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Original Research Article

Pteridophytic survey in forest region of Sirsi taluk, Uttara Kannada district, South India

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Keywords

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A B S T R A C T

Sirsi taluk is one of the richest floristic areas of Uttara Kannada district located in Central Western Ghats, Karnataka. The present study describes the distribution of the Pteridophyte flora of this region. Twenty-seven species pteridophytes were collected belongs to 22 genera belonging to 16 families. Taxonomically Pteridaceae was the dominant family with four genera and six species followed by Lomariopsidaceae was the codominent family represented by two species. The present data is the new and additional information to existing of forest area of Sirsi taluk.

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 *et al.*, 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). Several workers in the past had documented the pteridophytes of Western Ghats. Among them the oldest records are by Dixit (1984), Western Ghats harbors 349 pteridophytic species out of 1100-1200 species of ferns and fern allies in India (Manickam and Irudayaraj, 1992). Theuerkauf, (1994) estimated about half of the pteridophytes species of Southern India can be regarded as vulnerable, threatened or endangered species, and also according to Manickam, (1995) who had been enumerated about 46 rare and endangered species of pteridophytes found in the Western Ghats region of South India.

The Central Western Ghats, Karnataka also richest floristic area for harbors pteridophytic flora (Sukumaran, 2008; 2009). However, in depth and comprehensive work on the pteridophytes of Karnataka was carried out by Rajagopal and Bhat (1998) during 1988-1995 and listed out 174 species. Ramachandra *et al.,* (2010) documented 54 species of pteridophytes from the Gundia river basin in Hassan district. Deepa *et al.,* (2011) reported 19 pteridophytes in Maduguni forest of Bhadra Wildlife sanctuary, Chikmagalur district. The important pteridophytes hot-spots in Karnataka include Kemmangundi (Deepa *et al.,* 2013a) and Bababudan hills (Chikmagalur district), Kigga forest (Deepa *et al.,* 2013b) and Agumbe Ghats (Nataraja *et al.,* 2011). However, pteridophytic plants have not received sufficient attention by plant explorer of forest of Sirsi taluk due to difficulties in the species identification. Therefore, present work deals with the distribution of pteridophytes of Sirsi taluk of Uttara Kannada District, Karnataka.

Materials and Methods

Study area

The Sirsi taluk lies embedded within the Central Western Ghats region at an average elevation of about 590 m (1936 feet). Study area is lies between 14^0 $37^{'}$ 05" latitude and 74^0 $50^{'}$ 05" longitude (Figure 1). It encompasses an area 1322.33 sq km in which forests area represented by 1032.7 sq km. The climate is primarily monsoonal and rains were received mainly by southwest monsoon during June-September. During the monsoons, the region receives the heaviest rainfalls. The area receives an average annual rainfall of about 2500 mm. The annual temperature varies between 25° C to 30° C. As a result, the region has densely covered with flora and fauna. It comprises of wet and semi-evergreen vegetation with laterite soil type.

Survey was carried out throughout Sirsi taluk in different seasons to make a complete record of different habitats of the species and their occurrence during 2012-2013. Specimens were collected with their fertile parts and herbarium-specimens were prepared according to Jain and Rao (1976). Specimens were identified by referring keys and descriptions from taxonomic literature such as Pteridophytic Floras, manuals, monographs (Beddome, 1863, 1865, 1883; Clarke, 1880; Blatter and D'Almeida, 1922; Manickam and Iradayaraj, 1992). Botanical names were authenticated by consulting with the Panchavati Research Academy for Nature, Kalamanji, Karnataka. The herbarium collections are deposited in the Department of Botany, Davangere University, India. The nomenclature of taxa and species has been given according to Fraser-Jenkins (2008, 2010). Species were arranged alphabetically and categorized into rare, common and very common on the basis of their occurrence in the study area (Table 1).

Results and Discussion

A total of 27 species of Pteridophytes belonging to 22 genera and 16 families have been observed in the study area. Taxonomically Pteridaceae was the dominant family with six species (Figure 2). Similar observation on major families of pteridophytes of the Western Ghats is Thelypteridaceae, Aspleniaceae, Pteridaceae, Selaginellaceae and Polypodiaceae reported by Sumesh *et al.,* (2012). Out of 22 genera, 17 genera were

Table.1 Enumeration of Pteridophytes in Sirsi taluk of Uttar Kannada district, Central Western Ghats, Karnataka

Name of the Species and Family
Adiantum capillus-veneris L. : Pteridaceae, Common (DU/BOT/PTS-MP01)
Adiantum philippense L. subsp. *Philippense,* : Pteridaceae Very common (DU/BOT/PTS-MP02)
Angiopteris helferiana C.Presl: Marattiaceae, Rare (DU/BOT/PTS-MP03)
Azolla pinnata R.Br. subsp. *asiatica* R.M.K Saunders & K.Fowler : Azollaceae, Common (DU/BOT/PTS-MP04)
Blechnum orientale L. : Blechnaceae, Common (DU/BOT/PTS-MP05)
Bolbitis subcrenatoides Fraser-Jenk. : Lomariopsidaceae, Rare (DU/BOT/PTS-MP06)
Bolbitis presliana (Fee) Ching. : Lomariopsidaceae. Rare (DU/BOT/PTS-MP07)
Cyathea gigantea (Wall. *ex* Hook.) Holttum: Cyatheaceae, Rare (DU/BOT/PTS-MP08)
Dicranopteris linearis (Burm.f.) Underw.: Gleichenaceae, Common, Figure 4D (DU/BOT/PTS-MP09)
Drynaria quercifolia Fraser-Jenk. : Lomariopsidaceae, Common (DU/BOT/PTS-MP10)
Huperzia hamiltonii (Spreng.) Trevis. : Lycopodiaceae, Common (DU/BOT/PTS-MP11)
Lepisorus nudus (Hook.) Ching: Polypodiaceae, Rare (DU/BOT/PTS-MP12)
Leptochilus lanceolatus Fée : Polypodiaceae, Rare (DU/BOT/PTS-MP13)
Palhinhaea cernua (L.) Vasc. & Franco : Lycopodiaceae, Rare (DU/BOT/PTS-MP14)
Lygodium flexuosum (L.) Sw.: Lygodiaceae, Common (DU/BOT/PTS-MP15)
Marsilea minuta L. : Marsileaceae, Common (DU/BOT/PTS-MP16)
Nephrolepis cordifolia (L.) C.Presl: Oleandraceae, Rare (DU/BOT/PTS-MP17)
Nephrolepis undulata (Afzel. *ex* Sw.) J.Sm : Oleandraceae, Rare (DU/BOT/PTS-MP18)
Odontosoria chinensis (L.) J.Sm. : Lindsaeaceae, Common (DU/BOT/PTS-MPD19)
Parahemionitis cordata (Roxb. *ex* Hook. & Grev.) Fraser-Jenk.: Pteridaceae, Rare (DU/BOT/PTS-MP20)
Pityrogramma calomelanos (L.) Link.: Pteridaceae, Common (DU/BOT/PTS-MP21)
Pteris biaurita L.: Pteridaceae, Very common (DU/BOT/PTS-MP22)
Pteris pellucida C.Presl: Pteridaceae, Common (DU/BOT/PTS-MP23)
Selaginella tenera (Hook. & Grev.) Spring : Selaginellaceae, Common (DU/BOT/PTS-MP24)
Tectaria polymorpha (Wall. *ex* Hook.) Copel. : Dryopteridaceae, Rare (DU/BOT/PTS-MP25)
Tectaria coadunata (Wall. *ex* Hook. & Grev.) C.Chr.: Dryopteridaceae, Common (DU/BOT/PTS-MP26)
Thelypteris dentata (Forsk.) E.P.St.John :Thelypteridaceae, Very common, Figure 4C (DU/BOT/PTS-MP27)

Figure.1 Location map of the Sirsi taluk in Uttara Kannada district, Karnataka

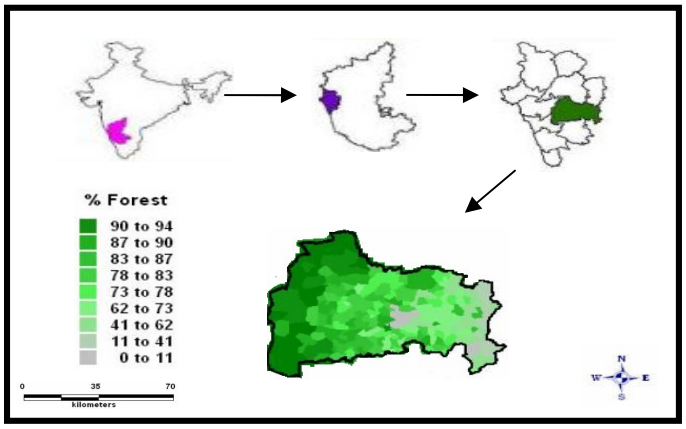

Figure.2 Major families of pteridophytes in the forest of Sirsi taluk of Uttara Kannada district, Karnataka

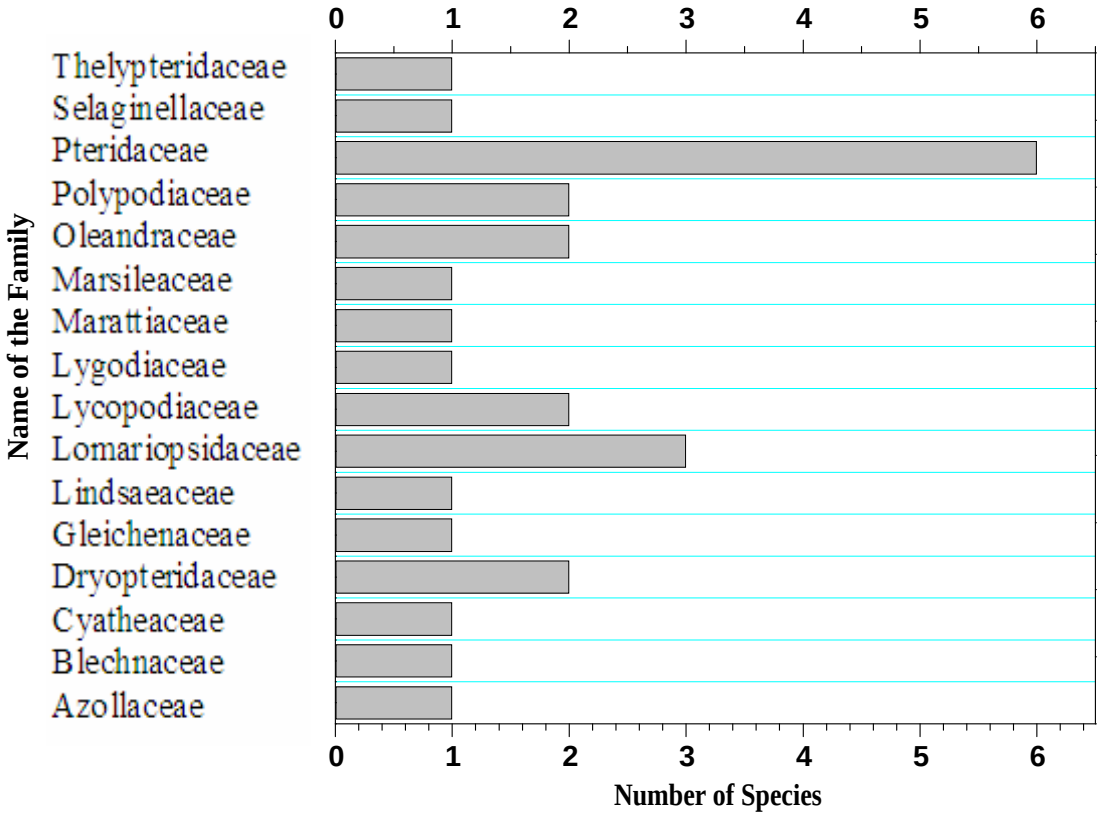

Figure.3 Total diversity of pteridophytes in forest of Sirsi taluk of Uttara Kannada district with regards to habitats

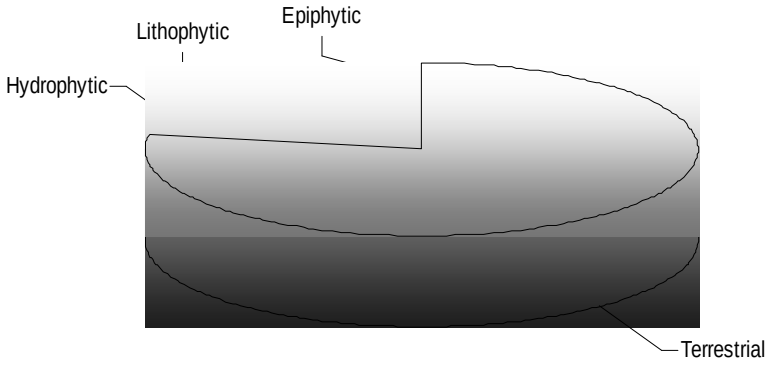

Figure.4 Certain pteridophytic species growing in Sirsi taluk of Uttara Kannada district, Karanataka

A-*Bolbitis presliana* (Fee) Ching.; **B-***Blechnum orientale* L.; **C-***Thelypteris dentata* (Forsk.) E.P.St.John; **D-***Dicranopteris linearis* (Burm.f.) Underw.

represented by a single species each and two species each represented five genera viz., *Adiantum, Pteris, Bolbitis, Nephrolepis* and *Tectaria*. According to habitats, 18 species of terrestrial ferns, two species were epiphytic and two species were aquatic ferns (Figure 3). Climbing ferns are represented by a single species i.e. *Lygodium flexosum* (L.) Sw. The present study indicated that during rainy season (June to November), 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). Terrestrial plants predominantly occurred in exposed areas, shady areas, stream banks and hill slopes. Rare species such as *Angiopteris helferiana* C.Presl, *Bolbitis presliana* (Fee) Ching., *Cyathea gigantea* (Wall. *ex* Hook.) Holttum, *Lepisorus nudus* (Hook.) Ching, *Leptochilus lanceolatus* Fée, *Nephrolepis undulata* (Afzel. *ex* Sw.) J.Sm and *Tectaria polymorpha* (Wall. *ex* Hook.) Copel. need to be conserved. Amongst the rare species *B. presliana* (Figure 4A) was reported in very limited population in the study area.

Many pteridophytes are known to be used by humankind in various ways, for example, *Adiantum philippense* L. is used as a medicine in fever, dysentery, jaundice (Patiri and Borah, 2007; Sen and Ghosh, 2011). *Azolla pinnata* R.Br. subsp. *asiatica* R.M.K Saunders & K. Fowler is well known for its nitrogen-fixation capacity used in rice fields (Sen and Ghosh, 2011). Fronds of *Blechnum orientale* L. (Figure 4B) were showing good antioxidant and antibacterial activities (Deepa *et al.,* 2013c, 2013d). Currently many pteridophytic species are under threat to a large extent due to various anthropogenic activities. The most commonly identified causes of global pteridophytes extinction are fragmentation, degradation and habitat destruction, commercial collection, pathogens, predators and invasive species, climate change and pollution (Arcand and

Ranker, 2008). Present work helped in making a necessary database to undertake conservation strategies. During the last five years, most botanical exploration in Sirsi taluk has been focused on angiospermic plants and usually excluded detailed studies of pteridophytes. Present data on pteridophytes in forest area of Sirsi taluk is a step in fulfill the lacuna regarding the taxonomical distribution of pteridophytes. The present preliminary survey also may be a helpful tool for the further depth study on pteridophytes and conservation aspect.

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