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Diversity of Pteridophytes in Wetlands of Gorakhpur and Adjacent Districts (Uttar Pradesh) India

Deepak Kumar Gond^{1,*}, C. O. Samuel¹, S. C. Tripathi² and D. C. Saini³

¹Department of Botany, St. Andrew's Post-Graduate College, Gorakhpur-273005, India.

²D. D. U. Gorakhpur University Gorakhpur-233009.

³Birbal Sahni Institute of Palaeobotany, 53 University Road, Lucknow-226007, India.

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ABSTRACT

Wetlands are the sites of natural succession and therefore contain all the groups of plant kingdom in a single place. The present paper encompasses the floristic account of Pteridophytes occur in wetland of Gorakhpur and adjacent districts of Uttar Pradesh. In this region, varies wetlands like Ramgarh Tal, Tura Nala, Salona Tal, Narya Tal, and Ratoi Tal and varies small water bodies. A total of 20 Pteridophytes species were recorded from the wetland.

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Introduction

India is one of the richest countries in the world in terms of biological diversity and holds a respectable position among the world's 12 mega biodiversity centers. It harbors about 18000 flowering plant species and nearly 1000 species of pteridophytes along with millions of other organisms, which account for 6 percent of the total plant species in the world (Bir, 1992, Dixit, 1984). Wetlands are described as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support (and under normal circumstances do support) a prevalence of vegetation typically adapted for life in wet or saturated soil conditions. An area is classified or determined to be a wetland when the three key parameters of hydrophytic vegetation, hydric soils, and wetland hydrology occur together on a site under normal circumstances and of sufficient duration just from looking at a wetland, it can be hard to imagine what kind of important value or use it might provide. But we have found that these 'wetland worlds' house many of our biological wonders and serve various important functions that make them of increasing value in their natural state.

Fresh water wetlands are the unique ecosystems having very specific vegetation. These are the sites of natural succession and therefore contain all the groups of plant kingdom in a single place. Water is the prime requisite of the vegetation of the wetland and any alteration in the availability of water affects their presence as well as distribution. Wetlands have often been described as the kidneys of the landscape because of the role they play filter out sediment and pollution from surrounding environment. Some plant species of ecotone zones, which grow in moist habitats, need well aerated soils. Wetland of India was explored by (Fassett, 2000; Cook, 1996; Subramanyam, 1962; Biswas & Calder, 1937). An account of Uttar Pradesh was given by (Saini, et al., 2010; Srivastava, 2004; Srivastava et al., 1987; Sen, 1959,). Scrutiny of

pteridophytes literatures, published by earlier workers from Uttar Pradesh (Singh, 2011; Saini, et al., 2010; Subhash, 2008; Srivastava 2008; Khare, et al., 2005; Srivastava, 2002; Dixit, 1992; Singh, 1989; Singh, et al., 1989; Chawdhury, 1973; Panigrahi and Dixit, 1969; Roy & Kumar 1966; Dixit and Tripathi, 1956; Hope 1899). The study area has been surveyed and a brief account of wetland vegetation is enumerated with their diversity.

Study Area

The extreme variations in climatic condition of Gorakhpur and adjacent district, especially in rainfall, naturally result in a wide range of vegetation patterns in wetland. North eastern Himalaya consists of a Terai belt which experiences humid subtropical climate. The annual means temperature is 24.45°C, the mean maximum temperature is 39.4°C, and the minimum temperature is 18.4°C. Soil of area is related to the new alluvium or khaddar, which covers the low lands. Particularly in flood plains of the rivers that are replenished every years. It contains a large percentage of humus and can grow crops without irrigation. This soil is very fertile and very much suitable for the cultivation of crops. The Gorakhpur and adjacent districts constitutes a major part of this densely vegetated Terai region. This area being situated on the foothills of great Himalaya. The district lies between 26° 46' N Latitude and 83° 22' E Longitude. The present study was conducted in highly degraded and fragmented wetlands of Gorakhpur and adjacent districts.

Materials And Methods

Several field trips were conducted during 2010 - 2012, with a view to collect information on wetland Pteridophytic diversity. The information recorded during this study was through direct observation. The survey was a random opportunistic visiting different wetland locality in Gorakhpur and Adjacent Districts. The collected plant specimens have been processed and pressed

and identified with the help of available literature on pteridophytes (Beddome, 1883; Tiwari, 1964; Panigrahi & Dixit, 1969; Dixit, 1984). Properly authenticated specimens have been incorporated in the Herbarium of Birbal Sahni Institute of Palaeobotany, Lucknow, as reference specimens for future work.

Result and discation:

Freshwater ecosystems provide vital resources for humans and are the sole habitat for an extraordinarily rich, endemic, and sensitive biota. Human demands on freshwater ecosystems have risen steeply over the past century, leading to large and growing threats to biodiversity around the world (Dudgeon et al., 2006). Most of the area of the wetland has been converted to agriculture fields and residential colonies. A total of 20 Pteridophytes belongs to 13 families and 13 genus were recorded from the wetland. The most species rich families in descending order are Ophioglossaceae (4 species), Adntiaceae (3species), Lygodiaceae and Salvinaceae (2species) and Cratopteridaceae, Dryopteridaceae, Equisetaceae, Pterdiaceae, Selagenaceae (1species). *Pteris multifida*, *Helmitosachyhes zeylanica*, *Ophioglossum nudicauli*, *Lygodium microphyllum*, and *Isoetes coromandelina* are rare in wetland. *Selaginella bryopteris* and *Ophioglossum gramineum* are uncommon species in wetlands. Due to high anthropogenic disturbance in the wetlands of Gorakhpur and adjacent districts as well as pteridophytes both are needed to conservation.

"In the end we will conserve only what we love; we will love only what we understand; and we will understand only what we have been taught." – *aba Dioum*, 1968 *International Union for Conservation of Nature*

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Table: Wetland Pteridophytes of Gorakhpur and Adjacent Districts

No.	Family	Botanical Name	Habit	Habitat	Abundance
1.	Adiantaceae	<i>Adiantum capillus- veneris</i> L.	T	1, 2	A
2.		<i>Adiantum philippense</i> L.	T	1, 3	C
3.		<i>Adiantum incisum</i> L.	T	1, 2	L
4.	Cratopteridaceae	<i>Ceropteris thalictroides</i> (L.) Brongn.	A	2, 3	A
5.	Dryopteridaceae	<i>Dryopteris auriculata</i> (L.) Kuntze	S	2, 3	C
6.	Equisetaceae	<i>Equisetum diffusum</i> D. Don	S	2, 3	C
7.	Isoetaceae	<i>Isoetes coromandelina</i> L.	A	2, 3	R
8.	Lygodiaceae	<i>Lygodium flexuosum</i> (L.) Sw.	S	1, 3	L
9.		<i>Lygodium microphyllum</i> (Cav.) R. Br.	S	1, 3	R
10.	Ophioglossaceae	<i>Ophioglossum gramineum</i> Wild.	S	3, 2	UC
11.		<i>Ophioglossum nudicaule</i> L.	S	3, 2	R
12.		<i>Ophioglossum reticulatum</i> L.	S	3, 2	C
13.		<i>Ophioglossum vulgatum</i> L.	S	3, 2	A
14.		<i>Helminthostachys zeylanica</i> (L.) Hook.	S	3, 2	R
15.	Pteridaceae	<i>Pteris multifida</i> Poir.	S	1, 2	R
16.		<i>Pteris vittata</i> L.	S	1, 2	A
17.	Selaginellaceae	<i>Selaginella bryopteris</i> Baker	S	3	UC
18.	Salvinaceae	<i>Azolla pinnata</i> R. Br.	A	1, 2	A
19.		<i>Salvinia natans</i> All.	A	1, 2	A
20.	Thelypteridaceae	<i>Ampelopteris prolifera</i> (Retz.) Copel.	S	2, 3	C

Appendix 1. Wetland Pteridophytes of Gorakhpur and Adjacent Districts

Habit: A = aquatic herb, S = semi aquatic herb, T = terrestrial herb

Habitat: 1 = shady place, 2 = along river banks, 3 = lowland,

Abundance: A = abundant, C = common, L = locally abundant, R = rarely found, UC = Uncommon.

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