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Taxonomy and diversity of rock and coral boring bivalve genus *Lithophaga* from Visakhapatnam coastal waters, east coast of India

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Abstract

There has been a renaissance of taxonomy and related subjects such as abundance, ecology and distribution of species as biodiversity in the last two decades. Diversity of rock and coral boring organisms comprises the most specious assemblages and species specificity of invertebrates. Diversity of rock and coral boring bivalve species taxonomic compositions were described along Visakhapatnam off shore region. They occurred on the huge cement concrete boulders and corals in the Visakhapatnam fishing harbour region and the entrance channel region of the port. Two species of genera *Lithophaga* were collected and observed in the Visakhapatnam offshore region. Diagnosis based on shell characters are given for *Lithophaga laevigata* (Quoy & Gaimard, 1835) and *Lithophaga teres* (Philippi, 1846) from the family Mytilidae. Morphological comparisons of shells are made for these two species. It is observed that the infestation of the boring organisms of different bivalves is very highly bore at the bottom region, at the junction of the arms region of the coral. The bivalves bored into different substrates such as limestone, calcareous rocks, sand rocks, rubber material, and polyvinyl, plastic, wood, live and dead coral. The diversity of two species of *Lithophaga* genus is abundantly available in Visakhapatnam coastal waters.

Keywords: Diversity, *Lithophaga*, rock and coral boring bivalves, Visakhapatnam off shore region, East Coast of India.

1. Introduction

The corals are very beautiful form and it is very important ornamental organisms as like that of the spectacular and coloured fishes of the oceans. They were in different colours like ash, like red. It is very good habitat for the hundreds of invertebrates forms and to vertebrates especially the fishes.

The corals are the beautiful good hide outs for much number of organisms and the burrowing of marine organisms into corals and concrete stone has been familiar for a long time to the researcher, but it has received scarcely the concentration it deserves from the national geographers and the scientists. The date mussels are a forms now living only below the level of high water in the world seas. In geographical literature the references made to the part played by boring organisms in the destruction of rocks are only cursory. The destructive action of certain molluscs, annelids and echinoderms on coral reefs has been recognised. The coral and cement substrata are often found as riddled with cavities as to fall any easy prey to the pounding of the waves alongside seashore. The depending of the lagoons of atolls has been ascribed in part to the destruction of dead coral by boring animals.

Coral boring bivalves are very highly destructive organisms. These boring bivalves effectively and extensively bore in to the wood but also the hard substrates like calcareous substrates on to the corals. The bivalves that bore into the corals and also the lime, sand stones and concrete boulders. The damage very heavily and also their destruction is very much. Number of fouling and boring bivalves are attacked the corals and make the corals very week and thereby we can say the deterioration takes place so much of deterioration by these forms. Many researchers [1, 2] worked on it or Indian region.

The distribution of corals by biological agents and human exploitation adversely affects the reefs. Coral boring organisms are very destructive group of forms which damage the corals heavily [3, 4]. Some other expertise [5, 6] pointed out the importance of coral borers in the devastation of concrete reefs and sand stones. Limited number of studies has been conducted with regard to corals as well as biodiversity of boring organisms in Visakhapatnam waters.

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So the present objective of the study is to trace out the diversity on rock and coral boring organisms with special emphasis on Visakhapatnam coastal waters.

2. Material and methods

Present study for the material has been collected corals and limestone were examined for boring bivalves, intertidal and sub tidal region in Visakhapatnam coastal waters jut region of the vicinity of the Dolphinnose (Lat.17°44' N, Long 83° 23' E). Dead and live coral specimens were brought to the laboratory from the outer harbour region from the huge boulders that were dumped into the sea near the shore to obstruct the water movement into the entrance channel of the ships for observation on their boring habits and all associated macro fauna was collected and preserved in 4% formalin. The living and dead corals broken by using a chisel and hammer. The present study shows one genus, two species, less than one family Mytilidae, genus *Lithophaga* species occurrence and abundance of various forms in the Visakhapatnam off shore region. The classification list of the genera and species identification is based on the keys [7-11].



Fig 1: Map showing Study area

3. Results

During the present study investigated, a total number of two boring bivalves' species were identified belonging to family Mytilidae. Bivalves are very highly bore at the bottom region, at the junction of the arms region. The boring infestation is a very scanty.

A definite organism the sea anemone which lives on the hermit crab, the *Pocillopora eydouxi* having a definite bivalve is nothing but the *Lithophaga laevigata*.

Lithophaga laevigata (Quoy & Gaimard, 1835) (Fig: a)

Shell up to 10- 20 mm long, very highly conspicuous, smooth, periostracum slightly yellowish to light brown, latero-posteriorly covered by an incrustation of thin, a little wavy, hard ridges, divaricating in a chevron pattern or resembling wrinkle marks, and increasing rather in width towards the posterior region, protruding somewhat beyond the shell rim as interlocking system found in the teeth. The narrow grooves

between the ridges are filled with softer white deposits, levelling the surface and make it look smooth.



Fig (a): *Lithophaga laevigata* (Quoy and Gaimard, 1835)

Lithophaga teres (Philippi, 1846): Fig (b)

Shell surface sculptured, lacking superficial calcareous incrustations; Sculpture of irregular, wavy, near vertical cords confined to antero-ventral area; moderately strong; elongate-elliptical, smooth postero-dorsally but sculptured antero-ventrally by conspicuous, crowded, vertical, parallel cords. Interior iridescent, exterior whitish but covered with a thick, smooth, dark-brown to almost black periostracum. Umbos sub-terminal; anterior and posterior ends rather sharply rounded; ventral margin straight or slightly convex; antero-dorsal margin (hinge-line) almost half the length of the shell, slightly convex; postero-dorsal margin straight; dorsal angle weak and low. There are no superficial calcareous incrustations but the posterior margins are sometimes thickened and lip-like, presumably forming a plug to block the burrow mouth and serving the same function as the thick posterior accretions of some other species. In older specimens successive phases of thickened posterior margins are often recorded as a series of thick concentric growth ridge.



Fig: (b) *Lithophaga teres* (Philippi, 1846)

Rock and coral boring organisms community abounding the Visakhapatnam offshore region was composed of two species represented by *Lithophaga* species namely *Lithophaga laevigata* (Quoy & Gaimard, 1835) and *L. Teres* (Philippi, 1846). Coral boring bivalves in this offshore region is usually

dominated by *Lithophaga laevigata* (Quoy & Gaimard, 1835) species, followed by *L. Teres* (Philippi, 1846 (Philippi, 1846) that mostly dwell in around by rock and coral vegetations. Numerical abundance of these marine borers was generally high. The study provides insights into the diversity and abundance of coral boring bivalves.

4. Discussion

The rock and coral boring bivalves of the Visakhapatnam region are diverse and numerous. With modest sampling effort, two species representing one family were observed and collected. While quantitative studies were not undertaken, several lime stone rocks had more than 40-50 individuals/m². However there was a distinct patchiness to the distribution of these borers, even with seemingly identical substrata in adjacent areas. Often, large limestone boulders were completely void of bivalve borers, where adjacent rocks were riddled with Mytilidae.

Careful examination of the living bivalves and boreholes has confirmed the boring mechanisms of two species. In agreement with different authors^[12, 13, 14] Reported 22 species of boring bivalves belonging to 11 genera from Indian waters. This information is mainly based on the collections from different coast (Mandapam south east coast of India, Quilon Coast, Minicoy and Andaman Island). For outside the scope of this paper are conclusions about the localized or global distributions of many boring bivalve.

5. Conclusion

These bivalves that are present in dead coral and live coral, as well as calcium deposited rocks of Visakhapatnam vicinity. The occurrence of these things shows or says even these types of forms that are available not only in Visakhapatnam reef area but also in the calcareous rocky shore region. The diversity of *Lithophaga* genus is abundantly available in these coastal waters. Because of availability of these species it shows taxonomically which is most important to species diversity and distribution with the above information we can come to a conclusion that the taxonomic importance is very much and it is worthwhile to the coming scientific community such as ecology their habitat and their importance.

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