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A new species of *Thorecta* (Porifera: Demospongiae) from the western Atlantic, with remarks on the taxonomy of the genus

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The family Thorectidae includes 23 valid genera and 130 species, characterized by the presence of laminated fibres and diplodal choanocytye chambers. Currently the genus Thorecta *comprises approximately 20 valid species, distributed mainly in the Indo-Pacific. We describe here a new species of* Thorecta *that is the only valid species of the genus described in the Atlantic Ocean so far. Samples were collected by trawling on board of the RV 'Astro Garoupa' in Potiguar Basin, on the northern coast of Rio Grande do Norte State, north-eastern Brazil.* Thorecta atlantica *sp. nov. is greyish-brown to dark brownish-grey and presents a distinctive globular or clavulate shape, with 1–2 large apical oscules that open to deep atria. It was found between 61 and 160 m depth. A literature survey suggests that many species referred to* Thorecta *should be relocated to different genera due to absence of diagnostic characters, and that the genus* Thorecta *should group only 11 species:* T. carteri, T. marginalis, T. prima, T. lata, T. farlovi, T. meandrina, T. polygona, T. reticulata, T. tuberculata, T. vasiformis *and* T. atlantica *sp. nov. The tortuous history of the genus is an example of the damage that poorly-described species can cause to classification. Detailed descriptions of fresh material, well illustrated by photographs and including as many characters as possible, are essential tools for the clarification of the systematics of* Thorecta *in the future.*

Keywords: *Thorecta atlantica* sp. nov., Thorectidae, Dictyoceratida, Porifera, western Atlantic, Brazil, taxonomy

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INTRODUCTION

The family Thorectidae Bergquist, 1978 (Demospongiae: Dictyoceratida) is distributed throughout the world from tropical to temperate seas, except for polar regions, and from the intertidal zone to around 100 m depth (Cook & Bergquist, 1996, 2002). It includes 23 valid genera and approximately 130 species whose shape varies from encrusting pads to massive, erect, lobate, caliculate or digitate growth forms. The surface is usually armoured with a sandy cortex or sculptured with ridges, pits or conules. The skeleton is a regular reticulum with rectangular meshes formed by primary, secondary and sometimes tertiary spongin fibres. Fibres are laminated in cross-section, with clear zones of disjunction between successive layers and a diffuse pith that may be obscured by an axial core of foreign material. Some fibres may be very stout or form complex fascicles (Cook & Bergquist, 2002).

The genus *Thorecta* Lendenfeld, 1889 is the type genus of Thorectidae. It is currently considered to comprise 20 valid species (Cook & Bergquist, 2002), although the exact number of valid species is controversial and varies from 8–24 according to the classifications adopted by different authors (e.g. Lendenfeld, 1889; de Laubenfels, 1948; Wiedenmayer, 1977, 1989; Bergquist, 1980; Cook & Bergquist, 1996, 2002). Species of *Thorecta* show stalked, globular, fan-shaped or cylindrical upright growth forms. The surface is always armoured with a sandy cortex; it may be smooth or regular, but not with typical conules; some species however may have microconulose areas on the surface. The reticulate skeleton has regular rectangular meshes, formed by primary fibres cored with debris and clear secondary fibres (Cook & Bergquist, 2002; Cook, 2007). Most species referred to the genus are distributed in the Indo-Pacific, especially in Australia (19 species), but also in Micronesia, Madagascar, Mauritius and New Zealand (one species each).

Six species assigned to *Thorecta* were previously recorded from the Atlantic Ocean, viz., *Thorecta dendroides* (Lendenfeld, 1889), *Thorecta galeiformis* Lendenfeld, 1889, *Thorecta gracillimus* Lendenfeld, 1888, *Thorecta laxus* Lendenfeld, 1889, *Thorecta horridus* (Hyatt, 1877), all from the Bahamas, and *Thorecta squalidus* Lendenfeld, 1888 from South Africa. The validity of all these species, however, is highly questionable: *T. dendroides* and *T. laxus* are considered unrecognizable (de Laubenfels, 1948; Bergquist, 1980); *T. galeiformis* is considered a junior synonym of *T. calyx*, and its records from the eastern Pacific and Caribbean are doubtful (de Laubenfels, 1948; Hooper & Wiedenmayer, 1994); *T. gracillimus* is a junior synonym of *Taonura colus* (cf. Bergquist, 1980; Hooper & Wiedenmayer, 1994); *T. horridus* is probably the poecilosclerid *Mycale* (*Arenochalina*)

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laxissima (Duchassaing & Michelotti, 1864) (see van Soest, 1978; Zea, 1987; Wiedenmayer, 1989); and *T. squalidus* was transferred to *Phoriospongia* (Poecilosclerida; Hooper & Wiedenmayer, 1994). In Brazil, Muricy *et al.* (2006) recorded without description a *Thorecta* sp. and other unidentified Thorectidae from Bahia State, and Muricy *et al.* (2008) described a *Thorecta* sp. from Rio Grande do Norte State, without naming it or designating type specimens. In summary, no valid species of *Thorecta* have been described from the Atlantic Ocean so far.

In the present paper we describe in detail the specimens of *Thorecta* sp. from Rio Grande do Norte State (Muricy *et al.*, 2008) as a new species, *T. atlantica* sp. nov. The new species is the only currently valid species of the genus described in the Atlantic Ocean so far. We also discuss the taxonomy and species composition of the genus *Thorecta*.

MATERIALS AND METHODS

Potiguar Basin is located on the north continental shelf of Rio Grande do Norte and Ceará States (north-eastern Brazil). The sampling area ranged between 04°30′00″–05°10′00″S and 36°10′00″–36°50′00″W, off the cities of Guamaré, Galinhos, Macau and Areia Branca, in Rio Grande do Norte State (Figure 1). Potiguar Basin is an area of oil and gas exploitation in which the research centre (CENPES) of the Brazilian oil company PETROBRAS is carrying on a programme of environmental characterization and monitoring, including a description of the sponge fauna (Muricy *et al.*, 2008).

The sponges studied here were collected by trawling on board of the RV 'Astro Garoupa' in three campaigns (BPOT 2–4) by the Project of Environmental Characterization and Monitoring of Potiguar Basin (Muricy *et al.*, 2008). Dredging and trawling were carried out in 136 stations within the study area, but the new species of *Thorecta* was found in only two of them (Figure 1C). Trawling was performed with a net 18 m long with a mouth of 9 m, mesh diameter of 30 mm in the body and 24 mm in the sac. Samples were fixed and preserved in 70% ethanol. The specimens were deposited in the Porifera collections of the Departamento de Zoologia da Universidade Federal de Pernambuco (UFPEPOR) and Departamento de Invertebrados do Museu Nacional, Universidade Federal do Rio de Janeiro (MNRJ). Thick

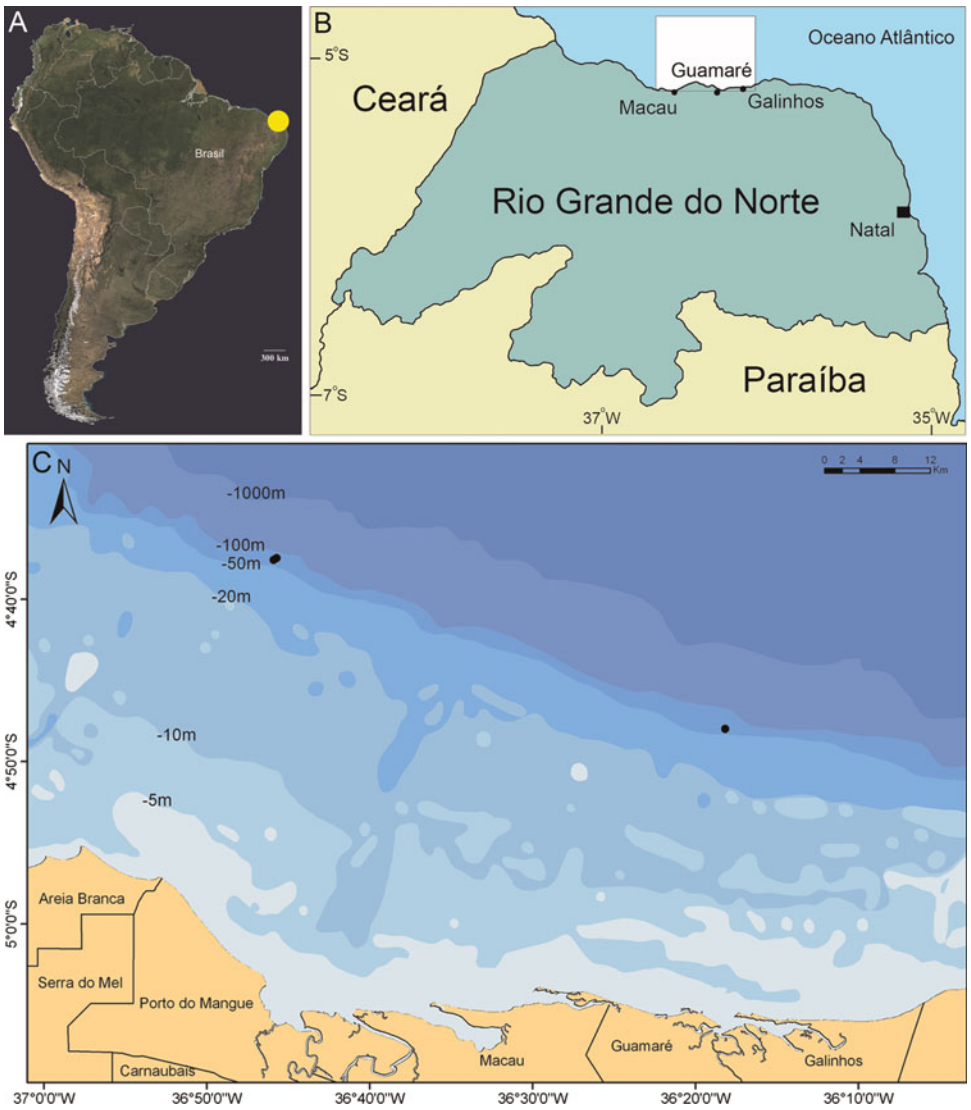

Fig. 1. Location of the studied area, Potiguar Basin, and of the collection sites of *Thorecta atlantica* sp. nov. (black circles in C).

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section preparations followed standard procedures (Cook, 2007). The measurements of fibre diameter are presented as minimum–mean–maximum; N = 20 per individual. Photomicrographs were taken with a Sony DSC-W50 digital camera coupled with a Nikon Eclipse E-200 light microscope.

RESULTS

SYSTEMATICS
Class DEMOSPONGIAE Sollas, 1885
Subclass CERACTINOMORPHA Lévi, 1953
Order DICTYOCERATIDA Minchin, 1900
Family THORECTIDAE Bergquist, 1978
Subfamily THORECTINAE Bergquist, 1978
Genus *Thorecta* Lendenfeld, 1888

TYPE SPECIES

Thorecta exemplum Lendenfeld, 1888 var. *tertia* Lendenfeld, 1888 (by subsequent designation; de Laubenfels, 1948); junior synonym of *Thorecta latus* (Carter, 1885) (cf. Cook & Bergquist, 2002).

DIAGNOSIS (FROM COOK & BERGQUIST, 2002)

Stalked, globular, fan-shaped or cylindrical upright growth forms, in which the primary fibres are cored with a regular axial column of debris and the secondary fibres are clear. The skeleton forms a regular, almost perfectly rectangular mesh in which the spaces between the fibres may be quite large (2 mm is common). The surface is always armoured, not conulose. These sponges are firm and compressible.

Thorecta atlantica sp. nov.

TYPE MATERIAL

Six specimens, all from Potiguar Basin, Rio Grande do Norte State, Brazil, coll. RV 'Astro Garoupa'—holotype: UFPEPOR 360, Campaign BPOT 04, Station A22, off Guamaré, (04°47′50.8″S–36°18′16.8″W), 62–63 m depth, 24 May 2004 (Figure 2A). Paratypes: UFPEPOR 121, Campaign BPOT 02, Station A4, off Porto do Mangue (04°37′31.7″S–36°46′00.7″W), 70–101 m depth, 14 May 2003; UFPEPOR 247, Campaign BPOT 03, Station A4, off Porto do Mangue (04°37′09.4″S–36°44′57.1″W), 61–160 m depth, 14 November 2003; UFPEPOR 442 (Figure 2B–D), 667, 668, Campaign BPOT 04, May 2004, Potiguar Basin; precise locality, depth and date of collection unknown; schizotype: MNRJ 13170 (fragment of UFPEPOR 442).

DIAGNOSIS

Thorecta with globular or clavate (stalked) shape and 1–2 large apical oscules with deep atria.

SYNONYM

Thorecta sp., Muricy *et al.*, 2008: 115.

DESCRIPTION

External colour greyish-brown to dark brownish-grey, sometimes with whitish or yellowish tinges in some parts of the surface, and with the lowest portion often in a lighter shade of brown; the interior is always brown. Shape massive, clavate, globular, ovoid or subspherical, with 1–2 large apical oscula and often fixed in the substrate by 1–2 thick peduncles (Figure 2A–C). Two specimens were fragments of sponges cut in half longitudinally, and three are damaged and apparently have lost their peduncles during collection by dredging. The largest specimen (the holotype) measures 27 cm high by 22–24 cm in diameter and has irregular lobes 23–45 mm high by 16–41 mm wide in its lower portion; it has two large oscula on top, 4.0–6.5 cm in diameter, each one with a large atrium 9.5–12 cm deep which becomes gradually thinner towards the base; the peduncle is 8.5 cm high by 7–8 cm in diameter, and it is subdivided in its base in four smaller extensions 3–4 cm high by 2–3 cm in diameter (Figure 2A). The smallest specimen is irregularly ovoid, 8 cm high by 6 cm in diameter, with a single sub-apical oscule, 1.5 cm in diameter, with a shallow atrium 3.7 cm deep; the sponge is fixed by two irregular peduncles, 20–21 mm high and 12.4–26.3 mm in diameter. The other specimens were similar or intermediate between these two in most characters except in that their apical oscules have an elevated rim, 3–13 mm high, and some have lost their peduncles.

Surface smooth or rugose, formed by a detachable, armoured cortex. In parts where the dermis has been lost, the surface is pierced by the extremities of the primary tracts, which form irregular crests or pointed elevations 1–9 mm wide by 2–4 mm high. These crests are sometimes aligned, forming radially arranged ridges. The surface has large patches of numerous, closely-spaced irregular openings, 0.7–4.8 mm in diameter (Figure 2D). In some parts these openings fuse together forming elongate depressions, 23–25 mm long by 2–4 mm wide. Consistency is hard but elastic in the choanosome and firm, resistant in the cortex. The peduncle is harder than the main body and incorporates large and abundant inorganic debris (fragments of shells, calcareous algae, etc.).

Dermal armour cortex is regular, granular, 150–300 μm thick (Figure 3A). Skeleton is reticulate, with strongly lamellate fibres, clearly distinguishable in primary and secondary ones (Figure 3B). In the ectosome the reticulation is regular, with ascending primary fibres 80–179–300 μm thick cored by relatively small amounts of detritus (Figure 3B, E). Secondary connective fibres, 24–101–228 μm thick, are free of detritus (Figure 3B, F). Meshes are almost rectangular, 60–2400 μm wide. Choanosome cavernous, with large canals 1.5–7.5 mm in diameter arranged more or less radially. Choanosomal reticulation more irregular, with rounded or polygonal meshes; choanosomal primary fibres often free of detritus, hardly distinguishable from secondary fibres (Figure 3C). Peduncle with an irregular reticulation in cross-section and longitudinal fibres tightly packed in transverse sections (Figure 3D); coarse sediment is very abundant, making the consistency there more rigid than in the main body of the sponge. Intraspecific variability in morphometric characters is relatively low (Table 1).

ETYMOLOGY

The adjective *atlantica* derives from the distribution of this species, which is the first valid species of *Thorecta* described from the Atlantic Ocean.

DISTRIBUTION

Only known from Potiguar Basin (Rio Grande do Norte State, north-eastern Brazil).

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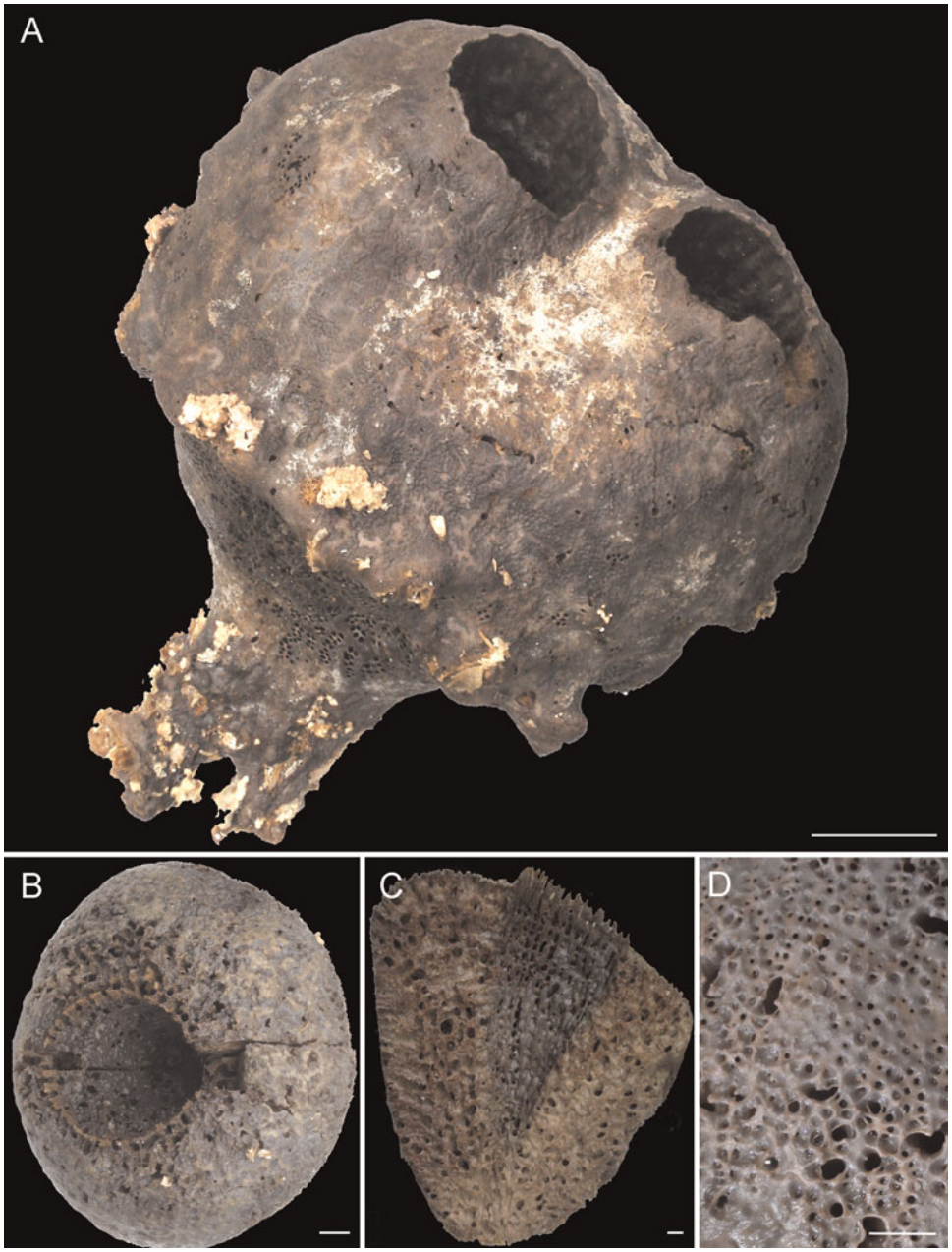

Fig. 2. *Thorecta atlantica* sp. nov. (A) Holotype (UFPEPOR 360), oblique view; (B) paratype (UFPEPOR 442), upper view; (C) another paratype (UFPEPOR 247), longitudinal section; (D) close-up of the surface showing the irregular openings. Scale Bars: A = 5 cm; B, C, D = 1 cm.

ECOLOGY

Hydrozoans and crustaceans were found associated with most specimens. This species occurs in relatively deep water, from 61–160 m depth.

DISCUSSION

The new species clearly belongs to *Thorecta* as demonstrated by its stalked globular shape, smooth surface, regular dermal armour, cored primary and uncored secondary fibres, and absence of mucus. It is easily characterized within the genus by its shape (massive globular or clavate) with one or, most often, two large apical oscules with deep atrial cavities. Among the species that we suggest that should remain in *Thorecta*, *T. carteri*, *T. farlovi*, and *T. polygonum* differ from the new species by the flabellate shape. *Thorecta vasiformis* is cup-shaped; *T. marginalis*, *T. prima*, and *T. meandrinus* are lamellate. *Thorecta reticulata* is massive, with upright turrets and without a peduncle. The new species is closest to *T. latus* and *T. tuberculatus* by its massive globular, stalked growth form. *Thorecta atlantica* sp. nov. can be easily distinguished from both species by its thicker fibres and very large apical oscules, limited to 1–2 per specimen, whereas *T. latus* and *T. tuberculatus* have numerous small oscules (Carter, 1885).

The species composition of the genus *Thorecta* has been subject of a great deal of controversy since its creation, ranging from the original 24 species (Lendenfeld, 1889) to 9

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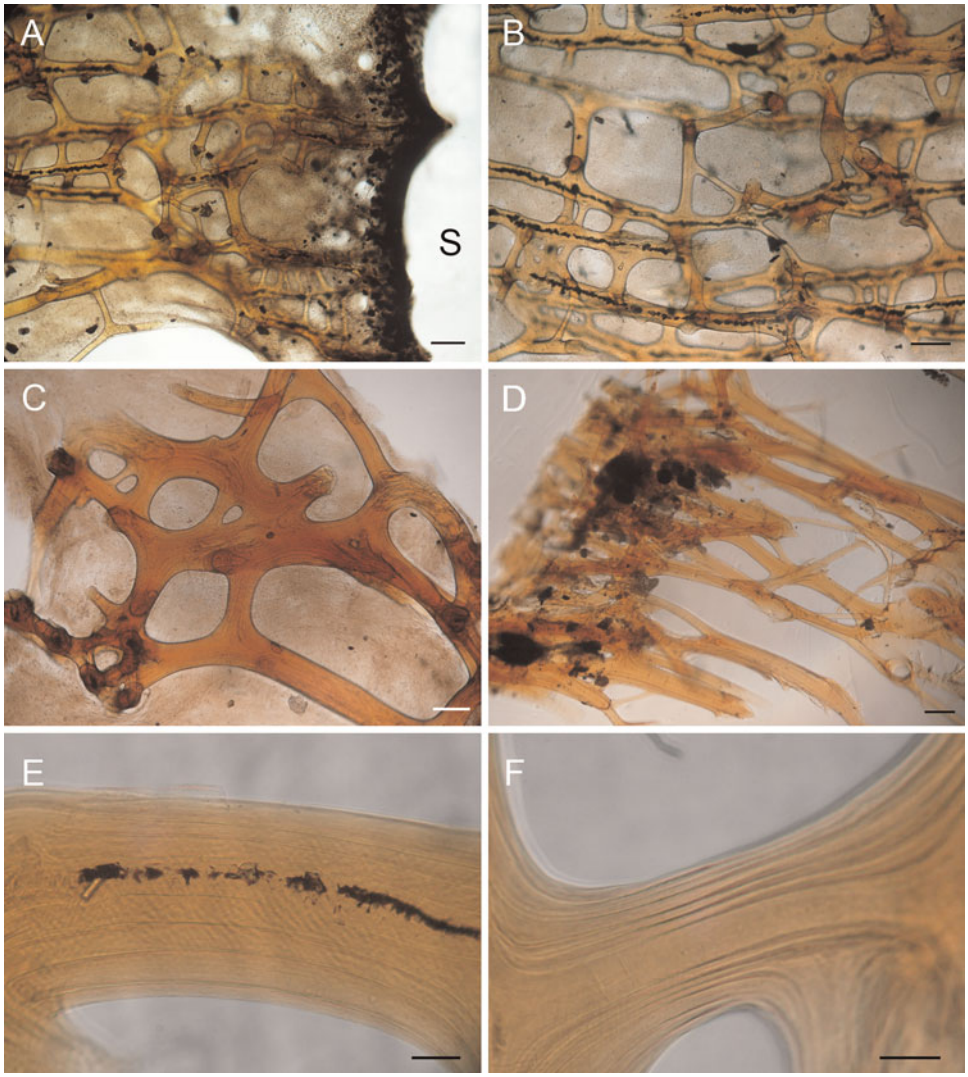

Fig. 3. *Thorecta atlantica* sp. nov. (A) transverse section of the ectosome (S, surface); (B, C) transverse sections of the choanosome (surface is in the right); (D) skeleton of the peduncle, heavily loaded with detritus; (E) primary fibre; (F) secondary fibre. Scale Bars: A = 800 μm; B, C, D = 300 μm; E, F = 50 μm.

(de Laubenfels, 1948), 12 (Cook & Bergquist, 1996) and 20 species (Cook & Bergquist, 2002). This high variation is due to the wide range of concepts of the genus and species by different authors, as well as by misinterpretations of taxonomic characters (Cook, 2007). Lendenfeld (1888, 1889) created the genus to include 'Spongiidae with a loose skeleton-net, with meshes 0.5–1.2 mm wide; stout, simple or branched connecting fibres, and a thick sand cortex on the smooth surface. Without superficially extending oscular tubes and corresponding grooves in the skeleton'. No mention was made to the presence or absence of foreign detritus in either primary or secondary fibres or to the stratification of the fibres; Lendenfeld thus included in *Thorecta* species with cored primary and secondary fibres, which would be currently assigned to *Hyrtios* Duchassaing & Michelloti, 1864 (e.g. *T. laxus* Lendenfeld, 1889; *T. madagascarensis* Lendenfeld, 1889).

De Laubenfels (1948) stressed the importance of the stratification of spongin fibres, with cored primary fibres and

Table 1. Intraspecific variation of morphometric characters of *Thorecta atlantica* sp. nov. (in μm). F1, primary fibres; F2, secondary fibres.

Specimens	Ectosome			Choanosome			Peduncle		
	F1	F2	Meshes	F1	F2	Meshes	F1	F2	Meshes
UFPEPOR 121	110–172–290	60–91–120	100–1500	100–150–300	40–70–100	175–1700	–	–	–
UFPEPOR 247	192–202–288	72–121–192	90–2400	110–130–300	45–82–120	95–2300	75–136–250	25–33–50	100–750
UFPEPOR 360	108–142–192	24–107–228	100–1800	98–204–310	30–65–100	120–1500	75–117–200	25–45–75	50–650
UFPEPOR 442	80–198–300	70–116–150	100–1000	100–245–290	50–80–110	120–1050	–	–	–
UFPEPOR 667	108–208–300	36–102–180	60–990	100–150–300	30–75–120	100–1400	–	–	–
UFPEPOR 668	80–150–200	40–70–100	100–1170	90–170–250	36–78–120	120–1300	80–94–120	20–34–50	90–660
Total	80–178–300	24–101–228	60–2400	90–174–310	30–75–120	95–2300	75–115–250	20–37–75	50–660

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Table 2. Main characters of valid species of *Thorecta*. F1, cored primary fibres; F2, uncored secondary fibres. All measurements are width in μm.

Species	Distribution	References*	Shape	Mucus	Surface	Dermal armour	Meshes	F1	F2	Latest classification	Proposed status
Thorecta carteri[6]	S Australia	6, 9	Flabellate	–	?	stout	>1000	160	60	*Taonura carteri*[9]	*Thorecta carteri*
Thorecta exemplum marginalis[5]	W, S, E Australia, Mauritius	5, 9	Lamellate, compressed, stalked	–	Ridges, Lamellae	700	1000	70–100	46	*Taonura marginalis* [9]	*Thorecta marginalis*
Cacospongia exemplum prima[4]	N, S, E Australia	4, 5, 6, 9	Lamellate, cup-shaped, flabellate	–	Even	Stout	800–1200	130	100	*Thorecta prima*[9]	*Thorecta prima*
Cacospongia exemplum tertia[4]	Florida, Cuba, Australia, New Zealand	4, 5, 6, 9	Massive, conical, irregular, stalked	–	Uneven, ridges, pits	1000	700–1000	67–200	40–100	*Thorecta latus*[9]	*Thorecta lata*
Spongelia farlovi[2]	N, S, W Australia	2, 6, 7, 9	Flabellate, stalked	–	Wavy, ridges	1000	400–1000	80–120	30–80	*Thorecta farlovi*[9]	*Thorecta farlovi*
Stelospongus flabeliformis latus[3]	S Australia	3, 9, 11	Globular, elongate, stalked	–	Smooth	Sandy		?	?	*Thorecta latus*[11]	*Thorecta lata*
Thorecta meandrinus[6]	Red Sea, Mauritius, W, E Australia	6, 9	Lamellate, small base, not stalked	–		Dense	400	100	30–50	*Thorecta meandrinus*[9]	*Thorecta meandrina*
Coscinoderma polygonum[6]	S Australia	6, 9	Frondose, flabellate concave, not stalked	–	Smooth, granules, micro-conules	1000	270	100	30	*Thorecta polygonum*[9]	*Thorecta polygona*
Thorecta atlantica sp. nov.	NE Brazil	Present paper	Globular, clavulate, stalked	–	Smooth or rough	150–200	60–2400	80–300	24–228	–	*Thorecta atlantica*
Thorecta reticulata[10]	New Zealand	10	Massive, w/turrets, not stalked	–	Smooth, pits, ridges	Present	Regular	58–116	20–90	*Thorecta reticulata*[10]	*Thorecta reticulata*
Stelospongus tuberculatus[3]	S Australia	3, 6, 8, 9	Globular, branched, stalked	Slimy	Smooth or rough	1000	500–1300	130–185	60–80	*Thorecta tuberculatus*[9]	*Thorecta tuberculata*
Geelongia vasiformis[3]	S, E Australia	3, 6, 9	Vasiform, stalked	–	Irregular	1000	190– 600	200	80	*Thorecta vasiformis*[9]	*Thorecta vasiformis*

S, South; W, Western; E, Eastern; N, Northern; *References: 1, Bowerbank (1872); 2, Hyatt (1877); 3, Carter (1885); 4, Lendenfeld (1885); 5, Lendenfeld (1888); 6, Lendenfeld (1889); 7, de Laubenfels (1948); 8, Wiedenmayer (1989); 9, Hooper & Wiedenmayer (1994); 10, Cook & Bergquist (1996); 11, Cook & Bergquist (2002).

uncored secondary fibres, since these characters were cited in the original description of the type species *T. exemplum* var. *tertia* (Lendenfeld, 1888, 1889). He amended the definition of the genus to include *Aplysinopsis* Lendenfeld, 1888 (which has conules and thinner dermal cortex) and *Thorectandra* Lendenfeld, 1889 (which has larger meshes and high amount of mucus). De Laubenfels (1948) also included species with cored secondary fibres (e.g. *Alcyonium boletus* Lamarck, 1815; *Aplysinopsis elegans* Lendenfeld, 1888). His extensive list of synonyms, however, reduced the genus to nine valid species: *T. boleta*, *T. farlovi* (Hyatt, 1877 as *Spongelia*), *T. pala* (Lamarck, 1814 as *Spongia*), *T. byssoides* (Lamarck, 1814 as *Spongia*), *T. calyx* (Lamarck, 1814 as *Spongia*), *T. murrayi* (Poléjaeff, 1884 as *Cacospongia*), *T. variabilis* (Poléjaeff, 1884 as *Luffaria*), *T. elegans* (Lendenfeld, 1888 as *Aplysinopsis*) and *T. penicillosa* (Lamarck, 1814 as *Spongia*).

Wiedenmayer (1977) added *Thorecta horridus* (Hyatt, 1877 as *Hircinia cartilaginosa var. horrida*), and later (Wiedenmayer, 1989) included *T. choanoides* (Bowerbank, 1872 as *Halispongia*, now considered as a *Thorectandra*; see Hooper & Wiedenmayer, 1994), *T. tuberculatus* (Carter, 1885 as *Stelospongus*) and *T. glomerosus* Wiedenmayer, 1989. Bergquist (1980) apparently considered valid only nine species of *Thorecta*: *T. murrayi*, *T. meandrinus*, *T. latus*, *T. calyx*, *T. madagascarensis*, *T. byssoides*, *T. vasiformis* and *T. freija*; *Thorecta pala* was listed by Bergquist (1980) as valid in p. 470, but was included in *Taonura* in p. 472. Eight species described by Lendenfeld (1888, 1889) were considered unrecognizable by Bergquist (1980): *T. pumilus*, *T cacos*, *T. murrayella*, *T. exemplum var. prima*, *T. laxus*, *T. crateriformis*, *T. dendroides*, and *T. tuberculatus*.

Hooper & Wiedenmayer (1994) included 12 Australian species in their catalogue: *T. calyx*, *T. donar* Lendenfeld, 1889, *T. farlovi*, *T. freija* Lendenfeld, 1889, *T. latus* (Carter, 1885 as *Stelospongus*), *T. meandrinus* Lendenfeld, 1889, *T. murrayi*, *T. polygonum* (Lendenfeld, 1889 as *Coscinoderma*), *T. prima* Lendenfeld, 1888, *T. tuberculatus*, *T. typhinus* (Lamarck, 1814), and *T. vasiformis* (Carter, 1885 as *Geelongia*). On the other hand, they transferred *T. boletus*, *T. choanoides* and *T. glomerulosus* to *Thorectandra*. Cook & Bergquist (1996) considered 12 species as valid: *T. byssoides*, *T. calyx*, *T. farlovi*, *T. horridus*, *T. murrayi*, *T. latus*, *T. vasiformis*, *T. freija*, *T. madagascarensis*, *T. meandrinus*, *T.* cf. *polygonum* and *T. reticulata* Cook & Bergquist, 1996. In the most recent revision of the genus, Cook & Bergquist (2002) stated that it includes 20 species, without naming them.

A detailed revision of all species related to *Thorecta*, including re-examination of all type specimens is greatly needed but is outside the scope of this paper. We tried, however, to reassign these species names according to the currently accepted definitions of Thorectid genera (Cook & Bergquist, 2002; Cook, 2007) and to the synonyms suggested in the literature, in order to allow comparisons with the new Brazilian species. Our analysis indicates that many of these species should be relocated to different genera. *Thorecta choanoides* is probably well placed in *Thorectandra* due to its large mesh size and production of mucus (Hooper & Wiedenmayer, 1994; Cook & Bergquist, 2002). Among the species included in *Thorecta* by Hooper & Wiedenmayer (1994), *T. calyx*, *T. freija, T. murrayella* and *T. typhina* differ from *Thorecta sensu* Cook & Bergquist, 2002 by the absence of a dermal armour, and would be better classified in *Taonura* (stalked species) and *Cacospongia* (massive species). *Thorecta galeiformis* and *T. murrayi* have tertiary fibres and should thus be included in *Luffariella* or *Phyllospongia. Cacospongia exemplum* var. *secunda* (Hooper & Wiedenmayer, 1994; as a junior synonym of *T. latus*) has uncored primary and secondary fibres and is therefore a *Datcylospongia. Thorecta madagascarensis* (referred as a junior synonym of *T. byssoides*) is unarmoured and has both primary and secondary fibres cored by detritus; it probably should be included in *Hyrtios*, although the presence of a stalk is atypical in that genus.

The genus *Thorecta* should probably be left with only 11 species, which have all the diagnostic characters of the genus (Table 2): *T. carteri*, *T. marginalis*, *T. primus*, *T. latus*, *T. farlovi*, *T. meandrinus*, *T. polygonum*, *T. reticulatus*, *T. tuberculatus*, *T. vasiformis*, and *T. atlantica* sp. nov. Wiedenmayer (1977: 70) suggested that *Thorecta* should be treated as a masculine name because it was not derived from either a Latin or a Greek word, but is instead an arbitrary latinization of the Greek *Thorectes* (=armoured warrior). The gender of *Thorecta*, however, was not specified by Lendenfeld (1888) and cannot be deduced from the names of the species originally included, which are variously masculine, feminine and neuter. In this case article 30.2.4 of the ICZN (1999), which states that if such name ends in '-a' the gender is feminine, should be applied. Therefore, we consider that *Thorecta* should be treated as a feminine name. In consequence, the specific epithets of some of the species of the genus should be changed to the feminine to agree in gender with the genus name (ICZN, 1999: article 31.2): *T. latus* to *T. lata; T. meandrinus* to *T. meandrina; T. polygonum* to *T. polygona; T. reticulatus* to *T. reticulata;* and *T. tuberculatus* to *T. tuberculata*. The names finishing in '-is', such as *marginalis* and *vasiformis*, can be both feminine and masculine; together with the names *carteri* and *farlovi*, derived from personal names, they need not to be changed.

The tortuous history of the genus *Thorecta*, its controversial scope and the disputed synonyms of many species are examples of the problems that poorly-described species can cause in sponge classification. Different authors have made great efforts to interpret such poor descriptions; the lack of information and their diverging views on the importance of characters such as growth form, surface sculpturing, dermal armour, fibre stratification, fibre coring and presence of tertiary fibres led to the currently confused classification of the genus. Detailed descriptions of fresh material, well illustrated by photographs and including as many characters as possible, are essential tools for the clarification of the systematics of *Thorecta* in the future.

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