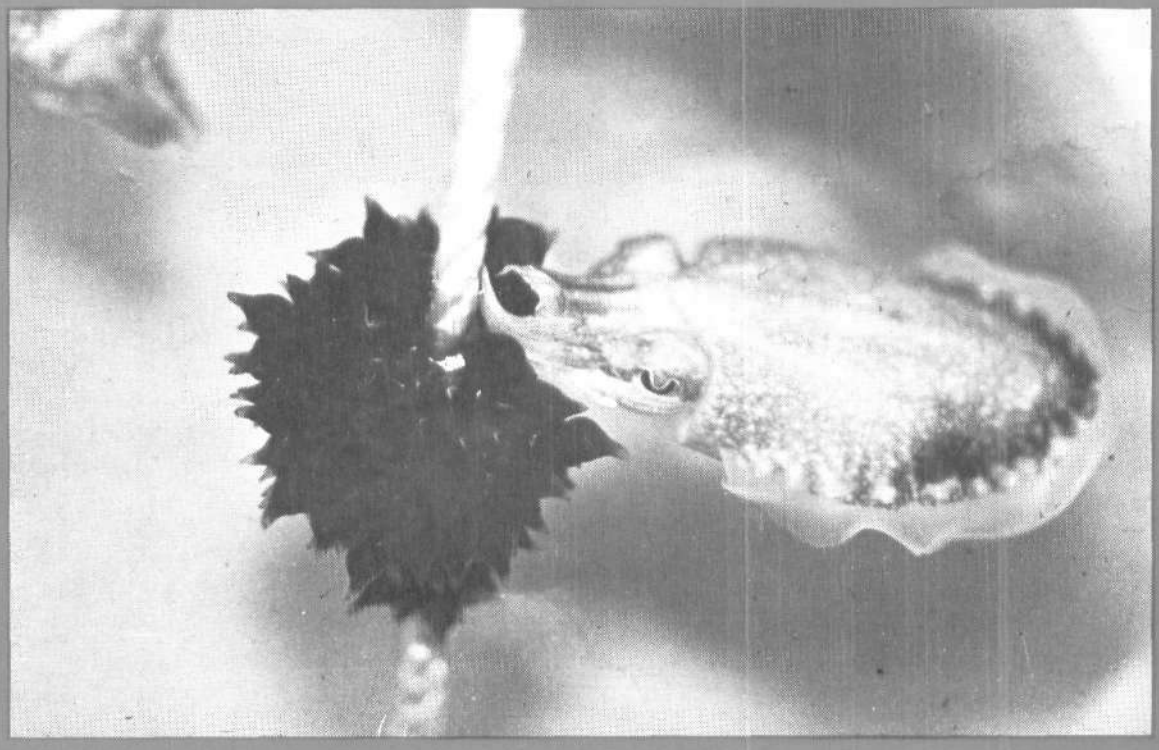
ISSN 0254-380 X

भाकृअनुप
ICAR

समुद्री मात्स्यिकी सूचना सेवा
MARINE FISHERIES INFORMATION SERVICE

No. 159 JANUARY, FEBRUARY, MARCH 1999



तकनीकी एवं विस्तार अंकावली
TECHNICAL AND EXTENSION SERIES

केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान कोचिन, भारत
CENTRAL MARINE FISHERIES RESEARCH INSTITUTE COCHIN, INDIA

भारतीय कृषि अनुसंधान परिषद
INDIAN COUNCIL OF AGRICULTURAL RESEARCH

894 MANGROVE ECOSYSTEMS OF MINICOY ISLAND, LAKSHADWEEP

A.K.V. Nasser, V.A. Kunhikoya and P.M. Aboobaker

Minicoy RC of CMFR Institute, Minicoy - 682 559, India

Introduction

Mangroves play an important role in coral reef ecosystems. The fringe and basin type mangrove forests act as depositional areas and are effective binders of sediments. This reduces the sediment loads in coastal waters. Trapping and stabilizing sediments is important for adjacent coral reefs because it prevents abrasion and burial of reefs during stormy conditions. Mangroves also regulate freshwater flows into coastal areas and buffer salinity changes. Mangrove vegetation is positively related to high nutrient inputs. They export excess nutrients to nearby waters as dissolved and particulate organic matter, some of which nourishing the reef organisms. Most of the commercially important prawns and fishes of coral reefs utilise mangrove areas as nurseries due to the presence of shelter and food.

Mangroves of coral reefs, like their counterparts in coastal areas are exploited for wood and stripping of bark for tanning. They are also subjected to oil, thermal and chemical pollution. Destruction of mangroves will allow terrigenous sediments to flow into coral reefs resulting in permanent damge. There can also be excessive outflow of organic matter which may cause shading and eutrophication. Refuges and nursery grounds for fishes and invertebrates will be destroyed and secondary production of reefs will be reduced.

Mangroves of Minicoy

Realising the importance of mangroves in coral reefs, a study to monitor these ecosystems was undertaken seasonally, at Minicoy from 1994 to 1998. Mangroves are noticed only at Minicoy Island in Lakshadweep and occur in two patches each of about 1 hectare in area. Unlike the mangroves of the mainland, the mangroves of Minicoy are in the formative stage and free from serious human pressure. The mangroves situated on the south-eastern side of the island near Well number 3 is constituted by a single species, *Brugulera cylindrica* . This mangrove has developed into a fully developed community in the past three years. The second group fringes the cove on the southwestern side of the island near helipad (Fig. 1). The predominant species is *Ceriops tagal* with a solitary tree of *Avicennia marina*. Preliminary studies were conducted at these sites to under-

stand the hydrography and phenology of mangroves.

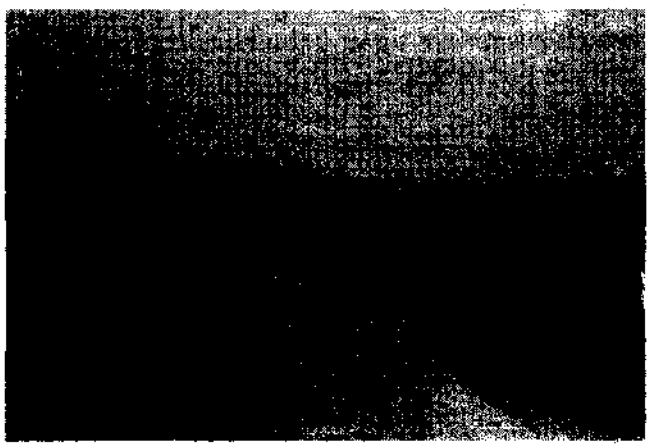


Fig. 1. *Ceriops tagal* site in the background and its connection with the Minicoy Lagoon.

The *Bruguiera* site is landlocked and ground water is found to be saline or fresh depending on the amount of rainfall received (Table 1). The *Ceriops* site is, however, inundated by normal high tides which influence the zonation, distribution and species composition. Majority of mangrove species grow best in low to moderate salinities (25 ppt) which may explain the phenomenal growth at the *Bruguiera* site. Nutrient values are normal for coral reef areas except for high values of silicate. The depth of water at the first site varies from a few centimetres in dry season to a maximum of 0.65 m during monsoon, while the depth at *Ceriops* site depends on the tide and varies from 0.25 to 1.75 m. Total rainfall received ranged from 47.2 to 380.4 mm in a month.

Phenology

Permanent plots were established at the *Bruguiera* site to study the phenology of this species. Seedling of height less than 0.5 m (Fig. 2) is the prominent group forming 40 % of all plants (Table 2). The number of propagules in secondary branches of trees varied widely (Table 3). Flowering of *Bruguiera* trees begin by August and fruiting is noticed in January with mature seeds in April. *C. tagal* starts to flower in September and ripe seeds are observed in February

Fig. 2. Seedlings of *Bruguiera cylindrica*.

Fig. 3.Ripe propagules of *C. tagal*.

Fig. 4. Flowers of *Avicennia marina*.

(Fig. 3). Flowers of *Avicennia* are first seen in October and continues upto February and fruiting is not observed in this species (Fig. 4). Litterfall estimated from quadrats indicate that

Bruguiera produce litter of 7.24 g/m²/day while *Ceriops* and *Avicennia* contribute respectively 1.18 and 1.59 g/m²/day. The low values of *Ceriops* site is due to the transport of litter to the lagoon at low tides. Twigs formed the main component of litter at *Bruguiera* site while at *Ceriops* site both twigs and fruits were important (Fig. 5). Leaves were the major constituent

Fig. 5. Seedlings of *C. tagal.*

near the *Avicennia* tree forming 47 % of total litterfall. *Ceriops* seeds were planted at the *Bruguiera* site to understand their survival in low saline conditions. Survival rate was high (70 to 92 %) for the first six months but seedlings did not survive after the 8 leaved stage. The propagules of *Ceriops* were longer (maximum length 28.1 cm) than those of *Bruguiera* (maximum length 7.0 cm).

Conservation and management needs

A national committee on wetlands, mangroves and coral reefs constituted in 1993 by the Ministry of Environment and Forests, recommended certain guidelines for management of mangroves. The recommendations include : nationwide mapping of mangrove areas, to study the growth rate and productivity of mangrove trees, seasonal variation in climate and environment, afforestation, identification of mangrove areas as "National Park" and to create awareness among the public on importance of mangroves. Some of these recommendations are applicable to the mangroves of Minicoy and if implemented would help in preserving this unique ecosystem. Introduction of the species available at Minicoy to suitable areas in other islands such as Kalpeni, Kavaratti, Bangaram and Suheli should be attempted. Mangrove areas of Minicoy which are presently under other departments or private ownership has to be transferred to concerned agencies for protection and preservation. Virgin mangroves of Minicoy may be declared as protected areas to prevent any modification or alteration. The local people and students have to be educated about the importance of mangroves through the media, lectures, exhibition, posters etc.

TABLE 1. *Hydrography of mangrove sites at Minicoy (Seasonal average)*

Parameters	*Bruguiera* site	*Ceriops* site
Atmospheric temperature (°C)	31.80	30.30
Water temperature (°C)	31.60	30.40
Salinity (ppt)	18.80	34.46
Dissolved oxygen (ml/l)	4.42	4.45
Phosphate (µg.at/l)	1.21	1.20
Nitrate (µg.at/l)	0.36	0.65
Silicate (µg.at/l)	16.81	13.97

TABLE 2. *Seasonal frequency of plants in* B. cylindrica *plot*

Plant	% in plot	Height (cm)
Tree	33	183
Sapling	27	71
Seedling	40	29

TABLE 3. *Phenology of* Bruguiera *trees at Minicoy*

Parameters	Plot 1	Plot 2	Plot 3
Number of primary branches	40	32	16
Number of secondary branches	160	192	176
Number of tertiary branches	Nil	Nil	14
Number of propagules	544	346	211
Length of propagules (cm)	4.0	4.9	3.7