

Five Scleractinian Corals as a New Record from Andaman Islands-A New Addition to Indian Marine Fauna

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Abstract: Scleractinian corals are one of the most promising components of marine biodiversity with constructive mode of attributes. Andaman and Nicobar Islands are two of several hundreds of islands with enriched hermatypic corals. With the existence of vast number of species of stony corals; five scleractinian corals such as *Cycloseris vaughani* (Boschma, 1923) belongs Fungiidae family, *Leptoseris tubulifera* Vaughan, 1907 belongs to Agariciidae family, *Turbinaria radicalis* Bernard, 1896 belongs to Dendrophyllidae family and *Goniopora savignyi* Dana, 1846 and *Goniopora pearsoni* Veron, 2000 belongs to Poritidae family, are observed as the new addition of marine fauna to Indian waters. The paper dealt with the morphological and structural attributes of these corals.

Key words: Andaman and Nicobar Islands · Marine biodiversity · Hermatypic Corals

INTRODUCTION

The Andaman and Nicobar group of Islands is located in the South-eastern of Bay of Bengal, between 6°-14° N latitude and 91°-94° E longitude. They are the part of the mountain chain and lie on a ridge that extends southward from Irrawaddy delta of Burma, containing the trend of the Arakan Yoma range [1]. There are 106 protected areas in these islands, 96 designated as wildlife sanctuaries, 9 national parks and one biosphere reserve. Among 9 national parks, 2 are marine national parks which have not yet inventoried thoroughly. The coral reefs of Andaman and Nicobar Islands are the biodiversity hot spot of India [2]. Coral reefs, in particular, are critical habitat that supports diversity of both residential and migratory faunal species especially for those are considered to be endangered and vulnerable. The structure of a reef provides homes and food for many types of plants, fish and invertebrates. Coral and rocky reefs constitute one of the most important ecosystems in our planet, being their astonishing diversity, productivity, abundance and beauty some of their main characteristics [3]. According to recent studies, coral reefs constitute one

of the country's main marine assets [4, 5]. Presence of diversified scleractinian corals in the Andaman and Nicobar group of islands will enhance the ecosystem for its better nourishment in future stock. The present paper is the descriptive analysis of morphological characters of five scleractinian species which are encountered as the new to Indian Waters.

MATERIALS AND METHODS

Extensive surveys were conducted in the Andaman and Nicobar Archipelago to monitor the coral reefs during August, 2010 to January, 2011 by employing Self-Contained Underwater Breathing Apparatus (SCUBA) diving. Species identification was confirmed by Veron and Pichon [6, 7], Sheppard [8], Wallace [9] and Veron [10]. Corallites of the specimen were studied in details for morphological features under stereo microscope (Leica, M 205 A). On completion of detailed structural study, the type specimens were registered in National Zoological Collection and deposited at Zoological Survey of India, ANRC, Port Blair.

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RESULTS

The five scleractinian corals belong to four families such as Fungiidae, Agariciidae, Dendrophyllidae and Poritidae, were observed as new to Indian Waters after detailed taxonomical examinations. The morphological features of the five specimens are cited below.

Cycloseris vaughani (Boschma, 1923), Fig. 1

Family Fungiidae Dana, 1846; Genus *Cycloseris* Edwards and Haime, 1849

Material Examined: Twenty one specimens were observed during the monitoring of coral reefs by SCUBA diving at Long Island (Lat. 12°21.749'N and Long. 92°55.410'E) at the depth of 5-23 meter on 22nd January, 2011. One specimen (Reg. No.-ZSI/ANRC-5530) was sampled to carry out the taxonomical study.

Key Characters: Not colonial, free living, central mouth dominant, disc small, costae inconspicuous, disc entire... Genus *Cycloseris*

Disc approximately circular, disc generally flat, septa exsert around the mouth costae thin and even, septo-costae alternate at the disc margin... *Cycloseris vaughani*

Description: The corallum was mottled brown in colour with pale coloured mouth at the centre. Corallum is circular, the undersurface is flat and the upper surface regularly increases in height towards the central fossa. Septa are numerous. The central part of first and second order septa are markedly thick ended and arched above the central fossa. Those of higher orders decrease regularly in height and length and remain unequal at the periphery. Septal margins bear very small triangular to lacerate dentations. Their sides are covered with small granules. Synapticulae are visible from above, between the septa. The undersurface is solid, imperforate, with numerous costae. These are low, very thin and inconspicuous in the central half of the corallum. They become cyclically unequal towards the outer half, the principal ones being relatively thicker higher and longer. All costae bear minute conical spines or frosted granules. A scar of attachment is not visible.

IUCN Red List Category and Criteria: Least Concern, 2010.

Distribution

India: Andaman and Nicobar Islands; *Elsewhere:*

Australia, Chile, Cook Islands, Fiji, Guam, Indonesia, Japan, Madagascar, Malaysia, Maldives, Marshall Islands, Mexico, New Caledonia, New Zealand, Palau, Papua New Guinea, Philippines, Pitcairn, Réunion, Samoa, Saudi Arabia, Seychelles, Singapore, Solomon Islands, Taiwan, Province of China, United States Minor Outlying Islands, United States of America and Viet Nam.

Leptoseris tubulifera Vaughan, 1907, Fig. 2

Family Agariciidae Gray, 1847; Genus *Leptoseris* Edwards and Haime, 1849

Material Examined: Eight specimens were observed during the monitoring of coral reefs by SCUBA diving at Long Island (Lat. 12°21.749'N and Long. 92°55.410'E) at the depth of 4-18 meter on 22nd January 2011. One specimen (Reg. No.-ZSI/ANRC-5543) was sampled to carry out the taxonomical study.

Key Characters: Colony not massive, corallite centres discernible, polyps aligned between collines, corallites with individual walls... Genus *Leptoseris*

Colonies delicate fronds, fronds not highly divided, fronds not flat sheets... *Leptoseris tubulifera*

Description: The colour of the colony was pale orange brown. Colony is in horizontal, unifacial, broad with irregular fronds. Fronds form upright cylindrical tube like structural conformations which may be tall and branched. Corallites are irregular and only slightly outwardly inclined. The thecal rim is usually distinct. Septo-costae are arranged alternately, frequently second order costae become first order when a new lateral pair of second order costae develops. All septo-costae are lightly granulated with those of the first order being thicker, more exsert and more granulated. They primarily radiate from the calices centre to the margins.

IUCN Red List Category and Criteria: Least Concern, 2010.

Distribution

India: Andaman and Nicobar Islands; *Elsewhere:* Indonesia, Papua New Guinea, Seychelles, Solomon Islands and United States of America.

Turbinaria radicalis Bernard, 1896, Fig. 3

Family Dendrophyllidae Gray, 1847; Genus *Turbinaria* Oken, 1815

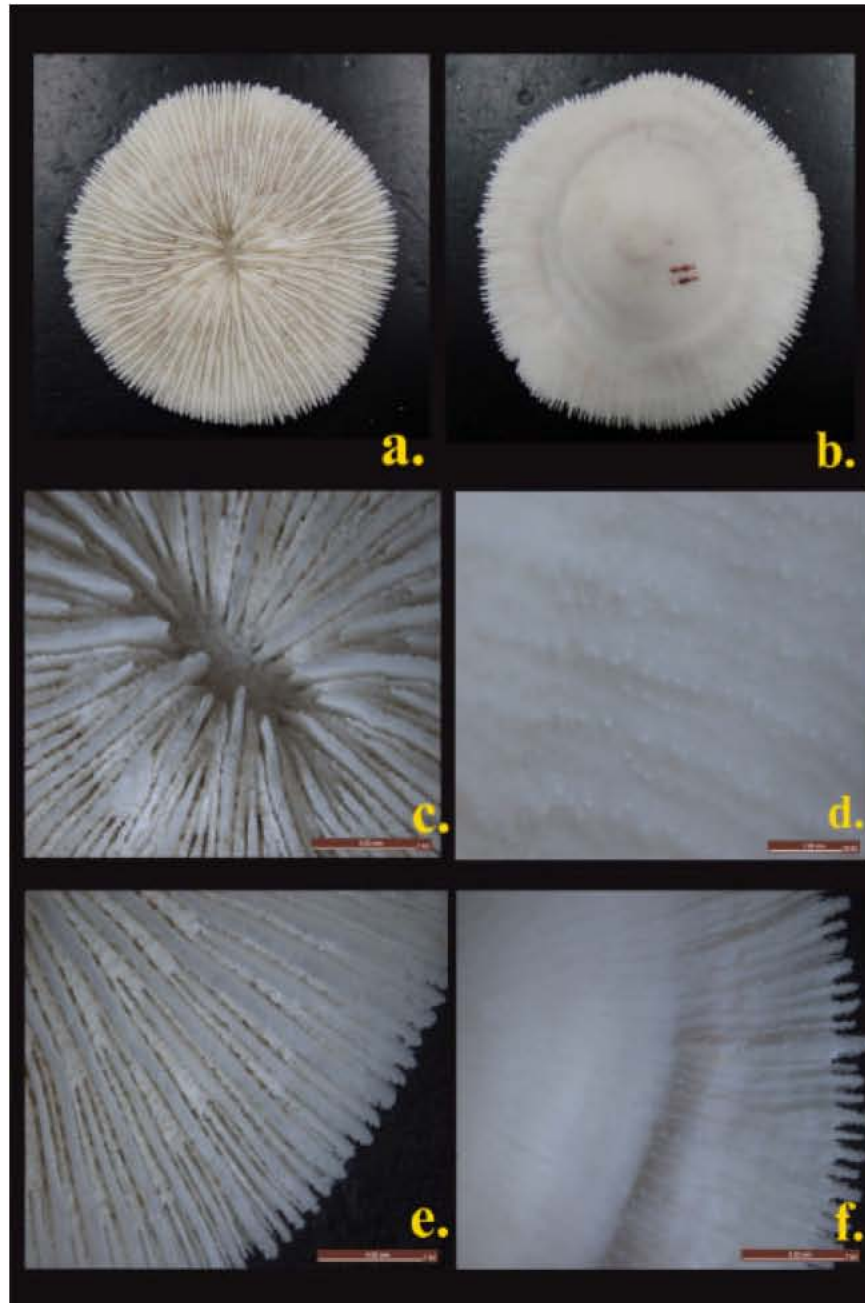


Fig. 1: *Cycloseris vaughani* (Boschma, 1923)

Material Examined: Five specimens were observed during the monitoring of coral reefs at Rutland Island (Lat. 11°27.307' N and Long. 92°36.090' E) at the depth of 8-17 meter on 19th August, 2010. One specimen (Reg. No.-ZSI/ANRC-5439) was sampled to carry out the taxonomical study.

Key Characters: Colony attached to substrate, colony with fronds or encrusting... Genus *Turbinaria*

Colony encrusting to sub-massive, colony surface smooth... *Turbinaria radicalis*

Description: Colonies are encrusting or form horizontal plates up to 15 mm thick and 1 m across. They are attached to the substrate by a series of tapering projections or rootless up to 55 mm long and 15 mm thick at their proximal end. These rootless are irregularly shaped according to the nature of the substrate they penetrate or

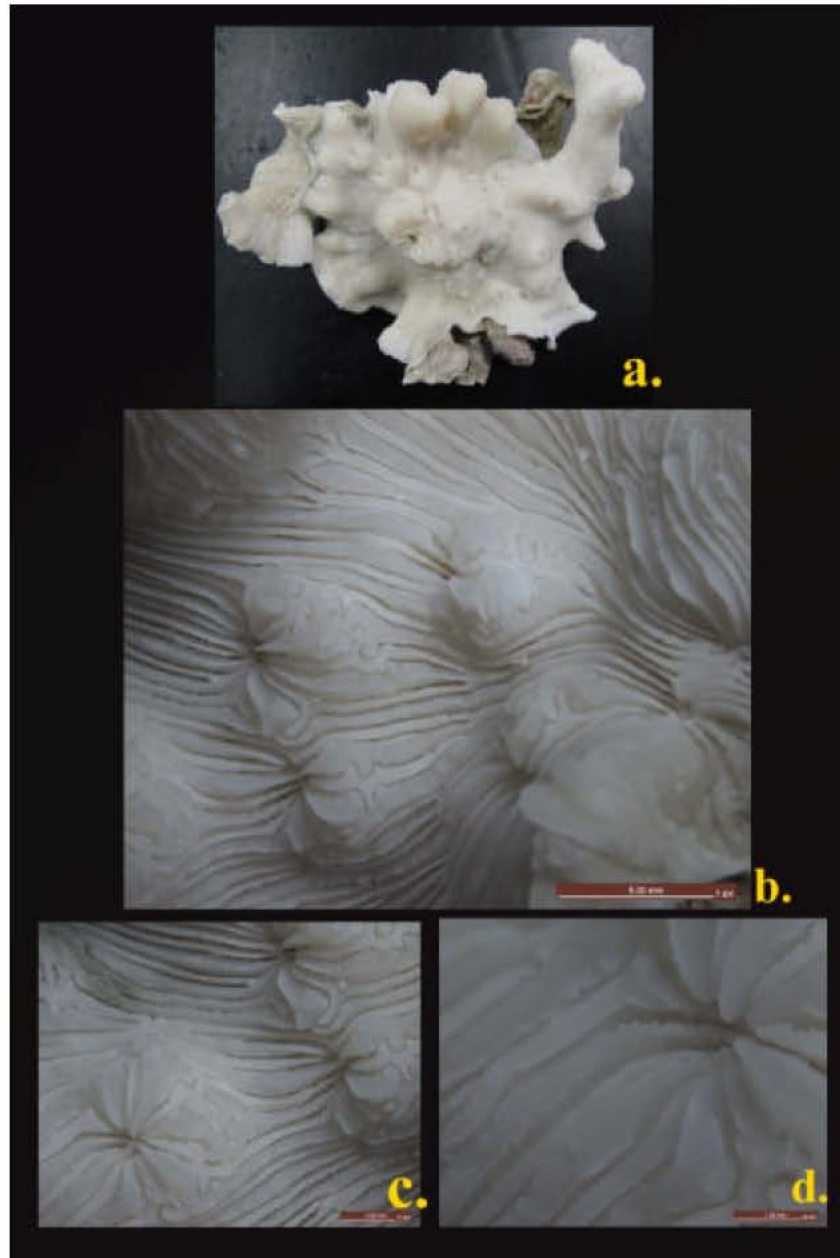


Fig. 2: *Leptoseris tubulifera* Vaughan, 1907

a. Colony; b. Corallites (7.8X); c. Thecal rim (12.6X); d. Septo-costae arrangement (29.5X)

adhere to and are frequently branched or anastomose. They are entirely made of compact coenosteum and are devoid of corallites. The cores of the rootless are composed of vesicular coenosteum. Corallites may form irregular concentric rows on flat laminae but are usually compacted on concave surfaces and widely separated on convex ones. They are never strongly inclined. They are small, circular or slightly elliptical and are slightly protuberant, with well defined margins. They contain

12-20 equal, evenly spaced septa, with non anastomosed sub-vertical inner margins. Columellae are elongate, either single or tri-ridged or sometimes taking the form of a series of vertical plates connected perpendicularly to a central ridge. The coenosteum is porous and devoid of ornamentation except for patterns produced by the deposition of corallites. Colonies are pale or dark, brown or green in colour.

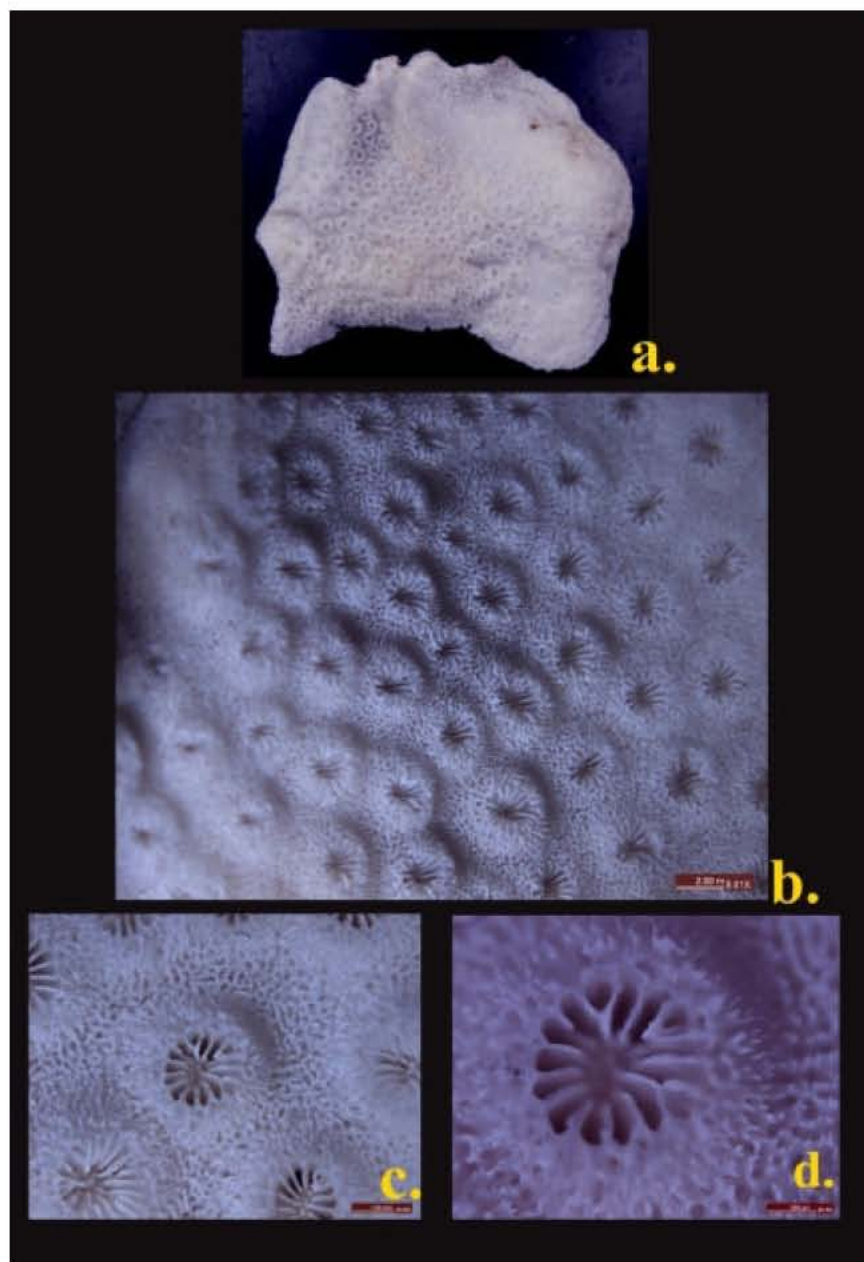


Fig. 3: *Turbinaria radicalis* Bernerd, 1896

a. Colony; b. Corallites (8.01X); c. Porous coenosteum (20.8X); d. Septa (46.5X)

IUCN Red List Category and Criteria
Near Threatened, 2010.

Distribution

India: Andaman and Nicobar Islands; *Elsewhere:* Australia, Indonesia, New Zealand, Norfolk Island, Singapore, Thailand and Viet Nam.

Goniopora savignyi Dana, 1846, Fig. 4

Family Poritidae Link, 1807; Genus *Goniopora* de Blainville, 1830

Material Examined: Twelve specimens were observed at Long Island (Lat. 12°21.749'N and Long. 92°55.410'E) at the depth of 7-18 meter on 22nd January, 2011. One specimen (Reg. No.-ZSI/ANRC-5567) was sampled to carry out the taxonomical study.

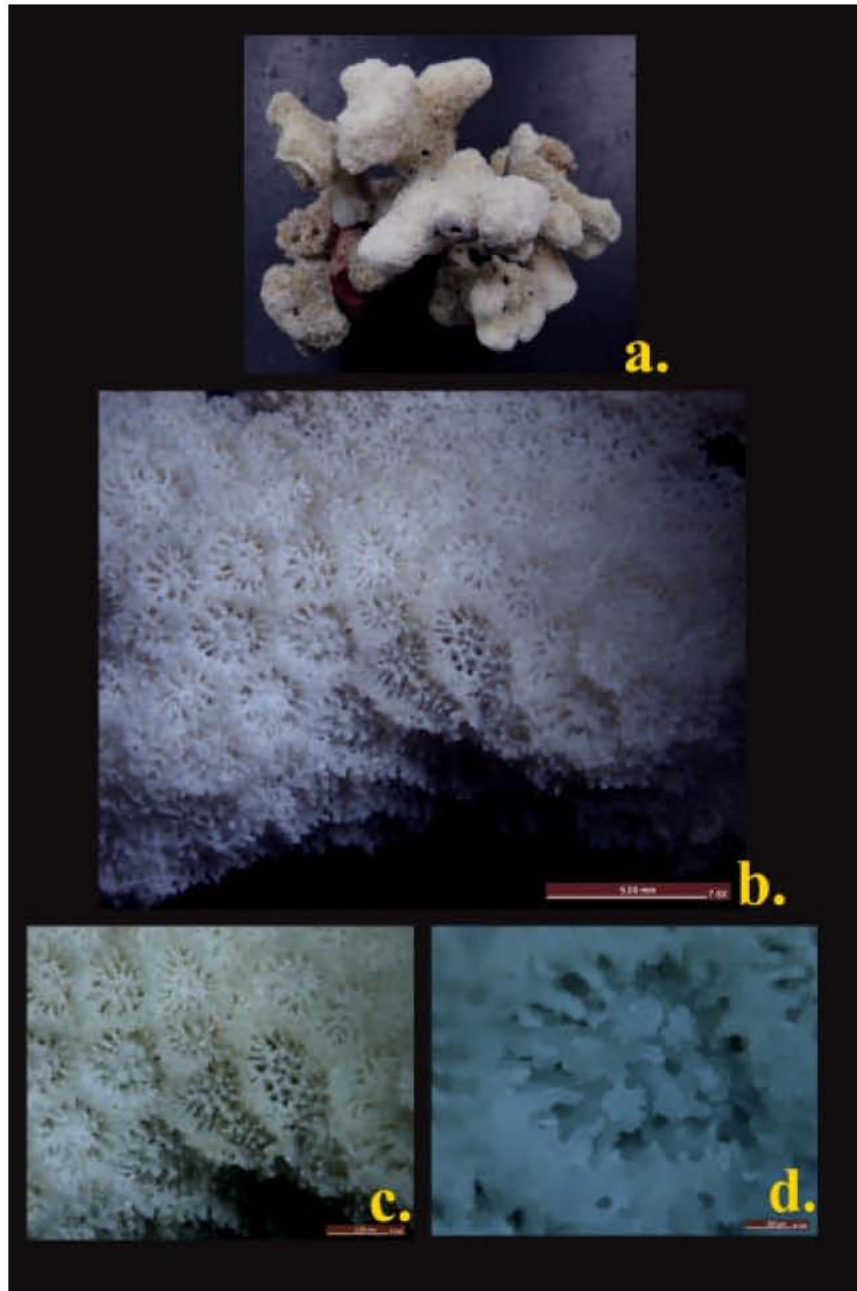


Fig. 4: *Goniopora savignyi* Dana, 1846

a. Colony; b. Polygonal Corallites (7.8X); c. Thin walled corallites (13.9X); d. Prominent Paliform lobe (44.6X)

Key Characters: Corallites >2 mm in diameter, skeleton robust, not very porous... Genus *Goniopora*

Colonies not encrusting, corallites <3 mm in diameter, colony columnar... *Goniopora savignyi*

Description: Colonies are columnar, usually with thin explanate basal plates. They are usually lobed and may be large. Calices are 2.0-2.5 mm diameter, rounded or

polygonal and uniform over the corallum surface. Walls are thin. Corallites are deep, polygonal to rounded, with short septa. Paliform lobes are prominent. Columellae are poorly developed. Polyps are a mass of grey tentacles when extended. Septa are in two alternating orders. First order septa reach the columellae and second order septa may consist of trabecular pillars in a gonioporoid pattern. All septa are strongly granulated or dentate.

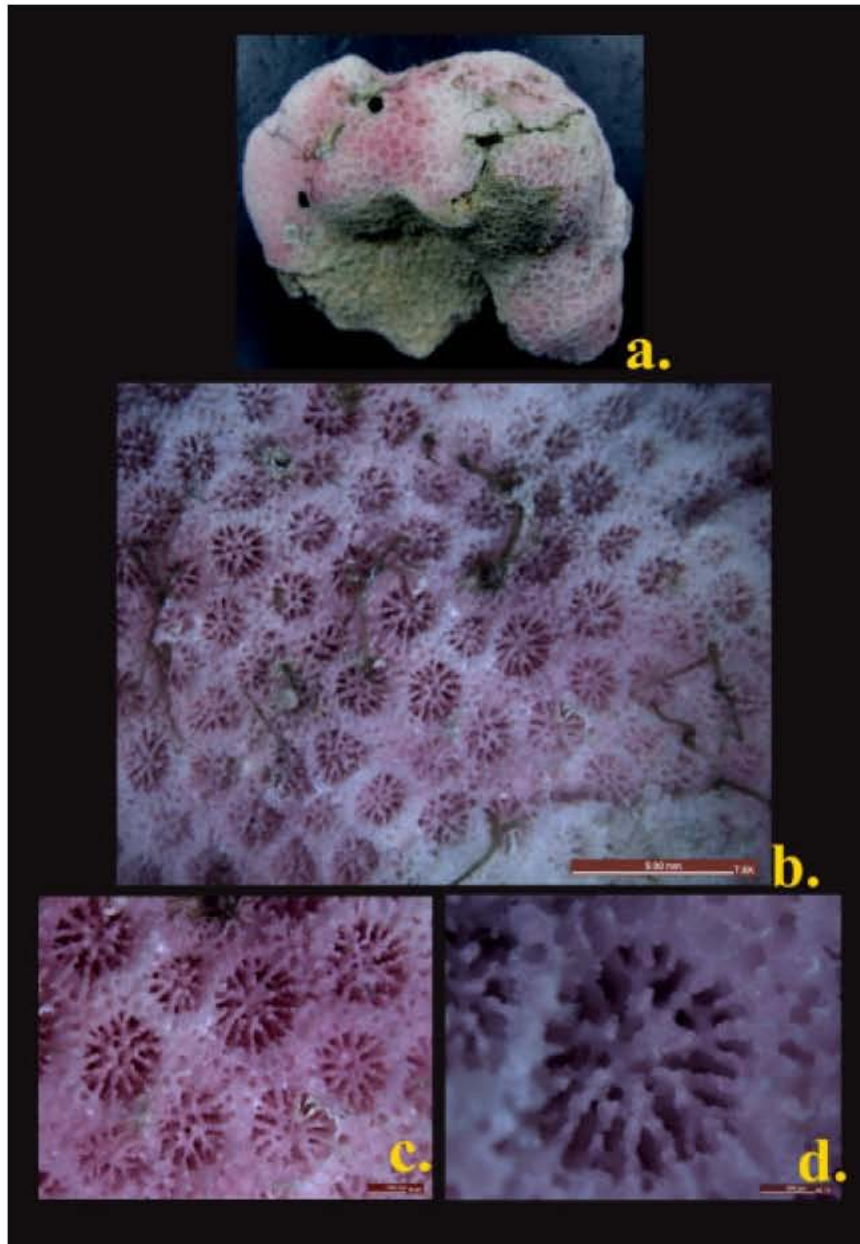


Fig. 5: *Goniopora pearsoni* Veron, 2000

a. Colony; b. Corallites (7.8X); c. Septa (18.9X); d. Paliform lobes (49.1X)

IUCN Red List Category and Criteria
Least Concern, 2010.

Distribution

India: Andaman and Nicobar Islands; *Elsewhere:* British Indian Ocean Territory, Egypt, Israel, Madagascar, Mauritius, Mozambique, Réunion, Saudi Arabia, Seychelles, Singapore, Sudan, United Republic of Tanzania.

Goniopora pearsoni Veron, 2000, Fig. 5

Family Poritidae Link, 1807; Genus *Goniopora* de Blainville, 1830

Material Examined: Seven specimens were observed at Long Island (Lat. 12°21.749'N and Long. 92°55.410'E) at the depth of 5-20 meter on 22nd January, 2011. One specimen (Reg. No.-ZSI/ANRC-5569) was sampled to carry out the taxonomical study.

Key Characters: Corallites >2 mm in diameter, skeleton robust, not very porous... Genus *Goniopora*

Colonies not encrusting, corallites 3-5 mm in diameter, colony massive, septal development uniform among corallites, corallites shallow... *Goniopora pearsoni*

Description: Colony was grey with blue mouths. Colony was massive, hemispherical or irregular. Calices are rounded or polygonal 2.5-3.1 mm diameter. Septa are in three well developed cycles. First cycle septa have no pali. Second cycle is very prominent having large pali. Third cycle septa are always short. All septa are regularly dentate. Corallites are rounded with thick walls and have six prominent paliform lobes. Polyps are elongated.

IUCN Red List Category and Criteria
Least Concern, 2010.

Distribution

India: Andaman and Nicobar Islands; *Elsewhere:* Egypt.

DISCUSSION

Scleractinian corals play a great role to maintain the marine biodiversity of Andaman and Nicobar Islands. Pillai [11] listed 135 coral species from Andaman and Nicobar and found that Andaman Islands were less diverse (31 genera with 82 species) than the Nicobar Islands (43 genera with 103 species). Venkataraman *et al.* [1] described 228 species of corals belonging to 58 genera and 15 families. Tamal Mondal *et al.* [12-15] reported seven, thirteen, nine and five species of Scleractinian corals respectively followed by the report of Ramakrishna *et al.* [16] in which 418 species were noticed. Ramakrishna *et al.* [17] also reported 44 species of mushroom corals from Andaman and Nicobar Islands. Observation of a mushroom coral *Cycloseris vaughani* and other four scleractinian corals will increase the database of mushroom corals in particular and scleractinian corals in general in Andaman and Nicobar Islands. Further extensive faunal explorations are required in near future to find out more comprehensive data on hermatypic corals.

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