

## OCCURRENCE OF LIVING CORALS AT SEVERAL PLACES ALONG THE WEST COAST OF INDIA

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### ABSTRACT

On the west coast of India, several species of reef building corals have been recorded from the intertidal zone of Ratnagiri, Malvan and Redi. Most of the colonies of corals in these areas were small and appear to be not more than a few years old. At Malvan, the colonies were somewhat larger and fairly widespread. All the three areas, where corals occur, have a luxuriant growth of sea weeds. Strong wave action along the coast probably prevents the growth of branching types of corals in these areas. The occurrence of hermatypic corals along the western shores of India indicates that these corals are adapted to fairly wide changes in salinity and turbidity which they experience during the monsoon months. Special attention is needed to protect these corals from human destruction.

Along the Indian Peninsula, coral formation is known to occur as fringing or patchy reefs in the Palk Bay and Gulf of Mannar (Pillai, 1972). In addition to these, dead corals are found in the Gulf of Kutch and off Ratnagiri (Angria Bank). Recently, along the west coast of India, off Malpe, "Gaveshani Bank" with living corals has been reported (Nair and Qasim, 1978). During the recent surveys conducted by the National Institute of Oceanography, living hermatypic corals were recorded at several places close to the shore along the west coast of India. It was earlier thought that no coral growth is likely to occur in these regions because of the influence of monsoon which is associated with high turbidity and dilution of sea water.

The corals were largely collected from the intertidal regions of Ratnagiri, Malvan and Redi (Fig. 1). A single collection at Redi yielded several colonies of *Porites* sp. The larger colonies of this species measured 15-20 cm in diameter.

At Ratnagiri and Malvan, sandy beaches are interspersed with rock formation extending over a considerable distance into the sea and forming into small bays. During the low tide, the exposed areas of the bay have large rock pools with rocks partially exposed (Plate 1). The corals are generally seen attached to the rocks (Plate 1). Coral formation was found to be fairly widespread at Malvan as compared to Ratnagiri and Redi. Nevertheless, their density was sparse and hardly exceeded 1-2 colonies per square metre. Malvan Bay was also found to be a favourite place for bird life (see Plate 1).

The corals collected belonged to the genera *Coscinarea*, *Turbinaria*, *Favites*, *Porites*, *Synarea*, *Pseudosiderastrea*, *Cyphastrea* and *Goniastrea*. The list of 117 species belonging to 33 genera of reef building corals so far recorded from the Indian coast (Pillai, 1972) does include the genera *Synarea* and *Pseudosiderastrea* and hence their occurrence is quite significant.

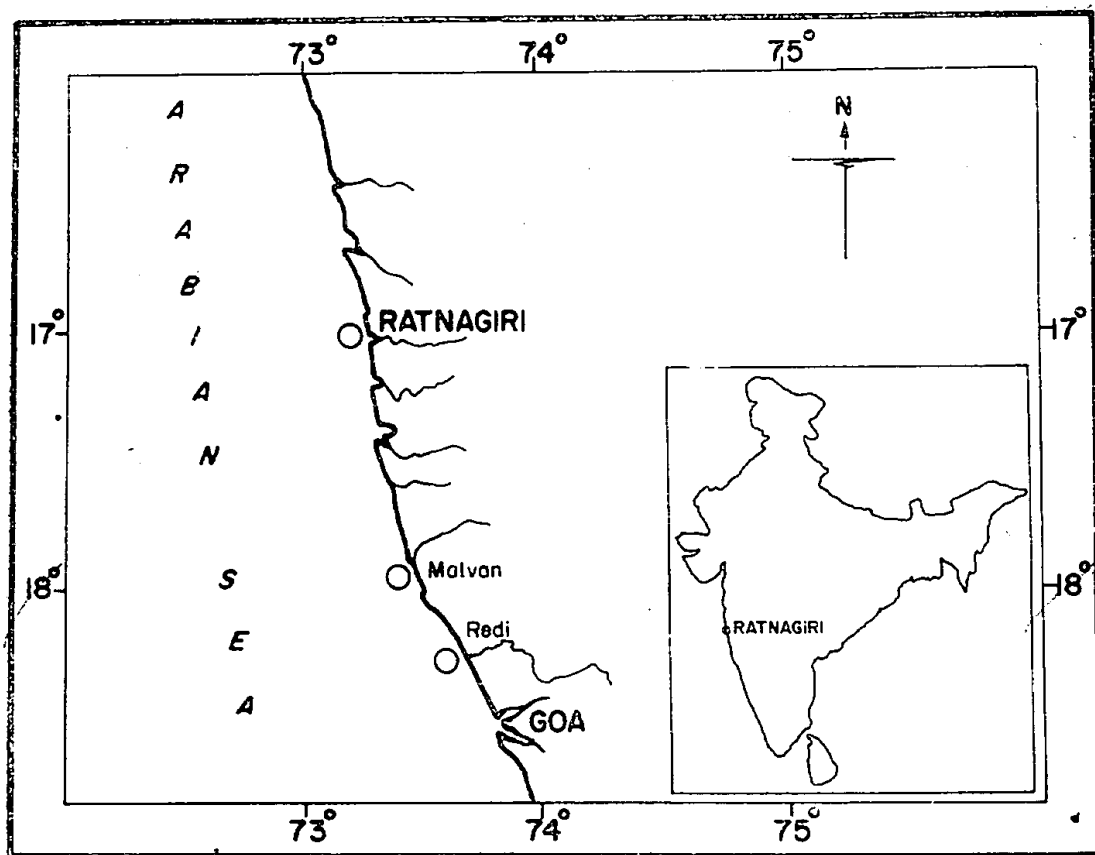


Fig. 1. Open circles indicate the locations where reef building corals occur along the west coast of India. Inset shows the position of Ratnagiri.

Regardless of the species, the colonies were mostly small measuring 15–20 cm across. Almost all the colonies were of encrusting type and the height of the colonies rarely exceeded 5 cm. Taking into account the slow rate of growth of reef building corals and the size and height of the coral colonies, it can be inferred that these colonies would not be more than 4–5 years old (see Plate II). At Malvan, a few large colonies of *Porites* measuring 25–30 cm in diameter and also of the other corals were seen. While most of the colonies had their tops abraded, some found in deeper waters were intact (Plate II). The dominant coral at Ratnagiri and Malvan was *Porites* represented by 2 species *P. lutea* and *P. lichen*. The other two genera found at both the places were *Coscinarea* and *Synarea*, but these were fewer in number. At Malvan, *Goniastrea* and *Pseudosiderastrea* species were next in dominance to *Porites*. These were followed by *Cyphastrea* sp. and *Turbinaria* sp. in waters more than 1 m deep. *Favites* was observed only at Malvan with very few colonies.

At Ratnagiri, Malvan and Redi, sea weeds were very abundant. The total number of sea weeds recorded so far at these three places was 72 with the following distribution:

Chlorophyta		Rhodophyta		Phaeophyta		Cyanophyta	
25 species		27 species		18 species		2 species	
Ratnagiri	11	Ratnagiri	14	Ratnagiri	6	Ratnagiri	1
Malvan	16	Malvan	9	Malvan	9	Malvan	0
Redi	5	Redi	5	Redi	8	Redi	1

PLATE I



Fig. 2. Bird life at Malvan Bay.



Fig. 4. Corals and calcareous algae exposed in the intertidal zone at Malvan. Most of the colonies of corals attached to the rocks appear to be only a few years old.



Fig. 1. Malvan Bay at low water.



Fig. 3. Rock pools in Malvan Bay where living corals are found growing on rocks.

PLATE II



*Figs. 1, 2, 3 & 4 (Clockwise). Coral colonies and calcareous algae photographed under water at Malvan*

Several species of calcareous algae belonging to the *Lithothamnion* were found along with corals. The animal life collected was typical of coral reef and included several species of brightly coloured fishes and crabs, alpheid shrimps, gastropods of the genus *Turbo* and *Cypraea* and holothurians.

At all the three locations where corals were found, the wave action was strong and hence at the low tide, the water in the rock pools was fairly turbid. At Ratnagiri, the average suspended load in the water was 30 mg/l. The absence of branching forms of corals at the three places indicates that intense wave action probably prevents their growth in these areas.

Coral growth in an area requires fairly uniform conditions of temperature and salinity. Along the west coast of India, while the temperature remains uniform almost throughout the year, the variations in salinity are often fairly wide. Salinity of the range of 20–25‰ is commonly recorded in the intertidal waters of the west coast during the monsoon months. Heavy river discharge and land run-off bring an enormous amount of sediment into these waters. Therefore, the occurrence of hermatypic corals in the intertidal zone is interesting because of their ecological adaptation to changes in salinity and turbidity. The only other record of reef building corals along the west coast of India is from the submerged Gaveshani Bank (Nair and Qasim, 1978) which is about 100 km away from the shore and at a depth of 32–40 m. Hence the corals of this bank will not experience much change in salinity or turbidity.

From the size of the colonies seen at Ratnagiri and Malvan, it is clear that these corals have been growing in these areas for the last several years. They would have thus experienced wide changes in the environmental conditions periodically. This indicates that although corals require uniform conditions, they can survive short spells of adverse changes in the environment. Corals have been recorded earlier from muddy sand and with some adaptations they can live in turbid waters (Goreau and Yonge, 1968). They have also been reported from the waters where the temperature is as low as 10°C (Macintyre and Pilkey, 1969). In a recent communication it has been shown that coral growth in the intertidal region can occur fairly high up on the shore in sheltered areas and that the limiting factor for coral growth is the period of desiccation during the low water and not the rain water or sedimentation to which they get frequently exposed (Ditlev, 1978). At Krusadi Island in the Gulf of Mannar, corals occur in highly turbid waters in which visibility is extremely poor.

There is one instance on record in May 1972 when the sea water, contaminated with thick *Trichodesmium* bloom, was accidentally circulated in the marine aquarium at Mandapam Camp. This resulted into mortality of almost all the animals in tanks probably because of deoxygenation of water. The coral *Favia* sp., on the other hand, kept in the same tank survived and fully recovered when normal sea water supply was restored. Some of these observations indicate that corals adapt themselves to fairly rapid changes in the environment.

The other point of interest is the possible source of these coral colonies at Ratnagiri, Malvan and Redi. The nearest coral reef known so far is the submerged Gaveshani Bank off Malpe, from where the planktonic plenula could drift and settle in the intertidal regions of Ratnagiri or Malvan. At least two genera of corals recorded from the submerged bank appear to be common to both these places. How-

ever, Gaveshani Bank seems to be rather far to be the possible source of these corals. Therefore, we strongly feel the possibility of several submerged banks with living corals in the vicinity of Ratnagiri and Malvan from where the larvae come and colonise the adjoining shores. However, the coral patches in the intertidal zone of Ratnagiri and Malvan are extremely susceptible to human influence, and unless special effort is made to protect them, it is feared that they may not last long. The Malvan beach is ideally suited for a marine park, and with rich bird life and luxuriant vegetation, it can become an attractive resort for naturalists. There is nothing like the Malvan Bay left anywhere along the west coast of India.

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