J. Algal Biomass Utln. 2012, 3 (4): 45–51 **Seaweeds from Indian Sundarbans mangrove forest and inner island area**
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Morphotaxonomic account of some common seaweeds from Indian Sundarbans mangrove forest and inner island area

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Abstract

The taxonomic study of marine seaweeds from Indian Sundarbans mangrove forest reveals the presence of nine taxa belonging to the class Chlorophyceae and Rhodophyceae. The present paper deals the morphotaxonomic description of nine taxa of which two from Chlorophyceae and seven from Rhodophyceae were recorded. Among the Chlorophyceae two species of *Ulva* viz. *U. lactuca* and *U. intestinalis* were found. The Rhodophycean taxa belongs to *Catenella* with two species viz. *C. repens* and *C. nipae*, *Polysiphonia*, *Bostrychia*, *Compsopogon*, *Gelidium* and *Ceramium*. The temperature (ºC), pH and salinity were also studied at the time of collection of seaweeds.

Introduction

Sunderbans, named after the ubiquitous Sundari trees found there in large numbers, is the largest single block of tidal halophytic mangrove forest in the world and has the honour of being a UNESCO World Heritage Site & a Biosphere Reserve in the year 1997. Sundarbans, the largest delta in the World, consists of 10, 200 sq. km of Mangrove forest spread over India (4200 sq. km of reserved forest) and is also the largest mangrove forest in the World. Another 5400 sq. km of non-forest inhabited region in India, along the north and north-western fringe of mangrove forest, is also known as Sundarbans region in India. The total area of Sundarbans region in India is 9600 sq. km which constitutes the Sundarbans Biosphere reserve. Indian Sundarban is bound on the West by river Muriganga and on the east by rivers Harinbhahga and Raimangal. Other major rivers flowing through this ecosystem are Saptamukhi, Thakuran, Matla and Gosaba. Diversity of marine and brackish water algae from the coastal regions India have been studied by a group of authors (Iyengar, 1927; Krishnamurthy, 1967; Rao, 1968; Islam, 1973; Kaliaperumal *et al*, 1986; Krishnamurthy *et al*, 1990; Kaliaperumal and Chennubhotla, 1997). A very few reports are available of seaweeds from brackish and marine regions of West Bengal coast (Naskar and Santra, 1985, 1986; Pal *et al*, 1988; Santra *et al*, 1988; Chattapadhyay *et al*, 1995; Pal *et al*, 1996; Naskar *et al*, 1999; Pal, 2000; Mukhopadhyay and Pal, 2002; Sen and Naskar, 2003). Earlier, Pal (2000) reported 6 species of *Enteromorpha* and two species of *Ulva* from West Bengal coast and studied their cultural behavior. The present group Mukhopadhyay and Pal (2002) reported 14 common macroalgal species from the coastal regions of Bay of Bengal and studied their cultural behaviour. Some new reports on benthic algae of Indian Sundarban was studied by Sen *et al*, 2003. The present paper is based on the study of further collections made from the unexplored regions of West Bengal. The main aim of the present work is to survey the both brackish and marine water regions of Indian Sundarbans mangrove forest and inner island area and to study the common seaweeds found in these regions.

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Materials and methods

Sampling sites

The algal samples were collected from the south-eastern part of Indian Sundarban mangrove forest and inner islands area (Fig. 1). The study area includes more than 14 islands covering Basnti, Hamanbere, Suryamoni, Amarboni, Narayanitala, Patibunia, Morahero, Cheramatla, Henry Island, Bakkhali, Namkhana etc.

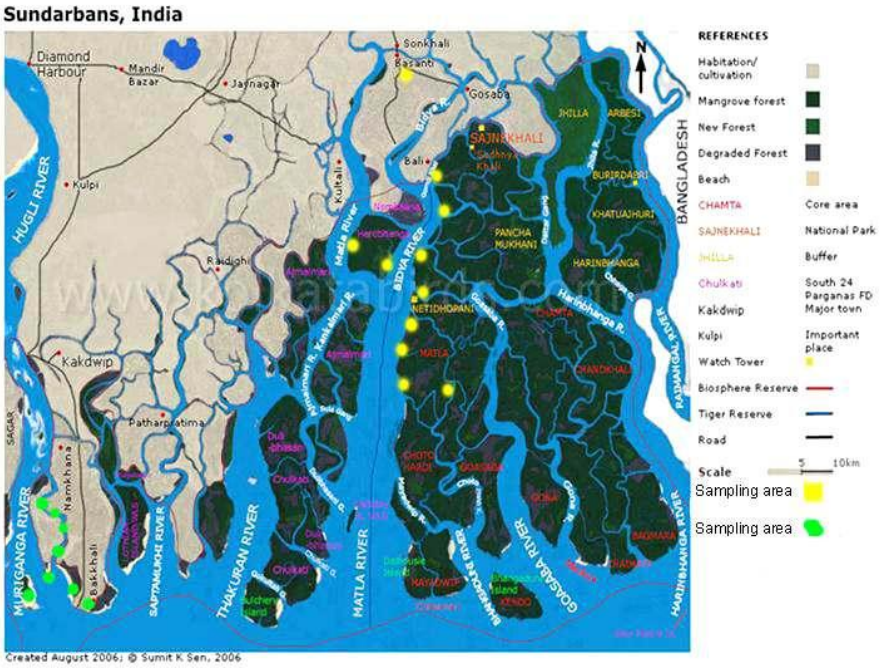

Fig. 1: Showing the sampling sites of common seaweed of Indian Sundarbans mangrove forest.

Algal sampling

The algal samples were mainly collected in three different season's viz. summer (March-June), monsoon (July-October) and winter (November-February) from the forest floor, tree bark, wooden and bamboo poles, concrete jetties, on the sides of boat and launches etc. Samples were collected from their natural sources. The collections of samples were done using long forceps and scalpels. After collection the samples were taken in zipper pouch and brought to the laboratory. The samples thus collected were thoroughly washed with running tap water or saline water and then with double distilled water to remove soil particles and other impurities. After washing the samples were preserved in 4% (v/v) formalin for further study. The slides were prepared and digital photographs were taken in Carl Zeiss Axioster plus Microscope by Cannon Power Shot 500D camera. Identification of taxa was done by standard monographs of Boergesen, 1913, Islam, 1976, Sen and Naskar, 2003. The unialgal cultures were raised using different culture media to induce the reproductive structures for proper identification.

Results and discussion

In the initial survey 9 species of common seaweeds were recorded from the Indian Sundarbans mangrove forest. Among them 2 belongs to the class Chlorophyceae and 7 belongs to the class Rhodophyceae. The genus *Ulva* with 2 species *U. lactuca* and *U. intestinalis* represented the class Chlorophyceae and Catenella with 2 species viz. *Catenella repens* and *C. nipae* followed by *Gelidium*, *Polysiphonia*, *Ceramium*, *Bostrychia* and *Compsopogon* represented the class Rhodophyceae. The salinity ranges from 2-32%, pH from 5-7 and temperature from 27-35˚C in the sampling

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site. The taxonomic description of the algal genera are given below-

DIVISION: CHLOROPHYTA

CLASS: CHLOROPHYCEAE

ORDER: ULVALES

FAMILY: ULVACEAE

1. *Ulva lactuca* Linnaeus (Pl. 1, Fig. A; Pl. 2, Figs. A & B)

Boergesen, 1913; Islam, 1976, p 11.

Plants 2-6 cm long, attached by a small and inconspicuous holdfast, foliaceous, bright green, blades lanceolate to broadly ovate to rounded, often irregularly and deeply incised to form lobes, margins of lobes ruffled and wavy or undulate, membrane thick near the base, marginal portions somewhat thin, cells usually as long as broad, closely packed, in cross- section sub-quadrate with rounded corners.

Occurrence- Bakkhali sea beach (N 20º00.015', E 088º80.609'), brackish water.

2. *Ulva intestinalis* (Linnaeus) Link. (Pl. 1, Figs. B-C; Pl. 2, Figs C-D)

Hoyt, 1920, pls 84-109; Islam, 1976, p 10; Santra & Pal, 1988, pl II, figs 18-19.

Plants 6-20 cm long, gregarious growth, at first attached to substratum by a holdfast, free floating later, tubular, with contortions, light green to yellowish green, membranous, fronds tapering below, in the upper portions elongate, tubular, cylindrical, clavate or generally inflated, simple or rarely sparingly branched from the base, the cells in section radially rounded to rectangular, oblong.

Occurrence- Fraserganj (N 20º03.031', E 088º81.310'), fresh water.

DIVISION: RHODOPHYTA

CLASS: RHODOPHYCEAE

ORDER: FLORIDAE

SUB-ORDER: GIGARTINALES

FAMILY: RHABDONIACEAE

3. *Catenella repens* (Lightfoot) Batters (Pl. 1, Fig. D; Pl. 2, Fig. E)

Feldmann & Lami, 1935; Taylor, 1942; Joly, 1951; Islam, 1976, pl 52, figs 301-304; Santra & Pal, 1988, pl VII, figs 44-47; Sen & Naskar, 2003, p 185, pl XXII, fig 137.

Plants up to 12 cm long, deep brown in colour, attached to the substratum by haptera, thallus regularly constricted at intervals, composed of a lax network of branching and anastomosing filaments in the centre.

Occurrence- Hamanbere Island (N 22º12.449', E 088º41.882'), brackish water.

4. *C. nipae* Zanardini (Pl. 1, Fig. E; Pl. 2, Fig. F)

Islam, 1973, pl 5, fig 1-4; Islam, 1976, pl 52, fig 307-308; Sen & Naskar, 2003, p 186, pl XXII, fig 139.

Plants stout, robust, 2-8 cm high, swollen, and dark purplish pink colour, dichotomously branched, deeply constricted with basal disc like haptera, each segment at terminal or subterminal position.

Occurrence- Sushni Island (N 21º42.803', E 088º18.038'), marine water.

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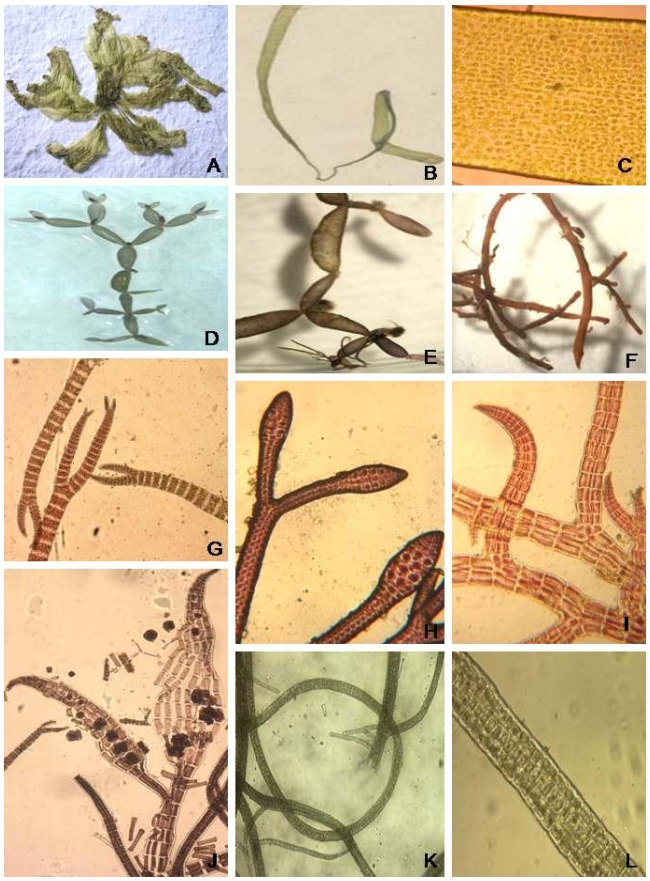

Plate 1: Showing microphotographs of A. *Ulva lactuca*, B. *Ulva intestinalis*, C. Cellular details of *Ulva intestinalis*, D. *Catenella repens*, E. *C. nipae*, F. *Gelidium pusillum*, G. *Ceramium manorensis*, H. *Bostrychia simpliciuscula*, I. *Polysiphonia mollis*, J. Tetrasporophyte with tetraspores of *P. mollis*, K-L. *Compsopogon coerculeus*.

SUB-ORDER: CERAMIALES

FAMILY: RHODOMELACEAE

5. *Polysiphonia mollis* Hooker and Harvey (Pl. 1, Figs. I-J; Pl. 2, Figs. K-L)

Islam, 1976, Pl 53, fig 311-313; Santra & Pal, 1988, pl VI, fig 40-43; Sen & Naskar, 2003, p 192, pl XXIV, figs 144a, b.

Erect plants, reddish purple to reddish brown colored, cells about 3-5 µ broad and 10-15 µ long, tetraspores 10-20 µ diameters.

Occurrence- Lothian Island (N 21º42.343', E 088º18.893'), brackish water.

6. *Bostrychia simpliciuscula* Harvey ex. J. Agardh (Pl. 1, Fig. H; Pl. 2, Fig. I)

Kamiya, 1994; Mukhopadhyay & Pal, 2002, p 102, pl 1, fig g.

Thallus brown, subdichotomously branched, densely tufted and entangled, often mixed with *Catenella* and *Polysiphonia* species on pneumatophores of mangrove trees consisting of main axis and lateral branches, main axis polysiphonous, alternately and densely branched; polysiphonous only at the base; stichidia borne terminally on the lateral branches, 10-20 µ long, 2-5 µ broad.

Occurrence- Patibunia Island (N 20º00.110', E 088º80.608'), marine water.

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SUB-ORDER: GELIDIALES

FAMILY: GELIDIACEAE

7. *Gelidium pusillum* (Stackh.) Le Jollis (Pl. 1, Fig. F; Pl. 2, Figs. G-H)

Boergesen, 1920, p 280; Rao, 1976, p 73, Figs 7C- D; Sen & Naskar, 2003, p 197, pl XXV, figs 150a, b.

Plants upto 10-20 cm tall, saxicolous, disc like holdfast, thallus with narrow erect axes, lateral ramuli slightly flattened, expanded with a rounded end, sometimes pointed.

Occurrence- Cheramatla Island (N 21º59.575', E 088º42.644'), marine water.

SUB-CLASS: BANGIOIDEAE

.

ORDER: COMPSOPOGONALES

FAMILY: ERYTHROTRICHIACEAE

8. *Compsopogon coerculeus* (Balbis) Montague (Pl. 1, Figs. K-L)

Taylor, 1960, p 296; Santra & pal, 1988, pl IV, figs 38-39; Sen & Naskar, 2003, p 184, pl XXII, figs 136a & 136b.

Thallus dark green, much branched, main axis erect, attached to substratum with the help of a basal disc, about 10 cm long, cells of main axis irregularly arranged, polygonal and of varied sizes and shapes, cells of branches regularly arranged, 2-10 µ long and 2-4 µ broad.

Occurrence- Morahero Island (N 22º03.096', E 088º40.315'), marine water.

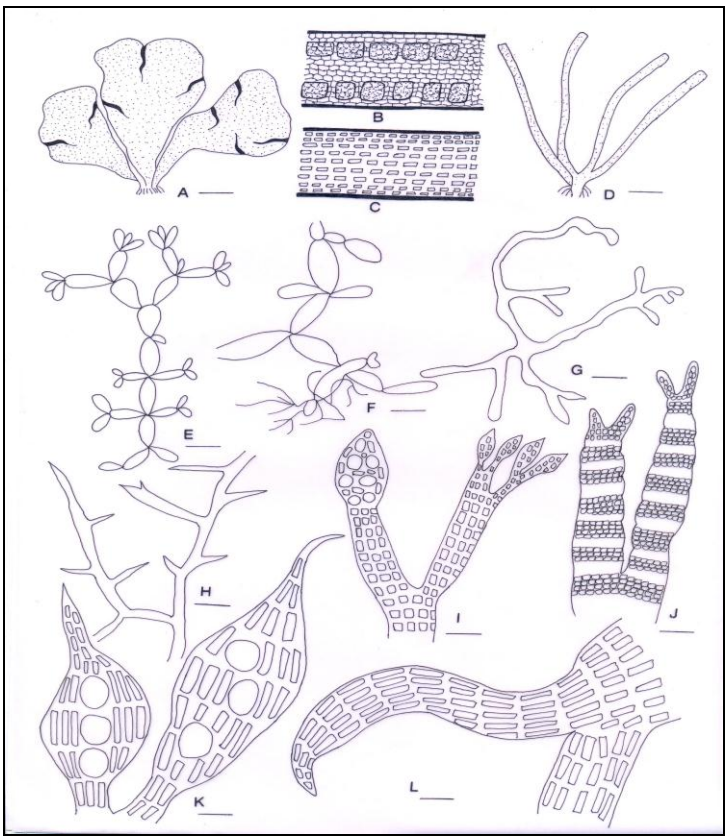

Plate 2: Showing line drawings of A. *Ulva lactuca*, B. Cellular details of *U. lactuca*, C. Cellular details of *U. intestinalis*, D. *U. intestinalis*, E. *Catenella repens*, F. *C. nipae*, G-H. *Gelidium pusillum*, I. Sporophyte of *Bostrychia simpliciuscula*, J. *Ceramium manorensis*, K. Tetrasporophyte of *Polysiphonia mollis*, L. Cellular details of *P. mollis*.

ORDER: CRYPTONEMIALES

FAMILY: CORALLINACEAE

9. *Ceramium manorensis* Anand (Pl. 1, Fig. G; Pl. 2, Fig. J). Anand, 1981, p 28, figs 19A-D.

Plants forming dense fastigiated tufts, erect fronds profusely branched, branching alternate below, irregularly dichotomous above, ramuli not curved inwards, occasionally spreading, apices acute to obtuse, only corticated at the nodes with 3-5 rows of cells, the cells of the central row being the largest, 1-2 µ in diameter.

Occurrence- Patibunia Island (N 20º00.110', E 088º80.608'), marine water.

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