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Revision of the genus *Trachytedania* (Porifera: Poecilosclerida) with a description of *Trachytedania ferrolensis* sp. nov. from the north-east Atlantic

F.J. Cristobo* and V. Urgorri†

*Departamento de Biodiversidade e Recursos Mariños, Instituto de Acuicultura, Universidade de Santiago de Compostela, 15706 Santiago de Compostela, Spain. E-mail: bafjcris@usc.es
†Laboratorio de Zooloxía Mariña, Departamento de Bioloxía Animal, Universidade de Santiago de Compostela, 15706 Santiago de Compostela, Spain. E-mail: bavituco@usc.es

The genus *Trachytedania* Ridley, 1881 (Porifera: Poecilosclerida), includes those tedaniidae sponges characterized by the presence of acanthostyles. To date, only five species of the genus *Trachytedania* have been described of which only three actually belong to this genus. Other species described as *Tedania* could be considered as *Trachytedania* because of the presence of acanthostyles in their skeletons. Some authors propose retaining *Trachytedania* as a subgenus of *Tedania* because of its skeletal structure. In this work, a taxonomic revision and consideration of the validity of the genus is provided. The morphology and anatomy of *Trachytedania ferrolensis* sp. nov. from the Ría de Ferrol (Spain, north-east Atlantic) are described in detail, and the types of the three valid species described as *Trachytedania* to date: *Trachytedania spinata*, *Trachytedania patagonica* and *Trachytedania biraphidora* are studied. A key to this genus is provided.

INTRODUCTION

The position of the Family Tedaniidae within the Poecilosclerida is still disputed. Species of the genus *Tedania* Gray, 1867, have always been difficult to differentiate clearly (Bergquist & Fromont, 1988) and the value of the genus *Trachytedania* has been called into question at different times since 1881. In Ridley's (1881) original description based on the species *Trachytedania spinata*, he remarks that this genus differs from all the known species of *Tedania* in having three kinds of spicules, one of them being spined. Ridley & Dendy (1886) described a new species, *Trachytedania patagonica* with entirely spined acanthostyles. Hope (1889) described one species incorrectly identified as *Trachytedania* (*T. echinata*), because it does not have onychaetes. Another erroneous identification is that of *Trachytedania arborea* (Këller, 1891) that has oxeas and onychaetes but does not have acanthostyles. Boury-Esnault (1973) describes a valid species, *Trachytedania biraphidora* with two size classes of onychaetes from the Atlantic coasts of South America. Different authors have sometimes described some of the preceding species, attributing them to the genus *Tedania*, while another *Tedania* could be included in *Trachyedania* because of the presence of acanthostyles in its skeleton. Owing to this confusion we are revising the genus beginning with a new diagnosis after reviewing types of species described as *Trachytedania*, and have completed their descriptions. In this paper, we also revise those species of *Tedania* with spined styles or acanthostyles in order to clarify the taxonomy of the group. Finally, in this work we describe a new species of *Trachytedania* (*T. ferrolensis*) from the north-east Atlantic.

MATERIALS AND METHODS

The specimens were collected by SCUBA divers and by dredging using a naturalist benthic dredge (Holme & McIntyre, 1984) in the sublittoral zones of Ría de Ferrol (Spain). Material from the following Museum collections was also examined: types of *Trachytedania biraphidora* Boury-Esnault, 1973 from the Muséum National d'Histoire Naturelle, Paris (LBIM N°D. NBE 974); types of *Trachytedania spinata* Ridley (BMNH: 1879.12.27.9) and *Trachytedania patagonica* Ridley & Dendy (BMNH: 1887.5.2.205) from the British Museum (Natural History), London (Figure 1).

The methods followed were those of Rützler (1978), Uriz (1978, 1986) and Cristobo et al. (1993). Spicules were examined under Hitachi S570 and Leo 435VP scanning electron microscopes (SEMs). Underwater photographs were taken with a Nikonos V camera and SB-102 flash. The megasclere spicules were measured using a light microscope which was adapted to a Kontron Bildanalyse Videoplan, equipped with CPU, TV camera, TV monitor and digitalizing tablet. This made it possible to take a large number of measurements. Microscleres were measured using SEM.

SYSTEMATICS

Phylum PORIFERA Grant, 1836
Class DEMOSPONGIAE Sollas 1885
Order POECILOSCLERIDA Topsent, 1928
Suborder MYXILLINA Hajdu, Van Soest & Hooper, 1994

Family TEDANIIDAE Ridley & Dendy, 1886

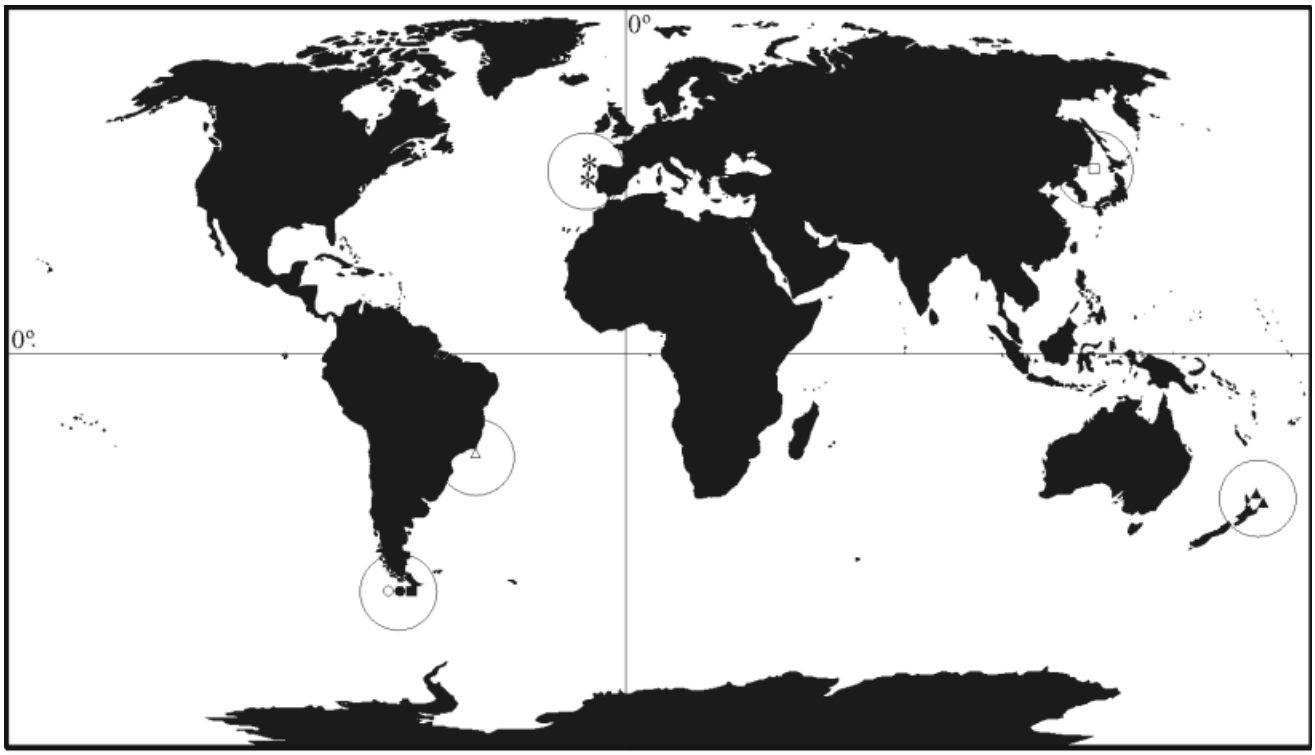

Figure 1. Map of the world showing the sites of collection of *Trachytedania* species: ○, *T. spinata*; ●, *T. patagonica*; △, *T. biraphidora*; ✻, *T. ferrolensis*; ▲, *T. spinostyla*; ■, *T. inflata*; □, *T. microrhaphidiophora*.

Diagnosis

Encrusting, massive or digitate Poecilosclerida with a choanosomal skeleton predominantly plumo-reticulate or even plumose of monactinal and/or diactinal megascleres which are organized in tracts of styles, acanthostyles or oxeas, enclosed within light or moderate spongin fibres, or with no visible spongin, and spicules merely cemented together with collagen at their nodes. The ectosomal skeleton consists of diactinal megascleres which may be distinguished from the choanosomal megascleres either in morphology or size; these spicules are tylotes or tornotes usually with basal spines, lying tangentially, paratangentially or erect on the surface. Microscleres are onychaetes. Chelae are absent.

Genus *Trachytedania* Ridley, 1881
Trachytedania spinata Ridley, 1881

Material examined

Type, British Museum (Natural History) (BMNH: 1879.12.27.9) (Figure 2).

Original description of the holotype in Ridley (1881: 122).

New data from the present authors' reexamination of the holotype:

Shape and size: encrusting, laminar. 10.2×9.1×2 mm.

Colour: yellowish white in spirit.

Surface: even, covered with a fine membrane. Oscula not detected; possibly represented by irregular depressions. Ostia not detected.

Texture: smooth.

Skeleton: choanosomal architecture is composed of loosely aggregated acanthostyles in an isotropic reticulation of three or four spicules, and transversal tracts of acanthostyles with few spines. The choanosomal skeleton is composed of tornotes with perpendicular and paratangential arrangement. Onychaetes are abundant, free in ectosome and choanosome.

Spicules megascleres. Acanthostyles straight or slightly curved with few short spines predominantly at the base of the spicule, 170–200 μm. Tornotes straight, smooth, isodiametric with apex abruptly pointed, 140–170 μm. Onychaetes very fine slightly curved, 130–150 μm.

Habitat: on both valves of small *Pecten*, 18.2 m.

Distribution: Portland Bay, Chile. South-west coast of Patagonia.

Remarks

After revision of the holotype of *Trachytedania spinata* Ridley, 1881, we have observed the presence of acanthostyles on the skeleton of this species (Figure 2B). Those nearest the base of the sponge possess more spines on the head than those situated at the frontal part of the ectosome, which are generally smooth. This fact is the reason why different authorss question the validity of this genus (Bergquist & Fromont, 1988; Desqueyroux-Faundez & Soest, 1996). However, it is necessary to bear in mind the fact that the specimen collected by Ridley (1881) was found on both valves of *Pecten* and that the existing specimen in the British Museum (Natural History) (BMNH: 1879.12.27.9) (Figure 2A) is separated from the shell of the mollusc. Probably the basal spongin plate with acanthostyles became stuck to the shell, and for this reason it is possible that the acanthostyles closest to the base (the spiniest) have disappeared on separation of the sponge from substrate to which it had been attached. On the other hand this does not occur with other species of the genus that have real acanthostyles and not just spined styles (Figures 3–6).

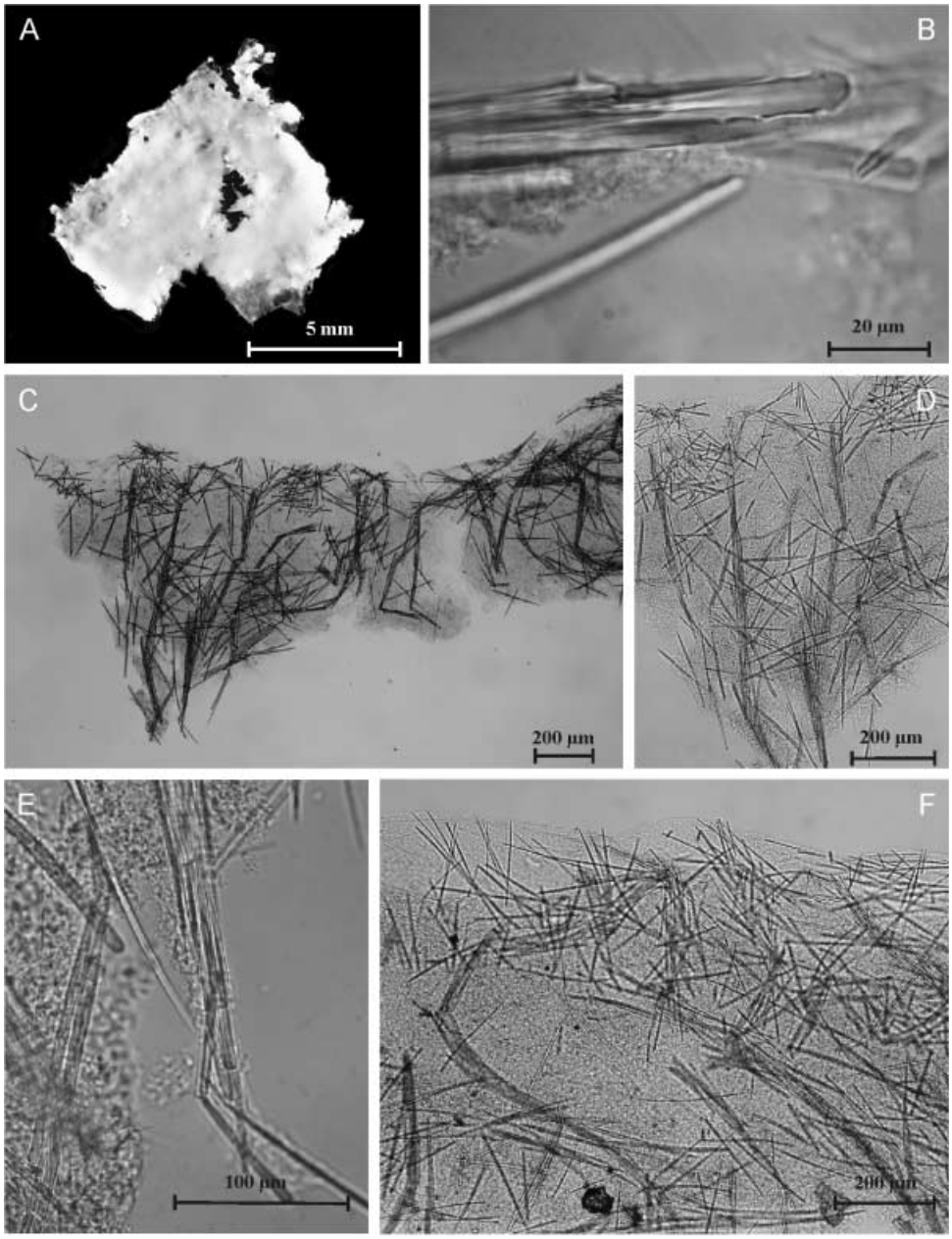

Figure 2. *Trachytedania spinata* Ridley, 1881; Holotype. (A) habitus; (B) acanthostyles at the base; (C&D) transverse section of the skeleton; (E) tracts of acanthostyles; (F) estosomal spicules.

Trachytedania patagonica Ridley & Dendy, 1886

Material examined

Holotype, British Museum (Natural History) (BMNH: 1887.5.2.205) (Figure 3A,B).

Original description of the holotype in Ridley & Dendy, 1886: 336; 1887: 57.

Shape and size: irregularly shaped, massive, ~37 mm.

Colour: pale yellow in spirit.

Surface: uneven with slight traces of hispidation. Oscula small, scattered. Ostia scattered throughout some parts of the dermal membrane.

Texture: soft and crumbling.

Skeleton: very loose and irregular, consisting of a somewhat isodictyal reticulation of acanthostyles but with a small admixture of tornotes. No distinct fibre. Immediately beneath the dermal membrane there are a number of irregular, divergent tufts of tornotes while similar spicules are scattered throughout the ectosome, which together with some of the stylote spicules, form a very sparse and irregular dermal reticulation.

Spicules: (a) Megascleres. Acanthostyles rather stout slightly curved, spined all over with the spination most marked at the base; size: 350×12.5 μm. Tornotes, tapering gradually to a slightly hastate point at each end; size: 245×7 μm. (b) Microscleres. Onychaetes very fine slightly thicker at one end than at the other; length: 200 μm spined near the broader end with fine spines directed towards that end of the spicule.

Habitat: bottom blue mud, 320 m.

Distribution: south-west coast of Patagonia.

Remarks

The slides of the holotype re-examined correpond to *Trachytedania patagonica* but a subsample from a wet

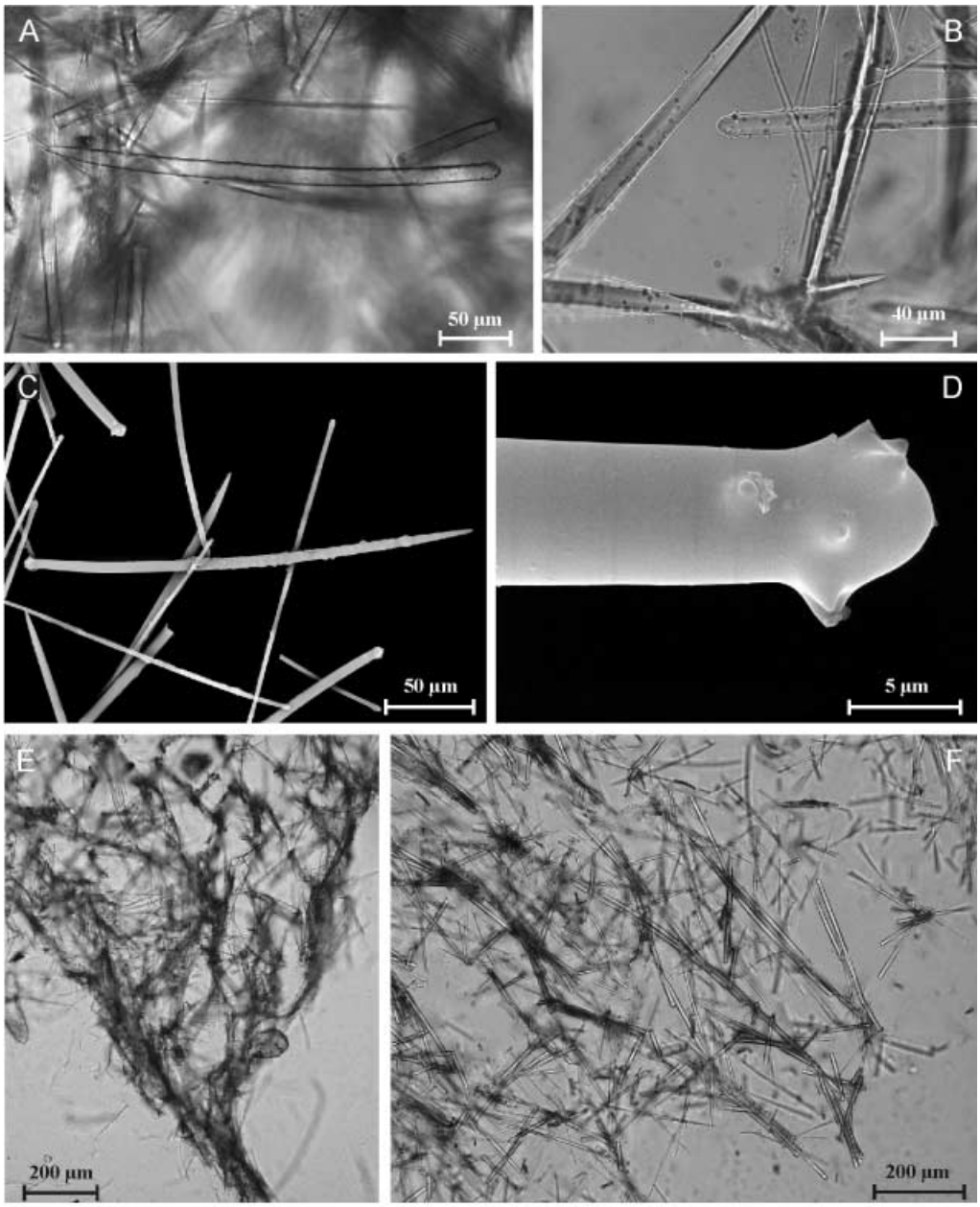

Figure 3. (A&B) acanthostyles of *Trachytedania patagonica* (Holotype); (C&D) acanthostyles of *Trachytedania biraphidora* (Holotype); (E&F) *Trachytedania biraphidora* (Holotype), tracts of acanthostyles in the choanosomal skeleton.

specimen corresponds to another species (*Iophon* sp.). For this reason there are no new data from the present authors' re-examination of the holotype.

Trachytedania biraphidora Boury-Esnault, 1973

Material examined

Holotype, Muséum National d'Histoire Naturelle, Paris (LBIM N°D. NBE 974) (Figure 3C–F).

Original description of the holotype in Boury-Esnault, 1973: 281.

Shape and size: massive ~10 cm tall.

Colour: yellowish.

Surface: mamelon shaped.

Skeleton: polygonal network of acanthostyles in the choanosome and tylotes on the surface; inside the sponge we can differentiate the main primary tracts of acanthostyles and tylotes joined by less dense lines. Onychaetes sometimes in bouquets.

Spicules: acanthostyles slightly curved although they may sometimes be found with a few spines (5–12) only at the base; there may also be some isolated spines, but always near the basal zone. Size: 190–280 μm × 2.2–6 μm. Tylotes are straight, isodiametric, completely smooth with elipsoidal ends sometimes different one from another without spines although they sometimes have a small mucronated end. Size: 172–210 μm × 1.2–3 μm. Onychaetes clearly differentiated into two size classes: 38–62 μm × 0.9 μm and 102–174 μm × 1.1 μm. The bigggest ones are straight or slightly curved and have pointed tips. The smallest ones are curved, slightly sinuous or straight, generally with one of the ends more rounded and the other pointed.

Habitat: 48 m.

Distribution: south-west Atlantic.

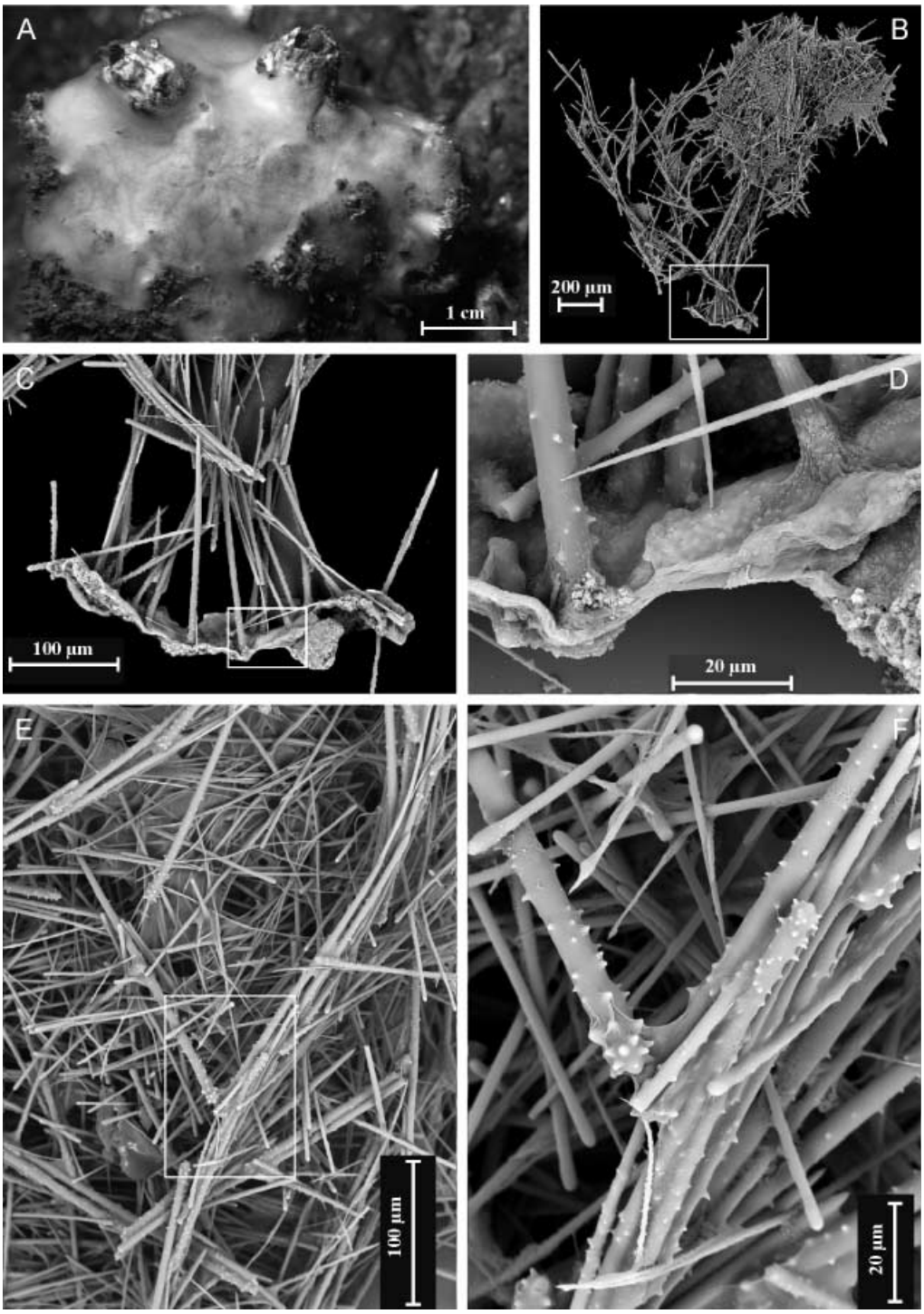

Figure 4. *Trachytedania ferrolensis* sp. nov.: (A) living specimen *in situ* (Paratype 1); yellowish colour, (photograph F.J. Cristobo). (B–D) SEM micrographs showing the arrangement of the skeleton. (E&F) Tracts of acanthostyles in the choanosomal skeleton.

Remarks

Sometimes young very fine acanthostyles may eassily be confused with onychaetes.

The size of spicules remeasured are slightly different from those indicated by Boury-Esnault, 1973.

After a revision of the holostyles, we do not agree with Desqueyroux-Faundez & Soest (1996: 68) who categorize *Trachytedania patagonica* as synononymous with *Trachytedania biraphidora*. The acanthostyles are clearly different, as we can see in Figure 3; the first possesses tornotes and the second tylotes; the onychaetes are of two size classes in *Trachytedania biraphidora* while in *Trachytedania patagonica* there is only one size class.

Trachytedania ferrolensis sp. nov.

Type material

Holotype: Museo Nacional de Ciencias Naturales of Madrid no. MNCN 1.01/184, from A Millonaria, Ría de Ferrol, Galicia, Spain; 43°28′13″N 08°15′09″W; 22 m, 14 March 2000. On coal slags and *Balanus*. Paratype 1: Muséum National d'Histoire Naturelle, Paris, no. MNHN

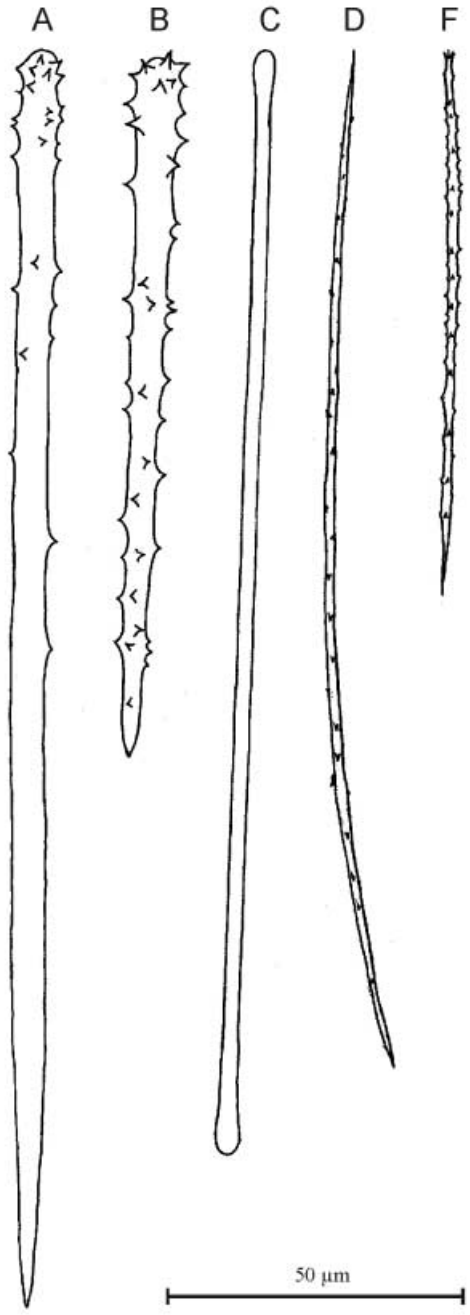

Figure 5. Camera lucida drawings of *Trachytedania ferrolensis* sp. nov. spicules. (A) Primary acanthostyle; (B) secondary acanthostyle; (C) tylote; (D) large onychaete; (E) small onychaete.

DCL 3667 from A Millonaria, Ría de Ferrol, Galicia, Spain; 43°28′13″N 08°15′09″W; 22 m, 14 March 2000. On coal slags and *Balanus*. Paratype 2: Museo de Historia Natural Luis Iglesias Universidade de Santiago de Compostela no. 10005; from A Millonaria, Ría de Ferrol, Galicia, Spain; 43°28′25″N 08°15′00″; 15 m, 30 August 1999. On the right valve (lower) of *Chlamis varia*. Paratype 3: Laboratorio de Zooloxía Mariña, Universidade de Santiago de Compostela; from A Millonaria, Ría de Ferrol, Galicia, Spain; 43°28′25″N 08°15′00′; 15 m, 30 August 1999. On both valves of *Chlamis varia*. Paratype 4: Laboratorio de Zooloxía Mariña, Universidade de Santiago de Compostela; A Millonaria, Ría de Ferrol, Galicia, Spain; 43°28′25″N 08°15′00″; 15 m, 24 November 1999. On the right valve (lower) of *Chlamis varia*. Paratype 5: Laboratorio de Zooloxía Mariña, Universidade de Santiago de Compostela, from Ría de Ferrol, Galicia, Spain; 43°28′26″N 08°14′47″; 10 m, 21 January 1988. Paratype 6: Laboratorio de Zooloxía Mariña, Universidade de Santiago de Compostela; A Millonaria, Ría de Ferrol, Galicia, Spain; 43°28′13″N 08°15′09″, 22 m, 14 March 2000. On both valves of *Chlamis varia*. Paratype 7: Laboratorio de Zooloxía Mariña, Universidade de Santiago de Compostela; A Millonaria, Ría de Ferrol, Galicia, Spain; 43°28′13″N 08°15′09″, 22 m, 14 March 2000. On the left valve (upper) of *Chlamis varia*.

Derivatio nominis. The name of this species derives from the toponymy of the type locality: Ría de Ferrol. This is a token of recognition of a ria with exceptional ecological characteristics that has unfortunately suffered from the adverse effects of human behaviour.

Diagnosis

The living sponge is a yellow encrusting thin sheet-like coating of the substrate. The choanosomal skeleton consists of acanthostyles of two size classes arranged with their heads fixed to a basal plate of spongin forming point directed outward columns. Right and thin ectosomal tylotes in palisade or few defined bouquets. Onychaetes abundant of two size classes.

Description

Shape and size: the sponge is encrusting, forming a sheet-like coating of rocky substrates and *Balanus*. Patches <30 cm in diameter and 3 mm thick have been seen. The sponge is firmly attached to the substratum by its whole undersurface (Figure 4A).

Colour: the *in situ* colour is bright yellow. After fixation in formalin, the alcohol-preserved specimens are white, cream or light pink. It may give the alcohol a slightly yellowish tint.

The surface is smooth but irregular as the sponge closely follows the irregularities of the substratum. Ostia scattered fairly evenly all over. Single circular oscules of >1 mm in diameter with small superficial canals. This aquiferous system that characterizes the sponge surface in the field is no longer detectable after collection.

Texture: smooth. The consistency is quite cartilaginous, although easy to tear.

Skeleton: the principal skeleton consists of acanthostyles of two size classes arranged with their heads fixed to a basal plate of spongin forming pointed outward directed columns of 4–5 spicules. Right and thin ectosomal tylotes in palisade or few defined bouquets. Onychaetes of two size classes more abundant in the ectosome (Figure 4B–D & F).

Spicules (Figures 5 & 6). Acanthostyles of two size classes: primary acanthostyles measure 167–261 μm in length. They are straight or slightly curved with identical heads; scattered spines extend along the shaft but are much less frequent in the distal half and disappear in the last quarter. Secondary acanthostyles measure 67–109 μm in length, almost always straight, conspicuously spined along the whole length. The spines on the head are fairly long, sometimes slightly recurved ending abruptly, sometimes deformed. Overall size: 67-(160)-261 μm by

Table 1. *Comparison between* Trachytedania *species*.

	T. spinata	*T. patagonica*	*T. biraphidora*	*T. ferrolensis*	*T. microrhaphidophora*	*T. spinostylota*	*T. inflata*
Acanthostyles L	165–28×05–11	350×12.5	265–322×3–6	167–261×45–10.4	228–390×7–12	190–260×4–6.5	160–220×4–6
Acanthostyles S				67–109			
Tylote/Tornote L	To: 180–240×4–7	To: 245×7	Ty: 228–278×3	Ty: 148–220×1.6–4.0	To: 320×6	Ty: 230–280×4–6	Ty: 160–180×2–4
Tylote/Tornote S						Ty: 169–2202–4	
Onychaetes L	52–210×1.2–2	200	220–260	148–205		115–143	100–180×0.5–1
Onychaetes S			62–143	39–117	50–81	35–72	
Skeleton	With basal lamina and vertical fibre of 3–6 acanthostyles. Tornotes on surface	Loose, irregular reticulation of acanthostyles with tufts of tornotes	Primary tracts of acanthostyles and tylotes on surface	Basal lamina of spongin. Columns of acanthostyles. Tylotes in palisade	Loose reticulation	Plumose tracts of acanthostyles. Palisade of tylotes	Uni-plurispicular reticulate fibres of acanthostyles. Tylotes on surface
Oscules	Irregular: 0.2–5 mm	Small, scattered	Not seen	Circular: 1 mm	Not seen	Not seen	Dispersed: 1 mm
Pores	Not found	Scattered	Not seen	Scattered	Circular: 1–3 mm	Not seen	
Shape	Encrusting, flabellate, branching or massive	Massive	Massive	Encrusting	Subspherical	Encrusting	Massive
Colour	Yellowish (Spt)	Pale yellow (Spt)	Yellowish	Yellow	Yellowish-white (Spt)	Red. Creamy-white (Spt)	Brown (Dry)
Surface	Glabrous	Uneven	Mameloned	Uneven	Uneven	Diff. Distinguish	Glabrous
Texture	Pitted	Soft. Crumbling			Firm	Elastic	Rough
Habitat	On *Pecten*. 18–207 m	Mud: 320 m	48 m	On stones: 10–34 m	28–194 m	On algae: Int–13 m	
Distribution	South-west Atlantic	South-west Patagonia	South-west Atlantic	North-east Atlantic	Sea of Japan	New Zealand	Patagonia

Measurements of spicules are given in μm. L, large; S, small; To, tornote; Ty, tylote; Spt, in spirit; Int, intertidal. Sources: *Trachytedania spinata*, Ridley (1881: 122); Burton (1932: 306). *Trachytedania patagonica*, Ridley & Dendy (1886: 336); Ridley & Dendy (1887: 57). *Trachytedania biraphidora*, Boury-Esnault (1973: 281). *Trachytedania ferrolensis*, Cristobo (1997: 197). *Trachytedania microphaphidophora*, Burton (1935: 70); Koltun (1959: 156). *Trachytedania spinostylota*, Bergquist & Fromont (1988: 59). *Trachytedania inflata*, Sará (1978: 59).

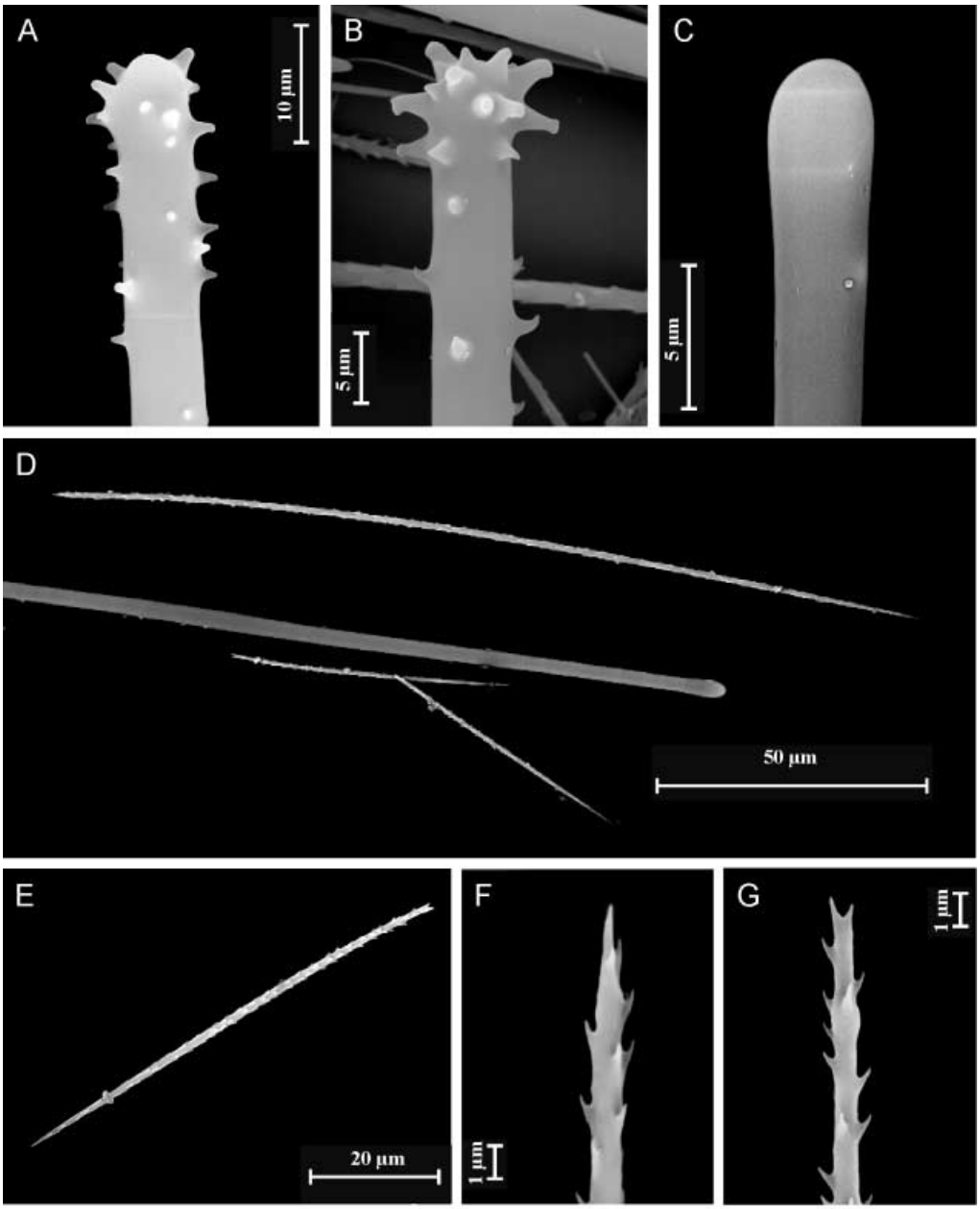

Figure 6. Scanning electron micrographs of *Trachytedania ferrolensis* sp. nov. spicules. (A) Head of a primary acanthostyle; (B) head of a secondary acanthostyle; (C) head of a tylote; (D) large and small onychaetes and a tylote; (E) small onychaete; (F) end of a large onychaete; (G) end of a small onychaete.

4.5-(7)-10.5 μm. The tylotes are straight, thin, with strongylote to subtylote and unequal ends. Size: 148-(187)-220 μm by 1.6-(3)-4 μm. The onychaetes are very thin, straight or slightly curved, strongly microspined with spines always bent toward one of the ends, two size classes: 39–117 μm and 148–205 μm. Small onychaetes with the end blunt instead of pointed as in the bigger forms (Figure 6F,G). Size altogether: 39.52-(116)-205 μm × 0.3-(1)-2 μm.

Locality and habitat: holotype was found in A Millonaria, Ría de Ferrol, Galicia, Spain; 43°28′25″N 08°15′00″; 10–22 m. Sandy and muddy bottoms with gravels and coal slags. In areas of sedimentary tubes of polychaetes *Chaetopterus variopedatus* (Renier, 1804) often occur and *Diopatra neapolitana* Delle Chiaje, 1841. The analysis of sediment reveals the following contents: sand mid–high (64.62%), pelitic low (5.56%); organic material 2.85%, and nitrogen 0.15%; carbonates low 33.66% (Parapar, 1991). This type of muddy bottom is poor in sponges although there are fragments of shells and small stones which form a peculiar habitat for a fixation base for some species. In spite of the presence of *Trachytedania ferrolensis,* its quantitative importance is exiguous.

Type locality

Dredging station no. 36 (Cristobo, 1997), is in front of Concepción Arenal key, Ría de Ferrol, Spain (43°28′26″N 08°14′47″) 10 m, it has a muddy bottom with gravel and coal slags.

DISCUSSION

The systematic position of the genus *Trachytedania* Ridley, 1881 (Porifera, Poecilosclerida) has already been discussed at length. It was proposed for classification in the *Tedania* species, in which the styles are partly or entirely spined. Whether this characteristic is in itself sufficient to separate the two genera was questioned by some authors after the first genus description (Ridley & Dendy, 1887; Topsent, 1892; Topsent, 1928; Topsent, 1929). Currently for some authors *Trachytedania* is a synonym of *Tedania* Gray, 1867, in view of the occasional occurrence of spining in the styles of different specimens (Bergquist & Fromont, 1988), while others propose retaining *Trachytedania* as a subgenus of *Tedania* (Desqueyroux-Faundez & Soest, 1996) because the ectosomic spicules differ rather significantly from *Tedania anhelans* in being mucronate-oxeote, without spination at the apices, the skeletal structure is very loose and no distinct meshes are recognized.

To date, only five species of the genus *Trachytedania* Ridley, 1881, have been described: *Trachytedania spinata* Ridley, 1881; *Trachytedania patagonica* Ridley & Dendy, 1886; *Trachytedania echinata* Hope, 1889; *Trachytedania arborea* Këller, 1891; and *Trachytedania biraphidora* Boury-Esnault, 1973, of which only three belong to this genus and two have been erroneously identified: Hope (1889: 338) has incorrectly identified his *Trachytedania echinata* because it has two size classes of acanthostyles and tylotes but does not have onychaetes, therefore it might also be a species of *Stylopus* but not a species of *Trachytedania*; another case is *Trachytedania arborea* (Këller, 1891: 314) that has oxeas, styles and onychaetes but does not have acanthostyles, therefore it may be a *Tedania* but not a *Trachytedania*. A survey of the literature of those species described as *Tedania* with spined styles or acanthostyles, shows that some of them could be included in *Trachytedania*: *Tedania microrhaphidophora* Burton, 1935, *Tedania inflata* Sará, 1978 and *Tedania spinostyla* Bergquist & Fromont, 1988, giving, with *Trachytedania ferrolensis,* a total of seven valid species belonging to *Trachytedania*, and others which cannot be included: *Tedania coulmani* Kirkpatrick, 1907; *Tedania bispinata* Hentschel, 1911; *Tedania murdochi* Topsent, 1913; *Tedania toxicalis* Laubenfels, 1930; *Tedania gurjanovae* Koltun, 1958; and *Tedania mucosa* Thiele, 1905 (synonymyzed with *Tedania pectinicola* Thiele, 1905; *Tedania fuegiensis* Thiele, 1905; and *Tedania excavata* Thiele, 1905 by Desqueyroux-Faundez & Soest, 1996). *Tedania microrhaphidophora* as we can see in Burton (1935, figure 1) and in Koltun (1959, figure 114), has slightly curved acanthostyles with sparse spines usually found only at the base, dermal tornota and onychaetes (raphides). *Tedania inflata* (Sará, 1978, figure 37) has acanthostyles with spines only at the base, and it also has tylotes and onychaetes. *Tedania spinostyla* has typical acanthostyles with spines on its head and spining which extends a short distance down the shaft and tylotes and onychaetes (Bergquist & Fromont, 1988: figure 26a). Spicule dimensions and the main characteristics of the three species are shown in Table 1.

On the other hand, the reasons for placing the other species outside *Trachytedania* are the following: (i) most of the species do not have acanthostyles: *Tedania excavata* (Thiele, 1905: figure 51); *Tedania pectinicola* (Thiele, 1905: figure 52); *Tedania fuegiensis* (Thiele, 1905: figure 53); *Tedania murdochi* (Topsent, 1913: 629); *Tedania toxicalis* (Laubenfels, 1932: 85) and *Tedania gurjanovae* (Koltun, 1959: figure 113); (ii) *Tedania coulmani* has acanthostyles but does not have onychaetes (Kirkpatrick, 1907: 280; 1908: 33); and (iii) *Tedania bispinata* has a kind of strongyles with microspined bases, and these structural macroscleres differ clearly from acanthostyles (Hentschel, 1911: figure 26).

Another incorrect identification is the presence of *Trachytedania spinata* in the Adriatic Sea (Szymanski, 1904; Vatova, 1928). Unfortunately these authors neither describe nor illustrate the specimen. Anyhow, if it is a *Trachytedania* species, it must be different from the *Trachytedania spinata* from south-west Atlantic.

In our opinion *Trachytedania* is a valid genus. Occurrence of acanthostyles is not sporadic or rare in the *Trachytedania* species and choanosomal megascleres are not only a few styles with spines but true acanthostyles as we can see in Figure 2B. Ridley's (1881) type is encrusting, laminar on both valves of *Pecten* but the specimen is now detached from the shell and it is possible that most of the acanthostyles were missing from the basal lamina.

According to Burton (1932), the significance of these spined spicules must be appreciated. In sections taken at right angles to the substratum it was found that the acanthostyles at the base of the vertical columns are the most conspicuously spined and those towards the surface are hardly spined at all. Moreover, small acanthostyles found in the embryos of his specimens are very occasionally associated with the normal basally spined styles set on the substratum. It seems probable therefore that the holotype of this species represents nothing more than the immediate post-fixation form of the species; that there is retained in the adult a tendency to form spines on the styles, and that this tendency, although almost wholly suppressed in the adult, is still occasionally found in spicules.

The synapomorphic value of acanthostyles is a widespread characteristic which leads to conflicting interpretations. They do not occur in the whole order of Poecilosclerida, so that postulating symplesiomorphic status on the one hand implies accepting their loss higher in the tree. Another possible interpretation is that Poecilosclerida without acanthostyles are primitive and that the latter developed subsequently (Hajdu et al., 1994).

In our opinion the presence of true acanthostyles is sufficient to uphold the separate categorization of the genus. There is, however, a further difference from species of *Tedania*: all the *Trachytedania* species revised have ectosomal spicules without spination on the apices. Type species of the genus *Tedania* (*Tedania anhelans*) have tylotes with well developed microspined heads.

Categorization of *Trachytedania patagonica* Ridley & Dendy and *Trachytedania biraphidora* Boury-Esnault as the same (Desqueyroux-Faundez & Soest, 1996: 68) is an error. The differences are sufficient for categorization as different species. The first one has spined acanthostyles all over except at the extreme apex, tornotes with hastate points and onychaetes of one size class. The second has slightly curved acanthostyles with marked spination only at the head, tylotes and onychaetes of two size classes.

Trachytedania ferrolensis differs from all other *Trachytedania* species because of the presence of two size classes of

acanthostyles. Moreover it differs from *Trachytedania spinata*, *Trachytedania patagonica*, *Trachytedania microrhaphidophora*, and *Trachytedania inflata* by the presence of two size classes of onychaetes while these species have only one size class. Its form, encrusting, and its skeleton with basal lamina of spongin, columns of acanthostyles and ectosomal diactines is similar to that of other species such *Trachytedania spinata* and *Trachytedania spinostylota* and differs from *Trachytedania patagonica* (massive), *Trachytedania biraphidora* (massive), *Trachytedania microrhaphidophora* (subspherical) and *Trachytedania inflata* (massive). With regard to distribution, most *Trachytedania* species are from the south-west Atlantic while *Trachytedania microrhaphidophora* is from the Sea of Japan, *Trachytedania spinostylota* from New Zealand, and *Trachytedania ferrolensis* from the north-east Atlantic.

Key to the species of Trachytedania

1. Onychaetes of two size classes 2
— Onychaetes of one size class 4
2. Acanthostyles of two size classes ..... *T. ferrolensis*
— Acanthostyles of one size class 3
3. Tylotes of two size classes. Straight acanthostyles with spines on the head and shaft ..... *T. spinostyla*
— Tylotes of one size class. Slightly curved acanthostyles with spines only at the head..... *T. biraphidora*
4. Tylotes present..... *T. inflata*
— Tornotes present 5
5. Onychaetes $<150\,\mu$m ..... *T. microrhaphidophora*
— Presence of onychaetes $>150\,\mu$m and acanthostyles $<300\,\mu$m ..... *T. spinata*
— Presence of onychaetes $>150\,\mu$m and acanthostyles $<300\,\mu$m ..... *T. patagonica*

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