

**THE GENUS *PRONEPHRIUM* C. PRESL (THELYPTERIDACEAE)  
FROM BANGLADESH**

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*Key words: Pronephrium, Thelypteridaceae, Pteridophyte, Bangladesh*

**Abstract**

The paper deals with the genus *Pronephrium* C. Presl of the family Thelypteridaceae and includes five species, namely *P. articulatum* (Haulst. & Moore) Holtt., *P. lakhimpurensis* (Rosenst.) Holtt., *P. nudatum* (Roxb. ex Griff.) Holtt., *P. parishii* (Bedd.) Holtt., and *P. triphyllum* (Sw.) Holtt. from Bangladesh. Descriptions of the species with artificial key, illustrations, distribution and short notes with conservation measures are given here.

**Introduction**

The genus *Pronephrium* C. Presl of the family Thelypteridaceae is a tropical genus with about 70 species (Dixit and Vohra 1984). The species are widely distributed in Tropical Asia, China, Japan, Malaysia, Sri Lanka, Fiji and Australia (Dixit and Vohra *l.c.*). From the Bangladesh territory, Prain (1903) first recorded *Menischyum triphyllum* Sw., only from Chittagong. Dixit (1984) recorded *Pronephrium articulatum* (Haulst. & Moore) Holtt. from Bangladesh. Later on, Mirza and Rahman (1997) recorded a total of five species, namely, *P. articulatum*, *P. lakhimpurensis* (Rosenst.) Holtt., *P. nudatum* (Roxb. ex Griff.) Holtt., *P. parishii* (Bedd.) Holtt., and *P. triphyllum* (Sw.) Holtt. from Bangladesh in a checklist. Here full description of each species with illustrations is provided.

The present work was based on the materials deposited at Bangladesh National Herbarium (DACB), Kew Herbarium (K), Natural History British Museum (BM) and Central National Herbarium (CAL), for taxonomic enumeration of the species.

The taxonomic description with key to species, illustrations, specimens examined, distribution, short notes and proposal for conservation measure are given below.

***Pronephrium* C. Presl, Epim. Bot.: 258 (1851).**

Lectotype: *P. lineatum* (Bl.) Presl (= *Aspidium lineatum* Bl.).

Rhizome short-creeping. Stipe dark brown to black, not tufted or rarely tufted. Fronds lacking reduced basal pinnae, pinnae sub-entire or crenate, usually with several pairs of anastomosing veins, lower surface between veins often pustular when dry, spherical glands sometimes present on the lower surfaces of pinnae or on sporangia. Sori

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exindusiate. Spores bilateral plano-convex to concavo-convex, perineous. Sori either super-ficial, circular or elongated, occur at the end of veins and secondary veins. Spores monolete and ellipsoidal or rarely trilete and somewhat spheroidal, surface often reticulate or with short, low ridges or prominently winged, the borders sometimes ciliate or shortly cristate to echinate. Chromosome number :  $x = 36$  ( Smith 1990).

### Key to the species

- |   |                          |
|---|--------------------------|
| 1. Fronds with more than 7 pairs of pinnae  | 2                        |
| - Fronds with less than 7 pairs of pinnae   | 3                        |
| 2. Rhizome tufted, erect; sporangia glandular; spores winged  | <b>P. articulatum</b>    |
| - Rhizome cylindrical, creeping; sporangia eglandular; spores without wings   | <b>P. nudatum</b>        |
| 3. Sori near costule, without indusia   | <b>P. lakhimpurensis</b> |
| - Sori medial, with profusely hairy indusia   | 4                        |
| 4. Fronds trifoliolate; sori in a crescent shaped row along each pair of convinent veins; apical pinna not auricled | <b>P. triphyllum</b>     |
| - Fronds penta-foliolate; sori transversely arranged on the costules; apical pinna auricled, at both sides          | <b>P. parishii</b>       |

1. **Pronephrium articulatum** (Haulst. & Moore) Holtt. in *Blumea* 21 (1): 116 (1972). Dixit, *Cens. Ind. Pterid.*: 111 (1984); *Nephrodium articulatum* Haulst. & Moore in *Gard. Mag. Bot.*: 293 (1851); *Nephrodium glandulosum* var. *late-strigosum* Clarke in *Trans. Linn. Soc. Lond. II. Bot.* 1: 532. t. 74. f. 2 (1880). **(Plate 1)**

Rhizome short, creeping. Sterile stipe 20-30 cm long. Fronds dimorphous, minutely hairy. Sterile lamina 30-40 cm long. Pinnae 12 pairs, basal pinnae narrowed at base, more on basispic than acroscopic side, base truncate, auricled on acroscopic side, apex abruptly short-acuminate, edges obliquely lobed to a depth of 1-2 mm or sometimes more deeply lobed. Veins 8 pairs, 2-4 pairs anastomosing. Lower surface of rachis covered with thick curved hairs, more than 0.5 mm long, upper surface covered throughout more or less closely with finely appressed hairs. Stipe fertile, frond about 50 cm long, pinnae widely spaced than sterile one, edges shallowly crenate. Sori medial, lower ones at least somewhat elongated along veins, sporangia with glands, spores with wing, ornamentation.

*Specimens examined* : **Chittagong**: Khasalong, 10.1.1869, *Clarke* 8276 A (K); Burkhal, 8.2.1873, *Clarke* 19698 (K, BM); Burkhal, 13.2.1873, *Clarke* 19902A (K); Chittagong, 31.12. 1850 *s.n. coll* (K); Burkhal, 13.2.1873, *Clarke* 19900 [Lectotype, (K)]; Ranganthea, 5.2.1873, *Clarke* 19539 (BM); Burkhal, 13.2.1873, *Clarke* 19902 (BM). **Sylhet**: Sylhet, *Griffith s.n. coll* (K).

*Distribution* : India, Sri Lanka, Mymanmar, N. Thailand and China.

*Pronephrum articulatum* grows in shady forests near streams. It is not so common in Bangladesh. Extensive survey should be made to find it out from different localities, and should be brought under cultivation, before the species becomes endangered in Bangladesh.

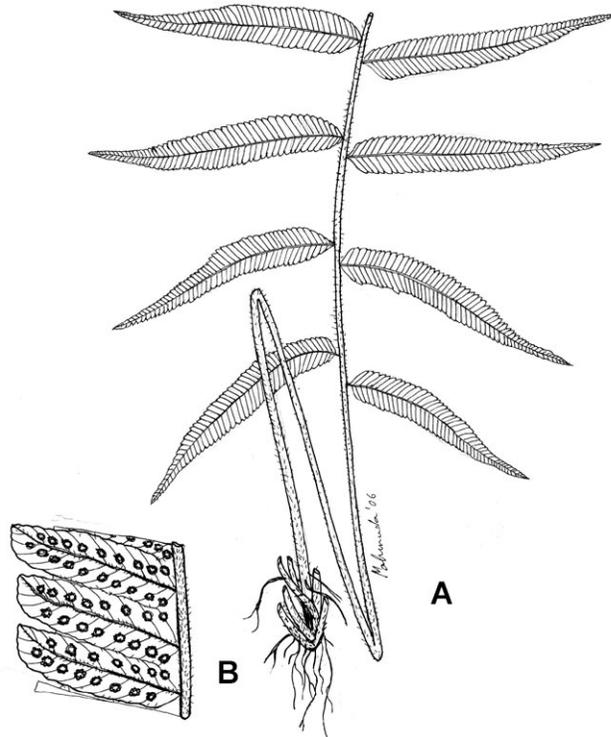


Plate 1. *Pronephrum articulatum*. A. Habit ( $\times 0.13$ ); B. Fertile pinna showing arrangement of sori and venation ( $\times 2.55$ ).

2. ***Pronephrum lakhimpurensis*** (Rosenst.) Holtt. in *Blumea* 20 (1): 110 (1972). Dixit, *Cens. Ind. Pterid.*: 111 (1984); *Dryopteris lakhimpurensis* Rosenst. in *Meded. Rijkskerb.* 31: 7 (1917); *Meniscium cuspidatum* var. *longifrons* Clarke in *Trans. Linn. Soc. Lond. II. Bot.* 1: 572 (1880). **(Plate 2)**

Rhizome short, creeping, 7-10 mm in diameter, bearing hooked hairs. Stipe about 50 cm or more long, dark at the base with hooked hairs and dark brown scales, sometimes not found on younger plants. Fronds simple-pinnate. Lamina commonly 30-50 cm long, firm, dull reddish after drying. Pinnae 4-7 pairs, lowest one opposite, sometimes a bud present on the highest pinnae of old fronds, basal pinnae with stalked apex, caudate-

acuminate, crenate. Veins 10-12 pairs, not prominent on either side. Sori near costule, somewhat elongated.

*Specimen examined* : **Sylhet** : Sylhet, 30.11.1872, *Clarke* 18431 (K).

*Distribution* : Malaysia, Java, India, China and Thailand.

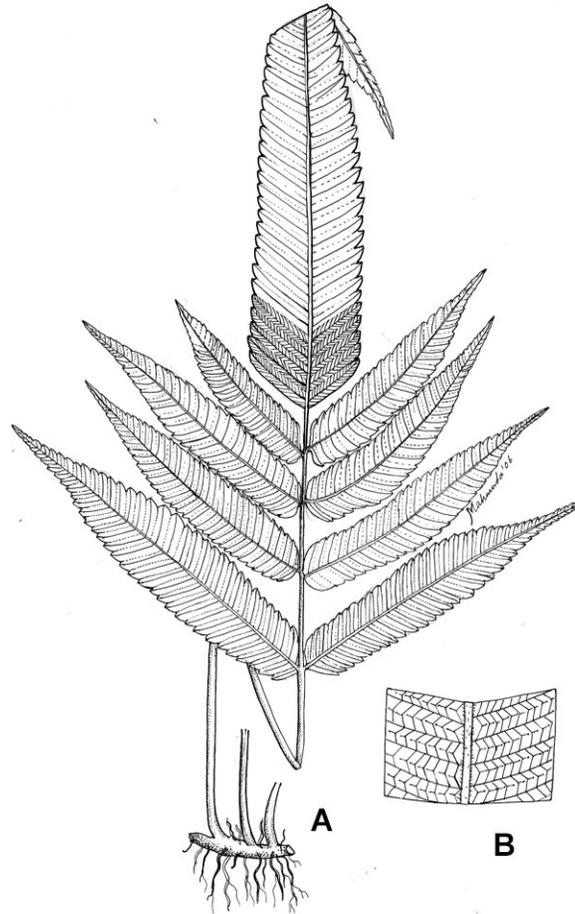


Plate 2. *Pronephrium lakhimpurensis*. A. Habit ( $\times 0.5$ ); B. Sterile frond showing venation ( $\times 2.5$ ).

*Pronephrium lakhimpurensis* grows on rocks or steep valley-sides in shady forests. It is a rare species in Bangladesh; only once collected from Sylhet by C.B. Clarke. Extensive survey is needed to find it out from other localities. The species should be brought under cultivation before it becomes threatened in Bangladesh.

3. ***Pronephrium nudatum*** (Roxb. ex Griff.) Holtt. in *Blumea* 20 (1):111 (1972). Dixit, *Cens. Ind. Pterid.*: 111 (1984); *Polypodium nudatum* Roxb. ex Griff. in *Calc. Journ. Nat. Hist.* 4: 491 (1884); *Nephrodium moulemeinense* Bedd., *Ferns Brit. India Suppl.*: 18 (1876). (Plate 3)

Rhizome stout, creeping. Stipe firm erect, slightly swollen and densely scaly at the base, about 80 cm or more long. Fronds 2-3 cm apart, 150 cm or more long, 4-28 cm. Lamina simply pinnate. Pinnae very shortly stalked, 10-12 pairs, 11.5-28 × 2.3-5 cm wide near the base, base cuneate, apex acuminate, margin sharply crenate, hairy. Veins several pairs, all anastomosing, free excurrent veins rare. Sori small, round, superficial, medial, indusiate. Indusium prominent, profusely hairy. Spores monolete, bilateral, brown perine absent, exine densely spinulose.

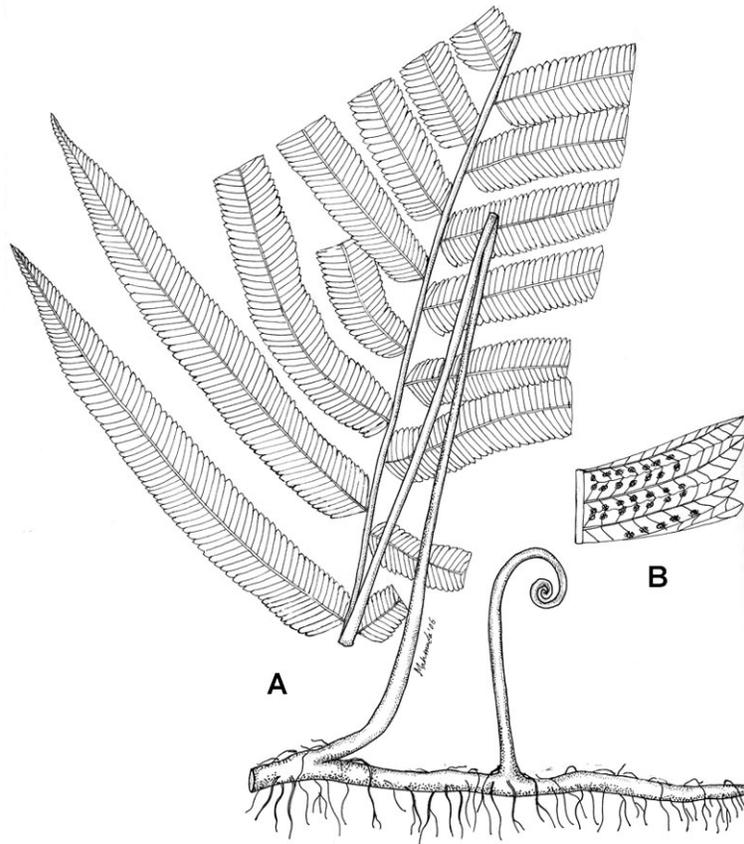


Plate 3. ***Pronephrium nudatum***. A. Habit ( $\times 0.13$ ); B. Fertile pinna showing arrangement of sori and venation ( $\times 2.5$ ).

*Specimens examined* : **Chittagong**: On the way to Chittagong University, 13.7.2004, M.M. Mirza Mm.429 (DACB). **Cox's Bazar**: Neela range, Madhaya Neela beat, 29.8.1991, Khan, Huq, Mia and Rahman K.8565 DACB; Himchari, 28.6.1993, Mia,

Karim and Rashid, M3612 (DACB). **Jamalpur**: Karnajhula, 8.8.2006 M.M. Mirza Mm.713 (DACB). **Mymensingh**: Bhyadanga, 20.11.1868, *Clarke* 8089 (BM); Mymensingh town, 6.8.2006, M.M. Mirza, Mm.689 (DACB). **Sherpur**: Jhenaighati, 7.8.2006, M.M. Mirza Mm.705 (DACB). **Sylhet**: Sylhet Station, 24.11.1872, *Clarke* 17937 (K); Adampur, 18.5.2005, M.M. Mirza Mm.537 (DACB); Lowachera, 19.5.2005, M.M. Mirza Mm.565 (DACB).

*Distribution* : India, Sri Lanka, Mymanmar, Malaya and China.

*Pronephrum nudatum* is a large terrestrial fern forming extensive colonies in partially shaded moist forest floor as undergrowth, particularly near streams. It is also found to grow on moist places in the plainland. It is quite common in Bangladesh; no conservation measure is needed.

4. ***Pronephrum parishii*** (Bedd.) Holtt. in *Blumea* 20(1): 111 (1972). Dixit, *Cens. Ind. Pterid.*: 111 (1984); *Meniscium parishii* Bedd., *Ferns Brit. India* t.184 (1866); *Meniscium triphyllum* var. *parishii* (Bedd.) Bedd., *Handb. Ferns Brit. Ind. Suppl.*: 102 (1892); Nakaike, *Enum. Pterid. Jap.*: 290 (1975). (Plate 4)

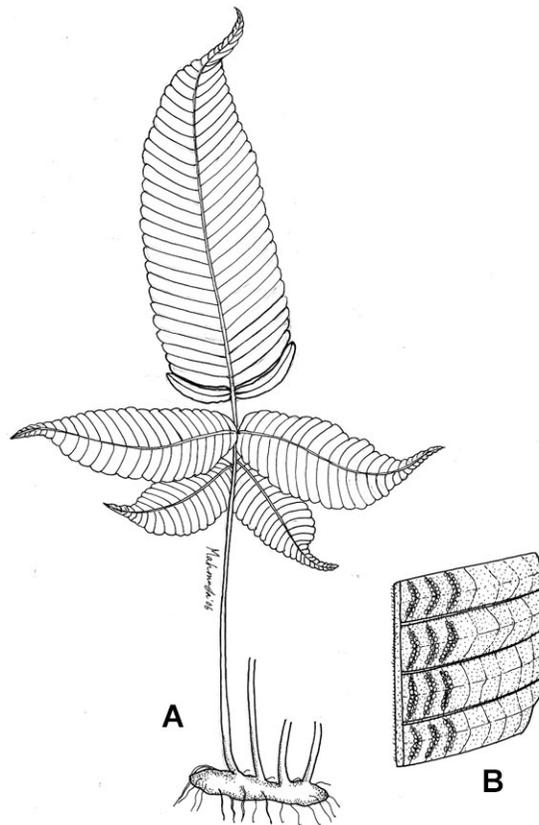


Plate 4. *Pronephrum parishii*. A. Habit ( $\times 0.5$ ); B. Fertile pinna showing arrangement of sori and venation ( $\times 2.5$ ).

Rhizome long, creeping upto 4 mm in diameter. Stipe about 15-20 cm long. Fronds simply pinnate. Lamina variable, apical part with 1-2 narrow lobes at the base, or 1-2 small narrow adnate free pinnae just below it, no buds present at the base or upper pinnae. Pinnae up to 6 pairs, usually opposite, but sometimes not, usually decreasing in size from the apex to the base or frond, upper ones always adnate to rachis at basicopic base. Sporangia with longer hooked hairs. Veins prominent. Sori transversely arranged on the lamina.

*Specimens examined* : **Chittagong**: Burkhal, 7.2.1873, *Clarke* 19742 (K); Kasalong, 13.2.1873, *Clarke* 19825 (K).

*Distribution* : India, Sri Lanka, Myanmmar and Malaysia.

*Pronophrium parishii* grows along the stream banks in open forests. From Bangladesh it is reported from Chittagong only. Attempts should be made to find it out from other localities. The species should be brought under cultivation before it becomes extinct from the wild.

5. **Pronophrium triphyllum** (Sw.) Holtt. in *Blumea* 20: 122 (1972). Nakaike, *Enum. Pterid. Jap.*: 289 (1976); Sledge in *Bull. Brit. Mus. Nat. Hist. Bot.* 8(1): 47 (1981); Dixit, *Cens. Ind. Pterid.*: 111 (1984); *Meniscium triphyllum* Sw. in *Schrad. J. Bot.* 1800 (2): 16 (1801); Bedd., *Ferns S. Ind. t.* 56 (1863); *Clarke* in *Trans Linn. Soc. Lond. II. Bot.* 1: 571 (1880). **(Plate 5)**

Rhizome slender, long-creeping, bearing stipes at interval of 1-2 cm. Stipes slender, covered with short hairs throughout, those of fertile fronds commonly more than twice as long as those of sterile fronds on the same plant, stipes of sterile fronds 7-20 cm long. Lamina trifoliate. The lateral leaflets opposite, attached at 1-2 cm below the terminal leaflet; sterile terminal leaflet 10-15 cm long, 2.5-4 cm wide, lanceolate, the base rounded, often somewhat unequal, apex acuminate, the edges entire or irregularly sinuate, the midrib and the upper surface shortly hairy. The midrib and veins beneath bearing numerous shortly spreading, pale, hooked hairs, the lamina between the veins dull, verrucose and glabrous. Veins 10-12 pairs, spreading from the costules at the very obtuse angle, usually almost straight, nearly always meeting in opposite pairs, the excurrent veinlet free or united to the next pair of veins above; lateral sterile leaflets similar, but shorter (5-10 × 1.5-3 cm), unequally rounded at the base, and shortly stalked, fertile fronds with narrower leaflets (apical leaflet 1-2.5 cm wide) the veins almost at right angles to the costules. Sori extending all along each vein so that sporangia are distributed in a crescent shaped row along each pair of connivent veins, without indusia.

*Specimens examined*: **Chittagong**: Chittagong, *Hooker & Thomson s.n.* (K); Burkhal, 6.2.1873, *Clarke* 19742 (BM). **Jamalpur** : Gozni, Lowachapra, Kornojhula, 8.8.2006, M.M. Mirza Mm.714 (DACB). **Sylhet** : Sylhet, 1820, *Wallich s.n.* (K). **Sylhet** : Sylhet Station, 24.11.1872 *Clarke*, 17937 (K); Adampur, 18.5.2005, M.M. Mirza Mm.537

(DACB); Adampur, 6.5.2003, M.M. Mirza Mm.326 (DACB); Lowachera, 19.5.2005, M.M. Mirza Mm.565 (DACB).

*Distribution* : India, Sri Lanka, Mymanmar, Thailand, Japan, Malaysia, Philippines and New Guinea.

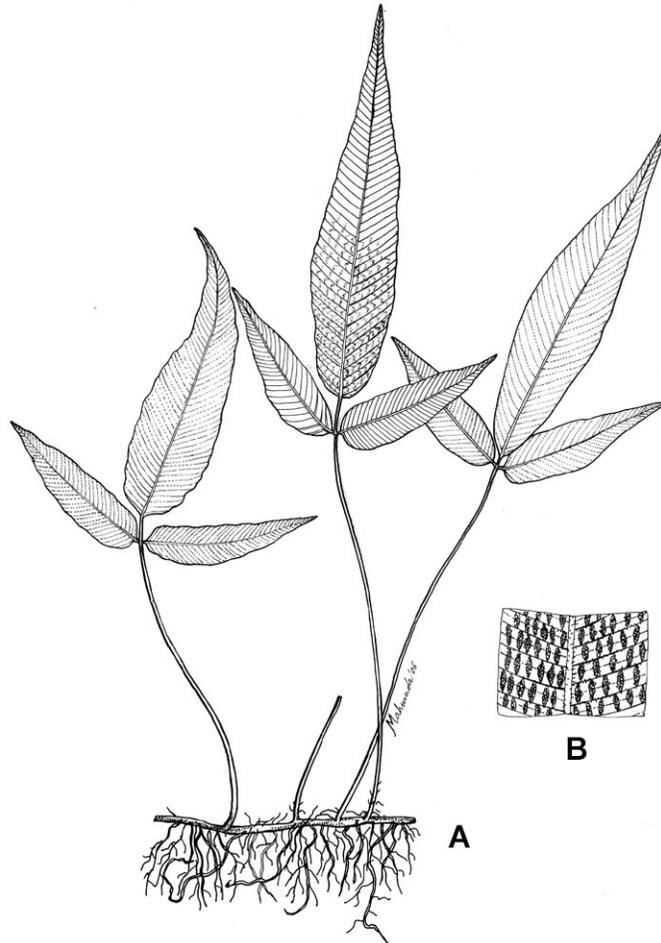


Plate 5. *Pronephrium triphyllum*. A. Habit ( $\times 0.25$ ); B. Fertile pinna showing arrangement of sori and venation ( $\times 2.5$ ).

*Pronephrium triphyllum* is a common species in Bangladesh forests, growing along the stream edges. No conservation measure needed.

#### Acknowledgements

The author is grateful to Dr. B.M. Wadhwa, Botanist, Kew Herbarium, Kew, for his help and supervision, during her visit to Kew Herbarium (K) and the authorities of herbarium of Natural History British Museum (BM) and Central National Herbarium,

India (CAL). Thanks are also due to Prof. A.B.M. Enayet Hossain, Department of Botany, Jahangirnagar University, for his valuable comments on the manuscript.

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*(Manuscript received on 19 September 2006; revised on 8 January 2007)*