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Family Euplectellidae Gray, 1867

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Euplectellidae Gray (Hexactinellida, Lyssacinosida) is revised to contain 27 genera in three subfamilies: Euplectellinae (with seven genera: *Euplectella, Acoelocalyx, Chaunangium, Docosaccus, Holascus, Malacosaccus* and *Placopegma*), Corbitellinae (12 genera: *Corbitella, Atlantisella* gen. nov., *Dictyaulus, Dictyocalyx, Hertwigia, Heterotella, Ijimaiella* gen. nov., *Pseudoplectella, Regadrella, Rhabdopectella, Symplectella* and *Walteria*) and Bolosominae subf. nov. (eight genera: *Bolosoma, Amphidiscella, Caledoniella, Caulocalyx, Hyalostylus, Saccocalyx, Trachycaulus* and *Vityaziella*). Several of these genera were transferred from other hexactinellid lyssacinosan families: *Symplectella* (previously in Rossellidae), *Placopegma, Chaunangium* and *Caulocalyx* (all previously in Leucopsacidae).
Keywords: Porifera; Hexactinellida; Euplectellidae; Euplectellinae; Corbitellinae; Bolosominae subf. nov.; *Acoelocalyx*; *Amphidiscella*; *Atlantisella* gen. nov.; *Bolosoma*; *Caledoniella* gen. nov.; *Caulocalyx*; *Chaunangium*; *Corbitella*; *Dictyaulus*; *Dictyocalyx*; *Docosaccus*; *Euplectella*; *Hertwigia*; *Heterotella*; *Holascus*; *Hyalostylus*; *Ijimaiella* gen. nov.; *Malacosaccus*; *Placopegma*; *Pseudoplectella*; *Regadrella*; *Rhabdopectella*; *Saccocalyx*; *Symplectella*; *Trachycaulus*; *Vityaziella*; *Walteria*.

DEFINITION, DIAGNOSIS & SCOPE

Synonymy

Euplectelladae Gray, 1867a: 527. Hertwigiidae Topsent, 1892a: 25. Alcyoncellidae de Laubenfels, 1936a: 188. Placoplegmatidae de Laubenfels, 1936a: 187 (part).

Definition

Lyssacinosida with choanosomal spicules of stauractines, tauactines and diactines; hexactines and pentactines, when present among the choanosomal spicules, are not numerous but are often the largest spicules constructing the base for the skeleton wall, their distal rays serve as prostalia lateralia (hypodermal pentactines are absent). Microscleres are various (graphiocomes, floricomes, drepanocomes characterize this family, but they are absent in some taxa).

Diagnosis

Tubular, cup-like, fungus-like growth forms; lophophytose or basiphytose, sometimes pedunculate. Prostalia basalia when present are anchorate spicules, rarely diactines. The main osculum may be covered by a sieve-plate. Choanosomal spicules of stauractines, tauactines and diactines; hexactines and pentactines, when present among choanosomal spicules, are not numerous but they are often the largest spicules constructing the base for the skeleton wall, their distal rays serve as prostalia lateralia. Dermalia are usually hexactines, in some genera pentactines or both. Atrialia are pentactines or hexactines or both. Microscleres are various with amazing variability of the outer ends.

Scope

27 genera, cosmopolitan in distribution, found at depths from 30–6328 m.

History and biology

The family was initially created by Gray (1867a) as Euplectelladae for three genera: *Euplectella, Corbitella* and *Heterotella*. It was characterized by a tubular body with oscula, sieve-plate and skeleton beams forming the regular skeleton network distributed in longitudinal, transverse and oblique directions. Schulze (1886; 1887a) corrected the family name to Euplectellidae and defined it by the dermal skeleton content only: "The dermal skeleton contains sword-shaped oxyhexacts with long proximal ray". He subdivided the family into three subfamilies: Euplectellinae (*Euplectella* and *Regadrella*); Holascinae (*Holascus* and *Malacosaccus*) and Taegerinae (*Taegeria* [later synonymized with *Corbitella*] and *Walteria*). Seven other genera were missing in the suggested subfamilies: *Habrodictyum* and *Eudictium* (synonymized with *Corbitella* and *Heterotella*); *Dictyocalyx; Rhabdodictyum* (later placed into Aulocalycidae (Ijima, 1927)); *Rhabdopectella; Hertwigia* and *Hyalostylus*. The subfamily Euplectellinae was defined as tubular sponges with sieve-plates having numerous lateral oscula and with hypodermal hexactines bearing floricomes (microscleres) at their distal rays. The Holascinae were characterized mainly by negative features: without the sieve-plate, without lateral oscula, without superficially situated floricomes. The positive features of Holascinae were quite vague: tubular sponges with 'parenchymal oxyhexasters'. The subfamily Taegerinae was defined by a mixture of features of Euplectellinae and Holascinae: tubular or sack-like body with lateral oscula of irregular shape and distribution; the skeleton forms an irregular meshwork; 'hypodermal' hexactines are sword-shaped each bearing a floricome.

The family Hertwigiidae was created by Topsent (1892a) for two genera *Hertwigia* and *Trachycaulus*. The genus *Rhabdodictyum* was considered as a potential representative of this family. Two the former genera are doubtless representatives of Euplectellidae, the latter one was placed into Aulocalycidae by Ijima (1927). Hertwigiidae were characterized by choanosomal diactines fused to each other by numerous synapticulars, loose hexactines represented by two types and microscleres consisting

mainly of hexasters. Herwigiidae has no reasonable valid basis since its diagnosis is indistinguishable from that of Euplectellidae.

The definition of this family to subfamilies followed in this paper is based on publications of Ijima (1901, 1902a, 1903, 1927) with division of Corbitellinae = Taegerinae to two subfamilies (a new subfamily is suggested). Description of new taxa of Euplectellidae in this paper led to revision of its diagnosis and tentative inclusion of some problematic genera of other lyssacinosan families (Rossellidae and Leucopsacidae) to Euplectellidae. This action resulted positively in Rossellidae and Leucopsacidae and somewhat disturbed Euplectellidae. The latter family requires further specifications.

Imperfection of the Schulze's system led to Ijima's revisions (1903, 1927), providing a new diagnosis for Euplectellidae: "Lyssacinosa of tubular, cup-like or massive body, sometimes stalked; either rooted by a tuft of monactine or anysodiactine anchorate basalia or firmly attached by compact base; commonly with numerous open oscula. Ectosomal skeleton of relatively large hexactine dermalia, the proximal ray of which is as a rule much longer then any other in the same spicule; without hypodermalia. Choanosomal megascleres of hexactines with rays varying in number from six to two. Hexasters various." Ijima divided Euplectellidae into two subfamilies: Euplectellinae (simply defined as lophophytose Euplectellidae) and Corbitellinae (basiphytose Euplectellidae). However, this system is here partly rejected for the following reasons: (1) Postulated presence of dermal hexactines, because, as it was already known (Ijima, 1901), small (juvenile) specimens of some *Euplectella* and *Regadrella* species have dermal pentactines instead of hexactines characteristic for the family; and (2) the theoretical impossibility to further subdivide the family given that all known euplectellids are principally lophophytose or basiphytose.

These contradictions are avoided in this present revision given the following assumptions: some Euplectellidae principally have dermal pentactines instead of hexactines; reorganization of sister family Leucopsacidae and reallocation of some of its genera to Euplectellidae; division of Euplectellidae into tree subfamilies: Euplectellinae, Corbitellinae (*sensu stricto*) and Bolosominae subf. nov. In Euplectellidae the lateral oscula are common for most representatives, although these seem to have a different origin and develop in different ways in Euplectellinae and Corbitellinae on the one hand and Bolosominae subf. nov. on the other hand. This new definition is based on three criteria: the mode of attachment to the substratum, differentiation of the choanosomal skeleton, and the corresponding skeletal organization.

Finks (1960) proposed two superfamilies, Euplectelloidea and Brachiospongioidea, primarily to assign fossil material. However, these groups are unsuitable for Recent taxa given that Euplectellidae contain many genera that overlap with the characteristics of both superfamilies. Finks (1960) defined Euplectelloidea as "Hexasterophora with main skeleton a continuous, non-cubic mesh of hexacts, joined by fusion at points of mutual contact and by synapticulae." On the basis of this diagnosis a large part of Euplectellidae would need to be removed, including all Bolosominae and some species of other subfamilies (i.e., *Euplectella jovis*), which consist of mostly unfused spicules. Finks (1960) defines Brachiospongioidea as: "Vasiform sponges with large circular oscula, parietal gaps; specialized dermal layer of large spicules, usually pentacts, with characteristic processes on distal surface and in some species with extra tangential rays; a supradermal quadrate mesh of small pentacts or stauracts often present; interior spicules without uniform orientation." Some Recent representatives of Euplectellidae correspond to this diagnosis, especially the newly described *Atlantisella incognita*. Consequently, these superfamilies are rejected here for Recent Lyssacinosida.

The only practical significance of hexactinellids is known for *Euplectella aspergillum* and probably other related species, known for their close symbiosis with a pair of shrimps (family Stenopodidae) in Japan where it has been used traditionally in the marriage ceremony (Y. Masuda, personal communication).

Differences between similar families

The enlarged diagnosis of Euplectellidae is created due to the facts observed in genera and species of both its former representatives, newly described and genera transferred from other lyssacinosan families. This action shows the problem that differences between the three allied families of Lyssacinosida sometimes are hardly visible. Nevertheless they differ by complexes of features (mentioned in their definitions). The rows of transitional allied forms provide the possibilities to refer a 'difficult' taxon to the corresponding family in many cases.

Previous reviews

The previous reviews of this family were connected with the descriptions of hexactinellid sponges collected by several expeditions: 'Challenger' (Schulze, 1886; 1887a), 'Valdivia' (Schulze, 1904), 'Siboga' (Ijima, 1927) or accomplished during the investigation of regional hexactinellid fauna off Japan (Ijima, 1901).

KEY TO SUBFAMILIES

(1) Lophophytose method of fixation ..... **Euplectellinae**
Basiphytose method of fixation 2
(2) Pedunculate; atrialia are usually hexactines ..... **Bolosominae subf. nov.**
Tubular, attached directly by its basal part; atrialia when present are usually pentactines ..... **Corbitellinae**

SUBFAMILY EUPLECTELLINAE SCHULZE, 1886

Synonymy

Euplectellinae Schulze, 1886: 37; Ijima, 1903. Holascinae Schulze, 1886: 39; 1887a: 85; 1895: 44.

Definition

Lophophytose Euplectellidae.

Diagnosis

Coexists with family diagnosis together with corresponding subfamily definition.

Scope

Seven genera, with cosmopolitan distribution excluding the Arctic ocean, with recorded depths of 36–6328 m.

Remarks

I have not provided an expanded diagnosis of the subfamily, nor has one been offered earlier (Ijima, 1903; 1927; Schulze, 1904), whereas it is more worthwhile to summarize here some of the features which can be used to differentiate all three subfamilies of Euplectellidae. In Euplectellinae the body is usually tubular. Lateral oscula are known in *Euplectella* and are likely developed through the mechanism of compensation of marginal growth which involves a fusion of small portions of oscula margins ("emission of tubular branches from the sides of axial funnels"; Reid, 1964). Hence, the difference between main osculum and lateral ones is significant. Basalia are always present and are usually anchorate monactines. As it was supposed by Ijima (1901) these spicules originated from diactines in which the spicule center (axial cross) is transferred to the distal part where a row of anchorate teeth are situated. The spicules with central cross in which all rays except two opposite ones are reduced were described for *Euplectella symplex* and in some representatives of *Holascus*. The anchorate spicules usually have numerous teeth (more than four in number) hence the speculations on their 'discoidal nature' (Ijima, 1901) but "pentactinic" forms are also known among the 'normal' basalia, i.e., in *Euplectella simplex* (Schulze, 1895) and *E. aspergillum* (Schulze, 1887a). Thus, the origination of basalia in Euplectellinae is very questionable and unclear. In *Acoelocalyx* basalia are organized in a peduncle in their upper part while in pedunculate *Malacosaccus* they are supplemented with tauactines in the peduncle. A sieve-plate is known in *Euplectella*, some species of *Hyalascus* and in *Placopegma*. This structure is organized from the spicules of the lateral wall which sometimes can be modified, whereas in some species the sieve-plate is formed by proximal rays of principal choanosomal spicules only.

Representatives of Euplectellinae are usually thin-walled sponges but often the walls are supported by large and thick choanosomal stauractines, pentactines or hexactines with short proximal ray. The distal ray of these pentactines and hexactines serves as prostalia lateralia. The common choanosomal spicules are thin stauractines, tauactines, diactines, sometimes hexactines and pentactines. The choanosomal skeleton is known to become rigid by means of synapticular junctions and at points of mutual contacts between choanosomal spicules in large specimens of some *Euplectella* species, including the well-known *Euplectella aspergillum* but this feature is uncommon for most other representatives of this subfamily. Dermalia are hexactines. Atrialia are sparse pentactines or rarely hexactines. Microscleres are variable and make combinations specific for genera and species.

Following a simultaneous revision of the family Leucopsacidae in conjunction with this one I transfer here two former leucopsacid genera to Euplectellinae: *Chaunangium* and *Placopegma*. Both these genera have predominately pentactines among dermal spicules, which was probably the reason why Ijima (1903) and Schulze (1904) initially included them in Leucopsacidae given that the diagnosis of Euplectellidae at that time contained species with dermal hexactines only, whereas all "strange" sponges with pentactines were placed in Leucopsacidae. This is surprising, however, because at that time it was known that dermal pentactines could be found in small (young) specimens of *Regadrella* and *Euplectella*. Moreover, they are the most abundant spicules in a true representative of Euplectellidae – *Atlantisella incognita* (gen.n., sp.n.). In any case the transfer of these genera, *Chaunangium* and *Placopegma*, to Euplectellinae is supported by their lophophytose method of fixation, and their other features do not contradict those of other representatives of Euplectellidae and Euplectellinae.

Placopegma has basalia of four-toothed anchors and monaxone spicules with rounded outer ends. Four-toothed anchors are found among other "multi-toothed" anchors in the former Euplectellinae (see above). Monaxones with rounded outer ends of *Placopegma* are quite peculiar. But peculiarity in basal spicules is known for evident Euplectellinae: *Malacosaccus* and *Acoelocalyx*. Their peduncle is supplemented by tauactines which notably differ from all the choanosomal spicules of the body. The other specific feature of *Placopegma* is that choanosomal and sieve-plate spicules are presented by diactines and some hexactines. However among former Euplectellinae, *Docosaccus* has the same choanosomal skeleton, and almost all representatives of subfamily Bolosominae have the same type of choanosomal skeleton. The problem of the dermalia of *Placopegma* has already been discussed above. The last distinguishing feature of *Placopegma* is the presence of a single type of microscleres – discohexasters. This feature is really more characteristic of Leucopsacidae but among former Euplectellinae *Acoelocalyx* has the same single type of microscleres. Two other species of *Placopegma* which are known to me (but not yet described) have other types of microscleres, including floricomes, plumicomes and hexasters, which are characteristic of Euplectellidae. Nevertheless, even the possession of a single type of microsclere does not contradict the placement of *Placopegma* into Euplectellidae.

Conversely, placement of *Chaunangium* in the euplectellid Euplectellinae is more tenuous. The body of *Chaunangium* has an everted low atrial cavity (unlike the other three genera of Leucopsacidae which all are saccular). The sponge is lophophytose but all the basalia are monaxones (probably diactines) gathered in several tufts. Among Euplectellinae several tufts of basalia are known for the genus *Docosaccus* as well as in *Euplectella* (its basalia begins as separate tufts which are distally gathered into a common one). As for the entire absence of teeth on the basalia it is worth noting that *Placopegma* represents an intermediate variant – it has both types, toothed and untoothed basalia. Choanosomal spicules and dermalia of *Chaunangium* are similar to that of *Placopegma*. Atrialia are represented only by hexactines, these spicules are usual among atrial pentactines in some Euplectellinae (whereas atrialia of the sister subfamily Bolosominae consists chiefly of hexactines). The microscleres of *Chaunangium* are discohexasters and plumicomes. Discohexasters are usual for Euplectellinae (*Placopegma, Acoelocalyx*). Plumicomes were previously absent among Euplectellinae but they occur in two other genera (*Hertwigia* and *Saccocalyx*) representatives of the other two subfamilies. Thus this action makes the plumicomes to be specific microscleres of Euplectellidae. Consequently, there are reasonable and justified grounds for transferring these two genera from Leucopsacidae to the euplectellid Euplectellinae.

KEY TO GENERA OF EUPLECTELLINAE

(1) Dermalia are mainly pentactines (in relatively large specimens) 2
Dermalia are hexactines 3
(2) Atrialia are mainly hexactines; basalia are represented by several tufts situated on the lower edge of the body; spicules of basalia have no teeth; atrial cavity is low; the body is flattened ..... ***Chaunangium***
Atrialia are mainly pentactines; anchors have four teeth; atrial cavity present; the body is oval ..... ***Placopegma***
(3) Anchorate basalia together with tauactines protrude from the peduncle formed in the lower part of the body 4
Basalia protrude directly from the lower part of the body 5
Basalia form a single tuft 6
(4) Only discohexasters present among microscleres ..... ***Acoelocalyx***
Microscleres various: hexasters, sometimes hemihexasters and hexactines; discohexasters, floricomes and sometimes onychasters ..... ***Malacosaccus***
(5) Basalia form several tufts; microscleres are hexactines, hemihexasters, hexasters, floricomes and, probably, discohexasters ..... ***Docosaccus***
Floricomes present among microscleres; atrialia are pentactines; lateral oscula numerous ..... ***Euplectella***
Floricomes absent; dermal spicules have pinular rays; atrialia are usually hexactines ..... ***Holascus***

EUPLECTELLA OWEN, 1841

Synonymy

Euplectella Owen, 1841: 3. *Conasterium* Ehrenberg, 1861: 452.

Type species

Euplectella aspergillum Owen, 1841 (by monotypy).

Definition

Euplectellinae deprived of peduncle, with a single tuft of basalia, numerous lateral oscula, dermalia of hexactines and obligate floricomes among other microscleres.

Diagnosis

The body is tubular with numerous lateral oscula and with colander-like sieve-plate. The sponge lophophythose attached to the substratum with anchor-like basalia. The principal choanosomal spicules (large) are chiefly stauractines usually together with hexactines or pentactines. The distal rays of such hexactines and pentactines are rough, the proximal ones in hexactines are always rudimentary. Additional choanosomal spicules are diactines, tauactines and rarely stauractines together with more rarely found other derivatives. The choanosomal spicules form longitudinal and circular skeleton beams. The sieve-plate contains hexactine derivatives various in different species. Basalia are anchor-like spicules with 4 and more teeth. Dermalia are hexactines. Atrialia are pentactines. Microscleres are floricomes and graphiocomes, sometimes hexasters and small sigmatocomes, rarely discohexasters, hemihexasters, hexactines and onychasters.

Description of type species

Euplectella aspergillum Owen, 1841 (Figs 1–2).

Synonymy. *Euplectella aspergillum* Owen, 1841: 3.

Material examined. Holotype: BMNH 1988.06.29.002 – off the Philippines. Other material. BMNH 1887.10.20.007–9, 12 – 'Challenger', off Cebu (Philippines), depth 95–100 m. BMNH 1902.07.28.001 – probably, off the Philippines. BMNH 1921.11.30.004 – John Murray collection, probably off the Philippines. MNHN (p4275) – 'Musorstom I', 14°1.80′–1.20′N 120°17.20′–17.19′E, depth 182–194 m. MNHN (p1108, p1109, p1110, p1111, p1112) – 'Musorstom II', 13°15.30′–16.90′N 122°45.90′–46.60′E, depth 166–172 m. MNHN (p4274, p4278) – Musorstom II, 14°1.50′–0.10′N 120°18.90′–18.20′, depth 195–191 m. IORAS 5/2/1324 – 'Vitiaz', 50, 4°31.2′–30.8′N 112°55.7′–56.3′E, depth 88–85 m.

Description. The sponge is represented by thin-walled tube, covered with colander-like sieve-plate. In the lower part the body is narrowed with numerous prostalia basalia. The lateral wall is covered with numerous lateral oscula 1–2 mm in diameter. The oscula are organized into two intersecting systems of parallel right and left-handed spirals, ascending at angle of 45 degrees. In old specimens some of these spirals are marked with ridges 2–10 mm high, however these ridges may be irregularly situated. The sieve-plate may be absent in small specimens (Schulze, 1904). The body of *E. aspergillum* is 40–240 mm long, 14–50 mm in diameter, basalia protrude at 20–80 mm. The sponge which must be the holotype is 200 mm in length, 40 mm in diameter, with basalia about 20 mm long. Some specimens of *Euplectella aspergillum* (i.e., BMNH 1902.07.28.1) have abnormal, dichotomously branching body and each branched part has its separate sieve-plate. Spicules. This species is found in many museums but most of the specimens including the holotype are represented by fused choanosomal spicules only while the loose ones are macerated. The choanosomal spicules (together with basalia) form circular and longitudinal skeletal beams which are strongly fused by synapticulae in large specimens. The principal skeleton architecture is constructed by large stauractines which give the principal net with square meshes. They are surrounded by other choanosomal spicules and lateral oscula are situated among them. Two rays of these stauractines are directed longitudinally and two other rays horizontally. The latter rays are slightly bent forming the circular shape of walls in the horizontal plane, hence these spicules are slightly similar to paratetractines. The large choanosomal spicules have smooth rays 8–19/0.046–0.152 mm with conically pointed outer ends. These spicules are absent in the sieve-plate, where large diactines (rarely triactines) are observed. Their rays are 3–6/0.061–0.076 mm. These diactines often have a widening in the middle and they are

usually curved. Unlike the large choanosomal stauractines their outer ends sometimes can be rough. Tauactines prevail among the choanosomal spicules, they have smooth rays 0.5–4.4 mm long (two opposite rays are usually longer than the "unpaired" one), they are 0.011–0.015 mm in diameter at base and about 0.033 mm in diameter in most parts of the shaft. The outer ends of choanosomal tauactines are needle-like, conical, rounded or clavate; smooth or rough. The other kind of choanosomal spicules is small and usually thick-rayed spicules, with 2–6 rays 0.061–0.578/0.004–0.049 mm, smooth conically pointed. These spicules are often similar and are hardly distinguished from choanosomal tauactines, dermal hexactines and atrial pentactines. Basalia are anchorate spicules: multi-teethed (about 6 teeth) anchors with partly spined shafts as in most Euplectellinae and four-toothed spicules with smooth shafts which are considered to be pentactines. The shafts of anchorate basalia are 0.015–0.061 mm in diameter, they penetrate deep into the upper parts of the sponge forming the longitudinal skeleton beams together with large stauractines. Dermalia are hexactines with smooth rays and rounded or conically pointed outer ends. The distal ray of dermal hexactine is 0.068–0.274 mm long, the tangential rays are 0.076–0.532 mm long, the proximal ray is 0.160–1.178 mm long, their diameter is 0.005–0.034 mm. Atrialia are pentactines with rays similar to dermal spicules. Tangential rays of atrial pentactines are 0.068–0.342 mm long, distal one is 0.114–0.988 mm long, their diameter is 0.007–0.009 mm. Microscleres. Microscleres are floricomes, hexasters and graphiocomes. The floricomes are 0.054–0.090 mm in diameter, with primary rosette 0.007–0.016 mm in diameter. The hexasters have smooth rays. They are 0.043–0.079 mm in diameter, with primary rosette 0.005–0.014 mm in diameter. The graphiocomes were found only in some investigated specimens in relatively small amounts, their secondary rays were always broken, so the complete measures of these spicules were reconstructed. The graphiocomes are 0.173–0.191 mm in diameter with primary rays 0.010–0.014 mm in diameter.

Remarks. The genus currently contains 16 species (including one in press). Some deformed specimens (e.g., of *E. aspergillum*) have two sieve-plates and dichotomously branching tubular body.

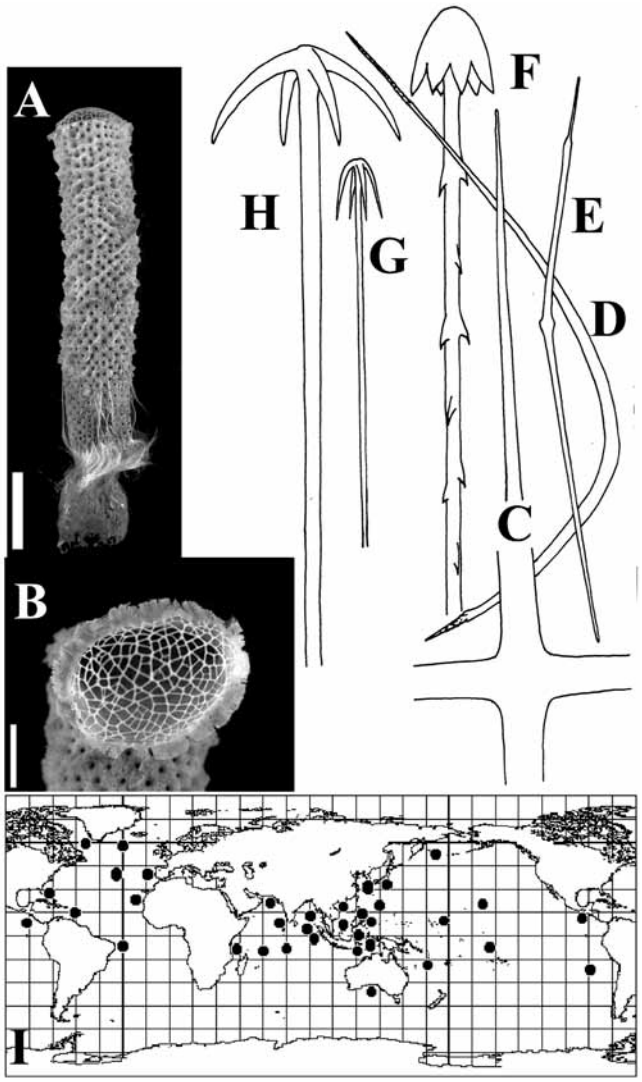

Fig. 1. *Euplectella aspergillum*. A, lateral view IORAS 5/2/1324 (scale 40 mm). B, upper view (scale 30 mm). C, large choanosomal stauractine 80×. D–E, large choanosomal diactines of the sieve-plate 80×. F–H, anchorate basalia. F, 160×. G–H, 40×. C–E, IORAS 5/2/1324. F–H, from Schulze (1886). I, distribution of *Euplectella*.

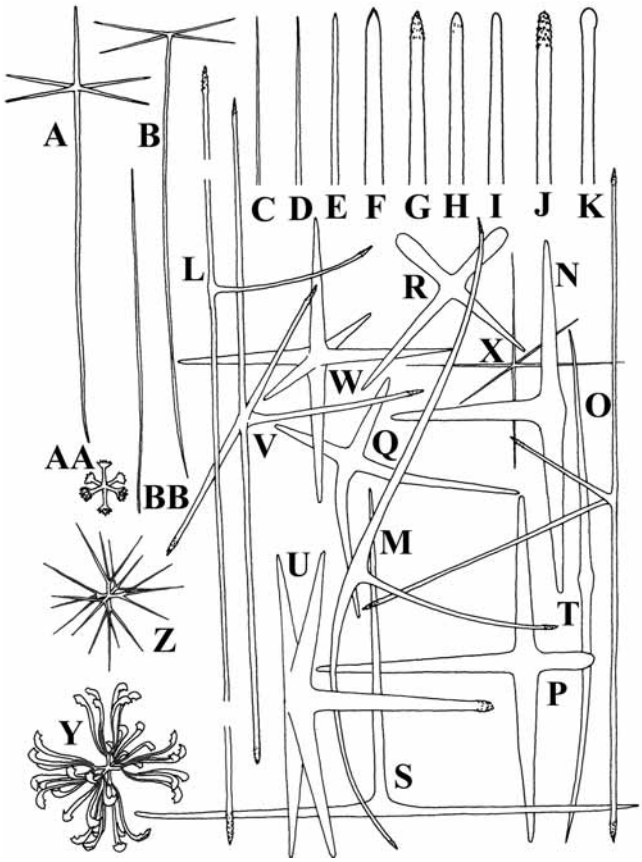

Fig. 2. *Euplectella aspergillum*. A, dermal hexactine 80×. B, atrial pentactine 80×. C–K, outer ends of choanosomal spicules 80×. L, common choanosomal tauractine with long rays 80×. M–N, S, choanosomal tauactines 80×. O, choanosomal paratetractine 80×. P–R, choanosomal stauractines 80×. T, choanosomal diactine 80×. U–V, choanosomal pentactines 80×. W–X, choanosomal hexactines 80×. Y, floricome 300×. Z, hexaster 300×. AA, primary rosette of graphiocome 300×. BB, its secondary ray 300×. A–BB, from Schulze (1886).

The small specimens have no sieve-plate and lateral oscula *(E. aspergillum* without the sieve-plate (Schulze, 1904); *E. marshalli* without the sieve-plate and lateral oscula (Ijima, 1901)). The sieve-plate is considered to have originated within the lateral walls (Ijima, 1901).

The synapticular fusion of the choanosomal skeleton takes place in different species with differently expressed grade. An entirely rigid choanosomal skeleton is known in some *E. aspergillum* while no fusion was reported in *E. jovis* (Schulze, 1886), *E. marshalli* (Ijima, 1895; 1901), *E. oweni* (Herklots, Marshall, 1868; Ijima, 1901) or *E. curvistellata* (Ijima, 1901). The number of longitudinal beams increases toward the osculum. In the lower part of a sponge basalia are always gathered in a single tuft but in the upper parts they follow to all longitudinal beams by numerous tufts. The new basalia arise and project throughout growth such that the anchorate outer ends can be located among the spicules which construct the longitudinal beam of the lateral wall in small specimens. Later this part of the sponge becomes basal and most of the anchorate spicules are macerated. In *E. crassistellata* (Schulze, 1987) monaxon spicules with rounded outer ends are found together with anchors. In some species (*E. aspergillum, E. simplex* (Schulze, 1895), *E. aspera* (Schulze, 1895)) four-toothed anchors, which are considered to be genuine pentactines (Ijima, 1901), are found together with common multi-toothed anchors.

The most numerous additional choanosomal spicules are mostly stauractines seen in a still-undescribed species off New Caledonia, whereas in all other species of *Euplectella* these spicules are rare.

Some pentactines in addition to hexactines in dermalia were reported in *E. timorensis* (Ijima, 1927) but they seem to have choanosomal origin. The atrial pentactines of *E. oweni* (Ijima, 1901) have a rudiment of the sixth ray.

Hexasters are unknown in *E. simplex* and *E. jovis*. *Euplectella jovis* also has curved diactines which could probably have originated from hexasters through microhexactines (Ijima, 1901). Hemihexasters and hexactines are numerous in the *Euplectella* off New Caledonia. Sigmatocomes are reported in *E. regalis, E. imperialis* and *E. marshalli*, a spicule derived from sigmatocome is described in *E. aspera* under the name "young not fully developed floricome". Some specimens of *E. suberea* have discohexasters and onychasters (Schulze, 1886; Topsent, 1892a). One new (still-undescribed) species from the N Pacific, which seems to be close to *Euplectella*, has sigmatocomes and spicules with onychoidal outer ends, its choanosomal skeleton contains chiefly diactines. The floricomes in *Euplectella* are usually located on the top of the distal ray of dermal hexactines.

In spite of the fact that *E. aspergillum* is one of the most famous Hexactinellid sponges (known under the name 'venus flower basket') its complete description exists only in Schulze's paper (1887a) while the accurate spicules measurements are not given in the descriptions. Unfortunately I have investigated and measured only the specimens of *E. aspergillum* off the Philippines Since I have no specimens collected by 'Valdivia' in the W Indian Ocean and described by Schulze (1904). The contribution of Lendenfeld (1888) about the finding of *E. aspergillum* off Portugal and the same of Arndt (1941) off Cape St. Vincent are likely to be erroneous and these sponges are, probably, the common Atlantic *E. suberea*.

Distribution

Low and temperate latitudes (Fig. 1), depth 36–5050 m.

ACOELOCALYX TOPSENT, 1910

Synonymy

Acoelocalyx Topsent, 1910: 520.

Type species

Acoelocalyx brucei Topsent, 1910 (by monotypy).

Definition

Euplectellinae with a peduncle and single tuft of basalia, dermalia of hexactines, microscleres are represented by discohexasters only.

Diagnosis

Body is cylindrical, lophophytose with shallow atrial cavity, fixed with anchorate basalia organized in a peduncle-like tuft. Choanosomal spicules are chiefly hexactines, sometimes pentactines, rarely stauractines. The spicules of the peduncle are tauactines and anchor-like basalia. Dermalia and atrialia are hexactines, some pentactines were found in atrialia. Microscleres are discohexasters.

Description of type species

Acoelocalyx brucei Topsent, 1910 (Fig. 3).

Synonymy. *Acoelocalyx brucei* Topsent, 1910: 520.

Material examined. Holotype: NMS 1921.143.1384 – 'Scotia', 64°48′S 44°26′W, depth 4547 m.

Description. A single specimen has the body length about 150 mm, it is transversally flattened being: about 23–44 × 8–10 mm in diameter. The atrial cavity is shallow. The peduncle is thick about 6 mm in diameter and 220 mm in length. Spicules. The choanosomal spicules of the body contains chiefly hexactines, sometimes pentactines, rarely stauractines and never diactines. All these spicules are smooth with smooth conical or rounded outer ends. Their rays are 0.9–2.1/0.007–0.010 mm. The choanosomal spicules of the peduncle are tauactines and anchor-like basalia with shafts about 0.12 mm in diameter, covered by spines and carrying more then 4 teeth at the outer end. Dermalia and atrialia are hexactines with rays directed outside the wall, slightly widened toward the outer end. All the rays are covered with short spines in the distal half and the rays directed outside the walls are nearly entirely covered with short spines. Pentactines which have the proximal ray reduced to a small tubercle were found rarely among numerous atrial hexactines. The ray of dermal and atrial hexactines directed outside the wall is 0.167–0.350 mm long, tangential rays are 0.266–0.388 mm long, the ray directed inside the wall is 0.334–0.798 mm long, their diameter is 0.022–0.025 mm. Microscleres. Microscleres are discohexasters and possibly hexasters. Discohexasters have toothed discs with straight or sometimes curved secondary rays. Some rarely found discs of these discohexasters are deformed being rather floricoidal then discoidal. The discohexasters are about 0.133–0.148 mm in diameter with the primary rosette 0.016–0.022 mm in diameter. The hexasters which were rarely found among discohexasters are rather discohexasters with deprived discs then true oxyoidal spicules.

Remarks. The genus is monotypic and known so far only from the holotype. The presence of hexasters in *Acoelocalyx* is

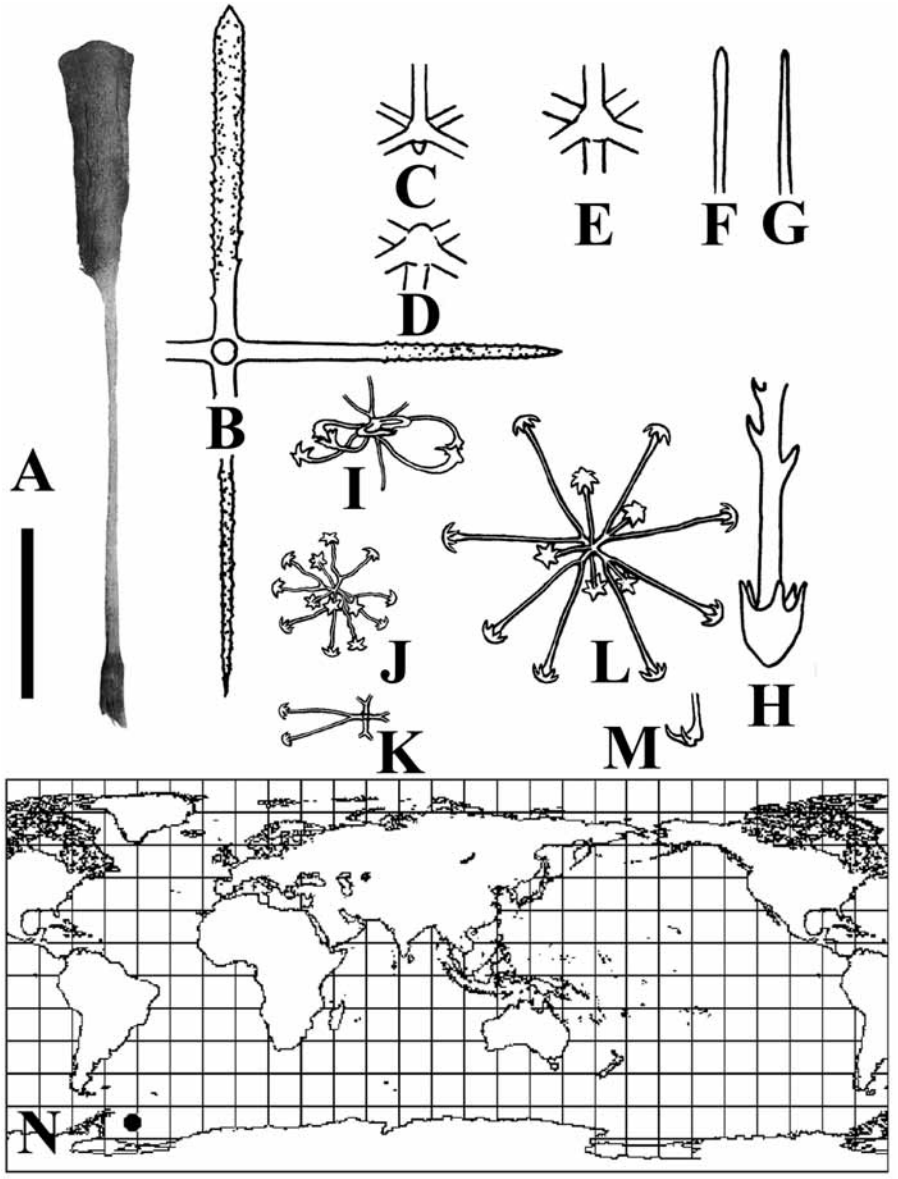

Fig. 3. *Acoelocalyx brucei*. A, external shape from Topsent (1913b) (scale 100 mm). B, dermal or atrial hexactine 120×. C–D, choanosomal pentactines 230×. E, choanosomal hexactine 230×. F–G, outer ends of the choanosomal spicules 230×. H, basal anchorate spicule 230×. I, deformed discohexaster with floricoidal outer ends 230×. J–L, discohexasters 230×. M, deformed onychoidal outer ends of the discohexaster 230×. B–M, from Topsent (1913b). N, distribution of *Acoelocalyx*.

questionable. These were reported by Topsent but I have not found undoubted hexasters in this same material. It is possible that his observations were made on irregular discohexasters, which sometimes have abnormal secondary rays, usually curved and irregular in shape, with their secondary rays more floricoidal than discoidal.

Distribution

Weddell Sea, Antarctic, depth 4547 m.

CHAUNANGIUM SCHULZE, 1904

Synonymy

Chaunangium Schulze, 1904: 31.

Type species

Chaunangium crater Schulze, 1904 (by monotypy).

Definition

Euplectellinae with flattened body with several tufts of basalia, dermalia of pentactines and plumicomes among microscleres.

Diagnosis

Body is flattened, lophophytose with low atrial cavity and several distinctly separated tufts of basalia (probably diactines) on the basal edge. Choanosomal spicules are diactines. Dermalia are pentactines, sometimes hexactines and stauractines. Atrialia are hexactines. Microscleres are discohexasters and plumicomes.

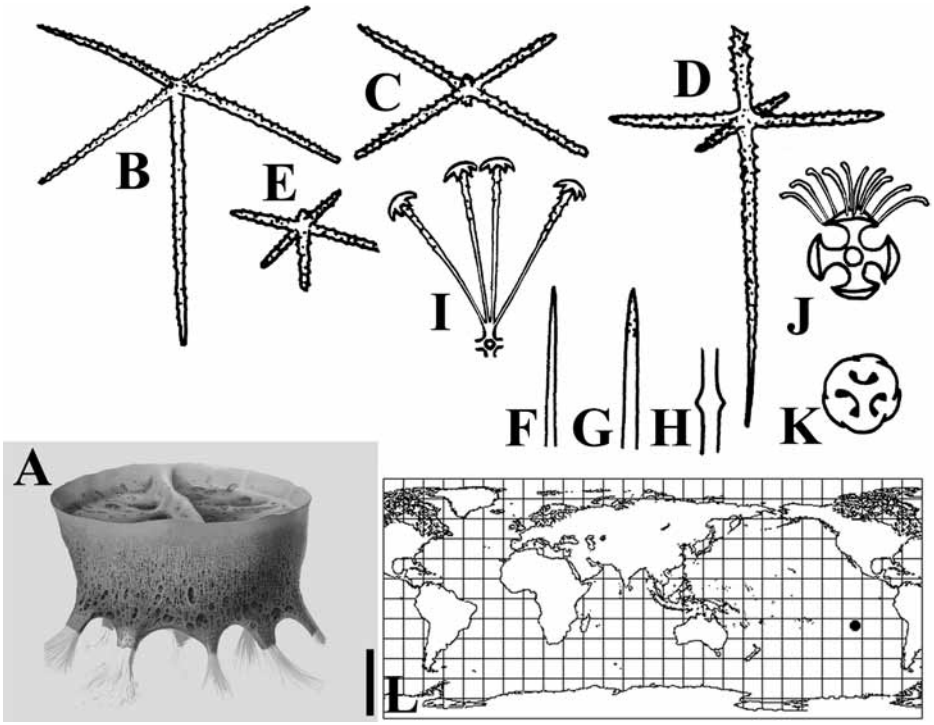

Fig. 4. *Chaunangium crater*. A, syntypes from Schulze (1904) (scale 50 mm). B–E, dermal spicules 190×. F–G, outer ends of choanosomal diactines 190×. H, central part of choanosomal diactine with a widening 190×. I, discohexaster 720×. J–K, plumicomes 720×. B–K, BMNH 1908.09.24.021. L, distribution of *Chaunangium*.

Description of type species

Chaunangium crater Schulze, 1904 (Fig. 4).

Synonymy. *Chaunangium crater* Schulze, 1904.

Material examined. One of 3 syntypes: BMNH 1908.09.24.021 – 'Valdivia', 6°56.3′N 93°32.7′E, depth 362 m; 7°48.8′S 93°07.6′E, depth 805 m; 6°53.1′S 93°33.5′E, depth 752 m.

Description. The holotype seems not to be distinguished among specimens of the type series collected on two stations. The best specimen is about 90 mm long and 180 mm in diameter with very low atrial cavity and narrow osculum. Lectotype status must be assigned to it, while the others must be considered paralectotypes. The basalia comprise diactines 20–30 mm long gathered in several tufts on the basal edge. The fragment stored in the Natural History Museum obviously belongs to the initial type series. Spicules. Choanosomal spicules are diactines 1.2–3.4/0.009–0.015 mm. They are smooth sometimes with rough conical outer ends, rarely with small thickenings. Basalia include spicules about 50 mm long which seem to be diactines. It is impossible to distinguish dermal and atrial surfaces of the fragment stored in the Natural History Museum. Pentactines, stauractines and hexactines from one surface were considered to be dermal and hexactines from the other surface – atrial. Dermalia are pentactines, hexactines, pentactines with a rudiment of the sixth ray, rarely stauractines. Atrialia are hexactines. Both dermalia and atrialia are covered with short dense spines. These spines are more dense on the outer parts of tangential rays of dermal pentactines. Tangential rays of dermal pentactines are 0.099–0.200 mm, proximal rays are 0.050–0.395 mm. Distal rays of atrial hexactines are 0.091–0.304 mm, tangential ones are 0.053–0.152 mm, proximal rays are 0.040–0.091 mm. All these dermal and atrial rays are about 0.009 mm in diameter. Microscleres. Microscleres are discohexasters and plumicomes. Discohexasters are spherical, toothed with 5–7 teeth, 0.061–0.120 mm in diameter, with primary rosettes 0.005–0.015 mm in diameter. The plumicomes (according to Schulze (1904) – discoplumicomes) have discoidal outer ends. The primary rays rarely fuse to one another. Fusion is formed by their discoidal parts: the hexaradiate central part is enclosed inside the spherical spicule which is covered with sigmoidal secondary rays. The same type of spicules I have found in some specimens of *Saccocalyx*. Plumicomes are 0.032–0.043 mm in diameter with primary rosette 0.014–0.025 mm in diameter. According to Schulze (1904), plumicomes are 0.093 mm in diameter but I consider this data to be erroneous.

Remarks. This monotypic genus was previously included in the family Leucopsacidae. Reasons for its transfer are provided in the general remarks for Euplectellinae and Leucopsacidae. The most outstanding feature identifying it as a true member of Euplectellinae is presence of non-anchorate basalia, probably diactines.

Distribution

East-central region of the Indian ocean (Fig. 4), depth 362–805 m.

DOCOSACCUS TOPSENT, 1910

Synonymy

[*Doco acus*] Topsent, 1910: 520 [*lapsus*]. *Docosaccus* Topsent, 1913b (nomen emend.).

Type species

Docosaccus ancoratus Topsent 1910 (by monotypy).

Definition

Euplectellinae with sac-like body and several tufts of basalia, dermalia of hexactines, microscleres with oxyoidal, floricoidal and, probably, discoidal outer ends.

Diagnosis

Lophophytose body is supposed to be sac-like with thin walls fixed by the anchor-like basalia which are organized in several tufts. Choanosomal spicules are diactines, rarely hexactines and their derivatives. Largest choanosomal spicules are hexactines with long tangential rays. Dermalia and atrialia are hexactines. Microscleres are hexactines, hemihexasters, hexasters, floricomes and, probably, discohexasters.

Description of type species

Docosaccus ancoratus Topsent, 1910 (Fig. 5).

Synonymy. *Docosaccus ancoratus* Topsent, 1910: 520.

Material examined. Holotype: NMS 1921.143.1385 – 'Scotia', 64°48′S 44°26′W, depth 4547 m.

Description. A single specimen is known. It is represented by nearly square fragments up to 50 × 40 mm about 2 mm thick. Spicules. The large choanosomal hexactines have short distal and proximal rays about 1 mm long while tangential ones are about 9 mm long. All their rays are 0.06–0.12 mm in diameter. These large hexactines are smooth with rounded outer ends smooth or rough. Diactines prevail among other choanosomal spicules, which include rare hexactines, pentactines and paratetractines. These spicules are smooth but sometimes have rare small spines. The outer ends are conically pointed. The diactines have a widened part or four rudimentary tubercles. The rays are 0.45–2.00/0.008–0.016 mm. Basalia are anchor-like spicules with shafts about 0.015 mm in diameter covered with spines. They have 4 and more teeth. Dermalia and atrialia are hexactines. Their rays directed outside the wall are covered with short spines or rough, the outer ends are conically or spherically pointed. These spicules are identical at both surfaces. The ray directed outside the wall is 0.084–0.334 mm long, the tangential ones are 0.152–0.388 mm long, the ray directed inside the wall is 0.416–0.813 mm long. The rays have the same diameter about 0.015 mm, the widened rays directed outside the wall are 0.025 mm in maximum diameter. Microscleres. Microscleres are microhexactines, hemihexasters, hexasters, floricomes and, probably, discohexasters. Microhexactines are 0.097–0.155 mm in diameter, hexasters have similar sizes being 0.086–0.133 mm in diameter, with primary rosette 0.011–0.018 mm in diameter. Floricomes are 0.058–0.101 mm in diameter with primary rosette 0.011–0.018 mm in diameter. Only one discohexaster was found in the holotype. It was 0.083 mm in diameter with primary rosette 0.013 mm in diameter. It seems that this discohexaster does not belong to *Acoelocalyx brucei* collected at the same station because its discs are rather serrated than toothed and it has more teeth than corresponding spicules in *Acoelocalyx*. The presence of discohexasters described by Topsent (1910, 1913b) is given in the genus diagnosis, in spite of the fact that their autochthonous origin is problematic. Hexactines and hemihexasters were found to be relatively numerous in the type material. Sometimes hexasters and hemihexasters are deformed having rays curved.

Remarks. This monotypic genus resembles *Malacosaccus* in its microsclere composition. The most notable feature which differentiates *Docosaccus* from other Euplectellinae is its choanosomal spicules. Discohexasters are rare while hexactines, hemihexasters are relatively common.

Distribution

Weddell Sea, Antarctica (Fig. 5), depth 4547 m.

HOLASCUS SCHULZE, 1886

Synonymy

Holascus Schulze, 1886: 39. *Holascella* (in part – *H. euonyx* Lendenfeld, 1915: 44); *H. taraxacum* (Lendenfeld, 1915: 29).

Type species

Holascus stellatus Schulze, 1886 (by original designation, since formally the type species was not indicated by Schulze when he was describing four species of *Holascus* simultaneously).

Definition

Euplectellinae with a single tuft of basalia, dermalia of pinular hexactines, atrialia usually of hexactines, deprived of floricomes.

Diagnosis

Body is tubular, lophophytose, with thin walls and a tuft of anchor-like basalia. Sieve-plate was observed in several species. Basalia are anchor-like spicules. Choanosomal spicules are hexactines, pentactines, stauractines and tauactines with different predomination in different species. Additional choanosomal spicules are short-rayed diactines and other short-rayed derivatives of hexactines. Dermalia and atrialia are usually pinular hexactines, rarely atrialia could be of pentactines. Microscleres are various combinations of hexasters, hemihexasters, hexactines, triactines and diactines, discohexasters, hemidiscohexasters, discohexactines, onychohexasters, hemionichohexasters, onycho-hexactines, graphiocomes, drepanocomes and tylohexasters.

Description of type species

Holascus stellatus Schulze, 1886 (Fig. 6).

Synonymy. *Holascus stellatus* Schulze, 1886: 40.

Material examined. Holotype: BMNH 1887.10.20.019 – 'Challenger', 36°44′S 46°16′W, depth 4850 m.

Description. Tubular sponge 80 mm long, 13 mm in diameter, the osculum is about 10 mm in diameter, basalia are at least 20 mm long. The irregular sieve-plate was figured by W. Thomson but it is not present in the holotype now. So the presence of the sieve-plate in *H. stellatus* is questionable. The walls are 1.5–2 mm thick. Spicules. The principal choanosomal spicules are hexactines and, probably, pentactines with rays 0.9–8/0.08 mm. In some choanosomal hexactines tangential rays seem to be the longest.

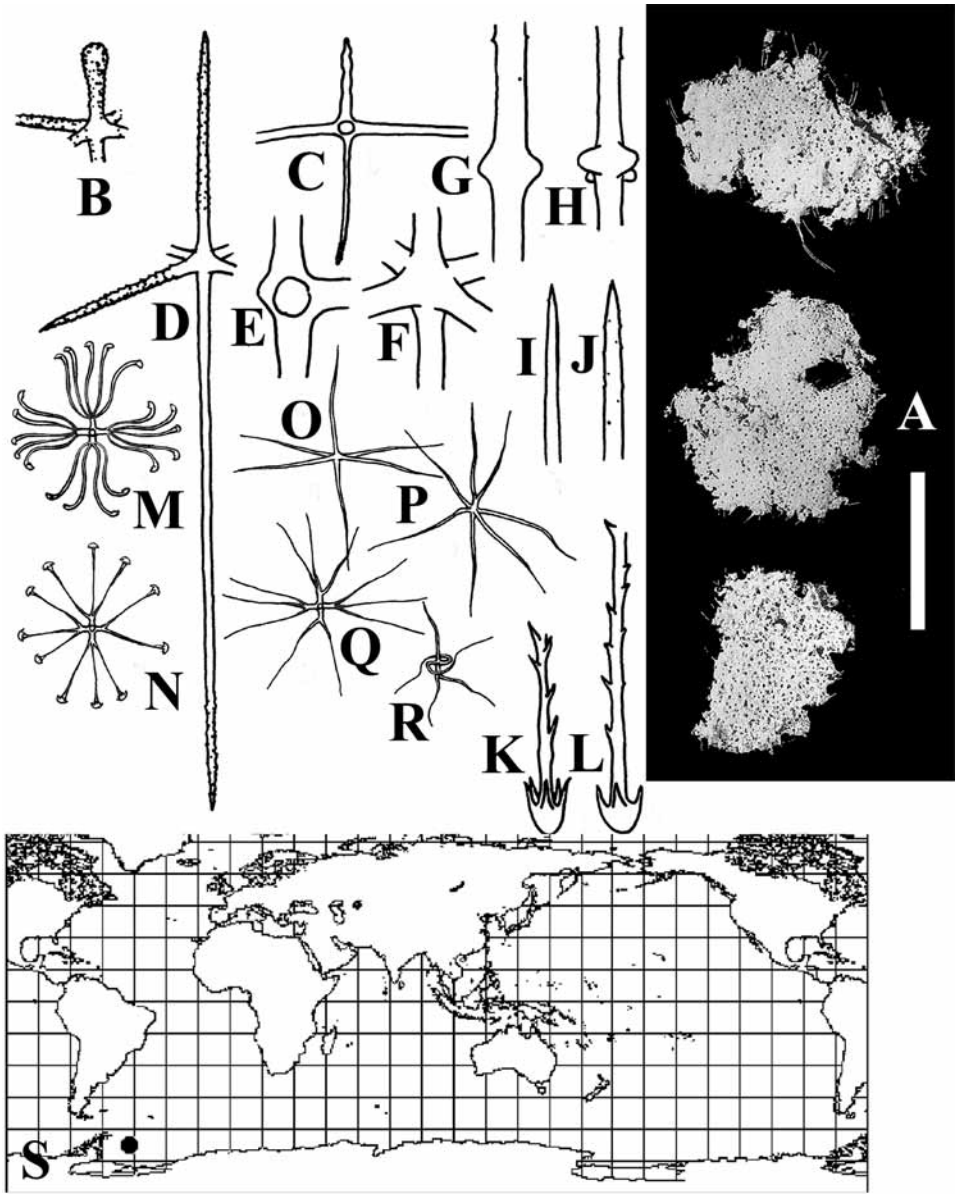

Fig. 5. *Docosaccus ancoratus*. A, holotype from Topsent (1913b) (scale 30 mm). B, D, dermal or atrial hexactines 140×. C, principal choanosomal hexactine 15×. E, choanosomal tauactine 260×. F, choanosomal hexactine 260×. G–H, choanosomal diactines 260×. I–J, outer ends of the choanosomal spicules 260×. K–L, basal anchorate spicules 140×. M, floricome 260×. N, discohexaster 260×. O, hexactine 260×. P, hemihexaster 260×. Q, hexaster 260×. R, hemihexaster with curved rays 260×. A–B; D–R, NMS 1921.143.1385. C, after Topsent (1913b). S, distribution of *Docosaccus*.

Additional spicules are numerous triactines, tauactines and rare diactines. These spicules have rays 0.4–3.3/0.008–0.023 mm. The vertically directed rays seem to be longer than the horizontally directed rays or rays directed inside the body. All the choanosomal spicules are smooth, they can have the outer ends covered with short spines or entire surface of the ray is covered with short sparse spines. Basalia are usually four-toothed (seldom more) anchor-like spicules. They are about 0.015 mm in diameter with upper part smooth and basal part spiny. Dermalia and atrialia are hexactines with the ray directed outside the wall covered with short spines, its outer end is conically pointed or rarely rounded. Atrialia are thinner than dermalia. The other rays (then directed outside the body) are smooth or covered with short sparse spines, their outer ends are conically pointed. Distal ray of dermal hexactine is 0.266–0.327 mm long, tangential rays are 0.236–0.494 mm, the ray directed inside the wall is 0.646–1.520 mm. The proximal ray of atrial hexactine is 0.205–0.350 mm long, tangential rays are 0.236–0.350 mm, distal one is 0.532–1.102 mm. These hexactines are very similar in size and shape but atrial ones are thinner than dermal. The ray directed outside the body is 0.009–0.017 mm in diameter at base and up to 0.033 mm in maximal diameter if it is spindle-like in shape, the other rays are 0.009–0.015 mm in diameter. Microscleres. Microscleres are graphiocomes and numerous hexasters and their derivatives. The regular hexasters have two–four straight secondary rays, only sometimes their outer ends are curved. These hexasters are 0.065–0.122 mm in diameter, with primary rosette 0.009–0.022 mm in diameter. Spicules with curved rays are hexasters, hemihexasters, hexactines, stauractines, tauactines and diactines (the three latter types have central part spherical). Hexactines are 0.076–0.122 mm in diameter. The

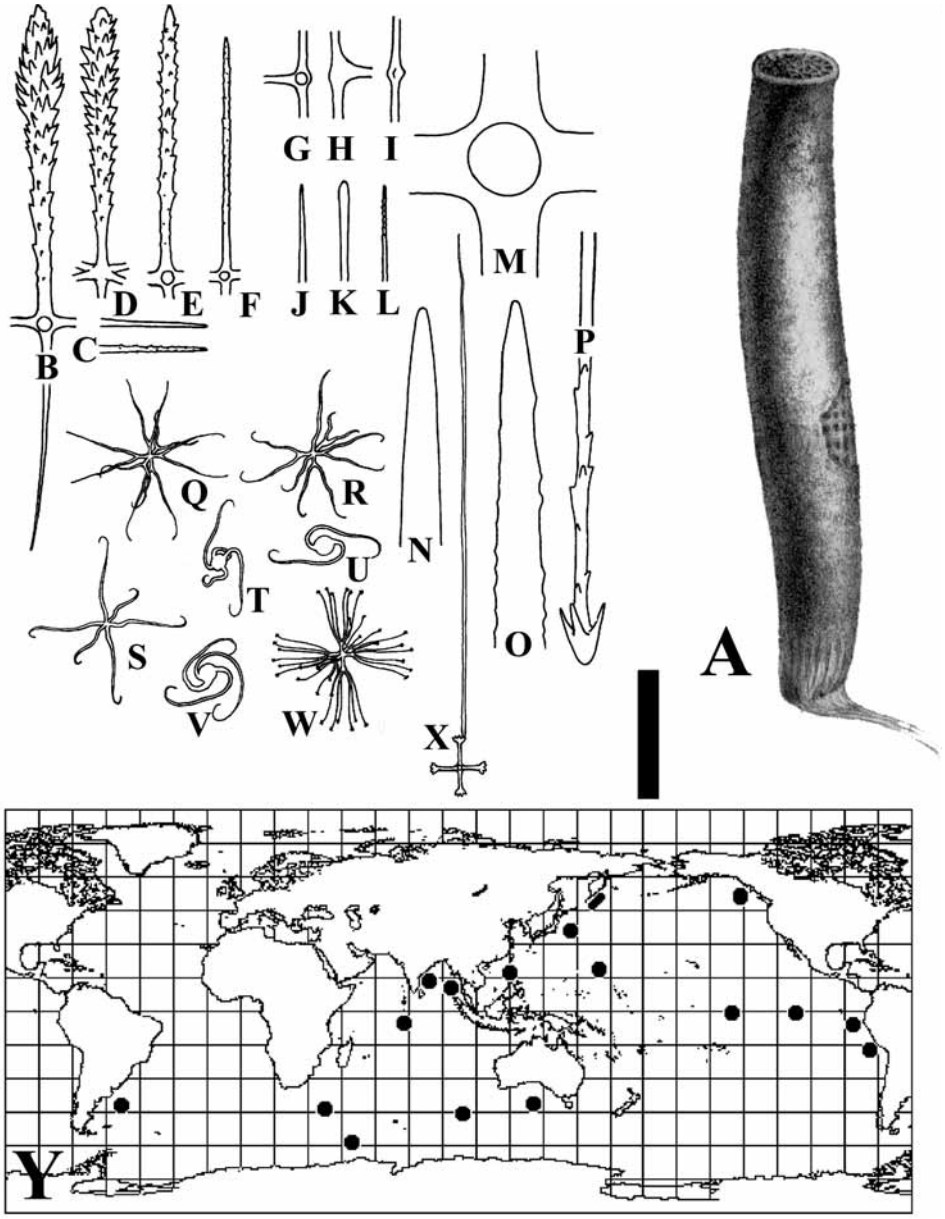

Fig. 6. *Holascus stellatus*. A, holotype from Schulze (1887a)(scale 20 mm). B–F, dermal and atrial hexactines and their outer ends 110×. G–L, choanosomal spicules and their outer ends 110×. M–O, large choanosomal hexactine and its outer ends 110×. P, anchorate basalia 110×. Q, hemihexaster 210×. R, hexaster 210×. S, hexactine 210×. T–V, hexactine's derivatives with curved rays 210×. W, discohexaster 210×. X, graphiocome 210×. B–P, X, BMNH 1887.10.20.019. Q–W, from Schulze (1887a). Y, distribution of *Holascus*.

graphiocomes are 0.526–1.125 mm in diameter with primary rosette 0.027–0.036 mm in diameter.

Remarks. *Holascus* presently contains 14 species, although the genus requires further revision. The genus *Holascella* (partly) is considered to be a junior synonym of *Holascus* due to a significant overlap of their diagnosis and absence of more precise criteria which could distinguish these genera correctly. Lendenfeld in characterizing the genus *Holascella* listed characters which differentiated it from *Holascus*: absence of discohexasters and floricomes in *Holascus* and location of axial cross in the basalia. In *Holascella* this is situated in the distal part of anchor-like spicule together with its disc while in *Holascus* it lies outside the disc. However some species of *Holascus* (e.g., *H. undulatus* (Schulze, 1899), *H. tenuis* (Schulze, 1904) and perhaps also *H. stellatus* (Schulze, 1887a)) have the 'calycocomes' which are themselves a kind of discohexasters. Besides *Holascella* floricomes were reported in a single specimen of *Holascus* – *H. stellatus* (Schulze, 1887a: 86) or same specimen presented as *H.* sp. (Schulze, 1887a: pl. XV, fig. 18 and corresponding footnotes). So the validity of *Holascella* for its possible future reconstruction as a supraspecific taxon requires further investigations of the axial cross position and floricomes presence in doubtless *Holascus* species. Moreover the position of the axial cross for most representatives of these genera is unknown and requires a special investigation. The sieve-plate is reported for *H. fibulatus* (Schulze, 1887a) and *H. polejaevi* (Schulze, 1887a). Pentactines as atrial spicules were observed in *H. fibulatus* and *H. polejaevi*. The microscleres are known to be present in different combinations in various species. A row from

calycocomes with discoidal outer ends as in *H. undulatus* (Schulze, 1899) to analogous spicules with finely pointed outer ends may be considered as hexasters in *H. polejaevi* (Schulze, 1887a) and to calycocomes with rounded outer ends – tylohexasters in *H. robustus* (Schulze, 1887a) is observed in this genus. An unusual type of microscleres, 'ring-shaped' diactines, was found in *H. edwardsii* (Lendenfeld, 1915). *Holascus* requires further revision. Variation of microscleres and other variable characters are extraordinary for the genus of Hexactinellida. Some specimens may turn to be young forms of other Euplectellinae genera. In the related subfamily Corbitellinae, young *Regadrella* are deprived of the sieve-plate and the lateral oscula and their spiculation also differs from the elder specimens.

Only a single specimen of the type species is known. Another specimen from the same station described by Schulze (1886, 1887a) as *H. stellatus* and figured as *H*. sp. (Schulze, 1887a) seems to be another (new) species. Schulze himself mentioned there were some differences in the spicule composition of these two specimens, whereas, unfortunately the spicules of both were described together. Thus, to reconstruct the holotype of *H. stellatus* the preserved material was compared with the published figures. The specimen number BMNH1887.10.20.019 was found to be the holotype of *H. stellatus*, whereas another specimen (1887.10. 20.018) is referred to this other species, differing from *H. stellatus* in having the prevailing hexactines and pentactines located in the choanosomal skeleton, having discohexasters, but lacking stauractines, tauactines and diactines with curved rays.

Distribution

S Atlantic, Pacific, Indian and Antarctic oceans (Fig. 6), depth 494–6328 m.

MALACOSACCUS SCHULZE, 1886

Synonymy

Malacosaccus Schulze, 1886: 41. *Holascella* (in part – *H. ancorata* Lendenfeld, 1915: 37).

Type species

Malacosaccus vastus Schulze, 1886 (by original designation, since formally the type species was not indicated by Schulze when he was describing two species of *Malacosaccus* simultaneously).

Definition

Euplectellinae with a peduncle, dermalia of hexactines, atrialia usually of hexactines, microscleres have oxyoidal, discoidal, floricoidal and sometimes onychoidal outer ends.

Diagnosis

Body is tubular or saccular, lophophytose, pedunculate with anchor-like basalia. Choanosomal spicules are chiefly hexactines, usually together with pentactines, stauractines and tauactines. The choanosomal spicules of the peduncle are tauactines together with rare stauractines, paratetractines and anchors. Dermalia and atrialia are usually pinular hexactines. Microscleres are hexasters, sometimes hemihexasters and hexactines; discohexasters, floricomes and sometimes onychasters.

Description of type species

Malacosaccus vastus Schulze, 1886 (Fig. 7).

Synonymy. *Malacosaccus vastus* Schulze, 1886: 41.

Material examined. Holotype: BMNH 1887.10.20.026 – between Kerguelen Island and Cape of Good Hope, 'Challenger', 46°46′S 45°31′E, depth 2510 m (this material is probably a fragment of the holotype, although not marked as such on the label).

Description. The external shape of the body is unknown. Sponge is described from a fragment of a wall about 300 × 300 mm and 4 mm thick. It was expected to be tubular about 400 mm in length and about 130 mm in diameter (Schulze, 1887a). Spicules. The choanosomal spicules of the body are smooth hexactines, rarely pentactines, stauractines and paratetractines. They have rays 1.3–2.3/0.007–0.013 mm with outer ends smooth, conical, rounded, spherical and clavate. The other type of choanosomal spicules are hexactines with rays about 0.5/0.016 mm covered with spines. The choanosomal spicules of the peduncle are chiefly tauactines, rarely paratetractines and stauractines. They are accomplished with anchor-like basalia. Dermalia are pinular hexactines. The ray directed outside the wall has spindle-like shape, covered with short spines. The other rays are smooth, conically pointed. Atrialia according to the primary description are short spiny hexactines with all the rays equal in length. I have not found such hexactines. The atrial spicules are identical to dermalia, and spicules figured by Schulze (1887a) are more similar to spiny choanosomal hexactines. The ray of dermal and atrial spicules directed outside the body is 0.258–0.540 mm long, the tangential rays are 0.319–0.418 mm long, the ray directed inside the wall is 0.699–1.216 mm long, all these rays are about 0.007 mm in diameter at base while the spindle-like pinular ray is about 0.018 mm in maximal diameter. Microscleres. Microscleres are hexasters, discohexasters and floricomes. Discohexasters are very similar to floricomes in shape and in having the discs on their secondary rays asymmetrically located. Intermediates between discoidal and floricoidal forms of secondary rays can be found and often it is impossible to decide whether a spicule belongs to a discohexaster or a floricome. The discohexasters are common. Secondary rays of hexasters are curved. They are 0.122–0.223 mm in diameter with primary rosette 0.011–0.025 mm in diameter. Floricomes are 0.097–0.140 mm in diameter with primary rosette 0.018–0.043 mm in diameter. The discohexasters are very similar to floricome in size, they are 0.115–0.151 mm in diameter with primary rosette 0.022–0.040 mm in diameter.

Remarks. The genus presently contains 8 species. The external shape of some species of *Malacosaccus* is known from broken fragments only. But the body shape described in the diagnosis seems to be uniform for all described species. Synapticular fusion is absent in this genus. Choanosomal diactines seem to be entirely absent. Anchorate basalia have four or more teeth. Atrialia in *M. heteropinularia* (Tabachnick, 1990a) and probably in *M. vastus* are short spiny hexactines with equal rays. It is doubtful that *Holascella ancorata* (Lendenfeld, 1915) belongs to *Malacosaccus*. It has no graphiocomes, besides it is the only sponge of the *Holascus* genus *sensu lato* with floricomes, and a significant number of tauactines are present in the choanosomal skeleton.

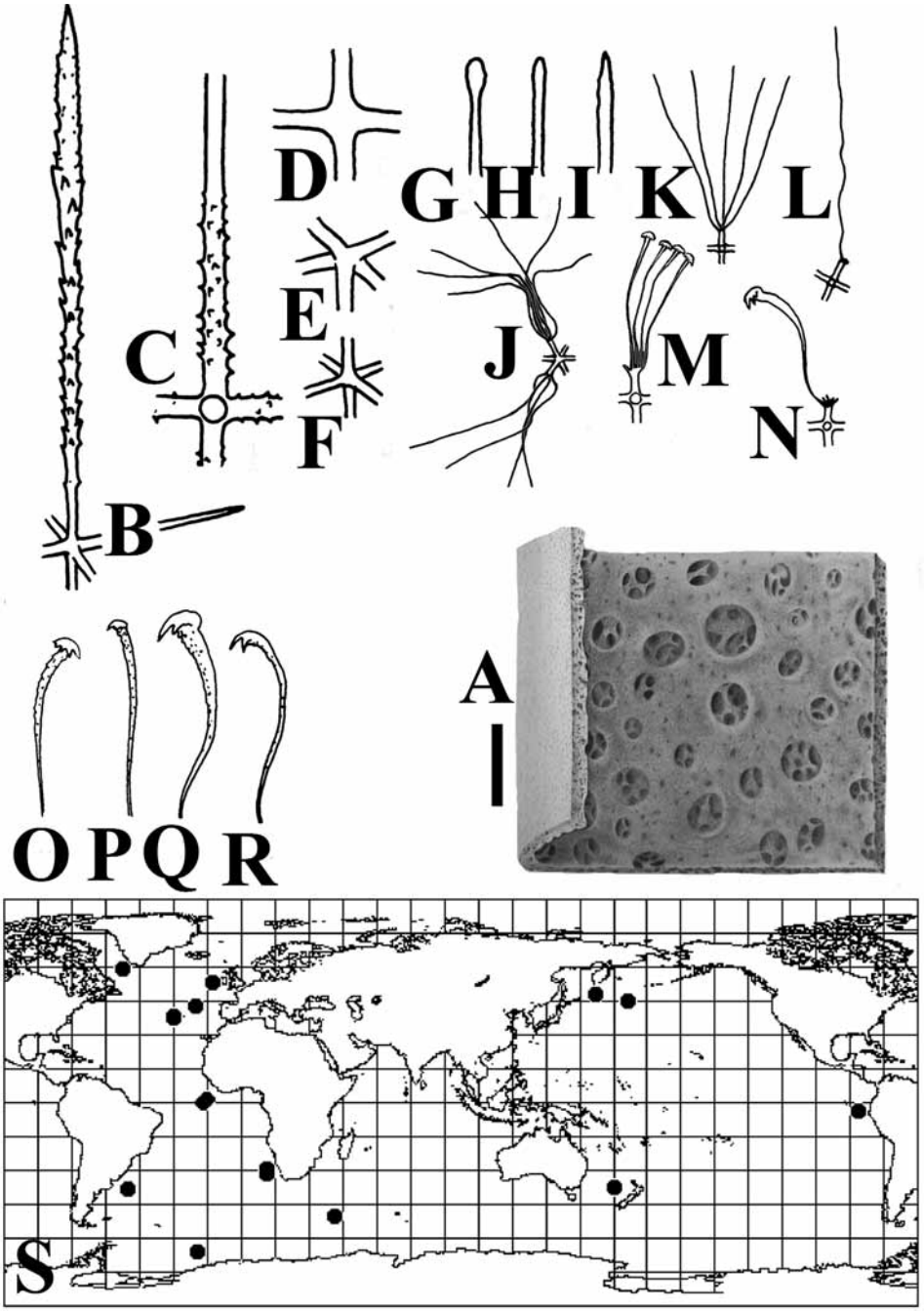

Fig. 7. *Malacosaccus vastus*. A, holotype from Schulze (1887a) (scale 20 mm). B, dermal or atrial hexactine 185×. C, choanosomal spiny hexactine 185×. D–F, choanosomal spicules 185×. G–I, outer ends of choanosomal spicules 185×. J–L, hexasters 360×. M, discohexaster 360×. N, floricome 360×. O, discoidal secondary ray 720×. P, intermediate secondary ray 720×. Q–R, floricoidal secondary rays 720×. B–R, BMNH 1887.10.20.026. S, distribution of *Malacosaccus*.

The microscleres in *H. ancorata* are more diverse then in other representatives of *Malacosaccus* and contain onychasters, hemionychasters, discohexactines, discohexasters, hemidiscohexasters and floricomes. Hexasters are absent but short spiny hexactines are present.

Distribution

Cosmopolitan, except the Arctic ocean (Fig. 7), depth 2510–6328 m.

PLACOPEGMA SCHULZE, 1895

Synonymy

Placopegma Schulze, 1895: 63. [*Placoplegma*] Burton, 1959a: 153; 179 (*lapsus*).

Type species

Placopegma solutum Schulze, 1895 (by monotypy).

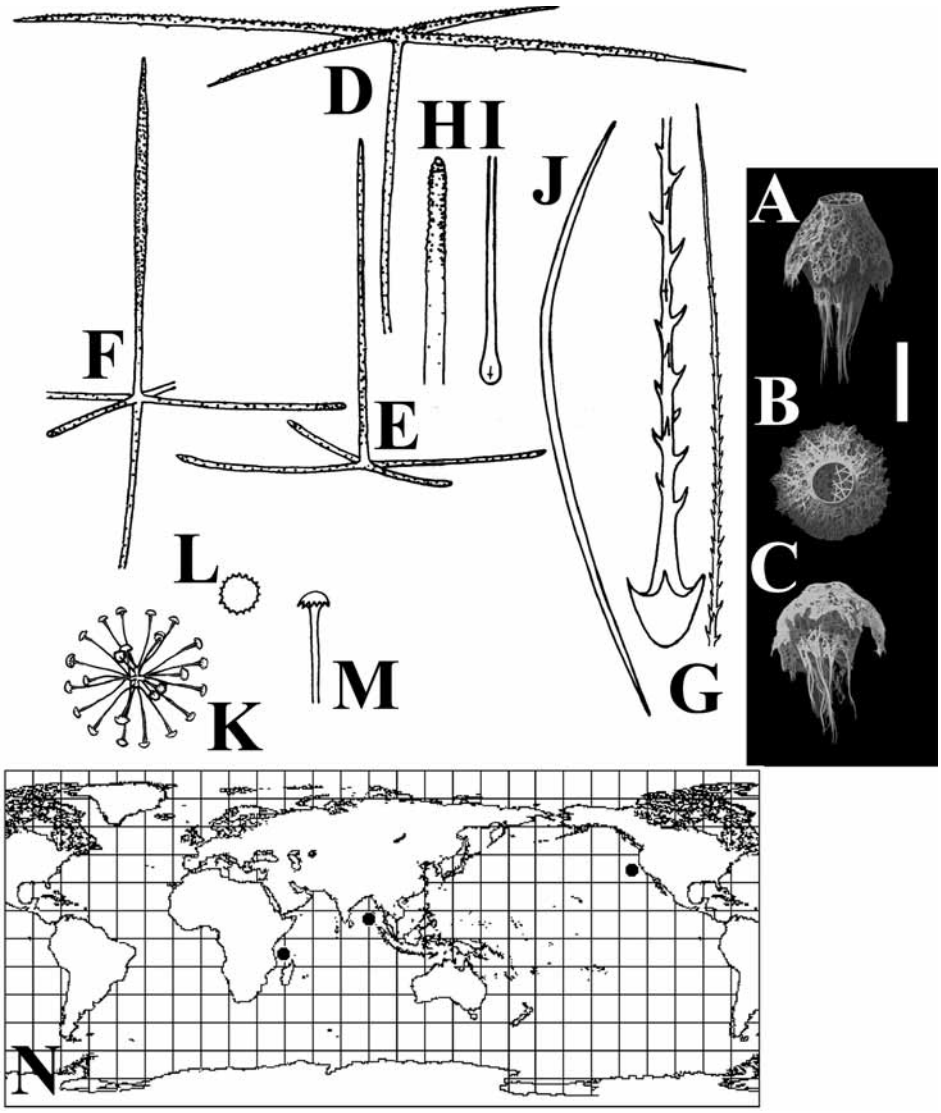

Fig. 8. *Placopegma solutum*. A–C, holotype after Schulze (1902, 1904)(scale 50 mm). A, lateral view. B, upper view. C, lateral view. D, dermal pentactine 170×. E, atrial pentactine 170×. F, hexactine of the sieve-plate 110×. G, anchorate basalia 110×. H, outer end of choanosomal spicule 280×. I, choanosomal monactine 110×. J, choanosomal diactine 110×. K, discohexaster 220×. L, disc of the discohexaster 560×. M, disc of the discohexaster 560×. D–H, I–L, from Schulze (1904). H, M, BMNH 1907.08.01.011. N, distribution of *Placopegma*.

Definition

Euplectellinae deprived of peduncle, dermalia and atrialia of pentactines, microscleres have discoidal outer ends.

Diagnosis

Body is oval with a circular colander-like fold in the middle directed downwards, lophophytose with flat upper part where a single terminal osculum with sieve-plate or prostalia marginalia are located. Basalia are four-toothed anchors and, probably, monaxone spicules with rounded outer ends, which are gathered in a more or less compact tuft in the lower end. Choanosomal spicules and spicules of the sieve-plate are diactines, sometimes hexactines. Dermalia and atrialia are pentactines, rarely hexactines. Hexactines similar to dermal and atrial ones are found among the sieve-plate spicules. Microscleres are discohexasters, sometimes in combination with plumicomes and hexasters and hexactines and discohexactines.

Description of type species

Placopegma solutum Schulze, 1895 (Fig. 8).

Synonymy. *Placopegma solutum* Schulze, 1895: 63. Not *Placoplegma solutum*; Burton, 1959a: 153; 179 (misidentified specimens of *Hyaloplacoida echinum*, see *Hyaloplacoida* in this volume).

Material examined. Holotype (fragment): BMNH 1907.08.01.011 – Indian Ocean, depth 3008 m. 'Investigator', 12°50′N 90°52′E. Other material. BMNH 1908.09.24.020 – 'Valdivia', 6°12.9′S 41°17.3′E, depth 2959 m (erroneously labeled as the type whereas the holotype was collected by 'Investigator').

Description. The body is conical without upper narrowing part where a single terminal osculum covered with a sieve-plate is

situated. A circular, thin colander-like fold is situated in the middle of the body being directed downwards, its edge is irregularly serrated. Basalia are gathered into a more or less compact tuft in the lower end of the body. The body of the holotype is 75 × 45 mm in diameter, the osculum is 18 mm in diameter. The other specimen is 85 mm in length, 55 mm in maximal diameter, the diameter of the osculum is 20 mm. Spicules. Choanosomal skeleton consists mainly of diactines 0.3–0.5/0.008–0.0053 mm. Some of the diactines have a widening in the middle, they are smooth with rough outer ends. Smooth and rough hexactines with rays 0.15–0.4 mm were also found. Spicules of the sieve-plate are similar to choanosomal spicules. Basalia are spiny anchors with four teeth and shaft covered with spines. Dermalia and atrialia are pentactines with more or less rough rays. Tangential rays of dermal spicules are covered with spines distally directed. The dermalia of the sieve-plate are hexactines with the distal ray more rough than that of other hexactines. Tangential rays of dermal spicules are 0.200–0.500 mm, proximal one is about 0.600 mm. Tangential rays of atrialia are 0.115–0.160 mm, distal ones are 0.283–0.400 mm. Microscleres. Microscleres are discohexasters 0.065–0.120 mm in diameter with primary rosette 0.011–0.014 mm in diameter. In the holotype I also observed several discohexactines 0.065–0.108 mm in diameter with primary rosettes 0.011–0.014 mm.

Remarks. The genus presently contains two species (one of which is currently in press), and a third probable new species (*Placopegma* sp. (Schulze, 1899)). However, the genus remains poorly known, especially the composition of atrial and dermal spicules which requires further investigation. The genus was previously included in the family Leucopsacidae, and is reassigned to Euplectellinae for reasons discussed earlier (see general remarks on Leucopsacidae, Euplectellidae and Euplectellinae). The construction (position) of the lower part of the body is poorly known. According to Schulze (1904) the oval body has a circular thin colander-like fold in the middle of the body directed downwards, its edge is irregularly serrated. Basalia are gathered into a more or less compact tuft in the lower end of the body.

The generic diagnosis can be expanded further through observation on a specimen housed in the Smithsonian Institution (kt26) collected by the 'Albatross' expedition (stn. 2380) from NE Pacific which belongs to the same genus. This specimen seems to be a new species, being similar in most characters to *P. solutum* but differing by having hexactines, hexasters and floricomes. This microsclere content corresponds better to Euplectellidae than to Leucopsacidae. It is further confirmation of the reassignment of *Placopegma* to Euplectellinae. Two other species of *Placopegma* are known from Indonesian and New Caledonian regions, with two types of microscleres – discohexasteres and plumicomes. The sieve-plate in the New Caledonian specimen is probably absent. Unfortunately this specimen now consists of broken fragments but according to pictures of C. Lévi (unpublished data) it was originally a complete sponge with two circular rows of prostalia lateralia: one located close to the osculum; the other starting from the circular colander, with both the colander and prostalia lateralia directed downwards. The position of the anchors is uncertain in this specimen and few anchorate spicules were found among choanosomal spicules in the lower part of the body.

Distribution

Indian Ocean, S Central and possibly E Pacific Ocean (Fig. 8), depth ? 1253–2959–3008 m.

SUBFAMILY BOLOSOMINAE, SUBFAM. NOV.

Synonymy

Taegerinae, in part.

Definition

Basiphytose Euplectellidae with peduncle (tubular peduncle is thin and long – at least several times longer than body in any direction).

Diagnosis

See below.

Scope

Eight genera (two poorly known), with cosmopolitan distribution, except the Arctic Ocean, depth 516–5120 m.

Remarks

Features which characterize the new subfamily are more usual among its representatives than in related subfamilies Euplectellinae and Corbitellinae (*sensu novum*). Body is cup-like, spherical or fungus-like attached with a long tubular peduncle with a basidictyonal skeleton plate which serves for better attachment. The globular or digitative outgrowths can be formed on the lateral walls of cup-like body. Comparing with other subfamilies of Euplectellidae the walls of Bolosominae are thick. The lateral oscula, if present, are formed on the lateral outgrowths by breaks on their tops. Choanosomal skeleton is composed of diactines often together with hexactines. The skeleton of the tubular peduncle is composed of diactines fused to each other by numerous synapticulars into a rigid unit, the upper parts of the body are always unfused, being soft and flexible. Dermalia and atrialia are hexactines. Microscleres are variable with specific Euplectellidae graphiocomes, plumicomes and drepanocomes which are specific for genera and species combinations.

A poorly investigated genus with a single species *Caulocalyx tenera* (Schulze, 1886) which previously belonged to Rossellidae (Schulze, 1886; 1887a; Ijima, 1898) or Leucopsacidae (Ijima, 1903; 1927; Schulze, 1904) is transferred here to Bolosominae. Some features make its position within the subfamily specific and requires special discussion. Hexactines are absent in the choanosomal skeleton of *Caulocalyx* and its dermalia are pentactines. The first mentioned feature is not strongly contradictory to most representatives of Bolosominae whereas its dermal and atrial spicules correspond better to the definition of Rossellidae. Nevertheless pentactines are common in the dermal skeleton for some species of Euplectellidae, according to more recent data, hence this feature does not contradict allocation of this genus to Euplectellidae Bolosominae. The microscleres of *Caulocalyx* are discohexasters and plumicomes, the latter type is more characteristic for Euplectellidae (i.e., *Saccocalyx*, *Hertwigia* and now *Chaunangium*) than for Rossellidae where close strobiloplumicomes characterize the subfamily Lanuginellinae including the genus *Sympagella*. Finally, the large size of dermal and atrial spicules and absence of hypodermal pentactines are features which support the placement of *Caulocalyx* to Euplectellidae rather than to Rossellidae. Hence long

prostalia lateralia of diactines in *Caulocalyx* allow to compare it with representatives of Rossellidae the entire absence of hypodermal pentactines in *Caulocalyx* does not allow to speculate more on this subject. Affinities of *Caulocalyx* with the family Leucopsacidae (*sensu novo*) are very weak. Another poorly known genus *Trachycaulus* is known only from stalks, and knowledge of its spicule content is also poor as well as extrapolations on its body form morphology. This genus is retained for the reason of stability of the genus *Saccocalyx* (see remarks below) and because of lack of any valuable information on it.

KEY TO GENERA OF BOLOSOMINAE

(1) Graphiocomes present 2
Graphiocomes absent 4
(2) Microscleres with discoidal outer ends present 3
Microscleres with discoidal outer ends absent ..... ***Trachycaulus***
(3) Microscleres with discoidal outer ends are calycocomes; body is fungus-like ..... ***Caledoniella***
Microscleres with discoidal outer ends are amphidiscs; body is cup-like or tubular ..... ***Vitiaziella***
(4) Plumicomes present 5
Plumicomes absent 6
(5) Only microscleres with discoidal secondary rays present besides plumicomes ..... ***Caulocalyx***
Other microscleres besides plumicomes and that with discoidal outer ends present: with sigmoidal and floricoidal secondary rays ..... ***Saccocalyx***
(6) Only microscleres with discoidal secondary rays present (sometimes including amphidiscs) ..... ***Bolosoma***
Microscleres various 7
(7) Amphidiscs present ..... ***Amphidiscella***
Amphidiscs absent ..... ***Hyalostylus***

BOLOSOMA SCHULZE, 1904

Synonymy

[*Placosoma*] Ijima, 1903: 2 (preoccupied, Reptilia). *Bolosoma* Schulze, 1904: 173.

Type species

Bolosoma paradictyum (Ijima), 1903 (by monotypy).

Definition

Bolosominae of which the microscleres have discoidal outer ends only.

Diagnosis

Body is fungus-like, pedunculate, basiphytose with more or less everted atrial cavity. Choanosomal spicules are predominately diactines, rare spicules are hexactines and pentactines. The spicules of the peduncle are diactines fused into a rigid skeleton by synapticulars. Dermalia and atrialia are hexactines, rarely pentactines. Microscleres are anchorate and toothed discohexasters, discasters, hemidiscohexasters, discohexactines and derivatives of the latter up to amphidiscs.

Description of type species

Bolosoma paradictyum (Ijima, 1903) (Fig. 9).

Synonymy. *Placosoma paradictyum* Ijima, 1903: 2.

Material examined. Holotype (not seen) – off Japan, Sagami Sea, depth 501–572 m.

Description (from Ijima, 1903). The species is represented by the holotype which has fungus-like body with everted atrial cavity. The total length of the sponge is 210 mm. The soft body in vertical direction is 126 mm, in horizontal direction is about 243 mm. The peduncle is vertically folded with some lateral oscula. The basal square is relatively large, it is about 130 mm in diameter. Spicules. Choanosomal diactines are 2–8/0.015 mm. The other type of choanosomal spicules are hexactines. The spicules of the peduncle are diactines fused into a rigid skeleton by synapticulars. Dermalia and atrialia are hexactines. The ray directed outside the wall is slightly widened toward the end being a little more rough then the other rays. All the rays have rounded outer ends. The rays of these hexactines directed inside the wall are usually the longest. The distal ray of dermal hexactine is 0.045–0.100 mm long, tangential rays are 0.150–0.300 mm long. Tangential rays of atrial hexactines are 0.200–0.260 mm long, the ray directed inside the body is 0.600–0.800 mm long. The diameter of the rays of dermal and atrial hexactines is 0.008–0.009 mm at base. Microscleres. Microscleres are anchorate and toothed discohexasters, hemidiscohexasters and discohexactines. Toothed macrodiscohexasters are 0.100–0.240 mm in diameter. Anchorate macrodiscohexasters are about 0.132 mm in diameter. Anchorate macrodiscohexactines are 0.110–0.176 mm in diameter. Toothed microdiscohexasters and microhemidiscohexasters are 0.030–0.100 mm in diameter. Toothed microdiscohexactines are 0.030–0.060 mm in diameter.

Remarks. The genus presently contains only two described species although another seven species are known, currently awaiting description. In *Bolosoma* the fusion of the skeleton takes place in the peduncle. The stalk of *Bolosoma paradictyum* can have some lateral oscula which arise by perforations of lateral lobate diverticula. *Bolosoma cavum* (Ijima, 1927) was initially described from the lower parts of tubular stalks with some occasional lateral oscula. Later this species was redescribed by Lévi (1990) and turned out to

be a fungus-like sponge without lateral oscula including the peduncle. Dermalia and atrialia of most representatives of this genus are usually hexactines. Usually the ray directed inside the body is the longest, sometimes the tangential rays are longer. The rays of dermal and atrial spicules are covered with rare short spines. One (yet undescribed) species which is tentatively placed in the genus *Bolosoma* has long spines on the rays of dermal and atrial spicules, these rays can be equal in length. The description of the microscleres given in the diagnosis is based on the investigation of the microscleres both of described and undescribed species.

Distribution

Central and S Pacific (Fig. 9), depth 730–4332 m.

AMPHIDISCELLA TABACHNICK & LÉVI, 1997

Synonymy

Amphidiscella Tabachnick & Lévi, 1997b: 147.

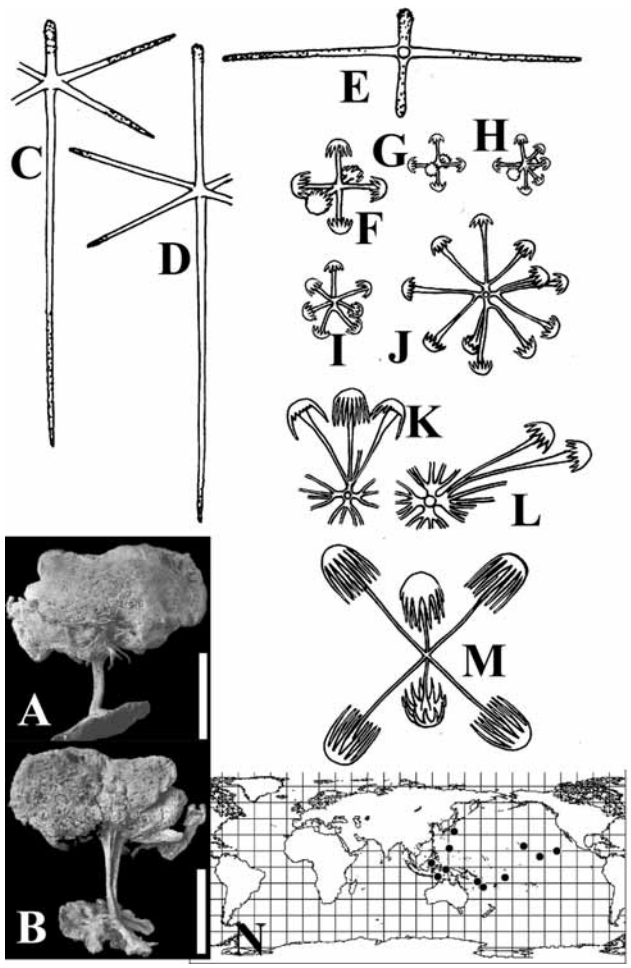

Fig. 9. *Bolosoma paradictyum*. A, holotype, view from 'atrial' side after Ijima (1903) (scale 100 mm). B, view from 'dermal' side after Ijima (1903) (scale 100 mm). C, E, dermal hexactines 170×. D, atrial hexactine 170×. F–G, toothed microdiscohexactines 330×. H–I, toothed hemimicrodiscohexasters 330×. J, L, toothed hemimacrodiscohexasters 330×. K, anchorate macrodiscohexaster 330×. M, anchorate macrodiscohexactine 330×. C–M, from Ijima (1903). N, distribution of *Bolosoma*.

Type species

Amphidiscella caledonica Tabachnick & Lévi, 1997b (by primary designation).

Definition

Bolosominae which microscleres have discoidal, floricoidal and sometimes sigmoidal outer ends only.

Diagnosis

Body is cup-like, basiphytose, pedunculate. Choanosomal skeleton is chiefly of diactines. Dermalia and atrialia are hexactines. Microscleres are amphidiscs, staurodiscs, hexadiscs, hemidiscohexasters, discohexasters, floricomes and sometimes sigmatocomes.

Description of type species

Amphidiscella caledonica Tabachnick & Lévi, 1997b (Fig. 10).

Synonymy. *Amphidiscella caledonica* Tabachnick & Lévi, 1997b: 147.

Material examined. Holotype: MNHN HCL 150 – 'CALSUB' 8, submersible 'Cyana' 1023/29, off New Caledonia, W of Lifou, N of the Bay Santal, 20°48′3S 167°05′E, depth 880–516 m.

Description. The single specimen is cup-like with wide osculum and atrial cavity, relatively thin walls, attached with a long and thin tubular peduncle. Total length of the body is 70 mm, maximum diameter is 80 mm; the walls are 15–20 mm thick. The tubular peduncle is over 50 mm in length and about 4 mm in diameter. Spicules. Choanosomal skeleton consists chiefly of diactines 1.2–2.8/0.005–0.010 mm with small widening or rarely with four rudimentary tubercles in the middle. Additional spicules are rare. They are hexactines and paratetractines with rays similar in length, outer ends and diameter to the rays of diactines. All the choanosomal spicules are smooth, their outer ends have short spiny end. The spicules of peduncle are diactines, 0.005–0.007 mm in diameter, fused to each other with numerous synapticulars. Dermal and atrial spicules are smooth hexactines which are very similar to each other. Few pentactines were found among atrialia. The length of the rays directed out of walls is 0.05–0.27 mm, tangential rays are 0.08–0.44 mm, the rays directed inside the wall are usually the longest 0.07–0.66 mm, diameter of these rays is 0.004–0.160 mm. Microscleres. Microscleres are represented by two groups: with discoidal and with floricoidal outer ends. The spicules with discoidal rays are of different kinds. The most abundant are amphidiscs with two rudimentary rays in the middle, total length 0.006–0.024 mm, the umbel length 0.003–0.009 mm, the umbel diameter 0.003–0.008 mm. Stauractines and hexactines 0.015–0.050 mm in diameter were found more rarely, their umbel length is 0.003–0.008 mm, the umbel diameter is 0.005–0.010 mm. Discohexasters and hemidiscohexasters were found occasionally, the latter have very short principal rays with 1–3 secondary rays, they are 0.035–0.060 mm in diameter, with primary rosette 0.010–0.015 mm in diameter. Another usual type of microscleres are

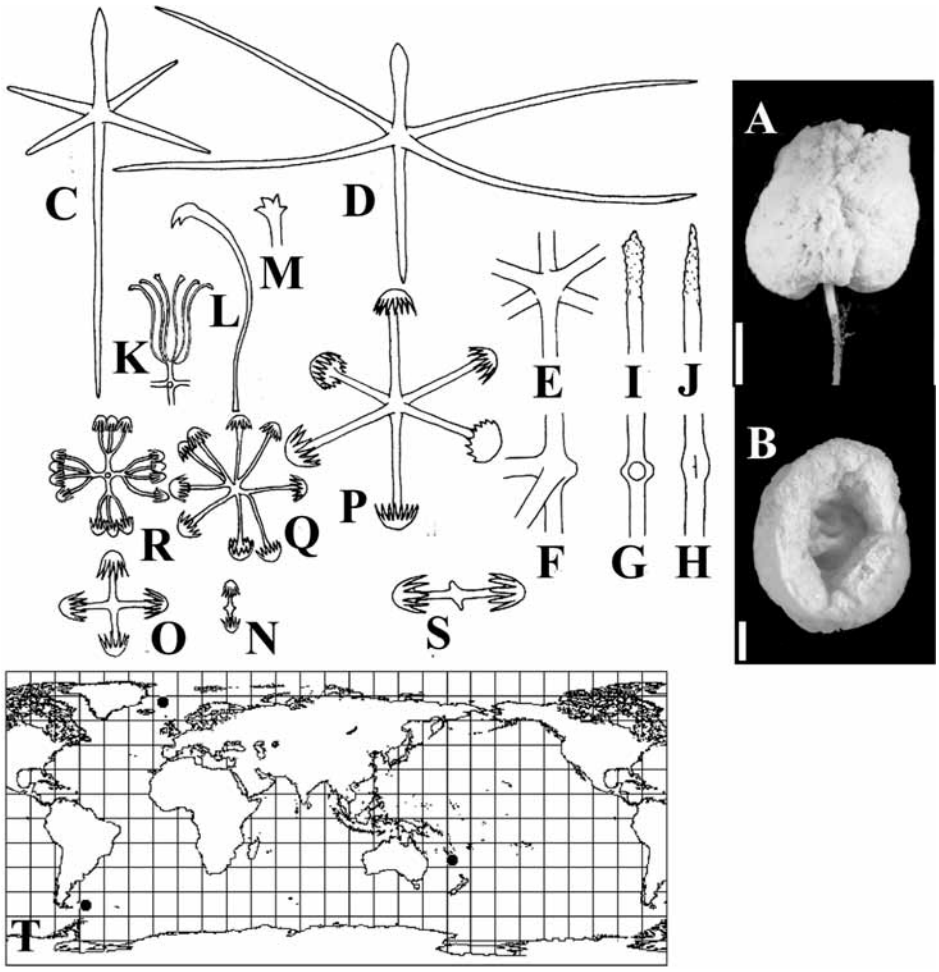

Fig. 10. *Amphidiscella caledonica*. A, holotype, lateral view (scale 30 mm). B, holotype, upper view (scale 20 mm). C, dermal hexactine 150×. D, atrial hexactine 150×. E, choanosomal hexactine 280×. F, choanosomal pentactine 280×. G, choanosomal diactine with four tubercles in the middle 280×. H, choanosomal diactine with widening in the middle 280×. I–J, outer ends of the choanosomal spicules 280×. K, floricome 560×. L–M, floricome outer ends 1120×. N, amphidisc 560×. O, staurodisc 560×. P, discohexactine 560×. Q, hemidiscohexaster 560×. R, discohexaster 560×. S, amphidisc 1120×.C–S, holotype. T, distribution of *Amphidiscella*.

floricomes, 0.050–0.072 mm in diameter, with the diameter of primary rosette 0.010–0.018 mm. The secondary rays of floricomes seem to be smooth under the light microscope and turned out to be covered with short spines at SEM.

Remarks. The genus currently contains two described species, with the description of a third (off S America) currently in preparation. The fusion of the skeleton by synapticulars takes place in the peduncle only. The sigmatocomes and different amphidiscs reduced through paradisc to sigmoidal diactines were found in the second species *A. monai* (Tabachnick & Lévi, 1997b). The discoidal secondary rays have toothed discs. The species off the Falkland Islands has amphidiscs, hemidiscohexasters and sigmatocomes with secondary rays very similar to that of *Hyalostylus dives*. Floricomes were not found in this species but may be present because the specimen is represented with a strongly damaged fragment.

Distribution

Off New Caledonia, N Atlantic, off the Falkland Islands (Fig. 10); depth 516–4090 m.

CALEDONIELLA TABACHNICK & LÉVI, 2002

Synonymy

Caledoniella Tabachnick & Lévi, 2002.

Type species

Caledoniella caulophacoides Tabachnick & Lévi, 2002.

Definition

Bolosominae with fungus-like body in which microscleres are calycocomes and graphiocomes.

Diagnosis

Body is fungus-like, pedunculate, basiphytose with completely everted atrial cavity. Choanosomal spicules are diactines. The spicules of the peduncle are diactines fused into a rigid skeleton by synapticulars. Dermalia and atrialia are pinular hexactines. Microscleres are graphiocomes and calycodiscohexasters.

Description of type species

Caledoniella caulophacoides Tabachnick & Lévi, 2002 (Fig. 11).

Synonymy. *Caledoniella caulophacoides* Tabachnick & Lévi, 2002.

Material examined. Holotype: MNHN (fr2) – 'CALSUB 8', submersible 'Cyana' 1019/25′, 23.2.1989, off New Caledonia, N of Lifou, 20°35.40′S 167°12′E, depth 2697–2380 m.

Description. The species is represented by a single fungus-like specimen with everted atrial cavity. The soft body is a disc 65 × 75 mm in diameter, 3–10 mm thick. The margin (primary oscula margin) is slightly everted downwards. The tubular peduncle is over 250 mm long, 7 × 10–10 × 15 mm in diameter, its basal part is absent. Spicules. Choanosomal diactines are 1.2–2.4/0.007–0.026 mm. These diactines often have a widening or rarely four rudimentary tubercles in the middle. Their outer ends are often rough, rarely smooth, they are conical, rounded or spherical. The diactines of the peduncle are about 20/0.008–0.152 mm, they are fused into a rigid skeleton by numerous synapticulars. Dermalia and atrialia are hexactines similar in shape. The ray directed outside the wall is pinular clavate or spherical in shape, it is thickest near the rounded outer end. The spines are shorter at base and toward the outer end. The pinular ray of dermal hexactine is 0.095–0.480 mm long, tangential rays are 0.060–0.370 mm long, the proximal ray is 0.080–0.920 mm long. The pinular ray of atrial hexactine is 0.160–0.470 mm long, tangential rays are 0.135–0.760 mm long, the distal ray is 0.100–1.180 mm long. Pinular rays of dermal and atrial hexactines are 0.052–0.067 mm in maximal diameter, the other rays are 0.006–0.015 mm in diameter. The rays directed inside the body can have a slightly thickening at some distance from the base. The rays except pinular ones are smooth with rough, rounded or conical outer ends. Microscleres. Microscleres graphiocomes and calycocomes (calycodiscohexasters). Graphiocomes have the usual shape. They are 0.432–0.540 mm in diameter, with primary rosette 0.022–0.029 mm in diameter. Another type of microscleres is calycocomes having the form of discohexasters 0.340–0.460 mm in diameter, with primary rosette 0.100–0.140 mm in diameter. They usually have 5 secondary rays which are rough at the base and covered with spines at the distal part. The spines become longer toward the outer ends, they are longer even than the small toothed terminal disc so that at low magnifications these spicules are similar to hexasters. Fragments of few spirodiscohexasters were also found in this specimen. They are likely to belong to *Saccocalyx pedunculatus* which was collected at neighboring stations.

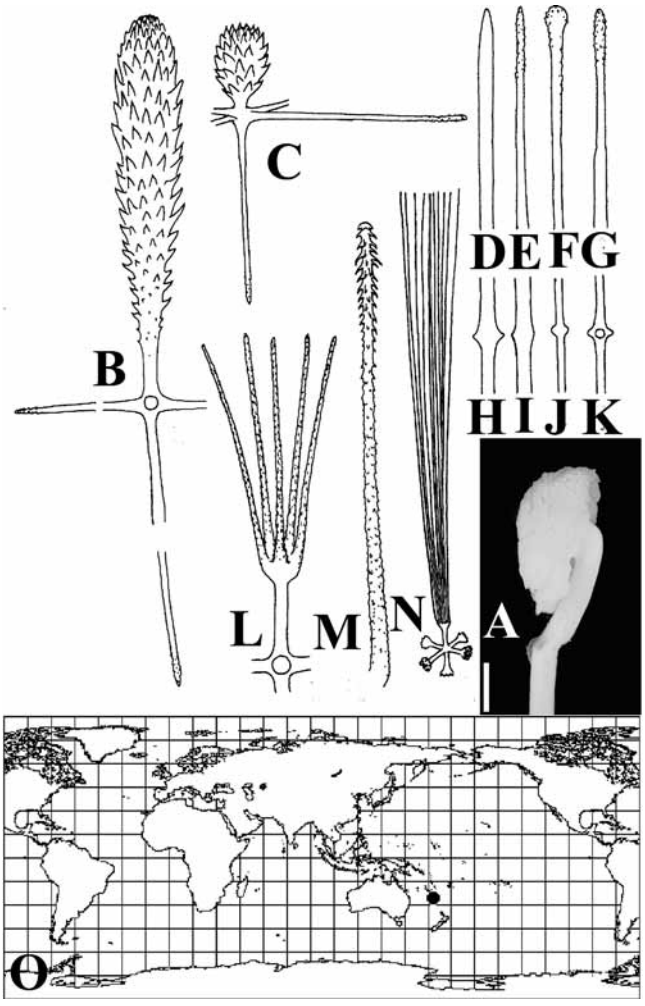

Fig. 11. *Caledoniella caulophacoides* Tabachnick & Lévi, 2002. A, holotype (scale 30 mm). B, dermal pinular hexactine 190×. C, atrial pinular hexactine 190×. D–G, outer ends of choanosomal diactines 190×. H–K, middle, widened parts of choanosomal diactines 190×; L, calycodiscohexasters 360×. M, its secondary ray 720×. N, graphiocome 360×. B–N, holotype. O, distribution of *Caledoniella*.

Remarks. Body form of this monotypic genus is similar to that of *Caulophacus* or *Caulodiscus*. *Caledoniella* is also remarkable in having pinular rays on dermal and atrial hexactines and calycodiscohexasters which are also found in some species of *Caulophacus*. Nevertheless *Caledoniella* is obviously close to pedunculate Euplectellidae: *Hyalostylus, Saccocalyx, Bolosoma, Trachycaulus, Amphidiscella* and *Vityaziella*. It is distinguished from them by the presence of pinular dermal and atrial hexactines. Its unique features, differentiating it from all other euplectellid genera, concern its microsclere composition – a combination of graphiocomes and calycodiscohexasters. The graphiocomes are common in many Euplectellidae whereas calycocomes (calycodiscohexasters) are known only for some species of Euplectellidae (*Holascus*), and for some genera and species of the family Rossellidae.

Distribution

Known only off New Caledonia (Fig. 11), depth 2380–2697 m.

CAULOCALYX SCHULZE, 1886

Synonymy

Caulocalyx Schulze, 1886: 55.

Type species

Caulocalyx tener Schulze, 1886 (by monotypy).

Definition

Bolosominae of which the microscleres are plumicomes and discohexasters.

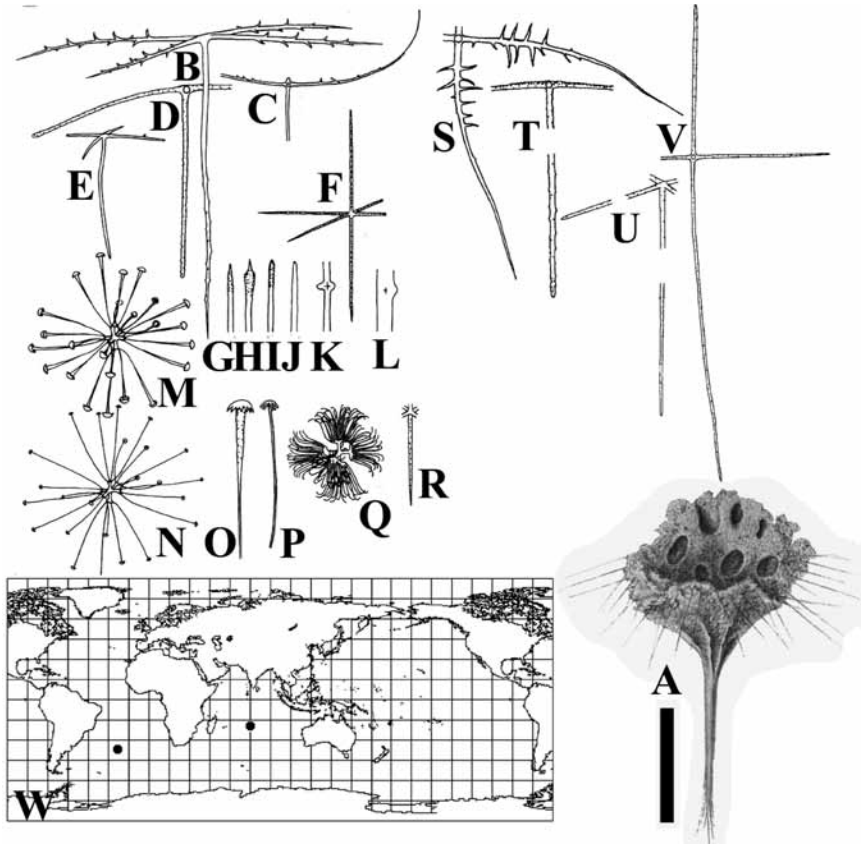

Fig. 12. *Caulocalyx tener*. A, holotype after Schulze (1887a) (scale 30 mm). B–E, dermal pentactines 100×. F, atrial hexactine 35×. G–J, outer ends of choanosomal diactines 170×. K–L, central parts with rudimentary rays of choanosomal diactines 170×. M–N, discohexasters 170×. O–P, their discoidal outer ends 340×. Q, plumicome 340×. R, microhexactine 340×. S–U, dermal pentactines 90×. V, atrial hexactine 90×. B, F, M–Q, from Schulze (1887a). C–E, G–L, R, BMNH 1887.10.20.071. S–V, IORAS 5/2/3025. W, distribution of *Caulocalyx*.

Diagnosis

Body is cup-like, probably basiphytose and pedunculate. Choanosomal spicules are diactines. Dermalia are pentactines. Atrialia are hexactines. Microscleres are pileate discohexasters and plumicomes.

Description of type species

Caulocalyx tener Schulze, 1886 (Fig. 12).

Synonymy. *Caulocalyx tenera* Schulze, 1886: 55. *Caulocalyx tener* Schulze, 1887a: 172; Ijima, 1898: 42.

Material examined. ? Holotype: BMNH 1887.10.20.081 (probable fragment BMNH 1887.10.20.071) – 'Challenger', W of Tristan da Cunha, 35°36′S, 21°12′W, depth 3700 m. Other material. IORAS 5/2/3025 – 'Dmitry Mendeleev' – 43, 17°32.5–32.8′S 67°25.4–24.0′E, depth 3285–3160 m.

Description. The type species is a cup-like fragment of at least 40–50 mm in length and diameter. It has a stalk about 40 mm long and 2–4 mm in diameter. Numerous spicules (prostalia lateralia) project beyond the dermal surface of the body at 20–40 mm. Spicules. Choanosomal skeleton consists of diactines, rather long, 0.004–0.023 mm in diameter, smooth. The outer ends are usually rough, conically pointed, rounded or spine-like. Some diactines have widening in the middle. The spicules of the stalk are diactines with some traces of synapticular junctions. Prostalia lateralia are smooth diactines which are longer than choanosomal ones, 0.084–0.099 mm in diameter. Dermalia are described by Schulze as pentactines with spines on the tangential rays. Smooth pentactines, pentactines with rough rays and smooth pentactines with rare spines are also present. In the specimen 5/2/3025 all the spines of dermal pentactines are orientated tangentially. Ray length of smooth, rough and spiny dermal pentactines is almost the same. Tangential rays of dermal pentactines are 0.167–0.479 mm, proximal ones are 0.334–0.879 mm. Atrialia are hexactines with rough rays. They are described (Schulze, 1887a) as hexactines with all the rays nearly equal 0.084–0.608 mm in length. Some atrial hexactines have rays equal in length, length of others differs. In the specimen 5/2/3025 the distal ray the longest 0.471–0.734 mm, but in some of these hexactines tangential and proximal rays have nearly the same length: the former are 0.167–0.312 mm, the latter – 0.167–0.380 mm long. Microscleres. Microscleres are pileate discohexasters and plumicomes. Discohexasters are 0.076–0.171 mm in diameter, with primary rosette 0.009–0.014 mm in diameter. Discoidal secondary rays are smooth or covered with short spines in distal parts. Another type of microsclere is plumicomes 0.029–0.046 mm in diameter with primary rays 0.007–0.022 mm in diameter. A few microhexactines were found in the specimens from the Natural History Museum. They have rays 0.034–0.056/0.002 mm covered with minute spines. These spicules are absent in the specimen 5/2/3025. It is very likely that they have allochthonous origin.

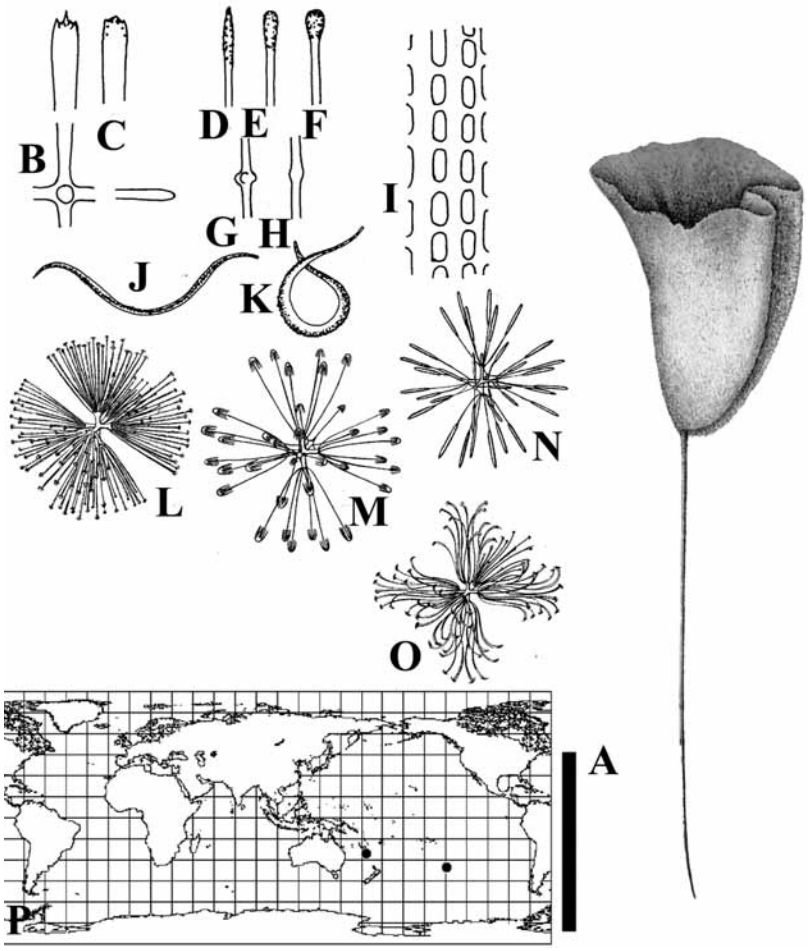

Fig. 13. *Hyalostylus dives*. A, holotype after Schulze (1887a) (scale 50 mm). B, dermal hexactine 250×. C, distal ray of dermal hexactine 250×. D–F, outer ends of choanosomal diactines 250×. G–H, central parts of choanosomal diactines 250×. I, diactines of the stalk 130×. J–K, secondary rays of sigmatocomes 130×. L, toothed discohexaster 250×. M, anchorate discohexaster 250×. N, typhoidal hexaster 250×. O, floricome 250×. B–H, BMNH 1887.10.20.033. I–O, from Schulze (1887a). P, distribution of *Hyalostylus*.

Remarks. This monotypic genus is still poorly known. It was previously included in the family Rossellidae (Schulze, 1886, 1887a), moved to Rossellidae Leucopsacinae (Ijima, 1898) and subsequently to Leucopsacidae (Ijima, 1903, 1927; Schulze, 1904). Justification for transferring it to Euplectellidae is provided in the general remarks on Leucopsacidae, Euplectellidae and Bolosomidae but requires new data for complete analysis.

Distribution

S Central Atlantic; Central Indian Ocean (Fig. 12), depth 3160–3700 m.

HYALOSTYLUS SCHULZE, 1886

Synonymy

Hyalostylus Schulze, 1886: 44.

Type species

Hyalostylus dives Schulze, 1886 (by monotypy).

Definition

Bolosominae of which the microscleres have sigmoidal, discoidal, typhoidal and floricoidal outer ends.

Diagnosis

Body is pedunculate, basiphytose, with bell-like or discoidal upper part and vast atrial cavity. Choanosomal spicules are diactines. The spicules of the peduncle are diactines fused by synapticulars. Dermalia and atrialia are hexactines. Microscleres are combinations of sigmatocomes, spherical and stellate discohexasters with serrated, toothed and anchorate discs, hexasters with typha-like secondary rays and floricomes.

Description of type species

Hyalostylus dives Schulze, 1886 (Fig. 13).

Synonymy. *Hyalostylus dives* Schulze, 1886: 44.

Material examined. Holotype: BMNH 1887.10.20.033 – 'Challenger', 39°41′S 131°23′W, depth 4590 m.

Description. The type species is known only from the holotype. The soft cup-like body is 55 mm long and 50 mm

in maximal diameter in the upper part. The wall is partly folded. The stalk is 110 mm long and 1–2 mm in diameter. Spicules. The choanosomal spicules are diactines. Dermal stauractines and atrial pentactines may be choanosomal spicules as well as some hexactines. These spicules are rare and always broken so that it is not clear to which part of the skeleton they belong. Diactines have a widening or four tubercles in the middle, their outer ends are clavate or rarely conically pointed, rough. The diactines are 1–1.6/0.006–0.007 mm. The diactines of the peduncle are fused by synapticulars. Hexactines prevail among spicules of dermalia and atrialia. They are similar from both surfaces. Dermalia are reported to consist of hexactines and stauractines while atrialia of hexactines and pentactines (Schulze, 1887a). Dermal and atrial hexactines have smooth rays, all rays except the ray directed outside the body are rounded or conically pointed. The ray directed outside the body is cusped, with several minute spines on the top, with rounded outer end, clavate in shape. The ray of dermal and atrial hexactine directed outside is 0.281–0.471 mm long, tangential rays are 0.251–0.426 mm long, the ray directed inside the body is 0.274–0.722 mm long. The rays are about 0.007 mm in diameter at base, the ray directed outside the body reaches about 0.014 mm in maximal diameter near the outer end. Microscleres. Microscleres are spherical and stellate discohexasters with serrated, toothed and anchorate discs, hexasters with typha-like secondary rays, floricomes and sigmatocomes. Only two types of discohexasters are abundant: spherical discohexasters with serrated and anchorate discs. The stellate discohexasters are rare. Toothed stellate discohexasters are about 0.166 mm in diameter with primary rosette about 0.022 mm in diameter. Toothed spherical discohexasters are about 0.144 mm in diameter with primary rosette about 0.025 mm in diameter. Serrated spherical discohexasters are 0.108–0.144 mm in diameter with primary rosette 0.018–0.040 mm in diameter. Anchorate discohexasters are 0.047–0.079 mm in diameter with primary rosette 0.009–0.018 mm in diameter. Floricomes are frequent being 0.047–0.097 mm in diameter with primary rosette 0.011–0.023 mm in diameter. Typhoidal hexasters are rare, they are about 0.050 mm in diameter with primary rosette about 0.011 mm in diameter. Secondary rays of sigmatocomes were described by Schulze (1887a) as "curved rough diactines". These "diactines" are covered with minute tubercles which are abundant along one lateral side. Despite the fact that no complete sigmatocome was found, the reason to consider the "diactines" to be secondary rays of sigmatocomes is reliable. At least one end in all the observed "diactines" is broken. It can be supposed that these spicules are sigmatocomes which were destroyed when preparing the microscopic slides. Some spicule fragments which may be primary rosettes of the sigmatocomes were found. Finally the "curved rough diactines" are very similar to so called "bow-shaped spicules" of *Rhabdopectella tintinnus* (Schulze, 1887a) which now turned to be obvious sigmatocomes. The diameter of sigmatocomes is reconstructed as 0.339–0.528 mm with primary rosette 0.018–0.025 mm in diameter.

Remarks. The genus contains three species: one published, a new species currently in press and another new species description currently in preparation. The bell-like upper part of the body is known for the holotype, the discoidal one for a new species off New Caledonia. Dermalia and atrialia contain additional types of spicules, stauractines and pentactines correspondingly. However, these spicules may be choanosomal. Their location requires further specification. The fusion of the skeleton by synapticulars takes place in the peduncle only. The species variability is based on the differences in the microscleres. A new species off New Caledonia has as the only type of microsclere the sigmatocomes.

Distribution

Mid S Pacific (Fig. 13), depth 1490–4590 m.

SACCOCALYX SCHULZE, 1895

Synonymy

Saccocalyx Schulze, 1895: 53. *Nubicaulus* Reiswig, 1999: 503.

Type species

Saccocalyx pedunculatus Schulze, 1895 (by monotypy).

Definition

Bolosominae of which the microscleres have sigmoidal (sigmatocomes and plumicomes), discoidal and floricoidal outer ends.

Diagnosis

Body is cup-like with vast atrial cavity and thin walls, basiphytose with long tubular peduncle. Large specimens have lateral oscula situated on the digitate processes of the wall. Choanosomal spicules are diactines and hexactines. The spicules of the peduncle are long diactines fused by synapticulars. Dermalia and atrialia are pinular hexactines. Microscleres are toothed spirodiscohexasters and usually plumicomes. Drepanocomes and anchorate disco-hexasters may be absent. Sigmatocomes were found in only one specimen.

Description of type species

Saccocalyx pedunculatus Schulze, 1895 (Fig. 14).

Synonymy. *Saccocalyx pedunculata* Schulze, 1895: 53. Probably also *Nubicaulus careyi* Reiswig, 1999: 503.

Material examined. Holotype: BMNH 1908.09.24.017 – 'Investigator, same location', 12°20′N 85°08′E, depth 3297 m. Paratype: BMNH 1907.08.01.013 – 'Investigator', **Other material.** IORAS 5/2/297 – 'Academic Kurchatov' – 36, 1°06.5′–06.1′N 56°28.7′–29.6′E, depth 1280–1380 m. IORAS 5/2/2608 – 'Dmitry Mendeleev' – 21, 4°49.1′N 154°55.2′E, depth 1660–1590 m. IORAS 5/2/1300; 5/2/1323 – 'Akademic Mstislav Keldysh' – 4, 58°25.1′N 31°32.7′– 33.6′W, depth 1635–1465 m. IORAS 5/2/401 – 'Akademic Kurchatov' – 6, 39°59.8′N 29°35.5′W, depth 2780–2500 m. IORAS 5/2/396 'Academic Kurchatov' – 6, 29°58.0′N 42°18.0′W, depth 3835 m. USNM (w472.1) – 'Eltanin', 67°00′–02′S 163°33′E, depth 1422–1444 m. MNHN (fr1) – 'CALSUB', 'Cyana' 1017/23, 20°37′S 167°14′E, depth 2191–1130 m. MNHN (fr4) – 'CALSUB', 'Cyana' 1019/25, 20°35.40′S 167°12′E, depth 2697–2380 m. MNHN(fr304-fr313) – 'Marion Dufresn', off Kerguelen, 37°38,80′S 77°18,30′E, depth 3075 m.

Description. The holotype has a cup-like body with large rounded digitate processes most of which are directed vertically downwards. The cup-like body is 50 mm long and about 50 mm in diameter. The walls are 2–3 mm thick. The digitate processes are up to 40 mm long and 15 mm in diameter. The apex of these processes has usually an 'irregular aperture' – lateral

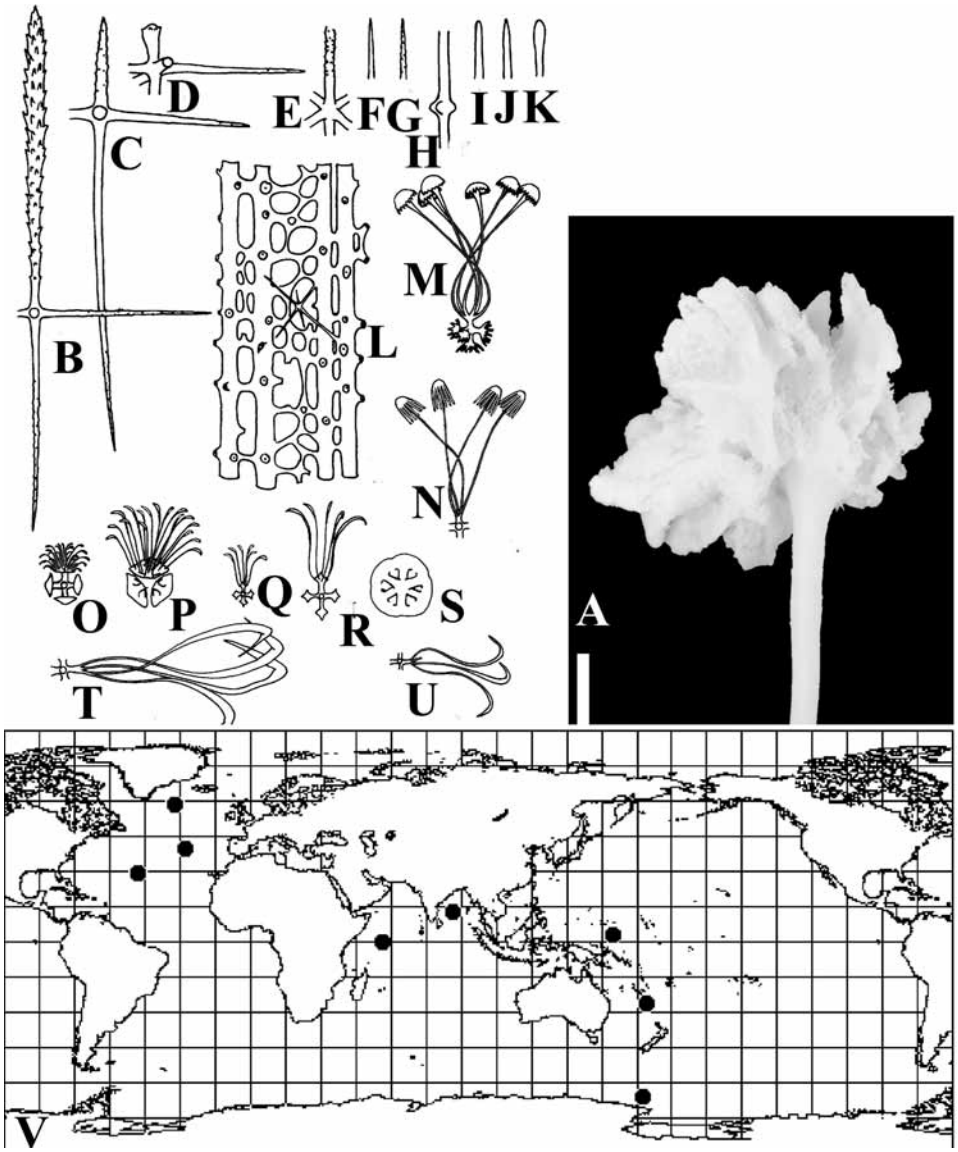

Fig. 14. *Saccocalyx pedunculatus*. A, specimen MNHN (fr4)(scale 20 mm). B, dermal hexactines 140×. C–D, atrial hexactines 140×. E–G, choanosomal hexactine and its outer ends 140×. H–K, choanosomal diactine and its outer ends 140×. L, spicules of the peduncle 140×. M, spirodiscohexaster 550×. N, anchorate discohexaster 550×, O–S, plumicomes 550×. S, primary rosette of plumicome in which primary rays are fused by their margins 550×. T–U, drepanocomes 280×. B, E–K, M, O, holotype. C–D, P, MNHN (fr4). L, from Schulze (1902). N, IORAS 5/2/297. Q–R, T–U, USNM (w672.1). BMNH 1908.09.24.017. V, distribution of *Saccocalyx*.

oscula. The peduncle is at least 250 mm long 5 mm in diameter with walls 1 mm thick. The largest specimens are MNHN (fr1) and (fr4) off the New Caledonia. They have more or less spherical upper parts of the body up to 170 mm in diameter covered with numerous digitative processes radially directed, which are about 20–40 mm long and 10–15 mm in diameter. Each of these processes has a lateral osculum on its distal part, while the central (primary osculum) is absent or it is entirely equal to the lateral ones. It is very likely that the main osculum was overgrown by lateral walls. The atrial cavity is common. The peduncle is tubular up to 230 mm long and 7–13 mm in diameter. The walls are 2–5 mm thick. Spicules. Choanosomal skeleton contains diactines and hexactines. The rays of the hexactines are covered with sparse short spines. The rays are tapering to a fine cone or rarely have rounded end. The diactines are 2.7–3.9/0.009–0.015 mm usually with four rudimentary tubercles in the middle. The choanosomal hexactines have rays 0.1–0.8/0.003–0.015 mm. Dermalia seem to be completely equal to atrialia, they both are pinular hexactines or rarely smooth hexactines in IORAS 5/2/401. The spicules of dermal and atrial surfaces were compared in several specimens and no notable difference was found. The pinular ray is widening in the middle being covered with scale-like processes, the outer end is sharply tapering or rarely rounded. Five other rays are smooth or only sparsely covered with short spines. The length of pinular ray is 0.068–0.509 mm, tangential rays are 0.030–0.800 mm long, the ray directed inside the body is 0.091–0.800 mm long. The rays of dermal and atrial hexactines are 0.006–0.0011 mm in diameter near the base, the diameter of the widened part of the pinular ray is 0.009–0.030 mm. Some dermal and atrial hexactines of specimens New Caledonia have thick rays up to 0.034 mm in diameter. The

rays directed outside the body are covered with short spines and have conically pointed or rarely rounded outer ends. Microscleres. Microsclere composition notably varies between the investigated specimens. Spirodiscohexasters are always numerously present in all the investigated specimens, they have toothed discs and secondary rays spirally twisted in each cluster. The spirodiscohexasters are 0.090–0.190 mm in diameter, with primary rosette 0.007–0.025 mm in diameter. Another type of discohexasters are those with anchorate discs. These discohexasters have some tendency to spirally twist the secondary rays as spirodiscohexasters, they are rare and were found in about half of all investigated specimens. The anchorate discohexasters are 0.076–0.155 mm in diameter with primary rosette 0.007–0.015 mm in diameter. Plumicomes are also common in all species except IORAS 5/2/1323 where they are rarely found. Plumicomes are 0.029–0.065 mm in diameter with primary rosette 0.013–0.025 mm in diameter. Some plumicomes in specimens from various locations have specific widenings into discs of the primary ray outer ends which can fuse to each other by their margins making a complete sphere with six axis of primary rays inside, the sigma-like secondary rays of usual shape are placed on its surface. Drepanocomes are not common, they were found in half of all specimens and they are not numerous. Drepanocomes are 0.068–0.415 mm in diameter, with primary rosette 0.010–0.025 mm in diameter. Only in one specimen IORAS 5/2/401 I have found fragments of sigmatocome secondary rays, which are represented by curved, rough fragments similar to those of *Rhabdopectella tintinnus* and *Hyalostylus dives*. It is possible that these spicules are of allochthonous origin. Their sizes are reconstructed as 0.396–0.450 mm in diameter, with primary rosette about 0.014 mm in diameter.

Remarks. The genus contains one confirmed species and one doubtful – *S. caryi* (Reiswig, 1999). The principal difference of Reiswig's species is that all pinular rays are clavate in shape while those of *S. pedunculatus* have only part of their pinular rays clavate. The spicule variaton of *N. careyi* does not differ much from the series I investigated and thus two possibilities exist: to consider all them a highly variable single species, or to distinguish many species of *Saccocalyx* (including *S. careyi*) corresponding to individual variations between specimens and regional material. The only valubale difference between *S. pedunculatus* (sensu lato) and *S. carei* of Reiswig is presence in the latter species of dermal hexactines with pinular ray always clavate.

The fusion of the skeleton by synapticulars takes place in the peduncle only. All specimens examined appear to belong to the same species despite their substantial geographic separation. All the specimens show notable uniformity of spicule sizes. Only dermal and atrial hexactines are larger in MNHN (fr1) and (fr4). As for drepanocomes, which have the biggest variation in sizes, the same range of variation is observed in a single specimen MNHN (fr1) – 0.080–0.415 mm in diameter. The difference in microsclere composition cannot be considered as an important feature which could distinguish the possible species because these microsclere are not frequent and no correlation was found between microsclere composition and specimen locality. Sigmatocomes are similar to those in *Hyalostylus dives*. The same sigmatocomes and spirodiscohexasters are known in *Rhabdopectella tintinnus* (Corbitellinae). Spirodiscohexasters are known also in *Hertwigia* (Corbitellinae) and in *Ijimadictyum* Mehl (1992) previously known as *Rhabdodictyum kurense* (Ijima, 1927) (Aulocalycidae). Another close affinity is seen between *Saccocalyx* and *Trachycaulus guirlittii*, the latter known only from stalks with dermal spicules and microscleres. The stalk of *S. pedunculata* MNHN (fr1) contains some loose spicules too: dermal hexactines and spirodiscohexasters together with drepanocomes whereas *T. guirlittii* also has drepanocomes. Further investigations are required to settle the problem with species definition in *Saccocalyx*.

Distribution

Central N Atlantic, Indo-West Pacific, Antarctica (Fig. 14), depth 1130–3835 m.

TRACHYCAULUS SCHULZE, 1886

Synonymy

Trachycaulus Schulze, 1886: 46. *Trachicaulus* (*lapsus*) Tabachnick, 1988: 55.

Type species

Trachycaulus guirlittii Schulze, 1886 (by monotypy).

Definition

Bolosominae of which the microscleres are represented by drepanocomes and graphiocomes.

Diagnosis

Pedunculate, basiphytose sponge, probably, with spherical body. Choanosomal spicules of peduncle are diactines fused into a rigid skeleton by synapticulars. Dermalia (of peduncle) are hexactines. Microscleres are drepanocomes and graphiocomes.

Description of type species

Trachycaulus guirlittii Schulze, 1886 (Fig. 15).

Synonymy. *Trachycaulus guirlittii* Schulze, 1886: 46. *Trachycaulus guirlittii* Schulze, 1887a, pl. XXVI footnote; Ijima, 1927; Lévi, 1964a; Reiswig, 1990.

Material examined. Holotype: BMNH 1887.10.20.042 – 'Challenger', 39°41′S 131°23′W, depth 4650 m.

Description. The species is known only by a single piece of tubular peduncle 120 mm long and 3–4 mm in diameter. Spicules. Spicules of the peduncle are diactines and relatively small hexactines. Diactines and often hexactines are fused to each other by synapticulars. The diactines are 0.008–0.02 mm in diameter. Dermalia are pinular hexactines with all rays conically pointed. The dermal ray is about 0.380 mm long, tangential rays are about 0.110 mm long, proximal ray is about 0.160 mm long these rays are about 0.007 mm in diameter at base. Microscleres. Microscleres are drepanocomes with four hook-like secondary rays. Drepanocomes are 0.350–0.400 mm in diameter, with primary rosette 0.040 mm.

Remarks. This monotypic genus is poorly known. Only two specimens have been collected and described so far, both represented only by their peduncles. One specimen is the holotype of the type species whereas the other probably belongs to another, second species. Body-form is known (thanks to a photograph of this sponge made just before collection; Tabachnick, 1988) to be spherical with

hardly resolvable osculum (no other details are available from the photo). *Trachycaulus* is a rare pedunculate Bolosominae with microscleres and dermal spicules in the peduncle. A proposal to synonymize *Trachycaulus* with *Hertwigia* by Lévi (1964a) is incorrect as these genera obviously belong to different subfamilies. Their similarities in microscleres seem to be less important than other features, for instance the body shape.

It is problematic whether genera of Hexactinellida can be distinguished by studying their peduncles alone. The only reason to distinguish *Trachycaulus* from other representatives of pedunculate Corbitellinae is the presence of graphiocome microscleres in a specimen described by Tabachnick (1988). The species described by Schulze (1887a) is very similar to a peduncle of *Saccocalyx* which can also contain some dermal spicules and drepanocomes. If this observation is confirmed *Saccocalyx* would be synonymized with *Trachycaulus*. In fact, *S. pedunculatus* may be synonymous with *T. guirlittii*, whereas a new genus would be created for *Trachycaulus* sp. (Tabachnick, 1988) due to the presence of graphiocomes in this material. However, it is presently impossible to prove the complete similarity between *T. guirlittii* and *Saccocalyx* based on existing material, and consequently the former is considered here as a doubtful genus of Bolosominae, with *Saccocalyx* well-established and well known from material and descriptions.

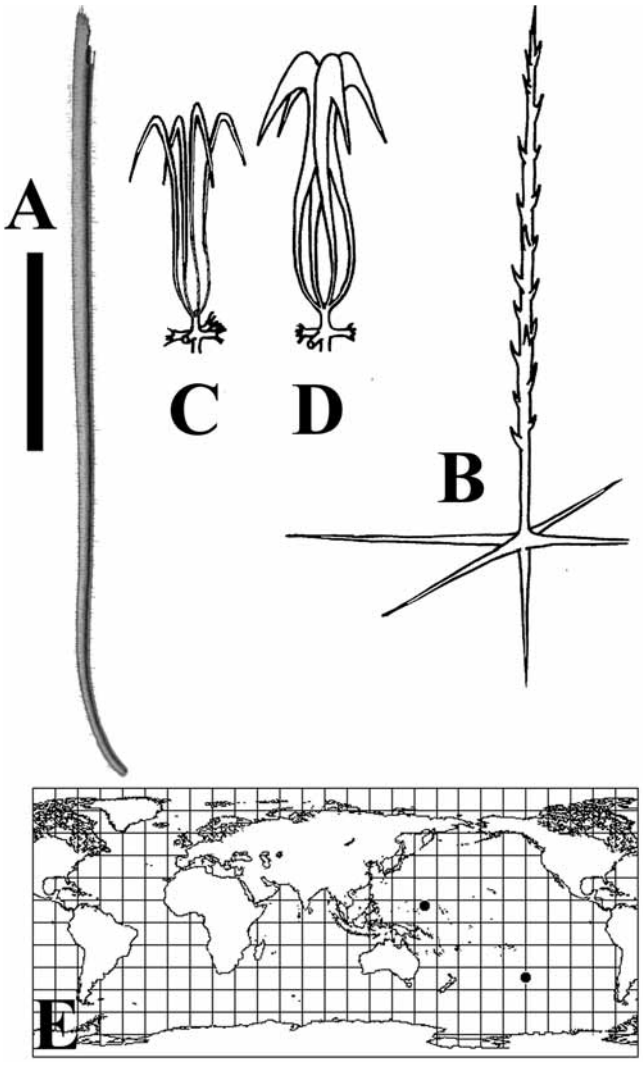

Fig. 15. *Trachycaulus guirlittii*. A, holotype after Schulze (1887a) (scale 30 mm). B, dermal pinular pentactine (300×). C–D, drepanocome (300×). B–D, from Schulze (1887a). E, distribution of *Trachycaulus*.

Distribution

Mid S Pacific and Central Pacific (Fig. 15), depth 1600–4650 m.

VITYAZIELLA TABACHNICK, 1997

Synonymy

Vityaziella Tabachnick, 1997: 151.

Type species

Vityaziella renki Tabachnick, 1997 (by original designation).

Definition

Bolosominae of which the microscleres are represented by amphidiscs and graphiocomes.

Diagnosis

Body is pedunculate, basiphytose, probably cup-like. Choanosomal skeleton is chiefly of diactines. Dermalia and atrialia are hexactines. Microscleres are amphidiscs and graphiocomes.

Description of type species

Vityaziella renki Tabachnick, 1997 (Fig. 16).

Synonymy. *Vityaziella renki* Tabachnick, 1997: 151.

Material examined. Holotype IORAS 5/2/1232 – 'Vityaz', campaign 54, Indian Ocean, West Australian basin, 15°46.6′S 99°54.5′E, depth 5120–4820 m.

Description. The single specimen is swab-like. It may be supposed that it was a cup-like pedunculate sponge. Both dermal and atrial surfaces and atrial cavity are strongly damaged when captured and owing to several years of storage in formalin. Total length of the body is at least 55 mm, diameter is about 45 mm. The tubular peduncle is over 100 mm and 1.5–3.5 mm in diameter. Spicules. Choanosomal skeleton consists chiefly of diactines 0.56–3.50/0.005–0.016 mm with widening or with four rudimentary tubercles in the middle. Additional spicules are hexactines, pentactines and paratetractines. All the choanosomal spicules have the rays with smooth or rough sometimes widened ends. The spicules of the peduncle are parallel diactines, 0.023–0.038 mm in diameter, fused to each other by numerous synapticulars. Dermal and atrial spicules are hexactines. The presence of additional pentactines as in *Amphidiscella* is not obvious. All these spicules are broken. The ray directed outside the wall is more or less widened, smooth or covered with spines, its length is 0.056–0.111 mm. The length of the tangential rays is 0.086–0.296 mm. The diameter of these rays is 0.007–0.030 mm. No spicules with an unbroken ray directed inside the wall were found, nevertheless it seems to be the longest. Microscleres. Microscleres are amphidiscs and graphiocomes. Amphidiscs have two rudimentary rays in the middle, total length 0.017–0.034 mm, the umbel

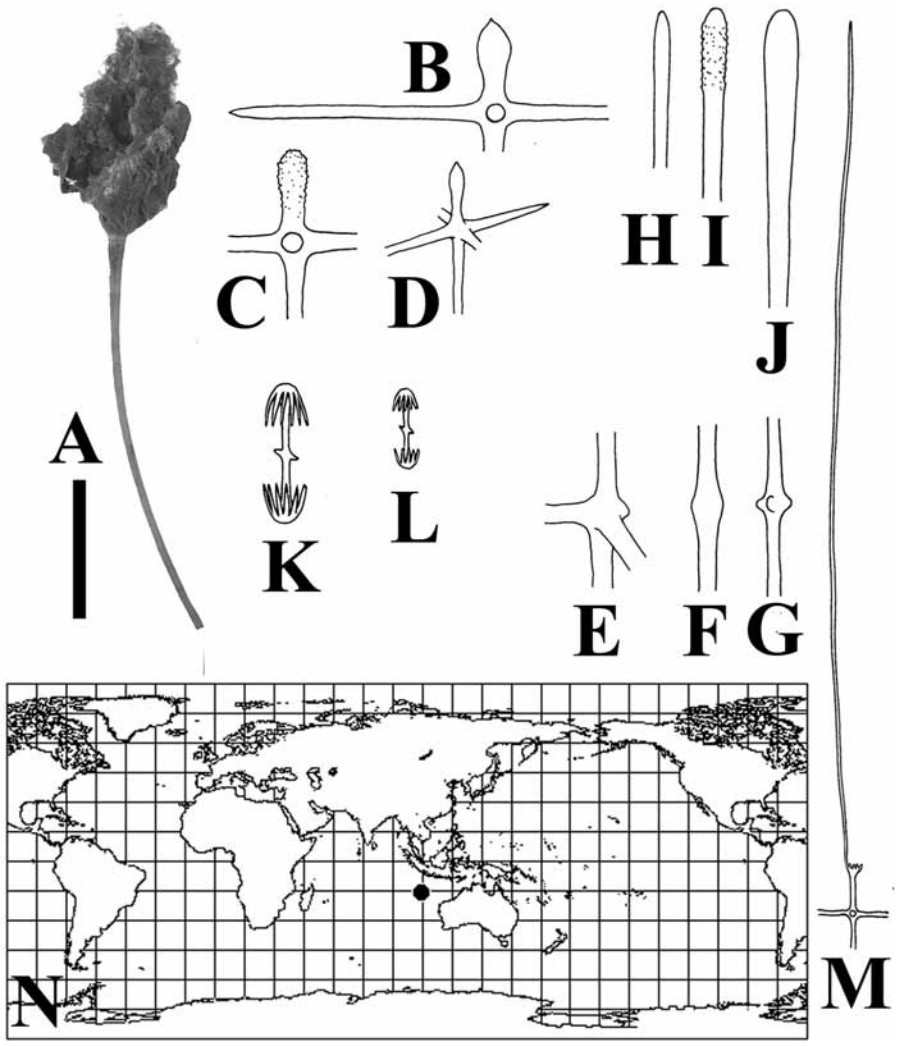

Fig. 16. *Vityaziella renki*. A, holotype (scale 30 cm). B–D, dermal or atrial hexactines 160×. E, choanosomal tauactine 310×. F, choanosomal diactine with widening in the middle 310×. G, choanosomal diactine with four tubercles in the middle 310×. H–J, outer ends of choanosomal spicules 310×. K–L, amphidiscs 620×. M, graphiocome 620×. B–M, from Tabachnick (1997). N, distribution of *Vityaziella*.

length 0.004–0.011 mm, the umbel diameter 0.004–0.009 mm. Graphiocomes are 0.297–0.459 mm in diameter, the diameter of primary rosette is 0.019–0.022 mm.

Remarks. This monotypic genus is similar to the genus *Amphidiscella* (Tabachnick & Lévi, 1997b) differing in their respective microsclere compositions. Fusion of skeleton by synapticulars junctions takes place in the peduncle only.

Distribution

Indian Ocean (West Australian basin) (Fig. 16), depth 4820–5120 m.

SUBFAMILY CORBITELLINAE GRAY, 1872

Synonymy

Corbitellidae Gray, 1872: 457. Taegerinae Schulze, 1886: 41; 1887a: 94; 1895: 49. Corbitellinae Ijima, 1902a: 30. Euplectellinae, in part (*Regadrella* Schulze, 1886, 1887a).

Definition

Basiphytose Euplectellidae attached directly by their lower part (without well-recognizable peduncle).

Diagnosis

See remarks below.

Scope

12 genera, low and temperate latitudes, depth 30–4732 m.

Remarks

The subfamily Corbitellinae was first erected by Gray but its scope gives reasons to consider it as a junior synonym of Euplectellidae Gray, 1867a. So the 'idea' of this subfamily (type genus, definition and scope) corresponds better to the earlier Taegerinae of Schulze (1886) and Corbitellinae Ijima (1902a). In this publication I propose to divide the previous concept of

subfamily Corbitellinae into two subfamilies: Corbitellinae (*sensu stricto*) and the new subfamily Bolosominae. The scope of Corbitellinae (*sensu novo*) contains 12 genera: *Corbitella*; *Atlantisella* gen. nov.; *Dictyaulus*; *Dictyocalyx*; *Hertwigia*; *Heterotella*; *Ijimaiella* gen. nov.; *Pseudoplectella*; *Regadrella*; *Rhabdopectella*; *Symplectella* (previously in Rossellidae) and *Walteria*.

In addition to the absence of peduncle and basiphytose type of fixation the body is generally tubular with thin basidictyonal skeleton plate. The lateral oscula are known in most representatives but they are different: numerous, small and rounded (similar to some Euplectellinae – *Euplectella*) in *Corbitella*, *Dictyaulus*, *Heterotella*, *Pseudoplectella*, *Regadrella* and *Walteria leuckarti*; rare and rounded in *Rhabdopectella* and *Ijimaiella*; numerous, large, irregular in shape, situated between thin beams of skeleton in *Dictyocalyx* and *Walteria flemmingi*. Similar to *Euplectella* the lateral oscula of these genera are likely to develop through the mechanism of compensation of marginal growth (as it is suggested for some Hexactinosida by Reid, 1964). The external shape of *Hertwigia* is unknown but it is suspected to be composed of dichotomously branching and anastomosing tubes with numerous oscula similar in shape and size. The sieve-plate is present in many genera. In some genera the upper part of specimens is unknown (*Atlantisella*, *Ijimaiella*, *Dictyocalyx*). The well-recognizable thin and long tubular peduncle is absent but the lower part often becomes gradually thinner in funnel-like sponges.

Walls are thin and rigid. Junctions of choanosomal spicules by synapticulars is common in most parts of a body, except small specimens and upper parts of large specimens. Prostalia lateralia when present are developed as the distally directed ray of large and thick choanosomal pentactines or hexactines (similar to Euplectellinae). Choanosomal spicules vary in different genera as well as in Euplectellinae, they are combinations of stauractines, tauactines, diactines, sometimes hexactines and pentactines.

In most specimens dermalia are usually hexactines sometimes with rare pentactines while atrialia are scarce pentactines (rarely together with hexactines): *Ijimaiella*, *Regadrella*, *Rhabdopectella*, *Pseudoplectella*, *Walteria*, *Corbitella*, *Dictyaulus*. The specific atrial spicules are absent in *Heterotella* and *Dictyocalyx*. *Hertwigia* is considered to have both dermal and atrial spicules of the same type – pinular hexactines. Specific dermal and atrial spicules are found in *Atlantisella*. In *A. incognita* (described here) dermalia and atrialia are mainly pentactines with long and strong spines distally directed and situated on the tangential rays. In the other species of this genus (undescribed) hexactines predominate the pentactines among both dermalia and atrialia.

Microscleres are variable as in the other subfamilies of Euplectellidae. The genus *Symplectella* which was initially related with some hesitations to Rossellidae (Dendy, 1924) I consider to be a representative of Euplectellidae – Corbitellinae. This genus is one of the most outstanding in the subfamily and hence its features are worthy of further discussion. The external body shape of *Symplectella* (Bergquist and Reiswig personal communications) is composed of a large globular central part with globular outgrowths making a circle in the lower part of the former. The sieve-plate covers the large central part and each lateral outgrowth. Such lateral outgrowths are not characteristic for Corbitellinae. Nevertheless specimens with tubular body irregularly dichotomously branching into large and small tubes each with its own sieve-plate were found in Corbitellinae (i.e., *Regadrella okinoseana* off the New Caledonia (unpublished materials)). Similarly, in the subfamily Bolosominae branching similar to *Symplectella* is common. Pentactines in dermal skeleton were the main feature which may have led Dendy (1924) to place the genus in Rossellidae. At that time only juveniles of Euplectellidae were considered to have dermal pentactines instead of hexactines (Ijima, 1901), whereas later it was discovered that pentactines predominate in dermalia of *Atlantisella incognita*. I consider that dermalia in *Symplectella* are hexactines, pentactines, rarely stauractines and other derivatives. Unlike the typical dermal spicules of Euplectellidae with long thin rays, the dermal spicules of *Symplectella* have short and thick rays but they are very similar to spicules of a sieve-plate in some Corbitellinae which are also small with short and thick rays. The presence of a choanosomal skeleton composed of diactines does not seriously contradict the existing sets of corresponding spicules in Euplectellidae-Corbitellinae. The absence of atrialia is rather a feature of some Corbitellinae and some Euplectellinae than of Rossellidae. As for calycocomes these were considered to be specific to *Rossella* (Rossellidae) whereas now calycocomes are well known in some representatives of *Holascus* (Euplectellinae) and now described for *Caledoniella* (Bolosominae). The final distinguishing feature of *Symplectella* is the absence of hypodermal pentactines. Despite the fact that there are doubtless some representatives of Rossellidae that have no such spicules this feature characterizes Euplectellidae rather than Rossellidae. Hence, the justification to relate *Symplectella* to Euplectellidae (Corbitellinae) has a better foundation than that which I can imagine for the unity with Rossellidae (since Dendy did not do so himself).

The suggested key to genera of Corbitellinae is preliminary given the current discovery of new species of existing genera and new material of existing species that will provide more precise definitions and consequently strongly modify their diagnoses.

KEY TO THE GENERA OF CORBITELLINAE

(1) Body (or at least its lateral wall) is plexiform (composed of dichothomously branching-anastomosing tubes); dermalia and atrialia are pinular hexactines ..... ***Hertwigia***
Body is tubular, saccular or spherical (lateral outgrowths are possible) 2
(2) With numerous small rounded lateral oscula regularly situated (typical 'venus flower basket' form) 3
The lateral oscula have different diameter, irregularly situated or absent 7
(3) Microscleres with discoidal outer ends present 4
Microscleres with discoidal outer ends absent 6
(4) Microscleres with oxyoidal outer ends present 5
Microscleres with oxyoidal outer ends absent; rare drepanocomes may be found ..... ***Pseudoplectella***
(5) Graphiocomes present ..... ***Corbitella***
Graphiocomes absent ..... ***Dictyaulus***

(6) Microscleres with onychoidal outer ends absent; only smooth and spiny microhexactines among spicules with oxyoidal outer ends (no true hexasters) ..... ***Heterotella***
Microscleres with onychoidal outer ends and hexasters (or staurasters) present ..... ***Regadrella***
(7) Graphiocomes present 8
Graphiocomes absent 10
(8) Microscleres with discoidal outer ends present 9
Only staurasters sometimes together with floricomes present besides graphiocomes among microscleres ..... ***Atlantisella***
(9) Spiny microhexactines present, anchorate discohexasters absent, microscleres with onychoidal outer ends may be present ..... ***Walteria***
Anchorate discohexasters present ..... ***Dictyocalyx***
(10) Floricomes absent; calycocomes present; the body is spherical with lateral outgrowths, each unit is provided by a sieve-plate ..... ***Symplectella***
Floricomes present 11
(11) Microscleres with onychoidal outer ends present ..... ***Ijimaiella***
Microscleres with onychoidal outer ends absent ..... ***Rhabdopectella***

CORBITELLA GRAY, 1867

Synonymy

Corbitella Gray, 1867a: 530. *Alcyonellum* in part – Owen, 1849: 205; *Alcyoncellum* in part – Milne-Edwards 1836: 586; Filhol, 1885: 284 (not Bowerbank, 1867b: 358–359; 1869: 344). *Euplectella* in part – Gray, 1866: 487. *Habrodictyon* Thomson, 1868: 131; Carter, 1873c: 361; in part – Marshall, 1876: 129; Schulze, 1886: 42; 1887a: 99. *Taegeria* Schulze, 1886: 41; 1887a: 94. *Eudictyon* Marshall, 1875: 211; 1876; 129. *Eudictyum;* Schulze, 1886: 43; 1887a: 103; 1900c: 164.

Type species

Alcyoncellum speciosum Quoy & Gaimard, 1833 (by monotypy).

Definition

Corbitellinae with 'venus flower basket' form and microscleres with discoidal, oxyoidal (microhexactines and graphiocomes) and floricoidal outer ends.

Diagnosis

The body is saccular with numerous lateral oscula and with sieve-plate colander-like or with radial elements of prostralia osculaia, basiphytose. Choanosomal spicules are predominately diactines and some other hexactine derivatives – stauractines, triactines. Dermalia are hexactines. Atrialia are pentactines similar to choanosomal ones. Microscleres are discohexactines, hemidiscohexasters and discohexasters, smooth and spiny microhexactines, floricomes and graphiocomes, sometimes discasters.

Description of type species

Corbitella speciosa (Quoy & Gaimard, 1833) (Fig. 17).

Synonymy. *Alcyoncellum speciosum* Quoy & Gaimard, 1833: 302. *Alcyonellum* Owen, 1849: 205; Milne-Edwards 1836: 586; Filhol, 1885: 284 (not Bowerbank 1867b: 353; 1869: 344). *Alcyoncellum* sp. Bowerbank, 1867b: 358–359. *Euplectella speciosa* Gray, 1866: 487. *Habrodictyon speciosum* Thomson, 1868: 131; Carter, 1873c: 361; in part – Marshall, 1876: 129; Schulze, 1886: 42: 1887a: 99.

Material examined. Holotype: MNHN HX26 – off the Mollucas, Indonesia, depth unknown.

Description. The species is known by a single specimen. Total length is 210 mm, the diameter near the upper end is 64 × 62 mm, in the middle – 45 × 42 mm, near the lower end – 36 × 33 mm. The atrial cavity is closed from both upper and lower ends with the sieve- and basal-plates which are very similar to the lateral walls (colander-like). Spicules. Because the sponge is represented by a specimen already deed before capture, the loose spicules are rare and some of them belong to other Hexactinellida. Amphidiscs, pinular pentactines, uncinates belong to some Amphidiscophora. Hexactines with spines near the center, pinular hexactines, spiny discohexactines and rare small discohexasters (Ijima, 1903, fig. 12) are 0.040–0.054 mm in diameter, and with the secondary rays covered with spines, must belong to *Caulophacus*. Scopules and probably some uncinates obviously belong to Hexactinosida. It is not clear whether the loose spicules (see below) of the choanosomal skeleton described by Ijima (1903) have autochthonous origin. The loose choanosomal spicules are diactines associated with some hexactines and occasional tauactines. The diactines have widened part or two, or four tubercles in the middle, their outer ends are rough. The hexactines are of different size with one ray usually longer then the others. The pentactines with the unpaired ray about 0.100 mm the longest were considered by Ijima (1903) to have atrial origin. The doubtful choanosomal spicules are the ones fused into rigid skeleton. They are large diactines 0.02–0.14 mm in diameter connected to each other by numerous synapticulars. Dermalia are hexactines with distal ray 0.015–0.167 mm long, tangential rays 0.091–0.200 mm long, proximal ray 0.243–0.853 mm long. Atrialia are pentactines with tangential rays 0.084–0.167 mm long, proximal rays 0.274–0.578 mm long. These dermal and atrial spicules have smooth rays 0.008–0.012 mm in diameter with outer ends usually rounded and rough. Microscleres. Doubtless autochthonous microscleres are discohexactines and hemidiscohexasters. The others: smooth and spiny microhexactines, floricomes and graphiocomes may be allochthonous. Only secondary rays (rhaphides) of graphiocomes were found by Ijima (1903). Hemidiscohexasters are 0.100–0.145 mm in diameter. They have very small primary rosette of asterous shape (0.007–0.011 mm in diameter). Discohexactines are 0.122–0.126 mm in diameter. Discoidal spicules have toothed discs. Floricomes are very rare

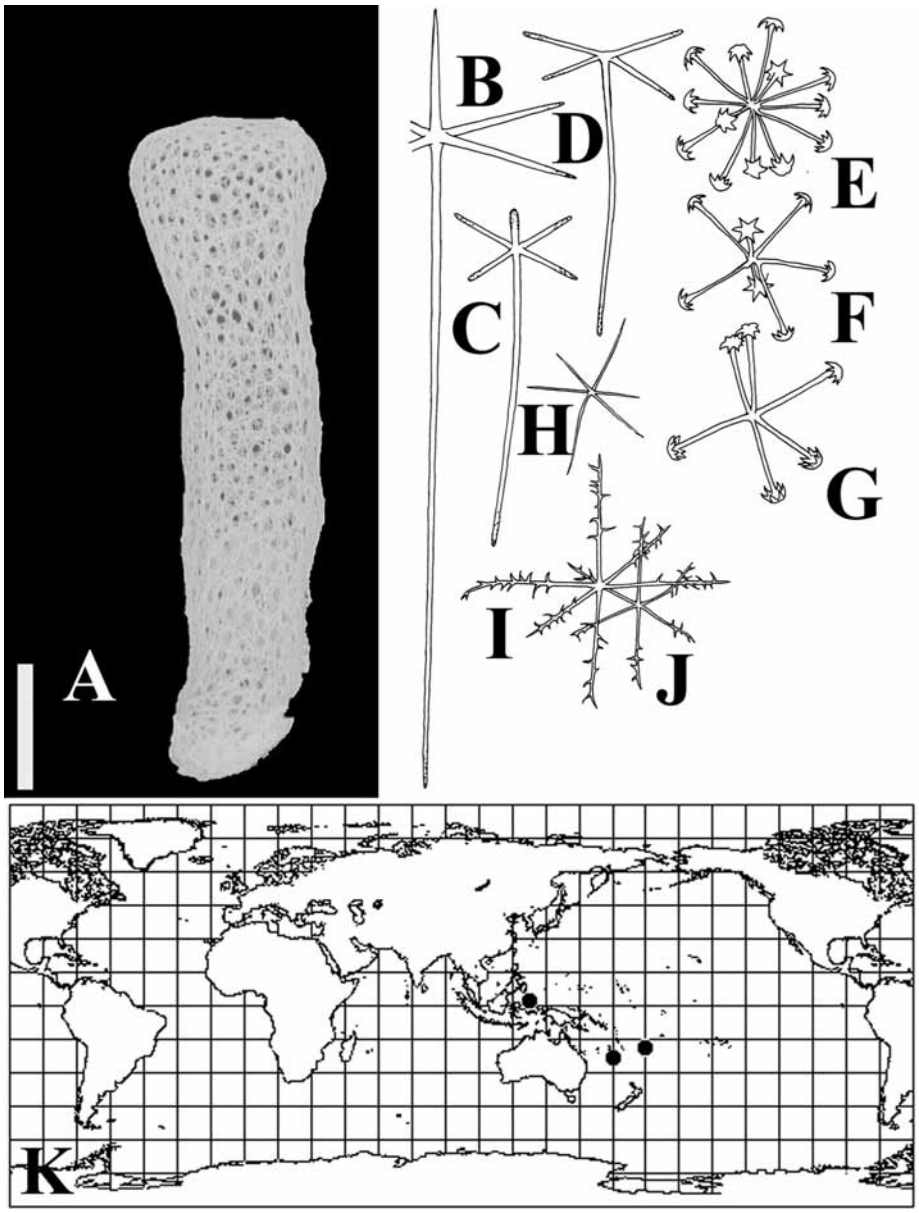

Fig. 17. *Corbitella speciosa*. A, holotype (scale 50 mm). B–C, dermal hexactines 110×. D, atrial pentactine 110×. E–F, hemidiscohexasters 220×. G, discohexactine 220×. H, smooth microhexactine 220×. I–J, spiny microhexactine 220×. B–F; H–J, from Ijima (1903). G, MNHN HX26. K, distribution of *Corbitella*.

being 0.072–0.083 mm in diameter, with primary rosette 0.018 mm in diameter. Microhexactines are 0.120–0.360 mm in diameter.

Remarks. This genus contains three published species, with a fourth species currently in press. The fusion of the skeleton is notable. *Corbitella elegans* may be a junior synonym of *C. speciosa*, however the observed differences in spicules measurements and spicule combinations do not provide sufficient evidence to settle this question at the present moment. The significant difference between *C. pulchra* (previously in *Taegeria*) off Fiji and two doubtless species of *Corbitella* off the Mollucas, which all were united into the latter genus by Ijima (1901, 1927), requires a special mention. The osculum of *C. pulchra* is covered with radially directed free rays of prostalia oscularia, its choanosomal skeleton is composed of predominate stauractines, triactines and diactines, atrial pentactines are well differentiated. Consequently, *Taegeria* should have at least subgeneric status within *Corbitella* due to these differences in choanosomal spicules and sieve-plate construction, but this question requires further investigations prior to any formal proposal to erect such a taxon. Atrial pentactines are similar to that of the choanosomal skeleton. The discohexactines, hemidiscohexactines and discohexasters have discs rather toothed then anchorate.

Distribution

S Pacific (Fig. 17), depth 1115–1665 m.

ATLANTISELLA GEN. NOV.

Type species

Atlantisella incognita sp. nov.

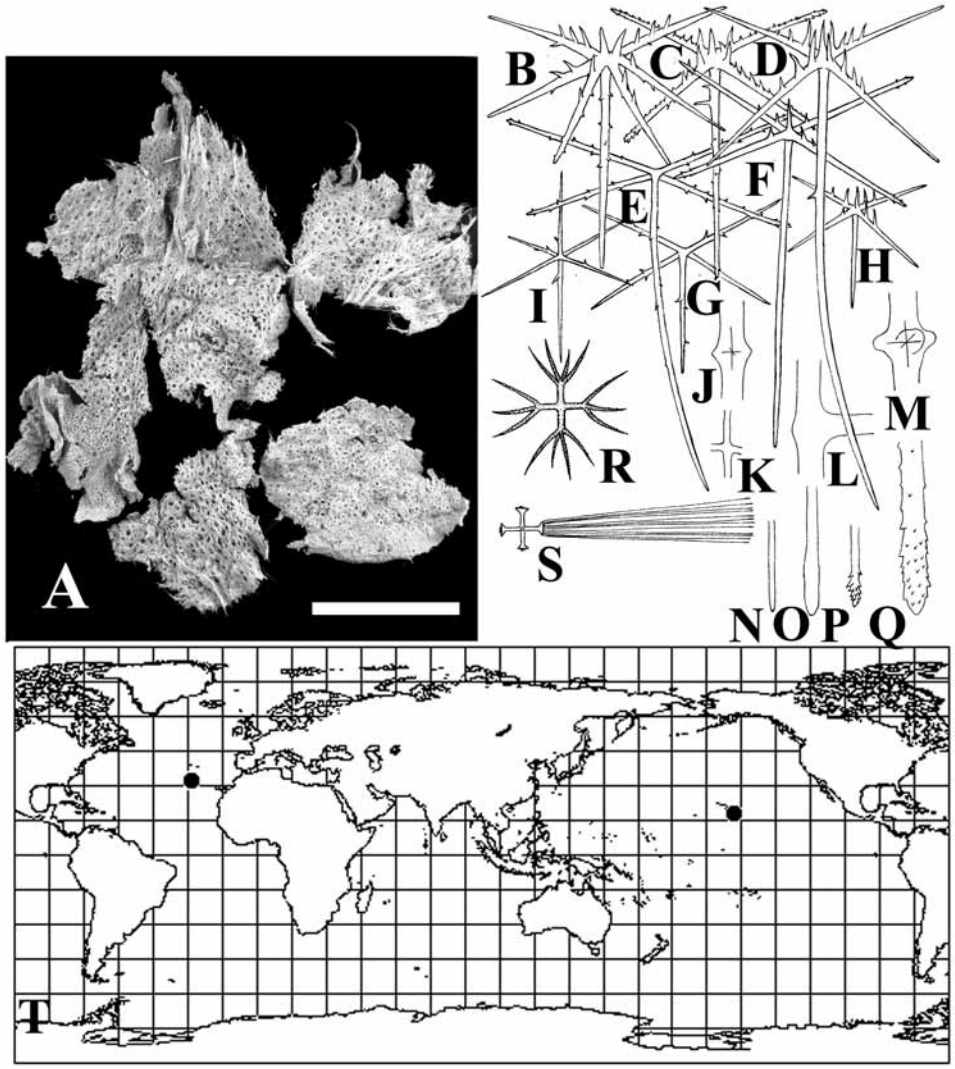

Fig. 18. *Atlantisella incognita* gen. nov., sp. nov. A, fragments of holotype (scale 50 mm). B–H, dermal and atrial pentactines 90×. I, dermal or atrial hexactine 90×. J–M, choanosomal spicules 90×. J, M, choanosomal diactines 90×. K, choanosomal stauractine 90×. L, choanosomal triactine 90×. N–Q, outer ends of choanosomal spicules 90×. R, stauraster 350×. S, graphiocome 170×. B–S, holotype. T, distribution of *Atlantisella*.

Definition

Corbitellinae with tubular body and microscleres of two forms: graphiocomes and stauraster.

Diagnosis

Body is tubular, basiphytose. Choanosomal spicules are diactines, rarely triactines, stauractines and pentactines which often fuse by synapticulars in the lower part of a sponge. Dermalia and atrialia are pentactines sometimes supplemented with hexactines. Microscleres are graphiocomes and stauraster.

Description of type species

Atlantisella incognita sp. nov. (Fig. 18).

Material examined. Holotype: IORAS 5/2/1284 – N Central Atlantic, depth 2820–2350 m. 'Akademic Mstislav Keldysh', 34°27.7–27.0′N 29°56.1–55.8′W, depth 2820–2350 m (fragment also deposited in the BMNH). Paratype: IORAS 5/2/1318 – same locality.

Description. The sponge is presented with numerous sufficiently rigid lamellar fragments 2–4 mm thick. The fragments of the holotype and paratype may belong to the same specimen. Small openings of short canals 1–2 mm in diameter are found on both sides of these fragments. The external shape of the body is unknown. A tubular peduncle 6–10 mm in diameter with walls about 1 mm thick captured on the same station likely belongs to another representative of Hexactinellida. Spicules. Choanosomal spicules are diactines, sometimes triactines and stauractines with rays several mm in length and 0.006–0.017 mm in diameter. They have rounded, usually widened outer ends, smooth or covered with short spines. Diactines predominate the other types of choanosomal spicules. The diactines are smooth or have a widening or four rudimentary tubercles in the middle. The choanosomal spicules are fused by synapticulars in the lower (thickest) parts of the body and

they are loose in the upper part of the body. Dermalia are equal to atrialia. They are pentactines, seldom hexactines with straight or rarely curved rays with rounded or conical outer ends. Tangential rays are 0.123–0.315 mm, the ray directed inside the body is 0.108–0.962 mm, they are 0.009–0.030 mm in diameter near the base. Some spicules have one or two additional tangential rays. All these spicules are covered with spines. Spines are short and sparse or even absent on the rays directed inside the body and on all the rays of analogous hexactines. The spines are long, usually numerous near the base of the tangential rays, they are directed outside the body. Some pentactines have spines or a single spine instead of the sixth ray, usually the longest (sometimes about 2 times longer than neighbour spines). No notable difference between dermal and atrial spicules was found. Microscleres. Microscleres are graphiocomes and staurasters. Graphiocomes are 0.380–0.440 mm in diameter, with primary rosette 0.032–0.044 mm in diameter. Staurasters have 3–4 secondary rays, they are 0.068–0.114 mm in diameter with primary rosette 0.042–0.056 mm in diameter. The secondary rays of staurasters and sometimes the primary ones are rough.

Remarks. The genus contains two species, one published and one currently being described. In the type species the lateral oscula and sieve plate are unknown. Both dermal and atrial spicules are covered with spines. Spines of tangential rays are usually directed outside the body. Some abnormal pentactines of *A. incognita* have more then four tangential rays. The proximal ray of dermal and atrial hexactines in *A. sp.* off the Hawaii is often pinular.

The position of this curious new genus in the family Euplectellidae was decided on the basis of the composition and structure of its choanosomal skeleton. It clearly belongs to Corbitellinae being basiphytose sponge without a peduncle. The genus is distinguished by the presence of specific dermal-atrial spicules, mostly pentactines in the type species, and original combination of microscleres. Dermal pentactines are not mentioned in previous definitions of the family Euplectellidae but they were found in young *Regadrella* (Ijima, 1901) and in mature *Euplectella timorensis* (Ijima, 1927). These pentactines were considered to be a juvenile or an 'extraordinary feature' not typical of the group. The pentactines of *Atlantisella* are similar in having long spines on the tangential rays directed outside the body to those of *Farrea* (Farreidae) and to some genera of Euretidae, and *Placopegma* (previously in Leucopsacidae). The shape of the pentactines is similar to some analogous pentactines in a fossil sponge *Docoderma rigida* (Finks, 1960) by its long spines. Microscleres of *Atlantisella* are typical for Euplectellidae: graphiocomes are present in several genera and staurasters (except hexasters) are known in some species of *Regadrella*. The latter spicules were found also in *Farrea occa mammillata* (Ijima, 1927).

Distribution

Central Atlantic (S of the Azores), Central Pacific (off Hawaii) (Fig. 18), depth 1549–2350 m.

DICTYAULUS SCHULZE, 1895

Synonymy

Dictyaulus Schulze, 1895: 36.

Type species

Dictyaulus elegans Schulze, 1895 (by monotypy).

Definition

Corbitellinae with 'venus flower basket' form and microscleres with oxyoidal, discoidal, floricoidal and sometimes sigmoidal (drepanocomes and sigmatocomes) outer ends.

Diagnosis

Body is tubular, basiphytose with numerous lateral oscula and a sieve-plate constructed with radially directed prostalia oscularia or colander-like structure, developed from the former. Choanosomal spicules are chiefly stauractines, tauactines and diactines are rare. The spicules of the sieve-plate are hexactines and their derivatives up to diactines. Large choanosomal hexactines with short spiny distal end are not obligate. Dermalia are hexactines. Atrialia are pentactines. Microscleres are spinous hexactines and pentactines, toothed discohexasters or discasters, anchorate discohexasters, floricomes and sometimes drepanocomes and sigmatocomes.

Description of type species

Dictyaulus elegans Schulze, 1895 (Fig. 19).

Synonymy. *Dictyaulus elegans* Schulze, 1895: 36.

Material examined. Holotype: BMNH 1908.09.24.015 – off the Laccadives, 10°47′45″N 72°40′20″E, depth 1290 m. The registration number contains two specimens. The holotype is the smaller of the two and marked 'holotype'. Paratype: BMNH 1907.08.01.008 – SSW of Cupe Comorin – 7°05′45″N 75°04′E, depth 1316 m.

Description. This species is known by two fragments of the upper part of the body: the holotype is at least 100 mm long and 50 mm in diameter, the paratype is at least 180 mm and 110 mm in diameter. Walls are about 1 mm thick. The sieve-plate is constructed with radially directed rays of prostalia oscularia which fuse to each other in the center and seldom in other parts. The sieve-plate is surrounded by a collar of prostalia marginalia about 1 mm high. Spicules. The choanosomal spicules consist chiefly of stauractines and tauactines with rays 0.56–10/0.0076–0.091 mm and notable amount of small hexactines which are described below as microscleres. The sieve-plate consists of prostalia oscularia represented by distal rays of large hexactines. Hexactines forming prostalia oscularia are larger then others. The other spicules of the sieve-plate are similar to the choanosomal ones. Dermalia are hexactines with equal rays. The distal ones sometimes have widened outer end, spherical or rounded. The other five rays are smooth or sparsely covered with short spines. According to the picture accompanying the description (Schulze, 1895), dermalia are pinular hexactines with the pinular ray having conical outer end. The distal ray of dermalia is 0.038–0.365/0.010–0.012 mm, tangential rays are 0.152–0.312 mm long, proximal one is 0.129–0.555 mm long. Nevertheless I have not found pinular rays in these spicules. Atrialia are pentactines usually with slightly widened outer ends which are often rough. The tangential rays of atrialia are 0.144–0.479 mm, distal one is 0.152–0.760 mm, their diameter is about 0.011 mm. Microscleres. The toothed discohexasters are 0.086–0.245 mm in diameter. They are very close to discasters and have relatively small primary rosette 0.014–0.032 mm in diameter. The anchorate discohexasters are very rare, they were not

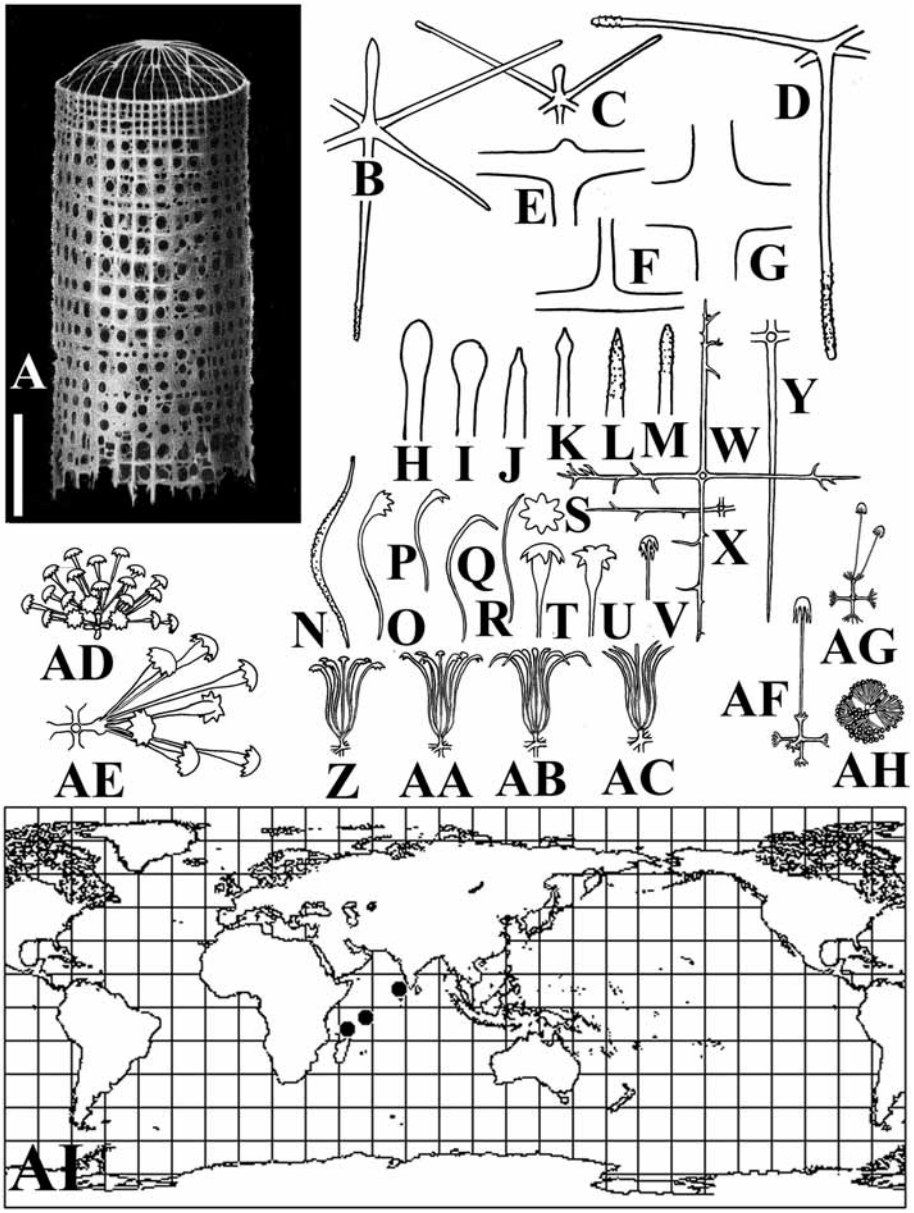

Fig. 19. *Dictyaulus elegans*. A, holotype after Schulze (1902) (scale 20 mm). B–C, dermal hexactines 140×. D, atrial pentactine 140×. E–M, choanosomal spicules and their outer ends 70×. N, R, secondary rays of sigmatocomes 530×. O–P, secondary rays of floricomes 530×. Q, secondary ray of drepanocome 530×. S–U, secondary rays of toothed discohexasters 530×. V, secondary ray of anchorate discohexaster 530×. W–X, spiny microhexactines 260×. Y, smooth hexactine 260×. Z–AA, floricomes 260×. AB, drepanocome 260×. AC, sigmatocome 260×. AD–AE, toothed discohexasters 260×. AF–AG, anchorate discohexasters 530×. AH, anchorate discohexaster 260×. B–N, W–Y, BMNH 1908.09.24.015. O–V, Z–AH, from Schulze (1902). AI, distribution of *Dictyaulus*.

found in the holotype. These spicules are notably smaller, the toothed discohexasters being 0.047–0.058 mm in diameter, they have numerous secondary rays. Another categories of discohexasters was described by Schulze (1900c), they are toothed discohexasters with 5–7 secondary rays; they are 0.060–0.080 mm in diameter with primary rosette about 0.012 mm in diameter. The sigmatocomes 0.090–0.137 mm in diameter are very similar to drepanocomes 0.050–0.065 mm in diameter, differing by a considerably greater size and by the absence of abrupt bends in the secondary rays of the former. The secondary rays of sigmatocomes are usually rough at one side like 'bow shape' spicules in *Rhabdopectella tintinnus* (see the corresponding description) or rarely they are smooth. The floricomes are 0.076–0.101 mm in diameter. Each floricoidal outer end has 2–5 fang-like spines. The secondary rays of drepanocomes are very similar to floricoidal ones. Since they have similar sizes it is possible to suggest that drepanocomes originated from floricomes by spine reduction. All the hexasterous microscleres: anchorate discohexasters, floricomes, sigmatocomes and drepanocomes, except toothed discohexasters are rare and they are nearly always broken hence their measures were made by indirect reconstructions. Two other type of spicules in this species are spiny microhexactines with rays 0.059–0.148/0.002 mm and smooth hexactines with rays 0.058–0.220/0.003–0.004 mm. The former are usually about two times smaller than the latter. It is possible to suggest origination of spiny microhexactines from oxyoidal hexasters (in this case spines are derivatives of secondary rays).

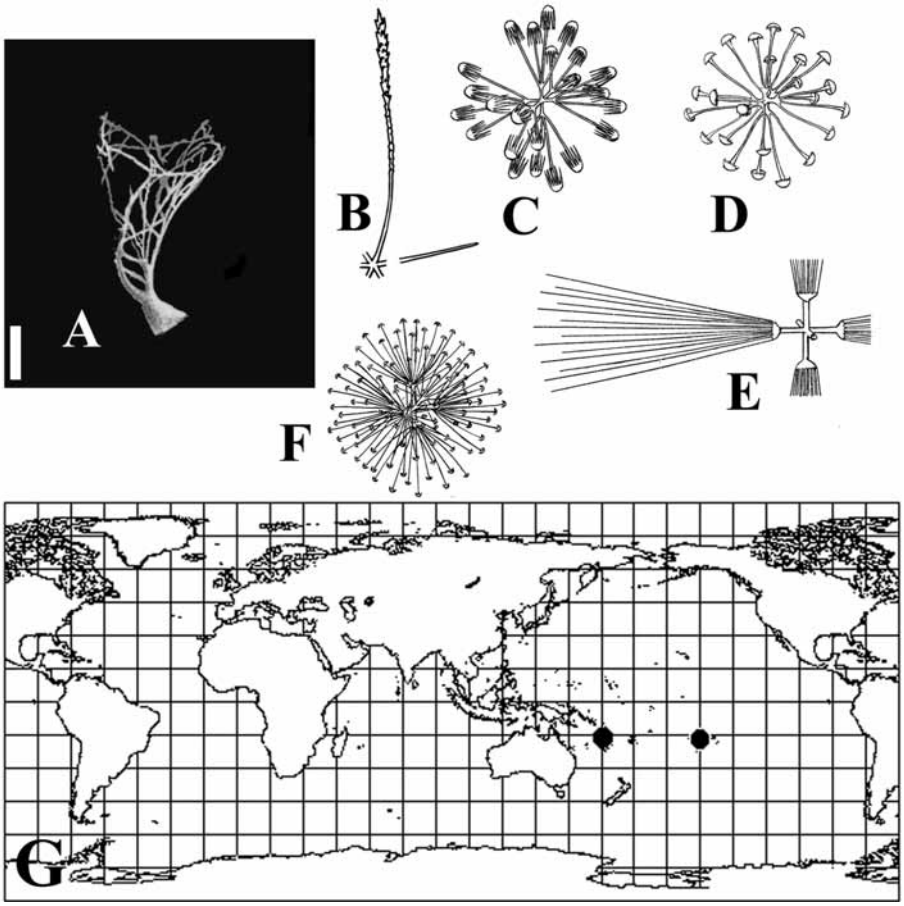

Fig. 20. *Dictyocalyx gracilis*. A, holotype (after Schulze, 1887a) (scale 10 mm). B, dermal hexactine 130×. C, anchorate discohexaster 250×. D, toothed discohexaster 250×. E, graphiocome 250×. F, toothed discohexaster 500×. B, BMNH 1887.10.20.030. C–F, from Schulze (1887a). G, distribution of *Dictyocalyx*.

Remarks. In this genus, currently monotypic but with a second species currently in press, the fusion of the choanosomal skeleton is notable. The diagnosis was supplemented by data on a new (undescribed) subspecies of *Dictyaulus elegans* which has colander-like sieve-plate and no sigmatocomes and drepanocomes among microscleres.

Distribution

N Indian Ocean, S Pacific (Fig. 19), depth 950–2000 m.

DICTYOCALYX SCHULZE, 1886

Synonymy

Dictyocalyx Schulze, 1886: 43.

Type species

Dictyocalyx gracilis Schulze, 1886 (by monotypy).

Definition

Corbitellinae with body of a framework of siliceous beams, microscleres are discohexasters and graphiocomes.

Diagnosis

Basiphytose body is funnel-like with irregularly distributed, rare lateral oscula. Choanosomal spicules are chiefly diactines. All the choanosomal spicules are cemented in irregular manner. Dermalia are hexactines, atrialia are pentactines of which rays are similar to that of choanosomal spicules. Microscleres are anchorate discohexasters, toothed discohexasters or discoctasters, graphiocomes, floricomes and sometimes hexactines.

Description of type species

Dictyocalyx gracilis Schulze, 1886 (Fig. 20).

Synonymy. *Dictyocalyx gracilis* Schulze, 1886: 43.

Material examined. Holotype: BMNH 1887.10.20.030 – 'Challenger', 22°21′S 150°17′W, depth 4400 m.

Description. This species is known by one fragment at least 25 mm in length and about 18 mm in maximal diameter of the upper part. One lateral side seems to be open inferiorly at a lower basal part and closed above. Beams of the framework are about 2–3 mm in diameter, they are thinner upwards. Spicules. Choanosomal spicules are chiefly diactines with prolonged rays. All the choanosomal spicules are cemented in irregular manner. Dermalia are hexactines. The distal ray is pinular, the other rays are smooth, conically pointed. The distal ray is about 0.300 mm long, tangential rays are 0.330–0.360 mm long, they are

0.006–0.008 mm in diameter. Atrialia were not found. One smooth hexactine with all rays equal 0.23/0.007 mm was found and may be considered as deformed dermal, or atrial, or choanosomal spicule. Microscleres. Microscleres are toothed and anchorate discohexasters and graphiocomes. The discohexasters are of two kinds with ordinary and unusually numerous amount of secondary rays. The discohexasters with numerous secondary rays have small discs, intermediate between toothed and anchorate. Investigating a fragment of the holotype I have not found microscleres at all. Their descriptions and measures (see below) are given according to Schulze (1887a). Anchorate discohexasters are about 0.127 mm in diameter with primary rosette about 0.022 mm in diameter. Toothed discohexasters with numerous secondary rays are about 0.060 mm in diameter with primary rosette about 0.016 mm in diameter. Toothed discohexasters with common amount of secondary rays are about 0.111 mm in diameter with primary rosette about 0.020 mm in diameter. Graphiocomes according to their illustrations have relatively short rays which are gathered in widened clusters so that the graphiocome becomes similar to pappocome. The diameter of graphiocome is about 0.377 mm, the primary rosette is about 0.050 mm in diameter. A floricome is figured on a plate (Schulze, 1887a, pl. XII, fig. 7) as a spicule of *D. gracilis*. Unfortunately it is not mentioned in the text and its belonging to this species is problematic. Floricomes are known in *Rhabdopectella tintinnus* which is figured on the same plate and may be it is a mistake in the plate-footnote comments.

Remarks. The genus is currently monotypic, although a second species is currently in press. Prior to the present work *Dictyocalyx* was poorly known from only part of a single specimen represented by a lower part which consists of a framework of siliceous beams. The choanosomal skeleton is notably fused. Atrialia are not described for the type species. Toothed discohexasters are presented by two varieties with ordinary and unusually numerous numbers of secondary rays. Another specimen off New Caledonia also consists on of the lower part, which is funnel-like with irregularly distributed lateral oscula. The atrial spicules which are given in the diagnosis are unknown for *D. gracilis*. The microsclere composition off the New Caledonian material consists of toothed discoctasters, anchorate discohexasters, floricomes, graphiocomes and hexactines. According to Schulze (1887a) *Dictyocalyx* is related to *Rhabdodictyum delicatum* Schmidt, which was later transferred to Aulocalycidae by Ijima (1927). However, evidence derived from the new specimen from New Caledonia suggests a closer relationship between *Dictyocalyx* and *Walteria*, and moreover, differences betwen these genera are not greatly significant at the generic level: *Dictyocalyx* has discohexasters with anchorate discs and its hexactines are not spiny while *Walteria* has spiny hexactines and no anchorate discs. Nevertheless, at this time I do not consider it appropriate to merge these two genera given that they have some differences between their graphiocome construction which may prove to be a significant generic feature. *Walteria* has common graphiocomes with disc-like primary rays and numerous thin secondary rays while graphiocomes in both known species of *Dictyocalyx* are similar to pappocomes without disc-like primary rays and with few rather thick secondary rays.

Distribution

S Pacific (Fig. 20), depth 489–4400 m.

HERTWIGIA SCHMIDT, 1880

Synonymy

Hertwigia Schmidt, 1880b: 41.

Type species

Hertwigia falcifera Schmidt, 1880b (by monotypy).

Definition

Corbitellinae with plexiform walls (composed of dichotomously branching-anastomosing tubes), microscleres vary having discoidal, sigmoidal (drepanocomes and plumicomes), oxyoidal and floricoidal outer ends.

Diagnosis

Body is plexiform composed of tubes with numerous oscula, basiphytose. Choanosomal spicules are diactines, rarely tauactines and other hexactine derivatives, fused by synapticulars. Dermalia and atrialia are pinular hexactines. Microscleres are toothed spirodiscohexasters, spherical discohexasters, drepanocomes, spiny hexactines and sometimes plumicomes, hexasters and floricomes.

Description of type species

Hertwigia falcifera Schmidt, 1880b (Fig. 21).

Synonymy. *Hertwigia falcifera* Schmidt, 1880b: 62.

Material examined. Holotype (? fragment): BMNH 1910.01.10.477 – off Dominica Island, depth 1117 m. Other material. IORAS 5/2/1304 – 'Akademic Mstislav Keldysh', 58°21.1–21.0′N 31°36.9–35.6′W, depth 1670–1750 m. IORAS 5/2/905 – 'Akademic Mstislav Keldysh', 58°21.3–20.8′N 31°38.5–37.0′W, depth 1620–1650 m. IORAS 5/2/1305 – 'Akademic Mstislav Keldysh', 58°25.1–25.1′N 31°32.7–33.6′W, depth 1635–1465 m. IORAS 5/2/0 – 'Vityaz-2', 29°56.0′N 28°16.8′S, depth 960–1140 m. IORAS 5/2/0 – 'Vityaz-2', 35°38.8′N 52°03.2′W, depth 1940–2040 m. MNHN (p4119) – Biacores, 'Jean Charcot', 37°56′N 24°49.50′W, depth 1750–1650 m. USNM (kt1052; kt1048) – 'Columbus Iselin', CI-8007.

Description. The holotype according to the description is a fragment of basal part – about 100 × 35 mm. It is small and the tubular-anastomosing structure is not visible. The piece of the holotype stored in the Natural History Museum (London) is a fragment which contains fused choanosomal spicules without loose ones. Other sponges which I have seen are represented with fragments about 150 × 100 × 100 mm. The tubes are about 10 mm in diameter with thin walls about 1 mm in thickness. Spicules. Most investigated materials have no loose spicules, being represented with rigid skeleton of fused spicules. Only two fragments contain loose spicules: (p4119) and 5/2/1305. Choanosomal spicules are diactines, rarely triactines and tauactines. These spicules are fused to each other by synapticulars. The choanosomal spicules have rays several mm long with rounded outer ends, 0.008–0.129 mm in diameter. Dermalia and atrialia are pinular hexactines. The pinular ray is even and equal in diameter to the other rays, it is covered with small spines. The tangential rays are smooth with short spines near the outer ends. The outer ends of dermal and atrial pinular spicules are conically pointed or rarely rounded. Pinular ray

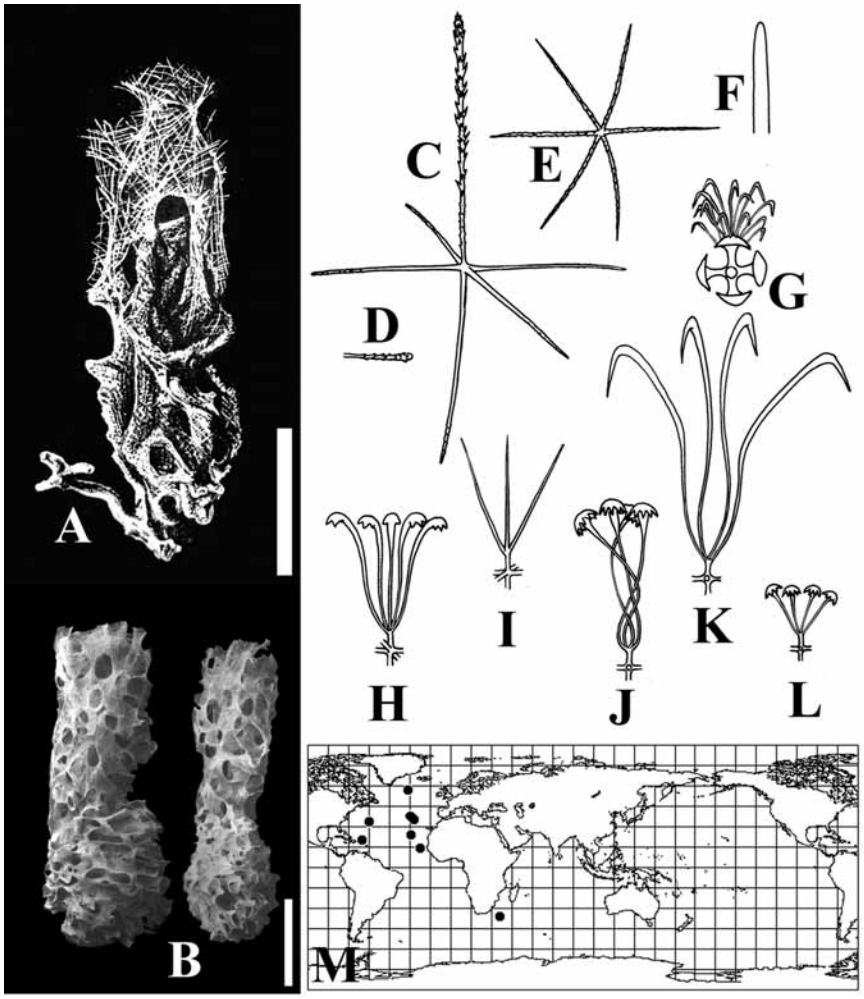

Fig. 21. *Hertwigia falcifera*. A, holotype after Schmidt (1880b)(scale 30 mm). B, specimen after Schulze (1904)(scale 50 mm). C, dermal pinular hexactine 120×. D, outer end of a ray of dermal pinular hexactine 120×. E, choanosomal spinouse hexactine 120×. F, outer end of large choanosomal diactine 120×. G, plumicome 460×. H, floricome 460×. I, hexaster 460×. J, spirodiscohexaster 460×. K, drepanocome 460×. L, discohexaster 460×. C–F, J–L, IORAS 5/2/1305. G, MNHN (p4119). H–I, from Schulze (1899). M, distribution of *Hertwigia*.

of dermal hexactine is 0.152–0.524 mm, tangential rays are 0.150–0.380 mm, the ray directed inside the body is 0.144–0.593 mm. Pinular ray of atrial hexactines is 0.167–0.494 mm, tangential rays are 0.155–0.252 mm, the ray directed inside the body is 0.192–0.593 mm. Their diameter is 0.007–0.011 mm. Microscleres. Toothed spirodiscohexasters, toothed spherical discohexasters, drepanocomes and spiny hexactines were found in all the investigated specimens. Plumicomes, hexasters and floricomes were found in some representatives only. Hexasters and floricomes were described from a single specimen by (Schulze, 1899). Spirodiscohexasters are 0.75–0.141 mm in diameter with primary rosette 0.006–0.022 mm in diameter. Toothed spherical discohexasters are 0.040–0.081 mm in diameter with primary rosette 0.007–0.016 mm in diameter. Drepanocomes are 0.133–0.360 mm in diameter with primary rosette 0.007–0.015 mm in diameter. Plumicomes were not found in 5/2/1305, in other specimens they are 0.050–0.076 mm in diameter with primary rosette 0.020–0.026 mm in diameter. Floricomes are about 0.104 mm in diameter with primary rosette 0.014 mm in diameter. Hexasters are 0.100–0.167 mm in diameter with primary rosette about 0.027 mm in diameter. Hexactines are covered with small spines, they have rays 0.074–0.184/0.004 mm.

Remarks. The genus is monotypic. It is still unknown whether the sponge has a regular external shape because all the known specimens are incomplete, broken fragments. According to Schmidt's (1880b) diagnosis it is composed of branching and anastomosing tubes like some primitive *Farrea*, with strong development of synapticulars and very rigid walls. The secondary points of attachment seem to be common in this genus. The microsclere composition varies between different specimens.

Distribution

N Atlantic and off South Africa (Fig. 21), depth 960–3800 m.

HETEROTELLA GRAY, 1867

Synonymy

Heterotella Gray, 1867a: 531; 1872: 457. *Euplectella*, in part, Bowerbank, 1858: pl. 25. *Alcyoncellum*, in part, Bowerbank, 1862b: 1103; 1864: 174; 1867b: 358. *Habrodictyon*, in part,

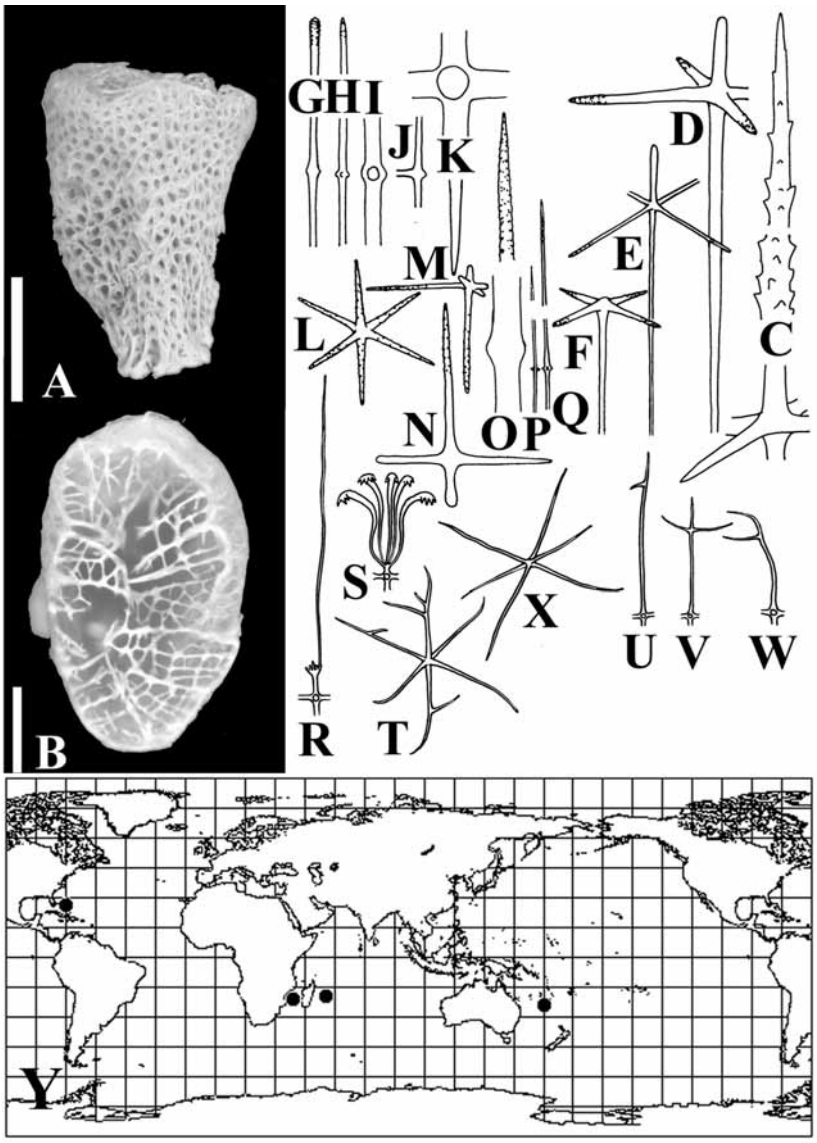

Fig. 22. *Heterotella corbicula*. A, lateral view holotype (scale 50 mm). B, upper view holotype (scale 20 mm). C, prostalia marginalia – pinular hexactine 120×. D–E, dermal hexactines 120×. F, dermal pentactine 120×. G–I, choanosomal diactines 120×. J, choanosomal tauactine 120×. K, thick-rayed choanosomal pentactine 120×. L–Q, spicules of sieve-plate 120×. L–M, hexactines. N, stauractine. O, thick-rayed diactine. P–Q, thin-rayed diactines. R, graphiocome 450×. S, floricome 450×. T–W, spiny hexactines or hemihexasters 450×. U–V, 450×. X, hexactine 450×. C–F, from Ijima (1902a). G–X, MNHN (p3161). Y, distribution of *Heterotella*.

Thomson, 1868: 129; Carter, 1873c: 361; Marshall, 1876: 129. *Habrodictyum*, in part, Schulze, 1886: 42; 1887a: 99.

Type species

Alcyoncellum corbicula Bowerbank, 1862b (by monotypy).

Definition

Corbitellinae of 'venus flower basket' form, microscleres have oxyoidal (microhexactines and graphiocomes), floricoidal and sometimes sigmoidal outer ends.

Diagnosis

Body is tubular, basiphytose with numerous lateral oscula and with colander-like sieve-plate. Choanosomal spicules are thin diactines and thick-rayed spicules: diactines, tetractines and hexactines. The skeleton of the sieve-plate is formed of diactines, hexactines and other hexactine derivatives. Dermalia are hexactines and pentactines. Atrialia, if present, are hexactines and pentactines. Microscleres are smooth and spiny microhexactines, graphiocomes, floricomes and sometimes sigmatocomes.

Description of type species

Heterotella corbicula (Bowerbank, 1862b) (Fig. 22).

Synonymy. *Euplectella* sp. Bowerbank, 1858: pl. 25. *Alcyoncellum corbicula* Bowerbank, 1862b: 1103; 1864: 174; 1867b: 358. *Alcyoncellum sp.* Bowerbank, 1864: pl. 7, fig. 187. *Habrodictyon corbicula* Thomson, 1868: 129; Carter, 1873c: 361. *Habrodictyon speciosum* in part Marshall, 1876: 129. *Habrodictyum speciosum* in part Schulze 1886: 42; 1887a: 99. *Corbitella corbicula*; Schulze, 1900c: 156.

Material examined. Holotype: MNHN HX23 (p1361) – off the Island of Bourbon (=Réunion), W Indian Ocean, 21°05′S 55°30′E, depth 146 m. Other material. MNHN HX23 (p3824; p1363) – same locality.

Description. The holotype was redescribed by Ijima (1902a) as 'specimen B'. It is a complete tubular specimen, total length 105 mm, the largest diameter is 92 × 96 mm, the sieve-plate is 50 × 60 mm in diameter. Specimen "C" MNHN (p1363) is an upper part of a sponge with the sieve-plate 54 × 68 mm in diameter and with small portion of the lateral walls. Specimen "A" MNHN (p3824) is also an upper part of a sponge. Its total length is over 40 mm, the sieve-plate is 50 × 58 mm in diameter. Spicules. The common choanosomal spicules are thin diactines with a widening or with four rudimentary tubercles in the middle. They are about 5/0.01 mm. Hexactines, stauractines and tauactines of same diameter are found occasionally. The thick choanosomal spicules are about 0.03–0.0 mm in diameter. They are chiefly diactines up to 15 mm long with or without a widening in the middle, but pentactines, hexactines and some other hexactine derivatives with rays 0.4–1.5 mm are also present. The spicules of the sieve-plate are thin diactines and notable amounts of hexactines and their derivatives up to monactines. Choanosomal diactines of the sieve-plate are 0.14– 0.78/0.004–0.010 mm. The rays of choanosomal hexactines of the sieve-plate are 0.074–0.220/0.004–0.015 mm. The thick-rayed choanosomal spicules of the sieve-plate are similar to those of the walls. The outer ends of choanosomal spicules are rounded, spherical, usually covered with short spines. In thick-rayed spicules the outer ends are often smooth. Marginalia (prostalia marginalia) are pinular hexactines which are connected with dermalia by intermediate sizes and forms (Ijima, 1902a). Their pinular ray is covered with tubercle-like spines being over 1 mm long and about 0.04 mm thick near the base. Dermalia are hexactines and pentactines. They have smooth rays and rough, conically pointed outer ends. Dermal pentactines often have a tubercle instead of the distal ray. The distal ray (if it is a hexactine) is 0.015–0.274 mm long, tangential rays are 0.061–0.441 mm long, proximal ray is 0.106–1.163 mm long, their diameters are 0.008–0.030 mm at base. Some hexactines and pentactines, of dermal or uncertain atrial origin were found in the preparations from the atrial surface. Ijima has considered the rarely found pentactines with more slender rays to be atrial ones, according to his description they are "occasionally met with in isolated positions". Microscleres. Microscleres are smooth and spiny hexactines, hemihexasters, graphiocomes and floricomes. Their is no hiatus between the former three types of microscleres since often it is impossible to decide to a long spine or to one of "initial" six rays a structure should be attributed. Hexactines and hemihexasters are 0.044–0.207 mm in diameter. Floricomes are 0.059–0.141 mm in diameter, with primary rosette 0.007–0.015 mm in diameter. Graphiocomes are 0.141–0.215 mm in diameter, with primary rosette 0.006–0.011 mm in diameter.

Remarks. The question of whether or not the specific atrial spicules are present in the type species requires further investigation. These rare spicules from the atrial surface spicules (pentactines or hexactines) may have a dermal origin as well as an atrial one. Rare atrial spicules are found in many representatives of Euplectellidae but they may be a result of artificial transfer of dermal spicules.

The genus *Heterotella* is currently monotypic, although two new species are currently in press, and the description of another new species is currently in preparation. The fusion of the choanosomal spicules is nearly absent in two species from the Indian Ocean but notably developed in a specimen from the Pacific Ocean (off Indonesia). Thick and long-rayed choanosomal elements are well described in a specimen of an undescribed species off the Comoro Islands. Diactines are always slightly curved in the middle so it is impossible to decide whether they are rhabdodiactines or orthodiactines. Two pairs of opposite rays of tetractines are bent at their ends so these spicules may be considered as stauractines or paratetractines. Hexactines have tangential rays the longest, the distal ray is covered with numerous tubercles. The presence of atrialia requires further investigation. In a new species atrialia seems to be entirely absent. Spiny microhexactines in *H. corbicula* have long and rare spines so some of these spicules are similar to hemihexasters in shape. These spicules in a species off New Caledonia have relatively short spines so the spicule is a doubtless hexactine and not a hexaster as in other species. In specimens examined off S Africa (although not yet described) and in two species from the Carribean Sea (*H. pomponae* Reiswig, 2000) and off New Caledonia the microscleres are supplemented with sigmatocomes which, in the South African species, are connected with floricomes by a row of intermediate forms.

Distribution

W Indian Ocean, S Pacific, W Atlantic (Fig. 22), depth 146–480 m.

IJIMAIELLA GEN. NOV.

Type species

Ijimaiella beringiana sp. nov.

Definition

Corbitellinae with tubular body, lateral oscula of different diameter irregularly situated, microscleres have oxyoidal, floricoidal, discoidal and onychoidal outer ends.

Diagnosis

Body is tubular with lateral oscula and prostalia lateralia of large hexactines, basiphytose. Choanosomal spicules are diactines, rarely triactines. Dermalia are hexactines. Atrialia are hexactines and pentactines. Microscleres are regular hexasters (similar to graphiocomes with short secondary rays); hemihexasters and rarely hexactines; floricomes; large thick-rayed hexactines, hexasters, hemihexasters, pentactines and their derivations: deformed spicules with various outer ends – discoidal, onychoidal, floricoidal; small thin rayed hemihexasters, asters, hexactines and their derivations: deformed spicules with onychoidal or discoidal outer ends.

Description of type species

Ijimaiella beringiana sp. nov. (Fig. 23).

Material examined. Holotype: IORAS 5/2/2048 – off Bering Island, 'Akademic Mstislav Keldysh', 55°36.08′–35.00′N 167°23.04′–24.46′E, depth 4200–4294 m. Paratypes (8): IORAS 5/2/2165, 5/2/2190, 5/2/2192, 5/2/2206, 5/2/2209, 5/2/2220, 5/2/2222, 5/2/2298 – same locality.

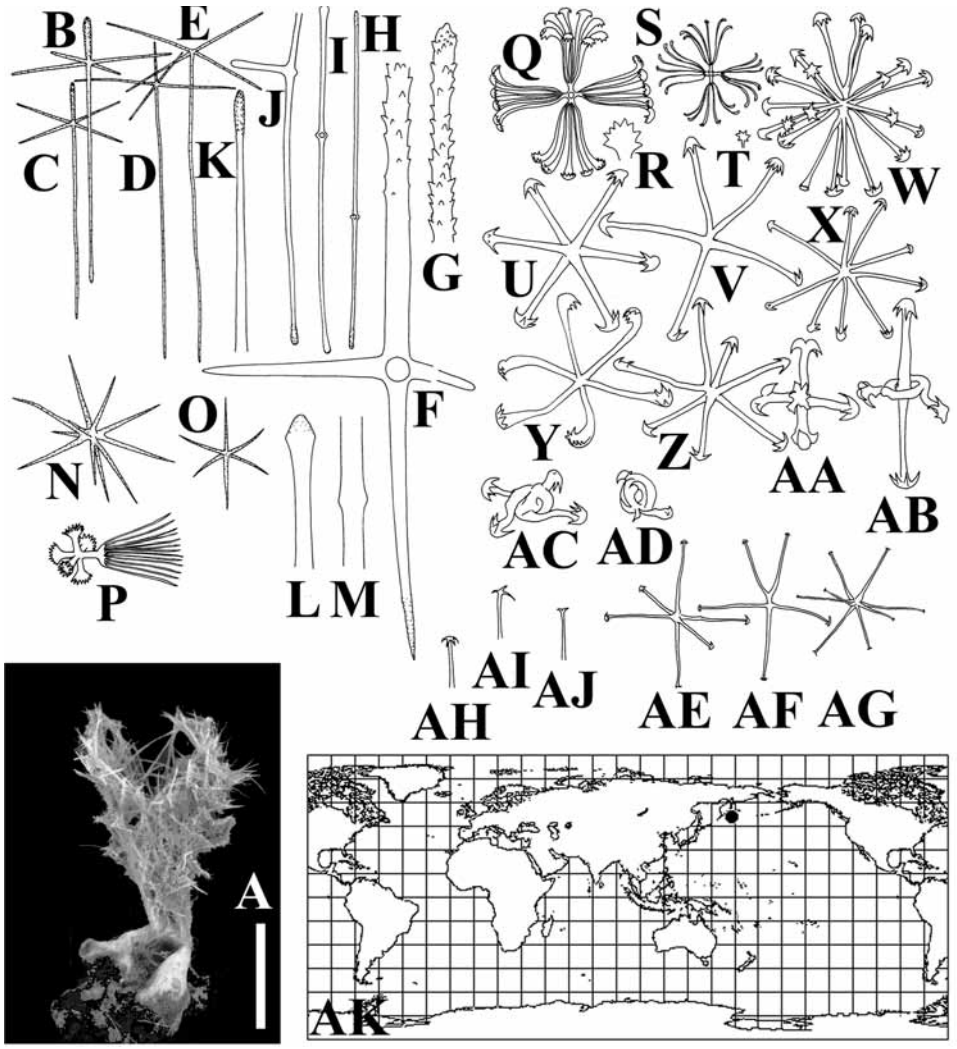

Fig. 23. *Ijimaiella beringiana* gen. nov., sp. nov. A, holotype (scale 50 mm). B–C, dermal hexactines 40×. D, atrial hexactine 40×. E, atrial pentactine 40×. F, large prostalia hexactine 40×. G, its proximal end 40×. H–I, choanosomal diactines 40×. J, choanosomal triactine 40×. K–L, outer ends of choanosomal diactines 40×. M, central part of choanosomal diactine 40×. N, hemihexaster 170×. O, hexactine 170×. P, regular hexaster 340×. Q, large floricome 170×. R, its outer end 340×. S, small floricome 170×. T, its outer end 340×. U, 'disco-onychoidal' hexactine 170×. V, 'disco-onychoidal' 'hemistauraster' 170×. W, 'disco-onychoidal' hexaster 170×. X, Z, 'disco-onychoidal' hemihexasters 170×. Y, 'floricoidal' hexactine 170×. AA–AD, 'disco-onychoidal' abnormal spicules with curved rays 170×. AE, 'onycho-discoidal' hexactine 170×. AF, 'onycho-discoidal' 'hemistauraster' 170×. AG, 'onycho-discoidal' aster 170×. AH, its discoidal outer end 340×. AI–AJ, its onychoidal outer ends 340×. B–AJ, holotype. AK, distribution of *Ijimaiella*.

Description. The holotype is a tubular sponge with broken upper part, it is over 120 mm in length and 55 × 65 mm in diameter. Walls are 3–5 mm thick. Sparse irregular located lateral oscula are 5 × 10–10 × 10 mm in diameter. They are situated on short tubular outgrowths of the lateral wall. Prostalia lateralia are short, their distal rays protrude several mm. The oscula sieve-plate is unknown but may be present as in most other related genera. Two paratypes (5/2/2050 and 5/2/2052) have 'dead' basal parts. All the other representatives are probably small fragments of a lateral wall. Spicules. The choanosomal spicules are diactines, rarely tauactines. The diactines are 0.7–10/0.007–0.228 mm. They have rounded or clavate, rough or sometimes smooth outer ends and four rudimentary tubercles or a widening in the middle. The tauactines have the unpaired ray several times shorter than the others. The hexactines which serve prostalia lateralia have the distal ray 0.6–2.7 mm in length, tangential rays are 0.4–2.3 mm in length, the proximal ray is 0.8–1.5 mm in length, they are all 0.061–0.129 mm in diameter. The distal ray is covered with spines, the other rays are smooth, their outer ends are rounded, conical or clavate. The choanosomal spicules are fused into a rigid skeleton in the lower part of the sponge by numerous synapticulae. Dermalia are hexactines with the distal rays 0.061–0.274 mm long, tangential rays 0.167–0.312 mm long, proximal rays 0.228–1.368 mm long. Atrialia are pentactines and hexactines with the distal rays (in the latter) 0.068–0.220 mm long, tangential rays 0.190–0.456 mm long, proximal rays 0.395–1.368 mm long. The rays of the dermal and atrial spicules are covered with sparse short spines, their outer ends are rounded or clavate, they are 0.008–0.015 mm in diameter. The distal rays of dermal hexactines are slightly clavate or spindle-like in shape, they are also more rough than the other rays. The analogous rays of atrial hexactines – the proximal ones – are smooth. Microscleres. All the microscleres may be divided into three

groups according to their outer ends: oxyoidal, floricoidal and 'mixed' (discoidal-onychoidal-floricoidal). The oxyoidal microscleres are regular hexasters which have rather compact tuft of short secondary rays. The secondary rays together with the form of their primary rosette make these spicules similar to graphiocomes. The regular hexasters are 0.065–0.094 mm in diameter with primary rosette 0.018–0.023 mm in diameter. Another type of oxyoidal spicules are hemihexasters and rare hexactines with rough secondary rays. The hemihexasters are 0.068–0.155 mm in diameter with primary rosette 0.007–0.025 mm in diameter. Floricomes are of two types: large and small (a unique situation in Hexactinellida). The large floricomes are 0.104–0.144 mm in diameter with primary rosette 0.016–0.023 mm in diameter. The small floricomes are 0.068–0.090 mm in diameter with primary rosette 0.013–0.020 mm in diameter. 'Mixed' spicules have secondary rays which vary in the same spicule. They have discoidal, onychoidal and rarely floricoidal rays. Principally these spicules are hexactines, hemihexasters, 'hemistaurasters', rarely hexasters and asters with the outer ends described above. They may be divided into 'thick-rayed' spicules (0.004–0.011 mm in ray diameter); 'large, thin-rayed' spicules and 'small' ones. The large hexasterous and hemihexasterous spicules are 0.137–0.173 mm in diameter, their primary rosette is 0.014–0.022 mm in diameter. The large hexactinous spicules are 0.130–0.205 mm in diameter. The small hexasterous and hemihexasterous spicules are 0.083–0.130 mm in diameter, their primary rosette is 0.007–0.022 mm in diameter. The small hexactinous spicules are 0.101–0.144 mm in diameter.

Remarks. Among the basiphytose Euplectellidae which have a shape similar to the 'venus flower basket' and a choanosomal skeleton composed chiefly of diactines, this new genus is most similar to *Regadrella, Corbitella, Walteria* and *Rhabdopectella*. Other 'venus flower basket' sponges (*Atlantisella* and *Hertwigia*) are probably more distantly related to *Ijimaiella*. The new genus is characterized by a unique microsclere composition. The regular hexasters are very similar to graphiocomes, especially in their primary rosette and fairly compact tuft of secondary rays, but the secondary rays are too short for them to be classed as real graphiocomes (these spicules may be considered as graphiocome derivatives as well as direct hexaster derivatives originated without of 'graphiocome' stage). Another significant feature of this new genus is the variability in the outer ends of its microscleres, ranging from discoidal, onychoidal and floricoidal on a single spicule. A sieve-plate is not present. The genus is currently monotypic.

Distribution

N Pacific (Fig. 23), depth 4200–4294 m.

PSEUDOPLECTELLA TABACHNICK, 1990

Synonymy

Pseudoplectella Tabachnick, 1990a: 171.

Type species

Pseudoplectella dentatum Tabachnick, 1990a (by original designation).

Definition

Corbitellinae of 'venus flower basket' form, microscleres have floricoidal, discoidal and sigmoidal (drepanocomes) outer ends.

Diagnosis

Body is tubular with numerous lateral oscula and sieve-plate of colander structure. Choanosomal spicules are chiefly stauractines. The spicules of the sieve-plate are predominately diactines, rarely hexactines. Dermalia are hexactines, sometimes pentactines. Atrialia are rare pentactines. Microscleres are toothed discohexasters, floricomes and rare drepanocomes.

Description of type species

Pseudoplectella dentata Tabachnick, 1990a (Fig. 24).

Synonymy. *Pseudoplectella dentatum* Tabachnick, 1990a: 171.

Material examined. Holotype: IORAS 5/2/1041 – 'Shtockman', the Nasca Mountain Chain, 25°07.8′S, 99°34.0′–37.2′W, depth 350–490 m. Paratypes: USNM (5/2/1042), ZMA10743 (5/2/1040), BMNH (5/2/1031) – same locality.

Description. The sponges are tubular, with numerous lateral oscula, thin (2–4 mm) rigid walls and a colander-like sieve-plate. The holotype is 80 mm in length and 55 × 60 mm in diameter, diameter of the main osculum is 28 × 30 mm. The other sponges are 50–110 mm in length, 30–50 mm in diameter. Spicules. The choanosomal spicules are stauractines, rarely – triactines, pentactines and hexactines with rays 0.4-several mm long and 0.020–0.114 mm in diameter. They are smooth with rough slightly widened outer ends. Spicules of the sieve-plate are diactines of two types: large, thick with a widening in the central part and small, tall with two or four relatively long rudiments in the middle. The large diactines are smooth, conically pointed, while the others have rough rounded outer ends. Hexactines are rarely found among the spicules of the sieve-plate. They have relatively short smooth rays. With conically pointed, spherical or rounded outer ends. Dermalia are hexactines and rarely pentactines with all the rays equal in length or sometimes with one ray a little longer then the others. They are 0.080–0.312/0.009 mm, usually smooth with some spines at their outer ends. Some dermal hexactines are covered with spines. They could be considered to be spinous microhexactines but by the length of the rays they are entirely similar to the dermal hexactines described above. Atrial pentactines seem to be not obviously differing from the choanosomal ones, they are rarely found and sometimes may be entirely absent. Their rays are similar to those of the dermal hexactines in shape and diameter. The tangential rays of atrial hexactines are 0.243–0.851 mm long, distal ray is usually longer 0.418–1.122 mm. Microscleres. The most numerous microscleres are floricomes 0.067–0.207 mm in diameter, with primary rosette 0.015–0.022 mm in diameter. Discohexasters are toothed, spherical, with short primary rays so that they are similar to discasters. Their diameter is 0.182–0.304 mm, the diameter of primary rosette is 0.023–0.038 mm. Only some rare fragments of drepanocomes were found in these specimens. Since no other Hexactinellid sponges which can have such spicules were found near and they are known in relative genera, I assume an autochthonous origin of drepanocomes in this species.

Remarks. *Pseudoplectella* is monotypic and close to the genus *Dictyaulus*, differing by the following features: anchorate

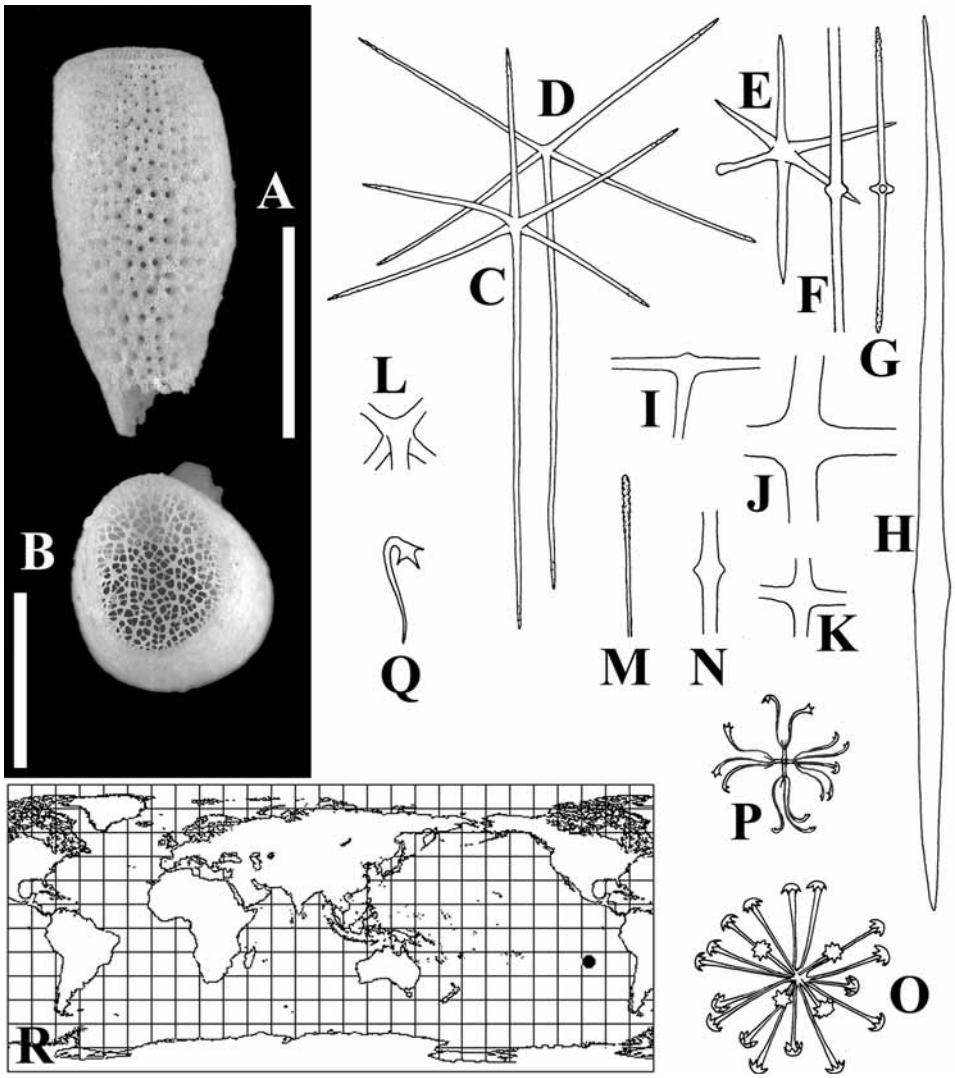

Fig. 24. *Pseudoplectella dentatum*. A, holotype lateral view (scale 50 mm). B, holotype upper view (scale 50 mm). C, dermal hexactine 130×. D, atrial pentactine 130×. E–H, spicules of the sieve-plate. E, hexactine 130×. F, central part of the diactine 130×. G, diactine 130×. H, large diactine 75×. I–L, choanosomal spicules. I, triactine 130×. J–K, stauractines 130×. L, pentactine 130×. M, outer end of choanosomal spicules 130×. N, central part of the diactine 130×. O, discohexaster 130×. P, floricome 250×. Q, secondary ray of the floricome 500×. C–Q, holotype. R, distribution of *Pseudoplectella*.

discohexasters and sigmatocomes are absent, spicules of a sieve-plate are predominately diactines, spicules of a choanosomal skeleton other than stauractines are rare, dermal hexactines have all the rays of nearly equal length. Discohexasters have very short primary rays being similar to discasters. The choanosomal skeleton is partly fused.

Distribution

SE Pacific (Fig. 24), depth 350–490 m.

REGADRELLA SCHMIDT, 1880

Synonymy

Regadrella Schmidt, 1880b: 61. *Trichaptella* Filhol, 1885: 284. *Rhabdodictyum*, in part, Topsent, 1892a: 25.

Type species

Regadrella phoenix Schmidt, 1880b, by monotypy.

Definition

Corbitellinae of 'venus flower basket' form, microscleres have floricoidal, oxyoidal (graphiocomes and hexasters or stauraster) and onychoidal outer ends.

Diagnosis

Body is saccular with numerous lateral oscula and with colander-like sieve-plate or with radically directed beams of prostralia osculaia, basiphytose. Choanosomal spicules are predominately diactines with additional hexactines and other hexactine derivatives. Prostalia lateralia, if present, are giant hexactines. Dermalia are hexactines. Atrialia are pentactines. Microscleres are floricomes,

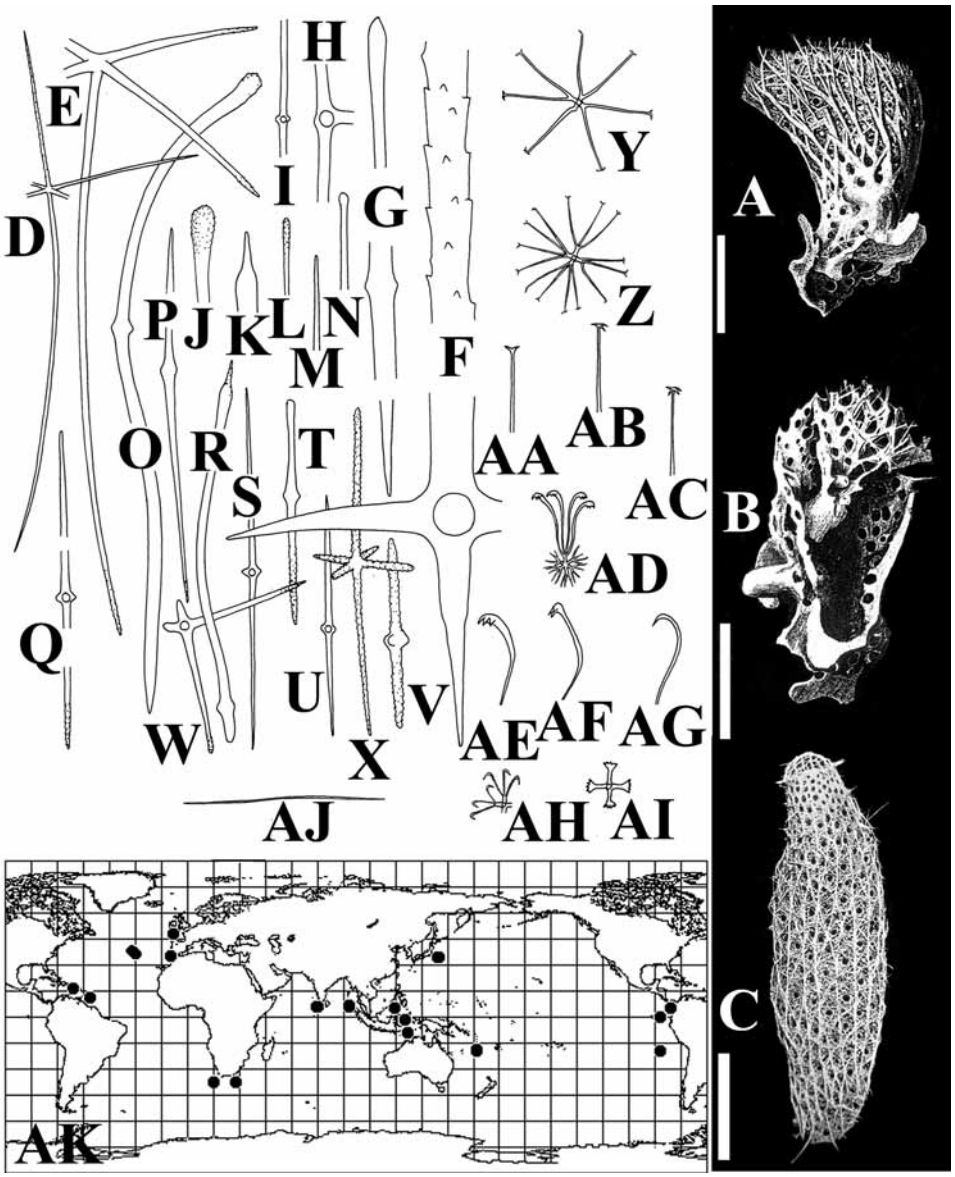

Fig. 25. *Regadrella phoenix*. A–B, lower fragments of the basal part of type specimens after Schmidt (1880b) (A, scale 40 mm. B, scale 30 mm). C, complete specimen off S Africa after Kirkpatrick (1913) (scale 30 mm). D, dermal hexactine 100×. E, atrial pentactine 100×. F, large choanosomal hexactine 50×. G, thick choanosomal diactine 100×. H, central part of thin choanosomal tauactine 100×. I, central part of thin choanosomal diactine 100×. J–N, outer ends of thin choanosomal spicules 100×. O–P, diactines of the sieve-plate 50×. Q–V, diactines of the sieve-plate 100×. W, orthodiactine of the sieve-plate 100×. X, hexactine of the sieve-plate 100×. Y, hemionychohexaster 200×. Z, onychohexaster 200×. AA–AB, onychoidal secondary rays 400×. AC, discoidal secondary ray 400×. AD, floricome 200×. AE–AF, floricoidal secondary rays 400×. AG, sigmoidal secondary ray 400×. AH, sigmatocome or hexaster with curved rays 200×. AI, primary rosette of graphiocome 400×. AJ, secondary ray of graphiocome 400×. D, F–J, Y–AG, AI–AJ, IORAS 5/2/1208. E, USNM (kt1465). O–X, AH, BMNH 1908.09.24.016. AK, distribution of *Regadrella*.

graphiocomes, onychohexasters, hemionychohexasters, hexasters or stauraster.

Description of type species

Regadrella phoenix Schmidt, 1880b (Fig. 25).

Synonymy. *Regadrella phoenix* Schmidt, 1880b: 61. *Trichaptella elegans* Filhol, 1885: 284. *Rhabdodictyum delicatum* Topsent, 1892a: 25. *Regadrella peru* Tabachnick, 1990a: 169.

Material examined. 'Syntypes': USNM (kt1465) – label 'off Barbados, det. O. Schmidt', 13°10′N 59°39′W, depth 400–530 m; off St. Cruz (=St. Croix), 17°45′N 64°45′W, depth 455 m. Other material. BMNH 1897.04.07.001 – 'Caudan'. BMNH 1908.09.24.016 – 'Blake', off Barbados. BMNH 1913.08.14.001 – off S Africa (Cape Morgan). SAMP A24496 (25; 26) – off S Africa (Cape Morgan), depth 450–576 m. MNHN (p1627) – Biacores, 'Jean Charcot', 36°54′N 25°08′W, depth 772–800 m. Holotype of *R. peru*: IORAS 5/2/1039 – 'Professor Schtockman' 18, 24°56.3′–58.2′S 88°32.6′– 29.8′W, depth 580–564 m. IORAS 5/2/1208 – 'Dmitry Mendeleev' 1, 16°32.5′–29.8′N 60°48.1′–51.0′W, depth 5190–5070 m. IORAS 5/2/1268 – 'Vityaz – II' 2, 29°56.0′N 28°16.8′S, depth 960–1140 m. IORAS 5/2/1267 – 'Vityaz – II' 2, 29°56.1′N 28°13.0′S, depth 2480–2550 m. IORAS 5/2/1269 – 'Vityaz – II' 2, 29°58.0′N 28°16.2′S, depth 625–580 m.

Description. The sponge is up to 380 mm with maximum diameter 70–80 mm in the middle and walls 4–7 mm thick. It is very likely that the sieve-plate of colander structure is present in the large specimens while the younger ones have prostalia marginalia. Most choanosomal spicules are organized into longitudinally and transversely directed beams which are often strongly fused by synapticulars and in points of mutual contacts in the lower part of the body. Numerous lateral oscula are situated regularly among these beams. Spicules. The choanosomal skeleton comprises some pinular hexactines and numerous diactines. The pinular hexactines have the pinular ray 1.43–9/0.02–0.09 mm, tangential rays 0.45–5/0.02–0.04 mm and the proximal ray usually the shortest 0.23–9/0.02–0.09 mm. Their distally directed pinular rays serve as prostalia lateralia and prostalia marginalia (the latter are mutual in some specimens). The outer ends of these spicules are conically pointed or sometimes rounded, smooth or rough. The most numerous thin-rayed diactines are 0.75–25/0.004–0.090 mm. They often have four rudimentary tubercles or a widening in the middle and rounded or conically pointed (rarely clavate) rough outer ends, the largest diactines never have tubercles but may be even or have a widening in the middle. Their outer ends are smooth or rough. The sieve-plate consists of large pinular hexactines and stauractines (derived from the former by the reduction of two tangential rays) supported with numerous diactines. The diactines are 0.5–2.0/0.015–0.034 mm, they prevail over the hexactines and tetractines which correspond to smallest diactines in size and shape. The smallest diactines are regular, usually with four rudimentary tubercles in the middle. The largest diactines are usually curved, with a widening in the middle. Their outer ends are rounded or conically pointed, often rough or sometimes smooth. Dermalia are thin-rayed hexactines with conically pointed outer ends. The rays are smooth except the distal one, which is entirely covered with sparse minute spines. The specimen from the E Pacific described by Ijima (1901) has dermalia with clavate or lanceolate outer end. The distal ray of dermal hexactines is 0.061–0.312 mm, the tangential rays are 0.091–0.502 mm, the proximal one is 0.106–1.368 mm, they are approximately 0.006 mm in diameter. Atrialia are pentactines which were numerous in USNM (kt1465) only. Their rays have rough outer ends, conically pointed or rounded. The tangential rays of these spicules are 0.137–0.532 mm, the distal one is 0.220–0.927 mm, their diameter is 0.008–0.011 mm. Microscleres. Microscleres are onychohexasters supplemented with hemionychohexasters, floricomes and graphiocomes (the latter seem to be absent in most representatives). The onychohexasters and hemionychohexasters are usually numerous. They are 0.043–0.104 mm in diameter with primary rosette 0.007–0.018 mm in diameter. In some specimens occasional onychoidal spicules were found: onychohexactines in specimen 5/2/1268; onychodiaster in specimen 1897.04.07.001; onychotriaster in specimen 5/2/1039. The floricomes are 0.054–0.130 mm in diameter with primary rosette 0.009–0.020 mm in diameter. Some sigmatocomes were observed to be very similar to the floricomes but they have a single spine at each secondary ray. The graphiocomes are 0.144–0.216 mm in diameter with primary rosette 0.013–0.022 mm in diameter. Graphiocomes were found in notable amount in the specimens from the Central Atlantic, E Pacific and in one specimen from the Caribbean region (specimen 5/2/1208). In other specimens the graphiocomes seem to be entirely absent or very rare. A few spicules with oxyoidal outer ends were found in some specimens. They are probably of allochthonous origin. The spiny hexactines are 0.266–0.365 mm in diameter (specimens 1908.09.24.016; SAMP (25); 5/2/1267; 5/2/1039). Hexasters 0.054–0.144 mm in diameter with primary rosette 0.014 mm in diameter are known in specimens SAMP (26) and 5/2/1269. Nevertheless discohexasters may have allochthonic origin. They correspond to onychoidal spicules in dimensions being 0.068–0.083 mm in diameter with primary rosette 0.007–0.014 mm in diameter. The discohexasters are numerous in specimens 5/2/1269, 5/2/1268 and 5/2/1208 and rare in specimen 1897.04.07.001.

Remarks. It appears that no holotype was chosen from among the original material of the type species (presumed syntypes). These consist of several fragments collected from the Caribbean off St. Croix Island and from two localities in Barbados. Descriptions of this material by Schmidt (1880b) and Schulze (1887a) are not satisfactory, and no well-preserved specimens exist of this species from the vicinity of the type localities. Consequently, it is not currently possible to nominate a lectotype from existing material. The type species requires further investigation to determine if it consists of more than one sibling species, given its wide distribution. For example, a specimen described off Chile, E Pacific by Ijima (1901) has clavate or lanceolate distal rays on dermal hexactines, whereas other material have distal rays entirely covered with sparse minute spines (including the holotype of *R. peru* described from the same broad region (Tabachnick, 1990a). Unfortunately such a determination is not presently possible based on existing materials as they are usually deprived of corresponding kinds of spicules necessary to make appropriate comparisons. Consequently, the description of the type species, above, is a synthesis of all specimens examined from different localities, emphasizing the Caribbean ones.

This genus contains six known species, with another two new species off New Caledonia currently in press, one of which differs from all others in having a short stalk. The choanosomal skeleton is partly fused. Prostalia oscularia if present are nearly pinular pentactines and stauractines. The prostalia lateralia when present are similar to prostalia oscularia. If the colander-like sieve plate is present its spicules are diactines, hexactines and derivatives up to monactines and spheres. It is probable that the sieve plate is formed with radially oriented free (distal) rays of prostalia oscularia and then develops to a colander structure during the growth. Dermalia sometimes have a pinular ray. Atrial pentactines are rare and usually are irregularly scattered, they were not observed in the two species off New Caledonia. Some floricomes in some specimens of *R. phoenix* are reduced to sigmatocomes. Discohexasters or generally onychoidal spicules with some secondary rays discoidal were observed in some specimens of *R. phoenix*. The graphiocomes are rare or probably entirely absent in some specimens of *R. phoenix*. One of the new species off New Caledonia has no other microscleres than floricomes, graphiocomes and maybe hexactines, other new species off New Caledonia has no graphiocomes at all, and in this regard both these species are similar to the genus *Heterotella*, and consequently referred to *Regadrella* with some hesitations. This fact shows the close relationship between these two genera. Young representatives of *R. okinoseana* (Ijima, 1901) are ovoid with a single terminal osculum without the sieve-plate. Their dermalia are pentactines, and atrialia are entirely absent. The only microscleres present are graphiocomes. The larger specimen possesses both dermal pentactines and hexactines. The sponge described as *R. okinoseana* by Reiswig (1991) off South Australia has a row of onychoidal asterous spicules: staurasters, rarely pentasters, occasional octasters (oxyoidal microscleres analogous to discoctasters of Rossellidae), triasters and hexasters. In this genus the fusion of the skeleton elements begins from the lower part of the sponge.

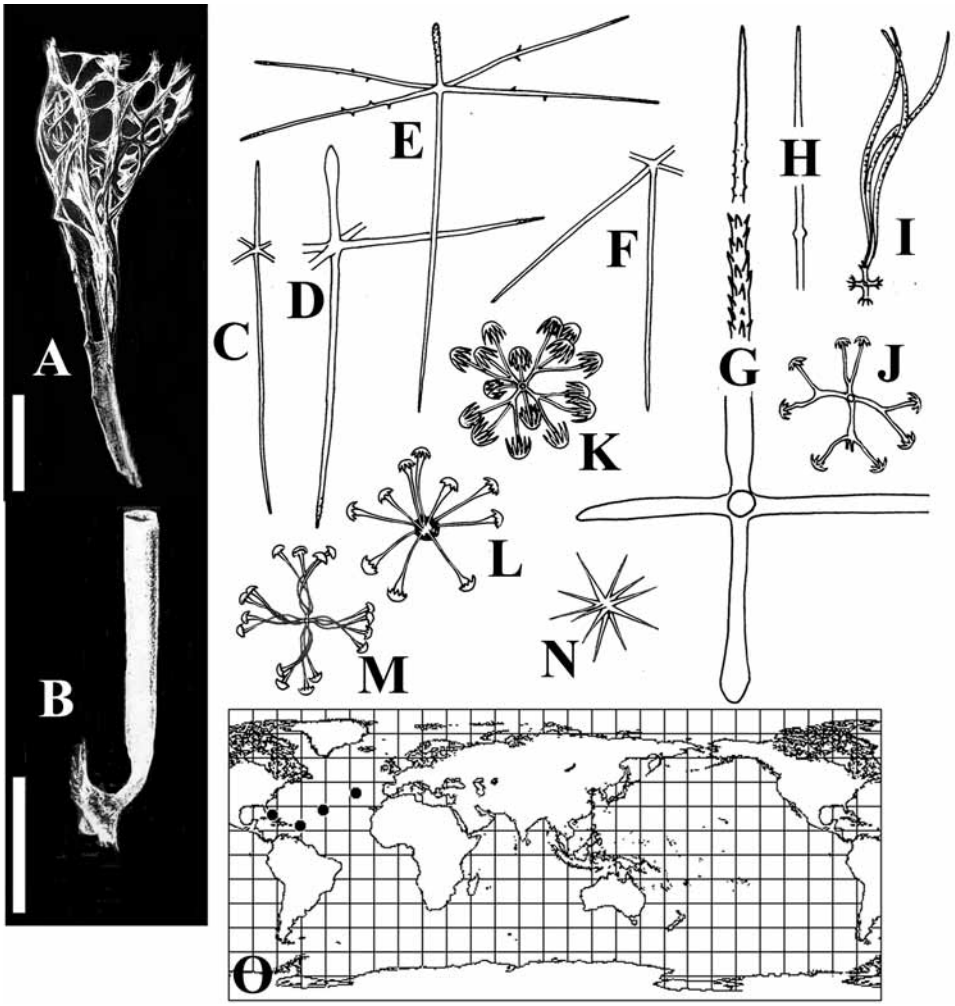

Fig. 26. *Rhabdopectella tintinnus*. A, lower part of the large specimen after Schmidt (1880b)(scale 50 mm). B, small specimen after Schmidt (1880b)(scale 30 mm). C–E, dermal hexactines 140×. F, atrial pentactine 140×. G, giant choanosomal hexactine 70×. H, choanosomal diactine 140×. I, sigmatocome 260×. J, toothed discohexaster 520×. K, anchorate discohexaster 520×. L, toothed discaster 140×. M, toothed spirodiscohexaster 140×. N, aster 140×. C–L, USNM(kt146). M–N, from Schulze (1887a)(USNM 988). O, distribution of *Rhabdopectella*.

Distribution

Low and temperate latitudes (Fig. 25), depth 352–3200 m.

RHABDOPECTELLA SCHMIDT, 1880

Synonymy

Rhabdopectella Schmidt, 1880b: 62. *Rhabdoplegma* (*lapsus*) Schmidt, 1880b, in the Plate VII footnote.

Type species

Rhabdopectella tintinnus Schmidt, 1880b (by monotypy).

Definition

Corbitellinae with tubular body, lateral oscula of different diameter irregularly situated, microscleres have discoidal, floricoidal, sigmoidal (sigmatocomes) and probably oxyoidal outer ends.

Diagnosis

Basiphytose body is tubular when small, in large specimens it consists of a framework of beams with numerous irregular lateral oscula being probably tubular too. Choanosomal spicules are diactines, pentactines, tauactines, stauractines and large hexactines. Dermalia are hexactines. Atrialia are pentactines, rarely hexactines and stauractines. Microscleres are toothed and anchorate discohexasters, discasters, sigmatocomes, rare toothed spirodiscohexasters, floricomes and probable hexasters.

Description of type species

Rhabdopectella tintinnus Schmidt, 1880b (Fig. 26).

Synonymy. *Rhabdopectella tintinnus* Schmidt, 1880b: 62. *Rhabdoplegma* (*lapsus*) (Schmidt, 1880b in the Plate VII footnote).

Material examined. Syntypes: unknown, type localities Grenada, 12°05′N 61°40′W, depth 530 m; Mexico, 21°34′N 76°33′W, depth 1830 m. Other material. USNM 988 – 'Blake', off Grenada, 524 m. USNM (kt146) – 'Albatross', Caribbean region?

Description. (from Schmidt, 1880b, Schulze, 1887a and other material examined here). Holotype was not designated when the species was defined and two specimens (syntypes) were described. The smallest specimen is a young tubular sponge 40 mm in length and 5 mm in diameter with thin walls. The other seem to be a basal part about 230 mm in length and about 65 mm in maximal diameter of the upper part. The first specimen has no lateral oscula while the second has a wall constructed by beams with numerous lateral oscula between them which are irregular in shape. Spicules. The choanosomal spicules are diactines, pentactines, tauactines, stauractines and giant hexactines. All of them except the giant hexactines are smooth with smooth conical outer ends about 0.008 mm in diameter. The diactines have a widened part in the middle. The longest ray of the giant hexactines is the distal one 0.04–0.06 mm in diameter, it is pinular in the middle part and smooth at ends. Other rays of these spicules are shorter, smooth with rounded or spherical outer ends. Dermalia are hexactines with rough or smooth outer ends, the distal ray 0.046–0.144/0.004–0.016 mm is smooth or rough, being the shortest, sometimes it is widened in the distal part. Rare spines are present sometimes on the tangential smooth rays 0.167–0.433/0.004–0.008 mm of dermal hexactines, the proximal ray 0.167–0.669 mm is smooth, equal in diameter to tangential ones. All the rays except the distal one have conical smooth or rough outer ends. Atrialia are smooth pentactines, rarely hexactines and stauractines. The tangential rays of atrial spicules are 0.228–0.410/0.004 mm, the distal one is 0.234–0.836 mm long. Microscleres are toothed and anchorate discohexasteres, discasters (spicules derived from discohexasters by shortening of primary rays which are all represented by a common sphere with numerous secondary rays starting from it), sigmatocomes and hexasters; toothed spirodiscohexasters, floricomes and probably asters (same with discasters but originated from hexasters). The discasters are 0.130–0.331 mm in diameter with primary rosette 0.029–0.043 mm in diameter, they have toothed discs. Discohexasters are 0.036–0.079 mm in diameter with primary rosette 0.013–0.032 mm in diameter, they have anchorate and toothed discs, some of them have curved rays. The spirodiscohexasters are 0.079–0.143 mm in diameter with primary rosette 0.013–0.022 mm in diameter, the discoidal outer ends are toothed. Sigmatocomes are 0.209–0.281 mm in diameter with primary rosette 0.014–0.022 mm in diameter, their secondary rays are rough and curved. Sigmoidal secondary ray is tuberculated. Tubercles are more numerous on one side along the lateral surface. Amphidiscs, uncinates, spinous pentactines were found in the specimen USNM (kt146), they must have had allochthonous origin. The observed hexasters may be fragments of other spicules, for example of discohexasters with broken secondary rays. Hexasters are 0.025–0.110 mm in diameter with primary rosette 0.009–0.022 mm. Asters are about 0.110 mm in diameter with central part about 0.013 mm in diameter.

Remarks. A poorly known monotypic genus. Basal fragments may represent peduncles with lateral secondary oscula (as known in some other genera of Euplectellidae – e.g., *Bolosoma*). Hence a large specimen may have another shape than that described in the diagnosis. The sigmatocomes described here were known to Schmidt (1880b) and Schulze (1887a) as 'bow-shaped spicules' – or curved rough diactines since only their secondary rays were found at that time. After careful investigation of two specimens several 'complete' sigmatocomes with 'bow-shaped spicules' serving as secondary rays were found. The asters were described by Schmidt (1880b) and Schulze (1887a) and found again in the specimen USNM (kt146), although in my opinion asters may have had allochthonous origin. The fusion of the choanosomal elements is present in the largest specimens but it seems to take place in the basal part only. The fusion of choanosomal skeleton of the main body (upper parts of the body) is problematic. The young specimen seems to have no notable fusion.

The specimen stored in the Natural History Museum (London), (BMNH 1939.02.10.024) collected by 'Blake', stn. 108) (but not including the pedunculate part which may be a fragment of *Caulophacus*) seems to belong to another species of this genus. It has discohexasters with rare, long tooth, which are nearly onychoidal. These spicules dominate all other microscleres.

Distribution

Off Grenada, Azores and in Gulf of Mexico, W Central and Central Atlantic Ocean (Fig. 26), depth 530–1830 m.

SYMPLECTELLA DENDY, 1924

Synonymy

Symplectella Dendy, 1924: 286.

Type species

Symplectella rowi Dendy, 1924 (by monotypy).

Definition

Corbitellinae of which body consists of a large globular central part and a row of lateral globular outgrowths in the lower part of it, lateral oscula of different diameters irregularly situated, microscleres have discoidal (calycocomes and spherical discohexasters) and oxyoidal outer ends.

Diagnosis

Body consists of a large globular central part and a row of lateral globular outgrowths in the lower part of it. The sponge is basiphytose with rare irregular lateral oscula and with colander-like sieve-plates on the upper part of each globular unit. Choanosomal skeleton is composed of diactines. Dermalia are hexactines, pentactines, rarely stauractines and other derivatives. Atrialia are absent. Microscleres are hexactines, hexasters, hemihexasters, calycocomes, spherical discohexasters and microdiscohexasters.

Description of type species

Symplectella rowi Dendy, 1924 (Fig. 27).

Synonymy. *Symplectella rowi* Dendy, 1924: 287.

Material examined. Holotype: BMNH 1923.10.01.012a (fragments BMNH 1923.10.01.012–013) – 'Terra Nova', E of North Cape, New Zealand, 32°S 167°E, depth 128 m. Other material. BMNH 1923.10.19.003 – location unknown, possibly same as holotype. MNHN (p4325) – off East Coromandel, New Zealand, 39°49.20′S 176°5.40′E, depth 120 m.

Description. *Symplectella* (Bergquist, pers. comm.) is composed of a large globular Central part and a row of small globular

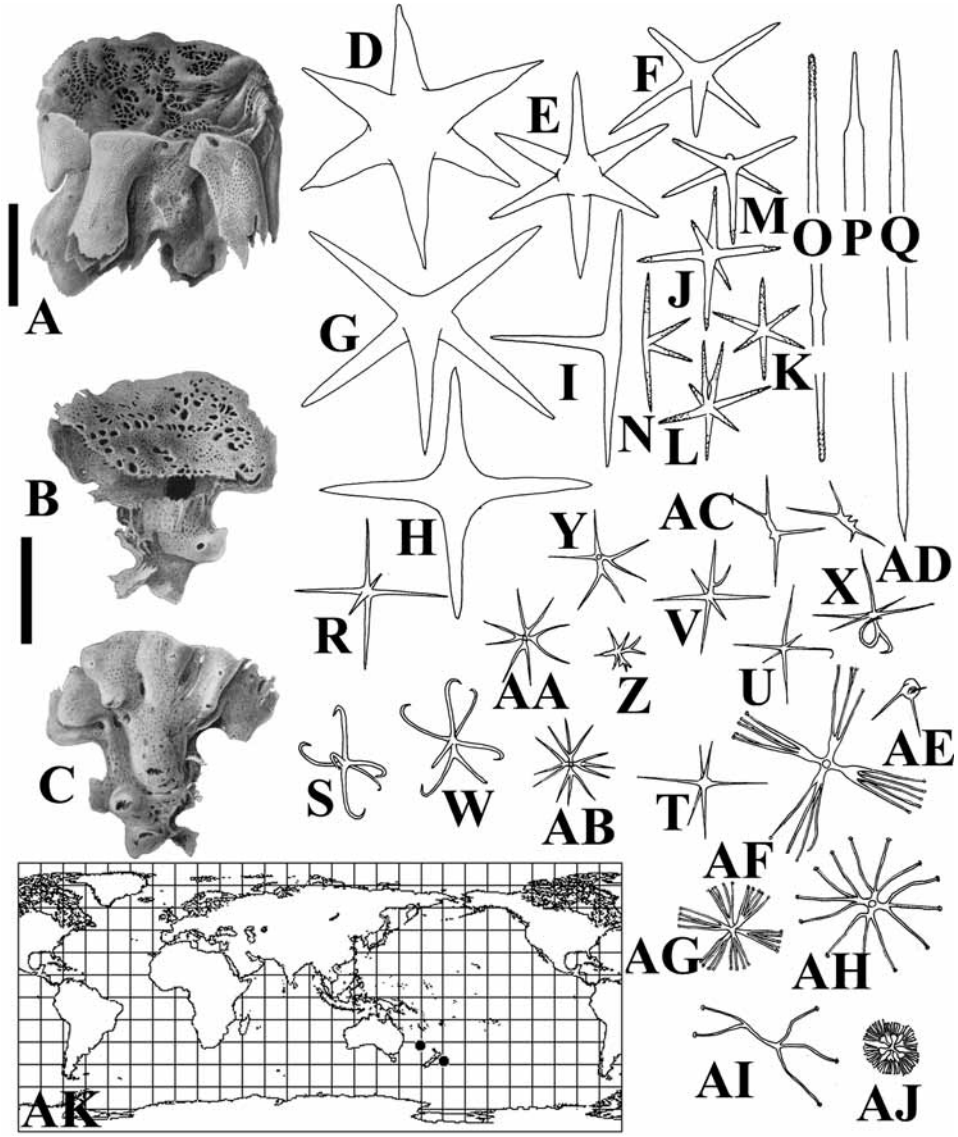

Fig. 27. *Symplectella rowi*. A, large specimen (scale 100 mm). B–C, smaller specimen viewed from lateral sides (scales 30 mm). A–C, after Dendy (1924). D–N, dermalia 130×. D–E, J–K, dermal hexactines 130×. F–G, M, dermal pentactines 130×. H, dermal stauractine 130×. I, dermal tauactine 130×. L, abnormal dermal hemihexaster 130×. N, dermal paratetractine 130×. O–Q, choanosomal diactines 75×. R–S, microhexactines 250×. T–U, microhexactines 250×. V, microhemihexaster or spiny microhexactine 250×. W, Y, microhemihexasters 250×. X, microhemihexasters 250×). Z, microhemihexaster 250×. AA, microhexaster 250×. AB, microhexaster 250×. AC, deformed microhemyhexaster 250×. AD–AE, deformed microhemihexasters 250×. AF–AG, calycocomes 250×. AH, discohexaster 250×. AI, deformed discohexaster 250×. AJ, microdiscohexaster 500×. D–H, J–K, M, R–S, W, Y, AA, AF–AG, AJ, from Dendy (1924). I, O–Q, T–V, Z, AB, AD–AE, AH–AI, MNHN (p4325). L, N, X, AC, BMNH 1923.10.01.013. AK, distribution of *Symplectella*.

outgrowths situated in the lower part of the former. The sponge is basiphytose with rare irregularly placed lateral oscula and with colander-like sieve-plates on the upper part of each globular unit. The type material is represented by one large fragment which is approximately cylindrical about 130 mm high and 170 mm in diameter. The others are broken fragments of lateral outgrowths about 33 mm in diameter. These fragments have walls about 2–3 mm in thickness. The sieve-plates have apertures rounded or polygonal about 4 mm in diameter, they are separated by beams about 1.5 mm in diameter (Dendy, 1924). Spicules. The choanosomal skeleton is composed of diactines forming two size groups. The larger ones are about 5/0.04–0.05 mm, they have no widening in the middle. The smaller are 0.4–4.6/0.004–0.006 mm. Dermalia are hexactines, pentactines, rarely stauractines and other derivatives: tauactines, paratetractines and rare hemihexasters. These spicules have rays 0.061–0.213/0.006–0.048 mm. The smallest spicules have thin rays which are rough at conical outer ends, the largest spicules have smooth rays, conically pointed or rounded. Atrialia are absent. Microscleres. Microscleres are hexactines, hexasters, hemihexasters and discohexasters. The hexactines and hexasters corresponding to them have rays 0.047–0.119/0.002 mm. Some of the rays are curved in their distal parts, some carry irregularly distributed long spines which may be considered as reduced secondary rays of asterous units. Rare abnormal irregular spicules derived from these forms with several rays and ray rudiments are present. Hexasters and hemihexasters are 0.023–0.101 mm in diameter, with primary rosette 0.004–0.016 mm in diameter. Spicules with discoidal secondary rays are represented

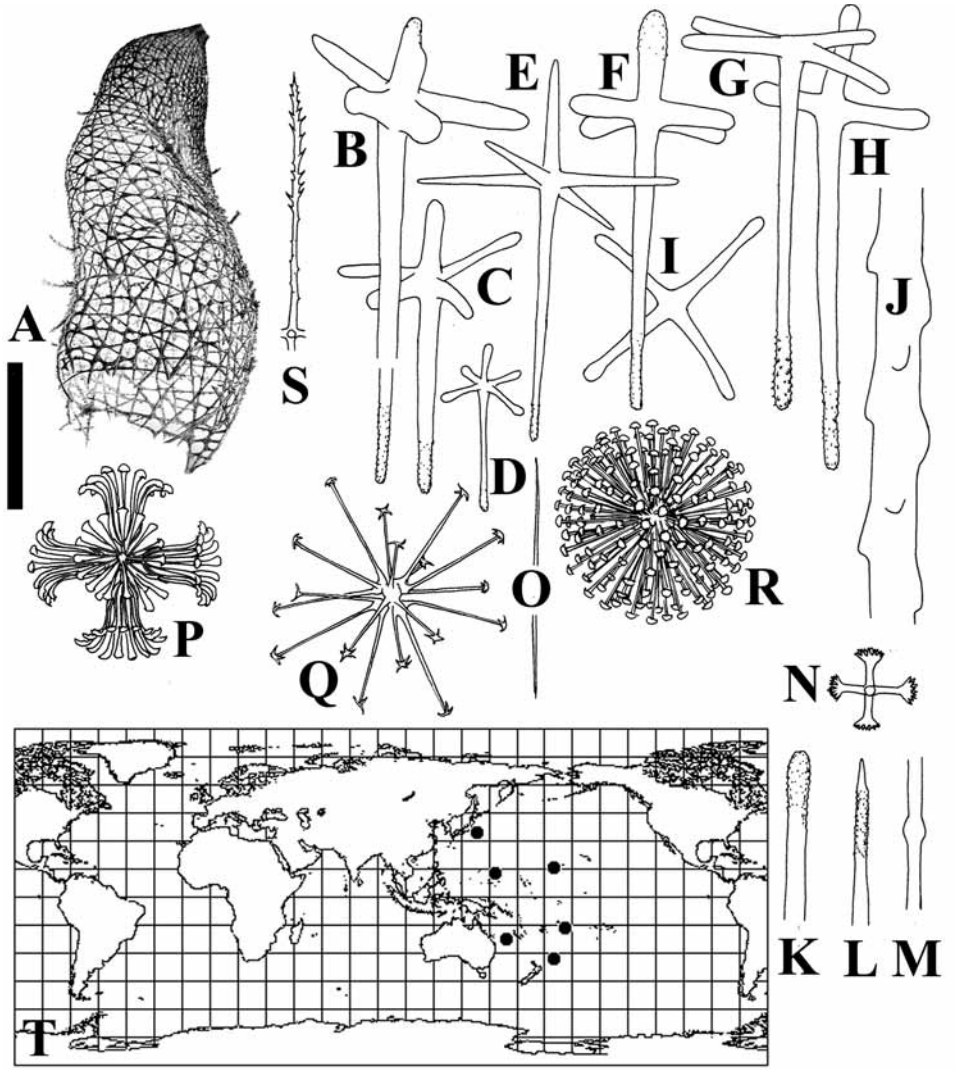

Fig. 28. *Walteria flemmingii*. A, holotype after Schulze (1887a) (scale 50 mm). B–F, dermal hexactines 100×. G, atrial pentactine 100×. H–I, dermal or atrial stauractines 100×. J, fragment of distal ray hexactine (prostalia lateralia) 25×. K–L, outer ends of choanosomal diactines 100×. M, central part of choanosomal diactine with a widening 100×. N–O, fragments of graphiocome 350×. P, floricome 350×. Q, onychohexaster 350×. R, discaster 350×. S, microhexactine 350×. B–M, Q, BMNH 1887.10.20.29. N–O, MNHN (p4327). P, R, from Schulze (1887a). S, MNHN (fr18). T, distribution of *Walteria*.

with calycocomes, spherical discohexasters, their abnormal forms with reduced number of rays and microdiscohexasters. Calycocomes are 0.040–0.112 mm in diameter, with primary rosette 0.011–0.025 mm in diameter. A few spherical discohexasters were found in specimen MNHN (p4325). They are 0.043–0.050 mm in diameter, with primary rosette 0.011–0.013 mm in diameter. Microdiscohexasters are rare. They are spherical spicules 0.018–0.029 mm in diameter, with primary rosette 0.007–0.011 mm in diameter.

Remarks. The monotypic genus *Symplectella* was initially included in Rossellidae on a tentative basis (Dendy, 1924) but for reasons described above it is referred to Euplectellidae-Corbitellinae (see remarks on subfamily diagnoses). In addition to the material examined above further material of this species was also recently collected off New Zealand at 30 m depth (Bergquist, personal communication). Dendy (1924) considered the larger hexactines, described here as dermal, to be choanosomal spicules, however, in all fragments examined here these spicules were located together with smaller hexactines, both occurring in the dermal surface.

Distribution

New Zealand (Fig. 27), depth 30–128 m.

WALTERIA SCHULZE, 1886

Synonymy

Walteria Schulze, 1886: 42. *Hyalodendron* Moore, 1898: 430.

Type species

Walteria flemmingii Schulze, 1886 (by monotypy).

Definition

Corbitellinae with tubular body, lateral oscula of different diameter irregularly situated, microscleres have oxyoidal

(microhexactines and graphiocomes), discoidal and sometimes floricoidal and onychoidal outer ends.

Diagnosis

Body is saccular or tubular, basiphytose. Walls are thin, rigid with numerous lateral oscula. Distal lateral processes are simple or dichotomously branching outgrowths of the lateral wall. Choanosomal spicules are monaxones – probably diactines, rarely triactines, tauactines and other hexactine derivatives, fused by synapticulae. Prostalia lateralia are large hexactines or pentactines. Dermalia are hexactines. Atrialia are pentactines. Microscleres are spiny microhexactines, graphiocomes, spherical toothed or serrated discohexasters with numerous secondary rays, stellate discohexasters. Floricomes and onychasters are sometimes absent.

Description of type species

Walteria flemmingii Schulze, 1886 (Fig. 28).

Synonymy. *Walteria flemmingii* Schulze, 1886: 42.

Material examined. Holotype: BMNH 1887.10.20.029 – 'Challenger', 29°45′S 178°11′W, depth 1150 m. Other material. MNHN (fr 18) – 'CALSUB', submersible 'Cyana', n 16, 20°37.80′S 167°2.70′E, depth 825–1370 m. MNHN (p28) – Chalcal-2, 'Coriolis', 24°40.32′S 168°38.67′E, depth 650–750 m. MNHN (p62; p4327) – Biocal, 'Jean Charcot', 20°31.69′–31.86′S 166°48.35′–48.59′E, depth 900–980 m.

Description. Until now this species was known only from a single 'Challenger' specimen. The holotype is a fragment of an upper part at least 150 mm in length and 80 mm in diameter. According to Schulze's (1887a) suggestion the holotype is represented by a basal part but the investigation of this specimen showed that it is rather an upper part of the body with a minute oscular opening few mm in diameter. Thus the entire shape of the sponge is ovoid, closed from all sides by framework of skeleton with minute primary osculum and without any notable sieve-plate. The prostalia are situated irregularly on the lateral surface, they protrude outside up to 14 mm long. The walls are rigid, about 6 mm in thick with lateral oscula irregular in shape. The other specimens are represented by fragments of considerable size. Spicules. Choanosomal spicules are monaxones, probably diactines 0.5- to more than 10 mm long, and 0.011–0.118 mm in diameter. They are smooth with rough rounded or conically pointed outer ends, rarely with a widening in the middle. Sometimes triactines and stauractines are present among choanosomal diactines. The spicules forming the basis of the lateral processes are hexactines or pentactines with long distal and short proximal and tangential rays. The distal ray is up to 70 mm in length, it has numerous widenings (reduced or undeveloped spines), the tangential rays are up to 23 mm in length, the proximal one is up to 1 mm in length, these rays are approximately 0.23–0.32 mm in diameter. Dermalia are hexactines and rare pentactines and stauractines. The stauractines are represented with tangential rays and with spicules which are originated from hexactines by reduction of two opposite radial rays. A few thin hexactines with a pinular distal ray were found in specimen (p62). The distal ray of a dermal hexactine is 0.046–0.258 mm long, tangential rays are 0.061–0.182 mm, proximal one is 0.038–0.973 mm, they are 0.006–0.037 mm in diameter. Atrialia are expected to be represented with few pentactines or they are entirely absent if these pentactines belong to dermalia (the walls are too thin to prepare dermal and atrial skeleton separately with accuracy). Tangential rays of atrial pentactines are 0.091–0.182 mm long, distal ray is 0.091–0.380 mm long. Both dermal and atrial spicules have smooth rounded or slightly clavate rays. The outer ends of the ray directed inside and more rarely outside the body are rough. Microscleres. Microscleres are serrated spherical discohexasters and discasters (sometimes they are very similar), graphiocomes and microhexactines. In some specimens floricomes and onychasters were also found. Discasters are 0.052–0.072 mm in diameter with primary rosette 0.011–0.018 mm in diameter. Discohexasters are 0.052–0.081 mm in diameter with primary rosette 0.011–0.019 mm in diameter. Graphiocomes are 0.266–0.594 mm in diameter with primary rosette 0.022–0.052 mm in diameter. Onychasters are very similar to some discasters, most spicules that are considered to be onychasters have also some discoidal outer ends at secondary rays. Onychasters are 0.052–0.086 mm in diameter with primary rosette 0.009–0.018 mm. Floricomes are 0.065–0.085 mm in diameter with primary rosette 0.011–0.019 mm in diameter. Microhexactines have rays covered with short spines 0.056–0.115/0.002 mm.

Remarks. The terminal osculum is a minute hole surrounded by prostalia oscularia, similar to prostalia lateralia. Previously these were only known for *W. leuckarti*, but now also present in the reconstruction of *W. flemmingii*. Onychasters were previously mentioned only for *W. leuckarti* (Ijima, 1901) but now also known in *W. flemmingii*. These are very similar to stellate discohexasters from which they are probably derived. The genus *Walteria* is close to *Corbitella* and *Regadrella*, with two known species and two subspecies.

Distribution

W Pacific (Fig. 28), depth 370–4732 m.

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