



ORIGINAL ARTICLE

New data on glass sponges (Porifera, Hexactinellida) of the northern Mid-Atlantic Ridge. Part 2. Aphrocallistidae, Euretidae, Euplectellidae and Rossellidae (with descriptions of two new species of *Sympagella*)

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Abstract

Species of hexactinellid sponges (families Aphrocallistidae, Euretidae, Euplectellidae, and Rossellidae) collected on the ECOMAR expeditions of the RRS *James Cook* to the northern Mid-Atlantic Ridge are considered. Two species new to science of the genus *Sympagella* (Rossellidae, Lanuginellinae) are described: *S. cooki* sp. nov. has as a unique feature the absence of discoidal and onychoidal outer ends in microscleres; *Sympagella ecomari* sp. nov. has the only types of microscleres represented by plumicomes and spicules with discoidal outer ends. A new name, *Bathydorus levis pseudospinosus*, is suggested for *Bathydorus levis spinosus* Wilson, 1904 (junior homonym) to avoid homonymy with *Bathydorus spinosus* Schulze, 1886 (senior homonym).

Key words: *Porifera, Hexactinellida, new species, Mid-Atlantic Ridge*

Introduction

Further descriptions of hexactinellid sponges collected on cruises of the RRS *James Cook* to the northern Mid-Atlantic Ridge are given. This article continues 'Part 1' (Lopes & Tabachnick 2013).

Material and methods

Material was collected in the framework of the ECOMAR project on cruises of the RRS *James Cook* using otter trawls and the ROV *Isis* on the northern MAR, in the Charlie-Gibbs Fracture Zone area. Photographs taken *in-situ* with the help of ROV *Isis* were analysed. Samples were fixed in formaldehyde, subsequently replaced with ethanol. Large specimens were preserved dry. Spicules were dissociated using a solution of K₂Cr₂O₇, fresh water and H₂SO₄, then washed in fresh water and dried on filter paper. Spicules were mounted in Canada balsam and analysed using light microscopy. The materials described here are stored at the National Oceanography Centre, Southampton

and their transfer to the Natural History Museum is suggested.

Abbreviations

avg, average; BMNH, Natural History Museum, London; BSO, National Oceanography Centre, Southampton; ECOMAR, the project 'Ecosystems of the Mid-Atlantic Ridge at the Sub-Polar Front and Charlie-Gibbs Fracture Zone'; JC, RRS *James Cook*; MAR, Mid-Atlantic Ridge; MAR-ECO, the project 'Patterns and Processes of the Ecosystems of the Northern Mid-Atlantic'; MNHN, Muséum national d'Histoire naturelle, Paris; *n*, number of measurements; std, standard deviation.

Taxonomy

Hexactinosida Schrammen, 1903

Aphrocallistidae Gray, 1867

Aphrocallistes Gray, 1858

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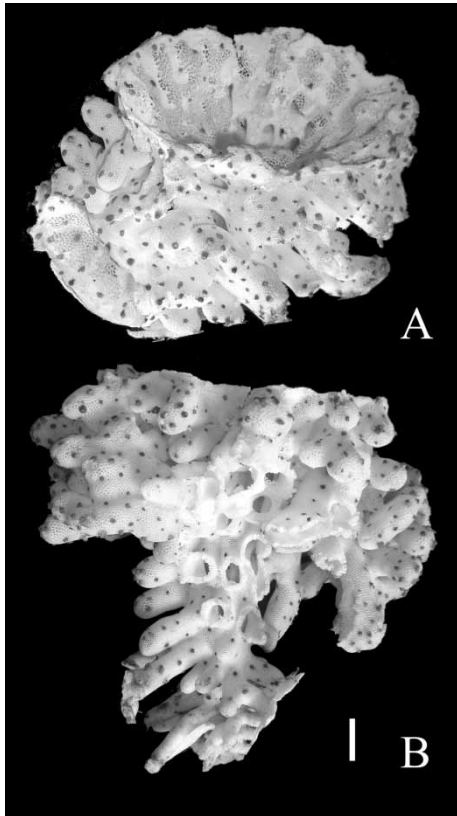


Figure 1. *Aphrocallistes beatrix beatrix* Gray, 1858. A, view from above. B, view from aside. Scale 20 mm.

***Aphrocallistes beatrix beatrix* Gray, 1858**
(Figure 1)

Material examined

BSO600, *James Cook*, St. JCO48/44, ROV *Isis* dive 175, 22–23 June 2010, 48°44.24′–48°44.27′N, 28°10.03′–28°10.35′W, depth 1111–850 m.

Description

Body morphology. Body is typical for the genus, globose, about 240 mm in diameter with vertical processes, round and/or oval in section (some of processes in lower part with secondary points of attachment to substratum). The sponge has two oscula covered with sieve-plates: 110 × 160 mm and 60 × 80 mm. Numerous zoantharians are attached to the specimen.

Spicules. The framework is typical for the genus structure. Loose spicules also present, but they are very rare. Scopule with two clavate tines was found to be deposited into the main framework. Uncinates numerous. Pinular hexactins with pinular rays 0.09–0.23/0.006 mm, tangential rays 0.07–0.15 mm long, rays directed inside body 0.06–0.66 mm long, diameter of other than pinular rays is smaller: 0.003 mm.

Microscleres. Syngamme hemioxyhexasters (spicules with 4 primary rays not branching and 2 rays directed in the opposite direction carrying secondary rays) and syngamme hemidiscohexasters occur in low numbers. Diameter of the former 0.035–0.059 mm, their primary rays 0.002–0.007 mm long. Diameter of spicules of the second type 0.048 mm, primary rays 0.007 mm long.

Remarks

This is the first finding of this species on the northern MAR, close to other known localities in the northern Atlantic – off Iceland, Ireland and the Azores (Reiswig 2002).

Euretidae Zittel, 1877

***Chonelasma* Schulze, 1886**

***Chonelasma choanoides* Schulze & Kirckpatrick, 1910**

(Figure 2)

Material examined

BSO51 RRS *James Cook*, St. JCO11/075, 05 August 2007, 53°51.10′–54°06.02′N, 36°11.36′–36°07.20′W, depth 2605–2630 m. Fragments of dead specimens, RRS *James Cook*, St. JCO11/101, 09 August 2007, 54°06.33′–53°47.47′N, 33°58.27′–34°02.89′W, depth 2405–2435 m. Fragments of dead specimens, RRS *James Cook*, St. JCO11/106, 11 August 2007, 54°05.68′–53°46.94′N, 33°58.54′–34°03.02′W, depth 2410–2445 m. Fragments of dead specimens, RRS *James Cook*, St. JCO37/015, 10 August 2009, 48°58.73′–49°11.14′N, 27°51.01′–27°49.17′W, depth 2630 m. Fragments of dead specimens, RRS *James Cook*, St. JCO37/019, 11 August 2009, 48°58.05′–49°14.36′N, 27°51.60′–27°49.29′W, depth 2750 m. Fragments of dead specimens, RRS *James Cook*, St. JCO37/027, 18 August 2009, 48°57.34′–49°13.55′N, 27°49.83′–27°50.92′W, depth 2700 m. BSO14, BSO12, RRS *James Cook*, St.



Figure 2. *Chonelasma choanoides* Schulze & Kirckpatrick, 1910. ROV photo.

JCO37/061, 28 August 2009, 54°19.62'–54°04.96'N, 36°00.87'–36°07.98'W, depth 2618 m. BSO2, RRS *James Cook*, St. JCO37/067, 29 August 2009, 54°19.50'–54°06.55'N, 36°01.11'–36°07.14'W, depth 2620–2676 m. Fragments of dead specimens, RRS *James Cook*, St. JCO37/070, 30 August 2009, 54°19.23'–54°03.65'N 36°01.17'–36°08.42'W, depth 2621–2630 m.

Description

Body morphology. Specimens are funnel-shaped or tubular (in the collection usually lamellate fragments), most of them without loose spicules.

Spicules. Dermalia and atrialia are pentactins, often with rudiment of the sixth ray directed outside the body, spiny tangential rays 0.089–0.359 mm long (avg 0.287 mm, *n* 22, std 0.062 mm), rays directed inside body 0.185–0.481 mm long (avg 0.095 mm, *n* 25, std 0.008 mm). Scopules 0.130–0.322 mm long (avg 0.241 mm, *n* 24, std 0.057 mm) carrying 2, rarely 1 or 3, tines 0.026–0.048 mm long (avg 0.038 mm, *n* 25, std 0.006 mm). Uncinates typical for the genus.

Microscleres. Oxyhemihexasters with 1–2, sometimes 3 secondary rays, 0.052–0.133 mm in diameter (avg 0.096 mm, *n* 25, std 0.025 mm), with primary rosette 0.007–0.015 mm in diameter (avg 0.011 mm, *n* 25, std 0.003 mm). Oxyhexactins 0.059–0.089 mm in diameter (avg 0.078 mm, *n* 25, std 0.008 mm).

Remarks

No specific features were found in these specimens from the MAR of this widely distributed Atlantic Ocean species.



Figure 3. *Euplectella gibbsa* Tabachnick & Collins, 2008. ROV photo.

Lyssacinossida Zittel, 1877

Euplectellidae Gray, 1867

Euplectellinae Schulze, 1886

Euplectella Owen, 1841

Euplectella gibbsa Tabachnick & Collins, 2008 (Figures 3, 4, Table I)

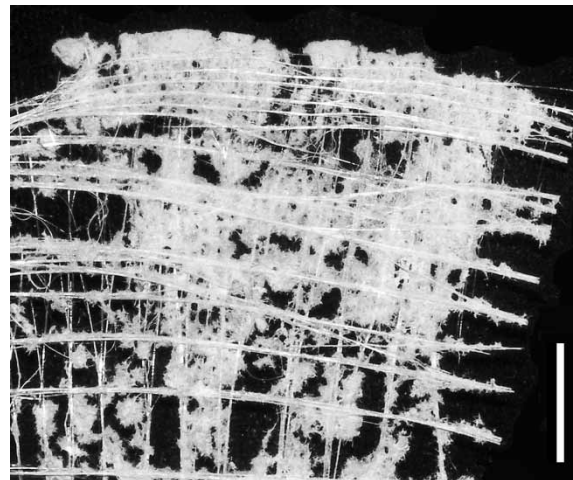


Figure 4. *Euplectella gibbsa* Tabachnick & Collins, 2008. Fragment of the wall with marginalia. Scale 10 mm.

Material examined

BSO40, BSO48, BSO49, BSO50 and likely BSO39, RRS *James Cook*, St. JCO11/023, 22 July 2007, 48°54.59'–49°15.85'N, 27°50.00'–27°50.00'W, depth 2718–2734 m. BSO66, BSO67, BSO68, RRS *James Cook*, St. JCO11/101, 09 August 2007, 54°06.33'–53°47.47'N, 33°58.27'–34°02.89'W, depth 2405–2435 m. BSO19, BSO20, BSO21, BSO22, BSO23, BSO24, BSO25, RRS *James Cook*, St. JCO11/111, 12 August 2007, 54°05.68'–53°47.71'N, 33°58.54'–34°02.83'W, depth 2404–2430 m. BSO13, RRS *James Cook*, St. JCO37/061, 28 August 2009, 54°19.62'–54°04.96'N, 36°00.87'–36°07.98'W, depth 2618 m.

Description

Body morphology. Two specimens (BSO13 and BSO19) are complete, large individuals, barrel-like with no sieve-plates or specific oscularia, one 150 mm high, 150 mm in diameter; second 130 mm high and 220 mm in diameter. Other specimens are fragments of large and apparently small specimens.

Remarks

Most important dimensions of spicules are given in Table I. Although some dimensions of microscleres do not correspond to those in the type specimen (Tabachnick & Collins 2008), these new specimens can be attributed to *E. gibbsa*. The sieve-plate obviously is absent in this, as in the type specimens. Well-preserved margin of the main osculum (BSO13) has no sieve-plate remnants, the feature also seen on *in-situ* images of *E. gibbsa* (most likely identification).

Table I. Spicule dimensions (in mm) of *Euplectella gibbsa* Tabachnick & Collins, 2008.

	<i>n</i>	BSO13				<i>n</i>	BSO19			
		min	max	avg	std		min	max	avg	std
L dermal hexactin distal ray	22	0.085	0.481	0.265	0.125	12	0.100	0.296	0.224	0.059
L dermal hexactin tangential ray	15	0.185	0.377	0.268	0.059	6	0.130	0.303	0.241	0.064
L dermal hexactin proximal ray	5	0.407	0.814	0.659	0.162	6	0.407	0.888	0.604	0.176
L atrial pentactin tangential ray	13	0.122	0.370	0.205	0.062	4	0.181	0.241	0.202	0.028
L atrial pentactin ray directed inside body	11	0.322	0.740	0.495	0.114	3	0.518	0.566	0.538	0.025
D oxyhexaster	25	0.096	0.141	0.117	0.010	22	0.104	0.141	0.123	0.011
d oxyhexaster	25	0.013	0.023	0.018	0.003	22	0.011	0.026	0.017	0.004
d graphiocomes	25	0.017	0.030	0.024	0.003	1	0.019	0.019	0.019	
D floricome	25	0.089	0.126	0.108	0.009	3	0.089	0.104	0.096	0.007
d floricome	25	0.015	0.029	0.022	0.003	3	0.015	0.019	0.017	0.002

Notes: L, length; D, diameter; d, diameter of primary rosette.

***Euplectella suberea* Thomson, 1877**
(Figure 5)

Material examined

BSO33, BSO34, BSO35, BSO36, BSO37, RRS *James Cook*, St. JCO37/015, 10 August 2009, 48°58.73'–49°11.14'N, 27°51.01'–27°49.17'W, depth 2630 m. BSO41, RRS *James Cook*, St. JCO11/023, 22 July 2007, 48°54.59'–49°15.85'N, 27°50.00'–27°50.00'W, depth 2718–2734 m. BSO63, BSO64, BSO65, RRS *James Cook*, St. JCO37/027, 18 August 2009, 48°57.34'–49°13.55'N, 27°49.83'–27°50.90'W, depth 2700 m.



Figure 5. *Euplectella suberea* Thomson, 1877. ROV photo.

Description

Body morphology. Specimens are small fragments only.

Remarks

The species is well-known in the North Atlantic (Tabachnick & Collins 2008), additional description is not necessary. Owing to the similarity in the shape and size of microscleres, there are some difficulties in distinguishing two co-occurring species of *Euplectella*. In *E. gibbsa* principalia are barrel-shaped stauractins and the main osculum has no sieve-plate, whereas in *E. suberea* principalia are pentactins, body shape tubular, osculum is covered by the sieve-plate, comitalia are spiny diactins placed along the distal ray of principalia-pentactins. *E. suberea* may appear to be a juvenile form of larger *E. gibbsa*, explaining changes in body shape, loss of the sieve-plate over the main osculum, changing of principalia from pentactins to stauractins with loss of the comitalia-diactins. Nevertheless, the differences in the macroscleres are significant and suggestions about their synonym status, based on the microsclere similarity, should be rejected.

***Euplectella* sp.**

Material examined

BSO26, BSO27, BSO28, RRS *James Cook*, St. JCO11/111, 12 August 2007, 54°05.68'–53°47.71'N, 33°58.54'–34°02.83'W, depth 2404–2430 m.

Description

Body morphology. Specimens are poor fragments.

Spicules. Basalia are broken shafts of anchorate spicules. Choanosomal spicules are hexactins,

pentactins and tauactins, no principalia, except one large pinular hexactin. Some dermal pentactins or hexactins with pinular distal rays occur and likely some atrial pentactins, which are not distinguishable from the choanosomal ones.

Microscleres. Floricomes, oxyhexasters, graphiocomes and rare oxyhexactins. The floricomes are numerous, 0.074–0.111 mm in diameter (avg 0.095 mm, n 25, std 0.008 mm), their primary rosette is 0.011–0.026 mm in diameter (avg 0.020 mm, n 25, std 0.003 mm). Oxyhexasters with 3–4 secondary rays with diameter 0.089–0.170 mm (avg 0.121 mm, n 16, std 0.021 mm), their primary rosette is 0.015–0.022 mm in diameter (avg 0.018 mm, n 16, std 0.003 mm). The only oxyhexactin is 0.148 mm in diameter. The raphides (broken secondary rays of graphiocomes) are numerous, primary rosettes of graphiocomes are rare. The reconstructed diameter of the graphiome is about 0.4 mm, primary rosette 0.019–0.026 mm in diameter.

Remarks

The specimens are too incomplete for definitive identification. They were attributed to *Euplectella* based on composition of microscleres. Absence of characteristic comitalia of diactins indicates that the specimens do not belong to *E. subarea*, and the lack of principal spicules does not allow referring the specimens to *E. gibbsa*.

***Malacosaccus* Schulze, 1886**

***Malacosaccus* aff. *floricomatus* Topsent, 1901** (Figure 6)

Material examined

BSO29, RRS *James Cook*, St. JCO11/111, 12 August 2007, 54°05.68'–53°47.71'N, 33°58.54'–34°02.83'W, depth 2404–2430 m.

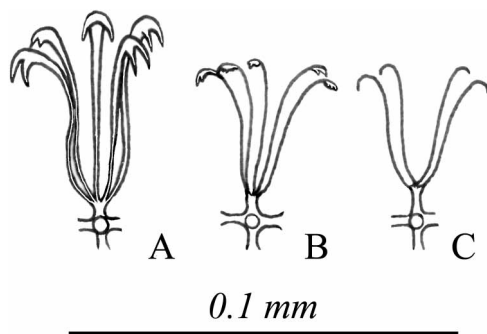


Figure 6. *Malacosaccus* aff. *floricomatus* Topsent, 1901. **A**, large floricome. **B**, small floricome. **C**, syngmatome.

Description

Body morphology. The specimen consists of poor wall fragments.

Spicules. Choanosomal spicules of the walls are hexactins and pentactins. Dermalia and atriallia are hexactins with pinular ray bearing few short spines, the pinular ray 0.152–0.315 mm long (avg 0.238 mm, n 10, std 0.052 mm), tangential rays 0.244–0.352 mm long (avg 0.316 mm, n 6, std 0.039 mm).

Microscleres. Floricomes of two types: small and large, syngmatomes and oxyhexasters occur. The large floricomes, with 5–6 secondary rays, each with 2–3 teeth, 0.104–0.133 mm in diameter (avg 0.126 mm, n 6, std 0.012 mm), primary rosette 0.015–0.022 mm in diameter (avg 0.019 mm, n 6, std 0.003 mm). Small floricomes, with 5–7 secondary rays, each with 3–4 teeth, 0.081–0.104 mm in diameter (avg 0.092 mm, n 26, std 0.005 mm), primary rosette 0.015–0.022 mm in diameter (avg 0.019 mm, n 26, std 0.003 mm). Syngmatomes with 3–4 secondary rays, 0.074–0.089 mm in diameter (avg 0.081 mm, n 8, std 0.005 mm), primary rosette 0.011–0.022 mm in diameter (avg 0.015 mm, n 8, std 0.004 mm). Oxyhexasters with two (rarely hemioxyhexasters with 1–2) secondary rays, diameter 0.096–0.148 mm (avg 0.125 mm, n 8, std 0.019 mm), primary rosette is 0.013–0.022 mm in diameter (avg 0.017 mm, n 8, std 0.003 mm).

***Malacosaccus* aff. *unguiculatus* Schulze, 1886** (Figure 7)

Material examined

BSO601, BSO612, RRS *James Cook*, St. JCO48/28, ROV *Isis* dive 168, 13 June 2010, 54°1.471'N, 34°10.632'W, depth 2445–2435 m.

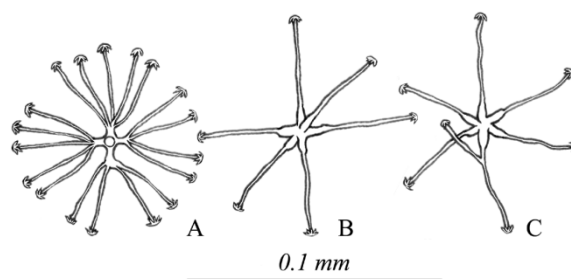


Figure 7. *Malacosaccus* aff. *unguiculatus* Schulze, 1886. **A**, discohexaster. **B**, discohexactin. **C**, hemidiscohexaster.

Description

Body morphology. Specimen BSO601 (spicules described below) is complete, 290 mm high, conical body 120 mm high and 70 mm in diameter in the upper part around osculum, peduncle 140 mm long and 10 mm in diameter, the basal tuft used for attachment to substratum is 30 mm long and 40 mm in diameter, walls about 1 mm thick. Other specimen, BSO612, is a lamellate fragment of the wall about 2 mm thick.

Spicules. Choanosomal spicules of the wall are hexactins, pentactins and tauactins. Spicules of peduncle and basal tuft are typical for the genus. Dermalia and atrialia are pinular hexactins with pinular ray bearing relatively few of short spines, club-shaped or stout with outer end, spherical or rounded or conically pointed. The dermal hexactins with pinular rays 0.185–0.274 mm long (avg 0.234 mm, *n* 22, std 0.022 mm), tangential rays 0.211–0.414 mm long (avg 0.295 mm, *n* 17, std 0.045 mm), ray directed inside body 0.555–0.962 mm long (avg 0.770 mm, *n* 9, std 0.124 mm). Atrial hexactins with pinular ray 0.152–0.252 mm long (avg 0.218 mm, *n* 24, std 0.027 mm), tangential rays 0.167–0.303 mm long (avg 0.227 mm, *n* 25, std 0.037 mm), ray directed inside body 0.466–0.888 mm long (avg 0.641 mm, *n* 11, std 0.142 mm).

Microscleres. Floricomes, discohexasters, rarely hemidiscohexasters, discohexactins, oxyhexasters and hemioxyhexasters occur. The floricomes, with 4–7 secondary rays, each with 4–5 teeth, 0.059–0.089 mm in diameter (avg 0.076 mm, *n* 26, std 0.007 mm), primary rosette 0.011–0.024 mm in diameter (avg 0.017 mm, *n* 26, std 0.003 mm). Discohexasters with 2–5 secondary rays, 0.067–0.104 mm in diameter (avg 0.080 mm, *n* 8, std 0.014 mm), primary rosette 0.010–0.016 mm in diameter (avg 0.080 mm, *n* 8, std 0.002 mm). The discohexasters in specimen BSO612 are generally smaller, 0.053–0.089 mm in diameter (avg 0.070 mm, *n* 4, std 0.015 mm), primary rosette 0.013–0.016 mm in diameter (avg 0.015 mm, *n* 5, std 0.001 mm). The discohexactins and rare hemidiscohexasters 0.081–0.089 mm in diameter (avg 0.085 mm, *n* 4, std 0.004 mm), often with distinguishable remnants of primary rays, thicker than secondary ray. The only discohexactin of BSO612 is bigger, 0.104 mm in diameter. Oxyhexasters and rare hemioxyhexasters with 2 (rarely 1–3) secondary rays, 0.081–0.207 mm in diameter (avg 0.128 mm, *n* 25, std 0.023 mm),

primary rosette 0.015–0.022 mm in diameter (avg 0.018 mm, *n* 25, std 0.003 mm).

Malacosaccus* sp.Material examined*

BSO43, RRS *James Cook*, St. JCO11/023, 22 July 2007, 48°54.59'–49°15.85'N, 27°50.00'W, depth 2718–2737 m. BSO, RRS *James Cook*, St. JCO37/067, 29 August 2009, 54°19.50'–54°06.55'N, 36°01.11'–36°07.14'W, depth 2620–2676 m.

Remarks

The genus *Malacosaccus* requires a revision with redescriptions of the type material; hence all identifications are preliminary and approximate.

Bolosominae Tabachnick, 2002a***Saccocalyx*** Schulze, 1895***Saccocalyx pedunculata*** Schulze, 1895

(Figure 8, Table II)

Material examined

BSO38, RRS *James Cook*, St. JCO11/017, 21 July 2007, 49°14.68'–49°03.43'N, 27°42.31'–27°53.86'W, depth 2687–2727 m. BSO605, RRS *James Cook*, St. JCO48/40, ROV *Isis* dive 173, 21 June 2010, 48°44.118'N, 28°39.335'W, depth 2623–2428 m.

Description

Body morphology. The specimen BSO38 consists of wall fragments. The specimen BSO605 is nearly complete, with upper part of the body about 50 mm high and 80 × 100 mm in section, main osculum 70 × 90 mm, many finger-like processes 15–20/10 mm directed distally, they may branch dichotomously and usually they have numerous additional oscula 2–6 mm in diameter, walls about 1 mm thick, the peduncle not complete, about 110 mm long and 10 mm in diameter.

Spicules. Choanosomal spicules are diactins with widening or four rudimental tubercles in the middle. Spicules of peduncle are also diactins and fused with numerous synapticular junctions. Dermal and atrial pinular hexactins with pinular rays usually stout, with conically pointed outer ends, rarely with spherical enlarged outer ends, 0.115–0.363 mm long, tangential rays 0.111–0.400 mm long, rays

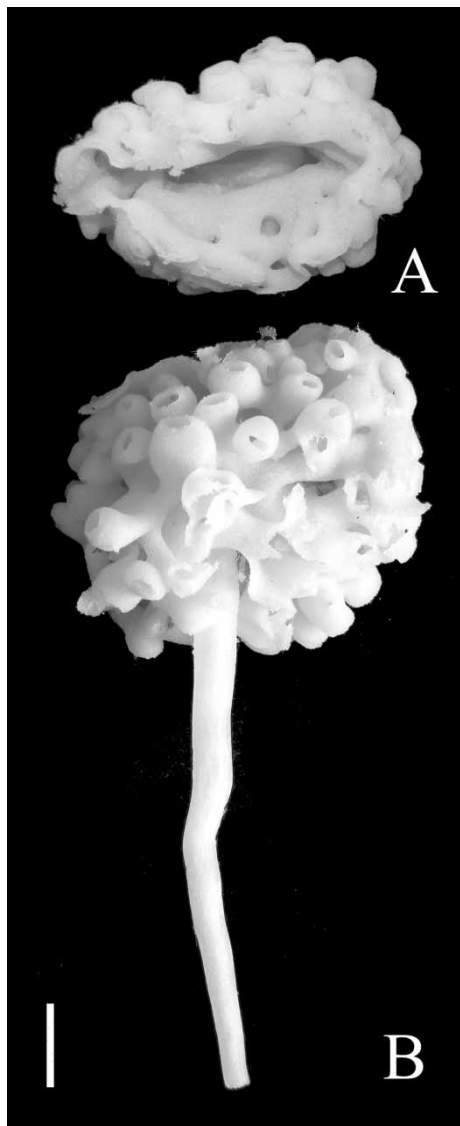


Figure 8. *Saccocalyx pedunculata* Schulze, 1895. **A**, view from above. **B**, view from aside. Scale 20 mm.

directed inside the body 0.093–0.666 mm long, diameter 0.006–0.019 mm.

Microscleres. Some variation is observed in the two specimens. The spirodiscohexasters and stellate discohexasters (the latter were not found in the specimen BSO38) may bear pileate and anchorate discs. The sygmatocomes are of two types, large ('drepanocomes') and small (rather than real sygmatocomes, they were not found in the specimen BSO38). Plumicomes are typical for the species. Dimensions of microscleres are given in Table II.

Remarks

Spicule dimensions of the new specimens correspond to parameters of *Saccocalyx pedunculata* (Tabachnick 2002a), a polymorphic species distributed widely in the Northern Indian ocean, North Atlantic, Central-West Pacific and Antarctica (northern Ross Sea).

Corbitellinae Gray, 1872

Rhabdoplectella Schmidt, 1880

Rhabdoplectella tintinnus Schmidt, 1880
(Figure 9)

Material examined

BSO1, RRS *James Cook*, St. JCO37/067, 29 August 2009, 54°19.50'–54°06.55'N, 36°01.11'–36°07.14'W, depth 2620–2676 m.

Description

Body morphology. The specimen is a fragment of the lower part of the body with basidictyonal plate about

Table II. Spicule dimensions (in mm) of *Saccocalyx pedunculata* Schulze, 1895.

	<i>n</i>	BSO605				<i>n</i>	BSO38			
		min	max	avg	std		min	max	avg	std
L dermal or atrial hexactin pinular ray	25	0.178	0.303	0.253	0.036	26	0.115	0.363	0.258	0.061
L dermal or atrial hexactin tangential ray	24	0.111	0.392	0.236	0.063	23	0.148	0.400	0.248	0.061
L dermal or atrial hexactin ray directed inside body	20	0.130	0.592	0.345	0.149	19	0.093	0.666	0.353	0.157
D spirodiscohexaster	26	0.089	0.133	0.111	0.011	23	0.067	0.155	0.118	0.025
d spirodiscohexaster	26	0.009	0.019	0.013	0.002	23	0.007	0.015	0.011	0.003
D discohexaster	11	0.059	0.155	0.095	0.024					
d discohexaster	11	0.007	0.015	0.011	0.002					
D large sygmatocome or drepanocome	4	0.163	0.207	0.183	0.024					
d large sygmatocome or drepanocome	4	0.009	0.016	0.012	0.004					
D small sygmatocome	9	0.052	0.089	0.067	0.015	9	0.046	0.111	0.071	0.022
d small sygmatocome	9	0.008	0.015	0.011	0.002	9	0.008	0.015	0.012	0.003
D plumicome	4	0.037	0.044	0.043	0.004	1	0.067	0.067	0.067	
d plumicome	7	0.011	0.020	0.015	0.003	1	0.015	0.015	0.015	

Notes: L, length; D, diameter; d, diameter of primary rosette.



Figure 9. *Rhabdopectella tintinnus* Schmidt, 1880. Scale 10 mm.

10 mm in diameter (place of attachment), short peduncle 2 mm in diameter and diactins fused by secondary silica depositions organised in tufts that branch and fuse, forming walls of conical body.

Remarks

The loose spicules are absent and the possibility remains that the specimen may belong to *Regadrella*, for instance *R. phoenix*, also distributed in the middle Atlantic (Tabachnick 2002a). However, the described remnants were known only for *Rhabdopectella tintinnus* in the Atlantic and its identification looks to be reliable with a high probability. In the Pacific Ocean similar remnants were described for *Dictyocalyx* (Schulze 1877).

Rossellidae Schulze, 1885

Rossellinae Schulze, 1885

Asconema Kent, 1870

Asconema fristedti Tabachnick & Menshenina, 2007

Asconema fristedti nordazoriensis Tabachnick & Menshenina, 2007

Material examined

BSO52, RRS *James Cook*, St. JCO11/075, 05 August 2007, 53°51.10'–54°06.02'N, 36°11.36'–36°07.20'W, depth 2605–2630 m. BSO609, RRS *James Cook*, St. JCO48/006, ROV *Isis* dive 159, 01 June 2010, 53°58,768'N, 36°11,501'W, depth 2500 m.

Description

Body morphology. The specimen BSO52 is oval, 70 mm high, 70 mm in diameter in the middle and 10 mm in diameter at the base and at the osculum, walls 1–2 mm thick. The specimen BSO609 consists of lamellate fragments.

Spicules. Choanosomal spicules are diactins. Hypodermalia and hypotrialia are pentactins with smooth or spiny and rough tangential rays (spines up to 0.3 mm long). Dermalia are pentactins with rudimentary rays directed inside body and stauractins, rarely tauactins and hexactins. The distal, slightly pinular ray of dermal pentactins is 0.044–0.093 mm long (avg 0.069 mm, *n* 26, std 0.013 mm), with tangential rays 0.048–0.074 mm long (avg 0.048 mm, *n* 26, std 0.007 mm). Tangential rays of dermal stauractins 0.059–0.104 mm long (avg 0.070 mm, *n* 25, std 0.008 mm). Atrialia are pentactins and hexactins, rarely stauractins. The atrial pentactins of the same type as dermal ones, with rays directed outside body 0.044–0.104 mm long (avg 0.075 mm, *n* 25, std 0.016 mm), tangential rays 0.048–0.100 mm long (avg 0.062 mm, *n* 25, std 0.010 mm). The atrial hexactins with rays directed outside body 0.044–0.096 mm long (avg 0.065 mm, *n* 13, std 0.017 mm), tangential rays 0.048–0.078 mm long (avg 0.060 mm, *n* 13, std 0.009 mm), rays directed inside body 0.022–0.074 mm long (avg 0.044 mm, *n* 13, std 0.016 mm).

Microscleres. Oxyhexasters and oxyhemihexasters with 1–3 secondary rays, 0.085–0.133 mm in diameter (avg 0.104 mm, *n* 26, std 0.013 mm), primary rosette 0.007–0.019 mm in diameter (avg 0.011 mm, *n* 26, std 0.003 mm). Oxyhexactins 0.067–0.130 mm in diameter (avg 0.104 mm, *n* 26, std 0.015 mm). The microdiscohexasters 0.013–0.020 mm in diameter (avg 0.015 mm, *n* 14, std 0.002 mm), primary rosette 0.006–0.010 mm in diameter (avg 0.008 mm, *n* 14, std 0.001 mm).

Remarks

New specimens lack features differentiating them from the type series (Tabachnick & Menshenina 2007).

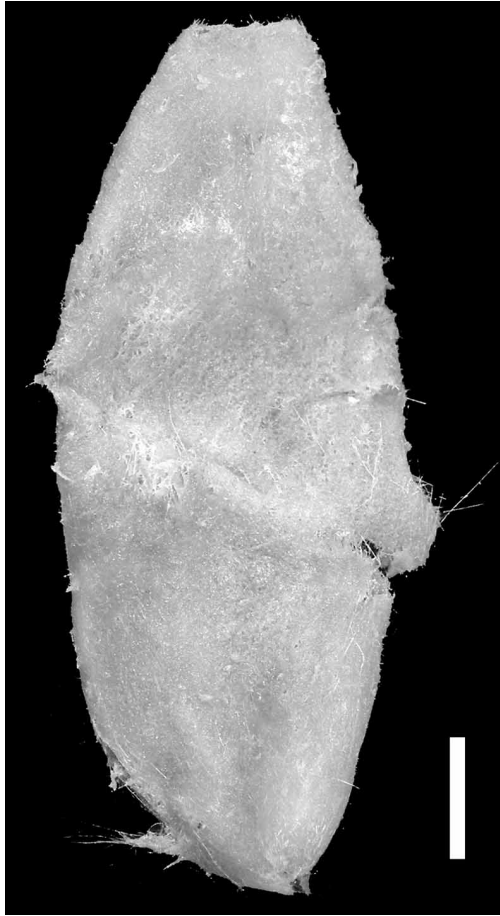


Figure 10. *Asconema fristedti islandiensis* Tabachnick & Menshenina, 2007. Scale 10 mm.

Asconema fristedti islandiensis Tabachnick & Menshenina, 2007
(Figures 10, 11)

Material examined

BSO604, RRS *James Cook*, St. JCO48/040, ROV *Isis* dive 173, 21 June 2010, 48°44.118'N, 28°39.335'W, depth 2623–2428 m.

Description

Body morphology. Specimen tubular, 140 mm high, 35 mm in diameter, 20 mm in diameter at the base. The walls about 2 mm thick.

Spicules. Choanosomal spicules are diactins. Hypodermalia and hypotrialia are pentactins with smooth or spiny and rough tangential rays (the spines are long, up to 0.27 mm). Dermalia and atrialia are pentactins with rudimental rays directed inside the body, rarely they are stauractins, tauactins and hexactins, the latter are more numerous among

atrialia. The distal ray of dermal pentactins is slightly pinular, 0.048–0.089 mm long (avg 0.072 mm, n 25, std 0.010 mm), their tangential rays are 0.046–0.074 mm long (avg 0.063 mm, n 25, std 0.006 mm). The ray of atrial pentactins directed outside body 0.048–0.126 mm long (avg 0.083 mm, n 25, std 0.018 mm), tangential rays 0.041–0.078 mm long (avg 0.059 mm, n 25, std 0.007 mm).

Microscleres. Oxyhexasters and oxyhemihexasters with 1–2, rarely 3–4, secondary rays, 0.059–0.126 mm in diameter (avg 0.103 mm, n 25, std 0.015 mm), primary rosette 0.007–0.015 mm in diameter (avg 0.012 mm, n 25, std 0.002 mm). The oxyhexactins are numerous, 0.089–0.133 mm in diameter (avg 0.108 mm, n 25, std 0.011 mm). The spherical macrodiscohexasters are 0.059–0.126 mm in diameter (avg 0.103 mm, n 25, std 0.015 mm), primary rosette 0.007–0.015 mm in diameter (avg 0.012 mm, n 25, std 0.002 mm). The microdiscohexasters are 0.014–0.023 mm in diameter (avg 0.018 mm, n 11, std 0.003 mm), primary rosette 0.005–0.010 mm in diameter (avg 0.008 mm, n 11, std 0.001 mm). The spherical macrodiscohexasters 0.085–0.104 mm in diameter (avg 0.092 mm, n 7, std 0.006 mm), primary rosette 0.015–0.023 mm in diameter (avg 0.017 mm, n 7, std 0.003 mm).

Remarks

The new specimen is the second finding of the subspecies described by Tabachnick & Menshenina

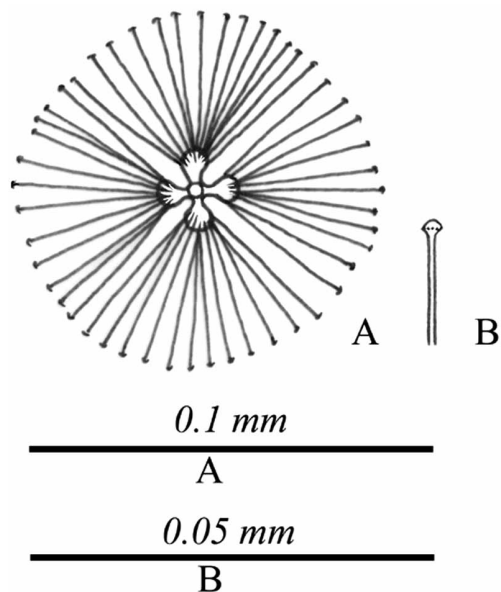


Figure 11. *Asconema fristedti islandiensis* Tabachnick & Menshenina, 2007. **A**, spherical macrodiscohexaster. **B**, secondary ray of macrodiscohexaster.

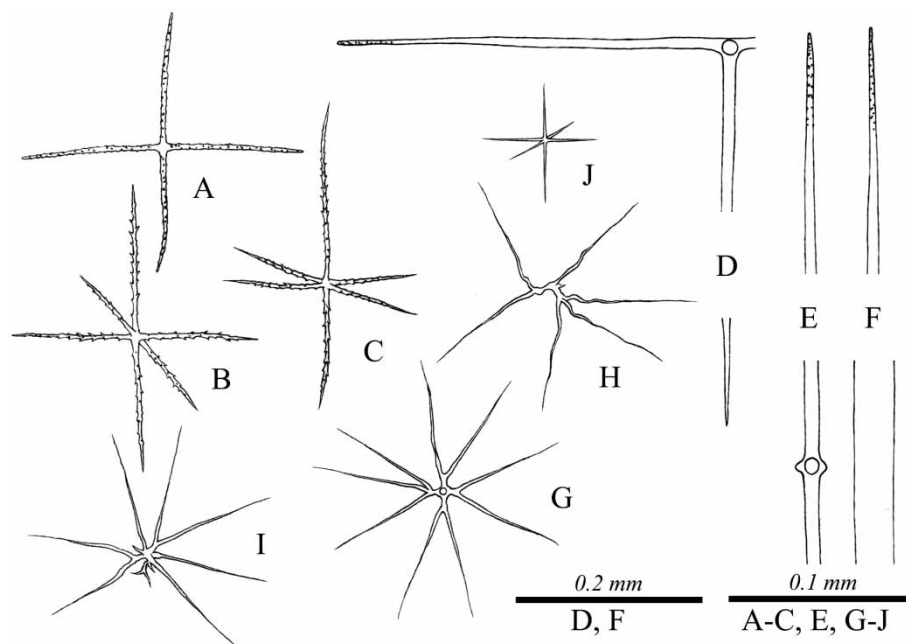


Figure 12. *Bathydorus spinosus* Schulze, 1886 (BSO17). A, dermal stauractin. B, C, atrial hexactins. D, hypodermal pentactin. E, F, choanosomal diactins. G, oxyhexaster. H, I, abnormal oxyoidal microscleres. J, oxyhexactin.

(2007). The only notable difference between the new specimen and the holotype is in the shape of primary rays of spherical macrodiscohexasters. Here they are spherical-clavate, whereas in the holotype, primary rays are stout. This difference is not considered to be important.

***Asconema fristedti* ssp.** Tabachnick & Menshenina, 2007

Material examined

BSO44, BSO45, BSO46, BSO47, RRS *James Cook*, St. JCO11/023, 22 July 2007, 48°54.59'–49°15.85'N, 27°50.00'–27°50.00'W, depth 2718–2734 m. BSO30, BSO31, RRS *James Cook*, St. JCO37/015, 10 August 2009, 48°58.73'–49°11.14'N, 27°51.01'–27°49.17'W, depth 2630 m. BSO 4, BSO10, *James Cook*, St. JCO37/067, 29 August 2009, 54°19.50'–54°06.55'N, 36°01.11'–36°07.14'W, depth 2620–2676 m. BSO604, *James Cook*, St. JCO48/040, ROV *Isis* dive 173, 21 June 2010, 48°44.118'N, 28°39.335'W, depth 2623–2428 m.

Remarks

The specimens lack dermal and atrial surfaces and their identification was based on hypodermal or hypoatrial pentactins with spines on their tangential rays or presence of specific dermal or atrial pentactins.

***Bathydorus* Schulze, 1886**

***Bathydorus spinosus* Schulze, 1886**

(Figure 12, Table III)

Bathydorus spinosus Schulze, 1886: 50; 1887: 153; 1897: 534; Ijima 1898: 48; Topsent 1901: 36; Koltun 1976: 165; Barthel & Tendal 1994: 109 (*B. levis* is mentioned as a lower synonym); Hooper & Wiedenmayer 1994: 525; Janussen et al. 2004: 1867; Dohrmann et al. 2008: 391; Janussen & Reisinger 2009: 15. Probably *Bathydorus servatus* Topsent, 1927: 1; Topsent 1928: 79. Not *Bathydorus levis spinosus* Wilson, 1904: 51 (distributed in the central east Pacific); Koltun 1967: 88 (northwest Pacific) – the name of the subspecies is a junior homonym and its replacement is required – a new name, *Bathydorus levis pseudospinosus*, is suggested here. It is possible that *B. levis* Schulze, 1895: 57 is also a lower synonym of *B. spinosus* with its several subspecies; this requires further investigations.

Holotype

BMNH 1887.10.20.061; HM 3938 (fragments of a single specimen subdivided by Schulze), HMS *Challenger*, St. 147, 46°16'S, 48°27'E, depth 2940 m.

Other material

BMNH 1910.02.09.003, *Belgica*, 70°15'S, 84°06'W, depth 569 m. BSO53, RRS *James Cook*, St. JCO11/

Table III. Spicule dimensions (in mm) of *Bathydorus spinosus* Schulze, 1886.

	Holotype BMNH 1887.10.20.061						BMNH 1910.02.09.003						MNHN (p1080)						MNHN (p530)																
	<i>n</i>	min	max	avg	std	<i>n</i>	min	max	avg	std	<i>n</i>	min	max	avg	std	<i>n</i>	min	max	avg	std	<i>n</i>	min	max	avg	std										
L dermal stauractin ray	26	0.026	0.126	0.093	0.019	9	0.078	0.100	0.090	0.008	25	0.052	0.137	0.078	0.023	25	0.059	0.093	0.073	0.009															
L atrial hexactin proximal ray	30	0.078	0.211	0.125	0.025	1	0.130	0.130	0.130		25	0.093	0.167	0.135	0.019	25	0.111	0.189	0.143	0.020															
L atrial hexactin tangential ray	27	0.063	0.122	0.089	0.014	7	0.063	0.078	0.068	0.006	25	0.044	0.096	0.069	0.012	25	0.052	0.089	0.075	0.010															
L atrial hexactin distal ray	24	0.067	0.111	0.088	0.012	1	0.063	0.063	0.063		25	0.048	0.100	0.073	0.011	25	0.048	0.093	0.076	0.011															
D oxyhexaster, oxyhemihexaster, oxyhexactin	26	0.067	0.141	0.092	0.016	26	0.067	0.141	0.092	0.016	25	0.068	0.097	0.083	0.008	25	0.079	0.126	0.093	0.011															
d oxyhexaster, oxyhemihexaster, oxyhexactin	26	0.007	0.019	0.013	0.003	26	0.007	0.019	0.013	0.003	25	0.007	0.018	0.011	0.002	25	0.007	0.018	0.011	0.002															
BSO17													BSO6													BSO53									
<i>n</i>	min	max	avg	std	<i>n</i>	min	max	avg	std	<i>n</i>	min	max	avg	std	<i>n</i>	min	max	avg	std	<i>n</i>	min	max	avg	std											
25	0.044	0.093	0.073	0.010	27	0.052	0.093	0.072	0.010	25	0.059	0.096	0.076	0.011	27	0.050	0.093	0.067	0.011																
L dermal stauractin ray																																			
L atrial hexactin ray	26	0.052	0.115	0.078	0.014	25	0.056	0.104	0.078	0.010	26	0.054	0.100	0.075	0.011																				
D oxyhexaster, oxyhemihexaster	25	0.093	0.155	0.128	0.016	25	0.096	0.155	0.135	0.014	25	0.081	0.170	0.127	0.024	24	0.089	0.141	0.116	0.014															
d oxyhexaster, oxyhemihexaster	25	0.009	0.019	0.014	0.003	25	0.009	0.019	0.015	0.002	25	0.009	0.019	0.014	0.002	24	0.007	0.019	0.013	0.003															
D oxyhexactin	16	0.044	0.133	0.084	0.030																														

Notes: L, length; D, diameter; d, diameter of primary rosette.

075, 05 August 2007, 53°51.10'–54°06.02'N, 36°11.36'–36°07.20'W, depth 2605–2630 m. BSO16, BSO17, BSO18, RRS *James Cook*, St. JCO37/061, 28 August 2009, 54°19.62'–54°04.96'N, 36°00.87'–36°07.98'W, depth 2618 m. BSO3, BSO4, BSO5, BSO6, BSO7, BSO8, BSO11, RRS *James Cook*, St. JCO37/067, 29 August 2009, 54°19.50'–54°06.55'N, 36°01.11'–36°07.14'W, depth 2620–2676 m. MNHN (p1055), MNHN (p1056), MNHN (p1080), *Walda*, St. CY 10, 28 June 1971, 18°28.5'S, 10°31.5'E, depth 3530 m. MNHN (p530), MNHN (p531), MNHN (p532), MNHN (p533), MNHN (p534), MNHN (p535), *Walda*, St. CP 60.

Description

Body morphology. Most of specimens are lamellate fragments with walls 1–2 mm thick. Some specimens from St. JCO37/067 were attached to another hexactinellid sponge with rigid skeleton, *Chonelasma choanoides* (BSO2): BSO3 a small specimen about 3 mm in diameter and a base of a bigger specimen BSO5. Three more or less complete specimens with broken bases: BSO6, 230 mm high, 60 mm in diameter at the base, 120 mm in diameter in the upper part; BSO7, 130 mm, 25 mm in diameter at the base, 60 mm in the upper part; BSO8, correspondingly 100 mm, 60 mm and 60 mm. The specimen MNHN (p530) is tubular, 90 mm long, 40 mm in diameter with walls 3–4 mm thick, other specimens from this station are lamellate fragments, may be from the upper part of same specimen. The specimen MNHN (p1080) is also tubular 90 mm long, 25 mm in diameter with walls about 1 mm thick. Other specimens from this station are lamellate fragments, likely of the same specimen.

Spicules. Choanosomal spicules are diactins 1.1–22/0.004–0.040 mm with a widening in the middle or 4 rudimental tubercles, their outer ends are rough and conically pointed. Hypodermalia are pentactins with tangential rays 0.15–0.50 mm in length, proximal ray 0.5–1.4 mm in length and 0.007–0.011 mm in diameter, their outer ends are smooth or rough, rounded or conically pointed. Dermalia are mostly stauractins with rough or numerous spiny and conically pointed or rounded rays, but rarely other spicules from diactins to hexactins, with equal or some rudimental rays. Rays of dermal stauractins 0.026–0.199/0.003–0.004 mm. Atrilia are hexactins, fine, 0.002–0.004 mm in diameter, whip-like rays covered by short spines; spines on the proximal ray slightly longer than on other rays. In some specimens the length of rays of atrial hexactins (all North Atlantic specimens) is equal, in others the ray which is directed

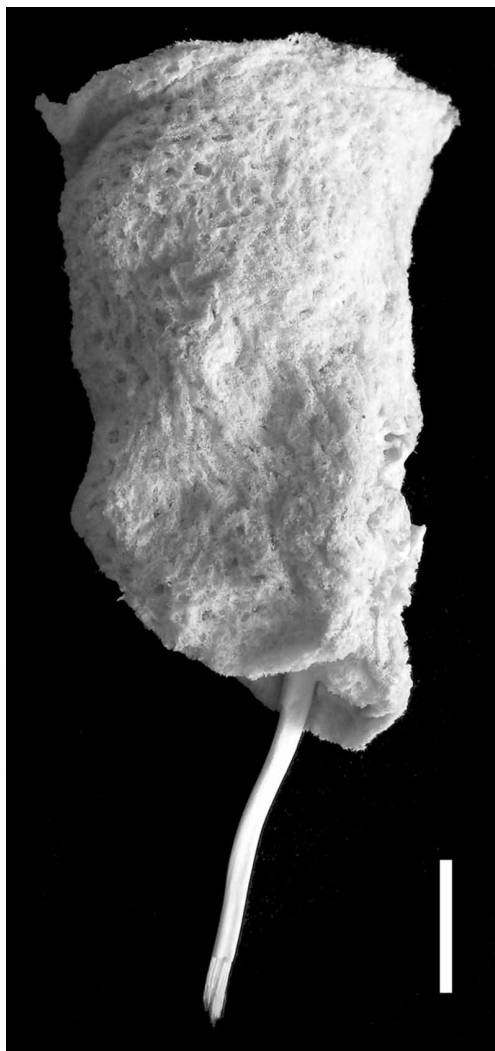


Figure 13. *Crateromorpha* (*Neopsacas*) *variata* Tabachnick, 2002. Scale 20 mm.

into the atrial cavity is longer (Table III). The ray of atrial hexactin 0.041–0.211/0.002–0.003 mm.

Microscleres. Oxyoidal microscleres are oxyhexasters, hemioxyhexasters with 1–3, rarely 4, secondary rays and rare oxyhexactins. These spicules are 0.067–0.155 mm in diameter with primary rosette 0.004–0.019 mm in diameter. In some specimens (BSO17) the oxyhexactins are relatively numerous.

Remarks

Synonymizing *B. spinosus* with *B. servatus* requires re-examination of the type specimen of the latter species. The definition of *B. servatus* by Topsent (1927, 1928) was based on similarity with the species discovered on the expedition of HMS *Challenger* and described by Schulze. Erroneously, species with other than oxyoidal microscleres were

used for comparison: *B. baculifer* Schulze, 1886 and *B. stellatus* Schulze, 1886. These species later were moved from the genus *Bathyxiphus* (Tabachnick 2002b). The similarity of *B. servatus* and *B. spinosus* seems to be enough to consider them to be one species. Absence of discohexasters, the feature mentioned by Topsent (1928), is now recognized as characteristic for the genus. The only character differentiating *B. servatus*, suggested by Topsent (1928), is the presence of rare oxyhexactins and hemioxyhexasters with 1–2, rarely 3, secondary rays. The same spicules occur in the holotype of *B. spinosus*. The curved rays in oxyhexasters are known both for the types of *B. servatus* and *B. spinosus*. Very few dimensions are available in the original description of *B. servatus*: ray of dermal stauractins (rare hexactins) is 0.100–0.125 mm long, ray of atrial hexactins is 0.100–0.140 mm long, diameter of oxyhexaster–oxyhemihexaster is 0.100–0.120 mm, their primary rosette is 0.004 mm in diameter (Topsent 1928). These data are not sufficient for correct comparison. We refer our specimens to *B. spinosus* with minor reservations.

The distribution of *B. spinosus* is extended to include the Antarctic and Atlantic Ocean. If *B. levis* also appears a synonym of *B. spinosus*, the latter species will be cosmopolitan, absent only in the Arctic. Further investigation of possible subspecies in *B. spinosus* is required.

Crateromorpha Gray in Carter, 1872

Crateromorpha (*Neopsacas*) Tabachnick, 2002b

Crateromorpha (*Neopsacas*) *variata* Tabachnick, 2002b

(Figure 13)

Material examined

BSO602, RRS *James Cook*, St. JCO48/24, ROV *Isis* dive 165, 9–10 June 2010, 54°1.081'N, 34°9.455'W, depth 2501–2398 m.

Description

Body morphology. The specimen is a bell-like body attached to thin peduncle, lower part absent. The upper bell-like part composed of loose spicules, 95 mm long, 45 mm in diameter, walls 5 mm thick. The peduncle is ovoid, 2 × 5 mm across.

Spicules. Choanosomal spicules are diactins, usually with 4 rudimentary tubercles in the middle and with rough outer ends. The diactins of peduncle are fused by synapticular junctions. Hypodermalia and hypoa-trialia are pentactins with rough or short spiny rays. Hypodermal pentactins with tangential rays,

0.198–0.327 mm long (avg 0.299 mm, n 31, std 0.054 mm), proximal rays 0.760–0.988 mm long (avg 0.837 mm, n 24, std 0.064 mm), diameter 0.015–0.023 mm. Hypoatrial pentactins are similar to hypodermal ones, but they are relatively rare and notably smaller, tangential rays 0.152–0.296 mm long (avg 0.195 mm, n 13, std 0.039 mm), rays directed inside body 0.258–0.509 mm long (avg 0.376 mm, n 6, std 0.101 mm), diameter 0.015–0.023 mm. Dermalia and atrialia are hexactins, pentactins, stauractins and diactins, often these spicules have rudimental rays – short tubercles; rays rough, difference in size between dermal and atrial spicules not important. Rays of dermal spicules 0.033–0.211 mm long (avg 0.097 mm, n 22, std 0.048 mm), 0.003–0.004 mm in diameter. Rays of atrial spicules 0.037–0.174 mm long (avg 0.088 mm, n 37, std 0.031 mm), 0.004–0.010 mm in diameter.

Microscleres. Onychoidal, oxyoidal and sometimes discoidal microscleres are present; usually it is difficult to differentiate them and they occur simultaneously in different rays on one spicule. Hemihexasters and derivatives with reduced numbers of primary rays prevail, regular hexasters rare. Onychodiscohexasters 0.074–0.104 mm in diameter (avg 0.083 mm, n 4, std 0.014 mm), their primary rosette is 0.015–0.023 mm in diameter (avg 0.019 mm, n 4, std 0.004 mm). Onychodiscohemihexasters 0.059–0.096 mm in diameter (avg 0.077 mm, n 26, std 0.010 mm), primary rosette 0.013–0.024 mm in diameter (avg 0.017 mm, n 26, std 0.003 mm). The diameter of onychodiscohexactins 0.067–0.089 mm (avg 0.077 mm, n 7, std 0.010 mm). Oxyhexasters are 0.044–0.070 mm in diameter (avg 0.058 mm, n 25, std 0.007 mm), primary rosette 0.015–0.030 mm in diameter (avg 0.020 mm, n 25, std 0.004 mm). The diameter of oxyhemihexasters 0.015–0.118 mm (avg 0.086 mm, n 25, std 0.020 mm), primary rosette 0.007–0.024 mm in diameter (avg 0.017 mm, n 23, std 0.004 mm). Oxyhexactins are 0.081–0.141 mm in diameter (avg 0.100 mm, n 7, std 0.020 mm).

Remarks

This species has the following peculiarities: absence of large and small regular discoidal microscleres, described and divided into three types by Tabachnick (2002b), and absence of small regular discoidal microscleres present in other species of the genus (Menshenina, Tabachnick & Janussen 2007). Intraspecific variation of some types of spicules (discoidal) is suggested for this species. Distribution in the northern part of the MAR.

Lanuginellinae Schulze, 1897

Doconesthes Topsent, 1928

Diagnosis (clarified)

Basiphytous or rhizophytous saccular body. Choanosomal spicules are diactins. Hypodermalia are pentactins, hypoatrialia are hexactins, when present. Dermalia are mostly diactins, atrialia are hexactins. Microscleres are strobiloplumicomes and oxyoidal: hemioxyhexasters, oxyhexasters and oxyhexactins.

Doconesthes sessilis Topsent, 1928

(Figures 14–16)

Material examined

BSO15, RRS *James Cook*, St. JCO37/061, 28 August 2009, 54°19.62'–54°04.96'N, 36°00.87'–36°07.98'W, depth 2608 m.

Description

Body morphology. The specimen is vase-like with basiphytous–rhizophytous type of attachment, 160 mm high, 40 mm in diameter at the base, 90 mm in thickest part, walls 1–10 mm thick, the osculum is ovoid, 50 × 60 mm.

Spicules. Choanosomal spicules are diactins, 2.5–6/0.012–0.175 mm with widening in the middle and rough or rarely smooth outer ends. Diactins in rhizophytous processes often fused by synapticular junctions. Hypodermalia are pentactins with rough outer ends of rays, rarely stauractins, tauractins, diactins and hexactins. Hypodermal pentactins with tangential rays, 0.365–0.912 mm long (avg 0.628 mm, n 29, std 0.133 mm), proximal ray 0.319–1.292

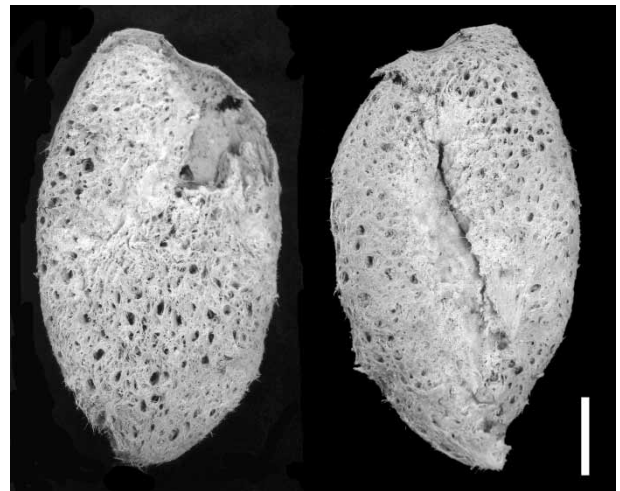


Figure 14. *Doconesthes sessilis* Topsent, 1928, view from different sides. Scale 30 mm.

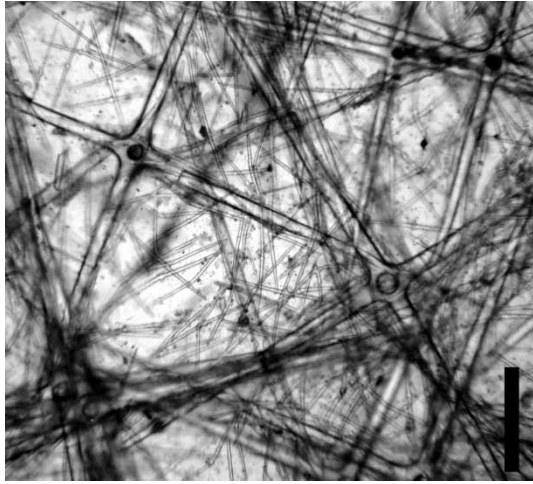
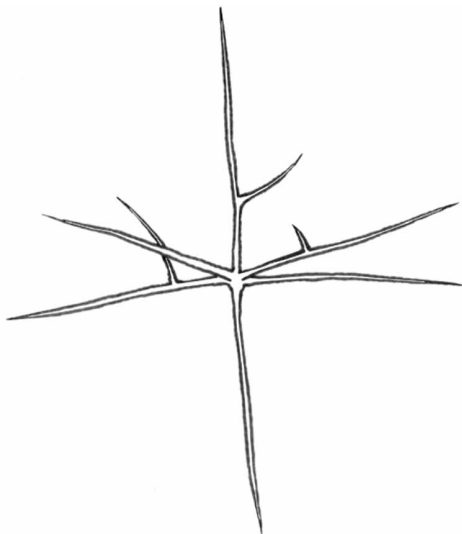


Figure 15. *Doconesthes sessilis* Topsent, 1928, dermal surface, hypodermal pentactins with regular orientation and dermal diactins with irregular distribution. Scale 0.1 mm.

mm long (avg 0.712 mm, n 10, std 0.313 mm), diameter 0.011–0.039 mm. Hypoatria are hexactins, their rays are similar to those of pentactins, except those directed into the atrial cavity: they are more rough or even spiny. Hypodermal hexactins with rays directed into the atrial cavity, 0.137–0.441 mm long (avg 0.288 mm, n 43, std 0.084 mm), tangential rays 0.236–0.631 mm long (avg 0.397 mm, n 38, std 0.097 mm), ray directed inside body 0.099–0.760 mm long (avg 0.262 mm, n 22, std 0.120 mm), diameter 0.011–0.038 mm. Both hypodermal and hypoatrial spicules regularly distributed,



0.1 mm

Figure 16. *Doconesthes sessilis* Topsent, 1928. Spiny oxyhexactin.

spicular centres form regular series, tangential rays of neighbouring spicules are parallel. Dermalia are mostly diactins distributed irregularly among spaces between tangential rays of hypodermal pentactins, diactins with rough rays and conically pointed outer ends; they bear 2 or 4 rudimentary tubercles in the middle. Sometimes diactins are curved in the middle. Rarely, they are tauactins and stauractins. The dermal spicules with rays 0.023–0.068 mm long (avg 0.058, n 22, std 0.009 mm), diameter 0.006–0.007 mm. Atrialia are hexactins, sometimes with rays of different length, rays with rough and conically pointed outer ends, there are rare and transitional spicules between them and hypoatrial hexactins may occur. Rays of atrial hexactins 0.076–0.304 mm long (avg 0.154, n 43, std 0.059 mm), diameter 0.005–0.015 mm.

Microscleres. Strobiloplumicomes and microscleres with oxyoidal rays: hemioxyhexasters, oxyhexasters and oxyhexactins. Oxyoidal microscleres rarely bear spines. Oxyhemihexasters with 1–2 secondary rays and rare oxyhexasters with up to 6 secondary rays, diameter 0.061–0.152 mm (avg 0.093 mm, n 25, std 0.020 mm), primary rosette 0.006–0.038 mm in diameter (avg 0.014 mm, n 25, std 0.006 mm). Oxyhexactins 0.065–0.122 mm in diameter (avg 0.106 mm, n 25, std 0.012 mm). The strobiloplumicomes 0.030–0.059 mm in diameter (avg 0.043 mm, n 22, std 0.010 mm), primary rosette 0.010–0.019 mm in diameter (avg 0.014 mm, n 29, std 0.002 mm).

Remarks

Our specimen is the third representative of this monospecific genus with a Mid-Atlantic distribution. The set of spicules and their dimensions correspond to those in previously described specimens (Topsent 1928; Tabachnick & Collins 2008). The new feature in our specimen is the presence of hypoatrial hexactins. This type of spicule was not found by Topsent, who dealt with a small fragment, and was also absent from a small specimen described by Tabachnick and Collins. The new feature was included in the clarified diagnosis of the genus suggested above.

Lophocalyx Schulze, 1887

Lophocalyx reisiwigi Menshenina, Tabachnick, Lopes & Hajdu, 2007
(Figure 17)

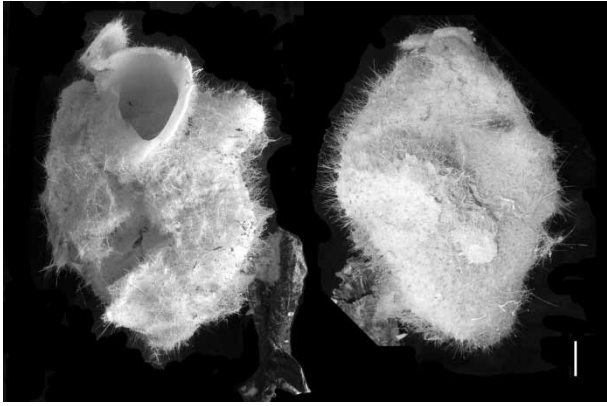


Figure 17. *Lophocalyx reiswigi* Menshenina, Tabachnick, Lopes & Hajdu, 2007, view from different sides. Scale 20 mm.

Material examined

BSO603, RRS *James Cook*, St. JCO48/40, ROV *Isis* dive 173, 21 June 2010, 48°44.118'N, 28°39.335'W, depth 2623–2428 m.

Description

Body morphology. Body globe-like with several oscula attached by short peduncle; attached to dead scleractinian coral in basiphytous mode. Body 140 mm high, 80 × 60 mm across in the middle; peduncle 20 mm in diameter. The sponge has several oscula from 4 to 50 mm in diameter, atrial cavity is common, walls 3–4 mm thick.

Spicules. Choanosomal spicules are diactins and rare hexactins. Hypodermalia and hypotrialia are pentactins. Dermalia are pinular hexactins, rarely pentactins with rudimentary instead of proximal ray, with slightly clavate pinular ray, other rays are rough. Dermal hexactins with pinular ray 0.059–0.104 mm long (avg 0.086 mm, n 27, std 0.012 mm), tangential rays 0.048–0.089 mm long (avg 0.070 mm, n 27, std 0.012 mm), ray directed inside body 0.048–0.089 mm long (avg 0.062 mm, n 25, std 0.009 mm), diameter of pinular ray 0.007–0.009 mm, other rays are thinner: 0.004–0.007 mm in diameter. Atrialia are similar to dermalia but their pinular rays are not clavate in shape. Atrial hexactins with pinular rays 0.063–0.122 mm long (avg 0.094 mm, n 25, std 0.015 mm), tangential rays 0.056–0.089 mm long (avg 0.070 mm, n 25, std 0.009 mm), ray directed inside body 0.037–0.074 mm long (avg 0.060 mm, n 25, std 0.011 mm), diameter 0.004–0.007 mm.

Microscleres. Strobiloplumicomes and microscleres with oxyoid rays: hemioxyhexasters, rare oxyhexasters

and oxyhexactins. Oxyhemihexasters and oxyhexasters with 1–2 (rarely 3) secondary rays, diameter 0.163–0.222 mm (avg 0.190 mm, n 15, std 0.021 mm), primary rosette 0.011–0.022 mm in diameter (avg 0.016 mm, n 15, std 0.003 mm). Oxyhexactins are 0.170–0.229 mm in diameter (avg 0.204 mm, n 15, std 0.018 mm). The strobiloplumicomes 0.025–0.047 mm in diameter (avg 0.034 mm, n 25, std 0.006 mm), primary rosette 0.010–0.018 mm in diameter (avg 0.015 mm, n 25, std 0.002 mm).

Remarks

The species was described based on a series of wall fragments sampled off the coast of Brazil. The species *L. reiswigi* is close to *L. atlantiensis* Menshenina, Tabachnick, Lopes & Hajdu, 2007 and localities of the two species are nearby. An important feature distinguishing the two species was the length of pinular rays in dermal hexactins. This parameter appeared to be similar in the two species: in the new specimen of *L. reiswigi* pinular rays are relatively small as in *L. atlantiensis*. Examination of more specimens is required to clarify the relationship between these two species.

Sympagella Schmidt, 1870

Sympagella cooki sp. nov.

(Figures 18, 19)



Figure 18. *Sympagella cooki* sp. nov. Scale 20 mm.

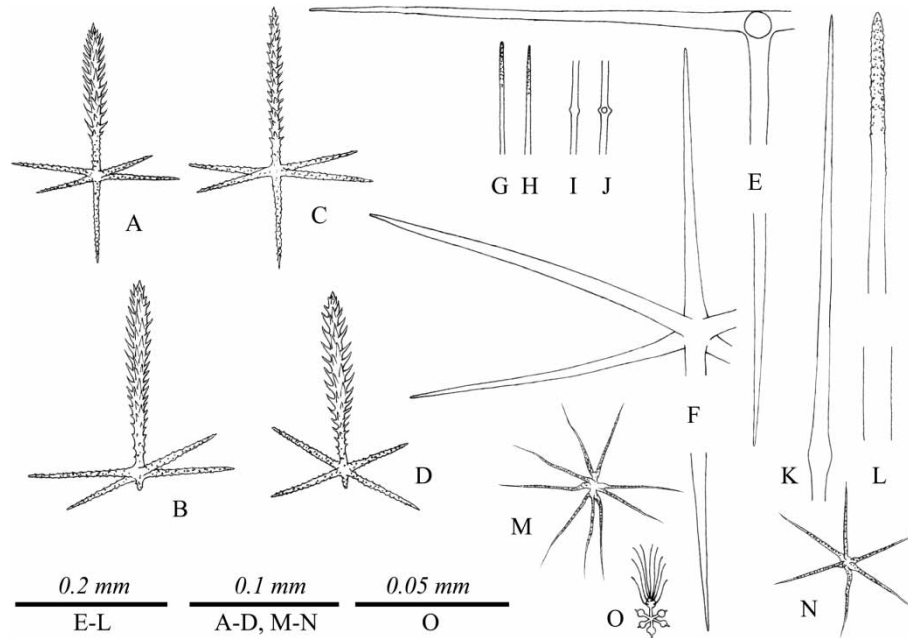


Figure 19. *Sympagella cooki* sp. nov. **A**, dermal pinular hexactin. **B**, dermal pinular pentactin. **C**, atrial pinular hexactin. **D**, atrial pinular pentactin. **E**, hypodermal or hypoatrial pentactin. **F**, hypodermal or hypoatrial hexactin. **G–L**, choanosomal diactins. **M**, oxyhexaster. **N**, oxyhexactin. **O**, strobiloplumicome.

Holotype BSO9, RRS *James Cook*, St. JCO37/067, 29 August 2009, 54°19.50'–54°06.55'N, 36°01.11'–36°07.14'W, depth 2620–2676 m.

Description

Body morphology. Body funnel-like with no prostalia, probably with short peduncle (the specimen was removed from the substratum); 100 mm high, 12 mm in diameter at the base, 60 × 70 mm across in the upper part around osculum, walls approximately 1 mm thick.

Spicules. Choanosomal spicules are diactins of two types, spicules of intermediate type relatively common. Thick diactins 1.2–10/0.04–0.32 mm, with widening in the middle or stout shaft and conically pointed rough or smooth outer ends. Other diactins 1.4–6.8/0.006–0.015 mm, with widening or four rudimental tubercles in the middle and rough conically pointed or rounded outer ends. Hypodermalia and hypoatria are similar, represented by pentactins and hexactins. Tangential rays of pentactins 0.5–0.7 mm long, rays directed inside body 1.3–1.4 mm long, conically pointed, smooth 0.02–0.03 mm in diameter. The hexactins with smooth rays 0.16–0.68/0.006–0.050 mm with conically pointed outer ends, some of rays directed outside body are rough and have rounded outer ends. Dermalia and

atria are pinular hexactins and rare pentactins with rudimentary ray directed inside body. They are of similar shape and size. The pinular ray is stout or lancelet in shape, other rays rough, conically pointed. Dermal hexactins with pinular rays 0.067–0.130 mm long (avg 0.103 mm, *n* 24, std 0.019 mm), tangential rays 0.063–0.089 mm long (avg 0.073 mm, *n* 23, std 0.006 mm), ray directed inside body 0.037–0.081 mm long (avg 0.066 mm, *n* 24, std 0.011 mm), diameter 0.005–0.007 mm. Atrial hexactins with pinular ray 0.078–0.141 mm long (avg 0.111 mm, *n* 28, std 0.017 mm), tangential rays 0.052–0.174 mm long (avg 0.078 mm, *n* 23, std 0.026 mm), ray directed inside body 0.052–0.174 mm long (avg 0.072 mm, *n* 21, std 0.030 mm), diameter the same as in dermal pinular hexactins.

Microscleres. Strobiloplumicomes and microscleres with rough or short-spiny oxyoid rays, oxyhemihexasters and oxyhexactins present. Strobiloplumicomes 0.025–0.047 mm in diameter (avg 0.037 mm, *n* 10, std 0.006 mm), primary rosette 0.011–0.014 mm in diameter (avg 0.012 mm, *n* 14, std 0.001 mm). Oxyhemihexasters and oxyhexasters with 1–2 (rarely 3) secondary rays, diameter 0.107–0.141 mm (avg 0.124 mm, *n* 25, std 0.009 mm), primary rosette 0.006–0.015 mm in diameter (avg 0.010 mm, *n* 25, std 0.003 mm). Oxyhexactins are

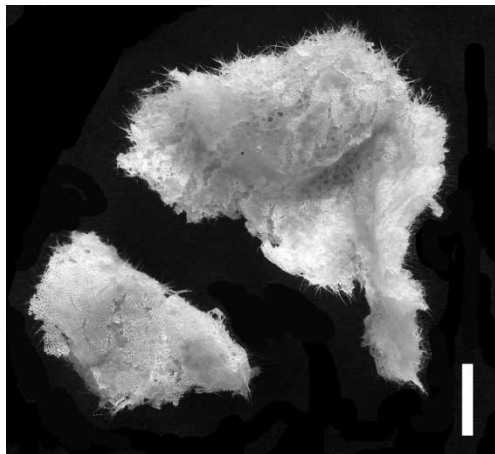


Figure 20. *Sympagella ecomari* sp. nov., holotype. Scale 10 mm.

0.104–0.148 mm in diameter (avg 0.127 mm, n 25, std 0.013 mm).

Etymology

The species is named after the RRS *James Cook*, in recognition that this species was discovered on an expedition aboard this research vessel.

Remarks

Before the present study, the genus *Sympagella* was represented in the northern Atlantic by a species known only from a single specimen, *S. nux* Schmidt (Tabachnick 2002b). A unique feature of the new species is the absence of discoidal and onychoidal

outer ends in microscleres typical of other species in the genus: *S. nux* Schmidt; *S. anomala* Ijima, 1903; *S. cantarellus* (Lendenfeld, 1915); *S. clavipinula* Tabachnick & Levi, 2004; *S. gracile* (Schulze, 1903); *S. johnsoni* (Schulze, 1887) and *S. multihexastera* Tabachnick & Levi, 2004. Dermal and atrial spicules of similar size and shape occur in the following four species: *S. cantarellus*, *S. gracile*, *S. johnsoni* and *S. multihexastera*.

Sympagella ecomari sp. nov.

(Figures 20, 21, Table IV)

Type material

Holotype: BSO608 (2 fragments), RRS *James Cook*, St. JCO48/006, 01 June 2010, 53°58.768'N, 36°11.501'W, depth 2500 m. Paratype: BSO607 (4 fragments), RRS *James Cook*, St. JCO48/40, ROV *Isis* dive 173, 21 June 2010, 48°44.118'N, 28°39.335'W, depth 2623–2428 m.

Description

Body morphology. All specimens are wall fragments: the holotype contains two fragments and the paratype four fragments. The wall is about 1 mm thick, with no prostalia.

Spicules. Choanosomal spicules are diactins 2.4–3.9/0.015 mm with widening in the middle and rounded, rough outer ends. Hypodermalia and hypotrialia are pentactins and rare hexactins. Rays in pentactins

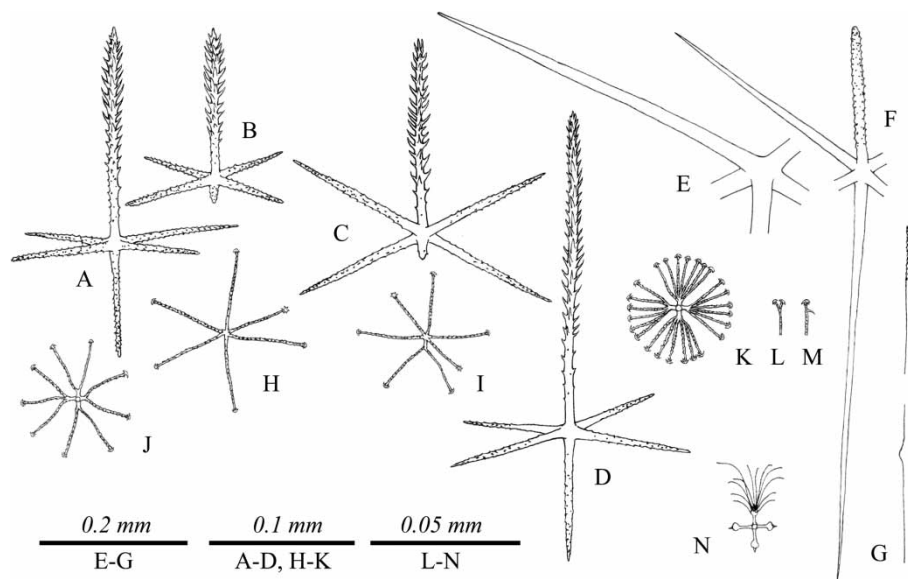


Figure 21. *Sympagella ecomari* sp. nov., holotype. **A**, dermal pinular hexactin. **B**, dermal pinular pentactin. **C**, atrial pinular pentactin. **D**, atrial pinular hexactin. **E**, hypodermal or hypotrial pentactin. **F**, hypodermal or hypotrial hexactin. **G**, choanosomal diactin. **H**, discohexactin. **I**, oxyhemidiscohexaster. **J**, **K**, discohexasters. **L**, **M**, abnormal discs of discohexasters. **N**, strobiloplumicome.

Table IV. Spicule dimensions (in mm) of *Sympagella ecomari* sp. nov.

	Holotype BSO608					Paratype BSO607				
	<i>n</i>	min	max	avg	std	<i>n</i>	min	max	avg	std
L dermal hexactin pinular ray	25	0.093	0.170	0.137	0.023	25	0.118	0.263	0.188	0.033
L dermal hexactin tangential ray	25	0.078	0.122	0.099	0.012	25	0.078	0.148	0.112	0.022
L dermal hexactin ray directed inside body	25	0.063	0.122	0.081	0.014	25	0.059	0.100	0.083	0.011
L atrial hexactin pinular ray	25	0.070	0.196	0.138	0.032	25	0.111	0.185	0.155	0.022
L atrial hexactin tangential ray	25	0.067	0.111	0.088	0.013	25	0.067	0.107	0.091	0.011
L atrial hexactin ray directed inside body	25	0.037	0.085	0.068	0.013	25	0.048	0.081	0.067	0.009
D discohexaster	25	0.058	0.090	0.076	0.008	25	0.054	0.086	0.071	0.009
d discohexaster	25	0.009	0.016	0.012	0.002	25	0.007	0.014	0.012	0.002
D strobiloplumicome	25	0.032	0.058	0.045	0.006	25	0.029	0.054	0.042	0.006
d strobiloplumicome	25	0.007	0.016	0.012	0.002	25	0.011	0.018	0.014	0.002

Notes: L, length; D, diameter; d, diameter of primary rosette.

with conically pointed, smooth outer ends. Tangential rays 0.28–0.50 mm long, rays directed inside body 0.61–1.14 mm, diameter 0.02 mm. Rare hexactins with rays as in pentactins, but rays directed outside body rough with rounded outer end. The ray directed outside body about 0.2 mm long, other rays 0.3–0.4 mm long, the ray directed inside the body 0.6–0.7 mm long, diameter 0.02 mm. Dermal and atrial spicules are pinular hexactins and rare pentactins, they are of similar size, but pinular rays in dermal spicules are more lancelet in shape and generally more spiny. Pinular rays in dermal hexactins 0.093–0.267/0.007 mm long, tangential rays 0.078–0.148 mm long, ray directed inside body 0.059–0.122 mm long, diameter of rays other than pinular 0.004–0.005 mm. Pinular rays of atrial hexactins 0.070–0.196/0.007 mm long, tangential rays 0.067–0.111 mm long, ray directed inside body 0.037–0.085 mm long, both latter rays 0.004–0.005 mm in diameter.

Microscleres. Strobiloplumicomes, discohexaster and rare discohexactins only. Strobiloplumicomes 0.029–0.058 mm in diameter; primary rosette 0.007–0.018 mm in diameter. Discohexasters with 2–3, rarely up to 8 secondary rays with rough or short-spiny surface, 0.054–0.080 mm in diameter, primary rosette 0.007–0.016 mm in diameter.

Etymology

The species is named after the ECOMAR project.

Remarks

The specimens are represented only by fragments of walls, therefore correct identification of dermal and atrial surfaces is difficult. Nevertheless it is suggested that hexactins with lancelet shape of tangential rays are dermal. This feature is unique to the genus,

including the species *Sympagella anomala* Ijima, 1903, *S. clavipinula* Tabachnick & Levi, 2004 and *S. multihexastera* Tabachnick & Levi, 2004. However, further examination of this character in the genus is required. A unique feature of the new species is that plumicomes and spicules with discoidal outer ends are the only types of microscleres.

Concluding remarks

This collection of glass sponges from the northern MAR shows how poorly known the hexactinellid fauna of this area remains. Based mainly on incomplete fragments collected by the MAR-ECO and ECOMAR projects, the list of Hexactinellida from northern MAR includes the following 24 species: *Amphidiscella atlantica* Tabachnick & Collins, 2008, *Aphrocallistes beatrix beatrix* Gray, 1858, *Asconema fristedti nordazoriensis* Tabachnick & Menshenina, 2007, *Caulophacus arcticus* (Hansen, 1885), *Chonelasma choanoides* Schulze & Kirkpatrick, 1910, *Crateromorpha (Neopsacas) variata* Tabachnick, 2002, *Dictyaulus marecoi* Tabachnick & Collins, 2008, *Doconesthes sessilis* Topsent, 1928, *Euplectella gibbsa* Tabachnick & Collins, 2008, *Euplectella suberea* Thomson, 1877, *Farrea* aff. *laminaris* Topsent, 1904, *Farrea herdendorfi* Duplessis & Reisswig, 2004, *Hertwigia falcifera* Schmidt, 1880, *Heterotella midatlantica* Tabachnick & Collins, 2008, *Lophocalyx atlantiensis* Menshenina, Tabachnick, Lopes & Hajdu, 2007, *Lophocalyx reisswigi* Menshenina, Tabachnick, Lopes & Hajdu, 2007, *Malacosaccus* aff. *floricomatus* Topsent, 1901, *Malacosaccus* aff. *heteropinularia* Tabachnick, 1990, *Malacosaccus* aff. *unguiculatus* Schulze, 1886, *Rossella nodastrella* Topsent, 1915, *Rhabdopectella tintinnus* Schmidt, 1880, *Saccocalyx pedunculatus* Schulze, 1895, *Sympagella cooki* sp. nov. and *Sympagella ecomari* sp. nov. Many species in this list were recently described from the MAR area.

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