



## ***Thandarum hernandezii*, a new genus and new species of sea cucumber family Sclerodactylidae (Echinodermata: Holothuroidea: Dendrochirotida) from the Southwestern Atlantic Ocean**

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### **Abstract**

A new genus and a new species of dendrochirotid, *Thandarum hernandezii* **gen. et sp. nov.**, is described from Buenos Aires coast in the Southwestern Atlantic. For this species is quite significant the body U shape, up to 14.08 mm (along the trivium), with double row of podia restricted to the ambulacra. Other features are ossicles from body wall with buttons and 4 pillar tables, tube feet with rods and end plate star-shaped; the introvert with rosettes and tentacles with rods. These characteristics require the recognition of a new genus, and the new species and represents the first sclerodactylid reported in Argentinean waters.

**Key words:** Sclerothyoninae, *Thandarum hernandezii* **gen. et sp. nov.**, holothurian, Argentine Sea

### **Introduction**

On the basis of the holothurians of South Africa, Thandar (1989) revised and modified the family Sclerodactylidae. He recognised the subfamily Cladolabinae for forms with 15–20 tentacles and he divided the included 10-tentacled taxa, based on the form of the calcareous ring, into two subfamilies; Sclerodactylinae and Sclerothyoninae. The subfamily Sclerothyoninae described by Thandar (1989) has 10 tentacles with a not tubular calcareous ring. For this subfamily are *Sclerothyone* with table ossicles from body wall with or without a handle on one side and usually an arched spire with or without teeth and *Temparena* with table ossicles from body wall without handles. This two genus are from South Africa and erected by Thandar (1989).

For Southwestern Atlantic Ocean, Ludwig (1887) and Cherbonnier (1961) described two sclerodactylids, *Pseudothyone belli* (Ludwig) with 10 tentacles and *Euthyonidiella dentata* Cherbonnier with 20, both with distribution in Brazil.

For the Argentine Sea waters, Tommasi (1974) and Tommasi *et al.* (1988) studied the holothurians near Rio de la Plata and Mar del Plata, and Hernández (1981) studied specimens from Puerto Deseado (47°45'S; 65°55'W), but none of these works reported species of the family Sclerodactylidae in the area.

In the present article we describe a new genus and a new species of Sclerodactylidae from the Argentinian coast, which represents the first report for this family in Argentinean waters.

### **Material and methods**

Samples were collected onboard B/O “Puerto Deseado” using an Agassiz trawl. Some samples were preserved in ethanol 96% and others in formalin and then conserved in ethanol 70%. Holotype and paratypes are deposited in the Invertebrate Collection of the Museo Argentino de Ciencias Naturales “Bernardino Rivadavia” (MACN-In), Buenos Aires, Argentina. Permanent slides of ossicles of the holotype are lodged in MACN-In. Digital photos of

specimens were taken in the laboratory using a Nikon digital camera D100. Digital images of ossicles were taken using Zeiss Axio Imager Z1 microscope with AxioCam HRC digital camera and Axiovision software.

For scanning electron microscope (SEM) examinations of calcareous ring and ossicles, small pieces of the body wall were macerated in sodium hypochlorite solution and then rinsed several times in distilled water, ethanol 96% and air dried. Finally, the ossicles were transferred to aluminum stubs and observed under SEM.

## Results

### Systematics

#### Order Dendrochirotida Grube 1840

#### Family Sclerodactylidae Panning 1949

#### Subfamily Sclerothyoninae Thandar 1989

Diagnosis (Thandar 1989): Tentacles 10, ventral-most two much reduced. Calcareous ring not tubular, radial and interradial plates united at base only; posterior paired processes of radial plates, long, 3–8 times the height of ring, either entire or broken into several pieces.

Type genus: *Sclerothyone* Thandar 1989

#### Key for genera of the subfamily Sclerothyoninae (modified from Thandar 1989)

- 1 Table ossicles from body wall with two pillars ..... 2
- Table ossicles from body wall with four pillars and buttons ..... *Thandarum* gen. nov.
- 2 Table ossicles from body wall with or without a handle on one side and usually an arched spire with or without teeth .....  
..... *Sclerothyone* Thandar 1989
- Table ossicles from body wall without handles, and smooth multilocular plates ..... *Temparena* Thandar 1989

#### *Thandarum* gen. nov.

**Diagnosis.** Small to medium-sized forms, up to 14.08 mm length. Tentacles 10, with two ventral tentacles smaller than others. Non-retractile podia in five series, restricted to the ambulacra. Radials of the calcareous ring with long forked tails. Body wall with 4-pillared tables and buttons. Tube feet with rods and star-shaped endplates. Tentacles with rods, and rosettes in the introvert.

**Type species.** *Thandarum hernandezi* sp. nov.

**Etymology.** This genus is named after Dr. Ahmed S. Thandar from the University of KwaZulu-Natal, Durban, Republic of South Africa, in recognition for his contributions to the taxonomy of holothurians and, particularly, of the family Sclerodactylidae. The gender is neuter.

**Remarks.** In comparison with *Sclerothyone* and *Temparena* species, *Thandarum* gen. nov. presents 4 pillar tables and buttons on the body wall.

#### *Thandarum hernandezi* sp. nov.

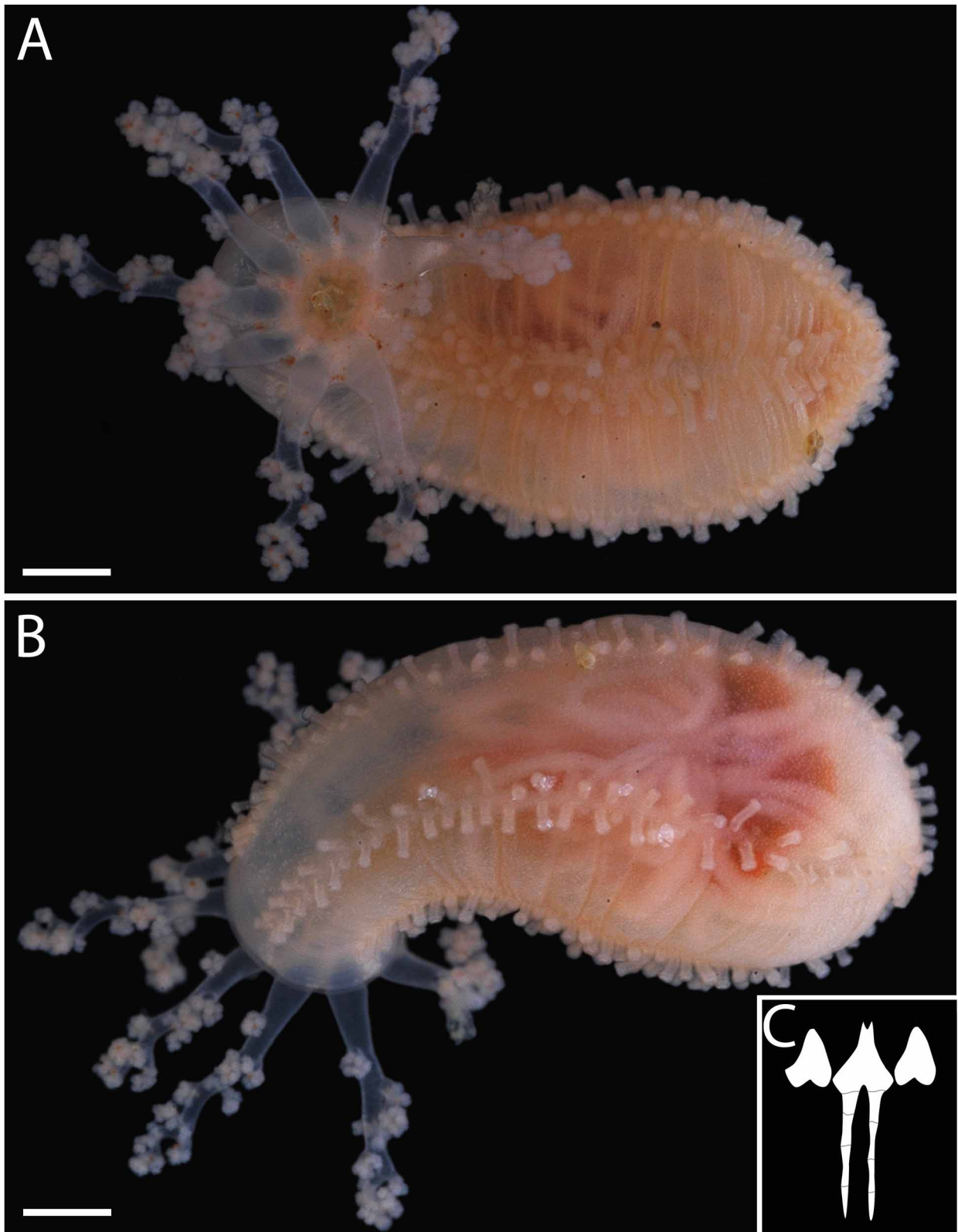
(Figures 1, 2)

**Type material.** Holotype: 11.50 mm length, one individual and 4 slides with ossicles. Argentine Sea, “Mejillón II” Expedition (15 Sep. 2009), St. n° 24 (36°09,567’S; 55°53,649’W), 15 m. MACN-In n° 39256. Paratypes: Six individuals, 14.58 mm; 14.08 mm; 13.96 mm; 13.86 mm; 13.03 mm; and 10.40 mm. Same locality and date. MACN-In n° 39257/1-6.

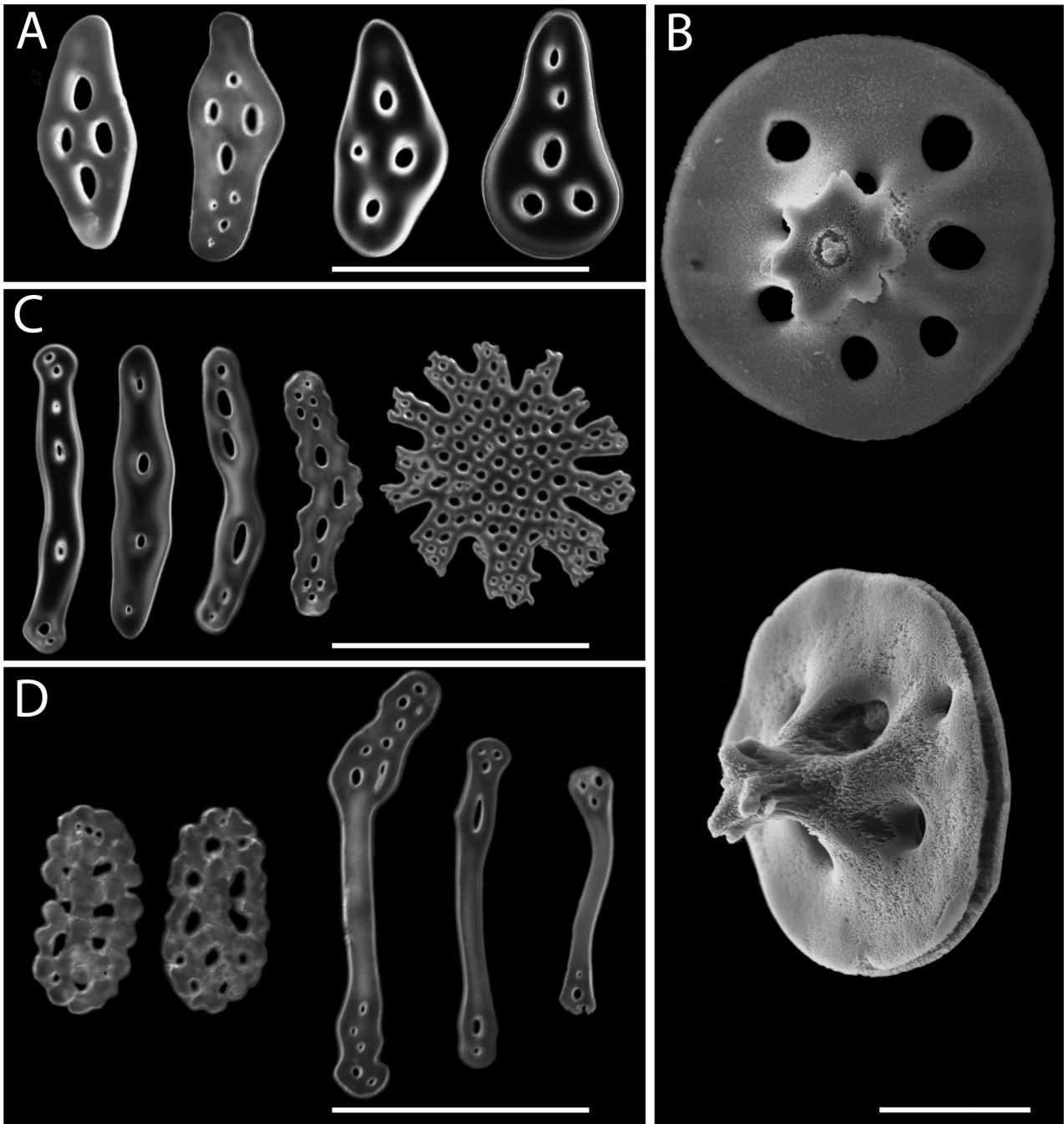
**Diagnosis.** Body U shaped, up to 14.08 mm with double row of podia restricted to the ambulacra. Ossicles

from body wall with buttons and 4 pillar tables. Tube feet with rods, end plate star-shaped. Introvert with rosettes and tentacles with rods.

**Etymology.** This species is dedicated to Dr. Domingo Andrés Hernández, for his contributions to the taxonomy of the Argentine Sea holothurians, and for being the starter of holothurians studies in Argentina. This epithet is use as a noun in apposition.



**FIGURE 1.** Holotype of *Thandarum hernandezii* gen. et sp. nov. A. Dorsal view; B. Ventral view; C. Calcareous ring shape. Scale bars: A and B = 1 mm.



**FIGURE 2.** Ossicles of *Thandarum hernandezii* gen. et sp. nov. A. Body wall buttons; B. Tables with four pillars from body wall; C. Rods from podia and star-shaped end plate; D. Rods from tentacles and rosettes from introvert. Scale bars: A, C and D = 50  $\mu\text{m}$ , B = 100  $\mu\text{m}$ .

**Description.** (Based on the holotype) Body curved, skin usually soft; live color orange-pink, and white in preserved state; anus and tentacles up turned; 10 dendritic tentacles, 2 ventral smaller; body wall thin with double row of podia restricted to the radii; trivium and bivium complete with well developed podia (Fig. 1 A–B); calcareous ring not tubular, radial and interradial plates joined only at the base, radials with posterior prolongations made up of a mosaic of 3–4 pieces; ratio of radial/interradial length approximately 1:3 (Fig. 1 C). A single polian vesicle. Stone canal bifurcated; one madreporite with two kidneys shaped. Respiratory trees with multiple branches extending to the half part of the body. Gonads attached to the gonoduct at the middle part of the body, with multiple branches extended all over the coelom cavity. Ossicles in body wall of two types. Buttons typically 50–80  $\mu\text{m}$  long with only 4 to multiple perforations (Fig. 2 A) and 4 pillar tables, typically of 130  $\mu\text{m}$  long and 260  $\mu\text{m}$  across (Fig. 2 B).

Tube feet with rods with 2 middle and 2 terminal holes; end plate star-shaped with multiple perforations typically 80–120 µm across (Fig. 2 C). Introvert with rosettes 40–55 µm long and tentacles with rods typically 80–100 µm long with only 1 to multiple terminal perforations (Fig. 2 D). No differences are observed between the holotype and paratypes.

**Type locality.** Off Buenos Aires (36°09.567'S, 55°53.649'W), Argentina.

**Habitat.** Sand.

**Remarks.** All the specimens collected are distinctive and have genus type characteristics. In comparison with *Sclerothyone* and *Temparena* species, *Thandarum hernandezi* gen. et sp. nov. presents 4 pillar tables. For South-western Atlantic waters, *Pseudothyone belli* has knobbed buttons with handle (Ludwig 1887) not observed on *T. hernandezi*. Also from Brazil *Cucumaria manoelina* Tommasi 1971 has 4 pillar tables but no material was found of *C. manoelina*, the type is lost, for this reason comparisons were made with the original description from Tommasi (1971). The differences between the two species are in the number of rows of podia and the shape of the ossicles. In *C. manoelina* 5 lines of podia were described, while in *Thandarum hernandezi* gen. et sp. nov. a double row of podia were observed. The tegument buttons have some differences in the number of holes, more in *C. manoelina* than *T. hernandezi*. For the podia introvert and tentacles the rosettes and rods have differences in shape, the rosettes in *C. manoelina* are circular and oblong in *T. hernandezi*. The rods on *T. hernandezi* has more holes than in *C. manoelina*, also the holes in *T. hernandezi* are restricted to the ends. Also, *C. manoelina* has tables with more holes and a reduced diameter than the observed for *Thandarum hernandezi* gen. et sp. nov.

## Discussion

Thandar (1989) discussed the calcareous rings forms of the family Sclerodactylidae, Phyllophoridae and Cucumariidae, and resumed the history of the family Sclerodactylidae. Comparing the shape of the different calcareous rings forms, *Thandarum hernandezi* gen. et sp. nov. conform within the Sclerothyoninae. In comparison with *Sclerothyone* and *Temparena*, *Thandarum* gen. nov. has 4 pillar tables, and also there are no plates in the introvert neither in the tentacles, the latter characteristics are observed in both members of Sclerothyoninae.

Holothurian fauna from southern Argentine Sea waters is closely related to that of southern Chile (Pawson 1969), including the absence of reports on Sclerodactylidae. There are also species like *Cladodactyla crocea* (Lesson), *Pseudocnus dubiosus leoninus* (Semper) and *Pseudocnus perrieri* (Ekman) that do not span north into Uruguayan neither Brazilian waters (Tommasi 1971, 1974; Hernández 1981; Tommasi *et al.* 1988; Tiago & Ditadi 2001). The reason of this pattern of distribution could be the effect of low salinity of the Rio de la Plata, that acts as a biogeographical barrier for some echinoderms (Tommasi *et al.* 1988), like *Pseudothyone belli* and *Euthyonidiella dentata*, both sclerodactylids from north side of the Rio de la Plata, and also for *Thandarum hernandezi* gen. et sp. nov., restricted to south side of the Rio de la Plata. Although it is important to mention that at some deep this effect could probably allow some exchange of fauna from one side to the other of the Río de la Plata, and this could explain the registry on *C. manoelina* that appear to be closely related with *T. hernandezi*.

The present represents the first report on the family Sclerodactylidae from Argentina and also the first report on the subfamily Sclerothyoninae, which was only known for South Africa (Thandar 1989). This distribution of the subfamily Sclerothyoninae occurs also with the subfamily Cucumariinae Panning, genus *Cladodactyla* Brandt, for which *Cladodactyla crocea* has a South Western Atlantic distribution and *Cladodactyla brunspicula* Thandar 2008 for South Africa.

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