



***Holothuria (Selenkothuria) parva* Krauss (in Lampert, 1885) (Holothuroidea: Holothuriida: Holothuriidae), new addition to the holothuroid fauna of Pakistan**

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Abstract

This paper provides the first record of *Holothuria (Selenkothuria) parva* Krauss (in Lamper, 1885) from the intertidal zone in Balochistan, Pakistan, on the northern shores of the Arabian Sea. We present a comprehensive description of this known species, illustrating its gross morphological characters and recording its habitat and expanding its known distribution now covering the western coastline of Pakistan its known distribution now covering also the western coastline of Pakistan. Identified specimens are deposited in the Marine Reference Collection and Resource Centre, University of Karachi (Cat. no. MRC&RC-UOK-Holo 27).

Key words: new record, northern Arabian Sea, Balochistan, Pakistan, *Holothuriaparva*

Introduction

The class Holothuroidea represents 90% of deep-sea floor biomass and since deep oceans make up about 70% of the earth's surface one can consider holothurians among the most dominant organisms on the planet (Pawson and Pawson, 2008; De Leo *et al.*, 2010). The family Holothuriidae represents 11% of the total diversity of the class Holothuroidea (Borrero-Pérez *et al.*, 2009). The genus *Holothuria* is diagnosed with reference to the body form, colour, number and shape of the tentacles, form of the calcareous ring and details of the ossicles (or sclerites), the calcified structures that are embedded in the echinoderm body tissues (see Purcell *et al.*, 2023). It is the most diverse genus within the family and is currently subdivided into 18 subgenera (Samyn *et al.*, 2005).

Here, we describe the first record of *Holothuria (Selenkothuria) parva* from the coastal waters of Balochistan, Pakistan. The species occurs on the rocky shoreline hiding under stones in the intertidal zone. It has also been reported from mangrove swamps and coral reefs. This species is widely distributed throughout the tropical-subtropical Indo-Pacific region, extending from the intertidal zone to a depth of about 20 meters (Ehsanpour *et al.*, 2016) also reported from Persian Gulf Iran. The species has a soft cylindrical body with blunt, thick extremities. The body wall is relatively thick and the tentacles are characteristically peltate in shape for deposit feeding.

Clark & Rowe (1971); Samyn *et al.*, (2006) and Thandar (2022) offer useful notes on the taxonomy, habitat and distribution of this species. Previously only 10 species of the genus *Holothuria* were reported from Pakistani coastal waters (Ali *et al.* 2024). This paper describes the taxonomic features, habitat and distribution of *Holothuria parva* which, as mentioned above, is a new addition to the holothuroid fauna of Pakistan.

Materials and Methods

Two specimens (Cat. no. MRC&RC-UOK-Holo 27) of the species were collected from the intertidal zone of Gariyan Beach (25°01'57"N, 61°46'38"E), Makran coast, Balochistan, on 11th August 2022, at low tide (-0.14 m)

(Figure 1). The specimens were photographed in their natural environment. The collected specimens were initially fixed in 5% formaldehyde solution and then, after 24 hours, transferred to 70% ethanol for long-term preservation and examination. The specimens were first studied under a dissecting microscope for gross morphology, and then examined with a compound microscope for the fine structure of the ossicles.

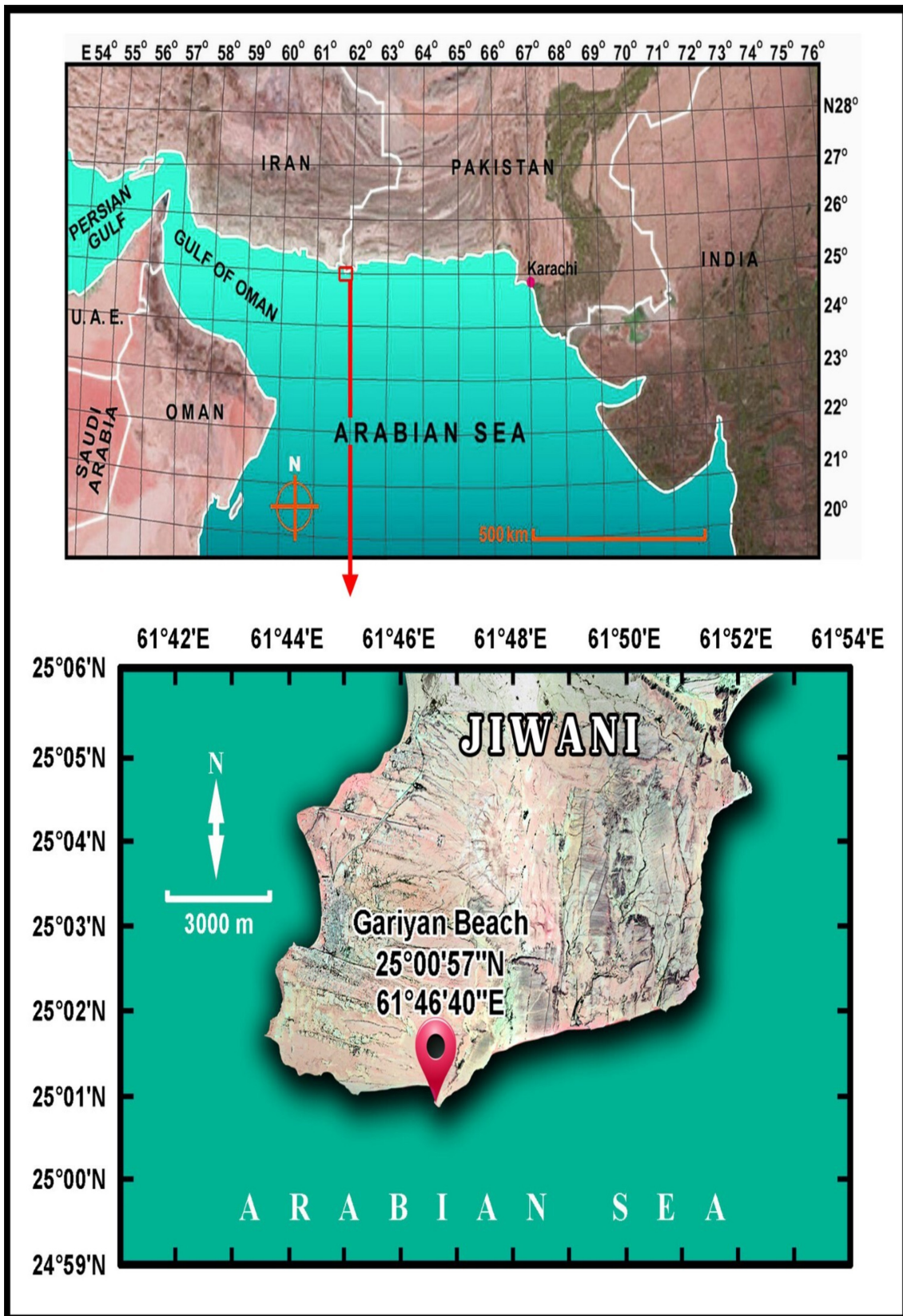


FIGURE 1. Map showing location of Gariyan (map developed by Abrar Ali, Marine Reference Collection and Resource Centre, University of Karachi)

Ossicles from the dorsal and ventral body wall, tube feet, papillae and tentacles were removed and examined for taxonomic investigation. This was done by collecting a fragment of the body wall, together with a tentacle, a few ventral and dorsal podia and placing them on a microscope slide to which a few drops of bleach were added to dissolve the tissue and extract the ossicles. After approximately 30 minutes (Hickman, 1998), a drop of liquid containing ossicles was spread out on a different glass slide, covered with a cover slip and water, and the ossicles inspected. A digital camera (FujiFilm 16MP), attached to the microscope was used to capture pictures of the ossicles for later used in the identification process.

Results and discussion

Taxonomy

Order Holothuriida Miller, Kerr, Paulay, Reich, Wilson, Carvajal & Rouse, 2017

Family Holothuriidae Burmeister, 1837

Genus *Holothuria* Linnaeus, 1767

Holothuria (Selenkothuria) parva Krauss (in Lampert, 1885)

(Figures 2 & 3)

Holothuria parva Krauss (in Lampert, 1885): 246, pl. 1, fig. 38; Théel, 1886: 264; Koehler & Vaney, 1908: 13, pl. 1, fig. 4; H.L. Clark, 1923: 424; Deichmann, 1948: 339, pl. 17, fig. 22–27; Cherbonnier, 1952: 503, pl. 49, fig. 1–23; Eisapour *et al.*, 2022: 67 & 69, fig. 3; Thandar, 2022: 222, fig. 117.

Holothuria (Holothuria) lubricavar. parva Panning, 1934 (II): 45, text-fig. 39.

Holothuria lubricavar. parva Mitsukuri, 1912: 97.

Halodeima parva Heding, 1940: 120.

Selenkothuria parva Deichmann, 1958: 315 (passim).

Holothuria (Selenkothuria) parva Rowe, 1969: 135 (passim); Clark & Rowe, 1971: 178 (dist.); Samyn *et al.*, 2006: 94–95, fig. 72; Pourvali *et al.*, 2014: 397–398, fig. 5.

Holothuria (Selenkothuria) perrieri Thandar, 1977: 62, fig. 2.

Diagnosis (from Samyn *et al.*, 2006, amended herein). The body dark brown, bivium lighter than trivium; podia and tentacles yellowish. Tegument relatively hard. Mouth ventral, encircled by 20 short peltate tentacles, anus terminal. Podia of trivium short, thick, with large, yellowish sucking discs; those of the bivium scattered, papilliform. Cuvierian tubules numerous, white, unbranched. Body wall ossicles short, thorny and/or spinous rods. Podial ossicles like those of body wall, with some ossicles bearing a hole resulting from fusion of some long spines; end plates present, multilocular, flat, with large central holes and smaller marginal ones. Tentacles with elongated spiny rods of varying length. Some podia plates with 5–12 holes, circular discs, and rod spicules in dorsal and ventral surfaces. Cuvierian organs present, unbranched.

Material examined. Two specimens collected from the intertidal zone at Gariyan Beach (25°00'57" N, 61°46'44" E) at low tide (at about -0.14 m depth) by Qadeer Mohammad Ali, Iqra Shaikh and Ateeqa Baloch on 11 August 2022.

Description. Length and weight of preserved specimens 10 cm / 55 gr, and 8 cm / 41 gr, respectively. Live colouration dark brown bivium with lighter trivium, podia and tentacles yellowish, preserved specimens turn black within 24 hrs. Twenty small peltate tentacles surrounding the mouth. Podia of the bivium, few, papilliform with reduced discs and much smaller than those of the trivium. Podia of the trivium, short, thick, with wide yellowish suckers. Cuvierian organ made of numerous white unbranched tubules.

Calcareous ring stout, radial plates notched both anteriorly and posteriorly and several times as broad as the interradials; interradial plates small, triangular, sharply projecting anteriorly (Figure 2C and 3E).

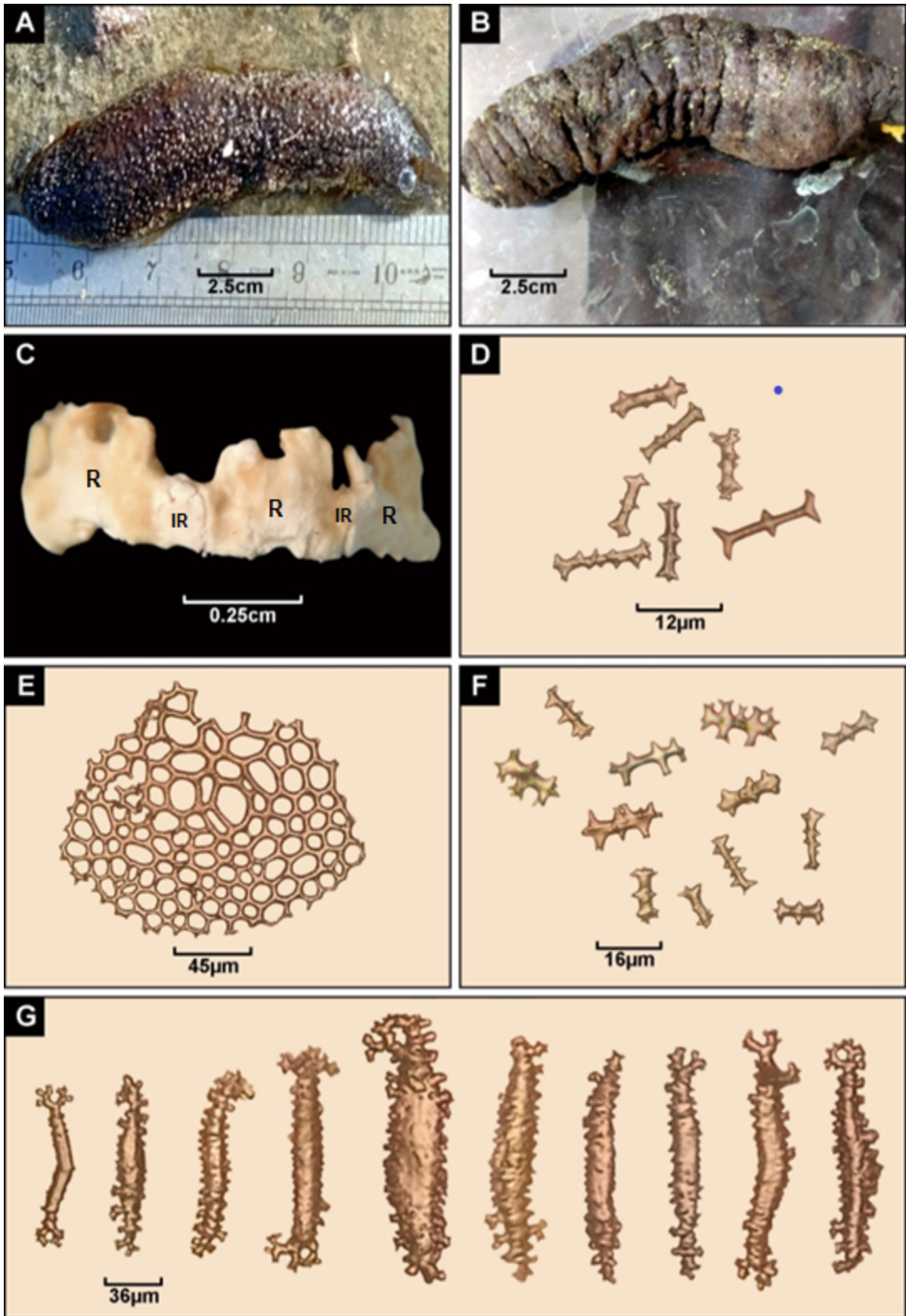


FIGURE 2. *Holothuria parva* Krauss (in Lampert, 1885): A. live specimen; B. dorsal side of preserved specimen; C. calcareous ring (R—radial plate, IR—interradial plate); D. body wall rods, E. podia endplate; F. podia rods; G. tentacle rods.

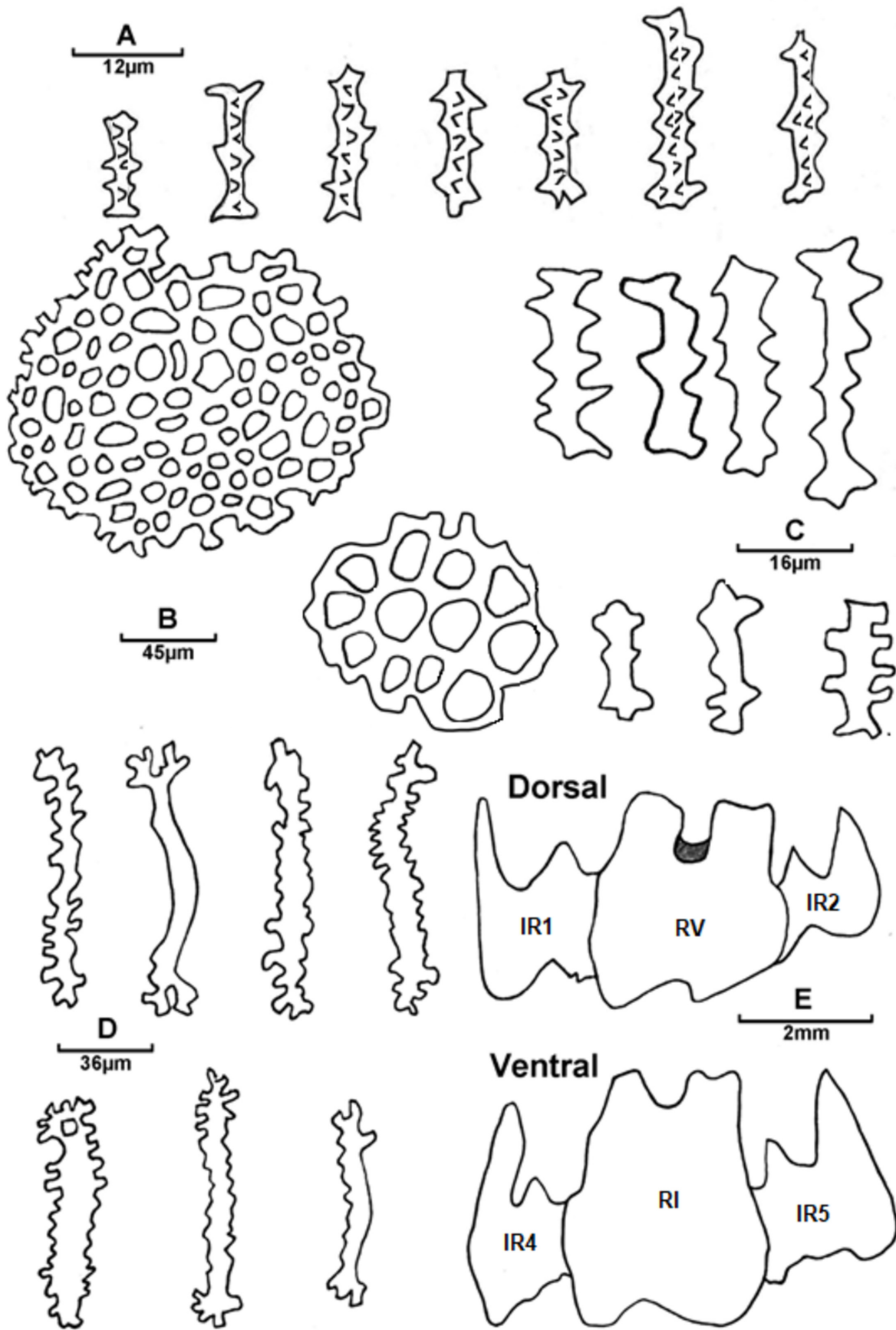


FIGURE 3. *Holothuria parva* Krauss in (Lampert, 1885): A. body wall rods; B. podia plate; C. podia rods; D. tentacle rods; E. calcareous ring (R—radial plate, IR—interradial plate).

Ossicles. Body wall deposits as large and short, spiny rods; podia with rods similar to those of the body wall, sometimes longer and perforated due to the fusion of some short or long spines, thus forming spiny plates; tentacles with elongated, perforated rods of varying length, the perforations resulting from fusions of tips of few short spines. Dorsal and ventral body wall rods 10–12 µm long (Figure 2D and 3A); podial rods 13–16 µm (Figure 2F and 3C), end plates 150–180 µm in diameter (Figure 2E and 3B). Tentacle rods 110–150 µm (Figure 2G and 3D).

Distribution. Generally tropical-subtropical Indo-West Pacific species—recorded from the Red Sea (Price 1982); Gulf of Aden, Djibouti (Cherbonnier 1955); Persian Gulf (Heding 1940); Iran Pourvali *et al.*, 2014; Eisapour *et al.*, 2022); Gulf of Oman, Muscat (Price & Reid 1985), Bender Mtoni, Somalia (Tortonese 1980); Zanzibar (Ludwig, 1899 & Mitsikuri 1912), Tanzania; Pangani (Lampert 1896), Seychelles; Aldabra (Sloan *et al.*, 1979 & Clark 1984); Comores (Cherbonnier 1988), Madagascar (Clark & Rowe 1971), Mozambique; North and South Coast (Kalk 1959), South Africa (Lampert 1885, Theel 1886 & Deichmann 1948; Natal (Thandar 1977, 1984, 2022).

Habitat. The specimens were taken from the intertidal zone, under rock, buried in sand.

Remarks. We compared our specimens with those described by Lampert (1885), Samyn *et al.*, (2006), Pourvali *et al.*, (2014) and the diagnosis of Thandar (2022). The colouration of our specimen was similar to that described by Samyn *et al.*, (2006) in being dark brown dorsally and lighter brown ventrally with the podia and tentacles yellowish. The body wall rods of our specimens are also short, massive, thick rods and covered with short thorns as described in Lampert, (1885). Our specimens also correspond well with the diagnosis given by Thandar (2022). Most authors record 20 tentacles, but 18 tentacles are also observed by Eisapour *et al.*, (2022). Except for variation in the size of the ossicles, those of our materials strongly resemble those described by Samyn *et al.*, (2006) as stout rods with few irregularly arranged spines, body wall rods of 8–14 µm long, tentacle rods 100–150 µm long, podial rods 12–16 µm and end plates of a podium 150–170 µm in diameter

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