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Ferns and Fern-Allies of Dangori Reserve Forest of Tinsukia District, Assam, India

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ABSTRACT

The ferns and fern-allies, the second largest vascular plant group has significant contribution to the plant diversity. The present study deals with the enumeration of 35 species of ferns and fern-allies belonging to 28 genera, 17 families and 7 orders from Dangori reserve forest. The order polypodiales and family pteridaceae shows maximum numbers of species

Key word*: Ferns, Fern-Allies, Dangori, Polypodials, Pteridaceae.*

Introduction

The ferns and fern-allies are the primitive vascular plans dominated the world's vegetation about 280-230 million years ago. They are non-flowering but reproduce by producing spore. From the evolutionary point of view, the plant group is placed between the Bryophytes and the Gymnosperms. They are the first vascular plants on land having vast paleobotanical importance. Their life cycle is dominated by the sporophyte following the reduced gametophytic generation. The plant is mostly herbs or shrubs and a few trees. The world flora contains approximately 12000 species of ferns and fern-allies (Chapman, 2009) of which about 1200 species are reported from the territory of India (Chandra 2000). The Eastern Himalayan region is very rich in diversity which includes the North-Eastern region of India which in turn contributes about 700 species of ferns and fern-allies (Dixit, 2000). According to Moran (2015), 'worldwide, there are about 13,600 species of ferns and lycophytes'. Fraser-Jenkins *et al.* (2017) consider that 'altogether there are 1114 indigenous taxa and 43 exotics' for the Indian subcontinent.

Assam is the gateway to the North-Eastern region of India having forest cover 27,673 sq. km. and 312 numbers of reserve forests. Out of which 35 number of reserve forests falls in the Digboi and Doom-Dooma division of Tinsukia district having 78,999 hectare land. The Dibru-Saikhowa Biosphere Reserve, Dehing Patkai National Park and Bherjan Borajan Padumoni Wildlife Sanctuary are also a part of the district. The reserve forests of the district are fragmented due to human settlement, tea plantation and large paddy fields. In Assam, some workers have done systematic works in ferns and fern-allies including Kachroo (1953); Panigrahi (1960 and 1968); Panigrahi and Chowdhury (1961 and 1962); Dutta *et al*. (1980); Handique and Konger (1986); Kachroo *et al*. (1989); Borthakur *et al*. (2001); Devi and Majumdar (2003); Sen and Ghosh (2011); Kalita (2015) etc.

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Materials and Methods

The Study Area

The Dangori reserve forest (Figure 1) covers an area of 919.44 hectare and lies in the Doom Dooma forest division in Tinsukia district with latitude 27.25^0 N to 27.30^0 N and longitude 94.50^0 E to 95^0 E with an elevation of about 102 m above sea level. The average rainfall is about 2768 mm per annum and humidity is 78%. The forest is tropical evergreen rain forest type dominated by *Dipterocarpus macrocarpus*. It is also home for White Winged Duck, primate species like Assamese Macaque, Hoollock Gibbon, Slow Loris etc. and other wildlife. The forest also has wetlands enriching aquatic flora and fauna.

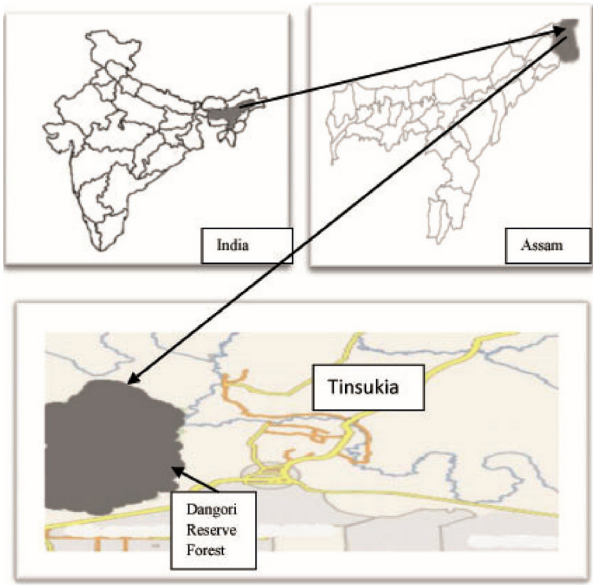

Fig. 1. Location map of the Study Area.

The Study Method

Collection of ferns and fern-allies covering all the seasons from various diverse habitats and localities were made randomly during the period 2019-2020. The plants collected are air dried, pressed and paste on herbarium sheet following standard herbarium preparation technique (Jain and Rao, 1977). These were worked out in the laboratory and identified consulting with the standard literatures like Jamir and Rao (1988); Baishya and Rao (1982); Borthakur *et al.* (2001 and 2018) etc. The herbarium specimens are deposited to the P G Department of Life Sciences, Debraj Roy College, Golaghat, Assam.

Statistical analysis

For determining the Percentage (%) of occurrence of a species, the following formula was used:

$$\% \text{ of occurrence} = \frac{\text{Total No. of species occurred}}{100} \times \text{No. of species}$$

Results

A total of 35 species of ferns and fern-allies belonging to 28 genera, 17 families and 7 orders at different habitat were recorded during the investigation. The statistical analysis of the taxa is given in Table 1. The order Polypodiales shows maximum species with an occurrence of 8.75 %. The Table 2 enlisted the name of the species in a particular family. The family Pteridaceae has maximum number of species, i.e. 9.

Discussion

Out of the 35 species found in the Dangori reserve forest, majority species are ferns i.e. 34 species while only one species belongs to fer,n-allies. Among the orders, Polypodiales has maximum species (Figure-2). Similarly, among the family, Pteridaceae has maximum species followed by Polypodiaceae and Thelypteridaceae. It is observed that the terrestrial species constitute 25 species while *Microsorum punctatum* (L.) Copel., *Schellolepis subauriculata*

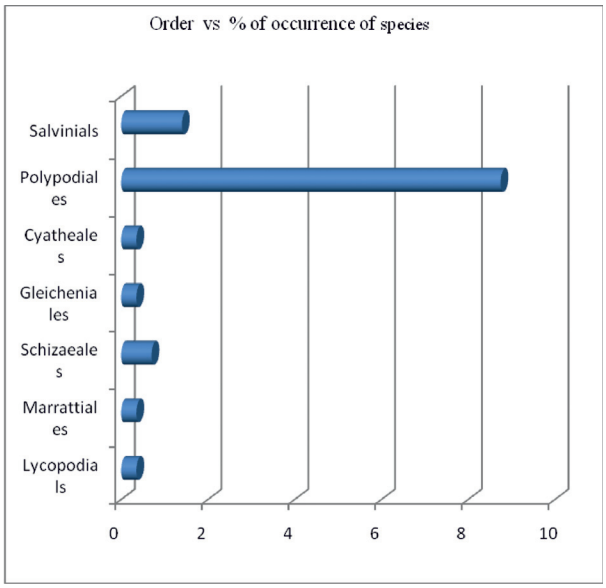

Fig. 2. Bar diagramme showing order vs % of occurrence of species of ferns and fern-allies.

Table 1: Statistical Analysis of taxa.

Sl. No.	Order	Family	No. of genus	No. of species	% of occurrence within a family	% of occurrence within an order
1.	Lycopodials	Lycopodiaceae	1	1	0.35	0.35
2.	Marrattiales	Marattiaceae	1	1	0.35	0.35
3.	Schizaeales	Lygodiaceae	1	2	0.7	0.7
4.	Gleicheniales	Gleicheniaceae	1	1	0.35	0.35
5.	Cyatheales	Cyatheaceae	1	1	0.35	0.35
6.	Polypodiales	Polypodiaceae	3	4	1.4	8.75
		Thelypteridaceae	3	4	1.4	
		Dennstaedtiaceae	1	1	0.35	
		Pteridaceae	6	9	3.15	
		Aspleniaceae	1	1	0.35	
		Blechnaceae	2	2	0.7	
		Bolbitidaceae	1	1	0.35	
		Tectariaceae	1	1	0.35	
		Athyriaceae	1	1	0.35	
		Lindsaeaceae	1	1	0.35	
7.	Salvinials	Marsileaceae	1	1	0.35	1.4
		Salviniaceae	2	3	1.05	
Total	7	17	28	35	12.25	12.25

Table 2. Species diversity of ferns and fern-allies recorded in the present study area

Sl. No.	FAMILY	NAME OF THE TAXA
1.	Lycopodiaceae	*Lycopodiella cernua* (L.) Pic. Serm.
2.	Marattiaceae	*Angiopteris evecta* (Forst.) Hoffm.
3.	Gleicheniaceae	*Dicranopteris linearis* (Burm.f.) Underw.
4.	Polypodiaceae	*Microsorum punctatum* (L.) Copel., *Schellolepis subauriculata* (Blume) J. Sm., *Pyrrosia lanceolata* (L.) Farewell., *Pyrrosia piloselloides* (L.) M. G. Price
5.	Lygodiaceae	*Lygodium flexuosum* (L.) Sw. *Lygodium japonicum* (Thunb.) Sw.
6.	Pteridaceae	*Adiantum capillus-veneris* L., *Amphineuron opulentum* (Kaulf.) Holtt., *Cyclosorus interruptus* (Willd.) H. Ito.Pittyrograma calomenonsis (L.) Link., *Pteris biaurita* L. *Pteris ensiformis* Burm. f., *Pteris semipinnata* L. *Pteris vittata* L., *Vitaria elongate* Sw.
7.	Marsileaceae	*Marsilea minuta* L.
8.	Cyatheaceae	*Cyathea gigantea* (Wall. ex Hook.) Holt.
9.	Dennstaedtiaceae	*Microlepia speluncae* (L.) T. Moore
10.	Lindsaeaceae	*Sphenomeris chinensis* (L.) Maxon
11.	Thelypteridaceae	*Ampelopteris prolifera* (Retz.) Copel., *Christella parasitica* H. L., *Thelypteris nudata* (Roxb.) C.V. Morton, *Thelypteris confluens* (Thunb.) C.V. Morton
12.	Aspleniaceae	*Asplenium nidus* L.
13.	Athyriaceae	*Diplazium esculantum* (Retz.) Sw.
14.	Tectariaceae	*Tectaria griffithii* (Bak.) C.Chr.
15.	Bolbitidaceae	*Bolbitis heteroclita* (Presl) Ching
16.	Blechnaceae	*Blechnum orientale* L.*Stenochlaena palustris* (Burm.f.) Bedd.
17.	Salviniaceae	*Azola pinnata* R. Br, *Salvinia cucullata* Roxb. *Salvinia natans* (L.) All

(Blume) J. Sm., *Pyrrosia lanceolata* (L.) Farewell., *Pyrrosia piloselloides* (L.) M. G. Price, *Vitaria elongata* Sw. and *Asplenium nidus* L. are epiphytes constituting 6 species. A total of 4 species are found to be aquatic; of which *Marsilea minuta* L. is rooted in soil or mud and *Azola pinnata* R. Br, *Salvinia cucullata* Roxb. and *Salvinia natans* (L.) are free floating; 3 species are climbers, 2 are trees and others are either herbs or Shrubs. A comparison of five dominant families of ferns in India (Dixit, 1984), Meghalaya (Baishya and Rao, 1982), Nagaland (Jamir and Rao 1988), Assam (Borthakur *et al*., 2001) with the present work shows that Polypodiaceae is not only the largest family in India but also in the North-East-

ern India, while its position becomes third in the North-Western Himalayas and fifth in Western Ghats but in our present study area Polypodiaceae is found to be second largest family with Thelypteridaceae having 4 species in each. Pteridaceae is found to be largest family having 9 species. *Pityrogramma calomelanos* (L.) Link. is a herbaceous fern producing silver colour spores at their reproductive parts. *Lygodium flexuosum* (L.) Sw., *Lygodium japonicum* (Thunb.) Sw. and *Stenochlaena palustris* (Burm.f.) Bedd. are climbers. *Cyclosorus interruptus* (Willd.) H. Ito. is seen abundantly grow in swamp area.

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