



HARD CORAL DIVERSITY OF MINICOY ISLAND, LAKSHADWEEP

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INTRODUCTION

Coral reefs are centres of high biological diversity and provide congenial habitats for many diverse invertebrates and fishes. Lakshadweep is formed exclusively by atolls with scattered group of 36 coral islands, in which Minicoy is the southernmost lying south of the Nine Degree Channel with a large lagoon lying west and north to the land mass. In the present study an attempt was made to investigate the hard coral diversity, coral cover, and health status of reef ecosystem of Minicoy Island.

MATERIALS AND METHODS

Underwater survey and sampling was carried out in Minicoy atoll during December 2015 for georeferenced mapping of the distribution and diversity of hard corals by SCUBA diving and snorkeling adopting Life – form line intercept transect method (English et al., 1994). The transects were positioned randomly over the reefs and all conspicuous benthic life forms underlying the transect lines were monitored. Species wise distribution was recorded for scleractinian corals. Linear scale of coral cover (Gomez and Yap, 1988), Relative abundance of corals (Rilov and Benayahu, 1998) Coral Mortality Index (Gomez et al., 1994) and Biodiversity Analysis using PRIMER (v.6) were also carried out. Digital photographs and video graphs of corals were taken using NIKON AW 130 and Sony Cybershot RX100 respectively.



Minicoy island

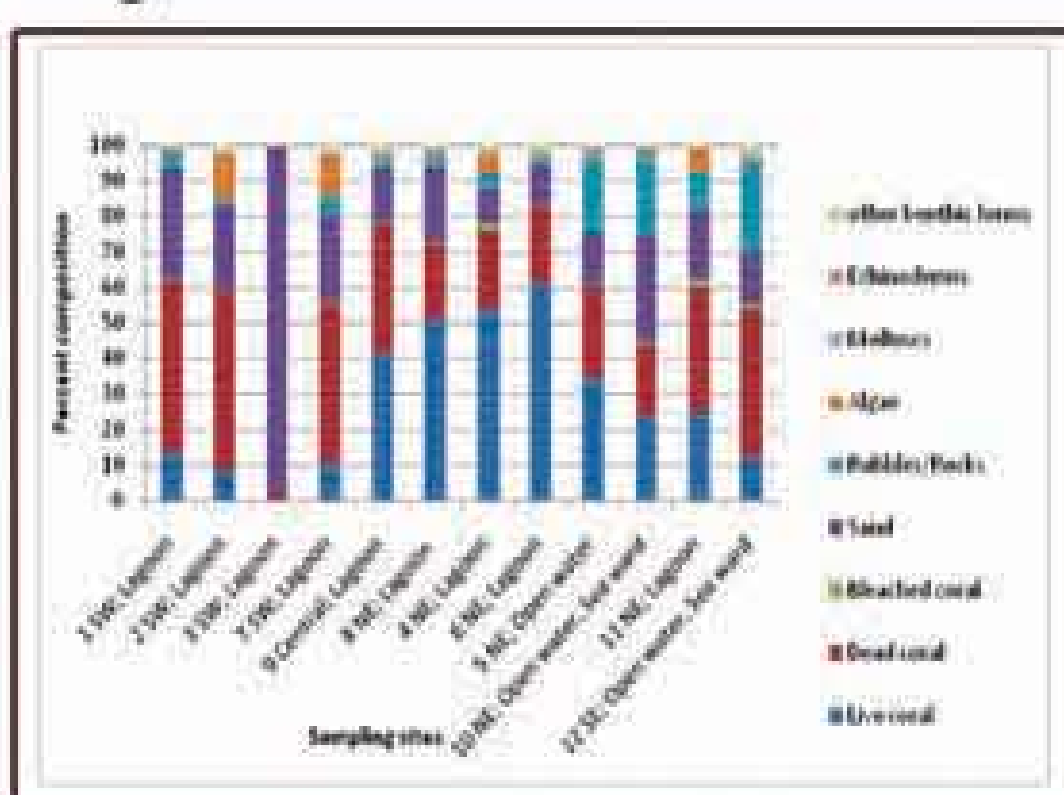


LIT stations covered under the study

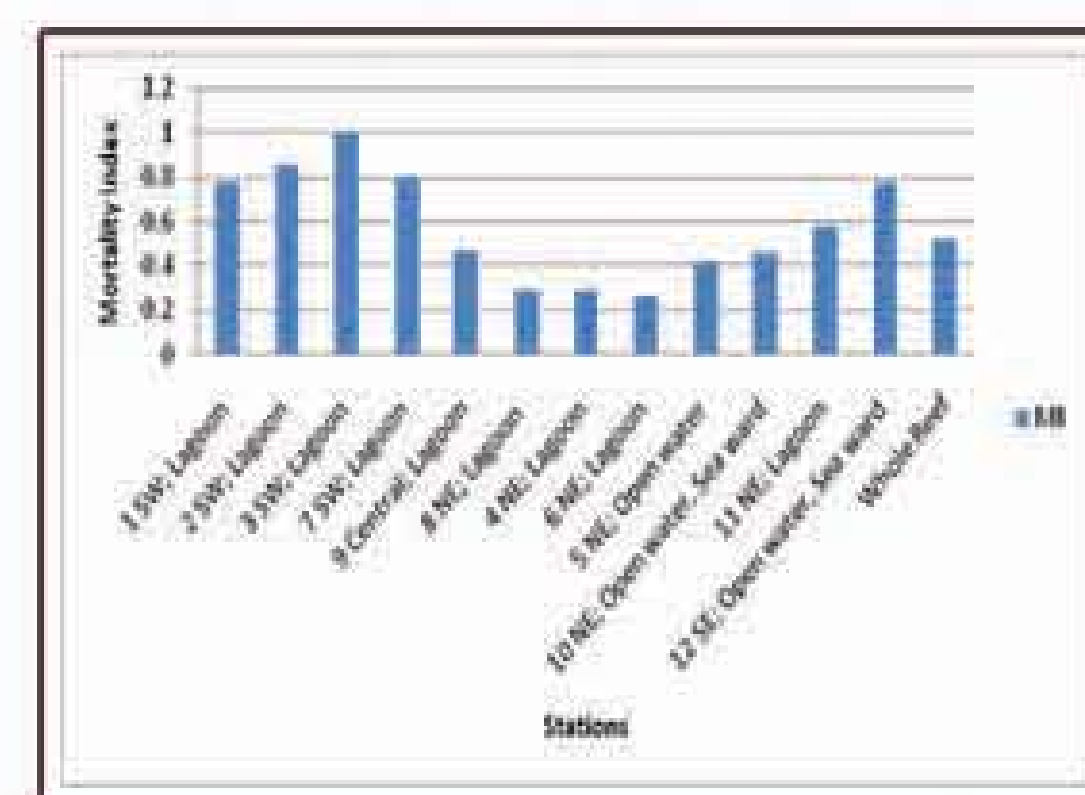
SALIENT FINDINGS

CORAL COVER AND DIVERSITY

The diversity and distribution of corals was more in the inner side the reef crest and the shallow areas of lagoon. The reef formation was more along the reef crest area and the rest of the lagoon, it exist as patchy growth. In the open water, the north eastern part of lagoon has a narrow slope where the sub-massive and massive corals are distributed where as in the north western side is with a reef flat occupied mostly by branching and plate corals. The reef showed an average live coral cover of 27.94% and average dead coral coverage of 30.78%, most of which were covered with algae. The rest is contributed by rocks, sand and other benthic flora and fauna. Based on reef condition index, minicoy reef falls under the "fair" category as the linear scale of live coral cover was 27.94%. Coral mortality index were derived for different transect areas. Average coral mortality index (MI) for the reef was 0.52, well above the cut off value of 0.33 to fall under the category 'sick' which shows that the health of the reef is in good condition.

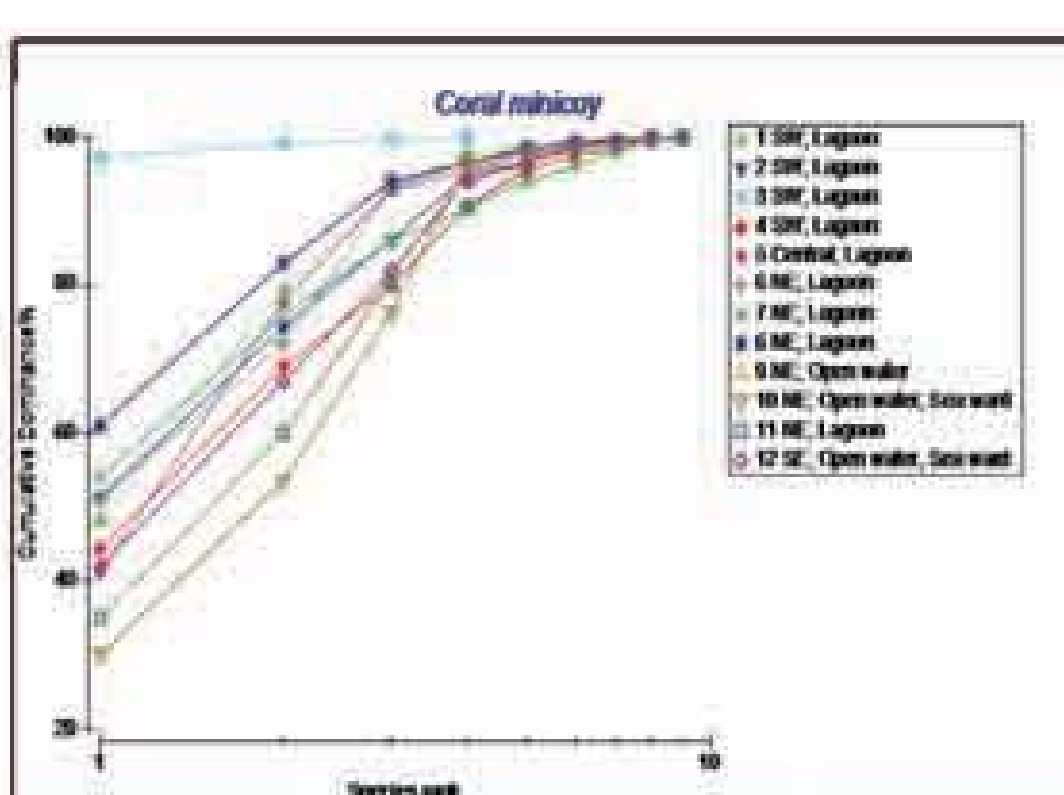


Overall percentage benthic composition

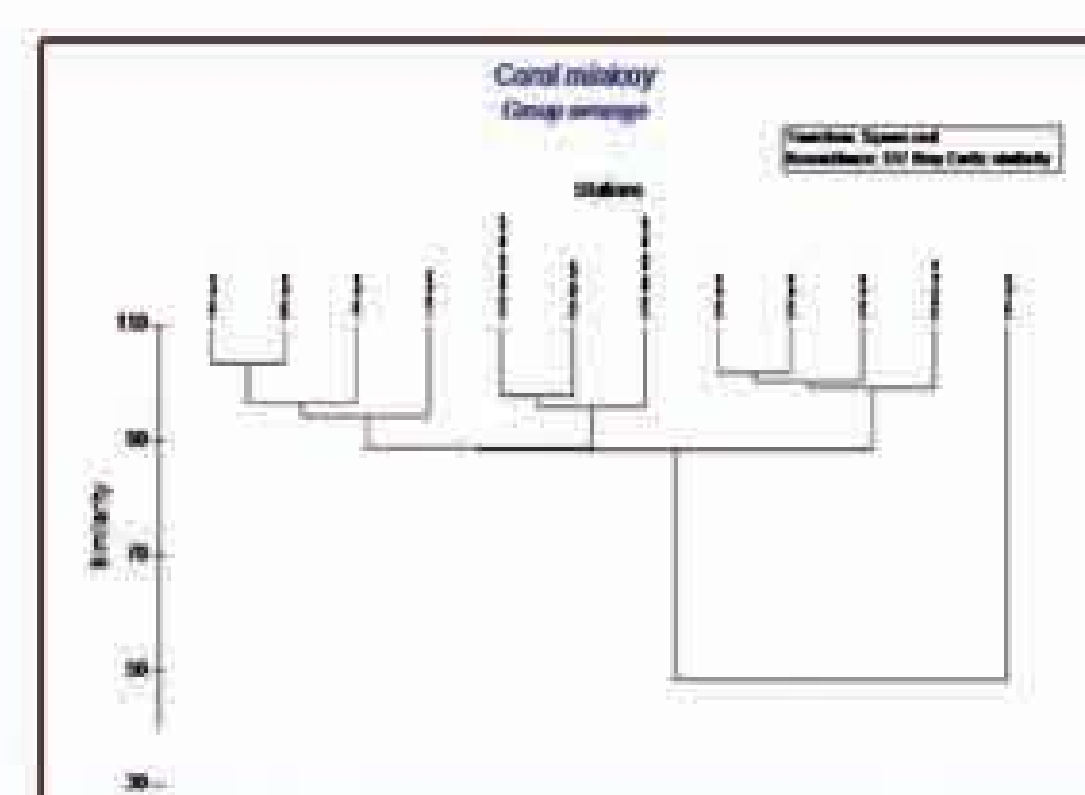


Mortality Index in the different transect area

The most dominant genera by extent of coral cover were found to be *Acropora* and *Porites*. The dominance plot for the 9 NE open water seaward side, clearly indicates that the curve showed a gentle slope with medium starting point indicating medium diversity. The same pattern was also evident in the dendrogram, the highest similarity was found between the 7 SW; Lagoon and 2 SW; Lagoon with 93.36% similarity. The sites 3 SW lagoon lying far apart in separate cluster with lowest similarity with all the other station.



K dominance plot Station wise



Dendrogram of different forms observed from different stations

Study on Coral fauna of Minicoy was initiated by Gardiner (1904, 1905) and later Pillai made extensive studies (1976; 1983a; 1986) and reported 103 species of hard corals belonging to 37 genera (Pillai and Jasmine, 1989). In the present study 75 species of reef building hard corals belonging to 32 genera under 11 families were recorded. Species diversity was maximum in Acroporidae with 22 species, followed by Merulinidae (14), Poritidae (8), Pocilloporidae (7), Fungidae (6), Lobophyllidae (4), Agaricidae, Mussidae and Psammocoridae (3 each), Euphyllidae (2) and the monotypic Diploasteridae. The scleractinian coral *Echinopora lamellosa* (Esper, 1795) has been recorded for the first time from this island. The genera *Echinopora* and *Montipora* were considered to be absent from the coral fauna of Minicoy by earlier workers, giving it a distinct composition when compared to that of the northern islands of the Lakshadweep archipelago. The current record of *Echinopora lamellosa* and *Montipora* establishes that the coral faunal composition of Minicoy is similar to that of other Lakshadweep islands.



Echinopora lamellosa



Porites lutea



Fungia sp.



Pocillopora meandrina



Heliopora coerulea



Acropora muricata

THREATS FACED BY MINICOY REEF

Disease, predation and stress were the major factors cause mortality of hard corals in any reef. The causes of coral disease outbreaks are complex and important drivers of coral disease include climate warming, and other anthropogenic stressors such as land-based pollution, sedimentation and overfishing. In Minicoy large scale bleaching, encrustations by coralline algae, ascidians and encrusting sponges were noticed in branching corals, especially in *Acropora* spp. Disease conditions were noticed in massive corals; pinking and ulcerative syndrome in *Porites* spp., tissue loss and brown band disease in *Favites* sp. large scale bleaching and ulceration in *Pavona* sp. Damage due to trematodiasis, infestation by feather duster worms and predation by giant clam *Tridacna* sp. was also noticed. The north eastern and northwestern sides of the island due to the pollution from construction activities the damage observed was comparatively high than the other sites. Large scale bleaching and ulceration, disease and algal encrustation in the massive corals were noticed in this area. Suspended solid matter in seawater of northern region is very high (turbidity 11.16 ntu) probably owing to the enhanced construction activity in this site. The major factor in habitat destruction is through transport vessel movement and particularly anchorage in the lagoon side.



Ascidian infestation



Overgrown Filamentous algae



Bleached and dead *Acropora*



Bleaching and tissue loss in *Pavona* sp.



Pinking and tissue loss in *Porites lutea*



Ulceration and tissue loss



Plastic debris



Construction debris

CONCLUSION

Coral reefs of the Indian subcontinent are under severe threat as there has been significant decline in live coral cover. Reef environment and the associated fauna in Lakshadweep is fast deteriorating and like the other islands in the archipelago, Minicoy also face threats from various anthropogenic activities mainly in habitat destruction. Studies have shown that the concentration of petroleum hydrocarbons is higher at Minicoy in comparison to other islands. Management strategies has to be formulated and implemented to utilise the reefs on a sustainable level and there is imperative need for convincing management interventions to create awareness among the various stakeholders to conserve this precious pristine wealth.

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