

Pteridophytic flora of Barddhaman district West Bengal, India

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Thirtytwo pteridophytic species collected from different parts of Barddhaman District represent twenty one genera belonging to sixteen families. Polypodiaceae is the dominant family represented by four genera. *Adiantum* is the largest genus known by four species. No endemic species was found in this district.

Key-words—Pteridophytes, Taxonomy, Barddhaman, West Bengal

INTRODUCTION

THE pteridophytic flora of India has been published by Beddome (1892), Clarke (1880) and Hope (1899-1904), as reference for identification. However, information about the pteridophytic flora of a large area of West Bengal, particularly of Gangetic plain, is insufficient.

Barddhaman district, with an area of 7028 sq km is situated between 22°56' and 23°53' N latitudes and 86°48' and 88°25' E longitudes with an altitude of 32 m above sea level. The climate of this district is tropical, hot and humid. There is prolonged summer and short winter. The soils of the plateau, particularly those in Asansol and Durgapur are lateritic and occasionally red loams. Loam is the most common soil of Barddhaman which is much porous and suitable for agriculture.

MATERIAL AND METHOD

The present work is based on the plant collection made between the years 1990 and 2000 from different parts of the Barddhaman district.

Standard techniques of collection were followed to collect pteridophytic plants of different ecological conditions. The dried herbarium specimens are maintained in the herbarium of the Botany Department, University of Burdwan. Provisional identifications were made from fresh collected specimens and these were authenticated by the specimens housed at Central National Herbarium,

BSI, Sibpur Botanic Garden, Howrah and with the help of published literature (Clarke 1880; Beddome 1892 and Hope 1899-1904).

The naturally occurring living specimens have only been enumerated and the families have been arranged according to Pichi Sermolli (1977) system of classification. Genera and species are arranged alphabetically.

OBSERVATION

Key to the families

- 1a. Leaves microphyllous; sporangia develop adaxially on the sporophylls:
 - 2a. Plants aquatic or marshy in habit; stem cormous
II. Isoetaceae
 - 2b. Plants terrestrial; stem not cormous
I. Selaginellaceae
- 1b. Leaves megaphyllous; sporangia develop marginally or abaxially or on a fertile spike:
 - 3a. Spores are of one kind:
 - 4a. Young leaf tips circinate in vernation;
 - 5a. Leaf grows indefinitely; annulus apical:
V. Lygodiaceae
 - 5b. Leaf growth definite; annulus not apical;
 - 6a. Sori covered by true indusium or by modified marginal indusium:
 - 7a. Plants aquatic; sporangia almost sessile
XI. Parkeriaceae

- 7b. Plants terrestrial; sporangia stalked: 13b. Sporangia in isolated circular/oval sori on the lamina: IV. Polypodiaceae
- 8a. True indusium present; leaf margin not reflexed or modified as indusium: III. Ophioglossaceae
- 9a. Acicular hairs present on the leaf surfaces; petiole base with two vascular strands having hippocampus shaped xylem XIII. Thelypteridaceae
- 9b. Acicular hairs absent on the leaf surfaces; petiole base with two vascular stands having omega shaped xylem XIV. Athyriaceae
- 8b. True indusium absent, leaf margin reflexed or modified as indusium: XV. Azollaceae
- 10a. Sporangia develop on the reflexed margin facing the lamina; veins enter the reflexed margin IX. Adiantaceae
- 10b. Sporangia do not develop on the reflexed margin facing the lamina; veins do not enter the reflexed margin: XVI. Salviniaceae
- 11a. Lamina dichotomously forked VII. Actiniopteridaceae
- 11b. Lamina not dichotomously forked:
- 12a. Sporangia intermingled with pluricellular trichomes unlike other lamina indument; sporangia develop on marginal commissure; spores with an equatorial flange VIII. Pteridaceae
- 12b. Sporangia not intermingled with trichomes or if present, similar to these of lamina indument; sporangia rarely develop on marginal commissure; spore without an equatorial flange VI. Sinopteridaceae
- 6b. Sori not covered by true or modified marginal indusium:
- 13a. Sporangia in long to short soral lines along the veins: X. Hemionitidaceae
- 14a. Acicular hairs present on the lamina XIII. Thelypteridaceae
- 14b. Acicular hairs absent on the lamina X. Hemionitidaceae
- 15a. Plants rooted in the soil XII. Marsileaceae
- 15b. Plants not rooted in soil:
- 16a. Root present, leaves arranged alternately XV. Azollaceae
- 16b. Root absent: leaves arranged in whorls of three XVI. Salviniaceae

Family-I Selaginellaceae Willk. in Willk. et Lange Prodr. Fl. Hisp.1 (1): 14.1861.

Type – *Selaginella* Palisot de Beauvois

Genus – *Selaginella* P. Beauv., Prodr. Fam, Aetheog. 101 (1805) (*nom. cons.*)

Key to the Species

- 1.a. Sporophylls uniform and without any laminal flap:
2.a. Stem erect / suberect, roots develop only at the base
2. *S. repanda*
- 2.b. Stem prostrate, rooting throughout the stem length
3. *S. vaginata*
- 1.b. Sporophylls dimorphic and the larger sporophyll always bear a dorsal laminal flap
1. *S. ciliaris*.

Selaginella ciliaris (Retz.) Spring, Bull. Acad. Brux **10**: 23 (1843).

Distribution – Salanpur Block.

Selaginella repanda (Desv. ex Poir.) Spring in Gaudich., Voy. Bonite Bot. 1:329 (1846).

Distribution – Barddhaman.

Selaginella vaginata Spring, Mem. Acad Belg. 24(2): 87 (1850).

Distribution: Salanpur Block.

Family-II. Isoetaceae Reichenb., Bot. Damen Kunst. Freunde Pflanzenw. 309. 1828.

Types – *Isoetes* L.

Genus – *Isoetes* L. Sp. Pl. 2:1100. (1753).

Isoetes coromandelina L. f. Suppl. Pl. Syst. veg. Ed. II : 447 (1781).

Distribution – Kanksa Block.

Family – III. Ophioglossaceae (R.Br.) Agardh, Aphor. Bot. 8:113 (1822). (Ophioglosseae)

Type – *Ophioglossum* L.

Genus – *Ophioglossum* L. Sp. Pl. 2:1062 (1753).

Key to the species

1a Rhizome globose; tropophyll with a conspicuous pale median band; venation double.

1. *O. costatum*

1b Rhizome cylindrical or subglobose; tropophyll without a pale median band; venation not double:

2a Tropophyll linear, apex acute, 2 to 3 parallel veins at the base of the tropophyll

2. *O. gramineum*

2b. Tropophyll cordate or ovate, lanceolate, apex not acute, many veins at the base of the tropophyll.

3. *O. reticulatum*

Ophioglossum costatum R. Br., Prodr. Fl. Nov Holl., 163 (1810).

Distribution – Ausgram Block 1.

Ophioglossum gramineum Willd. Nov. Act. Acad 2 18.t 1f. 1. (1802).

Distribution – Ausgram Block 1.

Ophioglossum reticulatum Linn., Sp. Pl. 2: 1063 (1753).

Distribution – Barddhaman.

Family –IV. Polypodiaceae Berchtold et J.S. Presl Prirozen. Rostl. 1:272. 1820.

Type – *Polypodium* L.

Key to the genera

1a. Humus collecting basal leaves present; nectaries present along the costa

1. *Drynaria*

1b. Humus collecting basal leaves not present; nectaries not present:

2a. Sori immersed within cavities

3a. Plants larger (45-47cm), sori distributed discretely in two rows on either side of the mid-rib.

3. *Phymatosorus*

3b. Plants smaller (15 – 18cm), sori distributed distally and are mostly confluent.

4. *Pyrrosia*

2b. Sori not immersed in cavities, sori small and distributed along the leaf.

2. *Microsorium*

Genus *Drynaria* (Bory de St. – Vincent) J. Sm. In Hook, Journ. Bot 4:60, (1841) (*nom.cons.*).

Drynaria quercifolia (L.) J. Sm., in Hook Journ. Bot 3:398 (1841).

Distribution – Barddhaman, Purbasthali Block 1.

Genus – *Microsorium* Link. Hort. Reg. Bot. Berol. 2:110 (1833).

Type – *Microsorium punctatum* (L.) Copel.

Microsorium punctatum (L.) Copel., Univ. Calif. Publ. Bot. 16: 111 (1929)

Distribution – Barddhaman, Kalna Block 2.

Genus – *Phymatosorus* Pic Ser., Webbia 28:457 (1973), based on *Phymatodes* C. Presl, Text. Pteridogr.: 195 (1836), *nom. illeg.*

Phymatosorus scolopendria (Burm.) Pic, Ser., Webbia 28: 460 (1973).

Distribution – Barddhaman, Purbasthali Block 1.

Genus – *Pyrrosia* Mirb. In Lam. Et Mirb. Hist. Nat Veg. 5:91. (1802).

Type – *P. lingua* (Thunb) Farwell.

Pyrosia lanceolata (L.) Farwell., Amer. Midl. Nat. 12:245. (1930)

Distribution – Barddhaman, Raina Block 2.

Family- V. Lygodiaceae K.B. Presl Suppl. Tent. Pterid.: 98:1845.

Type – *Lygodium* Sw., nom. cons.

Genus–*Lygodium* Swartz in Schrad. J. bot. 1800/ 2:7. 106 (1801).

Key to the species

1a. Plant size large (up to few meters), the cortex of rhizome is made up of both thin-walled and thick-walled cells.

1. *L. flexuosum*

1b. Plant size small (15 cm to 30 cm), the cortex of rhizome is made up of thick walled cells.

2. *L. japonicum*

Lygodium flexuosum (L) Sw, J Bot. (Schrader) 1800 (2): 106 (1801).

Distribution – Barddhaman, Durgapur.

Lygodium japonicum (Thunb.) Sw., Journ. Bot. (Schrader), 1800 (2): 106 (1801).

Distribution – Barddhaman.

Family –VI. Sinopteridaceae Acta Phytotax. Geobot 3:50 (1934).

Genus–*Cheilanthes* Swartz, Syn. Fil., 5.126 (1806).

Key to the species.

1a. Fronds bipinnate; lower surface of lamina covered with waxy powder.

1. *C. farinosa*

1b. Fronds tripinnate, lower surface of lamina not covered with waxy powder.

2. *C. tenuifolia*

Cheilanthes farinosa (Forsk). Kaulf. Enum, Fil 212. (1824).

Distribution – Kanksa Block.

Cheilanthes tenuifolia (Burm.) Sw., Syn. Fil. 129 t 332 (1806).

Distribution – Durgapur, Kanksa Block.

Family –VII. Actiniopteridaceae

Genus *Actiniopteris* Link, Fil. Sp 80 (1841).

Actiniopteris radiata (Sw.) Link, Fil. Sp. 79 (1841).

Distribution – Salanpur Block.

Family – VIII. Pteridaceae

Genus *Pteris* L. Sp. Plant, 2:1073 (1753).

LT.: *Pteris longifolia* L.

Key to the species.

1a. Leaf pinnae connected by wings; multicellular paraphysis absent in the coenosorus.

1. *P. multifida*

1b. Leaf pinnae not connected by wings; multicellular paraphyses present in the coenosorus

2. *P. vittata*

Pteris multifida Poir. In Lam. Encycl. Bot., 6:714 (1804).

Distribution – Barddhaman, Memari Block 1, Jamalpur, Katwa, Ondal, Kalna, Kanksa, Jamuria Block 1.

Pteris vittata Linn., Sp. Pl. 2:1074 (1753).

Distribution – All over the district.

Family – IX. Adiantaceae

Genus–*Adiantum* Linn., Sp. Pl., 2:1094 (1753).

Key to the species

1a. Leaves bipinnate

1. *A. capillus – veneris*

1b. Leaves unipinnate

2a. Hairs present on the laminar surface

3a. Both multicellular and unicellular hairs are present on the abaxial surface of lamina.

2. *A. caudatum*

3b. Only multicellular hairs present on the abaxial surface of lamina

3. *A. incisum*

2b. Hairs absent on the laminar surface

4. *A. lunulatum*

Adiantum capillus-veneris Linn., Sp. Pl. 2:1096 (1753).

Distribution – Raina Block 2 and Kalna.

Adiantum caudatum Linn., Mant. Pl. Act. 308 (1771).

Distribution – Barddhaman, Raina Block 1, Raina Block 2 and Kalna.

Adiantum incisum Forssk., *Fl. Aeg. Ar.*, 187 (1775); Pichi Sermolli, *Webbia*, 12:669. fig 6. (1957).

Distribution – Barddhaman, Raina Block 1.

Adiantum lunulatum Burm. *Fl. Ind.*, 235 (1768).

Distribution – Barddhaman, Memari Block 1, Memari Block 2, Raina Block 1, Raina block 2, Khandaghosh, Galsi Block 1, Galsi Block 2, Ausgram Block 2, Mangalkote Block, Katwa Block 1, Katwa Block 2, Ausgram Block 1, Bhatar, Purbasthali Block 1, Purbasthali Block 2, Kalna Block 1, Kalna Block 2, Monteswar Block, Asansol, Jamuria Block 1, Ketugram Block 1, Ketugram Block 2.

Family – X. Hemionitidaceae

Genus *Hemionitis* L. Sp. Pl. 2: 1077. (1753)

LT: *Hemionitis palmata* L.

Hemionitis arifolia (Burm.) Moore, *Ind. Fil.*, 114 (1859).

Distribution – Barddhaman.

Family – XI. Parkeriaceae

Genus–*Ceratopteris* Ad. Brongn. *Bull. Sci. Soc. Philom. Paris* 1821: 186 (1822).

Ceratopteris thalictroides (L.) Ad. Brongn., *Bull. Sci. Soc. Philom. Paris* 1821: 186 (1822).

Distribution – Barddhaman.

Family – XII. Marsileaceae Mirbel, *Hist. Nat. Veg. (Lam. & Mrib.)* 5:126, 1802.

Genus *Marsilea* L. Sp. Pl. 2:1099 (1753).

Marsilea minuta L. *Mant.* 308 (1771).

Distribution – Throughout the district.

Family – XIII. Thelypteridaceae Pic – Ser., *Webbia*, 24:711: 1970.

Type – *Thelypteris* Schmidel.

Key to the genera

1a. Sori not indusiate; glandular and pointed hairs are present on the scales of the rhizome

1. *Ampelopteris*

1b. Sori indusiate; hairs are not present on the scales of the rhizome:

2a. Plant size ranges from 18 cm to 50 cm: maximum size of the pinnae may be about 8 cm long and 1.5 cm wide; lower 2-3 pairs of pinnae are gradually reduced.

2. *Christella*

2b. Plant size ranges from 45 cm to 75 cm; maximum size of the pinnae maybe about 13 cm long and 1.25 cm wide; lower pinnae not so reduced.

3. *Thelypteris*

Genus–*Ampelopteris* Kunze. *Bot. Zeit.*, 6:114 (1848).

Ampelopteris prolifera (Retz.) Copel., *Gen. Fil.* 144. 1947.

Distribution– Barddhaman, Raina Block 1, Ausgram Block 2, Katwa Block 1, Katwa Block 2, Bhatar Block, Purbasthali Block 1, Kalna Block 1, Kalna Block 2, Asansol Block.

Genus–*Christella* Leveille, *Florae Kouy-Tscheon* 472 (1915).

LT: *Christella parasitica* (L.) Leveille.

Christella dentata (Forssk.) Brownsey & Jermy, *Brit. Fern Gaz.* 10:338 (1973).

Distribution – Throughout the district.

Genus—*Thelypteris* Schmidel Icon. Pl. ed. J.C. Keller 3:45, t. 11, 13 (1763). *nom. cons.*

LT.: *Thelypteris palustris* (Sallisb.) Schott.

Thelypteris interrupta (Willd.) K. Iwatsuki. Jap. J. Bot. 38:314 (1963).

Distribution – Durgapur.

Family – XIV. Athyriaceae

Genus—*Diplazium* Sw. in Schrad. J. Bot. 1800 (2): 61 (1801).

LT: *D. plantagineum* (L.) Sw.

Diplazium esculentum (Retz.) Sw. Schrad. J. Bot. 1801 / 2:312. 1803.

Distribution – Raina block 1, Purbasthali Block 1.

Family – XV. Azollaceae

Genus *Azolla* Lam. Encycl. Meth. 1:343 (1783).

Type – *Azolla filiculoides* Lam.

Azolla pinnata R. Br. Prod. Fl. N. Holl. 167. 1810.

Distribution – All over the district except Durgapur, Asansol, Raniganj, Salanpur and Hirapur blocks.

Family – XVI. Salviniaceae

Genus—*Salvinia* Seguiet, Fl. Veron, 3: 52 (1754).

Type – *Salvinia natans* (L.) All., Pedem. 2 : 269 (1785).

Key to the species

1a. Size ranges from 6-10 cm, scales present on the

adaxial epidermal surface of the leaf

2. *S. natans*

1b. Size ranges from 4-7 cm, scales absent on the adaxial epidermal surface of the leaf

1. *S. cucullata*

Salvinia cucullata Roxb. ex Bory. Bel. Voy. Bot. 2:6 (1883).

Distribution – Barddhaman, Raina Block 2, Katwa Block 1, Jamuria Block 1.

Salvinia natans (L.) All. Fl. Pedem 2 : 289 (1785).

Distribution – Barddhaman, Raina Block 2, Katwa Block 1, Jamuria Block 1.

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