TAXONOMIC OBSERVATIONS ON THELYPTEROID FERNS FROM PITHORAGARH DISTRICT (N.W. HIMALAYAS)

N. PUNETHA

Department of Botany, Govt. P.G. College, Pithoragarh - 262 501.

A detailed taxonomic account of the members of Thelypteridaceae of Pithoragarh district is given. Eleven species are described. *Ampelopteris, Gephyropteridopsis, Pronephrium, Pseudocircosorus, and Pseudophegopteris* are represented by one species each whereas *Christella* is represented by five species including a new species *C. multiauriculata* Punetha.

Key words: *Christella multiauriculata, C. Parasitula* ferns, taxonomy, Thelypteridaceae

In continuation to writer’s work on the Ferns of Pithoragarh district of Kamaon regions of North West Himalayas (Punetha, 1985; Punetha et al., 1985), the taxonomic distinction of members of seven genera of Thelypteridaceae makes the contents of this communication. In the classical literatures of Clarke (1880), Beddome (1883, 1892) and Hope (1899-1904), the Indian members of family Thelypteridaceae have been described as the species of either *Lastrea, Menisicum, Nephrodium*, or *Phegopteris*. However, Khullar et al. (1983) have given a detailed taxonomic account of the family from the Western Himalaya. A total of eleven species are described including a new species, *Christella multiauriculata*. The specimens are deposited in the herbarium of Botany department, Government P.G. College, Pithoragarh.

**TAXONOMIC ACCOUNT**

Key to the genera:

1. Fronds of indefinite growth; proliferating axillary buds present at the axils of the pinnae
   - *Ampelopteris*

1. Fronds of definite growth; proliferating buds absent.

2. Fronds simply pinnate

3. At least one pair of veins anastomosing

4. Several pairs of veins anastomosing; pinnae subentire or slightly lobed; basal pinnae not reduced
   - *Pronephrium*

4. 1 or 2 pairs of veins anastomosing; pinnae deeply lobed; basal pinnae reduced in almost all species

3. *Christella*

5. Veins all free

5. Hooked hairs present on lower surface of costa and on sporangia
   - *Cyclogramma*

5. Hooked hairs lacking

6. Basal pinnae not reduced

5. *Gephyropteridopsis*

6. Basal pinnae, several pairs much reduced

6. *Pseudocircosorus*

1. 2. Foronds bipinnate

7. *Pseudophegopteris*


The monotypic thelypteroid fern is widely distributed in the warmer parts of the old world. Presence of characteristic proliferating axillary buds in the axils of almost all the pinnae easily differentiate this fern from other members of the family.


**Hemionites prolifera** Retz Obs Bot 6: 36, 1791.

**Goniopteris prolifera** (Retz) Presl, Tent. Pterid. 183, 1836; Bedd. Ferns S India t 172 1864, Hindb. Ferns Brit India 296, 1883.

**Ampelopteris elegans** Kunze, Bot. Zeit. 6: 114, 1848.

**Ampelopteris firma** Kunze, Linnaea 24: 251, 1851.
Rhizome wide, creeping, 3 mm in diameter, scales at apex, scales at apex, scales dark brown, ovate, margins dentate, spines 10-20 cm or more long, stramineous, sparsely scaled when young, scales light brown, deciduous, lanceolate, entire, unicellular forked hairs present on rachis, lamina unipinnate, 10-80 cm or more long, scrambling, proliferating vegetative buds present, pinnate numerous, sub coriaceous, 5-10 cm long, 0.5-1 cm wide, alternate or sub opposite, subcostate, oblanceolate, base truncate, apex acute, margins serrate or wavy, veins 5-10 pairs, 4-6 basal pairs fused in zig-zag manner, acuminate, hairs present on lower surface of veins and upper surface of pinnate, lower surface of pinnate sparsely scaled, scales small, short exudusiate, round, spores light brown, perispore, perispore finely spongy, 25-40 μm.

A very rare fern of the region but locally common along a hill stream near Chaloth (800 m).


A genus of about 61 species (Holttum, 1972) is widely distributed in southern hemisphere and is characterised by anastomosing of several pairs of veins and the basal pair of pinnate are not reduced. Three species are known to occur in W. Himalaya (cf Khullar et al. 1983) of these P. nudatum is found in Pithoragarh district.


Polypondium multilinatum Wall. ex Hook., Spec. Fil. 5: 11, 1863; Clarke, Trans. Linn. Soc. 2 Bot. 1: 547, 1880.

Nephrodium moulineanum Bedd. Ferns Brit. India Suppl. 18: 1876.


Christella is a large genus of about 51 species (Holtum, 1976) and is widely distributed in the tropics of the old World. Ching (1978), however, did not recognise Christella as a distinct genus, he retained these ferns within Cyclosorus Link. The genus is characterised by the presence of basal 2-5 pairs of lateral reduced pinnae, 1, 2 pairs of veins Anastomosing and presence of erect, slender or capitate hairs Anastomosing and presence of erect, slender or capitate hairs on the upper surface of costae. Seven species of this genus have been reported from Meghalaya (Baishya & Rao, 1982). Khullar et al (1983) reported six species from W. Himalayas of which four species are found in this area in addition to C. multiauriculata.

Key to the species:

1. Rhizome short-creeping; hairs on lower surface of segments dense
   2. Acrosopic bases of at least lower 10 pairs of segments auricled; capitate hairs present on both surfaces of costae
      1. C. multiauriculata
   2. Acrosopic bases of segments not auricled; capitate hairs absent
      2. C. dentata

   1. Rhizome long-creeping; hairs on lower surface of segments sparse
   3. Basal pair of pinnae reduced
   4. Segments coriaceous; lobes 3/4 towards costa; sinus membrane long
      3. C. arieda
   4. Segments herbaceous; lobes 1/4 towards costa; sinus membrane short
      4. C. appendiculata
   3. Basal pair of pinnae not reduced
      5. C. parasitica


Christella dentata (Forssk.) Brownsey & Jermy affinis, ab ea differt: pinnis inferioribus multijugatis auriculatis, pagina pinnarum utroque inter venas pilis brevibus capitatis multose praedita.

Caudex short-creeping, c. 1 cm diameter; stipe to 15 cm long, stramineous when dried, its basal scales to 5 x 2 mm, bearing short acicular hairs; pinnae c. 25 pairs of which the lower 10 pairs bear auricles at their acrosopic bases, the auricles crenate, and the basal 2-4 pairs are gradually reduced, the lowest 2 cm long; largest pinnae 12 x 2 cm, lobed about half-way towards the costa; veins 8-9 pairs in each lobe, 1.5 pairs anastomosing and one vein ending beside the sinus membrane; slender acicular hairs to 0.5 mm long abundant on lower surface of costae, shorter ones present on veins; short erect acicular and capitate hairs abundant between veins on both surfaces; sori medial, indusia thin, hairy; spores dark brown, 47 x 28 μm (Figs. 3-7).

Type: Pithoragarh, near Government P.G. College, in exposed places at 1900 m alt., coll. N. Punetha, 726, Sept. 1985 (K).


Polypodium dentatum Forssk. Fl. Aegpt Arab 185 1775.


Thelypteris dentata (Forssk) E. St John in Amer Fern Journ. 26: 44, 1936.


Rhizome short-creeping, 2-4 mm in diameter; scales linear-lanceolate, 10x15 mm, brown; stipe to 30 cm long, wiry, stramineous when dry; fronds large to one meter long; 25-30 pairs of lateral pinnae,
lower 4-5 pairs gradually reduced and distant; acroscopic bases of reduced pinnae auricled, largest pinna 16x2.5 cm, acuminate, 2/3 lobed; lobes oblique with round apex; veins 10 pairs, lower 1.5 anastomosing and reaching to sinus, lower surface of costae and costules bearing slender, 0.2 mm long hairs; sori medial, indusia short-hairy, spores light brown, granulose, 40x26 μm.

A very common fern of the area, it is very variable in frond form.


Rhizome long-creeping, to 5 mm in diameter; scales light brown, linear, 6x0.5 mm; stipe erect, o 40 cm long, naked above, scaly at base; frond large up to 160 cm long, 30 cm broad; 30-36 pairs of lateral pinnae, lower 2, 3 or more reduced and distant, lowest 1-2 cm long, lateral pinnae up to 15 cm long, 1.5 cm wide, acuminate, lobed 1/4 towards costa, coriaceous, costules oblique with blunt apex; 9 pairs of veins, basal 1 pair anastomosing, lower surface of costae bear stiff, erect hairs 0.2 mm long, erect hairs present on veins; sori medial; indusia hairy; spores light brown, perine wrinkled, 42x20 μm.

Fairly common near Bisar, Lohaghat and Nainital.


Nephrodium extensum var. microsorum Clarke, Trans. Linn. Soc. 2 Bot. 1: 530, 1880.


Cyclosorus mollisculus (Bedd.) K. Iwats. in Hara, Fl. E. Himal. 484, 1966.

Nephrodium extensum var. laterepens Clarke, Trans. Linn. Soc. 2 Bot. 1: 530, 1880.

Rhizome long-creeping, 4 mm in diameter, scaly, scales light brown, lanceolate with acuminate apex, 4x0.8 mm; stipe 32 cm long, slender, stramineous, sparsely hairy; fronds 60 cm long, 12 cm wide, herbaceous; 20 pairs of lateral pinnae, basal pair slightly reduced, pinnae 6x2 cm, apex acuminate, 1/4 lobed to costa; lobes oblique, slightly falcate, 10x2 mm; 9-12 pairs of veins, basal 1.5 anastomosing; pale slender hairs present on lower surface of segments, hairs 1 mm long; sparse; sori medial, more towards margins; indusia small, hairy, spores pale brown, perine granulose, 26x24 μm.

A rare fern, only ones collected from Nainital Lachher region.


Rhizome long-creeping, 4 mm in diameter, scaly, scales light brown, linear, 5.5 x 0.5 mm, sup 30-35 cm long, hairy; fronds 40-45 cm long, 30-
32 cm broad 15-20 pairs of lateral pinnae, basal pair deflexed, lateral pinnae 15-16 cm long, 2 cm wide, short-acuminate, lobed, 2/3 towards costa; lobes oblique; 8-10 pairs of veins, basal pair anastomosing; hairs 1 mm long; sori medial; indusia sparsely hairy; spores light brown, perine wrinkled, 40x30 μm.

Although Beddome, Clarke and Hope have reported its presence in the Western Himalayas, it has not been collected by the recent workers from the western section of the Indo-Himalayas and is primarily an Eastern Himalayan element. Khullar et al. (1983), though believe its occurrence in the Western Himalayas, their description is based on an E. Himalayas specimen. I have collected this fern from the inner Himalayan ranges of the district (Thal, 900 m) where it is extremely rare.


*Cyclogranna* is a small genus of about 7-8 species restricted in distribution to North India, South China, Formosa and Luzon (Holtum, 1971). This genus is easily distinguishable from other members of the family by the presence of prominent hooked hairs on different parts of sporophyte. Only one species occurs in Pithoragarh district.


*Polypodium auriculatum* Wall. List no. 314, 1828; Bedd. Ferns Southern India 103 1866; Clarke Trans. Linn. Soc. 2 Bot 1: 543, 1880; Hope Journ.


*Phegopteris subvillosa* Moore, *Index Fil.* 308, 1861 nom. nud.


Rhizome short-erect, 6-7 mm in diameter; scales orange, linear-lanceolate, 5 x 3 mm; stipe long to 50 cm, 7-10 mm thick, grooved adaxially, pink, glabrous upward, scaly at base; lamina unipinnate, very large, up to 1.5 meter long, 35 cm wide; 25 - 30 pairs of lateral pinnae, lower ones not reduced but deflexed, 18 cm long, 2.5 cm wide, opposite or subopposite, sessile, deeply lobed; lobes 1.2 cm long, 0.4 cm wide at base, coriaceous, glabrous or sparsely hairy on under surface, narrow, oblong,
margins entire, subacute; 8-10 pairs of veins; sori exindusiate, close to costae, contiguous; spores light brown, wrinkled, 32 x 27 μm (Fig. 2).

Fairly common along water streams.


A genus of about 12 species is characterised by the presence of basal much reduced lateral pinnae which are sometimes represented by lobes only. In Western Himalayas it is represented by two species (Khullar et al., 1983) of which one species is found in this area.


_Aspodium mollisculum_ Kuhn, Bot. Zeit. 26: 41, 1868.


_Lastrea cana sensu_ Bedd., Handb. Ferns Brit. India 238, 1883.

_Asodium eburneum_ Wall. Cat. 389 nom. nud.


A genus of about 12 species (Holtttum, 1969) is characterised by its bipinnatifid or bipinnate lamina. Although Holtttum (1969) has given a detailed taxonomic account of 20 species of this genus, Pichi-Sermolli (1970) does not recognise this genus and he has merged it in _Macrothelypteris_. Three species of this genus are known to occur in W. Himalaya (Khullar et al., 1983) of which only one occurs in this area.


_Lastrea pyrrhorhachis_ (Kunze) Copel, Gen. Fil. 139, 1947.


_Polypodium distans_ D. Don, Prod Fl Nepal 2: 1825 non Kaulf.
Thelypterid ferns of Pithoragarh


Nephrodium microstegia Hook. Sp. Fil. 4, 1862.


Polypodium paludosum (non Bl.) Bedd. Ferns Southern India t 168, 1863.

Polypodium distans var. adnatum Clarke Trans. Linn. Soc. 2 Bot. 1: 544, 1880.


Polypodium brunneum Wall. Cat. no. 333, 1829 nom. nud.

Dryopteris brunnea Christensen, Index Fil. I: 255, 1905 nom. nud.


Rhizome sub-erect, 6 mm in diameter, scales pink yellow, linear-lanceolate, apex acute, margins hairy, 6-0.8 mm; stipe 25 cm long, dark purplish and naked upward and brown and sparsely scaly at base; lamina 45-50 cm long, 13 cm broad, narrowed towards both ends; 20-25 pairs of lateral pinnae, 2-3 basal apirs reduced, pinnae oblique, 10-12 cm long, crenately lobed or pinnaified half way to costaule; veins forked; sori on acroscopic branch of the forked vein, terminal on vein, exindusiate, round; spores light brown or hyaline, 44x36 μm.

Locally common at Lohaghat.

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REFERENCES


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