

Family Esperiosidae Hentschel, 1923

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Esperiosidae Hentschel (Demospongiae, Poecilosclerida) is revived and limited to sponges with the combination of possession of mycalostyles and lack of an ectosomal skeleton. The styles are united in tracts which form an isodictyal reticulation or an irregular anastomosing system. Microscleres if present include palmate isochelae, exceptionally anisochelae, and sigmas. The possession of forceps is reported but considered dubiously proper. The family is probably closest to Mycalidae, with which it is usually associated, and which shares the palmate chelae and mycalostyles. However, most Mycalidae have an elaborate ectosomal skeleton and most chelae are anisochelate. The family is predominantly recorded from temperate and colder waters.

Keywords: Porifera; Demospongiae; Poecilosclerida; Mycalina; Esperiosidae; *Amphilectus*; *Esperiosis*; *Semisuberites*; *Ulosa*.

DEFINITION, DIAGNOSIS, SCOPE

Synonymy

Esperiosidae Hentschel, 1923. Amphilectidae de Laubenfels, 1936a: 123. Semisuberitidae de Laubenfels, 1936a: 135.

Definition

Mycalina with a choanosomal skeleton consisting of a reticulation of tracts of styles, without a special ectosomal skeleton. Microscleres if present palmate isochelae and sigmas.

Diagnosis

Encrusting, massive, lobate, flabellate or cup-shaped sponges. Surface finely conulose or microhispid due to projecting spicule brushes. Skeleton a reticulation of tracts of styles ending at the surface in brushes or single spicules, no special ectosomal structures. Exclusively styles as megascleres although in one species there are desmas of unknown derivation in addition to the styles. Microscleres palmate isochelae and sigmas, often absent or rare, but may be abundant in one genus.

Scope

Four out of seven nominal genera are considered valid members of this family, *Amphilectus*, *Esperiosis*, *Semisuberites* and *Ulosa*. Only *Esperiosis* is widespread and diverse, the other genera have only few species. Most representatives typically occur in high latitudes or deeper waters.

History

Hentschel's (1923) concept of Esperiosidae was based on possession of styles, lack of diactinal ectosomal spicules, in combination

with isochelae. He did not distinguish between different chela types and included, amongst others, *Phelloderma* (Myxillina: Phellodermidae), *Artemisina* (Microcionina: Microcionidae) and *Chondrocladia* (Mycalina: Cladorhizidae). Topsent (1928c) likewise did not use chela morphology as a character at the family level, but went further in combining *Esperiosis* and *Mycale* and relatives into a large subfamily Mycalinae. De Laubenfels (1936a) assigned *Esperiosis* to his huge family Ophlitaspongiidae (which contained a broad assemblage of poecilosclerid sponges), whereas *Amphilectus* and *Ulosa* were put in a separate family Amphilectidae, (which again contained a broad assemblage of microcionine and mycaline genera). *Semisuberites* was assigned to a separate family Semisuberitidae, which contained a remarkable assemblage of genera such as *Cladocroce* (now Haplosclerida: Chalinidae), *Dragmatella* (now Desmacellidae), *Rhaphisia* (now Chalinidae), and *Pachaxinella* (a junior synonym of the suberitid *Homaxinella*). His classification has no serious followers.

Relationship with Mycalidae

Prior to Hentschel's (1923) distinction of a separate family Esperiosidae, *Esperiosis* was usually assigned to a broader assemblage including Mycalidae (e.g., Topsent, 1928c), and this tendency still finds followers, such as Bergquist & Fromont (1988) and Hajdu *et al.* (1994a). It is clear that *Esperiosis* and *Amphilectus* show similarities in megasclere and microsclere shape with *Mycale*, and it is likely that Mycalidae and Esperiosidae are sister families. A recent cladistic analysis of the major *Mycale* subgenera and various *Esperiosis* species demonstrated the monophyly of the Mycalidae, but showed the *Esperiosis* representatives were in a paraphyletic position. Nevertheless, the synapomorphic characters responsible for this result may need to be studied further using a larger complement of Esperiosidae and additional characters. On a more practical level, it is evident that a group comprising all the various *Mycale* subgenera and *Esperiosis c.s.* cannot be defined as a single family without also including Desmacellidae, for example. We prefer to retain two separate families Mycalidae and Esperiosidae, which clearly differ in the reticulate structure, lack of surface specialization of the latter and absence of isochelae in the former.

Inclusion of *Ulosa* and *Semisuberites*

These genera lack microscleres and their exclusive possession of styles has made them subject of widely divergent family assignments (see below). The esperioptid nature of these small genera is tentative and defended on the basis of similarity of style shape and a reticulate skeleton.

KEY TO GENERA

- (1) Chelae and/or sigmas present 2
 No microscleres 3
- (2) Skeleton of irregularly anastomosing spicule tracts, denser in the interior; styles usually over 400 μm ; sigmas usually present, chelae usually in several size categories *Esperioptis*
 Skeleton regularly isodictyal, anisotropic; megascleres usually not exceeding 400 μm ; only a single category of isochelae or derivatives; sigmas usually absent *Amphilectus*
- (3) Choanosomal skeleton consists of spongin encased polyspicular bundles making a rectangular reticulation; styles in a single size category *Ulosa*
 Choanosomal skeleton loosely reticulate, with many spicules in confusion; styles in two size categories *Semisuberites*

AMPHILECTUS VOSMAER, 1880**Synonymy**

[*Corybas*] Gray, 1867a: 537 (preocc.). *Amphilectus* Vosmaer, 1880: 109. *Brondstedia* Burton, 1929a: 428.

Type species

Isodictya gracilis Bowerbank, 1866: 331 (by subsequent designation; Dendy, 1922b: 58). This is generally considered a junior synonym of *Amphilectus fucorum* (Esper, 1794: 278).

Definition

Esperioptidae with ladder-like skeleton of ascending and interconnecting spicule tracts; microscleres only small palmate isochelae (occasionally slightly anisochelate), usually no sigmas.

Diagnosis

Encrusting, cushion-shaped, lobate, occasionally branching sponges with velvety to finely hispid surface. Skeleton an isodictyal or subsodictyal reticulation of short styles. Microscleres are small palmate isochelae or exceptionally anisochelae or sigmas. There are at least two species, both North Atlantic, but several others may be hiding under the name *Esperioptis*.

Remarks

Despite widespread use of the name *Esperioptis* for the species *fucorum*, *Amphilectus* is here recognized as a valid genus, in accordance with available phylogenetic evidence, which assumes an independent origin for species allied to *Esperioptis villosa* Carter, 1874a and *Amphilectus fucorum* Esper, 1794 (Hajdu & Desqueyroux-Faúndez, 1994), as *Esperioptis*-I and -II, respectively. Previously, Bergquist & Fromont (1988: 25) distinguished sponges here assigned to *Amphilectus* as 'Esperioptis sub-group two'. Authors who accept *A. fucorum* as the type of *Amphilectus*, but did not consider it distinct from *Esperioptis* overlooked the

Previous reviews

Hentschel (1923), Lévi (1973), Van Soest (1984b), Hooper & Lévi (1989), Hooper & Wiedenmayer (1994).

priority of the genus name *Amphilectus* over *Esperioptis*. The two genera differ in the structure of the skeleton which is irregular, and more condensed in the interior in *Esperioptis*, size of megascleres which is usually over 400 μm in *Esperioptis*, and the diversity of microscleres, which is usually greater in *Esperioptis*.

Description of type species

Amphilectus fucorum (Esper, 1794) (Fig. 1).

Synonymy (restricted). *Spongia fucorum* Esper, 1794: 278, pl. 49 figs 1–2; *Halichondria fucorum*; Johnston, 1842: 112, pls 9, 12 fig. 2; *Isodictya fucorum*; Bowerbank, 1866: 322; *Amphilectus fucorum*; Vosmaer, 1880: 117; *Esperioptis fucorum*; Topsent, 1890a: 201. *Spongia parasitica* Montagu, 1818: 34. *Isodictya gracilis* Bowerbank, 1866: 331; Bowerbank, 1874b: 149, pl. LVIII figs 23–26. Refer to Burton (1929a), Arndt (1935) and Van Soest *et al.* (2000) for suggested additional synonymy.

Material examined. Holotype of *Isodictya gracilis* (not seen): BMNH 1930.7.3.357 (dry), and 1 slide BMNH 1877.5.21.754 – labelled 'from type' (Hooper & Wiedenmayer, 1994 claim there are 3 syntypes but these were not found in a recent search, Ms C. Valentine, pers. comm.). Other material. ZMA 4302, 4400, 4532, 5925, 5927, 8795 – Ireland. ZMA 4723, 4832, 5913, 9668, 9703, 14102, 14141 – France. ZMA 6775, 6796, 6843 – France. MNRJ 1166, 1184 – France.

Description. Extremely polymorphic and fast-growing, changing shape in a few weeks. Encrusting as thin sheets or cushions (Fig. 1B), massive-lobose or branched (Fig. 1A, C). Size may range from a few cm^2 to several dm^2 , up to 15 cm high. The oscules may be only slightly raised from the surface, or be characteristically at the top of volcano-like growths, and may have 'tassel' growths originating near the margin of the oscules. The oscules do not contract. They are inconspicuous in encrusting forms, and large or crateriform in massive forms; they are often arranged in linear series in the branching forms. Surface even, minutely hispid, fairly open in appearance. It has a characteristic and unpleasant strong smell, not dissimilar to that of *Halichondria panicea*. Consistency soft and easily torn. Colour an intense reddish orange. Skeleton irregularly reticulate. The main skeleton (Fig. 1D) is an isodictyal to sub-isodictyal reticulation of multispicular fibres, reinforced

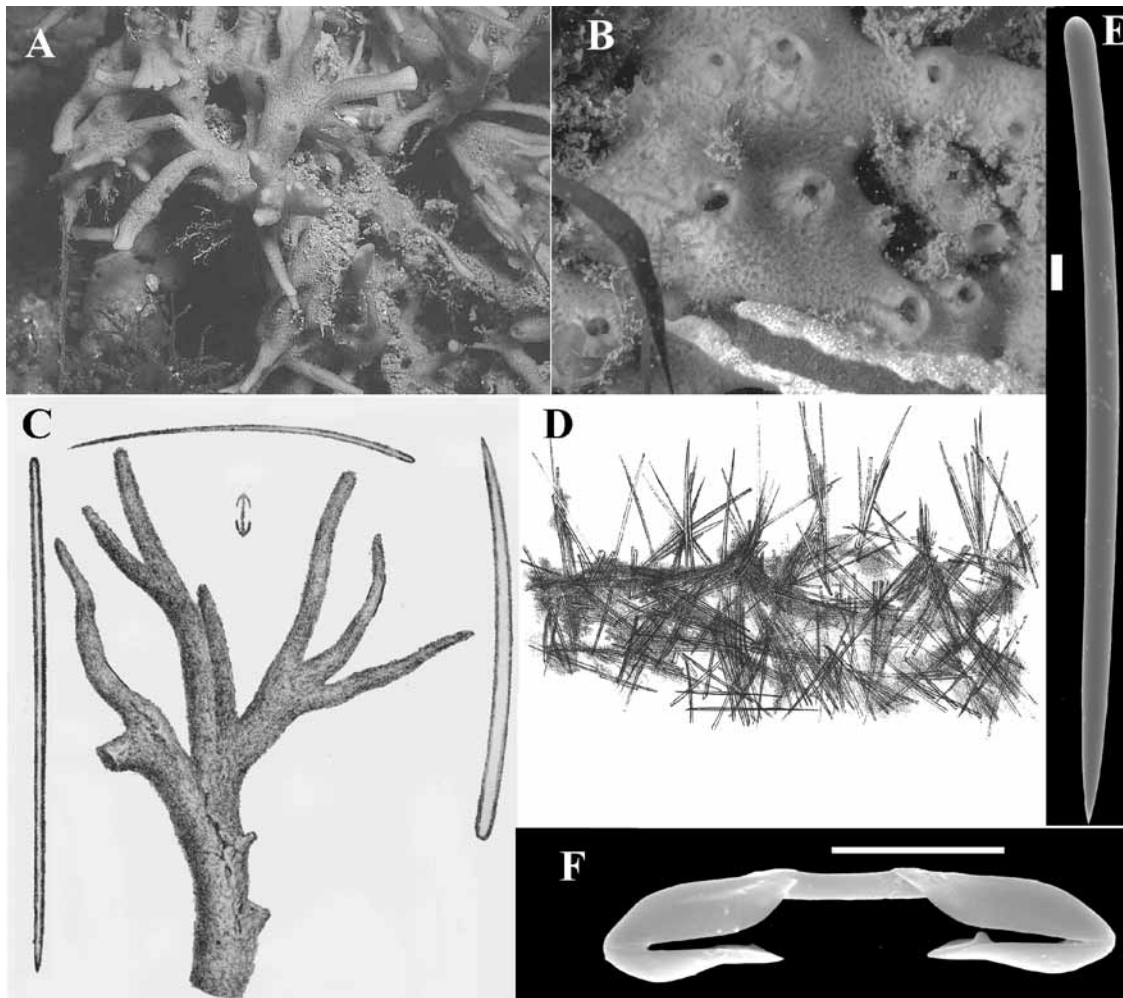


Fig. 1. *Amphilectus fucorum* (Esper, 1794). A, habit of ramose specimen (photo B. Picton, size see text). B, habit of encrusting specimen (photo R.W.M. Van Soest, size see text). C, drawings of holotype *Isodictya gracilis* Bowerbank, 1866, reproduced from Bowerbank, 1874b: pl. LVIII figs. 23–26 (sizes see text). D, drawing of skeleton of *Isodictya hispida* Bowerbank, 1882, considered a junior synonym, reproduced from Bowerbank, 1882: pl. XII fig. 3 (sizes see text). E, SEM photo of style of Irish specimen ZMA 4832 (scale 10 μm). F, SEM photo of palmate isochela of same (scale 10 μm).

with variable amounts of spongin (depending on the age of the sponge). There is no special ectosomal skeleton. Spicules smooth, usually curved, styles (Fig. 1C, E), size variable: up to 150–400 \times 3–19 μm . Microscleres small palmate isochelae (Fig. 1F), which may be rare, 14–28 μm . Reproduction August (Lévi, 1956a). Distribution and ecology. Atlantic coasts of Europe from Norway and the Faroes to the Mediterranean (latter record is by Uriz, 1983); on rock and under stones; amongst hydroids (it will grow up *Tubularia* stems) and has even been found on ascidian tests. It is often found growing on/in *Laminaria* holdfasts on the lower shore and shallow sublittoral, down to 108 m.

Remarks. The species is polymorphic, both in habit and in skeletal characters, and there are a large number of Bowerbank synonyms (at least 16, see Van Soest *et al.*, 2000) still to be checked which may result in a ‘splitting’ of the entity *A. fucorum* as now understood.

Amphilectus was erected by Vosmaer (1880: 109) for sponges which showed characters of dubious assignment to either of three genera, viz., *Desmacidon* Bowerbank, 1862b; *Mycale* Gray, 1867a and *Myxilla* Schmidt, 1862. Forty-two species were assigned to *Amphilectus*, believed to be the ancestral stock, from which the

derived characters of each of the three mentioned genera would have developed (Vosmaer, 1880). Vosmaer (1887) pointed to *Microciona armata* Bowerbank, 1866 as an example (‘Beispiel’) of what he intended to classify in *Amphilectus* (one of two species actually available to him, out of 42 species assigned to *Amphilectus* by Vosmaer). Lévi (1960a) took this as a type species designation. In spite of the fact that in other quoted genera the ‘Beispiel’ species coincide with the type species as currently understood, we submit that Vosmaer did not formally make a type species designation. Accordingly, we take Dendy’s (1922b), followed by Burton (1929a), as the objective designation, and recognize *Isodictya gracilis* (= *Amphilectus fucorum*) as the type species of *Amphilectus*. It is worth mentioning that *Isodictya gracilis* (as *Amphilectus* g.) was the first species listed by Vosmaer (1880), the remaining 41 lacking an alphabetical or a chronological order.

The genus [*Corybas*] Gray, 1867a: 537 was erected for type species *Isodictya lobata sensu* Bowerbank, 1866 (by original designation), which is based on *Spongia lobata* Montagu (1818). A type slide is extant in BMNH (unregistered, bearing number Bk. 952), labeled ‘spicula from the Type with Dr. Grant. Devon Coast’ (not examined). Synonyms include *Chalinula ovulum*

Schmidt (1870: 38), type in ZMUC with slides in ZMB and BMNH (not examined) and *Esperia lanugo* Schmidt (1875: 118), no type material located (Desqueyroux-Faúndez & Stone, 1992). Specimens ZMA 5388 (from the Netherlands) and ZMA 8453, 8454 (from Northern Ireland) were examined. This is a pale yellow, beige sponge forming round, egg-shaped, or flattened cushions (Fig. 2A) growing on brown algae, hydroids or erect bryozoans, 4–15 mm in diameter. Larger specimens are cylindrical or rather irregular in shape; larger specimens may have oscules in rows along a ridge, or somewhat scattered. Consistency slightly elastic, very soft. Skeleton of primary polyspicular bundles, cross-linked here and there by single spicules, running from the substratum to the surface. Spongin is not obviously abundant, and is colourless. Megascleres (Fig. 2C) more or less curved styles, 145–(190)–310 × of 2–11 µm. Microscleres (Fig. 2B) anisochelae variable in size, from 15–23 µm in length. They also vary greatly in the relative sizes of the chelate ends. In some specimens the difference between the ends is so slight as to suggest isochelae. Distribution. North Atlantic and North Sea, down to 200 m. The species is very close to *A. fucorum* but the anisochelate condition usually makes distinction easy. [*Corybas*] Gray is considered a synonym of *Amphilectus* and would have taken priority if it had not been preoccupied by *Corybas* Boisduval in Westwood, 1850 (Lepidoptera).

The genus *Brondstedia* Burton, 1929a: 428 was erected for the New Zealand type species (by original designation) *Esperiopsis glaber* Brondsted, 1924a: 141, fig. 20. This was described as having styles of 200–370 µm, palmate isochelae of 18 µm and sigmas of 14–35 µm. Brondsted also mentioned a thick tangential ectosomal crust and a reticulate choanosomal skeleton. Bergquist & Fromont (1988: 26, pl. 6B–C) redescribed this material but were unable to find any microscleres or the ectosomal skeleton; the choanosome appeared to be confused with very thick spicule tracts. They returned the species to *Esperiopsis*, but in view of the spicule size it seems better to consider it a species of *Amphilectus*, although it is by no means typical for this genus. If the microscleres described by Brondsted (1924a) are indeed foreign, is not impossible that it will have to be assigned to *Semisuberites*.

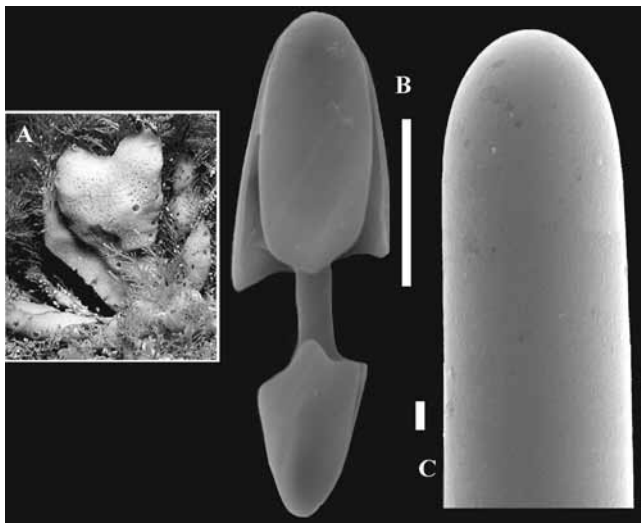


Fig. 2. *Amphilectus lobata* (Montagu, 1818 as *Spongia*), type of [*Corybas*] Gray, 1867a. A, habit in situ (photo B. Picton, size see text). B, SEM image of palmate anisochela (scale 10 µm). C, detail of head of style (scale 1 µm).

ESPERIOPSIS CARTER, 1882

Synonymy

Esperiopsis Carter, 1882a: 296. *Mycalopsis* Topsent, 1927b: 7.

Type species

Esperia villosa Carter, 1874a: 213 (by original designation).

Definition

Esperiopsidae with anastomosing skeleton of thick spicule tracts condensed in the interior and running upwards to the surface, occasionally desma-like spicules may occur; microscleres chelae and sigmas.

Diagnosis

Massive, pedunculate or flabellate sponges with plumoreticulate choanosomal skeleton, composed of anastomosing columns of large subtylostyles (mycalostyles), condensed in the interior and thinning out towards the surface. In species with desmas, these are concentrated in the interior forming an axial column (Hooper & Lévi, 1989). Microscleres include up to three categories of palmate isochelae, which may occur in rosettes, and up to two categories of sigmas. About 50 species have been recorded but these need revision. Most occur in higher latitudes or in deeper water.

Previous reviews

Bergquist & Fromont (1988), Hooper & Lévi (1989), Hooper & Wiedenmayer (1994).

Description of type species

Esperiopsis villosa (Carter, 1874a) (Fig. 3A–B).

Synonymy. *Esperia villosa* Carter, 1874a: 213, pl. XIII figs 13–15, pl. XV fig. 36; unknown sponge; Carter, 1879a: 502, pl. XVIIa, figs 12a–c; *Esperiopsis villosa*; Carter, 1882a: 296.

Material examined. Holotype: BMNH 1882.7.28.55a – ‘Porcupine’ Exp. ‘between the N coast of Scotland and the Faroe Islands; det. H.J. Carter’; slide from holotype registered as BMNH 1954.2.12.158.

Description (adapted from Lundbeck, 1905; spicules and architecture reevaluated from microscopic preparations of type). Erect, more or less leaf-shaped (Fig. 3A–B). Surface finely shaggy from protruding megascleres. Oscula mostly on top of small conical projections situated on the upper edge of the sponge. No specialized ectosomal skeleton. Dermal membrane rests on diverging tufts of megascleres from terminating ascending choanosomal tracts of megascleres. Choanosomal skeleton with ascending multispicular fibres which diverge and anastomose along the way, slendering when approaching the surface. Megascleres (Fig. 3A–B) are robust, slightly fusiform, smooth mycalostyles, 560–(619)–670 × 10–20 µm. Microscleres (Fig. 3A–B) are palmate isochelae of three size categories: I, 83–113 µm, II, 50–83 µm and III, 23–28 µm. Categories I and II may overlap, but the conspicuous narrow face and straight profile views of category I clearly set them apart. Sigmas are 50–193 µm

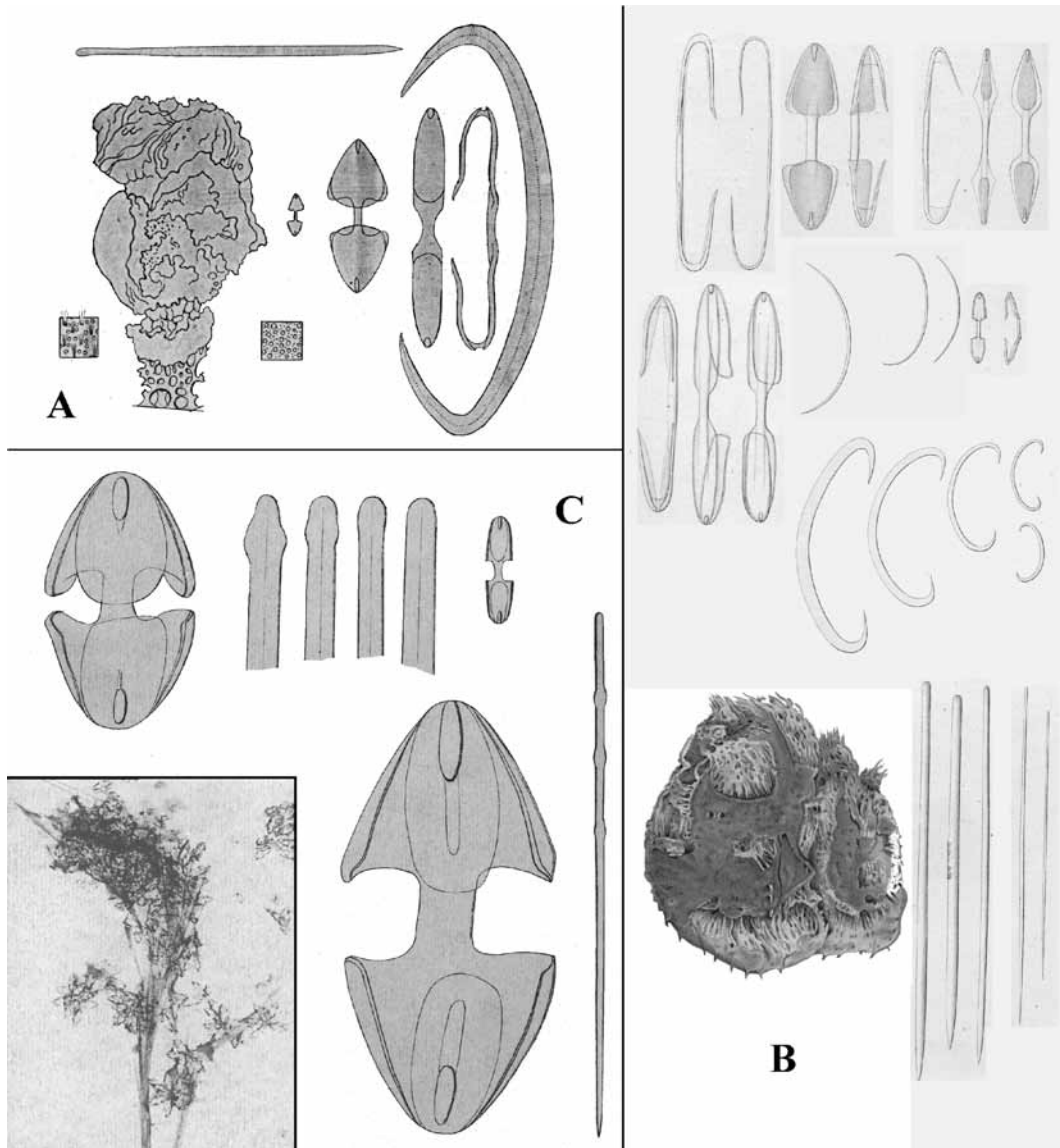


Fig. 3. A–B, *Esperipsopsis villosa* (Carter, 1874a as *Esperia*). A, drawing of habit and spicules reproduced from his pl. XIII figs 13–15, and pl. XV fig. 36. B, drawing of habit and spicules reproduced from Lundbeck, 1905, pl. I fig. 4, and pl. VIII fig. 1. C, *Esperipsopsis radiata* (Topsent, 1927b as *Mycalopsis*), drawings of spicules and photo of skeleton reproduced from Topsent, 1928c: pl. VII figs 8–9.

long. Sigmas 50–100 μm long are much more frequent (80%) than larger ones (20%), but no clear gap exists in their dimensions. Distribution and ecology. North Atlantic and Arctic Ocean, also reported from Antarctic waters (Kirkpatrick, 1907a), 650–200 m.

Remarks. *Esperipsopsis* is employed here in the sense of Burton (1929a), for a restricted group of species conforming to *Esperia villosa*. These possess a plumo-reticulate skeleton of tracts of large mycalostyles, and microscleres generally including more than one category of isochelae and sigmas. These species were collectively termed *Esperipsopsis*-I in Hajdu & Desqueyroux-Faúndez (1994) and Hajdu (1999). Further species included in this concept of *Esperipsopsis* are *E. flagellum* Lundbeck, 1905, and *E. typichela* Lundbeck, 1905, but a revision of original specimens is necessary to be certain of the genus membership. The genus *Amphilectus* is closely related, as is demonstrated above. Many contemporary authors consider *Amphilectus* to be a synonym, but the structure of

the skeleton is reticulate rather than plumose, it is more delicate, the spicules are shorter, the diversity of microscleres is limited to one small size category of chelae to which one size category of sigmas may be added.

The genus *Mycalopsis* Topsent, 1927b was erected for type species *Mycalopsis radiata* Topsent, 1927b: 7 (monotypy). See also Topsent, 1928c: pl. VII figs 8–9, here reproduced as Fig. 3C. A slide of the MOM holotype was examined, MNHN DT. 1336. This is a blackish encrustation from 1331 m off the Azores. It has a skeleton ‘similar to *Carmia*’, which may be translated as having polyspicular bundles rising up to the surface and lacking an ectosomal skeleton. Spicules (Fig. 3C) consist of straight, somewhat polytylote styles of 385–455 \times 7–8 μm , and three size categories of palmate isochelae, 80–95 μm , 40–60 μm and 18–20 μm , of which the largest occur in rosettes. This combination of characters conforms to *Esperipsopsis* as here defined and accordingly *Mycalopsis* is considered a synonym.

SEMISUBERITES CARTER, 1877**Synonymy**

Semisuberites Carter, 1877a: 39. *Stylaxia* Topsent, 1913a: 52. *Siphonocalypta* Burton, 1931c: 140.

Type species

Semisuberites arctica Carter, 1877a: 39 (by monotypy). This is here considered a junior synonym of *Semisuberites cribrosa* (Miklucho-Maclay, 1870: 6 as *Veluspa polymorpha* var. *cribrosa*).

Definition

Esperopsidae with skeleton consisting of loose brushes at the surface and a system of loose tracts parallel to the surface intercrossed by polyspicular tracts ending in the surface brushes. Spicules styles with slightly swollen heads. No microscleres.

Diagnosis

Trumpet-shaped sponges with velvety outer surface, caused by brushes of spicules ending at the surface; choanosomal skeleton with spicules arranged in loose tracts perpendicular to the surface crossing long tracts running parallel to the surface, with many loose single spicules; megascleres exclusively styles in one or more size categories, many with faintly swollen heads. A single species?

Previous review

Burton (1932a).

Description of the type species

Semisuberites cribrosa (Miklucho-Maclay, 1870) (Figs 4–5).

Synonymy. *Veluspa polymorpha* var. *cribrosa* Miklucho-Maclay 1870: 6, pl. I figs 12–16. *Semisuberites arctica* Carter, 1877a: 39; Burton, 1932a: 196, figs 1–2, pl. VII figs 1–2. *Cribrochalina sluiteri* Vosmaer, 1882a: 36; Vosmaer, 1885a: 22, figs 10–11; Levinsen, 1887: 352, pl. XXIX figs 6–9, pl. XXX fig. 6; *Stylaxia sluiteri* Topsent, 1913a: 54, pl. III fig. 1. *Cribrochalina variabilis* Vosmaer, 1882a: 36, pl. I figs 16–17, pl. III figs 67–69, pl. IV figs 145–147 (incl. var. *crassa* and var. *salpingoides*); Fristedt, 1887: 418, pl. 26 fig. 4; *Stylaxia variabilis*; Topsent, 1913a: 52. *Auletta elegans* Vosmaer, 1882a: 40, pl. I fig. 20, pl. III fig. 70, pl. IV fig. 152; *Siphonocalypta elegans*; Burton, 1931c: 140, fig. 1.

Material examined. Lectotype of *Semisuberites arctica* Carter (in alcohol): BMNH 1877.7.3.1 – ‘Smith’s Sound, Cape Napoleon, 50 fthm, presented by the Lords of the Treasury’. Paralectotype (dry): BMNH 1877.7.3.5 – ‘Smith Sound 50 fthm Aug. 1876, H.W. Jeilden, Lords of the Treasury’; including 3 sections and 1 spicule mount. Holotype of *Cribrochalina sluiteri* Vosmaer: RMNH 724 – Willem Barents Exped. 1878/79; ZMA 818, 819, Willem Barents Expedition 1881. Lectotype of *Auletta elegans*: ZMA 448 – Willem Barents Expedition 1881.

Description. Trumpet-shaped (Fig. 4B, D, F), or bushes of flaring tubes (Fig. 4A, G) or hollow branches (Fig. 4A, F), with a thin stalk, greatest height 14 cm, widest expansion of individual tubes/branches 3 cm in diameter. If synonymy of *Cribrochalina sluiteri* is accepted, then flabelliform sponges with widely expanded

shape are also included. Surface even, velvety. Oscules only on the inside of tubes or in the depressed apex of branches (Fig. 4A, D, F, G). Consistency delicate, easily damaged. Ectosomal skeleton not clearly separated from the choanosomal skeleton, consisting of brushes or loose palisades, which are the ends of loose choanosomal tracts fanning out at the surface (Fig. 4C). Some small open spaces are apparent subdermally between the ectosomal brushes. The choanosomal skeleton (Fig. 4C) consists of a system of loose longitudinal spicule tracts parallel to the surface and tracts running to the surface at right angles to these longitudinal tracts; many single spicules strewn in between. Spicules (Fig. 4C, E) exclusively styles in what could perhaps be two size categories 400–500 and 200–300 μm ; many styles show a faint swollen head, and are similar to mycalostyles. Distribution and ecology. Arctic, down to 100 m.

Remarks. This genus has been largely ignored by modern authors. Topsent (1928c: 37) assigned it to the Suberitidae, but most suberitids are compact and firm, with a high density of spicules, which are also usually true tylostyles. *Semisuberites cribrosa* is a fragile sponge with a loose, confusedly arranged skeleton. It shows some similarities with *Hymeniacion* in spicule size and shape, but lacks the tangential surface skeleton of that genus. The synonymy of *Veluspa polymorpha* var. *cribrosa* is based on Koltun’s treatment of this species (as *Phakettia cribrosa*), no original specimens could be studied. Still, there are no other matching records of Arctic species, and the synonymy with *Semisuberites arctica* appears well-founded. Burton (1932a: 196) also suggested the synonymy of *Semisuberites arctica* and Miklucho-Maclay’s species but confined himself to adding a questionmark. The genus *Veluspa* Miklucho-Maclay is a synonym of *Haliclona* (see chapter by De Weerd on Haplosclerida: Chalinidae).

The genus *Stylaxia* Topsent, 1913a: 52 was erected for type species *Cribrochalina variabilis* Vosmaer, 1882a: 36, pl. I figs 16–17 (here reproduced as Fig. 4D), pl. III figs 67–69 (here reproduced as Fig. 4E), pl. IV figs 145–147 (by original designation). This is considered a junior synonym of *Semisuberites cribrosa*. The type specimens of *Cribrochalina variabilis* (incl. varieties *crassa* and *salpingoides*), RMNH 725–727, and the very similar *Cribrochalina sluiteri* Vosmaer, 1882a, RMNH 724, as well as 4 specimens of *C. sluiteri* subsequently collected in the same area and kept in ZMA, were re-examined and they conform in all details to *Semisuberites cribrosa*.

The genus *Siphonocalypta* Burton, 1931c: 140, fig. 1 (here reproduced as Fig. 5B) was erected for type species (original designation) *Auletta elegans* Vosmaer, 1882a: 40, pl. I fig. 20 (here reproduced as Fig. 5A), pl. III fig. 70, pl. IV fig. 152. The lectotype ZMA 448, from northern Norway, collected by the Willem Barents Exped. 1881, was studied. It was originally a tube shaped sponge of 5 cm high, 1 cm diameter, which is now disintegrated. With the help of Vosmaer’s description, however, the properties of this specimen can be reconstructed. Despite Burton’s subsequent (1932a: 197) defensive statements, this appears to be a clear junior synonym of *Semisuberites arctica*, combining a tubular habit and curved styles of 300–500 μm , in two size categories, arranged in an irregular loose reticulation.

ULOSA DE LAUBENFELS, 1936**Synonymy**

Ulosa de Laubenfels, 1936a: 126. *Stylaxinella* Vacelet, 1960a: 264.

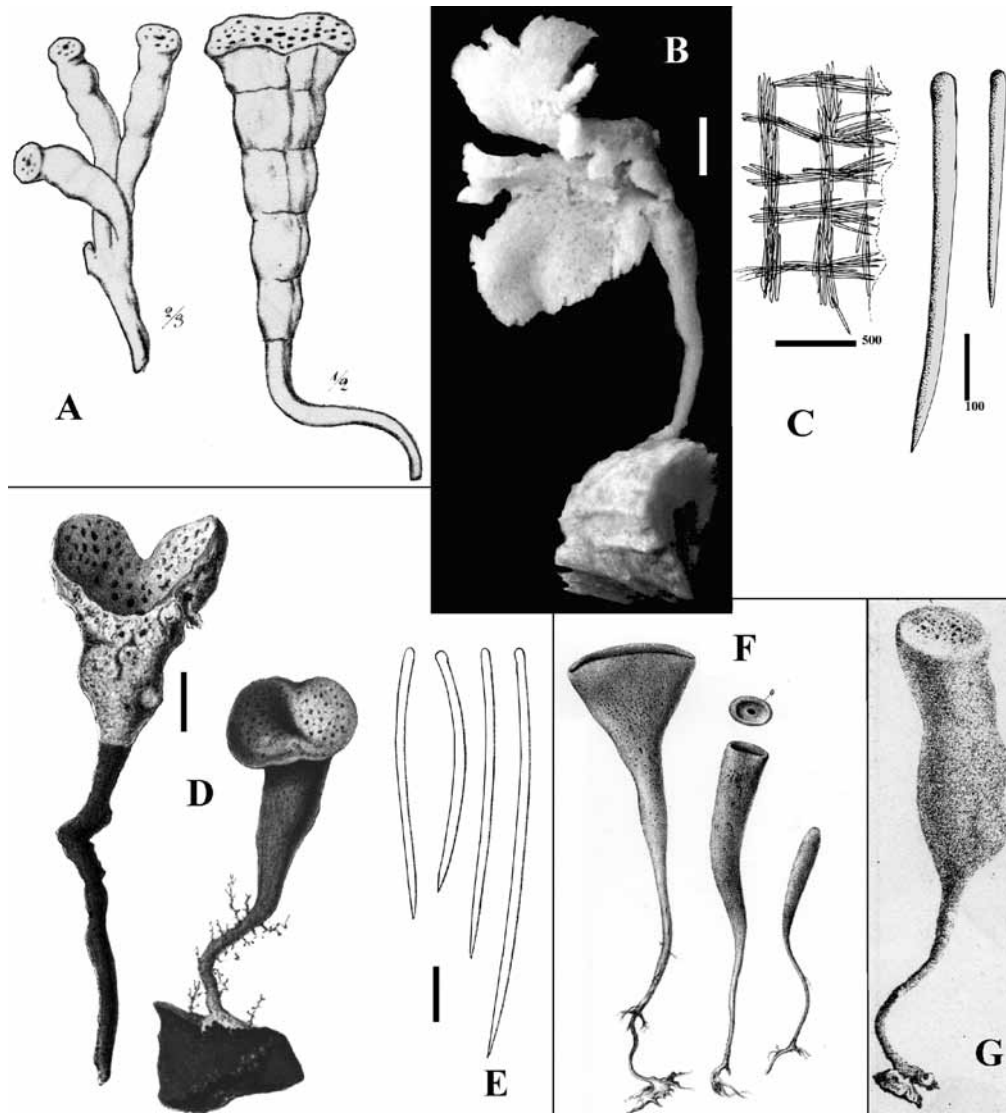


Fig. 4. *Semisuberites cribrosa* (Miklucho-Maclay, 1870). A, drawings of habit reproduced from Miklucho-Maclay, 1870: pl. I figs 12–13 (sizes see text). B, photo of lectotype of *Semisuberites arctica* Carter, 1877a, BMNH 1877:7:3:1 (scale 1 cm). C, drawing of skeleton and spicules made from a slide of the lectotype. D, drawings of habits of *Cribrochalina variabilis*, considered junior synonyms, reproduced from Vosmaer, 1882a: pl. I figs 16–17 (sizes see text). E, styles of *Cribrochalina variabilis* and *Aueletta elegans*, both considered junior synonyms, reproduced from Vosmaer, 1882a: pl. III figs 69–70 (scale 50 μ m). F, drawing of habits of specimens recorded as *Cribrochalina sluiteri* by Levinsen, 1887: pl. XXIX figs 6–9 (sizes see text). G, drawing of habit of specimen recorded as *Cribrochalina variabilis* by Fristedt, 1887: pl. 26 fig. 4 (size see text).

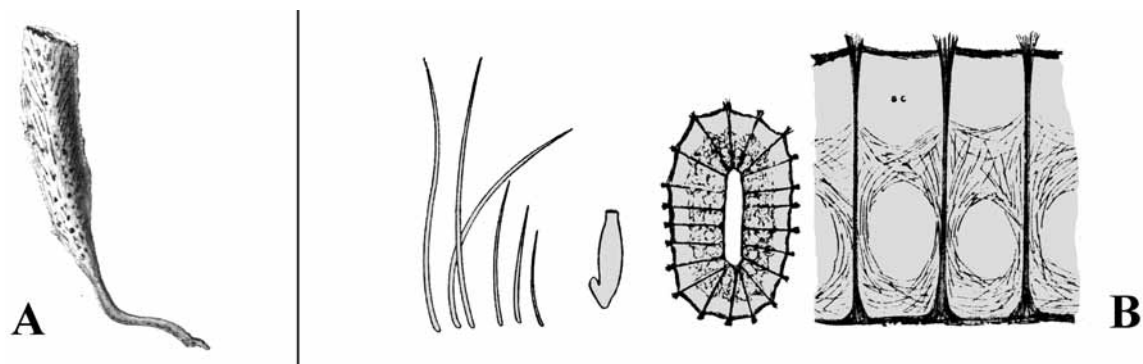


Fig. 5. A, drawing of *Aueletta elegans* Vosmaer, 1885a, type of *Siphonocalypta* Burton, 1931c, considered a junior synonym of *Semisuberites cribrosa*, reproduced from Vosmaer, 1882a: pl. I fig. 20. B, drawings of spicules, habit and skeleton of *Siphonocalypta elegans* Burton, 1931c, considered a junior synonym of *Semisuberites cribrosa*, reproduced from Burton, 1931c: fig. 1 (sizes see text).

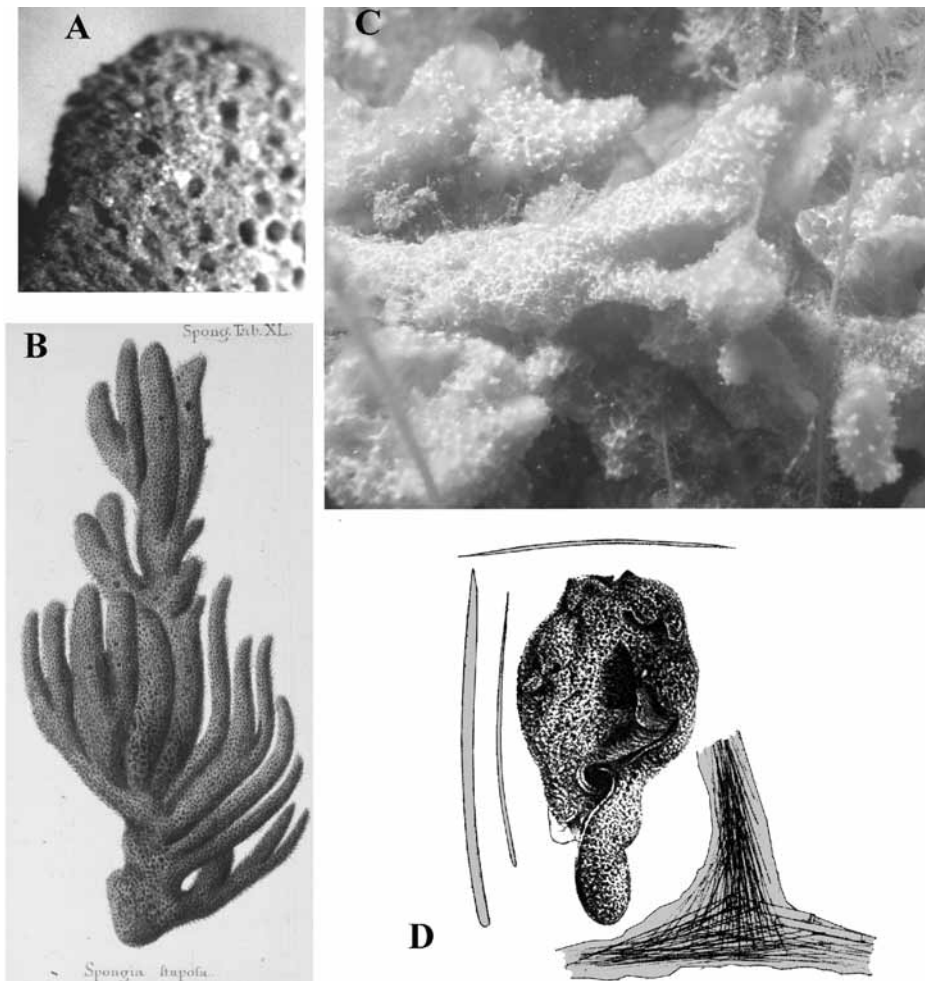


Fig. 6. *Ulosa* spp. A, photo of detail of surface of MNHN lectotype of *Ulosa angulosa* (Lamarck, 1814 as *Spongia*) (size see text). B, water colour of *Ulosa stuposa* (Esper, 1794 as *Spongia*), reproduced from his plate X (size see text). C, habit in situ of Roscoff specimen of *Ulosa stuposa* (photo M.J. de Kluijver). D, drawings of habit, skeleton and spicules of *Chalina inornata* Bowerbank, 1874b considered a junior synonym of *Ulosa stuposa*, reproduced from Bowerbank, 1874b: pl. LXXXIII figs 12–16 (sizes see text).

Type species

Spongia angulosa Lamarck, 1814: 376 (by original designation).

Definition

Esperiopsidae with a skeleton of polyspicular spicule fibres encased in spongin making a rectangular or polygonal reticulation. Megascleres styles of uniform size. No microscleres.

Diagnosis

Encrusting, lobate, and branching sponges with conulose surface due to projecting fibers; no ectosomal skeleton. Choanosomal rectangular or polygonal reticulation of spongin encased spicule tracts. Megascleres short styles of a single size, occasionally modified to oxeas. Microscleres absent. Three or four species from Atlantic-Mediterranean and South Pacific regions.

Previous review

Van Soest (1987).

Description of type species

Ulosa angulosa (Lamarck, 1814) (Fig. 6).

Synonymy. *Spongia angulosa* var. *β* Lamarck, 1814: 376; *Cacochalina angulosa*; Topsent, 1930: 27, pl. III fig. 2; *Ulosa angulosa*; de Laubenfels, 1936a: 126.

Material examined. Holotype: MNHN DT. 549 – from King Island, S Australia. Other material. ZMA 3042 – Indonesia.

Description (from Topsent, 1930). Lobate sponge (Fig. 6A). The type specimen is bilobate, 8 cm high with lobes of 3.5 cm in diameter and its surface appears macerated. There are regularly distributed rounded holes, 1.5–2 mm in diameter, which are considered oscules by Topsent. Surface conulose due to projecting fibres. Skeleton a reticulation of primary fibres of 55–80 μm in diameter, interconnected by secondary fibres of 30–60 μm in diameter, forming rectangular meshes of 100–350 μm, narrowing to only 30 μm near the periphery. The primary fibres have a continuous core of aligned spicules with a thin spongin border, the secondary fibres have fewer coring spicules. Spicules are styles, somewhat curved, isodiametrical, with well-rounded head and conical point, 125–180 × 5 μm; a small minority of the spicules are oxeote, with the rounded end

conically pointed. Distribution and ecology. King Island, N of Tasmania; ? Indonesia.

Remarks. The Indonesian material in ZMA answers in most aspects to Topsent's redescription, but fibres are thicker and meshes are wider, hence its assignment to this species with hesitation, including its disjunct distribution from the type locality.

This genus was associated with *Stylinos* Topsent, 1891a: 535 by some authors (e.g., Hooper & Wiedenmayer, 1994). This genus was erected for type species *Isodictya uniformis* Bowerbank, 1866: 329 (by subsequent designation; Hooper & Wiedenmayer, 1994: 295). A microscopical slide containing cross sections of the type specimen labeled 'Isodictya uniformis Bk. from Type', BMNH 1877.5.21.751, bearing the number 'Bk.751' and with engraved number 'R2698' was re-examined. The skeleton is confused with vague spicule bundles without visible spongin running to the surface following a wavy course. Many interstitial spicules in confusion. At the surface there is a crust of tangential and paratangential spicules intercrossing at all angles. The spicules are smooth styles, $220\text{--}310 \times 3\text{--}6 \mu\text{m}$, matching those of *Hymeniacion* *perlevis* as do the other features. All of these observations match the description by Bowerbank. *Stylinos* is an obvious synonym of *Hymeniacion* by virtue of the perhaps unfortunate type species designation by Hooper & Wiedenmayer. Topsent, in subsequent publications (Topsent, 1892a: 135, 137) made it clear he intended this genus to be a poecilosclerid, as he erected *Stylinos jullieni* in 1892a: 137 as 'type' of *Stylinos*. However, since *S. jullieni* was not among the species mentioned in Topsent's (1891a) publication, it cannot be the type of *Stylinos*. This species is very probably a member what is now to be called *Ulosa* de Laubenfels, 1936a, and consequently Hooper & Wiedenmayer attempted to sink *Ulosa* into synonymy of *Stylinos*. Hooper & Wiedenmayer (1994) were apparently unaware of the true nature of *Isodictya uniformis* when they designated this the type of *Stylinos*.

Furthermore some doubt about the *Ulosa* nature of *Stylinos jullieni* was raised by Topsent himself (1928c: 14), because he found spines on the styles and a dubious presence of tyloles. He suggested that *S. jullieni* is close to *Kirkpatrickia* (now in Hymedesmiidae), but left it *incertae sedis*.

A further complication arose when Vacelet, 1960a: 264 – accepting that *Stylinos sensu* Topsent, 1892a, 1928c could not be what Topsent originally intended, and apparently unaware of the properties of *Ulosa* – erected a replacement genus *Stylaxinella*. He chose as type species (original designation) *Spongia stuposa*

Esper, 1794: pl. V (not *Spongia stuposa* Ellis & Solander, 1785: 186 = *Stelligera stuposa*), with junior synonyms *Chalina digitata* Schmidt, 1866a, *Chalina inornata* Bowerbank, 1874b and *Desmacidon pannosus* Bowerbank, 1874b. Esper's original specimens are considered lost, but his figure (here reproduced as Fig. 6B) of this common European species is recognizable. It forms digitate cushions to ramose forms, up to 8 cm thick, branches up to 17 cm long and with a diameter up to 1.5 cm. Irregular in outline. Surface finely conulose (Fig. 6C), in places honeycombed, somewhat slimy. Consistency softly spongy, compressible, easily torn or damaged. Colour pinky orange, salmon pink or yellowish in life, pale yellow in alcohol. The organic ectosome is carried by the endings of choanosomal fibres, giving a conulose surface. Choanosomal skeleton is an irregular rectangular fibre system (Fig. 6D) with relatively few soft parts and large open spaces; frequently digitations and branches are partly hollow. Fibre reticulation consisting of barely distinguishable main and secondary fibres, which connect at right angles. Fibres heavily cored, but spongin coat normally well-developed. Meshes of the reticulum vary in size between 100 and 1000 μm , fibre diameter in the different specimens varies between 15 and 70 μm , coring extent between 3 and 20 spicules per cross section. Spicules (Fig. 6D) predominantly styles, but oxete and strongylote modifications are common. Size rather variable, especially the thickness, both within a single specimen and among different specimens, 115–260 by 2–10 μm . The species occurs on rocks and surrounding algae in the deeper sublittoral, 15–55 m. Distribution. Ireland, S England, Atlantic coasts of France and Spain, Western Mediterranean, probably also North West Africa. The characters of this species match those of *Ulosa angulosa* and thus *Stylaxinella* is a clear junior synonym of *Ulosa*.

Related forms (*U. tenellula* and *U. tubulosa*) have been recently described from the Mediterranean by Pulitzer-Finali (1983). All these appear to conform to the definition of *Ulosa* based on Lamarck's type.

Until recently, the genus name *Ulosa* was used for quite different sponges in recent West Indian literature. Particularly, the extremely common reef form '*Ulosa*' *ruetzleri* Wiedenmayer (1977b), is widely divergent from *U. angulosa* and *U. stuposa*. '*Ulosa*' *ruetzleri* is an incrusting sponge, fleshy-conulose, with a high content of organic material and a very loose system of dendritic spongin-fibres cored by rather few, long, sharply pointed styles. It conforms to *Scopalina* (Halichondrida: Dictyonellidae).