Systema Porifera: A Guide to the Classification of Sponges, Edited by John N.A. Hooper and Rob W.M. Van Soest

Family Tetillidae Sollas, 1886

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Tetillidae Sollas (Demospongiae, Spirophorida) are for the most part globular sponges ('golf ball' sponges) belonging to a small order on account of their possession of sigmaspire microscleres and triaene megascleres. The characteristic megasclere is the protriaene, which is found in most members of the family with very few exceptions. In addition there are long oxeas and frequently anatriaenes, rarely also calthrops or amphitriaenes. The skeletal architecture is strictly radial. Eight valid genera are recognized, differentiated by presence of cortical structures, specialized pore-sieves, and composition of the spicule complement. Tetillids are common and ubiquitous sponges in all oceans and at all depths.
Keywords: Porifera; Demospongiae; Spirophorida; Tetillidae; *Acanthotetilla*; *Amphitethya*; *Cinachyra*; *Cinachyrella*; *Craniella*; *Fangophilina*; *Paratetilla*; *Tetilla*.

DEFINITION, DIAGNOSIS, SCOPE

Synonymy

[Lophurellidae] Gray, 1872a. [Casuladae] Gray, 1872a. [Tethyina] Carter, 1875b (not Tethyadae Gray, 1848). Tetillidae Sollas, 1886a. Tethyopsillidae Lendenfeld, 1903. Tethydae Lendenfeld, 1907. Ectyonillidae Ferrer-Hernandez, 1914a. Craniellidae de Laubenfels, 1936a.

Definition

Spirophorida with sigmaspire microscleres and a radiate skeleton of triaenes and oxeas.

Diagnosis

Typically with spherical growth form, often with characteristic pits called porocalices containing the inhalant and occasionally also exhalant orifices. Cortical region often strengthened by collagen fibers and special cortical megascleres, but this region may be thin or absent in several genera. Skeleton with tetraxonic and monaxonic megascleres (triaenes, huge oxeas) organized in a radiate pattern of spicule bundles, often spiralling outwards from the centre of the body; oxeas, protriaenes and anatriaenes are most common and these often protrude from the surface producing a conulose or hairy surface. In sponges provided with porocalices they form a palisade of long spicules, protruding far beyond the sponge surface, surrounding the porefields or oscular apertures, which lie in rounded depressions. Microscleres are unique contorted microspined sigmaspires. Reproduction is oviparous without a larval stage, or viviparous with production of young adults within a parent.

Scope

Out of twenty six nominal genera eight are considered valid, *Acanthotetilla, Amphitethya, Cinachyra, Cinachyrella, Craniella, Fangophilina, Paratetilla, Tetilla*. They are differentiated on gross morphological structure (presence or absence of a cortical region, presence or absence of specialized pore areas), and spicule complement (possession of calthrops, amphitriaenes or other auxiliary megascleres). The family comprises more than one hundred species distributed over all oceans and habitats.

Biology

Tetillids have a preference for sedimented habitats and some species possess a root of long spicule bundles to attach them to the substrate. Reproductive patterns range from the extrusion of fertilized eggs, which fix to the substrate and develop directly, to incubation of complete young sponges which are then expelled by localised breakdown of the pinacoderm. No free larvae have yet been described.

Remarks

Gray (1867a) included sponges of this group under the genus name *Tethya* in a larger Tethyadae comprising a wide range of tetractinomorph genera. Carter (1875b) was the first to distinguish a separate group (subfamily) for tetillids, but like Gray called the group Tethyina. The explanation for this is that at that time there was still a great confusion over the identity of *Tethya*. Lamarck (1815) included in his genus *Tethya* next to *T. lyncurium* (=*T. aurantium*) and others, *Tethya cranium* (Müller, 1789 as *Alcyonium*). Carter was aware of the great difference between the type of *Tethya* (i.e., *T. lyncurium*) and *T. cranium* (see for example Carter, 1872a), but he ignored Schmidt's (1870) proposal to employ a separate genus *Craniella* for *Alcyonium cranium*. Schmidt (1870) included *Craniella* in his family Ancorinidae along with *Stelletta* and other astrophorid sponges, but Sollas (1886a) revived Carter's Tethyina under a different name by erecting the family Tetillidae based on Schmidt's (1868) genus *Tetilla*. In many ways this was an unwise choice of type genus, inspired by some notion that *Tetilla* would represent the most primitive of tetillid genera. The description of *Tetilla euplocamos* by Schmidt (1868: 40, pl. V fig. 10) is insufficient to conclude with certainty what its properties were. Selenka (1880: 469) thought to recognize Schmidt's species in an intertidal habitat in the Bay of Rio de Janeiro, and provided some additional data. Sollas (1888) was able to verify from a Schmidt slide that at least protriaenes were present, but apparently this species has no sigmaspires (cf. below). Even though protriaenes are of common occurrence in tetillids,

they are by no means confined to that group and we have to rely on the subtle tetilliform protriaene-type as proof that *Tetilla euplocamos* is a member of what is generally understood as *Tetilla* and the Tetillidae. In summary: we have a type species of the type genus of a family lacking the major synapomorphy of the order to which the family belongs! Some confidence may be obtained from the fact that *Tetilla* species lacking sigmaspires are not uncommon. Despite this dubious type species designation, Sollas' (1888) monographic treatment of Tetillidae was followed by most subsequent authors with the exception of Lendenfeld (1888, 1903, 1907) and de Laubenfels (1936a). Lendenfeld continued to employ *Tethya* for sponges answering to the definition of *Craniella*, but at least kept this in the family Tetillidae. He erected a family Tethyopsillidae for sponges without sigmaspires. Lendenfeld's division into Tetillidae and Tethyopsillidae was incorrect, since the type of Tetillidae and genus *Tetilla* (*T. euplocamos*) has no sigmaspires and thus would belong in Tethyopsillidae, making this family an objective synonym of Tetillidae. De Laubenfels (1936a) for the same reason refused to accept *Tetilla euplocamos* as a close relative of *Craniella*, and erected a separate family Craniellidae for the genera possessing sigmaspires. *Tetilla* and Tetillidae were defined as 'Choristida lacking microscleres' and an unrelated group of genera was assigned to it. Needless to say that neither scheme gained general support.

Previous reviews

Sollas (1888), Lendenfeld (1903), Wilson (1925), Topsent (1928c), Lévi (1973), Rützler (1987).

KEY TO GENERA

(1) Specialized pore-bearing pits ('porocalices') present 2
No porocalices 6
(2) Spicules include medium-sized heavily spined oxeas ('megacanthoxeas') ..... ***Acanthotetilla***
No megacanthoxeas 3
(3) Among the megascleres there are short-shafted triaenes with equal-sized rays (calthrops). N.B. these may have bifid cladi but are not to be confused with long-shafted amphiclads ..... ***Paratetilla***
No calthrops, all triaenes – if present – are long-shafted 4
(4) In cross section, there is a clear cortical region with special cortical megascleres (short oxeas) and collagenous reinforcement ..... ***Cinachyra***
In cross section there is no discernible peripheral layer different from that of the interior 5
(5) Porocalices all similar, undifferentiated morphologically ..... ***Cinachyrella***
Porocalices differentiated into a morphologically distinct inhalant and exhalant type ..... ***Fangophilina***
(6) Stalked sponges with differently structured stalk and main body; among the megascleres of the stalk there are triaenes with cladi on both ends (amphitriaenes, -diaenes, -monaenes, collectively called amphiclads) ..... ***Amphitethya***
No amphiclads, if stalked, then it is a thin root-like projection, not a proper stiff stalk 7
(7) In cross section, there is a clear cortical region with collageneous reinforcement ..... ***Craniella***
In cross section there is no discernible peripheral layer different from that of the interior ..... ***Tetilla***

ACANTHOTETILLA BURTON, 1959

Synonymy

Acanthotetilla Burton, 1959a: 201. *Acanthocinachyra* Lévi, 1964b: 386.

Type species

Acanthotetilla hemisphaerica Burton, 1959a: 201 (by monotypy).

Definition

Tetillidae with megacanthoxeas as auxiliary megascleres.

Diagnosis

Globular, hemispherical or irregularly massive sponges. Surface extremely hispid and provided with numerous small-sized porocalices. Skeleton radiating bundles of oxeas, protriaenes, anatriaenes and megacanthoxeas, developed into an impenetrable palisade at the periphery. Internally cavernous with megacanthoxeas and sigmaspires as the main spicule complement. Four species are known from the Western Indian Ocean and the Caribbean, depth range 38–100 m.

Previous review

Van Soest (1977b).

Description of type species

Acanthotetilla hemisphaerica Burton, 1959a (Fig. 1A–B)

Synonymy. *Acanthotetilla hemisphaerica* Burton, 1959a: 201, fig. 5; Van Soest, 1977b: 2, pl. I figs a–b, pl. II figs c–d, text-fig. 1.

Material examined. Holotype: BMNH 1936:3:4:530 – John Murray Exped. stat. 45, coast of S Arabia, litothamnion bottom, 38 m depth.

Description. Semiglobular (Fig. 1A), 4–5 cm diameter. Colour in alcohol yellowish brown. Surface hispid-bristly due to megascleres projecting 1 mm or more beyond the ectosome. Porocalices numerous, 1–2 mm diameter, scattered over the surface. No apparent oscules. Consistency hard, incompressible. Skeleton radiate, forming a tight palisade at the surface. The main megascleres are smooth long oxeas and medium-sized megacanthoxeas, but protriaenes and rare anatriaenes are also present. Interiorly, the skeleton is less dense, making the choanosome cavernous, with megacanthoxeas and sigmaspires as the main spicule categories present. Spicules. Protriaenes, simple, straight, relatively rare, shaft 1000–2520 × 6–14 μm, cladi 30–56 μm; anatriaenes even rarer, shaft 1250–1600 × 10 μm, cladi 55–80 μm; oxeas, forming the bulk of the radiating skeleton, straight, 3000–4400 × 25–40 μm;

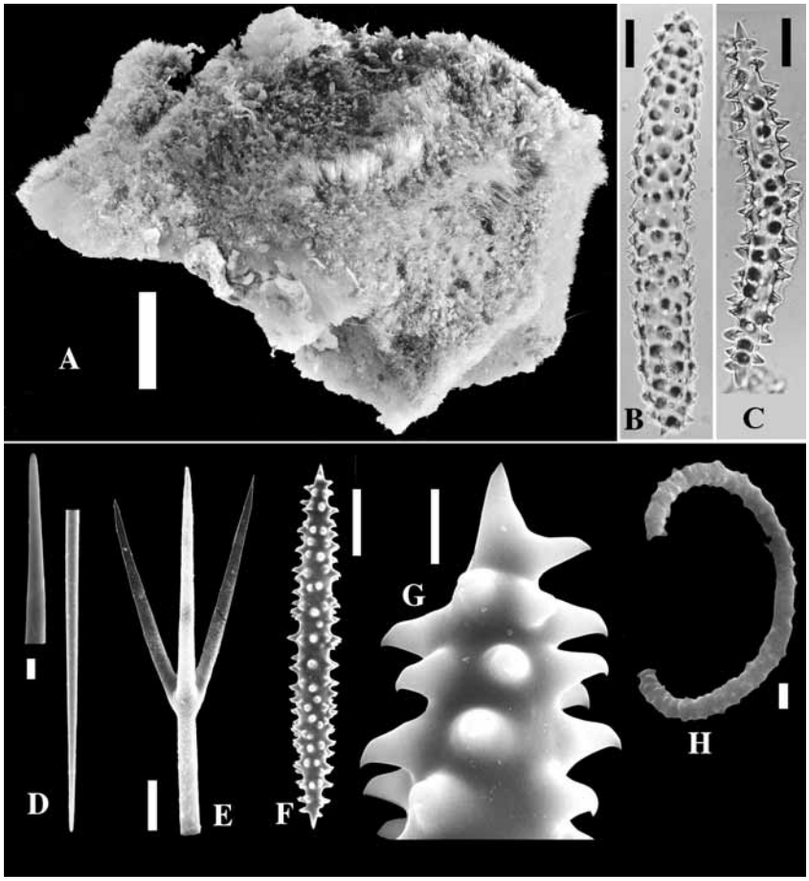

Fig. 1. *Acanthotetilla* spp. A–B, *Acanthotetilla hemisphaerica* Burton, 1959a. A, holotype BMNH 1936.3.4.530 (scale 1 cm). B, megacanthoxea of holotype (scale 50 μm). C, *Acanthotetilla enigmatica* (Lévi, 1964b as *Acanthocinachyra*), megacanthoxea (scale 50 μm). D–H, *Acanthotetilla gorgonosclera* Van Soest, 1977b. D, oxea (scale 10 μm). E, protriaene (scale 10 μm). F, megacanthoxea (scale 50 μm). G, detail of same (scale 10 μm). H, sigmaspire (scale 1 μm).

megacanthoxeas (Fig. 1B), thickly spined, spines arranged in irregular 'whorls', with points directed towards the centre, 325–414 × 40–60 μm, with 20–25 whorls of spines. Juvenile growth stages of the megacanthoxeas are centrotylote smooth oxeas. Distribution and ecology. Only recorded from the type locality.

Remarks. The structure of the skeleton is reminiscent of a cortical specialization (impenetrable palisade of oxeas and megacanthoxeas at the surface), but no organic fibrous cortical region has been described so far, so this remains undecided. Burton (1959a) gave a faulty description of *A. hemisphaerica* by expressly stating that sigmaspires were absent. This induced Lévi (1964b) to erect a genus *Acanthocinachyra* for material very similar to Burton's specimen, but possessing numerous microscleres. The type species (by monotypy) *Acanthocinachyra enigmatica* Lévi, 1964b: 386, fig. 2, from Inhaca island, Mozambique (material from MNHN re-examined, megacanthoxea figured in Fig. 2C) shares most features with *A. hemisphaerica* and since Burton's species (even his own preparations) contain numerous sigmaspires, the two genera are obvious synonyms. The two type species were kept as separate species by Van Soest (1977b), but additional material may bridge the few discrepancies and it is predicted that they both belong to the same species. A third species from the Western Indian Ocean, *Acanthocinachyra seychellensis* Thomas, 1973: 80, has unusually thin and curved megacanthoxeas as well as much smaller smooth oxeas, and may indeed be a valid separate species of *Acanthotetilla*. The fourth species, *Acanthotetilla gorgonosclera* Van Soest, 1977b: 7 was described from Barbados (see Fig. 2D–H). It has characters in between *A. seychellensis* and *A. hemisphaerica*, and in view of its Atlantic occurrence is also considered a valid species.

AMPHITETHYA LENDENFELD, 1907

Synonymy

Amphitethya Lendenfeld, 1907: 126.

Type species

Amphitethya microsigma Lendenfeld, 1907: 126 (by subsequent designation; Rützler, 1987, confirmed by Hooper & Wiedenmayer, 1994: 429).

Definition

Tetillidae with long-shafted amphiclad triaenes and plagiotriaenes.

Diagnosis

Globular-stalked sponges with conulose surface, lacking porocalices. Small scattered oscules. Skeleton of the main body

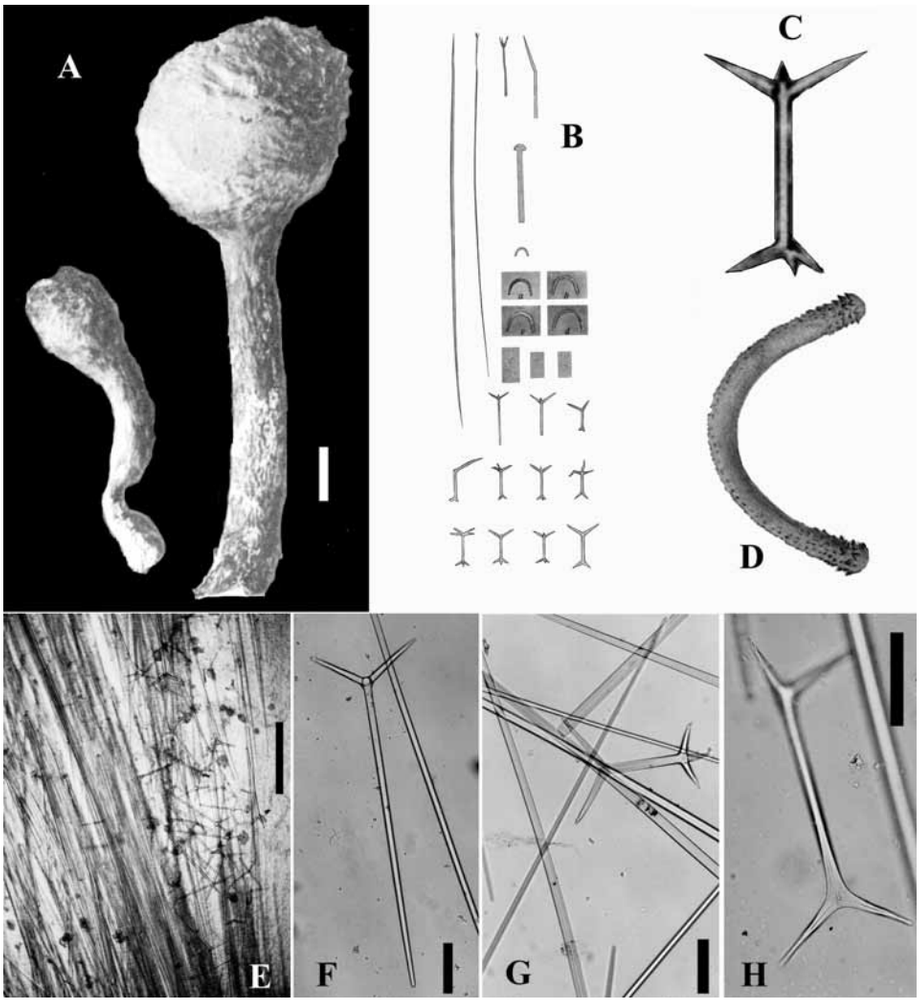

Fig. 2. *Amphitethya microsigma* Lendenfeld, 1907. A–D, habit and spicules reproduced from Lendenfeld, pl. XV fig. 19–3. A, habit (scale 1 cm). B, spicules. C, detail of amphitriaene. D, detail of sigmaspire (sizes see text). E–H, photos of spicules made from slides of one of the types kept in BMNH. E, cross section of peripheral region of peduncle (scale 500 μm). F, plagiotriaene (scale 100 μm). G–H, amphitriaenes (scale 100 μm).

radiate, consisting of oxeas and normal triaenes, and that of the stalk longitudinally arranged, consisting of all megascleres including amphiclad triaenes. Cortical region present in stalk and main body. Megascleres oxeas, protriaenes, anatriaenes, plagiotriaenes and long-shafted amphiclad triaenes. Microscleres sigmaspires. Two species, both from Australian waters.

Recent review

Rützler (1987).

Description of type species

Amphitethya microsigma Lendenfeld, 1907 (Fig. 2A–H).

Synonymy. *Amphitethya microsigma* Lendenfeld, 1907: 126, pl. XV figs 19–39.

Material examined. Syntypes: ZMB (not seen) – collected by the 'Gazelle' Exped., Dirk Hartog Island, off the NW coast of Western Australia, 82–110 m depth. BMNH 1908.2.9.33–35 (not seen) – 3 slides of one of the syntypes, labelled "Valdivia & Gazelle Lendenfeld".

Description (summary of Lendenfeld's 1907 extensive description). Stipitate sponge (Fig. 2A). Main body globular, up to 4.2 cm in diameter, surface conulose, optically smooth between conules. Stalk up to 7 cm long, 1.2 cm in thickness, circular in cross section, surface also slightly conulose. Colour in alcohol is coffee-brown. In cross section, both the main body and the stalk show a distinct cortical layer of about 250 μm thick, in which only microscleres and auxiliary megascleres are found. The amphiclad megascleres are confined to the stalk and are found in the subectosomal layer (Fig. 2E). The main skeleton consists of oxeas, packed longitudinally in the stalk and in radiating bundles in the main body, where they follow a spiral course as is found in many other tetillids. Megascleres (Fig. 2B), protriaenes, cladome regular, with fusiform shaft, 3000–5000 × 10 μm; anatriaenes, confined to the peripheral region of the stalk, 5000–7000 × 10 μm, cladi 15 μm; plagiotriaenes (Fig. 2F), confined to the peripheral region of the

stalk (Fig. 2E), straight shaft, rounded at the end, 320–1100 × 13–30 μm, cladi 50–250 μm; amphiclad triaenes (Fig. 2C, G–H), confined to the peripheral region of the stalk, shaft 160–540 × 14–30 μm, cladome usually irregular with cladi of 100–150 μm, mostly with different lengths, or occasionally absent (diaene and monaene variations are not uncommon); oxeas, straight, or more often curved, smooth, gradually but sharply pointed, 6000–8000 × 20–60 μm. Microscleres sigmaspires (Fig. 2B,D), 10–12 × 0.5–0.8 μm. Distribution and ecology. Dirk Hartog Island, off the coast of NW Australia, 82–110 m.

Remarks. In view of the similarity and the structural position they share, the amphiclad triaenes and the plagiotriaenes are very likely to be considered as the same spicule type, in which the amphiclad condition may or may not have developed. Lendenfeld assigned to his genus *Amphitethya* a second tetillid species with amphiclad triaenes, *Tethya stipitata* Carter, 1886c: 460 (redescribed by Sollas (1888: 49) as *Tetilla?*). This differs in details of spicule sizes from *A. microsigma*, but is otherwise similar and is an obvious *Amphitethya*. The fact that both species assigned to *Amphitethya* are prominently stalked sponges is not emphasized here, as root-organs of other tetillids (e.g., *Tetilla euplocamos* or *Cinachyra barbata*) may be considered homologous to a stalk. A further species assigned by Lendenfeld, viz., *Tetilla bacca* Selenka, 1867, is considered a member of *Paratetilla*. Its auxiliary spicules are calthrops-like, not amphiclad, although the cladi may be occasionally bifid. Likewise, assignments of *Tetilla merguiensis* sensu Topsent, 1897a and *Paratetilla aruensis* Hentschel, 1912 to *Amphitethya* by Wilson (1925) are incorrect. The differences are perceived such that the *Amphitethya* amphitriaene is a derivate of a long-shafted triaene (plagiotriaene), whereas the occasional bifid *Paratetilla* auxiliary megasclere derives from equal-rayed calthrops-like spicules.

CINACHYRA SOLLAS, 1886

Synonymy

[*Cinochyra*] Sollas, 1886a: 183 (*nomen corrigendum*); *Cinachyra* Sollas, 1888: 23.

Type species

Cinochyra barbata Sollas, 1886a: 183 (by monotypy).

Definition

Tetillidae with cortex reinforced by auxiliary oxeas, with flask-shaped porocalices.

Diagnosis

Globular sponges with surface covered by numerous porocalices. Full-grown specimens develop an irregular basal mass as wide as the globular upper part, equivalent perhaps to a stalk. Porocalices large and deep, flask-shaped, surrounded by a fringe of long megascleres. In cross section there is a prominent cortex strengthened by special cortical oxeas. Skeleton of the globular part radiate, consisting of bundles of oxeas originating in a central nucleus and spirally curving outwards toward the periphery, where they are mixed with protriaenes. These protrude beyond the layer of cortical oxeas and are the cause of the bristly surface. Megascleres choanosomal large oxeas, cortical small oxeas, protriaenes, and anatriaenes. Microscleres sigmaspires. So far, only a single valid species has been recognized with certainty to belong to this genus, most records of *Cinachyra* species concern the genus *Cinachyrella* (cf. below).

Previous reviews

Wilson (1925), Rützler (1987).

Description of type species

Cinachyra barbata Sollas, 1886a (Fig. 3A–C).

Synonymy. *Cinochyra barbata* Sollas, 1886a: 183; *Cinachyra barbata* Sollas, 1888: 23, pls III, XXXIX.

Material examined. Syntypes (not seen): BMNH 1889.1.1.14–19, 107–108 (slides 1894.11.16.37–51) – the type series consists of more than 60 syntypes all dredged from the shores of Balfour Bay, Kerguelen.

Description (from Sollas, 1888). Globular sponges (Fig. 3A), seated on a dense spicular basal mass; ash-grey in alcohol. Oscules inconspicous, scattered. Porocalices large and numerous, up to 5mm in diameter, scattered over the lateral surfaces, but relatively rare on top, and lacking from the basal mass. The porocalices are flask-shaped, penetrating deep into the interior. Internally, they are smooth-walled and -rimmed, and have a poresieve at the bottom. Surface hispid-bristly, with megascleres protruding far beyond the ectosome. Size of main body up to 7 × 8.5 × 7 cm, size of basal mass up to 5 × 10 × 7 cm. Basal mass apparently a fused root system which gradually expands during growth of an individual, it is absent in the smallest collected specimen. In cross section (Fig. 3B) the cortical region is visible as a dense peripheral layer, up to 1.75 mm in thickness, its whitish colour showing off from the yellowish choanosomal interior. The cortex consists of a distinct organic collagenous tissue, reinforced by special cortical oxeas strewn at all angles and microscleres. The choanosomal skeleton consists of bundles of oxeas issuing from an eccentrically located focus and following a spiral course towards the periphery. The peripheral bundles contain a mixture of oxeas and triaenes, with the latter protruding far beyond the surface. Megascleres (Fig. 3C). Protriaenes, occasionally prodiaenes, in two distinct size categories, large structural ones, fusiform, shaft up to 13,000 × 30 μm, cladi up to 180 × 16 μm, and small, sinuous, hair-like, up to 130 × 4 μm, with cladi 16–30 μm; anatriaenes, occurring only in the basal mass, where they function as anchoring spicules, up to 40,000 × 24 μm, cladi up to 215 × 28 μm; oxeas, in two distinct size categories, large choanosomal ones, sharply pointed, straight or curved, up to 8000 × 70 μm; small cortical oxeas, fusiform, bluntly pointed, up to 900 × 36 μm. Microscleres sigmaspires, 12–16 μm. Distribution. Kerguelen, Patagonia, Antarctica, sediment-rich bottoms, 45–549 m.

Remarks. The genus name has been widely used by many authors for sponges now recognized to belong in a separate genus *Cinachyrella* Wilson, 1925 (cf. below). This shares the porocalices, but lacks any cortical specialization. Sollas (1888) maintains that some of the porocalices are exhalant, whereas others are inhalant. However, Kirkpatrick (1905) found small, simple oscules separate from the complicated porocalices, and similar findings are reported by Boury-Esnault & Van Beveren (1982) and Rützler (1987).

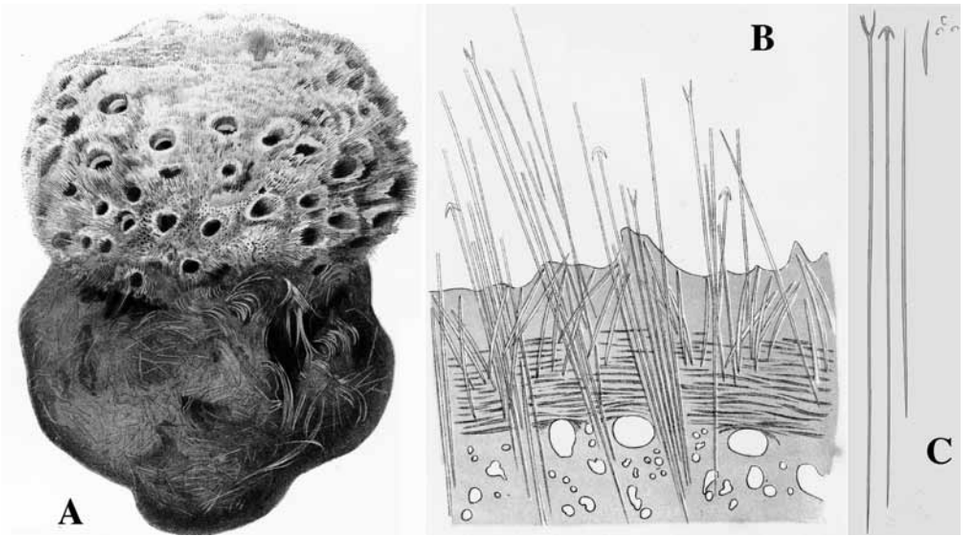

Fig. 3. *Cinachyra barbata* Sollas, 1888, drawing of habit (A), peripheral skeleton in cross section (B), and spicules (C), reproduced from Sollas' pl. III) (scales see text).

CINACHYRELLA WILSON, 1925

Synonymy

[*Psetalia*] Gray, 1873c: 234 (*nomen oblitum*). [*Labaria*] Gray, 1873c: 235 (*nomen oblitum*). *Cinachyrella* Wilson, 1925: 363. *Raphidotethya* Burton, 1934a: 526. *Uliczka* de Laubenfels, 1936a: 174.

Type species

Tetilla hirsuta Dendy, 1889: 75 (by subsequent designation; Rützler, 1987).

Definition

Tetillidae with undifferentiated porocalices, without cortex, without auxiliary megascleres.

Diagnosis

Globular sponges with hispid-bristly surface provided with numerous scattered porocalices; oscules inconspicuous. Skeleton radiate, consisting of bundles of oxeas issuing from the centre and running spirally to the surface. No cortical specialization. Megascleres protriaenes, anatriaenes, occasionally plagiotriaenes, and dominant large oxeas. Microscleres sigmaspires, which may be lacking occasionally, finely spined oxeas and/or raphides occur. More than one hundred species distributed in shallow water of tropical and subtropical seas.

Recent review

Rützler (1987).

Description of type species

Cinachyrella hirsuta (Dendy, 1889).

Synonymy. *Tetilla hirsuta* Dendy, 1889: 75; *Cinachyra hirsuta*; Lendenfeld, 1903: 28; *Tetilla (Cinachyrella) hirsuta*; Wilson, 1925: 363.

Material examined. Lectotype (here designated) (not seen): BMNH 1889.1.21.22 – (the larger of the two specimens), Rameswaram Island, Gulf of Manaar, Sri Lanka, Thurston collection. Paralectotype (not seen): BMNH 1925.11.1.769 – the smaller specimen from the same locality.

Description (from Dendy, 1889). Globular sponge, size up to 5 cm in diameter, colour dark grey in alcohol. Surface 'hirsute' due to projecting spicules. Porocalices scattered irregularly over the body. Some porocalices are hemispherical and shallow, others deep and tubular. The floor of the porocalices is alternatively perforated by a number of small pores, or some oscular tubes, or is devoid of openings. Dendy assumed the porocalices were either inhalant or exhalant, but these are not morphologically differentiated. In cross section there is no special cortical skeleton. The choanosomal skeleton consists of stout radiating fibers issuing from a dense central nucleus. Megascleres. Protriaenes, often of hair-like dimensions, i.e., comparatively thin and short, up to $460 \times 14\,\mu m$, cladi $50 \times 7\,\mu m$; anatriaenes similar in dimension, slightly shorter; oxeas, fusiform, sharply pointed, up to $3500 \times 42\,\mu m$. Microscleres the usual sigmaspires, up to $22\,\mu m$. Choanocyte chambers $20\,\mu m$ in diameter. Distribution. Known only from the type locality.

Remarks. No images of the type species are currently available, but it is likely that it is closely similar to e.g., *Cinachyrella apion* (Uliczka, 1929 as *Cinachyra*), as described and illustrated by Rützler & Smith (1992). Their illustrations are here reproduced in Fig. 4 (habit and surface characteristics) and Fig. 5A (spicules).

Burton (1934a) attempted to revise a large amount of *Cinachyrella* species (as *Cinachyra*), arriving at the remarkable conclusion that most tropical representatives are members of a single intertropical species to be called *Cinachyra australiensis* (Carter, 1886b). Needless to say that such a conclusion is unacceptable.

The genus *Psetalia* Gray, 1873c: 234 was erected for type species *P. globulosa* Gray, 1873c: 234 (by monotypy). There are

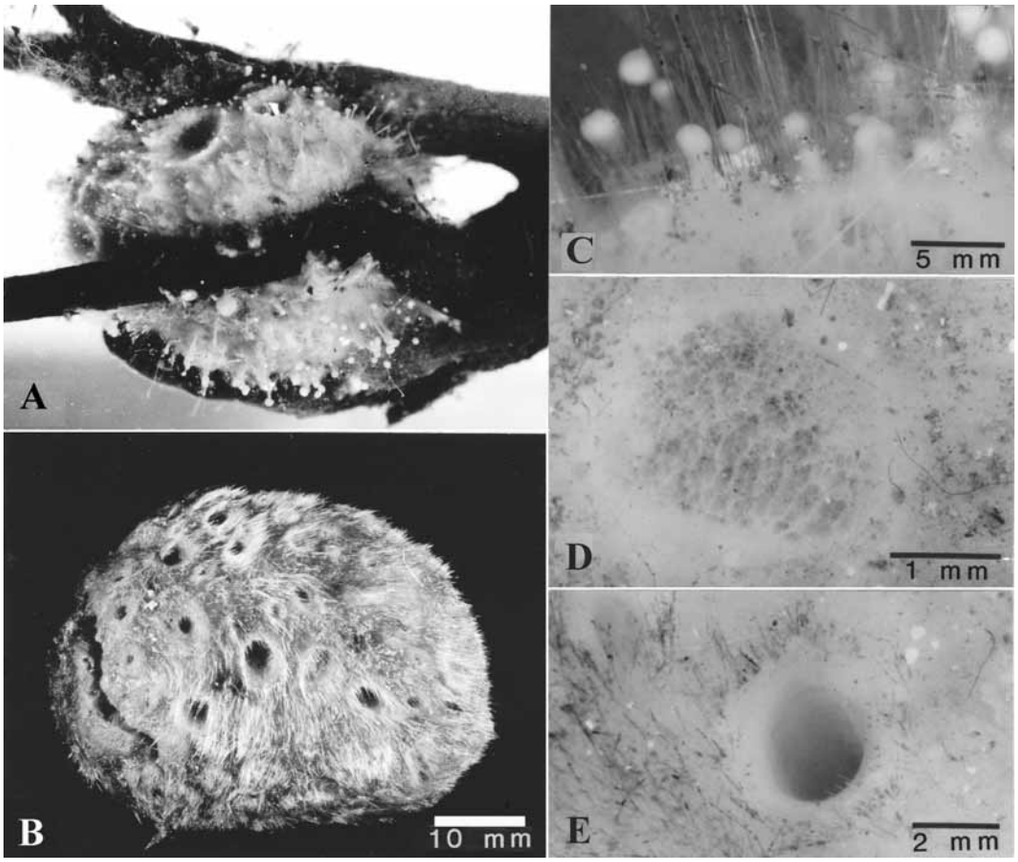

Fig. 4. *Cinachyrella apion* (Uliczka, 1929), habit and surface characteristics, reproduced from Rützler & Smith (1992: fig. 6). A, specimen *in situ* attached to alga, showing numerous buds. B, alcohol-preserved specimen. C, close-up of buds. D, close-up of porocalyx. E, close-up of oscule.

apparently four specimens of this species from Singapore. These are globular sponges of up to 6 cm diameter, covered by prominent "tubercles each containing a tuft of filamentous spicules". A deep concavity is found at the upper surface. It seems clear that this is a description of porocalyces, and as its type locality is in the tropics, it seems a safe conclusion that it concerns a species of *Cinachyrella*. The name *Psetalia* is an unused name in the sense of ICZN Article 23.9 (not used after 1899) and accordingly it is proposed to suppress it in favour of the prevailing junior name *Cinachyrella*.

The genus *Labaria* Gray, 1873c: 235 was erected for type species *Labaria hemisphaerica* Gray, 1873c: 235 (by monotypy). Like *Psetalia*, this hemispherical sponge of 5 cm diameter appears to be a *Cinachyrella*, as Gray described structures on the surface – "… cylindrical perforations, from the centre of which are emitted tufts of elongated filiform spicules …" – which can only be porocalices. The name *Labaria* is an unused name in the sense of ICZN Article 23.9 (not used after 1899) and accordingly it is proposed to suppress it in favour of the prevailing junior name *Cinachyrella*. The name is in any case preoccupied by *Labaria* Carter, 1873c (Hexactinellida, Pheronematidae).

The genus *Raphidotethya* Burton, 1934a was erected for type species (by monotypy) *Raphidotethya enigmatica* Burton, 1934a: 526, fig. 2 (here reproduced as Fig. 5B). The holotype (BMNH 1930.8.3.27; not examined) is described as a ficiform sponge of 4.5×2 cm, with a thick stalk and a uniformly hispid surface in which no pores or oscules were visible. No cortical specialization recognizable. The main genus character is the absence of triaenes, instead of which there are only oxeas as megascleres, arranged in the usual radiating bundles. At the surface and throughout the choanosome there are oxeas of 730×12 μm about half the length of the choanosomal main oxeas which measure 1400×24 μm. Microscleres are sigmaspires apparently in two size categories, 24 and 9 μm, and raphides also in two size categories, 30 and 15 μm. Despite the fact that no porocalices were described, this genus is considered a junior synonym of *Cinachyrella*, as it has no conulose surface, is hispid, and lacks a cortex. The absence of triaenes and the possession of spicule size categories is not of generic value, as there is a large diversity in these features among the many *Cinachyrella* species. Moreover, Hooper (pers. comm.) has observed specimens possessing triaenes with their cladomes sticking some distance beyond the surface. This may also have been the case for the type specimen.

The genus *Uliczka* de Laubenfels, 1936a: 174 was erected for type species *Cinachyra schistospiculosa* Uliczka, 1929: 45, figs 27–30 from Barbados (by original designation). This species is a commonplace *Cinachyrella*, assigned to the synonymy of *Cinachyrella kuekenthali* (Uliczka, 1929 as *Cinachyra*) by Rützler & Smith, 1992:154. It possesses occasional 'split' oxeas, but these are obvious artefacts, and certainly not a specific or generic character (see also Van Soest & Sass, 1981 and Rützler & Smith, 1992).

Wilson (1925) erected *Cinachyrella* as a subgenus of *Tetilla*, rather than of *Cinachyra*, thus apparently assuming the lack of

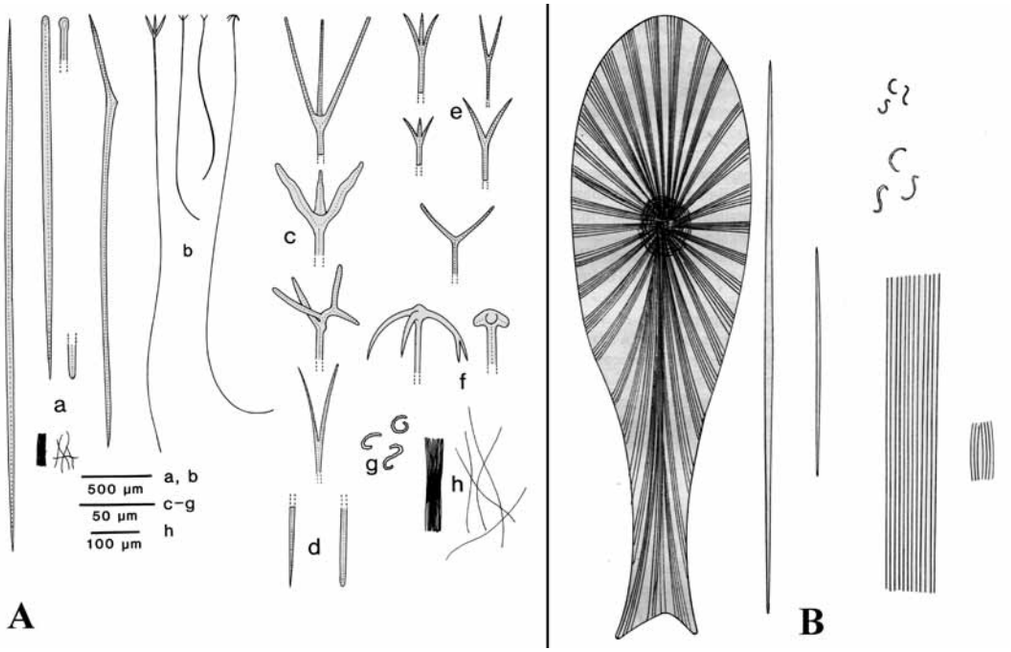

Fig. 5. A, *Cinachyrella apion* (Uliczka, 1929), drawing of spicules, reproduced from Rützler & Smith (1992: fig. 7). B, *Cinachyrella enigmatica* (Burton, 1934a as *Raphidotethya*), drawing of cross section and spicules reproduced from Burton's fig. 2 (scales see text).

a cortex is a more important feature than the presence of porocalices. The presence or absence of a cortical specialization is of dubious phylogenetic significance, as it occurs both in tetillids with porocalices (*Cinachyra* and *Cinachyrella*) and in those without (*Craniella* and *Tetilla*). Moreover, the cortical specialization is also used as a discriminatory character in other tetractinomorph groups. Cortical specialization is rather easily detected when the cortex is thick and strengthened by special cortical megascleres, but remains difficult to demonstrate when it is thin and cortical spicules are lacking. In the case of *Cinachyra*, the cortex is well-developed, but so far only a single species is known, whereas the bulk of the species described as *Cinachyra* are devoid of a cortex apparently, and need to be assigned to *Cinachyrella*. We maintain here the distinction between the two, because *Cinachyra barbata* differs also quite strongly from *Cinachyrella hirsuta* in spicule sizes and categories. A further complication for the use of *Cinachyrella* is the relationship with *Fangophilina* Schmidt (cf. below). This is maintained as a separate genus of Tetillidae on the strength of the occurrence of clearly morphologically differentiated oscular and ostial porocalices. Still, Dendy (1889) examined the bottom of several porocalices in *C. hirsuta* and distinguished oscular and poral types. Wilson (1925) described special simple oscules from the Philippine specimen he identified as *C. hirsuta*, and thus casted some doubt even though he acknowledged the possibility that Dendy may have been right. It is also not quite certain that Dendy's and Wilson's material was conspecific, because there is a large size discrepancy in the protriaenes recorded from the Indian and Philippine specimens. Later on, Rützler (1987) expressed strong doubts about the reality of the specialization of differentiated oscular and ostial porocalices, maintaining that all porocalices are inhalant and that separate simple oscules remain usually undetected in most *Cinachyra* and *Cinachyrella*. If Rützler is right and the differentiation will be demonstrated to be an artifact, then *Fangophilina* would be a synonym of *Cinachyrella*.

CRANIELLA SCHMIDT, 1870

Synonymy

Craniella Schmidt, 1870: 66. *Tethya* of authors (e.g., Carter, 1872a; Lendenfeld, 1903) (not *Tethya* Lamarck, 1815). *Polyurella* Gray, 1870b: 312. [*Lophurella*] Gray, 1872a: 471 (invalid name). [*Lophiurella*] Gray, 1873c: 234 (*lapsus*). *Tethyopsilla* Lendenfeld, 1888: 45. *Craniellopsis* Topsent, 1913a: 14.

Type species

Craniella tethyoides Schmidt, 1870: 66 (by subsequent designation; de Laubenfels, 1936a: 175).

Definition

Tetillidae without porocalices, with a distinct cortex strengthened by special cortical oxeas.

Diagnosis

Globular sponges with conulose but optically smooth surface over most of the upper body; at the base there are bundles of spicules acting as a root. Oscules few, usually on the top. Ostia in sieve-like groups overlying subdermal cavities. In cross section there is a distinctly visible cortical layer, which is perhaps divisible in a tightly collagenous layer strengthened by radially or confusedly arranged special cortical megascleres, and a less dense outer layer in which there are many subdermal cavities. Choanosomal skeleton radiating in spiral fashion, with bundles of oxeas originating from a central focus and spiralling outwards towards the surface where they are mixed with protriaenes to protrude in groups and push up the ectosome into conical elevations. Megascleres,

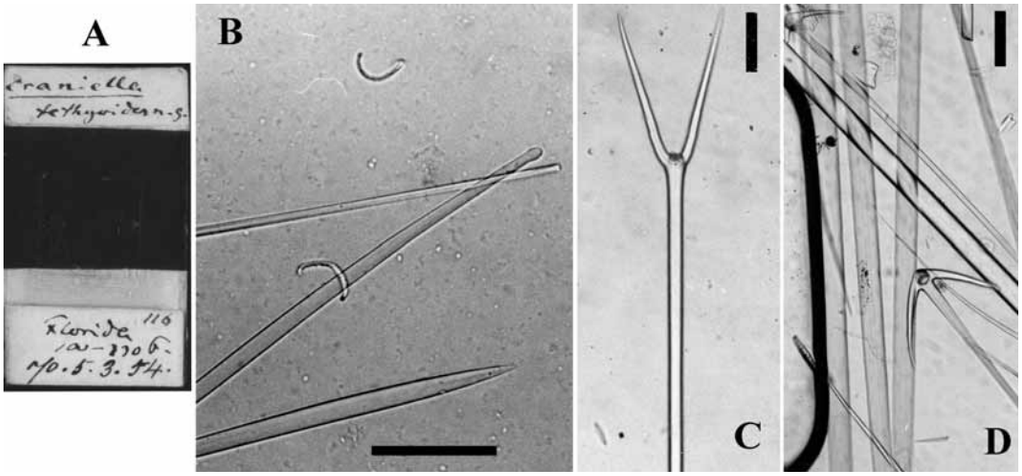

Fig. 6. *Craniella tethyoides* Schmidt, 1870. A, BMNH slide of lectotype. B–D, photos of spicules from lectotype (scales 50 μm). B, sigmaspires. C, protriaene. D, anatriaenes.

protriaenes, anatriaenes, choanosomal oxeas, shorter cortical oxeas. Microscleres, sigmaspires (may be lost not infrequently). About 25 species are recorded from most seas and oceans, often from somewhat deeper localities.

Previous reviews

Sollas, 1888; Topsent, 1894d; Wilson, 1925.

Description of type species

Craniella tethyoides Schmidt, 1870 (Fig. 6A–D).

Synonymy. *Craniella tethyoides* Schmidt, 1870: 66, pl. VI fig. 9; Sollas, 1888: 54; *Tetilla tethyoides*; Lendenfeld, 1903: 25.

Material examined. Lectotype (here designated): BMNH 1939.2.10.30 (not seen), slide examined BMNH 1870.5.3.54 – labeled in Schmidt's handwriting "Craniella tethyoides n.g. (116), Florida 100–230 fathoms" (here reproduced in Fig. 6A), presumable made from the lectotype which was apparently obtained in an exchange with MCZ. The latter museum is presumably holding a further specimen (here designated paralectotype). Other material. BMNH 1870.5.3.55 (slide) – Iceland, mentioned in Schmidt's report, and not considered part of the type series as it appears to be from a different species. Two further slides from Florida in BMNH bearing this name on the labels are likewise not part of the type material.

Description (from Schmidt, 1870, and Sollas, 1888). Globular, with conulose surface (where surface membrane is still intact). Distinct fibrous cortex strengthened by cortical oxeas arranged radially. Choanosomal oxeas robust, forming the bulk of the megascleres and protruding beyond the surface. Megascleres. Protriaenes (Fig. 6C) present (no size recorded), anatriaenes (Fig. 6D) with cladi of 70–90 μm, cladome 80–110 μm in diameter (no length recorded); oxeas in two distinct size categories (no sizes recorded). Microscleres (Fig. 6B), sigmaspires up to 35 μm. Distribution. Florida, down to 400 m.

Remarks. The type species remains ill-known and awaits proper redescription from type and fresh material. Nevertheless, the combination of the lack of porocalices and a cortical specialization is sufficient to recognize the genus as valid and of common occurrence. The genus is similar in many aspects to *Tetilla*, but this genus lacks a cortical specialization.

The genus *Polyurella* Gray, 1870b: 312 was erected for type species *Polyurella schmidtii* Gray, 1870b: 312 (by monotypy). Gray (1870b) admits himself that this is the same (i.e., a junior synonym) as *Tetilla* (spelled as *Tetella* (sic)) *polyura* Schmidt, 1870: 66, pl. VI fig. 8. This species is here assigned to *Craniella* on account of the presence of a cortical skeleton of smaller oxeas (based a.o. on subsequently assigned specimens in the collection of ZMA). Gray's (1870b) article was published after the appearance of Schmidt's monograph, so *Polyurella* is a clear junior synonym of *Craniella* Schmidt, 1870.

The genus [*Lophurella*] Gray, 1872a: 461 was erected for type species *Tetilla lophura* "Schmidt, table" (Gray's notation). There is no record of *Tetilla lophura* in any of Schmidt's papers; and it is also not mentioned in Desqueyroux-Faundez & Stone (1992). We must assume this is a misspelling, most likely of *Tetilla polyura*, since the definition of the family [Lophurellidae] Gray, 1872a: 460 to which this genus is assigned mentions the characteristic numerous rooting spicules, used by Schmidt to characterize *Tetilla polyura*. This is confirmed also by Gray (1873c: 234), where he indicates subsequently that *Tetilla polyura* is the type of his genus [*Lophiurella*] (sic!). Even so, [*Lophurella*] is not an available genus name as it cannot be unambiguously assigned to a nominal species-group taxon (ICZN Art. 12.2.5), which rules out type species assignment by indication (pers. comm. by Dr Alice Wells of the Australian Biological Resources Survey, Canberra). Likewise, [Lophurellidae] Gray, 1872a is unavailable as a family name as it is based on an unavailable genus name.

The genus *Tethyopsilla* Lendenfeld, 1888 was erected (by monotypy) for type species *Tethyopsilla stewarti* Lendenfeld, 1888: 45, to accomodate species lacking sigmaspire microscleres. The type (which was recently found to be missing from the ZMB, and also not located elsewhere, cf. Hooper & Wiedenmayer, 1994: 431) is described as a small (2 cm) spherical sponge, with smooth surface and slit-like oscules. There are abundant protriaenes, prodiaenes and promonaenes (up to 2000 × 10 μm), anatriaenes (no size quoted) and oxeas (1500 × 10 μm), no microscleres. The genus was made the type of a family Tethyopsillidae apparently

originally founded on the possession of irregular protriaenes, but later (Lendenfeld, 1903) on the absence of sigmaspires. The polymastiid genus *Proteleia* Dendy & Ridley, 1886 was also included in this nominal family. The absence or rarity of sigmaspires is rather a common phenomenon in unrelated tetillids and not worthy of genus or family distinction. Wilson (1925) assigned *Tethyopsilla* to *Tetilla*, but Lendenfeld (1903) expressly mentions a cortex of 1.2 mm thickness (admittedly without special cortical oxeas), so it seems more appropriate to assign the genus to *Craniella*. Hooper & Wiedenmayer (1994) remarkably assigned *T. stewarti* to *Cinachyra*, but this seems unlikely in view of the smooth surface and slit-like oscules.

The genus *Craniellopsis* Topsent, 1913a was likewise erected for tetillids possessing a cortex and lacking sigmaspires. Topsent (1913a) named three species, of which de Laubenfels (1936a: 171) subsequently designated *Tetilla zetlandica* (Carter, 1872a: 417) as the type species. Four syntypes (BMNH 1983.6.14.1–4), as well as several slides made from these (*fide* Hooper & Wiedenmayer, 1994: 432), are extant but have not been examined for this study. This is a common species in the North Atlantic, sharing the two size categories of oxeas with *C. tethyoides*, the smaller category of which is concentrated in the cortex. The lack of sigmaspires is considered of low importance. Lendenfeld (1903) and de Laubenfels (1936a) maintained a separation at the genus and family level for species with (Craniellidae de Laubenfels) and without sigmaspires (Tetillidae *sensu* de Laubenfels, Tethyopsillidae Lendenfeld) (cf. above).

FANGOPHILINA SCHMIDT, 1880

Synonymy

Fangophilina Schmidt, 1880b: 73. *Spongocardium* Kirkpatrick, 1902: 224.

Type species

Fangophilina submersa Schmidt, 1880b: 73 (by subsequent designation; Rützler, 1987: 189).

Definition

Tetillidae with morphologically distinct exhalant and inhalant porocalices positioned laterally, without cortical specialization, without auxiliary megascleres.

Diagnosis

Globular sponges with hispid surface provided with two large porocalices situated laterally. These are differentiated into an exhalant and an inhalant porocalyx. Skeleton radiate, with strongly protruding megascleres. Cortical specialization absent. Megascleres protriaenes, anatriaenes, oxeas. Microscleres sigmaspires. Three species have been assigned to this genus, distributed in the Caribbean and Indian Ocean.

Previous reviews

Lendenfeld (1907); Topsent (1920a); Wilson (1925).

Description of type species

Fangophilina submersa Schmidt, 1880b (Fig. 7A).

Synonymy. *Fangophilina submersa* Schmidt, 1880b: 73, pl. X fig. 3; Topsent, 1920a: 2; *Cinachyra submersa*; Lendenfeld, 1903: 28.

Material examined. Lectotype (here designated) (not seen): ZMUS P0160 – dry, Caribbean. Paralectotypes: ZMUS P.0166 – dry fragments. Fragments of types: ZMB 6650 (6 slides) – *fide* Desqueyroux-Faundez & Stone, 1992.

Description (from Schmidt, 1880b and Topsent, 1920a). The type redescribed by Topsent represents half of the original specimen. It is 3.4 cm high and has a diameter of 3.8 cm. It has no trace left of the spicular root mentioned in Schmidt's description. The surface is hispid and many foreign objects such as foraminifera and sand grains have attached to it. At opposite sides there are two large porocalices, both with palisade of very long spicules protruding up to 1.5 cm above the surrounding sponge surface. The porocalices are 1–1.5 cm deep and 0.8–1 cm in diameter. The left one has a perforated bottomplate, the other shows a few slit-like apertures in the bottom and the sides, but is generally without visible apertures. Schmidt apparently misinterpreted the functions of both types, but this was corrected by Topsent: the one depicted left in Schmidt's drawing (here reproduced as Fig. 7A) is the inhalant porocalyx, the other the exhalant porocalyx. The spicule palisade is made up of oxeas and protriaenes/prodiaenes. In cross section the structure of the sponge – apart from the porocalices – is radiate, with bundles of oxeas originating from a focal point traversing towards the surface. There is no cortical specialization. Megascleres. Protriaenes and prodiaene modifications, length not recorded, thickness of shaft up to 20 μm, cladi up to 400 μm long, cladome 130 μm wide; anatriaenes, length not recorded, thickness up to 8 μm, cladi up to 47 μm, cladome 27 μm; plagio/orthodiaenes and -monaenes, length not recorded, thickness 25 μm, cladi, sometimes flexuous, up to 420 μm; oxeas in two size categories, largest 25000 × 75 μm, smallest 900–1500 × 15–30 μm (the latter are found in the choanosome intercrossing the bundles of oxeas). Microscleres sigmaspires 15–35 μm, larger ones often elongated, wavy, toxiform.

Remarks. Although he did not define it, Schmidt (1880b) apparently considered *Fangophilina* to comprise a wider group of sponges than only *Fangophilina submersa*, since he assigned *Tetilla polyura* Schmidt, 1870, *Tetilla euplocamos* Schmidt, 1868, and *Tetilla radiata* Selenka, 1880 to it in the discussion of the new genus. He apparently forgot that *Tetilla* had been erected earlier by himself with *Tetilla euplocamos* as the type. Thus, we may surmise that *Fangophilina* was intended for at least several tetillids that did not share the peculiar porocalyx-specialization of *F. submersa*. The genus is of rather dubious validity, since several authors (e.g., Rützler, 1987) have expressed doubts about the nature of the exhalant porocalyx. Possibly, true oscules have become obscured through contraction in preserved state. Still, the fact that several species have been described with similar structure is considered sufficient to maintain the genus as valid for the time being (there is also the consideration, that *Fangophilina* is senior to *Cinachyrella*, the genus most similar to it).

Kirkpatrick, 1902, erected *Spongocardium* for type species (by monotypy) *Spongocardium gilchristi* Kirkpatrick, 1902: 224, pl. II fig. 1, pl. III fig. 1. This sponge (Fig. 7B) is very similar to Schmidt's *Fangophilina submersa*, with the poral and oscular porocalyx in a lateral position. There are a few spicular differences

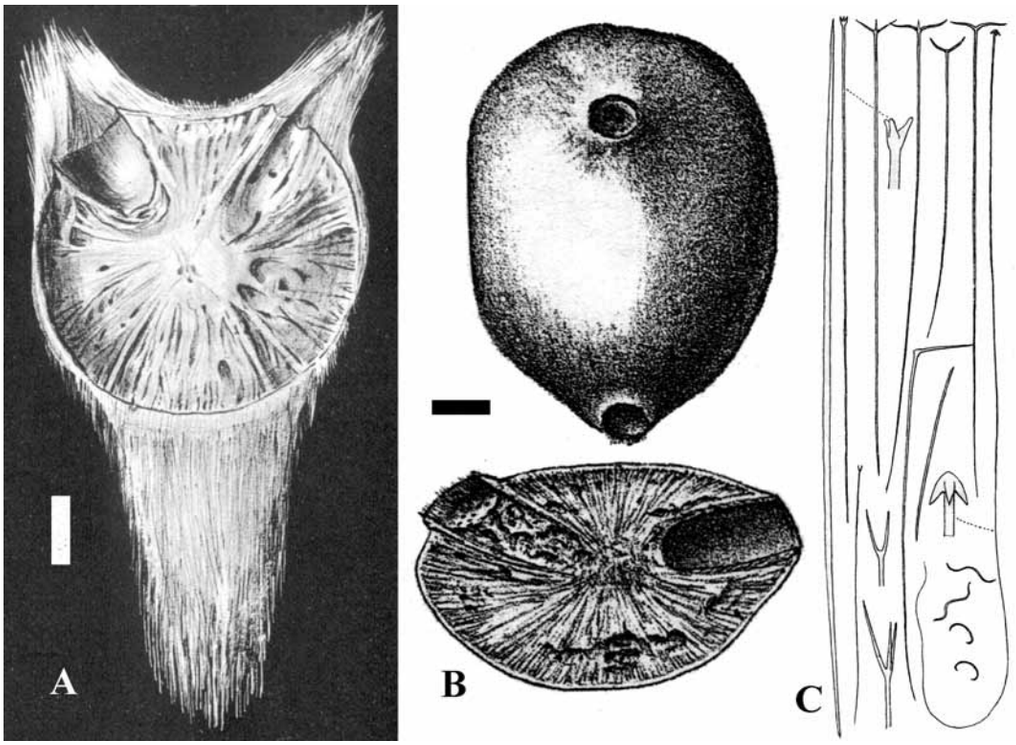

Fig. 7. *Fangophilina* species. A, *Fangophilina submersa* Schmidt, 1880b, drawing of cross section of holotype reproduced from Schmidt's pl. X fig. 3 (scale 1 cm). B–C, *Fangophilina gilchristi* (Kirkpatrick, 1902 as *Spongocardium*). B, lectotype and cross section, reproduced from Kirkpatrick's pl. II fig.1 (scale 1 cm). C, drawing of spicules from Kirkpatrick's pl. III fig. 1 (scale see text).

(Fig. 7C) (e.g., there are orthotriaenes, 4900 × 35 μm and a second smaller category of protriaenes, 5300 × 31 and 690 × 2 μm). Other measurements are similar, oxeas up to 10mm × 80–100 μm, anatriaenes ditto, sigmaspires 35–45 μm. However, Topsent's conclusion that *Spongocardium gilchristi* is a junior synonym of *Fangophilina submersa* appears incorrect in view of the considerable differences. Later, Kirkpatrick (1905) realized that Schmidt's genus was defined on the same characters, and pronounced the two genera synonyms. This was followed by Lendenfeld (1907: 157), who erected a third species of *Fangophilina, F. hirsuta*.

PARATETILLA DENDY, 1905

Synonymy

Paratetilla Dendy, 1905: 97.

Type species

Tethya merguiensis Carter, 1883a: 366 (by subsequent designation; de Laubenfels, 1936a: 175). This is generally considered a junior synonym of *Stelletta bacca* Selenka, 1867.

Definition

Tetillidae with porocalices, with megascleres including calthrops-like short-shafted triaenes.

Diagnosis

Globular sponges with hairy-bristly surface, provided with porocalices. Skeleton radiate, with bundles of oxeas originating from a central focus and running radially to the surface. Spicules protriaenes, anatriaenes, calthrops-like triaenes, oxeas, sigmaspires. So far only a single wide-spread Indo-West Pacific species is reliably recorded.

Previous reviews

Rützler (1987).

Description of type species

Paratetilla bacca (Selenka, 1867) (Fig. 8A–C).

Synonymy. *Stelletta bacca* Selenka, 1867: 569, figs 14–15; *Paratetilla bacca*; Hooper & Wiedenmayer, 1994: 433, with additional synonyms. *Tethya merguiensis* Carter, 1883a: 366, pl. XV figs 6–8; *Tetilla merguiensis*; Sollas, 1888: 14. *Tetilla ternatensis* Kieschnick, 1896: 527. *Paratetilla cineriformis* Dendy, 1905: 97, pl. III fig. 7.

Material examined. Type material: not located – Samoa. Type material of *T. merguiensis*. IM (presumed) – Burma (=Myanmar). Other material. ZMA specimens – Indonesia, 'Siboga' and 'Snellius II' collections (subjectively assigned to this species).

Description (based on Carter, 1883a and Selenka, 1867). Globular (Fig. 8B), size 2–3 cm diameter (larger in subsequently recorded specimens), surface uniformly hispid due to projecting

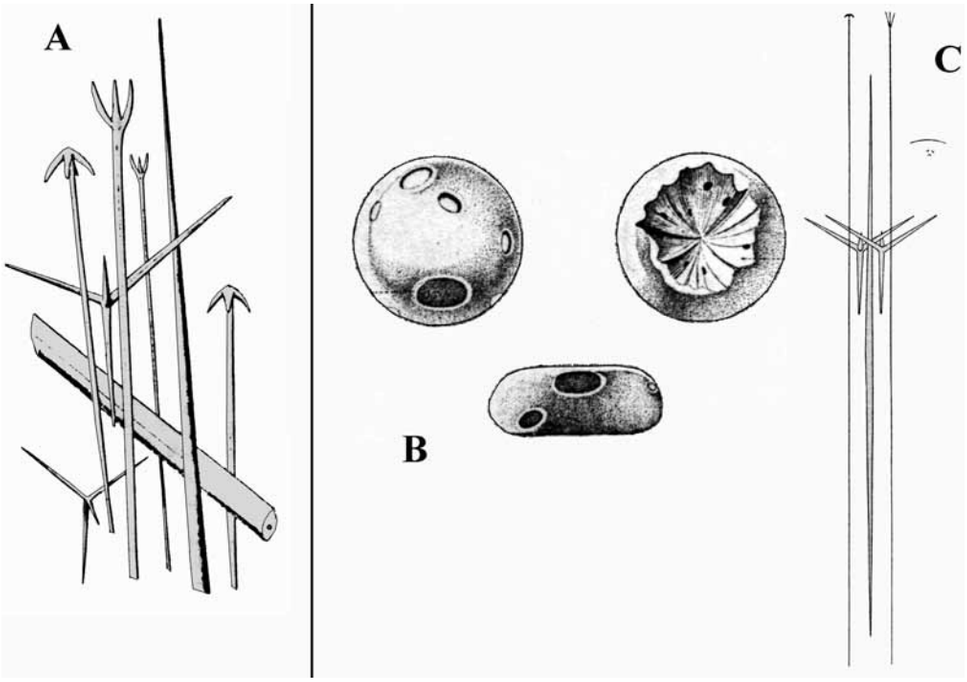

Fig. 8. *Paratetilla bacca* (Selenka, 1880) (scales see text). A, drawing of spicules reproduced from Selenka, 1867: fig. 15, as *Stelletta*). B–C, drawing of habit (B) and spicules (C) of *Tetilla merguiensis* Carter, 1883a: pl. XV figs 6–8, considered a junior synonym.

megascleres, with numerous larger apertures, 0.5–1 cm diameter, scattered evenly over the surface in Selenka's specimen, concentrated in the median region in Carter's specimen. Both authors interpret these as exhalant, but it is obvious they are porocalices. Colour: black-brown (according to Carter). In cross section there is no cortex (Selenka mentions a thin cortical layer containing a layer of calthrops, but this is simply the peripheral region), and the skeleton is radiate, with bundles of oxeas issuing from a central focus. Megascleres (Fig. 8A, C; sizes combined from data and drawings of Selenka, Carter, Sollas and Dendy). Protriaenes, up to 3500 × 15 μm, cladi up to 90 μm; anatriaenes 3500 × 15 μm, cladi 60 μm; calthrop-like short-shafted triaenes (Selenka: 'vierzackige Sterne'; Carter: 'zone-spicule', Sollas: 'orthotriaenes'), cladi 100–200 μm (Carter gives 1/56th of an inch, which would be 450 μm, clearly in excess of the sizes found in other recorded specimens); oxeas, up to 7000 × 42 μm. A smaller category of oxeas is mentioned by Carter (1883a) and Dendy (1905 as *Paratetilla cineriformis*). Microscleres sigmaspires (not recorded by Selenka), 11–17 μm. Distribution and ecology. Widespread Indo-West Pacific (Samoa, Myanmar, Indonesia, NE Australia, Sri Lanka), reefs, and deeper water, down to +200 m.

Remarks. Rützler (1987) nominated *Paratetilla cineriformis* Dendy, 1905 as the type species, but this was superseded by de Laubenfels' (1936a) previous nomination of *Tethya merguiensis* as the type. Since this species was mentioned by Dendy as a species of *Paratetilla*, de Laubenfels' designation is valid. All described tetillid species with calthrop-like short-shafted triaenes appear to be referable to a single widespread species, *Paratetilla bacca* (cf. synonymy in Hooper & Wiedenmayer, 1994). If this is confirmed in comparative studies, the validity of this genus is dubious, because the possession of the genus character is then limited to a single species, which in all other aspects conforms to *Cinachyrella*. The calthrop-like short-shafted triaenes are probably derived from plagiotriaenes, which are occasionally recorded in *Cinachyrella* (cf. Rützler, 1987; Rützler & Smith, 1993), and thus could be interpreted as a species rather than a genus character.

TETILLA SCHMIDT, 1868

Synonymy

[*Dactylella*] Gray, 1872a: 461 (*nomen oblitum*). [*Casula*] Gray, 1872a: 461 (*nomen oblitum*). *Tetilla* Schmidt, 1868: 40. *Chrotella* Sollas, 1886a: 181. *Spiretta* Lendenfeld, 1888: 42. *Trachygellius* Topsent, 1894c: 8. *Ectyonilla* Ferrer-Hernandez, 1914a: 452. *Kaira* de Laubenfels, 1936a: 175.

Type species

Tetilla euplocamos Schmidt, 1868: 40 (by monotypy).

Definition

Tetillidae without porocalices, without cortical specialization, without auxiliary megascleres.

Diagnosis

Globular sponges with conulose or uniformly hispid surface, with few oscules, usually situated at the top. Usually with spicule strands at the base, acting as root system. Surface without porocalices. In cross section, there is no visible cortex. The skeleton is spirally radiate, with bundles of oxeas originating from a central focus

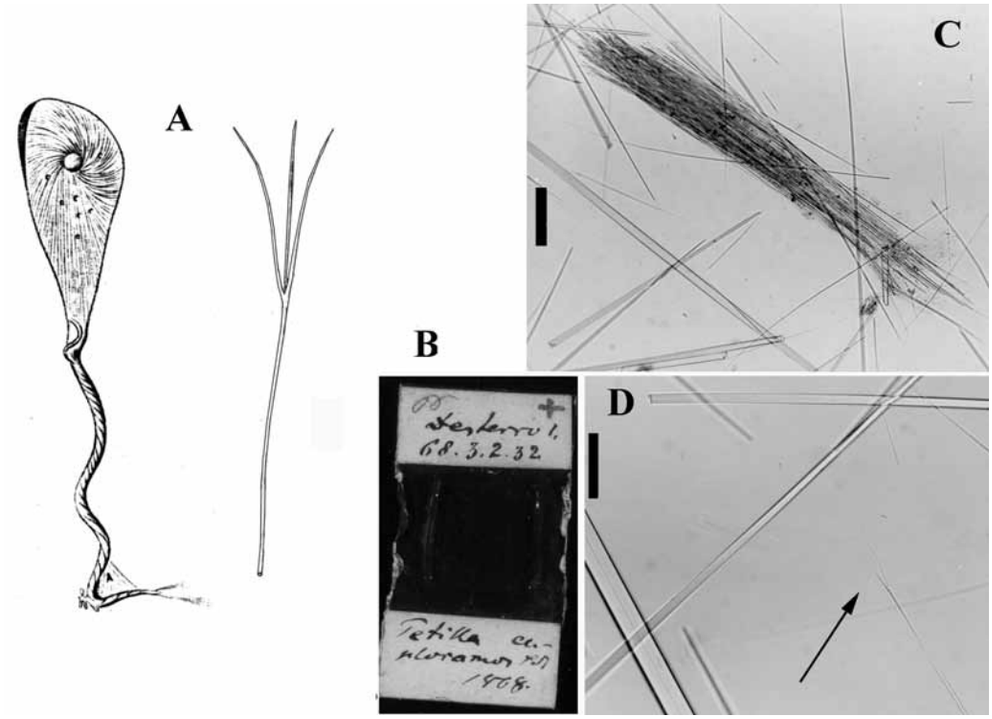

Fig. 9. *Tetilla euplocamos* Schmidt, 1868. A, drawing of type and protriaene reproduced from Schmidt, 1868: pl. V fig. 10 (sizes see text). B, BMNH slide of type. C–D, photos of spicules from BMNH slide. C, oxeas and bundle of small? protriaenes (scale 100 μm). D, protriaene (arrow) (scale 100 μm).

and radiating in a spiral manner to the surface. At the periphery, these bundles of oxeas become mixed with triaenes, predominantly protriaenes. Microscleres sigmaspires (absent in the type species). About 50 species have been described from all parts of the world oceans, mostly from deeper localities. Since many authors did not distinguish between *Tetilla* and *Craniella*, the actual number of species may be less.

Previous reviews

Sollas (1888); Rützler (1987).

Description of type species

Tetilla euplocamos Schmidt, 1868 (Fig. 9A–D)

Synonymy. *Tetilla euplocamos* Schmidt, 1868: 40, pl. V fig. 10; Selenka, 1880: 469, pl. 27 fig. 5.

Material examined. Holotype (not seen): MZUS P0206 – Desterro, Bay of Rio de Janeiro, intertidal, coll. F. Müller. Slide of the holotype (examined; Fig. 9B): BMNH 1868.3.2.32 – bearing Schmidt's handwriting, labeled "Desterro/Tetilla euplocamos Sch 1868". Fragment ZMB 7165 – (see Desqueyroux-Faúndez & Stone, 1992).

Description (from Schmidt, 1868). Pear-shaped (Fig. 9A), with long root ('Nadelschopf'). No cortex. Surface finely hispid. In cross section the choanosomal skeleton consists of bundles of oxeas originating from a core spiralling outwards toward the surface, where they mix with triaenes. The latter protrude beyond the surface and cause a fine downy pelt of spicules. Megascleres. Protriaenes (Fig. 9A, no size recorded), apparently no anatriaenes; oxeas 2300 × 22 μm. No sigmaspires were detected in the slide, nor recorded by Schmidt or others. Some spicules are here illustrated (Fig. 9C, D) in photos made from the BMNH slide. Distribution and ecology. Known only from type locality.

Remarks. For no apparent reason, Sollas (1888) changed *euplocamos* into *euplocamus*. The species remains ill-known. Schmidt's description is casual and short and subsequent specimens from the same area identified under this name (Selenka, 1880) are only presumably conspecific. Nevertheless, there are many species of tetillids sharing the characters described by Schmidt, and the genus is considered clear and unequivocal.

The genus *Dactylella* Gray, 1872a: 461 was erected for type species *Tethya dactyloidea* Carter, 1869a: 15, figs 1–4 from the SE coast of Arabia (by original designation). This is undoubtedly a member of Tetillidae, because Carter described a radiate structure and oxeas and protriaenes as megascleres. No certainty exists about the presence of sigmaspires, because Carter had "given away the specimen" (to Dr Bowerbank, cf. Carter, 1871e: 103). In view of the absence of clear porocalyces and apparent lack of a cortical skeleton, this is likely to be a *Tetilla*. Since the name *Dactylella* predates *Tetilla* it needs to be suppressed as an unused name in the sense of ICZN Article 23.9. The name *Tetilla* has been frequently used in the past 50 years by many authors, and thus fulfils the demands for continued usage under Article 23.9. The name *Dactylella* has not been used for a tetillid sponge after its original proposal, although subsequently, [*Dactylella*] was also used by Thiele, 1898 for type species *Dactylella hilgendorfi* Thiele, 1898: 56, pl. 4 fig. 8, pl. 5 fig. 25, pl. 8 fig. 41a–b. This is a sponge of the family Dictyonellidae, and the name is now considered preoccupied, and replaced by *Lipastrotethya* de Laubenfels, 1954.

The genus *Casula* Gray, 1872a: 461 was erected, in Casuladae Gray, 1872a: 461, for *Tethya casula* Carter, 1871e: 99, pl. IV from South Africa (by monotypy). The description of Carter leaves no doubt that this is a *Tetilla*, probably considerably damaged during

collection giving rise to the rather strange schematic drawing of the habit in his fig. 1. In its turn this induced Gray (1872a) to emphasize in his definition of the family Casuladae, that the sponge is free-living and has a "funnel-shaped expansion or disc formed of elongated spicules united together". Spiculation include protriaenes up to 10 mm, oxeas up to 5 mm, and sigmaspires of 14 μm. Since the family group name Casuladae Gray, 1872a is an unused name in the sense of ICZN Article 23.9 (not used after 1899), it is here suppressed in favour of Tetillidae (used many times by many authors in the past 50 years).

The genus *Chrotella* Sollas, 1886a was erected for type species *Chrotella simplex* Sollas, 1886a: 181; Sollas, 1888: 17, pl. II figs. 1–4 (by subsequent designation by Sollas, 1888: cxxv), South Australia, 274 m. The type series (BMNH 1889.1.1.12, with slides BMNH 1894.11.16.27–32, not examined) consists of four cream-coloured subspherical specimens of up to 2 cm in diameter. Oscules small, pores in sieve-like areas overlying subdermal spaces, surface uniformly pilose. Sollas records a cortex but neither his detailed description nor his drawings show a clear cortical specialization. There are many subdermal cavities but no peripheral collagenous region, nor cortical spicules. Megascleres are protriaenes, with rhabds of up to 3400 × 20 μm, cladi up to 158 × 16 μm; anatriaenes up to 5300 × 16 μm, cladi up to 47 × 12 μm; oxeas up to 3000 × 24 μm. Microscleres sigmaspires 12 μm. The characters of *C. simplex* appear to overlap with those of *Tetilla* and accordingly it is considered a junior synonym.

The genus *Spiretta* Lendenfeld, 1888: 42 was erected for type species *Spiretta raphidiophora* Lendenfeld, 1888: 43 (subsequent designation herein, lectotype in AM G9076, designation herein, with a small fragment in BMNH 1886.8.27.634, here designated paralectotype). The description of Lendenfeld makes it likely that this is a species of *Tetilla*, and Lendenfeld admitted as much himself at a later date (Lendenfeld, 1903). Although he mentions a 'cortex' this was apparently used to indicate the peripheral skeleton, rather than a real cortex. The species has an unusual spiculation by its complement of styles of 600 × 70 μm, small choanosomal oxeas of 240 × 20 μm, and ectosomal strongyles of 400 × 3 μm. Furthermore there are radiating oxeas 3000–4000 × 50 μm, anatriaenes 1000 × 10 μm, sigmaspires 14 μm; apparently no protriaenes. *Spiretta* was relegated into synonymy with *Cinachyra* by Burton (1934a: 524), as he assumed that the apertures of the type specimen represented 'collapsed porocalices'. This synonymy assignment was followed by Hooper & Wiedenmayer (1994: 430). Conversely, we prefer here to consider *Spiretta raphidiophora* a member of the genus *Tetilla* on account of the absence of clear porocalices and lack of cortex.

The genus *Trachygellius* Topsent, 1894c: 8 was erected for type species *Trachya globosa* Carter, 1886a: 121 from shallow water off Port Phillip Head, Victoria (by original designation). This is a yellow globular sponge with a short stalk and uneven surface. Oscules in a group around the top. The species is described by Carter (1886a) as having a skeleton that is radiate with a "thick dermis". Spicules are reported to be oxeas of 4250 × 36 μm, and sigmaspires of 8 μm. Topsent (1894c) erected this genus in a footnote discussing the genus *Gellius* (Haplosclerida), assuming apparently that the microscleres of *T. globosa* were true sigmas. However, it is clear from Carter's description that they are sigmaspires and that *T. globosa* belongs to *Tetilla* or possibly *Craniella*, and in view of the fact that special cortical oxeas were not reported, it is here considered a junior synonym of *Tetilla*. This assumption has been recently verified by re-examination of the type material (slides AM G2751–2) by J.N.A. Hooper (courtesy of Dr Penny Berents, AMS), confirming its allocation to *Tetilla* and not to *Craniella*.

The genus *Ectyonilla* Ferrer-Hernandez, 1914a: 452 was erected for type species *Tetilla truncata* Topsent, 1892a: 36, pl. VIII fig. 7 from the NW coast of Spain (by original designation). The genus was assigned to a new family Ectyonillidae defined as "Sigmatophora with a skeleton of Axinellidae". The holotype is housed in MOM (not examined). According to Topsent's description, this is a fragment of a definite *Tetilla*, with a radiate skeleton of styles of 1200 μm instead of oxeas (probably oxea-derived), and anatriaenes and protriaenes. No microscleres. The styles are unusual, but have nothing in common with those of Axinellidae. It is clear that it is a commonplace tetillid, and we assign it to the synonymy of *Tetilla* on account of the absence of special cortical megascleres.

The genus *Kaira* de Laubenfels, 1936a: 175 was erected for type species (by original designation) *Tethya hebes* Lendenfeld, 1907: 98, pl. XVI figs 19–38 from NW Australia (type ZMB 768 (not examined), with fragment BMNH 1908.9.24.66). This species was assigned into synonymy with *Cinachyra australiensis* (Carter, 1886b: 127 as *Tethya cranium* var. *australiensis*) by Burton (1934a: 524), followed by Hooper & Wiedenmayer (1994: 430), because both possessed rugose small oxeas. However, several discrepancies between the descriptions of *australiensis* and *hebes* are apparent (presence of plagiotriaenes and anatriaenes in the latter). Moreover, Lendenfeld's specimen possessed only a single lateral oscule and no other apertures, whereas *C. australiensis*, which is an obvious representative of *Cinachyrella*, has abundant porocalices. Until fresh material has been found, we prefer to consider *Tethya hebes* a member of *Tetilla*.