaurita L.	Pteridaceae	T
19.	Pteris confusa T.G. Walker	Pteridaceae	T
20.	Pteris gongalensis T.G. Walker	Pteridaceae	T
21.	Actinopteris radiata (Sw.) Link.	Actiniopteridaceae	E
22.	Adiantum capillus-veneris L.	Adiantaceae	T
23.	Adiantum hispidulum Sw.	Adiantaceae	T
24.	Adiantum incisum Forssk.	Adiantaceae	T
25.	Adiantum lunulatum Burm.f.	Adiantaceae	T
26.	Adiantum raddianum C. Presl.	Adiantaceae	T
27.	Adiantum zollingeri Mett.	Adiantaceae	T
28.	Parahemionitis cordata (Roxb. Ex Hook. & Grev.) Fras. Jenk	Hemionitidaceae	T
29.	Cyathea nilgirensis Holttum	Cyatheaceae	T
30.	Odontosoria chinensis (L.) J. Sm	Lindsaceae	T
31.	Christella dentata (Forsk.) Brownsey & Jermy	Thelypteridaceae	T
32.	Christella parasitica (L.) Lev.	Thelypteridaceae	T
33.	Asplenium tenuifolium D. Don,	Aspleniaceae	T
34.	Arachinoides aristata (Forst.f.) Tindale	Dryopteridaceae	T
35.	Nephrolepis auriculata (L.) Trimen	Nephrolepidaceae	T
36.	Nephrolepis multiflora (Roxb.) Jarrett	Nephrolepidaceae	T

Polypodiaceae and Pteridaceae (each of 11.11%) shared the second largest family status; they were represented by 4 species each. The third largest family was Lycopodiaceae (8.33%); it was represented by 3

species. The families Cheilanthaceae, Nephrolepidaceae and Selaginellaceae were recorded with each of 2 species (5.56%) and 11 families (Actiniopteridaceae, Angiopteridaceae, Aspleninaceae, Cyatheaceae, Dryopteridaceae, Equisetaceae, Gleicheniaceae,

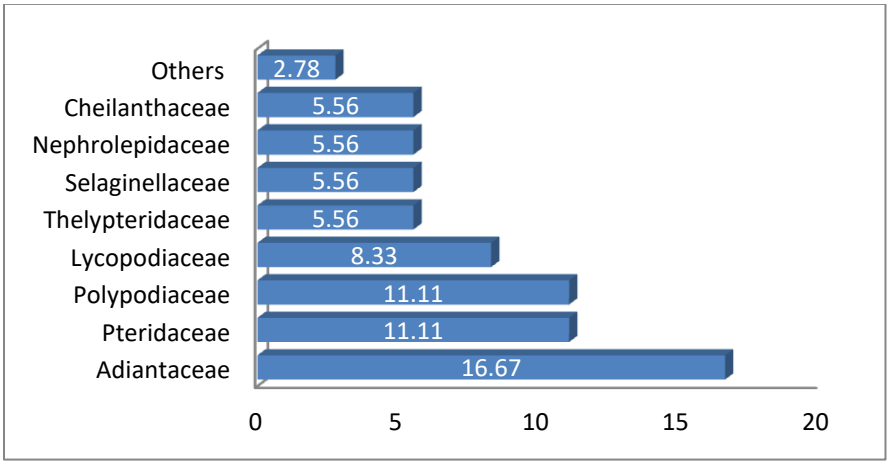

Figure 1: Familywise species percentage

Hemionitidaceae, Lindsaceae, Osmundaceae and Sinopteridaceae) were represented by single species (2.78%) (Table 1; Figure 1). The present study also indicated that during rainy season, all kinds of plants including ferns exhibited a very luxurious growth. Similar observation is also supported by many reports on pteridophytes of the Western Ghats (Sukumaran et al., 2006). Species diversity of pteridophytes slowly get decreased and today they are restricted to lesser habitat (Alagesaboopathi and Subramanian, 2017).

Regarding the habitats of the pteridophytic species recorded by the present investigation, terrestrial species (27 species) were found to be more in number than epiphytic (5 species), 3 species were found as both epiphytic and lithophytic species and 1 species was recorded as purely lithophytic (Figure 2). These results were corroborated with the findings of a study carried out in a miniature sacred groves of Kanyakumari district to document the pteridophytic flora from the same by Sukumaran et al. (2009) and they have found that the terrestrial pteridophytic species more in number than epiphytic and lithophytic species.

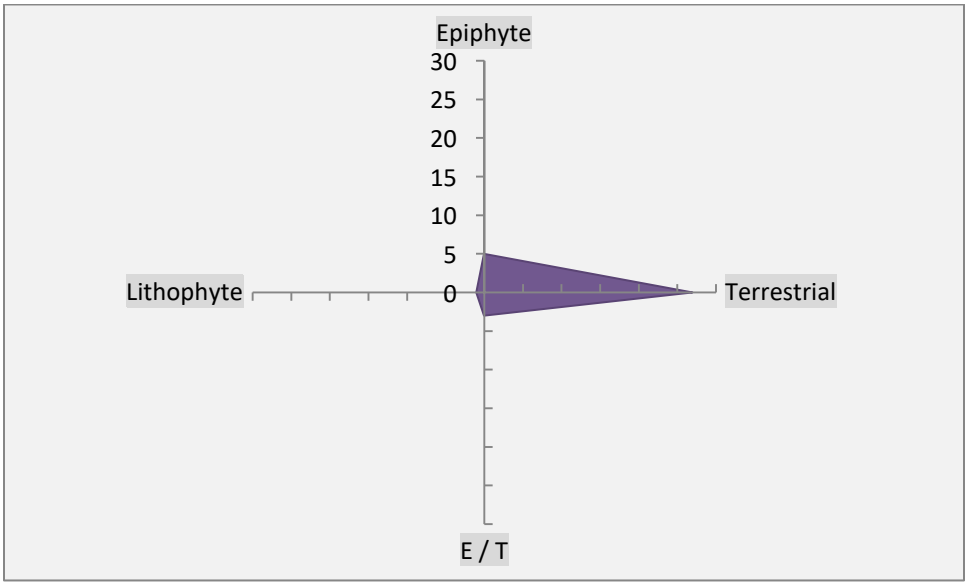

Figure 2: Habitat of Pteridophytic species.

Conclusion

The conservation focus should not be restricted upto the commercially important species and specific strategies for conservation of pteridophytes should be taken into account with much consideration. Botanical explorations should increase in the under-explored botanically rich areas for documenting the diversity and ecological characteristics of pteridophytes and taxonomic reinvestigations should take place in order to avoid the confusions with new species and existing species.

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