Opportunistic infestation of boring sponge *Cliona* sp. on naturally settled *Porites lutea* on concrete manhole rings in Vedalai coastal waters, Mandapam region, Tamil Nadu

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Abstract  
A rare habitat of massive coral *Porites lutea* growing on concrete manhole rings was observed at Vedalai coastal waters in the present study. This coral species is attacked by boring sponge *Cliona* sp. which is usually prevalent in coral reef areas. Interestingly, this boring sponge, *Cliona* sp. attacking *P. lutea* was also observed to be attacked by an unidentified black colored sponge. Observations of this study infer that coral and sponge interactions and dynamic changes in coral surfaces area are needs to be investigated spatiotemporally to understand coral and sponge associations.

Keywords: *Porites lutea*, *Cliona* sp., concrete manhole rings, Mandapam.

Introduction  
Coral reefs in the Gulf of Mannar Marine Biosphere, Southeast coast of Tamil Nadu, India, are facing potential threats from sedimentation, invasive algal blooms and boring organisms like sponges. Settlement preferences of different coral species for regeneration on dead reefs, coral rubbles and other artificial substrates which are cemented with crustose coralline algae is highly dependent on successive rate of algae, sponges and sedimentation as well as environmental conditions. Evidently, some coral species are reported to choose to settle on hard calcium carbonate skeletons of live and dead shells of the bivalve *Modiolus philippinarum* (Laju et al. 2019). Likewise, in a rare incidence, during coral reef restoration activities, a massive coral, *Porites lutea*, naturally preferred to grow on an artificial substrate of concrete manhole rings was documented at Vedalai coastal waters. On the other hand, *Porites* corals in the Indo-Pacific reefs environments are highly affected with widespread boring sponge, *Cliona* sp. (Calcinai et al. 2000). During this survey, opportunistic infestation of *Cliona* sp. overgrowing *P. lutea* colonies was documented and being reported in this study.

Materials and methods  
Underwater surveys were investigated at Vedalai coastal waters (9°15´48.00˝N, 79°06´12.77˝E). Concrete manhole rings deployed at 2 m depth for holding the harvested lobsters were investigated to see any settlement of coral colonies on concrete substrate. Massive coral colonies of *Porites lutea* growing on these concrete manhole rings were observed and photographed using underwater camera Nikon Coolpix. Invasion of coral boring sponge *Cliona* sp. was also photographed for understanding its distribution range other than coral reef areas.

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Results and Discussion

Concrete is a well-known substrate used for coral transplantation in Indo-Pacific reefs. Settlement preferences of various coral species as well as other marine fouling organisms on concrete substrates are well documented and highly recommended over other substrates due to its durability and shape flexibility (Fitzhardinge and Bailey-Brock, 1989). In a rare occurrence, *Porites lutea* growing in a new habitat near intertidal region of Vedalai coast which was fully occupied by seagrass bed was observed. Merely, *P. lutea* coral colonies were found to settle and grow on these concrete manhole rings (Fig. 1a & 1b). Previous study investigated the infestation of boring sponge *Cliona* sp. on *Porites* colonies and other coral species in the reef environment (Schonberg 2002). However, prevalence of *Cliona* sp. in intertidal region has not been documented. In this study, attack of *Cliona* sp. on *P. lutea* was documented at Vedalai coast, just 50 m away from the beach. While, fringing coral reef patches are found around the Islands in the Mandapam region. Evidently, *Cliona* species overgrowing *P. lutea* colonies were documented for the first time in the Mandapam region (Fig. 1c & 1d).

Fig. 1. Attack of *Cliona* sp. on *Porites* settled in a new environment. Concrete manhole rings at 2 m depth (a), *P. lutea* colonies (b), *Cliona* sp. attacking *P. lutea* (c), *Cliona* sp. overgrowing *P. lutea* colonies (d), an unidentified black sponge overgrowing *Cliona* sp. (e).
This Cliona sp. is overgrown by an unidentified black color sponge (Fig. 1e). This observation raises two questions: 1) does Cliona sp. always attack Porites colonies which are settled away from reef environments? 2) what could be the underlying cause for Porites specific invasion? These questions are needs to be addressed in the future research for better understanding the relationship between Porites and Cliona sp. Natural settlement preference of Porites on these concrete manhole rings indicates that these artificial substrates can be effectively used for restoration of massive Porites corals in the dead reef areas. Further observations on the above raised questions are being monitored to understand the long-term changes and dynamics occurring between Cliona and Porites on this artificial concrete manhole rings.

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References