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ECO–MORPHOLOGICAL STUDIES OF PTERIDOPHYTES DISTRICT MIRZAPUR, UTTAR PRADESH

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ABSTRACT

This Present study includes the ecological and Morphological diversity of pteridophytes in District Mirzapur, Uttar Pradesh, India, situated between 25.1449°N latitude and 82.5653°E longitude. The district's comprises tropical deciduous forests which form the forest of the Vindhya Range. Field surveys conducted by authors during the different seasons in different localities as Wyndom fall, Siddhnath ki Dari, Tanda fall, Sirsi Dam and Lakhaniya Dari and roadside of these area. Five Pteridophytic species *Adiantum caudatum* L., *A.lunulatum* Burm.f., *Selaginella bryopteris*(L.) Baker and *Pteris vittata* L. are collected by authors.

KEYWORDS: Pteridophytes, Mirzapur, Field Surveys, Vindhya Range

Mirzapur district, nestled in the Indian state of Uttar Pradesh, spans an area of approximately 4521 square kilometres. The region is bounded by the districts of Varanasi to the north, Chandauli to the east, Sonbhadra to the south, and Prayagraj to the northwest, forming a unique geographical tapestry.The magnificent waters of the Ganges River cradle the city of Mirzapur. Red lateritic soils, accounting for 27.8%, are typically found in areas with a higher elevation and are often used for plantation of crops and horticulture. The ecology of Mirzapur is characterized by its tropical deciduous forests, which experience long, hot summers, low rainfall and short, mild winters. These forests are part of the ecologically fragile Vindhya Range and serve as a vital wildlife corridor, supporting a diverse array of flora and fauna. The region of Mirzapur, with its diverse ecosystems, is home to a variety of plant species including Angiospers, algae, bryophytes, and pteridophytes. Pteridophytes, which are seedless vascular plants like ferns, thrive in the shaded and damp environments of Mirzapur. The term pteridophyte originates from Greek, where "pteron" means feather and "phyton" means plant. Ernst Hackel coined this term due to the feather-like appearance of their fronds. Pteridophytes are considered one of the most primitive groups of seedless vascular plants. Despite their primitive status, pteridophytes play a crucial role in understanding plant evolution and the transition from aquatic to terrestrial life forms. The present day pteridophytes consist of more than 400 living genera and about approximately 13000 species (Crabbe *et al.* 1975 and Verma 2000). Cryptogams like ferns, mosses, and fungi play crucial roles in their ecosystems, such as soil formation, nutrient cycling, and as bioindicators of environmental quality. They are an ancient lineage that once dominated the landscapes of the Carboniferous period. These plants are found in a variety of habitats like *Azolla pinnata, Salvinia molesta* are aqatic pteridophyte, *Selaginella lepidophylla, Equisetum arvense* are xerophytic and *Lycopodium phlegmaria, Phlebodium aureum* are epiphytic pteridophytes spread from tropical rainforests to arid deserts, showcasing a remarkable adaptability. The study and conservation of pteridophytes are crucial, as they play significant roles in ecosystems and have potential economic value. Research efforts continue to assess their conservation status and understand their distribution patterns to better protect these vital plant species.

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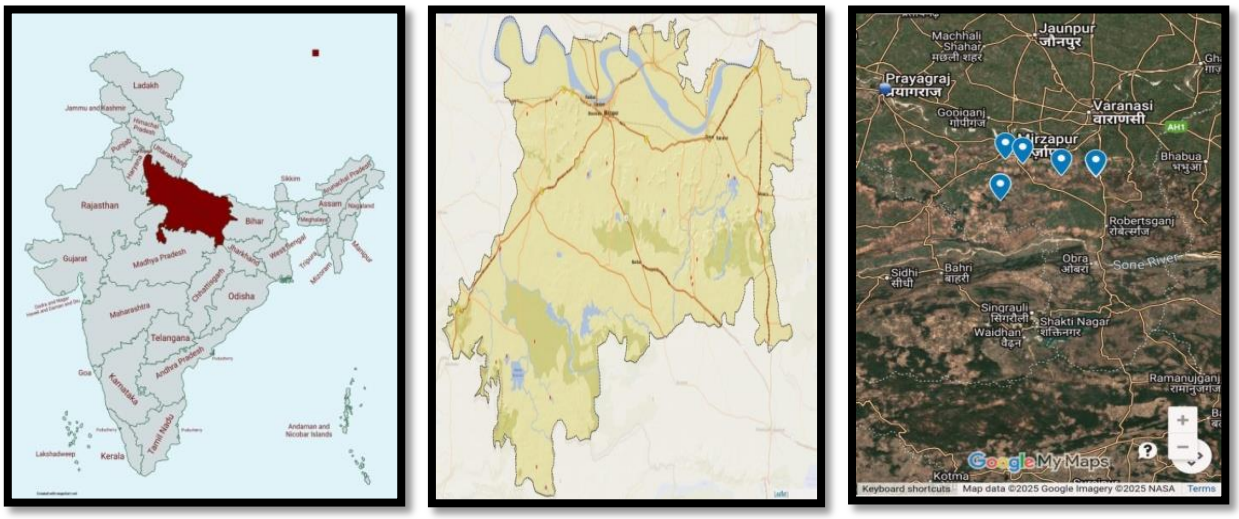

Figure 1: A) Map of India showing U.P., B) Map of Mirzapur, C) Study area showing collection sites

Figure 2: A) Tanda fall, B) Lakhaniya Dari waterfall, C) Siddhnath ki Dari

MATERIALS AND METHODS

Field surveys conducted by authors during the different seasons in different region's of district Mirzapur.Plants were collected and subsequently identified using standard taxonomic keys. Ecological parameters recorded included Habitat type,soil moisture levels,light availability etc.All the collected species of different pteridophytes *Adiantum caudatum* L., *A.lunulatum* Burm.f. *Pteris vittata* L. and *Selaginella bryopteris* (L.) Baker. were throughly studied with the help of natural photography, herbarium formations, diagrams formations, venation patterns, scales, epidermal details and reproductive structure like sori and spores. (Figure 1, 2, 3 & 4)

A **B** **C**

D E F

Figure 3: A) Plant collection at Wyndom Fall, B) *A.lunulatum* Burm.f. , C) *Pteris vittata* L., D&E) *Adiantum caudatum* L., F) *Selaginella bryopteris*(L.) Baker

Herbarium

A B C

D E

Figure 4: Dried and Pressed form of collected plants, A&D) *Selaginella bryopteris(* L.) Baker, B) One leaf of *A.caudatum* L., C) *A.lunulatum* Burm.f., F) *Pteris vittata* L.

Observation

Based on available scientific literature,no complete modern exclusive pteridophytic list published by any author for district Mirzapur was found. A state – wide checklist of 130 pteridophytic species of Uttar Pradesh is published by some workers (Singh *et al.* 2017, Journal of the Bombay Nature History Society). Some documentation of 68 pteridophytic plant were also given by in year 2005 species were published (Khare *et al.*, 2005). All these literatures suggests the following species are likely present in district Mirzapur based on habitat similarity .During field survey of different region in Mirzapur like Wyndom fall, Tanda fall,Siddhnath ki Dari, Lakhaniya Dari and Sirsi dam, five Pteridophytic species *Adiantum caudatum* L., *A.lunulatum* Burm.f., *Selaginella bryopteris* (L.) Baker and *Pteris vittata* L. are collected by authors. A list of 15 pteridophytic species of district Mirzapur were also reported by Bhattacharyya's (1963). (Table 1)

Table 1: List of pteridophytic

Family	Species Name	Common Name/Habitat
Adiantacea	*Adiantum capillus-veneris* L.	Maidenhair fern;rocky slopes
Adiantaceae	*Adiantum lunulatum* Burm.f.	Shaded rocks
Aspleniaceae	*Asplenium dalhousiae* hook.	Epiphytic on trees in hills
Athyriaceae	*Athyrium filix-femina*(L.) *Roth*	Lady fern;moist forest
Dryopteridaceae	*Dryopteris cochleata* (D.Don) C. Chr	Shaded moist areas
Equisetaceae	*Equisetum debile* Roxb.ex Vaucher	Horsetail;wetland edges
Lygodiaceae	*Lygodium flexuosum* (L.)Sw	Climbing fern;forest understory
Marsileaceae	*Marsilea minuta* L.	Water clover;aquatic in ponds
Osmundaceae	*Osmunda regalis* L.	Royal fern;swampy areas
Polypodiaceae	*Polypodium vulgare* L.	Wall-rue;epiphytic on rocks
Pteridaceae	*Pteris vittata* L.	Damp cliff
Selaginellaceae	*Selaginna bryopteris* (L.) Baker	Sanjeevani ;dry rocky slopes
Thelypteridaceae	*Christella arid* (*Gr*ev.&Hook.) Holttum	Moist shaded areas
Thelypteridaceae	*Pseudophegopteris pyrrhophylla*(Christ) Ching	Forest floors

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