



Research note

First record of *Lissothuria antillensis* (Echinodermata: Holothuroidea) from the Gulf of Mexico

Primer registro de *Lissothuria antillensis* (Echinodermata: Holothuroidea) en el golfo de México

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Abstract. Two specimens of *Lissothuria antillensis* Pawson, 1967 were collected at 2 localities from the Gulf of Mexico, Isla Verde and Tuxpan Reef, Veracruz, Mexico. This species had been reported previously only from the Caribbean Sea.

Key words: new record, Gulf of Mexico, family Psolidae, Veracruz.

Resumen. Dos ejemplares de *Lissothuria antillensis* Pawson, 1967 fueron capturados en 2 localidades del golfo de México, en Isla Verde, Veracruz y en el arrecife de Tuxpan, Veracruz, México. Esta especie ha sido registrada anteriormente sólo para el mar Caribe.

Palabras clave: nuevo registro, golfo de México, familia Psolidae, Veracruz.

Lissothuria antillensis Pawson, 1967 is one of 2 species in the genus *Lissothuria* Verrill, 1867 (Family Psolidae Forbes, 1841) known from the Caribbean Sea. The other 5 species in the genus, *L. ornata* Verrill, 1867; *L. veleronis* (Deichmann, 1941), *L. nutriens* (Clark H. L., 1901), *L. ekmani* (Deichmann, 1941), and *L. hancocki* (Deichmann, 1941), are distributed in the Pacific from the west coast of California, USA to Peru (Pawson, 1967). *Lissothuria antillensis* had only been reported from the type locality in the Caribbean Sea.

The Gulf of Mexico is a basin isolated from the Caribbean Sea by a channel of about 2 500 m depth, extending over a total area of 1 768 000 km² with areas where depth reaches approximately 3 400 m (De la Lanza, 1991). Although recent and detailed checklists of the Gulf of Mexico echinoderms have been published (see Pawson et al., 2009), recent studies in this area support the fact that a critical analysis of taxonomy

and ecological factors related to the distribution of adult Psolidae is still needed (see Arriaga-Ochoa, 2010). This is mostly due to the fact that many psolids (e.g., *Lissothuria*) are small, cryptic, and problematic species with a peculiar or restricted habitat. Even fairly common species have never been properly studied from a taxonomic viewpoint (e.g., *Psolus*). Fast coastal development is degrading ecosystems in the Gulf of Mexico, resulting in marked ecological differences among habitats. Complementary records of rare or cryptic species are therefore important to understand the distributional patterns of Psolidae in the Gulf of Mexico and along the Yucatán Peninsula.

The specimens collected were compared with the holotype and paratypes held at the Zoological Museum of Natural History, University of Copenhagen (ZMUC); material at the National Museum of Natural History, Smithsonian Institution, Washington, DC, USA (USNM), and the diagnosis by Pawson (1967). The specimens collected were deposited in the Colección Nacional de Equinodermos de México, Instituto de Ciencias del Mar y

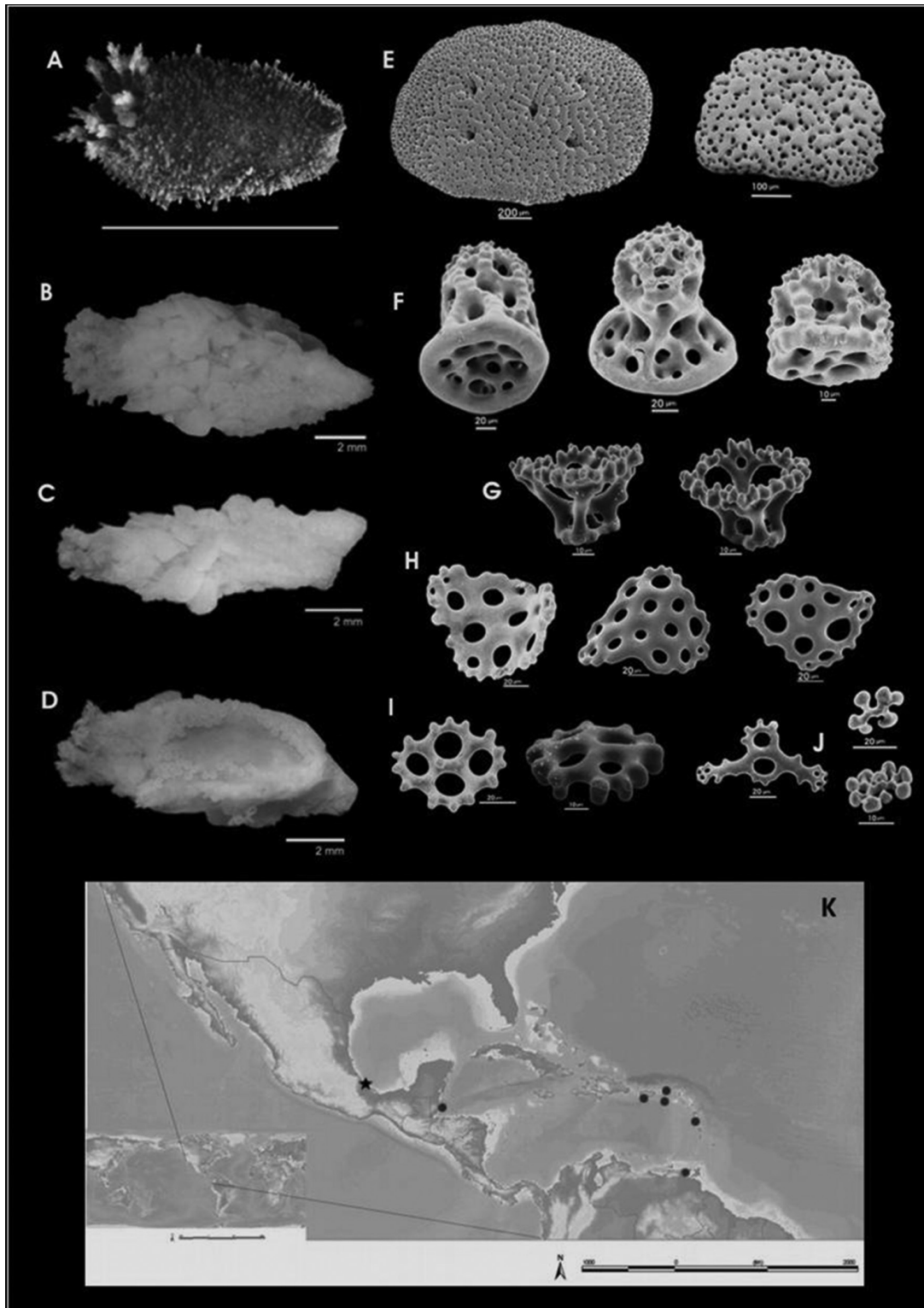


Figure 1. *Lissothuria antillensis*: (A), live specimen from Puerto Rico; (B), specimen from Tuxpan Reef, Veracruz, Mexico, Gulf of Mexico, dorsal view; (C), same, lateral view; (D), same, ventral view. Dorsal ossicles: (E), dorsal scales which form the test; (F), towers and thimble-shaped deposits; (G), cups; (H), irregular plates. Ventral ossicles: (I), knobbed plates; (J), deposits in the tentacles, support plate and rosettes; (K), distribution map of the species in the Caribbean Sea and Gulf of Mexico (★ new record).

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Systematics

Order Dendrochirotida Grube, 1840

Family Psolidae Forbes, 1841

Genus *Lissothuria* Verrill, 1867

Lissothuria antillensis Pawson, 1967 (Fig. 1)

Lissothuria antillensis Pawson, 1967: 10-12, fig. 3; Martínez, 1987: 167-168, figs. 2-3; Miller, 1985: 472; Arriaga-Ochoa, 2010, fig. 27, tab. 15-16.

Material examined. ICML UNAM 5.149.0, 1 specimen (15mm), Isla Verde, Veracruz, Mexico, Gulf of Mexico (19°12' N, 96°4' W) (2 m depth); ICML-UNAM-5.149.1, 1 specimen (14 mm), Tuxpan Reef, Veracruz, Gulf of Mexico, Mexico (21°1'44" N, 97°11' W) (0.5 m depth).

Additional material examined. ZMUC HOL-18, holotype; ZMUC HOL-296, paratypes, 2 specimens; ZMUC HOL-297, paratypes, 2 specimens. All previous records from Sto. Tomas Island, Virgin Island, USA, Caribbean Sea (no depth data); USNM-E53206, 2 specimens, St. Croix Island, Virgin Islands, USA; USNM 1017634, 2 specimens, Ragged Cay, Belize, North-Atlantic (16°51' N, 88°07' W) (2 m depth); E49450, 2 specimens, Portsmouth West, Dominica.

Diagnosis. Dorsal scale covering complete. Ossicles on dorsal surface are perforated plates, towers, and baskets; no hourglass-shaped deposits. Ossicles from the sole are knobbed plates and towers. Tentacles with rosettes (Pawson, 1967).

Description. Small size (10-15 mm), the length is twice the width; body elongate. Seven dorsal scales between the mouth and anus. Scales perforated to allow passage of tube feet, 4-5 holes per scale. Oral and anal valves triangular. Calcareous ring low, with radials and interradials about the same size (~ 2 mm). One Polian vesicle. No madreporite observed. Ossicles from the sole are plates and baskets. Tentacles with rosettes, perforated plates and rods.

Color. Color in life purple; observed in specimens collected in Puerto Rico (Pawson, pers. comm.); in these specimens the tentacles are dark-purple at the base and white distally.

Geographical and bathymetric distribution. Ragged Cay, Belize, North Atlantic; Bermuda (Pawson, 1985); La Parguera, Puerto Rico, USA; Guana Island, Virgin Islands, USA; St. Croix Island, Virgin Islands; Portsmouth West, Dominica, Lesser Antilles (Pawson, 1967); North Sucre, Venezuela (Martínez, 1987). Isla Verde and Tuxpan Reef, Veracruz, Mexico, Gulf of Mexico (new record). The bathymetric distribution range is from 0 to 17 m.

Remarks. Miller (1985) states that *L. antillensis* is the only psolid known to incubate young internally. The 3 development stages, embryo, pentactula and post-pentactula, can be incubated simultaneously. Martínez (1987) mentions that this species was found between layers of mussels in the north of Sucre, Venezuela at a depth of 2 m. This characteristic was not observed in the 2 specimens collected from the Gulf of Mexico. The specimen collected at Tuxpan Reef, was found among *Thalassia* fronds.

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Literature cited

- Arriaga-Ochoa, J. A. 2010. Análisis filogenético del género *Lissothuria* Verrill, 1867 (Dendrochirotida: Psolidae). MSc Thesis. Posgrado de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México. 86 p.
- De la Lanza-Espino, G. 1991. Oceanografía de mares mexicanos. A. G. T. Editor, S. A. México D. F. 569 p.
- Martínez, A. 1987. Presencia del género *Lissothuria* Verrill (Holothuroidea: Echinodermata) en la costa oeste del Estado de Sucre, Venezuela. Boletín Instituto Oceanográfico de Venezuela, Universidad de Oriente, Cumaná, Venezuela 1-2:165-172.
- Miller, J. E. 1985. Viviparity in a psolid holothurian from the tropical western Atlantic. Echinodermata. In Echinodermata, B. F. Keegan and B. D. S. O'Connor (Eds.). Proceedings of the Fifth International Echinoderm Conference. Galway, 24-29 September 1984. A. A. Balkema, Rotterdam. Boston. 472 p.
- Pawson, D. L. 1967. The psolid holothurian genus *Lissothuria*. Proceedings of the United States National Museum 122:1-17.
- Pawson, D. L. 1986. Phylum Echinodermata. In Marine fauna and flora of Bermuda: a systematic Guide to the identification of marine organisms, W. Sterrer (ed.). John Wiley and Sons, New York. p. 522-541.