

Phytodiversity of Sundarbans biosphere reserve with special reference to lichens

T.A.M. Jagadeesh Ram and G.P. Sinha

Botanical Survey of India, Eastern Circle, Shillong-793003

Jagadeesh Ram T.A.M & Sinha G.P. 2004. Phytodiversity of Sundarbans biosphere reserve with special reference to lichens. *Geophytology* 32 (1&2) : 35-38.

The paper deals with the preliminary report of the lichens of Sundarbans biosphere reserve. Systematic collections made from different parts of Sundarbans Biosphere Reserve and also the lichen specimens brought from Botanical Survey of India, Howrah (CAL) have been studied. Seventy two species belonging to 28 genera and 15 families have been identified. All the families, genera and species are arranged alphabetically. The new distributional records for the West Bengal lichen flora is provided.

Key-words—Lichen diversity, Sunderbans, W. Bengal.

INTRODUCTION

SUNDARBANS, the largest mangrove reserve of the world, covers the saline inter tidal zone Ganga-Brahmaputra delta of India and Bangladesh with a total of 25000 sq km area. The Indian part comes under North and South 24-Parganas districts of West Bengal. It lies between 21°31' N and 22°30' N latitude and 88°10'E and 89°51'E longitude with an area of 9630 sq km. Out of this *ca.* 4266 sq km area in the south-eastern part, including 1750 sq km water spread area, fall under forested area. It includes one National Park (Sundarbans NP, 1330 sq km) and three Wild Life Sanctuaries : Sajnakhali (362.40 sq km), Lothian island (38 sq km) and Haliday island (5.95 sq km). The area embodies the richest biodiversity amongst the inter tidal forest of the world.

The present land strata of Sundarbans are raised above 5-8 m from the mean sea level and are subject to tidal inundations during the tidal thrust. The temperature fluctuations range between 13°C and 35°C. The annual average precipitation is 1500-2000 mm and the relative humidity ranges from 60-90%. A large number of east to west flowing rivulets or creeks are interconnected with the large tidal rivers, which ultimately formed the entire area just like a complete network systems. These physiognomic factors of the Sundarbans are suitable for the mangrove flora and

mangrove ecosystem and also for the growth of rich corticolous lichens.

Floristically, the Indian part of Sundarbans is dominated by 26 true or major mangrove species belonging to *Aegialitis*, *Aegiceras*, *Atalantia*, *Avicennia*, *Brownlowia*, *Bruguiera*, *Ceriops*, *Excoecaria*, *Heritiera*, *Hydrophallus*, *Kandelia*, *Lumnitzera*, *Rhizophora*, *Scyphiphora*, *Sonneratia* and *Xylocarpus* and 30 mangrove associated or back mangrove taxa *viz.*, *Acanthus*, *Caesalpinia*, *Clerodendron*, *Dalbergia*, *Derris*, *Hibiscus*, *Pentatropis*, *Sarcolobus*, *Tamarix*, *Thespesia*, *etc.* In addition 3 species of pteridophytes, 4 species of bryophytes, 22 species of fungi and 30 species of algae are known to occur in the area (Naskar & Mandal 2000).

A careful perusal of literature reveals that the 24-Parganas area of West Bengal including parts of Sundarbans and Parmadan Forest is known to possess *ca.* 161 taxa of lichens (Roychowdhury, 1985). However, the present boundary of Sundarbans Biosphere Reserve remains to be explored properly. Identity of most of the earlier reports require verification in light of modern lichenological concepts. Lichen specimens from Sundarban area present at Botanical Survey of India, Howrah (CAL) were studied to verify the earlier identity and fresh collections made from unexplored and under explored areas of Sunderbans Biosphere Reserve.

OBSERVATION

During December 2001 and March 2002 more than 550 lichen specimens were collected from 29 islands/localities of Sundarbans Biosphere Reserve e.g. Gosaba, Sajnakhali WLS, Basanthi, Pakhrala, Jharkhali, Herobhanga, Bakkali, Namkhana, e.g. Patibunia, Mahisani, Jammu dweep, Sagar, Saptamukhi, Susmie, Patharprathima, Bhagabatpur, Lothian island WLS, Rakhashali, G-Plot, Thakuran, L-Plot, H-Plot, E-Plot, I-Plot, Mahespur, Gopalpur, K-Plot, Amalmari, Dublibhasani, Chulkatti and Bulchery.

72 species belonging to 28 genera and 15 families have been identified and studied in detail, of which 25 species are new record for West Bengal lichen flora. Investigation shows that Pyrenulaceae is the largest family with 14 species followed by Physciaceae with 13 species and Graphidaceae and Opegraphaceae with 9 species each. Microlichens or crustose forms are dominant in all the localities, with 61 species and the genera are *Anthracotheicum*, *Anisomeridium*, *Arthonia*, *Arthyropyrenia*, *Arthothelium*, *Bacidia*, *Buellia*, *Caloplaca*, *Enterographa*, *Glyphis*, *Gyrostomum*, *Lecanactis*, *Lecanora*, *Letrouitia*, *Mycomicrothelia*, *Opegrapha*, *Phaeographis*, *Porina*, *Pyrenula*, *Rinodina*, *Sarcographa*, *Sarcographina*, and *Trypethelium*. *Dirinaria*, *Parmotrema*, *Physcia* and *Pyxine* are the foliose genera occur in the area, of which *Dirinaria* spp. are most common. *Ramalina* is the only fruticose genus represented by 2 species. Teh mangrove trees viz., *Avicennia* spp. and *Excoecaria agallocha* support the growth of more number of lichens than other mangroves. *Avicennia* spp. and *Excoecaria agallocha* support the growth of more number of lichens than other mangroves. *Avicennia* spp. mostly favour crustose forms while *Excoecaria agallocha* favours all the forms. No saxicolous form has been found in the area. All the families, genera in each family and species in each genus have been arranged alphabetically. The list of identified taxa is being provided for reference, asterisk (*) mark taxa are addition to the West Bengal lichen flora.

ENUMERATION OF TAXA

ARTHONIACEAE

Arthonia Ach.

A. circumbalbicans Nyl.

**A. inconspicua* Stritton

A. polymorpha Ach.

A. radiata (Pers.) Ach.

A. recedens Stritton

A. subvelata Nyl.

A. tumidula (Ach.) Ach.

Arthothelium Massal.

A. abnorme (Ach.) Müll. Arg.

ARTHOPYRENIACEAE

Arthopyrenia Massal.

A. alboatra (Krempelh.) Müll. Arg.

**A. claveformis* (Stirton) Hawksw.

**A. grisea* (Schleich. ex. Schaer.) Korb.

**A. indusiata* Müll. Arg.

A. majuscula (Nyl.) Zahlbr.

A. terminata (Nyl.) Müll. Arg.

Mycomicrothelia Keissler

M. nonensis (Stirton) Hawk.

BACIDIACEAE.

Bacidia De Not.

B. connexula (Nyl.) Zahlbr.

B. medialis (Tuck. in Nyl.) Zahlbr.

GRAPHIDACEAE

Glyphis Ach.

G. cicatricosa Ach.

Gyrostomum Fr.

G. scyphuliferum (Ach.) Nyl.

Phaeographis Müll. Arg.

P. colligata (Stirton) Zahlbr.

P. dendritica (Ach.) Müll. Arg.

P. medusiformis (Krempelh.) Müll. Arg.

P. platygrapha var. *indica* Singh et Awasthi

Sacographa Fee*S. intricans* (Nyl.) Müll. Arg.*S. maculosa* (Sirton) Zahlbr.*Sarcographina* Müll. Arg.*S. glyphiza* (Nyl.) Singh *et* Awasthi

LECANORACEAE

Lecanora Ach.*L. argentata* (Ach.) Degel.

LETROUITIACEAE

Letrouitia Hafellner *et* Bellemere*L. leprolyta* (Nyl.) Haf.

MONOBLASTIACEAE

Anisomeridium (Müll. Arg.) Choisy*A. interspersum* (Nyl.) Makh., Adaw. *et* Patw.

OPEGRAPHACEAE

Enterographa Fee*E. pallidella* (Nyl.) Redinger*Lecanactis* Eschw.*L. patellarioides* (Nyl.) Vainio*Opegrapha* Ach.*O. bengalensis* Upreti *et* Singh*O. cinerea* Chevall.*O. inaequalis* Fee*O. leptoterodes* Nyl.*O. martii* Krempelh. in Nyl.*O. stirtonii* Zahlbr.*O. subvulgata* Nyl.

PAREMELIACEAE

Parmotrema Massal.*P. cf. dialantum* (Vainio) Hale

PHYSCIACEAE

Buellia De Not.*B. betulinoides* Schubert *et* Klement*B. confusa* Awasthi*B. curatellae* Malme*B. diorista* (Nyl.) Zahlbr.*Dirinaria* Tuck.*D. aplanata* (Fee) Aasthi*D. confluens* (Fr.) Awasthi*D. Consimilis* (Stirton) Aasthi*D. picta* (Swart) Clem. *et* Shear*Physcia* (Schreb.) Michaux*P. cf. caesia* (Hoffm.) Furnr*P. dimidiata* (Arn.) Nyl.*Pyxine* Fr.*P. cocoes* (Sw.) Nyl. var. *cocoes**P. consocians* Vainio*Rindodina* (Ach.) Gray*R. intrusa* (Krempelh. in Nyl.) Malme

PYRENULACEAE

Anthracothecium Hampe in Massal.*A. bengalense et* Singh*A. confine* (Nyl.) Müll. Arg.*A. ochrotropum* (Nyl.) Zahlbr.*A. parvinucleum* (Meyer *et* Flotow) Zahlbr.*A. seminudum* Müll. Arg.*Pyrenula* Ach.*P. anomala* (Ach.) Vainio*P. arthoniotheca* Upreti*P. defosa* Müll. Arg.*P. immersa* Müll. Arg.*P. introducta* (Stirton) Zahlbr.*P. leucotrypa* (Nyl.) Upreti*P. nitida* (Weig.) Ach.*P. ochraceoflava* (Nyl.) Harris*P. subacutalis* Upreti

RAMALINACEAE

Ramalina Ach.*R. leiodea* (Nyl.) Nyl.*R. pacifica* Asah.

TELOSCHISTACEAE

Caloplaca Th. Fr.*C. ferruginea* (huds.) Th. Fr.

TICHOTHELIACEAE

Porina Müll. Arg.*P. belanospora* (Nyl.) Müll. Arg.

TRYPETHELIACEAE

Tryphethelium Sprengel*T. eluteriae* Sprengel*T. tropicum* (Ach.) Müll. Arg.

ACKNOWLEDGMENT

The authors are grateful to the Ministry of Environment and Forest, New Delhi, for providing financial assistance; to Dr. M. Sanjappa, Director, Botanical Survey of India, Kolkata and Dr. K.P. Singh, Coordinator, AICOPTAX (Lichens and Bryophytes), Central Circle, Allahabad for constant encouragement; to Dr. T.M. Hynniewta, Deputy Director, Botanical Survey of India, Eastern Circle, Shillong for providing facilities and to Dr. D.K. Upreti, Scientist, NBRI, Lucknow for help in verifying the identity of some specimens.

REFERENCES

- Naskar, KR & Mandal, RN 2000. Ecology and biodiversity of Indian mangroves - Vol. I. *Jaya Publishing House*, New Delhi : 3-17.
- Roychowdhury, KN 1985. Lichen Flora of 24 - Parmadan Forest. *J. Economic Tax. Bot.* 6 (1) : 9-44.