

Diversity of Pteridophytes along the Stretches of Thamiraparani River (West), Kanyakumari District, Tamilnadu, India

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Abstract

An enumeration of pteridophytes was undertaken in the downstream reaches of Thamiraparani river, Southern Western Ghats. Sixty five species of pteridophytes belonging to 23 families and 44 genera were recorded. Most of the taxa recorded have great ornamental and medicinal value. Adiantaceae was the dominant family with 4 genera and 10 taxa, followed by Pteridaceae with 5 genera and 8 species, Dryopteridaceae with 4 genera and 6 species, Polypodiaceae with 5 genera and 5 species, Selaginellaceae and Thelypteridaceae with 5 species each and Lindseaceae with 3 species. Most of the species were terrestrial (36 species). The epiphytic taxon, *Huperzhia phlegmaria* was found to be very rare in the study area and was represented by only 12 individuals.

Key words: Pteridophyte, Thamiraparani river, Western Ghats.

Introduction

Pteridophytes are nonflowering, vascular and spore-bearing plants including ferns and fern allies. They are represented by about 305 genera and 13,000 species in the world (Anonymous, 2004). The World Conservation Monitoring Centre at Cambridge, England has listed 1650 threatened species of pteridophytes worldwide (Jerny, 1990). The Western Ghats is a rich repository of pteridophytes. This region harbour about 320 species of ferns and fern allies with more species diversity in the southern part. The major families of pteridophytes found in the Western Ghats are Aspleniaceae, Polypodiaceae, Thelypteridaceae, Selaginellaceae, Pteridaceae, etc. (Sumesh and Ramachandra, 2010). Most thrive in shady and moist places, a few survive in rock crevices and dry places, while some of them such as *Salvinia* and *Azolla* are aquatic in habitat (Bower, 1923).

The test end of the Western Ghats, falling within Kanyakumari district also harbours a high diversity of pteridophytes. Because of its geographic location, stable geological history, undulating topography, range of tropical and sub-tropical forest ecosystems this region is considered hotspot of plant diversity. Not much information is available on the pteridophytes expect of this region. Therefore, the study was undertaken in order to ascertain the pteridophytic composition in stretches of Thamiraparani river, Western Ghats of Kanyakumari district.

Materials and methods

Study area

The present study was conducted in Kanyakumari district of Tamilnadu, southern peninsular India (77°15' - 77°30'E, 8°30' - 8°15'N), southern Western Ghats. For detailed pteridophytic survey, six sites were selected along the downstream of Thamiraparani river (west) namely (Site I – Upper Kothayar; Site II – Lower Kothayar; Site III – Pechiparai; Site IV – Kuzhithurai; Site V – Munchirai; Site VI – Thengapattinam).

Climate and Soil

The climate of the district is favorable, warm and humid. The mean annual rainfall was 167.64 mm and varied from 70 mm (minimum during February) to 442 mm (maximum during October) during the study. The mean monthly temperature varied from 22.5 to 32.6°C. The forest soil is rich in humus and minerals.

Taxonomic evaluation

An extensive floristic survey of the study sites was carried out between July 2017 and March 2018. Specimens were collected and identified with the help of different floras (Beddome, 1868-1874; Chandra and Kaur, 1987; Chandra, 2000; Dixit, 1984; Manickam and Irudayaraj, 1992; Namby and Madhusoodanan, 1998). The Herbaria of Botanical Survey of India, Southern Circle, Coimbatore, and Botany Department, St. Xavier's College, Palayamkottai were consulted for correct identification of species. Voucher specimens were deposited at the herbarium of Nesamony Memorial Christian College, Marthandam, Kanyakumari district, Tamilnadu, India.

Results and Discussion

Taxonomically, a total of 65 pteridophytes belonging to 46 genera and 23 families were recorded. Among these, 33 (50.80%) were terrestrial, 12 (18.15%) inhabited marshy areas, 11 (16.9%) were lithophytes and 9 (13.8%) epiphytes. Of 23 families, 19 families were ferns and 4 fern allies such as Marsileaceae, Salviniaceae, Azollaceae and Psilotaceae. Adiantaceae was the dominant family with 4 genera and 10 species, followed by Pteridaceae (8 species), Dryopteridaceae (6 species), Polypodiaceae (5 species), Selaginellaceae and Thelypteridaceae

(4 species each), Lindsaeaceae with 3 species, Aspleniaceae, Blechnaceae, Dennstaedtiaceae, Gleicheniaceae, Lomariopsidaceae, Lycopodiaceae, Oleandraceae, Ophioglossaceae, Lygodiaceae (2 species each) and 7 families having single species.

SI No	Botanical Name	Family
1	<i>Adiantum caudatum</i> L.	Adiantaceae
2	<i>Adiantum latifolium</i> Lam.	Adiantaceae
3	<i>Adiantum lunulatum</i> Burm.	Adiantaceae
4	<i>Adiantum hispidulum</i> Sw.	Adiantaceae
5	<i>Adiantum raddianum</i> C. Persl	Adiantaceae
6	<i>Pityrogramma calomrlanos</i> (L.) Link	Adiantaceae
7	<i>Cheilanthes bullosa</i> (Kunze) Ching	Adiantaceae
8	<i>Cheilanthes mysurensis</i> Wall.	Adiantaceae
9	<i>Cheilanthes teunifolia</i> (Burm.f.) Trevis	Adiantaceae
10	<i>Pellaea boivini</i> Hook.	Adiantaceae
11	<i>Asplenium nidus</i> L.	Aspleniaceae
12	<i>Asplenium obscurum</i> Bl.	Aspleniaceae
13	<i>Diplazium</i> sp.	Athyriaceae
14	<i>Azolla pinnata</i> R.	Azollaceae
15	<i>Blechnum orientale</i> L.	Blechnaceae
16	<i>Stenochlaena palustris</i> (Burm.) Beddome	Blechnaceae
17	<i>Microlepia speluncae</i> (L.) T. Moore	Dennstaedtiaceae
18	<i>Pteridium aquilinum</i> (L.) Kuhl.	Dennstaedtiaceae
19	<i>Polystichum harpophyllum</i> (Zenker ex. Kunze) Sledge.	Dryopteridaceae
20	<i>Tectaria paradoxa</i> (Fee) Sledge.	Dryopteridaceae
21	<i>Arachniodes aristata</i> (Forst.f.) Tindale.	Dryopteridaceae
22	<i>Dryopteris cochleata</i> (Buch. Ham.ex D.Don) C.Chr.	Dryopteridaceae

SI No	Botanical Name	Family
23	<i>Tectaria Wightii</i> (Clarke) Ching.	Dryopteridaceae
24	<i>Tectaria Zeylanica</i> (Houtt.) Sledge	Dryopteridaceae
25	<i>Dicranopteris linearis</i> (Burm.f) var. <i>sebastiana</i> Panigrahi & Dixit	Gleicheniaceae
26	<i>Dicranopteris linearis</i> (Burm.f) var. <i>tenuis</i> Manickam & Irudayaraj.	Gleicheniaceae
27	<i>Hemionitis arifolia</i> Burm.	Hemionitidaceae
28	<i>Lindsaea ensifolia</i> Sw.	Lindsaeaceae
29	<i>Lindsaea heterophylla</i> Beddome.	Lindsaeaceae
30	<i>Odontosoria chinensis</i> (L.) J. Sm.	Lindsaeaceae
31	<i>Bolbitis appendiculata</i> (Wild) Kilwats.	Lomariopsidaceae
32	<i>Bolbitis semicardata</i> (Baker) Ching.	Lomariopsidaceae
33	<i>Huperzia pphlegmaria</i> Roth.	Lycopodiaceae
34	<i>Lycopodiella cernua</i> (L.) Pic.	Lycopodiaceae
35	<i>Lygodium flexuosum</i> (L.) Sw	Lygodiaceae
36	<i>Lygodium microphyllum</i> (Cav.) R.	Lygodiaceae
37	<i>Angiopteris evecta</i> Hoffm.	Marattiaceae
38	<i>Marsilea minuta</i> L.	Marsileaceae
39	<i>Nephrolepis ariculata</i> (L.) Trimen	Oleandraceae
40	<i>Nephrolepis multiflora</i> (Roxb.) Jarret	Oleandraceae
41	<i>Botrychium lanuginosum</i> Wall ex. Hook & Grev	Ophioglossaceae
42	<i>Helminthostachy zeylancia</i> (L.) Hook	Ophioglossaceae
43	<i>Drymoglossum heterophyllum</i> (L.) Trimen	Polypodiaceae
44	<i>Drynaria quercifolia</i> L.	Polypodiaceae
45	<i>Lepisorus nudus</i> (Hook) Ching	Polypodiaceae
46	<i>Leptochilus decurrens</i> Blume	Polypodiaceae
47	<i>Pyrrhosia lanceolata</i> Farwell	Polypodiaceae
48	<i>Psilotum nudum</i> (L.) P.	Psilotaceae
49	<i>Ceratopteris thalictroides</i> (L.) Brongn	Pteridaceae
50	<i>Acrostichum aureum</i> L.	Pteridaceae
51	<i>Pteris argyrea</i> T. Moore	Pteridaceae
52	<i>Pteris multiaura</i> Ag.	Pteridaceae
53	<i>Pteris otaria</i> Beddome	Pteridaceae
54	<i>Pteris scabripes</i> Wall	Pteridaceae
55	<i>Doryopteris concolour</i> Lang et Fishch Kuhn	Pteridaceae
56	<i>Vittaria elongata</i> Sw.	Pteridaceae
57	<i>Salvinia molesta</i> Mitch	Salviniaceae
58	<i>Selaginella inaequalifolia</i> (Hook. Gerv) Spring	Selaginellaceae
59	<i>Selaginella intermedia</i> (BI.) Spring	Selaginellaceae
60	<i>Selaginella</i> sp.	Selaginellaceae
61	<i>Selaginella involuens</i> (SW.) Spring	Selaginellaceae
62	<i>Christella parasitica</i> (Hope.) Holttum	Thelypteridaceae
63	<i>Cyclosorus interruptus</i> (Wild.) H.	Thelypteridaceae
64	<i>Metathelypteris flaccida</i> (BI.) Ching	Thelypteridaceae
65	<i>Trigonospora ciliata</i> (Wall. ex. Benth)	Thelypteridaceae

A total of 30 pteridophyte species were reported in Site I (Upper Kodayar), which included two fern varieties. Taxonomically, Adiantaceae was the dominant family with 2 genera and 4 species followed by Dryopteridaceae with 3 genera and 3 species and Dennstaedtiaceae, Lindsaeaceae, Lycopodiaceae, Oleandraceae, Polypodiaceae, Selaginellaceae and Thelypteridaceae having 2 species each. The family

Gleicheniaceae was represented by 1 species and 2 varieties. Marattiaceae, Aspleniaceae, Ophioglossaceae, Pteridaceae were monospecific.

In Site II (Lower Kodayar) 28 pteridoplyte species belonging to 19 families were recorded. Adiantaceae was the dominant family with 3 species. Other important families were Lycopodiaceae, Gleicheniaceae, Dennstaedtiaceae, Athyriaceae and Aspleniaceae which were represented by two species each; 12 families were monospecific. In the study site III (Pechiparai), 22 species belonging to 16 families were recorded. Polypodiaceae was the dominant family with 3 species, followed by Thelypteridaceae, Lygodiaceae, Heminonitidaceae, Adiantaceae (2 species each) and 12 families were monospecific.

About 20 taxa under 16 families were recorded in Site IV (Kuzhithurai). Adiantaceae topped the list in terms of species content, followed by Pteridaceae and Thelypteridaceae (2 species each) and 13 families were represented by only one species. The endangered species *Tectaria zeyalnica* and *Psilotum nudum* were confined to this area only. In Site V (Munchirai) 18 plants belonging to 13 families were recorded. In Site VI (Thengapattinam) 4 species belonging to 4 genera and 4 families were reported.

From the above findings it is evident that the study site I had highest species richness, followed by Site II and Site III. Reduction of species richness was recorded in the downstream stretches of the study area. The majority of the species showed luxuriant growth during rainy season. The epiphytic species, *Huperzhia phlegmaria* was found to be very rare in the study area and represented by only two populations. Bir *et al.*, (1983) reported that some species are found throughout the year in tropical climate but *Pteris argyrea* was abundant only during the rainy months. Our results, therefore, conform with those of Bir and Vasudeva (1971). It is interesting to note that, generally, pteridophytes are distributed in rain forests.

Economic importance

Most of the plants recorded from the study area are economically important. They have medicinal value and are also used as food, fodder, vegetables, etc. Some species have ornamental value because of their foliage and attractive fronds. The aquatic fern *Azolla pinnata* is used as a biofertilizer and fodder for buffaloes. The fronds of *Pteris* sp. are used to treat cuts and wounds, and is grown in gardens (Vineeth and Sathyanarayan, 2015).

Conclusion

This paper gives a broad outlook about the pteridophytes, focusing on stretches of Thamiraparani river which has its origins in the Western Ghats. Many pteridophytes appear in the list of threatened species. Several places in Western Ghats have not been extensively explored, and hence increased efforts should be made to study the pteridophyte wealth of this region.

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