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A contribution to the Vascular epiphytes, parasites and Carnivorous plants of Koch Bihar District, West Bengal

S. Bandyopadhyay

Department of Botany, K.N. College, Berhampore, Murshidabad,
West Bengal-742101 (India)
E-mail: subhajitb6@gmail.com

Abstract

Floristic survey conducted in the district of Koch Bihar, West Bengal reveals that the vascular epiphytes, parasites and carnivorous plants are represented by 22 species under 20 genera belonging to 11 families. Among the epiphytes there are 6species of Pteridophytes and 5 species of Orchids. Out of 9 parasitic plants 2species are total parasites and rest are partial stem parasites. The parasitic family Loranthaceae bears maximum5 species under 3 genera. There are only 2 carnivorous plant species recorded from the district namely *Drosera burmanii* and *Utricularia aurea*.. It has been noted that *Cuscuta reflexa* and *Dendrobium aphyllum* are used medicinally for the treatment of different ailments.

Epiphytes, parasites and carnivorous plants are the curious element to the flora of any region as these plants are differs from other plants by their habitat and about mode of nutrition. The knowledge regarding vascular epiphytes, parasites and carnivorous plants of West Bengal are inadequate as a few publication[7, 10-14] exist about these plants and on the other hand a complete and updated flora of West Bengal is still wanting though floristic studies were conducted in different districts of the state[8,15,18-20]. But the district of Koch Bihar in West Bengal is floristically under-explored and the published literature[1-6,9] does not provide a comprehensive idea about the vascular epiphytes, parasites and carnivorous plants of the district. The present work is such a small attempt to enlist these plants and their utilization by the local inhabitants.

Koch Bihar was a feudatory state under the British Government. It was transferred and merged with the province of West Bengal on 1st January1950 and since then Koch Bihar is being administered as a district of West Bengal. This district is situated between 26° 32'46" to 25°57'57" N latitude and 89° 52' 00" to 88°45'02" E longitude and has an area of 3,386 sq km. Six major rivers namely Tista, Torsha, Jaldhaka, Kaljani, Raidak, Gadadhar and their tributaries have intersected the entire district. The soil is alluvial and the vegetation is tropical moist deciduous type. The major ethnic communities of the district include Kheria, Oraon, Rabha, Rajbanshi and Santal.

The present work is based on the scrutiny of relevant literature[1,2,9], screening of herbarium specimens deposited at Central National Herbarium and extensive survey conducted in different areas of the district. Following the guidelines of Lawrence[17] and Jain & Rao[16] plant specimens were collected from the field and preserved. Local uses of the plants and vernacular names (if any) were procured from the ethnic medicine men and elderly knowledgeable persons of the villages. Correct identity and updated nomenclature of the collected plant specimens were established with the help of published literature and also comparing with the authentic herbarium specimens of Central National Herbarium (CAL).

Vascular epiphytes, parasites and carnivorous plants recorded during the present study are enumerated below. Scientific names of each category of plants are arranged alphabetically followed by vernacular names (in parenthesis), name of the families, field notes, flowering and fruiting periods (in Angiosperms), field numbers and ethnobotanical uses(if any). For easy identification key to the species has also been provided. The following abbreviations are used in the present work:

Bengali-Beng.; Oraon-Or.; Rabha-Ra.; Rajbanshi-Rj; Santal-Sant.

Epiphytes :
Key to the species :

1a. Flowers and fruits are not formed; Leaves where well developed show circinate vernation at young stage……(2)
1b. Flowers and fruits are formed; Leaves without circinate vernation at young stage……(7)
2a.Stem aerial erect, green; Leaves minute, scale like; Sporangia in threes to form three locular synangium……**7.*Psilotum nudum***
2b. Stem rhizomatous, non-green; Leaves well developed; Sporangia not as above……(3)
3a. Leaves are morphologically alike, not differentiated into sterile and fertile ones; Veins of the fronds obscure; Rhizome scales not peltate…….(4)
3b. Leaves dimorphic, differentiated into sterile and fertile one; Veins of the fronds prominent; Rhizome scales peltate……(5)
4a.Lamina linear; Sori marginal with narrow indusial flanges; Paraphyses turbinate……**11. *Vittaria elongata***
4b. Lamina elliptic to narrowly elliptic or narrowly ovate; Sori scattered over the undersurface of the lamina; Paraphyses not turbinate……**5.*Microsorium punctatum***
5a.Sterile fronds pinnatifid or lobed; Sori in a regular row on each side of main vein…....**3. *Drynaria quercifolia***
5b. Sterile fronds entire, not lobed; Sori not as above……(6)
6a.Sori superficial, covering the entire undersurface of the fertile fronds; Scales of the rhizome ovate, up to 2mm long……**4. *Leptochilus axillaris***
6b. Sori deeply sunken, usually on the upper half of the fertile frond; Scales of the rhizome linear,3-5mm long……**8. *Pyrrosia adnascens***
7a. Flowers with lateral sepals adnate to the foot of column, forming mentum; Lip without any spur; Plants leafless when in flowering…..……**2. *Dendrobium aphyllum***
7b. Flowers without forming any mentum; Lip distinctly spurred; Both leaves and flowers present in flowering season……(8)

8a. Inflorescence drooping ……..**9. *Rhynchostylis retusa***
8b. Inflorescence erect…….(9)
9a. Flowers up to 2 cm across; Mid-lobe of lip not subdividing……**1**. ***Aerides multiflorum***
9b. Flowers more than 2 cm across; Mid lobe of lip again deeply bifid……(10)
10a. Leaves terete; Flowers 6-10 cm across ……...**6.*Papilionanthe teres***
10b. Leaves strap shaped; Flowers 4-5 cm across……..**10.*Vanda tesellata***

1. *Aerides multiflorum* Roxb., Pl. Coromandel. 3: 68, *t*. 271.1820; Hook. *f*. in Hook. *f*., Fl. Brit. India 6: 44.1890; Prain, Bengal Pl. 2:1020.1903.Family:-Orchidaceae.

Common, found on the trunks and branches of the trees beside road and often in forest edges. April – July. Nagurhat, SB – 3621.

2. *Dendrobium aphyllum* (Roxb.) C.E.C. Fischer in Gamble, Fl. Pres. Madras 3: 1416. 1928; Karthikeyan *et al*., Fl. Ind. Enum. Monocot 126.1989. *Limodorum aphyllum* Roxb., Pl. Coromandel 1:34. *t*. 41.1795. *Dendrobium pierardi* Roxb. in Hook., Exot. Fl. 1: *t*. 9. 1822; Hook. *f*. in Hook. *f*., Fl. Brit. India 5: 738.1890; Prain, Bengal Pl. 2: 1009.1903. (*Ajali* – Ra.). Family:- Orchidaceae

Common , growing on the trees of the forest. March – May. Takuamari, SB – 3174.

Ethnobotanical use:

- Leaves are pounded and boiled in mustard oil (1:3) for 15 minutes. The oil is allowed to cool and used as **hair tonic** – Ra.

3. *Drynaria quercifolia* (L.)Sm. in J.Bot.3:398.1841. *Polypodium quercifolium* L. Sp.Pl. 2;1087.1753. Family:-Polypodiaceae. Common, generally found over the trees of village surroundings and beside roads. Koch bihar. Mukherjee-118

4. *Leptochilus axillaris*(Cav.)Kaulf.,Enum. Filc. 147, t.1, f.10.1824. *Acrostichum axillare* Cav.,Anal.Hist.Nat.1:101.1799.*Gymnopteris axillaris* Bedd. var *axillaris*,Handb.Ferns Brit.India 430.1883. Family :-Polypodiaceae. Rare, in forests, rhizome long creeping on tree trunks, Patlakhawa, Biswas-495.

5. *Microsorium punctatum* (L.) Copel. Orient. Gen. Polyp. in Univ. Calif.Pub. Bot. 16:110.1929. *Acrostichum punctatum* L.,Sp.Pl. (ed.2)2:1524.1763. *Pleopeltis punctata* Bedd.Ferns Brit. India, Suppl.22.1876. Family:-Polypodiaceae
Less common, over the trees near villages, rhizome shortly creeping, Tufangunj, S.B.-2810.

6. *Papilionanthe teres* (Roxb.) Schltr. in Orchis 9: 78.1915; Karthikeyan *et al*., Fl. Ind. Enum. Monocot. 160. 1989. *Dendrobium teres* Roxb., Fl. Ind. (ed. Carey) 3: 485.1832. *Vanda teres* (Roxb.) Lindl. Gen. Sp. Orchid 217. 1833; Hook. *f*. in Hook. *f*., Fl. Brit. India 6: 49.1890; Prain, Bengal Pl. 2: 1021. 1903. Family:- Orchidaceae.
Less common, in the forest, as epiphytes. April – August. Atiamochar forest, SB- 3365.

7. *Psilotum nudum* (L.) P.Beauv., Prodr. Aetheogam 112.1809. *Lycopodium nudum* L. Sp.Pl.2:11.1753.Biswas in J. Bombay nat. Hist. Soc.53:493-496.1956. Family :-Psilotaceae. Rare, grows on the trunk of *Polyalthia longifolia* in association with *Drynaria quercifolia*, NarendraNarayan Park , Koch Bihar, SB-2886

8. *Pyrrosia adnascens* (Swartz) Ching in Bull.

Ching. Bot. Soc. 1:45.1935. *Polypodium adnascens* Swartz,Syn.Fil. 222.1806. Family :- Polypodiaceae.

Common, both in forests and village surroundings, rhizome slender, long creeping, Koch Bihar, Mukherjee-119.

9. *Rhynchostylis retusa* (Linn.) Blume., Bijdr. 7: 286. *t.* 49. 1825; Hook. *f.* in Hook. *f.*, Fl. Brit. India 6: 32.1890; Prain, Bengal Pl. 2: 1020.1903. Karthikeyan *et al*., Fl. Ind. Enum. Monocot. 168. 1989. *Epidendrum retusum* Linn. Sp. Pl. ed. 1, 953.1753. Family:- Orchidaceae.

Common, on *Mangifera indica* and other trees beside roads. April – September. Meckligunj, SB – 3019

10. *Vanda tesellata* (Roxb.) Hook. *ex* G. Don in Loud Hort. Brit. 372.1830; Karthikeyan *et al*., Fl. Ind. Enum. Monocot 175. 1989 *Epidendrum tessellatum* Roxb., Pl. Coromandel 1: 34, *t*. 42. 1795. *Vanda roxburghii* R. Br. in Bot. Reg. 6: *t*. 506.1820; Hook. *f*. in Hook. *f*., Fl. Brit. India 6: 52. 1890; Prain, Bengal Pl. 2: 1021. 1903. (*Menda* – Sant.);. Family:- Orchidaceae.

Common, on the trees beside roads and villages. March – August. Atiamochar, SB – 3604.

11. *Vittaria elongata* Sw., Syn. Fil.109, 302.1806. *Oetosis elongata* (Sw.) Greene, Pittonia 4(22): 106.1900. *Haplopteris elongata* (Sw.) E.H. Crane, Syst.Bot.22:514.1997. Family :-Vittariaceae.

Less common, over forest trees, pendulous on trunk, Patlakhawa, Mukherjee-119

Parasites

Key to the Species

1a. Herbs; Leaves reduced to minute scales or absent…….(2)

1b. Under-shrubs or shrubs; Leaves well developed……(4)

2a. Stem filiform, twining; Flowers not in scape; Stamens not didynamous……(3)

2b. Stem neither filiform nor twining; Flowers scapigerous; Stamens didynamous …..…...**5. *Orobanche aegyptiaca***

3a. Stem yellow; Flowers white, 6-7.5mm long; Stamens uniseriate……**2.*Cuscuta reflexa***

3b. Stem dark green; Flowers yellow, less than 5mm long; Stamens 3-seriate……**1. *Cassytha filiformis***

4a. Flowers unisexual; Calyx absent……**9. *Viscum monoicum***

4b. Flowers hermaphrodite; Calyx reduced to an entire or lobed limb…….(5)

5a. Corolla lobes 6; Flowers subtended by 3 bracts……..**4.*Macrosolen cochinchinensis***

5b. Corolla lobes 4-5; Flowers subtended by a single bract…….(6)

6a. Corolla lobes 5; Calyculus present; Flowers in dense raceme, sometimes superficially umbellate…… **3. *Dendrophthoe falcata***

6b. Corolla lobes 4; Calyculus absent; Flowers in short raceme ...……(7)

7a. Mature leaves densely whitish tomentose, venation inconspicuous, base cordate or rounded……**6. *Scurrula cordifolia***

7b. Mature leaves mealy or scurfy…… (8)

8a. Fruits clavate; Peduncles more than 1 cm long……**7. *Scurrula pulverulenta***

8b. Fruits pyriform; Peduncles less than 1 cm long…… **8.*Scurrula parasitica***

1. *Cassytha filiformis* Linn., Sp.Pl. ed. 1, 35, 1753; Hook. *f*. in Hook. *f*., Fl. Brit. India 5: 188. 1886. Prain, Bengal Pl. 2: 904. 1903. (*Akasbel*-Beng.) Family:- Lauraceae

Less common, over roadside trees. Noember-March. Takamari, Aditya-232

2. *Cuscuta reflexa* Roxb., Pl. Coromandel.

2: 3, *t*. 104.1799; Clarke in Hook. *f*., Fl. Brit. India 4: 225.1883; Prain, Bengal Pl. 2:723.1903; Yuneker in Mem. Torrey Bot. Club 18: 259.1932; Bhattacharyya and Sarkar, Fl. W. Champaran, Bihar 293. 1998. (*Swarnalata*-Beng. ,*Amarbeli* – Rj.; *Alokelata* - Or.). Family:-Cuscutaceae

Common, on the roadside trees and bushes, often in hedges. September – January. Naturapara, SB – 3268; Gossanimari, SB – 3322.

Ethnobotanical Uses:

- The plant is given with the food to the cattle after delivery as **galactogogue** – Or.
- About 20 gm of plant is fried in mustard oil and is given twice a day to the patient suffering from **puerperal fever** – Rj.

3. *Dendrophthoe falcata* (Linn. *f*.) Etting., Denkehr. Kaiserl. Akad. Wissen. Math.-Natur. W. KI. 32:52-53, 58, *t*. 13. *f*. 14.1872; Danser in Bull. Tard. Bot. Brit. Ser. 3, 16: 30.1938; Grierson and Long, Fl. Bhutan 1.1:148.1983. *Loranthus falcatus* Linn. *f*., Suppl. 211.1781. *Loranthus longiflorus* Desr. in Lam., Encycl. 3:598.1789; Hook. *f*. in Hook. *f*., Fl. Brit. India 5: 214. 1886. Prain, Bengal Pl. 2: 910. 1903 . Family:- Loranthaceae

Common, parasite on the trunk of forest trees and also on *Shorea robusta*, in the village on *Mangifera indica* and other large trees. September – January. Ghughumari, SB – 3861.

4. *Macrosolen cochinchinensis* (Lour.) van Teigh. in Bull. Soc. Bot. Fr. 41: 122. 1894; Danser in Blumea 2: 42.1936. *Loranthus cochinchinensis* Lour. Fl. Cochinch. 1: 195. 1790. *Loranthus ampullaceus* Roxb., Fl. India (eds. Carey and Wall.) 2: 202.1824; Hook. *f*. in Hook. *f*., Fl. Brit. India 5: 220.1886; Prain, Bengal Pl. 2: 910.1903. Family:-Loranthaceae

Common, parasite on the trunk of trees beside roads and villages. March – August. Ucchalpukuri, SB – 3491.

5. *Orobanche aegyptiaca* Pers.Syn.Pl. 2:181.1806. *Orobanche indica* Buch._Ham. *ex* Roxb., Fl.Ind. (ed. Carey) 3:27.1832; Hook. *f*. in Hook. *f*., Fl. Brit. India 4: 326.1884; Prain, Bengal Pl. 2:779.1903. Family:-Orobanchaceae

Less common , generally in the tobacco field. December-March. Gossanamari , Banerjee-15379

6. *Scurrula cordifolia* (Wall.) G. Don, Gen. Syst. 3: 421.1834; Tebbs in Hara *et al*., Enum. Fl. Pl. Nepal 3: 191. 1982. *Loranthus cordifolius* Wall. in Roxb., Fl. Ind. (eds. Carey and Wall.) 2:221.1824; Hook. *f*. in Hook. *f*., Fl. Brit. India 5:209.1886; Prain, Bengal Pl. 2:911.1903. Family:- Loranthaceae

Less common, parasite on trees of the forest. October – March. Patlakhawa forest, SB – 3554; Atiamochar forest, Banerjee 15386.

7. *Scurrula parasitica* (Linn.) Sp. Pl. ed. 1, 110, 1753; Tebbs in Hara *et al*., Enum Fl. Pl. Nepal 3: 191. 1982. *Loranthus scurrula* Linn., Sp. Pl. ed. 2, 1: 472. 1762; Hook. *f*. in Hook. *f*., Fl. Brit. India 5:208.1886; Prain, Bengal Pl. 2: 911.1903. Family:- Loranthaceae

Common, hemi-parasite grows over forest trees and trees near villages and roadsides. August – November. Atiamochar forest, SB – 3201.

8. *Scurrula pulverulenta* (Wall.) G. Don, Gen. Hist. 3: 421.1834; Danser in Bull. Jard. Bot. Buit. Ser. 3, 10: 353. 1929; Grierson and Long, Fl. Bhutan 1.1: 143. 1983. *Loranthus pulverulentus* Wall. in Roxb., Fl. Ind. (eds. Carey and Wall.) 2:221.1824; Hook. *f*. in Hook. *f*., Fl. Brit. India 5:221.1886; Prain, Bengal Pl. 2:910.1903. Family:- Loranthaceae

Common, hemi-parasite, in the forests, and villages. November – March. Mathabhanga, SB – 3475.

9. *Viscum monoicum* Roxb. *ex* DC., Prodr. 4: 278.1830; Hook. *f.* in Hook. *f.*, Fl. Brit. India 5:224. 1886; Prain, Bengal Pl. 2:912.1903 ; Rao in J. Ind. Bot. Soc. 36: 160. 1957; Grierson and Long, Fl. Bhutan 1.1: 150. 1983. Family:- Viscaceae

Less common, grows on the trunk of forest trees. December – March. Rasikbil, SB – 3464.

Carnivorous plants :

Key to the Species :

1a. Plants with distinct stems: Foliar organs highly dissected, not glandular; Insect captured by bladder like trap; Flowers irregular; Stamens-2……**2. *Utricularia aurea***

1b. Plants acaulescent; Foliar organs not dissected, rosette, covered with glandular tentacles;

Insect captured by sticky glandular tentacles; Flowers regular; Stamens more than 2 ……..1. ***Drosera burmannii***

Drosera burmannii Vahl, Symb. 3:50.1794; Roxb. Fl. Ind. (ed. Carey) 2: 113.1832; Clarke in Hook. *f.*, Fl. Brit. India 2:424. 1878; Prain, Bengal Pl. 1: 472. 1903; Singh *et al.*, Fl. Bihar 191. 2001. (*Takkagach* – Sant.). Family :- Droseraceae

Common, found mainly in paddy fields (after harvesting) during the winter season, also occur in the moist grassy land in the village and beside roads. December – February. Mathabhanga, SB – 3469.

Uricularia aurea Lour., Fl. Cochinch. 26. 1790; Merr. in Trans. Amer. Phil. Soc. Philadelphia, *n. s.* 24: 356.1935; Cook, Aq. Wetland Pl. India 235.1996. *Utricularia flexuosa* Vahl., Enum. Pl. 1:198. 1806; Clarke in Hook. *f.* Fl. Brit. India 4: 329. 1884; Prain, Bengal Pl. 2: 780.1903. *Utricularia fasciculata* Roxb. Fl. Ind. (eds. Carey and Wall.) 1:143.1820. Family:-Lentibulariaceae

Common, in ponds, ditches and also in water logged rice fields. August – November. Atiamochar-bil. SB –3158.

The present study reveals that the vascular epiphytes, parasites and carnivorous plants of Koch Bihar district are represented by 22 species under 20 genera belonging to 11 families (Table-I). Orchidaceae is the only family which has 5 epiphytes followed by Polypodiaceae (4sp.). Both *Cuscuta reflexa* and *Orobanche aegyptiaca* are leafless total parasites but the former one is stem parasites and the later one is root parasites. The rest 7 species are partial stem parasites or hemiparasites. Among the parasitic families Loranthaceae bears 5 species which are fairly common in the district and causes damage to the timber and other economic plants. It is observed that the ethnic medicine men prescribe two species namely *Cuscuta reflexa* and *Dendrobium aphyllum* for the treatment of health problems.

Psilotum nudum-a curious and threatened plant has been found to grow over the trunk of five very old *Polyalthia longifolia* trees at NarendraNarayan Park, Koch Bihar. This species may be vanished from the district if the *Polyalthia longifolia* trees are falling down due to their very old age in the near future. Therefore, it is an urgent need to take immediate measures to conserve this species. District administration and forest department should take necessary steps to

Table-1. Conspectus of the Taxa of Vascular Epiphytes, Parasites and Insectivorous Plants of Koch Bihar

Taxa	Epiphyte			Parasite			Carnivorous plants			Total
	Pteri-dophyta	Dicot.	Monocot.	Pterid-ophyta	Dicot.	Monocot.	Pterid-ophyta	Dicot.	Monocot.	
Family	03	—	01	—	05	—	—	02	—	11
Genus	06	—	05	—	07	—	—	02	—	20
Species	06	—	05	—	09	—	—	02	—	22

save one of the most primitive members of the living vascular plants.

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