

Family Monorhaphididae Ijima, 1927

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Monorhaphididae Ijima (Hexactinellida: Amphidiscophora) is revised to contain only a single genus and single authentic species, *Monorhaphis chuni*. This family is well differentiated from other Amphidiscophora by the predominance of triactines (tauactines) amongst choanosomal megascleres.

Keywords: Porifera; Hexactinellida; Amphidiscophora; *Monorhaphis*.

DEFINITION, DIAGNOSIS, SCOPE

Synonymy

Monorhaphididae Ijima, 1927: 36. Hyalonematidae, in part, Gray, 1857: 279. Semperellidae, in part, Schulze, 1904 (only *Monorhaphis* Schulze, 1904: 112).

Definition

Amphidiscophora with most choanosomal megascleres in the form of tauactines (triactines) and single giant anchoring spicule.

Diagnosis

Body is cylindrical round or oval in section, lophophytose, with atrial surfaces situated along one side as a linear series of rounded separate spots. Basalia consist only of a single spicule. Choanosomal skeleton consists predominantly of tauactines (triactines), elongate in the complete axis, sometimes paratractines and diactines (the latter are usually longer and thicker than other choanosomal spicules). Dermalia and atrialia are pinular pentactines, rarely hexactines. Hypodermal skeleton consists of pentactines, sometimes of hexactines and stauractines. Microhexactines are accompanied by rare pentactines and stauractines. Amphidiscs of three types (each with many forms), macramphidiscs and mesamphidiscs may be absent.

Scope

One genus with a single valid species.

History and biology

Monorhaphididae was erected for *Monorhaphis*, which was initially associated with *Semperella* in Semperellidae (Schulze, 1904). Ijima (1927) emphasized the significance of the choanosomal spicules in the families of Amphidiscophora and proposed the taxon Monorhaphididae which have most choanosomal megascleres in the form of triactines. Until recently the family contained 3–4 species whereas the recent revision of Tabachnick & Lévi (2000) concludes that there is only one authentic species.

Except for the single basal spicule, prosthelia of *Monorhaphis* are unknown. The anchor of the basal spicule is probably absent and this spicule is considered to be a monaxone (monactine or

diactine). Uncinates occur in moderate abundance. Hexadiscs corresponding to mesamphidiscs and micramphidiscs are found in some specimens. *Monorhaphis* inhabits muddy substrata, fixed to the bottom by the single basal spicule.

Distribution

The family is widely distributed in the Indo-West Pacific (Fig. 1), depth 516–1920 m.

MONORHAPHIS SCHULZE, 1904

Synonymy

Monorhaphis Schulze, 1904: 112.

Type species

M. chuni (by subsequent designation; de Laubenfels, 1936a).

Definition

Same as family.

Diagnosis

Same as family.

Description of type species

Monorhaphis chuni Schulze, 1904 (Fig. 1).

Synonymy. *Monorhaphis chuni* Schulze, 1904: 112. *Hyalonema* sp. Schulze, 1887a: 233. *Hyalonema fruticosum* Schulze, 1893: 555; Schulze, 1904: 154. *Monorhaphis fruticosa* Ijima, 1927: 37. *Monorhaphis dives* Schulze, 1904: 121; Burton, 1959a: 176. *Monorhaphis intermedia* Li Jinhe, 1987: 130.

Material examined. Holotype: not seen, 'Valdivia'. Other material. 'Valdivia', 3°38.8'S, 40°16.0'E, depth 863 m; 3°07.0'S, 40°45.8'E, depth 748 m; 6°18.8'N, 49°32.5'E, depth 1079 m. Holotype of *Monorhaphis dives*: BMNH 1908.09.24.065 (fragment) – 'Valdivia', 1°48.2'N, 45°42.5'E, depth 1644 m. Paratype of *Monorhaphis chuni*: BMNH 1908.09.24.064 (fragment) – 'Valdivia', 6°18.8'N, 49°32.5'E, depth 1079 m. QM (fr867.1) – 'Franklin', Cidaris I, NE. shelf of Australia, 18°07.82'S, 148°15.39'E, depth

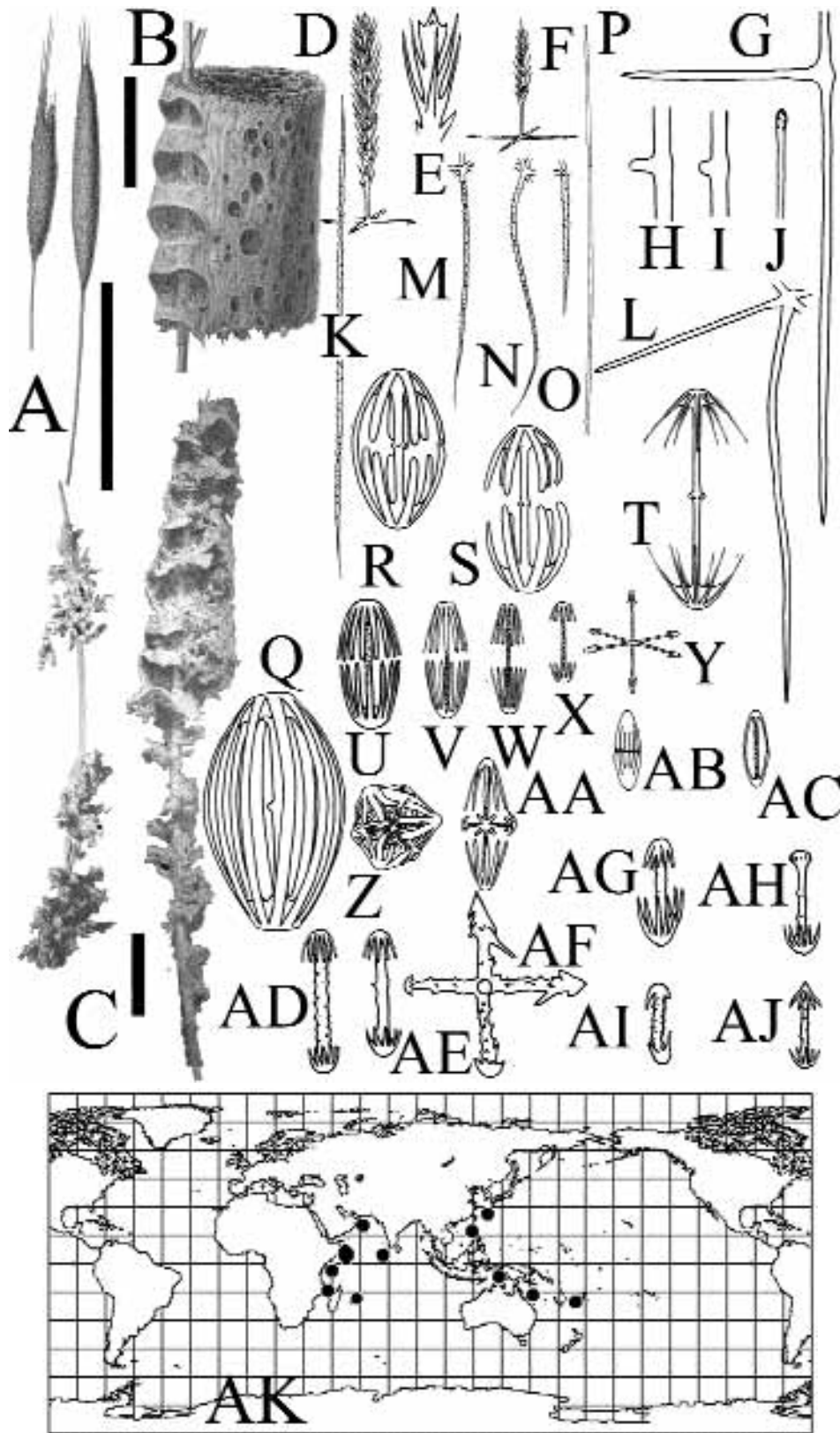


Fig. 1. *Monorhaphis chuni*. A, young specimens (scale 50mm). B, fragment of the body (50mm). C, large specimens (100mm). D, dermal pinular pentactine (150×). E, termination of dermal pinule (500×). F, canalular pinular pentactine (150×). G, choanosomal tauactine (150×). H–J, choanosomal tauactines and termination (50×). K, uncinates (250×). L, hypodermal pentactine (130×). M–O, microhexactines (250×). P, choanosomal diactine (0.5×). Q–T, macramphidiscs (160×), U–AA, mesamphidisc and hexadisc (160×). AB–AC, mesamphidisc with fused teeth and its optical section (160×). AD–AI, micramphidiscs and their derivatives (530×). AJ, microparadisc (1000×). A–J, P–T, U–AA, after Schulze (1904). K–O, AB–AJ, from Tabachnick & Lévi (2000). AK, distribution of *Monorhaphis*.

1115–1119 m. QM (p540) – 18°08.69'S, 147°33.79'E, depth 962–966 m. QM (fr767) – 18°11.52'S, 147°52.12'E, depth 1012–1998 m. MNHN HCL 405, HCL 406, HCL 407 – 'Jean Charcot', Biocal, Norfolk Rise, 22°18.65'–20.42'S, 167°23.30'–23.41'E, depth 825–860 m. MNHN HCL 445 – 24°11.67'–10.67'S, 167°31.37'–33.65'E, depth 1070 m. MNHN HCL 408, HCL 409 – 'Coriolis', Musorstom 5, 21°15.01'S, 157°51.33'E, depth 970 m. MNHN HCL 410 – CALSUB 'Cyana', 21°26.0'S, 166°22.70'E, depth 1807–1567 m. MNHN HCL 411 – 20°48.0'S, 167°05.0'E, depth 970–489 m. MNHN HCL 412 – 20°48.0'S, 167°05.0'E, depth 880–516 m. IORAS 5/2/1351, 5/2/1422, 5/2/1352 – 'Vitjaz II', 12°31.50'–25.04'S, 48°05.50'–08.00'E, depth 700 m. IORAS 5/2/1408 – 12°27.40'–26.70'S, 48°06.80'–06.40'E, depth 700–720 m. USNM (kt476) – 'Anton Bruun', 28°N, 35°36.00'E, depth 880 m (the Red Sea location for this specimen (Tabachnick & Lévi, 2000) is erroneous).

Description. External shape as described for family. The basal spicule may grow up to 3 m long and about 10 mm diameter (Schulze, 1904), whereas the most complete from material examined (5/2/1351) was more than 1 m long, 35 × 25 mm in horizontal section. Other specimens are broken fragments. The small specimens described by Schulze (1904) are about 50 mm in length, 6 mm in diameter with basal spicule at least 50 mm in length, the atrial surface in small specimens seems to be absent. Spicules. The choanosomal spicules are typically smooth triactines (tauactines) with lateral ray shorter than two opposite ones, rare diactines widened at the middle, paratetractines and uncinates. The lateral ray of tauactines is 0.053–0.517 mm long, the long rays longitudinally directed are 0.243–1.140 long, these rays are 0.006–0.023 mm in diameter. The uncinates are 0.481–0.962/0.002–0.004 mm. Dermal and atrial pinular pentactines are nearly identical. Pinular hexactines are rarely found among pentactines. The pinular ray of most dermal and atrial spicules has an apical cone, while in the rare ones and in that of canalaria it is finely pointed with rhachis thickest at base. Pinular ray of dermal pentactine is 0.091–0.441/0.006–0.015 mm, tangential one is 0.015–0.106/0.018–0.027 mm. Pinular ray of atrial pentactine is 0.076–0.281/0.006–0.011 mm, tangential one is 0.018–0.053/0.018–0.027 mm. Pinular ray of canal pentactine is 0.040–0.122 mm, tangential one is 0.022–0.053 mm. Hexactines, pentactines and stauractines are present in hypodermalia. The tangential rays of hypodermal pentactines are 0.213–0.532 mm long, the proximal ray is 0.213–0.669 mm, with diameter of 0.006–0.023 mm. Microscleres. Amphidiscs are of three kinds. The macramphidiscs are usually notably larger (about 0.3 mm in length) than mesamphidiscs, and have less teeth (about 8) in each umbel, they often have shafts smooth or with sparse short spines. Among macramphidiscs there are forms with all or some of the opposite teeth fused at equator (barrel-shaped) (Schulze, 1904). Total length of macramphidiscs is 0.061–0.334 mm, umbel length 0.038–0.185 mm, umbel diameter 0.016–0.242 mm. Mesamphidiscs are differentiated by their length, shafts densely covered with spines and often more elongate umbels than in micramphidiscs. Sometimes they can be found in the form of hexadiscs. Rarely mesamphidiscs are found with fused opposite teeth as

macramphidiscs (specimens HCL 405, 406, 409). In one (HCL 409) all teeth of some mesamphidiscs are fused into a continuous silica layer. All the exceptional forms of mesamphidisc are very similar to macramphidiscs. Total length of mesamphidiscs 0.038–0.151 mm, umbel length 0.014–0.059 mm, umbel diameter 0.014–0.077 mm. Some forms of amphidiscs are transitional between macramphidiscs and mesamphidiscs are common in specimens HCL 406, 407, 409. Forms of amphidiscs transitional between micramphidiscs and mesamphidiscs were observed in BMNH1908.09.24.065, HCL 406, 408, 410. Micramphidiscs are very similar in all material examined. They are chiefly similar in shape and size and only in some specimens they may have more-or-less spinose shafts. As curious micramphidiscs rarely found among the normal ones it is possible to mention the row of abnormal forms. Micramphidiscs in the form of a paradisc were seen in specimen kt417 – with the ratio of umbel diameter 0.7. Micramphidiscs with one tooth at each umbel (sigmoidal in shape) were found in specimen 5/2/1408; in specimen HCL 411 only two teeth were found at one side while the other side has deprived umbel and a small spherical termination. Micramphidiscs in the form of tylodiscs, with one umbel reduced to a spherical end when the other is 'normal', were found in specimen 1908.09.24.065. Micramphidiscs with one umbel hemispherical and the other conically pointed were found in HCL 410. And finally, hexadiscs corresponding to micramphidiscs in shape and size were found in specimen fr767. Total length of micramphidiscs 0.018–0.056 mm, umbel length 0.005–0.013 mm, umbel diameter 0.006–0.018 mm. Some specimens of the type species, *M. chuni*, previously referred to another species, were differentiated by presence or absence of macramphidiscs and mesamphidiscs whereas re-examination of material showed that this character is only of significance at the intra-specific level. Microhexactines (rarely micropentactines and microstauractines) are usually numerous in all material examined. Microhexactines have rays 0.020–0.213/0.011–0.018 mm covered with more-or-less dense short spines.

Remarks. *Hyalonema fruticosum* described off the Philippines may also be a junior synonym of *M. chuni*, but since the holotype is so poorly described and the location of type material is presently unknown this question remains open. This species was referred to *Monorhaphis* by Ijima (1927) following the description of *Hyalonema sp.* (Schulze, 1887a, p233) further named *H. fruticosum* (Schulze, 1893).

Distribution

As for family.

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