



NEW RECORD OF FIVE FEATHER STARS (CLASS: CRINOIDEA) FROM ANDAMAN AND NICOBAR ISLANDS.

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ABSTRACT : A taxonomic survey of feather star collected from two dive sites of Andaman and Nicobar Islands during April'2011 – October' 2011 yielded 8 specimens. Echinoderm are the important animal groups of marine ecological niche for the sustainable existence of marine biodiversity and advocates the other faunal communities for their betterment, as well as their way of life towards the future generation. During our coral reef survey, five species of crinoids *Heterometra crenulata*, *Amphimetra molleri*, *Cenometra bella*, *Cenometra emendatrix*, *Comanthus alternanans*, belonging to order Comatulida and 3 families have been investigated as a new report from Andaman and Nicobar Islands. The present study describes the taxonomy of the identified echinoderms based on their morphological characteristics.

Key Words: Crinoids, Marine biodiversity, Taxonomy, Morphological characteristics

INTRODUCTION

Feather stars constitute a group of echinoderms belonging to class Crinoidea and order Comatulida, having five to hundreds of arms surrounding their cup-like bodies (Grzimek 2003; Hyman, 1955). Just like their closest relatives, the sea lilies, feather stars are stalked only in the juvenile stage but detach their cup-like bodies in the adult stage to become freely moving or motile crinoids (Grzimek 2003). Feather stars are regarded as primitive echinoderms and today's living species all belong to the subclass Articulata (Ausich and Messing 1998). Order Comatulida is composed of 18 extant families, with family Comasteridae being the most common in tropical shallow water in both the Indo-west Pacific and the Western Atlantic (Meyer and Macurda 1980; Messing 1998, 2003; Kirkendale and Messing 2003). Feather stars are among the least known echinoderms attributable to difficulty in their collection on account of their fragile nature, secretive habits, and distribution in deep waters. In India, although it is believed that shallow waters (Below 50m) are inhabited by 50 crinoids, there are no documented studies to warrant this claim (Sastry, 2005). The taxonomic study on Indian crinoids was performed by A.H.Clark (1912). During our field survey, we reported five crinoid species as new record to Andaman and Nicobar Islands. This paper deals with the morphologic as well as the taxonomic characters of five newly reported species from Andaman and Nicobar Islands.

MATERIALS AND METHODS

The survey was conducted in Pongibalu (Lat: 11°30.956'N and Long: 92°39.201'E) Rutland Island (Lat: 11°23.737'N and Long: 92°40.838'E) of South Andaman during April'2011 to October'2011 by using self-contained underwater breathing apparatus (SCUBA) diving and snorkeling. Species recording was performed by underwater digital photography (Sony - Cyber shot, Model-T900, marine pack, 12 megapixels) for detailed identification. Identification based on morphological features was made by using literature of Clark, 1912 and Arguelles *et.al.* 2010.

RESULTS

1. *Heterometra crenulata* (P.H.Carpenter, 1882) Fig. 1a-1c

Systematic Position:

Class: Crinoidea
Order: Comatulida
Family: Himerometridae
Genus: *Heterometra*
Species: *crenulata*

Morphometric measurements:

ZSI/ANRC- 6758 (Date of collection: 31.03.2011); Pongibalu; Disc diameter: 3.379mm; Length (Centro dorsal to brachial arch): 4.116mm

Key Characters:

Usually more than 10 arms with the IIBr series mostly four but if only 10 arms are present then the proximal pinnules are distinctly modified with a strong crest or the segments have flared or spinose distal ends.....**Genus: *Heterometra***

Distal cirrus segments with distinct dorsal spines or tubercles, Proximal pinnules appearing serrated in profile, due to projections from the distal ends of the segments.....***Heterometra crenulata***

Description:

Proximal pinnules are large and strongly triangular in cross section, strongly serrate in profile. Outer portion of prismatic ridge on each segment raised into conspicuous broad rounded triangular processes. Distal cirrus segments occur with distinct dorsal spines or tubercles. Most of the IIBr series of the arms are composed 4(3+4) brachials but few with only two brachials; single spine on each cirral; first three pinnules largest and stiffest among all other pinnules.

Colour: Body colour Red with white ridges in arms.

Habitat: Found in the reef slopes.

Distribution: *India:* Andaman Island (New report from India); *Elsewhere:* Cambodia, China, Double Island Point, East Indies, Indonesia, Maldives, Monte Bello Islands, North Australia, Philippines, Queensland, Singapore, South Japan, Vietnam and West Australia.

Remark: New record to Andaman and Nicobar Islands reported from Pongibalu, South Andaman.

2. *Amphimetra molleri* (A. H. Clark, 1908) Fig. 2a-2c

Systematic Position:

Class: Crinoidea
Order: Comatulida
Family: Himerometridae
Genus: *Amphimetra*
Species: *molleri*

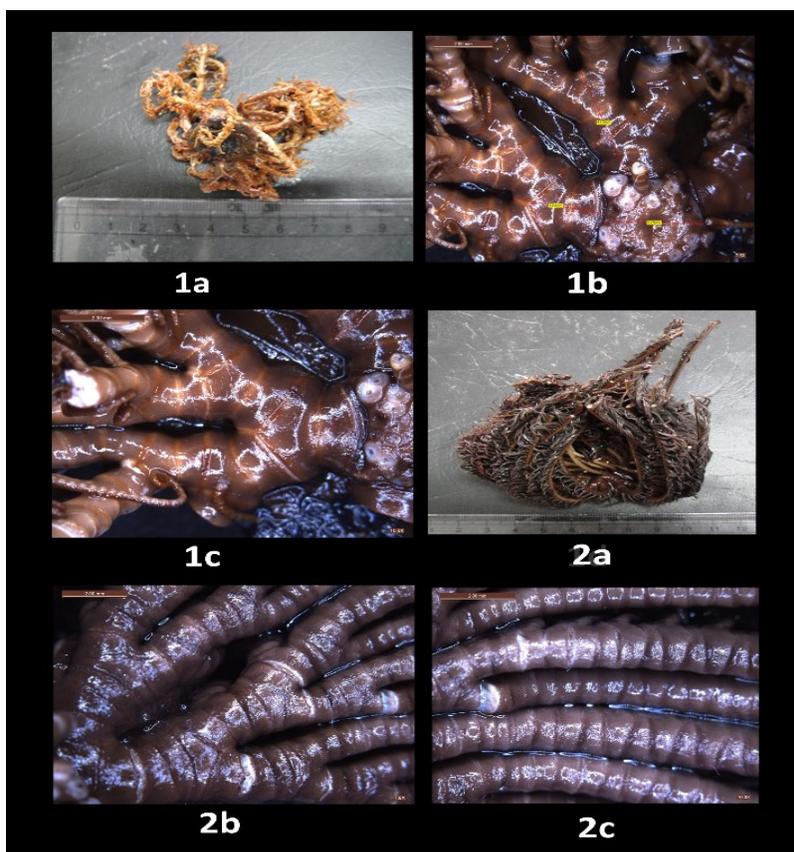


Fig.1a- General View of *Heterometra crenulata*. 1b- Centrodorsal with division series. 1c- Arm bases of a single radius; Fig. 2a- General view of *Amphimetra molleri*. 2b- Segmentation of arm bases of a single radius. 2c- Middle and Distal segments of cirri with tubercles.

Morphometric measurements:

ZSI/ANRC- 6757 (Date of collection: 31.03.2011); Pongibalu; Distance between two brachial segments: 0.531mm;

Key Characters:

Rarely more than 10 arms but should this number be exceeded than the IIBr series are two; the proximal pinnules little different from the following ones.....**Genus: *Amphimetra***

Cirri with 30-35 segments and outer pinnules with 18-21.....***Amphimetra molleri***

Description: Usually 10 arms are present and rarely more than 10 arms are found. Cirri are stout, curved and formed of 24-50 short sub equal segments. First aboral spine appears proximal to 8th cirrus. Arms are 150mm in size. Outer pinnules are 18-21 in number. Central disc and the proximal portion of arms very dark brown; proximal pinnules also dark brown but tips bright yellow; middle portion of the arms have even distributions of dark brown and yellow; distal portion of arms all yellow with some pinnules orange; cirri yellow and brown; mouth marginal to the central disc; all brachitaxes of the arms composed of two brachials only and joined by synarthry; axils asymmetrical, such that the arms are arranged in different planes; one tubercle in each cirral; nonconfluent oral pinnules; thin, rounded keels found at the bases of each pinnule.

Colour: Dark red in colour with black ridges.

Habitat: Mainly found on shoreline to 50m depth range.

Distribution: *India:* Andaman & Nicobar Islands and Gulf of Mannar; *Elsewhere:* China, East Indies, Greater Sunda Islands, Gulf of Thailand, Maldives, Philippines, South Japan and Sri Lanka.

Remark: New record to Andaman and Nicobar Islands.

3. *Cenometra bella* (Hartlaub, 1890) Fig. 3a-3d

Systematic Position:

Class: Crinoidea
Order: Comatulida
Family: Colobometridae
Genus: *Cenometra*
Species: *bella*

Morphometric measurements:

ZSI/ANRC- 6759 (Date of collection: 31.03.2011); Pongibalu; Diameter of centrodorsal: 4.181mm; Distance between brachial arches: 0789mm.

Key Characters:

Outer pinnules (2) very stout, stiff and erect or even recurved over the disc, its segments with conspicuously flared and spinose distal ends, Arms: more than 10.....**Genus: *Cenometra***

Basal segments of none of the proximal pinnules carinates, A simple keel on the bases of the proximal pinnules or else the edge rounded.....***Cenometra bella***

Description: Outer pinnules (2) are very stout, stiff and erect or even recurved over the disc. Arms are more than 10 in number. Basal segments of none of the proximal pinnules carinates. A simple keel on the bases of the proximal pinnules forms rounded edge. Whole aboral side including brachials and cirri dark brown; pinnules cream, with dark brown spots, their proximal segments also colored dark brown; mouth located at the center of the central disc; each of the IIBr series of the arms composed of two brachials; each segment from the middle and distal areas of the cirri with a pair of tubercles, one each side of the midline.

Colour: Central ridge of the arm is white and pinnules are dark brown in colour.

Habitat: Commonly found below 5m depths and it lives with the association of encrusting and massive coral species.█

Distribution: *India:* Andaman Islands; *Elsewhere:* East Indies, Philippines, China, South Japan and South Pacific Islands.

Remark: New record to India reported from Pongibalu, South Andaman.

4. *Cenometra emendatrix* (Bell, 1892) Fig. 4a-4d

Systematic Position:

Class: Crinoidea
Order: Comatulida
Family: Colobometridae
Genus: *Cenometra*
Species: *emendatrix*

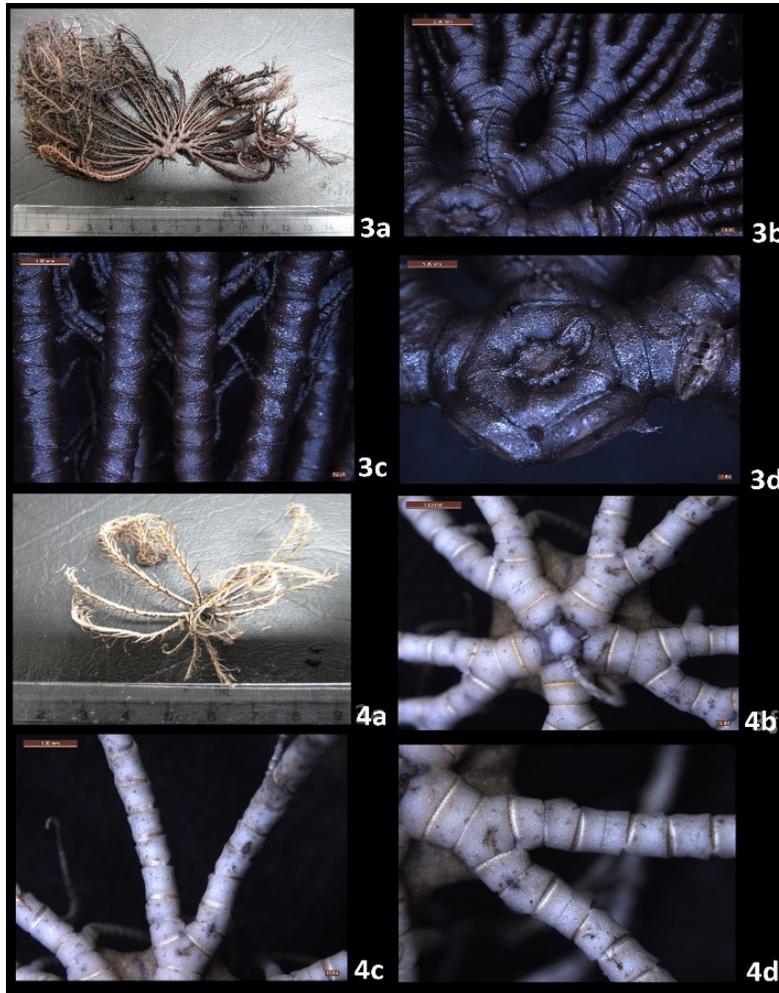


Fig. 3a- General view of *Cenometra bella*; 3b- Arm bases of a single radius; 3c- Middle and distal segments of arms with paired tubercles; 3d- Details of centrodorsal area. 4a- Whole specimen showing aboral surface with arms and cirri of *Cenometra emendatrix*. 4b- Centrodorsal with division series. 4c- Structure of arm bases. 4d- Middle and distal segments of arms.

Morphometric measurements:

ZSI/ANRC- 6760 (Date of collection: 15.07.2011); Rutland Island; Diameter of centrodorsal: 0.532mm. Length (Centro dorsal to brachial arch): 1.784mm.

Key Characters:

Basal segments of the proximal pinnules with knob-like rounded process forming a crest along the edge facing the tip of the arm.....*Cenometra emendatrix*

Description: The Basal segments of the proximal pinnules have knob-like rounded process that forms a crest along the edge. Arms are 10 in number. Cirral borne on one or two transverse combs with two or three thorny projections curving inward. The second oral pinnule (P2) is very stout and stiff and much longer than the first and third; the segments of P2 have flared and spinose distal ends; and all have more than 10 arms.

Colour: Dark red in colour

Habitat: It occurs in Littoral to 55m depths.

Distribution: *India:* Andaman Islands; *Elsewhere:* Aldabra, Madagascar, Mascarene Basin, Mauritius, Seychelles and West Indian Ocean.

Remark: New record to India reported from Rutland Island, South Andaman

5. *Comanthus alternans* (P. H. Carpenter, 1881) Fig. 5a-5d

Systematic Position:

Class: Crinoidea

Order: Comatulida

Family: Comasteridae

Genus: *Comanthus*

Species: *alternans*



Fig.5a- General view of *Comanthus alternans*. 5b- Details view of centrodorsal area.5c- Division series and arm bases of a single radius. 5d- Detail of brachial series.

Morphometric measurements:

ZSI/ANRC- 6761 (Date of collection: 15.17.2011); Rutland Island; Diameter of centrodorsal: 4.964mm; Length (Centro dorsal to brachial arch): 4.097mm; Distance between brachial arches: 0.639mm

Description:

This is a crinoid with busy appearance due to presence of 10~125 arms. The anterior arms are not markedly longer than posterior arms. Cirri absent in specimens with >40 arms (except for immature cirrus buds). Cirri sometimes present in specimens with <40 arms, to XI, 10-13 segments.

Colour: Different colour patterns recorded elsewhere include black or deep mahogany with green or white pinnule tips, and sometimes with a white aboral arm stripe; dark brown with a dusting of tiny white or yellow spots; rays greenish yellow with groups of pinnules alternating between black with white tips and white with a middle black band; and pale gray or white with few to many pinnules black or brown with white tips.

Habitat: *Comanthus alternans* typically occurs under ledges, coral rubble or among branching corals with at least some of its arms extended.

Distribution:

India: Andaman Island (Ritchie's Archipelago). *Elsewhere:* Northern Australia, Indo-Malaya, southern Japan, Palau, Guam, Chuuk and Kwajalein Atolls and New Caledonia.

Remark: New record to India reported from Rutland Island, South Andaman.

DISCUSSION

Echinoderms are efficient scavengers within their respective marine ecosystems and plays important ecological functions. Crinoids are among the least known echinoderms attributable to difficulty in their collection on account of their fragile nature, secretive habits and distribution in deep waters. Also, their identification requires patience and painstaking attention to morphological details (Arguelles *et.al.* 2010). We reported five new records of crinoids form Andaman and Nicobar Islands with their habitats and taxonomic characters. Present findings of newly recorded crinoid species in Andaman & Nicobar Islands is the addition of total biodiversity index of these islands records. Several intensive studies are required in future for getting adequate data on echinoderms and their associates.

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