

Distribution of Aquatic Macrophytes in the Coastal Area of Salimpur, Chittagong, Bangladesh

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ABSTRACT

This preliminary study was conducted to investigate the distribution pattern of the aquatic macrophytes in the inter-tidal coastal belt of Salimpur, Chittagong. During this study, 3 species of mangrove, i.e., Sonarattia apetala, Avicennia marina and Acanthus ilicifolius, 1 species of wild rice related to salt marsh grass, i.e., Porteresia coarctata, 3 species of macro-algae, i.e., Ulva intestinalis, Catenella nipae and Dictyota dichotoma and 1 species of poison lily Crinum defixum were identified from this coast. The dominant macrophyte was planted Sonarattia apetala, followed by Porteresia coarctata in the coast line of Salimpur. Considering from the ecological and economic view, especially Catenella nipae, could be an important living resource for cultivation and sea ranching in this area. Besides, the importance of these aquatic inter-tidal macrophytes for fishery resources and overall ecosystem processes should not be over looked in this coastal area.

Key words: Aquatic macrophytes, Salt marsh, Mangrove, Macro-algae, Salimpur, Chittagong

INTRODUCTION

Bangladesh is blessed with an extensive coastline of about 710 km, which is mostly covered by varieties of coastal living resources such as mangroves, salt marshes, sea grasses, macro and micro algae and fisheries (Pramanik, 1988). These coastal resources play a vital role in the life history development and food source of many coastal organisms. It is also well established that the coastal environment of Bangladesh is highly productive in terms of nutrient input from different sources, and promote the other living resources in the vicinity of the coastal environment. The diverse living resources in the coastal areas play an important role on the national economy as well as promote the socio-economic well-being of the coastal poor communities. Although these coastal resources contribute a vital role in the ecosystem and have a great significance in economic aspect, the study on the coastal plant resources and their usefulness are very limited. Till to date, except the studies by Das and Siddiqi (1985), no systematic investigation or inventory has been carried out on the diversity of the coastal macrophyte

resources together with their zonation pattern in the country. Few scientific data on macrophytes species are available for the coastal waters of Bangladesh and Indian Subcontinent (Islam, 1976; Salam and Khan, 1978, 1979; Islam and Aziz, 1987a, 1987b; Haider, 1993; SMRC 2000; Jagtap et al., 2002; Abu Hena et al., 2005; Jagtap and Nagle, 2007). Thus, any form of investigation on this coastal macrophytes resources and their environment condition can be considered to be important study in the country. Therefore, as a part of coastal study, this study deals with the diversity, distribution and zonation profile of the macrophytes growing in the inter-tidal coast line of Salimpur, Chittagong.

MATERIALS AND METHODS

Study Area Description

The study area is situated at the Salimpur coast, Chittagong and geographically located at 22° 15' N latitude and 91° 49' E longitude, and 15 km away from Chittagong port city. The study area is about ≥ 100 ha. The tidal range of this coast was about 2.43 m to 3.04 m throughout the year (Talukder, 2004). The muddy and sandy muddy alkaline soil substrate exists in the study area which is generally suitable for the growth of aquatic macrophytes.

Collection of Samples

This study was carried out during the months of April and May 2006. The zonation profile of the study area and distribution pattern of the macrophytes were observed physically by placing three transects perpendicular to the shore (English et al., 1994). The different types of macrophytes specimens were collected manually by hand or using a knife during the low tide. All samples were collected in the pre labeled plastic bag while macro algae were collected in the plastic pots containing 5% formalin. All the collected samples were brought back to the Laboratory of Estuarine, Coastal and Aquaculture Research (LECAR), Institute of Marine Sciences and Fisheries, University of Chittagong and washed under tap water. The identification of the specimens was done following the literature described by Singh and Garge (1993) for mangroves, Lewmanomont and Ogawa (1995) and Islam (1976) for macro-algae, followed by Chapman (1977) and Flowers et al., (1990) for salt marsh.

RESULTS AND DISCUSSION

The species list of aquatic macrophytes found in the Salimpur inter-tidal coast and their major ecological functions is given in Table 1. A tentative zonation profile of the study area of Salimpur is presented in Figure 1. During this study, three species of mangrove, i.e., *Sonneratia apetala*, *Avicennia marina* and *Acanthus ilicifolius*, one species of wild rice salt marsh, i.e., *Porteresia coarctata*, three species of macro-algae, i.e., *Ulva intestinalis*, *Catenella nipae* and *Dictyota dichotoma* and one species of poison lily *Crinum defixum* were identified from this coast.

Table 1. Coastal aquatic macrophytes and their ecological functions in Salimpur, Chittagong.

Group	Species	Status and ecological function
Mangroves	<i>Sonaratia apetala</i> <i>Avicennia marina</i> and <i>Acanthus ilicifolius</i>	Planted and growing naturally; fishery importance; ecosystem stability; nutrient input and habitat for coastal fishes and birds, and coastal environment.
Macro algae	<i>Ulva intestinalis</i> <i>Catenella nipae</i> and <i>Dictyota dichotoma</i>	Primary producer; direct food source of many animals including human; provide shelters for number of marine and coastal species.
Salt marsh	<i>Porteresia coarctata</i>	Strong dilution and stabilization of pollutants from terrestrial run off and tidal waters flow through marshes; nutrient supply that are as important part of marine food chain; spawning and nursery area; refuge habitat for many fish and shellfish species; nesting and feeding areas of shore birds and wild life.
Other aquatic plants (poison lily)	<i>Crinum defixum</i>	Coastal stabilizer and habitat of macro and microorganisms.

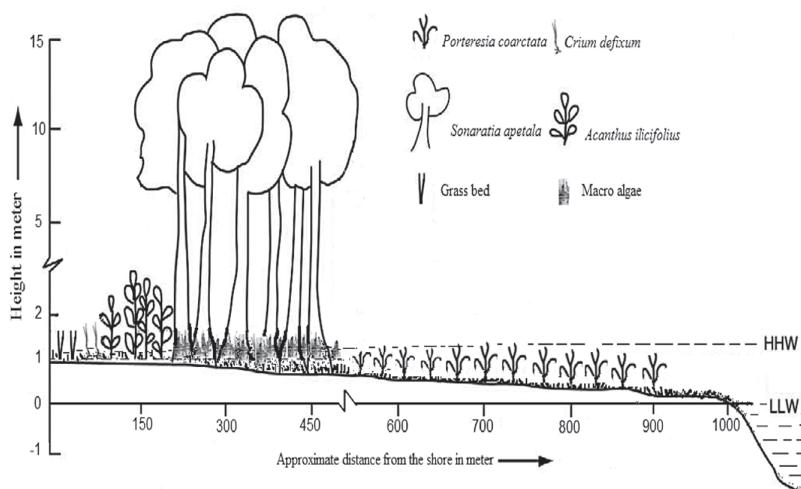


Figure 1. Schematic zonation pattern of macrophytes at Salimpur coast, Chittagong (based on three transects).

The most of the mangrove species were planted *S. apetala* in the intertidal area of Salimpur coast under the green belt project of Bangladesh (Mahmood, 1986; 1995), which are colonized by macro-algae and other coastal plants naturally through succession. The mangrove *S. apetala* was found as four-species association with the salt marsh (*P. coarctata*), macro-algae (*U. intestinalis*, *C. nipae* and *D. dichotoma*) and *A. ilicifolius*/*C. defixum* in this study area. Infrequently, *A. ilicifolius* and *C. defixum* were found as patchy form in this inter-tidal coastal area. This type of mangrove exists in other coastal area of Bangladesh (Zafar, 1992). The almost of the macro-algae grow on the mangrove roots in the coast of Salimpur, especially *C. nipae*. Other types of macro-algae usually creep with segmented thallus associate with decomposed mangrove twigs and leaves

acting as growing substrate. However, some studies suggested that the prospect of macro-algae culture in Bangladesh is very rich and potential which could support to the national economy (Zafar, 2004).

The wild rice *P. Coarctata*, relative salt marsh grass, dominates the regularly-flooded low marsh in the study area of Salimpur. Similarly, salt marsh *P. coarctata* was found growing in the inter-tidal brackish water in river mudflat system (Jagtap et al., 2006), and estuaries and marine environment elsewhere (Table 2). Salt marsh grass is the most abundant salt-tolerant plant in most of the estuarine environment of Bangladesh and responsible for much of the marsh productivity. The salt marsh *P. coarctata* was found as a mono-specific association and sometime it grows as two- species association with *A. ilicifolius*, macro-algae (*U. intestinalis*, *C. nipae* and *D. dichotoma*) or mangrove (*S. apetala* and *A. marina*). Altogether, there are 5 genera (*P. coarctata*, *Imperata cylindrica*, *Eriochloa procera*, *Myriostachya wightiana* and *Phragmites karka*) of salt marsh grass in the coastal and estuarine area of Bangladesh which also grow in the South Asian and South East Asian subtropical and tropical coasts (Das and Siddiqi, 1985; Abu Hena et al., 2007b). Among 5 species of salt marsh grasses, *P. coarctata* is dominant in different geographical regions, i.e., Eastern and Western coasts of India, coast of Sri Lanka and coast of Karachi, Pakistan (Latha et al., 2004). It has extensive rhizome, root, stem and leaf systems which are almost similar to those seen in the species of genus *Spartina* spp. found in temperate salt marsh habitat, i.e., Central American coasts (Caribbean-Eastern-Pacific), South American coasts, North American coasts and also harboring in the Western Indo-Pacific coasts (Hitchcock, 1951; Alderson and Sharp, 1994). The salt marsh grass *Porteresia's* successful adaptations enable it to live where only few other plants could survive. It has narrow and tube-shaped stem, tough leaf blades and special glands that secrete excess salt, making it ideal to withstand the high heat and daily exposure to sea water. Some herbivores feed directly on salt marsh, especially cattle, and a substantial fraction of plant carbon enters into the coastal and estuarine food web through the microbial process of litter and particulate organic detritus (Abu Hena et al., 2007a and 2007b). Salt marsh meadows physically filter suspended sediments from the water, help reduce wave and current energy and stabilize bottom sediments of the coastal area (Day et al., 1989). Therefore, this habitat is among the most productive ecosystem in the world in term of the quantity of vegetation produced annually per unit area (Gosselink et al., 1974; Day et al., 1989). The high primary production rates of salt marsh are closely linked to the high production rates of associated fisheries in the study area of Salimpur coast, Chittagong.

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Table 2. Location and habitat description of salt marsh grass *Porteresia coarctata*.

Location	Habitat description	References
Prentice and Chuksar Islands, India	Coastal mudflat and marine environment growing with mangrove ecosystem in mono specific condition and tow species association	Misra et al. (1998)
Goa coast, India	River mudflat with mangroves and coastal area growing in mono specific form with patches	Jagtap et al. (2006)
Cox's Bazar, Bangladesh	Estuarine intertidal zone and river bank with seagrass (<i>H. beccarii</i>), mangroves (<i>Avicennia alba</i> , <i>A. marina</i> and <i>Acanthus ilicifolius</i>) and macro algae (<i>Ulva intestinalis</i>) and salt marsh (<i>Imperata cylindrica</i>)	Abu Hena et al. (2007a; 2007b)
Salimpur, Chittagong	Coastal intertidal zone with mangroves (<i>Avicennia marina</i> ., <i>Sonartia apetala</i> and <i>Acanthus ilicifolius</i>) and macro algae (<i>Ulva intestinalis</i> , <i>Catenella nipae</i> and <i>Dictyota dichotoma</i>) and poison lily (<i>Crinum defixum</i>)	Present study

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