

Pteridophytic Flora Of Kemmangundi Forest, Karnataka, South India

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Abstract: Kemmangundi forest is located in Bhadra wildlife sanctuary of central Western Ghats. Studies were conducted to determine the pteridophytic composition in Kemmangundi forest during 2009 to 2012. Present study indicated that the checklist consists of 38 taxa, of which 29 species of terrestrial, five epiphytic, one climber and six lithophytes belonging to eighteen families were documented with their diversity index. Pteridaceae stands the dominant family of the study area with eight species followed by Polypodiaceae (5), Adiantaceae and Aspleniaceae each with three species. Pteris is reported as a largest genus including eight species in study area. *Arachniodes sledgei* Fraser-Jenk. is followed by *Pteris biaurita* L., *Tectaria coudunata* (Wall. ex Hook. & ex Grev.) C. Chr., *Odontosoria tenuifolia* (Lam.) J. Sm. and *Thelypteris caudipinna* Ching the most densely populated with highest Importance value index in the study area. The Shannon's diversity index value (H') 2.97 and Simpson's diversity (D) = 0.269 values for pteridophytic species in Kemmangundi forest evidencing the pteridophytes richness of the area. This is a comprehensive report of the pteridophytic diversity and distribution of Kemmangundi forest with special emphasis on composition, which will help various researchers as the sound basis for further works and conservation efforts.

Keywords: Pteridophytes, Kemmangundi forest, Diversity index

Introduction

Kemmangundi forest is located in Bhadra wildlife sanctuary of central Western Ghats of Chikmagalur district. The area consists of undulating terrains with valley and steep. The altitude varies from 650 meters to 1875 metres above M.S.L. the highest peak in the sanctuary. It is geographically situated between and $13^{\circ} 26'$ to $13^{\circ} 31'$ N latitude and $75^{\circ} 42'$ to $75^{\circ} 45'$ E longitude. It covers an area of 55.68 Km² and vegetation is moist deciduous type and also finds Shola - like vegetations. It receives annual rainfall from 2500 to 4500 mm. The dense forests of these hills provide a home for angiosperm flora of phytogeographical significance. However, no effort was done earlier to the composition of pteridophytic diversity in Kemmangundi forest. The present study denotes the diversity of Pteridophytes in the Kemmangundi forest. In India, Fraser-Jenkins (2008: 516) reported the number of Pteridophytes to be about 962-986 and later added some 26 previously species newly found in Arunachal Pradesh (Fraser-Jenkins and Benniamin 2010), Khullar (1994, 2000) described 360 fern species in his *Illustrated Fern Flora of Western Himalaya*, with 399 Pteridophytes given by Fraser-Jenkins (2010), which included fern-allies. Western Ghats supports 349 pteridophytic species out of 1100-1200 species of ferns and fern allies in India (Manickam 1992).

Karnataka is the well known state in India with 400 km long stretch of Western Ghats region which is exceptionally rich in flora and fauna. Many authors reported significant work on the pteridophytes in Karnataka (Matchperson, 1890; Blatter and Almeida, 1992; Alston, 1945; Kammathy *et al.*, 1967; Razi and Rao, 1971; Bhaskar and Razi, 1973; Holttum, 1976; Deepa *et al.*, 2011; Nataraja *et al.*, 2011). Yoganarasimhan *et al.*, (1981) recorded 12 species of ferns in their flora of Chikmagalur District. The survey of pteridophytes of Karnataka has been done by Rajgopal and Bhat (1998). In this study, an attempt has been made to determine the pteridophytic composition in Kemmangundi forest region.

Materials and Methods

A survey of Pteridophytes in Kemmangundi forest conducted during different seasons of the year 2009 to 2012. A total of 25 transects each measuring 50x2 were laid in Kemmangundi forest is located in Bhadra wildlife sanctuary of central Western Ghats region. Terrestrial, epiphytic and lithophytic forms of Pteridophytes were recorded. In case of epiphytic form present on large tree considered as one colony. Diagnostic features of all the specimens were studied and relevant field notes were made on fresh plant

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materials. Photographs were taken at the time of field observation. Identification of specimens was made by referring to Pteridophyte floras (Beddome 1863, 1865, 1883, Clarke 1880, 1961, Blatter et al. 1922, Tryon and Tryon 1982, Bir 1987, Khullar 1994, 2000, Verma 2005, 2008, Dixit 1984, Chandra 2008). The species identity was kindly authenticated by Prof. S P Khullar and Mr. C R Fraser-Jenkins. All the collected specimens were properly processed and the herbariums have been deposited in the department of Applied Botany, Kuvempu University, and Shankaraghatta. For nomenclature, Fraser-Jenkins (2008) has been followed. Data on various pteridophytic characters in different transect were collected and analyzed through statistical methods (Shukla, 2001; Tuomisto 2000; Deepa et al., 2013).

Results and Discussion

Survey of the study area for pteridophytic diversity indicated that a total of 2202 individuals recorded from 25 transects in Kemmangundi forest. They are 38 species and 28 genus belongs to 18 families are enumerated and arranged alphabetically in Table.1. Most of species are terrestrial, except fewer epiphytic and lithophytes in Kemmangundi forest. The largest families are pteridaceae (8 spp.) followed by polypodiaceae (5 spp.), Aspleniaceae, Adiantaceae and Thelypteridaceae (each 3 spp.) covering 57% of the total species. The major families of pteridophytes of the Western Ghats are Thelypteridaceae, Aspleniaceae, Pteridaceae, Selaginellaceae and Polypodiaceae (Sumesh et al., 2012). *Pteris* is the largest genus having 4 species followed by *Adiantum*, *Asplenium* and *Thelypteris* each of 3 species, covering about 46% of the total species. Nine families having only one genus and species are recorded in study area. The rare species are *Oleandra musifolia* and *Osmunda regalis* (Subash et al., 2008). *Aleuritopteris anceps* is common

species in study area but it is a lesser known fern from the W. and C. Himalaya (Khullar, 1976).

Arachniodes sledgei is densely populated in study area followed by *Thelypteris caudipinna*, *Tecteria coadunata*, *Odontosoria tenuifolia* and *Pteris biaurita* while, lowest for *Osmunda regalis* and *Oleandra musifolia*. *Thelypteris caudipinna* and *Nephrolepis cordifolia* found to be more abundant followed by *Tecteria coadunata*, *Adiantum concinnum*, *Adiantum philippense* while, *Selliguea hastata* and *Lepisorus nudus* were recorded as of less abundance. The maximum frequency found in *Arachniodes sledgei* followed by species *Tecteria coadunata*, while *Lindsaea ensifolia*, *Nephrolepis cordifolia*, *Oleandra musifolia*, *Ophioglossum reticulum* and *Osmunda regalis* were observed as of low frequency. *Arachniodes sledgei* was reported by 298 individuals with higher Importance Value Index (IVI) of 24.2 and followed by *Pteris biaurita*, *Tecteria coadunata*, *Odontosoria tenuifolia* and *Thelypteris caudipinna*. *Oleandra musifolia*, *Lygodium flexuosum* and *Ophioglossum reticulum* showed less IVI. The Shannon's diversity index value (H^1) 2.97 and Simpson's diversity (D) = 0.269 values for pteridophytic species in Kemmangundi forest showed high diversity and species richness.

Anthropogenic activities destructed the habitat of different angiospermic species as well as pteridophytic species from the locality besides this it is also observed that activities like tourism, expansion of roads and visitors at hilly station and also affecting these populations. In this context, present study provides information on a novel pteridophytic species in study area and the data could be used for taking conservation efforts in Kemmangundi forest.

Table.1: Pteridophytic species composition in Kemmangundi forest of Chikmagalur district, Karnataka.

Name of the Species	Abu	Fre	Den	IVI
<i>Adiantum concinnum</i> Humbl.& Bonpl.ex Willd.(Adiantaceae), KU/NT/09-DPN23	18.3	0.24	4.4	7.9
<i>Adiantum philippense</i> L.(Adiantaceae), KU/TT/09-DPN03	16.2	0.36	5.84	10.9
<i>Adiantum capillus veneris</i> Linn. (Adiantaceae), KU/TT/09-DPN02	14.4	0.2	2.88	5.69
<i>Aleuritopteris anceps</i> (Blanf.) Panigrahi (Pteridaceae), KU/TT/09-DPN22	9.8	0.24	2.36	5.59
<i>Angiopteris helferiana</i> C.Presl (Marattiaceae), KU/NT/09-DPN21	8.0	0.12	0.96	2.54
<i>Arachniodes sledgei</i> Fraser-Jenk. (Dryopteridaceae), KU/TT/12-DPN52	13.5	0.88	11.9	24.2
<i>Asplenium aethiopicum</i> (Burm.f.) Bech. (Aspleniaceae), KU/TT/10-DPN37	9.5	0.16	1.52	3.66
<i>Asplenium formosum</i> (Aspleniaceae), KU/ST/09-DPN04	9.0	0.12	1.08	2.68
<i>Asplenium phyllitidis</i> D.Don (Aspleniaceae), KU/TT/10-DPN40	3.0	0.08	0.24	1.24
<i>Blechnum orientale</i> L. (Blechnaceae), KU/ST/09-DPN06	6.6	0.48	3.2	9.45
<i>Cyathea gigantea</i> (Wall. ex Hook.) Holttum (Cyatheaceae), KU/NT/09-DPN11	4.5	0.08	0.36	1.37
<i>Dicranopteris linearis</i> (Burm.f.) Underw. (Gleichenaceae), KU/MT/09-DPN24	7.5	0.24	1.8	4.95
<i>Drynaria quercifolia</i> (L.) J. Sm (Polypodiaceae), KU/NT/09-DPN01	3.0	0.08	0.24	1.24
<i>Lepisorus nudus</i> (Hook.) Ching (Polypodiaceae), KU/TT/09-DPN08	1.81	0.44	0.8	6.24
<i>Lindsaea ensifolia</i> Sw. (Lindsaeaceae), KU/ST/11-DPN30	16.0	0.04	0.64	1.21
<i>Lycopodiella cernua</i> (L.) Pic.Serm. (Lycopodiaceae), KU/TT/10-DPN36	10.5	0.08	0.84	1.92
<i>Lygodium flexuosum</i> (L.) Sw. (Lygodaceae), KU/MT/09-DPN13	2.0	0.04	0.8	0.57
<i>Microsorium zippellii</i> (Blume) Ching * (Polypodiaceae), KU/TT/09-DPN14	6.0	0.12	0.72	2.27
<i>Nephrolepis cordifolia</i> (L.) C.Presl (Oleandraceae), KU/MT/11-DPN53	25.0	0.04	1.0	2.68
<i>Odontosoria tenuifolia</i> (Lam.) J.Sm. (Lindsaeaceae), KU/TT/09-DPN18	17.5	0.48	8.4	15.4
<i>Oleandra musifolia</i> (Bl.) C.Presl ** (Oleandraceae), KU/TT/10-DPN38	2.0	0.04	0.08	0.57
<i>Ophioglossum reticulatum</i> L. (Ophioglossaceae), KU/TT/10-DPN42	5.0	0.04	0.2	0.71
<i>Osmunda regalis</i> L. ** (Osmundaceae), KU/TT/10-DPN41	2.0	0.04	0.08	0.57
<i>Parahemionitis cordata</i> (Roxb. ex Hook. & Grev.) Fraser-Jenk. (Pteridaceae), KU/CT/09-DPN26	5.4	0.2	1.08	3.65
<i>Pityrogramma calomelanos</i> (L.) Link. (Pteridaceae), KU/ST/11-DPN28	9.75	0.16	1.56	3.71
<i>Pteris argyrea</i> (Pteridaceae), KU/TT/10-DPN39	6.33	0.12	0.76	2.31
<i>Pteris biaurita</i> L. (Pteridaceae), KU/TT/09-DPN15	7.45	0.8	5.96	16.5
<i>Pteris pellucida</i> C.Presl (Pteridaceae), KU/NT/09-DPN16	5.33	0.12	0.64	2.18
<i>Pteris vittata</i> L. subsp. <i>Vittata</i> (Pteridaceae), KU/KT/09-DPN17	4.75	0.16	0.76	2.80
<i>Pteridium revolutum</i> (Blume) Nakai (Dennstaedtiaceae), KU/TT/09-DPN19	9.0	0.48	4.32	10.7
<i>Pyrrosia porosa</i> T.Moore (Polypodiaceae), KU/TT/10-DPN35	2.0	0.08	0.16	1.15
<i>Selliguea hastata</i> (Thunb.) H. Ohashi & K.Ohashi (Polypodiaceae), KU/CT/09-DPN09	1.66	0.12	0.2	1.68
<i>Tectaria polymorpha</i> Wall. ex Hook. (Tectariaceae), KU/ST/09-DPN07	5.8	0.2	1.16	3.74
<i>Tectaria coadunata</i> (Wall.ex Hook. & ex Grev.) C.Chr.(Tectariaceae), KU/TT/11-DPN51	20.9	0.44	9.2	15.8
<i>Thelypteris dentata</i> (Forssk.) E.P.St.John (Thelypteridaceae), KU/TT/09-DPN26	7.33	0.12	0.88	2.45
<i>Thelypteris caudipinna</i> Ching (Thelypteridaceae), KU/ST/11-DPN29	30.9	0.32	9.88	15.1
<i>Thelypteris trigonospora</i> (Holttum) Fraser-Jenk.S (Thelypteridaceae), KU/TT/12-DPN54	8.4	0.2	1.68	4.33
<i>Trichomanes companulatum</i> Roxb. (Hymenophyllaceae), KU/TT/11-DPN50	2.5	0.08	0.2	1.19

Note: Abu:Abundance; Fre:Frequency; Den:Density; IVI:Importance value index, * near threatened; ** Rare.

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