

Holothuria (Semperothuria) surinamensis Ludwig, 1875 (Echinodermata: Holothuroidea): Record of the species for the northeast coast of Brazil

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ABSTRACT: *Holothuria (Semperothuria) surinamensis* Ludwig, 1875 (Holothuroidea: Holothuriidae) was recorded for the first time in northeastern Brazil, from reefs at Ponta Verde, Maceió Municipality, state of Alagoas, Brazil. The identified specimens are deposited in the Echinoderm Collection, Invertebrate Collection Paulo Young, Federal University of Paraíba.

The Family Holothuriidae includes a great number of species that live in tropical waters. Species are medium-sized to large, with about 20 shield-shaped tentacles and ambulacral feet arranged irregularly and more abundant on ventral region of body (Deichmann 1958). The great diversity of forms led to the erection of five genera (Honey-Escandón *et al.* 2011), of which *Holothuria* is the most diverse. This genus was subdivided into 18 subgenera (Rowe 1969; Samyn *et al.* 2005). The subgenus *Holothuria (Semperothuria)* is characterized by the presence of tables, with reduced bases (Rowe 1969; Pawson *et al.* 2010) and high pillars in the body wall combined with rods, perforated plates and the absence of rosettes (Deichmann 1958; Rowe 1969). *H. (Semperothuria)* contains about seven species, of which only two occur in the Western Atlantic.

For the Northeast region of Brazil, the following species of Holothuriidae family have so far been recorded: *Holothuria (Halodeima) grisea*, *Holothuria (Thymiosycia) arenicola* (Tommasi, 1969) and *Holothuria (Platyperona) parvula* (Selenka, 1867) being the first one the most abundant along the Brazilian coast. In the present study we present a new record of *Holothuria (Semperothuria) surinamensis* Ludwig, 1875 for northeastern Brazil. This species has been found in southern Brazil by Tommasi (1969) and Mondin (1973), but no recent records for other localities in Brazil have been established since. Recent papers that deal with *H. (Semperothuria) surinamensis*, such as Pawson *et al.* (2010) and Hendler *et al.* (1995), do not cite the occurrence of this species in Brazil. Here in we record *Holothuria (Semperothuria) surinamensis* Ludwig, 1875 for Ponta Verde, Maceió Municipality, state of Alagoas, Northeast Brazil.

The specimens studied were deposited in the Invertebrate Collection Paulo Young, Federal University of Paraíba, Brazil. The material was collected during Project Fauna in the period between 1982 and 1983. Specimens were dried with absorbent paper for the observation of external characters. For the analyses of internal

structures, specimens were sectioned longitudinally along the left side of the body. Histological sections were made of the body wall, ambulacral feet, papillae, and tentacles, in order to study the endoskeleton. Tissue fragments were immersed in a solution of sodium hypochlorite at 3% for the extraction of ossicles. Slides were observed under the optic microscope and specimens were then identified by comparisons with the literature.

Class Holothuroidea (Blainville, 1834)

Order Aspidochirotida Grube, 1840

Family Holothuriidae Ludwig, 1894

Genus *Holothuria* Linnaeus, 1767

Subgenus *Holothuria (Semperothuria)* Deichmann, 1958

Holothuria (Semperothuria) surinamensis Ludwig, 1875

Holothuria surinamensis Ludwig, 1875: 35, fig. 27; Lampert, 1885: 80; Deichmann, 1930: 63, fig. 12-15, 19. Hendler, 1995: 294-296, figs. 185d-f; Pawson, 2010: 38, fig. 31.

Holothuria subditiva Selenka, 1867: 338, fig. 86 - 87.

Holothuria languens, Semper, 1868: 87, 248.

Halodeima surinamensis Cherbonnier, 1951: 19-20, fig. 10-22.

Semperothuria surinamensis Deichmann, 1958: 303; 1963: 109-110.

Material examined: 6 specimens. UFPB.ECH-2071, 1 specimen collected in Francês Beach, Marechal Deodoro, Alagoas, AL, in 29.i.1983 by Paulo S. Young and Martin L. Christoffersen at littoral. UFPB.ECH-1984, 5 specimens from the Ponta Verde reef, Maceió, Alagoas, AL, in 31.i.1983 by Martin L. Christoffersen and Paulo S. Young at littoral.

Diagnosis: Large species, body cylindrical, shaped for excavation, found up to 200 m deep. Color in life from light yellow to dark brown. Few ambulacral feet, which are flattened dorsally, and cylindrical ventrally. With papillae on lateral region of body. Cuvierian tubules absent. Ossicles of table type, with reduced bases and single perforation (35-40 μm), large rods and perforated plates (about 400 μm) reduced in number; buttons absent (Pawson *et al.* 2010).

Description: Body cylindrical, elongate, ventrally flattened. Tegument smooth, not very thick (Figure 1A). With 15 peltate tentacles and a collar of short papillae around the mouth. Few ambulacral feet on dorsal region. Small papillae dispersed irregularly on dorsal region, more abundant on lateral regions of body. Podia abundant and larger on ventral region. Mouth of median-ventral position, anus ventral. A group of 10 or more small papillae surround the anus. The color of specimens conserved in alcohol varies from light to dark brown. Tentacle dark brown at apex and with peduncle yellow. Ambulacral feet and papillae light yellow. Calcareous ring simple, formed by 10 pieces, the radial ones being the most robust, rectangular, with recesses in the central regions. Interradial plates robust, smaller than the radial plates, and triangular in shape. Stone canal short, madreporite inconspicuous. Polian vesicles reduced. Longitudinal muscles well developed, divided. Retractor muscles continuous. Gonads in a tuft, with many tubules, not ramified. Cuvierian tubules absent. Respiratory trees present, very ramified,

on left side of body. Ossicles of body wall are table with spire of four pillars, with about four ramifications at the apex of each pillar and two protuberances along their length (Figure 1B). The base of the table is reduced, with about three ramifications at each edge along the margin, and with a central perforation. Perforated plates occur in smaller numbers (Figure 1C-D). Simple and slightly curved rods without perforations or ramifications are also present (Figure 1E), and may present rugosities along their length.

Habitat: Specimens were found in a reef environment composed mostly by hermatypic corals and coralline algae (Sarmiento and Correia 2002). The studied material was found below coralline stones and gravel. According to Hendler *et al.* (1995), this species lives in areas close to the coast, in shallow tidal pools. They are indicators of the presence of corals, and live over coral gravel, in algae and associated with coralline algae. They may reach depths of 0-42m.

Geographic distribution: Surinam is the type locality (Ludwig 1875). It has been found in Bermuda, Jamaica, Cuba, Puerto Rico, Antilles, Gulf of Mexico, Colombia, Venezuela, Surinam and southern Brazil (Tommasi 1969; Hendler *et al.* 1995). This is the first record of *Holothuria (Semperothuria) surinamensis* for the northeastern coast of Brazil. This is also the first record of subgenus *Semperothuria* for Northeast Brazil.

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LITERATURE CITED

- Cherbonnier, G. 1951. Holothurians de L'Institut Royal des Sciences Naturelles de Belgique. *Memoires, Institut Royal des Sciences Naturelles de Belgique*, 41(2): 1-65.
- Deichmann, E. 1930. The holothurians of the western part of the Atlantic Ocean. *Bulletin of the Museum of Comparative Zoölogy at Harvard College*, 71: 43-226.
- Deichmann, E. 1958. The Holothuroidea collected by the Velero III and IV during the years 1932 to 1954. Part II. Apsidochirota. *Allan Hancock Pacific Expeditions*, 11(2): 239-349.
- Hendler, G., J.E. Miller, D.L. Pawson and P.M. Kier. 1995. *Sea Stars, Sea Urchins and allies: Echinoderms of Florida and the Caribbean*. 1st edition. Washington: Smithsonian Institution Press. 392 p.
- Honey-Escandón, M., F.A. Solís-Marín and A. Laguarda-Figueras. 2011. *Holothuria (Selenkothuria) carere*, a new species of sea cucumber (Echinodermata: Holothuroidea) from the Mexican Pacific. *Zootaxa*, 2922: 27-33.
- Lampert, K., 1885. Die Seewalzen, eine Systematische Monographie mit Bestimmung und Verbreitung Tabellen; p. 1-310 In C. Semper (ed.). *Reisen im Archipel der Philippinen*. Volume II. Wiesbaden: Wissenschaftliche Resultate.
- Ludwig, H.L. 1875. Beitrage zur Kenntniss der Holothurien. *Arbeit aus dem Zoolzootom Institut Würzburg* 2(2): 77-120.
- Mondin, M.A. 1973. Estudo sobre os Holothuroidea do Brasil. I - Holothuroidea de Santa Cruz, Estado do Espírito Santo. *Atas da Sociedade de biologia do Rio de Janeiro* 17(1): 5-12.
- Pawson, D.L., D.J. King. 2010. A taxonomic guide to the Echinodermata of the South Atlantic Bight, USA: 1. Sea cucumbers (Echinodermata: Holothuroidea). *Zootaxa*, 2449, 1-48.
- Rowe, F.W. 1969. A review of the Family Holothuriidae (Holothuroidea: Apsidochirotida). *Bulletin of British Museum (Natural History) Zoology*, Londres. 18(4): 119-170.
- Samyn, Y., W. Appeltans and A.M. Kerr. 2005. Phylogeny of *Labiodemas* and the Holothuriidae (Holothuroidea: Apsidochirotida) as inferred from Morphology. *Zoological Journal of the Linnean Society* 144: 103-120.

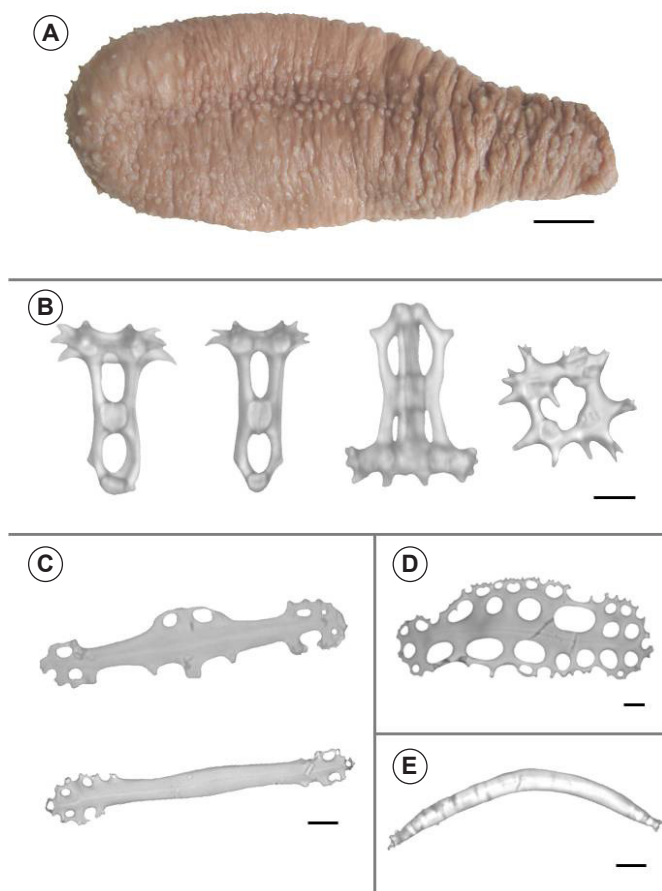


FIGURE 1. *Holothuria (Semperothuria) surinamensis* Ludwig, 1875. A. Dorsal view. B. Lateral view of spire and base of tables. C. Ossicles perforated plate. D. Perforated plate from body wall. E. Curved rod. Scales: A= 3cm; B, C, D and E= 10 μm .

Sarmento, F. and M.D. Correia. 2002. Descrição de parâmetros ecológicos e morfológicos externos dos poríferos no recife de coral da Ponta Verde, Maceió, Alagoas, Brasil. *Revista brasileira de Zoociências*,4(2): 215-226.

Selenka, E. 1867. Beitrage zur Anatomie und Systematik der Holothurien. *Zeitschrift für wissenschaftliche Zoologie* 17: 291-374.

Semper, C. 1868. Holothurien. *Reisen im Archipel der Philippinen von Dr. C. Semper in Würzburg. II. Wissenschaftliche Resultate* 1. Leipzig: Verlag von Wilhelm Engelmann. 288 p.

Tommasi, L.R. 1969. Lista dos Holothuroidea recentes do Brasil. *Contribuições Avulsas do Instituto Oceanográfico, série Oceanografia Biológica* 15: 1-29.

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