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Order Agelasida Hartman, 1980

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Agelasida Hartman (Demospongiae) is a small order characterized by the possession of verticillately spined styles (occasionally with oxeote derivatives). Sponges of the two families belonging to this order are otherwise quite different in their structure. Agelasidae have elaborate habits, are compressible, and possess a reticulate skeleton of spongin fibres, whereas Astroscleridae are coralline sponges having an inorganic limestone basal skeleton upon which is draped a thin organic veneer as the only living tissue. Agelasidae comprise a single species-rich circumtropical genus. Astroscleridae were formerly joined with other such 'sclerosponges' in a separate class Sclerospongiae Hartman & Goreau, but subsequent studies (e.g., Vacelet, 1985), on living and fossil coralline sponges clearly demonstrate them to be polyphyletic, and assignable to various orders of the Demospongiae. Astroscleridae have low species and ecological diversity, confined to cryptic reef habitats, but are circumtropical in distribution.
Keyword: Porifera; Demospongiae; Agelasida; Agelasidae; Astroscleridae.

DEFINITION, DIAGNOSIS, SCOPE

Synonymy

Agelasida Hartman, 1980a: 29. Sclerospongiae Hartman & Goreau, 1970: 228 (in part). Ceratoporellida Hartman & Goreau, 1972: 145.

Definition

Demospongiae with verticillately spined monactine megascleres.

Diagnosis

Encrusting, semiglobular, lobate, repent-ramose, branching-erect, tubular, globular, of flabellate sponges. Surface optically smooth. Hypercalcified (basal limestone) skeleton present in one of the two families. Skeleton of siliceous spicules with binding spongin or a system of anastomosing spongin fibres, cored and echinated by spicules. In hypercalcified sponges the spicules may echinate the limestone chamber walls, blunt ends embedded in it and progressively becoming entrapped in the limestone walls. In sponges with spongin fibre system, the fibres are echinated by spicules, blunt ends embedded in the fibre, with main fibres also having a core of spicules. Megascleres verticillately spined styles, occasionally oxeas, no microscleres. Representatives of both families of the order produce similar pyrrole-2-carboxylic compounds, characteristically with a bromine addition.

Scope

Two families are recognized, Agelasidae with a single genus and several dozen species, and Astroscleridae with five, mostly monotypical, genera. The order is predominantly circumtropical, with a few species occurring in the Mediterranean and in subtropical waters of the NW Pacific.

History and biology

The two families of this order have had a chequered history. Until quite recently Agelasidae (partly as Ectyonidae) was considered a member of Poecilosclerida (or equivalent earlier higher taxon) by most authors, and in the older literature it was simply defined to contain Poecilosclerida with echinating spicules. Topsent (1928c) subdivided the former widely defined Ectyoninae into a number of families including Microcionidae (as Clathriinae), Myxillinae, Hymedesmiinae, etc., and was the first to restrict Ectyonidae to *Ectyon* (at the same time casting doubt over the synonymy with *Agelas*) and *Ectyonopsis* Carter (1883b: 315). The latter genus is not a member of Agelasidae as the spines of its spicules are not arranged in verticils, it is here considered a member of Poecilosclerida: Myxillidae. Up to and including Lévi (1973) all major authors assigned Agelasidae to Poecilosclerida. However, Bergquist (1978) was the first to realize that this was not consistent with life history and biochemical data.

Bergquist (1978: 168) assigned Agelasidae to the order Axinellida on the basis of free amino acid patterns, sterol composition and on the apparent oviparity. Although this was not formally followed by many authors, possibly because Axinellida *sensu* Lévi (1973) and Bergquist (1978) was obviously polyphyletic, close relationship of *Agelas* and *Axinella* was nevertheless generally accepted. Later, additional evidence for this close relationship was obtained by Chombard *et al*. (1997) using 28S rRNA sequence data. In the same study they also found a sister group relationship for Agelasidae and Astroscleridae. Hartman (1980a: 29) tentatively erected the order Agelasida, admitting that there were biochemical affinities with Axinellida, but arguing that in other features '… these groups do not seem especially close.'

The family Astroscleridae was first discovered by Lister (1900), but its sponge nature was contested due to the similarity of the basal skeleton to that of cnidarians. Likewise, the next discovered representative of the family, *Ceratoporella nicholsoni* (Hickson, 1911) was ignored by spongologists because it was wrongly classified in Cnidaria until its rediscovery (Hartman & Goreau, 1966). Astroscleridae are the main representatives of the calcified demosponges that were classified in a special class of sponges, Sclerospongiae (Hartman & Goreau, 1970), which have subsequently

been shown to be polyphyletic (e.g., Vacelet, 1985; Van Soest, 1984a; Reitner, 1992), and now with corroboratory molecular data (Chombard *et al*., 1997). The family has affinities with extinct reef builders such as chaetetids and stromatoporoids (Hartman & Goreau, 1972). The monophyly of the family, however, is not well established. The five genera included in Astroscleridae share the basal calcareous skeleton made of aragonitic sclerodermites. However, the basal skeleton of *Astrosclera* is spherulitic, the spherules being of intracellular origin, whereas the other genera have a clinogonal structure, with extracellularly secreted sclerodermites.

The synapomorphy for the order, viz., the verticillately spined styles, is lacking in one genus of Astroscleridae, *Hispidopetra*. For this reason, Reitner (1992: 195) assigned *Hispidopetra* to the halichondrid family Hymeniacidonidae (now included in Halichondriidae). The similarity with non-coralline style-bearing halichondrids is not great, and it is here preferred to retain *Hispidopetra* in Agelasida, family Astroscleridae because of overall similarity with genera of that family (see Vacelet's chapter on Astroscleridae, this volume). We assume here, that the spines of *Hispidopetra* have become lost.

Agelas species are usually large, bright-coloured, conspicuous inhabitants of shallow-water reefs and other clear-water environments. Greatest recorded depth is 150 m. Where known, sexual reproduction is oviparous. *Astrosclera willeyana* incubates embryos of the parenchymella type and is thus viviparous. Astroscleridae occur predominantly in submarine caves and are only found in the open at greater depths.

Recent reviews

Reitner (1992), Hooper & Wiedenmayer (1994), Chombard *et al*. (1997).

KEY TO FAMILIES

(1) Calcareous basal skeleton with soft parts only a thin veneer ..... **Astroscleridae**
Compressible sponge without calcareous skeleton ..... **Agelasidae**