First Report of Two Brittle Star *Ophiothela venusta* (Family: Ophiotrichidae) and *Dougaloplus echinatus* (Family: Amphiuridae) from Andaman and Nicobar Islands, India

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**Abstract:** Andaman and Nicobar group of islands being a part of India shows a great deal of ecological diversity in marine ecosystem. The Ophiuroids species represent major concentration of benthic biomass and play important role in functioning of their local ecosystem. Specimens were collected in subtidal sampling followed by preserving in 70% alcohol and carefully examined the specimens under light microscope Leica M 205A. Two species of Brittle star (Class: Ophiuroidea) *Ophiothela venusta* and *Dougaloplus echinatus* are firstly reported from Andaman and Nicobar Islands. The present study describes the taxonomical features of the identified echinoderms based on their morphological characters. The species *Ophiothela venusta* belongs to family Ophiotrichidae are distinguished by the spinelets on their disks, thorny arm spines and an oral armament consists of dental papillae. Another species *Dougaloplus echinatus* belongs to family Amphiuridae are characterized by their radial shields, finely scaled disc and attached oral plates with adoral shields.

**Key words:** Ophiuroids • Subtidal • Radial shields • Dental papillae • Morphological characters

**INTRODUCTION**

The coastline of Andaman and Nicobar islands provides varied habitats such as rocks, sand, mud, mangroves etc. All these factors have encouraged a rich settlement of echinoderms in the coastal and offshore habitats of these islands. The echinoderm fauna of these islands is around 53.1% of the entire Indian Coast, though the coastline of these islands is only 28% and the exclusive economic zone only 30% of the Indian subcontinent [1]. The Ophiuroidea survives in all types of marine habitats, such as soft bottoms in shallow water and tide pools. This class represents 103 species from the reef habitats of Andaman and Nicobar islands that constitutes higher percentage (62%) of their diversity in the islands [2]. At first Bell [3] is the first who published the list of echinoderm species from Andaman islands. Several species of Ophiuroidea collected as reference collection for Indian museum were identified by Koehler [4, 5, 6, 7]. In addition, some monographic and revisionary accounts on Ophiuroidea have also been performed by Doderlein [8], Clark, [9, 10], Fell [11], Madsen [12]. At earlier, James [13] reported *Dougaloplus echinatus* from gulf of Manner in India. During our survey these two species named as *Ophiothela venusta* and *Dougaloplus echinatus* are firstly reported from Andaman and Nicobar Islands and described them with morphological and taxonomic characters.

**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) South Andaman in November, 2010 by using self-contained underwater breathing apparatus (SCUBA) diving. During scuba diving, we collected the specimens by hand and then transferred the animal to fresh water for killing. The specimens were then carefully lifted and immersed into their respective sea-water-filled containers to which 95% ethanol (3 parts sea water: 1 part 95% ethanol) was added, oral side down with arms spread out [14]. In laboratory, specimens were examined under Leica M205 A light microscope. Specimens were collected to study their morphological and taxonomic characters. All specimens were registered and deposited in the National Zoological Collection of Z.S.I, Port Blair. Identification was done by in situ observation and photographs in conjunction with Clark and Rowe [15], Koehler [7].
Fig. 1: Ophiothela venusta (de Loriol, 1900): a. Dorsal view; b. Ventral view; c. Oral Shields with the arrangement of tooth papillae; d. Dorsal arm plate with arm spines; e. Arrangement of ventral arm plate; f. Tentacles and tentacle scale.

**RESULTS**

**Ophiothela Venusta (de Loriol, 1900)**

**Systematic Position:**

Phylum: Echinodermata  
Class: Ophiuroidea  
Order: Ophiurida  
Family: Ophiotrichidae  

**Morphometrics:** Specimen: ZSI/NZC/ANRC/6206; disc diameter: 1.5 cm; arm length: 9 cm (Fig. 1a); Length of arm spines: 1.990 mm; dorsal arm plate- vertical line length: 1.035 mm (32X), horizontal line length: 1.718 mm (32X); ventral arm plate- vertical line length: 1.880 mm (32X), horizontal line length: 1.926 mm (32X).

**Description:** The dorsal side of the disc are covered with coarse granules often also with conical spines or rounded tubercles. There are five oral shield attached at the point of each arm. The oral shields are large; four sided with distal margin wider than the proximal (Fig. 1c). At the tip of the jaw there are 11-14 tooth papillae. The dorsal arm plates are fan-shaped and bear four tapering spines throughout the arm (Fig. 1d). The first ventral arm plate is about half the size of the following one. Both are longer than wider. The proximal edge is almost rounded and the distal edge is almost straight (Fig. 1e). The lateral edges of the plates are concave. Each tentacle pored are covered with oval shaped tentacle scale (Fig. 1f).

**Habitat:** This species occupies a much extended zone in the intertidal region from almost the supra-littoral region to the low water mark. It is somewhat gregarious and its
rock pools with fissures. This species are also collected from muddy button at a depth of 3-15 meters off Pongibalu, South Andaman. At the slightest touch all the arms spread out and the brittle stars ties to get away. It is always found either under a dead coral or seen through the crevices of the rock.

**DISTRIBUTION**

East Africa, Madagascar, South East Asia, East Indies and Islands of West Indian Ocean.

**Remarks:** This species is firstly reported from Andaman and Nicobar islands as well as from India also. The synonymous species of *Ophiothela venusta* is *Ophiothela beauforti* which differs by extraordinarily variable armament ranging from complete absence of the disc dorsally, only marginal spines being present, to a continuous covering of coarse granules with conical tubercles or spines near the centre of the disc.

**Dougaloplus Echinatus (Ljungman, 1867)**

**Systematic Position:**

- Phylum: Echinodermata
- Class: Ophiuroidea
- Order: Ophiurida
- Family: Amphiuridae

**Morphometrics:** Specimen: ZSI/NZC/ANRC/ 6207; disc diameter: 6.197mm (7.9X); arm length: 7.8-8.2 cm (Fig. 2a and 2b); length of arm spines: 2.533mm (32X); dorsal arm plate- vertical line length: 1.218mm (32X), horizontal line length: 1.628mm (32X); ventral arm plate- vertical line length: 1.919 mm (32X), horizontal line length: 1.737mm (32X).

**Description:** The dorsal surface of the disc is very finely scaled and no central rosette of primary plates is apparent (Fig.2c). The radial shields are banana-shaped, three times as long as broad and equal to half the disc radius.

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**Fig. 2: Dougaloplus echinatus (Ljungman, 1867): a. Dorsal view; b. Ventral view; c. Details of the disc portion; d.; Detailed structure of oral plates e. Arrangement of ventral arm plate; f. Dorsal arm plate with arm spines.**
The oral plates are conspicuously sunken midway along their length; rising up to meet the adoral shields distally and for the insertion of the infradental papillae proximally (Fig. 2d). The ventral arm plates are longer than broad for the greater part of the arm length. There is one moderate sized tentacle scale (Fig. 2e). The dorsal arm plates are rounded pentagonal and the lateral and distal margins form a continuous fan shape; there is some overlap between succeeding plates (Fig. 2f). Proximally, there are six arm spines, which reduce in number to five and then four about halfway along the arm length. The spines are cylindrical with bluntly pointed rugose tips; the lowermost in each series is the longest and approaches one arm segment in length.

**Distribution:** Ceylon area, East Indies, North Australia and Philippines.

**Habitat:** This species appears to live beyond 5m depth. It appears to be associated with live corals and under the crevices of dead corals.

**Remarks:** *Dougaloplus echinatus* is newly recorded from Andaman and Nicobar islands and it is reported from Pongibalu and Rutland island of South Andaman. In India, the genus *Dougaloplus* represents only this species which were reported from gulf of Manner, Tamilnadu at earlier.

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**REFERENCES**

3. Bell, F.J., 1887. Report on a collection of echinoderms from Orissa coast followed by Gravely [17] from Tamilnadu coast, by James [18] from Andaman coast. In the present paper the distribution of *Ophiothela venusta* also includes in Indian subcontinent investigated from Andaman and Nicobar islands. In the present paper the distribution of *Ophiothela venusta* also includes in Indian subcontinent investigated from Andaman and Nicobar islands. The species *Ophiothela venusta* which differs from *O. danae* by characteristics of their disc granules with conical spines or rounded tubercles. *O. danae* also has marked colouration of red and blue on the dorsal side of the disc. The genus *Dougaloplus* represents two species worldwide [15] of which *Dougaloplus echinatus* is previously recorded from Gulf of Manner of Indian subcontinent by James [19].

The similar species *Dougaloplus acanthinus* is characteristically distinguished by their few scattered disc spines and distinct scaling on the disc. Arms of *Dougaloplus ehinatus* also characterized with black strips on yellow lines whereas *Dougaloplus acanthinus* has uniformly black arms. 427 species of echinoderms of which 105 Ophiuroids species have been reported from Andaman and Nicobar islands [2]. Finding of new records will be helpful for the preparation of biodiversity conservation and management action plan for the echinoderms in Andaman and Nicobar islands.

Further study on echinoderm taxonomy are necessary should be done in terms of monographic works and marine scientist should be encouraged to study the other aspects on this animal [20]. More surveys are also required in near future to get more apprehensive data on different types of Ophiuroids species from Andaman and Nicobar Islands.

**DISCUSSION**

Echinoderms are efficient scavengers within their respective marine ecosystems and plays important ecological functions [16]. On the basis of taxonomical character, two ophiuroidea species are identified as the new record to Andaman and Nicobar islands. At earlier, the genus *Ophiothela* represents one species namely *Ophiothela danae* which was first reported by Koehler [5] from Orissa coast followed by Gravely [17] from Tamilnadu coast, by James [18] from Andaman coast. In the present paper the distribution of *Ophiothela venusta* also includes in Indian subcontinent investigated from Andaman and Nicobar Islands. Proceedings of Zoological Society of London, 1887: 139-145.


