

Holothurians from Pakistan: New addition of *Holothuria (Theelothuria) notabilis* (Ludwig, 1875) and rediscovery of *Actinocucumis typica* (Ludwig, 1875) from the Karachi coast, northern Arabian Sea

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Abstract

In total, 63 specimens of sea cucumbers were collected from the Sunehri (24°52'33.49" N, 66°40'40.20" E, on 19 January 2015) and Buleji coasts (24°50'20.41" N, 66°49'24.15" E on 31 August 2015) in the intertidal zone. Among them, *Holothuria notabilis* is a new record from Pakistan and *Actinocucumis typica* (Ludwig 1875) is rediscovered after 45 years (earlier recorded by Clark and Rowe in 1971). We present a morphological description and habitat characteristics of the collected specimens. The identified specimens are deposited in the repository of Marine Reference Collection and Resource Centre at the University of Karachi (catalogued as Holo-20 and Holo-21).

Keywords: *Holothuria notabilis*, *Actinopyga typica*, northern Arabian Sea

Introduction

The number of holothurian species worldwide is about 1717 (Paulay 2014). Nineteen species – belonging to the class Holothuroidea – have been reported from Pakistan, of which eight belong to the family Holothuriidae, three to the family Cucumariidae, two to the family Synaptidae, two to the family Sclerodactylidae and four to the family Phyllophoridae (Tahera 1992, 1997, 2004; Tahera and Tirmizi 1995; Tahera and Kazmi 1995, 2005; Ahmed et al. 2016).

Actinocucumis typica belongs to the family Cucumariidae, which includes small to medium-size animals, characterised by ten branching tentacles of which the lowest two are often smaller than the others. They are filter feeders, and use their tentacles to catch micro-organisms and pass them to their mouth. They are found on coral reefs but mostly live in deep water on sand and gravel substrates. From Pakistan, four genera *Aslia*, *Staurothyone*, *Stolus* and *Cucumaria* have been reported (Clark and Rowe 1971; Tahera 2004).

The genus *Cucumaria* is represented in Pakistan by a single species *Cucumaria conjungens* (Semper, 1868). It was recorded for the first time in Pakistan by Tahera (2004). The genus *Actinocucumis* is also represented in Pakistan by a single species *A. typica* (Ludwig 1875), which was first reported from the northern Arabian Sea in Pakistan by Clark and Rowe (1971). This document contains morphological

descriptions, and the distribution and habitat characteristics in the northern Arabian Sea of the new species *Holothuria notabilis* and the rediscovered species *A. typica*, 45 years after Clark and Rowe (1971).

Methods

Specimens were collected from intertidal zones from January to December 2015 on Pakistan's Karachi coast. In total, 63 specimens were collected from Buleji 24°50'20.41" N, 66°49'24.15" E and Sunehri 24°52'33.49" N, 66°40'40.20" E (Fig. 1).

Specimens were brought to the laboratory and kept in a well-aerated aquarium. Specimen length (mm) and weight (g) were recorded. After relaxation, specimens were preserved in 5% neutralised formaldehyde and later transferred to 70% ethyl alcohol. For further taxonomic studies and identification, morphological features were examined and microscopic studies were conducted. Ossicles were taken from three positions (dorsal and ventral body walls, and tentacles). A small piece of skin tissue was placed on a slide with a few drops of 3.5% bleach sodium hypochloride (NaOCl); the slides were then rinsed with drops of distilled water, and then examined under a microscope at 10 x 10 magnification. Microphotography was also performed using a digital camera (Olympus 16 MP).

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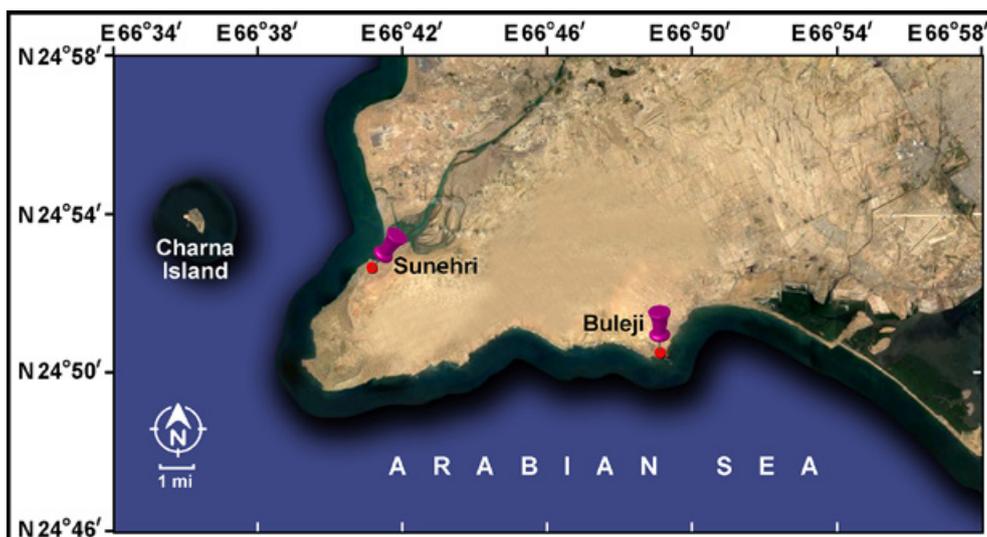


Figure 1. Sea cucumber sampling localities.

Results and discussion

Actinocucumis typica (Ludwig, 1875)

Taxonomic account: order Dendrochirotida, family Cucumariidae, genus *Actinocucumis*

Material examined: One specimen (catalogued as Holo-21) of *Actinocucumis typica* was collected from Buleji beach at 24°50'20.41" N, 66°49'24.15" E on 31 August 2015.

Habitat: The specimen was found hardly attached to a rock in the intertidal zone. This species inhabits the lower mid-littoral zone on rock and sand substrate.

Distribution: Indo-west Pacific: western India and Pakistan, Ceylon area, Bay of Bengal, East Indies, north of Australia, China and Japan, South Pacific Islands.

Description: Species length: 65 mm; weight 11.42 g; body cylindrical in shaped and tapering from mouth towards anus. The dorso-ventral colour of specimen is creamy-brown (Figs. 2A and B). Body covered by well-developed conspicuous stiff and non-retractile pedicels. Podia arranged in distinct bands side by side. Mouth possesses 10 dark coloured tentacles. Dorso-ventral spicules figure eight-shaped or pear-shaped (Fig. 2C). Body wall buttons numerous and equal although some are irregular (Fig. 2D). Small perforated plates and irregular tables with pointed spires present (Fig. 2E) and tentacle rods (Fig. 2F). Calcareous ring consists of five radials and five inter-radials (Fig. 2G).

Remark: The specimen *Actinocucumis typica* is a rediscovery from Pakistan's coastal waters in the northern Arabian Sea, 45 years after Clark and Rowe (1971). It is one of a species complex (Gustav Paulay, pers. comm.). Spicules of this specimen are similar to those described by James (1984), collected from Mandapam: Gulf of Mannar, Ratnagiri (Arabian Sea) and Port Okha (Gulf of Kutch).

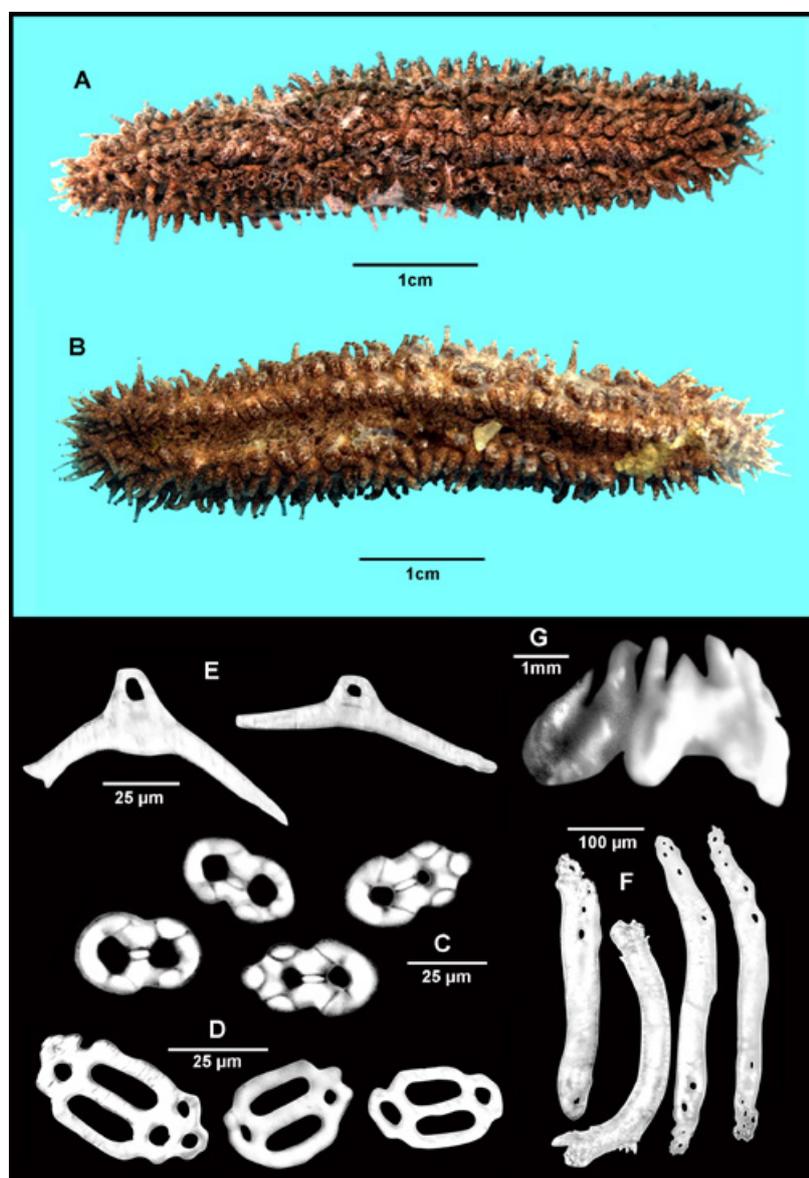


Figure 2. *Actinocucumis typica* (Ludwig 1875). A and B: dorso-ventral body; C: figure eight-shaped or pear-shaped spicules from dorso-ventral body wall; D: equal and irregular buttons from dorso-ventral body wall; E: small perforated plates and irregular tables with pointed spires; F: tentacle rods; G: calcareous ring.

Holothuria notabilis (Ludwig 1875)

Taxonomic account: order Aspidochirotida, family Holothuriidae, genus *Holothuria*, subgenus *Theelothuria*

Material examined: one specimen (catalogued as Holo-20) of *Holothuria notabilis* collected from Sunahri beach at 24°52'33.49" N, 66°40'40.20" E on 19 January 2015.

Habitat: The specimen was collected from under a rock (boulder) from a rocky shore during low tide.

Distribution: Great Barrier Reef, Australia and found at localities in the Indian Ocean, including Madagascar, Mozambique and eastern Indonesia.

Description: Species length: 60 mm; weight: 9.34 g; body cylindrical in shaped and tapering at the ends. The tegument colour is creamy white with many dark-brown blotches. On the dorsal surface there are two rows of 8–10 dots (Fig. 3A). Ventral surface teguments are dark brown in colour (Fig. 3B). Dorsal and ventral papillae are yellowish. The mouth is on the ventral side with 20 small light-yellowish tentacles. Spicules of the specimen are irregular and not uniform in size; tables round and normal with a spiny disc; small concave plates with perforations (Fig. 3C); buttons with knobs that were not in similar size; some buttons found with three pairs of holes and some with six pairs of holes (Fig. 3D). Dorsal body wall buttons (with three pairs of holes) were smaller than ventral side buttons (with six pairs of holes). Calcareous ring well developed (Fig. 3G). Tentacles rods present (Fig. 3E). Podia with end-plates and elongate rods with central and terminal perforations (Fig. 3F). Tentacles slightly bent, non-perforated rods usually with slightly spinose margins (Fig. 3E).

Remarks: *Holothuria notabilis* (Ludwig 1875) is a new addition to the coastal fauna of Pakistan.

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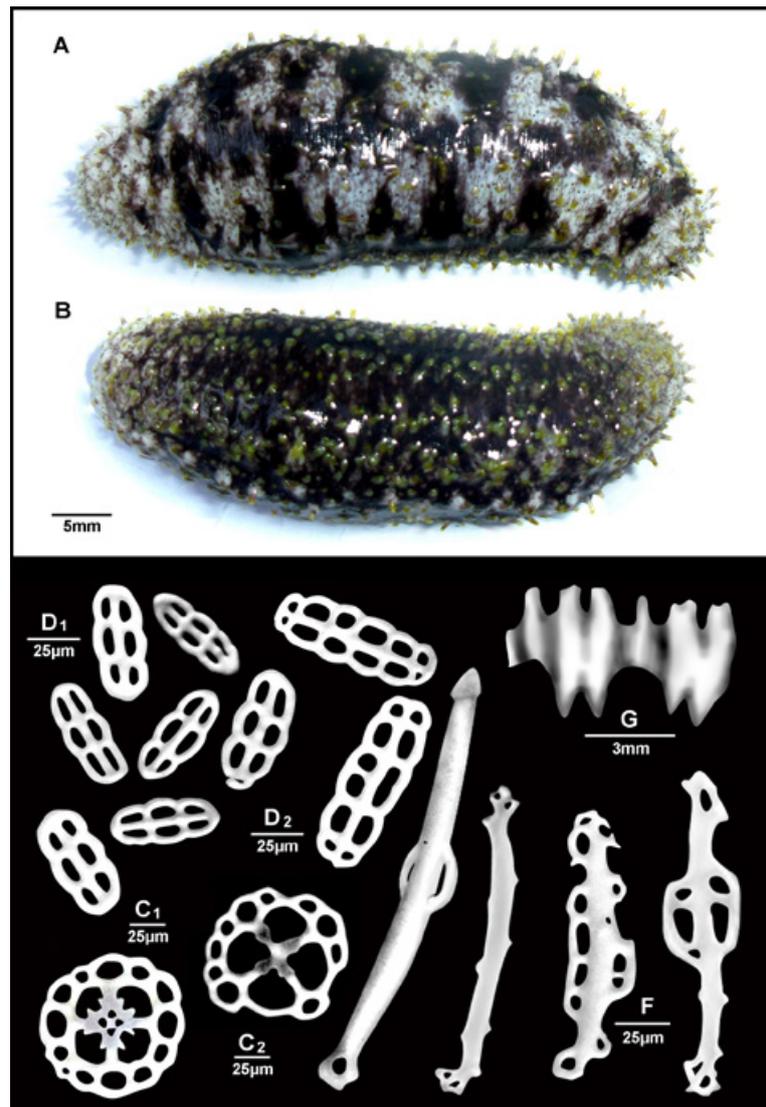


Figure 3. *Holothuria notabilis* (Ludwig, 1875). A: dorsal body; B: ventral body; C1: table from dorsal body wall; C2: table from ventral body wall; D1: knobbed buttons from dorsal body wall; D2: buttons from ventral body wall; E: tentacles rods; F: podia with end-plates and elongate rods with central and terminal perforations; G: calcareous ring.

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