



Research Paper

ALTERATION IN GROWTH FORMS OF SOME OF THE SCLERACTINIAN CORALS IN THE GULF OF KACHCHH – WESTERN INDIA

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Abstract

There are four major coral reef areas in India viz., Gulf of Kachchh, Gulf of Mannar, Lakshadweep and Andaman and Nicobar Island. More than 60 species of corals are recorded from the Gulf of Kachchh till date by researchers. Coral growth form is one of the characters of corals, researchers using for their identification. The present study describes alteration in two genera of scleractinian corals viz., *Favia* and *Turbinaria*. The observation suggests that environmental factors like higher sedimentation and long-time exposure of reef to air causing desiccation has altered growth form of coral species *Favia fava* and *Turbinaria peltata*. The same altered growth form in *Favia fava* was also found in other species of genera *Favia*.

Key words: Coral reef, Growth form, Gulf of Kachchh.

INTRODUCTION

Coral reefs are the ecosystem of shallow tropical seas [1]. The reefs are distributed like a belt around the globe between the Latitude 35° 10' N and 32° S covering an area of approximately 50,00,000 square miles [2]. Corals have very particular requirement such as hard bottom as substrate because the larvae cannot settle on a soft bottom. They can grow in wave sheltered [3] and shallow area and where light can penetrate for the zooxanthallae algae on which they depend for food through photosynthesis. Reef building corals are limited to warm water and can grow and reproduce only if the average water temperature is above about 21°C and lower to 17.5°C [4]. Most coral reefs exist in stable salinity ranged between 34 – 36ppt [1]. Increased sedimentation rate cause severe reef degradation of coral reef organisms and reduce light availability for photosynthesis of symbiotic algae [5]. They are also sensitive to pollution of many kinds. Even low concentrations of chemicals are harmful [6]. In high concentrations, nutrients too can be harmful to reef growth. Nutrients may harm the corals directly by interfering with the formation of their skeleton [1].

In India, the reef is restricted to four major areas viz., Gulf of Kachchh, Gulf of Mannar, Lakshadweep and Andaman and Nicobar Islands. Estimated reef flat areas recorded through remote sensing are 148.4 Km² in Gulf of Kachchh, 64.9 Km² in Gulf of Mannar, 140.1 Km² in Lakshadweep and 813.2 km² in Andaman and Nicobar Island [7].

A tiny sea anemone like animal called polyp is the smallest unit of a coral colony. The colonies of hard corals are found in different growth forms and are used in the identification and description of corals from which six major growth forms found among the Gulf of Kachchh are, massive (hemispherical or have similar dimensions in all directions), submassive (form small columns, knobs or wedges), branching (Branch with compact radial subbranches), foliose (leaf or plate like), encrusting (thin layer or crust over underlying substrate) and solitary (single individuals)[8]. But some of the abiotic factors influence the growth forms such as light, sedimentation, water movement,[5, 9, 10, 11]. Such changes have also been observed in Gulf of Kachchh mentioned below.

RESULTS

Table 1: Growth forms of scleractinian corals

Sr. No.	Species	Original growth form	Observed /altered growth forms
1.	<i>Turbinariapeltata</i>	Plate like	Massive and encrusting
2.	<i>Favia fava</i>	massive	Pseudo-encrusting (Dead from the top)

***Turbinariapeltata*(Esper, 1794)**

IUCN Category: Vulnerable

Turbinariapeltata is one of the hard coral species found in Gulf of Kachchh, with its representation from almost all reef regions [8]. Total three species are found from genus *Turbinaria* [12]. The general growth form of *Turbinariapeltata* found in the world is plate like[8] (Figure 1A). Apart from this, two altered growth forms were observed having massive growth form (Figure 1B), encrusting (Figure 1C) and plate like with central mound (Figure 1D).

***Favia fava* (Forskål, 1775)**

IUCN Category: Least concern

Favia fava is the most dominant and common species recorded from all reef areas of the Gulf of Kachchh[8]. Total 6 species are found from genus *Favia* [12].The general growth form of *Favia fava* is massive [8](Figure 1A). The altered growth form found in this study hasPseudo-encrusting (Dead from the top and appears as encrusted on the sides of the boulder or dead coral) (Figure 2B) growth form.Also in all the other species of *Favia* are found to have this type of altered growth form.

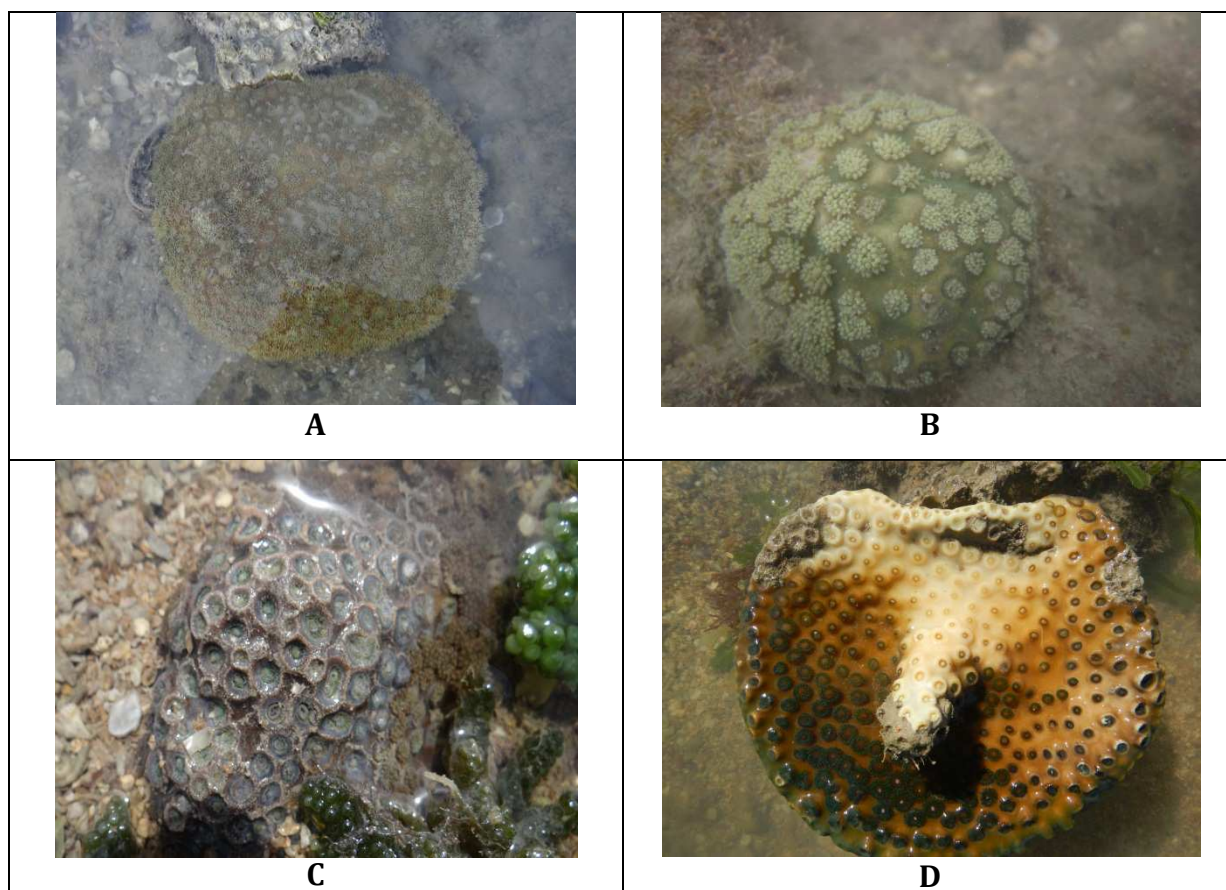


Fig 1: Different growth forms of *Turbinaria peltata*



Fig 2: Different growth forms of *Favia favus* and *Favia speciosa*

DISCUSSION

The alteration in the growth forms can be attributed to various environmental factors such as high sedimentation in the area covering the coral colony, desiccation due to the long exposure to air during low tides, dynamic current pattern and lot more. Whereas the reef growth is controlled by salinity, temperature, light (both quality and quantity), nutrients, exposures and other hydrodynamic factors such as sediment and seawater carbonate chemistry [1]. In the Gulf of Kachchh, the reefs are degrading day by day because of two main factors such as sediment deposition and coral bleaching due to sea surface temperature rise and low tide exposure [13]. Deposited sediment particles smother the reef organisms and reduce light availability for photosynthesis to its

symbiotic algae zooxanthallae[5]. Some studies on the different types of growth forms of a species revealed sedimentation as the main factor to change their form [5, 9, 10, 11]. The alterations observed in the species are showing adaptability of particular species to their adverse condition. In the case of *T. peltata* the altered growth form (Figure 1C & 1D) can be due to variations in the flow angle of the receding tide, whereas Figure 1B is purely due to the sedimentary deposition on the available substrate, restricting the further settlement of coral polyps. In *Favia favus* the deposition of fine sediment is clearly visible on the top of the colony causing tissue death and gives an appearance of an encrusting colony. It is also observed that the colony which gets exposed during the low tides showed the symptoms in greater number. However detailed observations and correlations are required to establish the localised effect of such parameters on the growth of various scleractinian corals.

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