

References

- Bordoloi, R.P.M. 1974. *Studies on algal flora of Assam*, Gauhati University, Guwahati. (Ph.D. Thesis)
- Bruhl, P. and K. Biswas 1922. The algae of Bengal filter beds. *J. Deptt. Sci. Calcutta University*. **4**: 6-10.
- Deka, M. and R.P.M. Bordoloi 1991. Studies on blue-green algae from rice fields of Assam, A qualitative assessment. *Phykos* **30**: 173-180.
- Desikachary, T.V. 1959. Cyanophyta. Indian Council of Agricultural Research, New Delhi.
- Fogg, G.E. 1949. Culture media for algae. Appendix III. In *The cultivation of algae* (Ed. G.S. Venkataraman). ICAR, New Delhi. pp. 237-246.
- Fritsch, F.E., 1945. *The structure and reproduction of the Algae*. Vol. **2**, Cambridge. 939 p.
- Geitler, L. 1932. Cyanophyceae in Rabenhorst's Kryptogamenflora. *Leipzig* **14**: 1196.
- Hazarika, D. 1988. *Distribution of blue green algae of rice-field of Golaghat sub-division (now district), Assam*. Gauhati University, Guwahati. (Ph.D. Thesis).
- Parukutty, P.R. 1939. On a collection of algae from Assam. *Proc. Ind. Acad. Sci.* IX. B.
- Prescott, G.W. 1984. *The algae: A review*. Otto Koeltz Science Publisher, West Germany. pp. 141-153.
- Saikia, P. and R.P.M. Bordoloi 1994. Blue -green algae of the rice fields of Barpeta, Nalbari and Kamrup district of Assam. *Phykos* **33(1-2)**: 53-58.

Fern and Fern-Allies of Eastern Terai, Nepal

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Received: 18.10.2010, Accepted: 29.11.2010

Key words: Fern, fern allies, enumeration, Polypodiaceae, Nepal.

The eastern Terai covers 620369 hectare area in the southern part of Mechi, Koshi and Sagarmatha zone which comprises 5 districts viz. Jhapa, Sunsari, Morang, Saptari and Siraha. The soil is alluvial, dark grayish to brown in colour with sandy loam to sandy silt in texture. The climate is tropical and sub-tropical and vegetation is

predominated by broad leaved, wet monsoonic deciduous forest.

Nepal consists of more than 500 species of ferns and fern-allies. Ferns are generally known as "Unyu/Oony" in Nepali. There are some medicinal ferns, which are regularly exploited both for ayurvedic formulations and traditional healing

practices. The different species of ferns are also used as vegetables in rural areas in Nepal.

Literatures on the Nepalese Pteridophytes are not sufficient, except some casual references have been made by earlier workers (Raizada and Vaid, 1952; Tagawa, 1975; Panday, 1962; Shakya, 1965; Iwatsuki, 1988; Shrestha and Gurung, 1985; Gurung, 1991; Subba *et al.*, 2001; Thapa, 2002).

The present work is based on one year 2001-2002 of intensive and extensive study of ferns of eastern terai, Nepal, in the field, library, laboratory and herbarium. The ferns were collected from different places of five districts. During the exploration, care was taken to visit all the areas located in different districts to collect plants in fruiting stage. Plant materials and field data were carefully gathered. The identification of collected materials was confirmed by cross checking with the authentic specimens at Tribhuvan University Herbarium, P.G. campus, Biratnagar and National Herbarium and Plant Laboratories, Kathmandu. The cited specimens are preserved in Department of Botany, Post graduate campus, Biratnagar.

The present record includes 35 species of ferns and fern allies belonging to 28 genera and 23 families (Tab.1). Out of these the dominant families are Polypodiaceae (5), Adiantaceae (4), Pteridaceae (3). Three families Schizaeaceae, Thelypteridaceae, Dryopteridaceae are represented by 2 species.

Seventeen families are represented by single species. The members of Athyriaceae, Dryopteridaceae, Pteridaceae and Thelypteridaceae are dominant terrestrial species where as the *Marsilea* sp., *Azolla* sp. and *Ceratopteris* sp., are aquatic, similarly the members of Nephrolepidaceae, Polypodiaceae and Vittariaceae are epiphyte and the members of Adiantaceae, Sinopteridaceae are lithophyte, 2 sp. of Schizaeaceae (*Lygodium* sp.) are climbing ferns and *Cyathea spinulosa* is an interesting tree fern.

The dominant genera are *Adiantum* (4) and *Pteris* (3). Ferns used as green vegetables are *Diplazium esculentum*, *Dryopteris cochleata*, *Ophioglossum* sp. and *Tectaria coadunata*. Similarly ferns with medicinal values are *Adiantum capillus-veneris* (plants in bronchial and throat pain), *A. incisum* (fronds in cough fever and diabetes), *A. philippense* (leaves, rhizome and spores in dysentery and diarrhoea), *Diplazium esculentum* (rhizome in tuberculosis), *Lygodium flexuosom* (rhizome and leaves as expectorant) and *Tectaria coadunata* (fronds and rhizome in diarrhoea and dysentery). Ferns with ornamental values are *Adiantum capillus-veneris*, *Cyathea spinulosa*, *Phymatosorus cuspidatus*, *Nephrolepsis cordifolia* etc.

Acknowledgements

Grateful thanks are due to Prof. S.D. Joshi, Central Department of Botany, Tribhuvan University and Mr. N. Thapa, National Herbarium and Plant Laboratories,

Table 1. List of fern and fern-allies of East Nepal

Family	Scientific name	Locality
Lycopodiaceae	<i>Lycopodium cernum</i> L.	Terrestrial, frequent on forests edges at base camp, Dharan, July-Aug., Bhagat & Shrestha 1
Selaginellaceae	<i>Selaginella ciliaris</i> (Retz.) Spring	Terrestrial, frequent on sandy slopes at Char koshe jungle, Aug.-Sep., Bhagat & Shrestha 2
Equisetaceae	<i>Equisetum debile</i> Roxb. ex Vaucher	Terrestrial, abundant along roadsides at Biratnagar, Sep.-Oct., Bhagat & Shrestha 3
Ophioglossaceae	<i>Ophioglossum reticulatum</i> L.	Terrestrial, common forest floor at Charkoshe, Aug.-Sep., Bhagat & Shrestha 4
Gleicheniaceae	<i>Gleichenia gigantea</i> Wall. ex Hook.	Terrestrial, frequent along at Sanischare Jhapa, Jul.-Aug., Bhagat & Shrestha 5
Polypodiaceae	<i>Drynaria quercifolia</i> (L.) J. Sm.	Epiphytic, frequent on tree trunks in forest at Charkoshe, Aug.-Oct., Bhagat & Shrestha 6
	<i>Lepisorus loriformis</i> (Wall. ex Mett) Ching.	Epiphytic, occasional on tree trunk in forest at Charkoshe Jhadi, Jun.-Aug., Bhagat & Shrestha 7
	<i>Microsorium embranaceum</i> (D. Don) Ching.	Epiphytic, frequent on tree trunk in forest at Tarahara, Jul.-Sep., Bhagat & Shrestha 8
	<i>Phymatosorus cuspidatus</i> (D. Don) Pich. Serm.	Terrestrial, common on moist & sunny places of Charkoshe forest, Jul.-Sep., Bhagat & Shrestha 9
	<i>Pyrrosia porosa</i> (C. Prest) Hovenkamp	Epiphytic, common on shady parts of Charkoshe Jungle, Jul.-Sep., Bhagat & Shrestha 10
Schizaeaceae	<i>Lygodium flexuosum</i> (L.) Sw.	Climber, frequent at Charkoshe Jungle, Aug.-Oct., Bhagat & Shrestha 11
	<i>Lygodium japonicum</i> (Thunb.) Sw.	Climber, common in moist & exposed areas at Charkoshe, Sep.-Nov., Bhagat & Shrestha 12
Parkeriaceae	<i>Ceratopteris thalictroides</i> (L.) Brong.	Aquatic, common in marshy places at Biratnagar, Jun.-Aug., Bhagat & Shrestha 13
Adiantaceae	<i>Adiantum capillus-veneris</i> (L.) Sp.	Terrestrial, common in rocky places at Baraha Chhetra, Jul.-Sep., Bhagat & Shrestha 14
	<i>Adiantum incisum</i> Forssk.	Terrestrial, common in rock crevices, slopes and walls at Charkoshe, Jul.-Sep., Bhagat & Shrestha 15
	<i>Adiantum caudatum</i> (L.) Mant Pl.,	Terrestrial, muddy rocks at Dharan, Jul.-Sep., Bhagat & Shrestha 1
	<i>Adiantum philippense</i> (L.) Sp.	Terrestrial, common in rock crevices, slopes and walls at Charkoshe, Jul.-Sep., Bhagat & Shrestha 17
Cryptogrammeae	<i>Onychium siliculosum</i> (Desv.) C.	Terrestrial, common on exposed sandy slopes of forests at Panchkanya, Aug.-Oct., Bhagat & Shrestha 18
Hemionitidaceae	<i>Pityrogramma calomelanos</i> (L.) Link.	Terrestrial, common in rocky slopes and stream banks of shady areas at Dharan, Aug.-Oct., Bhagat & Shrestha 19
Pteridaceae	<i>Pteris biaurita</i> L.	Terrestrial, common in moist places at Charkoshe, Aug.-Oct., Bhagat & Shrestha 20
	<i>Pteris pellucida</i> C. Persl.	Terrestrial, scattered in moist shady areas at Dharan, Aug.-Oct., Bhagat & Shrestha 21
	<i>Pteris vittata</i> L.	Terrestrial, common on roadside drains & walls at Biratnagar, Jul.-Sep., Bhagat & Shrestha 22
Sinopteridaceae	<i>Cheilanthes bicolor</i> (Roxb.) Fraser-Jenkins	Terrestrial, common on exposed rock crevice at Panchkanya, Aug.-Sep., Bhagat & Shrestha 23
Vittariaceae	<i>Vittaria</i> sp. J. Sm.	Epiphytic, common in damp tropical at Dharan, Jul.-Sep.,

		Bhagat & Shrestha 24
Marsileaceae	<i>Marsilea minuta</i> L.	Aquatic, common on the stream sides & marshes at Biratnagar, Jul.-Aug., Bhagat & Shrestha 25
Cyatheae	<i>Cyathea spinulosa</i> Wall. ex Hook.	Terrestrial, common on the stream at Biratnagar, Jul.-Aug., Bhagat & Shrestha 26
Thelypteridaceae	<i>Thelypteris prolifera</i> C. Reed	Terrestrial, common near water sources & garden at Biratnagar, Aug.-Oct., Bhagat & Shrestha 27
	<i>Thelypteris dentata</i> (Forssk.) St. John	Terrestrial, common in open moist places along roadsides at Dharan, Aug.-Oct., Bhagat & Shrestha 28
Athyriaceae	<i>Diplazium esculentum</i> (Retz.) Sw.	Terrestrial, common in moist and rocky places at Sitaganj, Aug.-Oct., Bhagat & Shrestha 29
Dryopteridaceae	<i>Dryopteris cochleata</i> (D. Don) C. Chr.	Terrestrial, scattered in shady slopes at Panchakanya, Aug.-Oct., Bhagat & Shrestha 30
	<i>Polystichum squarrosum</i> (D. Don) Fee.	Terrestrial, common in damp places at Charkoshe forests Jul.-Aug., Bhagat & Shrestha 31
Tectariaceae	<i>Tectaria coadumate</i> (J. Sm.) C. Chr.	Terrestrial, common in moist places and rocky slopes, Aug.-Oct., Bhagat & Shrestha 32
Nephrolepidaceae	<i>Nephrolepi cordifolia</i> (L.) Presl.	Terrestrial, common in moist places and along open slopes of roadsides, also cultivated in gardens, Dharan, Jul.-Sep., Bhagat & Shrestha 33
Blechnaceae	<i>Blechnum orientale</i> (L.)	Terrestrial, occasional on slopes of forest edges at Pathari & Jhapa, Jul.-Sep., Bhagat & Shrestha 34
Azollaceae	<i>Azolla imbricata</i> (Roxb.)	Floating aquatic, common in ditches, rice fields, ponds, Tarahara, Jul.-Sep., Bhagat & Shrestha 35

Kathmandu for plant identification. We also thank to U.G.C., Nepal for the financial support.

References

- Gurung, V.L. 1991. *Ferns the beauty of Nepalese flora*. Sahayogi Press Pvt. Ltd., Kathmandu.
- Iwatsuki, K. 1988. An enumeration of the pteridophytes of Nepal. In *The Himalaya plants* (Eds. H. Ohba and S.B. Malla), Univ. Tokyo Bull. **31**: 231-339.
- Panday, B.D. 1962. Some aspects of the vegetation of Nepal. *Bull. Bot. Survey India* **4(4)**: 135-140.
- Raizada, M.B. and K.M. Vaid 1952. Fern of Nepal. *India Forester* **78**: 576-581.
- Shakya, A.R. 1965. *Cytotaxonomical studies on ferns of the Kathmandu valley and its environs*. Patana University, Patna. (Ph.D. thesis)
- Shrestha, R. and V.L. Gurung 1985. A study on ecology of eusporangiate ferns of Nepal Himalaya. In *Proceedings of National Conference on Science and Technology*, Apr. 24-27, 1988. Royal Nepal Academy of Science and Technology, Kathmandu. pp. 359-364.
- Subba, D.K., B.K. Rai and M.R. Dhakal 2001. Food value of some edible ferns from Dharan, south eastern Nepal. *J. Bomb. Nat. Hist. Soc.* **98(3)**: 499-502.
- Tagawa, M. 1975. Contribution to the ferns of Annapurna-Dhaulagiri range, central Nepal. *J. Bomb. Nat. Hist. Soc.* **72(3)**: 728-731.
- Thapa, N. 2002. *Pteridophytes of Nepal*. National Herbarium and Plant Laboratories, Department of Plant Resources, Ministry of Forests and Soil Conservation, His Majesty's Government (Nepal), Lalitpur. 175 p.