

## Note

### Observations on the recruitment of the Scleractinian coral in the Gulf of Mannar, India

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#### Abstract

Techniques to enhance natural recruitment in the restoration of coral reefs are being developed in many reef areas around the World. The Indian reefs, which were subjected to wide-scale destruction in the past due to several factors, natural as well as anthropogenic, also demand the understanding of coral recruitment patterns as the first step to evolve restorative measures. This study reports coral recruitment patterns at a reef location in Gulf of Mannar along southeast coast of India. Though the results of this study are preliminary, subsequent observations are recommended for a complete understanding on species-wise behavioural patterns and seasonal role in recruitment.

Reproduction in Scleractinian corals is both by sexual and asexual processes. Both of these processes are equally depending on the ecological conditions in a reef (Richmond, 1997). Nevertheless, sexual recruitment plays an important role in conservation and management, especially for the preservation of genetic diversity in natural and ex-situ populations (Petersen and Tollrian, 2001). There are several factors which influence sexual recruitment in a reef. Studies indicate that reproductive output in corals is decreased by sedimentation, high temperatures, low tides, mechanical damage, pollution and eutrophication (Harrison and Wallace, 1990; Rinkevich, 1995). Several factors which determine the successful sexual recruitment of corals are: availability of

viable larvae, successful settlement, and early development of propagules (Richmond, 1997). All these factors in relation to sexual recruitment of corals have now been monitored in reefs in order to aid in the restoration efforts of damaged reefs (Peterson and Tollrian, 2001). Techniques to enhance natural recruitment in damaged reefs have also been tested in many reefs (Fox and Pet, 2001)

Observations on sexual recruitment of corals have not been carried out in Indian reefs. Results of studies also are not available, so far, on reefs which have been damaged in a large scale in the 1998-bleaching event. With the significance now given to natural recruitment as restorative measures in reefs the world over, the need for studies on sexual recruitment of corals

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has become imperative in Indian reefs. The ecological factors that characterize these reefs, demand that these studies have to be carried out at specific reef locations. This brief-note is the result of the observation of natural recruitment of Scleractinian corals in a Gulf of Mannar and is an initial step towards enhancing the natural recruitment in reef restoration in India.

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#### Material and methods

The Tuticorin harbour basin, a protected area located within the two arms of breakwater wharf wall of the Tuticorin Harbour, along the southeast coast of India, was chosen as the study location. The breakwater, constructed 25 years ago for harbour activities, is extending seaward on the eastern side, with huge granite boulders dumped in the sea, and a road has been laid over it to facilitate harbour traffic. The sides of this breakwater drop steeply to 25 m. On the northern side of this artificial breakwater is a recent coral formation, stretching for 1.5 km. Corals are found along the stretching from the high water mark to a maximum depth of 4.5 meters; below which the granite stones are covered with barnacles. This recent reef is as pleasing visually as any of the fringing reef. The dominant coral fauna are *Goniastrea*. The other common organisms are: alcyonarians, gorgonids, sea-anemones, ascidians and calcareous al-

gae. Few filamentous algae were also found attached to the dead coral branches.

#### Observations on coral recruitment

For coral recruitment studies, terracotta tiles were used as settlement plates, fixed on to iron frame and deployed in the reef location. Iron frames of size 1x 0.75m were made out of 20mm diameter MS rod. On each frame, 4 to 6 terracotta tiles (ungalzed) of size 22 x 22 cm were fixed (Fig. 1) and the frames were set at 45° inclination in the reef for studying the monthly settlement patterns of corals. Two iron frames with tiles were kept at 2 meters depth owing to the maximum density of corals. The tiles deployed were then removed at weekly intervals (from April - June 2003) - for study under binocular dissection microscope. The only settlement observed on the 8th week was *Favia* sp. at a rate of single polyp per tile

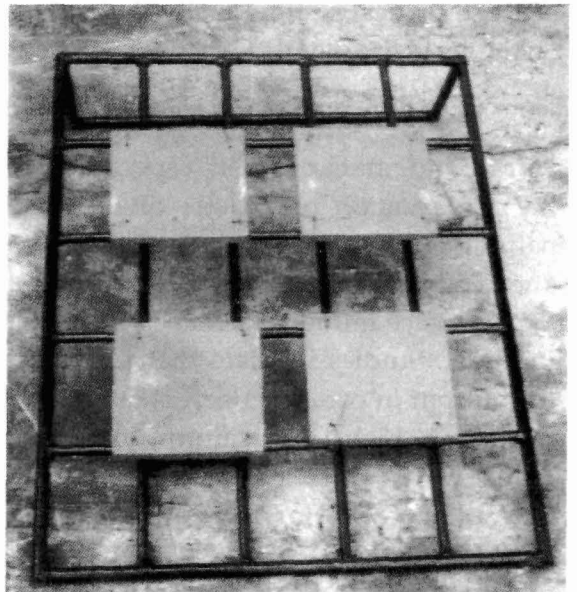


Fig.1. Terracotta tiles fixed on to the iron frame

i.e., 22 cm<sup>2</sup> of substrate (individual polyp 4 mm dia.) (Fig.2). Other major fouling organisms settled on the tiles were barnacles, oysters, coralline algae and serpulids.



Fig. 2. *Favia polyp* settled on a tile

Failure of recruitment of acroporids in the Caribbean reefs was attributed to the damages caused by hurricanes, water quality and diseases (Kojis and Quinn, 2001). In the present location in Gulf of Mannar, the parental colonies appear robust, acroporids make the majority of the growth form and do not appear to be stressed. Degradation in water quality, however, is still a factor that commands attention in this location. The recruitment

of acroporids might have been limited by the heavy suspended load (6.95 mg/l) inside the harbour basin. Further, it may be also due to the seasonal differences in recruitment pattern of different species at this study area, or species-wise behavioural patterns (i.e., some species recruit in the nearby area while some like to broadcast their larvae to distant locations) in recruitment. More detailed observations are recommended on recruitment pattern in relation to other ecological factors for better understanding of natural coral recruitment for reef restoration.

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