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MANGROVE RESOURCES

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INTRODUCTION

There has been an increasing awareness among the scientific community that the mangroves are an important component of the tropical marine ecosystem and apart from the economic uses of their vegetation, the mangrove areas are potential grounds for coastal aquaculture. It is generally recognised that mangrove areas form the feeding and nursery grounds for the juvenile stages of many commercially important species of prawns and fishes. The high productivity resulting from mangrove leaf fall supports a host of detritus feeding animals such as amphipods, mysids, harpacticoids, molluscs, crustacean larvae, prawns and fishes. The mangrove vegetation acts as a buffer against tidal currents, floods, storms and cyclones and the network of creeks and channels provide shelter to aquatic life especially in the critical stages of their life history. The vegetation also helps in preventing soil erosion in the coastal zone.

Blasco (1975) has made a comprehensive study of the mangroves of India. It is estimated that the mangrove areas in India spread to about 0.7 million ha and in the Andaman-Nicobar Islands alone it occupies 115, 200 ha. Thottathri (1960, 1962) gives a detailed account of the mangrove vegetation of Andaman-Nicobar islands. The Union Territory of Andaman-Nicobar Islands consists of several islands extending to about 800 km between lat. 6°40′ N and 13°41′ N. These islands have a long coastline where mangrove vegetation thrives under typical tropical conditions. The mangroves in general are a complex ecosystem which is influenced by tropical rains, tidal interaction, winds, cyclone and habitats such as rocky substratum and coral reefs. Because of the sparse human population and browsing cattle, the mangroves of these islands are well preserved by nature as compared to those of the Gulf of Kutch and Sunderbans which are being continually exploited for fodder and firewood. The mangroves have good seed resources of prawns and fishes.

ECOLOGICAL CHARACTERISTICS

Vegetation

There are 55 mangrove species in the world, of which 27 have been recorded from India including the Andaman-Nicobar islands (Banerji, 1958 ; Navalkar, 1973). Broadly, there are three habitats of mangroves, namely the coastal mangroves, mangroves along the creeks and back mangroves which are not influenced by tidal effects. The physico-chemical condi ions of the water in the swamp area, the soil and substratum supporting the vegetation and the faunal association exhibit variations in these three habitats. These ecological conditions give rise to changing pattern of vegetation as well as succession in the mangrove species (Macnae, 1968 ; Walsh, 1974). The important mangrove trees identified in these areas were : *Avicennia marina, Sonneratia caseolaris, S. alba, Rhizophora mucronata, R. apiculata, Excoecaria agallocha, Bruguiera gymnorhiza, B. parviflora, Aegiceras corniculatum, Nypa fruiticans* and *Barringtonia racemosa.* In addi ion to typical mangrove vegetation, terrestrial forms consisting of *Pandanus* sp., *Calophyllum inophyllum, Hibiscus tiliaceous* and *Thespesia populnea* colonise the upper zone and exhibit a kind of association.

Depending upon the nature of the substratum, different associations could be seen in the mangrove areas investigated. These are :

1. *Avicennia—Sonneratia—Rhizophora* association
2. *Bruguiera—Excoecaria—Barringtonia* association
3. *Pandanus—Thespesia—Hibiscus* association

The mangrove swamps of the islands protect an abundance of microscopic and macroscopic algae. The higher algal forms such as *Padina gymnospora*

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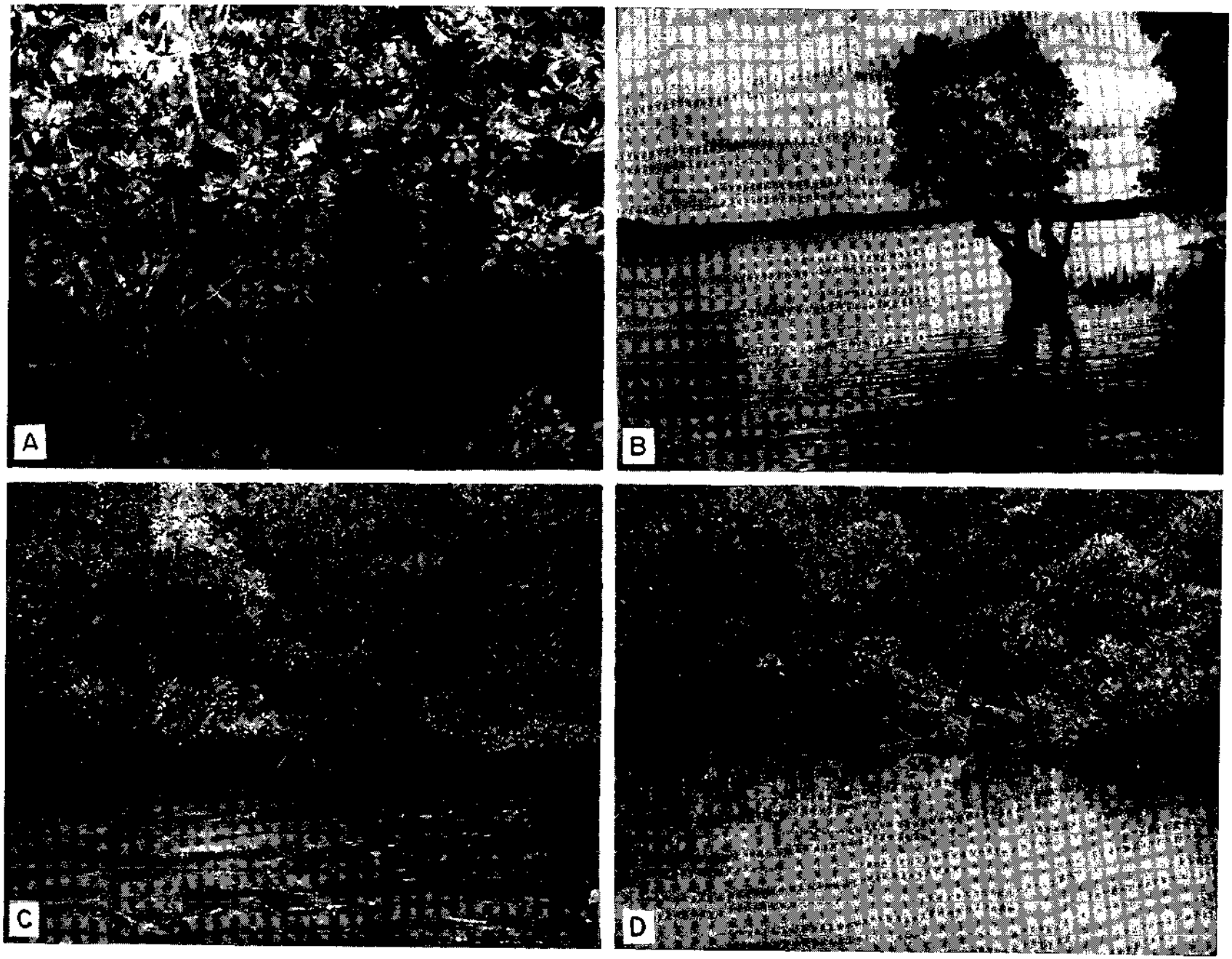

PLATE I. A. Diglipur; thick vegetation of *R. mucronata* in the mangrove; B-D. Mangroves of Spiteful Bay, Nancowry Island; B—*Avicennia marina* with submerged 'pneumatophores' in the marsh, C—*Rhizophora mucronata* and seagrass *Cymodocea* in shallow swamp, D—*A. marina* and *R. mucronata* dominating floral association.

Laurencia papillosa, *Dictyota dichotoma* and *Ulva lactuca* could be seen in most of the mangroves investigated. Besides, the micro-algal forms such as species of *Enteromorpha*, *Chaetomorpha*, *Cladophora* and *Ectocarpus* were also present.

An association dominated by the seagrasses *Zostera*, *Thalassia* and *Cymodocea* could be seen in the Spiteful Bay of Nancowry and Kakana region of Camorta Island. Strictly *Rhizophora mucronata* forests could be seen in the mangrove areas of Lakshmipur (Diglipur), Mayo, Wandoor, Chiriyatapu and Kimios (Car Nicobar). In the Corbyn's Cove near Port Blair and Katchall East Bay *Avicennia marina* is dominant.

Salient features of important mangroves

Diglipur (Pl. I, A): In the Ariel Bay region, the Lakshmipur mangrove shows thick growth of *Rhizophora mucronata* and *R. apiculata*. The alginophytic seaweeds *Padina* and *Dictyota* were found to grow well in this mangrove. The rate of production of the water column is of a lesser order (< 0.2 gC/m²/day) due to the lack of sufficient illumination. Rock oysters and few fish fry were collected from the swamp.

Mayabunder: On the southern side of the jetty and in the Seaward Bay, luxuri nt growth of *Rhizophora mucronata* and *Sonneratia caseolaris* was observed. The alginophytes *Sargassum* spp. and *Padina gymnospora* grow in the intertidal area. Production rate of the water column was high (> 0.5 gC/m²/day).

Rangat: The mangrove is dominated by species of *Rhizophora*, *Avicennia* and *Excoecaria*. Comparatively moderate rate of production was noticed in this region (0.2-0.5 gC/m²/day). The faunistic composition of this area shows an abundance of oyster spat, young ones of *Trochus*, *Turbo* and other gastropods such as *Cerithedium* and *Telescopium*.

Henry Lawrence: Western side of this island has a good mangrove swamp wi h species of *Rhizophora* and *Sonneratia*. Seaweeds such as *Padina*, *Sargassum* and *Turbinaria*, edible oysters and crabs were abundant. The rate of primary production is less than 0.5 gC/m²/day.

Neill: Rhizophora and *Excoecaria* thrive on the northern and southern side of this island. The rate of production of the water is moderate (0.3-0.5 gC/m²/day). The faunis ic composition consists of young ones of edible oysters, few fish fry and crabs.

Chiriyatapu :nd Wandoor: The mangrove areas of this part of southern Andamans have a luxuriant growth of *Rhizophora mucronata* alone. Primary production (>0.5 gC/m²/day) is high and the faunistic composition proved to be good. Large quantities of fish fry (*Harengula ovalis*) and ocypod, graphid and xanthid crabs were collected.

Corbyn's Cove (*Port Blair*): *Avicennia marina* is dominant. The bay as well as the mangrove swamp water has a high rate of primary production (> 1 gC/m²/day). The fauna consists of ocypod crabs, mud skipper *Periophthalmus* sp., fry of *Ambassis* sp. and *Therapon* sp. Seaweeds were not common in the swamp region.

Janglighat (*Navy Bay, Port Blair*): Navy Bay mangrove has a domination of *Avicennia marina*. The swamp in the jetty region is naturally protected and the depth is less than 4 m. This area was observed to have plenty of prawn seed, especially of *Penaeus merguiensis* and *Metapenaeus ensis* and crabs such as *Portunus pelagicus* and *Scylla serrata*.

Car Nicobar: The Kimios Bay encloses a thick mangrove vegetation dominated by *Rhizophora mucronata*. The production rate of the water was very high (> 1 gC/m²/day). Seedlings of mullets and prawns, particularly *Macrobrachium equidens* were found in large quantities. Crabs *Portunus pelagicus*, *Thalamita crenata*, *Calappa hepatica* and *Metapograpsus messor* were present.

Katchall: In the east bay, the mangrove protects a good vegetation consisting of *Avicennia marina* and *Rhizophora mucronata* in the inner zone and *Pandanus* sp., *Bruguiera gymnorhiza* and *Barringtonia racemosa* in the upper zone. However, colonisation of *Hibiscus tiliaceous* and *Thespesia populnea* is also seen in the upper regions. Fry of mullets, *Ambassis* and *Therapon* were collected from here.

Nancowry (Pl. I, B-D): The Spiteful Bay is surrounded by *Rhizophora mucronata*, *R. apiculata*, *A. marina* and *Sonneratia caseolaris*. Primary production rate was more than 1 gC/m²/day. Seagrasses such as *Thalassia* and *Cymodocea* were abundant in the shore region besides the domination of alginophytic seaweeds. The fauna consists of several species of crabs, fry of *Harengula ovalis*, mullets, mussels and edible oysters.

REMARKS

The practice of fish culture in brackishwater ponds (tambaks) cleared out of mangrove areas has been in vogue for many years in Indonesia. These ponds which are 0.5-2.0 ha in area are used to produce marketable crop of milkfish *Chanos chanos*. Several mangrove sites which are potential aquaculture farms have been surveyed in the Andaman and Nicobar Islands. Of

these, the mangrove areas of Mayabunder, Rangat, Henry Lawrence, Neill, Chiriyatapu and Wandoor regions, Corbyn's Cove and Janglighat regions of Port Blair, Kimios Bay of Car Nicobar and Spiteful Bay of Nancowry appear suitable for developing mariculture. Chiriyatapu, Wandoor, Janglighat, Neill Islands and Kimios Bay appear good for developing 'tambak' system of coastal aquaculture.

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