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A new species of *Havelockia* Pearson, 1903 from the Argentine Sea (Holothuroidea: Dendrochirotida: Sclerodactylidae)

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Abstract

Havelockia pegi **sp. nov.**, is here described from shallow waters of the Argentine Sea. This new species is distinctive in the purple colouration of its tentacles, scarcity of body wall ossicles and the presence of rosette-shaped ossicles in both the introvert and the tentacles. It is not closely related to any of its congenors. This is the first record of a true sclerodactylid from Argentina. *Thandarum hernandezi* Martinez & Brogger, 2012, described in the family Sclerodactylidae, is now classified in the family Sclerothyonidae.

Key words: Echinodermata, south-western Atlantic Ocean, sea cucumber, *Havelockia pegi*

Introduction

Only three orders of holothuroids, comprising 26 species, have this far been reported from the Argentine Sea: Apodida, Molpadida and Dendrochirotida (Martinez & Brogger 2012, Brogger et al. 2013). The latter, which constitutes most of the world's described holothuroids, is represented in Argentinian waters by 18 species spread over four families: Psolidae (5 spp.), Cucumariidae (11 spp.), Sclerodactylidae (1 sp.), and Phyllophoridae (1 sp.) (see, Pawson 1969, Tommasi 1974, Hernández 1981, Tommasi et al. 1988a, b, Martinez & Brogger 2012, Brogger et al. 2013). The single sclerodactylid above was recently described by Martinez & Brogger (2012) but in the Sclerothyoninae, a subfamily which has recently been elevated to full family status (Sclerothyonidae) by Smirnov (2012) (see below). The current paper describes a new dendrochirotid strictly belonging to the family Sclerodactylidae. Hence, this must be regarded as the first record of a true sclerodactylid from the Argentine waters. The family Sclerodactylidae was erected by Pawson & Fell (1965), who determined that the use of the tentacle number by Panning (1949), Heding & Panning (1954) and other authors to characterize dendrochirotid families was artificial and hence proposed a new classification by re-combining various subfamilies so they became inter-mixed. Thus, Sclerodactylinae Panning, 1949, originally included in the Cucumariidae, and Cladolabinae Heding & Panning, 1954, originally included in the Phyllophoridae, were combined in the family-group taxon Sclerodactylidae. The validity of the taxon Sclerodactylidae has been questioned by Thandar (1989) and more recently by Arumugam (2012), but this taxon still stands and has been employed by many authors, including Thandar himself the way it was constituted by Pawson & Fell (1965). While the current paper was in review, Smirnov (2012), published his comprehensive paper on the system of the Holothuroidea, elevating the taxonomic status of the subfamily Cladolabinae to family Cladolabidae and the subfamily Sclerothyoninae to family (Sclerothyonidae), thus accepting the validity of the family Sclerodactylidae as originally diagnosed by Panning (1949). Smirnov's revision is here accepted.

The family Sclerodactylidae is currently represented in South America by only *Pseudothyone belli* (Ludwig, 1887), extending from Panama to the Abrolhos Archipelago, in the north-east of Brazil and the recently described

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Coronatum baiensis Martins & Souto, 2012 from Brazil. There are no reports of this family from Chile or, until now, from Argentina. The lack of more species within it is rather surprising as this family is well represented in all oceans of the world. In fact, the genus *Havelockia* Pearson 1903 itself has approximately 17 species worldwide (Arumugam 2012). This anomaly is perhaps due to the paucity of collections and lack of more taxonomists in Argentina. Even Deichmann's (1930) extensive paper on the West Atlantic holothuroids only reports on collections as far as the south of Brazil, thus ignoring species from Uruguay and Argentina.

The new species is represented by several specimens recently collected by one of us (MIM) along the Argentinian coastline, from Buenos Aires to Chubut Province. It is here described as *Havelockia pegi* **sp. nov.** in the family Sclerodactylidae. All pertinent taxa are diagnosed.

Acronyms. The following acronyms are used in this paper to indicate the source of materials:

MACN-Museo Argentino de Ciencias Naturales "Bernardino Rivadavia"; CNP-INV-Colección de Invertebrados del Centro Nacional Patagónico; ICML-UNAM-Colección Nacional de Equinodermos de México "Dra. Ma. E. Caso Muñoz", del Instituto de Ciencias del Mar y Limnología; Universidad Nacional Autónoma de México.

Systematics

Family Sclerodactylidae Panning, 1949

Diagnosis (amended from Smirnov, 2012: 821)

Dendrochirotida with 10 tentacles. Tube feet lying along radii, and often also arranged in the interradii, sometimes papilliform. Calcareous ring high; radial and interradial plates not fragmented, connecting to one another along almost entire length thus forming a short tube; radial plates with forked processes of medium-size, usually subdivided into three-four large pieces. Ossicles: tables with two or four pillars or plates, sometimes baskets or buttons.

Genus *Havelockia* Pearson, 1903

Diagnosis (after Thandar, 1989: 292)

Calcareous ring short, stout, only anterior projections of radial and interradial plates free; posterior paired processes of radial plates divided into several pieces. Body wall ossicles tables with a squarish to oval disc usually perforated by four large central and four smaller peripheral holes, the latter sometimes reduced or absent; spire of two pillars joined at apex and terminating in few blunt teeth.

Type species: *Havelockia herdmani* Pearson, 1903 (by original designation).

Havelockia pegi sp. nov.

(Figures 1–3)

Diagnosis. Tentacles purple in colour; body wall ossicles scarce, only few detected, especially from the anal region and base of tube feet, comprising tables with a 2-pillared, often regressed spire; tentacles and introvert with rosettes.

Etymology. The specific name *pegi* is used to honour the Martinez-Ferreyra family to whom this name is quite significant. It is a noun in apposition.

Material examined. *Holotype*: 86 mm length, one male individual and 3 slides with ossicles, Villarino, Golfo San José, Chubut Province (Sep. 2006), (42°25'S–64°31'W), 10 m. MACN-In 39019. *Paratypes*: 32,70 mm, 55,95 mm, Buenos Aires Province (9 Sep. 2009), (38°15'S–57°15'W), 48 m., MACN-In 39021 (2 paratypes); 35,55 mm, Villarino, Golfo San José, Chubut Province (42°25'S–64°31'W), 10m, MACN-In 39020 (1 paratype); 30,43 mm length, one individual and 1 slide with ossicles; El sótano, Golfo San Matías, Río Negro Province, Argentina (Nov.

2011), (41º00’ S–65º08’ W), 15 m, ICML-UNAM 5.195.0 (1 paratype); 40 mm, one individual; San Matías, Río Negro Province (16 Nov. 2009), (41º 20’S–62º 59’W), 34 m, CNP-INV 415 (1 paratype).

Description. All specimens partially eviscerated; length up to 86 mm. Body form U-shaped to cylindrical. Colour in life and in alcohol, brown; tentacles purple in life, turning to light violet or brown in alcohol. Tube feet scattered, covering entire body with no indication of any regular arrangement (Fig. 1). Larger tube feet around 2 mm in length, suckers well developed. Tentacles 10, bushy, ventral two reduced to quarter the size of large tentacles. Anal teeth present. Calcareous ring short-tubular with plates compact, fused for most of their length; posterior paired processes of radial plates of moderate length, divided into 3–4 pieces of calcite. Polian vesicle single, saccular, free, on left side of mesentery; stone canal long, straight, on right side of mesentery, madreporite lenticular. Gonad of holotype mature, in two tufts, attached to the middle of body, each with numerous undivided branches, filling greater part of coelom. Respiratory trees, each with two branches, extending along the total length of body, the right tree slightly longer. Longitudinal muscle bands well developed. Retractor muscles attach to the radial plates. Cloaca elongate, about quarter to one fifth the total length of body.

Body wall ossicles rare, only a few detected, especially in the anal region and bases of tube feet, comprising tables with an oblong or irregular, often regressive disc (65–160 µm) with 4–8 holes and a low, 2-pillared spire, pillars sometimes fused (Fig. 2a, 3a). Tube feet ossicles as tables with a quadrilocular, straight or slightly curved disc (115–172 µm), with four central holes and often an additional hole at each end; spire 2-pillared, ending in several blunt teeth or spire regressive or absent (Fig. 2b, 3b), end-plate circular, ca. 225 µm, with small central holes and larger ones outside these in no regular arrangement (Fig. 2c). Introvert and tentacles with closed rosettes, 30–62 µm (Fig. 2d).

Habitat: sand, broken shells and gravel.

Distribution: South Atlantic Ocean, from Buenos Aires Province, Mar del Plata (38°15’S–57°15’W) to Chubut Province, Villarino (42°25’S–64°31’W)

Depth: 10–48 m.

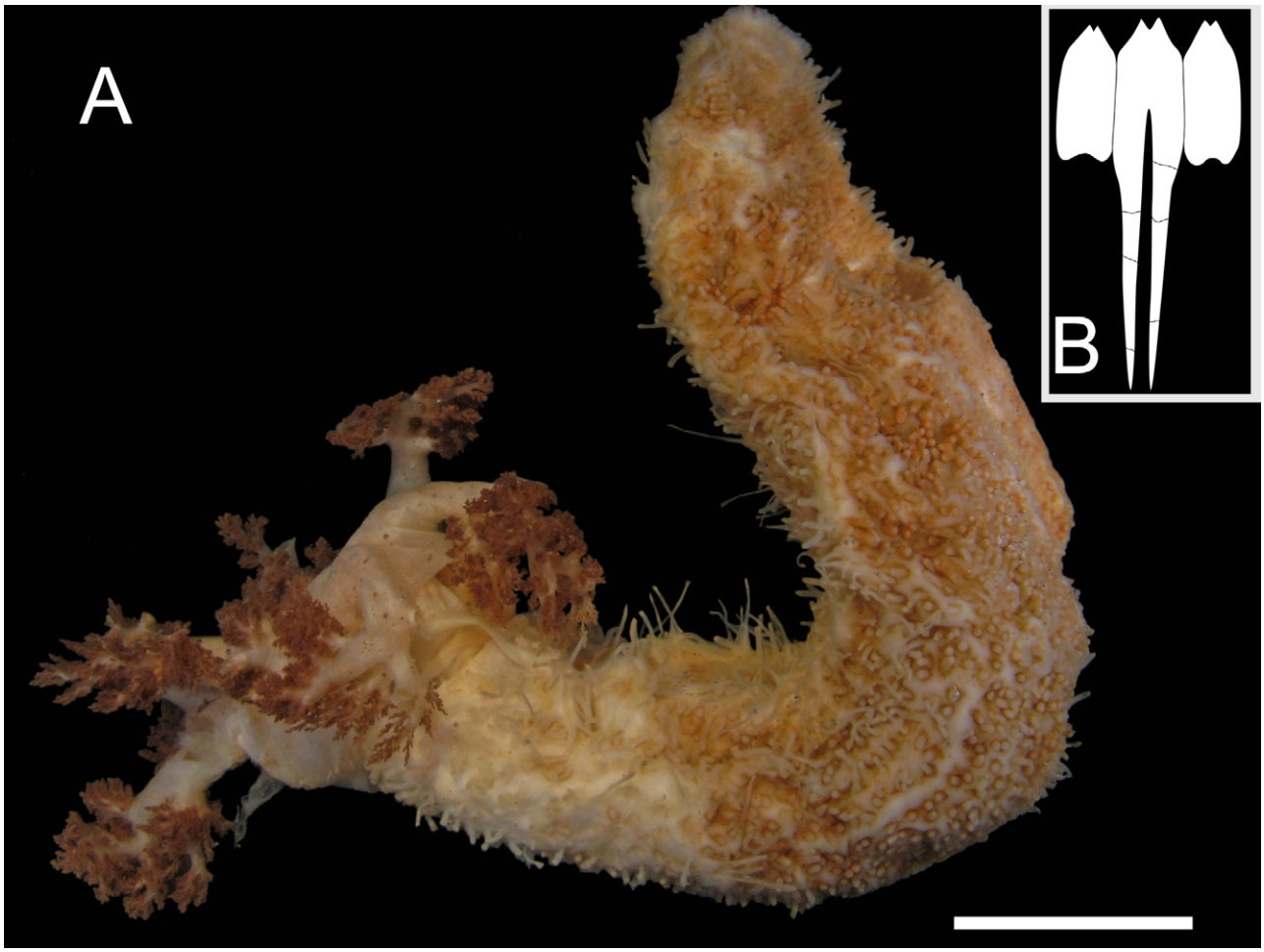

FIGURE 1. A. Holotype of *Havelockia pegi* **sp. nov.**, MACN-In 39019, scale 2 cm; B. Calcareous ring.

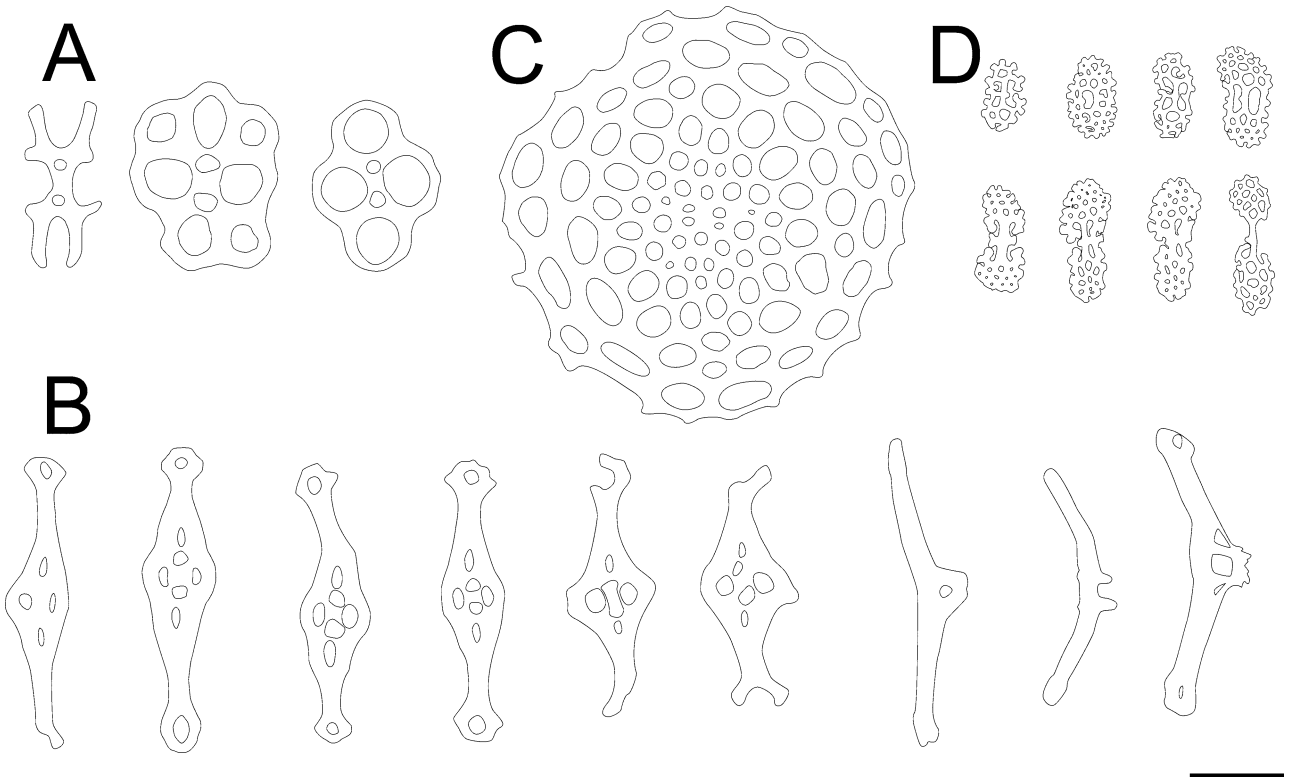

FIGURE 2. Ossicles of *Havelockia pegi* **sp. nov.** A. Tables from body wall; B. Quadrilocular tables from tube feet; C. end-plate; D. Rosettes from introvert and tentacles. Scale 50 µm.

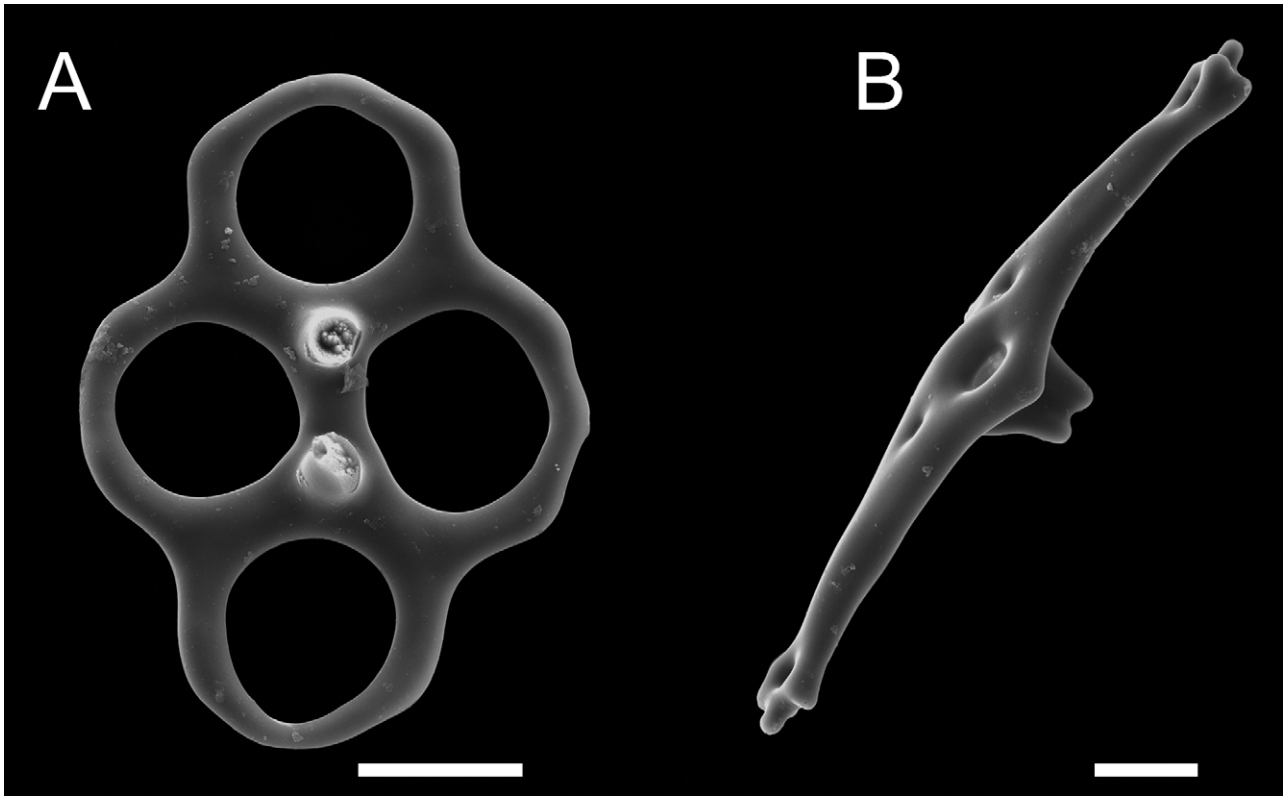

FIGURE 3. A. table from body wall near anus; B. Quadrilocular table from tube foot. Scale 20 µm.

Remarks. In all individuals examined, the tentacles, calcareous ring and the first part of the gut are partially eviscerated. The dark purple colour of the tentacles, in living, and brown or light-violet in preserved specimens, is quite distinctive in comparison with that of some other Argentinian dendrochirotids.

The family Sclerodactylidae (sensu Pawson & Fell 1965) comprises over 80 species with a world-wide distribution, but it is surprising that besides *Pseudothyone belli* (Ludwig, 1887) and the recently described *Coronatum baiensis* Martins & Souto, 2012, no other true sclerodactylid has been recorded from the south-western Atlantic Ocean so far. In comparison with most species of the genus, *Havelockia pegi* **sp. nov.** has scarce body wall ossicles, a circular end-plate, and rosettes in both the introvert and tentacles. These features in combination make it distinctive. There are only a couple of *Havelockia* species with scarce or no body wall deposits. These are *H. discolor* (Sluiter, 1901) with no body wall deposits and *H. conciliatrix* (Sluiter, 1901) with scarce deposits, restricted to the podia. Both are warm-water West Pacific species and differ from the new species in many features, e.g. *H. conciliatrix* has conical papillae and naked dorsal interradii and *H. discolor* has rods in the tentacles and no deposits in the body wall and tube feet. In comparison with the other sclerodactylids (sensu Panning, 1949, non Pawson & Fell, 1965) from South America, *C. baiensis* has tables with oval, knobbed disc while *Pseudothyone belli* has knobbed buttons instead of tables in the body wall.

The new species might be mistaken to represent a *Pentamera*, notably *P. chiloensis*, which also occurs in Argentinian waters. However, the genus *Pentamera* is well characterized by the ambulacral restriction of the tube feet, a different type of calcareous ring and well developed body wall ossicles, often accompanied by plates. *P. chiloensis* in particular, although lacking plate-like ossicles, has well-developed table deposits with numerous holes, table spires with 1–4 pillars and stellate end-plates (Pawson 1969). *Thandarum hernandezi* differs from *H. pegi* in the ambulacral restriction of the tube feet and the presence of 4-pillared tables in the body wall. However, both species have a northern distribution, but restricted to the Rio de la Plata and are not found further north as the low salinity prevent their influx into the northern waters. Perhaps the same factor intervenes to prevent Brazilian species extending southwards (Tommasi et al. 1988b, Martinez & Brogger 2012).

More collections along the long Argentinian coastline will undoubtedly reveal more dendrochirotids as this order is notorious for its distribution in temperate waters of all the world's oceans. In fact, the temperate waters of most continents or subcontinents of the southern hemisphere, including New Zealand, are well endowed with endemic dendrochirotids—so Argentina may not be an exception.

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