

Family Bubaridae Topsent, 1894

Belinda Alvarez¹ & Rob W.M. Van Soest²

¹Museum and Art Gallery of the Northern Territory, P.O. Box 4646, Darwin, NT 0801, Australia. (belinda.glasby@nt.gov.au)

²Zoological Museum, Faculty of Science, University of Amsterdam, P.O. Box 94766, 1090 GT, Amsterdam, The Netherlands. (soest@science.uva.nl)

Bubaridae Topsent (Demospongiae, Halichondrida) is used here in the restricted sense of Topsent (1928c) to group exclusively encrusting forms that were related to the family Axinellidae at one time or another. The family includes four valid genera and approximately 30 species, characterised by a basal layer of interlacing spicules, generally diactines, and erect monactines spicules, with bases embedded in the basal layer, projecting perpendicularly to the substratum. Most species of the family are found in deep waters down to 1300 m but shallow water species are also known.

Keywords: Demospongiae; Halichondrida; Bubaridae; *Bubaris*; *Cerbaris*; *Hymerhabdia*; *Monocrepidium*.

DEFINITION, DIAGNOSIS, SCOPE

Synonymy

Bubarinae Topsent, 1894c: 20 (in part); Bubaridae *sensu* Hentschel, 1923: 407 (in part); Topsent 1928c: 42; Vacelet, 1969: 180 (in part); Lévi, 1973.

Definition

Halichondrida of encrusting habit and skeleton differentiated into a basal layer of interlacing spicules and a perpendicular layer of monactines with bases embedded in the basal skeleton.

Diagnosis

Encrusting sponges generally with hispid surface. Ectosomal skeleton absent. Choanosomal skeleton differentiated into a basal layer of interlacing diactines and, in some cases additional styles; and perpendicular to this layer longer monactines with bases embedded in the basal skeleton. Megascleres in the basal skeleton are diactines of different kinds (strongyles, oxeas, anisoxeas, angulated-centrotylote oxeas, anisoxeas, ceroxas, i.e., m-shape diactines), different shapes (sinuous or vermicular, bent, angulate or centrotylote) and different textures (smooth, evenly or unevenly acanthose, tuberculate or annulate). Rhabdostyles or styles with contorted or reflexed bases are also present. Longer styles (sometimes in two size categories) or tylostyles are located perpendicularly to substrata. Raphides occasionally present.

Scope

The family includes nine nominal genera, but only four are considered valid under the definition of the family employed here. Other genera of the nominal Bubaridae are currently included in other families (i.e., *Suberotelites* Schmidt (= *Phorbis*) in Hymedesmidae; *Plocamia* Schmidt (= *Antho* (*Acarnia*)) in Microcionidae; *Plocamiopsis* Topsent (= *Antho* (*Acarnia*)) in Microcionidae; *Crambe* Vosmaer in Crambeidae; *Lithobubaris* Vacelet in Desmanthidae; *Lithoplocamia* Dendy in Raspailiidae; *Rhabderemia* Topsent in Rhabderemiidae (see respective chapters in this volume).

Distribution

Most genera are found only in the East Atlantic and Mediterranean, and generally in deep waters (down to 1300 m depth). However, the genus *Bubaris* has an allegedly wider distribution including species records from the Arctic, Indian Ocean, Indonesia, Japan, New Zealand and Antarctica.

History and biology

Topsent (1894c: 20; 1898b: 247) erected the subfamily Bubarinae (under Poeciloscleridae: Halichondrina) to include *Plocamia* Schmidt, *Suberotelites* Schmidt, *Bubaris* Gray, *Cerbaris* Topsent, *Rhabderemia* Topsent and *Hymerhabdia* Topsent. *Cerbaris*, *Plocamia*, *Rhabderemia*, and *Suberotelites* were later transferred by Topsent (1904b) to a subfamily Ectyoninae.

Hentschel (1923) defined the family Bubaridae as 'with special diactinal spicules of remarkable form, which are placed in encrusting sponges at the base, in erect sponges in the centre, and in branching sponges in the axis. If these spicules are absent there may be walking-stick (cane) spicules (rhabdostyles). Main megascleres almost always monactinal. Microscleres can be chelae or sigmas, or can be absent'. Genera included were *Plocamiopsis*, *Lithoplocamia*, *Crambe*, *Monocrepidium* (erected under Desmanthidae by Topsent, 1898b: 229), *Rhabdoploca* (erected under Ectyoninae by Topsent, 1904b: 157) in addition to those assigned by Topsent (1894c, 1898b) to Bubarinae.

Topsent (1928c) recognised that Bubaridae as defined by Hentschel (1923) was a heterogeneous assemblage of genera and proposed a new arrangement to include only those genera with a basal layer of spicules and perpendicular monactines (i.e., *Bubaris*, *Cerbaris*, *Hymerhabdia*, *Monocrepidium* and *Rhabdoploca*). Other genera included in Bubaridae subsequent to the arrangement proposed by Topsent were: *Bubaropsis* Lévi and Vacelet, *Lithobubaris* Vacelet, *Skeizia* Cabioch, *Rhabdobaris* Pulitzer-Finali and *Uplexoa* de Laubenfels.

In some axinellid genera (e.g., *Phakellia*, *Auletta* and *Acanthella*) the axial skeleton is compressed and formed by interlaced strongyles from which longer monactines project perpendicularly. A similar architecture is seen in members of Bubaridae, as initially suggested by Hentschel (1923), and led some authors to include some bubarid

genera in Axinellidae (e.g., Bergquist, 1970; Van Soest *et al.*, 1990). The resemblance in skeletal structure between some Axinellidae and Bubaridae suggests a close relationship between these two families. At this stage, however, is not possible to establish whether or not this similarity can be interpreted as a homology to relate both families, or if it is a condition independently acquired in both groups.

Relationships among some members of Desmanthidae (i.e. *Lithobubaris*) and Bubaridae have also been proposed based on

similarities of the skeletal organisation seen in both groups (see Desmanthidae in this volume).

Bubaridae is restricted here to encrusting forms with similar skeletal architecture (i.e., a basal layer of spicules with perpendicular monactines). Detailed studies of bubarid species must be undertaken to establish whether or not this type of skeletal arrangement represents a good synapomorphy to unite the members of Bubaridae.

KEY TO GENERA

- (1) Basal skeleton formed only by diactines 2
 Basal skeleton includes monactines (rhabdostyles). Diactines bent or angulate oxeas *Hymerhabdia*
- (2) Diactines of basal skeleton always smooth, typically vermicular or sinuous. Spicules projecting perpendicular to substrate are long and smooth styles *Bubaris*
 Diactines (including strongyles, toxostrongyles, oxeas and ceroxas) evenly or unevenly acanthose, but smooth ones occasionally present. Spicules projecting perpendicular to substrate are styles and rhabdostyles sometimes in two size categories *Cerbaris*
 Diactines are tuberculate or annulate but smooth ones occasionally present. Spicules projecting perpendicular to substrate are styles and tylostyles *Monocrepidium*

BUBARIS GRAY, 1867

Synonymy

Bubaris Gray, 1867a: 521.

Type species

Hymeraphia vermiculata Bowerbank, 1866 : 141 (by original designation).

Definition

Bubaridae with basal skeleton formed by smooth sinuous or vermicular strongyles or strongyloxeas.

Diagnosis

Encrusting. Surface hispid. Choanosomal skeleton formed by bundles or individual styles projecting perpendicularly to substrata with heads embedded in a basal layer of vermicular or sinuous strongyles or strongyloxeas.

Remarks

The skeleton of *Bubaris* resembles the one found in some axinellid genera such as *Phakellia*, *Acanthella* and *Auleta* (i.e., axes of sinuous strongyles with projecting styles); but as stated above, this homology is considered insufficient to relate *Bubaris* to Axinellidae. It is also possible that some species of *Bubaris* are actually juvenile forms of *Phakellia* or *Acanthella*, but currently there is no empirical evidence to support this hypothesis.

The genus has been previously referred to Leiospongia (Halichondriadae) (Gray, 1867a), Halichondrina: Poeciloscleridae: Bubarinae (Topsent, 1894c), Halichondrina: Bubarinae (Topsent, 1896a), Halichondrina: Bubaridae (Topsent, 1928c), Axinellida: Bubaridae (Lévi, 1973); Halichondrida: Axinellidae (Van Soest *et al.*, 1990).

Distribution

Approximately twenty species of *Bubaris* have been reported in the literature (Alvarez, 1998), mainly from deep waters, but a revision is necessary as some of these species may be better allocated to *Phakellia* or *Acanthella*. The genus has an allegedly wide distribution including records from the Arctic, amphi-Atlantic, S Atlantic Ocean, Mediterranean Sea, Indian Ocean, Japan, New Zealand, Antarctica (Hooper & Wiedenmayer, 1994).

Previous reviews

Gray (1867a: 521); Carter (1880b: 46); Topsent (1891a: 546); Topsent (1894c: 22); Thiele (1903b: 379); Topsent (1904b: 137, 145); Dendy (1922b: 62); Topsent (1928c: 189); Burton (1928a: 128); de Laubenfels (1936a: 131); Bergquist (1970: 19); Hechtel (1969: 25); Boury-Esnault & Van Beveren (1982: 48); Boury-Esnault & Lopès (1985: 171).

Description of type species

Bubaris vermiculata (Bowerbank, 1866) (Figs 1–2).

Synonymy. *Hymeraphia vermiculata* Bowerbank, 1866: 141. *Bubaris vermiculata*; Topsent, 1891a: 545; Topsent, 1894c.

Material examined. Lectotype (here designated): BMNH 30.7.3.86 – Shetland, Bowerbank collection, coll. Barlee, Peach & Gregor (Fig. 1A). Paralectotypes (here designated): BMNH 30.7.3.85 – Shetland, Bowerbank collection (Fig. 1B); BMNH 10.1.1.89, dry – Shetland, 100 fathoms (Fig. 1C). Other material. BMNH not registered – 2 slides, Bowerbank collection No. 453; BMNH 1910.1.1.564 – Lervig, Norway, Norman collection.

Description. Encrusting, 0.5–1 cm diameter, on pebbles or bivalve shells; surface microhispid; red in life (Boury-Esnault & Lopès, 1985) (Fig. 2); grey in dry state. Specialised ectosomal skeleton absent; choanosomal skeleton basal layer of sinuous-vermiform strongyles or strongyloxeas echinated by long styles perpendicular to substrate with heads embedded in basal layer (Fig. 1D). Megascleres styles (Fig. 1E), length 230–2200 µm (681 ± 572.5), width 13–30 µm (21.7 ± 5.8) (n=10),

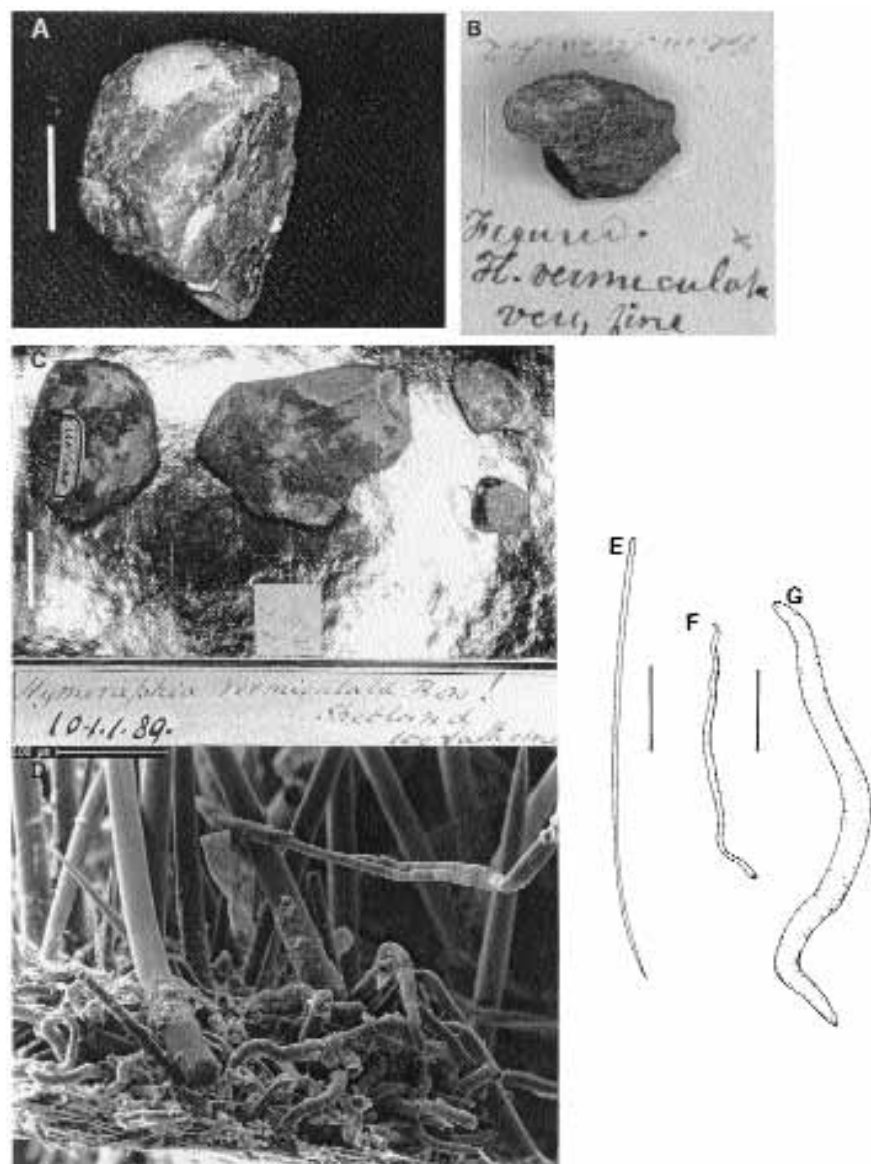


Fig. 1. *Bubaris vermiculata* (Bowerbank). A, lectotype, BMNH 30.7.3.86. B, paralectotype BMNH 30.7.3.85. C, paralectotype, BMNH 10.1.1.89. D–G, BMNH 1910.1.1.564. D, SEM of the skeleton. E–G, styles and vermicular anisoxeas (scales A–C, 1 cm; E, 100 μ m; F–G, 50 μ m).

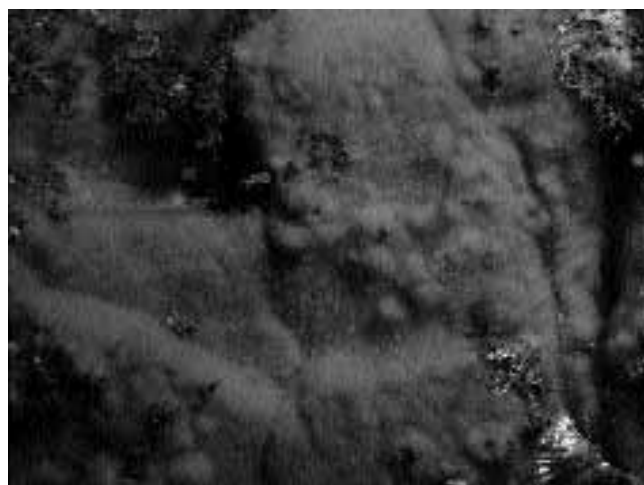


Fig. 2. *Bubaris vermiculata*, in situ, Ireland (photo Bernard Picton).

strongyloxeas (Fig. 1F)- anisoxeas (Fig. 1G), sinuous to vermiform, length 360–510 μ m (438 ± 45.2), width 8–13 μ m (10.5 ± 1.9) ($n=10$).

Remarks. Other material examined included possible syntypes of *Hymeraphia vermiculata* var. *erecta* (Carter, 1876): 307 (BMNH 1982.7.28.30, W of Shetlands Is., sta. 82, 312 fms, coll. HMS 'Porcupine'; BMNH 1882.7.28.34, West of Shetland Is., 624 m depth, sta.82, HMS 'Porcupine'(?)). This species does not agree with the concept of *Bubaris* under this revision. It has close affinities with species of *Acanthella* such as *A. flagelliformis* (Van Soest & Stentoff, 1988) and *A. mastophora* (Schmidt, 1870) as suggested by Carter (1876: 308).

Habitat and distribution. East Atlantic, 9–1360 m depth. The species has been also recorded for the Mediterranean (Babic, 1922: 238; Sarà, 1960a: 452; Sarà & Siribelli, 1962: 30; Pulitzer-Finali, 1977: 36; Pulitzer-Finali, 1983: 523), Indonesia (Topsent, 1897a; Desqueyroux-Faúndez, 1981), Kerguelen Island, Tristan da Cunha (Boury-Esnault & Van Beveren, 1982: 48) and New Zealand (Dendy,

1924: 351; Bergquist, 1970: 19) – but all these latter records might represent different species of *Bubaris*.

CERBARIS TOPSENT, 1898

Synonymy

Cerbaris Topsent 1898b: 247; Topsent 1904b: 160. *Rhabdoploca* Topsent, 1904b: 157 (new synonym). *Bubaropsis* Lévi & Vacelet, 1958: 235 (new synonym). *Rhabdobaris* Pulitzer-Finali, 1983: 526 (new synonym).

Type species

Cerbaris torquatus Topsent, 1898b: 248 (by monotypy).

Definition

Bubaridae with evenly or unevenly acanthose diactines in the basal skeleton.

Diagnosis

Encrusting. Surface hispid. Choanosomal skeleton formed by a basal layer of acanthose and smooth diactines with monactines projecting perpendicularly to substrata. Megascleres in the basal skeleton are evenly or unevenly acanthose ceroxas, i.e., m-shaped oxeas, toxostrongyles or strongyles; smooth oxeas or strongyles are also present. Styles, subtylostyles or rhabdostyles, sometimes in two size categories located perpendicularly to the basal layer. Raphides may be present.

Remarks

The definition of *Cerbaris* has been expanded here to include bubarid-like species that share the presence of acanthose diactines in the basal skeleton and that were previously assigned to *Rhabdoploca* Topsent, 1904b, *Bubaropsis* Lévi & Vacelet, 1958 and *Rhabdobaris* Pulitzer-Finali, 1983.

Rhabdoploca Topsent, 1904b: 157 (type species *Microciona curvispiculifera* Carter, 1880b: 43) is considered here a junior synonym of *Cerbaris*. The type material is confirmed destroyed during an air raid in 1941 (S. Stone, pers. com.), but the species is recognisable from Carter's description who described it as: encrusting with surface hispid, colour cream, basal skeleton of toxostrongyles (i.e., strongyles bent in the centre) smooth or fully spined; perpendicular styles, smooth, in two size categories, with bases fixed in the basal layer (Fig. 3B). Topsent (1904b) initially erected *Rhabdoploca* in Ectyonidae and transferred it later to Bubaridae (Topsent, 1928c). As indicated by Topsent (1928c), the genus shares the presence of a basal layer of spicules with perpendicular monactine spicules with other members of Bubaridae. Hooper (1996a: 578), suggested that the type species of *Rhabdoploca* might be a *Clathria* (*Clathria*) but this is less likely. The generic assignment of another species previously assigned to *Rhabdoploca* (i.e., *R. topsenti* Hentschel 1912: 43; Vacelet & Vasseur 1965: 21) needs to be re-evaluated.

Bubaropsis Lévi & Vacelet, 1958 (type species *Bubaropsis curvisclera* Lévi & Vacelet, 1958: 235, by original designation) agrees also with the definition of *Cerbaris* given above. It was

initially erected in Bubaridae and described as a small encrusting fragment with disorganised skeleton of spicules. The megascleres included oxeas of variable sizes, straight, curved and angulated (600–1600 $\mu\text{m} \times 20\text{--}55 \mu\text{m}$) toxiform oxeas (110–150 μm) and strongyles slightly sinuous (300–450 $\mu\text{m} \times 22 \mu\text{m}$). Trichodragmata (110–130 μm) and small acanthostrongyles were located at the base (75 \times 12 μm) (Lévi & Vacelet, 1958). The type slide examined at MNHN (DCL741L) has all the spicules originally described; but it also contains long styles and a mixture of foreign spicules some of which could be assigned to haplosclerid genera such as *Petrosia*. A second species, *Bubaropsis alborani* Boury-Esnault *et al.*, 1994b: 82, has been recently described. The species differs from *B. curvisclera* in the absence of raphides, trichodragmata and toxiform oxeas, and in the size of the acanthostrongyles.

Rhabdobaris Pulitzer-Finali, 1983: 526 (type species *Rhabdobaris implicata*, by monotypy) was erected for a very small specimen (18 mm high \times 2 mm diameter) with a spicule composition similar to species included previously in *Rhabdoploca* and *Bubaropsis* (i.e., styles-rhabdostyles in two size categories, oxeas and strongyles sinuous or centrotylote, smooth or acanthose and raphides). The synonym of *Rhabdobaris* with *Cerbaris* is established here with hesitation. The habit of the type species was described as stipitate, which is not typical of Bubaridae, and there

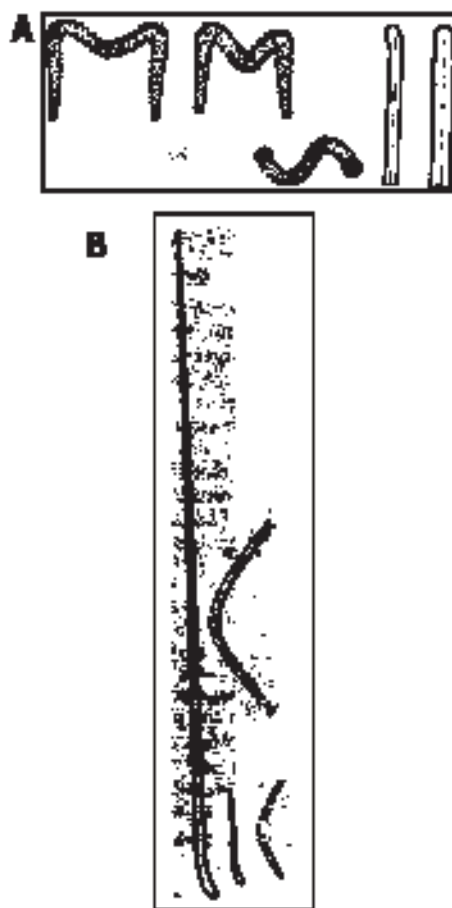


Fig. 3. A, styles and ceroxas found in *Cerbaris torquatus* Topsent 1898b (reproduced from Topsent, 1904b, pl. XIII fig. 18). B, styles and toxostrongyles found in *C. curvispiculifera* (reproduced from Carter, 1880b, pl. IV fig. 6).

is no indication in the original description or in the extant material (a spicule slide) on the type of skeletal organisation.

Distribution

East Atlantic, Mediterranean, Gulf of Manaar, 121–599 m depth.

Description of type species

Cerbaris torquatus Topsent, 1898b (Fig. 3A).

Synonymy. *Cerbaris torquatus* Topsent, 1898b: 248; Topsent, 1904b: 160.

Material examined. Holotype: MOM (?) – 1897; Azores; station 866, 599 m (not found). Slide from the holotype: MNHN LBIM DT943.

Description. Encrusting. Surface hispid. Colour grey. Skeleton formed by long subtylostyles (1500–2000 μm), smooth with bases slightly constricted, embedded in a basal layer of ‘ceroxas’ and projecting perpendicularly through surface. Ceroxas unevenly acanthose or smooth with two parallel conical branches (120 μm long, 17 μm wide) connected transversely, sometimes forming a spiral; spines abundant at terminal ends.

HYMERHABDIA TOPSENT, 1892

Synonymy

Hymerhabdia Topsent, 1892b: 25; Topsent, 1894c: 23; Topsent, 1904b: 159; Topsent, 1928c: 42; de Laubenfels, 1936a: 151; Bergquist, 1970: 20. *Uplexoa* de Laubenfels, 1936a: 131.

Type species

Hymerhabdia typica Topsent, 1892b: 26 (by monotypy).

Definition

Bubaridae with a basal skeleton of interlacing rhabdostyles and/or bent angulate oxeas.

Diagnosis

Encrusting. Surface hispid. Choanosomal skeleton formed by individual or bundles of long styloid spicules with heads embedded in a basal layer of smaller rhabdostyles and angulate or bent oxeas. Megascleres are styles, subtylostyles and tylostyles, smooth, straight or slightly bent; rhabdostyles, some with bases contorted or reflexed, or oxeas angulate, centrotylote or irregularly bent. Microscleres absent.

Remarks

Hymerhabdia has been related to other bubarid-like genera. The skeletal architecture is similar to *Bubaris*, but spicules located in the basal layer are rhabdostyles and angulate oxeas instead of sinuous or vermiform strongyles and anisoxeas, and there are tylostyles in addition to the styles, projecting perpendicularly to the substratum.

Carballo (2000) expanded the definition of *Hymerhabdia* to include species with fistules (i.e., *H. diversicolor* and

H. papillosa). We reject this proposal and suggest that such species are better placed in *Axinyssa* (see Family Halichondriidae, this volume).

Uplexoa de Laubenfels, 1936a: 131 (type species *Bubaris oxcata* Dendy, 1924: 349, by original designation) is referred here to *Hymerhabdia*, as suggested previously by Bergquist (1970). The type material of *Uplexoa* (BMNH 23.10.1.124, slide, ‘Terra Nova’ Expedition) was examined and shown to be an encrusting specimen with a thin dermal membrane. The skeleton is formed by styles (250–1000 \times 20–45 μm) projecting perpendicularly to the surface with bases embedded in a basal layer of angulate oxeas (180–310 \times 5–10 μm) (Fig. 5). Smaller and less common rhabdostyles, some located in the basal layer and some projecting at an acute angle (‘echinating’), are also present. The genus was erected in Axinellidae by de Laubenfels (1936a) to include *Bubaris oxcata* and *B. elegans* Dendy, 1924, two species that share the presence of bent oxeas. The description of *B. elegans* given by Dendy (1924: 350) is not in agreement with the concept of Bubaridae adopted here. This species is clearly related to Axinellidae and should be referred to *Axinella*.

Other species assigned to *Hymerhabdia* are *H. contracta* Sará & Siribelli, 1960: 30, *H. diversicolor* Carballo, 2000: 580; *H. intermedia* Sará & Siribelli, 1960: 48; *H. oxytrunca* Topsent, 1904b; *H. papillosa* Sará & Siribelli, 1960: 31, *H. pori* Tsurumal, 1969: 346; *H. reichi* Tsurumal, 1969: 348, all from the Mediterranean and *H. topsenti* Lévi, 1952: 56 from Senegal.

The genus has been previously referred to Monaxonida: Ectyoninae (Topsent, 1892b); Halichondrina: Poeciloscleridae: subfamily Bubarinae (Topsent, 1894c), Halichondrina: Axinellidae (Topsent, 1896a), Halichondrina: Bubaridae (Topsent, 1928c), Hadromerina: Suberitidae (de Laubenfels, 1936a) and Halichondrida: Axinellidae (Van Soest *et al.*, 1990; Carballo, 2000).

Distribution

East Atlantic, Mediterranean, North Africa.

Description of type species

Hymerhabdia typica Topsent, 1892b (Fig. 4).

Synonymy. *Hymerhabdia typica* Topsent, 1892b: 26; Topsent, 1894c: 24; Topsent, 1934a: 38; Pulitzer-Finali, 1977: 37.

Material examined. Holotype: MNHN LBIM DT3075 (not found). Slide made from holotype MNHN DT2359 – Banyuls.

Description. Encrusting. Surface hispid. Skeleton formed by a basal layer of interlacing rhabdostyles with long tylostyles and styles projecting perpendicularly to substrata and with bases embedded in the layer. Styles and tylostyles, smooth, straight or slightly bent, sometimes with prominent bases, 650–800 \times 10 μm . Rhabdostyles, some with bases contorted or reflexed, 80–120 \times 8–10 μm .

Remarks. *Hymerhabdia oxytrunca* Topsent, 1904b: 15 is considered a junior synonym of *H. typica* by Carballo (2000), based on the similarities of types and dimensions of spicules. Both species bear, in particular, rhabdostyles and centrotylote oxeas. The presence of centrotylote oxeas were also recorded in *H. typica* by Topsent (1934a). It seems, however, that this might be a variable character within the species as it has not been recorded in other descriptions.

Habitat and distribution. East Atlantic and Mediterranean; 15–120 m.

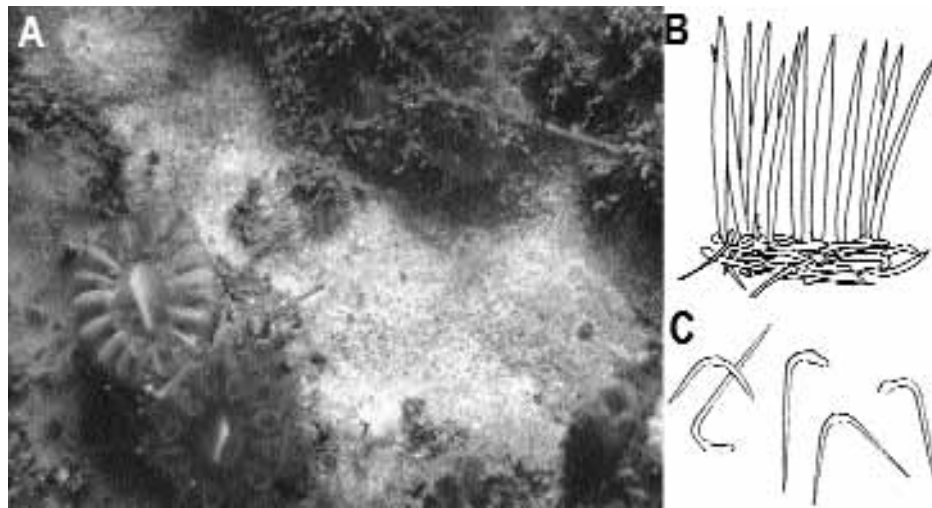


Fig. 4. *Hymerhabdia typica* (Topsent). A, photo *in situ*, Ireland (photo B. Picton). B, diagram of skeleton of *Hymerhabdia typica* as observed in the slide made from holotype (MNHN DT2359). C, drawing of spicules (reproduced from Topsent, 1904b, pl. XIII, fig. 16).

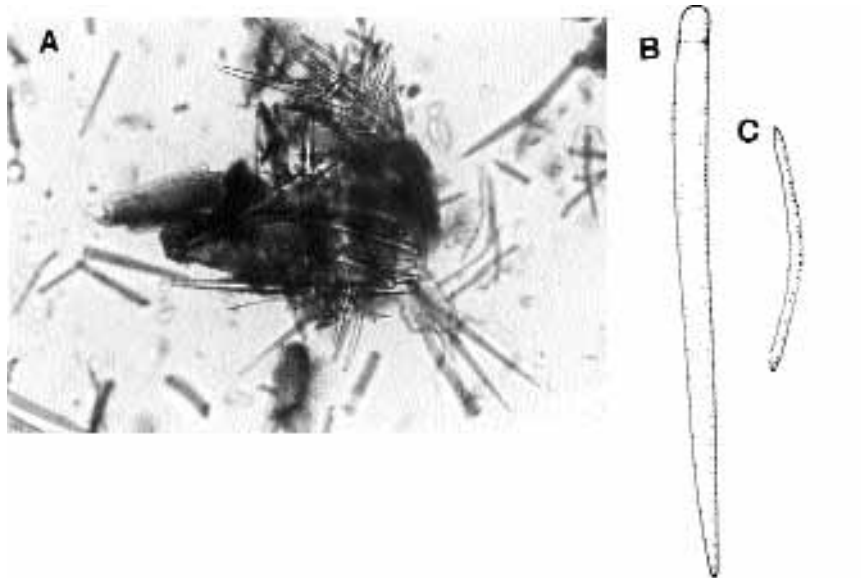


Fig. 5. *Hymerhabdia oxedata* (Dendy). A, BMNH 23.10.1.124, slide (labelled as 'type'); B, style. C, oxea (scale 100 μ m).

MONOCREPIDIUM TOPSENT, 1898

Synonymy

Monocrepidium Topsent, 1898b: 229; Topsent, 1904b: 137, 147; Topsent, 1928c: 28; de Laubenfels, 1936a: 103; Vacelet, 1969: 183. *Skeizia* Cabioch, 1968b: 220; Van Soest *et al.*, 2000.

Type species

Monocrepidium vermiculatum Topsent, 1898b: 229 (by original designation).

Definition

Bubaridae with basal skeleton that includes stout diactines, smooth tuberculate or annulate.

Diagnosis

Encrusting. Surface hispid. Choanosomal skeleton formed by styloids single or in bundles, projecting perpendicularly to the substrata and through the ectosome with heads embedded in a basal layer of vermicular diactines some of which are tuberculate or annulate. Megascleres are long smooth styles, slightly curved near the bases, subtylostyles or tylostyles. Diactines of the basal skeleton are strongyles or strongyloxeas, stout, vermiculate, tuberculate or annulate.

Remarks

Monocrepidium has skeletal architecture typical of Bubaridae. It was initially referred to Desmanthidae by Topsent (1898b) based on the resemblance of the tuberculate diactines with monocrepid desmas. That view was later rejected by Topsent (1904b) based on

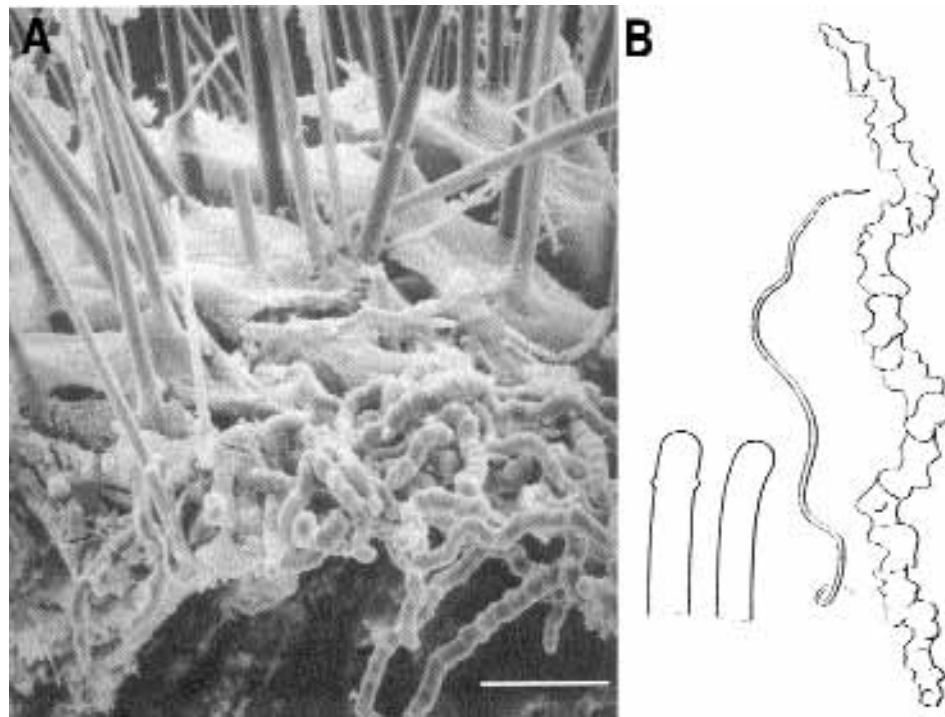


Fig. 6. *Monocrepidium vermiculatum* Topsent. A, SEM of the surface and basal layer of tuberculate spicules (photo J. Vacelet; scale 100 μ m). B, drawing of spicules (reproduced from Topsent, 1904b, pl. XIII fig. 9).

the presence of an axial canal observed in the diactines of both *Bubaris* and *Monocrepidium*, which he considered to be homologous. The genus is related mainly to *Bubaris* and *Hymerhabdia*, both of which have smooth diactine spicules in the basal skeleton.

Hymeraphia eruca Carter, 1880b: 46 was referred to *Monocrepidium* by Topsent (1928c: 41) and to *Laoenia* Hallmann, 1917c: 675 by de Laubenfels (1936a:144). The description of Carter agrees with the definition of *Monocrepidium* adopted here, and therefore this species is the second representative of the genus.

Skeizia (type species *Skeizia minuta* Cabioch, 1968b: 220; by original designation) is here considered to be a synonym of *Monocrepidium*. The type species has all the features of *Monocrepidium* but differs in having tylostyles instead of styles. We consider that this is not a valid reason to erect a new monotypic genus, and consequently, we have expanded the definition of *Monocrepidium* here to include species with tylostyles.

The genus has been previously referred to Lithistida: Desmanthidae (Topsent, 1898b), Halichondrina: Axinellidae (Topsent, 1904b), Halichondrina: Bubaridae (Topsent, 1928c), Myxilliformes: Amphibleptulidae (de Laubenfels, 1936a), Axinellida: Bubaridae (Lévi, 1973) and Halichondrida: Axinellidae (Van Soest *et al.*, 1990).

Distribution. East Atlantic, Mediterranean and Indian Ocean.

Description of type species

Monocrepidium vermiculatum Topsent, 1898b (Fig. 6).

Synonymy. *Monocrepidium vermiculatum* Topsent, 1898b: 229; Topsent, 1904b: 148; Topsent, 1928c: 41; Vacelet, 1969: 183; Pulitzer-Finali, 1977: 36; Pulitzer-Finali, 1983: 526.

Material examined. Holotype (fragment): MNHN LBIM DT 887, slide.

Description. Encrusting, surface hispid. Colour, grey. Skeleton formed by a basal layer of interlacing diactines with styles embedded by their bases in the layer and projecting perpendicular to the substrate (Fig. 6A). Styles or subtylostyles smooth, slightly bent near the base (170–1400 \times 5–25 μ m). Strongyles and strongyloxeas, thick (15 μ m), sinuous, with tubercles roughly arranged in a spiral, located in the basal skeleton. Smooth, thinner and sinuous oxeads also present (Fig. 6B).

Habitat and distribution. The species seems to be restricted to deep waters (121–600 m depth) across the Mediterranean and East Atlantic.